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Certified documentation according to DIN EN ISO 9001:2008

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1 Introduction

1.1 Overview

This manual describes the LPe16000 and the LPe16002 fibre channel card, 16 gigabit per second (Gb/s) Fibre Channel (FC) to Peripheral Component Interconnect Express (PCIe) host bus adapters (HBAs).

The core technology of these HBAs is Emulex's 10th generation FC controller. The controller is a multi-function PCIe Gen3 interface controller that is compliant to the PCI Express Base Specification Rev 3.0 and PCI Express CEM Specification Rev 3.0. This product is targeted at FC storage networking environments that require the highest degrees of robustness, performance and ease of management. The LPe16000 fibre channel card is a single-channel adapter. The LPe16002 fibre channel card is a dual-channel adapter.

The HBAs support packet transfers at 2.5, 5.0, and 8 gigatransfers per second (2.5, 5.0, and 8 GT/s) on the PCIe link (auto-negotiated with the system). The supported physical PCIe connector is x8. The fully featured FC port is compliant to various American National Standards Institute (ANSI) FC standards. The product is targeted at FC storage networking environments that require the highest degrees of robustness, performance and ease of management.
Introduction

1.2 Major Features

- Multi-function PCIe 3.0 device with one (LPe16000) or two (LPe16002) independent FC port(s).
- Auto-negotiation between 4-Gb/s, 8-Gb/s or 16-Gb/s FC link speeds.
- Complies with the PCIe base and CEM 3.0 specifications.
- CEM 3.0 compliant systems and backwards compatible to 1.0a, 1.1 and 2.0 compliant systems
- PCI Express 3.0 compliant systems: x8 lane transfer link interface at up to 8 Gb/s per lane.
- x8-lane standard Generation 3, PCIe interface at 2.5GT/s, 5GT/s or 8GT/s (auto-negotiated with the system).
- ECC protection of high density RAM (single-bit correction, double-bit detection).
- SFP+ interface supporting optics with LC connections and digital diagnostics capability.
- Host interface support provided through standard drivers for Windows, Linux, VMware, Solaris and other major operating system environments.
- Parts and construction are compliant to the European Union Directive of Restriction of Hazardous Substances (RoHS).

Table 1: Overview of product names and order numbers

<table>
<thead>
<tr>
<th>Product Name</th>
<th># Port</th>
<th>PCI Bracket</th>
<th>Order Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFC EP LPe16000</td>
<td>single</td>
<td>FH*</td>
<td>S26361-F4994-E1</td>
</tr>
<tr>
<td>PFC EP LPe16000 LP</td>
<td>single</td>
<td>LP*</td>
<td>S26361-F4994-E201</td>
</tr>
<tr>
<td>PFC EP LPe16002</td>
<td>dual</td>
<td>FH*</td>
<td>S26361-F4994-E2</td>
</tr>
<tr>
<td>PFC EP LPe16002 LP</td>
<td>dual</td>
<td>LP*</td>
<td>S26361-F4994-E202</td>
</tr>
<tr>
<td>PFC EP LPe16000</td>
<td>single</td>
<td>FH* attached LP* mounted</td>
<td>S26361-F4994-L501</td>
</tr>
<tr>
<td>PFC EP LPe16002</td>
<td>dual</td>
<td>FH* attached LP* mounted</td>
<td>S26361-F4994-L502</td>
</tr>
</tbody>
</table>

*LP = Low Profile Bracket
*FH = Full Height Bracket
1.3 **Prerequisites**

Use PCIe Gen 3 compliant systems that are x8 lane at up to 8 GT/s per lane.

1.4 **HBA Identification**

Each HBA ships with several numbers clearly marked on the board. Fujitsu recommends recording these numbers before installation.

- Serial number – assigned by Fujitsu and used when communicating with Fujitsu.
- IEEE address – an Institute of Electrical and Electronics Engineers (IEEE) unique 64-bit identifier used for system configuration

*If the adapter has two ports, it has two IEEE addresses and two WWNs; one for each port with the second IEEE address/WWN being the next successive number of the first.*
Introduction
2 Installation

2.1 Hardware Installation

The standard LPe16000 and LPe16002 host bus adapters (HBAs) can be connected to fiber optic cables.

Preparing the HBA for Installation

The Fujitsu LPe16000 and LPe16002 HBAs use removable optical transceivers. If you need to change the bracket for HBA installation, you must first remove the optical transceiver(s), if installed, from the housing (cage). This procedure explains how to install the HBA and, if necessary, how to remove the transceiver and bracket safely.

Each HBA is shipped with several numbers clearly marked on the board. These include

- IEEE Address
- Serial number

The IEEE address is a unique 64-bit identifier that you use when configuring your system. If the adapter has two ports, there are two IEEE addresses. Use the serial number when communicating with Fujitsu. Record these numbers before installation.

When ordered as single or spare part, the HBA comes with a low profile bracket installed. A standard (full height) PCIe bracket is included in the box with the HBA. The low profile mounting bracket is shorter than the standard bracket; approximately 3.11 inches (7.9 cm) compared to 4.75 inches (12.06 cm) long.

Step 1:

For the standard LPe16000/16002 HBA, if you want to change the low profile bracket to a standard bracket, follow steps 2–10 analogously; otherwise, proceed to "Installing the HBA" on page 15.
Installation

Changing the bracket

Please check the respective server manual for the correct bracket type.

Figure 2: LPe 16000 HBA with one port and low profile (LP) bracket

Figure 3: LPe 16002 HBA with two ports and full height (FH) bracket
Installation

Step 2:

LPe16000/16002 HBAs come with optical transceivers embedded in their cage assemblies. These optical transceivers must be removed before the bracket can be removed. If the HBA contains optical transceivers, continue with the following steps; otherwise, proceed to step 5 on page 14.

⚠️ CAUTION!

This is a delicate operation. Take care not to damage the optical transceiver.

The HBA uses different types of optical transceivers. Figure 4 shows an example of one type with the bail (handle) extended.

Figure 4: Typical Optical Transceiver
Installation

Step 3:

To remove a transceiver, pull the bail (handle) out and down to release the latch and gently pull the transceiver out. Do not force it. After the latch is released, the transceiver slides out easily.

Figure 5 shows a transceiver with the latch released (bail extended) and another transceiver latched in place.

![Figure 5: Releasing the Latch on an Optical Transceiver](image)
Figure 6 shows an extracted transceiver and another transceiver latched in place.

Step 4:
Observing Electrostatic Discharge (ESD) precautions, store the transceiver in an ESD-safe place.
**Installation**

**Step 5:**
Remove the mounting bracket screws from the top of the HBA.

Figure 7 shows the screws that are removed from the bracket.

![Figure 7: Removing the Bracket](image)

**Step 6:**
Remove the bracket and store it for future use.

**Step 7:**
Align the new mounting bracket tabs with the holes in the HBA.

Be careful not to push the bracket past the transceiver. Ensure the light emitting diodes (LEDs) are properly aligned with the holes in the bracket.

**Step 8:**
Re-install the screws that attach the HBA to the bracket.
Installation

Step 9:
Re-install the transceiver by sliding it into the housing. When the latch engages, it clicks.

Step 10:
Push the bail back into place.

Installing the HBA
1. Turn off the computer if hotplug is not supported on the server. See your server documentation to see if it supports Hot Plug/Hot Swap of PCIe adapter cards.

2. Remove the computer cover.

3. Remove the blank panel from an empty PCIe bus slot. See "Preparing the HBA for Installation" on page 9 to change the brackets if needed. Otherwise, proceed to "Attaching Media" on page 16.

   Place the HBA into an empty PCIe x8 or x16 slot. Make sure that the adapter is in an appropriate PCIe slot that does not interfere with other components or with the case to prevent damage to the HBA.

4. Insert the HBA into the empty x8 or x16 PCIe bus slot. Press firmly until the adapter is seated.

5. Secure the HBA mounting bracket to the case with a panel screw or clip.

6. Close the computer case and tighten the case screws.

The HBA is now installed in the server and is ready for media attachment.
Installation

Attaching Media

The HBA will not allow normal data transmission on an optical link unless it is connected to another similar or compatible laser product (that is, multimode to multimode.)

The HBA will not automatically downgrade to the required FC speed based on cable length. You must downgrade the speed with the appropriate utility or link errors may occur.

Use a multimode fiber optic cable, with short-wave lasers, that adheres to the following specifications:

<table>
<thead>
<tr>
<th>Fiber Optic Cable</th>
<th>Maximum Length</th>
<th>Min. Length</th>
<th>Connector</th>
</tr>
</thead>
</table>
| OM4 - Multi-mode 50/125 micrometer fiber (4700 MHz*km bandwidth cable) | 4GFC: 0.5m - 400m  
|                                                        | 8GFC: 0.5m - 190m  
|                                                        | 16GFC: 0.5m - 125m  | 0.5 meters | LC        |
| OM3 - Multimode 50/125 micron fiber (2000 MHz*km bandwidth cable) | 4GFC: 0.5m - 380m  
|                                                        | 8GFC: 0.5m - 150m  
|                                                        | 16GFC: 0.5m - 100m  | 0.5 meters | LC        |
| OM2 - Multimode 50/125 micron fiber (500 MHz*km bandwidth cable) | 4GFC: 0.5m - 150m  
|                                                        | 8GFC: 0.5m - 50m   
|                                                        | 16GFC: 0.5m - 35m  | 0.5 meters | LC        |
| OM1 - Multimode 62.5/125 micron fiber (200 MHz*km bandwidth cable) | 4GFC: 0.5m - 70m   
|                                                        | 8GFC: 0.5m - 21m   
|                                                        | 16GFC: 0.5m - 15m  | 0.5 meters | LC        |

Table 2: Media Specifications
Installation

To attach media to the HBA:

1. Connect the appropriate cable to the HBA.

   When connecting an optical cable, ensure the cages have optical transceivers installed in them (see figure 8).

Figure 8: Installing an Optical Transceiver
Once the optical transceivers are installed, insert the optical cable into the LC connectors on the HBA (see figure 9).

2. After the appropriate fiber optic cable is connected to the HBA, connect the other end to an FC switch. After the cable is connected to the HBA, you are ready to apply power to the computer.
**Applying Power**

To apply power:

1. Verify that the HBA is securely installed in the computer.
2. Verify that the correct media is attached.
3. Plug in and turn on the computer.
4. Watch the LEDs for Power On Self Test (POST) results.

**Viewing the LEDs**

You can view green and yellow LEDs through openings in the HBA's mounting bracket. The green LED indicates firmware operation and the yellow LED indicates port activity or link speed. Each port has a corresponding set of green and yellow LEDs as shown in the figure below.

![Figure 10: Optical HBA LED Indicators](image-url)
Installation

POST Conditions and Results

Power-On-Self Test (POST) is the default mode of self-test for the LPe16000-series HBAs. No jumpers or connectors are necessary for this test to run. These tests perform a quick confidence level check of the HBA before running the operational software.

At a minimum, the following tests are performed by POST:

- Flash boot image checksum test
- Internal ASIC RAM tests for proper ECC and parity operation
- NLPort loopback test

The following table summarizes the different LED states:

For the Link Rate conditions, there is a 1 second pause when the LED is off between each group of fast blinks (2, 3 or 4). Observe the LED sequence for several seconds to be sure you have correctly identified the pattern.

<table>
<thead>
<tr>
<th>Green LED</th>
<th>Yellow LED</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>Boot failure (Dead board)</td>
</tr>
<tr>
<td>Off</td>
<td>On</td>
<td>POST failure (Dead board)</td>
</tr>
<tr>
<td>Off</td>
<td>Slow Blink</td>
<td>Boot failure after POST</td>
</tr>
<tr>
<td>Off</td>
<td>Fast Blink</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Off</td>
<td>Flashing</td>
<td>POST processing in progress</td>
</tr>
<tr>
<td>On</td>
<td>Off</td>
<td>Failure in Common Code Module</td>
</tr>
<tr>
<td>On</td>
<td>On</td>
<td>Failure in Common Code Module</td>
</tr>
<tr>
<td>On</td>
<td>1 Fast Blinks</td>
<td>Normal (Link up at 2GFC) (legacy compatibility only)</td>
</tr>
<tr>
<td>On</td>
<td>2 Fast Blinks</td>
<td>Normal (Link up at 4GFC)</td>
</tr>
<tr>
<td>On</td>
<td>3 Fast Blinks</td>
<td>Normal (Link up at 8GFC)</td>
</tr>
<tr>
<td>On</td>
<td>4 Fast Blinks</td>
<td>Normal (Link up at 16GFC)</td>
</tr>
<tr>
<td>On</td>
<td>Flashing</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Slow Blink</td>
<td>Off</td>
<td>Normal-link down</td>
</tr>
<tr>
<td>Slow Blink</td>
<td>On</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Slow Blink</td>
<td>Slow Blink</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Slow Blink</td>
<td>Fast Blink</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Slow Blink</td>
<td>Flashing</td>
<td>Not Defined</td>
</tr>
</tbody>
</table>

Table 3: Conditions and Results (part1 of 2)
### Table 3: Conditions and Results

<table>
<thead>
<tr>
<th>Green LED</th>
<th>Yellow LED</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast Blink</td>
<td>Off</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Fast Blink</td>
<td>On</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Fast Blink</td>
<td>Slow Blink</td>
<td>Not Defined</td>
</tr>
<tr>
<td>Fast Blink</td>
<td>Fast Blink</td>
<td>Beaconing</td>
</tr>
<tr>
<td>Fast Blink</td>
<td>Flashing</td>
<td>Not Defined</td>
</tr>
</tbody>
</table>

(part2 of 2)
### 2.2 Software Installation

**First installation**

For the first installation please use the ServerView Installation Manager (SVIM). For detailed information please refer to the ServerView Installation Manager manual available on the web via:


**Update and manual installation**

FTS provides necessary driver and utilities on the web via:

http://support.ts.fujitsu.com/productselect.asp?lng=com&Level1=20966&lnid=3

**Emulex Management Utility OneCommand Manager (OCM)**

For Windows operating systems the Emulex Management Utility OneCommand Manager (OCM) will be installed by SVIM automatically.

Under Linux operating systems a manual installation is necessary. Link to:

http://support.ts.fujitsu.com/productselect.asp?lng=com&Level1=20966&lnid=3
3 BIOS Utility

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.

Before using the BIOS utility, ensure that the boot code is loaded and enabled on the adapter as described in the following section:

3.1 Install, Update, and Enable Boot Code

Use BIOS utilities 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 5 indicates the utilities you can use to install and update boot code, and Table 6, "Utilities that Enable Boot Code" indicates the utilities you can use to enable boot code.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>OneCommand Manager Utility</th>
<th>HBACmd Utility</th>
<th>emlxadm</th>
<th>Offline Utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>X</td>
<td>X</td>
<td>–</td>
<td>X</td>
</tr>
<tr>
<td>Linux</td>
<td>X</td>
<td>X</td>
<td>–</td>
<td>X</td>
</tr>
<tr>
<td>Solaris LPFC</td>
<td>X</td>
<td>X</td>
<td>–</td>
<td>X</td>
</tr>
<tr>
<td>Solaris emlxs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>–</td>
</tr>
<tr>
<td>(SFS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VMWare</td>
<td>X</td>
<td>X</td>
<td>–</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 4: Utilities that Install and Update Boot Code

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

- OneCommand Manager utility: See the OneCommand Manager User Manual.
- HBACmd utility: See the OneCommand Manager User Manual.
- emlxadm: See the FCA Utilities User Manual.
- Offline utility: See the Offline and Online Adapter Management Utilities User Manual.
3.2 Start the BIOS Utility

To start the BIOS Utility:

1. Turn on the computer and press and hold down [Alt] or [Ctrl] and [E] immediately (within five seconds) when the bootup message to enter the BIOS utility is displayed. An adapter listing is displayed (See figure 11).

   Links must be connected and established before entering the BIOS utility; otherwise, you will receive an error message.
If the bootup message does not appear, you must enable x86 BootBIOS. See "Enable an Adapter to Boot from SAN" on page 27 for more information.

2. Select the adapter you want to examine or configure using the arrow keys to move up and down and pressing [Enter]. The main configuration menu is displayed (See figure 12).
Under normal circumstances, you would first configure boot devices using the BIOS Utility (page 28). However, in the following two situations, you must perform the indicated procedure first:

- The adapter is not enabled to boot from SAN: You must enable the adapter’s BIOS to boot from SAN (See "Enable an Adapter to Boot from SAN" on page 27).

- You want to use a topology other than the default (auto topology with loop first): You must change the topology setting before configuring boot devices (See "Change Topology" on page 37).
### 3.3 Enable an Adapter to Boot from SAN

To enable an adapter to boot from SAN:

From the Main configuration menu, select *Enable/Disable Boot from SAN.* Adapters are disabled by default. At least one adapter must be enabled to boot from SAN in order to use remote boot functionality.

Once you enable an adapter, the status of the boot BIOS changes as shown in figure 13.

> x86 BootBIOS supports a maximum of eight ports.

![Figure 13: BIOS Status Screen](image)
3.4 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).

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 ALPA of 01 (Hex).

To configure boot devices:

1. On the main configuration menu (figure 12 on page 26), select Configure Boot Devices.

A list of eight boot devices is shown (figure 14 on page 29). It is recommended 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, if it is configured in the system BIOS on a BBS system.

The BIOS utility only presents the boot devices to the system BIOS. The system BIOS must enumerate and attempt to boot from the drive as the primary hard drive from which to boot. See "Use Multi-Path Boot from SAN" on page 51.
2. Select a boot entry. A screen similar to Figure 15 is displayed.
To minimize the amount of time needed to locate the boot device, it is recommended that you select the drive with the lowest ALPA as the boot device when connected to devices on a FC arbitrated loop.

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 16). The starting LUN can be any number from 0 to 255.

![Figure 16: LUN listing Screen](image)

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

5. Type the two digits corresponding to the entry you are selecting. The boot devices menu (figure 17 on page 31) displays the following options:
6. 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.
7. Press [Esc] until you exit the BIOS utility.
8. Reboot the system for the new boot path to take effect.
3.5 Configure Adapter Parameters

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

- Change default ALPA of the adapter
- Change PLOGI retry timer
- Select a topology
- Enable or disable spinup delay
- Set autoscan
- Enable or disable EDD 3.0
- Enable or disable the start unit command
- Enable or disable the environment variable
- Enable or disable auto boot sector
- Select a link speed

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

To access the adapter configuration menu:

When the main configuration menu (figure 12 on page 26) is displayed, select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed.
Default settings are acceptable for most installations. To reset all values to their defaults, from the main configuration menu (figure 12 on page 26) select *Reset Adapter Defaults*.

### 3.6 Change the Default ALPA (Arbitrated Loop Physical Address)

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

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

To change the default ALPA:

1. On the main configuration menu (figure 12 on page 26), select *Configure Advanced Adapter Parameters*. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select *Change Default ALPA of this adapter*. Information similar to figure 20 is displayed.

![Change Default ALPA Screen](image-url)
3. Change the default ALPA by using the arrow keys to scroll through the valid ALPAs (Table 6 below lists the valid ALPA values).

4. Press [Esc] until you exit the BIOS utility.

5. Reboot the system.

If the adapter's ALPA is changed, it does not show on the NVRAM ALPA until the system has been reset.

<table>
<thead>
<tr>
<th>ALPA Value</th>
<th>ALPA Value</th>
<th>ALPA Value</th>
<th>ALPA Value</th>
<th>ALPA Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x00</td>
<td>0x01</td>
<td>0x02</td>
<td>0x04</td>
<td>0x08</td>
</tr>
<tr>
<td>0x18</td>
<td>0x1B</td>
<td>0x1D</td>
<td>0x1E</td>
<td>0x1F</td>
</tr>
<tr>
<td>0x27</td>
<td>0x29</td>
<td>0x2A</td>
<td>0x2B</td>
<td>0x2C</td>
</tr>
<tr>
<td>0x32</td>
<td>0x33</td>
<td>0x34</td>
<td>0x35</td>
<td>0x36</td>
</tr>
<tr>
<td>0x43</td>
<td>0x45</td>
<td>0x46</td>
<td>0x47</td>
<td>0x49</td>
</tr>
<tr>
<td>0x4D</td>
<td>0x4E</td>
<td>0x51</td>
<td>0x52</td>
<td>0x53</td>
</tr>
<tr>
<td>0x59</td>
<td>0x5A</td>
<td>0x5C</td>
<td>0x63</td>
<td>0x65</td>
</tr>
<tr>
<td>0x6A</td>
<td>0x6B</td>
<td>0x6C</td>
<td>0x6D</td>
<td>0x6E</td>
</tr>
<tr>
<td>0x74</td>
<td>0x75</td>
<td>0x76</td>
<td>0x79</td>
<td>0x7A</td>
</tr>
<tr>
<td>0x82</td>
<td>0x84</td>
<td>0x88</td>
<td>0x8F</td>
<td>0x90</td>
</tr>
<tr>
<td>0x9D</td>
<td>0x9E</td>
<td>0x9F</td>
<td>0xA3</td>
<td>0xA5</td>
</tr>
<tr>
<td>0xAA</td>
<td>0xAB</td>
<td>0xAC</td>
<td>0xAD</td>
<td>0xAE</td>
</tr>
<tr>
<td>0xB4</td>
<td>0xB5</td>
<td>0xB6</td>
<td>0xB9</td>
<td>0xBA</td>
</tr>
<tr>
<td>0xC6</td>
<td>0xC7</td>
<td>0xC9</td>
<td>0xCA</td>
<td>0xCB</td>
</tr>
<tr>
<td>0xD1</td>
<td>0xD2</td>
<td>0xD3</td>
<td>0xD4</td>
<td>0xD5</td>
</tr>
<tr>
<td>0xDC</td>
<td>0xE0</td>
<td>0xE1</td>
<td>0xE2</td>
<td>0xE4</td>
</tr>
</tbody>
</table>

Table 6: Valid ALPA Values
3.7 Change the PLOGI Retry Timer

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

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

To set the interval for the PLOGI retry timer:

1. On the main configuration menu (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select Change PLOGI Retry Timer. Information similar to figure 21 is displayed.

![Figure 21: Change the PLOGI Retry Timer Screen](image-url)
3. Select the retry timer interval.
4. Press [Esc] until you exit the BIOS utility.
5. Reboot the system.

3.8 Change Topology

Fujitsu drivers support arbitrated loop and point-to-point topologies. 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 ALPA of 01 (Hex). You can configure:

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

To select the adapter topology:

1. On the main configuration menu (Figure 12), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).
2. Select Topology Selection. Information similar to figure 22 on page 38 is displayed.
3. Select the topology for the adapter.
4. Press \(<Esc>\) until you exit the BIOS utility.
5. Reboot the system.
3.9 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 boot devices have not 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 ALPA 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 (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select Enable or Disable Spinup Delay. Information similar to figure 23 on page 40 is displayed.
3. Enable or disable spinup delay.

4. Press [Esc] until you exit the BIOS utility.

5. Reboot the system.
3.10 Set Auto Scan

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

Use the Boot Devices menu (figure 17 on page 31) to configure up to eight boot entries for fabric point-to-point, public loop, or private loop configurations. The first adapter is usually in the lowest PCI slot in the system. This device is the only boot device and it is the only device exported to the multi-boot menu.

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

To set auto scan:
1. From the main configuration menu (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).
2. Select Auto Scan Setting. Figure 24 on page 42 is displayed.
3. Select the auto scan option.
4. Press Esc until you exit the BIOS utility.
5. Reboot the system.
3.11 Enable or Disable EDD 3.0

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

To enable or disable EDD 3.0:

1. From the main configuration menu (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select Enable or Disable EDD 3.0. Figure 25 on page 43 is displayed.

3. Enable or disable EDD 3.0.

4. Press [Esc] until you exit the BIOS utility.

5. Reboot the system.
3.12 Enable or Disable the Start Unit Command

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

To enable or disable the start unit command:

1. From the main configuration menu (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select Enable or Disable Start Unit Command. Figure 26 is displayed.

3. Enable or disable the start unit command.

4. Press \[Esc\] until you exit the BIOS utility.

5. Reboot the system.
3.13 Enable or Disable the Environment Variable

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

To enable or disable the environment variable:

1. From the main configuration menu (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select Enable or Disable Environment Variable. Figure 27 is displayed.

3. Enable or disable the environment variable.

4. Press [Esc] until you exit the BIOS utility.

5. Reboot the system.
3.14 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. From the main configuration menu (figure 12 on page 26), select *Configure Advanced Adapter Parameters*. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select *Enable or Disable Auto Boot Sector*. Figure 28 is displayed.

3. Enable or disable auto boot sector.

4. Press Enter until you exit the BIOS utility.

5. Reboot the system.
3.15 Change Link Speed

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

Possible link speeds (depend upon your adapter model):

- Auto Select – default
- 1 Gb/s
- 2 Gb/s
- 4 Gb/s
- 8 Gb/s
- 16 Gb/s

8 Gb/s HBAs do not support 1 Gb/s link speed. 16 G/bs HBAs do not support 1 Gb/s or 2 Gb/s link speed. Additionally, some older devices do not support auto link speed detection, therefore the link speed must be forced to match the speed of those devices.

To change the adapter’s link speed:

1. From the main configuration menu (figure 12 on page 26), select Configure Advanced Adapter Parameters. The adapter configuration menu is displayed (figure 19 on page 33).

2. Select Link Speed Selection. A menu similar to figure 29 on page 48 is displayed.
3. Use the up and down arrows to select the desired FC link speed you would like to use.

4. Press `Esc` until you exit the BIOS utility.

5. Reboot the system.
## 3.16 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 7.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Valid Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot from SAN</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td>ALPA Value</td>
<td>0x00 Fibre</td>
<td>See ALPA reference table (&quot;Change the Default ALPA (Arbitrated Loop Physical Address)&quot; on page 34.)</td>
</tr>
<tr>
<td>EDD 3.0</td>
<td>EDD 2.1</td>
<td>Disabled (EDD 2.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enabled (EDD 3.0)</td>
</tr>
<tr>
<td>PLOGI Retry Timer</td>
<td>Disabled</td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 msec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 msec</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 msec</td>
</tr>
<tr>
<td>Spinup Delay</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>Auto Scan</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>Start Unit</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>Environmental Variable</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>Auto Boot Sector</td>
<td>Disabled</td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>Topology</td>
<td>Auto (start FC-AL)</td>
<td>Auto (start FC-AL) Auto (start Point-to-Point) Auto (start Point-to-Point) FC-AL</td>
</tr>
<tr>
<td>Link Speed</td>
<td>Auto (highest successfully negotiated speed)</td>
<td></td>
</tr>
</tbody>
</table>
To reset parameters to their factory default settings:

1. On the main configuration menu (figure 12 on page 26) select Reset Adapter Defaults. A screen is displayed that asks if you want to reset to the defaults.

2. Press [Y].

   All settings revert to their factory default values.
3.17 Use Multi-Path Boot from SAN

Multi-boot BIOS is in compliance with the BIOS Boot Specification (BBS). The system must have a Multi-boot system BIOS 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 HBA 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 ALPA 02. However, you can select ALPA 23 in the system BIOS setup menu. The boot device is the FC disk with ALPA 23 instead of ALPA 02, as is set in the BIOS utility.

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

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

The order of boot entries exported to Multi-boot (BBS) is:
boot_entry0, boot_entry1, boot_entry2, and boot_entry3.

However, Multi-boot allows changing the boot order in the server BIOS, which allows any disk to become the C drive.
BIOS Utility
4 Configure EFIBoot in a UEFI System

4.1 Open the BIOS setup

➤ Start the system and wait until the screen output appears.
➤ Press the [F2] function key.
➤ If a password is assigned, enter this password and confirm with the [Enter] key.

The BIOS setup Main menu will be displayed on the screen.
➤ To show system specific information select System Information and press the [Enter] key.

The BIOS release information will be displayed.
- BIOS release (e.g. Version R1.3.0)
  The number of the system board (e.g. D2949-A1x) you will find under Board.
- Press the [F1] function key.
  The General Help information will be displayed.

When the Main menu does not appear:
- If the Main menu does not appear by pressing the [F2] function key, press the Ctrl + Alt + Delete keys at the same time to restart the system. then start up BIOS Setup Utility.
- Go to Advanced.
Configure EFIBoot in a UEFI System

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 arrow keys ↑/↓ on your keyboard to select it, and press [Enter].

![Advanced Menu (figure 7-3)](Anm. d. Red.: Korrekt?)

EFI Utility Conventions in UEFI

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

- Press the arrow keys ↑/↓ on your keyboard to move through and select menu options or configuration fields. When multiple adapters are listed, use the arrow keys ↑/↓ 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.
Configure EFIBoot in a UEFI System

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.

### 4.2 Configure EFIBoot in UEFI

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
Configure EFIBoot in a UEFI System

4.3 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.

3. Make your selection and press [Enter]. The utility displays the new boot from SAN setting (see next page).
Configure EFIBoot in a UEFI System

Figure 33: New Boot From SAN Setting (figure 7-6)
Configure EFIBoot in a UEFI System

4.4 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].

2. 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 34: Discovered Targets Screen (figure 7-7)
4.5 Add Boot Devices

To add a boot device:

1. From the Adapter Selection screen, select the adapter to which you want to add a boot device and press [Enter].

2. From the Main menu, select Add Boot Device and press [Enter]. A screen appears displaying the discovered targets.

3. Select the target you want and press [Enter]. A list of bootable LUNs is displayed (see next page).
Configure EFIBoot in a UEFI System

4. Select the boot device you want to add and press [Enter]. A menu appears enabling you to commit or discard your changes (see next page).
5. Select *Commit Changes* and press **Enter**.
4.6 Delete Boot Devices

To delete boot devices:

1. From the Adapter Selection screen, select the adapter from which you want to delete a boot device and press [Enter].

2. From the Main menu, select Delete Boot Device and press [Enter]. A list of boot devices is displayed.

3. Select the boot device you want to delete and press the space bar. The device appears with [DELETE] beside it (see next page).
4. Select *Commit Changes* and press *Enter*. 
Configure EFIBoot in a UEFI System

4.7 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.

3. Select Boot Device Order (see next page).
Configure EFIBoot in a UEFI System

4. Press [Enter]. The Boot Device Order menu screen appears (see next page).
Configure EFIBoot in a UEFI System

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.
4.8 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.

![Configuring Adapter Parameters](image)

Figure 43: Adapter Configuration Menu (figure 7-16)
4.8.1 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:

3. Select a topology and press [Enter]. The screen is refreshed with the new value. The presence of a fabric is detected automatically.
4. Press [Esc] to return to the EFI utility menu.

5. Select Commit Changes and press [Enter].

4.8.2 Change the PLOGI Retry Timer

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

You can choose:

– Disable – Default
– 50 msec
– 100 msec
– 150 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 (see next page).
Configure EFIBoot in a UEFI System

3. Select a retry timer option and press [Enter]. The screen is refreshed with the new value.

4. Press [Esc] to return to the EFI utility menu.

5. Select Commit Changes and press [Enter].

4.8.3 Change the Link Speed

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

Possible link speed choices:
- Auto negotiate – Default
- 4 Gb/s link speed
- 8 Gb/s link speed
- 8 Gb/s or 4 Gb/s link speed
Configure EFIBoot in a UEFI System

- 16 Gb/s link speed
- 16 Gb/s or 8 Gb/s or 4 Gb/s link speed
- 16 Gb/s or 8 Gb/s link speed

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.

3. Select a link speed and press [Enter].

4. The screen is refreshed with the new value.

5. Press [Esc] to return to the EFI utility menu.

6. Select Commit Changes and press [Enter].
Configure EFIBoot in a UEFI System

4.9 Configure Boot Parameters

You can change the:

– Maximum LUNS/targets
– Boot target scan method
– Device discovery delay

4.9.1 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 (see next page).
3. Type the maximum LUN value (between 1 and 4096) and press [Enter]. The screen is refreshed with the new value.

   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. Press [Esc] to return to the EFI utility menu.

5. Select Commit Changes and press [Enter].

### 4.9.2 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.
Configure EFIBoot in a UEFI System

The boot scan options are:

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

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

- **Do not create a boot path.**

- **Boot Scan from EFIFCScanLevel** – Allows third-party software to toggle between Boot Path from NVRAM and Boot Path from Discovered Targets by manipulating an 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 third-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 (see next page).
3. Select a boot scan setting and press \[Enter\]. The screen is refreshed with the new value.

   If you have a large SAN and set the boot path to “Boot Path Discovered Targets”, discovery takes a long time.

4. Press \[Esc\] to return to the EFI utility menu.

5. Select Commit Changes and press \[Enter\].

### 4.9.3 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,
Configure EFIBoot in a UEFI System

- 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 conditions exist, typically set this parameter to 20 seconds. However, the delay only needs to be long enough for the array to be reliably discovered after a reset. Your value 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 49: Delay Device Discovery Screen (figure 7-22)](image-url)
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. Press [Esc] to return to the EFI utility menu.

5. Select Commit Changes and press [Enter].
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4.10 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>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Valid Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable/Disable BIOS</td>
<td>Disabled</td>
<td>Enabled, Disabled</td>
</tr>
<tr>
<td>ALPA Value</td>
<td>0x00 Fibre</td>
<td>See ALPA reference table</td>
</tr>
<tr>
<td>PLOGI Retry Timer</td>
<td>Disabled</td>
<td>Disabled, 50 msec, 100 msec, 150 msec</td>
</tr>
<tr>
<td>Boot Target Scan</td>
<td>Boot path from NVRAM targets</td>
<td>Boot path from NVRAM targets, Boot path discovered targets, Do not create boot path</td>
</tr>
<tr>
<td>Max LUNs Setting</td>
<td>256</td>
<td>0 - 4096</td>
</tr>
<tr>
<td>Topology</td>
<td>Auto (start FC-AL)</td>
<td>Auto (start FC-AL), Point-to-Point, Auto (start Point-to-Point), FC-AL</td>
</tr>
<tr>
<td>Delay Device Discovery</td>
<td>0000</td>
<td>0000 - 0255</td>
</tr>
<tr>
<td>Link Speed</td>
<td>0 (Auto-select)</td>
<td>&lt;0&gt; = Auto Select (the adapter’s speed is selected automatically based on its model), 4 Gb/s link speed, 8 Gb/s link speed, 8 Gb/s or 4 Gb/s link speed, 16 Gb/s link speed, 16 Gb/s or 8 Gb/s or 4 Gb/s link speed, 16 Gb/s or 8 Gb/s link speed</td>
</tr>
</tbody>
</table>

Table 8: Adapter Defaults
Configure EFIBoot in a UEFI System

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].

2. 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.


4. 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.

6. Select Set Adapter Defaults and press [Enter]. The adapter is returned to its default settings. Press [Esc] to return to the adapter list.
4.11 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 \( \text{Enter} \).

2. From the Adapter configuration Main menu, select Display Adapter Info and press \( \text{Enter} \). A screen appears displaying information about the selected adapter (see next page).
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![Figure 51: Adapter Information Screen (figure 7-26)](image_url)
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5 References

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Dimensions</td>
<td>Low-profile form factor, 6.600 inches (16.76cm) by 2.713 inches (6.89cm), and accommodates both the full-height and low-profile bracket.</td>
</tr>
<tr>
<td>Airflow</td>
<td>150 lfm (minimum)</td>
</tr>
<tr>
<td>Temperature</td>
<td>0 °C to 55 °C (+32 °F to +131 °F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>5% to 85% (non-condensing)</td>
</tr>
<tr>
<td></td>
<td>40 °C, 16 hour dwells at extremes</td>
</tr>
</tbody>
</table>
| Agency Approvals for LPe 1600x series HBAs | • Class 1 Laser Product per DHHS 21CFR (J) & EN60825-1  
• UL recognized to UL60950-1 2nd Edition  
• CUR recognized to CSA 22.2, No. 60950-1-07  
• TUV certified to EN60950-1  
• FCC Rules, Part 15, Class A  
• Industry Canada, ICES-003, Class A  
• EMC Directives 2004/108/EEC (CE Mark)  
  - EN55022, Class A  
  - EN55024  
• Australian EMC Framework (C-Tick Mark)  
  - AS/NZS CISPR22:2006 Class A  
• Japan VCCI, Class A  
• Taiwan BSMI, Class A  
• Korea KCC, Class A  
• RoHS Compliant (EU RoHS directive 2011/65/EU)  
• China RoHS compliant |
| Vibration, peak acceleration  | 0.25g (5 Hz to 500 Hz)                                               |
|                               | (Sweep Rate = 1 octave/min.)                                         |

Table 9: LPe 1600x Series HBA Specifications

Fujitsu 16Gb Fibre Channel HBA LPe 1600x