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Digital Research

Buxton

Product Development Plan

**Version 1.10
(21 January 1991)**

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FL }
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Plaintiff's Exhibit
5221
Comes V. Microsoft

MS-CCP-MDL 5010663

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OVERVIEW

This document summarizes all the enhancements and changes that are to be made to the current release of DR DOS 5.0 during the next development, code named *Buxton*.

In many cases full details of functional changes can be found in the corresponding Engineering, Documentation or Marketing specification. All reference documents are listed in the final section of this specification.

Many of the elements of the *Buxton* development have been designed with several distinct phases. Each phase results in a complete entity; this allows greater flexibility in the scheduling of the project. This technique also ensures that the initial releases of these elements provides the right basis for our longer term goals.

Document History

Throughout this document paragraphs that have been changed since the previous version of this document are marked in the left hand margin with a "Change Bar". This paragraph is always marked with a change bar as an example.

V0.00 18/Jan/91 - Initial Limited Release


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DESIGN GOALS

Design decisions for elements of the Buxton product will be made based of the following promised design goals. For the purposes of this document, the kernel is regarded as the

Basic Input/Output System (IBMBIO.COM)
Basic Disk Operating System (IBMDOS.COM)
Command Interpreter (COMMAND.COM)

MS-DOS Compatibility

Compatibility with MS-DOS 3.31 as shipped by COMPAQ is the primary goal of this development. All external data structures and code interfaces will mimic the action of 3.31. This means in some cases that functional improvements cannot be made to the system in order to retain compatibility.

Run Time Size

The run time size of the operating system has a fundamental effect on the compatibility of the system. Many of today's major applications are extremely sensitive to the available TPA (Transient Program Area) especially when network software is loaded. Our goal is to increase the TPA available to applications over that provided by DR-DOS 5.0.

Performance

The performance goal for this release of DR-DOS is to get within 10% of the times achieved by a similarly configured copy of MS-DOS 5.0. Other commercially available utilities and drivers will be used to add functionality to the basic MS-DOS operating system as required.

Obviously benchmarks will highlight differences in architecture (8080/Small Model), algorithms, functionality and coding between the two products. These differences will not be allowed to significantly degrade the performance of DR-DOS as compared to MS-DOS for the following industry standard benchmarks:

PC LABS Benchmarks
BYTE Benchmarks
PC Tech Journal Benchmarks
Coratest
PC Magazine

The following areas of the product are of most interest:

Disk Performance (with and without a cache)
Character Screen I/O (with and without a 386 Memory Manager)
EMM386 SYS exception handling
and



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Product Generation and Translation

With this release of DR DOS it is our intention that an OEM or translator only requires Borlands Turbo C Professional in addition to the tools supplied by Digital Research in order to complete any system modification or enhancement.

Romable

The DR DOS BIOS and BDOS must be able to execute from ROM or Write Protected RAM



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FUNCTIONAL ENHANCEMENTS

Task Switcher (TaskMAX)

Switcher Software

The SWITCHER will be designed to run effectively on all hardware configurations from the low end 8086 with 640Kb of RAM to a 486 with several megabytes of extended memory. Automatically configuring itself to take advantage of the hardware facilities available to it.

State
Data
Exchange?

The user will be able to load up to a maximum of 20 separate tasks, swapping between them using a simple hot key sequence which will invoke a pop menu. This menu will allow the user to create a new task or switch to an existing one.

All tasks are suspended in background and have no access to any system resources. The state of interrupts, COM ports etc is preserved when the task is suspended and completely restored when the task is activated. This means that separate tasks may use the same resource in different ways and it is up to the user to resolve any conflicts.

ViewMAX Interface

ViewMAX will be modified so that it can display, create and switch to tasks when it is loaded on top of the switcher. All these features will be available through the standard ViewMAX menus.

Switcher Documentation

To be determined

Microsoft Windows 3 Support (VxD)

EMM386 SYS will be modified to support execution of Microsoft Windows 3 in any one of its three operating modes. Currently only Real Mode execution is supported which severely restricts the functionality of the windows product. With the implementation of a DR DOS aware Virtual Memory Driver, often referred to as a VxD driver, EMM386 will fully support the Standard and Enhanced modes of operation. All the facilities currently provided by EMM386 will be available when Windows is loaded ie -

- BDOS Relocation to Upper or High Memory
- HILOAD command (TSRs in Upper Memory)
- HIDEVICE statement (Device Drivers in Upper Memory)
- Buffers and other system structures in Upper Memory

// HIMEM
// DOS Apps Only

In the course of supporting Windows and its VxD driver full XMS support will be added to EMM386 SYS.

Benchmarks comparing the interrupt performance of EMM386 against other commercially available memory managers have highlighted problems with the protected mode exception handlers of this driver. The user perceives this as a noticeable slow down in character screen I/O from the command line. These will be addressed as part of this development.



File Recovery Tools

Undelete Utility

// Snapshot?
// Delwatch?

This utility will attempt to recover a file after the user has erroneously deleted it. The utility is intended to be used immediately after the event but even then no guarantee of success is possible as all the information about the location of the files data on disk is destroyed by the delete function. As more disk activity occurs the chances of successfully recovering the data are substantially reduced.

Two alternative interfaces are possible and these define the level of functionality available to the end user. Option 1 is recommended and has been used for scheduling.

1. A simple command line interface would force the utility to rely on its own algorithms for specifying the location of the deleted data. The end user would not be able to modify the algorithm or display the data recovered. This may be sufficient for the majority of end users who would not be able or willing to improve on the default algorithm.
2. A full screen interface could provide all of the above functionality in an easily understood format with context sensitive help. The more advanced user would also be able to modify the search algorithms used, display the data and therefore successfully recover information in difficult situations where UNDELETE unassisted would fail.

Snapshot

// TM?

This utility will take a Snapshot of the current disk saving copies of the boot sector, FAT and root directory to a disk file. The UNDELETE utility can use this extra information if present to enhance its recovery routines.

Delete Tracker (DELWATCH)

// TM?

DELWATCH is a TSR which monitors all INT 21 function calls which result in the deletion of a file. Details of the path, filename, date, time, size and cluster chain are stored in a fixed length data file. This information allows the UNDELETE utility to accurately recover a deleted file. The DELWATCH utility also generates a checksum for the deleted file which is checked by UNDELETE after recovery so that data integrity can be guaranteed.

Could be improved.
file
Automatic?
// Trackwatch.

Quick/Safe Format

Floppy

The SFORMAT utility is a direct replacement for the standard FORMAT program. It differs in that when formatting a disk which contains valid data the root directory and FAT information are saved to a Snapshot data file on an unused part of the disk. The other parts of the root directory and FAT are then erased. This data file can then be used by the UNDELETE or UNFORMAT utilities to recover some or all of the original files.

UNFORMAT

UNFORMAT will recover a Quick/Safe formatted disk using the Snapshot data file.



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Installation

The INSTALL program will be modified to support any configuration options required by the new features of Buxton. In addition the user will be allowed to select the product component that he wishes to modify from a central menu. This means the user will not be forced to through every menu serially but just the menus for the components that must be reconfigured. The main menu will consist of the following entries

- Country and Keyboard Defaults
- MemoryMAX configuration
- ViewMAX configuration
- System Parameters
- Device Drivers
- ? (Other Items) *Snapshot?*
Delwatch?

Uninstall

An option to the INSTALL program will save the current hard disk environment to floppy. This would allow the user to restore the original DOS system to his hard disk at some future date. The following items would be saved

- Partition Table
- Master Boot Record (Sector 0 Drive C)
- IBMIO.COM and IBMDOS.COM or their equivalent files
- COMMAND.COM
- CONFIG.SYS and AUTOEXEC.BAT

The UNINSTAL program will prompt for the disk containing the information preserved by INSTALL and restore the state of the system image and control files. At this point the user will be able to reboot his system and run his original system.

However this technique does not preserve the utilities and device drivers used by the previous version of DOS. These must be backed up and then restored by the end user probably under the direction and control of the INSTALL and UNINSTAL programs ?

Non-Booting Upgrade System

The Non-Booting version of DR DOS is supplied in the same configurations as the standard system except that the boot sector on the Startup disk has been disabled. If the user tries to boot this disk a message will be displayed prompting him to boot using his existing DOS system and run the UPGRADE program.

The UPGRADE program will simulate a soft reset and force DR DOS to be loaded from the Startup disk. Installation will then proceed as for the standard bootable system.

2.88Mb Floppy Disk Support

The BIOS and all disk related utilities will be upgraded to support this new format 3 1/2" media.



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Online Help/? Help

All utilities will support both /H and /? to display the brief help information. The /? is a common and language independent method of requesting help and will make us compatible with MS DOS 5.0.

COMMAND.COM Online help

The brief help information currently supported by our external utilities will now be displayed by all the internal commands.

Context Sensitive Help CHAP 8 ONLYHelp Utility

The HELP utility allows the user to access the hypertext help data file in one of two ways:-

If invoked from the command line (ie XDIR (subject)) help will display either the main index or the closest match to the subject specified in the command line. The user can then navigate through the help database using the PgUp and PgDn keys. The TAB key will move the cursor to the next high-lighted keyword which when selected will either display a brief descriptive note about the item (ie a definition of Filename) or jump to that topic in the help database.

HELP can also be loaded as a TSR and when invoked by the [?]hot key sequence it will check the current cursor location for a valid subject and jump straight to that entry. If no match is found then the main index will be displayed.

The Turbo C Help system is very similar in functionality to the planned DR DOS HELP utility.

Help Data

The help data will be compiled from a Ventura ASCII file into a compacted (?) format used by the help utility. A very basic Ventura Style sheet will be defined which will allow the documentation group to work with their existing tools and produce hard copy containing all the Jumps, Notes, Headings and Index required by the help program.

KEYS.COMRelocate KEYS.COM to High Memory

Currently only 37Kb of the 64Kb High Memory area is used when the 5DOS is relocated to High memory by EMM386 SYS or HDOS SYS. The remaining 27Kb could be used for up to 53 disk buffers on a typical system. However no substantial performance improvement is gained from having more than about 30 disk buffers. Therefore the remaining memory can be used for other data structures and code.

All non-US users currently lose about 5Kb of conventional memory for KEYS.COM whose code and data could be dynamically relocated to the later half of High memory. This would mean implementing a technology similar to the MP/M Page Relocatable (PRL) file format. PRL files contained a bit map which allowed the loader to relocate the programs start address to any 100h boundary.

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Keyboard Macros ✓

Basic keyboard macro TSR supporting simple parameter substitution equivalent in functionality to the MS DOS 5.0 offering. The user would be able to set, display and save keyboard macros. Typical examples would be -

Macro Definition	User Input	Expanded Command
M=dir ** /w	M	dir ** /w
M2=dir \$1 * /w	M2 agenda	dir agenda * /w

Improved BatteryMAX

→ **Microsoft Windows 3**

One of the major restrictions with the current BatteryMAX implementation is that it is effectively disabled by any application which internally multi-tasks. These applications tend to loop in their own dispatchers or idle processes which BatteryMAX cannot detect. The most visible application of this type is Microsoft Windows.

There have been reports in the press recently from Microsoft and other third parties that software is available which will recover Windows idle time. As part of the Buxton development we will investigate this aspect of Windows and link it to BatteryMAX.

This may result in either a Windows Driver/Application or specific modifications to BatteryMAX this can only be ascertained after a detailed investigation.

Improved MemoryMAX

Explain

Buxton will support disk buffers in High Memory. This typically means that 15Kb of RAM can be freed in conventional memory. This is especially significant on 286 machines where currently the buffers are forced to reside below 640Kb. On 386 and 486 machines where EMM386 can relocate buffers to Upper Memory the benefits are less dramatic.

Security

Power On Passwords

Support for a Power On password will be added which will prevent unauthorised use of the machine. The boot process will only complete when the correct password has been entered.

Disk Maintenance Utilities

One + the same?

Prevent disk maintenance utilities like Norton Utilities and PCTOOLS from circumnavigating the security system. Precise techniques to be determined.

Private Partition Types

Buxton will support private partition types which are unknown to DOS. This will prevent the circumnavigation of DR DOS security features by simply booting MS DOS or earlier versions of DR DOS.



Keyboard lock and Screen Saver

KEYB COM (?) will be enhanced to support a key sequence which will lock the keyboard until the correct password is given. Applications will continue to run with a locked keyboard.

The user will also be able to disable Ctrl-Alt-Del and on VGA adaptors (and other displays ?) optionally blank the screen while the keyboard is locked.

Maintenance Issues

JL.

// The SPR database will be checked for high profile problems which can only be fixed a extensive kernel changes. These will be targeted in early stages of the Buxton development in order to stabilise the kernel as early as possible.

Sexier Utilities

Specification of a DR DOS full screen interface is currently in progress the first draft of this and demonstration software will be available in early February.

The first utilities to use this new interface will be the HELP and UNDELETE. Another obvious candidate is FileLink.

Postscript Printer Support

Most Postscript printers are unable to print simple text, ie the output from the DIR command, because the data to be printed is not contained within the appropriate Postscript statements. This means the user must go through a complex process of -

1. Redirecting his output to a file
2. Importing the data into a word processor
3. Specifying the correct font and pitch
4. and finally printing the data.

Instead of DIR >LPT1 The SCRIPT utility will trap all data printed to a specified printer port add the correct postscript commands and send the modified information to the real postscript printer port. SCRIPT could also provide some basic printer emulation which would allow old applications which are not postscript aware to print more sophisticated data.

Disk Optimiser

A disk optimiser to reduce the fragmentation of files which naturally occurs with a FAT based file system. This can often result in dramatic increases in disk performance.

Dynamic File compression

Implement a suite of programs which will compress all files on a hard disk only expanding them when accessed. The user would rapidly build a core set of files which are always left expanded because they are frequently used. Files which are only occasionally accessed would remain compressed and a small performance penalty would be incurred when they are accessed for the first time.

→ FLINK (RS232 Lan)



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POSSIBLE ADDITIONAL FEATURES

The following items require additional resources to meet the proposed *Buxton* development schedule

Improved ViewMAX

In addition to implementing phases 2 and 3 of the ViewMAX development which were outlined in the *DR DOS Shell Specification (v1.04)* various cosmetic changes can also be made to modernize the look of the graphical shell. Cosmetic changes would include:-

- More and coloured icons
- Three dimensional buttons
- Proportional Fonts
- etc


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TEST/VALIDATION

Internal QA

To Be Completed

External Certification

Buxton will be submitted to an independent external test facility for the following reasons:

- Certification of the Buxton release against the Top 50 applications
- Certification against a standard implementation of MS NET, either 3 Com or IBM PC LAN
- Independent regression test
- Verification of full Windows 3 Support

Testing will done using Buxton Beta 2 and be completed within 1 month

Beta Program

Buxton will have a 12 week Beta cycle with TWO Beta releases. This gives Beta sites time to respond and the EOC time to fix the problems before the next Beta is released.

The ENGLISH version will be used throughout the development cycle and will be the only language variant used in the Buxton Beta cycle.

Beta 1

The following items would be complete for B1

- Microsoft Windows 3 Support
- Task Swtcher without ViewMAX and Static Data Exchange
- All Kernel changes
- Contact Sensitive Help Utility with a sample help file

Beta 2

A fully functional product would be available at B2



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DOCUMENTATION OVERVIEW

The DR DOS User Guide
The *ViewMAX* User Guide
The DR DOS Quick Reference Card
DR DOS Release Notes

The DR DOS System and Programmers Guide

Also as part of the *Buxton* development, three Application Notes will be produced on the following subjects:

Implementing *BatteryMAX* in DR DOS
Implementing DR DOS in ROM with a ROMDISK



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PRODUCT FORMAT**Language Variants**

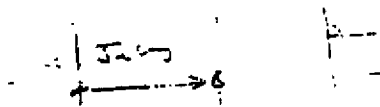
The following language versions of Buxton will be produced and released by Digital Research. They are listed below in priority order.

Language	Estimated FCS	Current Version	Comments
English		5.0	
German	English FCS	5.0	
French	English FCS → 1Mth	5.0	
Spanish	TBD 6.16, 8.17	5.0	
Italian	TBD 6.2	5.0	
Portuguese	Not Planned	5.0	5.0 to be completed 3QFY91
Japanese (KANJI)	Not Planned	5.0	
Korean	Not Planned	3.41	
Russian	Not Planned	3.41	Copy Protected
Turkish	Not Planned	3.41	Copy Protected
Hungarian	Not Planned	3.42	Copy Protected

Other languages will be translated by OEMs using the message files and tools supplied with the DR DOS Translation Kit.

Copy Protected System

No Copy protected version of Buxton is currently planned.



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Retail Product *- DualMedia - No. 5.25 360K*

In order to minimize the number of disks required in the retail product and the size of the DR DOS when installed the LZEXE compression tool will be used. This utility reduces the size of an EXE file by 30% to 50% depending on the file contents.

The context sensitive help utility will cause the single largest increase the size of DR DOS. This would be up to 300Kb depending on the amount of data compression that can be applied to the help data file. The increase in addition to the other new utilities, even with the use of LZEXE, will force the full retail product to be shipped on at least 5 360Kb disks.

Documentation

- The DR DOS User Guide
- The DR DOS Quick Reference Card
- The ViewMAX User Guide (Optional)
- DR DOS Release Note

5.25" 360Kb Retail Disk Set

why 360 Kb.

- DR DOS System and Installation Disk
- DR DOS Utilities Disk 1
- DR DOS Utilities Disk 2
- DR DOS Help Utility
- ViewMAX Disk (Optional)

3.5" 720Kb Retail Disk Set

- DR DOS System and Installation Disk
- DR DOS Utilities Disk 1 (including Help)
- ViewMAX Disk (Optional)



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OEM Kit

Documentation

MRD?

Retail Kit Documentation
The DR DOS System and Programmers Guide
Cut-down BIOS for embedded systems
ROMming DR DOS

5.25" 360Kb OEM Kit

5 25" 360Kb Retail Disk Set
DR DOS PC BIOS Disk
DR DOS Skeleton BIOS

3.5" 720Kb OEM Kit

3 5" 720Kb Retail Disk Set
DR DOS PC BIOS Disk
DR DOS Skeleton BIOS

BatteryMAX Supplement

Idle Detection Supplement
DR DOS BatteryMAX (360Kb and 720Kb)

Translation Kit

Documentation

To be Specified

5.25" 1.2Mb Translation Kit

DR DOS Message Files
DR DOS Utility Object Files 1
DR DOS Utility Object Files 2
ViewMAX Translation Kit



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DEVELOPMENT TIME SCALES

Key Development Mile Stones

Beta I Release	MARCH 19
Beta II Release (Provisional)	MAY 29
Vendor Validation Begins (Provisional)	who starts 6/26
Engineering Release (ER)	
First Customer Ship (FCS)	

English/US Product Mile Stones

User Guide First Draft	
Engineering Release (ER)	
First Customer Ship (FCS)	

German Product Mile Stones

Translated Software	TBD
Translated User Guide First Draft	TBD
Engineering Release (ER)	TBD
First Customer Ship (FCS)	TBD

French Product Mile Stones

Translated Software	TBD
Translated User Guide First Draft	TBD
Engineering Release (ER)	TBD
First Customer Ship (FCS)	TBD



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REFERENCE DOCUMENTS

The following documents are referenced in the Burton Engineering Specification and contain detailed information about specific aspects of this development

Burton & Panther Product Requirement Document (Version 1.1)

Multi Language Support (8/Nov/89)

DR DOS Shell Program (v1.04 John Linney)

Investigation and Outline Specification for a Task Switcher (John Linney)

Draft Online Help Utility Specification (Anthony Hay)

Draft Undelete Utility Specification (Anthony Hay)

Draft Safe Disk Format Tools (Anthony Hay)

Copy:



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