



Software Installation Guide for the QLA2200 Board Family

Fibre Channel Host Adapter Boards
for the PCI Bus

FC0153302-00 D
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Drivers Affected for the Following Operating Systems
SCO UnixWare 7.0 and 7.1 Novell NetWare 4.X and 5.X Windows NT 4.0 Windows 2000 Solaris SPARC v2.6 and 7 Solaris x86 v2.6 and 7 Red Hat Linux 6.0 and 6.1 kernel (versions 2.2.X and above), and 6.2 kernel (versions 2.2.14-5.0 and 2.2.14-6.1)

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Section 1

Introduction

NOTE: The following QLogic host adapter boards are collectively referred to as the **QLA22xx board** unless otherwise noted:

- ❑ **QLA2200** family (64-bit PCI to Fibre Channel copper media):
 - FC0210406-03 (ISP2200 chip)
 - FC0210406-04 (ISP2200A/33 chip)
 - FC0210406-05 (ISP2200A/66 chip)
- ❑ **QLA2200F** family (64-bit PCI to Fibre Channel optical media):
 - FC0310406-03 (ISP2200 chip)
 - FC0310406-04 (ISP2200A/33 chip)
 - FC0310406-05 (ISP2200A/66 chip)
- ❑ **QLA2202F** family (64-bit PCI to dual channel optical media):
 - FC0610403-04 (ISP2200A/33 chip)
 - FC0610403-05 (ISP2200A/66 chip)
- ❑ **QLA2204F** family (64-bit PCI to quad channel optical media):
 - FC2610402-XX (ISP2200A/66 chip)
- ❑ **QLA2200G** family (64-bit PCI to Fibre Channel gigabit interface converter [GBIC]) with ISP2200A/66 chip:
 - FC3010402-01 (QLA2200G/66; without GBIC)
 - FC3010402-01(QLA2200GC/66, with GBIC copper)
 - FC3010402-01 (QLA2200GF/66; with GBIC optical)
- ❑ **QLA2200L** family (64-bit, low-profile PCI to Fibre Channel copper media):
 - FC0210408-XX (ISP2200A/66 chip)

In the chip and board names, /33 indicates 33 MHz; /66 indicates 66 MHz.

1.1

Before You Begin

After successfully installing your QLA22xx board, you are ready to install the software drivers you need for the QLA22xx board to communicate between your host machine and the attached peripherals.

1.2

Before You Install

Before you install the software drivers, you need to:

- Locate and download the appropriate drivers for your operating system. The latest version of the QLA22xx drivers for the following operating systems are located on the QLogic web site, <http://www.qlogic.com>.
 - Santa Cruz Operations (SCO) UnixWare 7.0 and 7.1
 - NetWare 4.X and 5.X
 - Windows NT 4.0
 - Windows 2000
 - Solaris SPARC v2.6 and 7
 - Solaris x86 v2.6 and 7
 - Red Hat Linux 6.0 and 6.1 kernel (versions 2.2.X and above), and 6.2 kernel (versions 2.2.14-5.0 and 2.2.14-6.1)

NOTE: QLogic drivers are self-extracting and meant to be downloaded onto diskettes. The installation instructions in this guide assume that the QLogic drivers reside on diskettes.

- Read through this guide to determine which drivers you want to install.

1.3

General Description

Software drivers for the following operating systems are provided for your QLA22xx board:

- Santa Cruz Operations (SCO) UnixWare versions 7.0 and 7.1
- Novell NetWare versions 4.X and 5.X
- Windows NT version 4.0
- Windows 2000
- Solaris SPARC v2.6 and 7
- Solaris x86 v2.6 and 7
- Red Hat Linux 6.0 and 6.1 kernel (versions 2.2.X and above), and 6.2 kernel (versions 2.2.14-5.0 and 2.2.14-6.1)

Section 2

UnixWare 7 Driver Installation (qlc2200)

2.1

Introduction

This section provides instructions for installing the UnixWare driver under the following operating system conditions:

- Initial installation of UnixWare 7.0 and the qlc2200 driver
- Initial installation of UnixWare 7.1 and the qlc2200 driver
- Installation of the qlc2200 driver in an already installed UnixWare 7.0 or 7.1 system

If UnixWare is not installed on your system, perform the installation procedures in section 2.2 (UnixWare 7.0) or section 2.3 (UnixWare 7.1). If UnixWare (7.0 or 7.1) is already installed, perform the installation procedures in section 2.4.

The latest version of the UnixWare driver package is available on the QLogic web site for UnixWare 7.0 and 7.1. The files in the driver package cannot be read nor installed from a DOS environment. Be sure to review the README.TXT for both new and changed information.

The installation of host adapter boards and devices is covered in detail in the UnixWare documentation. See the following topics for more information.

- Using boot-time loadable drivers (*Installation Guide*)
- Adding hard disks and CD-ROM drives (*System Administrator's Guide*)

2.2

Installing UnixWare 7.0 and the qlc2200 Driver

Perform the following steps to install UnixWare 7.0 and the qlc2200 driver.

1. Follow the installation instructions that come with the UnixWare 7.0 installation diskettes. During the installation, you will be prompted to install the driver for the QLA22xx board.

When installing UnixWare 7.0, the following choices appear (the asterisk is the system default):

```
( ) Install HBA diskette
(*) Proceed with installation
```

2. Remove the UnixWare 7.0 installation diskette and insert the diskette that contains the QLogic driver.

Select `Install HBA diskette`. Press <F10> to continue; the qlc2200 driver is automatically installed.

2.3

Installing UnixWare 7.1 and the qlc2200 Driver

Perform the following steps to install UnixWare 7.1 and the qlc2200 driver.

1. Follow the installation instructions that come with the UnixWare 7.1 installation diskettes. During the installation, you will be prompted to install the driver for the QLA22xx board.

When installing UnixWare 7.1, the following prompt appears:

```
Please insert your first HBA diskette. This may
be a vendor-supplied HBA if you have one,
otherwise insert the diskette labeled:
```

```
UnixWare 7.1 Host Bus Adapter Diskette for
Release 7.1
```

2. Remove the UnixWare 7.1 installation diskette and insert the diskette that contains the QLogic driver.

Press <F10> to continue; the qlc2200 driver is automatically installed.

2.4

Installing the qlc2200 Driver

Perform the following steps to install the qlc2200 driver in a previously installed UnixWare 7.0 or 7.1 system.

1. Make sure you have root privileges.
2. Enter the following text at the prompt to run the pkgadd program:

```
pkgadd -d diskette1
```

3. The following prompt appears:

```
Insert diskette into Floppy Drive 1.  
Type [go] when ready,  
or [q] to quit: (default: go)
```

4. Insert the diskette that contains the QLogic driver into drive 1 and press <ENTER> to select [go].
5. You are prompted to select a driver package. For example:

```
Installation in progress. Do not remove the  
diskette.
```

```
The following packages are available:  
1 qlc2200 QLogic QLA22XX Series  
IHV HBA (i386) 3.01
```

```
Select package(s) you wish to process (or 'all'  
to process all packages). (default: all)  
[?,??,quit]:
```

6. Type 1 and press <ENTER> to install the qlc2200 driver.
7. When the driver is installed, the following prompt appears:

```
Installation of QLogic QLA22XX Series  
IHV HBA (qlc2200) was successful.  
  
Insert diskette into Floppy Drive 1.  
Type [go] when ready,  
or [q] to quit: (default: go)
```
8. Type q and press <ENTER> to exit the installation program.
9. Remove the diskette that contains the QLogic driver.
10. Reboot the system to load the driver.

Section 3

NetWare Driver Installation (QL2200.HAM)

3.1 Introduction

This section provides instructions for installing the NetWare driver in an already installed Novell NetWare 4.X or 5.X system.

NOTE: References to Novell NetWare versions 4.X or 5.X refer to versions that are currently supported by Novell.

3.2 NetWare Driver Files and Parameters

The latest versions of the software drivers and documentation for NetWare 4.X and 5.X are available on the QLogic web site. Be sure to review the README.TXT file for both new and changed information.

You can load the QL2200.HAM driver with optional switches to customize the interface between the driver and Novell NetWare. The switches are described in table 3-1.

Table 3-1. QL2200.HAM Driver Parameters

Parameter	Description
SLOT = n	This switch specifies the PCI slot (slot <i>n</i>) in which the QLA2200 board is installed. The driver should be loaded once for each QLA2200 board in your system.
/LUNS	This switch specifies that all logical unit number (LUN) devices are scanned after the driver loads. This switch is optional.

3.3 Installing the NetWare Driver

The QL2200.HAM driver may not be compatible with NetWare versions earlier than 4.X or 5.X.

Perform the following steps to install the NetWare driver in a previously installed NetWare 4.X or 5.X system.

NOTE: The following procedure modifies your NetWare STARTUP.NCF file to load the driver automatically when your system boots.

1. Start NetWare and load the NetWare Install program from the NetWare server prompt (*SERVERNAME:*).

Type the following command if you are using NetWare 4.X:

```
LOAD INSTALL
```

Type the following command if you are using NetWare 5.X:

```
LOAD NWCONFIG
```

2. Select *Driver options* from the main menu.
3. Select *Configure disk and storage device drivers*.
4. Select *Select an additional driver*.
5. Press <INSERT> to install an unlisted driver.
6. Insert the diskette that contains the QLogic driver in an appropriate drive.
7. Press <ENTER> to scan the diskette for the QLogic driver.
8. Press <ENTER> to select the QL2200.HAM driver.
9. If prompted, select *Yes* to copy the driver.
10. You are prompted for the server directory. Type the path of the server directory, or press <ENTER> to accept the default.
11. If necessary, select *Select/Modify Driver Parameters* to modify the default settings.
12. Press <F10> to save the parameter settings.
13. Select *Save parameters and load driver* to complete the NetWare set up.

NOTE: If ASPI support is required for the SCSI devices, you must load the NWASPI.CDM module, which is provided by Novell. For example:

```
LOAD QL2200.HAM
LOAD NWASPI.CDM
```

Section 4

Windows NT Driver Installation (QL2200.SYS)

4.1

Introduction

This section provides instructions for installing the Windows NT driver under the following operating system conditions:

- Initial installation of the Windows NT 4.0 operating system and the Windows NT driver
- Installation of the Windows NT driver in an already installed Windows NT 4.0 operating system
- Installing an updated Windows NT driver in an already installed Windows NT 4.0 operating system that has an older version of the driver

4.2

Windows NT Driver Files

The latest version of the software drivers and documentation for Windows NT are available on the QLogic web site. Be sure to review the README.TXT file for both new and changed information.

4.3

Windows NT Installation

To install Windows NT 4.0 on the Fibre Channel disk that is attached to the QLA22xx board, perform the installation procedures in section 4.3.1. If Windows NT 4.0 is already loaded on your system, perform the installation procedures in section 4.3.2. If Windows NT 4.0 and an older Windows NT driver are already installed on your system, perform the update procedures in section 4.3.2.

For information about enhanced scatter/gather in Windows NT, see section 4.3.4.

4.3.1

Initial Installation of Windows NT and the Windows NT Driver

Perform the following steps to install Windows NT 4.0 on the Fibre Channel drive attached to the QLA22xx board.

1. Insert the Windows NT setup diskette or CD (if booting from a bootable CD-ROM drive) in an appropriate drive.
2. Reboot your system.
3. Press <F6> to *Install Additional Devices*.
4. Press *s* to specify an additional device.
5. Select *Other*, then press <ENTER>.
6. Insert the diskette that contains the QLogic driver into an appropriate disk drive, then press <ENTER>.
7. Select *QLogic QLA2200 PCI Fibre Channel Adapter*, then press <ENTER>.
8. Follow the standard Windows NT installation instructions to complete the Windows NT setup.

4.3.2

Installing or Updating the Windows NT Driver

Perform the following steps to add the Windows NT driver to a previously installed Windows NT 4.0 system.

NOTE: This procedure restores the default Registry parameters for the QLA22xx Windows NT driver.

1. Select *My Computer* from the desktop.
2. Select *Control Panel*.
3. Select *SCSI Adapters*.
4. Select the *Drivers* tab and click *Add*.
5. Insert the diskette that contains the QLogic driver into an appropriate drive and click *Have Disk*.
6. Type the path to the NT driver. For example:
A: \NT
7. Click *OK*.

8. Select the *QLogic QLA2200 PCI Fibre Channel Adapter*, then click *OK*.
9. Remove the diskette and click *Yes* to restart the system.

4.3.3

Updating the Windows NT Driver

Perform the following steps if a Windows NT driver is already installed and you want to install an updated version of the driver.

NOTE: This procedure does not modify the current Registry parameters for the QLA22xx Windows NT driver.

1. Open a DOS command prompt window.
2. Change the current directory to the Windows NT driver directory. For example:

```
CD \WINNT\SYSTEM32\DRIVERS
```

3. Make a backup copy of the old driver. You can copy the file into the same directory with a .SAV extension indicating that it is the saved file. For example:

```
COPY QL2200.SYS QL2200.SAV
```

4. Insert the diskette that contains the updated QLogic driver into an appropriate drive.
 5. Copy the new driver over the old driver. For example:
- ```
COPY A:\NT\QL2200.SYS
```
6. Remove the diskette that contains the QLogic driver.
  7. Reboot your system to load the updated driver.

### 4.3.4

## Enabling Enhanced Scatter/Gather

Windows NT 4.0 includes enhanced scatter/gather list support for handling very large SCSI I/O transfers. Version 4.0 supports up to 256 scatter/gather segments of 4096 bytes each, allowing transfers of up to 1,048,576 bytes. For some disk drives, it is better to reduce the transfer size to 65,536 bytes. To reduce the transfer size, change the subkey value in the registry (see the QLogic README.TXT file for more information).

#### 4.4

### QLDIRECT

The QLDIRECT driver, coupled with the QLogic Windows NT enhanced miniport driver, provides the following features:

- A highly optimized I/O path for normal read and write operations with reduced CPU utilization and increased parallelization
- Fail-over and fail-back features to reroute I/O operations to the correct path

See appendix A for further information.

#### 4.5

### QL2200IP NDIS Network Driver Installation

Your system must meet the following requirements for the QL2200IP network driver interface specification (NDIS) network driver to function properly:

- The QL2200 Enhanced + IP SCSI miniport driver must be installed.
- The *Fast!Util Drivers Load RISC Code* adapter parameter must be enabled (refer to appendix A of the *Hardware Installation Guide for the QLA2200 Board Family [FC0151103-00 D]*).
- Windows NT networking software must be installed.
- All adapters on the network must have the same value set for the maximum transfer unit (MTU) size (IP configuration parameter).

If a QL2200IP NDIS network driver is not installed on your system, perform the installation procedures in section 4.5.1. If an older QL2200IP network driver is already installed on your system, perform the update procedures in section 4.5.2.

#### 4.5.1

### Initial Installation of the QL2200IP NDIS Network Driver

Perform the following steps to install the QL2200IP NDIS network driver.

1. Select *My Computer* from the desktop.
2. Select *Control Panel*.
3. Select *Network*.
4. Select the *Adapters* tab and click *Add*.
5. Insert the diskette that contains the QLogic driver into an appropriate drive and click *Have Disk*.

6. Type the path to the QL2200IP NDIS network driver. For example:  

```
A:\NT\IP
```
7. Click *OK*.
8. Select the *QLogic QL2200IP Network Driver*, then click *OK*. The *QL2200IP Configuration Utility* dialog box opens.
9. Check that the *MTU Size* is set to the same value that is used on the other adapters on the network, then click *OK*.
10. Click *Close*. The *TCP/IP Properties* dialog box is displayed.
11. Specify an IP address and subnet mask for each adapter on the network. Each IP address must be unique and all adapters must use the same subnet mask. For example:  

```
Adapter 1
 IP address: 10.0.0.1
 Subnet mask: 255.255.0.0

Adapter 2
 IP address: 10.0.0.2
 Subnet mask: 255.255.0.0
```
12. Click *OK*.
13. Remove the diskette and click *Yes* to restart the system.

#### 4.5.2

### Updating the QL2200IP NDIS Network Driver

Perform the following steps if a QL2200IP NDIS network driver is already installed and you want to install an updated version of the driver.

1. Open a DOS command prompt window.
2. Change the current directory to the Windows NT driver directory. For example:  

```
CD \WINNT\SYSTEM32\DRIVERS
```
3. Make a backup copy of the old driver. You can copy the file into the same directory with a *.SAV* extension indicating that it is the saved file. For example:  

```
COPY QL2200IP.SYS QL2200IP.SAV
```
4. Insert the diskette that contains the updated QLogic driver into an appropriate drive.

5. Copy the new driver over the old driver. For example:  

```
COPY A:\NT\IP\QL2200IP.SYS
```
6. Remove the diskette that contains the QLogic driver.
7. Reboot your system to load the updated driver.

### 4.5.3 QL2200IP NDIS Driver Configuration

The QL2200IP NDIS driver provides optional configuration parameters. The configuration parameters are listed in table 4-1 and described in the following paragraphs.

*Table 4-1. QL2200IP.SYS Configuration Parameters*

| Parameter         | Minimum | Maximum         | Recommended Default |
|-------------------|---------|-----------------|---------------------|
| MTU Size          | 92      | 65280           | 8192                |
| Buffer Count      | 8       | 128             | 32                  |
| Buffer Size       | 512     | 65536           | 4096                |
| Header Split Size | 24      | Buffer size - 1 | 0 <sup>a</sup>      |

Table Notes

<sup>a</sup>A value of 0 indicates that the headers and data are not split.

- ❑ **MTU Size.** This parameter specifies the maximum transfer or packet size that the host system will send or receive. All systems on the network must have the same MTU size value. QLogic recommends a default value of 8192.
- ❑ **Buffer Count.** This parameter specifies the number of receive buffers that the QL2200IP driver allocates during initialization. The number of buffers multiplied by the buffer size must be equal to or greater than the MTU size. QLogic recommends a default value of 32.
- ❑ **Buffer Size.** This parameter specifies the size of each receive buffer. The buffer size multiplied by the number of buffers must be equal to or greater than the MTU size. QLogic recommends a default value of 4096.
- ❑ **Header Split Size.** This parameter accounts for packets with split headers and data. The parameter value specifies the number of bytes at the beginning of an incoming packet that must be isolated in the first receive buffer. A zero value indicates that the packet header and data are not split. QLogic recommends a default value of 0.

Perform the following steps to make QL2200IP NDIS driver configuration modifications.

1. Select *My Computer* from the desktop.
2. Select *Control Panel*.
3. Select *Network*.
4. Select the *Adapters* tab.
5. Select the *QLogic QL2200IP Network Driver*, then click *Properties*.
6. Make configuration parameter modifications as necessary.
7. Click *OK*. The Network dialog box reappears.
8. Click *Cancel*.
9. Click *Yes* to restart the system.



## *Section 5*

# Windows 2000 Driver Installation (QL2200.SYS)

### 5.1

#### **Introduction**

This section provides instructions for installing the Windows 2000 driver under the following operating system conditions:

- Initial installation of the Windows 2000 operating system and the Windows 2000 driver
- Installation of the Windows 2000 driver in an already installed Windows 2000 operating system
- Installing an updated Windows 2000 driver in an already installed Windows 2000 operating system that has an older version of the driver

### 5.2

#### **Windows 2000 Driver Files**

The latest version of the software drivers and documentation for Windows 2000 are available on the QLogic web site. Be sure to review the README.TXT file for both new and changed information.

### 5.3

#### **Windows 2000 Installation**

To install Windows 2000 on your system, perform the installation procedures in section 5.3.1. If Windows 2000 is already loaded on your system, perform the installation procedures in section 5.3.2. If Windows 2000 and an older Windows 2000 driver are already installed on your system, perform the update procedures in section 5.3.3.

### 5.3.1

## Initial Installation of Windows 2000 and the Windows 2000 Driver

Perform the following steps to install Windows 2000 on the Fibre Channel drive attached to the QLA22xx board.

1. Insert the Windows 2000 setup diskette or CD (if booting from a bootable CD-ROM drive) in an appropriate drive.
2. Reboot your system.
3. Follow the standard Windows 2000 installation instructions.
4. Press <F6> to *Install Additional Devices*.
5. Press *s* to specify an additional device.
6. Insert the diskette that contains the QLogic driver into an appropriate drive, then press <ENTER>.
7. Windows 2000 detects the *QLogic QLA2200 PCI Fibre Channel Adapter*. Press <ENTER> to continue the driver installation.
8. Press <ENTER> to continue the Windows 2000 installation.
9. Follow the instructions on the screen to complete the Windows 2000 installation.

### 5.3.2

## Installing the Windows 2000 Driver

The QLA2xxx boards are plug-and-play devices that are automatically detected by Windows 2000. Perform the following steps to add the Windows 2000 driver to a previously installed Windows 2000 system.

1. Install the QLA22xx board.
2. Power up the computer. Windows 2000 detects the QLA22xx and starts the *Found New Hardware Wizard*.
3. Click *Next*.
4. Select *Search for a suitable driver for my device (Recommended)*. Click *Next*.
5. Select *SCSI and RAID controllers* in the *Hardware Types* list, then click *Next*.
6. Click *Have Disk*. The *Install From Disk* dialog box opens.



7. Insert the diskette that contains the QLogic driver into an appropriate drive, then type the location of the Windows 2000 driver. For example:  
A:\W2K
8. Click *OK*.
9. Select *QLogic QLA2200 PCI Fibre Channel Adapter*, then click *Next*. Windows 2000 indicates that the wizard is ready to install the device.
10. Click *Next*.
11. If the *Digital Signature Not Found* dialog box appears, click *Yes*.
12. Click *Finish*.
13. Remove the diskette that contains the QLogic driver from the disk drive, then click *Yes* to restart the system.

### 5.3.3

## Updating the Windows 2000 Driver

Perform the following steps if a Windows 2000 driver is already installed and you want to install an updated version of the driver.

**NOTE:** The latest versions of the software drivers and documentation are available on the QLogic web site, <http://www.qlogic.com>.

1. Click the *Start* button on the Taskbar.
2. Select *Programs to Administrative Tools to Computer Management*.
3. Double-click *System Tools*.
4. Double-click *Device Manager*.
5. Double-click *SCSI and RAID controllers*.
6. Double-click *QLogic QLA2200 PCI Fibre Channel Adapter*.
7. Select the *Driver* tab.
8. Click *Update Driver*. The *Upgrade Device Driver Wizard* dialog box appears. Click *Next*.
9. Select *Display a list of the known device drivers for this device so that I can choose a specific driver*. Click *Next*.
10. Click *Have Disk*. The *Install From Disk* dialog box opens.
11. Insert the diskette that contains the QLogic driver into an appropriate drive, then type the location of the Windows 2000 driver. For example:

A:\W2K

12. Click *OK*.
13. Select *QLogic QLA2200 PCI Fibre Channel Adapter*, then click *Next*. Windows 2000 indicates that the wizard is ready to install the device.
14. Click *Next*.
15. If the *Digital Signature Not Found* dialog box appears, click *Yes*.
16. Click *Finish*.
17. Remove the diskette that contains the QLogic driver from the disk drive, then click *Yes* to restart the system.

## 5.4

### QLDIRECT

The QLDIRECT driver, coupled with the QLogic Windows 2000 enhanced miniport driver, provides the following features:

- A highly optimized I/O path for normal read and write operations with reduced CPU utilization and increased parallelization
- Fail-over and fail-back features to reroute I/O operations to the correct path

See appendix A for further information.

## 5.5

### QL2200IP NDIS Network Driver Installation

Your system must meet the following requirements for the QL2200IP network driver interface specification (NDIS) network driver to function properly:

- The QL2200 Enhanced + IP SCSI miniport driver must be installed.
- The *Fast!Util Drivers Load RISC Code* adapter parameter must be enabled (refer to appendix A of the *Hardware Installation Guide for the QLA2200 Board Family [FC0151103-00 D]*).
- Windows 2000 networking software must be installed.
- All adapters on the network must have the same value set for the maximum transfer unit (MTU) size (IP configuration parameter).

If a QL2200IP NDIS network driver is not installed on your system, perform the installation procedures in section 5.5.1. If an older QL2200IP network driver is already installed on your system, perform the update procedures in section 5.5.2.

### 5.5.1

## Initial Installation of the QL2200IP NDIS Network Driver

Perform the following steps to install the QL2200IP NDIS network driver.

1. Click the *Start* button on the Taskbar.
2. Select *Settings* to *Control Panel*.
3. Select *System*.
4. Select the *Hardware* tab, then click *Hardware Wizard*.
5. Select the *Add/Troubleshoot a device* radio button.
6. Select *Add a new device*.
7. Select the *No, I want to select the hardware from a list* radio button.
8. Select *Network Adapters*.
9. Insert the diskette that contains the QLogic driver into an appropriate drive and click *Have Disk*.
10. Type the path to the QL2200IP NDIS network driver. For example:  
A : \W2K\IP
11. Click *OK*.
12. Select the *QLogic QL2200IP Network Driver*, then click *Next*.
13. Click *Finish* to complete the driver installation.
14. Click *OK* to close the *System* dialog box.
15. Select *Network & Dial-up Connections* in the *Control Panel*.
16. Right-click the *Local Area Connection* icon, then select *Properties*.  
**NOTE:** If your system has multiple Local Area Connection icons, select the most recent (highest number listed).
17. Make sure the *QLA2200 PCI Adapter* is listed under *Connect using*.
18. Click *Internet Protocol (TCP/IP)*, then select *Properties*. The *TCP/IP Properties* dialog box is displayed.

19. Specify an IP address and subnet mask for each adapter on the network. Each IP address must be unique and all adapters must use the same subnet mask. For example:

Adapter 1

IP address: 10.0.0.1

Subnet mask: 255.255.0.0

Adapter 2

IP address: 10.0.0.2

Subnet mask: 255.255.0.0

20. Click *OK* to close the *TCP/IP Properties* dialog box.
21. Click *OK*.

### 5.5.2

## Updating the QL2200IP NDIS Network Driver

Perform the following steps if a QL2200IP NDIS network driver is already installed and you want to install an updated version of the driver.

1. Open a DOS command prompt window.
2. Change the current directory to the Windows 2000 driver directory. For example:

```
CD \WINNT\SYSTEM32\DRIVERS
```

3. Make a backup copy of the old driver. You can copy the file into the same directory with a .SAV extension indicating that it is the saved file. For example:

```
COPY QL2200IP.SYS QL2200IP.SAV
```

4. Insert the diskette that contains the updated QLogic driver into an appropriate drive.
5. Copy the new driver over the old driver. For example:

```
COPY A:\W2K\IP\QL2200IP.SYS
```
6. Remove the diskette that contains the QLogic driver.
7. Reboot your system to load the updated driver.

### 5.5.3

## QL2200IP NDIS Driver Configuration

The QL2200IP NDIS driver provides optional configuration parameters. The configuration parameters are listed in table 5-1 and described in the following paragraphs.

*Table 5-1. QL2200IP.SYS Configuration Parameters*

| Parameter         | Minimum | Maximum         | Recommended Default |
|-------------------|---------|-----------------|---------------------|
| MTU Size          | 92      | 65280           | 8192                |
| Buffer Count      | 8       | 128             | 32                  |
| Buffer Size       | 512     | 65536           | 4096                |
| Header Split Size | 24      | Buffer size - 1 | 0 <sup>a</sup>      |

#### Table Notes

<sup>a</sup>A value of 0 indicates that the headers and data are not split.

- MTU Size.** This parameter specifies the maximum transfer or packet size that the host system will send or receive. All systems on the network must have the same MTU size value. QLogic recommends a default value of 8192.
- Buffer Count.** This parameter specifies the number of receive buffers that the QL2200IP driver allocates during initialization. The number of buffers multiplied by the buffer size must be equal to or greater than the MTU size. QLogic recommends a default value of 32.
- Buffer Size.** This parameter specifies the size of each receive buffer. The buffer size multiplied by the number of buffers must be equal to or greater than the MTU size. QLogic recommends a default value of 4096.
- Header Split Size.** This parameter accounts for packets with split headers and data. The parameter value specifies the number of bytes at the beginning of an incoming packet that must be isolated in the first receive buffer. A zero value indicates that the packet header and data are not split. QLogic recommends a default value of 0.

Perform the following steps to make QL2200IP NDIS driver configuration modifications.

1. Select *My Computer* from the desktop.
2. Select *Control Panel*.
3. Select *Network & Dial-up Connections*.

4. Right-click the *Local Area Connection* icon, then select *Properties*.

**NOTE:** If your system has multiple Local Area Connection icons, select the connection that uses the *QLogic QLA2200 PCI Adapter*.

5. Click *Configure*.
6. Select the *Advanced* tab.
7. Make configuration parameter modifications as necessary.
8. Click *OK*.
9. Restart your system.

## Section 6

# Solaris SPARC Driver Installation (QLA2200)

### 6.1

#### Introduction

This section provides instructions for installing the Solaris SPARC driver in an already installed Solaris SPARC operating system.

The latest version of the Solaris SPARC driver package is available on the QLogic web site. The files in the driver package cannot be read nor installed from a DOS environment. Be sure to review the README.TXT for both new and changed information.

### 6.2

#### Installing the Solaris SPARC Driver

Perform the following steps to install the QLA2200 driver in a previously installed Solaris SPARC system.

**NOTE:** To install the QLA2200 driver, you must have super-user privileges.

1. Logon to the system as a superuser.
2. Insert the diskette that contains the QLogic driver in the first floppy drive.
3. Enter the following text to stop the Volume Manager:

```
/etc/init.d/volmgt stop
```

4. Enter the following text to run the package add (pkgadd) program:

```
pkgadd -d /dev/rdiskette0
```

**NOTE:** If you downloaded the driver package from the QLogic web site, you must first uncompress the file before running the pkgadd program.

5. You are prompted to insert a diskette. For example:

```
Insert diskette into Floppy Drive.
Type [go] when ready,
or [e] to eject the diskette,
or [q] to quit:
```

6. Type go and press <ENTER> to continue.
7. You are prompted to select a driver package. For example:

The following packages are available:

- 1 QLA2200 QLogic QLA2200 driver  
(sparc) Solaris 2.6, Rev=X.XX
- 2 QLA2200 QLogic QLA2200 driver  
(sparc) Solaris 2.7, Rev=X.XX

Select package(s) you wish to process (or 'all' to process all packages). (default: all)  
[?,??,q]:

**NOTE:** The revision number, X.XX, indicates the most recent version of the driver.

8. Type the number associated with the Solaris SPARC version on your system and press <ENTER> to continue.
9. You are prompted to select the directory where the driver will be installed. For example:

Processing package instance <QLA2200> from  
</dev/rdiskette0>

QLogic QLA2200 driver  
(sparc) Solaris 2.7, Rev=X.XX

Copyright (c) 1996-1999, by QLogic Corporation.  
All rights reserved.

Where do you want the driver object installed  
(default=/kernel/drv):

10. Press <ENTER> to accept the default.



11. The `pkgadd` program performs a series of checks, then posts a script warning and asks whether or not to continue the installation. For example:

```
Using </kernel/drv> as the package base
directory.
Processing package information.
Processing system information.
Verifying disk space requirements.
Checking for conflicts with packages already
installed.
Checking for setuid/setgid programs.

This package contains scripts which will be
executed with super-user permission during the
process of installing this package.

Do you want to continue with the installation of
<QLA2200> [y,n,?]
```

12. Type `y` and press `<ENTER>` to continue the driver installation. The `pkgadd` program notifies you when the driver installation is complete. For example:

```
Installing QLogic QLA2200 driver as <QLA2200>
Installing part 1 of 1.
/kernel/drv/qla2200
/kernel/drv/qla2200.conf
[verifying class <none>]
Executing postinstall script

Installation of <QLA2200> was successful.
```

13. You are prompted for an action. For example:

```
Type [go] when ready,
or [e] to eject the diskette,
or [q] to quit:
```

14. Type `q` and press `<ENTER>` to quit the installation process.
15. Remove the diskette that contains the QLogic driver.
16. Enter the following text to reboot and reconfigure the system:

```
reboot -- -r
```



## *Section 7*

# Solaris x86 Driver Installation (QLA2200)

### 7.1

#### **Introduction**

This section provides instructions for installing the Solaris x86 driver under the following operating system conditions:

- Installation of the Solaris x86 operating system on a Fibre Channel disk that is attached to the QLA22xx board. (The QLA22xx board is installed as a boot adapter.)
- Installation of the QLA22xx board as an add-on adapter in an already installed Solaris x86 (v2.6 or 7) operating system.

### 7.2

#### **Solaris x86 Driver Files**

The latest version of the Solaris x86 driver package is available on the QLogic web site. The files in the driver package cannot be read nor installed from a DOS environment. Be sure to review the README.TXT for both new and changed information.

### 7.3

#### **Solaris x86 Installation**

To install the Solaris x86 driver on the Fibre Channel disk that is attached to the QLA22xx board (installed as a boot adapter), perform the installation procedures in section 7.3.1. To install the Solaris x86 driver on a system that uses the QLA22xx as an add-on adapter, perform the installation procedures in section 7.3.2.

### 7.3.1

## Installing the Solaris x86 Driver (QLA22xx Board as a Boot Adapter)

### NOTE:

- ❑ To install the QLA22xx driver, you must have super-user privileges.
- ❑ You must install the QLA22xx host bus adapter board into your x86 system *before* installing the Solaris x86 driver.
- ❑ The QLA22xx host bus adapter must be the only boot device in the system during driver installation.

Perform the following steps to install the Solaris x86 operating system and QLA22xx driver on a Fibre Channel disk attached to the QLA22xx.

1. Insert the Solaris Configuration Assistant diskette in the first floppy drive.
2. Boot the system.
3. Press <F4> when the Configuration Assistant screen displays.
4. Remove the Configuration Assistant diskette when the *Install Driver Update* screen displays.
5. Insert the diskette that contains the QLogic driver into the first floppy drive, then press <F2>.
6. Remove the diskette that contains the QLogic driver when the *Continue Driver Update Installation* screen displays.
7. Insert the Solaris Configuration Assistant diskette in the first floppy drive, then press <F4>.
8. Follow the on-screen instructions to complete the Solaris x86 setup.
9. Select *Automatic reboot* when prompted. The system prepares for system configuration and you are prompted to insert the diskette that contains the QLA22xx driver. For example:

```
Installing unbundled device driver support.
Extracting driver list from tree...
QLA2200_990 drv/qla2200...
```

```
Please insert the Driver Update diskette labeled
QLA2200_990.
Press <ENTER> when ready.
```

10. Insert the diskette that contains the QLogic driver into the first floppy drive. Press <ENTER>.

11. The system processes the driver diskette and prompts you for additional diskettes. For example:

```
If you have additional Update diskette to install
(such as video), please insert diskette now.
Additional Update diskette to install? (y/n) [y]
```

12. Remove the diskette that contains the QLogic driver.
13. Type n.
14. Follow the on-screen instructions to complete the setup.

### 7.3.2

## Installing the Solaris x86 Driver (QLA22xx Board as an Add-on Adapter)

Perform the following steps to install the QLA22xx driver in a previously installed Solaris x86 v2.6 or 7 system.

**NOTE:** To install the QLA22xx driver, you must have super-user privileges.

1. Logon to the system as a superuser.
2. If necessary, enter the following text to start the Volume Manager:  

```
/etc/init.d/volmgt start
```
3. Insert the diskette that contains the QLogic driver in the first floppy drive.
4. Enter the following text to run the volume check program:  

```
volcheck
```
5. Start the driver installation process.

Type the following command if you are using Solaris v2.6:

```
/floppy/floppy0/DU/sol_26/i86pc/Tools/install.sh
```

Type the following command if you are using Solaris v7:

```
/floppy/floppy0/DU/sol_27/i86pc/Tools/install.sh
```

6. If you have a previously installed version of the QLA22xx driver on your system and are prompted to create a new instance of the package, type n.
7. If you are prompted to overwrite an installed instance of the QLA2200 package, type y.

8. When the driver is installed, the following information appears:

```
Using </> as the package base directory.
Processing package information.
Processing system information.
 11 package pathnames are already properly
 installed
Verifying package dependencies.
Verifying disk space requirements.

Installing QLogic QLA2200 PCI-SCSI Adapter
as <QLA2200>

Installing part 1 of 1.
/kernel/drv/qla2200
/kernel/drv/qla2200.conf
/platform/i86pc/boot/solaris/drivers/notisa.01
0/qla2200.bef
[verifying class <none>]
[verifying class <master>]
Executing postinstall script

Installation of <QLA2200> was successful.
```

9. Remove the diskette that contains the QLogic driver.
10. Enter the following text to reboot and reconfigure the system:
- ```
reboot -- -r
```

Section 8

Red Hat Linux Driver Installation (qla2x00.o/qla2x00smp.o)

8.1

Introduction

This section provides instructions for installing the QLogic Red Hat Linux driver under the following system conditions:

- Installation of the Red Hat Linux driver in a previously installed Red Hat Linux 6.0 or 6.1 kernel (version 2.2.X)
- Installation of the Red Hat Linux driver in a previously installed Red Hat Linux 6.2 kernel (versions 2.2.14-5.0 and 2.2.14-6.1)

The installation of host adapter boards and devices is covered in detail in the Red Hat documentation. See the *Making an Initrd Image* installation guide for more information.

8.2

Linux Driver Files

The latest version of the software drivers and documentation for Red Hat Linux are available on the QLogic web site. Be sure to review the README.qla2x00 and RELEASE.TXT files for both new and changed information.

8.3

Extracting and Loading the Red Hat Linux Driver

If the Red Hat Linux 6.0 or 6.1 kernel (version 2.2.X) is installed on your system, perform the installation procedure in section 8.3.1. If the Red Hat Linux 6.2 kernel (versions 2.2.14-5.0 and 2.2.14-6.1) is installed on your system, perform the installation procedure in section 8.3.2.

8.3.1

Extracting and Loading the Red Hat Linux 6.0 or 6.1 Driver

Perform the following steps to extract and load the Red Hat Linux driver in an already installed Red Hat Linux 6.0 or 6.1 kernel (version 2.2.X) system.

1. Create a directory on the boot drive of the computer to store the driver. For example:

```
mkdir /home/qla2x00
```

2. Insert the diskette that contains the QLogic driver.
3. Change the current directory to the Linux driver directory. For example:

```
cd /home/qla2x00
```

4. Copy the Linux driver file to the directory created in step 2. For example:

```
mcopy a:* /home/qla2x00
```

5. Uncompress and extract the two modules from the tar archive. For example:

```
tar -xvzf qla2x00.tgz
```

NOTE: The Tar utility extracts the following two files:

- qla2x00.o – uniprocessor version of the driver
- qla2x00smp.o – multiprocessor version of the driver

6. Copy the two modules into the subdirectory under `/lib/modules/kernel_release/`, where *kernel_release* is the kernel version.

Type the following commands if you are using Red Hat Linux 6.0:

```
cp qla2x00.o /lib/modules/2.2.5-15/scsi
cp qla2x00smp.o /lib/modules/2.2.5-15/scsi
```

Type the following commands if you are using Red Hat Linux 6.1:

```
cp qla2x00.o /lib/modules/2.2.12-20/scsi
cp qla2x00smp.o /lib/modules/2.2.12-20/scsi
```

Installing and removing the QLogic driver module is quick and easy because the driver is created as a Linux dynamically loadable module. The module is loaded using the *insmod* (loadable kernel module installation facility) utility and removed using the *rmmod* (remove module) utility.

To load the Red Hat Linux driver, type the following command after the Linux shell prompt to load the Red Hat Linux driver:

```
insmod qla2x00
```


If you are running on an SMP system, load the SMP version of the driver `qla2x00smp`. For example:

```
insmod qla2x00smp
```

NOTE: This method loads the Red Hat Linux driver for the current operating session. When you reboot the system, you must reload the QLogic driver. If you want the driver to load automatically each time the system boots, follow the instructions in section 8.4.

8.3.2

Extracting and Loading the Red Hat Linux 6.2 Driver

Perform the following steps to extract and load the Red Hat Linux driver in an already installed Red Hat Linux 6.2 kernel (version 2.2.14-5.0 or 2.2.14-6.1) system.

1. Create a directory on the boot drive of the computer to store the driver. For example:

```
mkdir /home/qla2x00
```

2. Insert the diskette that contains the QLogic driver.
3. Change the current directory to the Linux driver directory. For example:

```
cd /home/qla2x00
```

4. Copy the Linux driver file to the directory created in step 2. For example:

```
mcopy a:* /home/qla2x00
```

5. Change the current directory to the root directory. For example:

```
cd /
```

6. Extract the modules from the archive. For example:

```
zcat  
/home/qla2x00/qla2x00-vXX.YY.ZZ-2.2.14.cpio.gz  
| cpio -id
```

NOTE: Insert the driver version number in place of `XX.YY.ZZ`, for example, `02.19.02`.

7. Load the module. For example:

```
modprobe qla2x00
```

8.4

Installing the QLogic Driver Using a Ramdisk Image

The Red Hat Linux kernel 2.2.X does not automatically load the `qla2x00` driver when the system reboots. You can load the `qla2x00` driver at boot time using a ramdisk image. For more information, refer to the Red Hat installation guide.

Perform the following steps to load the `qla2x00` driver using a ramdisk image.

1. Add the following line to the file `/etc/conf.modules`. For example:

```
alias scsi_hostadapter qla2x00
```

NOTE: If there are other SCSI host adapters installed on your system and the `scsi_hostadapter` alias is used, define a different alias (for example, `scsi_hostadapterN` [where *N* is a number from 1-9]).

2. Build a new ramdisk image that contains the `qla2x00.o` object file. For example:

Type the following commands if you are using Red Hat Linux 6.0:

```
/sbin/mkinitrd /boot/newinitrd-image 2.2.5-15
```

Type the following commands if you are using Red Hat Linux 6.1:

```
/sbin/mkinitrd /boot/newinitrd-image 2.2.12-20
```

Type the following commands if you are using Red Hat Linux 6.2:

```
/sbin/mkinitrd /boot/newinitrd-image 2.2.14-5.0
```

or

```
/sbin/mkinitrd /boot/newinitrd-image 2.2.14-6.1
```

NOTE: The 2.2.5-15, 2.2.12-20, 2.2.14-5.0, or 2.2.14-6.1 file is the subdirectory under `/lib/modules/kernel_release` where the `qla2x00.o` module resides.

3. Modify the `/etc/lilo.conf` file to load the ramdisk image. Add the following line anywhere after the bootable kernel label. For example:

```
initrd=/boot/newinitrd-image
```

4. Load a new lilo file by running `/sbin/lilo`.

8.5

Building an SMP Kernel

If the Red Hat Linux 6.0 or 6.1 kernel (version 2.2.X) is installed on your system, perform the procedure in section 8.5.1 to build an SMP kernel. If the Red Hat

Linux 6.2 kernel (versions 2.2.14-5.0 and 2.2.14-6.1) is installed on your system, perform the procedure in section 8.5.2 to build an SMP kernel.

8.5.1

Building an SMP Kernel for Red Hat Linux 6.0 or 6.1

Building an SMP kernel is necessary if you are creating an SMP version of the QLogic Red Hat Linux driver for Red Hat Linux 6.0 or 6.1.

Perform the following steps to create and build an SMP kernel.

1. Extract the kernel-headers and kernel-sources RPM files from CD 1 of the Red Hat Linux distribution. For example:

```
rpm -iv kernel-headers*.rpm
rpm -iv kernel-sources*.rpm
```

2. Change to the Linux source directory. For example:

```
cd /usr/src/linux
```

3. Prepare for a new kernel using the `make mrproper` command. For example:

```
make mrproper
```

4. Create a bootable kernel image. For example:

```
make def;make clean;make boot
```

If you receive a message indicating that the kernel is too large, try compressing the image. For example:

```
make def;make clean;make bzImage
```

5. Copy the kernel image to the boot directory. For example:

```
cd arch/i386/boot
cp bzImage /boot/newsmp
```

6. Modify the `/etc/lilo.conf` file to make the boot loader load the new image. For example:

```
image=/boot/newsmp
label=newsmp
root=/dev/hda5
read-only
```

The above example makes the boot loader load the new kernel image (newsmp) in the `/boot` directory and mounts the root partition using device `/dev/hda5`.

7. Load the boot configuration. For example:

```
/sbin/lilo
```

8. At the boot prompt, "lilo:", type the name of the kernel image listed in the lilo.conf file. For example:

```
newsmp
```

8.5.2

Building an SMP Kernel for Red Hat Linux 6.2

Building an SMP kernel is necessary if you are creating an SMP version of the QLogic Red Hat Linux driver for Red Hat Linux 6.2.

Perform the following steps to create and build an SMP kernel.

1. Extract the kernel-headers and kernel-sources RPM files from CD 1 of the Red Hat Linux distribution. For example:

```
rpm -iv kernel-headers*.rpm
rpm -iv kernel-sources*.rpm
```

2. Change to the Linux source directory. For example:

```
cd /usr/src/linux
```

3. Prepare for a new kernel using the make mrproper command. For example:

```
make mrproper
```

4. Type the following command to begin kernel configuration:

```
make menuconfig
```

5. Select *SCSI Support*, then press <ENTER>.
6. Select *SCSI Low Level Drivers*, then press <ENTER>.
7. Scroll to, then press the spacebar twice to select *QLA2x00 Support* (the selection is indicated with an asterisk [*]).
8. Exit to the *Main Menu*.
9. Select *Processor type and features*, then press the spacebar.
10. Select *Symmetric multiprocessor*, then press the spacebar.
11. Exit the menuconfig program. Make sure to save the changes when prompted.
12. Change to the Linux source directory. For example:

```
cd /usr/src/linux
```

13. Create a bootable kernel image. For example:

```
make dep;make boot
```

If you receive a message indicating that the kernel is too large, try compressing the image. For example:

```
make dep;make bzImage
```

14. Create a directory for the source files. For example:

```
mkdir /home/qla2x00
```

15. Uncompress and extract the driver sources from the tar archive. For example:

```
tar -xvzf qla2x00src-vXX.YY.ZZ.tgz
```

NOTE: Insert the driver version number in place of XX.YY.ZZ, for example, 02.10.00

16. Type the following command to build and install the driver from the driver sources.

```
make SMP=1 install
```


Appendix A

QLDIRECT for Windows NT 4.0 and Windows 2000

A.1

Introduction

The QLDIRECT driver, coupled with the QLogic Windows NT enhanced miniport driver, provides the following features:

- ❑ A highly optimized I/O path for normal read and write operations with reduced CPU utilization and increased parallelization
- ❑ Fail-over and fail-back features to reroute I/O operations to the correct path

This appendix provides installation instructions for the QLDIRECT driver in an already installed Windows NT 4.0 or Windows 2000 operating system.

NOTE: The QLDIRECT driver has been tested with Windows NT 4.0 and Windows 2000. Earlier versions of these operating systems are not supported.

A.2

QLDIRECT Driver Files

QLDIRECT.SYS requires the QL2200.SYS *enhanced* miniport driver version 7.00.00 or above. The latest version of the QLDIRECT driver and QL2200.SYS enhanced miniport driver for Windows NT and Windows 2000 are available on the QLogic web site.

A.3

QLDIRECT Installation

If QLDIRECT is not yet installed on your system, perform the installation procedures in appendix A.3.1. If the QLFILTER driver is installed on your system, perform the update procedures in appendix A.3.2.

A.3.1

Initial Installation of QLDIRECT

Perform the following steps to add the QLDIRECT driver to a previously installed Windows NT 4.0 or Windows 2000 system.

1. If necessary, install the QLA2xxx Windows NT 4.0 (see section 4) or Windows 2000 (see section 5) enhanced miniport driver.
2. Insert the diskette that contains the QLDIRECT driver into an appropriate drive.
3. Execute the SETUP.EXE installation program on the diskette and follow the instructions on the screen.
4. Remove the diskette that contains the QLDIRECT driver.
5. Reboot your system to load the driver.

A.3.2

Updating to QLDIRECT from QLFILTER

The QLDIRECT driver replaces the QLogic QLFILTER driver. You must first uninstall the QLFILTER driver before installing the QLDIRECT driver.

NOTE: Windows NT does not always remove driver files and Registry keys when uninstalling a driver. You must manually remove the QLFILTER.SYS file and associated Registry key to ensure that Windows NT does not load the QLDIRECT.SYS and QLFILTER.SYS drivers.

Perform the following steps to update from the QLFILTER driver to the QLDIRECT driver.

1. Manually delete the QLFILTER.SYS file from the following directory. For example:

```
DEL C:\WINNT\SYSTEM32\DRIVERS\QLFILTER.SYS
```
2. Manually remove the QLFILTER key from the following Registry location:

```
\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services
```
3. Insert the diskette that contains the QLDIRECT driver into an appropriate drive.
4. Execute the SETUP.EXE installation program on the diskette and follow the instructions on the screen.
5. Remove the diskette that contains the QLDIRECT driver.
6. Reboot your system to load the driver.