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QLE2360/2362 User's Guide

2-Gbps Fibre Channel to PCI Express Host Bus Adapters

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Rev C release 12/17/04	Removed Section 1.4: Features Removed Section 1.5: Compliance Removed Tables 2.1 and 2.2: QLE2360/2362 HBA Operating Environment and QLE2360/2362 HBA Specifications, respectively, and replaced them with a new table taken from the QLE2360/2362 Datasheet.

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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 ***QLE2360/2362 HBA*** unless otherwise noted.

- **QLE2360** (single channel, half size, full-height bracket, optical media)
- **QLE2362** (dual channel, half size, full-height bracket, optical media)

The QLE2360/2362 is a PCI Express to Fibre Channel optical media host adapter.

First, install the QLE2360/2362 HBA according to the directions in the hardware installation section (see section 2). Please refer to the software driver Readme files for software installation instructions.

1.2 General Description

Thank you for selecting the QLE2360/2362 Fibre Channel (FC) HBA. The QLE2360/2362 HBA is an intelligent, high-performance adapter designed for high-end systems. The intelligence and performance are derived from the ISP2322 FC Controller, making the QLE2360/2362 HBA a leading-edge host adapter. The ISP2322 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. The QLE2360/2362 HBA supports all FC peripherals that support private loop direct attach (PLDA) and fabric loop attach (FLA). Installation of the QLE2360/2362 HBA is quick and easy.

The QLE2360/2362 HBA is a single-slot PCI Express bus expansion board that interfaces a x4 (four-lane) PCI Express bus to two FC optical media buses. The QLE2360/2362 HBA supports one- and four-lane operations. One ISP2322 FC Controller supports two independent fibre channel ports. An Intel 41210 PCI Express to PCI-X bridge interfaces the ISP's PCI-X bus to the host's PCI Express bus.

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 optical interfaces. The QLE2360/2362 HBA uses 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 Technical Support

Customers should contact their authorized maintenance provider for technical support of their QLogic HBA products. QLogic-direct customers may contact QLogic Technical Support; others will be redirected to their authorized maintenance provider.

Visit the QLogic support Web site listed in section 1.4.3 for the latest firmware and software updates.

1.4.1 Availability

QLogic Technical Support is available from 7:00 AM to 7:00 PM Central Standard Time, Monday through Friday, excluding QLogic-observed holidays.

1.4.2 Training

QLogic offers certification training for the technical professional for both the SANblade HBAs and the SANbox switches. From the training link at qlogic.com, you may choose Electronic-Based Training or schedule an intensive "hands-on" Certification course.

Technical Certification courses include installation, maintenance and troubleshooting QLogic SAN products. Upon demonstrating knowledge using live equipment, QLogic awards a certificate identifying the student as a Certified Professional. The training professionals at QLogic may be reached by email at tech.training@qlogic.com.

1.4.3 Contact Information

Address:	QLogic Corporation 6321 Bury Drive Eden Prairie, Minnesota 55346 USA
Telephone:	+1 952-932-4040

Fax:	+1 952-932-4018
Email:	
Technical Service	support@qlogic.com
Technical Training	tech.training@qlogic.com
HBA Support Web Site:	support.qlogic.com

Part I
Hardware

This part of the *QLE2360/2362 User's Guide* describes the host bus adapters (HBAs) and how to install and configure them. Section 3 contains troubleshooting information.

HBA	Section
QLE2360/2362	2

Notes

Section 2
QLE2360/2362

2.1 QLE2360/2362 HBA Components

Figure 2-1 identifies the QLE2360/2362 HBA components referenced throughout this section. The J2 transceiver and associated LED is only for the dual channel QLE2362. The QLE2360 is single channel; it uses only one of these transceivers.

Each QLE2360/2362 HBA has a unique serial number; its location on the HBA is noted in figure 2-1. Take a minute to write down the serial number of the QLE2360/2362 HBA.

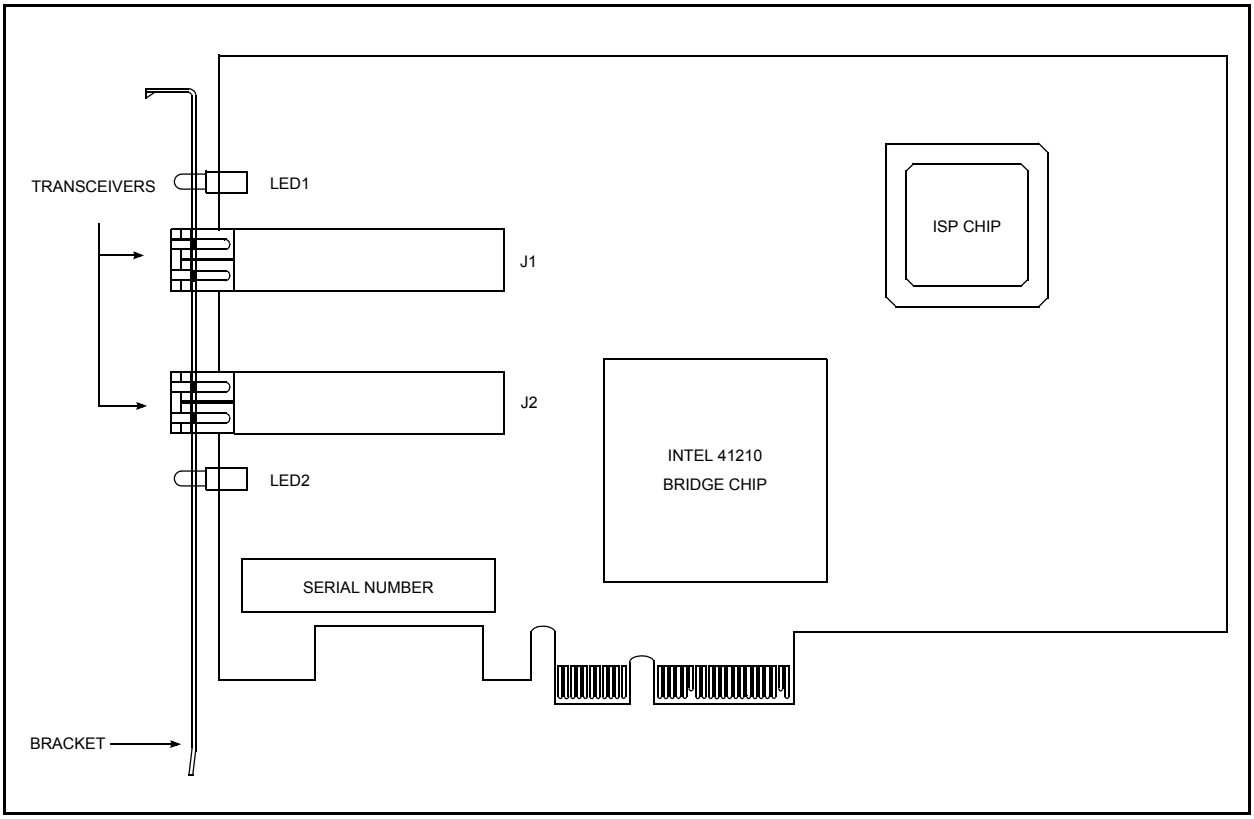
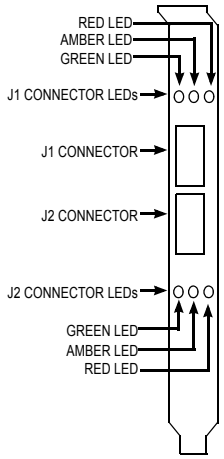


Figure 2-1. QLE2360/2362 HBA Layout

2.1.1 LEDs

Figure 2-2 identifies and describes the activity of the QLE2360/2362 HBA LEDs. The red LED on the bracket is not used. For more information about the beacon LED activity, see the *SANsurfer FC HBA Managers User's Guide* (FS0054601-00).



Activity	Green LED	Amber LED	Red LED
Power Off	Off	Off	Off
Power On (Before Firmware Init)	On	Off	Off
Online, 1Gb/s link established	One flash every 4 Sec.	Off	Off
1Gb/s activity	One flash every 4 Sec.	On	Off
Online, 2Gb/s link established	Two flash every 4 Sec.	Off	Off
2Gb/s activity	Two flash every 4 Sec.	On	Off
Power On (After Firmware Init and/or Loss of Sync)	On	Off	On
Firmware Error	Error Code	Error Code	On
Beacon	Flash	Flash	Flash

Figure 2-2. QLE2360/2362 HBA LED Activity

2.2 Installation in the Computer

Before you install the QLE2360/2362 HBA in your computer, you need the following:

- A screwdriver (usually a Phillips #1)
- One (QLE2360) or two (QLE2362) optical multimode cables with LC-style duplex connectors

CAUTION! The QLE2360/2362 HBA contains parts that can be damaged by ESD. Before handling the QLE2360/2362 HBA, use standard methods to discharge static electricity. Keep the QLE2360/2362 HBA in the antistatic bag until you are ready to install it. Place the HBA on the bag when you examine or configure it. Retain the bag for future use.

Perform the following steps to install the QLE2360/2362 HBA in your PC:

1. Check the motherboard and make any configuration changes necessary to accommodate the QLE2360/2362 HBA.
2. Power down the peripherals, then the computer.
3. Remove the computer cover and save the screws.
4. Choose any PCI Express bus slot (x4 or higher).

   NOTE: If you select a slot higher than x4 lane width, make sure that the slot supports x4 or x1 lane widths. The PC may contain PCI and PCI-X slots as well as PCI Express slots. Refer to the PC manufacturer's instructions to determine the correct slot type.

5. Remove the slot cover for the slot in which you will install the QLE2360/2362 HBA.
6. Place the QLE2360/2362 HBA into the slot. Carefully press the HBA into the slot until it seats firmly.
7. Secure the QLE2360/2362 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 QLE2360/2362 HBA are not identified. For example:

```
QLogic Corporation
QLE23xx PCI Fibre Channel ROM BIOS Version x.xx
Copyright (C) QLogic Corporation 2000-2003 All rights reserved.
www.qlogic.com

Press <CTRL-Q> for Fast!UTIL

BIOS for Adapter 0 is disabled

ROM BIOS not installed
```

NOTE:

- Enable the BIOS only if the boot device is attached to the QLE2360/2362 HBA. This allows the system to boot faster.

If the information displayed on your monitor is correct, congratulations! You have successfully installed the QLE2360/2362 HBA in your computer.

See the appropriate section for detailed instructions on how to install the software drivers.

If the information displayed is not correct and you have checked the QLE2360/2362 HBA's configuration, see section 3 for troubleshooting information.

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, 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 QLE2360/2362 HBA BIOS must be enabled if the boot device is connected to the QLE2360/2362 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 QLE2360/2362 HBA automatically configures the FC peripherals.

Some new system BIOS' support selectable boot, which supersedes the QLE2360/2362 HBA BIOS selectable boot setting. Select the QLE2360/2362 HBA FC hard disk in the system BIOS to boot from an FC hard disk attached to the QLE2360/2362 HBA.

2.3 Specifications

Table 2-1 below defines the QLE2360/2362 specifications.

Table 2-1. HBA Operating Environment and Specifications

Host Bus Interface Specifications	
Bus interface	2.5 GHz PCI Express x4
Memory	1-MB SRAM per port, 1-MB flash, and 4-Kb NVRAM
Compliance	*PCI Express Base Specification* rev. 1.0a, *PCI Express Card Electromechanical Specification* rev. 1.0, *PCI Local Bus Specification* rev. 2.3, *PCI Bus Power Management Interface Specification* revision. 1.1

Table 2-1. HBA Operating Environment and Specifications

Fibre Channel Specifications	
Data rate	2/1 Gbps auto-negotiation (2.1240/1.0625 Gbps)
Compliance	*Second Generation FC Generic Services Definition* (FC-GS-2), *Third Generation FC Generic Services Definition* (FC-GS-3), *Fibre Channel-Physical and Signaling Interface* (FC-PH), *SCSI-3 Fibre Channel Protocol* (SCSI-FCP), *Fibre Channel-Arbitrated Loop-2* (FC-AL-2), *Fibre Channel-Private Loop Direct Attach Technical Report* (FC-PLDA), RFC 2625 *IP and APR Over Fibre Channel, Fibre Channel Framing and Signaling* (FC-FS), *SCSI-3 Architecture Model* (SAM), and *SCSI-3 Controller Command Set*
Topology	FCAL, FCAL-2, point to point, switched fabric (FL_Port and F_Port)
Class of service	Class 3 FC service
Protocol	SCSI-FCP, IP, FC-TAPE
Buffer credits	3 credits available per port (2,112 Byte frame payload)
Physical Specifications	
Ports	One (QLE2360) Two (QLE2362)
Media	Multimode optic
Optics	Short wave laser
Form factor	Half size: 16.76 cm×11.12 cm (6.6"×4.376")
Bracket size	Standard size
Connectors	LC-style connectors that support non-OFC, multimode fibre optic cabling using a small form factor optical transceiver modules (one in the QLE2360, two in the QLE2362)
Environment and Equipment Specifications	
Airflow	None required
Temperature	Operating: 0°C/32°F to 55°C/131°F. Storage: -20°C/-4°F to 70°C/158°F
Humidity	Relative (non-condensing): 10% to 90%, Storage: 5% to 95%
Power dissipation	~8.5 W (QLE2360); ~11.5 W (QLE2362)
Distance	1 Gbps: 500 meters 50/125 µm fiber, 300 meters 62.5/125 µm fiber 2 Gbps: 300 meters 50/125 µm fiber, 150 meters 62.5/125 µm fiber
Cable	50/125µm multimode fiber, 62.5/125 µm multimode fiber

Table 2-1. HBA Operating Environment and Specifications

Software	
Applications	SANsurfer® FC HBA Manager, SANsurfer® FC CLI
Operating systems	Windows® Server™ 2003; Windows 2000; Linux Red Hat AS 3.0; Linux SuSE SLES 8, 9; Novell NetWare 6.5
HW platforms	IA32 (x86), IEM64T
Flash utilities	Utilities for firmware, driver, boot code, and NVRAM
Boot support	BIOS
Compliance	SNIA HBA API V2, SMI-S, FC-SP/DH-CHAP, and FDMI

2.4 Label

The transceiver on the QLE2360/2362 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

The following sections contain a summary of the EMC/EMI test specifications performed on the QLE2360/2362 HBA (PX2410402-*xx*) to comply with radiated emission, radiated immunity and product safety standards.

2.5.1 EMI and EMC Requirements

The QLE2360/2362 HBA conforms to the following requirements:

- FCC Part 15, Class A
  - Radiated Emission Class A
  - Conducted Emission Class A
- ICES-003 Class A
  - This Class A digital apparatus complies with Canadian ICES-003.
  - Cet appareil numériqué de la classe A est conformé à la norme NMB-003 du Canada.
- CE Mark 89/336/EEC EMC Directive

- EN55022:1998/CISPR22:1997 Class A
  - Radiated Emission Class A
  - Conducted Emission Class A
- EN55024:1998
  - Immunity Standards
  - IEC61000-4-2 :2001 ESD
  - IEC61000-4-3 :2002 RF Electro Magnetic Field
  - IEC61000-4-4 :2001 Fast Transient/Burst
  - IEC61000-4-5 :2001 Fast Surge Common/Differential
  - IEC61000-4-6 :2003 RF Conducted Susceptibility
  - IEC61000-4-8 : 2001 Power Frequency Magnetic Filed
  - IEC61000-4-11: 2001 Voltage Dips and Interrupt
- EN61000-3-2:2000 Harmonic Current Emission
- EN61000-3-3:2001;A1:2001 Voltage Fluctuation and Flicker

- AS/NZS CISPR 22, Class A
- VCCI, Class A certified

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。
VCCI-A

Translation:
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take corrective actions. VCCI-A

- Korea MIC certified
- Korea MIC Class A E-G900-04-3176 (A)
  - Product Name/ Model PX2410402
  - Certification holder QLogic Corporation
  - Manufactured date 2004
  - Manufacturer/Country of origin QLogic Corporation/USA

Class	User Information Guide
A class equipment (Business purpose info/telecommunications equipment)	As this equipment has undergone EMC registration for business purpose, the seller and/or the buyer is asked to beware of this point and in case a wrongful sale or purchase has been made, it is asked that a change to household use be made.

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

- CNS 13438 Class A
  - This is a class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures

警告使用者:

這是甲類的資訊產品， 在居住的環境中使用時 ，
可能會造成射頻干擾， 在這種情況下，
使用者會被要求採取某些適當的對策。

2.5.2 Product Safety Requirements

- UL, cUL
  - UL60950
  - CSA C22.2 No.60950
  - Class 1 Laser Product per DHHS 21CFR
- 73/23/EEC Low Voltage Directive
  - TUV:
    - EN60950-1:2001

- EN60825-1:1994+A1+A2
- EN60825-2:1994+A1

2.5.3
Laser Safety

- FDA Notice
  - This product complies with DHHS Rules 21CFR Chapter I,Subchapter J.

    This product has been designed and manufactured according to IEC60825-1 on the safety label of laser product.
- Class 1 Laser Product
  - Appareil A Laser De Classe 1
  - Laser Klasse 1 Nach IEC 60825-1
  - Luokan 1 Laserlaite
- Caution—Class 1 laser radiation when open
  - Do not view directly with optical instruments
- Attention—Radiation laser de classe 1
  - Ne pas regarder directement avec des instruments optiques
- Vorsicht—Laserstrahlung der Klasse 1 bei geöffneter Abdeckung
  - Direktes Ansehen mit optischen Instrumenten vermeiden
- Varoitus—Luokan 1 lasersäteilyä, kun laite on auki
  - Älä katso suoraan laitteeseen käyttämällä optisia instrumentteja

Notes

Section 3

Troubleshooting

3.1

Problems After Installation

There are three basic types of installation problems that can cause your QLE2360/2362 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 QLE2360/2362 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 QLE2360/2362 HBA connectors to the device are connected correctly. For example, the optical transmit connector on the QLE2360/2362 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 QLE2360/2362 HBA or the device, then restart your system. If the BIOS is enabled, devices attached to the QLE2360/2362 HBA are displayed on the screen.
- Is the QLE2360/2362 HBA installed correctly in the PCI Express slot (x4 or higher lane width)? If you select a slot higher than x4, make sure that the slot supports x4 or x1. Is it seated firmly in the slot? The PC may contain PCI and PCI-X slots as well as PCI Express slots. Refer to the PC manufacturer's instructions to determine the correct slot type.
- Check for interference due to nonstandard PCI connectors.

3.3 System Configuration Problem Checklist

Check the motherboard for proper configuration (see the appropriate installation section for more information.

Check 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 QLE2360/2362 matches the target device. For example, if the QLE2360/2362 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

3.5 Troubleshooting

The QLogic knowledge database contains troubleshooting information for the QLogic SANblade HBAs. Access the database from the QLogic website at: www.qlogic.com/support/knowledge_base.asp