

QLA[®] 2310F/2310FL User's Guide

2-Gb Fibre Channel to PCI-X Host Bus Adapters

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Section 1

Introduction

1.1

How to Use this Guide

The SANblade™ QLogic host bus adapters (HBAs) supported in this document are described in the following paragraphs. They are collectively referred to as the **QLA2310F/2310FL HBA** unless otherwise noted.

- **QLA®2310F** (single channel, full-height bracket, optical media)
- **QLA®2310FL** (single channel, low-profile bracket, optical media)

The QLA2310F/2310FL HBAs are 64-bit, 66-MHz PCI-X to Fibre Channel optical media.

First, install the QLA2310F/2310FL HBA according to the directions in the appropriate hardware installation section. Secondly, install the software driver according the directions in the associated readme.txt file.

1.2

General Description

Thank you for selecting the QLA2310F/2310FL Fibre Channel (FC) HBA. The QLA2310F/2310FL HBA is an intelligent, high-performance, DMA bus master host adapter designed for high-end systems. The intelligence and performance are derived from the ISP23xx chips, making the QLA2310F/2310FL HBA a leading-edge host adapter. The ISP23xx combines a powerful RISC processor, a Fibre Channel protocol manager (FPM) with one or more 2-Gb Fibre Channel transceivers, and a peripheral component interconnect-extended (PCI-X) local bus interface in a single-chip solution. The QLA2310F/2310FL HBA supports all FC peripherals that support private loop direct attach (PLDA) and fabric loop attach (FLA). Installation of the QLA2310F/2310FL HBA is quick and easy.

1.3

What is Fibre Channel?

Fibre Channel technology is outlined in the *SCSI-3 Fibre Channel Protocol* (SCSI-FCP) standard. Fibre Channel is a high-speed data transport technology used for mass storage and networking. It connects mainframes, super computers, workstations, storage devices, and servers.

Fibre Channel supports data transfer rates up to 200 MBps half-duplex and 400 MBps full-duplex on copper and optical interfaces. The QLA2310F/2310FL HBAs use a multimode optical interface for intermediate distances (less than

500 meters at the data rate of 1 Gbps; less than 300 meters at the data rate of 2 Gbps).

With its increased connectivity and performance, Fibre Channel is the I/O technology preferred and used by system designers.

1.4 Features

- Compliance with *PCI Local Bus Specification* revision 2.2
- Compliance with *PCI-X Addendum (revision 1.0) to the PCI Local Bus Specification*
- Compliance with *Third Generation Fibre Channel-Physical and Signaling Interface (FC-PH-3)* standard
- Compliance with *Fibre Channel-Arbitrated Loop (FC-AL-2)* standard
- Compliance with U.S. and international safety and emissions standards
- Support for bus master DMA
- *Fast!*/UTIL BIOS utility to customize the configuration parameters on the QLA23xx HBA and attached drives
- Supports Fibre Channel protocol-SCSI (FCP-SCSI) and IP
- Supports point-to-point fabric connection (F-PORT FABRIC LOGIN)
- Supports Fibre Channel security protocol (FC-SP) using DH-CHAP (Solaris SPARC 2.6, 7, 8, and 9 only)
- Supports fabric device management interface (FDMI) on the following operating systems: Windows 2000; Windows Server 2003; Red Hat Linux 8 and 9, Advanced Server 2.1; SuSE SLES 8; Solaris 2.6, 7, 8 and 9

Using FDMI, storage area network (SAN) administrators can view device-specific information (for example, driver version, firmware version, and model number) from a central console, regardless of the device manufacturer. This information is kept at the FC switch and viewed through the switch's management application or third party SAN management applications.

Section 2 QLA2310F/2310FL

2.1 QLA2310F/2310FL HBA Components

Figure 2-1 identifies the QLA2310F/2310FL HBA components referenced throughout this section.

Each QLA2310F/2310FL HBA has a unique serial number; its location on the HBA is noted in figures 2-1 and 2-2. Take a minute to write down the serial number of the QLA2310F/2310FL HBA.

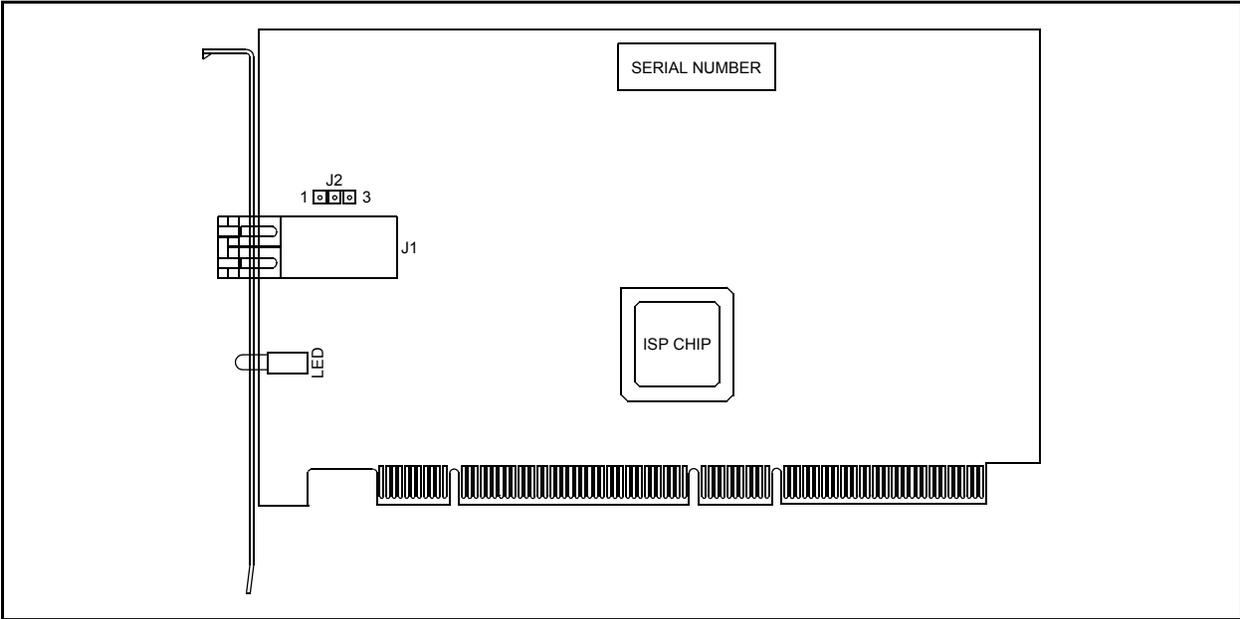


Figure 2-1. QLA2310F HBA Layout

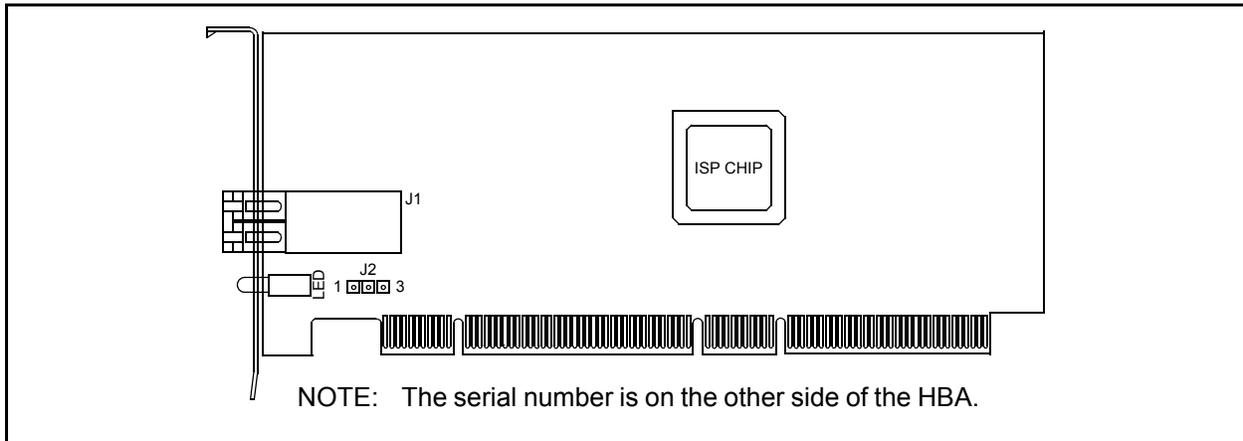


Figure 2-2. QLA2310FL HBA Layout

2.1.1 LEDs

Figure 2-3 identifies and describes the activity of the QLA2310F/2310FL HBA LEDs.

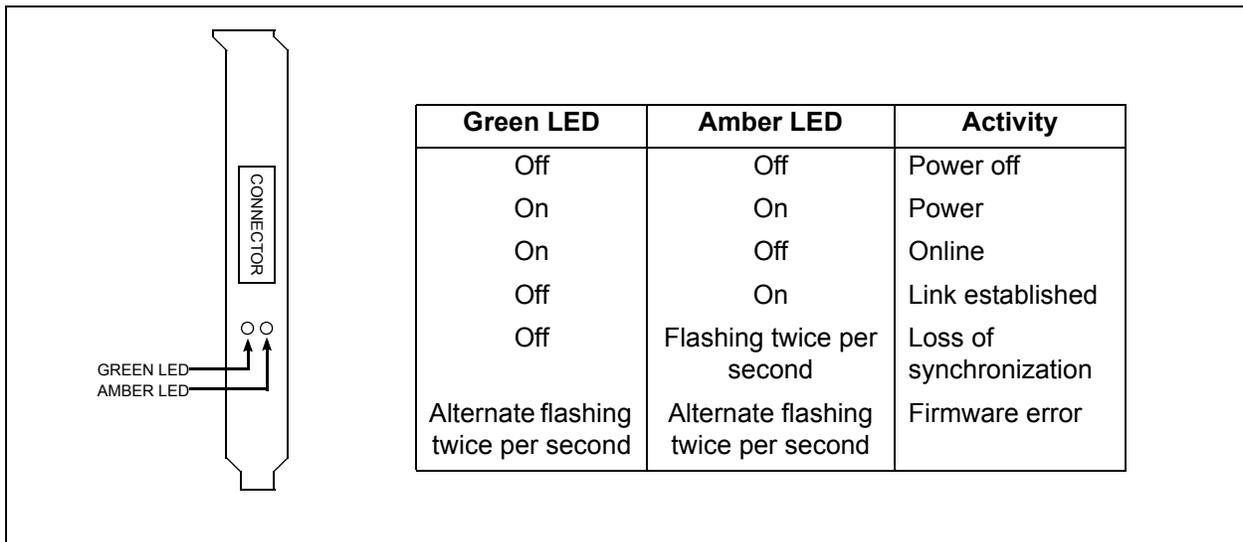


Figure 2-3. QLA2310F/2310FL HBA LED Activity

2.1.2 Jumpers

The J2 jumper on the QLA2310F/2310FL HBAs set the default state of the laser and are set at the factory with a jumper plug on pins 2–3.

CAUTION! Changing the jumper setting can result in the HBA being inoperable.

2.2

Installation in the Computer

Perform the following steps to install the QLA2310F/2310FL HBA in your PC:

1. Check the motherboard and make any configuration changes necessary to accommodate the QLA2310F/2310FL HBA.

The QLA2310F/2310FL HBA is self-configuring; however, some motherboards require manual configuration. For example, some systems have a **PCI Device Configuration** menu in the motherboard setup BIOS where you must enable HBAs, bus master slots, and IRQ levels. If the motherboard supports triggering, use *level triggering* for the QLA2310F/2310FL HBA. See the documentation supplied with your computer, or contact your computer dealer to determine if your motherboard requires configuration.

2. Power down the peripherals, then the computer.
3. Remove the computer cover and save the screws.
4. Choose any PCI bus slot that supports bus mastering. Most motherboards automatically assign an IRQ level and interrupt line; if your motherboard does not, you must assign the IRQ level and use *interrupt line A* for this slot.

NOTE:

- Some motherboards have two kinds of PCI bus slots: master and slave. The QLA2310F/2310FL HBA must be in a PCI bus master slot. (Some motherboards have PCI bus master slots that are shared with onboard devices. QLA2310F/2310FL HBAs do not work in shared slots.)
 - PCI connectors vary among system board manufacturers. The QLA2310F/2310FL HBA is a 64-bit PCI device that can function in a 32-bit PCI slot; the slot conforms to the PCI specification (the rear edge of the PCI slot is notched). If you try to install the QLA2310F/2310FL HBA into a PCI slot that does not conform to the PCI specification, you may damage the QLA2310F/2310FL HBA.
 - PCI and PCI-X slots look the same. If the PC contains both PCI and PCI-X slots, refer to the PC manufacturer's instructions to determine the slot type.
 - The QLA2310F/2310FL HBAs are designed and tested to operate at PCI-X bus speeds up to 66 MHz.
5. Remove the slot cover for the slot in which you will install the QLA2310F/2310FL HBA.
 6. Place the QLA2310F/2310FL HBA into the slot. Carefully press the HBA into the slot until it seats firmly.

7. Secure the QLA2310F/2310FL HBA to the chassis. Follow the PC manufacturer's instructions.
8. Connect the appropriate cable from the devices to the corresponding connector.
9. Carefully reinstall the computer cover. Insert and tighten the computer cover screws.
10. Power up all external FC devices, then power up the PC and observe the monitor. The BIOS is disabled by default. Consequently, the devices attached to the QLA2310F/2310FL HBA are not identified. For example:

```
QLogic Corporation
QLA23xx PCI Fibre Channel ROM BIOS Version x.xx
Copyright (C) QLogic Corporation 2002 All rights reserved.
www.qlogic.com
```

```
Press <CNTRL-Q> for Fast!UTIL
```

```
BIOS for Adapter 0 is disabled
```

```
ROM BIOS not installed
```

NOTE:

- SunSPARC systems do not display the BIOS banner.
- Enable the BIOS only if the boot device is attached to the QLA2310F/2310FL HBA. This allows the system to boot faster.
- For further information about enabling the QLA2310F/2310FL HBA BIOS, see the appropriate readme.txt.

If the information displayed on your monitor is correct, congratulations! You have successfully installed the QLA2310F/2310FL HBA in your computer.

If the information displayed is not correct and you have checked the QLA2310F/2310FL HBA's configuration, [see section 3](#) for troubleshooting information.

See the associated readme.txt file for detailed instructions on how to install the software drivers.

If you need FCode (Solaris SPARC systems), see the associated readme.txt file for instructions on how to install or update the FCode on the QLA2310/2310FL HBA.

Optionally, you can customize the QLA2310F/2310FL HBA and its attached devices using the *Fast!UTIL* BIOS utility. See the associated readme.txt file for detailed instructions.

2.2.1

Installation Help

If your system has an IDE hard disk, it may be assigned device number 80, which is the boot device. If your system does not have an IDE hard disk, a parallel SCSI host bus adapter (HBA), or a RAID adapter, the first bootable FC hard disk configured (the one with the lowest ID) is assigned device number 80 and becomes the boot device. The QLA2310F/2310FL HBA BIOS must be enabled if the boot device is connected to the QLA2310F/2310FL HBA.

If you have a selectable boot BIOS and want to boot to an FC hard disk, set the motherboard BIOS parameters to None or Not Installed. The ROM BIOS on the QLA2310F/2310FL HBA automatically configures the FC peripherals.

Some new system BIOSs support selectable boot, which supersedes the QLA2310F/2310FL HBA BIOS selectable boot setting. Select the QLA2310F/2310FL HBA FC hard disk in the system BIOS to boot from an FC hard disk attached to the QLA2310F/2310FL HBA.

2.3

Specifications

Tables 2-1 and 2-2 define the QLA2310F/2310FL specifications.

Table 2-1. QLA2310F/2310FL Board Operating Environment

Environment	Minimum	Maximum
Operating temperature	0°C/32°F	55°C/131°F
Storage temperature	-20°C/-4°F	70°C/158°F
Relative humidity (noncondensing)	10%	90%
Storage humidity (noncondensing)	5%	95%

Table 2-2. QLA2310F/2310FL Board Specifications

Type	Specification
Host bus	Conforms to <i>PCI Local Bus Specification</i> , revision 2.2 and the <i>PCI-X Addendum</i> , revision 1.0
PCI/PCI-X signaling environment	3.3 V and 5.0 V buses supported
PCI/PCI-X transfer rate	132 MBps maximum burst rate for 32-bit PCI operation at 33 MHz 264 MBps maximum burst rate for 32-bit PCI/PCI-X operation at 66 MHz 264 MBps maximum burst rate for 64-bit PCI operation at 33 MHz 528 MBps maximum burst rate for 64-bit PCI/PCI-X operation at 66 MHz

Table 2-2. QLA2310F/2310FL Board Specifications (Continued)

Type	Specification
Fibre Channel specifications	Bus type: Multimode fibre optic media Bus transfer rate: 200 MBps maximum at half-duplex 400 MBps maximum at full-duplex Interface chip: ISP2310
CPU	Single-chip design that includes a QLogic RISC processor, Fibre Channel protocol manager, PCI/PCI-X DMA controller, and integrated serializer/deserializer (SERDES) and electrical transceivers that can auto-negotiate a data rate of 1 Gbps or 2 Gbps
RAM	256 KB of sync SRAM supporting parity protection
BIOS ROM	128 KB of flash ROM in two 64-KB, software selectable banks. The flash is field programmable.
NVRAM	256 bytes, field programmable
Onboard DMA	Five-channel DMA controller: two data, one command, one auto-DMA request, and one auto-DMA response
Frame buffer FIFO	Integrated 4-KB transmit and 6-KB receive frame buffer FIFO for each data channel
Connectors	LC-style connector that supports non-OFC, multimode fibre optic cabling using a small form factor optical transceiver module
Form factor	17.78 cm×10.67 cm (7.0"×4.2") (QLA2310F) 16.93 cm×5.15 cm (6.7"×2.5") (QLA2310FL)
Operating power	Less than 15 watts

**2.4
Label**

The transceiver on the QLA2310F/2310FL HBA is a Class I laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.

CLASS I LASER PRODUCT

2.5 Agency Certification

2.5.1 QLA2310F

The following sections contain a summary of EMC/EMI test specifications performed on QLA2310F (FC2310401) to comply with radiated emission, radiated immunity and product safety standards.

2.5.1.1 EMI and EMC Requirements

The QLA2310F conforms to the following requirements:

- FCC Part 15, Class B
 - Radiated Emission Class B
 - Conducted Emission Class B

- 89/336/EEC EMC Directive CE
 - EN55022:1995 Class B
 - Radiated Emission Class B
 - Conducted Emission Class B

 - EN55024:1998
 - Immunity Standards
 - EN61000-4-2:1995 ESD
 - EN61000-4-3:1995 RF Electro Magnetic Field
 - EN61000-4-4:1995 Fast Transient/Burst
 - EN61000-4-5:1995 Fast Surge Common/Differential
 - EN61000-4-6:1996 RF Conducted Susceptibility
 - EN61000-4-8:1994 Power Frequency Magnetic Field
 - EN61000-4-11:1994 Voltage Dips and Interrupt

 - EN61000-3-2:1995 Harmonic Current Emission
 - EN61000-3-3:1994 Voltage Fluctuation and Flicker

- VCCI, Class B
- CNS 13438 Class B BSMI
- AS/NZS 3548 Class B
- Korea MIC

2.5.1.2

Product Safety Requirements

- UL, cUL
 - UL60950
 - CSA C22.2 No.60950
 - Class 1 Laser Product per DHHS 21CFR (J)

- 73/23/EEC Low Voltage Directive
 - TUV:
 - EN60950:1992+A1,2,3,4,11
 - EN60825-1:1994+A11
 - EN60825-2:1994

2.5.2

QLA2310FL

The following sections contain a summary of EMC/EMI test specifications performed on QLA2310FL (FC2310405) to comply with radiated emission, radiated immunity and product safety standards.

2.5.2.1

EMI and EMC Requirements

The QLA2310FL conforms to the following requirements:

- FCC Part 15, Class B
 - Radiated Emission Class B
 - Conducted Emission Class B

- ICES-003, Class B

- 89/336/EEC EMC Directive CE
 - EN55022:1995 Class B
 - Radiated Emission Class B
 - Conducted Emission Class B

 - EN55024:1998
 - Immunity Standards
 - EN61000-4-2:1995 ESD
 - EN61000-4-3:1995 RF Electro Magnetic Field
 - EN61000-4-4:1995 Fast Transient/Burst
 - EN61000-4-5:1995 Fast Surge Common/Differential
 - EN61000-4-6:1996 RF Conducted Susceptibility
 - EN61000-4-8:1994 Power Frequency Magnetic Field
 - EN61000-4-11:1994 Voltage Dips and Interrupt

- EN61000-3-2:1995 Harmonic Current Emission
- EN61000-3-3:1994 Voltage Fluctuation and Flicker

- VCCI, Class B
- CNS 13438 Class B BSMI
- AS/NZS 3548 Class B
- Korea MIC

2.5.2.2

Product Safety Requirements

- UL, cUL
 - UL1950
 - cUL C22.2 No.950
 - Class 1 Laser Product per DHHS 21CFR (J)

- 73/23/EEC Low Voltage Directive
 - TUV:
 - EN60950:1992+A1,2,3,4,11
 - EN60825-1:1998+A1
 - EN60825-2:1994

Notes

Section 3

Troubleshooting

3.1

Problems After Installation

There are three basic types of installation problems that can cause your QLA2310F/2310FL HBA to function incorrectly: hardware problems, system configuration problems, and Fibre Channel problems. The following section provides itemized checklists to help you determine why your QLA2310F/2310FL HBA is not functioning.

3.2

Hardware Problem Checklist

- Are all of the circuit cards installed securely in the system?
- Are all of the cables securely connected to the correct connectors? Be sure that the FC cables that attach from the QLA2310F/2310FL HBA connectors to the device are connected correctly. For example, the optical transmit connector on the QLA2310F/2310FL HBA must be connected to the optical receive connector on the device. Some connectors require a firm push to ensure proper seating. An easy way to check for correct seating is to switch the connectors on either the QLA2310F/2310FL HBA or the device, then restart your system. If the BIOS is enabled, devices attached to the QLA2310F/2310FL HBA are displayed on the screen.
- Is the QLA2310F/2310FL HBA installed correctly in the PCI slot? Is it seated firmly in the slot? PCI and PCI-X slots look the same. If the PC contains both PCI and PCI-X slots, refer to the PC manufacturer's instructions to determine the slot type.
- Check for interference due to nonstandard PCI connectors.
- Is the *Fast!*/UTIL data rate setting correct? See the appropriate readme.txt file for information about setting the data rate.
- Are all external peripherals properly powered up? See the appropriate readme.txt file for information about displaying attached devices.

3.3

System Configuration Problem Checklist

All PCI-compliant and PCI-X-compliant systems automatically detect 32-bit or 64-bit HBAs and set the appropriate bus speed (for example, 33 MHz or 133 MHz). Check the motherboard for proper configuration (see the appropriate installation section for more information).

See the documentation supplied with your computer, or contact your computer dealer to determine if your motherboard requires special configuration.

3.4

Fibre Channel Problem Checklist

- Were all of the FC devices powered up before you powered up the PC?
- Check that all cables are properly connected.
- Have you configured your RAID controller using the utilities provided by the manufacturer?
- Some Fibre Channel switches support zoning. Make sure that your switch is configured correctly.
- Make sure that data rate setting on the QLA2310F/2310FL matches the target device. For example, if the QLA2310F/2310FL is set to 2 Gb, set the target device to 2 Gb.
- If you are using a RAID box, modify the following settings in *Fast!*/UTIL:
 - Login Retry Count = 60
 - Port Down Retry Count = 60
 - Execution Throttle = 100