



Driver for NetWare Version 2.22

For Emulex® HBAs

User Manual

Copyright© 2006–2008 Emulex Corporation. All rights reserved worldwide. No part of this document may be reproduced by any means nor translated to any electronic medium without the written consent of Emulex Corporation.

Information furnished by Emulex Corporation is believed to be accurate and reliable. However, no responsibility is assumed by Emulex Corporation for its use; or for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Emulex Corporation.

Emulex, AutoPilot Installer, BlockGuard, cLAN, FabricStream, FibreSpy, Giganet, HBAnyware, InSpeed, IntraLink, LightPulse, MultiPulse, SAN Insite, SBOD and Vixel are registered trademarks, and AutoPilot Manager, EZPilot, SLI and VMPilot are trademarks, of Emulex Corporation. All other brand or product names referenced herein are trademarks or registered trademarks of their respective companies or organizations.

Emulex provides this manual "as is" without any warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose. Emulex Corporation may make improvements and changes to the product described in this manual at any time and without any notice. Emulex Corporation assumes no responsibility for its use, nor for any infringements of patents or other rights of third parties that may result. Periodic changes are made to information contained herein; although these changes will be incorporated into new editions of this manual, Emulex Corporation disclaims any undertaking to give notice of such changes.

Installation	1
Driver Information	1
Supported Features	1
Prerequisites	1
Compatibility	1
Things to Know Before You Download	1
Known Issues	2
Installing the Driver	3
Installing the Driver on a New NetWare Server	3
Installing the Driver on an Existing NetWare Server	4
Using an Emulex HBA to Boot NetWare 6.5	6
Shutting Down, Resetting and Restarting the Server	7
Updating x86 BootBIOS Using the Dos Offline Utility	7
Configuration	10
Driver Parameters	10
Special Command Line Parameters	15
Troubleshooting	18
Failback Detection Not Automatic	18
Targets are Not Discovered	18

Installation

Driver Information

Supported Features

- Supports 16 host bus adapters (HBAs).
- Supports a maximum of 250 targets.
- Supports suitable target hardware. (The Emulex lpfc.ham driver complies with the American National Standards Institute [ANSI] -T11 Storage Area Network [SAN] protocols for switched fabrics and arbitrated loops.)

Prerequisites

- NetWare 6.5 - driver tested using Support Pack 7 (NW65SP7). .

Note: NetWare 6.0 is not supported. You can use it at your own risk with NW60SP5.

Note: NetWare 5.1 is not supported. You can use it at your own risk with NW51SP8.

Note: NetWare 4.2 is not supported. You can use it at your own risk with Emulex driver version 1.23c.

Note: This driver has not been tested and is not supported with NetWare 6.0 or Netware 5.1. You can use it at your own risk in these environments.

Note: This driver will not operate with NetWare 4.2 which requires Emulex driver version 1.23c.

Compatibility

- The Emulex driver for NetWare is compatible with the following Fibre Channel (FC) HBAs:
 - LPe12000, LPe12002, LPe1250 and LPe121 (minimum firmware version 1.00a9)
 - LPe11000, LPe11002 and LPe1150 (minimum firmware version 2.50a2)
 - LP11000, LP11002, and LP1150 (minimum firmware version 2.10a5)
 - LP10000, LP10000DC, LP1050 and LP1050DC (minimum firmware version 2.50a2)
 - LP10000ExDC, LPe1050Ex and LP1005DC (minimum firmware version 1.90a4)
 - LP9802, LP9802DC, and LP982 (minimum firmware version 1.91a1).
 - If you update the firmware on an LP9802DC HBA, use the DOS offline utility version 1.06a or later.
 - LP9402DC, LP9002L, LP9002DC, LP9000 and LP952L (recommended firmware version 3.92a2).

- LP8000, LP8000DC and LP850
 - If your HBA has a Dragonfly chip version 2.00 or higher, use firmware version 3.92a2
 - If your HBA has a Dragonfly chip version lower than 2.00, use firmware version 3.30a

Note: If a Fibre Channel link fails to come up, verify that an 8-Gb HBA is not attempting to connect to a 1-Gb device. Only 2-Gb, 4-Gb and 8-Gb devices are supported on 8-Gb HBAs.

Things to Know Before You Download

- Before you download, create a temporary directory for the driver kit.
- You can install NetWare files on an FC disk, provided a local boot disk with DOS exists.
- For NetWare 6.5, you can replace the "local boot drive" with an FC boot drive.
- If you are using NetWare 6.5 SP1 and booting from an Emulex HBA, ensure that the HBA boot drive is connected to the first HBA loaded. See *"Using an Emulex HBA to Boot NetWare 6.5"* on page 6 for more information.
- You may see "orphaned" mirror partitions under NW6SP2. NW6SP3 and the MM6UP1A patch correct this.

Known Issues

- A small percentage of attempts to unload a single HBA may cause a dismount of a mirrored partition supported by another HBA. The work around is to scan for new devices, then enter 'mount xyz' where xyz is the partition in question.

Installing the Driver

In addition to the two methods described in this manual, you may also pre-load the driver in C:\NWUPDATE. See Novell Technical Information Document 2950728 for more information.

Installing the Driver on a New NetWare Server

The following items are required to install the driver on a new NetWare server:

- Downloaded and extracted contents of the Emulex driver for NetWare, copied onto a floppy diskette.
- Installation CDs for NetWare. You can install NetWare files on an FC disk, provided a boot disk with DOS exists.

To install the Emulex driver on a new NetWare server:

1. Insert the floppy diskette with the latest Emulex driver for NetWare into your floppy disk drive.
2. Insert CD 1 of the NetWare installation CD into your CD drive.
3. Follow the standard installation for your version of NetWare. For most applications, leave all driver options in default mode.
 - a. If you are installing NW6.0 SP3 or NW6.5, the NetWare installation CD ships with an old version of the Emulex driver for NetWare. Remove this old driver before you install the latest version of the Emulex driver for NetWare. During installation, a screen similar to Figure 1 appears:

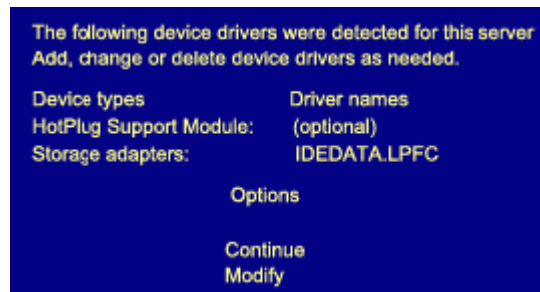


Figure 1: Detected Device Drivers

- b. Select **Modify**. A screen similar to Figure 2 appears (your HBA model may vary):

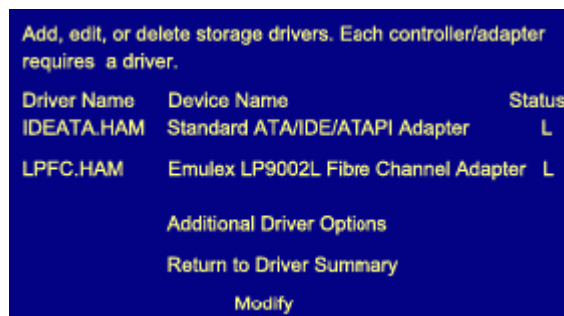
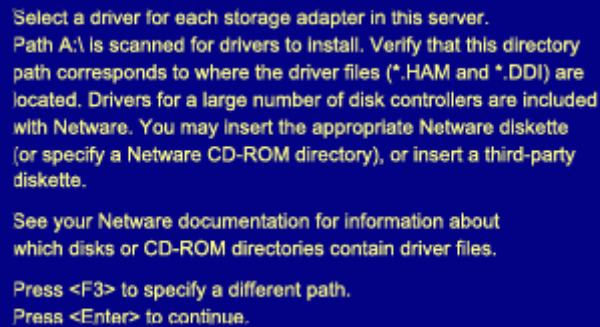


Figure 2: Device Driver Information

Note: "L" in the Status column indicates that the driver is loaded.

- c. Select LPFC.HAM and press **<Delete>**. The LPFC.HAM driver is deleted from the list of disk drivers.

Continue with normal installation. During installation, a screen similar to Figure 3 appears:



Select a driver for each storage adapter in this server.
 Path A:\ is scanned for drivers to install. Verify that this directory path corresponds to where the driver files (*.HAM and *.DDI) are located. Drivers for a large number of disk controllers are included with Netware. You may insert the appropriate Netware diskette (or specify a Netware CD-ROM directory), or insert a third-party diskette.

See your Netware documentation for information about which disks or CD-ROM directories contain driver files.

Press <F3> to specify a different path.
 Press <Enter> to continue.

Figure 3: Installation Screen to Specify Driver Path

4. Press **<F3>** to specify the driver directory path and browse to the driver files location.
5. Select the Emulex lpfc.ham driver and continue with the standard Novell installation procedure.
6. Reboot the system.

When attaching the driver to an array, you must enable the /LUN option and set the MAX_LUN value depending upon the array configuration.

The NetWare device driver installation is complete.

Installing the Driver on an Existing NetWare Server

The following items are required to install the driver on an existing NetWare server:

- Downloaded and extracted contents of the latest Emulex driver for NetWare, copied onto a floppy diskette.
- Installed compatible HBA.
- The server must support Peripheral Connect Interface (PCI) 2.2 standard slots or PCI-X 1.1 standard slots.

To install the Emulex driver on an existing NetWare server, deselect the existing Emulex driver for NetWare and select (add) the new Emulex driver for NetWare as follows:

1. At the server console, load the installation program:
 - If you are running NetWare 5.1 or 6.0, enter the command:
 LOAD NWCONFIG
 - If you are running NetWare 6.5, enter the command:
 LOAD HDETECT

2. During configuration, a screen similar to Figure 4 appears:

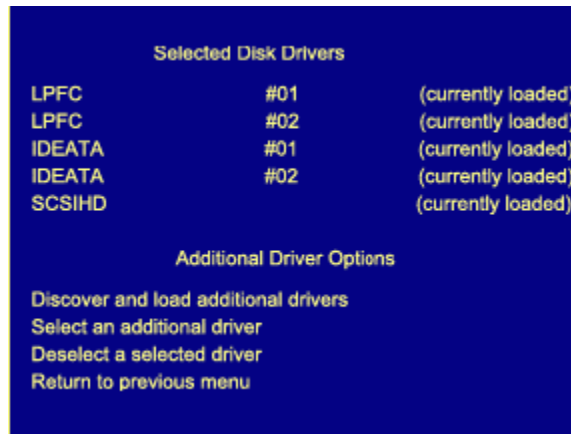


Figure 4: Selected Disk Drivers

3. Choose (highlight) the driver to deselect. Choose Deselect a selected driver and press **<Enter>**.
4. Choose (highlight) the driver to add it to the Selected Disk Drivers list. Choose Select an Additional Driver and press **<Insert>** to install a driver not on the list.
5. Press **<F3>** to specify the path for the new driver and enter "A:\".
6. Select the Emulex lpfc.ham driver and copy the driver files to the server directory. A screen similar to the Figure 5 appears:

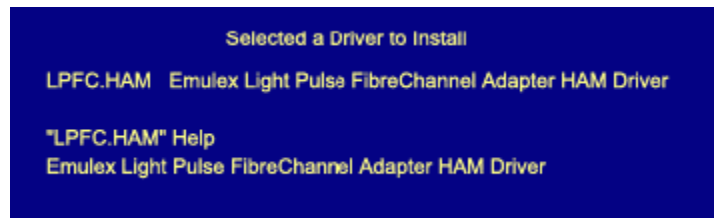


Figure 5: Select a Driver to Install

7. Press **<Enter>**. A screen similar to Figure 6 appears:

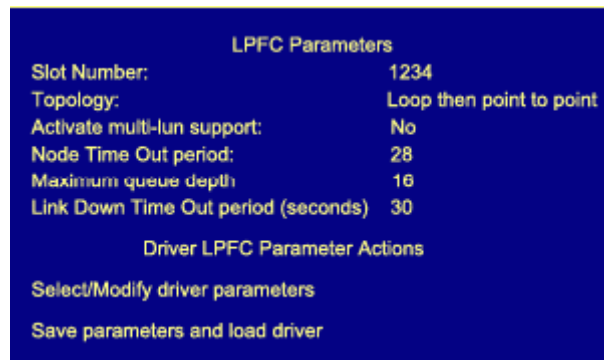


Figure 6: LPFC Parameters

8. Select Save parameters and load driver. Press **<Enter>**.
9. Reboot the system.

When attaching the driver to an array, you must enable the /LUN option and set the MAX_LUN value depending upon the array configuration.

Using an Emulex HBA to Boot NetWare 6.5

With NetWare 6.5, Novell provides you a robust transition from BootBIOS drivers to full protected mode drivers. You can take advantage of this enhancement and boot from storage provided by the SAN. You can access the boot partition and NetWare volumes through the same HBA, supporting physical security, better allocation of storage, and/or business continuance.

The server system hardware must be suitable for NetWare 6.5; see the NetWare 6.5 documentation for details:

- The server must support PCI 2.2 standard slots or PCI-X 1.1 standard slots.
- The system BIOS must support HBAs with expansion read-only memory (ROM) compatible with the following specifications:
 - PCI 2.1, section on option ROMs (PCI SIG)
 - Plug and Play BIOS Specification v.1.0a (Microsoft)
 - Boot Bios Specification 1.01 (Phoenix)
- If the system has an internal hard disk, disable or remove the disk from the boot device selection. This is typically done from a setup screen of the System BIOS.

To use an Emulex HBA to boot NetWare 6.5:

1. Prepare the SAN:
 - a. Configure the storage space by creating a single logical unit number (LUN) with at least 2 gigabit (GB) free space and no used space (partitions nor file systems).
 - b. Check the storage device and determine if additional configuration is necessary to accept requests from the Emulex HBA used for booting.

Note: Some storage arrays require the World Wide Node Name (WWNN) or World Wide Port Name (WWPN) in their configuration data. Small storage units, such as individual drives and JBODs, typically require no additional configuration.

- c. Record the WWNN or WWPN of the LUN for use in configuring the BootBIOS.
 - d. Check switch zoning configuration: if a Fibre Channel switch connects storage to the HBA, switch zoning configuration must have the LUN and the HBA in the same zone.
 - e. Check cable connection reliability: each element in the path between LUN and HBA must be connected by reliable cabling, and have compatible interfaces.
2. Prepare the HBA:

BootBIOS version 1.63a2 or later must be installed on the HBA.

Note: If you have access to a computer running DOS, you can enable the BootBIOS or load an updated version of BootBIOS by installing the HBA in the DOS system and using the offline utility.

- a. Power on the server on which you want to configure the BootBIOS.

As the system BIOS proceeds through initializing the system, it invokes the BootBIOS. The console screen shows a prompt similar to "Emulex LightPulse....<alt e> to configure, s to skip". Use the <Alt> and <E> keys to enter the BootBIOS. Refer to the online BootBIOS documentation for instructions for configuration instructions.
3. Prepare the operating system:
 - Configure NetWare 6.5 according to Novell-recommended practices. Consult the NetWare 6.5 documentation for more details.

- Be sure to have a diskette available with the latest version of the Emulex NetWare driver files (lpfc.ham and lpfc.ddi).
4. Boot from the NetWare installation CD:
 - a. If the server is not powered on, power on the server.
 - b. Insert the NetWare 6.5 OS Installation CD in the server's CD drive.
 - c. At the "Install or Run" prompt, select Install.
 - d. Confirm creating an active DOS partition of 2 GB.
 - e. When prompted for "Disk drivers," press <Insert> to install an unlisted driver.
 - f. Press <F3> to specify the driver directory path, for example A:\
 - g. Select the Emulex driver lpfc.ham and continue with the standard Novell installation procedure.
 - h. For most applications, leave all driver options in default mode. When attaching the driver to an array, enable the /LUN option and set a MAX_LUN value depending upon the array configuration. Once installation finishes, the server resets and boots from the boot drive.

Shutting Down, Resetting and Restarting the Server

The process of shutting down, resetting and restarting the server differs if you use lpfc.ham with an FC boot drive. The process is also affected by your choice of automatic power options (selected when you installed NetWare) and boot selection.

- If you have installed acpidrv.psm:
 - By default, the Down command completes shutdown and powers the system off. Perform the necessary hardware maintenance. Then power the system back on.
 - By default, the Restart Server command does a warm-reset of the server and reboots the system.
- If you have not installed acpidrv.psm or if the server configuration parameter "Server Power Down Options" is set to off:
 - The Down command completes and this message appears on the console screen:

```
The server is now ready to be powered off.  
It is not possible to exit to DOS.  
Power the system off and perform the necessary hardware maintenance. Then power the system back on.
```
 - The Restart Server command completes and this message appears on the console screen:

```
The server is now ready to be powered off.  
Power the system off and perform the necessary hardware maintenance. Then power the system back on.
```
- The Reset Server command always completes shutdown by performing a warm-reset of the server and rebooting.

Updating x86 BootBIOS Using the Dos Offline Utility

You can use the DOS offline utility to load x86 BootBIOS from the command line on one HBA or to all HBAs of the same type in your system.

The following items are required to load x86 BootBIOS:

- The appropriate x86 BootBIOS file has been downloaded and extracted to a local drive, for example C.
- A copy of DosLpCfg is available.

You can enable the BootBIOS bootup message or load an updated version of BootBIOS by installing the HBA in a DOS system and using the DOS offline utility. To use the DOS offline utility to update x86 BootBIOS:

1. Boot your system with DOS. Do not run the utility from a DOS window.
2. From the directory where the DosLpCfg.exe file resides, enter the command:
`DosLpCfg`
3. A window displays a list of DosLpCfg commands and the C:\> prompt near the bottom.

```

C:\>DosLpCfg
Please enter a valid command after DOSlpcfg name!
Available Commands:
  @
download          config          directdownload  disableboot
intloopback       enableboot     extloopback     help (or ?)
listIoBase        jumper        listboot        listhba
pciloopback       listrev       listWWN         logfile
repeat           posttest      readbootdevice  readconfig
restoreWWN        reset         restoreDefWWN   restoreNUWWN
scriptUWWPN       saveWWN       screendisplay   scriptUWWNN
setbootdevice     version       scriptWWPN      setAltBoot
writeWWN
Enter DOSLPCFG help <command> or DOSLPCFG ? <command> for syntax display
C:\>

```

Figure 7: DosLpCfg Opening Screen

Note: DosLpCfg is not case sensitive. DosLpCfg works the same as doslpcfg.

Note: You must begin every DosLpCfg command with *DosLpCfg*.

4. In DosLpCfg, you can use the download command to load new firmware to one or many HBAs.
 - Select individual HBAs by adapter number.
 - Select a group of (similar) HBAs by adapter name.
5. If you want to update more than one adapter, you will need the adapter names. The listhba command lists all adapters including their names. On dual-port boards, each port has its own adapter number. The syntax of the listhba command is:

```
DosLpCfg listhba
```

Following is a typical listhba result.

Adapter No.	WWN Word 1	WWN Word 2	Firmware	Adapter name
adapter 1:	10000000	C9420964	Functional FW: TS2.12X2	LP10000DC
adapter 2:	10000000	C9420964	Functional FW: TS2.12X2	LP10000DC
adapter 3:	10000000	C96C182E	Functional FW: WS2.70A5	LPe1150-F4
adapter 4:	10000000	C96C146D	Functional FW: WS2.70A5	LPe1150-F4
adapter 5:	10000000	C94B0718	Functional FW: ZS2.72A2	LPe11002-F4
adapter 6:	10000000	C94B0719	Functional FW: ZS2.72A2	LPe11002-F4

6. The syntax of the download command is:

```
DosLpCfg download <n=adapter> <i=imagename>
```

Or:

```
DosLpCfg download <a=adaptername> <i=imagename>
```

Note: No spaces are allowed on either side of an equal sign (=).

If you are downloading on a dual-channel HBA, repeat step 6 to download x86 BootBIOS on the second port, or use the adapter name command.

7. To load the x86 BootBIOS to *a single* HBA specified by HBA *number*, use the following format:

```
DosLpCfg download n=2 i=a:\cb170a3.prg
```

In this example, n = 2 indicates the HBA number 2 as the update target, and i =a:\cb170a3.prg indicates the path to the .prg file.

8. To load the x86 BootBIOS to *all HBAs of the same type*, specified by HBA *name*, use the following format:

```
download a=lp11xxx i=a:\cb170a3.prg
```

In this example, a = lp11xxx indicates the HBA family type, and i =a:\cb170a3.prg indicates the path to the .prg file.

Configuration

The Driver Parameters and Special Command Line Parameters can be configured to optimize the Emulex SCSI device driver for NetWare.

Driver Parameters

The following table lists the parameters alphabetically.

Table 1. Alphabetical Driver Parameter Listing

Parameter	See Page
/LUN	10
AL_PA	13
DELAY_TOUT	12
FCBOOT	12
HARD_ADDRESS_MODE	14
LINK_DOWN_TOUT	12
LINK_SPEED	11
MAX_LUN	10
MAX_QDEPTH	13
N_TIMEOUT	12
NUMBDES	14
NUMDEVICES	14
RSCNADISC	13
RSCNDELAY	12
RSCNZONE	13
SCANDOWN	14
TOPOLOGY	11

/LUN

Boolean parameter: 0 = off, 1 = on

Default = 0

If this parameter is turned off (default), access is restricted to LUN 0 of any multi-LUN device. When this parameter is turned on, multi-LUN support for the Emulex LightPulse PCI Fibre Channel HBA driver is activated. See MAX_LUN.

MAX_LUN

Minimum value = 1, maximum value = 255 (decimal)

Default = 255

MAX_LUN determines the number of LUNs supported per device. This is important for RAID arrays. This value is required if /LUN is set to 1 (turned on). The value is dependent on the device configuration.

The LUN number begins with 0. This parameter allows the driver to look for all possible LUNs with LUN number less than the selected value. For example, if MAX_LUN = 1 is selected, only LUN 0 will be found. The driver does not require all LUNs to be present, but MAX_LUN is the limit to the LUN numbers and not a count of LUNs. If only LUNs 9 through 15 are available, MAX_LUN still needs to be set to 16 or more.

The MAX_LUN parameter is provided for compatibility with older versions of the NetWare driver. In certain cases the driver will encounter a significant number of devices with only one LUN or a small number of LUNs and those devices do not respond to the SCSI command REPORT LUNS; setting a MAX_LUN value can reduce driver memory usage.

TOPOLOGY

Accepted values = 0, 1, 2, or 3

Default = 2

Topology specifies the type of link supported.

0 to specify loop topology,

1 to specify point-to-point topology (including switched fabric),

2 to attempt to use loop first, then point-to-point if loop is not found,

3 to attempt to point-to-point first, then loop if point-to-point is not found.

Note: If the actual setup is private loop using a HUB product (not a driver setting; for example, the Emulex LH5000) and topology option 3 is used to attempt point-to-point first with fail-over to loop, be sure to set the AutoLIP feature (LIP F7 on insert) to enable.

Note: Autotopology is handled by the firmware. If the driver is configured to use autotopology, it tells the firmware to use autotopology when initializing the link. If the firmware does not subsequently tell the driver for NetWare that the link is up, the initialization is considered to have failed and the driver completes loading without discovering any targets. In some cases, the firmware and the port it is connected to cannot resolve autotopology; for critical applications. It may be useful to specify the actual topology (for example, "TOPOLOGY = 1" when connected to a switch).

LINK_SPEED

Minimum value = 0, maximum value = 8

Default = 0 (appropriate for most environments)

link_speed controls the setting of the Fibre Channel link speed in HBAs capable of 2 Gbps or higher link speeds. The value 0 selects auto-negotiate. If set to auto-negotiate, the HBA attempts to match the link speed of the other devices on the link.

The value 1, 2, 4 or 8 forces the HBA to use 1 Gbps, 2 Gbps, 4Gbps or 8Gbps respectively as the link speed.

If the selected speed is not supported by the HBA, a "link init failure" will be reported on the console and/or logger screens.

FCBOOT

Minimum value = 0, maximum value = 1

Default = 1

If this parameter is enabled (value = 1) a device attached to the selected Fibre Channel HBA can boot NetWare 6.5 (or a later version). If this parameter is disabled (value 0), boot support is disabled for the HBA and the operating system is allowed to unload the driver.

N_TIMEOUT

Minimum value = 0, maximum value = 300 (decimal)

Default = 20

Node timeout controls a "second chance" for a "disappearing" device. After events such as a cable disconnect/reconnect or drive removal/insertion, the driver checks the devices it has found. If that list does not include a previously found device, and this value is not 0, the driver waits the specified number of seconds and then restarts the checking. If the device is found on the second try, then the device is considered available. If still not found, the driver rejects any further attempts to access it. The default value should be satisfactory for most cases. CLARiiON RAID arrays may require the value set to 90.

LINK_DOWN_TOUT

Minimum value = 0, maximum value = 65536 (decimal)

Default = 60

This parameter specifies the maximum time, in seconds, for a link to remain down prior to beginning to return I/O requests in error. Use a value of zero to never timeout I/O requests when the link is down. Events such as cable disconnects can cause the link to remain down indefinitely. Events such as drive removal/insertion only cause the link to be down briefly. The default value should be satisfactory for most cases.

DELAY_TOUT

Minimum value = 0, maximum value = 500 (decimal)

Default = 0

This parameter specifies a delay period to extend the timeout value of operations (such as read or write to a target device). This allows, for instance, an adjustment in timeouts when large fabrics or WAN-connected fabrics may add delays to normal response times. The default value is appropriate for most environments, and you should use care should in choosing any non-zero value.

RSCNDELAY

Minimum value = 0, maximum value = 60 (decimal)

Default = 0

RSCNDELAY specifies the time, in seconds, to delay a query to the Fibre Channel Name Server after a State Change Notification. The default value should be satisfactory for most cases.

RSCNADISC

Boolean parameter: 0 = not selected, 1 = selected

Default = 1

RSCNADISC is used in link error recovery situations. When set to 1 (default), the system uses ADISC, when possible, to rediscover a node. If set to 0, only PLOGI is used.

RSCNZONE

Boolean parameter: 0 = not selected, 1 = selected.

Default = 1

If set to 1 (default), always query the Fibre Channel Name Server after a State Change Notification. If set to 0, query only when necessary.

MAX_QDEPTH

Minimum value = 1, maximum value = 64 (decimal)

Default = 16

MAX_QDEPTH controls the number of commands that issued at one time to each LUN before automatic throttling occurs. The default value should be satisfactory for most cases.

AL_PA (Arbitrated Loop Port Address)

This parameter selects the AL_PA that the HBA requests during the loop initialization. The AL_PA selected needs a valid value. The default of 17 (hex) is compatible with previous drivers. The following table lists all possible AL_PAs. FC disks typically use values at the high end of the list; and HBAs use values at the low end.

Default = 17

Table 2. Valid AL_PA Values

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

SCANDOWN

Boolean parameter: 0 assigns to each device in the loop a fixed SCSI ID in the range of 0 to 125. 1 assigns to each device in the loop a fixed SCSI ID in the range 125 to 0. This parameter applies ONLY to private loop configurations.

Default = 0

Scan Direction for Loop Auto Binding:

When SCANDOWN=0, this option assigns to each device in the loop a fixed SCSI ID in the range 0 to 125, in increasing order depending on the AL_PA of the device. For instance, the device at AL_PA 1 is always SCSI ID x01, and the device at AL_PA xEF is always SCSI ID 125. This is the default, and matches the behavior of earlier drivers.

When SCANDOWN=1, this option assigns to each device in the loop a fixed SCSI ID in the range 125 to 0, in decreasing order depending on the AL_PA of the device. For instance, the device at AL_PA xEF is always SCSI ID 0, and the device at AL_PA x01 is always SCSI ID 125.

HARD_ADDRESS_MODE

Boolean parameter: 0 = not selected, 1 = selected

Default = 0

If HARD_ADDRESS_MODE is not selected (the default), whenever devices are discovered/rediscovered (such as after cable disconnect/connect or drive removal/insertion) the WWPN and the WWNN of the device are compared to verify that the same device is still present. If HARD_ADDRESS_MODE is selected, no checking is performed to verify that a device discovered at one Fibre Channel address is the same as the one previously found there. HARD_ADDRESS_MODE is used for certain dual-channel Redundant Array of Independent Disks (RAID) arrays where you do not have the option to retain the WWPN and the WWNN of the controller when you replace the controller. In any other situation I/O may be sent to the new device when it shouldn't be.

NUMDEVICES

Minimum value = 0, maximum value = 1000 (decimal)

Default = 400

NUMDEVICES specifies the maximum number of target devices that might be connected to the fabric. The default value should be satisfactory for most cases.

Note: To allow for loop operations, 126 additional devices are always enabled.

NUMBDES

Minimum value = 2000, maximum value = 5000 (decimal)

Default = 4000

This parameter allows resources to be tuned for the number of devices. Each BDE resource consumes 12 bytes of memory. The default value should be satisfactory for most cases.

USEADISC

Boolean parameter: 0 = not selected, 1 = selected

Default = 0

USEADISC is used in link error recovery situations (link up events). If set to 0 (default), only PLOGI is used. If set to 1, uses ADISC when possible to rediscover a node.

Special Command Line Parameters

These command line parameters in this manual are parsed separately from the rest of the command line parameters. Install-time help information is not available for them.

These parameters control whether certain Fibre Channel devices are included or excluded from the list of devices an HBA recognizes for valid connections. The following descriptions represent hex strings by "xxx...", where each x represents a hex digit.

ACCEPTDID

This parameter configures the driver to recognize a specific device by the Fibre Channel device ID for the device as the key to identification. The Fibre Channel device ID is determined by fabric and/or loop considerations, and may change if the physical connection is moved or if a change occurs in participating vs. non-participating devices, or other configuration changes take place. The syntax is:

```
ACCEPTDID=xxxxxx
```

```
ACCEPTDID=xxxxxx:lun
```

```
ACCEPTDID=xxxxxx:luny-lunz
```

The last two forms allow the parameter to refer to a specific LUN or range of LUNs.

When you need to specify several devices with similar names, an asterisk (*) may substitute for any number of the digits from the right. Only one asterisk is allowed. For example, ACCEPTDID=012345*.

ACCEPTWWPN

This parameter configures the driver to recognize a specific device with the WWPN for the device as the key to identification. The WWPN is typically based on the WWNN of a specific device. The syntax is:

```
ACCEPTWWPN=xxxxxxxxxxxxxxxxxx
```

```
ACCEPTWWPN=xxxxxxxxxxxxxxxxxx:lun
```

```
ACCEPTWWPN=xxxxxxxxxxxxxxxxxx:luny-lunz
```

The last two forms allow the parameter to refer to a specific LUN or range of LUNs.

When you need to specify several devices with similar names, an asterisk (*) may substitute for any number of the digits from the right. Only one asterisk is allowed. For example, ACCEPTWWPN=012345*.

ACCEPTWWNN

This parameter configures the driver to recognize a specific device with the WWNN for the device as the key to identification. The WWNN is typically based on the IEEE identification of a specific device. The syntax is:

```
ACCEPTWWNN=xxxxxxxxxxxxxxxxxx
```

```
ACCEPTWWNN=xxxxxxxxxxxxxxxxxx:lun
```

```
ACCEPTWWNN=xxxxxxxxxxxxxxxxxx:luny-lunz
```

The last two forms allow the parameter to refer to a specific LUN or range of LUNs.

When you need to specify several devices with similar names, an asterisk (*) may substitute for any number of the digits from the right. Only one asterisk is allowed. For example, ACCEPTWWNN=012345*

BINDDID

This parameter configures the driver to recognize a specific device with a specific SCSI ID used to identify it to the system, using a DID (a Fibre Channel address) for the device as the key to identification.

The syntax is:

`BINDDID=xxxxxx:yy` where yy is the desired SCSI ID.

BINDWWPN

This parameter configures the driver to recognize a specific device with a specific SCSI ID used to identify it to the system, using the WWPN for the device as the key to identification. The syntax is:

`BINDWWPN=xxxxxxxxxxxxxxxx:yy`

where yy is the desired SCSI ID.

BINDWWNN

This parameter configures the driver to recognize a specific device with a specific SCSI ID used to identify it to the system, using the WWNN for the device as the key to identification. The syntax is:

`BINDWWNN=xxxxxxxxxxxxxxxx:yy`

where yy is the desired SCSI ID.

REJECTDID

This parameter configures the driver to ignore a specific device with the Fibre Channel device ID for the device as the key to identification. The Fibre Channel device ID is determined by fabric and/or loop considerations, and may change if the physical connection is moved or a change in participating vs. non-participating devices, or other configuration changes. The syntax is:

`REJECTDID=xxxxxx`

`REJECTDID=xxxxxx:lun`

`REJECTDID=xxxxxx:luny-lunz`

The last two forms allow the parameter to refer to a specific LUN or range of LUNs.

REJECTWWNN

This parameter configures the driver to ignore a specific device with the WWNN for the device as the key to identification. The WWNN is typically based on the IEEE identification of a specific device. The syntax is:

`REJECTWWNN=xxxxxxxxxxxxxxxx`

`REJECTWWNN=xxxxxxxxxxxxxxxx:lun`

`REJECTWWNN=xxxxxxxxxxxxxxxx:luny-lunz`

The last two forms allow the parameter to refer to a specific LUN or range of LUNs.

REJECTWWPN

This parameter configures the driver to ignore a specific device with the WWPN for the device as the key to identification. The WWPN is typically based on the WWNN of a specific device. The syntax is:

`REJECTWWPN=xxxxxxxxxxxxxxxx`

REJECTWWPN=xxxxxxxxxxxxxxxx:lun

REJECTWWPN=xxxxxxxxxxxxxxxx:luny-lunz

The last two forms allow the parameter to refer to a specific LUN or range of LUNs.

Troubleshooting

Failback Detection Not Automatic

Situation: Failover/failback may require "scan for new devices".

Resolution: Following the release of NetWare 6.0 SP4 and NetWare 6.5 SP1, the behavior of a Novell component in the path between 3rd-party failover software and the lpfc.ham driver has changed. Some versions of the failover software may not automatically detect that failback is complete. In those cases, you may enter "scan for new devices" at the server console to complete the recovery.

Targets are Not Discovered

Situation: An autotopology option is selected for the driver for NetWare, however the driver completes loading without discovery of any targets.

Resolution: Change the driver load line to specify a specific topology. Autotopology is handled by the firmware. If the driver is configured to use autotopology, it tells the firmware to use autotopology when initializing the link. If the firmware does not subsequently tell the driver that the link is up, the initialization fails and the driver completes loading without discovering any targets.

Link Fails to Come Up

Situation: A fibre channel link fails to come up when connected to an LPe12000, LPe12002, LPe1250 or LPe121.

Resolution: If a Fibre Channel link fails to come up, verify that an 8-Gb HBA is not attempting to connect to a 1-Gb device. Only 2-Gb, 4-Gb and 8-Gb devices are supported on 8-Gb HBAs.