Hardware Installation Guide for the QLA12160/12160L

64-Bit PCI Dual SCSI Host Adapter Board
for the PCI Bus

DC8151101-00 B
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Document Revision History

Rev. A initial release, 6/22/99
Rev. B update, 5/24/00 (QLA12160L board added)
Boards Affected
QLA12160 (DC8110402) QLA12160L (DC8110404)

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FIGURES

TABLES

Quick Installation Instructions

NOTE: These instructions are for the QLA12160/12160L board (wide, low voltage differential [LVD], dual port, Ultra3, 64-bit PCI) containing the ISP12160A/33 or ISP12160A/66 chip.

Using These Instructions

Before installing your QLA12160/12160L board, take a moment to read this guide. These instructions are a condensed version of the instructions in section 2.

Termination for the QLA12160 board is set automatically in most cases; see appendix A for details. See appendix B for manual termination instructions for the QLA12160/12160L board.

What You Need for Installation

- ❑ A screwdriver (usually a Phillips #1)
- ❑ One or more of the following cables:
  - ❑ Internal narrow (68-pin to 50-pin)
  - ❑ Internal wide (68-pin to 68-pin)
  - ❑ External narrow (68-pin very high density [VHDC] to 50-pin)
  - ❑ External wide (68-pin VHDC)

Installing Your QLA12160/12160L Board

CAUTION! The QLA12160/12160L board contains parts that can be damaged by ESD. Before handling the QLA12160/12160L board, use standard methods to discharge static electricity. Keep the QLA12160/12160L board in the antistatic bag until you are ready to install it. Place the board on the bag when you examine or configure it. Retain the bag for future use.

1. Check the motherboard and make any configuration changes necessary to accommodate the QLA12160/12160L board.
2. Power down your peripheral devices, then your computer.
3. Remove the computer cover.

4. Install the QLA12160/12160L board in an appropriate PCI slot.

   NOTE:

   - ❑ QLogic recommends installing the QLA12160/33 in a 33-MHz PCI slot and the QLA12160/66 or QLA12160L/66 in a 66-MHz PCI slot.
   - ❑ Installing a QLA12160/33 adapter in a 66-MHz PCI slot forces the entire PCI bus to 33 MHz.
   - ❑ Installing a QLA12160/66 or QLA12160L/66 in a 33-MHz slot does not provide the board with the performance benefits of a 66-MHz PCI bus.

5. Connect the appropriate SCSI peripheral cables.

   CAUTION! If the QLA12160/12160L board is on a SCSI bus with any single-ended peripheral device, for example, a CD-ROM, the QLA12160/12160L board automatically operates as a single-ended, Ultra device. Consequently, all single-ended device restrictions apply to the QLA12160/12160L board, even though it is an LVD device (see table 3-1 and appendix C).

6. Replace the computer cover.
7. Power up the peripherals, then the computer.

Congratulations! You have successfully installed your new QLA12160/12160L board. See the *Software Installation Guide for the QLA12160/12160L* on the QLogic web site *http://www.qlogic.com/* for detailed instructions on how to install the QLA12160/12160L board's software drivers.

Section 1
Introduction

NOTE: This installation guide affects the following QLogic host adapter boards, collectively referred to as the ***QLA12160/12160L board*** unless otherwise noted:

- ❑ QLA12160/33 (DC8110402-06)
- ❑ QLA12160/66 (DC8110402-07)
- ❑ QLA12160L/66 (DC8110404-02)

The QLA12160/12160L board (wide, low voltage differential [LVD], dual port, Ultra3, 64-bit PCI) contains the ISP12160A/33 or ISP12160A/66 chip.

1.1 Product Description

The QLA12160/12160L board is an intelligent, high-performance, DMA bus master SCSI host adapter designed for high-end systems. The intelligence and performance are derived from the ISP chip, making the QLA12160/12160L board a high performance host adapter. The ISP chip combines a powerful RISC processor, two SCSI executive processors (SXPs), and a peripheral component interconnect (PCI) local bus interface in a single-chip solution. The QLA12160/12160L board supports bootable devices (hard drives and CD-ROM drives) and can be used with tape drives and other SCSI devices. Installation of the QLA12160/12160L board is quick and easy.

The QLA12160/12160L board is for use only with UL listed computers that have detailed instructions for user installation of accessory cards.

The QLA12160/12160L board is designed to operate with multiple data transfer speeds under SCSI specifications (see table 1-1).

Table 1-1. SCSI Data Transfer Rates

SCSI Mode	Maximum Data Rate Narrow (8-bit)	Maximum Data Rate Wide (16-bit)
SCSI (or parallel SCSI)	5 Mbytes/sec (asynchronous)	—
Fast SCSI	10 Mbytes/sec	20 Mbytes/sec
Ultra SCSI	20 Mbytes/sec	40 Mbytes/sec

Table 1-1. SCSI Data Transfer Rates (Continued)

SCSI Mode	Maximum Data Rate Narrow (8-bit)	Maximum Data Rate Wide (16-bit)
Ultra2, LVD SCSI	40 Mbytes/sec	80 Mbytes/sec
Ultra3, LVD SCSI	80 Mbytes/sec	160 Mbytes/sec

NOTE: Only single-ended and LVD devices (Ultra2 and Ultra3) can be connected to the QLA12160/12160L board.

The QLA12160/12160L board supports Ultra, Ultra2, and Ultra3 transfer speeds. The board can connect computers to other computers or to peripheral devices such as CD-ROM drives, tape drives, and hard drives. SCSI allows connecting the following number and type of devices to a single port by *daisy chaining*:

- ❑ 15 fast, wide SCSI devices
- ❑ 15 Ultra2 or Ultra3, LVD SCSI devices
- ❑ 6 Ultra SCSI devices (QLA12160/12160L board in single-ended mode)

A daisy chain is a series of connections where the first device is connected to the host adapter board, the second device is connected to the first, and so on. A daisy chain can be created by using either a daisy chain cable (one cable with multiple connectors) or by using multiple cables. Each SCSI device must have a unique SCSI ID.

Because SCSI allows the computer to use a standard set of commands to communicate with peripherals, adding a variety of peripherals to your computer using one host adapter board is easy.

1.2 Features

- ❑ Compliance with Intel PCI version 2.2 specification
- ❑ Compliance with ANSI X3.131-1994 SCSI-2 standard
- ❑ Compliance with ANSI X3T10/1071D SCSI-3 Fast-20 standard (Ultra SCSI)
- ❑ Compliance with ANSI X3T10/1142D Fast-40 draft (Ultra2 SCSI)
- ❑ Compliance with ANSI T10 project 855D, *Information Technology – SCSI-3 Parallel Interface (SPI)*
- ❑ Compliance with ANSI T10 project 1142D, *Information Technology – SCSI Parallel Interface-2 (SPI-2)*

- ❑ Compliance with ANSI T10 project 1302D, *Information Technology – SCSI Parallel Interface-3 (SPI-3)*
- ❑ Compliance with U.S. and international safety and emissions standards
- ❑ Support for asynchronous and synchronous transfer modes
- ❑ Synchronous SCSI data transfer rates supported:
  - ❑ Ultra3, LVD SCSI (160 Mbytes/sec)
  - ❑ Ultra2, LVD SCSI (80 Mbytes/sec)
  - ❑ Ultra SCSI wide (40 Mbytes/sec)
  - ❑ Ultra SCSI narrow (20 Mbytes/sec)
  - ❑ Fast SCSI wide (20 Mbytes/sec)
  - ❑ Fast SCSI narrow (10 Mbytes/sec)
  - ❑ SCSI narrow (5 Mbytes/sec)
- ❑ Support for single-ended mode
- ❑ Support for LVD mode
- ❑ Support for up to 30 LVD SCSI devices (15 per channel)
- ❑ Support for logical unit numbers (LUNs) 0-15
- ❑ Support for bus master DMA
- ❑ *Fast!*UTIL BIOS utility to customize the configuration parameters on the QLA12160/12160L board and attached drives
- ❑ Active termination
- ❑ Active negation

1.2.1 Mixed Peripheral Support

- ❑ Support for hard disk, removable disk, optical disk, scanner, tape drive, CD-ROM, and other SCSI devices
- ❑ Simultaneous mixed-peripheral configurations support
- ❑ Bootable device support for disk and CD-ROM
- ❑ DOS advanced SCSI programming interface (ASPI) manager for disk, tape, and other devices

Section 2
Hardware Installation

2.1 Preinstallation Procedures

Before installing your QLA12160/12160L board, take a moment to read this instruction guide.

CAUTION!

- ❑ Your computer, the QLA12160/12160L board, and each SCSI device must be configured properly for optimum performance. Refer to the appropriate documentation to configure your computer and SCSI devices.
- ❑ Pay particular attention to the SCSI ID assignment. The QLA12160/12160L board is set at the factory for SCSI ID 7. **The QLA12160/12160L board and each SCSI device attached to the board must have different SCSI IDs.**
- ❑ The QLA12160/12160L board contains parts that can be damaged by electrostatic discharge (ESD). Before handling the QLA12160/12160L board, use standard methods to discharge static electricity. Keep the QLA12160/12160L board in the antistatic bag until you are ready to install it. Place the board on the bag when you examine or configure it. Retain the bag for future use.

2.2 What You Need for Installation

Before you install the QLA12160/12160L board in your computer, you need the following:

- ❑ A screwdriver (usually a Phillips #1)
- ❑ One or more of the following cables:
  - ❑ Internal narrow (68-pin to 50-pin)
  - ❑ Internal wide (68-pin to 68-pin)
  - ❑ External narrow (68-pin very high density [VHDC] to 50-pin)
  - ❑ External wide (68-pin VHDC)

Figures 2-1 and 2-2 identify the QLA12160/12160L board components referenced throughout this section.

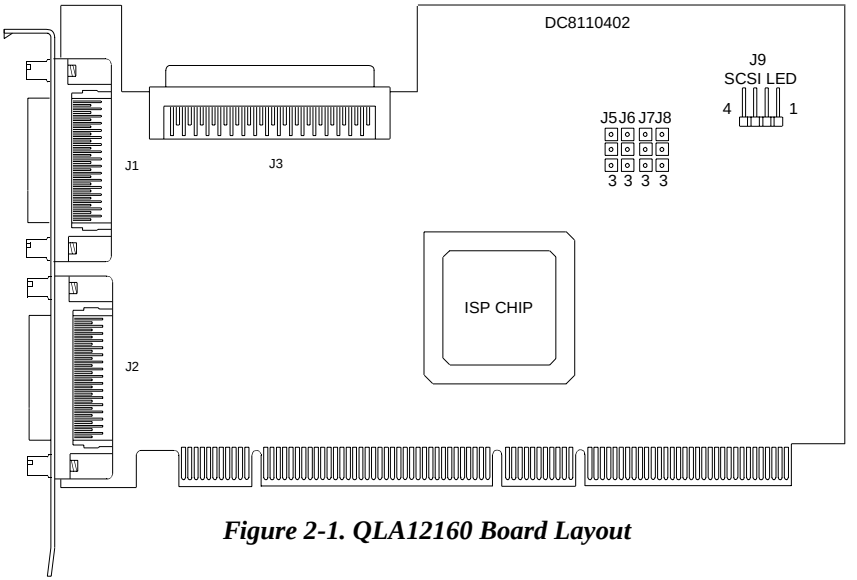

Figure 2-1. QLA12160 Board Layout

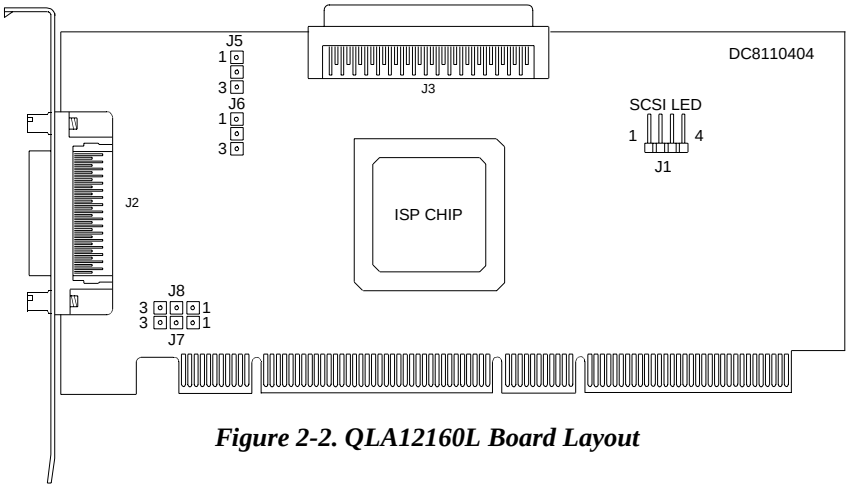

Figure 2-2. QLA12160L Board Layout

2.3 Setting the SCSI Termination

Termination for the QLA12160/12160L board is set automatically in most cases. You can change the termination using the *Fast!*UTIL software (see section A.2.1).

Termination for the QLA12160/12160L board can also be set using jumpers (see section B.2).

2.4 SCSI Termination Power

The QLA12160/12160L board supplies termination power to itself and to the SCSI bus. The circuit is protected by a self-restoring fuse.

2.5 Installing the Device Activity Light

If the SCSI disk is assigned as drive C (boot drive), you can connect the device activity light on the front panel of the PC to indicate boot drive activity. Connect the light to the J9 jumper block on the QLA12160 or J1 on the QLA12160L (pins 1 and 4 are positive). If your boot drive is an integrated drive electronics (IDE) drive or connected to a different adapter, you can connect an LED to the QLA12160/12160L jumper blocks to show activity of devices connected to your QLA12160/12160L board.

2.6 Installation in the Computer

If you changed the termination on the QLA12160/12160L board, double-check the new setting prior to installation.

Perform the following steps to install the QLA12160/12160L board in your PC:

1. Check the motherboard and make any configuration changes necessary to accommodate the QLA12160/12160L board.

   The QLA12160/12160L board 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 host adapter boards, bus master slots, and interrupt request (IRQ) levels. If the motherboard supports triggering, use *level triggering* for the QLA12160/12160L board. 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 QLA12160/12160L board must be in a PCI bus master slot. (Some motherboards share PCI bus master slots with onboard devices. QLA12160/12160L boards do not work in shared slots.)
   - ❑ If your board is labeled QLA12160/66 or QLA12160L/66, it can run in a 66-MHz PCI slot.
     - ❑ QLogic recommends installing the QLA12160/33 in a 33-MHz PCI slot and the QLA12160/66 or QLA12160L/66 in a 66-MHz PCI slot.
     - ❑ Installing a QLA12160/33 adapter in a 66-MHz PCI slot forces the entire PCI bus to 33 MHz.
     - ❑ Installing a QLA12160/66 or QLA12160L/66 in a 33-MHz slot does not provide the board with the performance benefits of a 66-MHz PCI bus.

5. Unscrew and remove the slot cover. Retain the screw; you will use it when you install the QLA12160/12160L board.
6. Place the QLA12160/12160L board into the slot. Carefully press the board into the slot until it seats firmly.

   NOTE: QLA12160/12160L boards are designed with the components on the opposite side compared to non-PCI boards.

7. Secure the QLA12160/12160L board with the slot cover screw.
8. Install the cable.

   - ❑ Internal: Connect the cable from the devices to the J3 connector on the QLA12160/12160L board.
   - ❑ External: Connect a SCSI cable from the devices to the J1 connector (QLA12160) and/or the J2 connector (QLA12160/12160L).

   NOTE: If you are attaching an external device, you must provide your own cable.

9. Carefully reinstall the computer cover. Insert and tighten the computer cover screws.
10. Power up all external SCSI devices, then power up the PC and observe the monitor. The BIOS lists all SCSI devices attached to the QLA12160/12160L board. For example:

```
QLogic Corporation
PCI SCSI ROM BIOS Version X.XX
Copyright (C) QLogic Corporation 1999 All rights reserved.

Press <Alt-Q> for Fast!UTIL

Using IRQ number X

 Device   Device   Adapter   SCSI   SCSI    Vendor   Product    Product
 Number    Type    Number     ID     LUN       ID       ID      Revision

   81      Disk       0        0      0     SEAGATE  ST32550     7394
```

It is a good idea to write down and store the SCSI device information for future use. You can access the same information using *Fast!*UTIL (see appendix A). This information is helpful for troubleshooting or when you install other devices.

If you don't have a hard drive attached to your computer, a ROM BIOS NOT INSTALLED message displays after the device listing.

If the information displayed on your monitor is correct (all installed devices are listed with the correct SCSI ID, device type, etc.), congratulations! You have successfully installed the QLA12160/12160L board in your computer.

See the *Software Installation Guide for the QLA12160/12160L* on the QLogic web site *http://www.qlogic.com/* for detailed instructions on how to install the QLA12160/12160L board's software drivers.

If the information displayed is not correct and you have checked the QLA12160/12160L board's configuration, see section 3 for troubleshooting information.

2.7 Installation Help

If your system has an IDE fixed disk device, make sure you program the system BIOS to point to the appropriate boot drive. If your system does not have an IDE disk device, the first bootable SCSI disk device configured (the one with the lowest SCSI ID) is assigned device number 80 and is the boot device.

For a motherboard BIOS that does not support SCSI disk booting, you can use settings in *Fast!*UTIL to select the system's boot device attached to the

QLA12160/12160L board. If the boot device is a CD-ROM, see the CDROM Boot setting in table A-1. If the boot device is a disk, see appendix A.2.4 about selectable boot settings.

SCSI ID numbers must be unique. If not, the BIOS list of SCSI devices displayed on your monitor will not be correct. For example, if you give one of your devices the same SCSI ID as the QLA12160/12160L board, that device will be listed for all SCSI IDs, or if you have two devices with the same SCSI ID, only one of the devices will be listed. If the BIOS list is not correct, power down the computer and recheck the configuration. Be sure to check the QLA12160/12160L board, which uses SCSI ID 7. If you do not see your device listed on the BIOS listing, see section 3.

If you do not have an IDE drive, set the motherboard BIOS parameters to None or Not Installed. The ROM BIOS on the SCSI controller automatically configures the SCSI peripherals.

If the QLA12160/12160L board is on a SCSI bus with any single-ended peripheral device, for example, a CD-ROM, the QLA12160/12160L board automatically operates as a single-ended, Ultra device. Consequently, all single-ended device restrictions apply to the QLA12160/12160L board, even though it is an LVD device (see table 3-1 and appendix C).

Section 3
Troubleshooting

3.1
Problems After Installation

There are three basic types of installation problems that can cause your QLA12160/12160L board to function incorrectly: hardware problems, system configuration problems, and SCSI problems. The following section provides itemized checklists to help you determine why your QLA12160/12160L board is not functioning.

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

3.2
Hardware Problem Checklist

- ❑ Are all of the circuit cards installed securely in the PC?
- ❑ Are all of the cables securely connected to the correct connectors?
- ❑ Is the QLA12160/12160L board installed correctly in the PC slot? Is it seated firmly in the slot?
- ❑ Are all external peripherals properly powered up? See section A.3 for information about displaying attached devices.

3.3
System Configuration Problem Checklist

- ❑ Check the motherboard for proper configuration (see section 2.6).

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

- ❑ If the system message *Missing Operating System* or *No ROM BASIC, System Halted* appears, the disk drive attached to the QLA12160/12160L board is not partitioned in a format compatible with the board. The proper geometry for use with the QLA12160/12160L boards is the Microsoft standard.
  - ❑ Drives less than one gigabyte are 64 heads, 32 sectors per track
  - ❑ Drives greater than one gigabyte are 255 heads, 63 sectors per track

If the drive is not formatted with this geometry, repartition and format the drive using the DOS FDISK and FORMAT utilities.

3.4 SCSI Problem Checklist

- ❑ Make sure that the SCSI bus termination for the QLA12160/12160L board is set correctly (see appendices A and B).
- ❑ Make sure that the termination for all devices on the SCSI bus is set correctly.
- ❑ Were all of the SCSI devices powered up before you powered up the PC?
- ❑ Does each device have a unique SCSI ID? Each device must have its own unique ID between 0 and 15. The QLA12160/12160L board is set for SCSI ID 7 at the factory.
- ❑ Check the cable lengths. Make sure that the total length for the cables connected to the QLA12160/12160L board don't exceed the limits listed in table 3-1.

Table 3-1. Maximum Cable Length

Board and Mode	Cable Length
QLA12160/12160L point to point 15 nodes single-ended Ultra mode	 25 meters 12 meters 9.8 feet (3 meters)[a] 4.9 feet (1.5 meters)[b]

Table Notes
If you are mixing Ultra and non-Ultra SCSI devices, the total length of the cables cannot exceed the maximum cable length established for Ultra SCSI devices.

[a]For four or less devices connected to the board.

[b]For up to six devices connected to the board.

Appendix A
*Fast!*UTIL

A.1
Introduction

This appendix provides detailed configuration information for advanced users who want to customize the configuration of the QLA12160/12160L board and the connected devices.

The QLA12160/12160L board is configured at the factory to provide maximum performance. When your board is operating at maximum performance, it may not be 100% compatible with some older SCSI-1 devices. If you are using a SCSI-1 device, see section A.5 for more information.

The board can be configured using *Fast!*UTIL. Access *Fast!*UTIL by pressing <ALT>-<Q> during the QLA12160/12160L board BIOS initialization (it may take a few seconds for the *Fast!*UTIL menu to appear). If you have more than one QLA12160/12160L board, *Fast!*UTIL asks you to select the board you want to configure. After changing the settings, *Fast!*UTIL reboots your system to load the new parameters.

CAUTION! If the configuration settings are incorrect, your QLA12160/12160L board will not function properly.

The following sections describe the *Fast!*UTIL options.

A.2
Configuration Settings

The first selection on the *Fast!*UTIL *Options* menu is *Configuration Settings*. These settings configure the SCSI devices and the QLA12160/12160L board to which they are attached.

A.2.1
Host Adapter Settings

From the *Configuration Settings* menu in *Fast!*UTIL, select Host Adapter Settings. The default settings for the QLA12160/12160L host adapter board are listed in table A-1 and described in the following paragraphs.

Table A-1. Host Adapter Settings

Setting	Options	Default
Host adapter	*Enabled or Disabled*	*Enabled*
Host adapter BIOS	*Enabled or Disabled*	*Enabled*
Host adapter SCSI ID	*0-15*	*7*
PCI bus DMA burst	*Enabled or Disabled*	*Enabled*
CDROM Boot	*Enabled or Disabled*	*Disabled*
SCSI bus reset	*Enabled or Disabled*	*Enabled*
SCSI bus reset delay	*0-15 seconds*	*5 seconds*
Concurrent command/data	*Enabled or Disabled*	*Enabled*
Drivers load RISC code	*Enabled or Disabled*	*Enabled*
Adapter Configuration	*Auto, Manual, Safe*	*Auto*
SCSI termination	*Auto, Enabled, Disabled, High only*	*Auto*

- **Host adapter.** When this setting is enabled, the system BIOS and drivers recognize the QLA12160/12160L board. When this setting is disabled, the BIOS and drivers ignore the board. The default is *Enabled*.
- **Host adapter BIOS.** When this setting is disabled, the ROM BIOS on the QLA12160/12160L board is disabled, freeing space in upper memory. The RAM BIOS and other drivers still recognize the QLA12160/12160L board. Do not disable this setting if you are booting from a SCSI disk drive attached to the QLA12160/12160L board. The default is *Enabled*.
- **Host adapter SCSI ID.** This setting defines the SCSI ID of the QLA12160/12160L board. The default is *SCSI ID 7*.
- **PCI bus DMA burst.** When this setting is enabled, burst transfers are performed. When this setting is disabled, data is transferred in nonburst mode, with each cycle initiated by a new address phase. The default is *Enabled*.

- **CDROM Boot.** When this setting is enabled, the ROM BIOS boots from the attached SCSI CD-ROM if a bootable compact disk is installed. If no bootable CD-ROM is found, the system boots from the first bootable SCSI drive. When this setting is disabled, the ROM BIOS does not boot from the CD-ROM. The default is *Disabled*.
- **SCSI bus reset.** This setting enables or disables resetting the SCSI bus when the system is powered up. The default is *Enabled* (the SCSI bus is reset at system power up). Disable this setting when you have two or more host adapter boards on the SCSI bus to prevent unwanted SCSI bus resets.
- **SCSI bus reset delay.** After resetting the SCSI bus, the firmware does not initiate any SCSI activity for the number of seconds specified in this setting. The default is *5 seconds*.
- **Concurrent command/data.** When this setting is enabled, both the data DMA and the command DMA execute concurrently. When this setting is disabled, either the data DMA or the command DMA is operational. To maximize bus transfer performance, the default is *Enabled*.
- **Drivers load RISC code.** When this setting is enabled, the QLA12160/12160L board uses the RISC firmware that is embedded in the software driver. When this setting is disabled, the software driver loads the latest version of RISC firmware found on the system. The default is *Enabled*.

  NOTE: The driver being loaded must support this setting. If the driver does not support this setting, the result is the same as disabled regardless of the setting. Leaving this option enabled guarantees a certified combination of software driver and RISC firmware.

- **Adapter Configuration**
  - *Auto* (default). The ROM BIOS automatically configures the QLA12160/12160L board to match any SCSI device attached to the board and selects optimum performance.
  - *Manual*. You can manually control the configuration settings for each SCSI device. If you choose *Manual*, you have the option of running *Autoconfigure* (see section A.2.3) to have *Fast!*UTIL configure the devices.

    NOTE: Changing any value can cause performance problems or incorrect device operation.
  - *Safe.* All optimal configuration settings are turned off and all attached devices work in minimal configuration (narrow, asynchronous mode).

    NOTE: *Safe* mode is primarily for troubleshooting SCSI devices that are not operating properly during normal system operation.

- **SCSI termination**

  Termination for the QLA12160/12160L board can be set in one of three ways:

  - Automatic (default) (QLA12160)
  - Manual (through *Fast!*UTIL)
  - Jumpers

  NOTE: The last SCSI device on each end of the SCSI bus must be terminated.

  The QLA12160/12160L board is a dual port host adapter. Each port is a separate SCSI bus and must be terminated independently. The port one and two connectors are listed in table A-2.

Table A-2. QLA12160/12160L Ports

Port	QLA12160 Port Connector	QLA12160L Port Connector
One	J1 and J3	J3
Two	J2	J2

The following text explains automatic and manual termination. See section B.2 for jumper termination instructions.

- *Auto* (default). SCSI termination requirements are sensed by the board and set automatically. This setting is not available on the QLA12160L/66 board.

  With the QLA12160/33 and QLA12160/66 board, the Auto setting assumes that port one is at one end of the SCSI bus and enables termination for port one. If you are using only one port one connector, the Auto setting assumes that port one is at the end of the SCSI bus and enables termination for port one. If you have devices connected to both port one connectors, the Auto setting disables termination for port one.

- *Enabled*. This setting overrides termination requirements sensed by the board. This setting assumes that the selected port is at one end of the SCSI bus and enables termination.

- *Disabled*. SCSI termination is disabled. This setting overrides termination requirements sensed by the board. Use this setting when J1 (QLA12160/33 and QLA12160/66) , J2, or J3 is not at one end of the SCSI bus. For example, use this setting if you have wide devices daisy chained to the QLA12160/12160L J1 (QLA12160/33 and QLA12160/66), J2, or J3 connector with a single cable and the J1, J2, or J3 connector is not at the end of the cable.

- *High only* (QLA12160/33 and QLA12160/66). High termination is enabled. This setting overrides termination requirements sensed by the board. This setting is not available on the QLA12160L/66 board.

  Use this setting for the QLA12160/33 and QLA12160/66 boards' port one (J1 or J3) when you have a wide device connected to one connector and a narrow device connected to the other connector. Use this setting for the QLA12160/33 and QLA12160/66 boards' port two (J2) if the port two connector is not at one end of the SCSI bus and you have narrow devices at one end of the bus and wide devices at the other end.

A.2.2
SCSI Device Settings

After changing the host adapter settings for the QLA12160/12160L board, you can modify the device parameters for SCSI devices connected to the board. From the *Configuration Settings* menu in *Fast!*UTIL, select SCSI Device Settings. The settings are linked to the device's SCSI ID (0-15). If you make changes, be sure the SCSI ID matches the device whose settings you want to change. Select *Scan SCSI Bus* from the *Fast!*UTIL Options menu to see the SCSI IDs assigned on your system (see section A.3).

NOTE: The Adapter Configuration setting in the Host Adapter Settings (see section A.2.1) controls which device settings you can change.

The options and defaults for the SCSI device settings are listed in table A-3 and described in the following paragraphs.

Table A-3. SCSI Device Settings

Setting	Options	Default	Adapter Configuration Setting
Disconnects OK	*Yes or No*	*Yes*	*Auto, Safe, Manual*
Check Parity	*Yes or No*	*Yes*	*Auto, Safe, Manual*
Enable LUNs	*Yes or No*	*Yes*	*Auto, Safe, Manual*
Enable Device	*Yes or No*	*Yes*	*Manual*
Negotiate Wide	*Yes or No*	*Yes*	*Manual*
Negotiate Synchronous	*Yes or No*	*Yes*	*Manual*
Tagged Queuing	*Yes or No*	*Yes*	*Manual*
Enable PPR	*Yes or No*	*Yes*	*Manual*
Sync Offset	*00, 02, 04, 06, 08, 12, 14, 16, 18, 20, 22, 24*	*24*	*Manual*
Sync Period	*9, 10, 12, 25, 40*	*9*	*Manual*
Exec Throttle	*1,4,8,16,32,64,128, 255*	*16*	*Auto, Safe, Manual*

NOTE: These settings apply to each SCSI ID individually.

- **Disconnects OK.** When set to *Yes*, the device is notified that it can optionally disconnect from the host adapter. When the drive is ready to continue executing the command, it must reestablish the link through a reconnect cycle. When set to *No*, disconnects are not allowed. The default is *Yes*.

  If you have more than one device attached to the QLA12160/12160L board, set Disconnects OK to *Yes* for best performance.

- **Check Parity.** When set to *Yes*, odd parity is checked and passed to the SCSI FIFO when data is received from the SCSI bus. When set to *No*, the received SCSI parity is ignored and odd parity is generated for the SCSI FIFO. The default is *Yes*.

- **Enable LUNs.** When set to *Yes*, multiple LUNs are supported. When set to *No*, multiple LUNs are not supported. LUN support is typically required for CD-ROM changers or redundant array of independent disks (RAID) boxes that use LUNs to map drives. The default is *Yes*.
- **Enable Device.** When set to *Yes*, the system BIOS recognizes the device at this SCSI ID. When set to *No*, the system BIOS ignores the device at this SCSI ID. The default is *Yes*.
- **Negotiate Wide.** When set to *Yes*, the device supports 16-bit, wide (68-pin cable) SCSI data transfers. When set to *No*, only 8-bit (50-pin cable) SCSI data transfers are supported. The default is *Yes*.
- **Negotiate Synchronous.** When set to *Yes*, the QLA12160/12160L board negotiates synchronous data transfers with the device. When set to *No*, the QLA12160/12160L board only uses asynchronous data transfers. The default is *Yes*.
- **Tagged Queuing.** When set to *Yes*, the device queues multiple commands. When set to *No*, multiple queues are not supported. The default is *Yes*.
- **Enable PPR.** When set to *Yes*, the QLA12160/12160L board attempts to negotiate for parallel protocol request (PPR) transfers. When set to *No*, the QLA12160/12160L board does not negotiate for PPR transfers. The default is *Yes*.
- **Sync Offset.** This field specifies the maximum number of requests (REQ) that can be sent during a synchronous data transfer before an acknowledge (ACK) is received. The valid values for this field are: *00, 02, 04, 06, 08, 12, 14, 16, 18, 20, 22, 24.* The default is *24*.
- **Sync Period.** This field specifies the minimum REQ/ACK period (in 4-ns increments) for a synchronous data transfer. The valid values for this field are *9* (160 Mbytes/sec, Ultra3), *10* (80 Mbytes/sec, LVD), *12* (40 Mbytes/sec, Ultra), *25* (20 Mbytes/sec, fast), and *40* (12.5 Mbytes/sec). The default is *9*.
- **Exec Throttle.** This field specifies the maximum number of commands executing on any one port. When a port's execution throttle is reached, no new commands are executed until the current command finishes executing. The valid values for this field are: *1, 4, 8, 16, 32, 64, 128,* and *255*. The default is *16*.

A.2.3
Scan and Configure SCSI Devices

NOTE: You must set the Adapter Configuration setting in the Host Adapter Settings to *Manual* (see section A.2.1) to use Autoconfigure; otherwise, all changes made with Autoconfigure are reset when your system is rebooted.

The QLA12160/12160L board is designed to sense and configure the devices connected to your board. With the Adapter Configuration set to *Manual*, the Autoconfigure option gives you control of when the bus is scanned and configured. Selecting the *Autoconfigure SCSI Devices* option from the Configuration Settings menu causes the QLA12160/12160L board to scan the devices on the SCSI bus and set the following options, based on the capabilities of each device:

- ❑ Enable Device
- ❑ Disconnects
- ❑ Negotiate Wide
- ❑ Negotiate Synchronous
- ❑ Tagged Queuing
- ❑ Enable LUN Support

The settings are displayed in the *SCSI Device Settings* screen. Use the arrow keys to change the settings. See section A.2.2 for more information about the SCSI device settings and section A.2.1 for host adapter settings.

If you use Autoconfigure to configure your system, you should run *Fast!*UTIL and select *Autoconfigure SCSI Devices* after adding or reconfiguring devices attached to the QLA12160/12160L board.

A.2.4
Selectable Boot Settings

The *Selectable Boot Settings* option is accessed from the *Configuration Settings* menu. If you enable this option, you can select the SCSI ID from which you want to boot. SCSI ID values range from 0-15. Once enabled, this option forces the system to boot on the selected SCSI drive, ignoring any IDE drives attached to your system. If you disable this option, the system looks for an IDE drive from which to boot. If an IDE drive is not found, the system looks for the first bootable SCSI drive. In disabled mode, the SCSI Boot ID and SCSI Boot LUN parameters have no effect.

NOTE: This option applies only to disk devices; it does not apply to CD-ROMs, tape drives, and other nondisk devices.

A.2.5
Restore Default Settings

The *Restore Defaults* option from the *Configuration Settings* menu restores the QLA12160/12160L board default settings. The default settings are displayed on the *SCSI Device Settings* screen. Use the arrow keys to change the settings. See section A.2.2 for more information about the SCSI device settings and section A.2.1 for host adapter settings.

A.2.6
Raw NVRAM Data

This option displays the adapter's nonvolatile random access memory (NVRAM) contents in hexadecimal format. This is a troubleshooting tool; you cannot modify the data.

A.3
Scan SCSI Bus

This option scans the SCSI bus and lists all the connected devices by SCSI ID. Information about each device is listed, for example, vendor name, product name, and revision. This information is useful when configuring your QLA12160/12160L board and attached devices.

A.4
SCSI Disk Utility

This option scans the SCSI bus and lists all the connected devices by SCSI ID. You can select a disk device and perform a low-level format or verify the disk media.

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

A.5
Using SCSI-1 Devices

The QLA12160/12160L board is configured at the factory with default parameters that provide maximum performance. When the board is operating at maximum performance, it may not be 100% compatible with some older SCSI-1 devices.

If the SCSI-1 device attached to the QLA12160/12160L board is having problems, you can turn off some of the high-performance parameters to get maximum compatibility. Follow these steps:

1. When you power up the system, access *Fast!*UTIL with the <ALT>-<Q> key combination.
2. Select *Configuration Settings* from the *Fast!*UTIL *Options* menu.

3. Select SCSI Device Settings. A screen appears with the settings for each SCSI device. Make the following changes for each SCSI ID to which a SCSI-1 device is assigned.

   a. Change the *Negotiate Wide* setting to *No*.
   b. Save the parameters.
   c. Exit from *Fast!*UTIL.
   d. Reboot your system.

4. If your SCSI device is still having problems, repeat steps 1 through 3. In step 3, change the following parameters to *No*, one at a time, rebooting after each change to check your system's performance.

   a. Negotiate Synchronous
   b. Check Parity
   c. Enable LUNs
   d. Disconnects OK

   When the system operates correctly, stop changing the parameters!

If you've changed all parameters in steps 3 and 4 and things still aren't working right, follow these steps.

1. When you power up the system, access *Fast!*UTIL with the <ALT>-<Q> key combination when the BIOS banner appears.
2. Select *Configuration Settings* from the *Fast!*UTIL *Options* menu.
3. Select *Host Adapter Settings*.
4. Change the PCI bus DMA burst setting to *Disable.*
5. Exit from *Fast!*UTIL.
6. Reboot your system.

If your devices are still not working properly, change the Adapter Configuration settings in the Host Adapter Settings to *Safe* (see section A.2.1).

Appendix B
SCSI Termination

B.1
Setting the SCSI Termination

The first and last physical SCSI devices on each end of the SCSI bus must be terminated.

Termination is set automatically through *Fast!*UTIL (see section A.2.1). The QLA12160/12160L board offers the additional option of terminating with jumpers (see section B.2).

Some cables have multiple connectors for connecting several devices to one of the board's connectors. If the board uses a connector that is **not** on either end of the cable, then the board is not at one end of the SCSI bus and you need to change the termination setting.

The following sections describe how to set termination for the QLA12160/12160L board. The text and illustrations describe multiple SCSI devices daisy chained onto a single connector on the board. When daisy chaining narrow and wide SCSI devices, always have a wide SCSI device at the end of the chain.

NOTE: QLogic recommends using external termination in system configurations that have multiple initiators that share the same SCSI bus (such as in Microsoft Cluster configurations). External termination ensures proper device operation during power cycles. If external termination cannot be provided, terminate all the host bus adapters using jumpers (see appendix B.2).

B.2
Termination (Jumpers) for the QLA12160/12160L

The QLA12160/12160L board comes from the factory with jumpers on pins 1-2 of J5, J6, J7, and J8; these settings allow automatic termination (see section A.2.1).

Moving the jumpers on J5 and J6 on the QLA12160/12160L board manually sets the termination for port one. Moving the jumpers on J7 and J8 on the QLA12160/12160L board manually sets the termination for port two (see figure B-1). Settings you make with these jumpers override all *Fast!*UTIL or automatic termination settings.

The QLA12160/12160L board jumper block is illustrated in figure B-1.

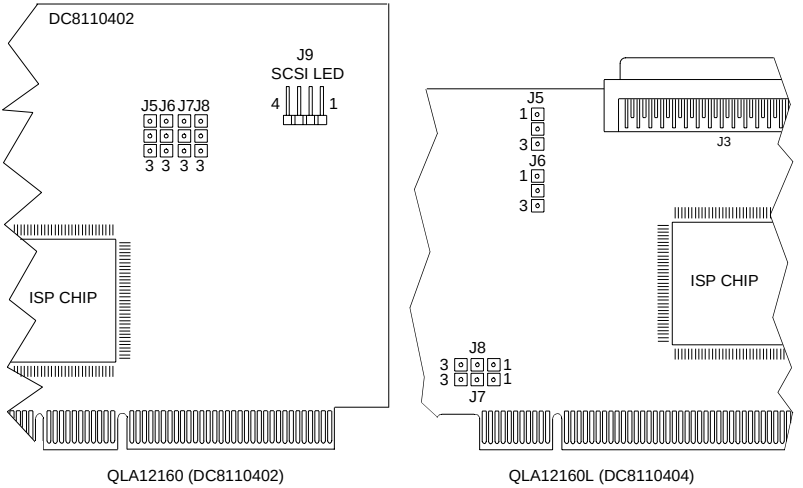

Figure B-1. QLA12160/12160L Jumper Termination

The following paragraphs give manual termination instructions.

- ❑ Termination disabled. Removing the jumpers from J5 and J6 disables termination for port one. Use this configuration if you have wide devices daisy chained to J1 (QLA12160) and J3 with a single cable, or J1 or J3 is not at the end of the cable. Removing the jumpers from J7 and J8 disables termination for port two. Use this configuration if you have wide devices daisy chained to J2 with a single cable, and J2 is not at the end of the cable.
- ❑ Termination enabled. Putting jumpers on pins 2-3 of J5 and J6 enables termination for port one. Use this setting when you have a wide device connected to J1 (QLA12160) or J3. Putting jumpers on pins 2-3 of J7 and J8 enables termination for port two. Use this setting when you have a wide device connected to J2.
- ❑ High only (QLA12160). Putting a jumper on pins 2-3 of J5 and removing the jumper from J6 enables high termination for port one. Use this setting when you have a wide device connected to one connector and a narrow device connected to the other. This setting is not available on the QLA12160L board.

Appendix C
Specifications

Table C-1. QLA12160/12160L 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 C-2. QLA12160/12160L Board Specifications

Type	Specification
Host bus	Conforms to PCI Local Bus Rev. 2.2 specification
SCSI standard	ANSI X3.131-1994 SCSI-2 ANSI X3T10/1071D SCSI-3 Fast-20 (Ultra SCSI) ANSI X3T10/1142D Fast-40 draft (Ultra2 SCSI) ANSI T10 project 855D, *Information Technology – SCSI-3 Parallel Interface (SPI)* ANSI T10 project 1142D, *Information Technology – SCSI Parallel Interface-2 (SPI-2)* ANSI T10 project 1302D, *Information Technology – SCSI Parallel Interface-3 (SPI-3)*
SCSI data handling	Synchronous: Wide and Ultra SCSI (40 Mbytes/sec) Narrow Ultra SCSI (20 Mbytes/sec) Ultra2, LVD SCSI (80 Mbytes/sec) Ultra3, LVD SCSI (160 Mbytes/sec) Wide and fast SCSI (20 Mbytes/sec) Narrow fast SCSI (10 Mbytes/sec) Narrow SCSI (5 Mbytes/sec) Asynchronous (all boards)
CPU	Embedded RISC processor
Host data transfer	64-bit, bus master DMA data transfers to 264 Mbytes/sec
Transfer counter	24-bit
RAM	128K bytes of static RAM

Table C-2. QLA12160/12160L Board Specifications (Continued)

Type	Specification
FIFO	128-byte command DMA FIFO; 512-byte data DMA FIFO with threshold control
Electrical drivers	Single-ended and LVD
Connectors	QLA12160: 68-pin, high-density, internal SCSI-2 connector (port one) Two 68-pin, external VHDCs QLA12160L: 68-pin, high-density, internal SCSI-2 connector (port one) One 68-pin, external VHDC
Form factor	17.78cm x 10.67cm (7.0" x 4.2") (QLA12160) 16.93cm x 5.15cm (6.7" x 2.5") (QLA12160L)
Operating power	5 volts @ 3 ampere