LSIFC929X
Dual Channel Fibre Solutions

LSIFC929X single-chip, dual-channel Fibre Channel controller increases system performance for storage area networks, storage virtualization, and RAID applications.

FIBRE CHANNEL PROTOCOL CONTROLLER

To keep pace with the considerable performance demands in today's SAN and storage virtualization applications, LSI Logic offers an unprecedented dual-channel PCI-X-to-Fibre Channel controller–the LSIFC929X.

An extremely cost-effective, power-efficient Fibre Channel solution, the LSIFC929X controller enables OEMs and system integrators the full advantages of today's dual-channel drive storage devices. The LSIFC929X controller frees up valuable PCI-X board slots, and additionally eliminates the need for a PCI bridge, a second single-channel Fibre Channel controller and the associated memory and support devices of current dual-channel designs. The result is marked savings in circuit board real estate and power consumption, making the LSIFC929X controller the Fibre Channel solution for servers, RAID and storage area networks. The LSIFC929X controller features 2 Gbit data rates per channel ideal for designing highly integrated systems. The controller supports all Fibre Channel topologies with full duplex communications on both channels and offers industry leading performance in target mode.

The LSIFC929X controller is the first true multifunctional device supporting Fibre Channel Protocol (FCP) and Internet Protocol (IP) intermixed and simultaneous on both channels. Providing designers the greatest flexibility in system configuration, IP traffic can be fully intermixed with SCSI traffic or routed separately to an individual channel. Also, IP and SCSI traffic can coexist in NT systems without the need for a full port driver.

HARDWARE FEATURES

- Highly-integrated 2 Gbit dual-channel, full duplex Fibre Channel protocol controller
- 64-bit, 133 MHz PCI-X host bus interface
- Integrated GigaBlaze™ 2 Gbit serial link
- Fusion-MPT™ architecture
- Auto-negotiation for legacy connect
- Custom ARM® RISC processor
- Intelligent and high-performance context management
- Synchronous SRAM external memory interface
- Full simultaneous target and initiator operations
- PC2001 compliant
- JTAG debug interface
- 456 PBGA

FUSION-MPT™
MESSAGE PASSING TECHNOLOGY

QUALIFIED SAN mark™ FCIA

LSI LOGIC®

FIBRE CHANNEL FEATURES

- Class 2 and 3 support
- BB credit of 16, alternate login of 1
- FC-PH, FC-AL2 r7.0, FC-FCP, FC-PLDA, FC-FLA, FCA-IP, and IETF-IPFC compliant
- N_Port supporting:
  - N_Port (Point-to-Point)
  - F_Port (Fabric Attach)
- NL_Port supporting:
  - NL_Port (Private Loop)
  - FL_Port (Public Loop)

APPLICATIONS

- Storage Area Networks (SANs)
- Storage virtualization implementations
- Embedded applications
  - HBAs
  - RAID storage systems
  - Routers and bridge implementations
  - Specialty servers
    - Storage applications

HARDWARE FUNCTIONALITY

PCI Interface

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

The LSIFC929X 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 FC Channel A and FC Channel B for maximum performance.

The LSIFC929X complies with PCI Power Management Interface Specification Revision 1.1 and PC2001. It supports 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.

32-bit Memory Controller

The memory controller in the LSIFC929X provides access to Flash ROM and 32-bit synchronous SRAM. The 32-bit memory controller also supports both interleaved and non-interleaved configurations up to a maximum of 4 MB of synchronous SRAM. A general-purpose memory-expansion bus supports up to 1 MB Flash ROM.

Custom ARM RISC Processor

The LSIFC929X utilizes a 32-bit custom ARM RISC processor to control the system interface and dual-channel functionality, freeing the host CPU for other processing activity while maximizing overall I/O performance. The RISC processor and associated firmware has the ability to manage I/O's from start to finish without host intervention. The RISC processor also manages the SAN-architected, message-passing interface.

Link Control

The integrated link controller is FC-AL-2 r7.0 compliant and performs all link operations. The controller monitors the Link State and strictly adheres to the Loop Port State Machine, ensuring maximum system interoperability.

GigaBlaze Integrated 2 Gbit Transceivers

The LSIFC929X features LSI Logic's GigaBlaze dual integrated 2 Gbit transceivers, providing considerable reliability, speed and distance in interconnect technology. The channels independently support autonegotiation down to 1 Gbit rates, allowing for the separation of legacy and next-generation devices.

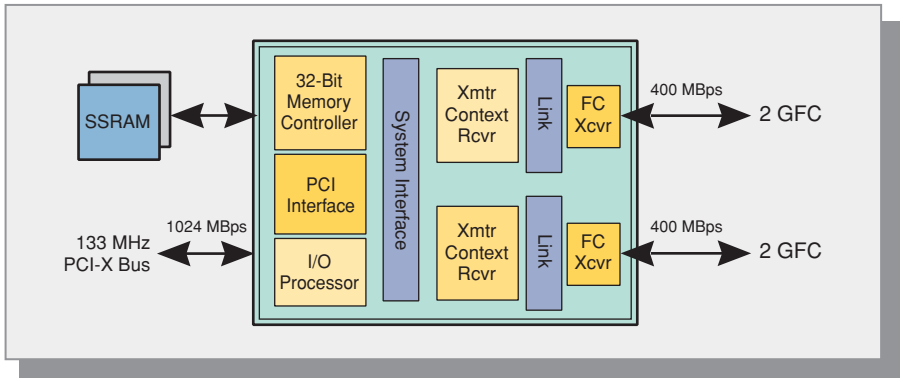

Figure 1: LSIFC929X block diagram

FUSION-MPT ARCHITECTURE

LSI Logic's Fusion-MPT architecture has integrated internal processors that offload the server CPU for automatic linear scalability, giving you better overall system performance and more reliable data transfers at a faster rates. The Fusion-MPT architecture also has thinner host drivers that support better system performance with more versatile performance (up to 100,000 I/O per second).

Fusion-MPT is designed as a standard software interface that is independent of underlying physical interfaces and protocols. The LSIFC929X Fusion-MPT implementation allows compatibility with LSI Logic's complete line of Common Architecture Drivers. This technology provides the benefit of complete binary compatibility of host software across different physical interfaces (such as SCSI, Fibre Channel and Serial ATA) and future interface controller product generations. The result is reduced software development, as well as considerably less integration and certification time, for system designers with a critical need to shorten time to market.

SOFTWARE FEATURES

- Supports Fibre Channel class 2 and 3 service and all topologies
- Supports scalable server I/O performance with multiple LSIFC929Xs
- Supports LAN over FC for cost-effective combined SAN and LAN in-band solution
- CIM based storage management
- Support for failover and load balancing
- FC-Tape support
- Supports target mode and SCSI initiator, concurrently
- Concurrent SCSI and IP protocol
- FC-PLDA, FC-FCP compliant
- FC-FLA compliant
- SANmark™ approved

OS SUPPORT

- NT 4.0, Windows 2000, Windows XP
- NetWare 4.11 and 5.0
- UnixWare 7
- Linux (Red Hat 6.X, SUSI, Turbo)
- Solaris 7.X, 8.X and SPARC™

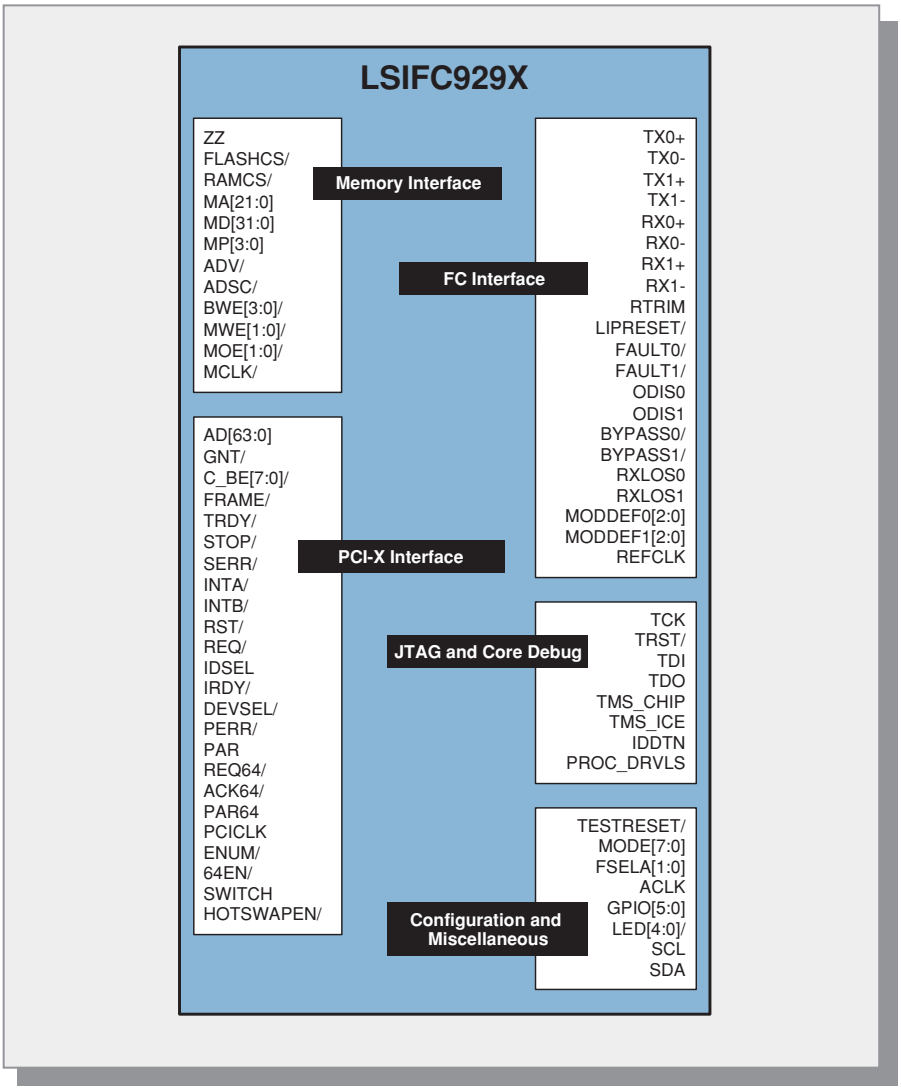

Figure 2: LSIFC929X functional signal grouping

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

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