

Let's Talk

A Quarterly Newsletter
For Memorex Customers
And Friends.

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Let's Talk

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At last look, there were seven major vendors of large system storage devices to the IBM world, seven significant terminal vendors, umpteen manufacturers of media and an untold number of intelligent workstation suppliers. Aside from IBM, Memorex is the only company with comprehensive offerings in all of the above arenas.

That starts to answer the question, "Why do business with Memorex?", but only just starts. A recent Dataquest symposium on what will make U.S. companies successful into the next decade concluded that more emphasis needs to be put on service and support. Companies must think of the customer first, was the consensus.

I don't call that news. As a customer, I doubt that you think of "customer-first" as a radical doctrine, either. But you're also part of a larger organization supplying a product or service and, in that role, are keenly aware of how challenging it is to be 100% customer driven.

It's a challenge that's very much on my mind, day in and day out.

When Memorex changed ownership this past December, the new manager
(continue on page 14)



The Memorex 6880 Solid State Storage Subsystem dramatically increases I/O throughput. See stories on pages 2 and 4.

This is the inaugural issue of *Let's Talk*, a quarterly newsletter for Memorex customers and friends. We've chosen a balanced format designed to share technical and semi-technical information, pertinent user applications and experiences, and a measure of Memorex news in each issue.

We will also be airing the views of well positioned industry analysts, trade and business publication editors and Memorex users. Our guest editorial series is kicked off by Paul Schindler, Senior Editor at *Information WEEK* who discusses the relationship between MIS and the trend towards corporate decentralization.

Ultimately, we want to see *Let's Talk* evolve into a user forum, where we address issues at your request. Your feedback isn't just welcome, it's crucial. So, let's talk. You can address your comments to the Editor directly, or through your Memorex representative.

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Improving System Performance Through Cache And SSD

Matching the Right Data to the Right Device

The simple days of storing data on punch cards and paper tape are gone. We all know that today's data storage choices are much more complex: magnetic tape (both reel-to-reel and cartridge) and single, double and now, triple capacity direct access storage. But that's not all.

As dramatically as storage technology has advanced, it has not kept pace with CPU developments, causing a widening performance gap between traditional storage devices and the central processor. This has led to such developments as disk cache and solid state disk—devices which provide the highest possible performance for (at least) the most important data used by the computer system.

Memorex has been marketing its 6880 Solid State Storage Subsystem since October of 1985 and its 3888-23 Disk Cache Controller since April of 1986.

Categorizing Data is First Step Toward Identifying Best Device
Choosing the device that will improve performance the most requires an in-depth look at the data on the system. Today's storage devices, and the data best suited for them, may vary from shop to shop, but the matching procedures addressed in this article stay the same.

In order to match data requirements to the best suited device (according to price, capacity and performance), the first step is to categorize all types of data. The following simplified categories are the most recognized in the DP industry, however, there is no limitation to the number of categories a shop can have.

- **Archival Data:** Usually kept on electronic file for limited access and processed infrequently. Typically stored on tape and accessed during batch operations.

- **Frequently Used Data:** Usually kept on-line in an active file for immediate access when required. Frequently used during peak periods. Users do not depend on sub-second response times to reach data. Most often placed on disk drives and accessed through an on-line terminal network.
- **High Performance Data:** Always kept in on-line files for instant access. High frequency of use by most on-line applications/users. Users depend on good service times and fast response times. Data may indirectly affect revenue. Always stored on disk drives, and is a strong candidate for disk cache and/or assistance from a solid state storage unit.

device or devices will support the data best. This is done by looking at the size of the data set, the locality of reference or read/hit ratio and the read/write ratio.

- **Size of Data:** If high performance data or critical data is larger than 2 Gbytes and cannot be separated, disk cache is most likely the best choice to improve performance levels at a reasonable price. A cache controller can give significant improvements to large amounts of data (up to 40 Gbytes).

If the same data is smaller than 2 Gbytes it can be placed on a solid state unit. In many cases, however, DP shops have found that using both devices together helps them achieve even better performance. The solid state unit takes on smaller, very critical data that may require frequent reads and writes, while the cache controller would be used for much larger data sets.

- **Locality of Reference (Read/Hit Ratio):** Locality of reference means that if a given piece of data is used, there is a high probability that a

“Many DP shops have found that using both devices achieves even better performance. Solid state disks take on smaller, very critical data that may require frequent reads and writes, while the cache controller would be used for much larger data sets.”

- **Critical Data:** Critical to the company's business. It is always kept on-line. Very high frequency of use by most, if not all, I/O operations in the computer system. Instant access is crucial. Users depend on superior service times and subsecond, consistent response times. Directly affects revenue. Always placed on multiple disk drives, disk cache and DASD combinations or on solid state storage units.

Where the Data Fits Best

Once the data has been categorized, the next step is to determine which

nearby piece will be used soon after.

Most cache controllers utilize a Least Recently Used (LRU) algorithm to ensure that only blocks of data that have been used recently are kept in the cache memory. Large areas of commonly accessed data must be available in cache in order to receive the best performance benefits. A good rule of thumb: When read requests are sent to cache, they must be satisfied by data in the cache at least 70% of the time.

As for the solid state unit, all performance data placed on it remains on the device (no LRU algorithm is



Memorex 3888-23 Disk Cache Storage Control Unit.

employed). A 100% hit ratio is realized on all requests.

• **Read/Write Ratio:** This ratio represents the number of read transactions requested compared to write transactions. With most cache controllers, write operations are completed with the same speed as with the attached drives. To receive added benefits, there must be more reads than writes. A minimum number of at least three reads to every write must be serviced by the cache in order to obtain increased performance.

With a solid state unit, the data residing on it is always there. Any read/write operation will be serviced at the same speed, providing consistent performance.

Cache and Solid State Improve Performance Together

MSA, a software development firm, uses both a 6880 solid state unit and a disk cache device. The firm wanted to reduce response times for some of its critical files as well as get quicker access to its highest used data.

Two files performed better on the 6880: RACF, a security system, and a data set that allows file sharing between multiple CPUs. These files were heavily used and critical to MSA's system performance. They were also under 2 Gbytes. Putting these files on the 6880 dramatically reduced response times.

The firm's high volume user data sets, such as software development data bases, were put on the disk cache device. The data was highly accessed and critical to MSA's business. Because of the large size of these files and a high hit ratio the cache unit was the best choice. MSA has been able to get much quicker access to its highest used data.

Improving system performance can be accomplished in a number of ways, yet data processing managers are increasingly turning toward cache and solid state units. Their speed of access and consistency are proving to be the right choice for storing highly used and critical data. For more information on how other DP shops have implemented solid state devices, see application articles in this issue and circle #1 on the reader service card.

Package Leasing As A Healthy Alternative

There are some stories that grow in the telling. Washington Hospital, owned and run by Maryland's Medlantic Health Care Group, knew Memorex as a vendor who would meet budgets and who could work quickly to deliver its products. That view hasn't changed, but it certainly has expanded.

Medlantic initially dealt with Memorex, in 1986, based on responsiveness, price and financing. More recently, the two companies tailored a multimillion dollar financial package that allowed Medlantic to get out of its old computer technology, and into the new IBM mainframe environment they wanted.

The package paid off the old technology, leased an IBM mainframe and provided Memorex peripherals to Medlantic using a single agreement, with terms and conditions that matched the special financial requirements of this major health care organization.

Says Mike Putro, Director of MIS at Washington Hospital, "We essentially gained a new shop, but without stretching ourselves any further financially. Memorex took us places we couldn't have gotten to on our own."

From a Single Step

In March of this year, well aware of Memorex's financing capabilities, Medlantic asked whether it could lease from Memorex a few thousand dollars worth of IBM equipment. Sure, was the answer, followed quickly by another Medlantic request to take out some older IBM gear. This led to an investigation of Medlantic's financial commitments by Memorex's Financial Services Group, and the beginnings of a dialog on the company's overall data processing needs.

Putro wanted to install an IBM 3090-150 processor, a major financial investment, but one deemed necessary for the proper conduct of Medlantic's business. But he also faced a tangled skein of third party leases and financial commitments with several hardware and software vendors.

WHEN TO USE DISK CACHE AND SOLID STATE DASD*

	DISK CACHE	SOLID STATE DASD
SIZE	Over 2 GB is best (can be smaller)	Under 2 GB only (may consider partitioning data)
READ/WRITE RATIO	At least 3 to 1	Does not matter
READ HIT RATIO	70% or more	Does not matter

*Example is simplified. Each data center varies and may not fit into example but may still find disk cache and/or SSD valuable.

"My objective," said Putro, "was to get the new equipment, plus get everyone paid off and place all our financing under one umbrella. I just wasn't sure if it could be done either neatly or quickly."

After a review of the objectives, and the budgeted resources, a financing plan that was both neat and quick evolved. Memorex first lined up for lease the IBM 3090-150, and then worked to extricate Medlantic from a variety of existing leases in the interest of consolidation. Thus, wrapped into a new umbrella lease agreement was hardware from Businessland, Four Phase, and Condor Financial Services plus a considerable amount of software. In addition, a number of penalties were paid off in order to unwrap various third party agreements that alone totaled over a million dollars.

The peripherals Medlantic needed to fill out the new shop ran the gamut of Memorex's offerings, including 6240 High Density DASD, a 6880 Solid State Storage Subsystem, tape drives and media, and 150 model 2179 Display Stations. All were wrapped into the package lease agreement.

As an aside, Memorex was also awarded the maintenance contract for the entire computer room, including the IBM equipment.

Says Putro, "We really improved the efficiencies of our operation and reduced our overall costs, with newer, lower maintenance products. Just as important, we now have the flexibility to address future needs through the contracts with Memorex."

"This is a story of team playing," he concludes. "Strong product people, strong financial people. I'd have burned a lot of time and effort doing this on my own, provided I had the time, which I didn't. This has been a very valuable association."

For more information on the range of Memorex's financial services, please circle #2 on the reader service card, or call 1-800-CALL-MRX.

Solid State Disk Provides Mutual Benefits

Leveraging the right equipment for the right purpose has been key to solving data processing problems at Minnesota Mutual Life Insurance Company. Based in St. Paul, this one hundred year old insurance firm was able to avoid a costly memory expansion of its CPU by installing a solid state storage subsystem.

After a test, which involved isolating page and swap data sets to disk drives, proved phenomenally successful but prohibitively expensive, the data was put on a solid state unit, a Memorex 6880. In one month's time, on-line system response times dropped 23 percent while the number of transactions increased 15 percent. Minnesota Mutual was able to keep costs down while improving service to its network users, even with an increased load.

Efficiency Critical To Closing Business
Minnesota Mutual is a one billion dollar, Fortune 500 insurance company. With nine million clients, it's the 15th largest in the country.

"We have over 700 users at our home office, accessing client records. We also have an online network of agencies in almost every state," says Joe Dawson, Production Services Manager at Minnesota Mutual's Information Systems Services (ISS). "The timeliness of processing our transactions is critical to all aspects of our business."

Minnesota Mutual uses an IBM CPU, an IBM 3081K. In addition to its agency network, the system supports some 200 TSO (time sharing) users, of which 90 to 120 are on the system at the same time doing interactive development work on applications programs.

But, in late 1985, the company experienced a sudden rise in the number of life insurance products offered and in the use of its computer system. ISS saw an increase in the number of TSO users, the volume of transactions and the number of concurrent TSO users.

"We had already recently gone through a CPU upgrade," Dawson said, "and we didn't want to do it again. We had to find a way to prolong the life of the CPU, yet sustain more users and a subsecond response time."

Getting More Work Done
Minnesota Mutual invited systems engineers from Memorex to present methods of achieving better performance. A solution discussed was to isolate page and swap data sets. Using a few IBM 3380 disk drives, ISS tested the Memorex suggestion and for the first time, TSO users got a consistent response time of .2 seconds rather than the .7 seconds they were used to.

"The test worked well, but we tied up \$.5 million in drives just for that test," Dawson said. "And as our data storage demand increased, we would lose the ability to isolate page and swap data and the response rates would increase again."

A more cost-effective answer was seen in Memorex's solid state disk storage device, the 6880. It also supports page and swap data sets much more efficiently than conventional disk drives with a faster access time—3 milliseconds versus 16 milliseconds with a 3380-class device.

"The result has been a much improved service time which allowed us to run our CPU busier, and to effectively get more work done."

Solid State Basics

The Memorex 6880 uses semiconductor memory technology in place of the spinning media and access arms of conventional disk drives. Consequently, the 6880 eliminates all mechanical delays associated with input/output processing time of disk, leading to better overall system utilization and productivity.

The solid state device can serve as temporary or permanent data storage.

It can handle more critical application and system files concurrently with page and swap data sets (see sidebar). Storage capacity is available in 32 megabyte increments, up to 128 MB per unit. A full subsystem consists of four units for a total of 512 MB. An expanded capacity feature extends storage to 2 GB. The data transfer rate is 3 MB per second on each of the four directors, giving a total aggregate transfer rate of 12 MB/second.

- The number of TSO transactions increased 15 percent during peak hours. The average response time for TSO short transactions dropped by 23 percent.
- During peak hours of the morning, the average response time for IMS transactions dropped nearly 40 percent. The maximum response time recorded dropped 70 percent.
- The average batch job turnaround



Joe Dawson (left) and Ellen Britz of Minnesota Mutual review performance data with Memorex SE, Chauncey Schwartz.

Choosing The Right Device

The selection procedure for Minnesota Mutual was simple. Since IBM did not offer a solid state device, Dawson's choices were narrowed. He already knew it was too expensive to use disk drives for paging and swapping. He could either increase the memory of the CPU or go with a solid state unit.

"A solid state disk drive always has a place in any well run shop," says Dawson. "The Memorex 6880 fit our needs. But what really made our decision was Memorex's outstanding support group. They came up with solutions to our processing problems even in cases where no Memorex sale was possible."

A 6880, with a storage capacity of 160 MB's was installed at Minnesota Mutual in July, 1986. The following month, ISS recorded dramatic improvements:

time was reduced by as much as 51 percent. The average number of jobs increased by 26 percent.

"Before we installed the 6880, our computer system could not handle any more work and still provide good service," says Dawson. "The cost of the unit was offset by avoiding the cost of additional main memory, and by reallocating the 3880 and 3380 equipment that had been previously used for the 6880's function. Memorex knew exactly what to do with the 6880 in our shop."

Solid State: Not Just For Paging And Swapping

Chilton Credit Corporation, one of the nation's largest credit reporting vendors, provides reports on a moment's notice to credit grantors in 39 states. But placing critical application files on the same mechanical drives as archival data was slowing it down. Chilton needed a sub-second response time on the reporting network and that dictated special handling for its frequently accessed, high performance data files.

Since Chilton determined that the credit reporting network was critical to the operation of its business, it needed to keep the data on-line to achieve the best possible performance. Its on-line users also needed frequent access to the data for read and write activities. Because of the frequent use and size of the files (under two gigabytes), Chilton chose to put the two performance files on a Memorex 6880 solid state storage device (terminal work file and message spool file).

By moving these crucial application files from rotating media to the 6880, Chilton immediately reduced task residency time for a given transaction by 40 percent. As an added bonus, the "customer service-conscious" organization saw improved stability and consistency in its terminal response-time to customers.

"In America, ergonomics has been given fad status by some companies, and ignored entirely in others. But, there is a pragmatic, dollars and cents reason why your company should take ergonomics seriously."

Economics Of Ergonomics

Ergonomics is a term heard quite often these days. But, what does it mean? The word comes from the Greek "Ergon" to work, and "Nomos" the law. Ergonomics then is the interface between work and law.

In Sweden, they've taken this translation literally. A law on their books states, "the working environment shall be adapted to human physical and psychological capabilities." That means the equipment and the work area must adapt to the human, not vice versa.

In America, ergonomics has been given fad status by some companies, and ignored entirely in others. But, there is a pragmatic, dollars and cents reason why your company should take ergonomics seriously.

To understand that reason, let's start with just a bit of theory, the Herzberg Two Factor Theory to be precise.

When you hire a person, they come to you with a built-in amount of productivity. To this given productivity, the Herzberg Theory says two types of work environment factors are applied ... motivation and hygiene (or health).

Motivational factors include such things as award, acknowledgement of a person's competence, and other "pats on the back" from management. These factors add to the person's built-in productivity.

The other factors that Herzberg calls "hygiene" are work detractors, they can only decrease a person's productivity. Herzberg hygiene factors include such things as delays, interruptions, equipment difficulties, noise, cramped work area, and other physical and psychological irritations.

When you think about it, it makes a

great deal of sense. People can not be productive during the time they spend overcoming handicaps created by their work environment or equipment.

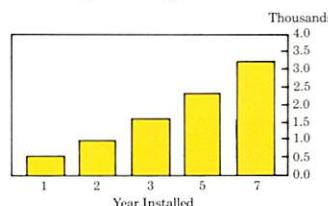
"The purpose of ergonomics is to prevent productivity erosion..."

The purpose of ergonomics is to prevent the productivity erosion caused by hygienic work detractors. We have found there are a number of small, but meaningful changes in equipment design and work area layout which can prevent the erosion of up to three percent of a person's annual productivity.

Three percent may not seem like much, but over time, even one percent of an individual's time can amount to hundreds of dollars to your company (see chart below).

Value Added Ergonomics

Man Year Cost: \$18,000
3% Productivity Savings



If we take the example of a display station operator who is paid a total of \$18,000 per year in salary and benefits, the cost of one percent of that operator's annual productivity is \$180. If the ergonomic design of the display were to prevent three percent of that person's annual productivity from hygiene factor erosion, the company would save \$540. Multiply that annual savings by the number of years the display will be in service, and savings due to ergonomics are substantial.

Tiredness, a Terminal Disease

In computer peripherals, the ergonomic design of display station keyboards, logic modules and monitors are critical, for they are what are used most by humans.

Operating a display station can be exhausting work. If you don't believe it, ask anyone in your organization who sits in front of a terminal for more than four hours a day. In all likelihood, they will tell you they experience one or more of these forms of terminal tiredness everyday:

- muscle ache
- eye strain
- tension head aches
- monotony
- chronic listlessness
- psychological stress

Obviously, the more of these ailments a person suffers, the less productive they will be.

But, as previously mentioned, preventative measures are fairly inexpensive and easy to apply. For example, the following chart lists some of the symptoms, causes and suggested ergonomic cures for terminal tiredness:

SYMPTOMS: HEAD ACHE, NECK ACHE, EYE IRRITATION PROBABLE CAUSES

- A. Characters displayed on the monitor may be too bright or character contrast may be too high or too low.
- B. There may be glare or reflections on the screen.
- C. Characters may be poorly designed, making them difficult to distinguish from one another and hard to read.

SUGGESTED CURES

- A. Adjust the display station screen brightness and contrast.
- B. Tilt or swivel the monitor to reduce or eliminate reflections on the screen and add a glare filter to the monitor if the unit does not have one built-in.
- C. If the characters are poorly designed, exchange the display for another that has better readability. Whenever possible, give operators who spend the most time working with display stations the most ergonomic units.

SYMPTOM: PHYSICAL DISCOMFORT PROBABLE CAUSES

- A. Poor work posture

B. Too much static work and not enough dynamic work

SUGGESTED CURES

A. Adopt the "90-degree work posture" to help improve blood circulation and reduce discomfort by positioning the monitor screen so the viewing angle is 20-degrees below horizontal as shown in the illustration.

B. Use system response delays as signals to do some "Micropause Isometrics and Stretching Exercises" and take time every day to do some form of dynamic exercise even if it's just a walk around the block or building.

SYMPTOMS: GENERAL IRRITABILITY, INABILITY TO CONCENTRATE

PROBABLE CAUSE

A. Too much noise

SUGGESTED CURES

A. If the work area is an open landscape design, or one which uses cubicles, select display stations with silent keys and adjustable volume alarms.

B. If your work area layout requires people to share space with a printer, try to select printers that operate at acceptable sound levels **without sound covers** (around 55 dB) then sound covers can be added if they are still needed.

Like it or not, Herzberg hygiene factors are real, and they can have an adverse effect on all of us. The next time you're at your desk and your neck aches or your eyes feel irritated ask yourself if poor ergonomics are causing the ailments. Better yet, take a moment to see if there are changes in the equipment you use or the layout of your office that can be made right now to remove or lessen hygienic work detractors in your environment.

Take a moment also to think about the display station operators in your company. When it comes time to purchase new displays, keep the Herzberg Two Factor Theory in mind, and look for ergonomic features which **prevent** productivity erosion.

In the meantime, if you would like more information about the economics of ergonomics, circle number 3 on the Reader Service Card.

Memorex Tries Harder At AVIS

If you want to know about walking shoes, ask a mail carrier. When you want to learn about the ergonomics of display terminals, ask an Avis reservation sales agent.

Avis' worldwide reservation center in Tulsa hasn't closed for a minute since the doors opened in 1975. Twenty-four hours a day, twenty-three shifts of agents handle twelve million calls a year. Their terminals are connected to The Wizard of Avis System. Each operator processes approximately 174 request calls on an average day.

Not surprisingly, Avis runs a well oiled reservations machine. Time is money and reservation sales agents place a premium on the performance of their equipment.

In mid-1986, Avis started replacing some older model terminals. In the interest of agent satisfaction, Avis asked its employees to compare terminals. Three brands of terminals—

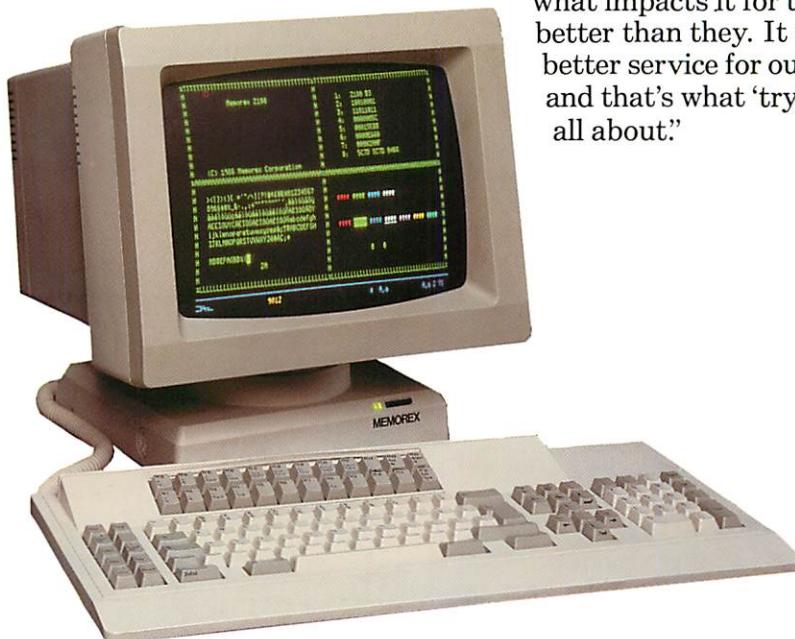
Memorex, IBM and Harris—were worked twenty-four hours a day for a month. Sixty-eight people spent time testing the brands.

The criteria were functionality and ergonomics—as they related to performance. In terms of functionality, Avis looked for different types of program keys, the ability to view multiple sessions and the ability to utilize expanded fields.

Ergonomically, the agents judged such attributes as the ability to control keyboard height more than two points, the clarity of the amber screens they tested, and the tilt and control of the tube itself.

Memorex's 2180C was judged the winner by the terminal "experts" who work the equipment. "In particular," said John Sellers, Director of Voice Operations and Reservation Training at Avis, "they preferred the clarity of the screen, the flexibility of the tilt and swivel and the touch (and quietness) of the keyboard."

Concluded Sellers, "We listened to our reservation sales agents when we made our purchase because no one's closer to the equipment, and no one understands their work environment, and what impacts it for the positive, better than they. It all adds up to better service for our customers, and that's what 'trying harder' is all about."



Memorex 2180-C Display Station.

Tape Meant To Take It

Not All Cartridge Tapes Are Created Equal, But How Do You Tell?

Here's a nightmare for you, and it may come sooner than you think. Data, so carefully backed up to 3480-type cartridge tape and entrusted to archives, is found to be inaccessible. A victim of tape deterioration.

Most managers take the offensive in preventing loss of information on tape through multiple backup and careful planning. Responsible vendors, such as Memorex, lend their support through products that stand up to the often surprisingly rough functions of tape handling, as well as the deterioration of time.

Still, cartridge tape quality is nothing to take for granted. It remains an everyday—and major—problem in any data center. And the issue is only going to become hotter as tape hardware technology moves forward.

Binder Stability

The recording surface of 3480-type tape consists of a thin film of chromium dioxide particles, bound to the tape's polyester base film by a chemical binder system. A stable binder system is critical to the integrity of your data. An unstable binder can eventually result in permanent data loss, within as little time as two years.

Here's the scenario. Chromium dioxide chemically attacks the soft polyester part of a tape binder, causing molecular weight degradation. When the molecular weight of the extractable binder falls below 25% of the original value (see chart), problems begin—a soft, sticky debris from the degraded binder forms on the tape surface, and deposits on various drive components, multiplying the probability of errors.

Licking The Deterioration Problem

Memorex has essentially eliminated the problem of binder deterioration on its 3480 cartridge product by the use of state-of-the-art "hard segment" binder components. These components

are highly resistant to unwanted chemical attack by chromium dioxide particles, thus insuring long term data integrity.

Says Fred Sischka, Memorex media development director, "Through the use of this new technology, Memorex products equal or exceed the IBM and industry standards for 3480-type cartridge life. Laboratory tests show that data integrity of the Memorex 3480 cartridge media should remain stable for ten years or beyond.

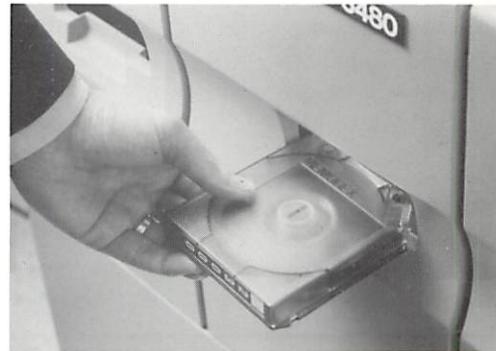
"Tapes with poor binder stability can fail in just one or two years," continues Sischka, "and should not be used for critical data or archive applications."

Staying Compatible—The Next Big Issue

Beyond the issue of deterioration is that of upward compatibility. By matching all IBM 3480 cartridge recommendations, Memorex insures compatibility with all future generation 3480-type equipment.

3480 technology may eventually evolve to more tracks (probably doubled from 18 to 36) and twice the present linear

density. Doubled linear density will require tapes to possess higher, more uniform electrical output. It will also dictate extremely tight control on error rates and defects. The fact is, smaller track widths and double linear density recordings can reduce tape signal strength by 50% or more—leading to increased sensitivity to errors.



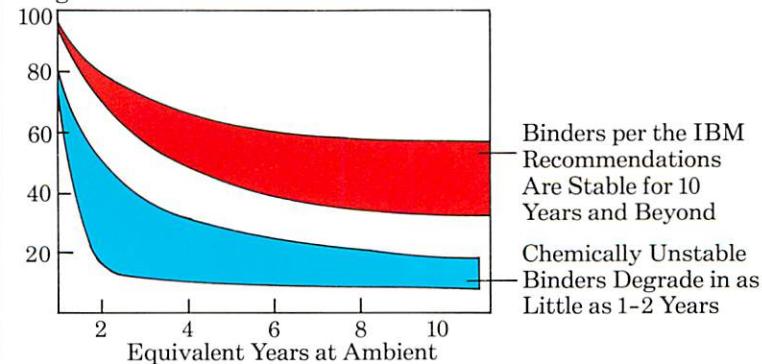
Memorex is the only plug-compatible vendor to supply both 3480-type cartridge tape and a cartridge tape drive—the Memorex 5480.

Tapes with low output, high error rates and poorly controlled physical characteristics (ie. poor slitting) will likely be incompatible with the future high density formats. Users of the higher density cartridge drives can avoid such problems by shunning tapes and drives not closely matched to the IBM and ANSI standards.

"As a responsive vendor," says Sischka, "Memorex is sparing no efforts to ensure it can supply reliable media products that are upwards compatible with future hardware generations."

Advantages of Memorex Binder System

Percent Molecular Weight Retained



3480 Binder System



Single Screen/Dual Sessions — The 2192-DS Provides A Unique-To-Memorex Solution

It's a problem for the ages, or at least for the eighties. You call your insurance company to check on a claim and the clerk you reach brings it up on his or her terminal screen. Then the gyrations begin.

In order to consult your policy, the clerk commences a series of keyboard clicks and shuffles, exiting one session, entering another, jumping back and forth between policy file and claim file with all the speed of a teenager asked to do lawnwork; and all the while, you drum your fingers in perfect counterpoint.

"There, I've got it now, sir." Terrific.

Why can't these sessions be displayed simultaneously, on the same screen, and why can't you easily cut and paste to transfer data between them, asked one of the world's largest insurance companies. Working with Memorex, the problem was uniquely solved, not just for insurers, but for banks, schools, airlines and any service business that shuffles documents, not on paper, but via computer.

Memorex has packaged its solution as the 2192-DS Display Station — "DS" standing for "Dual Screens." Two separate and complete screen host sessions, one "active," the other "suspended," can be displayed side-by-side on either a green, amber or white phosphor monitor, in up to three screen formats. A "zoom" feature allows you to bring a selected screen into full screen presentation as desired.

Cut and Paste

Not only does the Model DS provide split screen and zoom features, but it also lets you "cut and paste" data, so you can transfer fields of information between screens. Split screen mode features several special key assignments for controlling one or both sessions.

A typical application can be found in travel services, where an agent calls up credit information on one side of the screen, and then books a reserva-



Working with a leading insurance company, Memorex developed the pcm industry's only dual sessions capability—now marketed as the 2192-DS Display Station.

tion using a second, concurrently displayed session—fields containing name/address or credit limit information can be cut from the first session and pasted into the latter.

Hardware

The Memorex 2192 is a plug-compatible alternative to the IBM 3192. The DS Model is unique-to-Memorex in the IBM plug-compatible world. Like all 2192 models, the DS features extended highlighting and APL support, along with a screen printer port.

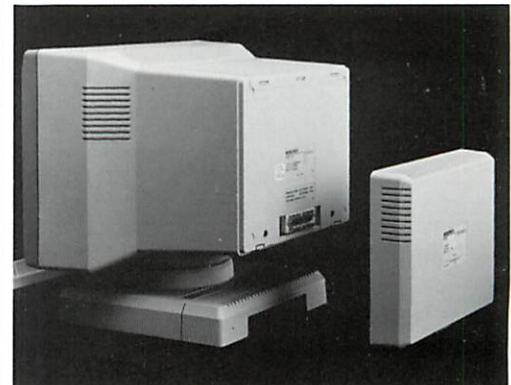
2192 Display Stations utilize logic "backpacks" for easy upgrades and servicing. Users no longer need to buy an entirely new terminal for added functionality—a Memorex 2180-1 or 2192-D, for example, can be upgraded to a 2192-DS through adding the logic, thus protecting the original investment.

For More Information

For more information on Memorex's dual sessions capability, circle #5 on the reader service card, or call 1-800-CALL-MRX.



The screen above is displaying an 80 column by 24 row application on the left and an 80 column by 43 application on the right.



The "back-pack" design of the MRX 2192 family provides easy upgrade capability.

MEMOREX NEWS PAGE

Memorex Enters Third Party Services Business

At our customers' request, and contending that a larger group of Data Processing users can benefit from the quality of Memorex maintenance services, Customer Engineering has entered the Third Party Service Business with an impressive start.

Third Party Maintenance (TPM) involves taking responsibility for hardware service from the manufacturer or supplier, and is a keenly contested business. However, Memorex believes that our existing world-wide service organization, particularly as it affects the U.S. market, asserts a unique competitive edge.

"Both we, and our customers will benefit from the present economies of scale," according to Robert P. Berry, Vice President of Customer Operations. "Our logistics, support, dispatch, and technical operations are already geared up to dealing with all service needs of users on a nationwide basis.

"We have a professional, trained, and very experienced group of over 440 personnel in the U.S. that include some of the most experienced personnel in the IBM sector of the business.

"Flexibility is our by-word, and gives us a distinct advantage over more rigid organizations.

"Initially, Memorex intends to sell our service capabilities for CPUs that Memorex products can be attached to, primarily IBM 43XX and System 3X. We have, however, signed agreements for over 40 other products, as well. Since Memorex started our entry into this business, we have seen a 100% growth rate every month.

"It is important to note that our service organization's number one objective is to provide a quality of service so good, that customers will buy Memorex equipment, not only because of the excellence of the product, but also because of the excellence of the service. Our entry into TPM has been undertaken to respond to customer demand and to extend Memorex's total market share.

"Our goal in TPM is to provide a professional, quality, cost effective service solution to users of data processing equipment, primarily in, but not limited to, the IBM market segment. In this effort," said Berry, "Memorex has entered a period of aggressive growth that will enable customers to leverage an existing, high quality service organization. We can truly add value to their total service decision."

For more information on Memorex third party maintenance, please circle #6 on the reader service card, or call 1-800-CALL-MRX.

Memorex In The System 3X World

With plans to rapidly grow its business in the IBM Systems 34/36/38 (3X) marketplace, Memorex is focusing very heavily on its newly formed Small Systems Group.

"The System 3X marketplace is a completely different environment," says Greg Grodhaus, vice president of the Small Systems Group. "The size of the customer, the CPU architecture, service and machine requirements are all very different from medium and large installations. Because of this difference we've established a separate group focusing entirely on meeting System 3X customer needs."

The Small Systems Group was formed in June, combining sales through distributors as well as a new direct sales force trained exclusively on 3X products. The group is adding 25 new products and services to its portfolio this year. Among the new products and services recently announced are CPU upgrades, add-in main memory, non-impact printers, intelligent workstations, new line printers and leasing of both Memorex and non-Memorex products. Memorex has begun offering equipment brokerage services to small systems users as well.

Notes Grodhaus, "No other company offers terminals, intelligent workstations, printers, main memory, CPU upgrades, tape and disk drives, supplies and third party financing and maintenance to 3X users."

For more information on Memorex's Small Systems Group, circle #7 on the reader service card, or call 1-800-CALL-MRX.



Memorex's new 7000 Series Personal Systems: mix and match monitors, keyboards, system units and options suit particular applications.

Memorex Launches New Series Of Personal Systems

Since the beginning of the year, Memorex has engaged in a major series of product introductions—well over 30 new products have been announced and are now shipping. Among the most significant is the recently announced 7000 Series Personal Systems, a family of personal computers that offers dozens of configurations molded to individual users' needs.

The various monitors, system units, keyboards and options of the 7000 Series allow users to "mix and match" features to suit particular applications, such as 3270 host communication and file transfer or expanded storage for complicated files. All features can be specified at time of order, or added on later.

The reason for the flexibility is simple. No single company has identical desktop processing needs across the board; personal computing needs are as varied as the types of jobs within a company. Memorex customers can now configure each system to each individual user's need, while enjoying the benefits of a single vendor.

The 7000 Series features three control unit types:

7088

Positioned as a "power terminal," the 7088 provides basic computing capabilities and is functionally 100% compatible with the IBM PC/XT. Standard features include two 8-bit expansion slots, a 5.25 inch peripherals bay (or two 3.25 inch bays) and an 8088 processor with switchable speeds of 4.77 and 10 MHz.

7188

For users requiring PC/XT capabilities with room for more expansion, the 7188 offers five 8-bit expansion slots, an additional 5.25 inch peripherals bay and an 8088 processor with switchable speeds of 4.77 and 8 MHz.

7186

Advanced processing needs are met with the 7186 unit, which provides full IBM PC/AT compatibility. With one additional 5.25-inch and one additional 3.5-inch peripheral bays, plus one 8-bit and four 16-bit expansion slots, the 7186 allows ample room for Memorex or off-the-shelf additions. The 80286 processor offers switchable speeds of 6 and 10 MHz.

Many features which may be optional on other systems are standard on Memorex 7000 units. Each 7000 system unit comes with 640 Kb random access memory; 5.25-inch, 360 Kb

diskette drive (1.2 Mb drive is an option on the 7186); integrated diskette controller; integrated video adapter; clock/calendar with battery backup, socket for numeric co-processor; and serial and parallel input/output ports.

Microsoft's MS-DOS operating system is included in each system unit.

Keyboard and Monitor Choices

The 7000 Series includes a choice of three monitors: high-resolution green, amber monochrome phosphor or EGA-compatible color.

Three types of keyboards are also available: an 84-key AT style, a 101-key enhanced model and a 122-key 3270 PC style.

3270 Communications

Memorex provides a variety of ways to communicate with an IBM 3270 host. The basis for communication is the 3270 Connection option, which allows connection to a Memorex or IBM cluster controller.

Beyond this are several options including 3270 MULTI Connection for 3270 PC emulation; 3270 PC GRAPHICS Connection for IBM 3279 S3G color graphics emulation; and 3270 FAST FILE Connection for file transfer between the host and the 7000 Series system (at speeds almost 10 times faster than IBM's Host File Transfer).

Other Options

The variety of configurations is further expanded through the range of 7000 Series options. A memory expansion board and upgrade kit permit users to enlarge the system unit's memory to a maximum of 1.5 Mb per board. Monochrome and enhanced color graphics adapters are also available.

Storage additions include 5.25-inch floppy diskette drives of 360 Kb or 1.2 Mb; 5.25-inch disk drives of 20 or 40 Mb, eight-bit or 16-bit fixed disk controller boards; and a 20 Mb fixed disk card.

And, yes, there's also an optional serial mouse.

The Symbiotic Relationship Between MIS And Mid-80's Style Decentralized Management

by Paul E. Schindler

(Schindler is a west coast-based senior editor of Information WEEK, the weekly news magazine for IS managers)

There are a number of fanciful theories as to why the dinosaurs disappeared. Perhaps mammals ate their eggs. Maybe a comet changed the climate. The explanation with most intuitive appeal, however, is the theory that dinosaurs vanished because of imbalanced evolution; to wit, their bodies grew too large for their brains. You just can't run a system the size of a city bus with a control room the size of a walnut.

This theory, combined with what I know about span of control, convinced me some time ago that the modern behemoth corporation had best stop scanning the skies for comets, and start looking to its own evolution—or else face becoming an organizational dinosaur.

In your basic large corporation, the combined momentum (or inertia) of thousands of people is so resistant to change that attempting to manage centrally is like trying to steer the QEII by firing a squirt gun off the stern. It may be satisfying, but it isn't effective.

Since I'm not the smartest person in the world, many others noticed this trend before I did. The result has been an accelerated rush towards decentralization in the 1980s. Skeptics believe this merely reflects another of those massive, soon-to-be-reversed pendulum swings which periodically sweeps U.S. management, leaving it open to charges of terminal trendiness. The innocents among us patiently note that, terminally trendy or not, U.S. managers run one of the best, most consistently successful economies in the world. We also see this swing

towards decentralization as fundamentally different.

Chicken or Egg?

The communications and transportation technologies of the first half of the century facilitated centralization, and gave it its infrastructure. You can't run the Very Large Corporation of America on a centralized basis without the phone, the car, the jet. Similarly, you can't run the decentralized corporations of the 80s without the management information systems and office automation which facilitate dispersed decision making and provide its infrastructure.

There is some question of which came first, the chicken or the egg? Was it MIS and OA that made the decentralized corporation possible, or was it modern decentralization that drove the demand for office information systems, departmental computers, and terminal-per-desk networking schemes? In either case, MIS/OA and decentralization are now intimately intertwined and neither can survive or grow without the other—a classic definition of symbiosis.

Recognition of what this symbiosis entails should, under able management, produce some healthy short and long term results. In the short term, managers planning corporate reorganization or IS strategy should recognize the need for balance between the decentralization of systems and the centralized nature of their corporation. Decentralized IS wreaks as much havoc in a centralized organization as centralized IS does in a decentralized company. The best way to avoid the fate of the dinosaurs (extinction) is to avoid duplicating their imbalanced evolution.

Balance works fine, conceptually, yet in the real world, who makes the first step? Walking in tandem sometimes proves impossible. MIS should lead, follow, or get out of the way of decen-

tralization, but it is impossible to provide generalized guidelines about which course is appropriate for a given organization. But it's something for MIS to consider seriously. And it's something for responsible vendors to ponder as well.

The longer term implications seem clearer. In the world of hardware, the dinosaur is the traditional mainframe. Who knows if it will vanish, or what will replace it, but its days of absolute domination are numbered. That's a difficult thing to write, but we all need to face facts and avoid rationalizations: in this era of mergers, buyouts and international competitiveness, corporate staffs will continue to shrink and with them the need for/ability to support large, centralized corporate IS.

Today's corporations are increasingly mindful of the need to push decision making responsibilities (and the attendant support systems) down the organizational ladder, "out into the field," "closer to the front lines." Some are even doing it. Sure, a few tasks will be performed less efficiently, but no one outside of a handful of fanatics will claim that mainframes perform every task efficiently today.

Taking The Lead

The most important thing about the symbiosis between MIS/OA and decentralization is to recognize it. Failure to see that the two intertwine will devastate MIS managers (and the corporations they serve) as surely as railroad managers self-destructed by failing to recognize their firms were transportation companies, not just railroads.

Decentralization involves dispersed authority, the execution of which requires dispersed information; thus, it cannot succeed without a strong MIS/OA infrastructure. Of the classic three choices, IS managers must lead, not wait to follow or to be told to get out of the way.

We know you couldn't care less about us.

Let's talk about the Memorex commitment to your complete customer satisfaction.

It could be that the only reason you're reading this ad is that your system is down.

And the last thing on your mind is a company called Memorex.

We know that.

And we'd like to change that.

So let's talk:

We know who you are. And we know your problems.

But who are we?

Well, aside from IBM, we're the only computer products company in the world to sell a full line of IBM-compatible computer products (everything from mass storage and communications equipment to System 3X peripherals, magnetic media and a host of other computer supplies).

But product selection is only the beginning of our commitment to you and your complete satisfaction.

For instance, we know that

in terms of service, when you're down, you're losing major dollars and probably a lot of sleep. So when you're down, we're up. Our response time for critical system components is 2 hours or less.

In fact, we take down time so seriously that many of our products, like the 3682 Disk Drives and 6880 Solid State Disk Drives are guaranteed to be up and running 100% of the time (Or the maintenance is free).

When it comes to parts availability, in nine out of ten cases that require a customer engineer to repair equipment (and we have over 2,000 of those talented people), the part is available in a nearby branch office. In 76 countries throughout the world. (The only continent we're not on is Antarctica.)

As for financing, let's just say we're extremely flexible and offer many innovative financing options. June 15 just may be a better day for you to make a payment than April 15th. We understand this.

Finally, we know that when you use us, on a scale of 1 to 10 you rate us an "8" on satisfaction with both our products and our service. That's good. But we're working on improving that figure.

We hope you're still listening. Because we'd like to talk some more.

Simply dial 1-800-CALL-MRX and let us know how we can help you.

As we said, we know you couldn't care less about us.

Which is our whole point. To know us is not to worry about us.

Let's talk.

1-800-CALL-MRX.

Advertising Campaign

Memorex began its first major advertising as a new company in the month of September with two page ads in Datamation, Computerworld, Decisions and Systems 3X World.

The new campaign theme is "Let's Talk," an invitation to customers and prospective customers to communicate with Memorex. Communication is easy by dialing a new 800 number put in place specifically to allow you to call us for more information about our products, plans or anything else you've wanted to know about Memorex.

The campaign grew out of a series of research groups we conducted last spring. You told us that you needed more information about Memorex, particularly our lines of business. You also said you wanted to do business with a company that not only provides the right product at the right time at the right price, but also provides significant value-added services. In other words, a company that would "own" any problem that might arise and follow through to ensure promises are kept.

"Let's Talk" communicates all the key messages you said you wanted to hear from Memorex and does it in a very provocative way that I'm sure you won't miss.

The first ad in the series says: "We know you couldn't care less about us." It's an admission that we need to work harder at letting you know who we are. Many customers don't know the breadth of our product line, or the international scope of our operations, or the quality and capability of our service commitment. These are things you need to know to get full value from your Memorex relationship.

Four subsequent ads will focus specifically on our product selection, service maintenance abilities, customer commitment, and the benefits that the Memorex Finance Corporation provides.

We think it is very important that you stay informed on the products and services you can expect from Memorex and learn how to get full value from us. That's the purpose of "Let's Talk," words that say let's communicate. Call our new 800 number: 800-CALL-MRX today and learn more about the Memorex commitment to your complete satisfaction.

When you're down, we're up.

Let's talk about Memorex's ability to be by your side in less than two hours.

It could be you have a recurring nightmare: your computer system goes down and stays down.

And all the while you're burning major dollars and the valuable goodwill of your customers.

We understand the horror. Down time is no time to count on another computer supplier to do the computer to come through for you with parts and service.

So let's talk. This is your nightmare we can answer. You will never come true.

But who are we? Well, aside from IBM, we're the only computer products company in the world to sell a full line of IBM-compatible computer products (everything from mass storage and communications equipment to Systems 3X per-

ipherals, magnetic media and a host of other computer supplies).

Yes, Memorex. We are the

single source alternative to IBM.

Our product selection and

service maintenance where

service is concerned.

That's the only way we can

operate.

And it's working. When you

use us, on a scale of 1 to 10

you rate us an "8" on satisfaction

with both our products and

service. That's good. But

we're working on improving

that figure.

One way we're improving is

the introduction of our new

M+ service, third party

maintenance where service

means action, not words.

There are many more ways

we can help you rest assured.

So let's talk more.

Simply dial 1-800-CALL-

MRX and let us show you the

products and services that makes

for pleasant dreams.

We'll be up and ready when you call.

Let's talk.

1-800-CALL-MRX.

MEMOREX

Let's Talk

(continue from page 1)

ment team (each of us Memorex sales and marketing veterans) positioned the company as a value-adding sales and service organization. It's what we've done best for over twenty-six years. I believe it's what you know us for.

Organizationally, we've reduced the levels of management between you, the customer, and our top decision makers. And we've put the day to day running of the company out into the field, where it can benefit you best—in terms of speed and responsiveness to your needs. (Our field people, your daily interface with Memorex, are recognized as our prime asset. That's how we want it.)

In short, we're playing to our strengths. Our differentiation from the pack depends on the value-adding services we perform for you, the visibility of those services, and on our outstanding price/performance.

We source and develop technologies and products from around the world, then package and bring them to you under one name, one purchase order, one set of guarantees. We have no vested interest in keeping technologies off the market—you want it, we'll find it, test it, service it.

We'll work with you, consulting and suggesting options, whether Memorex will make a sale or not. Then, we'll help you finance your decisions, regardless of who makes the equipment.

Finally, we'll get it to you quickly, in practically every country, and in every U.S. market. That goes for spares and repairs as well. And we'll maintain not just our own equipment, but virtually any piece of hardware in your computer room.

This is what we do for a living. That we do it well is why you should do business with Memorex.

This publication provides concrete examples of our sourcing, consulting, financing, delivery and maintenance capabilities. I can personally put you in contact with numerous other customers we've helped.

Likely we've performed similar services for you. I know we can do more. So, let's talk.



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