VSC7158

Enhanced 18-PHY 1.5Gbps and 3.0Gbps SAS Edge/Fanout Expander

Low-Cost Single-Chip SAS Edge/Fanout Expander

This product is Not Recommended for New Designs. Some versions may be No Longer Available or being discontinued and subject to Last Time Buy, after which new orders can not be placed.

Description

The VSC7158 is an 18-PHY Serial Attached SCSI (SAS) edge/fanout expander. The device provides SAS port expansion as defined by the ANSI T10 Serial Attached SCSI 1.0 and 1.1 specifications for both edge and fanout expanders. The VSC7158 is targeted at embedded applications in the midrange and enterprise storage environments including Blade servers, JBODs, and RAID systems. It offers an attractive technology upgrade for those systems that currently employ parallel SCSI technology and have substantial reliance on SCSI-centric applications software or management solutions.

The VSC7158 provides active port expansion for up to 18 connected PHYs with connections made via a high-performance internal nonblocking cross-bar matrix.

Programmable output preemphasis and input signal equalization ensure consistent high signal quality in lengthy in-and-out-of-box backplanes or cable infrastructures.

The on-board CPU in the VSC7158 performs the role of an SMP management application client and can participate in enclosure management functions through serial I²C interfaces, an embedded Ethernet controller, or vendor-specific SMP implementations.

The VSC7158 is a SAS expander containing all the functions needed to implement a 1.5Gbps or 3.0Gbps SAS enterprise server or JBOD system. This device is typically used in distributing SAS signals to an array of disk drives either in a server or an external enclosure. Commonly, two or more "initiator" ports connect to the SAS SAN and several disk ports connect to drives over a 3Gbps serial backplane. The embedded enclosure management controller, software/firmware-compatible with other Maxim enclosure management controllers, configures and monitors both the VSC7158 and the entire enclosure through flexible low-speed interfaces.

The SAS expander device consists of 18 10-bit serializer/deserializers (SerDes), per-PHY diagnostics facilities, retiming elasticity buffers, a target/initiator-capable SMP virtual PHY engine, a target/initiator-capable STP virtual PHY engine, multiple I²C serial interfaces, a v3000 CPU, two UARTs, and a variety of general-purpose I/O (GPIO) including SGPIO. Each receiver's incoming data is monitored and checked for 8b/10b violations, data path parity errors, disparity errors, CRC errors, and many other common error conditions.

The VSC7158 is a highly integrated solution that provides high-performance characteristics, expander/enclosure management, as well as industry leading high-speed inputs/outputs that can drive 3.0Gbps signals across existing backplanes.

Customers already using Maxim enclosure management controllers are able to reuse their software from previous products for reduced time-to-market and development effort.

Key Features

- 18 SAS Expander PHYs with Integrated SerDes
- Each PHY Can Operate Independently at 1.5Gbps or 3.0Gbps
- Configurable as a SAS Fanout or Edge Expander
- Nonblocking Switch Architecture (Any PHY to Any PHY Connectivity)
- Table Routing
- SMP and SSP Virtual PHY with Initiator and Target Capability
- Embedded Enclosure Management Processor for Local Control and SES Functions
- Four Operating Modes: Parallel Master, Parallel Slave, I²C Serial Interface Slave, and SPI™ Master
- Automatic PHY Speed Detection and Negotiation
- Serial ATA Drive Support Using Internal STP/SATA Bridging Functions (1 per PHY)
- Programmable Output Deemphasis and Input Signal Equalization Levels
- Variable Wide-Port Support

Applications/Uses

- Blade Servers
- Disk-Based Backup Storage
- Enterprise Storage Environments
- Fabric Attached Storage (FAS) Systems
- Fixed-Content Storage Systems
- JBOD Arrays
- Modular Direct-Attached Storage (DAS)
- Near-Line Storage Replacement Systems
- Network Attached Storage (NAS) Systems
- Rack-Mounted Servers with RAID
- Storage Area Network (SAN) Appliances

Part Number	Package
VSC7158HT-03	BGA; 448Pin; 529mm^2

Part Number	Package
VSC7158XHT-03	BGA; 448Pin; 529mm^2

Part Number
VSC7158EKN