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FACSIMILE

TO: GREG EWALD
 FROM: JOHN BROMHEAD
 RE: MSDOS 5.0 COMPETITIVE

Attached find copies of info
 re: Microsoft's Promises
 only Pages 16 → 28 are relevant.

Regards.
 John B

If you haven't seen before suggest you
 share this with DW, + rest of sales
 (also Linnet).

We are working on a competitive style
 analysis of these 'proposed features'.

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Number of pages:

14

THE GREAT NEWS is they are FOLLOWING US!

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Plaintiff's Exhibit

7432

Comes V. Microsoft

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Slide #2: MS-DOS 5.0 Overview

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This slide sets up the rest of the presentation by describing at a high level what is new in MS-DOS 5.0 and why these things are significant.

MS-DOS 5.0 includes a number of important new enhancements including:

- Significantly improved memory efficiency

Memory efficiency is one of the major user benefits of MS-DOS 5.0. DOS 5.0 requires considerably less memory than the previous version of DOS, 4.0. Most users - of DOS 4.0 as well as DOS 3.3 - will find that DOS 5.0 frees up at least 40K of additional "lower 640K" memory for applications.

- Improved shell and installation

MS-DOS 5.0 incorporates a completely new installation program as well as a new shell. Installing DOS, and doing day to day system management tasks, are now easier than ever before in DOS.

- Enhanced utility set

We've introduced a number of new utilities in DOS 5 and enhanced many of the existing ones, providing more functionality in DOS than ever before.

- Full ROM executable implementation with integrated power management

DOS 5.0 is fully "ROMable" - meaning that an OEM can put it in ROM, and it will also execute from ROM. This ROM-ability, plus some power management features that we've incorporated, make this version of MS-DOS an outstanding solution for battery powered systems like laptop, notebook and pocket PCs.

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Slide #3: MS-DOS 5.0 Overview

Schedule:

- OEM adaptation kit (disk version), August, 1990

The U.S. OEM adaptation kit will be available in August, and the following localized versions are expected to be available within 6-8 weeks of the U.S. version: French, German, and Kanji. These additional localized versions should be available within 12-14 weeks of the U.S. version: Spanish, Italian, Portuguese, Swedish and Dutch.

- OEM adaptation kit (ROM version), September, 1990

DOS 5.0 will also be available in a ROM version. This will be delivered in a separate OEM adaptation kit, and will be available within 4-6 weeks of the DOS 5.0 disk version adaptation kit.

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Slide #4: MS-DOS 5.0 Features/Benefits

DOS in "Himem"

- Utilizes High Memory Area to run DOS

The "High Memory Area" (commonly referred to as "Himem") is the first 64K of extended memory above 1 MB. Most 286 and 386-based systems with at least 1 MB of memory have a High Memory Area. And the vast majority of PCs being shipped worldwide today are either 286 or 386-based with 1MB or more. The implementation of DOS 5 allows the two major DOS modules (MSDOS.SYS and IO.SYS) to be relocated to this area.

- Reduce base memory occupied by DOS to 18K for most systems
- Benefits all systems with High Memory Area - frees up additional 40K of low memory for applications

The net result of implementing DOS in Himem is that DOS 5 only occupies about 18K of lower 640K memory - a reduction of about 66K over DOS 4, and 40K over DOS 3.3. This is a significant user benefit. A typical user with a 1 MB 286, for example, today might load DOS 3.3, his network software, and a large application. Once all this has been loaded into memory, he typically will have about 100K left for his workspace. By loading DOS into Himem, the user gains an additional 40K of memory - thus increasing the size of his workspace by 40%.

- Significantly benefits Windows 3.0 users

Windows 3.0 will include a 386 "enhanced" mode, which will allow the user with a 386-based system to multitask DOS applications through its support of the 386's virtual machine capability. DOS 5.0 complements Windows 3.0 enhanced mode by freeing up an additional 40K for each virtual machine as a result of the DOS in Himem implementation. Applications running under Windows 3.0 standard mode will also gain 40K of additional memory.

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Slide #5: MS-DOS 5.0 Features/Benefits

Reduced Kernel Size

- Reduction of DOS size through code optimization
- DOS 5.0 kernel to be roughly same size as DOS 3.3

While most new PCs being shipped today include a High Memory Area, 8086/88-based systems do not have this. Microsoft recognizes that there are users who will not be able to benefit from DOS in Himmem, so - independent of the Himmem implementation - we have also reduced the actual size of the MS-DOS 4.0 kernel. Through code optimization, we have reduced the total amount of memory occupied by DOS to about 58K - roughly the same as MS-DOS 3.3. Furthermore, we have done this without sacrificing any of the DOS 4.0-level functionality - like DOS 4.0. DOS 5.0 includes support for large disk partitions (partitions up to 2 gigabytes are supported), EMS support, etc.

- Benefits all x86-based systems

The DOS size reduction benefits all systems, including those that are 8088/86-based. For all of these systems, MS-DOS 5.0 offers much greater functionality than DOS 3.3 or DOS 4.0, while taking up about the same amount of memory as 3.3 (and considerably less memory than 4.0).

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Slide #5: MS-DOS 5.0 Features/Benefits

New MS-DOS Installation

DOS 5.0 includes a new, streamlined install program that is patterned after the Windows 3.0 install program. With DOS 5.0, a user can now install DOS onto his hard disk in a minimal amount of time.

- Significant usability improvements

DOS 5.0 makes it very easy for the user to install DOS. The user is presented with a full-screen menu interface, and is required to interact with no more than 3 different screens of information. In all cases, the install program will provide default choices and allow the user to override those if he so desires. The program will also automatically determine if the system has a High Memory Area and install DOS there. If it determines that a High Memory Area is not available on this system, it will install DOS in lower 640K memory.

- Automatically sets up config.sys for user

The DOS 5.0 install program relieves the user from having to set up config.sys (which has always been a very intimidating task for novice users). This will all be set up automatically for the user by the install program. The install program will also set up disk partitions for the user, so users will not be required to run fdisk to accomplish this.

- Support for 1.2 MB and 1.44 MB media

The DOS 4.0 install program did not support high density media. As a consequence, the end user could not install DOS onto high density media, and the OEM was precluded from distributing DOS on high density media. DOS 5.0 solves this by supporting 1.2 MB and 1.44 MB media in the install program.

- Designed for future integration with Windows install

The DOS 5.0 install program has been designed in a modular fashion, and is the first step towards a common installation for both DOS and Windows. The next step towards a common install would be some additional work to the Windows install program. However, for those OEMs who are planning to bundle Windows and DOS with all systems, what we have done is important in that it enables the OEM to ship a more seamless DOS/Windows product in the future.

- User benefit: reduced time installing DOS

- OEM benefit: reduced cost of goods, can distribute DOS 5.0 on high density media

By providing support for high density media in the DOS 5.0 install program, it will now be possible for the OEM to ship fewer total DOS disks thereby reducing the OEM's cost of goods.

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Slide #7: MS-DOS 5.0 Features/Benefits

Improved MS-DOS Shell

- Shell re-written using Microsoft CW libraries

The DOS 4.0 shell has been completely re-coded in version 5.0, using standard Microsoft character window (CW) libraries.

- Smaller, faster than DOS 4 shell

As a result of re-coding the shell in CW, the DOS 5.0 shell is significantly faster, and users will see a noticeable improvement in performance. The DOS 5.0 shell is also more memory efficient. Once an application has been launched from the shell, the resident size of the shell is less than 1KB - compared to 3.5 KB for the DOS 4.0 shell.

- Usability improvements - more consistent with Windows 3.0 Shell

The DOS 5.0 shell is visually quite similar to the DOS 4.0 shell, but includes a number of usability improvements that make the DOS 5.0 shell more consistent with the Windows 3.0 shell. These usability improvements include:

- 1) Modifications that make the behavior of DOS shell scroll bars and dialogue boxes consistent with Windows 3.0 and OS/2 Presentation Manager.
- 2) Modification of the file manager to provide for collapsible/expandable directory tree displays. This collapsible/expandable feature makes it much easier for users to navigate through complex directory structures and will make hard disk management easier.

- New utilities integrated into shell: File search, Unformat

The File Search utility provides the ability to quickly locate files that match specific search criteria, regardless of where they might reside on the user's disk. If the user wanted to search for all files that matched "*.DOC", for example, File Search would recursively search all directories and subdirectories and list the files that match "*.DOC". File search is a very useful tool for managing large numbers of directories and files, and provides a significant benefit in this area to the end user.

Unformat provides the ability to recover if a user inadvertently formats a disk. Under DOS 5.0, the format command automatically saves the necessary information needed so that the user's disk can be rebuilt using unformat.

- User benefit: reduced time spent on system management tasks

The improvements to the DOS shell (in the areas of size, performance and usability), and the new utilities (file search and unformat) make it a much more powerful tool for performing basic system management tasks (organizing files and directories, etc.). This should benefit all users, in that it

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reduces the amount of time spent on basic system management tasks.

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- OEM benefit: much easier for OEM to modify / add value to than DOS 4 Shell

Microsoft has CW tools available that would allow an OEM to modify the DOS 5.0 shell. So, it is now possible for any OEM to add his own specific utilities or other type of value-added, and integrate that seamlessly into the DOS 5.0 shell. (The DOS 4 shell, which was not based on CW, was effectively non-modifiable by the OEM.)

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Slide #8: MS-DOS 5.0 Features/Benefits

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Improved Utility Set

- Command line edit / recall

This utility provides a buffer which stores the user's most recently executed DOS commands. (The size of the buffer is user configurable - by default it is set up to store about 16 DOS commands.) It also provides the ability to recall those DOS commands and easily edit them, using a number of pre-defined editing keys. This command line edit/recall capability is very popular among power users, and is a standard feature in most of the popular third party utilities packages.

This utility also includes a keyboard macro facility. This allows the user to define a macro that can execute one or a series of complicated DOS commands with a single keystroke. It is ideal for automating tasks like backup that require lengthy DOS commands to execute.

The command line edit/recall utility is available only from the DOS command line, and is not integrated into the DOS 5.0 shell.

- Unformat

The Unformat command was described in the previous slide. It is available both from the DOS 5.0 shell and the command line.

- File Search command

This command was described in the previous slide. It is available both from the DOS 5.0 shell and the command line.

- Sorted directories

The dir command has been enhanced to provide sorted directories (allows sorting by file name, size, date or extension). In addition, dir now includes additional display options such as wide-screen display of file names (5 columns across). These enhancements make the dir command more usable. Sorted directories have also been implemented in the LDRS.DIR files.

- Improved expanded memory manager

DOS 4.0 included an expanded memory manager (or "EMulator"), EMM386.SYS, that emulated expanded memory in extended memory on 386-based systems. In DOS 5.0, this expanded memory manager has been improved in a number of areas:

1) Size. The previous expanded memory manager required 70K of lower 640K memory. The DOS 5.0 version requires only 6K.

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2) Performance. The DOS 5.0 expanded memory manager is considerably faster.

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3) VCPi support. VCPi (Virtual control program interface) support is needed for allowing expanded memory managers to co-exist with certain types of applications that utilize DQE extender technology (examples include Lotus 1-2-3 version 3.0, and Borland Paradox/386). The DOS 5.0 expanded memory manager includes VCPi support, and is therefore usable with a larger number of applications.

The improved expanded memory manager offers a nice benefit to 386 users. It provides them with a very usable UMemulator, and means that they don't have to spend additional money on a third party expanded memory manager.

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Slide #9: MS-DOS 5.0 Features/Benefits

New User Documentation

- Complete re-write of DOS 4 documentation

The DOS 5.0 user documentation is completely new and offers major improvements over the DOS 4.0 documentation.

includes task oriented user reference with more user examples and scenarios

The task-oriented user reference provides more assistance to the user in understanding how to use DOS in common user scenarios. It also illustrates how to perform specific tasks from the DOS 5.0 shell as well as from the command line.

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Slide #10: MS-DOS 5.0, ROM Version Features

Fully ROMable

The DOS 5.0 product is fully ROMable, and is particularly useful for laptop, notebook and handheld PCs. The DOS 5.0 ROM version is provided as a separate OEM adaptation kit, and will be available within 4-6 weeks of the standard DOS 5.0 OEM adaptation kit.

- DOS able to execute from ROM space (area between 640K and 1MB)

The ROM version of DOS 5.0 allows the OEM to adapt DOS so that it resides in a ROM chip. In addition, DOS 5.0 can actually execute from the ROM space (the area between 640K and 1 MB). DOS executing out of the ROM space means that DOS takes up a minimal amount (about 16K) of lower 640K memory. As with DOS in Himmem, this significantly benefits the user in that it frees up about 40K or more of memory for applications.

The ROM version of DOS 5.0 can be implemented on all x86-based systems (including 8085/86), and is particularly useful for laptop/notebook/handheld PCs with limited amounts of system memory.

- DOS fits into 64K of ROM space

The ROM version of DOS 5.0 is economical in terms of the amount of ROM it requires - it fits into a single 64KB ROM chip.

- DOS takes up only 15K of RAM (for buffers, DOS data, etc.)

As discussed earlier, because the ROM version of DOS 5.0 executes from the ROM space, it takes up a very small amount of lower 640 memory.

Standard disk emulator

The ROM version of DOS 5.0 includes tools for disk emulation in a ROM device. This is a benefit to the OEM that wishes to ship ROM-based applications in addition to ROM based DOS.

- Provides facility for ROM disk

The DOS 5.0 ROM version adaptation kit includes ROM imaging tools, which make it easier for the OEM to create a DOS disk image in ROM.

- Provides capability for "diskless" system

The tools that Microsoft provides allow for ROM-based applications as well as ROM-based DOS. This should be particularly useful to OEMs who intend to offer some type of diskless PC product.

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Slide #11: MS-DOS 5.0, ROM Version Features

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Integrated Power Management

The ROM version of DOS 5.0 provides, for the first time, power management capability in MS-DOS. This allows for extended battery life for portable, battery-powered systems.

- Suspend / resume support in DOS

The power management implementation in DOS 5.0 provides "suspend/resume" support. This is the ability to suspend the state of the system and reduce power consumption during idle periods, and resume when the user strikes a key, or some other external interrupt occurs.

- 2-tiered approach:

The suspend capability is provided at two different levels in DOS 5.0:

1) System level

System initiates suspend

At the operating system level, DOS 5.0 will actually monitor DOS idles. If it determines that the system is in an idle state, it will call out to a power management device driver. (The adaptation kit will include a definition for this device driver, but actual development of the driver will be up to the OEM). The power management device driver will then communicate with the ROM BIOS, which will then initiate the suspend state.

2) User level

User initiates suspend

DOS 5.0 will include a utility that will allow the user to initiate suspend and shutdown commands.

- Implementation assumes suspend / resume support in ROM BIOS

The two-tiered approach to power management in DOS 5.0 requires that the ROM BIOS also support suspend/resume.

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Slide #12: MS-DOS 5.0, ROM Version Benefits

User Benefits:

- RAM economy

As described earlier, because the ROM version of DOS 5.0 executes from ROM, a significant amount of lower 640K memory is made available to applications.

- Instant on

Because DOS 5.0 can reside in ROM, the user can boot up DOS after powering the system on almost instantaneously.

- No end user installation

Providing DOS in ROM means that the user is relieved of having to install DOS initially - it is pre-installed by the OEM.

- Prolonged battery life

The power management capabilities of DOS 5.0 extend the battery life of portable systems. Extended battery life increases the portability of these systems and makes them more attractive to end users.

OEM Benefits:

- ROM economy - reduced cost of goods

As described earlier, DOS fits into a single 64KB ROM chip, thus minimizing the cost of goods to the OEM and making additional ROM space available for ROM-based applications.

- Power management support in DOS reduces OEM effort in implementing system power management

Providing power management as a standard feature in DOS reduces the amount of customization required of the OEM in implementing system power management.

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