

REVIEWS

The DOS heavyweights go another round

IBM bolsters PC DOS features; MS-DOS gets data compression back with DriveSpace

BY JOHN M. GOODMAN, PH.D.
REVIEW BOARD

TESTED BY ANDREAS UITERWIJK
AND TIM ZITTE
TECHNICAL ANALYSTS

EDITED BY ELIZABETH EVA

In yet another round of the ongoing battle of one-upmanship in the DOS arena, behemoths IBM and Microsoft Corp. have recently updated their DOS offerings. In its MS-DOS, Version 6.22, Microsoft added a legally correct version of data compression and enhanced the operating system's safety features. Meanwhile, IBM has souped up PC DOS 6.3 with new features and made its memory optimizer capable of sensing multiple configurations.

In our January 24 comparison of IBM's PC DOS 6.1 and Microsoft's MS-DOS 6.2 (see "DOS vs. DOS two variations on the theme," page 59) we concluded that, although 6.1 was not completely compatible in some minor ways with Microsoft's standard for DOS, overall it was the better product. IBM's DOS won its extra points for on-the-fly data compression, backup, antivirus, setup, and support policies. In a more recent review, we looked at Novell Inc.'s DOS 7 and scored it below both Microsoft and IBM. (See "Novell ups the ante for DOS functionality," May 2, page 107).

A REVOLVING DOOR. In February of this year, Microsoft lost its patent-infringement legal battle with Stac Electronics Inc., the maker of Stacker data compression software. The jury decided that a small but crucial part of Microsoft's on-

the-fly data compression scheme was an impermissible infringement of Stac's patents. This forced Microsoft to modify MS-DOS. In fact, Microsoft released MS-DOS 6.21 on the day the jury returned its verdict.

MS-DOS 6.21 was identical to MS-DOS 6.2, minus the patent-infringing portions — specifically, DoubleSpace was no longer a part of the product. However, those who used 6.21 to upgrade a 6.0 system (which also included the disk compression utility), still had DoubleSpace. The court decision let anyone who already owned DoubleSpace continue to use it; Microsoft just couldn't continue to sell that technology.

A less publicized change to MS-DOS 6.21 removed compression code in both the DOS and Windows versions of Microsoft's backup program. So 6.21's versions of MSBACKUP and MIBACKUP could no longer create or read compressed backups. If Microsoft had followed its usual practice in upgrading DOS files, no 6.21 user would be able to restore any backups made with DOS 6.0 or 6.2.

To circumvent that problem, Microsoft instructed its setup program for 6.21 to let the user opt to not replace either of those files if they were already present on the user's disk. Thus, if you upgraded from a version of DOS prior to 6.0, you would not get the capability to create or access compressed backups; if you had previously owned MS-DOS 6.0 or 6.2, then you could.

In June, Microsoft released MS-DOS 6.22, replacing its disk compression utility, DoubleSpace, with DriveSpace. The new name means that all third-party utilities that work with DoubleSpace must

also be made compatible with DriveSpace. (Both Symantec Corp., maker of Norton Utilities, and Central Point Software Inc., maker of PC Tools, are working on DriveSpace upgrades.) In addition, the company modified ScanDisk, its disk analysis and repair utility, to make the process of upgrading from PC DOS 6.x a tad safer.

Microsoft does not expect users of MS-DOS 6.2 to upgrade to 6.22. The company provides a StepUp package for users of MS-DOS 6.0 or later and an upgrade package designed for people with previous versions of MS-DOS, or with another brand of DOS.

The new versions of MSBACKUP and MIBACKUP in MS-DOS 6.22 can once again read and write compressed backups. However, DOS 6.22 users who did not previously own DOS 6.0 or 6.2 can create and read backups only in the new compressed format. So that you are not left completely high and dry, Microsoft offers a conversion disk (or you can download a file from Microsoft's BBS) that allows Version 6.22 users to read (but not write) backups created by DOS 6.0 or 6.2.

IBM KEEPS ONE STEP AHEAD. In April IBM introduced PC DOS 6.3. In this version IBM made several important improvements to an already impressive product. Many changes included the addition of small yet valuable features introduced by Microsoft in MS-DOS 6.2: commas in large numbers; file overwrite protection for COPY, XCOPY, and MOVE; interactive batch-file processing; and enabling MOUSE.COM to load itself into upper memory automatically. Other additions were no-swap DISKCOPY, changes

to FORMAT to enhance data safety, enabling SMARTDRV to cache CD-ROMs, and augmenting clean and interactive boot procedures to let users suppress data compression. PC DOS 6.3 now includes MSCDEX for CD-ROM support, and IBM has significantly enhanced the system's editor, backup, and antivirus programs.

The most noteworthy improvements in PC DOS 6.3 are its changes in the RAM-Boost and RAMSetup memory management programs. These two applications now support multiple configurations on a single machine — something MS-DOS' MemMaker cannot do.

WHICH DOS IS BEST? The truth is that either version of DOS is the better choice for some people. Microsoft's DOS is guaranteed to be the most compatible choice. You also don't have to contend with a new editor (or an editor other than that provided with DOS). Keep in mind that new PCs equipped with MS-DOS will come with Version 6.22, and that a mix of Versions 6.2, 6.21, and 6.22 presents some special interoperability problems.

On the other hand, the utility programs included with PC DOS 6.3, as a whole, clearly surpass those that Microsoft bundles with MS-DOS 6.22. If you are willing to learn how to use them, you may prefer IBM's offering.

John M. Goodman is the author of Hard Disk Secrets (IDG Books) and Memory Management for All of Us, Deluxe Edition (Sams), and was the lead author of DOS 6.0 Power Tools (Random House). He has been teaching about microcomputers for the past 17 years.

MS-DOS Version 6.22

Since its first release of DOS in 1981, Microsoft has set the standard for an IBM-compatible PC operating system. DOS 6.0 raised that standard by incorporating a plethora of utilities, and Version 6.2 remedied some problems that plagued 6.0. Microsoft intends to maintain DOS 6.22 as the current version until next year's release of Chicago.

FEATURES:

The few changes that Microsoft implemented in DOS 6.22 have some profound consequences. As we mentioned in the introduction to this head-to-head review, Microsoft was compelled to alter its compression format from DoubleSpace to DriveSpace, modifying the files from DBLSPACE.* to DRVSPACE.* accordingly. New versions of MSBACKUP and MIBACKUP also reflect these changes.

In addition, Microsoft enhanced ScanDisk in a way that should lessen the risk of data damage or loss when

you are moving compressed volume files (CVFs) between PC DOS and MS-DOS. If ScanDisk finds a CVF that looks incompatible, it will warn the user that the CVF may have been created by a compression scheme other than DoubleSpace or DriveSpace.

Microsoft also improved MS-DOS 6.22's boot capabilities, making it possible to start up any 6.x system that has a compressed disk, whether it's compressed with DoubleSpace, DriveSpace, or PC DOS' SuperStor/DS. This means you can use MS-DOS 6.22 to start up a system that was originally running MS-DOS 6.x or PC DOS 6.x.

MS-DOS' protection against user errors and other disasters is impressive, and the Setup program is particularly robust — the system can even recover gracefully from a power outage during an upgrade, without losing data.

When you upgrade to MS-DOS 6.22, by default Setup installs SMARTDRV with delayed-write caching turned off (unless you previously had delayed-write caching turned on). Be aware, however, that an MS-DOS 6.0 system

See MS-DOS, page 88

PC DOS Version 6.3

With PC DOS 6.1, IBM did a nice job making its DOS operating system a highly compatible and, in some important ways, better alternative to Microsoft Corp.'s MS-DOS. PC DOS, Version 6.3 carries the system further with improved compatibility and additional features.

FEATURES:

With Version 6.3, PC DOS' features are back in step with those of MS-DOS. In a few areas, however, the products still diverge significantly. IBM provides an enhanced version of its editor, E, but it will take some learning for users accustomed to the Microsoft Edit program. IBM bundled a set of utility programs with PC DOS 6.3 that perform the same tasks (backup, undelete, and antivirus) as those in MS-DOS, but the IBM-provided utilities deliver notably greater capabilities.

PC DOS includes the full-screen version of an undelete utility (which IBM licensed from Central Point Software

Inc.) for DOS and Windows; MS-DOS 6.2 has only the command-line portion of the same Central Point DOS utility. This undelete program provides five different methods for tracking deleted files. PC-DOS offers three undelete tools: DOS directory entry and file allocation table [FAT] information, delete tracking, and delete sentry.

One particularly nice addition is the file viewing capability in both the Windows and the DOS portions of PC DOS' undelete program. This feature lets you see the file contents you are about to undelete so you can ensure you're recalling the right file.

These viewers are also available in PC DOS' backup facility.

IBM equips PC DOS with the complete version of Central Point Backup, which includes the Central Point Scheduler, a tool that lets you schedule unattended backups of your files to a tape drive, network volume, or large removable drive. PC DOS 6.3 includes support for PCMCIA cards and pen-aware applications, both of which are still missing in MS-DOS 6.22. Although

See PC DOS, page 90

Version 6.22

has delayed-write caching turned on if its SMARTDRV does not have command-line parameters. Also be sure to inspect your system settings after the upgrade to verify that you have the desired configuration.

Delayed-write caching will dramatically speed up your system, but it does so at some risk to your data. In particular, you must never press the reset button or power down your computer without first waiting for SMARTDRV to flush its buffers. Normally, if you exit all programs, SMARTDRV will flush its buffers before returning the DOS prompt. If you shell out of a DOS application, however, you can get what appears to be a normal prompt before those buffers have been flushed.

PERFORMANCE:

Speed: Neither IBM nor Microsoft changed its kernel code significantly in the latest upgrades. We therefore did not

expect, nor we did see, any significant differences in speed. MS-DOS 6.22 achieved a SYSmarkWIN93 rate of 165.24, almost identical to that of PC DOS 6.3 (164.98).

When we ran our benchmark test on a drive compressed with DriveSpace, the SYSmarkWIN93 rate fell to 148.78, registering a drop in speed of about 10 percent. Again, MS-DOS 6.22's results were less than 1 percent faster than those of PC DOS 6.3.

We rate speed excellent.

Compression: The good news is that DriveSpace appears to work about as well as DoubleSpace. It runs as fast as DoubleSpace, and in some cases even faster, and it will compress your files to the same degree as DoubleSpace (though not quite as well as PC DOS' SuperStor/DS and certainly not as well as the industry leader, Stac Electronics Inc.'s Stacker).

The bad news is that DriveSpace is not the same program as DoubleSpace. That means more complexity, especially for a support staff that has to work with a

mixed environment. If some of your machines run MS-DOS 6.0 or 6.2 and others run 6.22, you must be prepared to encounter some difficulties when exchanging data on compressed floppies or via backups.

Our testing did not reveal any problems with using CVFs created under DOS Versions 6.0, 6.1, 6.2, or 6.3 on a system started up with MS-DOS 6.22 and DriveSpace. Our past experience, however, suggests that you should remain vigilant if you choose to support a mixed environment. You will probably be safer converting the foreign CVFs to the new DriveSpace format. (Remember also to make and verify backups of all your files before changing DOS versions. These might save you if something goes amiss in the upgrade and conversion process.)

In Version 6.2, Microsoft introduced DoubleGuard, a portion of its compression program that, when enabled, will watch for damage to either the compression engine or the data in its buffers. The DoubleGuard protection impedes performance slightly, but you may find the added peace of mind worth it. In addition, DriveSpace will force ScanDisk, MS-DOS' disk analysis and repair utility, to run on any volume you plan to compress. This includes performing the surface test, which is optional when you run ScanDisk from the command line. This step takes a significant amount of time, but it will save you from untold grief if it finds and locks out any unreadable clusters.

MS-DOS 6.22's compression ratios were lower than those of PC DOS 6.3 by a slim margin. The two systems compressed our hard drive at about the same rate. MS-DOS 6.22's improved performance over that of 6.2 raises its compression score from good to very good.

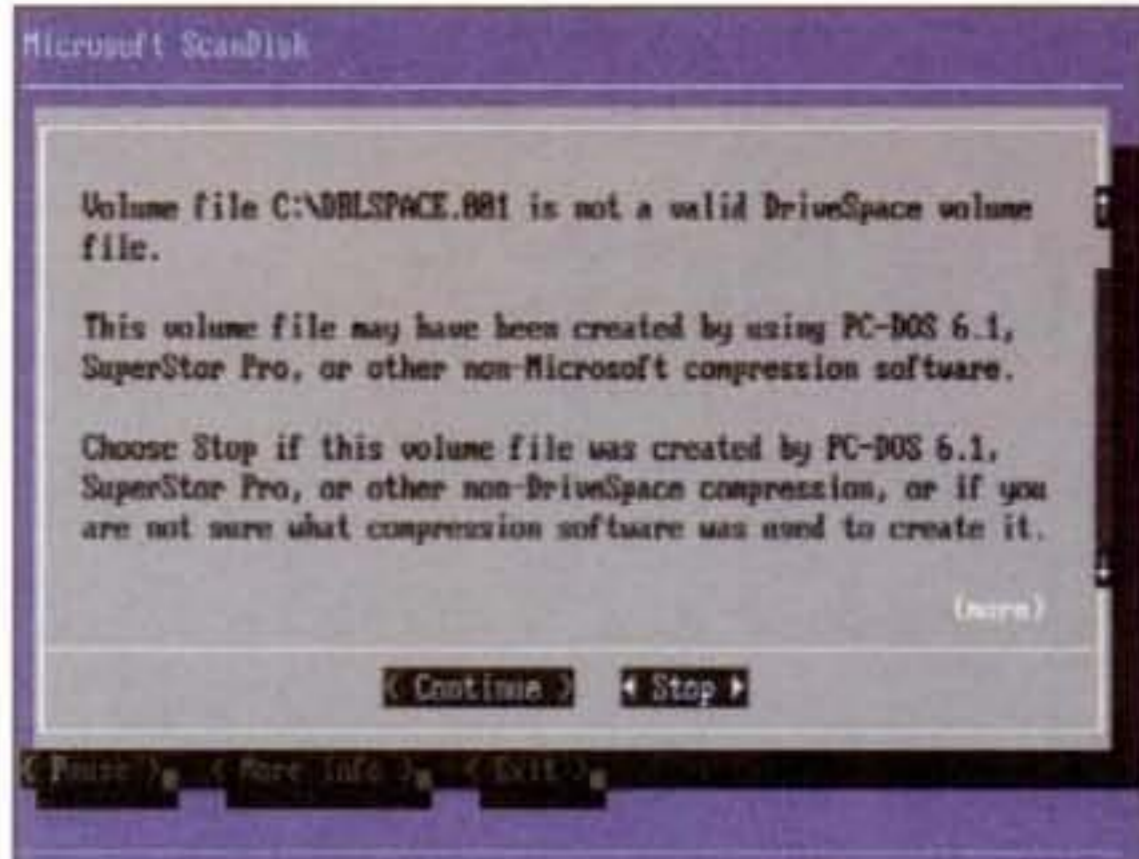
Memory management: Memory management in MS-DOS 6.22 is essentially the same as in Version 6.2. In our earlier review, we found it to be a capable solution, offering acceptable memory management options. MS-DOS' memory optimizer, MemMaker, however, did not perform as well as similar products, including PC DOS 6.x's **RAMBoost**. Our tests for this review confirm this. In addition, MemMaker has fallen farther behind the ever-moving industry standard because it cannot optimize multiple CONFIG.SYS and AUTOEXEC.BAT configurations on the same machine.

If you have both PC DOS 6.1 or 6.2 and MS-DOS 6.22 installed, you can use IBM's **RAMBoost** with MS-DOS' HIMEM.SYS and EMM386.EXE. But you cannot use MemMaker at the same time.

Memory management drops from a score of very good to good.

Backup: Other than removing support for DoubleSpace-style compression in the transition from Version 6.2 to 6.21, and then inserting the alternative DriveSpace-style compression in Version 6.22, Microsoft has not modified MS-DOS 6.2x's backup programs for DOS and Windows.

MS-DOS supplies stripped-down versions of Symantec Corp.'s Norton Back-



MS-DOS 6.22's SCANDISK utility takes a cautious approach to checking files created with PC DOS 6.1 or 6.3.

up programs. MSBACKUP can back up only DOS volumes (which can be floppy disks, removable Bernoulli or SyQuest cartridges, or another hard disk). There is no provision for backing up to a tape drive.

We did like the fact that if you select a removable hard disk as the target destination, MSBACKUP will put each full backup into a different subdirectory, so you can use the same target disk for more than one full backup.

MSBACKUP is a fine basic utility, but it cannot equal the range of features found in PC DOS' backup facility. We rate backup good.

Antivirus: Microsoft made no significant changes to its antivirus products in MS-DOS 6.22. The tools, though workable, perform more slowly and offer fewer features than those included with PC DOS 6.3. In addition, even if you select the "install antivirus tools" option in Setup for MS-DOS 6.22, you are not automatically protected; you have to manually turn virus protection on.

MS-DOS 6.22's TSR antivirus tool is quite a bit larger than that included with PC DOS 6.3, requiring more than 40K of memory. (If you have EMS memory, the tool can load all but 7K in EMS; it can also load its buffers in XMS.) This may tempt an MS-DOS user (more than a PC DOS user) to forgo that protection in order to reclaim memory.

We did not retest the antivirus tools for this review. Based on our earlier tests of essentially the same program, it merits a score of good.

Compatibility: By its very ubiquity, Microsoft's MS-DOS, page 92

REPORT CARD

INFO
WORLD

Single-tasking operating systems



(Weightings)		MS-DOS Version 6.22		PC DOS Version 6.3		Novell DOS 7*	
Performance		-					
Speed	(125)	Excellent	(125.00)	Excellent	(125.00)	Good	(78.12)
Compression	(125)	Very Good	(93.75)	Very Good	(93.75)	Very Good	(93.75)
Memory management	(100)	Good	(62.50)	Excellent	(100.00)	Satisfactory	(50.00)
Backup	(75)	Good	(46.87)	Very Good	(56.25)	Good	(46.87)
Antivirus	(50)	Good	(31.25)	Very Good	(37.50)	Poor	(12.50)
Compatibility	(100)	Excellent	(100.00)	Excellent	(100.00)	Good	(62.50)
Ease of use	(75)	Excellent	(75.00)	Very Good	(56.25)	Very Good	(56.25)
Setup	(50)	Very Good	(37.50)	Very Good	(37.50)	Very Good	(37.50)
Documentation	(75)	Very Good	(56.25)	Very Good	(56.25)	Excellent	(75.00)
Support							
Support policies	(75)	Good	(46.87)	Excellent	(75.00)	Good	(46.87)
Technical support	(50)	Excellent	(50.00)	Excellent	(50.00)	Poor	(12.50)
Value	(100)	Excellent	(100.00)	Excellent	(100.00)	Good	(62.50)
Final score		8.2		8.8		6.3	

*Reviewed May 2, page 107.

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parenthesis) of each criterion by its rating, where:

Excellent = 1.0 - Outstanding in all areas.

Very Good = 0.75 - Meets all essential criteria and offers significant advantages.

Good = 0.625 - Meets essential criteria and includes some special features.

Satisfactory = 0.5 - Meets essential criteria.

Poor = 0.25 - Falls short in essential areas.

Unacceptable or N/A = 0.0 - Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little.

Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

Products receive InfoWorld Buyers Assurance Seals if they meet the following conditions: Software vendors must offer 60-day money-back guarantees on the products, and hardware vendors must offer a



one-year repair or replacement warranty.

No product is eligible that receives a score lower than Satisfactory in any of our Report Card categories. Vendors who qualify have signed contracts with

InfoWorld that detail these support policies. (InfoWorld does not charge for the Buyers Assurance Seal.) We award the Recommended Seal to products that, in addition to the above criteria, receive a final score of 8.0 or higher.

PRODUCT SUMMARY

MS-DOS

VERSION 6.22

Company: Microsoft Corp., in Redmond,

Wash., can be reached at (800) 426-9400.

List price: \$40 to \$50 estimated street price for upgrade package; \$9.95 for StepUp.

Requirements: Intel 8086 or higher compatible computer; 512K of RAM; 5MB of hard disk space; MS-DOS 2.11 or later, PC DOS, Novell DOS, or OS/2; mouse optional. StepUp disks require MS-DOS 6.0 or later.

Pros: Full compatibility with DOS standard; easy to use; fine on-line documentation; safety feature for compression.

Cons: Bundled utility programs are limited in scope and sparsely documented.

Summary: The safe choice for anyone who wants an up-to-date version of DOS.

Throw your



Windows

Break down the walls around your Windows.[™] OS/2[®] for Windows rises above the limitations of DOS, Program Manager and File Manager, unlatching a higher level of power and performance.

Add OS/2 for Windows to your current Windows 3.1 setup. Now you can multitask DOS and Windows programs with more speed and reliability than ever before. Print

out a WordPerfect[®] document while you download files from CompuServe,[™] without fear of the dreaded General Protection Fault. Watch your multimedia programs really sing—and dance—with incredible audio/video synch. Right from Windows, launch into 32-bit OS/2 programs that take advantage of the full power of your PC. Or break free from the confines of Windows. The object-oriented OS/2 Workplace Shell[™] interface brings “drag and drop” ease to file and print management, customization and more.

wide open.

See your local software dealer to take advantage of special offers for OS/2 for Windows and Lotus Smart Suite[®] for OS/2. If you use Windows, this is one window of opportunity that's wide open.

Operate at a higher level.[™]

HOW OS/2 AIRS OUT YOUR WINDOWS:

Brings your PC up to speed: exploit the 32-bit power and performance of 386SX processors—and beyond.

Increases your productivity: run more than one program at a time with greater reliability.

Gives you more programs to choose from: run DOS, Windows and OS/2 programs.

Saves you money: no need to buy various utilities to improve Windows performance.

PC DOS / from page 87

Version 6.3

PC DOS 6.3 doesn't support Microsoft's Basic language, it does retain the DOSSHELL and EDLIN editor from DOS 5.0 (both of which Microsoft omitted from recent versions of MS-DOS). Finally, IBM dropped the Microsoft diagnostic program, MSD, replacing it with its own QCONFIG. This program does much the same job as MSD, minus the full-screen interface.

PERFORMANCE:

Speed: Like Microsoft, IBM didn't change the kernel code significantly in its latest upgrades. And as with MS-DOS, we didn't see any significant differences in speed. When we ran our SYSmark/Win93 test on an uncompressed disk, PC DOS 6.3 posted a rate of 164.98, less than 1 percent slower than MS-DOS 6.22's rate of 165.24.

On the same machine with a compressed drive, PC DOS 6.3's 142.00 rate was also less than 1 percent slower than MS-DOS 6.22's rate, which stood at 148.78.

Overall, PC DOS 6.3 ran 14 percent slower on a compressed drive. We rate speed excellent.

Compression: Although IBM plans to include Stac Electronic Inc.'s Stacker compression software in future versions of PC DOS, Version 6.3 offers only Addstor Inc.'s less capable SuperStor/DS compression utility. We were also disappointed to find that IBM still relegates its compression documentation to a separate manual.

To enhance the safety of your data, Version 6.3 of PC DOS uses its FORMAT program to lock out bad clusters on a newly formatted disk. However, IBM doesn't provide a disk surface test utility comparable to MS-DOS' ScanDisk program. PC DOS' RTools can test and repair compressed volumes, but the user must find another product, such as Gibson Research Corp.'s SpinRite, to test the host volume and any other uncompressed volumes.

Like Version 6.1, PC DOS 6.3 can mount and use compressed volume files (CVFs) created by MS-DOS 6.x, but only those created with DoubleSpace, not DriveSpace. This is not surprising, given that PC DOS 6.3 and MS-DOS 6.22 were released at about the same time.

In our previous review we noted that a CVF created by PC DOS 6.1 can be dam-

aged by Microsoft's ScanDisk utility if the volume is mounted with MS-DOS 6.2. (This does not apply to compressed floppy diskettes if you mount their CVFs using the Universal Data Exchange [UDE] program provided in PC DOS.) Fortunately, ScanDisk issues a warning before doing something that could damage a CVF created by either PC DOS 6.1 or 6.3.

The preview function in SuperStor is still very nice. This feature allows you to estimate the possible compression for a full disk in about one-tenth the time it takes to do the actual compression. This helps you choose the anticipated compression ratio when creating a CVF, as well as decide whether compressing a disk is worthwhile.

PC DOS 6.3's compression performance is unchanged from that of 6.1. In comparison to MS-DOS 6.22, PC DOS' compression ratios are just a few percent better; its speed is approximately the same. We rate this category very good.

Memory management: Like 6.1, PC DOS 6.3 includes the same two memory managers as MS-DOS 6.x: HIMEM.SYS and EMM386.EXE. IBM has modified them in several ways, though, and supplements them with its own memory optimizer, RAMBOOST (licensed from Central Point Software).

The most significant change in PC DOS' memory management is that the RAMSETUP and RAMBOOST programs now support multiple configurations on the same machine. This means you can put menus in your CONFIG.SYS file and have corresponding branching paths through your AUTOEXEC.BAT file, and still automatically optimize memory usage. To enable this support you must run RAMSETUP once for each named configuration you have in your CONFIG.SYS menus. This builds a special copy of the data file RAMBOOST.INI for each named configuration.

From there on, each time you start up your system RAMBOOST will check to see if you have modified the system files for that configuration. If you have, it will re-optimize the location of device drivers and TSR programs in upper and lower memory for that configuration. When you restart to an unchanged configuration, RAMBOOST simply loads the resident programs in the places it previously selected. By default, RAMBOOST will attempt to include all TSRs and device drivers in its optimizations. You can manually edit the various .INI files it creates to exclude unwanted files.

In our testing, RAMSETUP and RAM-

BOOST usually found more upper memory for programs to use than did MS-DOS' MemMaker. RAM BOOST was equally good at filling the memory it found. On the other hand, it doesn't automatically provide space in upper memory for Windows translation buffers, as MemMaker does. PC DOS also lacks the capabilities to undo the most recent optimization and to automatically detect an interrupted memory optimization.

RAMBOOST is able to move the data tables for file control blocks (FCBs), STACKS, BUFFERS, and LASTDRIVE into upper memory. Only the system file table remains in lower memory (and a portion of that will be in the High Memory Area [HMA] if you specify DOS=HIGH). RAM BOOST does not, however, allow DOS to manage upper memory; it relies solely on HIMEM.SYS. In Version 6.3, you no longer need to load the DOSUMB.COM TSR program if you want to use the DOS=UMB directive in your CONFIG.SYS file; the system now does this by default.

RAMBOOST can also work with other memory managers, such as Quarterdeck Office Systems Inc.'s QEMM or Qualitas Inc.'s 386Max, and supply its automatic reoptimization. In addition, SETVER in PC DOS 6.3 is able to load itself completely in the HMA, so it consumes no upper or lower memory. This only saves about three-quarters of a kilobyte of memory, but even that can sometimes be a critical amount. Unique to PC DOS is the capability to create Upper Memory Blocks (UMBs) for programs in PCs with 8088 or 80286 processors. PC DOS can do this by using either EMS memory or unused RAM on a second video card.

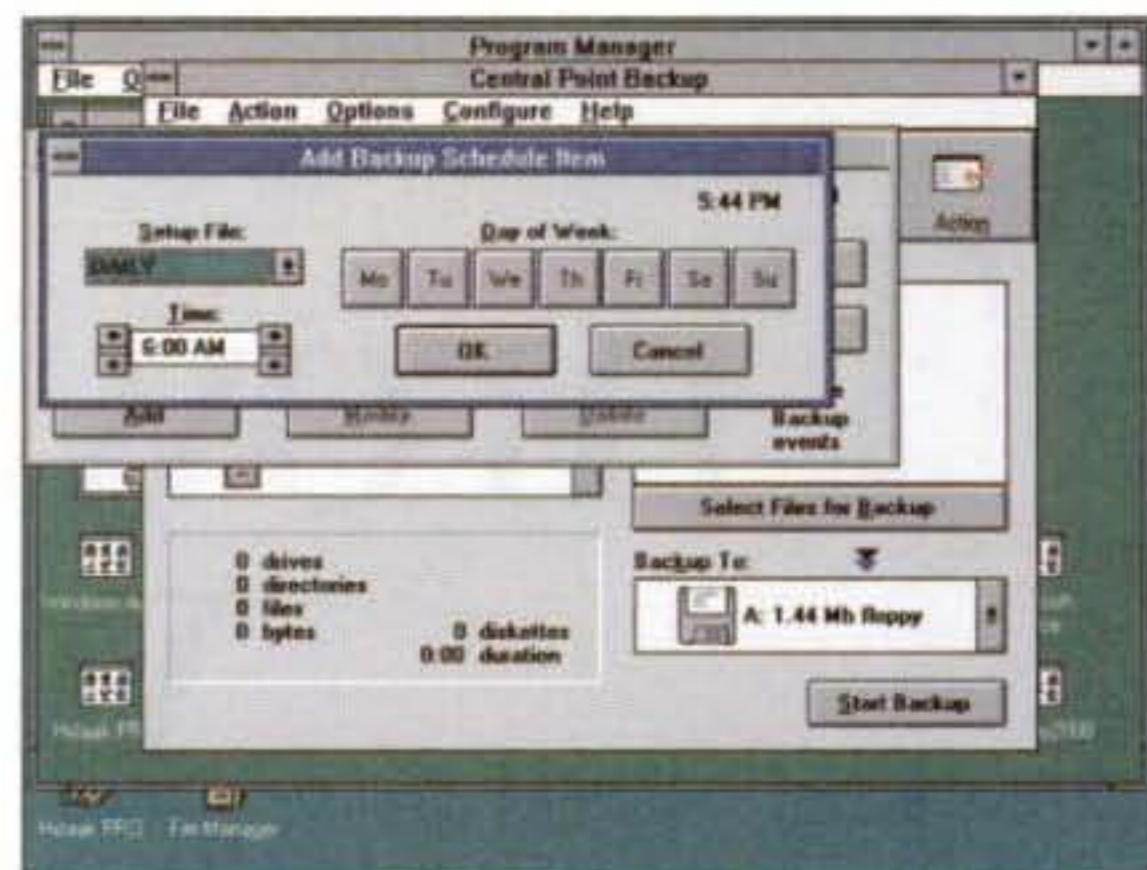
We were impressed with PC DOS 6.3's facility for memory management, especially due to its new multiconfiguration support. We raise memory management from a score of very good for Version 6.1 to excellent for 6.3.

Backup: IBM still bundles Central Point Backup (CPBACKUP) for both DOS and Windows with PC DOS 6.3, incorporating updates equivalent to those Central Point has implemented in the commercial version since the release of PC DOS 6.1. The backup programs offer a full-screen interface for both DOS and Windows, as well as a rich assortment of command-line parameters for use from within batch files.

We like the file viewers available in the Windows interactive mode. These let you view the contents of files so you can make sure you have the right files. We were particularly impressed that this utility can display CorelDraw .CDR files.

CPBACKUP can back up to any DOS logical volume or path name, or to any of nearly 100 models of tape drives. PC DOS supplies the usual assortment of tools for selecting and excluding files for backup, as well as the capability to save named setups for later use. Unlike MS-DOS 6.22, PC DOS' CPBACKUP can run unattended backups at prescheduled times, using the CPSCHED and SCHEDULE programs.

If you're using your PC at the time that



PC DOS' flexible backup utility comes from Central Point and includes a Windows interface and a scheduling feature.

a scheduled event is to occur, Scheduler will interrupt your work with a message and give you 12 seconds to abort the prescheduled event by pressing the Escape key. If you let Scheduler proceed, it will save the current state of your PC and restore it to that state when the event is finished. This is a marvelous addition to DOS.

One limitation we found is that CPBACKUP can put only one full backup on a removable disk. The next full backup you make to the disk overwrites the previous backup. (MS-DOS 6.22's backup facility puts each new backup into a different subdirectory on the disk.) CP BACKUP can, however, add incremental backups to the same disk. We rate backup very good.

Antivirus: As with backup, IBM shunned Microsoft's choice of antivirus program; PC DOS instead uses its own small, yet effective, set of antivirus tools developed by IBM. IBM's program uses a "fuzzy" logic approach that can detect some mutated viruses, even if the altered signature byte string is missing. PC DOS 6.3 can detect more than 2,000 strains of viruses, an enhancement over Version 6.1.

We didn't retest the antivirus capabilities of PC DOS 6.3, but judging by our tests of Version 6.1, the system is quite capable. Antivirus merits a score of very good.

Compatibility: In an attempt to improve performance, IBM modified some of Microsoft's DOS kernel code. Al-

See PC DOS, page 92

COMPRESSION TESTS

INFO
WORLD

Single-tasking operating systems

	MS-DOS Version 6.22	PC DOS Version 6.3	Novell DOS* Version 7
Overall compression ratio	1.69	1.75	1.8
By file type:			
ASCII	1.45	1.49	1.71
Database	1.84	1.9	1.95
.EXE	1.33	1.37	1.38
Image	1.76	1.82	1.9
Mix	1.69	1.75	1.8
Spreadsheet	1.75	1.8	1.89
Word processing	1.63	1.68	1.82

*Reviewed May 2, page 107.

PRODUCT SUMMARY

PC DOS

VERSION 6.3

Company: IBM, in Armonk, N.Y., can be reached at (800) 342-6672. In Canada, (800) 465-7999.

List price: \$127; \$77 for upgrade version.

Requirements: Intel-based 8086 or higher compatible computer; 3MB of disk space; 512K of RAM; previous version of DOS (2.1 or higher); mouse optional.

Pros: Compatible with DOS standard; memory optimization for multiple configurations on the same machine; more full-featured utilities than MS-DOS 6.22.

Cons: Possible compatibility limitations with MS-DOS; file-compression module offers possibly less-effective safety measures than those of MS-DOS 6.22.

Summary: A fine choice for the power DOS user who is willing to learn a few new utility programs.

MS-DOS / from page 88**Version 6.22**

Microsoft's MS-DOS is the standard for DOS operating systems. Version 6.22 maintains broad compatibility with a wide range of hardware and software (including all earlier versions of MS-DOS). When using third-party utility programs that operate on your PC at a very low level (such as Symantec's Norton Utilities and Central Point Software Inc.'s PC Tools), be sure to use versions that have been particularly updated to work with DriveSpace.

MS-DOS 6.22 comes with three text files that detail known incompatibilities and work-arounds for certain hardware and software problems, and provide information on networks and how to set up DOS for foreign-language support.

We rate compatibility excellent.

EASE OF USE:

MS-DOS 6.22 implements almost all commands in the same manner as previous versions.

MS-DOS 6.22 also maintains the safety features introduced in Version 6.2, including modifications to Copy and Move to prevent accidental overwriting of destination files. These features not only make the operating system easier to use, but also make it more secure.

Ease of use earns an excellent score.

SETUP:

MS-DOS 6.22 is available to consumers as either a complete upgrade (on three disks) or a StepUp version (on two disks). You can install the former over any version of DOS. The StepUp version upgrades only machines with MS-DOS 6.x installed.

If you upgrade from a system other than MS-DOS 6.0 or 6.2, you will need the DoubleSpace conversion files in order to enable DriveSpace to mount DoubleSpace volumes, and you will need MS-BACKUP to read DoubleSpace-style compressed backups.

Like Version 6.2, MS-DOS 6.22 supports a full uninstall feature. Even if you have compressed your disk with DriveSpace, you can uncompress it and then uninstall the new DOS, returning to your previous version of DOS.

By default, the upgrade and StepUp installations have you create an uninstall disk for removing Version 6.22. You can override this default by invoking the setup routine with a /G command-line parameter. Both the upgrade installation and the StepUp installation will back up the DOS files that they change to an OLD_DOS directory.

A full installation puts about 130 files on your hard drive and occupies a little less than 6MB of disk space, plus whatever space is needed for the old DOS files. (You can run DELOLDOS.EXE to delete old DOS files without deleting the files

that are unique to your old DOS.)

We raise setup from a score of good to very good.

DOCUMENTATION:

The MS-DOS 6.22 upgrade comes with an update to the User's Guide that Microsoft shipped with prior 6.x versions of MS-DOS. The StepUp version ships without documentation, because Microsoft has not altered the manual that shipped with MS-DOS 6.0.

The on-line help for basic DOS commands is far superior to the on-line help in DOS versions earlier than 6.0 and far better than the help provided with PC DOS 6.3. The on-line help provided for the various utility programs, however, lacks the depth of the help included for the corresponding utilities in PC DOS.

We rate documentation very good.

SUPPORT:

Support policies: Microsoft offers free (but not toll-free) telephone support for MS-DOS 6.22 for a period of 90 days, starting with your first support call. A variety of other support services are available, including a 900-number support line; flat-rate per-call support; CompuServe forums; Microsoft FastTips (a recorded message service that answers commonly asked questions); and custom corporate support plans. Microsoft provides a 30-day money-back guarantee.

If Microsoft confirms a bug in MS-

DOS, it will first attempt to find a work-around. If that does not work, Microsoft will create a custom patch — even for a single user. The company does not supply these patches or any information about them to the general public. (This could be a virtue because it gives third-party vendors a stable version of DOS with which to develop their software.)

We rate support policies good.

Technical support: We were very impressed with how quickly Microsoft's support staff answered our calls and competently responded to our questions. Technicians offered unsolicited advice in addition to solving our problems.

We raise technical support from a score of very good to excellent.

VALUE:

MS-DOS 6.22 is a fine value. It offers a high level of compatibility and improved safety features. If you have MS-DOS 6.0 installed on your PC, then Microsoft's StepUp disks, priced at only \$9.95, are a must. If you are currently using MS-DOS 6.21, you may want to upgrade in order to obtain on-the-fly data compression and the capability to create and read compressed backups. Users of MS-DOS 6.2 do not need to upgrade.

For users of other DOS versions, the 6.22 upgrade package can be purchased for a street price of \$40 to \$50 — the same prices as version 6.2. We rate it an excellent value.

PC DOS / from page 90**Version 6.3**

though IBM says that these changes improve the handling of some interrupts and batch files, our benchmarks showed PC DOS was still nearly identical to MS-DOS.

Moreover, there's a potential downside to IBM's kernel code improvements. In removing alleged "dead code" (code that DOS may no longer use but that still resides in the program) and speeding up the handling of certain kinds of processing, PC DOS may also have inadvertently introduced some limits on its compatibility with MS-DOS or some third-party utility programs that may depend on the removed code. IBM maintains that it conducts rigorous tests for compatibility

with DOS applications. Our tests did not reveal any incompatibilities.

As always, you should be sure to upgrade any third-party utility programs that work at a low level on your PC when you upgrade DOS. PC DOS 6.3 ships with a README.TXT file that contains information on known incompatibilities and possible work-arounds for some of them.

Based on our tests, we rate PC DOS' compatibility excellent.

EASE OF USE:

For the most part, working with PC DOS 6.3 is almost identical to working with MS-DOS 6.22. One noticeable difference lies with the line editor. MS-DOS uses Edit (and has since Version 5.0), which simply invokes QBasic in its editing mode. PC DOS includes its own editor,

E, introduced in Version 6.1.

E, which uses function keys and other key combinations, works much differently than Edit. (IBM plans to augment the next version of E with pull-down menus.) E is a more capable editor than Edit, but users will have to spend some time getting the hang of it. The E editor is such a departure from the DOS standard that it lowers PC DOS' ease of use. Of course, you can easily substitute another editor in place of E, including Edit if you are upgrading from DOS 5.0 or MS-DOS 6.x.

Some portions of PC DOS 6.3, however, are easier to use than MS-DOS 6.22. PC DOS' UNDELETE sports a full-screen interface, for example, and an abundance of command-line switches that you can use from within a batch file.

Overall, we rate PC DOS' ease of use very good.

SETUP:

With Version 6.3, IBM did away with the superfluous disk that confused users of Version 6.1. The setup process is now a relatively simple, straightforward procedure. A full installation takes up 10MB of disk space, but because the system doesn't back up your old DOS files, you won't need this much free space on the disk before you start.

The SETUP program will install PC DOS 6.3's antivirus protection by default. On the other hand, if you're upgrading an older version of DOS that contains SMARTDRV.SYS in its CONFIG.SYS file, 6.3's SETUP will remove that line and not insert a corresponding line invoking SMARTDRV.EXE in your AUTOEXEC.BAT file. You must do that yourself to continue to use disk caching.

We rate setup very good.

DOCUMENTATION:

PC DOS 6.3's documentation consists of four updated, useful manuals and two booklets that cover the system's new functions. The only omission was compression commands, which are in a sepa-

rate book. And Version 6.3's on-line help for basic DOS commands is still below par, but that for the utility programs remains superb.

Documentation earns a score of very good.

SUPPORT:

Support policies: IBM provides toll-free support weekdays from 8 a.m. to 8 p.m. Eastern time. During off hours, you can leave a message to receive a return call during regular hours. In addition, IBM maintains a CompuServe forum and a private BBS. IBM also provides a 30-day money-back guarantee.

If a user finds a bug in PC DOS, IBM will prepare a patch disk and mail it to the user. Often, IBM will make these patches available to other users as an IBM Corrective Service Disk, either via mail or on CompuServe. (Microsoft doesn't do this.) Because one bug fix can sometimes introduce other problems, you should only use fixes specific to problems you experience.

We rate support policies excellent.

Technical support: Staff people answered our calls quickly and responded knowledgeably to our questions. We raise technical support from very good to excellent.

VALUE:

An upgrade to PC DOS 6.3 from any version of DOS has a list price of \$77. Its street price — approximately \$40 to \$50 — is comparable to that of MS-DOS 6.22. PC DOS 6.3 offers a lot of benefits even for its full \$127 price.

Although PC DOS 6.3 contains much the same source code as MS-DOS 6.22, IBM's DOS offers more robust utilities and additional features that MS-DOS lacks. Due to the modifications in the kernel code, PC DOS might suffer some incompatibilities with MS-DOS and other utilities, though we found none. As with Version 6.1, we find PC DOS 6.3 an excellent value. □

SPEED TESTS**INFO
WORLD****Single-tasking operating systems**

	Uncompressed drive			Compressed drive		
	MS-DOS 6.22	PC DOS 6.3	Novell DOS ¹ 7	MS-DOS 6.22	PC DOS 6.3	Novell DOS ¹ 7
SYSmark/Win93²	165.24	164.98	110.67	148.78	142	100.82
Applications						
Database	144.44	143.5	39.64	131.99	124.53	38.17
Desktop graphics	180.31	179.77	120.8	156.52	148.22	100.79
Desktop publishing	151.93	151.42	201.92	129.35	109.55	199.25
Desktop presentation	166.72	166.31	132.73	162.82	139.51	111.36
Spreadsheet	163.59	163.99	181.42	146.42	154.09	169.86
Word processing	175.68	175.7	172.71	159.83	146.37	146.37

¹Reviewed May 2, 1994, page 107.

²Higher numbers indicate better performance. SYSmark/Win numbers are relative to a reference machine. A score of 100 is equal to the performance of a generic 33-MHz 486 Intel BAPCo machine. For example, a score of 165 is 65 percent faster than the base system.