I/A Series® Hardware

Redundant Array of Independent Disks

The Redundant Array of Independent Disks (RAID) is an extremely flexible and cost effective subsystem solution for data storage requirements. This highly reliable, high performance family of RAID-based products uses cutting edge mass storage technology, which is designed to address the key issues of today's dynamic data environment such as:

‣ System flexibility

‣ Long-term reliability

‣ Easy maintenance

‣ Robust data security

‣ Quick expansion.

A RAID system incorporates multiple hard disk drives and interfaces to UNIX® and Windows® workstations with SCSI interfaces. Any one drive can be added to or removed from the RAID system while it is operational (called hot swapping). Both RAID1 and RAID5 systems are equipped with dual power supplies that can be replaced by hot swapping. In case of failures in RAID 5 systems, power supplies, hard disks, and fans also can be hot swapped.

The RAID 1 system is offered as a basic, low cost, 73 GB disk mirroring system. It is a tabletop-mounted unit containing a RAID controller and three hard disk drives for the protection of data in the event of a single drive failure.

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The RAID 5 system (striping with distributed parity) is available for supporting large storage requirements with added protection to retain data in the event of a single drive failure. It is offered with a single or redundant RAID 5 controller, and 288 GB or 360 GB of data storage space on five to six 73 GB hard disk drives.

All RAID controllers run a self-test on power-up and continuously monitor their internal health.

Both the RAID 1 and the RAID 5 systems communicate with their processor via the high speed Ultra 160 SCSI bus. Cabling from the RAID system to its associated processor should not exceed 1.5 meters to maintain maximum data transfer rate.

Configuration and additional monitoring on all RAID systems can be done using an RS-232 port.

RAID systems are supported by the following workstations:

- 50 Series Model 51, Style D and E UNIX processors
- Model P79, P80, and P81 UNIX processors
- 70 Series, Style B Windows processor
- Model P92 and P93 (SCSI) Windows processors.

Each RAID system appears as a single hard drive to the processor.

CONFIGURATIONS

The following table lists the individual models and the configuration of each.

Table 1. Raid Configurations

Model	Controller	Drives	Drive Usage	Capacity*
RAID 1	Single RAID controller with 128 MB of cache	Three 73 GB drives in hot-swappable canisters	Two data/parity storage drives plus one for redundancy	73 GB
RAID 5	Single RAID controller with 128 MB of cache	Five 73 GB drives in hot-swappable canisters	Four data/parity storage drives plus one for redundancy	288 GB
RAID 5	Single RAID controller with 128 MB of cache	Six 73 GB drives in hot-swappable canisters	Five data/parity storage drives plus one for redundancy	360 GB
RAID 5	Hot-swappable redundant RAID controllers with 128 MB of cache	Five 73 GB drives in hot-swappable canisters	Four data/parity storage drives plus one for redundancy	288 GB
RAID 5	Hot-swappable redundant RAID controllers with 128 MB of cache	Six 73 GB drives in hot-swappable canisters	Five data/parity storage drives plus one for redundancy	360 GB

* Capacity numbers are rounded off

HARDWARE

The major blocks in a basic RAID system (SCSI-based) include the intelligence (controller or software), the host interface, the mechanical and electro-mechanical subassemblies, an internal signal and power bus system and the drives. RAID systems operate on both Windows and UNIX (Solaris®) operating systems.

RAID 1

The RAID 1 system is table top mounted disk-mirroring system containing a controller and three disk drives, two with mirrored data, one hot spare. The RAID 1 system has a capacity of 73 GB and functions as a boot and/or extension drive.

In the event of a drive failure or other malfunction, the RAID 1 system sounds an audible alarm beeper. Status LEDs and the controller LCD display inform you of the nature of the problem. The failed drive can be replaced and the RAID system can be rebuilt without an interruption to operation.

RAID 5

The tabletop-mounted RAID 5 system is offered with a single or redundant RAID controller and five or six hot-swappable disk drives. The RAID controller acts as the interface between the processor and the hard disk drives in the RAID system. A RAID 5 system with hot-swappable redundant controllers allows the subsystem to continue operation with the failure of either controller.

The system also features status LEDs, an audible alarm beeper in case of drive failure or other malfunction, and hot-swappable dual power supplies and hot-swappable fans. Internal monitoring functions provide fault isolation and alarming for any power supply or fan failures.

In the event of a single drive failure, data is reconstructed by the remaining drives, while the data integrity is retained due to the disk striping. The failed drive can be replaced and the data on the replacement drive is rebuilt by the system. The processor continues to operate normally as the data is rebuilt.

The RAID controller automatically handles the reconstruction of the data after the failed drive is replaced. A RAID 5 system with a redundant RAID controller and a hot standby drive has the highest level of protection against interruptions and data loss.

The disk drives in the RAID 5 are offered in two configurations:

▶ 288 GB over five drives (one for redundancy)

▶ 360 GB over six drives (one for redundancy), and a hot standby drive for automatic recovery).

FUNCTIONAL SPECIFICATIONS

Power

VOLTAGE INPUT RANGE
115 to 230 V ac ± 15% (auto-ranging and auto-sensing)

POWER SUPPLY
Dual 300 W load sharing

FREQUENCY RANGE
47 to 63 Hz

TOTAL LOAD

Startup
300 W

Typical Operation
150 W

Transfer Rates

MAXIMUM
160 MB/sec (burst)

SUSTAINED READ
Up to 32 MB/sec

SUSTAINED WRITE
Up to 15 MB/sec

Host Interface
Ultra 160

Cache Size
128 MB

PHYSICAL SPECIFICATIONS

Dimensions

HEIGHT
30.8 mm (12.125 in)

WIDTH
26.0 mm (10.25 in)

DEPTH
36.8 mm (14.5 in)

Weight

EMPTY CASE
27.3 kg (60 lb)

MAXIMUM WITH DEVICES
34.2 kg (76 lb)

SHIPPING MAXIMUM
54 kg (120 lb)

ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature

OPERATING
0 to 40°C (32 to 122°F)

STORAGE
-25 to +66°C (-13 to +151°F)

Humidity (noncondensing)

OPERATING
20 to 80% at 40°C (122°F)

STORAGE
10 to 95% at 40°C (122°F)

Altitude

OPERATING
-300 to +3,000 m (-1000 to +10,000 ft)

STORAGE
-300 to +12,200 m (-1,000 to +40,000 ft)

Shock (to frame)

OPERATING
2 G at 11 ms

STORAGE
20 G at 11 ms

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