



NS-RC 2500R **NS-RC 2500E**

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

Ultra160-Ultra160,
Fibre-Ultra160

RAID Controllers
5.25" Drive Profile



NS-RC 2500R (R1, R2 or 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)

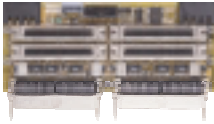


MODELS

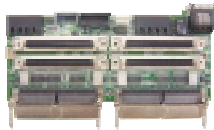
	BASE CHANNELS	PROFILE
2500	4 Ultra160	Half-height
2500E	4 Ultra160	Half-height
2500R1	3 Ultra160	Full-height
2500R2	4 Ultra160	Full-height
2500R3	2 Fibre+ 2 Ultra160	Full-height
2500-50	4 Ultra160	Board-only
1500	2 Ultra160	Half-height
1500-50	2 Ultra160	Board-only

BACKPLANES TO MAIN CIRCUIT BOARD

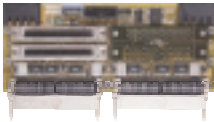
IFT-9288MB4 (for 2500 main board)
4 DB68 SCSI, power, I²C, serial port, battery, temp power



IFT-9288MB4E (for 2500E main board)
4 DB68 SCSI, power, I²C, serial port, battery, temp power, Ethernet



IFT-9288MB2 (for 1500 main board)
2 DB68 SCSI, power, I²C, serial port, battery, temp power



EXPANSION

(For half-height models only)
Daughterboards add I/O channels with the choices of SCSI or 1G Fibre.

DAUGHTERBOARDS

IFT-9284U3 4 Ultra160



IFT-9282F 2 Fibre (1Gbit)

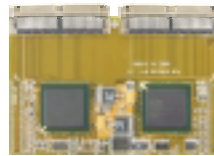


IFT-9284U3F 2 Ultra160+ 2 Fibre (1Gbit)



OEM VERSIONS

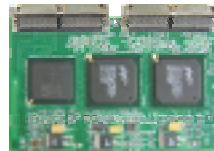
IFT-9284U3M 4 Ultra160



IFT-9282FM 2 Fibre

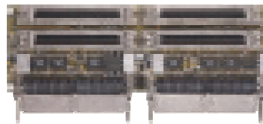


IFT-9284U3FM 2 Ultra160 + 2 Fibre

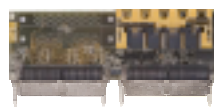


BACKPLANES

IFT-9288B4 (for IFT-9284U3)
4 DB68 SCSI connectors, temp power



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



IFT-9288B4U2F (for IFT-9284U3F)
2 DB68 SCSI, 4 3-pin Fibre ports



VERTICAL FULL-HEIGHT BACKPLANES

IFT-9288BC (for 2500R1)
4 DB68 SCSI (one installed with terminator), battery x 2, and other interfaces identical to 9288MB4.



IFT-9288BD (for 2500R3-1Gbit Fibre)
2 DB68 SCSI, 2 DB-9 Fibre, battery x 2, and other interfaces identical to 9288MB4, bypass circuits on board



IFT-9288BH (for 2500R2)
4 DB68 SCSI, battery x 2, and other interfaces identical to 9288MB4.



ACCESSORIES

- IFT-9010C Battery cell pack
- IFT-9070C Battery daughterboard (charger circuit)
- IFT-9512 COM1 + COM2 combo cable
- IFT-9515 Terminator power cable
- IFT-9519 Battery extension cable
- IFT-9531 Bezel key
- IFT-9535 X cable for redundant controller configuration
- IFT-9537 Ethernet cable

OVERVIEW

The NS-RC 2500r controllers are designed for fast, flexible RAID operation using Ultra160 SCSI and Fibre channels. With the help of a high-performance 64-bit 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

All SCSI channels can be defined as either a drive channel or a host channel. This allows users to change the host and drive deployment for connecting multiple host systems through independent channels.

Firmware upgrade does not affect the single or redundant controller configuration. Controllers can shift I/Os temporarily to allow both firmware's to be updated. In the unlikely event of controller failure, a failed unit can be replaced with one running later version of firmware.

SAN Application

NS-RC 2500r 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, and multi-file systems lock support. 64 array partitions and 128 LUN filter entries per controller are supported.

Fibre-to-SCSI

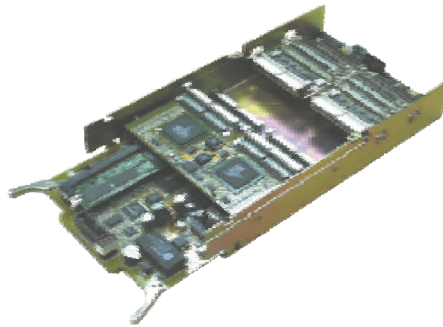
The NS-RC 2500r series is ideal for a mixed Fibre-to-SCSI solution with the flexible connectivity of arbitrated loop, point-to-point, and switched-fabric.

By combining a pure Fibre or Fibre + SCSI daughterboard with the controller's base channels, the controller is ideal for SAN environments where features like LUN masking and multi-RAID partitioning can be applied.

High Data Availability

With a multitude of RAID functions, the NS-RC 2500r series gives users the highest data availability. NS-RC 2500r'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.

The battery backup option protects write-back cache data from sudden power interruptions. The battery supplies auxiliary power (see specifications for details) to the controller's cache memory for up to 72 hours.



The controller itself is hot-swappable for full non-stop redundant operation. The backplane holding the cable connections is joined by and separated from the main controller board with docking connectors. A faulty unit is easily removed and replaced.

Bad Sector Management

NS-RC 2500r 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

NS-RC 2500r 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. Failover and failback are totally transparent to the host.

Redundant Chassis (2500R1, R2, R3)

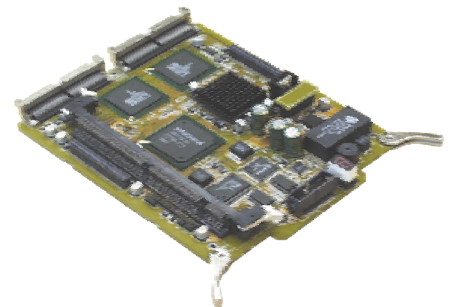
The NS-RC 2500r series consists of two controllers housed in a single 5.25" full-height chassis. A dedicated high-bandwidth channel is used for cache synchronization. The 2500R is a cableless solution designed for ease-of-integration.

Zero-Down-Time Technology

The controller is designed from top to bottom to be hot-swappable. Implemented with features like the automatic failover/failback, auto hot-spare engagement, advanced failed drive management, ... to name a few, disk array operation is protected from possible causes of downtime.

Board-Only Solutions for OEM's

NS-RC 2500r controllers are the ideal solutions for OEM customers who design their own backplanes. The controller board can be readily integrated with a cableless and hot-swappable enclosure design via two docking connectors. Daughterboards with an M suffix are designed for this application.





SPECIFICATIONS

Compatibility

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

SCSI Operation

- Ultra160 160MBytes/sec per channel transfer rate with CRC data protection
- 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

- 1Gbit FC-AL Fibre channels
- 100 MBytes/sec transfer rate
- Up to 125 drives per channel
- Dynamic load balancing
- Half-duplex send/receive payload buffers: up to 30m(copper), 10km(optic) cable length
- Passive host redundant loop support

SAN Operation

- LUN Filtering (SAN mapping or masking)

RAID Operation

- RAID levels 0, 1, (0+ 1), 3, 5, 10, 30, 50, NRAID, and JBOD
- Multiple host support; All channels can be assigned as host or drive
- Up to 8 logical drives of variable RAID levels for a maximum of 16 terabytes
- Dedicated and global spare drive 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
- Hot spare drive operation
- Disk hot-swapping
- Memory parity checking
- SAF-TE and ISEMS (Infotrend Simple Enclosure Management Service) via I²C interface
- Controller self-diagnostics: voltages, temperature (CPU, board, ASIC, ...) and fan rpm
- Clustering support

Management

- RAIDWatch GUI management software through In-band SCSI or out-of-band via Ethernet port for 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)
- Field-upgradeable firmware in flash memory

Processor

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

Physical / Electrical

Channels	UUltra160 and FC-AL Fibre (1Gbit)
Interfaces	Power x 2, I ² C port, COM1+ COM2 serial ports, battery connectors
Input Voltage	+5VDC, +12VDC
Form Factor	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
Main Board Dimensions	6.88L x 5.62W inches
Operating Temperature	5 to 44°C
Relative Humidity	10-95%, non-condensing
Altitude	Sea level to 10,000 ft
MTBF	> 500,000 hours



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