SELLING & MARKETING
SMART STORAGE
SOFTWARE

SMART STORAGE

Introducing Smart Storage Inc.

Smart Storage Inc. believes that CD-Recordable (CD-R) technology will be the *de facto* standard for data archival and storage, due to the price/performance characteristics of CD-R media and hardware, and because of the underlying standards of CD technology. As software leaders in the CD storage industry, we have leveraged the CD technology to create a new paradigm for archival storage. We brought our years of experience in CD networking and CD-Recording to create a set of software solutions that define performance, reliability and ease for CD storage, CD access and CD-Recording. Our product strategy is to provide the best software in the industry for access and recording, including:

- **SMARTCD Archive--**for access to CD-R based information in a stand-alone or network environment.
- **SMARTCD Library--**for network or stand-alone access to published CDs.
- **SMARTWRITE CD--**for high or low-volume CD-Recording over a network.

The Smart Storage Product Line

Product	Function	Versions Available
SMARTCD Archive	CD-R based mass storage and archiving.	- PC Server - NFS Server - NLM - Solaris - Stand-Alone versions for DOS, Windows
SMARTCD Library	Access to collections of published CD-ROMs.	- PC Server - NLM - Stand-alone versions for DOS, Windows, Macintosh and Solaris
SMARTWRITE CD	Network-based CD-Recording.	- SMARTWRITE CD-HV - SMARTWRITE CD-LV

Our success is linked to our ability to anticipate the technology of tomorrow and to identify and develop new products and markets. Our patent-pending file system is unique among mass storage software products. The breadth and depth of our software development expertise is demonstrated by our ability to rapidly transfer a core technology to multiple platforms and many flexible configurations, for different user sets and product applications. This foresight and an innovative culture makes Smart Storage a unique business partner. Smart Storage is a strategic business partner with several leading companies in the CD marketplace. Smart Storage software is sold through standard imaging and CD product distribution channels.

Part I
SMARTCD Archive

CD-Recordable Based Mass Storage and Archival

What is it?

SMARTCD Archive is software for enabling network or stand-alone access to archival data residing on CD-Recordable media. SMARTCD Archive is a combination of the following: jukebox management software, device driver, volume and device management utility, network interface and system administration utility. Together, these components create a comprehensive storage management system for access to large data sets on CD-R discs.

Who needs it?

An archive-class application typically involves any number of CD-R discs involving data sets from gigabytes to terabytes in size. Generally speaking, these data sets reside in CD jukeboxes, mini-changers, CD towers or any combination thereof. Data sets can be of any kind, from text to document images to multimedia. Archive-class applications include:

- Microfiche and Microfilm conversion
- Litigation support
- Large records management projects
- Network file archiving
- GIS applications
- Engineering document management
- In-house and commercial database publishing

Features and Benefits

- **Comprehensive device support**--All viable CD jukeboxes and all SCSI CD-ROM drives and drive towers are supported. Most other archive-class products on the market provide support for only a few kinds of devices, or for proprietary devices only. With SMARTCD Archive, users can choose from the widest range of CD storage devices. No other product on the market offers such expandability: as many as 392 storage devices may be placed on the system, ranging from single CD-ROM drives to jukeboxes that hold 1400 or more discs.

- **Simple integration**--For integrators putting together turnkey systems, SMARTCD Archive offers simple integration with any file-based application.

- **Aggregate directory building**--gathers all information on a collection of CDs stored across many storage devices under one drive letter or volume. Searching for files is much easier when there's only one drive to search instead of many.

- **Caching**--SMARTCD Archive caching improves the performance of any CD storage device. The multiple levels of caching used by SMARTCD Archive help to minimize jukebox thrashing, minimize disc swapping, maximize data throughput, and to facilitate rapid searching across a storage structure. Although caching is handled differently from version to version, the resulting performance boost is the same in every case. SMARTCD Archive is also a complete multi-tasking system, servicing all requests for data on the system to allow multiple users access to multiple devices concurrently.

Smart Storage has already had success with a prototype version of SMARTCD Archive that controls both access and recording to CD in a CD-ROM jukebox. Developing software for the leading edge of technology is what makes Smart Storage the leader in CD-R and CD-ROM access and mastering software. As the technology grows, so do our products. Resellers and users are a critical element of our development process and we seek their feedback for ongoing product development ideas.

Versions of SMARTCD Archive

Below is a discussion of differentiating features of currently available versions of SMARTCD Archive, and the ways in which they might benefit specific applications or situations.

NFS Server--Ideal for sites that involve mixed operating system environments.

- Supports all UNIX, PC and Macintosh clients through the NFS protocol.
- All data on CD is presented in native file system formats.
- Supports Rockridge CDs, so that UNIX clients can access data with UNIX file attributes.

NLM--Best suited for small to medium-sized applications with up to 2 million files, and requiring security/on-line updates.

- Data sets are presented as a NetWare volume.
- Cross-platform support--any client who can attach to a Novell file server can access data in the CD storage structure.
- Security--The NOS provides file, directory, and user security.
- Online updates - CDs can be added and deleted dynamically.
- No workstation TSR - Logging into the server provides access to the CD data.

PC Server--Ideal for data sets that are terabytes in size and involve tens of millions of files.

- Supports the IPX, Banyan SPP, NetBIOS and NetBEUI protocols.
- Presents multiple jukeboxes and readers as a single DOS drive letter.
- Clients run a TSR to mount and use the CD structure as a read-only drive.
- Workstations may attach to multiple servers simultaneously, via additional drive letters (up to six).
- Very large data structures can be broken into several smaller structures to provide redundancy, security and easier administration.

Solaris--Best for users with Sun-based applications who wish to integrate CD mass storage.

- Runs directly on a Sun SPARCstation, eliminating the need for a TSR or client software.
- Supports any NFS client.
- The CD storage structure may be divided into discrete mount points pertaining to specific collections of discs.

Stand-Alone--Ideal for projects that start small and concentrated, but allows for an easy upgrade to a network version later, if necessary.

- Easy-to-use DOS and Windows interfaces.
- Presents multiple jukeboxes and readers as a single DOS drive letter.
- Clients run a TSR to mount and use the CD structure as a read-only drive.
- Many imaging applications involving centralized archives might utilize such a configuration.

Future versions are planned or near completion for UNIX flavors such as Windows NT, HPUX and DGUX. We anticipate a read/write version to be available in the near future, allowing users to record, store and access data on a single device.

Competitors to SMARTCD Archive
Primary competitors to SMARTCD Archive are:

- HyperROM by Tracer
- Ultra Capacity by Young Minds
- Virtual CD by Celerity
- OptiDriver-CD and Opti-LAN by Optisys
- SCSI Express by Micro Design

In general, these products are limited by their device support, cross-platform support, and caching abilities. Customers who are interested in these competitors should be encouraged to look closely at the following specific problem areas:

- **Single-platform focus**--Many companies support only one platform (i.e. UNIX, Windows, Novell) and cannot offer cross or multi-platform support. No other company can offer solutions for virtually any platform.
- **Lack of focus on CD-ROM**--Companies that are entrenched in the market with WORM, MO or other optical solutions traditionally have been forced to incorporate CD-ROM support. System development approaches derived from optical technology tend to be highly dependent on the proprietary nature of optical. The lack of control over the physical and logical formats typical of CD is often a serious handicap for these developers.
- **Limited numbers of devices**--Only SMARTCD Archive can claim to support 392 CD-ROM storage devices.
- **Limited device support**--Often, our competitors are selling software bundled with their proprietary devices. Smart Storage's philosophy is to support as many devices as possible--more than any competitor--and let the customer choose the hardware they want.

- **Insufficient caching**--Many other programs use only the caching available to the underlying operating system. SMARTCD Archive's **multiple** levels of caching are **tunable** to provide the best performance available from application to application, and its caching is in addition to host system caching.
- **Read/write integration**--Smart Storage has demonstrated expertise in both CD-Recordable and CD storage technology and is uniquely positioned to integrate the technologies in the near future. Every one of our competitors will have to either license somebody else's technology or build a new product from scratch. Smart Storage already has several products that define the state-of-the-art in network-based CD-Recordable in the SMARTWRITE CD product.

Overall, SMARTCD Archive's drawbacks are easily overcome. For example, an end-user who is not interested in a dedicated server solution can choose an NLM or a Solaris solution.

Part II
SMARTCD Library

Network Access to Collections of Published CDs

What is it?

SMARTCD Library's architecture is designed around access to **published** CDs. Among a growing field of CD networking products, it stands out by supporting all viable jukeboxes on the market. Whether the discs are multimedia encyclopedias, atlases or multi-volume phone directories, SMARTCD Library provides optimal multi-user (or stand-alone) access. CD-Recordable discs created for backup purposes may also be used in a SMARTCD Library system. SMARTCD Library is aggressively priced to compete with similar products, making it the best value.

How is it different from SMARTCD Archive?

The differences between the two products are not obvious. The four main differences are:

- **Mass storage vs. Reference volumes**--SMARTCD Archive is for large data sets that may span many CDs and are created on gold CD-R discs. SMARTCD Library is for published CD-ROMs which are typically self-contained (with data and software on the same silver disc).
- **File vs. volume**--SMARTCD Archive presents a jukebox as a single combined file system, while SMARTCD Library presents the jukebox as a list of titles.
- **CD-R vs. CD-ROM**--SMARTCD Archive's caching is engineered around access to CD-Recordable discs, while SMARTCD Library's caching is oriented to published CDs.
- **Cost**--SMARTCD Library's SRP is $795, while SMARTCD Archive's pricing is a function of the size of the storage structure and can range in price from $1000 to $10,000.

Who needs it?

A Library-class application primarily involves commercially published CD-ROMs. From the single user who wants stand-alone access to a collection of published CDs to the network administrator who wants to share mass-produced CD-based software and reference titles on a network, SMARTCD Library is appropriate in any situation where a user wishes virtual access to a CD-ROM collection.

Features and Benefits

While there are many Library-class software solutions on the market, SMARTCD Library is unique from competitive products because of the following:

- **Comprehensive device support**--supports all leading jukeboxes and SCSI CD-ROM drive arrays--plenty of room to expand with a wide choice of storage devices. As many as 392 SCSI devices may be supported by a single server.
- **Powerful administrative tools**--network versions feature online updates, remote administration, and extensive usage reporting by disc and device.
- **Direct access** to the CD collection via DOS/Windows software.
- **Seamless access** to multi-volume CD-ROM sets.
- Caching--SMARTCD Library's multiple levels of caching
- **TSR**--A small, unloadable TSR provides complete MSCDEX emulation.
- **API**--Command line operation provides easy integration with any application.

Versions of SMARTCD Library

Below is a discussion of the currently available versions of SMARTCD Library. While the core features and benefits remain the same, functionality changes from version to version:

PC Server--A CD-ROM networking utility for any PC-based client.

- Supports the IPX, SPP, NetBIOS and NetBEUI protocols.
- Presents multiple jukeboxes and readers as a single DOS drive letter.
- Workstations may attach to six SMARTCD Library servers simultaneously.
- Complete multi-tasking system.

NLM--CD-ROM networking for Novell clients.

- CDs presented as DOS drive letters.
- Complete multi-tasking system.
- Online updates--CDs can be added and deleted dynamically.
- Supports DOS and Windows clients.

Stand-Alone Versions--Ideal for personal or small business use, or for collections of CDs with confidential or classified data.

- Provides access to CD collections stored in CD jukeboxes for a single user.
- Runs in conjunction with MSCDEX.
- Allows users to inventory and manage CDs stored both on and off-line.
- Ideally suited for jukebox devices with a single reader**.**
- Versions available for DOS, Windows, Macintosh and Solaris.

Competitors to SMARTCD Library

Primary competitors to SMARTCD Library include:

- LanCD by Logicraft
- CD-Net by Meridian Data
- SCSI Express by Micro Design International
- DiscPort and DiscView by Microtest
- Opti-Net by Online Computer Systems
- OptiDriver Net by OptiSys
- CD-View by Ornetix

Competitor software to SMARTCD Library can usually be found to have one or more of the following weaknesses:

- **Weak or proprietary device support**--Too many companies are trying to sell their own hardware, or are connected with only a few major CD storage device companies. Smart Storage has no hardware biases and wants its customers and resellers to be able to add any devices they choose, since devices have varied storage characteristics.
- **Expandability**--An important question to ask when shopping for CD networking software is: can the system grow with changing needs? With the ability to connect 392 SCSI CD storage devices to a single server, we think we can meet your future needs.
- **Integrated package**--Some CD networking software companies require you to buy additional modules to fill out functionality. SMARTCD Library comes with all functionality included--no additional modules, no additional cost.

The chart on the next page compares the products listed above with SMARTCD Library.

Part III

SMARTWRITE CD

SMART WRITE™

State-of-the-Art Network-Based CD-Recording

What is it?

SMARTWRITE CD software is for high or low-volume CD-Recording over a network. The functionality is similar to a network laser printer, with all clients able to access a networked CD-Recorder. SMARTWRITE CD software features support for multiple clients (DOS, Windows, Macintosh & UNIX), an API for easy integration with other applications, and recording as simple as copying files to another drive letter. A dedicated multi-tasking server is used to manage jobs to the CD-Recorder.

Who needs it?

Anyone who wants to do in-house CD-Recording can use SMARTWRITE CD software. It can be used for low-volume publishing, data archiving or mass storage. Recorded data may be audio, text or multimedia. Applications include:

- Print-on-demand of large data sets
- Digital archival
- Backup
- COLD
- Low-volume digital publishing
- Software distribution
- Network Backup

Features and Benefits

The SMARTWRITE CD product family can be characterized by the following distinguishing features:

- High-performance CD-Recording--Record at 2x or 6x speeds over a network.
- Multi-client support--DOS, Windows, Macintosh & UNIX nodes may all use the same shared recorder.
- Multiple recording methods--with a built-in API, by batch file or from the DOS/Windows interface.
- Works with CD autoloaders for hands-off automation of multiple CD-Recording.

As new network-capable CD recording hardware devices emerge Smart Storage will quickly offer new network recording solutions that take advantage of the unique benefits of new devices.

Versions of SMARTWRITE CD

SMARTWRITE CD-HV--For high-volume, unattended multiple CD production over a network.

- Supports 2x and 6x recorders.
- Supports autoloaders such as the Kodak Disc Transporter to produce CDs continuously over a network.
- Image Creation Workstation software for DOS, Windows and UNIX clients allows creation and testing of CD images before recording to disc.

SMARTWRITE CD-LV--For low-volume CD-Recording over a network.

- Shared high-speed, single-disc recording over a network.
- Allows formatting on-the-fly to minimize production time.