LSI53C1030
Ultra320 SCSI Controller

PCI-X TO DUAL CHANNEL ULTRA320 SCSI CONTROLLER

The LSI53C1030 is an extremely high performance, intelligent PCI-X to Dual Channel Ultra320 SCSI controller. The LSI53C1030 is compliant with the SPI-4 SCSI draft specification, and provides additional features to ensure robust system operation. The LSI53C1030 provides a low-risk migration path from the LSI53C1010R PCI-Dual Channel Ultra160 SCSI controller with pin compatibility. LSI Logic's Fusion-MPT™ (Message Passing Technology) architecture provides unparalleled performance, binary compatibility of host software with LSI Logic's Fibre Channel products, and significantly reduced software development time. With this advanced architecture, the LSI Logic product family can be quickly adapted to respond to emerging I/O interfaces.
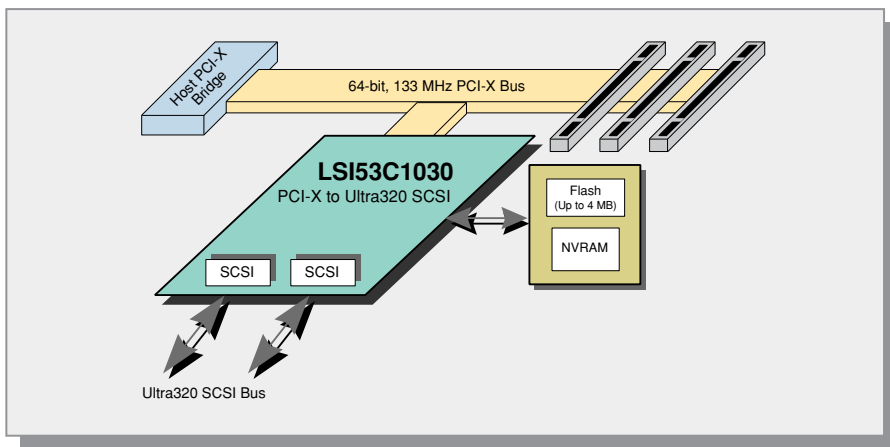

Figure 1: LSI53C1030 implementation

BENEFITS

- Unmatched performance with Fusion-MPT™ architecture

  – Based on industry standard ARM® technology

  – High throughput, low CPU utilization to offload the host processor

  – 640 MBps bandwidth on SCSI bus

  – 1066 MBps bandwidth on PCI-X bus

- Time to market reduced with Fusion-MPT architecture

  – Same single driver binary for SCSI and Fibre Channel products

  – Thin, easy to develop drivers

  – Less integration and certification effort

- Low-risk migration path to Ultra320 with pin compatible Ultra160 device

  – Design in LSI53C1010R now, drop in LSI53C1030 when ready

  – One board design for Ultra160 and Ultra320 SCSI

- Robust system operation with SureLINK™ domain validation

FEATURES

- Pin compatible with LSI53C1010R Ultra160 SCSI controller

  – Design board to accommodate either device in the same socket

- 133 MHz, 64-bit PCI-X interface

  – Theoretical 1066 MBps zero wait state transfer rate

  – 64-bit addressing support through Dual Address Cycle (DAC)

  – True PCI multifunction device presents one electrical load to host bus

  – Compliant with PCI 2.2 and PCI-X Addendum Rev. 1.0

  – Compliant with PCI Power Management Interface Specification 1.1 and PC2001 Draft

- Supports Ultra320 SCSI with:

  – Double transition clocking for 320 MBps throughput on each channel

  – Packetized protocol

  – Quick Arbitrate and Select (QAS)

  – Skew compensation

  – InterSymbol Interference (ISI) compensation

  – Domain validation, including margining

- Performance optimized architecture

  – ARM processors provide high performance with low latency

  – Two independent wide Ultra320 SCSI channels

APPLICATIONS

- *Servers* – Internet/Intranet network, video, e-mail, printing, database management, and financial applications

- *Workstations* – CAD/CAM, industrial simulation, etc.

- *Host attach for RAID and JBOD mass storage subsystems* – Anywhere data access is the bottleneck

NEW ULTRA320 SCSI FEATURES

Paced transfers and double transition clocking enable throughput of up to 320 MBps on each channel for a total of 640 MBps. Both the data and clock frequencies are doubled from Ultra160 SCSI. Because of the faster data and clock speeds, Ultra320 SCSI introduces skew compensation and InterSymbol Interference (ISI) compensation. These new features simplify system design by resolving timing issues at the chip level. Skew compensation adjusts for timing differences between data and clock signals caused by cabling, board traces, etc. ISI compensation enhances the first pulse after a change in state to ensure data integrity.

FUSION-MPT ARCHITECTURE

The LSI53C1030 incorporates LSI Logic's Fusion-MPT (Message Passing Technology) to deliver industry-leading performance and is based on industry standard ARM technology to control the system interface and the SCSI channels. These processors free the host CPU for other processing tasks while maximizing overall I/O performance. The processing power of the Fusion-MPT architecture also allows for advanced features such as Integrated Mirroring™ which provides a greater level of fault tolerance by mirroring the boot volume.

Fusion-MPT is a message passing architecture provides an open programming interface for developers and also allows a single binary device driver to support both LSI Logic's Ultra320 SCSI and Fibre Channel solutions. The Fusion-MPT OS driver suite supports all major operating systems including Windows NT and Windows 2000, Linux, Solaris, UnixWare, and NetWare. High performance, easy to adopt, open programming interface, all result is reduced software development, less integration and certification time, and reduced time to market.

HARDWARE/SOFTWARE OVERVIEW

PCI-X Interface

The host PCI-X interface complies with the PCI Local Bus Specification Revision 2.2, and the PCI-X addendum, Revision 1.0. It implements a 133 MHz, 64-bit bus and is backward compatible with 33/66 MHz, 32/64-bit PCI. Support for 64-bit addressing with Dual Address Cycle (DAC) is provided.

The LSI53C1030 is a true PCI multifunction device and presents one electrical load to the PCI bus. It uses one REQ/-GNT/ pair to arbitrate for PCI bus mastership, and separate interrupt signals are generated for SCSI Channel A and SCSI Channel B for maximum performance. The LSI53C1030 allows for independent control of the two channels; for example, RAID on one channel and a legacy driver on the other. SCSI Interrupt Steering Logic (SISL) provides alternate interrupt routing for RAID applications.

The LSI53C1030 complies with PCI Power Management Interface Specification Revision 1.1 and PC 99, as well as the draft PC2001. It supports power states D0, D1, D2, D3hot and D3cold, power management capabilities registers, and programmable values for PCI Subsystem Vendor ID and Subsystem ID. Extended access cycles (Memory Read Line, Memory Read Multiple, and Memory Write and Invalidate) are also supported.

SCSI Cores

The LSI53C1030 provides two independent Ultra320 SCSI controllers on a single chip. Each controller supports wide Ultra320 SCSI synchronous transfer rates up to 320 MBps on a LVD SCSI bus. Integrated LVDlink™ transceivers support both LVD and single-ended signals with no external transceivers required. Fast SCSI, Ultra SCSI, Ultra2 SCSI, Ultra160 SCSI, and Ultra320 SCSI are all supported by the LSI53C1030 controller.

Memory Interfaces

The LSI53C1030 supports up to 4 MB of external expansion ROM through a parallel interface for add-in card designs. For ease of software development and field upgrades of the ROM, the interface supports local programming of FLASH memory. A serial 2-wire interface provides a connection to a single external serial EEPROM for storing Subsystem Vendor ID and Subsystem ID. No external SRAM is required for normal operation of the device.

FEATURES (Continued)

- – Enhanced interrupt coalescing with hardware assist

- – Designed for optimal packetized performance

- SCSI Interrupt Steering Logic (SISL) provides alternate interrupt routing for RAID applications

- Proven integrated LVDlink transceivers for direct attach to either Low Voltage Differential (LVD) or single-ended (SE) SCSI buses with precision-controlled slew rates

- Comprehensive SureLINK domain validation

  - – Basic (Level 1) with inquiry command

  - – Enhanced (Level 2) with read/write buffer

  - – Margined (Level 3) with margining of drive strength and slew rates

- IEEE 1149.1 JTAG boundary scan

- Flash and local memory interface

- Packaged in a 456 EPBGA

- Supports Integrated Mirroring

- Supported by Fusion MPT drivers with full operating system support:

  - – Windows® NT®/2000

  - – Linux™

  - – Solaris™

  - – UnixWare™

  - – Novell® NetWare®
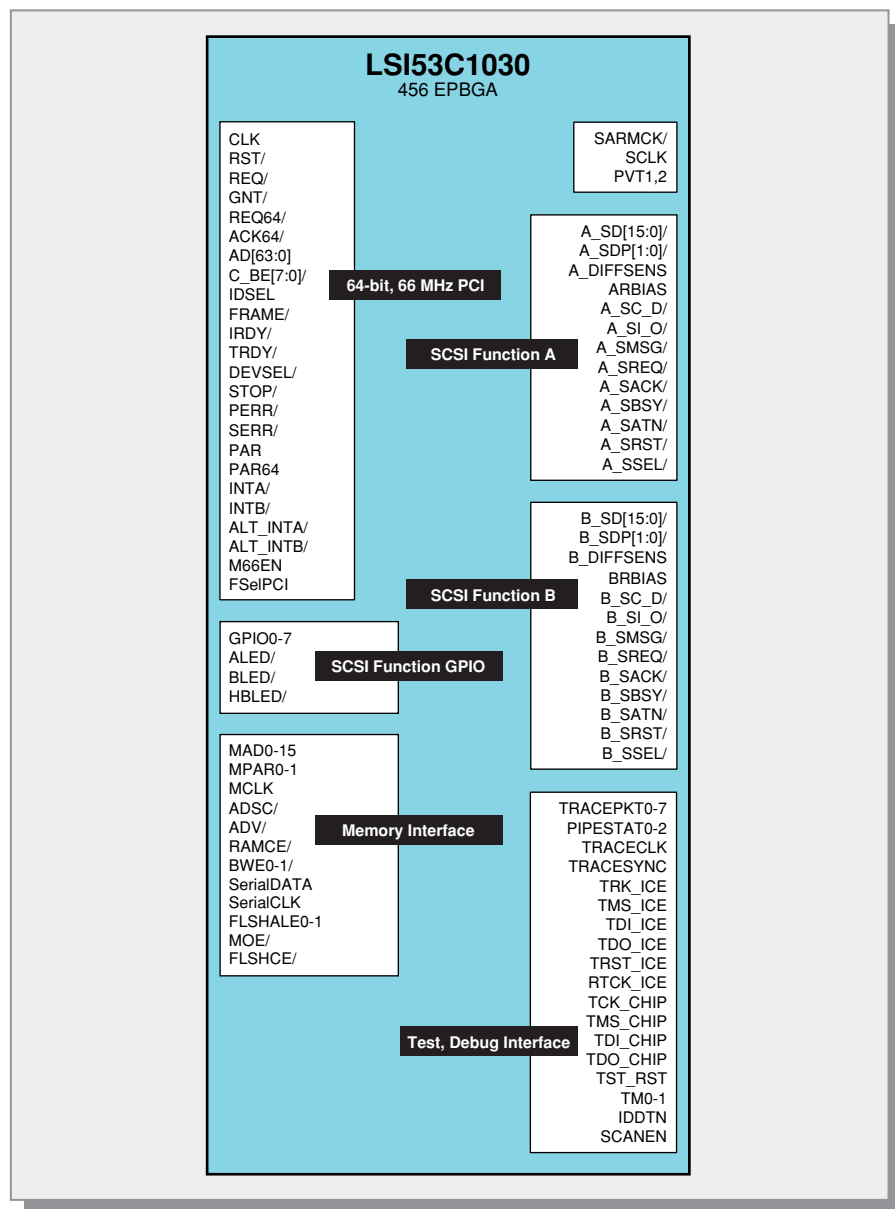
LSI53C1030 Ultra320 SCSI Controller

Figure 2: LSI53C1030 functional signal grouping

For more information please visit the LSI Logic web site at:
http://storageio.lsilogic.com

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