LSISAS2x28
28-Port 6Gb/s SAS/SATA Expander

Extending Its SAS Technology Leadership, LSI Introduces Its Third Generation Of SAS/SATA Expanders.

LSI offers the broadest SAS product portfolio in the industry with true end-to-end solutions - controllers, expanders, active-active multiplexers, ROCs, host bus adapters, RAID solutions, and external storage. LSI's proven SAS core has completed extensive stress and interoperability testing resulting in the industry's most robust, interoperable solution.

Overview

The LSISAS2x28 is LSI's third generation of SAS/SATA expanders that incorporates the latest enhancements in SAS technology.

The LSISAS2x28 is a 28-port 6Gb/s SAS/SATA expander with an integrated ARM processor for topology management functions such as discovery and enclosure management. This device offers enhanced Enclosure Services such as drive management and supports an optional external enclosure management processor interface. The external storage enclosure processor interface is backward compatible to the LSISASx28, LSI's first generation SAS expander, allowing customers to migrate to the LSISAS2x28 with minimal changes to their enclosure management solution.

The LSISAS2x28 supports SAS and SATA data transfer rates of 1.5, 3, and 6Gb/s and incorporates enhanced features such as Spread Spectrum Clocking for EMI reduction and T-10 based zoning as well as Phy-based zoning for network storage security applications. Other features such as Port Mirroring allow the customer to access signals that are not easily accessible by mirroring that signal to an external connection for debug and diagnosis and the SATA affiliation option of turning off all affiliations and allowing multiple hosts to control various SATA drives. The LSISAS2x28 provides a programmable timer for SAS or SATA hard disk drive spin up sequencing that also includes the ability to program the number of hard disk drives that can concurrently spin-up.

The LSISAS2x28 SAS expander provides large storage environments the ability to connect multiple targets and initiators through a switched device for scalability and fault tolerant path-redundancy to improve system reliability ideal for today's data center and storage subsystems.

The LSISAS2x28 expander is ideal for high availability and scalable server clustering environments and front-end storage subsystems used in clusters, SAN, and NAS environments.

Applications

- SAS/SATA drive enclosures
- External RAID Subsystems

Features

- 28 Phy edge expander
- 6Gb/s SAS interface
  - 6 and 3Gb/s SAS
  - 6.0, 3.0, and 1.5Gb/s SATA
  - Supports SSP, SMP and STP protocols
  - Wide port support
  - Spread spectrum clocking
- Integrated enclosure processor
  - ARM926 @ 150MHz
  - I/D cache
  - Internal RAM
- SSP and STP initiator function for device management
- SMP initiator function for device management
- T-10 and Phy-based zoning
- 11 GPIO pins
- 3 LED pins per Phy
  - Link status, drive activity, fault LED outputs
  - Can also be used as GPIOs
- External memory interfaces
  - Flash, PBSRAM, NVSRAM

FEATURES (Continued)

- **Communication Interfaces**
  - — Four I2C interfaces for enclosure management services
    - One I2C interface supports an external SEP
  - — Two UART interfaces
    - Debug UART
    - Standard UART for out of band communication
  - — Enhanced Parallel Port (EPP)
    - Debug interface
    - High speed connection to an external processor
  - — 10/100 Ethernet Management Port for out of band communication
  - — Low Pin Count Interface
    - Trusted platform module support for encryption and authentication
- **Security features**
  - — Random number generator
  - — Hash generator
- **SFF-8485 compliant, SGPIO**
- **JTAG support**
- **780 FPBGA, 29x29mm**

Software Development Kit

- **ThreadX Real Time Operating System from Express Logic**
- **Hardware Abstraction Layer (HAL)**
- **Application Programming Interfaces (APIs) functions**
  - — SSP target/initiator
  - — SMP target/initiator
  - — Configuration page management

A software development kit (SDK) is available which provides the application programming interface (API) functions and a baseline SES solution enabling customers to create their own unique firmware solutions. The same programming model can be used for the internal processor or an external SEP for seamless customer migration. Please contact your LSI Sales Representative for more SDK details and Third Party support.
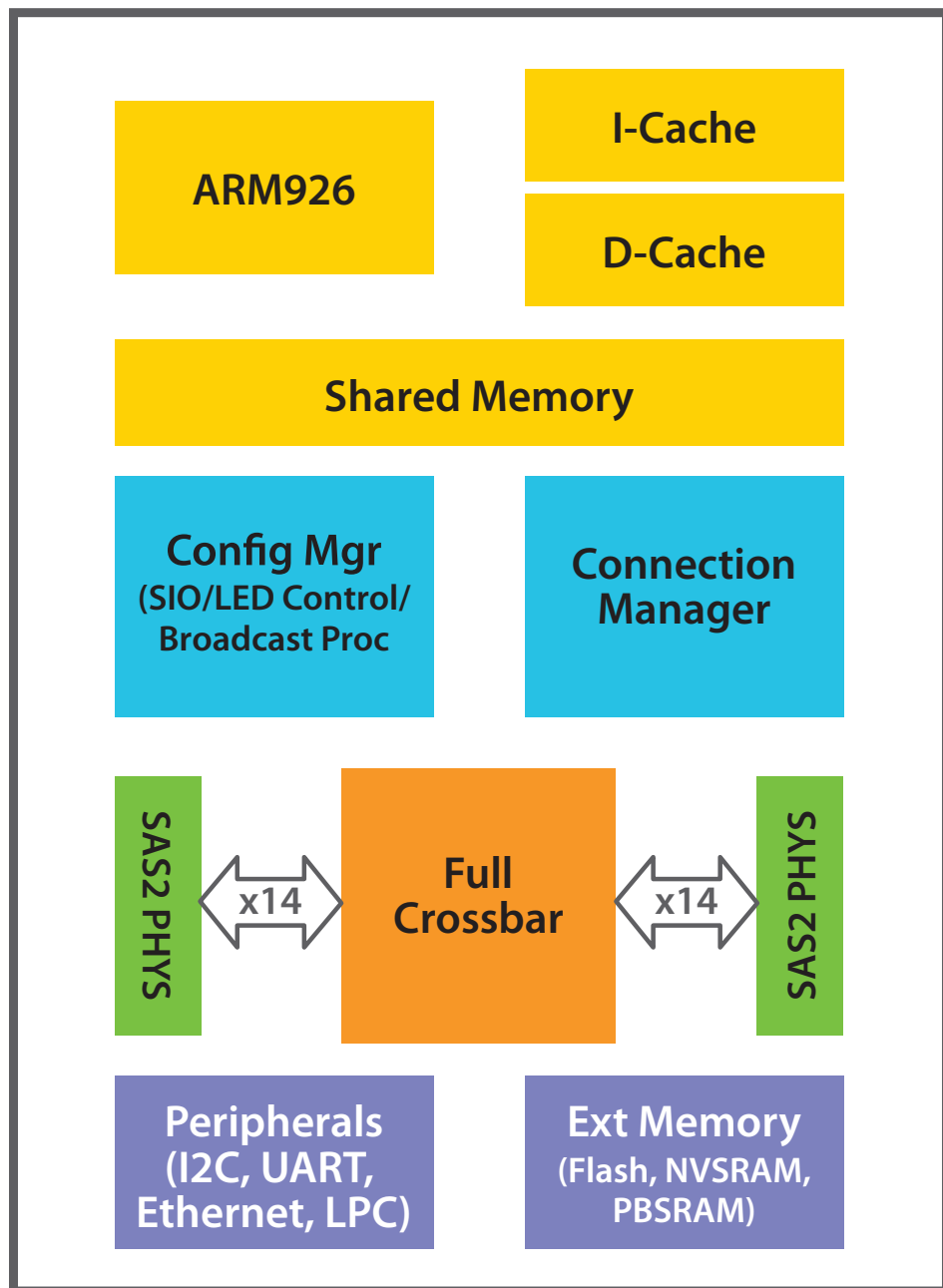

Figure 1: LSI SAS2x28 block diagram

— Flash support

— I2C master/slave

— SES enclosure support

- LED

- GPIO

- SGPIO

■ Baseline SES firmware solution with sample code

■ NetX support from Express Logic

■ Simple, embedded CLI (register access, basic configuration)

■ Self -configuring expander and T-10 zoning

■ Device drivers for I2C, SSP target, CLI, debug UART, debug Ethernet

Third Party Support

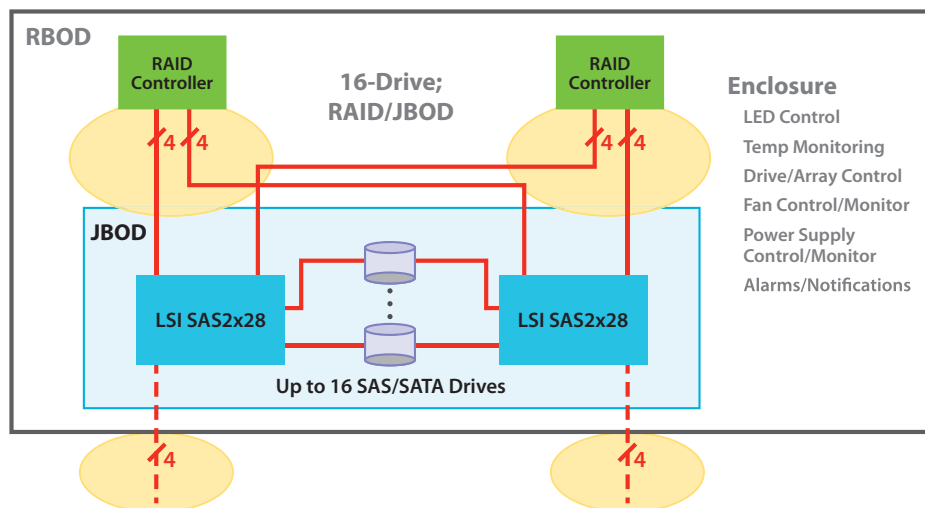■ ARM Realview developer suite

■ ARM Realview ICE

■ Cygwin environment

Figure 2: SAS/SATA storage application

For more information and sales office locations, please visit the LSI website at: www.lsi.com

Storage. Networking. Accelerated.