

# LSI8952U SCSI Host Adapter

## KEY APPLICATIONS

- High-performance desktop PCs and workstations
- Intersystem connections: server and workstation to RAID, network management
- Ultra2 SCSI hard drives in servers, clustered servers, workstations and high-end desktops
- Upgrade systems to Ultra2-level performance with Ultra2 drives

### Bus Interface:

3/5V PCI

### PCI Mode:

Bus Master

### Plug-and-Play:

Yes

### SCSI Rate:

80 Mbps synchronous  
14 MBps asynchronous

### SCSI Bus:

16-bit SE and LVD

### Bootable:

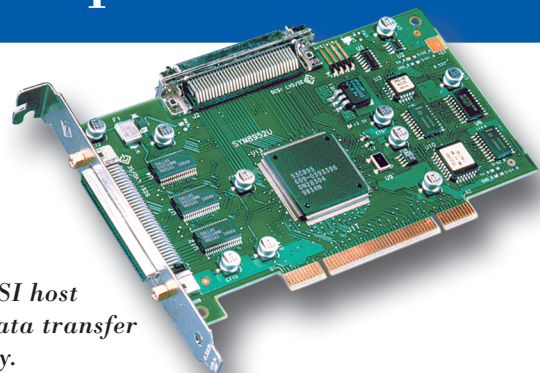
Yes

### No. of SCSI Devices:

15

### SCSI Connectors:

Internal: 68-pin HD  
External: 68-pin HD



*The LSI8952U PCI-to-Ultra SCSI host adapter combines Ultra SCSI data transfer rates with reliable data integrity.*

## OVERVIEW

The LSI8952U PCI-Ultra2 SCSI host adapter by LSI Logic matches high performance and Ultra2 SCSI data transfer rates, with the speed of the PCI system bus. As part of LSI Logic's Ultra2 host adapter family, the LSI8952U supports wide (16-bit) Fast, Ultra, or Ultra2 SCSI devices. The LSI8952U and its Ultra2 complement, the LSI8951U, are ideal host connections to RAID controllers and other demanding I/O applications in the high-performance workstation and server markets.

Connecting up to 15 SCSI devices is as simple as plugging in the LSI8952U host adapter and loading the drivers. New systems can start with the LSI8952U and wide Fast/Ultra devices and then improve performance up to 80 MBps by replacing them with new Ultra2 devices. As compared to Ultra SCSI designs, Ultra2 provides twice the performance and greater flexibility with increased cable lengths.

The flexibility, functionality and performance of the LSI8952U host adapter comes from the on-board LSI Logic LSI53C895 PCI-Ultra2 single-chip controller design. System design flexibility is provided by the LSI8952U's ability to automatically switch from single-ended operation for legacy Fast/Ultra devices to universal low voltage differential (LVD) operation when Ultra2 devices are connected. Using LVDlink™ (Low Voltage Differential) technology, LSI Logic's implementation of LVD transceivers, the LSI8952U provides superior performance, device connectivity and signal reliability. These LVDlink transceivers provide the data reliability of differential signaling without the high cost of high voltage differential transceivers.

Setting up hard drives and other wide Fast/Ultra legacy or Ultra2 SCSI devices is fast and easy with built-in SCAM (SCSI Configured Automatically) and SCSI bus configuration utilities. The board's PCI bus interface provides Plug-and-Play installation without jumpers, switches, IRQs, system DMA or addresses to set.



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## FEATURES AND BENEFITS

### Performance

- Synchronous:
  - up to 80 MBps Ultra2 SCSI
  - up to 40 MBps Ultra SCSI
  - up to 20 MBps Fast SCSI
- Asynchronous: up to 14 MBps
- DMA bus mastering for low overhead with 32-bit burst data transfers at PCI data transfer rates
- Zero wait state PCI transfers
- Up to 128 dword PCI burst size to maximize the PCI data transfer rate

## HARDWARE FEATURES

### PCI Bus Support

- PCI 2.1 compliant
- PCI write and invalidate, read line and read multiple commands
- 32-bit, 33-MHz PCI bus
- Functions as full 32-bit PCI DMA bus master
- Operates on 3.3V or 5V PCI buses

### SCSI Bus Support

- LVDlink transceivers meet all of the requirements of the SPI-2 standard and utilize TolerANT™ active negation technology for improved single-ended SCSI signal integrity
- Prefetches up to 8 dwords of SCSI SCRIPTS™ instructions to save PCI bus overhead

For critical data-handling applications, LSI Logic offers data and product reliability, and software and hardware compatibility with easy installability. LSI Logic and our technology partners' extensive host adapter and testing ensures OEM compatibility with all major operating systems and a wide variety of Fast, Ultra and Ultra2 devices.

The powerful LSI Logic SCSI Device Management System (SDMS) software, on-board BIOS and configuration utility make SCSI I/O subsystem installation easy and virtually automatic.

## SCSI DEVICE MANAGEMENT SOFTWARE (SDMS)

### SDMS Software Features

- Multiple host adapter support
- Scatter/gather
- Tagged command queuing for peak performance in multi-tasking environments
- Shared interrupts and shared memory to allow multiple PCI devices in a single-interrupt system
- Multiple LUNs per SCSI ID for RAID and media changer capability
- Supports hard drives > 8 GBytes
- ASPI interface support
- Multi-initiator in most operating systems
- Disconnect/reselect support
- Target initiated negotiation
- On-board, field upgradeable BIOS in Flash ROM
- On-board serial EEPROM for SCSI bus configuration storage

### SDMS Software Support

Operating systems supported are: DOS (with ASPI support), Windows 3.1, Windows for Workgroups 3.11, Windows 95, Windows NT 3.51 & 4.0, Novell NetWare 3.1 & 4.x, SCO UNIX Open Server 5.0.2 and above, UNIXWare 2.1 & 7, OS/2.4x, and Solaris 2.6. Utilities: Install and FLASH (DOS only), SCSI format, SCSI configuration, verify.

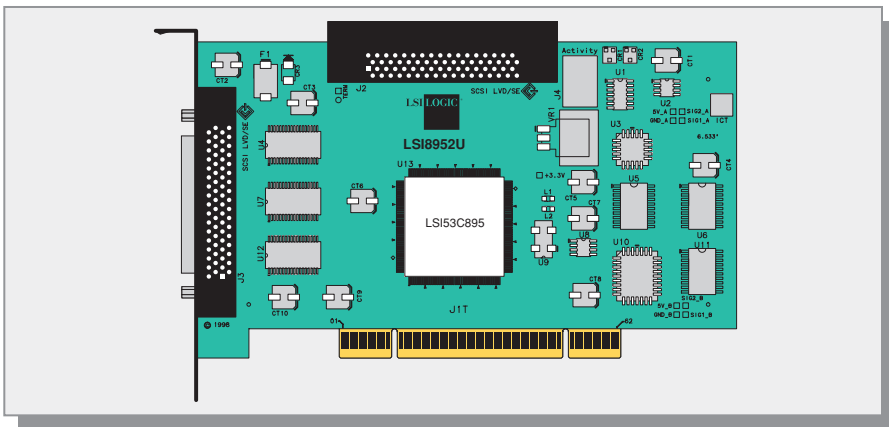
## HOST ADAPTER COMPATIBILITY AND QUALITY

LSI Logic is a key developer and contributor to the original committees that defined today's SCSI and PCI standards. Our continuing work with other industry leaders of core chip sets, processors, system providers, SCSI device peripherals, BIOS, and operating systems enables us to provide users with the utmost compatibility and interoperability. Product compatibility and interoperability are rigorously tested and our ISO-9001 certified fabrication facilities assures users of the highest levels of product quality and reliability.

## LVDLINK - UNIVERSAL LVD TRANSCEIVERS

Balancing backward compatibility with I/O performance, the LSI8952U utilizes the LSI Logic LSI53C895 PCI-Ultra2 SCSI controller IC which integrates LSI Logic's Universal LVDlink transceivers with an Ultra2 SCSI I/O processor. Depending on SCSI bus connections, bus cables are sensed and the universal LVDlink transceivers automatically select single-ended or LVD SCSI modes. In single-ended mode, the LSI8952U performs synchronous data transfers up to Ultra SCSI rates, subject to standard Ultra SCSI cable distance and number of connected device constraints. In LVD mode, the host adapter supports up to 12-meter cables and up to 15 LVD devices with the same cables and connectors as defined in the SCSI-3 Parallel Interface ANSI standard. In LVD mode, the LSI8952U host adapter is capable of running at 80 MBps.

LVDlink transceivers also provide fail-safe protection of the receiver by detecting when the LSI8952U is connected to a High Voltage Differential (HVD) signal. When connected to HVD, the LSI8952U's SCSI bus enters a high-impedance mode.



LSI8952U host adapter diagram

## SCSI Bus Support (Continued)

- Supports SCSI SCRIPTS load and store instructions for more efficient moving of data between memory and chip register space
- Includes 4 KB internal RAM for SCRIPTS instruction storage to reduce or eliminate instruction fetches over the PCI bus
- Improved support for large block transfers at Ultra2 SCSI speeds
- Termination:
  - Active, automatic
  - LVDlink provides automatic switching between single-ended and LVD signaling
  - Automatically enters high-impedance state when connected to a HVD signal
- Provides data reliability and cable distance of differential SCSI without the cost of external differential transceivers
- Improves connectivity (up to 15 LVD Ultra2 SCSI devices) and cable lengths (up to 12 meters of Ultra SCSI - longer cables may be possible in point-to-point connections)
- Uses same internal cables as Ultra SCSI and same connectors as Fast/Ultra SCSI
- Supports wide variety of 16-bit SCSI peripherals
- Supports SCAM (SCSI Configured AutoMatically) Level 1 functionality
- Uses LSI53C895 proprietary Ultra2 SCSI I/O RISC processor

# LSI8952U SCSI Host Adapter

## LSI8952U KIT CONTENTS

- LSI8952U PCI-to-Ultra2 SCSI host adapter
- SCSI Device Management System (SDMS) software with a full range of operating system support and SCSI configuration utilities
- LSI8952U Users Guide
- SDMS Users Guide
- 68-pin SE/LVD cable (with built-in LVD termination for 4 devices)

## Technical Specifications

PCI Bus	32-bit, 3.3/5 V local bus (versions 2.0 and 2.1)	
PCI Modes	Bus master DMA	
PCI Transfer Rate	up to 133 MBps	
SCSI Asynchronous	up to 14 MBps	
SCSI Synchronous SE	Fast: up to 20 MBps, Ultra: up to 40 MBps	
SCSI Synchronous LVD	Ultra2: up to 80 MBps	
PCI Voltage	+5V $\pm 5\%$ (1.5 A max), 12V $\pm 5\%$ (50mA max)	
PCI Form Factor	3.5" x 6.0"	
Bracket	ISA/EISA	
Certification Level	PCI 2.1 compliant	
SCSI Bus	16-bit wide	
SCSI Processor	LSI53C895	
Connectors	<b>External</b>	<b>Internal</b>
	68-pin VHDCI	68-pin HD
Termination	Active, automatic terminating, universal LVDlink SCSI with automatic switching to single-ended	
Termination Power	Self-resetting	
LED Indicators	4-pin header for off-board LEDs	
Environments	<b>Operating</b>	<b>Storage</b>
Temperature	5°C to 55°C	-40°C to +85°C
Relative Humidity	5 to 90% non-condensing	5 to 90% non-condensing
Max Dew Point Temp	32°C	
MTBP	>500,000 hours	
Compliances	CE VDE, VCCI, FCC and CISPR class B, UL 94VO	

## Software Support

OS Support	Versions
DOS	with ASPI support
Windows	95, 98, Me, 2000, NT4.0 SP4 and above
NetWare	4.2, 5.0 and 5.1
UnixWare	2.1 & 7.x
SCO Unix	Open Server 5.x
OS/2	Warp 4.x
Utilities	Install, Flash (DOS only), SCSI format, SCSI configuration, verify

For more information please visit the LSI Logic web site at:

<http://storageio.lsillogic.com>

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