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Product Brief

SAS35x Series of Expanders

Power-Optimized, Avago 12 Gb/s SAS/SATA SAS35x48, SAS35x40, SAS35x36 Expanders

Enhance your external storage environment with the industry's most trusted SATA+SAS expanders

Broadcom offers the industry's broadest portfolio of storage solutions, backed by decades of experience and trusted by the world's leading server and storage suppliers. Broadcom provides the building blocks for storage solutions that help customers understand, prioritize, store and protect critical data.

The Avago 12 Gb/s SAS portfolio includes MegaRAID® controller cards, host bus adapters (HBAs), advanced software options, and SAS storage ICs, including RAID-on-Chip (ROCs), I/O controllers and expanders.

Overview

The SAS35x expanders are the second series of high performance 12 Gb/s SAS expanders that utilize a new, power-optimized design to deliver best in class power utilization and the latest enhancements in SAS technology. The 48, 40, 36-port expanders offer a smaller footprint and are equipped with an integrated ARM Cortex-R4 processor for system initialization, LED management, enclosure management, and topology management functions such as discovery. The SAS35x expanders support end device SAS data transfer rates of 12, 6, 3 Gb/s, and SATA data transfer rates of 6 and 3 Gb/s.

Representing the eighth generation of SAS expanders, the SAS35x series adds a suite of enhanced power management features encompassing the ability to create vendor-unique SMP or SES commands. Firmware features include:

• SAS PHY Power Conditions
• Partial and Slumber Power Management
• Wake-In-Band and Enter/Exit Chip Wide-Low Power modes.
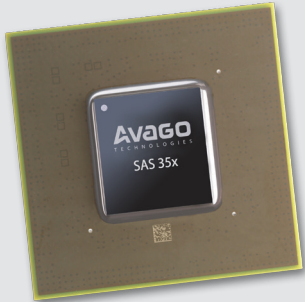
Applications
• SAS/SATA drive enclosures
• External RAID subsystems
• JBOD architectures
• Server backplanes

Key Features
• Integrated enclosure processor
    – ARM Cortex-R4 @ 300 MHz
• 12 Gb/s SAS interface
    – 48, 40, 36-port SAS/SATA expanders
    – Supports 12 Gb/s, 6 Gb/s, and 3 Gb/s SAS, and 6 Gb/s and 3 Gb/s SATA data transfer rates
    – Ports are non-denominational - initiator and target connect
    – Supports narrow and wide port configurations
    – Spread Spectrum Clocking
    – Supports SSP initiator and target, SMP initiator and target, STP initiator and SATA protocols
    – DataBolt Bandwidth Optimizer (40 ports maximum)

Key Features (cont.)

- T-10 zoning – 255 zones

- Port mirroring

- 16 GPIO Pins (64 total, including multiplexed GPIOs)

- 1 LED Pin per PHY

    - Configurable for link status, drive activity, fault LED outputs

    - Can be used as GPIOs

- SFF-8485 Compliant
  (2 SGPIO ports)

- External memory interface support

- Communication Interfaces

    - Twelve I²C interfaces for enclosure management services or debug

    - Two UART interfaces for debug as well as an out of band communication port

- 10/100/1000 Ethernet Management Port interface for out-of-band communication

- JTAG support

- 28nm, FPB22GU,
  29 mm x 29 mm

The innovative and unique DataBolt bandwidth optimizer is carried forward from the prior generation expander and enhanced to provide robust 12 Gb/s performance while preserving prior investments in SAS and SATA devices. By buffering data received at 6 or 3 Gb/s rates and bursting to the host at 12 Gb/s speeds, the SAS35x expanders with the DataBolt technology cost-effectively ease the transition to 12 Gb/s SAS technology and extend the longevity of the existing infrastructure.

The SAS35x expanders support scalability and the fault-tolerant path redundancy needed by today's data centers, enterprise servers and storage subsystems. While connecting multiple targets and hosts in a switched SAS environment, the SAS35x expanders improve system performance and reliability in feature-rich, power-efficient and industry-trusted offerings.

SDK

The comprehensive Avago SAS35 Software Development Kit (SDK) is available to facilitate efficient OEM specific firmware implementations. The SDK includes source code for the SES module with examples of typical SES device drivers as well as the SSP Target, the I²C Target, the CLI Interface, and the Serial Debug port. API support for Hardware Abstraction Layer (HAL) functions is included, covering SSP and SMP Target and Initiator, STP Initiator, UART, I²C Master and Slave, LED management for both GPIO and SGPIO, Configuration Page Management, PHY configuration and control, firmware event logging, firmware tracing and more.
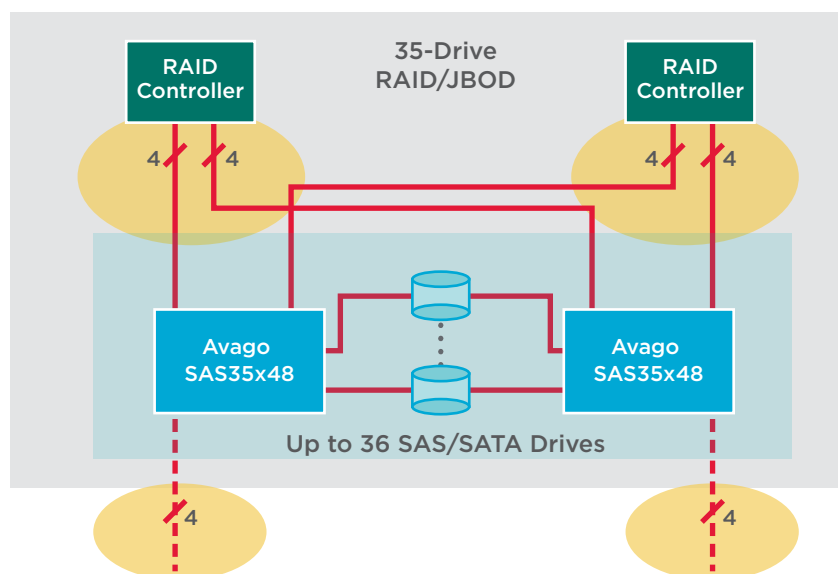
Enclosure Functions

- LED Control
- Temp Monitoring
- Drive/Array Control
- Fan Control/Monitor
- Power Supply Control/Monitor
- Alarms/Notifications

SAS35X48, SAS35X40, SAS35X36 Expander Technical Specifications

SEP	ARM Cortex R4 300 MHz
Instructions	1.6 DMIPs/MHz
Internal Memory	2 MB SRAM
SAS Ports	48, 40, 36
Data Transfer	12.0/6.0/3.0 Gb/s SAS 6.0/3.0 Gb/s SATA
DataBolt Bandwidth Optimizer (EDFB)	All ports (LSI IP)
SSC (Spread Spectrum Clocking)	Y
Port Mirroring	Y (LSI IP)
Direct, Table, & Subtractive Routing Methods	Y
Route Table Entries	2048
PHY Based Zoning, T-10 Zoning	Y
T-10 Optical Support	Y
A/D Converter	1, (2 analog inputs)
Pulse Width Modulator	2
External Memory Interfaces	8/16-bit Flash, with 6 chip selects SRAM, NVSRAM
Security Features	TRNG/Hash & HMAC Generator/Secret Root Key
8-bit SEP interface	Y
I^2C Interfaces	12
SGPIO interface	2, SFF- 8485
UART Interfaces	2
LED	1 LED pin per PHY
GPIO	16
Package	28nm, FPB22GU, 29 mm x 29 mm

Ordering Information

Product	OPN
SAS35x48B0	SX00-0B00-00
SAS35x40B0	SX01-0B00-00
SAS35x36B0	SX02-0B00-00

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