



Hardware Installation Guide for the QLA12160 Board

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

*DC8151101-00 C
September 14, 2001*

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QLA12160 (DC8110402)	
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Table of Contents

Section 1 Introduction

1.1	Product Description	1-1
1.2	Features	1-2
1.2.1	Mixed Peripheral Support	1-3

Section 2 Hardware Installation

2.1	Preinstallation Procedures	2-1
2.2	What You Need for Installation	2-1
2.3	Setting the SCSI Termination	2-2
2.4	SCSI Termination Power	2-2
2.5	Installing the Device Activity Light	2-2
2.6	Installation in the Computer	2-3
2.7	Installation Help	2-5

Section 3 Troubleshooting

3.1	Problems After Installation	3-1
3.2	Hardware Problem Checklist	3-1
3.3	System Configuration Problem Checklist	3-1
3.4	SCSI Problem Checklist	3-2

Appendix A *Fast!UTIL*

A.1	Introduction	A-1
A.2	Configuration Settings	A-1
A.2.1	Host Adapter Settings	A-2
A.2.2	SCSI Device Settings	A-3
A.2.3	SCSI Bus Settings	A-5
A.2.4	Autoconfigure SCSI Devices	A-7
A.2.5	Selectable Boot Settings	A-7
A.2.6	Restore Default Settings	A-8
A.2.7	Raw NVRAM Data	A-8
A.3	Scan SCSI Bus	A-8
A.4	SCSI Disk Utility	A-8
A.5	Using SCSI-1 Devices	A-8

Appendix B SCSI Termination

B.1	Setting the SCSI Termination	B-1
B.2	Termination (Jumpers) for the QLA12160	B-1

Appendix C Specifications

FIGURES

Figure		Page
2-1	QLA12160 Board Layout.	2-2
B-1	QLA12160 Jumper Termination	B-2

TABLES

Table		Page
1-1	SCSI Data Transfer Rates	1-1
3-1	Maximum Cable Length	3-2
A-1	Host Adapter Settings	A-2
A-2	SCSI Device Settings	A-3
A-3	SCSI Bus Settings.	A-5
A-4	QLA12160 Ports	A-6
C-1	QLA12160 Board Operating Environment	C-1
C-2	QLA12160 Board Specifications	C-1

Section 1

Introduction

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

- QLA12160/33 (DC8110402-06)
- QLA12160/66 (DC8110402-07)

The QLA12160 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 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 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 board supports bootable devices (hard disk drives and CD-ROM drives) and can be used with tape drives and other SCSI devices. Installation of the QLA12160 board is quick and easy.

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

The QLA12160 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 MBps (asynchronous)	—
Fast SCSI	10 MBps	20 MBps
Ultra SCSI	20 MBps	40 MBps
Ultra2, LVD SCSI	40 MBps	80 MBps
Ultra3, LVD SCSI	80 MBps	160 MBps

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

The QLA12160 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 disk drives. SCSI allows connecting the following numbers and types 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 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 device, and so on. A daisy chain can be created either by using 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
- Support for synchronous SCSI data transfer rates:
 - Ultra3, LVD SCSI (160 MBps)
 - Ultra2, LVD SCSI (80 MBps)
 - Ultra SCSI wide (40 MBps)
 - Ultra SCSI narrow (20 MBps)
 - Fast SCSI wide (20 MBps)
 - Fast SCSI narrow (10 MBps)
 - SCSI narrow (5 MBps)
- 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 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 board, take the time to read this instruction guide.

CAUTION!

- Your computer, the QLA12160 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 board is set at the factory for SCSI ID 7. **The QLA12160 board and each SCSI device attached to the board must have different SCSI IDs.**
- The QLA12160 board contains parts that can be damaged by electrostatic discharge (ESD). Before handling the QLA12160 board, use standard methods to discharge static electricity. Keep the QLA12160 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 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 cable [VHDC] to 50-pin)
 - External wide (68-pin VHDC)

Figure 2-1 identifies the QLA12160 board components referenced throughout this section.

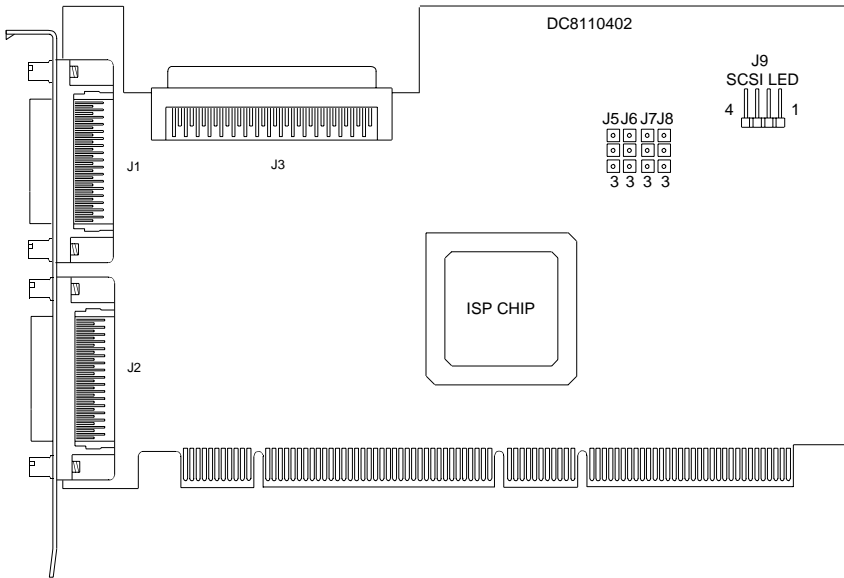


Figure 2-1. QLA12160 Board Layout

**2.3
Setting the SCSI Termination**

Termination for the QLA12160 board is set automatically in most cases. You can change the termination using the *Fast!UTIL* software (see section A.2.3).

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

**2.4
SCSI Termination Power**

The QLA12160 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 board (pins 1 and 4 are positive). If your boot drive is an integrated device electronics (IDE) drive or connected to a different adapter, you can connect an LED to the QLA12160 board jumper blocks to show activity of devices connected to your QLA12160 board.

2.6

Installation in the Computer

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

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

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

The QLA12160 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 your motherboard supports triggering, use *level triggering* for the QLA12160 board. See the documentation supplied with your computer, or contact your computer dealer to determine whether or not 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 board must be in a PCI bus master slot. (Some motherboards share PCI bus master slots with onboard devices; QLA12160 boards do not work in shared slots.)
- If your board is labeled QLA12160/66, 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 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 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 to use when you install the QLA12160 board.
- 6. Place the QLA12160 board into the slot. Carefully press the board into the slot until it seats firmly.

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

- 7. Secure the QLA12160 board with the slot cover screw.
- 8. Install the cable.
 - Internal: Connect the cable from the devices to the J3 connector on the QLA12160 board.
 - External: Connect a SCSI cable from the devices to the J1 connector and/or the J2 connector.

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 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 Number	Device Type	Adapter Number	SCSI ID	SCSI LUN	Vendor ID	Product ID	Product Revision
81	Disk	0	0	0	SEAGATE	ST32550	7394

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 when troubleshooting or installing other devices.

If there is no hard disk drive attached to your computer, a ROM BIOS NOT INSTALLED message is displayed after the device listing.

When 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 board in your computer.

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

If the information displayed on your monitor is not correct and you have checked the QLA12160 board's configuration, [see section 3](#) for troubleshooting information.

2.7

Installation Help

If your system has an IDE fixed disk device, be sure to 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 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 section A.2.5](#) about selectable boot settings.

SCSI ID numbers must be unique; otherwise, the BIOS list of SCSI devices displayed on your monitor is not correct. For example, if you give one of your devices the same SCSI ID as the QLA12160 board, that device is listed for all SCSI IDs; or if you have two devices with the same SCSI ID, only one of the devices is listed. If the BIOS list is not correct, power down the computer and check the configuration. Be sure to check the QLA12160 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 board is on a SCSI bus with any single-ended peripheral device, for example, a CD-ROM, the QLA12160 board automatically operates as a single-ended, Ultra device. Consequently, all single-ended device restrictions apply to the QLA12160 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 types of installation problems that can cause your QLA12160 board to function incorrectly: hardware problems, system configuration problems, and SCSI problems. This section provides itemized checklists to help you determine why your QLA12160 board is functioning incorrectly.

NOTE: The latest versions of 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 circuit cards installed securely in the PC?
- Are all cables securely connected to the correct connectors?
- Is the QLA12160 board installed correctly in the PC? 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

- Is the motherboard configured properly (see [section 2.6](#))? See the documentation supplied with your computer, or contact your computer dealer to determine whether or not your motherboard requires configuration.
- Is the disk drive partitioned correctly? If the system message *Missing Operating System* or *No ROM BASIC, System Halted* is displayed, the disk drive attached to the QLA12160 board is not partitioned in a format compatible with the board. The proper geometry for use with the QLA12160 boards is the Microsoft standard.
 - Drives less than 1 GB are 64 heads, 32 sectors per track
 - Drives more than 1 GB 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

- Is the SCSI bus termination for the QLA12160 board set correctly (see appendixes [A](#) and [B](#))?
- Is the termination for all devices on the SCSI bus set correctly?
- Were all SCSI devices powered up before you powered up the PC?
- Does each device have a unique SCSI ID? Each device must have a unique ID between 0 and 15. The QLA12160 board is set to SCSI ID 7 at the factory.
- Are the cable lengths within limits? Be sure that the total length for cables connected to the QLA12160 board does not exceed the length listed in [table 3-1](#).

Table 3-1. Maximum Cable Length

Board and Mode	Cable Length
QLA12160 point-to-point 15 nodes single-ended Ultra mode	82 feet (25 meters) 39 feet (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 cable length cannot exceed the maximum cable length established for Ultra SCSI devices.

^aFor four or fewer devices connected to the board.

^bFor 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 board and the connected devices.

The QLA12160 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*. To access *Fast!UTIL*, press ALT+Q during the QLA12160 board BIOS initialization (it may take a few seconds for the *Fast!UTIL* menu to appear). If you have more than one QLA12160 board, *Fast!UTIL* prompts you to select which board you want to configure. After changing the settings, *Fast!UTIL* reboots your system to load the new parameters.

CAUTION! When the configuration settings are incorrect, the QLA12160 board does 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 SCSI devices and the QLA12160 board to which they are attached.

A.2.1

Host Adapter Settings

From the **Configuration Settings** menu in *Fast!UTIL*, select **Host Adapter Settings**. Default settings for the QLA12160 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 BIOS	Enabled, Disabled	Enabled
PCI bus DMA burst	Enabled, Disabled	Enabled
CDROM Boot	Enabled, Disabled	Disabled
Adapter Configuration	Auto, Manual, Safe	Auto
Drivers load RISC code	Enabled, Disabled	Enabled
>4 Gbyte Addressing	Enabled, Disabled	Disabled
Fast Command Posting	Enabled, Disabled	Enabled

- **Host adapter BIOS.** When this setting is Disabled, the ROM BIOS on the QLA12160 board is disabled, freeing space in upper memory. The RAM BIOS and other drivers still recognize the QLA12160 board. Do not disable this setting when you are booting from a SCSI disk drive attached to the QLA12160 board. The default is Enabled (ROM BIOS on the QLA12160 board is enabled).
- **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 when 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.
- **Adapter Configuration**
 - *Auto.* The ROM BIOS automatically configures the QLA12160 board to match any SCSI device attached to the board and selects optimum performance. The default is Auto.
 - *Manual.* You can control the configuration settings for each SCSI device and have the option of running Autoconfigure. [See section A.2.4](#) 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 disabled and all attached devices work in minimal configuration (narrow, asynchronous mode).

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

- **Drivers Load RISC Code.** When this setting is Enabled, the QLA12160 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; otherwise, 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.

- **>4 Gbyte Addressing.** Enable this setting when your system has more than 4 GB of RAM available. The default is Disabled.
- **Fast Command Posting.** When this setting is Enabled, command execution time is decreased by minimizing the number of interrupts. The default is Enabled.

A.2.2

SCSI Device Settings

After changing the host adapter settings for the QLA12160 board, you can modify 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 that the SCSI ID matches the settings of the device 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 SCSI device settings are listed in table A-2 and described in the following paragraphs.

Table A-2. SCSI Device Settings

Setting	Options	Default	Adapter Configuration Setting
Disconnects OK	Yes, No	Yes	Auto, Safe, Manual
Check Parity	Yes, No	Yes	Auto, Safe, Manual
Enable LUNs	Yes, No	Yes	Auto, Safe, Manual
Enable PPR	Yes, No	Yes	Manual

Table A-2. SCSI Device Settings (Continued)

Setting	Options	Default	Adapter Configuration Setting
Enable Device	Yes, No	Yes	Manual
Negotiate Wide	Yes, No	Yes	Manual
Negotiate Synchronous	Yes, No	Yes	Manual
Tagged Queuing	Yes, No	Yes	Manual
Sync Offset	00, 02, 04, 06, 08, 10, 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 re-establish 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 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 RAID boxes that use LUNs to map drives. The default is Yes.
- **Enable PPR.** When set to Yes, the QLA12160 board attempts to negotiate for parallel protocol request (PPR) transfers. When set to No, the QLA12160 board does not negotiate for PPR transfers. 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, the device supports only 8-bit (50-pin cable) SCSI data transfers. The default is Yes.

- **Negotiate Synchronous.** When set to Yes, the QLA12160 board negotiates synchronous data transfers with the device. When set to No, the QLA12160 board uses only 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.
- **Sync Offset.** This setting specifies the maximum number of requests (REQ) that can be sent during a synchronous data transfer before an acknowledge (ACK) is received. Valid values for this field are 00, 02, 04, 06, 08, 10, 12, 14, 16, 18, 20, 22, and 24. The default is 24.
- **Sync Period.** This setting specifies the minimum REQ/ACK period, in 4-ns increments, for a synchronous data transfer. Valid values for this field are 9 (160 MBps, Ultra3), 10 (80 MBps, LVD), 12 (40 MBps, Ultra), 25 (20 MBps, fast), and 40 (12.5 MBps). The default is 9.
- **Exec Throttle.** This setting 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. Valid values for this field are 1, 4, 8, 16, 32, 64, 128, and 255. The default is 16.

A.2.3

SCSI Bus Settings

The options and defaults for SCSI bus settings are listed in [table A-3](#) and described in the following paragraphs.

Table A-3. SCSI Bus Settings

Setting	Options	Default
Host adapter SCSI ID	Enabled, Disabled	Enabled
SCSI bus reset	Enabled, Disabled	Enabled
SCSI bus reset delay	0–15 seconds	5 seconds
SCSI Termination	Auto, Enabled, Disabled, High Only	Auto

- **Host adapter SCSI ID.** This setting defines the SCSI ID of the QLA12160 board. The default is 7.
- **SCSI bus reset.** When this setting is Enabled, the SCSI bus is reset at system power up. Disable this setting to prevent unwanted SCSI bus resets when you have two or more host adapter boards on the SCSI bus. The default is Enabled.
- **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.

■ **SCSI termination**

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

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

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

The QLA12160 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-4](#).

Table A-4. QLA12160 Ports

Port	QLA12160 Port Connector
One	J1 and J3
Two	J2

The following text explains automatic and manual termination. See [section B.2](#) for jumper termination instructions.

- Auto.* SCSI termination requirements are sensed by the board and set automatically. The default is Auto.

With QLA12160 boards, 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 a single 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, 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, J2, or J3 is not at one end of the SCSI bus. For example, use this setting when you have wide devices daisy chained to the QLA12160 J1, 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.* High termination is enabled. This setting overrides termination requirements sensed by the board.

Use this setting for the QLA12160 board's 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 board's port two (J2) when 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.2.4

Autoconfigure SCSI Devices

NOTE: You must set the **Adapter Configuration** setting in **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 board is designed to sense and configure the devices connected to your board. When **Adapter Configuration** is set to Manual, the Autoconfigure option allows you to control when the bus is scanned and configured. Select the **Autoconfigure SCSI Devices** option from the **Configuration Settings** menu to scan devices on the SCSI bus. Set the following options, based on the capabilities of each device:

- Disconnects
- Enable LUN Support
- Enable PPR
- Enable Device
- Negotiate Wide
- Negotiate Synchronous
- Tagged Queuing
- Sync Period

The settings are displayed in the **SCSI Device Settings** window. Use the arrow keys to change settings. See section A.2.2 for more information about **SCSI Device Settings** and see section A.2.1 for **Host Adapter Settings**.

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

A.2.5

Selectable Boot Settings

The **Selectable Boot Settings** option is accessed from the **Configuration Settings** menu. When this option is Enabled, you can select the SCSI ID (0–15) from which you want to boot. Once enabled, this option forces the system to boot on the selected SCSI drive, ignoring any IDE drives attached to your system. When this option is Disabled, the system looks for an IDE drive from which to boot. When an IDE drive is not found, the system looks for the first bootable SCSI drive. When this option is disabled, SCSI Boot ID and SCSI Boot LUN parameters have no effect.

NOTE: This option applies only to disk devices, not to CD-ROMs, tape drives, or other nondisk devices.

A.2.6

Restore Default Settings

The **Restore Defaults** option from the **Configuration Settings** menu restores the QLA12160 board default settings, which are displayed in **SCSI Device Settings**. Use the arrow keys to change settings. See section A.2.2 for more information about **SCSI Device Settings** and see section A.2.1 for **Host Adapter Settings**.

A.2.7

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 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 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 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 board is not functioning correctly, you can turn off some high-performance parameters for maximum compatibility. Follow these steps:

1. When you power up the system, press CTRL+Q to access *Fast!UTIL*.
2. Select **Configuration Settings** from the **Fast!UTIL Options** menu.

3. Select **SCSI Device Settings**. A window displays 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 *Fast!UTIL*.
 - d. Reboot the system.

4. If your SCSI device still does not function correctly, 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, do not change more parameters.

If you've changed all parameters in [steps 3](#) and [4](#) and your system still does not function correctly, follow these steps.

1. When you power up the system and the BIOS banner appears, press ALT+Q to access *Fast!UTIL*.
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 *Fast!UTIL*.
6. Reboot the system.

If your devices still do not function 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 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 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 with multiple initiators that share the same SCSI bus (such as in Microsoft cluster configurations). External termination ensures proper device operation during power cycles. When external termination cannot be provided, terminate all host bus adapters using jumpers (see section B.2).

B.2

Termination (Jumpers) for the QLA12160

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

The QLA12160 board jumper block is illustrated in [figure B-1](#).

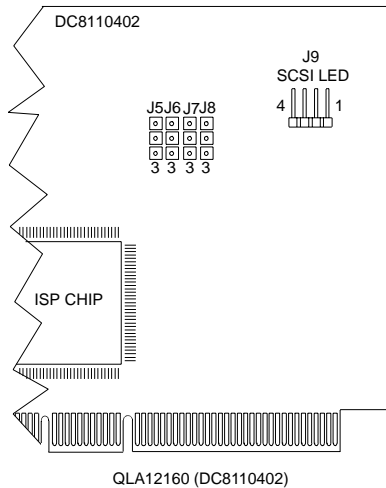


Figure B-1. QLA12160 Jumper Termination

The following paragraphs give manual termination instructions.

- **Termination disabled.** Removing the jumpers from J5 and J6 disables termination for port one. Use this configuration for wide devices daisy chained to J1 and J3 with a single cable, or when 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 for 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 a wide device is connected to J1 or J3. Putting jumpers on pins 2–3 of J7 and J8 enables termination for port two. Use this setting for a wide device connected to J2.
- **High only.** Putting a jumper on pins 2–3 of J5 and removing the jumper from J6 enables high termination for port one. Use this setting for a wide device connected to one connector and a narrow device connected to the other.

Appendix C Specifications

Table C-1. QLA12160 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 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, <i>Information Technology—SCSI-3 Parallel Interface (SPI)</i> ANSI T10 project 1142D, <i>Information Technology—SCSI Parallel Interface-2 (SPI-2)</i> ANSI T10 project 1302D, <i>Information Technology—SCSI Parallel Interface-3 (SPI-3)</i>
SCSI data handling	Synchronous: Wide and Ultra SCSI (40 MBps) Narrow Ultra SCSI (20 MBps) Ultra2, LVD SCSI (80 MBps) Ultra3, LVD SCSI (160 MBps) Wide and fast SCSI (20 MBps) Narrow fast SCSI (10 MBps) Narrow SCSI (5 MBps) Asynchronous (all boards)
CPU	Embedded RISC processor
Host data transfer	64-bit, bus master DMA data transfers to 264 MBps
Transfer counter	24-bit
RAM	128 KB of static RAM
FIFO	128-byte command DMA FIFO; 512-byte data DMA FIFO with threshold control
Electrical drivers	Single-ended and LVD

Table C-2. QLA12160 Board Specifications (Continued)

Type	Specification
Connectors	68-pin, high-density, internal SCSI-2 connector (port one) Two 68-pin, external VHDCs
Form factor	17.78 cm × 10.67 cm (7.0" × 4.2")
Operating power	5 volts @ 3 ampere

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