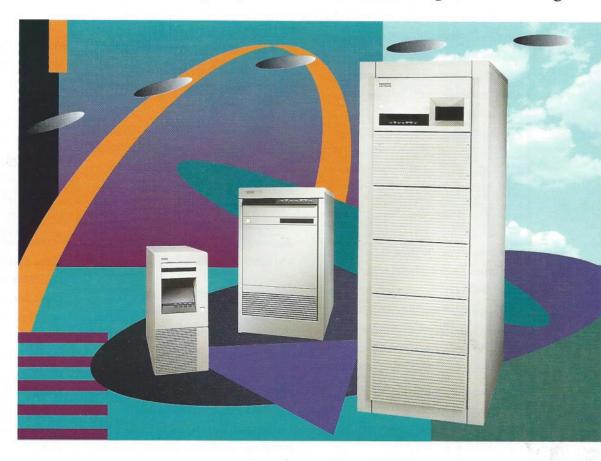# StorageWorks

RW500 MULTIFUNCTION OPTICAL LIBRARY SYSTEMS

Low-Cost Enhanced-Capacity Solutions for Bulk Storage and Archiving

digital

Complete hardware/ software solutions

Industry-standard storage

Exceptional flexibility

Maximum investment protection

If your data storage needs are growing faster than your budget, you're not alone. Today, business trends such as downsizing, data center consolidation, increased archiving requirements, and new applications—using imaging, voice, and video—are creating unprecedented demands for electronic data storage.

Digital's optical library systems, also called jukeboxes, provide a low-cost, near online growth alternative for businesses facing increasing storage demands. These devices provide storage for imaging, archiving, and storage management applications at a substantially lower cost than online storage.

In addition, some data must be stored for many years in order to meet regulatory and audit requirements. The traditional solution—long-term storage on removable magnetic media—requires periodic maintenance and climate-controlled conditions which add cost over time. In contrast, Digital's optical solution provides long-term, stable data storage to meet critical data retention needs—without the added cost.

HIGHLIGHTS

Includes hardware, software, media, and interconnects to provide a total solution.

Provides quick, automated access to large quantities of data—at a significantly lower cost per megabyte than either online magnetic disks or operator-attended off-line storage.

Uses multifunction (WORM and rewritable) drives, and allows mixed media in the jukebox, for great application flexibility.

Provides high data integrity and high system reliability—with no preventive maintenance required.

Offers hardware and software investment protection through forward and backward media compatibility, drive migration, jukebox expandability, and the uniform software interface of DEC OSMS.

Adheres to industry standards—ensuring long-term data readability and lower costs, and allowing media interchange and multiple sourcing.

Gets up and running quickly—providing fast investment recovery via ease-of-integration and turnkey application support.

Enables the development of imaging, archiving, hierarchical data management, computer output to laser disk, and other applications that lower costs and increase efficiency.

Meets multiple price/capacity requirements with wide breadth of offerings.

Backed by Digital's world-class service and support.

When used with Digital's Optical Storage Management Software (DEC OSMS), the RW500 family forms a complete OpenVMS VAX solution for many applications. The RW500 optical jukeboxes are also used in the StorageServer 100—Digital's hierarchical storage management product for ULTRIX systems. Additionally, the jukeboxes integrate with many software products from both Digital and other suppliers to provide a variety of turnkey solutions.

The RW500 family of jukeboxes are ideal for data-intensive applications and industries, including document image processing, CAD/CAM, CASE, COLD (Computer Output to Laser Disk), financial services, healthcare, electronic publishing, pharmaceutical, and scientific data collection.

A SCALABLE FAMILY OF OPTICAL LIBRARIES WITH MULTIFUNCTION DRIVES TO MEET YOUR PRICE/PERFORMANCE/ CAPACITY REQUIREMENTS

Each optical library consists of one or more 5.25-inch storage drives, industry-standard media in slots, a robotic handler to move the media, and associated management software (middleware). Each library holds a variable number of media cartridges and multifunction drives that support both rewritable and write-once (WORM) operation. Since both types of media can be intermixed within a single jukebox, you have unprecedented flexibility in designing application solutions.

With this wide range of products, Digital can work with you to tailor optical storage solutions for your specific price/capacity requirements, which may vary by application or site—thus ensuring consistent implementation and lower application development and training costs.

PROVIDES SUPERIOR APPLICATION SUPPORT THROUGH DEC OSMS

Digital's Optical Storage Management Software (DEC OSMS) is an easy-to-use development platform that provides transparent disk-like access to all platters within the jukebox. This software presents an application interface and gives you the software base necessary to use the product, plus linkages to application software.

From a functional perspective, DEC OSMS manages the jukebox, controls the robot, and tracks media and slot locations. When a drive detects the presence of WORM or rewritable media, DEC OSMS automatically invokes the appropriate file system, and provides the WORM file system. Finally, it works with OpenVMS to create a directory on each optical platter.

PROTECTS YOUR INVESTMENT — TODAY AND TOMORROW

Today's second-generation RW500 family is part of a long-term strategy to introduce new libraries based on higher-capacity drives. As new drive generations are introduced, you will be able to upgrade to the latest

technology by replacing the drives — without having to replace the libraries. This is possible because the new drives will be able to read and write your current media, protecting your data investment. You'll be able to operate with a mixture of media with different capacities in your jukebox, and the system will automatically adjust. This upgrade capability enhances your flexibility and provides a growth path for your expanding storage requirements.

Looking backward, the RW500 products can read and write rewritable platters from many other OpenVMS VAX jukebox vendors and from Digital's previous 5.25-inch rewritable library offerings—thus providing a migration path for many current optical disk users. And in the interest of protecting your software investment, DEC OSMS is designed to present a consistent interface to your OpenVMS VAX applications—facilitating the introduction of new technology without application modifications.

Since Digital's optical libraries will smoothly incorporate successive hardware generations, you will be able to benefit quickly from the newest technologies.

For example, today's double-capacity drives can read and write to the 600 MB media used by Digital's RW504, RW510, RW514, and RW516 systems. Owners of these first-generation RW500 systems can economically upgrade their optical libraries to the double-capacity drives—while retaining the jukeboxes, media, and application software they have already written.

Digital's optical library family consists of four systems with a broad range of formatted capacities:

RW524: Deskside pedestal system	16 cartridge	single-drive	19 GB
RW530: Deskside mid-range system	32 cartridge	dual-drive	38 GB
RW534: Datacenter system	88 cartridge	4-drive	104 GB
RW536: Datacenter system	144 cartridge	4-drive	170 GB

MEETS YOUR REQUIREMENTS FOR DATA RETENTION AND SECURITY

Does your business need to store information for a long time, or keep data tamper proof? Digital's RW500 optical libraries can retain data for thirty years or longer on either WORM or rewritable storage media—which makes them the ideal solution for long-term data retention. And the RW500 optical libraries provide security and protection against tampering because they offer write-once media.

So whether you expect to retain data for long periods of time to meet future business requirements—such as seismic data analyses, medical records, or customer histories—or need to store tamperproof records in order to meet legal and audit requirements—tax records, for example—Digital's optical libraries are your answer.

OFFERS HIGH PERFORMANCE— AFFORDABLY

For many applications, a single piece of information may be accessed only rarely, but when access occurs, there is typically a burst of frequent activity. For example, hospital records may be archived until a previous patient is re-admitted, after which records will be updated frequently. Or insurance records may not be touched for long periods of time, until a claim is filed.

By using high-density, low cost-per-megabyte random access media in conjunction with robotic data retrieval, Digital's optical libraries offer speedy access to data as needed—at costs significantly lower than either online storage or human-assisted off-line media retrieval. In addition, multiple RW500 jukeboxes will often provide high capacity and higher performance — at lower cost — than jukeboxes using 12-inch WORM media.

A requested platter will typically be mounted in a drive in less than ten seconds. Once the platter is mounted, the library's high-performance drive will access and transfer files at speeds that are very close to the performance of magnetic disks.

A BROAD PLATFORM STRATEGY

Digital's family of optical libraries supports multiple operating systems and multiple applications. It also incorporates expansion to cover a wide range of platform and operating system support. For OpenVMS, DEC OSMS is the application interface used. In the ULTRIX environment, StorageServer 100 integration is available today. Additional applications will be supported in the near future.

SPECIFICATIONS

DRIVE CHARACTERISTICS FOR ALL SYSTEMS:

Interface	Single-ended SCSI-2; one cable supports robot and drive
Media technology	Magneto-optical (130mm/5.25 in)
Archival life	30 years

Capacity:*	High-Capacity Mode	Low-Capacity Mode
512-byte sectors	1.2 GB (600 MB/side)	594 MB (297 MB/side)
1,024-byte sectors	1.3 GB (650 MB/side)	650 MB (325 MB/side)
Rewritable format	RWX5K-01	RWX1K-01
Rewritable standards (CCS format)	ECMA 184 ISO/IEC DIS 13549 (draft)	ISO/IEC 10089A ANSI X3.220-1992
Write-once media	RWX5K-02	RWX1K-02
Write-once standards (CCW format)	ECMA 184 ISO/IEC DIS 13549 (draft)	ISO/IEC 11560 ANSI X3.220-1992
Average access time	36.0 ms	31.8 ms
Average load time	2.3 s with spin-up	2.8 s with spin-up

Data Transfer Rates:		
Reads (max. sustained)	1.6 MB/s	1.0 MB/s
Writes (max. sustained)		
with verification (default)	0.53 MB/s	0.33 MB/s
without verification	0.80 MB/s	0.50 MB/s
Burst sync./async.	5.0/3.0 MB/s	5.0/3.0 MB/s

LIBRARY CHARACTERISTICS:

	RW524	RW530	RW534	RW536
SCSI IDs used	2	3	5	5
Average disk exchange time(s)	8	7	8	8
Height (mm/in)	494/19.4	720/28.3	1,847/72.7	1,847/72.7
Width (mm/in)	220/8.7	375/14.8	651/25.6	651/25.6
Depth (mm/in)	694/27.3	800/31.5	971/38.2	971/38.2
Weight (kg/lb)	35/78	86/189	347/764	360/792
Mechanical reliability (Mean swaps between failures)	300,000	1,200,000	1,200,000	1,200,000
Environmental:				
Operating temperature (°C)	5–50	10–40	10–40	10–40
Operating humidity (%RH)	10–90	10–90	10–90	10–90
Power Requirements:				
Voltage (VAC)	110–240	110–240	110–240	110–240
Frequency (Hz)	50/60	50/60	50/60	50/60
Power consumption typical/maximum (W)	70/100	110/250	100/250	100/250

Software Support:	OpenVMS 5.4-3 through 6.0 StorageServer 100 Software for ULTRIX
System Support:	Most Q-bus and SCSI-based systems and VAXstations; contact your sales representative for the latest information.

Digital's operating systems use 512-byte sector media.

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