



Storage Disk Drives
V2.7—08 February 1999
Systems and Options Catalog

StorageWorks RZ1CF, RZ1DF, RZ1EF 7200 RPM 8-bit Narrow Drives

StorageWorks RZ1CF, RZ1DF, RZ1EF 7200 RPM UltraSCSI Drives

StorageWorks RZ1CD, RZ1DD, RZ1ED 10000 RPM UltraSCSI Drives

StorageWorks EZ3x/EZ6x Solid State Disks

StorageWorks RRD47 32X SCSI CD-ROM Drive

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StorageWorks RZ Family of Disk Drives

The RZ family of SCSI disk drives consists of 3.5-inch 7200 RPM, 8-bit and 16-bit drives with capacities ranging from 4.3 Gbyte to 18.2 Gbyte. The family offers a variety of capacity points and performance characteristics that can be matched to the system or application environment. The drives are typically mounted in the system enclosure of both Alpha and VAX desktop and deskside systems and servers. They are also available in StorageWorks external expansion enclosures for desktop data center needs.

UltraSCSI disk drives offer industry leading 10000 RPM performance for demanding applications, including network file servers and enterprise servers. The latest addition to the StorageWorks UltraSCSI drive family is targeted for transaction and scientific/graphic applications. It is available in a Compaq StorageWorks System Building Block (SBB) and is supported in standalone RAID subsystems.

Features

- UltraSCSI 10000 RPM disk drive increases application performance by 20 to 50 percent over 7200 RPM drives
- Extra high performance 10000 RPM and high performance 7200 RPM models.
- 96-bit error correction code ensures data integrity.
- Quadruplicate headers ensure proper identification and transfer of correct data.
- Comprehensive power-up, periodic self diagnostics, and device testing provide early warning of potential drive failure.
- Extended operating temperature specifications provide reliability in the desktop or office environment.

Ordering Information

See individual system ordering menus for specific variants and quantities supported.

Compaq StorageWorks 7200 RPM Disk Drives

Supported in StorageWorks 8-bit narrow shelves

DS-RZ1CF-VA	4.3 GB 8-bit 7200 RPM SCSI-2 disk drive in 3.5 inch x 1.0-inch carrier—narrow
DS-RZ1DF-VA	9.1 GB 8-bit 7200 RPM SCSI-2 disk drive in 3.5 inch x 1.0-inch carrier—narrow
DS-RZ1EF-VA	18.2 GB 8-bit 7200 RPM SCSI-2 disk drive in 3.5 inch x 1.6-inch carrier—narrow

Supported in StorageWorks 16-bit wide shelves

DS-RZ1CF-VW	4.3 GB 16-bit 7200 RPM UltraSCSI disk drive in 3.5-inch x 1.0-inch blue carrier—wide
DS-RZ1DF-VW	9.1 GB 16-bit 7200 RPM UltraSCSI disk drive in 3.5-inch x 1.0-inch blue carrier—wide
DS-RZ1EF-VW	18.2 GB 16-bit 7200 RPM UltraSCSI disk drive in 3.5-inch x 1.6-inch blue carrier—wide

StorageWorks 10000 RPM Disk Drives

Supported in StorageWorks 16-bit wide shelves

DS-RZ1CD-VW	4.3 GB 16-bit 10000 RPM UltraSCSI disk drive in 3.5 -inch x 1.6-inch blue carrier—wide
DS-RZ1DD-VW	9.1 GB 16-bit 10000 RPM UltraSCSI disk drive in 3.5 -inch x 1.6-inch blue carrier—wide
DS-RZ1ED-VW	18.2 GB 16-bit 10000 RPM UltraSCSI disk drive in 3.5 -inch x 1.6-inch blue carrier—wide

StorageWorks RZ Family of Disk Drives
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Specifications

	7200 RPM Drives			10000 RPM Drives		
Drive/capacity formatted	4.3 GB	9.1 GB	18.2 GB	4.3 GB	9.1 GB	18.2 GB
Cache buffer size	512 KB	512 KB	1 MB	512 KB	1 MB	1 MB
Average seek time	8 ms -9 ms	8 ms -9 ms	8 ms -9 ms	7.5/8.5 ms	5.2/6.0 ms	5.7/6.5 ms
Average latency	4.17 ms	4.17 ms	4.17 ms	2.99 ms	2.99 ms	2.99 ms
Average access time	12.2 ms	12.2 ms	12.2 ms	10.5 ms	8.2 ms	8.7 ms
Max data transfer rate To/from media	121 MB/s	170 MB/s	170 MB/s	177 MB/s	231 MB/s	231 MB/s
Bus/synchronous 8-bit	10 MB/s	10 MB/s	10 MB/s	20 MB/s	10 MB/s	10 MB/s
Bus/synchronous 16-bit	40 MB/s	40 MB/s	40 MB/s	40 MB/s	40 MB/s	40 MB/s
Form factor	3.5-inch	3.5-inch	3.5-inch	3.5-inch	3.5-inch	3.5-inch
Operating Environment						
Temperature	5 to 50 C	5 to50 C	5 to50 C	5 to50 C	5 to50 C	5 to50 C
Relative humidity	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%

StorageWorks EZ3x/EZ6x Solid State Disks

StorageWorks EZ3x and EZ6x solid state disks provide very high access time—ten times faster than the EZ5x products. The EZ3x and EZ6x devices provide sustained user data bandwidth rates close to the SCSI bus limit. Non-volatility is provided by an integrated data retention system to ensure data permanence if power is lost.

Solid state disks use the speed of DRAM storage media to provide the highest storage subsystem performance by eliminating the seek and rotational latencies inherent in magnetic disks. They bridge the performance gap between CPU power and traditional storage media to increase application performance. Solid state disks complement cache and RAID configurations by eliminating bottlenecks caused by random workloads and small data sets, and provide instant access to "hot" files resident in the device.

Features

- Time critical data is accessed 100+ times faster than magnetic disks.
- Access times under 100 microseconds.
- Supports bandwidth critical applications with very high data transfer rates.
- Sophisticated continuous backup and ECC provides industry leading availability.
- Industry standard and open, executes the SCSI-2 Common Command Set.
- Wide SCSI support.

Operating System Support

- OpenVMS VAX V5.5-2 with HSxxx controllers only
- OpenVMS V6.2 on Alpha systems
- Tru64 UNIX V3.2C
- Windows NT 3.51

Hardware support

EZ3x/EZ6x Solid State Disks supported on the following systems with KZMSA, KZPSC, KZPSA, and KFTIA

- AlphaServer 2000, AlphaServer 2100
- AlphaServer 4000, AlphaServer 4100
- AlphaServer 8200, AlphaServer 8400
- DEC 7000, DEC 8000

Controller, Adapter, and Converter Support

Controllers

- Minimum firmware revision required is HSOV V2.5, for maximum performance V2.7 or higher is recommended.
- HSxxx controllers do not support wide operation at this time. If 16-bit wide solid state disks are used with narrow HSxxx controllers, a "personality" card is required to enable operation in 8-bit mode.
 - DSSI Array Controllers—HSD30, HSD50
 - CI Array Controllers—HSJ30, HSJ40, HSJ50
 - SCSI Controllers—HSZ40, HSZ50

Adapters and Converters

- Wide solid state disks work best with Wide KZxxx FWD adapters. Narrow solid state disks, in narrow shelves, may be used with wide KZxxx FWD adapters though disks will operate in 8-bit narrow mode.
 - PCI-based FWD SCSI Adapter—KZPSA-BB
 - TURBOchannel-based FWD SCSI Adapter—KZTSA
 - 16-bit FWD to 8-bit FNSE—DWZZA signal converter
 - 16-bit FWD to 16-bit FWSE—DWZZB signal converter

Configuring Solid State Disks

- In a typical I/O active application, the vast majority of I/O requests is directed toward 1%–5% of the on-line data. Placing this small percentage of data ("hot" files) on solid state disk reduces I/O wait-time (CPU idle) and enables CPU cycles to do work.

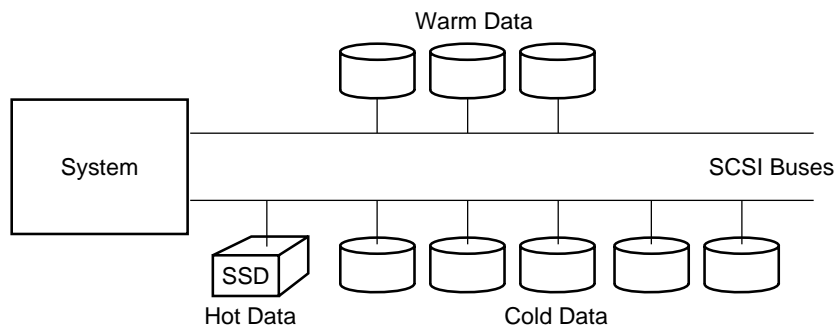
StorageWorks EZ3x/EZ6x Solid State Disks (continued)

I/O Balancing

- Given the I/O profile, when multiple SCSI buses are implemented, optimum performance will be achieved by “balancing” the I/O as shown in the following figure to achieve an average “warm temperature” across the buses. For maximum system performance, 5.25-inch solid state disks should reside on a dedicated bus and not be mixed with other SCSI devices.

Wide SCSI

- Wide SCSI solid state disks (-VW variants) should be configured on a 16-bit wide adapter for optimal performance.



BU-3415

Ordering Information

EZxx-VA/VW drives are packaged as StorageWorks Building Blocks, no additional mounting hardware or cabling is required.

EZ69-VW	950 MB 5.25-inch 16-bit wide SCSI solid state disk with data retention system
EZ69-VA	950 MB 5.25-inch 8-bit narrow SCSI solid state disk with data retention system
EZ64-VW	475 MB 5.25-inch 16-bit wide SCSI solid state disk with data retention system
EZ64-VA	475 MB 5.25-inch 8-bit narrow SCSI solid state disk with data retention system
EZ31-VW	134 MB 3.5-inch 16-bit wide SCSI solid state disk with data retention system
EZ32-VW	268 MB 3.5-inch 16-bit wide SCSI solid state disk with data retention system

Specifications

Physical characteristics	EZ6x-VA	EZ6x-VW	EZ3x-VW
Height	82.6 cm (3.25 in)	82.6 cm (3.25 in)	41.4 cm (1.63 in.)
Depth	203.2 cm (8.0 in)	203.2 cm (8.0 in.)	146 cm (5.75 in.)
Width	146.0 cm (5.75 in)	146.0 cm (5.75 in.)	101.0 cm (4.0 in.)
Weight	2.55 kg (5 lb., 10 oz)	2.55 kg (5 lb., 10 oz)	1.4 kg (3.0 lbs.)
SCSI-2 Interface	8-bit	16-bit	16-bit
Capacity	475/950 MB	475/950 MB	134/268 MB
Form Factor	5.25 in x 3.2 in	5.25 in x 3.2 in	3.5 in x 1.6 in
Access Time	Less than 100 us	Less than 100 us	Less than 100 us
Sustained bandwidth	9.4 MB per second	13 MB per second	13 MB per second
Maximum I/O Throughput	5000 + I/Os per second	5000 + I/Os per second	5000 + I/Os per second
RAID compatible	Yes	Yes	Yes
Data retention system	Yes	Yes	Yes
Write-through mode	Yes	Yes	Yes
Hot swappable	Yes	Yes	Yes
Battery life	10 years	10 years	10 years

StorageWorks RRD47 32X SCSI CD-ROM Drive

The Compaq RRD47 5.25-inch half-height SCSI CD-ROM drive is capable of transferring digital/binary data at a 32X transfer rate, approximately 4,800 KB per second. The RRD47 drive provides 600 MB capacity per CD-ROM, and is compliant with all major CD formats. With mean time between failures (MTBF) of 100,000 hours, it is an extremely reliable drive. The drive's increased performance and lower seek time makes it well suited for demanding applications such as multimedia (MPEG-1) and software delivery.

Hardware Support

- AlphaServer 8200/8400
- AlphaServer 4000/4100
- AlphaServer 1200
- AlphaServer 1000A
- AlphaServer 800
- AlphaServer 300
- VAXstation 4000 Model 96
- MicroVAX 3100 Models 88 and 98
- VAX 4000 Model 108

Ordering Information

RRD47-AA	Internal 32X SCSI CD-ROM 5.25-inch half-height grey
RRD47-AB	Internal 32X SCSI CD-ROM 5.25-inch half-height white
RRD47-AC	Internal 32X SCSI CD-ROM 5.25-inch half-height blue
RRD47-EN	Internal 32X SCSI CD-ROM 5.25-inch half-height for MicroVAX 3100 / VAXstation 4000/ VAX 4000
DS-RRD47-VA	32X SCSI CD-ROM 5.25-inch in StorageWorks SBB
DS-RRD47-VU	32X SCSI CD-ROM second drive for VA variant
RRD47-VE	32X SCSI CD-ROM for AlphaServer 8000
RRD47-VC	32X SCSI CD-ROM for AlphaServer 1000A
RRD47-VD	32X SCSI CD-ROM for AlphaServer 1200

Specifications

Applicable disc format	Red Book, Yellow Book, CD-ROM XA , CD-I Bridge (Photo CD, Video CD), CD-I, CD-I ready, CD-G, and Multi-session (Photo CD, CD Extra, CD-RW, CDR)
Transfer rate	
Sustained block transfer rate	75 Blocks (1X) 450-750 Blocks (6-10X) 1,035-2,400 Blocks (13.2-32X)
Sustained data transfer rate	
Mode 1 (2,048 Bytes/Block)	150 KB/s (1X) 900-1,500 KB/sec (6-10X) 2,070-4,800 KB/sec (13.2-32X)
Mode 2 (2,336 Bytes/Block)	171 KB (1X) 1,025-1,710 Kbytes/sec (6-10X) 2,359-5,472 Kbytes/sec (13.2-32X)
Burst (SCSI interface)	10 MB (Sync), 5 MB (Asynchronous)
Access time	
Average random access time	90 ms Typical (32X)
Average random seek time	85 ms (32X)
Average full-stroke access time (forward and backward)	140 ms (32X)
Data buffer capacity	256 KB
Load/Eject	(a) Electrical Load/Eject (Eject Button) (b) Load/Eject by SCSI command (c) Emergency Eject
Air flow	Not required
Acoustic noise	45dB (IEC 179 A-weighted) maximum at 1 meter
Power supply	+5 V and +12 V

Storage Disk Drives

Specifications *(continued)*

Environmental conditions	
Operating temperature	5 C to 40 Degree C (Class B)
Storage temperature	-10 C to 60 C
Non operational temperature	-40 C to 66 C
Humidity non-operational	Up to 95%
Altitude operating	6,562
Altitude non-operational	12,000 Feet
Humidity operational	10 to 90%
MTBF	100,000 hours
Drive life	15,000 hours or 5 years (earlier one)

Warranty Support

The standard price includes a one-year onsite hardware warranty with priority response, typically the next business day. The onsite hardware support is available Monday through Friday, 8:00 a.m. to 5:00 p.m. excluding Compaq holidays. Users can purchase upgrades and extensions to suit their needs.