SteelVine™ Storage Processor

Storage processor with embedded USB 2.0 and eSATA interfaces

The SiI5744 is a low-cost, single-chip solution for digital home and small office storage appliances. This SteelVine Storage Processor connects a USB 2.0 or 3 Gbps eSATA host port to two 3 Gbps eSATA Gen2m device ports. Features of the SiI5744 include advanced RAID modes, drive locking, and single-button backup. Extensive software developer kits are available from Silicon Image to simplify product differentiation.

All of the SATA ports on the SiI5744 comply with the 3 Gbps eSATA specification, making this semi-conductor suitable for use in both internal and external applications. The SiI5744 features propri-etary eSATA based capacity expansion, which allows users to easily grow the capacity of an existing SteelVine enabled device by adding addi-tional drives. The new drives will appear to the host system as additional space in the existing SteelVine volume.

The SiI5744 also features drive locking, which helps protect users' data by allowing them to password lock directly attached and cascaded drives. If a locked drive is detached from its assigned computer or cascade, the data on the drive will be inaccessible until it is reconnected and unlocked with the user supplied password. In addition, the SiI5744 supports single-button backup through third-party applications for sim-ple and worry-free data protection.

SiI5744 supports JBOD and the following RAID modes: FAST (RAID 0), SAFE (RAID 1) and BIG (Concatenation) as well as two new modes, SAFE50 and SAFE33. SAFE50 creates two vol-umes across two drives, with half of each physical drive being allocated to each volume. One volume is in SAFE mode (RAID 1) and the other is in BIG (Concatenated) mode. SAFE33 also creates two volumes, but with 1/3 of physical space being ded-icated to SAFE mode and 2/3 to BIG mode. These modes offer a balance between protection of criti-cal data and maximization of space for non-criti-cal data. The SiI5744 allows RAID mode configuration through a GUI, strap pins, or I²C for true software-free implementations.

Which RAID modes are supported depends on the way drives are connected to the storage processor. When adding two drives to the SiI5744, BIG, FAST, SAFE, JBOD, SAFE50 and SAFE33 are sup-ported. When drives are cascaded, BIG and SAFE are available.

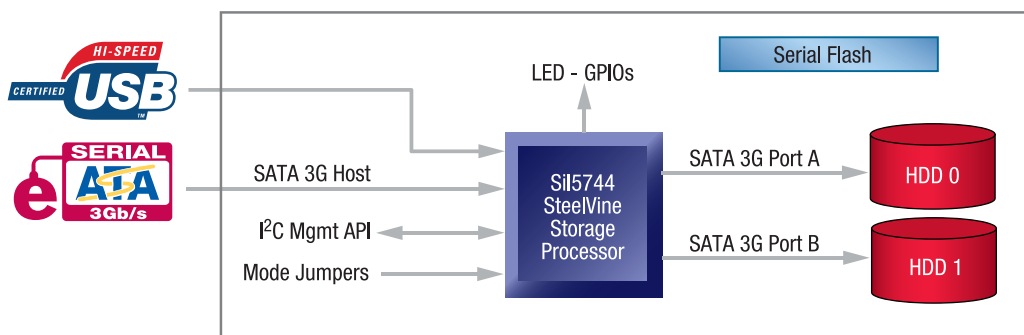## SiI5744

Applications

- Storage appliances
- CE storage devices
- External storage enclosures

Key Features

- eSATA and USB 2.0 host ports
- eSATA capacity expansion
- Drive locking
- Backup button
- RAID modes: FAST (RAID 0), SAFE (RAID 1), BIG (Concatenation), SAFE50 & SAFE33, JBOD

SiI5744 System Diagram

eSATA-Based Capacity Expansion

With eSATA-based Capacity Expansion, the capacity of a SiI5744 enabled appliance can be easily expanded either by adding additional drives directly to the chip, or by adding additional SteelVine enabled devices in a cascaded topology. These additional drives or devices will dynamically appear (in BIG, SAFE33 or SAFE50) to the host system as increased storage capacity in the existing SteelVine volume.

Serial ATA Host Interface Features

- Serial ATA Gen2m compliance
- eSATA and 2-meter cable support
- 3 Gbps (auto-negotiates to 1.5 Gbps)
- Compatible with PM aware and non-PM aware hosts
- Allows multiple drives to be accessed by non-PM aware drive hosts
- Supports NCQ

USB Host Interface Features

- Complies with USB 2.0 specification
- 480 Mb/s (can auto-negotiate to 12 Mb/s)
- Compatible with OHCI / UHCI / EHCI hosts
- Supports up to four LUNs
- Supports Mass Storage Class

Device Interface Features

- Serial ATA Gen2m compliance
- eSATA and 2-meter cable support
- 3 Gbps (auto-negotiates to 1.5 Gbps)
- Independent 8KB FIFO / Port
- Power management capabilities
- Supports hot plug
- Supports ATAPI & asynchronous notification

Electrical Specifications

- GPIO pins: 9 GPI, 6 GPO
- 3.3V IO Supply, 1.8V Core Supply
- 1.02 watts (typical)

Environmental

- Operating temperature: 0ºC to 70ºC
- Operating relative humidity: 5% to 80%
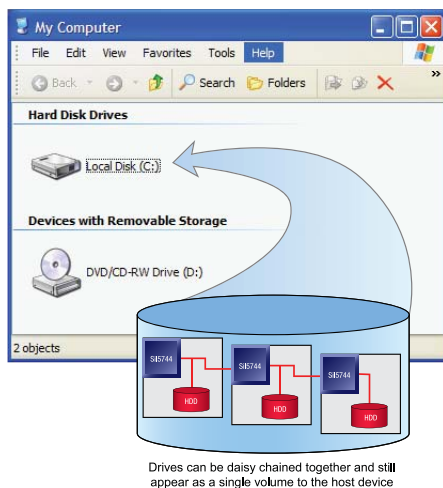- Non-operating relative humidity: 5% to 95%
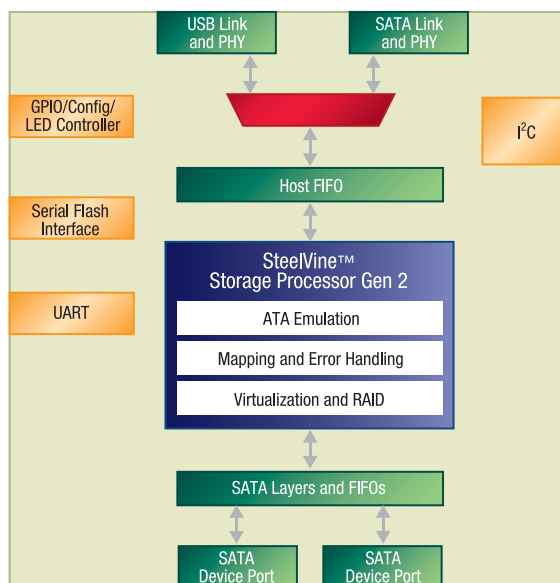
Physical Specifications

- 88-pin QFN, 10mm x 10mm

Additional SteelVine features

- No driver, BIOS or software required
- User API interface through I^{2}C
- No drive reformatting on RAID change
- Email Notification
- Optional XML API
- RAID 1 drive racing
- Optional SteelVine Manager GUI
- Mandatory SMART commands available
- SAFE later

Capacity Expansion Diagram

Drives can be daisy chained together and still appear as a single volume to the host device

Block Diagram

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