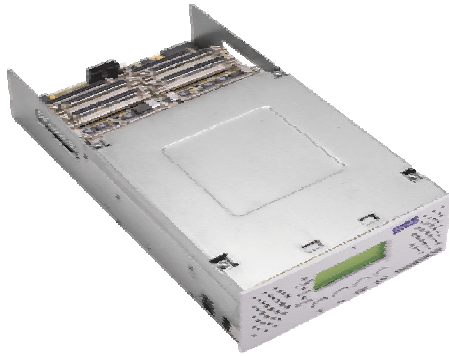


## **SentinelRAID™ 2500**

4 Ultra160 Channels (Up to 8 Ultra160 or 6 Ultra160+2 Fibre)



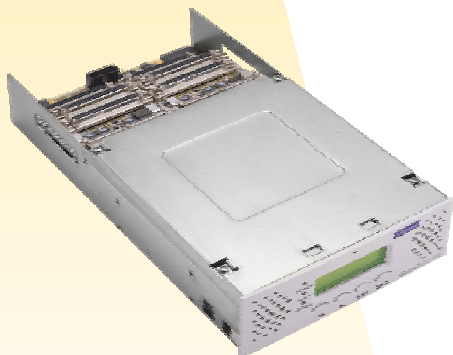
## **SentinelRAID™ 2500R (R1, R2, R3)**

3 Ultra160, 4 Ultra160, or 2 Ultra160 +2 Fibre  
Redundant Channels



## **SentinelRAID™ 1500**

2 Ultra160 Channels (Up to 6 Ultra160 or 4 Ultra160+2 Fibre)



Ultra160-Ultra160,  
Fibre-Ultra160  
RAID Controllers  
5.25" Drive Profile

EXTREMELY  
HIGH  
PERFORMANCE

**Infortrend®**

## MODELS

	BASE CHANNELS	PROFILE
<b>2500</b>	4 Ultra160	Half-height
<b>2500R1</b>	3 Ultra160	Full-height
<b>2500R2</b>	4 Ultra160	Full-height
<b>2500R3</b>	2 Fibre+2 Ultra160	Full-height
<b>2500-50</b>	4 Ultra160	Board-only
<b>1500</b>	2 Ultra160	Half-height
<b>1500-50</b>	2 Ultra160	Board-only

## DAUGHTERBOARDS

(For SentinelRAID 1500 & 2500 only)

**IFT-9284U3** 4 Ultra160



**IFT-9282F** 2 Fibre (1GHz)



**IFT-9282F2** 2 Fibre (2GHz)



**IFT-9284U3F** 2 Ultra160+2 Fibre (1GHz)

**IFT-9284U3F2** 2 Ultra160+2 Fibre (2GHz)



**IFT-9281FA** 1 Fibre (1GHz)

**IFT-9281F2A** 1 Fibre (2GHz)

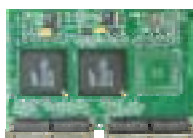


### OEM Only Daughterboards

Elongated versions of daughterboards for OEM system backplanes

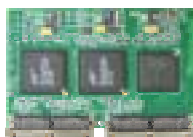
**IFT-9282FM** 2 Fibre (1GHz)

**IFT-9282F2M** 2 Fibre (2GHz)



**IFT-9284U3FM** 2 Ultra160+2 Fibre (1GHz)

**IFT-9284U3F2M** 2 Ultra160+2 Fibre (2GHz)



**IFT-9284U3M** 4 Ultra160

## BACKPLANES

**IFT-9288MB2** (for 1500 main board)  
2 DB68 SCSI, power, I C port, COM1+COM2 serial port, battery connector, terminator power connector



**IFT-9288MB4** (for 2500 main board)  
4 DB68 SCSI, other interfaces same as MB2



**IFT-9288B4** (for IFT-9284U3)  
4 DB68 SCSI connectors, terminator power connector

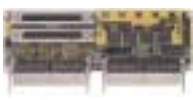


**IFT-9288B2F** (for IFT-9282F)  
4 3-pin Fibre connectors



**IFT-9288B2F2** (for IFT-9282F2)  
4 3-pin Fibre connectors

**IFT-9288B4U2F** (for IFT-9284U3F)  
2 DB68 SCSI, 4 3-pin Fibre connectors and terminator power connector



**IFT-9288B4U3F2** (for IFT-9284U3F2)  
4 3-pin Fibre connectors, other interfaces same as IFT-9288B4U2F

**IFT-9288BC** (for 2500R1 main boards)

4 DB68 SCSI, 2 battery connectors, and other interfaces identical to 9288MB4. Vertical backplane for redundant SentinelRAID 2500R1 configuration, full-height



**IFT-9288BD** (for 2500R3-1GHz Fibre)  
2 DB68 SCSI, 2 DB-9 Fibre, 2 battery connectors, and other interfaces identical to 9288MB4. Vertical backplane for redundant SentinelRAID 2500R3 configuration, bypass circuits on board, full-height



**IFT-9288BD2** (for 2500R3-2GHz Fibre)  
4 3-pin Fibre connectors, other interfaces same as 9288BD.

**IFT-9288BH** (for 2500R2 main boards)  
4 DB68 SCSI, 2 battery connectors, and other interfaces identical to 9288MB4. Vertical backplane for redundant SentinelRAID 2500R2 configuration, full-height.



**IFT-9288BH2** (for 2500R2)  
Interfaces same as 9288BH. Controller communications over dedicated high speed channel.

## ACCESSORIES

**IFT-9010C**

**IFT-9070C**

**IFT-9512**

**IFT-9515**

Battery cell pack  
Battery backup daughterboard  
COM1+COM2 serial combo cable  
Terminator power cable (provided with SCSI daughterboard backplane)  
Battery connection extension cable  
Bezel key  
X serial combo cable for redundant controller configuration (the R series uses 9512)

**IFT-9519**

**IFT-9531**

**IFT-9535**

## OVERVIEW

SentinelRAID controllers are designed for fast, flexible RAID operation using Ultra160 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. 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 extended LUN capabilities such as LUN filtering, also known as SAN mapping or masking.

### Fibre-to-SCSI

For SCSI-to-SCSI capabilities, a SentinelRAID 2500 is the ideal solution. Where a mixed Fibre-to-SCSI solution is needed, however, the SentinelRAID 1500 (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 into 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 one and initiate an automatic rebuild.

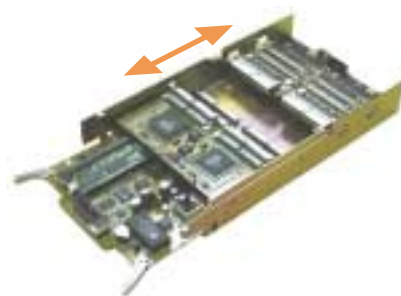
### Bad Sector Management

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 counterpart controller. Controller failover and failback 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 and separated from the main controller board with docking connectors. A faulty controller is easily removed and replaced.

### Redundant Chassis (2500R1, R2, R3)

The SentinelRAID-2500R 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 2500R series controllers are cableless solutions for ease-of-integration.

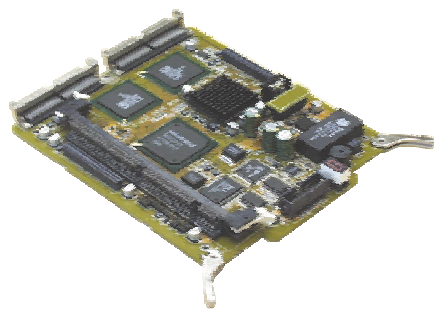
### Battery Backup

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.

### Hot-Swap 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 the system down.

### Board-Only Solutions for OEM's



The board-only SentinelRAID controllers are ideal solutions for OEM customers to accommodate the mechanical and electrical design of their backplanes and enclosures. Infortrend's board-only solutions provide OEM customers the option of a cableless connection with hot-swappability.

## SPECIFICATIONS

### Compatibility

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

### SCSI Operation

- Ultra160 SCSI channels
- 160MBytes/sec per channel 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

- 1GHz or 2GHz FC-AL Fibre channels
- 100 or 200 MBytes/sec transfer rate (single loop)
- Up to 125 drives per channel
- Dynamic load balancing
- Full-duplex send/receive payload buffers
- Up to 30m (copper), 10km (optic) cable length
- Dual loop support
- Loop ID aliasing

### SAN Operation

- LUN Filtering (RAID-based access control across storage network)
- Dual loop load balancing

### RAID Operation

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

### Fault Detection, Monitoring and Recovery

- Auto-rebuilding
- Background rebuilding
- Disk hot-swapping
- Memory parity checking
- Infortrend Simple Enclosure Management Service (ISEMS) via I C interface
- SAF-TE support
- On-board alarm
- Controller self-diagnostics
- Voltage and temperature monitoring

### Management

- Java-based RAIDWatch GUI management software for use on any platform that supports Java 2.0 or higher
- Firmware-embedded manager (via RS-232C port)
- Management via LAN
- 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
- Architecturally up to 1GB maximum cache size on single SDRAM DIMM socket with or without ECC support

### Physical / Electrical

<b>Channels</b>	Ultra160 and FC-AL Fibre
<b>Interfaces</b>	Power x 2, f C port, COM1+ COM2 serial port, battery connector
<b>Input Voltage</b>	+5VDC, +12VDC
<b>Form Factor</b>	1500, 2500 5.25" half-height, 10.39L x 5.74W x 1.60H inches 2500R 5.25" full-height, 8.83L x 5.74W x 3.30H inches
<b>Main Board Dimensions</b>	6.88L x 5.62W inches
<b>Operating Temperature</b>	5 to 44 °C
<b>Relative Humidity</b>	10-95%, non-condensing
<b>Altitude</b>	Sea level to 10,000 ft
<b>MTBF</b>	>500,000 hours



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

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