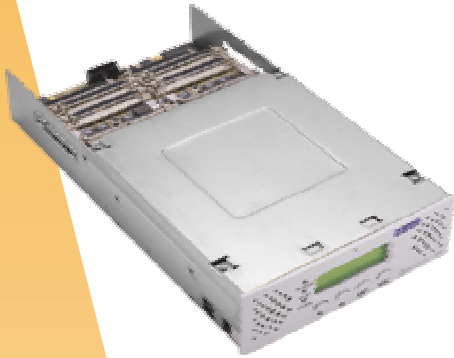# SentinelRAID ™2000

4 Ultra2 Channels (Up To 8 Ultra2 or 6 Ultra2 + 2 Fibre)
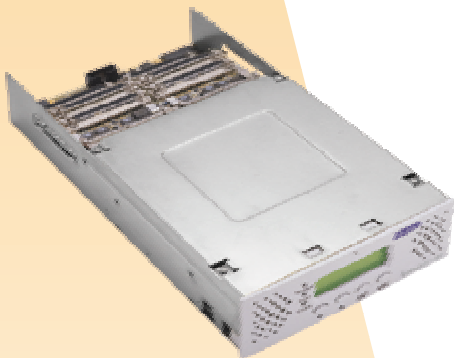
SentinelRAID ™2000R

3 Ultra2, 4 Ultra2 or 2 Ultra2 + 2 Fibre Redundant Channels
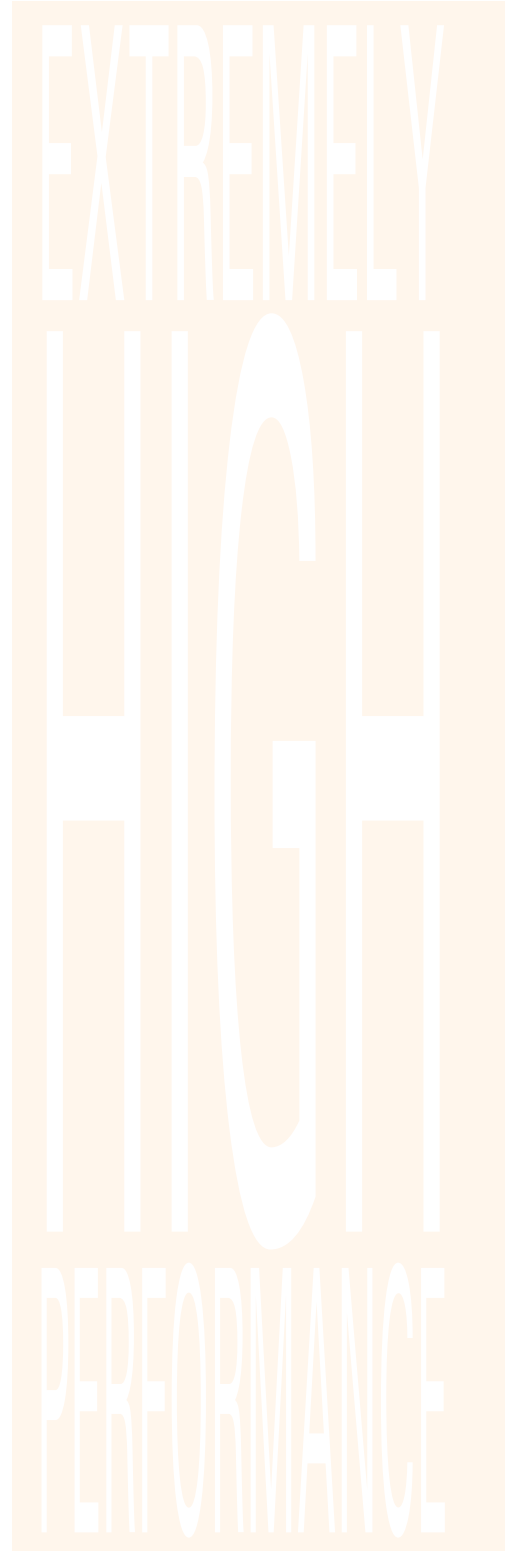
SentinelRAID ™1000

2 Ultra2 Channels (Up to 6 Ultra2 or 4 Ultra2 + 2 Fibre)

EXTREMELY HIGH PERFORMANCE

Infortrend®

MODELS

	BASE CHANNELS	PROFILE
2000	4 Ultra2	Half-height
2000R1	3 Ultra2	Full-height
2000R2	4 Ultra2	Full-height
2000R3	2 Ultra2 + 2 Fibre	Full-height
2000-50	4 Ultra2	Board-only
1000	2 Ultra2	Half-height
1000-50	2 Ultra2	Board-only

DAUGHTERBOARDS

(For SentinelRAID 1000 & 2000 only)

IFT-9284U2   4 Ultra2

IFT-9282F   2 Fibre

IFT-9284U2F   2 Ultra2 + 2 Fibre
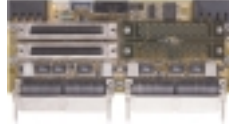

OEM Only Daughterboards

IFT-9284U2M   4 Ultra2
IFT-9284U2FM   2 Ultra2 + 2 Fibre
IFT-9282FM   2 Fibre

BACKPLANES

IFT-9288MB2 (for 1000 main board)
2 DB68 SCSI, power x 2, I^{2}C port,
COM1+COM2 combo serial port, battery
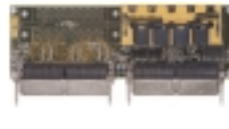connector, terminator power connector

IFT-9288MB4 (for 1000 & 2000 main
boards) 4 DB68 SCSI, power x 2, I^{2}C port,
COM1+COM2 combo serial port, battery
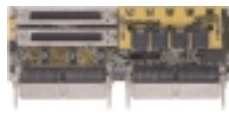connector, terminator power connector

IFT-9288B4 (for IFT-9284U2)
4 DB68 SCSI connectors, terminator
power connector
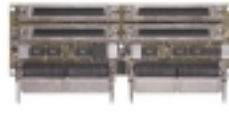
IFT-9288B2F (for IFT-9282F)
4 3-pin Fibre connectors

IFT-9288B4U2F (for IFT-9284U2F)
2 DB68 SCSI, 4 3-pin Fibre connectors
and terminator power connector

IFT-9288BC
4 DB68 SCSI, battery connector x 2, and
other interfaces identical to 9288MB4.
Vertical backplane for redundant Sentinel-
RAID 2000R1 and R2 configurations, full-
height

IFT-9288BD
2 DB68 SCSI, 2 DB-9 Fibre, battery
connector x 2, and other interfaces
identical to 9288MB4. Vertical backplane
for redundant SentinelRAID 2000R3
configuration with bypass circuits on
board, full-height

ACCESSORIES

IFT-9010C	Battery cell pack
IFT-9070C	Battery back-up daughterboard
IFT-9512	COM1+COM2 combo cable
IFT-9515	Terminator power cable
IFT-9531	Bezel key

OVERVIEW

SentinelRAID controllers are designed for fast, flexible RAID operation using Ultra2 SCSI and Fibre channels. With the help of a high-performance 64-bit RISC PowerPC CPU and sophisticated Infortrend RAID ASIC, I/Os are rapidly processed and distributed to array hard drives. Data is transferred between the host and the drives via a high-speed 64-bit data path at a burst rate of 533MB/second. The result is a controller which excels in applications that require both high sustained data rates and fast I/O turnaround.

FEATURES

High Flexibility

Each SCSI channel can be defined as either a drive channel or a host channel. This allows users to connect multiple host systems through independent channels.

SAN Application

SentinelRAID controllers have all the necessary protocols for SAN applications. These include LUN filtering, also known as SAN mapping or masking, and global file system (GFS) Dlocks capabilities. They also have advanced functions for setting up different types of data protection - from local back-up to full disaster-tolerant remote redundant capabilities.

Fibre-to-SCSI

For SCSI-to-SCSI capabilities, a SentinelRAID 2000 is the ideal solution. Where a mixed Fibre-to-SCSI solution is needed, however, the SentinelRAID 1000 (coupled with a Fibre daughterboard) provides an excellent Fibre-to-SCSI choice (2 Fibre + 2 SCSI).

High Data Availability

With a multitude of RAID functions, the SentinelRAID series gives users both the highest data availability and security. SentinelRAID's capabilities include: automatic drive failure detection, background rebuilding, and bad sector reassignment. When the controller detects a hard drive failure in a RAID 1, 3, or 5 logical drive, the disk array will instantly replace the failed disk with a hot-spare drive. Data is reconstructed onto the hot-spare drive, while the host remains uninterrupted. In the absence of a hot-spare drive, users can hot-swap the failed drive with a new drive and initiate an automatic rebuild.

Bad Sector Management

SentinelRAID controllers detect bad sectors on SCSI drives during disk reads or writes. They will recover the data from parity fault and perform bad sector reassignments. Bad sector management is fully transparent to the host.

Active-Active Redundancy

SentinelRAID controllers support active-active redundancy with a synchronized write-back cache. Each controller has a dedicated high-bandwidth channel for cache synchronization. While in redundant mode, a failed controller automatically shifts I/O functions to the secondary controller. Failures are transparent to the host.

Hot-Swap Mechanism
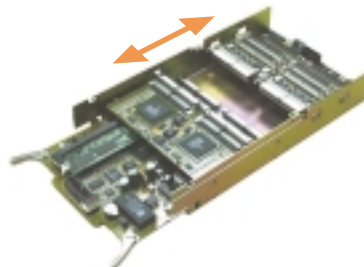
The controller itself is hot-swappable for full non-stop redundant operation. The backplane holding the cable connections is joined or separated from the main controller board by a docking connector. A faulty controller is easily removed and replaced.

Redundant Chassis (2000R)

The SentinelRAID 2000R series consists of two controllers housed in a single 5.25" full-height chassis. A dedicated high-bandwidth channel is used for cache synchronization. The 2000R is a cableless solution for ease-of-integration.

Battery Back-Up

Infortrend's battery backup option protects write-back cache data from sudden power interruptions. If system power is lost before the controller completes a cache write flush operation, the battery supplies auxiliary power (see specifications for details) to the controller's DRAM until system power is restored and the write cache is flushed.

Zero-Down-Time Technology

The controller is designed from top to bottom to be hot-swappable. When two controllers are in a redundant configuration and one controller fails, it can be swapped and replaced online without shutting down the system.

Board-Only Solutions for OEM's
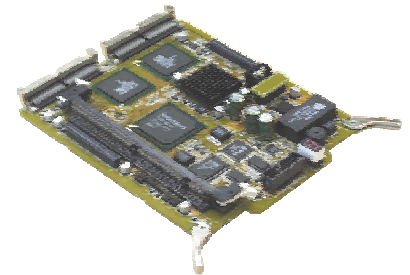
SentinelRAID controllers are ideal solutions for OEM customers who want to design their own backplanes. The controller board can fit the mechanical design of their backplane. This makes cableless, hot-swappable enclosures possible. Daughterboards with an M or FM suffix are designed for this application.

SPECIFICATIONS

Compatibility
- Host platform independent
- Host OS independent
- 5.25 inch, half- or full-height form factor
- Support for S.M.A.R.T. capable drives
- SAN ready

SCSI Operation
- Ultra2 LVD SCSI channels (Ultra3 - Q3, '00)
- 80 MBytes/sec per channel Ultra2 transfer rate
- Up to 15 devices per channel, total of 105 drives per controller
- Concurrent I/O commands
- Tagged Command Queuing
- Automatic bad sector reassignment
- Built-in SCSI terminator
- Up to 12m cable length

Fibre Option
- FC-AL Fibre channels
- 100 MBytes/sec transfer rate
- Up to 125 drives per channel
- Dynamic load balancing
- Full-duplex send/receive payload buffers
- Up to 30m (copper), 10km (optical) cable length
- Redundant loop support
- Loop ID aliasing

SAN Operation
- LUN Filtering (SAN mapping or masking)
- Disaster tolerance: remote redundancy and mirroring
- SAN Backup: remote replication and local snap-shot backup
- Redundant loop balancing
- Global File System (GFS) Dlocks

RAID Operation
- RAID levels 0, 1, (0 + 1), 3, 5, 10, 30, 50, NRAID and JBOD
- All channels can be assigned as host or drive
- Up to 8 logical drives of variable RAID levels for a maximum of 16 terabytes
- Unlimited logical drive size
- Dedicated and global spare drive support
- Multiple host support
- MSCS clustering support
- Active-active redundant controller operation with synchronized write-back cache
- Host-LUN mapping
- Online RAID expansion

Fault Detection, Monitoring and Recovery
- Auto-rebuilding
- Background rebuilding
- Hot spare drive operation
- Disk hot-swapping
- Memory parity checking
- Infortrend Simple Enclosure Management Service (ISEMS) via I^2C interface
- SAF-TE, S.E.S.
- On-board alarm
- Controller self-diagnostics
- Voltage and temperature monitoring

Management
- RAIDWatch GUI management software for use on any platform that supports Java 2.0 or higher
- Text-based RAID manager (Text RAID Manager) software (all major platforms)
- Firmware-embedded manager (via RS-232C port)
- Management via LAN SNMP
- Field-upgradeable firmware in flash memory

Processor
- PowerPC 64-bit RISC microprocessor
- Infortrend proprietary 64-bit ASIC chipset with enhanced hardware assisted XOR
- Read-Ahead/Write-Back cache
- Up to 1GB maximum cache size on single SDRAM DIMM socket with ECC support

Physical / Electrical

Channels	Ultra2 LVD (Ultra3 - Q3, '00) and FC-AL Fibre
Interfaces	Power x2, I^2C port, COM1 + COM2 serial ports, battery connectors
Input Voltage	+5VDC, +12VDC
Form Factor	
1000, 2000	5.25" half-height, 10.39L x 5.74W x 1.60H inches
2000R	5.25" full-height, 8.83L x 5.74W x 3.30H inches
Main Board Dimensions	6.88L x 5.62W inches
Operating Temperature	5^0 to 44^0C
Relative Humidity	10-95%, non-condensing
Altitude	Sea level to 10,000 ft
MTBF	> 500,000 hours

Infortrend

3 Year Warranty

Quality is our priority and we back it with a 3 year warranty.

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