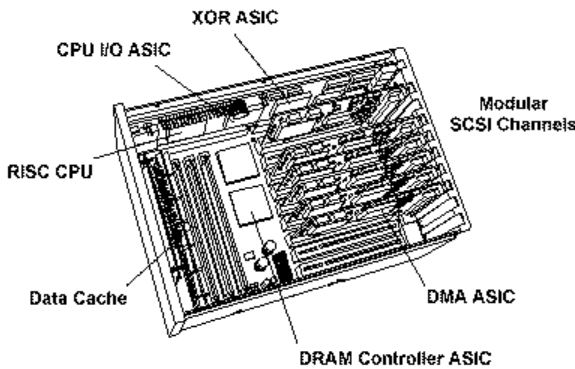# CRD-5500



**RAID DISK ARRAY CONTROLLER**

Once again, CMD has raised the standard by which all other RAID controllers will be compared! CMD's CRD-5500 SCSI to SCSI RAID controller is the industry's best solution for building high performance, high availability SCSI disk array subsystems. CMD's years of experience as an industry leader in high performance, advanced technology RAID controllers and SCSI host adapters for Unix, midrange, and PC systems has given CMD unmatched insight in designing a second-generation disk array controller solution that allows OEMs, VARs, and system integrators to build the best RAID subsystems available today.

## Key Benefits

The CRD-5500 was designed to satisfy the most demanding requirements of today's sophisticated RAID user; it gives you high performance in every application, without compromising reliability or data integrity. The key to the CRD-5500's outstanding performance is CMD-designed proprietary ASIC components, as well as innovative caching and RAID algorithms. Unlike other RAID controllers, CMD's advanced "Viper" RAID architecture and ASICs were designed to support tomorrow's high speed serial interfaces, such as Fiberchannel (FCAL) and Serial Storage Architecture (SSA). In addition, the CRD-5500's modular design allows the user to quickly and easily configure an optimal RAID subsystem simply by installing individual Fast, Fast/Wide, or Fast/Wide/Differential SCSI interface modules and up to 512 MB of data cache using industry standard SIMMs.

## Advanced Features

- Over 6,450 IOPS and 17 MB/Sec. per SCSI Host Channel
- 40 MHz, 32-bit LR33310 RISC CPU (MIPS R3000 core)
- Proprietary CMD RAID ASICs for advanced features and highest performance
- Up to 512 MB of Data Cache using industry-standard, 72-pin SIMMs
- RAID levels 0, 1, 0+1, 4, 5, and JBOD
- Modular, scalable design
- Up to eight Fast or Fast/Wide SCSI disk channels
- Up to four Fast/Wide or Fast/Wide/Differential SCSI host channels
- Dual redundant controller option
- Standard 5¼ inch, full-height form factor

## Scalable Performance, Features & Configuration

CMD designed the CRD-5500 with the OEM, VAR, and Reseller in mind. The CRD-5500's scalable architecture was designed to allow

you to configure a RAID storage solution for every application, from entry-level imaging workstations to fully fault-tolerant, high-capacity OLTP and Video-on-Demand servers. Unlike other RAID controllers, CMD's unique and modular design uses individual SCSI interface modules that allow the user to increase performance and expand subsystem capabilities by simply adding modules. The controller has nine module slots. Up to four slots may contain modules configured as host channels. Slots not configured as host channels may be used as drive channels. CMD offers the following SCSI modules for use in the CRD-5500:

| CRD-5530 | Fast, Single-Ended (disk channels only) |
|----------|------------------------------------------|
| CRD-5540 | Fast/Wide, Single-Ended (disk or host channels) |
| CRD-5560 | Fast/Wide, Differential (disk or host channels) |

Only CMD allows you to easily add new interfaces or more powerful modules as they become available, protecting your valuable storage investment.

### Unmatched Performance & Reliability

CMD's CRD-5500 provides unequaled performance! To meet the performance requirements of tomorrow's high-speed serial interfaces, CMD designed the CRD-5500 to use the MIPS R3000 family of 32-bit RISC processors and proprietary CMD custom ASIC logic components. Four separate ASICs for RAID (Exclusive OR), DRAM management (fast page mode DRAM control), CPU-I/O (CPU support logic), and DMA (high-speed data path management) functions, together with an internal 80 MB/sec. 36-bit (32 data and four parity) data bus provides the CRD-5500 with up to 6500 I/Os per SCSI host channel.

Users can install up to four industry-standard 72-pin SIMMs to provide a total of up to 512 MB of (user-selectable) Write-Back or Write-Through cache. To provide guaranteed data integrity, the CRD-5500 includes a built-in battery charger and monitoring circuit that supports an external 6.6 VDC sealed, lead-acid type battery (not included) for cache power backup. For use with external UPS systems, an optional "2-minute warning" input is also provided. In either case, the CRD-5500's intelligent power management circuitry assures cached data integrity during extended power blackouts or enclosure power supply failure.
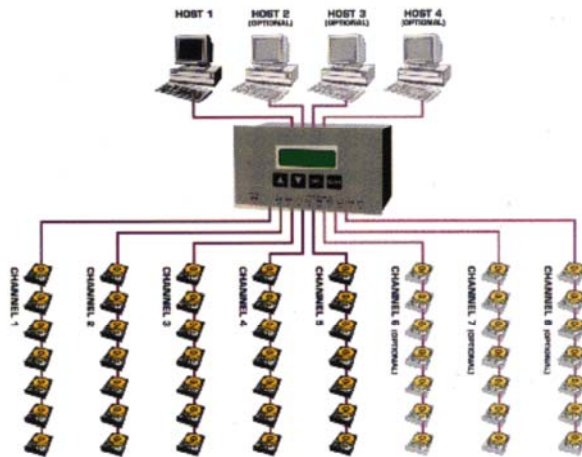


### Unlimited Configuration Flexibility

The CRD-5500 allows almost unlimited configuration flexibility! Each CRD-5500 supports up to 32 logical devices (RAID sets or JBOD disks) as separate SCSI logical unit numbers (LUNs). Logical devices can be mapped to individual host channels as shared or non-shared, with a LUN number unique to a specific host bus. RAID sets can be configured in any orientation and can consist of one to 56 drives, depending on RAID level and other options selected. Partitioning is supported on a per-LUN basis (up to 16 per RAID set), as well as Write-Through or Write-Back caching. Global (floating) spare disks and standalone (JBOD) disk drives are also supported. In addition, the CRD-5500's Dynamic Reconfiguration capability allows individual disk drives and RAID sets to be removed and re-installed in any location. High performance, fault tolerant RAID subsystems can be configured using two CRD-5500s in a redundant configuration (depending on host platform and operating system capabilities).

### Choose a RAID Level To Optimize Performance and Data Availability

The CRD-5500 gives you the option of selecting the RAID level that best suits your application's unique requirements. Each RAID set can be formatted as RAID 0 (for high throughput without data protection), RAID 1 (disk mirroring for small capacity applications), RAID 0+1 (mirrored RAID 0 arrays), RAID 4 (for large file size, high throughput applications), or RAID 5 (for small file applications, such as OLTP or database servers). Regardless of the RAID level you choose, the CRD-5500's exclusive RPM (RAID Performance Monitor) algorithms provide information on cache hit rates, stripe size, and I/Os per second that allow you to fine-tune your RAID subsystem for maximum performance.

### Other CRD-5500 Key Features Include

- Global spare disk and dynamic rebuild. Multiple disks can be configured as hot or warm spares.
- Supports mixed disk drive vendors and capacities, even within the same RAID set!
- Front panel LCD display, I/O channel LEDs, and audible alarm for reporting critical failures.
- Comprehensive statistics and debug utility (via terminal) for optimizing subsystem performance.
- Dual controller option for building true fault tolerant subsystem configurations.
- RS-232 serial terminal interface for configuration and monitoring.
- Remote Terminal Services (RTS) Asynchronous Event Notification interface option.
- Separate termination power input for SCSI disk drives.

## Specifications

| General | |
|---|---|
| System Architecture | LR33310 32-bit RISC CPU. Internal 80 MB/sec., 36-bit DMA data path and XOR using CMD's custom ASIC RAID chipset. |
| Host Bus Interface | Up to four, 20 MB/sec. Fast/Wide/Single-Ended or 20 MB/sec. Fast/Wide/Differential SCSI. |
| Disk Bus Interface | Up to eight, 10 MB/sec. Fast/Single-Ended, 20 MB/sec. Fast/Wide/Single-Ended or 20 MB/sec. Fast/Wide/Differential SCSI (up to 56 SCSI disk drives per CRD-5500). |
| Command Queuing | 64 commands (host and disk SCSI channels) |
| Cache | Up to 512 MB (up to four, industry-standard 72-pin, 60 nanosecond SIMMs) |
| Operating Systems Supported | Any operating system that supports standard SCSI with block size from 256 to 520 bytes (in eight-byte increments) and SCSI LUNs |

| Environmental | |
|---|---|
| Temperature | 5°C to 50°C operating, -40°C to +60° non-operating |
| Relative Humidity | 10% to 85% non-condensing (operating), 5% to 90% non-condensing (non-operating) |

| Physical | |
|---|---|
| Controller Size | 8.1 inches deep, 5.57 inches wide, 3.25 inches high (full-height 5¼ inch form factor) 8 pounds maximum weight |
| Power Required | 5 VDC @ 6 amps peak, not including disk termination power requirements. 12 VDC @ 1.2 amps peak, includes battery charger current requirements. |
| Reliability | MTBP/MTTR: 450,000 POH, 20 minutes MTTR |
| Warranty | Three years return to factory. Custom warranty programs available. |

**Specifications subject to change without notice.**

## Ordering Information

The CRD-5500 may be ordered in many configurations, depending on the number and type of SCSI modules required. SIMM cache modules are not available from CMD but may be purchased off-the-shelf from any major computer parts distributor. Basic CRD-5500 models and standard options are as follows:

| | |
|---|---|
| CRD-5500-015 | CRD-5500 with one Fast/Wide host and five Fast SCSI disk channels |
| CRD-5500-105 | CRD-5500 with one Fast/Wide/Differential host and five fast SCSI disk channels |
| CRD-5530 | Additional Fast/Single-Ended SCSI channel module |
| CRD-5540 | Additional Fast/Wide/Single-Ended SCSI channel module |
| CRD-5560 | Additional Fast/Wide/Differential SCSI channel module |

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