1GB Fibre / Ultra 160 SCSI to IDE Rackmount RAID Subsystem

Overview

The NS-IS 8D includes both SCSI-to-IDE and 1GB Fibre-to-IDE disk array subsystems all powered by a sophisticated RAID controller technology. With 64-bit architecture centered around a dedicated XOR ASIC and advanced firmware functions run by the PowerPC processor, data is distributed and processed at raging speed among CPU, memory, and drives. The NS-IS 8D rackmount configuration unit provides eight hot-swappable trays in a standard 19-inch equipment cabinet-size enclosure. The RAID array can be configured to levels 0, 1 (0+1), 3, or 5. Each drive array allows one HDD failure without impact on the existing data and failed drive rebuild is transparent to the host. System operation is constantly protected by redundant cooling fans and redundant power supplies. Environmental information is accessible via the control panel, RAIDGuide Manager, or VT-100 compatible terminal emulation.

High Performance

The subsystem's high performance comes from its 64-bit Power PC CPU and hardware XOR ASIC. The 64-bit bus band-width at 66MHz between SDRAM and CPU makes its high data throughput more than sufficient for small-to-medium sized servers or workstations. Data can be distributed through a high-speed 64-bit path at a burst rate up to 195MB/sec and the system's overall performance reaches up to 140MB/second (sustained reads, Fibre or SCSI models). The dual independent PCI bus design efficiently eliminates bandwidth bottlenecks for IO traffic. Balanced bus loading and the superior architecture make it an optimal RAID solution for a wide range of SCSI-based PCs, single-user workstations, NT or Linux-based servers.

High Data Availability

The system provides RAID levels 0, 1 (0+1), 3 and 5. Its high data availability derives from the following capabilities: automatic drive failure detection, automatic failed drive rebuild, hot spare and back-ground rebuild, disk hot swap, and online background rebuilding.

Bad Block Handling

Hard drives can fail and bad blocks may occur simultaneously on two separate drives. The occurrence of bad blocks on more than one drives usually leads to unrecoverable loss of data. To prevent data loss caused by this situation, two options are implemented: Bad Block Scrub and Bad Block Handling in Degrade Mode. The Bad Block Scrub can be performed regularly to examine drives and data can be reconstructed onto good sectors if the controller find any bad blocks during the process. If bad blocks are encountered on yet another drive during the rebuild process, the block LBA (Logical Block Address) will be indicated and the rebuild process can be continued with the unaffected sectors, salvaging most of the precious data.

Redundant Power Supplies

Two hot-swappable redundant power supplies provide zero down time and fault tolerant power. With two power supplies installed, both will share the current power needs of the whole system. If one should fail, an alarm will sound and the remaining power supply will take over the full load until the faulty unit is replaced. The hot-swap feature ensures that the system remains operational while replace-ment is taking place.

Redundant Cooling Fans

Three cooling fans are integrated for redundancy. Failures are displayed by the RAIDGuide manager software. The system's ventilation is from front to back. Specially designed airflow passages dissipate heat from the hard disks and the controller. Power-supply modules are equipped with their own independent cooling fans.

NETWORK SYNTHESIS
Phone: (949)453-1805 • **Fax:** (949) 453-1806
Web: http://www.networksynthesis.com
Email: info@networksynthesis.com

Enclosure Fault Management

The system can monitor the operating status of enclosure components, including that of fans, power supplies, and disk drives. Component failures are locally indicated on the LCD control panel, by the sounding alarm, or through the RAIDGuide manager software. The RAIDGuide's sub-module, NPC, can be used to notify system administrators remotely via e-mail, pager, fax, SNMP traps, or LAN broadcast.

Setup and Status Monitoring

The system will automatically initialize based on the number of disk drives installed at start up. Manual configuration and monitoring can be done through the LCD control panel. The firmware also contains an embedded management program that can be accessed using a terminal connected to the RS-232C port. The later is a convenient platform-independent management utility.

RAIDGuide Manager

RAIDGuide is an easy-to-use, Java-based GUI RAID management software designed specifically for use with SCSI-to-IDE and Fibre-to-IDE RAID subsystems. Operating under Java 2.0 (Java Run-time Environment 1.2 or 1.3), RAIDGuide provides complete management interface to the disk array and a constant real-time report of the current RAID status, errors, events, and capacity. RAIDGuide permits IDE RAID managers to quickly locate and rectify problematic hardware without downtime or data loss. Many RAID controller functions, such as password management and firmware upgrades can be handled through the software console. The information window provides information about all installed hard drives and the key elements of the RAID controller such as cache size.

Controller

- PowerPC-750 RISC processor with 1 MB L2 cache
- Standard 128MB cache memory on one SODIMM SDRAM; Other available cache sizes: 256/512MB
- System voltage and temperature self-monitoring
- Firmware in Flash ROM for easy upgrades

RAID Operation

- RAID level 0, 1 (0+1), 3 and 5
- Multiple RAID & Dual-host support
- Drive hot-swapping
- Automatic background rebuild
- Hot-spare drive support
- Online expansion

Host Interface

- Single or Dual Ultra160-Wide LVD SCSI; Transfer rate up to 160MB/sec *OR*
- Single or Dual FC-AL 1GBit Fibre channel; Transfer rate up to 100MB/sec
- Concurrent I/O command
- Tagged Command Queuing
- Automatic bad-sector reassignment

Controls / Indicators

- Front LCD control panel for setup and configuration
- 3 drive LED indicators: power, busy, attention
- Power and drive failure indication through LCD
- Built-in alarm / alarm mute button

Management Software

- RAIDGuide manager software for Windows 2000 / NT via in-band SCSI or in-band Fibre
- Firmware-embedded manager via RS-232C (platform independent)

Drive Interface

- EIDE ATA-66, ATA-100 and ATA-133 compatible hard disk drives
- 8 hot-swap drive bays and trays
- Supports 1-inch height form factor

Physical / Electrical

Interfaces

One or two 68-pin, LVD SCSI host channel on SCSI subsystems, one or two external DB-9 for Fibre subsystems, and one DB-9 RS-232C serial port (38400, n, 8,1) for terminal connections

Power Supply

2 redundant hot-swappable power supplies with PFC

Input	100 to 240VAC, 47 to 63 Hz, 5A
Output	12V (19A max.), 300 Watts
	5V (25A max.), 300 Watts

Cooling Fan

2 cooling fans in two separate modules, ball bearing, 54 CFM Each

Operating Temperature

5° to 40° C

Relative Humidity

10-95%, non-condensing

Altitude

Sea level to 10,000 ft

Dimensions

2U x 19"w x 20"d

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