ETERNUS

Disk storage systems

Server Connection Guide
(Fibre Channel)

for Windows®

Driver Settings for QLogic Fibre Channel Cards
Preface

This document briefly explains the operations that need to be performed by the user in order to connect an ETERNUS2000 model 100 or 200, ETERNUS4000 model 300, 400, 500, or 600, or ETERNUS8000 model 700, 800, 900, 1100, 1200, 2100, or 2200 Disk storage system to an Industry Standard Server running Windows®.

This document should be used in conjunction with other applicable user manuals such as those for the ETERNUS2000 model 100 or 200, ETERNUS4000 model 300, 400, 500, or 600, or ETERNUS8000 model 700, 800, 900, 1100, 1200, 2100, or 2200 Disk storage system, server, OS used, Fibre Channel cards, drivers, etc.

Note that this manual refers the following documents.

- Server Support Matrix
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel)
- ETERNUS Disk Storage System Settings
- ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for Windows®

Also, note that in this document the ETERNUS2000 models 100 and 200, ETERNUS4000 models 300, 400, 500, and 600, and ETERNUS8000 models 700, 800, 900, 1100, 1200, 2100, and 2200 Disk storage systems are collectively referred to as ETERNUS Disk storage systems.

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The Contents and Structure of this Manual

This document is composed of the following six chapters and an appendix.

- Chapter 1 Workflow
  This describes how to setup the server and QLogic Fibre Channel card driver when connecting the ETERNUS Disk storage systems to the server via QLogic Fibre Channel cards.

- Chapter 2 Installing the Fibre Channel Card
  This describes how to install a Fibre Channel card.

- Chapter 3 Installing the Drivers
  This describes how to install the Fibre Channel card drivers.

- Chapter 4 Checking the Driver Version
  This describes how to check the driver version.

- Chapter 5 Setting up the Driver Parameters
  This describes how to set up the driver parameters.
Chapter 6  Installing the ETERNUS Disk Storage System Driver

This describes how to install the ETERNUS Disk storage system drivers.

An appendix contains a WWN instance management table for servers, for use in "Chapter 2 Installing the Fibre Channel Card" (page 9).

Safe Use of this Product

■ Using this manual

This manual contains important information to ensure the safe use of this product. Be sure to thoroughly read and understand its contents before using the product. After reading, store this manual in a safe place for future reference.

FUJITSU has made every effort to ensure the safety of the users and other personnel, and to prevent property damage. When using this product, carefully follow the instructions described in this manual.

Acknowledgments

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Naming Conventions

■ OS names

- "Windows Server® 2008 R2" represents the following products.
  - Microsoft® Windows® Web Server 2008 R2
  - Microsoft® Windows Server® 2008 R2 Standard
  - Microsoft® Windows Server® 2008 R2 Enterprise
  - Microsoft® Windows Server® 2008 R2 Datacenter
  - Microsoft® Windows Server® 2008 R2 for Itanium-based Systems
• "Windows Server® 2008" represents the following products.
  - Microsoft® Windows Server® 2008 Standard
  - Microsoft® Windows Server® 2008 Enterprise
  - Microsoft® Windows Server® 2008 Datacenter
  - Microsoft® Windows Server® 2008 for Itanium-based Systems

• "Windows Server® 2003" represents the following products.
  - Microsoft® Windows Server® 2003, Enterprise Edition
  - Microsoft® Windows Server® 2003, Standard x64 Edition
  - Microsoft® Windows Server® 2003, Enterprise x64 Edition
  - Microsoft® Windows Server® 2003 R2, Standard Edition
  - Microsoft® Windows Server® 2003 R2, Enterprise Edition
  - Microsoft® Windows Server® 2003 R2, Standard x64 Edition
  - Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition
  - Microsoft® Windows® Storage Server 2003 R2, Standard Edition
  - Microsoft® Windows® Storage Server 2003 R2, Enterprise Edition
  - Microsoft® Windows® Storage Server 2003 R2, Standard x64 Edition
  - Microsoft® Windows® Storage Server 2003 R2, Enterprise x64 Edition
  - Microsoft® Windows® Storage Server 2003 R2, Standard x64 Edition
  - Microsoft® Windows® Storage Server 2003 R2, Enterprise x64 Edition

• "Windows® 2000" represents the following products.
  - Microsoft® Windows® 2000 Server operating system
  - Microsoft® Windows® 2000 Advanced Server operating system

■ Other names

• "Fibre Channel card" refers to the Fibre Channel interface module normally used in the server. A "Host Bus Adapter" (HBA) or "Channel Adapter" (CA) may be used instead, depending on the server.
• "Fibre Channel cable" refers to the cable that is used to connect the ETERNUS Disk storage systems and server via a Fibre Channel interface. "FC cable", "optical fibre cable", or "multi mode Fibre Channel cable" may be used instead, depending on the storage system.
• Italics are used to show variables such as values and characters that appear in command parameters and output examples.
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Chapter 1  Workflow

This chapter describes how to install and set up QLogic Fibre Channel cards.

Workflow

1. Install the Fibre Channel Card
   - Install the Fibre Channel cards and acquire the Fibre Channel card information.
     - "Chapter 2 Installing the Fibre Channel Card" (page 9)
     - "Appendix A WWN Instance Management Table for the Server (Blank)" (page 22)
   - (Not Itanium-based Systems)
   - (Itanium-based Systems)

2. Set the BIOS parameters
   - Set the BIOS parameters.
     - "2.1 For non-Itanium-based Systems" (page 9)

3. Install and Set Up the EFI Code
   - Install and set up the EFI Code (Boot Code).
     - "2.2 For Itanium-based Systems" (page 14)

4. Install the Fibre Channel Card Driver
   - Identify the required Fibre Channel card driver and install it.
     - "Chapter 3 Installing the Drivers" (page 18)
     - "Chapter 4 Checking the Driver Version" (page 19)
     - Identify the required driver version.
       - "Server Support Matrix"
Install the ETERNUS Disk Storage System Driver

If it is required, install the ETERNUS Disk Storage System driver

**Refer**
- Check the driver-related notes.
  - "Chapter 6 Installing the ETERNUS Disk Storage System Driver" (page 21)
  - "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for Windows®"

Once all these steps have been completed, proceed as described in "ETERNUS Disk storage systems Server Connection Guide (Fibre Channel) for Windows®".
Chapter 2 Installing the Fibre Channel Card

2.1 For non-Itanium-based Systems

Install the Fibre Channel card to the server, and acquire the physical address and World Wide Name (WWN) for the Fibre Channel card. The physical address and WWN of a Fibre Channel card are required information in the following cases: when an error has occurred in the system, when using the ETERNUS Disk storage systems (security function, host affinity function, etc.) to restrict server access, or when connecting the ETERNUS Disk storage systems and the server using Fibre Channel switch.

Acquire the physical address and WWN when installing the Fibre Channel card, because they cannot be determined from BIOS and OS. Physical address and WWN must be assigned to "WWN instance management table for the server".

(1) Install the Fibre Channel card
(2) Turn on the server
(3) Acquire the physical address and WWN for the Fibre Channel card
(4) Add a record for the server in the WWN instance management table for the server
(5) Set the Fibre Channel card

When installing two or more Fibre Channel cards to the server, first turn off the server, then repeat Steps (1) through (5) above for each Fibre Channel card to be installed.

The procedure is as follows.

**Procedure**

1. Install the Fibre Channel card to the server.
   For the installation method, slot positions and notes regarding the Fibre Channel card, refer to the manual provided with the Fibre Channel card or the User Guide of the server.

2. Turn on the server, and press the [Ctrl] + [Q] keys while the following message is displayed.

   QLogic Corporation
   QLA23xx PCI Fibre Channel ROM BIOS Version *.**
   Copyright(C) QLogic Corporation 2000. All rights reserved
   www.qlogic.com
   Press <CTRL-Q> for Fast!UTIL
"Fast!UTIL" program starts up (Startup may take longer than usual).

3 Check the value of [I/O Address] of the [Select Host Adapter] window. The value of [I/O Address] is the physical address.


6 Check the value of [Adapter Port Name]. The value of [Adapter Port Name] is the Fibre Channel card WWN.
7 Record the physical address and WWN in the WWN instance management table for the server (found in "Appendix A WWN Instance Management Table for the Server (Blank)" (page 22)).

The following shows an example of this.

<table>
<thead>
<tr>
<th>Physical slot name</th>
<th>Fibre Channel card WWN</th>
<th>Instance name</th>
<th>Physical address</th>
<th>Cable tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>slot0</td>
<td>20 00 00 E0 8B 02 14 D0</td>
<td>3400</td>
<td>SERV1_SLOT0 to SN200_1_port0</td>
<td></td>
</tr>
</tbody>
</table>

8 Set up the Fibre Channel card.

Check the values for each parameter in the [Host Adapter Settings] window.

Set the various parameters, referring to the following table.

For details on how to set the values, refer to BIOS Readme file and Fibre Channel card user guide.

Do not modify any parameters other than those described in the following table.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>8Gbps</th>
<th>4Gbps</th>
<th>2Gbps</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Address</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOS Revision (*1)</td>
<td></td>
<td></td>
<td></td>
<td>Settings cannot be changed.</td>
</tr>
<tr>
<td>Adapter Serial Number</td>
<td>Fixed for each card</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interrupt Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapter Port Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Host Adapter BIOS</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td></td>
</tr>
<tr>
<td>Frame Size</td>
<td>2048</td>
<td>2048</td>
<td>2048</td>
<td></td>
</tr>
<tr>
<td>Loop Reset Delay</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Adapter Hard Loop ID</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td></td>
</tr>
<tr>
<td>Hard Loop ID</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Spinup Delay</td>
<td>Disabled</td>
<td>Disabled</td>
<td>Disabled</td>
<td></td>
</tr>
<tr>
<td>Connection Options</td>
<td>0 or 1</td>
<td>0 or 1</td>
<td>0 or 1</td>
<td>&quot;0&quot; for an FC-AL connection, &quot;1&quot; for a fabric connection</td>
</tr>
</tbody>
</table>
> Chapter 2  Installing the Fibre Channel Card

2.1  For non-Itanium-based Systems

---

*1: BIOS version of the Fibre Channel card is displayed.
Check that the BIOS version is the same as shown in "Server Support Matrix".

9 Return to the [Configuration Settings] menu by pressing the [Esc] key.

The [Advanced Adapter Settings] window appears.

---

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fibre Channel card type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape Support</td>
<td>8Gbps  4Gbps  2Gbps</td>
<td>If &quot;Enabled&quot; is set, it must be changed to &quot;Disabled&quot;.</td>
</tr>
<tr>
<td>Data Rate</td>
<td>ETERNUS 2000: &quot;3&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ETERNUS 4000 or ETERNUS 8000 - &quot;4&quot; for 8Gbps CA (maximum speed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- &quot;3&quot; for a 4Gbps CA (maximum speed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;3&quot; for an 8Gbps or 4Gbps CA (maximum speed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;1&quot; for a 2Gbps CA (maximum speed)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;0&quot; for a 1Gbps CA (maximum speed)</td>
<td></td>
</tr>
</tbody>
</table>

---

"1": BIOS version of the Fibre Channel card is displayed.
Check that the BIOS version is the same as shown in "Server Support Matrix".

---

Advanced Adapter Settings:

- Execution Throttle :xx
- LUNs per Target :8
- Enable LIP Reset :No
- Enable LIP Full Login :Yes
- Enable Target Reset :Yes
- Login Retry Count :8
- Port Down Retry Count :30
- Link Down Timeout :30
- Extended Error Logging :Disabled
- RIO Operation Mode :0
- Interrupt Delay Timer :0

---
Set the various parameters, referring to the following table.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fibre Channel card type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8Gbps</td>
<td>4Gbps</td>
</tr>
<tr>
<td>Execution Throttle</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>LUNs per Target</td>
<td>128</td>
<td>128</td>
</tr>
<tr>
<td>Enable LIP Reset</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Enable LIP Full Login</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Enable Target Reset</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Login Retry Count</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Port Down Retry Count</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Link Down Timeout</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Operation Mode</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Interrupt Delay Timer</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Enable Interrupt</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>EV Controller Order</td>
<td>Disabled</td>
<td>—</td>
</tr>
<tr>
<td>EV Boot Order</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Extended Error Logging</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*1: Some BIOS versions may not have the "Extended Error Logging", "Enable Interrupt", or "EV Boot Order" parameters.
*2: Only for 8Gbps Fibre Channel cards.

11 Press the [Esc] key twice to return to the [Fast!UTIL Options] menu.

If the BIOS settings were changed, save the settings using [Save xxxxxx].

When two or more Fibre Channel cards are installed to the server, select the second or later Fibre Channel card using the following Steps, and set the BIOS of selected card.

11-1 Select [Select Host Adapter] from the [Fast!UTIL Options] menu and press the [Enter] key.

The [Select Host Adapter] window appears.
11-2 Select the Fibre Channel card to be set (BIOS setting) in [Select Host Adapter] window.

<table>
<thead>
<tr>
<th>Adapter Type</th>
<th>I/O Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>QLA2xxx</td>
<td>3400</td>
</tr>
<tr>
<td>QLA2xxx</td>
<td>3800</td>
</tr>
</tbody>
</table>

The [Fast!UTIL Option] menu appears. Then perform Step 3 through Step 11 shown here.

12 Select [Exit Fast!UTIL] and press the [Enter] key.

The following window appears.

13 Select [Reboot System] and press the [Enter] key.

The server reboots.

To return to the [Fast!UTIL] menu, select [Return to Fast!UTIL].

End of procedure

2.2 For Itanium-based Systems

Procedure

1 Install the EFI code.

1-1 Download the EFI code from the QLogic Corp. web-site.

1-2 Unpack the downloaded file and copy it to a floppy disk.

Example: Unpack "qlx24xx-qle2x0clf1.56risc4.00.26.zip" and copy "Q24CF156.BIN", "update.nsh", and "efiutil.efi" to a floppy disk.

1-3 Load the EFI floppy disk in the server and (re)boot the server.

1-4 Select the EFI shell, search for the floppy disk using the device map and move to the floppy disk.

On Japanese keyboards, press the [Shift] + [;] keys to get the ":" character.

Shell>blk0:
1-5 Identify and record all the installed adapter information details. Execute the following commands from the EFI shell. For the QLA2462, information for two ports will be displayed.

```
blk0> efiutil all info
```

1-6 Write the driver image to the ROM. Execute the following commands from the EFI shell.

```
Caution On Japanese keyboards, press the [\] key to get the "=" character.

blk0> efiutil adapter=0 efi_write=Q24CF156.BIN
blk0> efiutil adapter=1 efi_write=Q24CF156.BIN
```

1-7 Execute the "exit" command and return to EFI shell.

2 Set the EFI code.

2-1 Execute the following command.

```
Shell> drivers -b
```

The QLogic Fibre Channel Driver value (DRVNUM) will be displayed on the very left, in the DRV column.

2-2 Execute the following command.

```
Shell> drvcfg DRVNUM
```

The "CTRLNUM" is displayed.

2-3 Execute the following command with these DRVNUM and CTRLNUM values.

```
Shell> drvcfg -s DRVNUM CTRLNUM
```

The "Edit Adapter Settings" and "Edit Advanced Settings" screens will be displayed.
(1) Select "Edit Adapter Settings"
Set the various parameters, referring to the following table.
For the QLA2460 and QLA2462 Fibre Channel cards, set the following EFI-related parameters to the indicated values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Hard Loop ID</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Hard Loop ID</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reset Delay</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Enable FC Tape</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>Frame Size</td>
<td>2048</td>
<td></td>
</tr>
<tr>
<td>Connection Options</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loop Only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(FC-AL connection)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Point To Point</td>
<td>(Fabric connection)</td>
</tr>
<tr>
<td>Data Rate</td>
<td>4Gb/s (4Gbps fixed), 2Gb/s (2Gbps fixed), or 1Gb/s (1Gbps fixed)</td>
<td>The default value is &quot;4Gb/s&quot;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| (2) Select "Edit Advanced Settings"
Set the various parameters, referring to the following table.
For the QLA2460 and QLA2462 Fibre Channel cards, set the following EFI-related parameters to the indicated values:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Mode</td>
<td>Interrupt for every I/O completion</td>
</tr>
<tr>
<td>Interrupt Delay Timer (dec)</td>
<td>0</td>
</tr>
<tr>
<td>Execution Throttle (dec)</td>
<td>16</td>
</tr>
<tr>
<td>Login Retry Count (dec)</td>
<td>8</td>
</tr>
<tr>
<td>Port Down Retry Count (dec)</td>
<td>30</td>
</tr>
<tr>
<td>Link Down Timeout (dec)</td>
<td>30</td>
</tr>
<tr>
<td>Luns Per Target (dec)</td>
<td>128</td>
</tr>
<tr>
<td>Enable Extended Logging</td>
<td>n</td>
</tr>
<tr>
<td>Enable LIP Reset</td>
<td>n</td>
</tr>
<tr>
<td>Enable LIP Full Login</td>
<td>y</td>
</tr>
<tr>
<td>Enable Target reset</td>
<td>y</td>
</tr>
<tr>
<td>LED Mode</td>
<td>QLogic</td>
</tr>
</tbody>
</table>

(3) Enter "Write" to save any changes to the adapter settings.
Referring to the above tables, check that the appropriate parameters have been correctly set for each Fibre Channel card.

(4) Enter "Quit" to return to the EFI shell.
3 If setting the driver parameters for multiple adapters, specify the next adapter's DRVNUM and CTRLNUM and repeat from Step 2-3.

End of procedure
Chapter 3  Installing the Drivers

Refer to the Fibre Channel card documentation for details on how to obtain and install the Fibre Channel card driver.
Chapter 4  Checking the Driver Version

Use the Device Manager to check the version of the Fibre Channel card driver.

Procedure

1  In the Device Manager go to [SCSI and RAID controllers], and open the [Properties] of the Fibre Channel card.

2  Select the [Driver] tab, and open the [Driver Details].

3  Select the "lpxnds.sys" driver file, and check its [File version].

Caution  If a different driver version is displayed from that shown in "Server Support Matrix", reinstall the driver.

End of procedure
Chapter 5  Setting up the Driver Parameters

Driver parameter settings do not need to be adjusted when a QLogic Fibre Channel card is used.
Chapter 6  Installing the ETERNUS Disk Storage System Driver

Install the driver for ETERNUS Disk storage systems to the server if necessary.

- Refer to "Driver Notes" section in "ETERNUS Disk storage systems Server Connection Guide (Fiber Channel) for Windows®" for notes on each driver. This section applies when using path redundancy control (path fail-over) for a multipath connected ETERNUS Disk storage system or when connecting the ETERNUS Disk storage system to the server via single-path.

- For details on how to install, uninstall, set up and operate the ETERNUS Disk storage systems' driver, refer to the Readme file or the User Guide provided with the software.
Appendix A  WWN Instance Management Table for the Server (Blank)

This table is used in "Chapter 2 Installing the Fibre Channel Card" (page 9). Utilize this table if necessary.

<table>
<thead>
<tr>
<th>Host name</th>
<th>IP Address</th>
<th>Physical slot name</th>
<th>Fibre Channel card WWN</th>
<th>Instance name</th>
<th>Physical address</th>
<th>Cable tag</th>
</tr>
</thead>
</table>
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