

Multi-boot Image for 4Gb Fibre Channel Adapters

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1. Package Contents

The multi-boot package for 4Gb Fibre Channel adapters is a compressed file that contains QLx246x/QLE220 BIOS, QLx246x/QLE220 FCode, QLx246x EFI and firmware. This package also includes the Flasutil and the VPD applications.

- The multi-boot BIOS contained in this package supports 4Gb Fibre Channel adapters on Intel x86, Intel 64, and AMD64 platforms.
- The EFI Fibre Channel driver contained in this package supports 4Gb Fibre Channel adapters on Intel IA64 platforms.
- The FCode contained in this package supports 4Gb Fibre Channel adapters on Solaris SPARC platforms.
- `readme.txt` - Readme file for the multi-boot package. This readme file contains details for the multi-boot image, including the BIOS, EFI code, and FCode contained in this package.
- `release.txt` - Release notes for the multi-boot package. This file contains revision notes for the multi-boot image, including the BIOS, EFI code, and FCode contained in the package.

2. 4Gb BIOS

This section provides user notes regarding the BIOS contained in the 4Gb multi-boot package. It includes the following topics:

- [2.1 BIOS Package Contents](#)
- [2.2 Supported Features](#)
- [2.3 Fibre Channel Adapter Configuration \(*Fast!UTIL*\)](#)
- [2.4 Updating the BIOS \(FlasUtil\)](#)
- [2.5 Additional Notes](#)

2.1 BIOS Package Contents

The following table describes the BIOS files included for updating the Fibre Channel adapter BIOS.

Filename	Description
update.bat	DOS batch file that calls the executable files to update the Fibre Channel adapter BIOS.
FlasUtil.exe	Utility to update multi-boot code and firmware.
VPD.exe	Utility to update the Fibre Channel adapter's Vital Product Data.
q24xyyy.bin	Combined binary file, which includes the binaries for the firmware, FCode, EFI, and BIOS.

2.2 Supported Features

The 4Gb BIOS package supports the following features:

- Up to 2031 target IDs.
- Up to 256 LUNs.
- Point-to-point and loop configuration.
- Boot capability in FC-AL and fabric topologies.
- Compatible with DOS, Windows 2000, Windows Server 2003, Windows XP Professional, Windows Vista, Windows Server 2008, Novell NetWare, Solaris x86, and Linux on x86, AMD64, and Intel 64 based systems.

2.3 Fibre Channel Adapter Configuration (*Fast!UTIL*)

NOTE: The *Fast!UTIL* BIOS utility does not run on SUN SPARC systems.

This section provides detailed configuration information for advanced users who want to customize the configuration of the 4Gb Fibre Channel adapter and the connected devices. You can configure the Fibre Channel adapter using *Fast!UTIL*.

To access *Fast!UTIL*, press **<ALT>+<Q>** or **<CTRL>+<Q>** during the Fibre Channel adapter BIOS initialization (it may take a few seconds for the *Fast!UTIL* menu to appear). If you have more than one Fibre Channel adapter, *Fast!UTIL* asks you to select the Fibre Channel adapter you want to configure. After changing the settings, *Fast!UTIL* reboots your system to load the new parameters.

CAUTION! If the configuration settings are incorrect, your Fibre Channel adapter may not function properly.

The *Fast!UTIL* Options menu provides the following options:

- **Configuration Settings** ([section 2.3.1](#))
- **Scan Fibre Channel Devices** ([section 2.3.2](#))
- **Fibre Disk Utility** ([section 2.3.3](#))
- **Loopback Data Test** ([section 2.3.4](#))
- **Select Fibre Channel Adapter** ([section 2.3.5](#))
- **Exit *Fast!UTIL*** ([section 2.3.6](#))

2.3.1 Configuration Settings

The following topics show and describe the configuration settings for the 4Gb Fibre Channel adapter.

NOTE: A double asterisk (**) next to the parameter entry indicates that the QLE2x0 Fibre Channel adapter also supports that feature.

The following topics show and describe the configuration settings for the 4Gb drivers:

- [2.3.1.1 Fibre Channel Adapter Settings](#)
- [2.3.1.2 Selectable Boot Settings](#)
- [2.3.1.3 Restore Default Settings](#)
- [2.3.1.4 Raw NVRAM Data](#)
- [2.3.1.5 Advanced Fibre Channel Adapter Settings](#)

NOTE: A double asterisk (**) next to the parameter entry indicates that the QLE2x0 Fibre Channel adapter also supports that feature.

2.3.1.1 Fibre Channel adapter Settings

Setting	Values	Default	Description
Host Adapter BIOS**	Enabled/Disabled	Disabled	Disabling this setting disables the ROM BIOS on the Fibre Channel adapter, which frees space in upper memory. If you are booting from an FC disk drive attached to the Fibre Channel adapter, you must enable this setting. See section 2.3.1.2 for details on specifying the boot device.
Frame Size	512/1024/2048	2048	This setting specifies the maximum frame length supported by the Fibre Channel adapter.
Loop Reset Delay	0 - 60 seconds	5 seconds	After resetting the loop, the firmware refrains from initiating any loop activity for the number of seconds specified in this setting.
Adapter Hard Loop ID	Enabled/Disabled	Disabled	This setting forces the adapter to attempt to use the ID specified in the Hard Loop ID setting.
Hard Loop ID	0 - 125	0	If the Adapter Hard Loop ID setting is enabled, the adapter attempts to use the ID specified in this setting.
Spin Up Delay**	Enabled/Disabled	Disabled	When this bit is set, the BIOS waits up to two minutes to find the first drive.
Connection Options	0/1/2	2	This setting defines the type of connection: 0 - loop 1 - point-to-point 2 - loop preferred then point-to-point
Fibre Channel Tape Support	Enabled/Disabled	Enabled	This setting enables FCP-2 recovery.
Data Rate	0/1/2/3	2	This setting determines the data rate: 0 - Fibre Channel adapter runs at 1-Gbps. 1 - Fibre Channel adapter runs at 2-Gbps. 2 - Fibre Channel adapter auto-negotiates and determines the data rate. 3 - Fibre Channel adapter runs at 4-Gbps.

** The QLE2x0 Fibre Channel adapter also supports that feature.

2.3.1.2 Selectable Boot Settings**

The **Configuration Settings** menu provides access to the **Selectable Boot Settings** option. If you enable the Host Adapter BIOS in the **Adapter Settings**, you can select the boot device as shown in the following table.

Selectable Boot Settings

Enable Selectable Boot	Boot WWPN/LUN	Device Boot
No	x	BIOS configures the first disk drive it finds as boot device.
Yes	None specified	BIOS configures the first disk drive it finds that is also a LUN 0 as boot device.
Yes	Specified	BIOS scans through the specified Boot WWPN/LUN list until it finds a disk drive. This is configured as boot device.

The **Selectable Boot Settings** option allows you to specify up to four WWPN/LUN as boot devices. To enable the **Selectable Boot** option and insert devices into the boot device locations, follow these steps:

1. From the **Configuration Settings** menu, select **Host Adapter Settings**.
2. Enable the **Fibre Channel Adapter BIOS**, then press **ESC** to return to the **Configuration Settings** menu.
3. From the **Configuration Settings** menu, select **Selectable Boot Settings**.
4. Press **ENTER** to enable or disable (toggle) the **Selectable Boot** option. Use the down arrow key to move to the **Primary** location of the **Selectable Boot List** menu.
5. Press **ENTER** to see a list of accessible devices (in the **Select Fibre Channel Device** menu).
6. Select a drive using the arrow keys to scroll down to the device you want to put into your **Selectable Boot** menu list, then press **ENTER** to select the requested device and load it into the **Selectable Boot** menu list.
7. Repeat this step to specify a secondary boot device on the QLE2x0 Fibre Channel adapter or up to three alternate boot devices.

NOTES :

- To boot from a QLogic Fibre Channel adapter in newer systems with the Phoenix and AMI multi-boot BIOS, the System BIOS Boot menu must include the Fibre Channel adapter in the correct order.
- Solaris x86 Boot from a SAN: To boot from an FC drive connected to a QLogic host Fibre Channel adapter, reboot the system and enter *Fast!Util*. Enter into the **Selectable Boot** menu, enable selectable boot and insert the BOOT drive in the Primary location of the **Selectable Boot** menu prior to performing the OS (Solaris X86) installation. For these BOOT from SAN configurations, the Solaris x86 QLA driver supports booting from the **Primary** location only. The driver will not attempt to boot from the **Alternate 1**, **Alternate 2**, and **Alternate 3** entries.

2.3.1.3 Restore Default Settings

The **Restore Defaults** option from the **Configuration Settings** menu restores the Fibre Channel adapter default settings.

2.3.1.4 Raw NVRAM Data

This option displays the adapter's NVRAM contents in hexadecimal format. This is a QLogic troubleshooting tool; you cannot modify the data.

2.3.1.5 Advanced Adapter Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Advanced Adapter Settings**. The following table describes the default settings for the 4Gb Fibre Channel adapter.

Advanced Adapter Settings

Setting	Values	Default	Description
Execution Throttle	1-65535	16	This setting specifies the maximum number of commands that can execute on any one target port. When it reaches a target port's execution throttle, the system will not issue any new commands until one of the current commands finishes executing.
LUNs per Target	0/8/16/32/64/128/256	128	This setting specifies the number of LUNs supported per target if the target does not support the Report LUN command. Multiple LUN support is typically for redundant array of independent disks (RAID) boxes that use LUNs to map drives.
Enable LIP Reset	Yes/No	No	This setting determines the type of loop initialization process (LIP) reset used when the operating system initiates a bus reset routine as follows: yes = The driver initiates a global LIP reset to reset the target devices. no = The driver initiates a global LIP reset with full login.
Enable LIP Full Login	Yes/No	Yes	This setting instructs the ISP chip to re-login to all ports after any LIP.
Enable Target Reset	Yes/No	Yes	This setting enables the drivers to issue a Target Reset command to all devices on the loop when a SCSI Bus Reset command is issued.
Login Retry Count	0 - 255	8	This setting specifies the number of times the software tries to log in to a device.
Port Down Retry Count	0 - 255 seconds	30 seconds	This setting specifies the number of seconds the software waits to retry a command to a port returning port down status.
Link Down Timeout	0 - 255 seconds	30 seconds	This setting specifies the number of seconds the software waits for a link down to come up.
Operation Mode	0/5/6	0	This setting specifies the reduced interrupt operation (RIO) modes, if supported by the software driver. The RIO modes allow posting multiple command completions in a single interrupt. This option supports the following modes: 0 - Interrupt for every I/O completion 5 - Interrupt when Interrupt Delay Timer expires 6 - Interrupt when Interrupt Delay Timer expires or no active I/Os
Interrupt Delay Timer	0 - 255 seconds	0	This setting contains the value (in 200-microsecond increments) used by a timer to set the wait time between generating an interrupt.
Enable Interrupt	Yes/No	No	Enable or disable the interrupt: Yes - Enables the BIOS to use the IRQ assigned to the 4Gb Fibre Channel adapter No - The BIOS polls for Fibre Channel adapter's RISC controller mailbox command completion status.
EV Controller Order	Enabled/Disabled	Disabled	This setting enables BIOS compatibility with older HP (G3) systems such as the ML370G3, DL360G3, and DL380G3. In the default setting, the Fibre Channel adapter BIOS will load in any CMOS location, allowing the system to boot off an FC drive even after other devices, like a floppy or CDROM. When enabled, the QLogic BIOS loads only if the Fibre Channel adapter is selected as the first controller in the system BIOS\Boot Controller Order.

2.3.2 Scan Fibre Devices

This option scans the Fibre Channel loop and lists all the connected devices by loop ID. It lists information about each device; for example, vendor name, product name, and revision. This information helps when configuring your Fibre Channel adapter and attached devices.

2.3.3 Fibre Disk Utility

This option scans the Fibre Channel loop and lists all the connected devices by loop ID. You can select a Fibre Channel hard disk and do one of the following:

- Perform a low-level format. (Most targets do not support this feature.)
- Verify the disk media.
- Verify the disk data. (Some targets do not support this feature.)
- Select a disk device.

CAUTION! Performing a low-level format destroys all data on the disk.

2.3.4 Loopback Data Test

This option allows you to perform Loopback tests. You can select one of the following Loopback tests:

- External Loopback Data Test.
- Internal 1 bit Interface Loopback Data Test.
- Internal 10 bit Interface Loopback Data Test.

NOTE: When running an external Loopback data test, make sure that the Fibre Channel loop is up or a Loopback plug is attached to the Fibre Channel adapter before starting the test. If your Fibre Channel adapter is attached to a fabric switch port, you must set the Fibre Channel adapter and Switch ports to run in Arbitrated Loop mode.

2.3.5 Select Fibre Channel Adapter

If you have a multi-port or multiple 4Gb Fibre Channel adapters in your system, use this option to select and then configure or view the settings of a specific Fibre Channel adapter port or Fibre Channel adapter.

2.3.6 EXit *Fast!UTIL*

This option allows you to exit the utility and reboot the system or to return to *Fast!UTIL*. After making changes to the QLogic Fibre Channel adapter in *Fast!Util*, make sure you save the changes before you reboot the system.

2.4 Updating the BIOS (FlasUtil)

The QLogic flash programming utility is a DOS utility. To run this utility, boot to a DOS hard drive or USB removable drive.

NOTE: Do not run this utility from drive connected to the 4Gb Fibre Channel adapters.

Make sure `Flasutil.exe` and the `q24xxyyy.bin` source files are in the same directory.

For details, see the following topics:

- [2.4.1 Flashing the BIOS](#)
- [2.4.2 FlasUtil Command Line Options](#)

2.4.1 Flashing the BIOS

To flash the BIOS:

1. Insert the 4Gb Fibre Channel adapter in the system.
2. Boot to DOS.
3. Run the update script at the command prompt:
c:\> update.bat
This script program updates the BIOS image on the Fibre Channel adapter.
4. Reboot the system.

NOTE: You can also use SANsurfer GUI/CLI to flash the Multi-boot image.

2.4.2 FlasUtil Command Line Options

The `UPDATE.BAT` file uses the executable file (`Flasutil.exe`) to update your Fibre Channel adapter BIOS. The application `FlasUtil.exe`, may also be used to read, write and verify the multi-boot image or parameters on the Fibre Channel adapter.

Use `FlasUtil` to write, read, or verify the multi-boot image on the Fibre Channel adapter. The following table describes the command line options available with this utility.

BIOS Flash Options

Option	Description
Boot Code Only	
/FB xxxx	Writes 1MB complete boot image to the Fibre Channel adapter at address xxxx. Using this option without an address writes the complete boot image to all adapters.
/CB xxxx	Verifies the 1MB complete boot image of Fibre Channel adapter at address xxxx. Using this option without an address verifies the complete boot image of all adapters.
/WB xxxx	Copies the 1MB complete boot image from the Fibre Channel adapter at address xxxx to a file (for example, QL25ROM.SAV).
/F xxxx	Writes BIOS Flash using the adapter address = xxxx. Using this option without an address writes BIOS code to all Fibre Channel adapters. If the Fibre Channel adapter already contains a valid BIOS, this option preserves the existing NVRAM contents.
/C xxxx	Verifies Flash of Adapter at Address xxxx. Using this option without an address verifies the BIOS images of all Fibre Channel adapters.
/W xxxx	Copies the image of the BIOS from the Fibre Channel adapter at address xxxx into a file (for example, QL24ROM.SAV).
/O <filename.ext>	Use <filename.ext> instead of q2xyzzz.bin.
/V xxxx	Displays current version of the BIOS on adapters at address xxxx. Using this option without an address displays the BIOS version of all adapters.
NVRAM Only	
/I xxxx	Write NVRAM to adapter at I/O address xxxx.
/D xxxx	Copy NVRAM to file: QLxxNVR.SAV, adapter address = xxxx.
/N <filename.dat>	Use <filename.dat> instead of NVRAMxx.DAT.
/X xxxx	Verify NVRAM of adapter at address xxxx.
Firmware Only	
/FR xxxx	Writes firmware to Flash, Adapter Address = xxxx. Using this option without an address writes firmware to all Fibre Channel adapters.
/CR xxxx	Verifies firmware of Adapter at Address xxxx. Using this option without an address verifies firmware of all Fibre Channel adapters.
/WR xxxx	Copies the image of the firmware from the Fibre Channel adapter at address xxxx to a file.
/VR xxxx	Displays current version of the firmware on adapters at address xxxx. Using this option without an address displays the firmware version of all adapters.
Other Options	
/S xxxx	Displays the serial number of the Fibre Channel adapter at address xxxx. Entering this option without an address displays the serial number of all adapters.
/Y xxxx	Displays the port name of the Fibre Channel adapter at address xxxx. Entering this option without an address displays the port name of all adapters.
/I	Ignore Subsystem ID.
/Q	Quiet mode, which does not display any messages.

For example, for Fibre Channel adapters with previous valid Flash and NVRAM contents, use the following command line options:

- To update the flash on a QLogic Fibre Channel adapter: `c:\>flasutil /fb /o q24xyyyy.bin`
- To update the firmware code (only) on a QLogic Fibre Channel adapter: `c:\>flasutil /fr /o 24xx.bin`

2.5 Additional Notes

- If you used an FC RAID target in a cluster environment, you should enable the `Enable Target Reset = Enabled` (Advanced Adapter Settings).
- Use `/I` option if the update utility, FlasUtil, does not detect your Fibre Channel adapter.
- Some FlasUtil options may require the use of an external filename instead of the default file. For example:
`C:\Flasutil /C /O q2xyzzz.bin`

3. 4Gb EFI

This section provides user notes regarding the EFI driver contained in the 4Gb multi-boot image. It includes the following topics:

- [3.1 EFI Package Contents](#)
- [3.2 Supported Features](#)
- [3.3 Fibre Channel Adapter Configuration](#)
- [3.4 Updating the EFI \(EfiUtil\)](#)
- [3.5 Additional Notes](#)

3.1 EFI Package Contents

The following tables describes the files included in the EFI software package.

Filename	Description
q24xyyy.bin	Combined binary file, which includes the binaries for FCode, EFI driver, and BIOS.
2x00.bin	RISC firmware file. If this file is not provided, the firmware is included in the q24xyyy.bin file.
EfiUtil.EFI	EFI Utility to update the EFI driver, firmware, and NVRAM.
QL24XX.DRV	Auxiliary driver file used for updating the Fibre Channel adapter.
UPDATE.NSH	EFI script file used to update the Fibre Channel adapter on an EFI system.
EFICFG.PDF	Adapter Configuration and Diagnostic PDF.
EFIUTIL.PDF	Adapter EfiUtil Utility PDF.

NOTES:

- Updating the adapter on an EFI system requires that all bin, efi, drv, and nsh files reside in the same directory.
- If this kit includes an EFI directory, it will contain the EFI PDF files

3.2 Supported Features

The 4Gb EFI package supports the following features:

- EFI Specification 1.10, 2.1
- EFI protocols: SCSI Pass Thru, Block IO, Driver Diagnostics, Driver configuration, and Component Name
- 382 targets
- 2047 LUNs per target
- Fabric and arbitrated loop topologies
- Boot from SAN

3.3 Fibre Channel Adapter Configuration

Refer to the EFICFG.PDF file to configure the Fibre Channel adapter parameters.

3.4 Updating the EFI (EfiUtil)

The EfiUtil is a QLogic flash programming utility for EFI. To run the utility, boot to the EFI shell. Do not run this utility from the drive connected to 4Gb Fibre Channel adapters.

Make sure efiutil.efi, ql24xx.drv and the q24xyyy.bin source files are in the same directory.

For details, see the following topics:

- [3.4.1 Flashing the EFI](#)
- [3.4.2 FlasUtil Command Line Options](#)

3.4.1 Flashing the EFI

To update the EFI driver or firmware:

1. Unzip and copy the update kit files to the root level of a USB storage device.
NOTE: Please do not change or rearrange the kit directories and/or files that were unzipped and copied to the USB storage device.
2. Connect the USB device to the EFI based system with the Fibre Channel adapters.
3. At the system's EFI shell prompt, enter the `map -r` command to map the USB device file system. You can check the mapping as follows:
`map -b`

4. Locate the USB device and change to that device. For example, if the USB device is mapped to `fs9` after the `map -r`:
`fs9: <enter>`
The EFI shell prompt should change as follows:
`fs9:\>`
5. Run the `update.nsh` script to update the EFI driver and RISC firmware. For example:
`fs9:> update.nsh`
`Update.nsh` calls `efiutil.efi` to update all of the Fibre Channel adapters.
6. Reboot the system to make the driver/firmware changes take effect.

3.4.2 EfiUtil Options

Use EfiUtil to write, read, or verify the multi-boot image on the Fibre Channel adapter.

NOTE: To perform other manual EfiUtil flash functions, refer to the `efiutil.pdf`.

3.5 Additional Notes

None

4. 4Gb FCode

This section provides user notes regarding the FCode contained in the 4Gb multi-boot image. It includes the following topics:

- [4.1 FCode Package Contents](#)
- [4.2 Supported Features](#)
- [4.3 Fibre Channel Adapter Configuration](#)
- [4.4 Updating the FCode](#)
- [4.5 Additional Notes](#)

4.1 FCode Package Contents

The following table describes the files included for the FCode software package.

Filename	Description
q24xxyy.bin	Combined binary file, which includes the binaries for the firmware, FCode, EFI, and BIOS.

4.2 Supported Features

The FCode package supports the following features:

- 2048 target IDs
- 256 LUN/targets for qla mode
- 16384 LUN/target for qlc mode
- Boot from fabric and local loop
- 1, 2, or 4-Gbps data rate
- SUN Solaris SPARC OS version 8, 9, and 10

4.3 Fibre Channel Adapter Configuration

This section describes the Fibre Channel adapter configuration for the FCode that comes packaged in the 4Gb multi-boot image. For details, see the following topics:

- Selecting QLogic/SUN Fibre Channel adapter Port at OBP ([section 4.3.1](#))
- Setting and Viewing NVRAM Parameters ([section 4.3.2](#))
- Setting and Viewing Fibre Channel Connection Mode ([section 4.3.3](#))
- Setting and Viewing Fibre Channel Data Rate ([section 4.3.4](#))
- Setting and Viewing FCode Operation Mode ([section 4.3.5](#))
- Setting and Viewing login-retry-count ([section 4.3.6](#))
- Setting and Viewing link-down-timeout ([section 4.3.7](#))
- Setting and Viewing port-down-retry-count ([section 4.3.8](#))
- Setting and Viewing max-frame-size ([section 4.3.9](#))
- Restoring NVRAM Parameter Defaults ([section 4.3.10](#))
- Displaying and Entering Boot Device Information ([section 4.3.11](#))

4.3.1 Selecting QLogic/SUN Fibre Channel adapter Port from OBP

Prior to setting Fibre Channel adapter NVRAM parameters or executing diagnostic commands, you must select the device. To select the device, you may use either `select-dev` or `select` method, as shown in the examples below.

```
{0} ok " /pci@7c0/pci@0/pci@1/pci@0,2/SUNW,qlc@1" select-dev
      ^-- must have leading space.
      or
{0} ok select /pci@7c0/pci@0/pci@1/pci@0,2/SUNW,qlc@1
```

To view a list of all devices in the system, enter the `show-devs` command.

As an alternative, you can list all attached Fibre Channel adapter devices using the `show-disks` command, as shown in the following example:

```
{0} ok show-disks
a) /pci@7c0/pci@0/pci@9/QLGC,qla@0,1/sd(QLogic FC adapter Port 1)
b) /pci@7c0/pci@0/pci@9/QLGC,qla@0/sd (QLogic FC adapter Port 0)
c) /pci@7c0/pci@0/pci@8/QLGC,qla@0/sd
d) /pci@7c0/pci@0/pci@1/pci@0,2/LSILogic,sas@2/disk
e) /pci@7c0/pci@0/pci@1/pci@0,2/SUNW,qlc@1,1/fp@0,0/disk
(SUN FC adapter Port 1)
f) /pci@7c0/pci@0/pci@1/pci@0,2/SUNW,qlc@1/fp@0,0/disk
(SUN FC adapter Port 0)
g) /pci@7c0/pci@0/pci@1/pci@0/ide@8/cdrom
h) /pci@7c0/pci@0/pci@1/pci@0/ide@8/disk
q) NO SELECTION
Enter Selection, q to quit: f
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW,qlc@1/fp@0,0/disk has been selected.
Type ^Y ( Control-Y ) to insert it in the command line.
e.g. {0} ok nvalias mydev ^Y
for creating devalias mydev for
/pci@7c0/pci@0/pci@1/pci@0,2/SUNW?qlc@1/fp@0,0/disk

{0} ok " /pci@7ce/pci@0/pci@1/pci@0,2/SUNW,qlc@1" select-dev
      ^                                     ^
enter ctrl-Y here                        use backspace to remove fp...
```

or if you had selected the a) device, then **Ctrl-Y** would produce:

```
{0} ok select /pci@7c0/pci@0/pci@1/pci@0,2/QLGC,qla@0,1
      ^
      enter ctrl-Y here
```

When you select the Fibre Channel adapter device the first time, a banner appears. For example:

```
QLogic QLE246x Host adapter FCode(SPARC): X   Y
Firmware version Z
```

where:

X = FCode version

Y = Date of FCode version release

Z = Firmware version

4.3.2 Setting and Viewing NVRAM Parameters

To list all NVRAM and diagnostic commands, enter show-commands at ok prompt. For example:

```
{0} ok show-commands
NVRAM Parameter commands
    show-settings
    set-connection-mode
    set-data-rate
    set-fc-mode
    set-login-count
    set-link-timeout
    set-port-down-count
    set-max-frame-size
    set-boot-wnn (qla mode only)
    set-boot-id  (qla mode only)
Diag Commands
    version
    beacon
    selftest
    ext-loopback-test
    show-children
    disk-test
    sel-dev
    sel-lun
```

To show the current value of all of the NVRAM parameters, as well as the version, serial number, and Fibre Channel adapter WWN, enter show-settings at the ok prompt. For example:

```
{0} ok show-settings
QLogic QLE246x Host FC adapter FCode(SPARC): X   Y
Firmware version Z
Firmware version 4.00.30
Serial# FFC0551D59046
node-wwn 200000e0 8b85867a
port-wwn 210000e0 8b85867a
Current FC adapter Connection Mode: 2 - Loop preferred, otherwise point-to-point
Current FC adapter Data Rate: Auto-negotiated
Current FCode Mode: qla
Current login-retry-count: b(11)
Current link-down-timeout: 7(7)seconds
Current port-down-retry-count: a(10)
Current max-frame-size: 800(2048)
Current Boot-WWPN: 210000203711bfb9, Boot-LUN: 1b(27), Boot-Target-
ID:aa(170)
```

where:

X = FCode version

Y = Date of FCode version release

Z = Firmware version

4.3.3 Setting and Viewing Fibre Channel Connection Mode

NOTE: If your device ID is 54xx (QLE220), you cannot change the connection-mode. By default, it uses loop preferred, otherwise point-to-point.

To change or view the current Fibre Channel connection mode, enter set-connection-mode at the ok prompt. For example:

```
{0} ok set-connection-mode
Current FC adapter connection mode: 2 - Loop preferred, otherwise point-to-point
Do you want to change it? (y/n) y
Choose FC adapter Connection Mode:
0 - Loop Only
1 - Point-to-point only
2 - Loop preferred, otherwise point-to-point
Enter: 2
Current FC adapter connection mode: 2 - Loop preferred, otherwise point-to-point
```

4.3.4 Setting and Viewing Fibre Channel Data Rate

NOTE: If your device ID is 54xx (QLE220), you cannot change the data-rate. By default, it uses Auto-Negotiated.

To change or view the current Fibre Channel data rate, enter `set-data-rate` at `ok` prompt. For example:

```
{0} ok set-data-rate
Current FC adapter Data Rate: Auto-Negotiated
Do you want to change it? (y/n) y
Choose Data Rate:
0 - 1 Gb/sec
1 - 2 Gb/sec
2 - Auto-negotiated
3 - 4 Gb/sec
Enter: 2
Current FC adapter Data Rate: Auto-Negotiated
```

4.3.5 Setting and Viewing FCode Operation Mode

FCode supports two FCode operation modes: `qla` and `qlc` (default – `qlc`).

- `qla` mode requires a driver named `qla2300`
- `qlc` mode requires a driver named `qlc`

NOTE: `qla` mode is not supported on Sun (SUNW) branded Fibre Channel adapters.

WARNING! Use extreme caution when changing the FCode mode. Changing it may cause Solaris to create new device paths for this Fibre Channel adapter, which may affect driver instance numbers and mount points in Solaris.

To set or view the FCode operation mode, enter `set-fc-mode` at the `ok` prompt. For example:

```
{0} ok set-fc-mode
Current FCode Mode: qlc
Do you want to change it? (y/n) y
Choose FCode Mode:
0 - qlc
1 - qla
enter: 0
Current FCode Mode: qlc
```

4.3.6 Setting and Viewing login-retry-count

FCode uses the `login-retry-count` NVRAM parameter to determine the number of login retries attempted to the boot device. The default value is 8. Use the `set-login-count` command to change this parameter. For example:

```
{0} ok set-login-count
Current login-retry-count: 8(8)
Do you want to change it? (y/n) y
login-retry-count: Enter 1-ff hex: 7
Current login-retry-count: 7(7)
```

4.3.7 Setting and Viewing link-down-timeout

FCode uses the `link-down-timeout` NVRAM parameter to determine the number of seconds to wait for the link to come up. The default value is 30. Use the `set-link-timeout` command to change this parameter. For example:

```
{0} ok set-link-timeout
Current link-down-timeout: 1e(30) seconds
Do you want to change it? (y/n) y
link-down-timeout: in Secs. Enter 2-ff hex: 14
Current link-down-timeout: 14(20) seconds
```

4.3.8 Setting and Viewing port-down-retry-count

FCode uses the port-down-retry-count NVRAM parameter to determine the number of retries when using the start, read, and write SCSI commands. The default value is 30. Use the set-port-down-count command to change this parameter. For example:

```
{0} ok set-port-down-count
Current port-down-retry-count: 1e(30)
Do you want to change it? (y/n) y
port-down-retry-count: Enter 1-ff hex: 10
Current port-down-retry-count: 10(16)
```

4.3.9 Setting and Viewing max-frame-size

FCode uses the max-frame-size NVRAM parameter to set the maximum frame length field in the firmware initialization control block. The default value is 2048. Use the set-max-frame-size command to change this parameter. For example:

```
{0} ok set-max-frame-size
Current max-frame-size: 800(2048)
Do you want to change it? (y/n) y
Choose max-frame-size:
1 - 512
2 - 1024
3 - 2048
enter: 2
Current max-frame-size: 400(1024)
```

4.3.10 Restoring NVRAM Parameter Defaults

Use the restore-default-settings command to restore the default values of all NVRAM parameters used by the FCode. For example:

```
{0} ok restore-default-settings
Reset all NVRAM values back to defaults. Are you sure? (y/n) y
Current FC adapter Connection Mode: 2 - Loop preferred, otherwise point-to-point
Current FC adapter Data Rate: Auto-negotiated
Current FCode Mode: qlc
Current login-retry-count: 8(8)
Current link-down-timeout: 1e(30) seconds
Current port-down-retry-count: 1e(30)
Current max-frame-size: 800(2048)
Current Boot-WWPN: 0000000000000000, Boot-LUN: 0(0), Boot-Target-ID: 0(0)
{0} ok
```

4.3.11 Displaying and Entering Boot Device Information (required for qla mode only)

If the FCode operation is in qla mode, you must save the boot device information to the Fibre Channel adapter, as shown in the following examples.

Selecting the boot device from list:

```
{0} ok set-boot-wnn
Current Boot-WWPN: 0000000000000000, Boot-LUN =0(0), Boot-Target-ID =0(0)
Do you want to change it? (y/n) y
Select one of these devices:
0 - Dev# 0   PortID 101c9   Port WWN 21000020.3711b72b
1 - Dev# 1   PortID 101ca   Port WWN 21000020.3711c1b6
2 - Dev# 2   PortID 101cb   Port WWN 21000020.3711c13a
3 - Enter Manually
Select #: 2
Boot-Target-ID: Enter 0-7ff hex: 82
Current available LUNs:
  LUN 0   DISK  SUN   StorEdge 3510   411I

Boot-LUN: Enter 0-ff hex: 0
Current Boot-WWPN: 210000203711c13a, Boot-LUN =0(0), Boot-Target-ID =
82(130)
{0} ok
```

Manually entering boot device information:

NOTE: This step is optional if `set-boot-wwn` is entered correctly.

```
{0} ok set-boot-wwn
Current Boot-WWPN: 210000203711c13a, Boot-LUN =0(0), Boot-Target-ID =3(3)
Do you want to change it? (y/n) y
Select one of these devices:
0 - Dev# 0   PortID 101c9   Port WWN 21000020.3711b72b
1 - Dev# 1   PortID 101ca   Port WWN 21000020.3711c1b6
2 - Dev# 2   PortID 101cb   Port WWN 21000020.3711c13a
3 - Enter Manually
Select #: 3
Boot-WWPN: Enter HI 32-bit hex: 11223344
Boot-WWPN: Enter LOW 32-bit hex: 55667788
Boot-Target-ID: Enter 0-7ff hex: 9a
Boot-LUN: Enter 0-ff hex: 3f
Current Boot-WWPN: 1122334455667788, Boot-LUN =3f(63), Boot-Target-ID=9a(154)
{0} ok
```

Setting and viewing the boot target ID only:

NOTE: This step is optional if `set-boot-wwn` is entered correctly.

```
{0} ok set-boot-id
Boot-Target-ID: aa(170)
Do you want to change it? (y/n) y
Boot-Target-ID: Enter 0-7ff hex: 1a
Boot-Target-ID: 1a(26)
{0} ok set-boot-wwn
Current Boot-WWPN: 210000203711bfb9, Boot-LUN: bb(187), Boot-Target-ID: 1a(26)
Do you want to change it? (y/n) n
No change
{0} ok
```

4.4 Updating the FCode

You can update the FCode using SANsurfer FC HBA Manager or the SANsurfer CLI application. Before flashing the FCode, the latest QLogic/Sun Solaris Fibre Channel adapter driver must be installed. Copy the multi-boot binary file `Q24xyyy.BIN` on the Sun SPARC system under root (`/`) directory.

For procedures on updating FCode using the SANsurfer management tools, see the FC HBA Manager Online Help and the *SCLI User's Guide*.

4.5 Additional Notes

This section provides the following information:

- Limitations ([section 4.5.1](#))
- Diagnostic commands ([section 4.5.2](#))
- Building a bootable disk ([section 4.5.3](#))

4.5.1 Limitations

- The SANsurfer FC HBA Manager and the SANsurfer CLI management tools do not show the FCode settings.
- Issue `reset-all` after modifying the FCode or fibre link/target.
- External optical loop back is required when issuing `test /pci@xxx`.
- FCode does not support loop only connection mode when attached directly to the EMC Symmetrix Storage.
- QLE2x0 does not support FL mode.

4.5.2 Diagnostic Commands

Diagnostic commands include the following:

- version ([section 4.5.2.1](#))
- beacon ([section 4.5.2.2](#))
- selftest ([section 4.5.2.3](#))
- ext-loopback-test ([section 4.5.2.4](#))
- show-children ([section 4.5.2.5](#))
- disk-test ([section 4.5.2.6](#))
- sel-dev - Select a device for disk-test.
- sel-lun - Select LUN # for disk-test.

4.5.2.1 version

To display the current FCode and firmware version, enter the `version` command at the `ok` prompt. For example:

```
{0} ok version
QLogic QLA2462 Host adapter FCode(SPARC): 1.27 08/21/07
Firmware version 4.00.30
```

4.5.2.2 beacon

The beacon feature allows you to locate a specific Fibre Channel adapter visually. When activated, this feature flashes yellow and amber LEDs on the back of the Fibre Channel adapter at approximately one second intervals.

To enable the feature:

1. Select the Fibre Channel adapter you want to locate, as described in [section 4.3](#).
2. Enter `beacon` at the prompt. The following message appears:
Flashing FC adapter LEDs, type any character to quit.
The yellow and amber LEDs on the selected Fibre Channel adapter flash until you press any character on the keyboard.

NOTE: For multi-channel Fibre Channel adapters, only one channel's LED flashes.

4.5.2.3 selftest

To perform a selftest, enter `test <node path>` at the `ok` prompt. For example:

```
{0} ok test /pci@1c,600000/SUNW,qlc@1
or
{0} ok test /pci@1d,700000/pci@2/QLGC,qlc@6,1
```

NOTE: QLogic recommends using a loopback plug to insure the external loopback test runs.

As an alternative, select the device you want to test, then enter `Selftest` at the `ok` prompt. For example:

```
{0} ok selftest
nvram ok
FCode Checksum OK
Testing memory, pattern 0 - PASS
Testing memory, pattern ffffffff - Passed
Testing memory, pattern 55aa5555 - Passed
Testing memory, pattern aaaa55aa - Passed
Testing memory, pattern a55aa55a - Passed
Testing memory, pattern 5b5a5a6a - Passed
Testing memory, pattern ff00f0f0 - Passed
Testing memory, pattern 1ff00f0e - Passed
10-bit Internal Loopback Test - Passed
1-bit Internal Loopback Test - Passed
External Internal Loopback Test - Passed
{0} ok
```

4.5.2.4 ext-loopback-test

The `ext-loopback-test` method allows you to execute the external loopback test manually. Selftest skips this test if the Fibre Channel adapter device is attached to a switch. It uses the `Diag Echo` command instead of the `loopback` command if the topology is either F-port or FL-port (switch). Not all FC switches support the `Diag Echo` command; therefore, it is skipped during selftest. For example:

```
ext-loopback-test
Switch Diag Echo Loopback Test - Passed
{0} ok
```

4.5.2.5 show-children

The `show-children` command is called after running the `probe-scsi-all` command. The `probe-scsi-all` command shows all of the SCSI target/LUNs attached to the system by executing `show-children` on all devices with the `device-type` property set to `scsi` or `scsi-fcp`. To show the targets and LUNs of a single Fibre Channel adapter, select the Fibre Channel adapter device as described in [section 4.3.1](#), then enter `show-children` at the `ok` prompt. For example:

```
{0} ok show-children
adapter portID - 10000
***** Fabric Attached Devices *****
Dev# 0   PortID 10f00   Port WWN 216000c0ff8986bf
LUN  0   DISK   SUN     StorEdge 3510   411I

{0} ok
```

4.5.2.6 disk-test

The `disk-test` command allows you to perform a simple, non-destructive, read/write data test to a selected target. To run `disk-test`:

1. Select the Fibre Channel adapter device as described in [section 4.3](#), above.
2. Enter the `show-children` command and pick a target (Dev#) and LUN from the listed devices.
3. Login to the target by entering `<dev#> sel-dev`. For example:
`7 sel-dev` (will login to Dev# 7)
4. Select a LUN by entering `<lun#> sel-lun`. For example:
`4d sel-lun` (will select LUN 4d, hex)
NOTE: You may skip this step if the `LUN # = 0`, which is the default.
5. Run `disk-test` by entering `disk-test`. This performs a `read-write-read-compare` test to the selected target, 64 blocks (32k bytes) at a time. While running, it displays the current disk block address. You can terminate the test by pressing any key.

You can also use the `disk-test` command to locate a particular target, if there is an activity LED on the target.

4.5.3 Building a Bootable Disk

This procedure assumes the system is already booted from an existing system disk, and that you have already performed a full system backup. The device name shown in this example is for a device on the third PCI bus slot, target ID 130, LUN 0, and slice 0. The device path is different on each system depending on the PCI bus slot, such as target ID and LUN.

You must have already completed the steps listed above before attempting to create a bootable disk.

This procedure involves using the Solaris command, `ufsdump` to create temporary `saveset` files for each partition on your current boot disk. This requires enough extra disk space to create the `saveset` files or your Solaris machine must have a high capacity tape drive attached.

To build a bootable disk:

1. Determine the amount of disk space used on your current boot disk using the `/usr/bin/df -k -l` command. For example:

```
# /usr/bin/df -k -l
```

Filesystem	kbytes	used	avail	capacity	Mounted on
/dev/dsk/c0t0d0s0	2577118	1650245	875331	66%	/
/proc	0	0	0	0%	/proc
fd	0	0	0	0%	/dev/fd
mnttab	0	0	0	0%	/etc/mnttab
swap	1310480	0	1310480	0%	/var/run
swap	1311344	864	1310480	1%	/tmp
/dev/dsk/c0t0d0s7	5135326	114	5083859	1%	/home

This `df` example shows that the current boot disk is `/dev/dsk/c0t0d0s(x)`. There are two partitions of interest, slice 0 or `/` and slice 7 or `/home`. Slice 0 uses 1.6GB and has 875MB free. Slice 7 uses 114KB and has 5GB free. Therefore, you can use slice 7 or `/home` to store the temporary saveset files. If the disk did not have at least 1.7GB free space, you would need to create a partition on the new bootable disk large enough to hold the largest temporary saveset plus the largest used space on a partition. In this example, that would be a partition at least 3.2GB(1.6GB+1.6GB).

2. Use the `format` command to create, label, and format partitions on the new bootable disk. These partitions must contain the contents of the temporary savesets. If you are not familiar with the `format` command, carefully read about it in the Solaris documentation and man pages.

WARNING! Misusing the `format` command could destroy the data on the current disk drives.

Example:

```
# format
partition
print
```

Current partition table (original):

Total disk cylinders available: 3880 + 2 (reserved cylinders)

Part	Tag	Flag	Cylinders	Size	Blocks
0	root	wm	0 - 2650	2.73GB	(2651/0/0) 5726160
1	swap	wu	2651 - 2930	295.31MB	(280/0/0) 604800
2	backup	wm	0 - 3879	4.00GB	(3880/0/0) 8380800
3	unassigned	wm	0	0	(0/0/0) 0
4	unassigned	wm	0	0	(0/0/0) 0
5	unassigned	wm	0	0	(0/0/0) 0
6	unassigned	wm	0	0	(0/0/0) 0
7	home	wm	2931 - 3879	1000.90MB	(949/0/0) 2049840

```
label
quit
quit
```

3. Use the `newfs` command to create the file system, as shown in the following examples.

For qla operation mode, enter:

```
# newfs -v /dev/rdsk/c3t130d0s0 (/)
```

```
# newfs -v /dev/rdsk/c3t130d0s7 (home)
```

For qlc operation mode, enter:

```
# newfs -v /dev/rdsk/c5t22000004CFDF306d0s0 (/)
```

```
# newfs -v /dev/rdsk/c5t22000004CFDF306d0s7 (home)
```

NOTE: The target device ID (t130) is in decimal format. The boot command line in step 12 uses the hexadecimal value for the target ID.

4. Mount the boot partition to the `/mnt` mount point, as shown in the following examples.

For qla operation mode, enter:

```
# mount /dev/dsk/c3t130d0s0 /mnt
```

For qlc operation mode, enter:

```
# mount /dev/dsk/c5t22000004CFDF306d0s0 /mnt
```

5. Change directory to the root partition mount point. For example:

```
# cd /mnt
```

6. Use the `ufsdump` utility to copy the root partition to the new boot disk. For example, for both qla and qlc operation mode, enter:

```
# ufsdump 0f - / | ufsrestore rf -
```

7. Enter the command:

- ```
rm restoresymtable
```
8. Install the boot block on the new boot disk, as shown in the following examples.  
**For qla operation mode**, enter:  

```
installboot /usr/platform/`uname -i`/lib/fs/ufs/bootblk
/dev/rdsk/c3t130d0s0
```

**For qlc operation mode**, enter:  

```
installboot /usr/platform/`uname -i`/lib/fs/ufs/bootblk
/dev/rdsk/c5t22000004CFDF306d0s0
```
  9. Edit the new vfstab file to properly mount the new partitions during boot. For example, to change each reference of c0t0d0s0 to 3t130d0s0 (qla mode) or c5t22000004CFDF306d0s0 (qlc mode):  

```
vi /mnt/etc/vfstab
```

**NOTE:** Replace every instance of c0t0d0 with c3t130d0 (in case of qla operation mode) or c5t22000004CFDF306d0 (in case of qlc operation mode) in the /mnt/etc/vfstab file.
  10. Edit the /mnt/kernel/drv/sd.conf to add the boot target ID and LUN number. For example:  

```
name="sd" class="scsi" target=16 lun=6;
```
  11. Shut down the system. For example:  

```
/sbin/init 0
```
  12. Boot from the newly created boot disk, as shown in the following examples.  
**For qla FCode mode**, enter:  

```
{0} ok boot /pci@if,2000/QLGC,qla@1/sd@82,0
(boot to port 0 target 130 LUN 0)
or
{0} ok boot /pci@if,2000/QLGC,qla@1,1/sd@3,ff
(boot to port 1 target 3, LUN 255)
```

**For qlc FCode mode**, enter:  

```
{0} ok boot /pci@lf,700000/SUNW,qlc@3/fp@
0,0/disk@w22000004cdf306
(In case of JBOD)
{0} ok boot
/pci@lf,700000/SUNW,qlc@3,1/fp@0,0/disk@w216000c0ff898d16,a
(Port 1, LUN No. 10) (In case of RAID)
```
  13. View the current dump device setting. For example:  

```
dumpadm
Dump content: kernel pages
Dump device: /dev/dsk/c0t0d0s1 (swap)
Savecore directory: /var/crash/saturn
Savecore enabled: yes
```
  14. Change the dump device to the swap area on the new boot drive, as shown in the following examples.  
**For qla operation mode**, enter:  

```
dumpadm -d /dev/dsk/c3t130d0s1
```

**For qlc operation mode**, enter:  

```
dumpadm -d /dev/dsk/c5t22000004cdf306d0s1
```

**NOTE:** The following two steps set the newly created boot disk as the default boot disk.
  15. Create an alias entry for the new boot device (optional). For example, at the ok prompt, enter:  

```
{0} ok nvalias fibredisk /pci@lf,700000/SUNW,qlc@3/fp@0,0/disk@w22000004cdf306
```
  16. Set default boot device to be the new boot device (optional). For example, at the ok prompt, enter:  

```
{0} ok setenv boot-device fibredisk
```
  17. If desired, you can also build a SANDisk from CD/DVD or boot server. For example, at the ok prompt, enter:  

```
{0} ok boot cdrom or boot net
```

This loads the embedded qlc driver. Refer to SUN manuals for more details.

## 5. Contacting Support

Please feel free to contact your QLogic approved reseller or QLogic Technical Support at any phase of integration for assistance. QLogic Technical Support can be reached by the following methods:

Web: <http://support.qlogic.com>

Email: [support@qlogic.com](mailto:support@qlogic.com)

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