



Malcolm Bull
Training and Consultancy Publications

MB-Guide to Pick on the PC

© Malcolm Bull

Malcolm Bull

MB-Guide
to
Pick on the PC

MB-Guide
to
Pick on the PC

by
Malcolm Bull

(c) Malcolm Bull 1991

MALCOLM BULL Training and Consultancy Services

(c) MALCOLM BULL 1991

Malcolm Bull
Training and Consultancy Publications
19 Smith House Lane
BRIGHOUSE
HD6 2JY
West Yorkshire
0484-713577
ISBN: 1 873283 40 7

No part of this publication may be photocopied, printed or otherwise reproduced, nor may it be stored in a retrieval system, nor may it be transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written consent of Malcolm Bull Training and Consultancy Services. In the event of any copies being made without such consent or the foregoing restrictions being otherwise infringed without such consent, the purchaser shall be liable to pay to Malcolm Bull Training and Consultancy Services a sum not less than the purchase price for each copy made.

Whilst every care has been taken in the production of the materials, MALCOLM BULL assumes no liability with respect to the document nor to the use of the information presented therein.

The Pick Operating System is a proprietary software product of Pick Systems, Irvine, California, USA. This publication contains material whose use is restricted to authorised users of the Pick Operating System. Any other use of the descriptions and information contained herein is improper.

The use of the name PICK and all other trademarks and registered trademarks is acknowledged and respected.

Introduction

The *MB-Guide to Pick on the PC* is produced for those who need a quick introduction to the use of the Pick operating system on PC, PS/2 and compatible computers.

This *MB-Guide* contains:

- * A brief overview of the Pick operating system.
- * Details of how PC Pick interacts with DOS.
- * Differences between PC PICK and other implementations of the operating system.

This *MB-Guide* discusses the facilities up to and including Release R83 version 3.1 of the PC Pick operating system.

This *MB-Guide* is suitable for Pick users who wish to move to the PC implementation and also for DOS users who are confronted with the prospect of using Pick on their machines.

We do not give a detailed discussion of the Pick operating system here, nor do we discuss the detailed features of DOS. It is assumed that the reader is already familiar with the detailed technical aspects of the Pick operating system and now needs to apply that knowledge to the PC implementation.

You may find the following titles in the *MB-Guide* beginner's guide series useful in conjunction with the present volume:

- File-save and file-restore
- Files: monitoring and sizing
- Group format errors
- Operations and systems management
- Security
- The system debugger

and you may also find the following *MB-Master* self-tuition courses of interest in conjunction with the material presented in this *MB-Guide*:

- PICK1: Starting Pick
- PICK2: Pick systems management

A range of supporting software is available for use in conjunction with the material presented in this *MB-Guide*. The range of *MB-Software* includes:

- * *MB-ACCESS*: Generate Access sentences interactively.
- * *MB-BACKING*: a front-end processor for the fundamental operations involving the backing storage devices.
- * *MB-FILE-SIZING*: A front-end processor for the activities associated with file-sizing.
- * *MB-FILE-SAVE*: a front-end processor for the fundamental save and restore operations.

- * *MB-OPERATIONS*: a front-end processor for the fundamental operational duties involved in the day-to-day running of a Pick system.
- * *MB-SPOOLER*: a front-end processor for the fundamental features of the Pick spooler.

All *MB-Software* includes a TCL stacker utility, and many individual routines are available directly from TCL. The Mal MB-Software is particularly valuable to users of native PC Pick which does not provide such utilities. Please write or call for a leaflet or to place an order.

This *MB-Guide* is not intended to present a complete description of the subject but merely to place it in context and give the reader enough information to use the facilities and to survive.

Best use can be made of this *MB-Guide* if it is read in conjunction with the reference literature which is provided for your system. You should amend your copy of this guide so that it accurately reflects the situation and the commands which are used on the implementation which you are using. By doing this, your *MB-Guide* will become a working document that you can use in your daily work.

I hope that you enjoy reading and using this *MB-Guide* and the others in the series, and welcome your comments.

Section		Page
1	Introduction to Pick	1
1.1	R83	1
1.2	Advanced Pick	1
1.3	Pick hardware	2
1.4	Pick software	3
1.4.1	Access	3
1.4.2	TCL	4
1.4.3	Editor	5
1.4.4	Basic	5
1.4.5	Procs	6
1.4.6	Runoff / Jet	6
1.4.7	Update Processor	7
1.4.8	Spooler	7
1.4.9	System generation tools	7
1.4.10	Other software	7
1.5	Applications software	8
2	PC / PS/2 hardware	8
2.1	Hard disk	8
2.2	Virtual memory	10
2.3	Terminals	10
2.4	Function keys	12
2.5	Keyboard	13
2.6	Graphics	15
2.7	Colour	15
2.8	COLOR	16
2.9	System clock/calendar	17
3	DOS files	18
3.1	DOS filenames	22
4	Operations - 1 - setting up	23
4.1	Creating DOS partitions	23
4.2	Loading DOS	25
4.3	Loading the Pick system	26
5	Operations - 2 - routine	26
5.1	Power-up	27
5.2	Power-off	27
5.3	Booting from disk / diskette	29
5.4	Moving between DOS / Pick	29
5.5	COPYDOS / COPYPICK	30
5.6	EXPORT / IMPORT	32
5.7	DIR file listing	34
6	Operations - 3 - devices	34
6.1	SET- and T- verbs	35
6.2	Diskette format	37
6.3	Magnetic tape	39
6.4	Printers	40
6.5	Back-up	40
6.6	Systems programming	41
7	Bibliography	42
8	Glossary	43

1 Introduction to Pick

The Pick operating was conceived in the mid-1960s by Dick Pick and Don Nelson working in the USA. Since that time, the operating system has gone from strength to strength and is available on a wide range of equipment, from a small single-user PC implementation up to large Ultimate and McDonnell systems supporting several hundred users. The name of the operating system may be different:

Pick
Reality
Ultimate
Universe
Prime/Information
Revelation

but whatever the nature of the hardware and whatever implementation you are using, the underlying database model is the same, and with very little effort (and virtually no un-learning) a programmer can move from one system to another. When moving software from one implementation to another, it is not usually necessary even to recompile the source programs.

The Pick operating system is one of the most powerful means of performing commercial computing, and with its Access enquiry language it represents a database management system whose power is almost unchallenged.

1.1 R83

The most popular implementation of Pick is that known as R83, release 83. Since its original release in the early 1980s, the release has gone through several versions and the current version is R83 version 3.1. It is this release which is the subject of the present *MB-Guide*.

All other implementations of the operating system (with the exception of those described below) are based upon the R83 release. In most cases, the individual implementors have added their own facilities.

1.2 Advanced Pick

After the development of the R83 release, Pick Systems introduced a number of radical changes:

- * file indexing
- * macros
- * menus
- * a TCL stacker to store and re-issue TCL commands.

So great were these changes, that they represented more than just another version of R83. Instead this version,

originally to be called R84, was named OA, Open Architecture.

Further changes were made to the underlying strategy of R83 and OA and this version, known as AP, Advanced Pick, was announced during 1988.

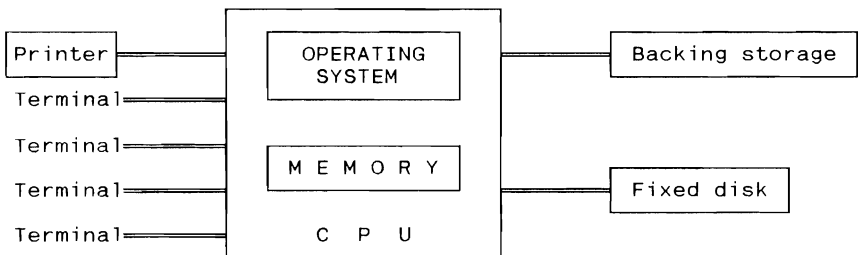
The major additional features in AP were:

- * a new Update Processor to facilitate the creating and maintenance of items through the dictionary definitions.
- * an new output processor based upon Runoff and the Update Processor.
- * new processing codes to ensure file integrity and the ability to pass from one file to another during file processing with the Update processor.
- * an ability to interact with SCO Unix.

Pick Systems major products are now the R83 release and the AP release.

1.3 Pick hardware

The Pick operating system is available on a wide range of equipment from a wide range of manufacturers. Some systems are based on IBM-PC and compatible equipment and serve only one user, others support several users, whilst others will handle hundreds of terminals. Whatever its size, every Pick system is made up of the same basic components:



- 1) the central processor unit and the operating system
- 2) the memory - this holds all the data and programs which are being processed by the users at any moment.
- 3) the user terminals - Pick is designed to be used from a VDU keyboard terminal. Each terminal is connected to the computer via a connection known as a **port**. The actual number of ports which are available depends upon the configuration. Pick will support the familiar keyboard terminals, including VDU and printer-terminals, but many features of the operating system are designed specifically for VDU terminals and screen displays.

- 4) the printer - this may be a simple serial printer or a full-size line-printer. The printers may be connected to the same ports as the terminals. A part of the operating system, known as the **spooler**, enables two or more users to produce printed reports at the same time.
- 5) the backing storage - this may be a standard reel-to-reel magnetic tape deck, or a tape-streamer, or a floppy-disk. It is used to pass data from one system to another and to produce back-up copies of the system and its files for security purposes.
- 6) the fixed disk - this holds all the programs and the datafiles created and processed by the individual users and those used by the operating system. Disk storage space is shared by all users of the system, and the number of disks and the size of the available disk space depends upon the configuration of the equipment. The **virtual memory** feature of Pick means that this disk space can be regarded as an extension of the memory space.

Based around this fundamental configuration, it is perfectly feasible to attach other equipment and devices such as bar-code readers and encoders, plotters, point-of-sales terminals and telex machines. Such devices may be linked to the operating system via a port.

1.4 Pick software

Whatever the nature of the hardware on which the Pick Operating System and its cognates are implemented, the physical structure is essentially the same:

- * a central processor unit
- * one or more terminals
- * one or more printers
- * one or more backing storage devices
- * memory and the virtual memory feature of the operating system.

There is also a range of software which comes as standard with the operating system. This standard software is summarised here.

1.4.1 Access

Access is a database enquiry language. It is known by other names such as ENGLISH, RECALL or INFO/ACCESS and allows you and your users to make enquiries about your files and to produce displayed or printed reports based upon the contents of those files. These enquiries and reports are produced by means of English sentences such as:

LIST STOCK DESCRIPTION PRICE

SORT STOCK DESCRIPTION QTY PRICE WITH MATERIAL = "OAK"

SORT STAFF BY DEPARTMENT BY SALARY IF THE SEX = "F" AND THE AGE < "60"

SORT STOCK BY COLOUR DESCRIPTION TOTAL PRICE

Access is an example of a **query language** or an **enquiry language**. These are flexible and powerful tools which enable non-technical users to get the best value from the data on their database. Access is so powerful that there is no longer any need to write report programs. Furthermore, the language is so simple that it can be used by non-technical users as well as by programmers and analysts.

The language is supported by a collection of field definitions which the analyst establishes on the **data dictionary** for the user. These definitions - for data elements such as DESCRIPTION, PRICE, QTY and MATERIAL in the above examples - can be used to extract and report any part of the database by means of an Access sentence.

The version of Access which is available on Ultimate implementations of the operating system - known as RECALL - have facilities which allow you to update your files by means of Recall sentences.

1.4.2 TCL

The terminal control language - TCL - is the most fundamental way of communicating with the operating system. By typing in TCL commands, the user is able to perform a vast number of activities, including:

- * Create and maintain data files and their contents.
- * Create and maintain user-accounts.
- * Copy data from one file to another.
- * Create, maintain, compile and execute Basic language programs.
- * Execute standard programs and utility software.
- * Create, maintain and invoke procedures written in the Proc language.
- * Control and interrogate the usage made of the system.
- * Control the spooler.

The TCL operations - the **verbs** - which are available are held on a file called the **master dictionary** - the MD. Each separate account has its own MD. If a particular account is not to be allowed to use any facility - such as the Editor - then the EDIT verb can be removed from the MD of that account. The verbs can be **renamed**: EDIT could be renamed CHANGE, for example. New verbs can be added, as we shall see later.

1.4.3 Editor

The Editor is a software package which enables the user to create, change and delete the items on his files. It is a **line-editor** processing each line of the item in turn. Since it is rather a complicated tool, it is chiefly used for writing Basic programs and Procs. Non-technical end-users have much more user-friendly - and much more secure - means of maintaining their files.

A more user-friendly alternative to the Pick Editor - Jet-edit - is a part of the Jet package which is available on some systems.

1.4.4 Basic

The dialect of Basic which is offered on the various implementations of the Pick operating system is a very powerful version of Dartmouth Basic. The language has been extended to allow programs to handle Pick disk data files and other aspects of the operating system. It has further features, including:

- * Optional statement labels.
- * Alphanumeric statement labels on some implementations.
- * Several statements on one line.
- * Meaningful variable-names may be used, and variable-names may be of any length.
- * Any variable may hold either numeric data or an alphanumeric string.
- * Structured programming facilities: LOOP statement, CASE statement, IF ... THEN ... ELSE statement.
- * Complex and multi-line IF statements.
- * Modular programming facilities: GOSUB and RETURN statements, CALL and SUBROUTINE statements are also available.
- * Use of COMMON data to pass information between modules.
- * File handling facilities: OPEN, READ, WRITE and DELETE statements
- * File-locking to prevent several users updating the same record at the same time.
- * Handling output to backing storage: magnetic tape, floppy disk.
- * Handling the data structure of Pick items: attributes, values and subvalues.
- * Dynamic arrays: any number of elements, deletion and

insertion of elements, sorting elements into sequence as they are added to the array.

- * An interactive debugger to facilitate program development.
- * Ability to invoke any TCL commands or Access sentences from within a program.

The language is also known as DATA/BASIC or PICK/BASIC.

So powerful is the language that it really does belie its name.

1.4.5 Procs

The PROC language was originally intended to allow a user to save a command or a sequence of several TCL commands as a single unit on the MD and then invoke this sequence - procedure - as a single operation.

It is particularly useful when a complicated Access sentence is to be used many times, or when a complex sequence of operations is to be used by non-technical operators. By typing in the sentence once and saving it as a Proc, it can be re-used many times simply by typing the name under which it has been saved.

The Proc language has become very sophisticated and has now developed into a programming language in its own right: there are facilities for accepting keyboard input and for displaying output, for performing calculations and for subroutines. In some of the more powerful implementations, such as RPL and those of McDonnell Douglas, it is even possible to perform disk input-output operations.

Recently, Basic has acquired facilities to invoke any TCL command from within a Basic program. This means that Proc is gradually being replaced by the more easily legible and more easily maintainable Basic language.

The OA and AP versions of Pick have largely replaced the Proc language by a system of macros and menus which offer the same facilities as Proc but with much less effort.

There is also a Pick Assembler language. This is rarely used by commercial programmers, and is only of interest to those who are developing applications - or parts of applications - which need to utilise the low-level features of the computer.

1.4.6 Runoff / Jet

One of the fundamental components of Pick is the Runoff text-processing feature. This offers many of the features of standard word-processing systems: text input and output; text formatting; pagination with headings and footings; indexing; table of contents. Unfortunately, Runoff is not a **wysiwyg** - what you see is what you get - system. The text

must be maintained by the Pick Editor and the format of the final document is only revealed when it has been displayed or printed. For this reason, it has been superseded by Jet. Jet is a screen-oriented word-processing system and offers many of the facilities which we have come to expect of a word-processor.

The AP implementation of Pick has extended the facilities of Runoff in its Output Processor - the OP - which provides a more powerful text handling tool than does Runoff.

A number of other proprietary pieces of word-processing software are available: KEYWORD and INFOLEX.

1.4.7 Update Processor

The Advanced Pick implementation also offers a powerful Update Processor - the UP - which extends the features of the Pick dictionary to allow full editing and updating of data items. Amongst its other advantages, the UP also enforces data integrity and allows users to cruise through file indexes looking for data as they maintain the data files.

1.4.8 Spooler

Printed output is controlled by a standard piece of Pick software known as the **spooler**. This offers facilities for:

- * Simple jobs to be printed with no intervention from the user - the normal situation.
- * Supporting several printers.
- * Producing multiple copies of reports.
- * Holding reports for inspection prior to printing and for overnight printing.
- * Stationery alignment.

The ordinary user may work without any knowledge of the spooler if he does not require any of these latter facilities.

1.4.9 System generation tools

Another area in which Pick users receive considerable support from the software industry is that of program and system generation tools and fourth generation languages. Typical of these are System Builder, SB+ (System Builder Plus), Creator, and Libra. Another approach has been adopted by McDonnell Douglas whose ALL - all-purpose language liberator - is a dialect of the PRO_IV fourth generation language adapted for use in the Reality and Pick environment.

1.4.10 Other software

Since the Pick operating system was first implemented, many of its features have been overtaken by modern technology. As

a result, Pick has been criticised for its shortcomings in certain areas:

- * graphics (with ACCU/PLOT),
- * spreadsheets (with CompuSheet+),
- * communications,
- * numerical accuracy.

To these, can be added an even wider range of applications software such as

- * word-processing,
- * stock control,
- * payroll processing,
- * general ledgers and accounts,
- * financial and credit control,
- * vehicle scheduling,
- * catalogue, index and directory production,

We have already seen how the Jet package has filled the word-processing gap. Similarly, other software suppliers provide solutions in other areas. It is now Pick's intention **not** to address these topics, but to leave them to such software suppliers.

1.5 Applications software

A wide range of add-on software is available for use with the Pick operating system. Most of this is available for use with all R83 implementations, but the very nature of the software renders them ideally suitable for PC users.

2 PC / PS/2 hardware

A booklet, the Peripheral Installation Guide, is supplied with the Reference Manual for your Pick PC system. This covers the current details for all aspects of the peripherals, multi-port boards, modems, cables and serial cards which can be used with your system:

- * installation
- * cables
- * troubleshooting

and so on.

It is essential that you, or whoever installs peripheral devices to your system, be familiar with the information contained in the Peripheral Installation Guide.

2.1 Hard disk

The primary requirements for any PC compatible machine to be able to run the Pick operating system is that it has a hard disk. On Pick, the hard disk is used as an extension of core (or RAM or memory) and is controlled by the virtual memory feature of the operating system.

A number of commands are available for monitoring disk usage and the fragmentation of the disk space. These are described in the *MB-Guide to operations and systems management*.

The TCL command

DISK-USAGE

displays details of the amount of disk space which is used by the operating systems and the user-files.

Disk Utilization for PICK'S R83 Ver 3.1 04 Jul 1990				
0....1....2....3....4....5....6....7....8....9....100%				

		MB	Bytes	Frames
Maximum disk space	100%	38	38,206,464	74,622
System usage	5%	4	3,577,344	3,915
Data usage	75%	29	28,645,376	55,948
Available disk space	20%	7	7,556,608	14,759

The TCL command

POVF

displays figures for the available disk space, and indicates the fragmentation of the available space. A typical display might look like this:

6934-	6934 :	1	12466-	12514 :	49
12577-	12732 :	156	12907-	13275 :	369
32658-	33627 :	970	45324-	46916 :	1593
57898-	75582 :	17685			
TOTAL NUMBER OF CONTIGUOUS FRAMES					: 20823

This report is based upon information held in frame 195 of the ABS section and shows the frames which are available for use as overflow frames and for creating new files.

When creating a new file, the operating system will scan the above table for the smallest **gap** into which the file can be placed and then allocate these frames to the file and remove them from the table.

If the available disk space becomes too fragmented, it may prevent the creation of new files and may make overflow of existing files inefficient. In such circumstances, a file-save and file-restore procedure should be carried out.

2.2 Virtual memory

The Pick operating system uses a virtual memory facility to render all data (which is permanently stored on hard disk) available in memory when needed by the users. Frames of data are continually being read into memory and held there for inspection, amendment and deletion by the users. The frames are written back to disk when

- * space is required in order for more frames of data to be brought into memory,
- * when the machine is inactive (or quiescent) for a period of 3 seconds, the system busies itself by dumping any amended frames back to hard disk.
- * On some implementations, frames are written back to disk when they have been updated a specified number of times.

BUFFERS is a utility which displays the entire contents of virtual memory. For each buffer, there is shown the FID of the disk frame which is held there, an indication of whether that frame has been used, whether that frame is locked, and whether it is necessary to write that frame back to disk as a result of the contents having been updated. [3.1]

As the BUFFERS display shows, there is a great amount of data in the buffers which has not yet been updated on disk. In the worst case, the entire contents of core may be frames which have been updated in memory but not yet written back to disk.

For this reason, the machine must be properly shutdown, as described later, and not just switched off.

For the same reasons, unless it is absolutely necessary (for example, when the system is completely dead and all else has failed) the Pick system should never be rebooted by pressing the

<CTRL><ALT>

sequence. This sequence is used to reboot when in the DOS partition, but if issued whilst the Pick partition is active, it will interrupt the operating system and the virtual memory processor; this will abandon the flushing of frames back to hard disk and data will almost certainly be lost (and GFES created).

2.3 Terminals

Each terminal is associated with a set of parameters - the terminal characteristics - which the operating uses to control all input/output to the terminal. To determine the format (width and depth) of all output reports and also the terminal display protocol.

The terminal characteristics can be displayed by means of the command

TERM

A typical display from this command might look like this:

	Terminal	Printer
Page width:	79	132
Page depth:	24	64
Line skip :	0	
LF delay :	2	
FF delay :	2	
Backspace :	8	
Term type :	T	

These parameters are used by all the standard Pick processors and changing any of the parameters may affect the output produced.

- + Page width: the number of characters per line for the device.
- + Page depth: the number of lines for the device
- + Line skip: the number of lines to be left at the foot of the screen. This is the difference between then **page depth** value for the screen and the physical depth of the screen.
- + Line-feed delay: the number of delay characters which are to be output after each line-feed.
- + Form-feed delay: the number of delay characters which are to be output after each form-feed, or top-of-form skip.
- + Backspace: this is the decimal value of the character which the terminal is to interpret as the back-space character.
- + Terminal type: this is a single-character code denoting the type of terminal which is being used. Some of these are shown below.

A ADDS	N Wyse 100
A Adds 580	P Hewlett-Packard 2621A
A CIE-ANT	P Pertec 701
B Ampex 210	Q QVT 102
C C-Itoh VT52	R Adds Regent
C VT52	S SOROC
D Datamedia	S Wyse 60
D DEC VT100	T Mini-Tec 2401
F TV910	T Tec 2402
G IBM 3161	T TV950
H Honeywell VIP 7200	U Ultimate - Volker-Craig
I IBM monitor	V Adds Viewpoint
J VT100	V Ultimate - Viewpoint
L Lear Seigler ADM-3A	W Wyse 50
L LSI	X no cursor control required

M Ampex 80	
------------	--

If a terminal does not have the correct terminal type, then the cursor control and formatting features will not work correctly.

Some implementations hold the terminal characteristics for each port on the item TERMTYPE on the ERRMSG file, others store them in items on the DICT section of the ACC file. When logging on, the terminal characteristics are reset to the default settings for that port.

The TERM command can be used to reset the terminal characteristics for the current port. To change the parameters for the **entire system**, the System Manager will use the SET-TERM command. Many implementations have a utility such as the DEFINE-TERMINAL, to set the characteristics for a specific terminal type.

The SET-PORT and the SET-BAUD commands are used to set the communication characteristics and the baud rate for a port. You are referred to your system Reference Manual for the format of this command on your implementation.

2.4 Function keys

The function keys can be used with the Pick operating system. Their use, however, is different from their application within DOS systems, each function key sending a pre-determined stream of characters to the CPU.

The SET-FUNC command allows the functions keys F1 to F12 of the terminal on line 0 to be loaded with special characters.

An item defining the characters for each function key is established on a file, and this used to load the keys by means of the command:

SET-FUNC file item

specifying the filename and the itemname.

The item which defines the function keys consists of 4 lines each made up of 12 pairs of hexadecimal digits, one pair for each function key. The four lines represent the various characters generated when the user presses:

- 1) the function key and <SHIFT>
- 2) the function key only
- 3) the function key and <CTRL>
- 4) the function key and <ALT>

A fifth line contains a single pair of hexadecimal digits representing a **lead-in** character which will be transmitted immediately before the appropriate character for each function key. This is illustrated below. A line beginning with an asterisk is a comment, and all text separated from the parameters by a space is also regarded as a comment. So

in the diagram below, only the first part of lines 4, 5, 6, 7 and 11 is significant.

A standard file - FUNCKEYS - is available on the SYSPROG account. This contains a number of items - DEFAULT, NULL and TEST. Their effect can be illustrated by issuing a command such as:

SET-FUNC FUNCKEYS TEST

This will set the function keys with character hex (2) (= the smiling face) as the lead-in character and a for F1, hex(2) and b for F2, and so on up to hex(2) and l for F12. This can be seen if you press any of the functions keys. The contents of the TEST item are:

```
000 TEST
001 *
002 * Define function keys for testing
003 *
004 4142434445464748494A4B4C      function key + shift
005 6162636465666768696A6B6C      function key only
006 313233343536373839414243      function key + ctrl
007 21402324255E262A28295F2B      function key + alt
008 *
009 * Define function key lead-in character
010 *
011 02                                lead-in character = STX
012 *
```

```
004 4142434445464748494A4B4C      function key + shift
      └───┬──────────┬──────────┘
            │          │
            └───┬───┘ <SHIFT> and F12 is to transmit
                  │   hex 02 followed by hex 4C
            └───┬───┘ <SHIFT> and F1 is to transmit
                  │   hex 02 followed by hex 41
            └───┬───┘
011 02                                lead-in character = STX
```

The command:

SET-FUNC FUNCKEYS NULL

will reset the function keys so that they have no effect. This is achieved by setting all the function keys to hex FF, and the command:

SET-FUNC FUNCKEYS DEFAULT

will reset the function keys to their default definitions.

2.5 Keyboard

The keyboard is set up to the USA layout when you boot the system. The SET-KBRD command allows the keyboard of the terminal on line 0 to be redefined for other layouts and for

foreign languages.

An item defining the characters for each key is established on a file, and this used to load the keys by means of the command:

SET-KBRD file item

specifying the filename and the itemname.

The item which defines the function keys consists of four sets of specifications. The four sets represent

- 1) the key and <SHIFT>
- 2) the key only
- 3) the key and <CTRL>
- 4) the key and <ALT>

Within each set, the lines represent the various characters generated by the keys on the top row of the keyboard, the second row, the third row, and so on.

Each line is made up of pairs of hexadecimal digits, one pair for each key of that row. If the pair FF is used for any key, then that key will have no effect when pressed.

A standard file - KEYBOARDS - is available on the SYSPROG account. This contains a number of items for specific IBM national keyboards:

BRITISH-101	ITALIAN-102
BRITISH-102	ITALIAN-84
BRITISH-84	SPANISH-102
FRENCH-102	SPANISH-84
FRENCH-84	USA-101
GERMAN-102	USA-84
GERMAN-84	

The keyboard can be set to any of these layouts by issuing a command such as:

SET-KBRD KEYBOARDS BRITISH-102

The command:

SET-KBRD KEYBOARDS NULL

will reset the keys so that they have no effect. This is achieved by setting all the keys to hex FF, and the command:

SET-KBRD KEYBOARDS DEFAULT

will reset the keys to their default definitions.

The function keys are set by means of the SET-FUNC command, as described above.

2.6 Graphics

The graphics capabilities of the standard Pick system are limited to the ASCII characters and other facilities which your terminal can produce. Programmers using Assembler have wider scope than those using the fundamental tools, Basic, Runoff, Jet.

Most add-on software makes some use of colour and graphics.

A demonstration program, invoked by

```
RUN BP MMVIDEO
```

shows off some of the graphics capabilities on a memory-mapped monitor. This uses an Assembler user-exit to achieve its effects.

2.7 Colour

Colour displays make use of the @ function in conjunction with the Basic PRINT statement. The available colours are

```
White
Brown (yellow in foreground)
Magenta
Red
Cyan
Green
Blue
Black
```

You can select any of these colours for the **foreground** - the foreground is the displayed information - and any for the **background**.

When a colour has been selected, it effects the remainder of the screen (down and to the right) of the position at which the character is displayed.

The codes for the background colours are:

```
@(-33)      White
@(-34)      Brown
@(-35)      Magenta
@(-36)      Red
@(-37)      Cyan
@(-38)      Green
@(-39)      Blue
@(-40)      Black
```

The codes for the foreground colours are:

```
@(-41)      White
@(-42)      Brown / yellow
@(-43)      Magenta
@(-44)      Red
@(-45)      Cyan
@(-46)      Green
```

@(-47)	Blue
@(-48)	Black

and those for half-intensity foreground colours are:

@(-57)	White
@(-58)	Brown
@(-59)	Magenta
@(-60)	Red
@(-61)	Cyan
@(-62)	Green
@(-63)	Blue
@(-64)	Black

2.8 COLOR

The COLOR verb is available to set the foreground and background colours for the screen. This facility can only be performed on the terminal attached to line 0 and is only effective on terminals fitted with a suitable adapter.

The format of the command is:

```
COLOR {foreground},{background}{switches}
```

where **foreground** and **background** are both optional and are selected from the colours:

```
WHITE  
BROWN  
MAGENTA  
RED  
CYAN  
GREEN  
BLUE  
BLACK
```

as discussed above. The switches may be entered in upper- or lower-case and may be any valid combination of

/H	or /HALF	switch half intensity on
/F	or /FULL	switch full intensity on
/B	or /BLINK	switch blinking on
/NB	or /NOBLINK	switch blinking off
/R	or /REVERSE	switch reverse video on
/NR	or /NOREVERSE	switch reverse video off

Unlike standard Pick options, the switches are not preceded by (and each must be preceded by the / character. Some examples are:

```
COLOR WHITE,BLACK  
COLOR CYAN,WHITE  
COLOR CYAN  
COLOR ,WHITE  
COLOR WHITE,BLACK/B
```

Note the spelling of the word COLOR in this command.

The MONO command is available to switch off the colour effects capability of the terminal.

The format of the command is

MONO {switches}

The immediate effect of the command is to reset the screen display to WHITE on BLACK. The terminal will ignore any subsequent PRINT statements using the PRINT @ or other means of creating colours and special effects.

The switches with the MONO verb may be in upper- or lower-case and may be any valid combination of

/U or /UNDERLINE	switch underline on
/NU or /NOUNDERLINE	switch underline off
/H or /HALF	switch half intensity
/F or /FULL	switch full intensity
/B or /BLINK	switch blinking on
/NB or /NOBLINK	switch blinking off
/R or /REVERSE	switch reverse video on
/NR or /NOREVERSE	switch reverse video off

When the underlining feature is **on**, all displayed text will be underlined.

Unlike standard Pick options, these switches are not preceded by (and each must be preceded by the / character. Some examples are:

```
MONO
MONO /U
MONO /NU
```

The terminal can be reset by issuing any COLOR command.

2.9 System clock/calendar

Pick and DOS both use the same clock/calendar and these may be set from either partition.

The DOS command

time

will display the current time and give the user the opportunity to reset the clock. The DOS command

date

will display the current date and give the user the opportunity to reset the calendar.

Within the Pick partition, the SET-TIME or SET.TIME verb is used to change the current internal time on the system. Examples of this command are:

```
SET-TIME 13:45
```

showing the hours (using the 24-hour clock) and minutes, or, if you are going to be very precise, you may also include the seconds:

SET-TIME 13:45:55

The SET-DATE or SET.DATE verb is used to change the current internal date on the system. The date can be expressed in any of the valid date formats:

SET-DATE 31 DEC 1999

SET-DATE 31:12:99

SET-DATE 31/12/99

If you use the latter forms, expressing the date in the Pick D2/ format, you must enter the date according to the format (European or standard USA) which is currently effective.

The date format - USA or European - may be set by the verbs:

SET-DATE-EUR

to will set the date to European format (outputting D2/ format dates as 31/12/99 in this case).

SET-DATE-STD

to set the date to standard USA format (outputting D2/ format dates as 12/31/99 in this case).

SET-DATE-FORMAT countrycode

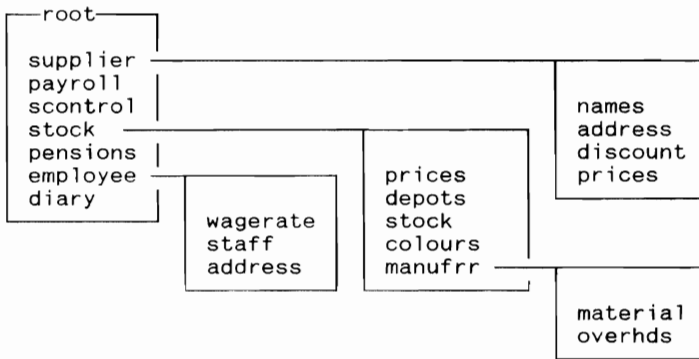
Version 3.1 has this utility which accepts a single parameter, such as UK, US, FR (French), GR (German), SP (Spanish) to indicate the country code format required. The country specifications are held as Assembler modes in a new file called DATE-FORMATS and these declare, amongst other things, the abbreviations which will be used for outputting the names of the months.

3 DOS files

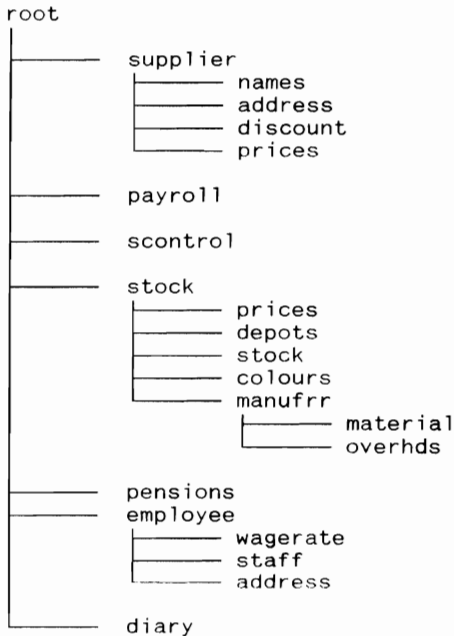
Conceptually, DOS files are organised differently to those of Pick. Whereas a Pick file comprises a number of items and, in turn, an item consists of a number of attributes (or lines) of data, a DOS file comprises a number of lines of information, and each file is independent of all other files.

DOS files are organised into directories and subdirectories. When the machine boots up, the user is positioned within the root directory. The root directory contains a number of files and a number of subdirectories. In turn, each subdirectory contains files and, possibly, further subdirectories.

We might visualise the files on a DOS disk/diskette as being organised like this:



or, more conventionally, as a tree structure like this:



In this instance, the root directory contains the files

```

payroll
scontrol
pensions
diary

```

and the subdirectories:

```

supplier
stock

```

employee

Descending the file structure, we see that the subdirectory **supplier** contains the files

names
address
discount
prices

The subdirectory **stock** contains the files

prices
depots
stock
colours

and a subdirectory

manufr

which, in turn, contains the files

material
overhds

To access the file called **payroll** we might use a command such as

type \payroll

indicating that we are starting at the root directory and looking for the file called **payroll**. The **type** command simply displays the file on the screen. Since we are already *in* the root directory, we could omit the first backslash and issue the command

type payroll

To display the file called **depots** in the **stock** subdirectory, we would issue the command

type stock\depots

and to look at the **overhds** file, we could issue the command

type stock\manufr\overhds

This organisation of the files is very similar to the MD, dictionary, data section structure of Pick. DOS, however, can continue much further down the tree structure than Pick is able to go.

If we are doing all our work on the files in a specific subdirectory, then we can simplify the references by moving **into** that subdirectory by issuing the **change directory** command

cd \stock

and from the **stock** subdirectory we can access the files in that directory by commands such as

```
type colours
```

```
type manufrr\material
```

We can still access files in another directory by using file references such as

```
type \payroll
```

```
type \supplier\address
```

which give a **path** to that file starting from the root directory.

Unlike Pick, DOS allows diskettes to hold specific files and these diskettes may be mounted (and dismounted) as required. The hard disk is always identified as drive C. The main backing storage diskette-drive is identified as drive A, and a second backing storage diskette-drive is identified as drive B.

Each diskette may hold a file structure similar to the one shown above.

Just as the user may be in a specific subdirectory, so he/she may switch between disks. When you boot up the machine, you are handling the files on drive C (the hard disk). To switch to another drive, you must mount the required diskette and issue a command of the form:

```
a:
```

Drive A will now become the current drive and the system prompt will then become:

```
A>
```

and all files will be assumed to be held on the diskette which is in drive A. Thus a command such as

```
type fred
```

would process the file **fred** on the root directory of the current drive (A).

If you wish to handle files on a diskette other than the current drive, and you don't want to switch that drive to become the current drive, then the paths which identify the files must also include the drive letter. Thus we might use commands such as

```
type c:\supplier\names
```

Note the colon following the drive letter. This is necessary to distinguish it from a filename.

3.1 DOS filenames

We have used relatively simple filenames for the purposes of the above explanation. In practice, a DOS filename are usually of the form:

name.extension

where **name** is any combination of letters, digits and (typically) the characters

£	- (hyphen)
\$	@
%	^ (caret)
&	_ (underscore)
' (apostrophe)	{
(	}
)	~ (tilde)

The following characters should not used in filenames or extensions:

"	<
*	=
+	>
, (comma)	?
. (full stop)	[
/	\
: (colon)	]
; (semi-colon)	(split bar)

There are also certain reserved words - such as device names and standard commands - which cannot be used as filenames. Your DOS manual will tell you what these are. The name may be up to eight characters in length. The **extension** is any three characters. The use of an extension in the filename is optional (we did not use any extensions in our introductory discussion), but if an extension is used, a full stop must separate the name and the extension. Note that, in general, DOS does not distinguish between upper-case and lower-case letters in this context.

A number of standard extension are used and recognised by DOS software and packages. Typical of these are

.BAT	to identify a batch processing file
.BAS	a Basic program source code file
.COM	an executable program in memory-image format
.DAT	a general data file
.EXE	an executable program in relocatable format
.TXT	a text file for use with a word-processor
.PCX	a file contain an image for use with a graphics package

Using names of this format, we might encounter commands such as

type autoexec.bat

There are two wildcard characters available for filenames. Using these, we might issue commands such as

```
type *.bat
```

meaning display all the files (on the current directory) which end with the extension .BAT. The asterisk means *any string of characters*. Thus a command of the form

```
copy a:*. * b:
```

could be used to copy all the files from the diskette in drive A to the diskette in drive B. In this context, the use of * is similar to the use of] and [in Access selection criteria.

The question mark represents a **single** wild card character. Thus, a command such as

```
copy a:stock.?at b:
```

would read the diskette in drive A and look for any files which begin with the name **stock** and whose extensions end in the letters **at** and copy these files across to drive B. In this context, the use of ? is similar to the use of ^ in Access selection criteria.

The general conventions for identifying a specific file are

- 1) give the drive letter (if the file is not on the current drive)
- 2) give path from the root directory of the drive (if the file is not in the current directory) to the directory which contains the file,
- 3) give the name and extension of the file.

You will need to be able to construct and use the DOS file name if you are transferring data between DOS and Pick, to show the source or destination of the data on the DOS files.

4 Operations - 1 - setting up

In this Section, we look at the steps to be taking in setting up your PC to run under the Pick operating system.

It is important to remember that the Pick operating system lives in its own partition, away from DOS. It is not a DOS package. Indeed, it is not even necessary to have DOS installed on the machine which you will use to support the Pick operating system.

4.1 Creating DOS partitions

You should perform the following steps to partition your disk prior to loading Pick.

- 1) Insert the DOS diskette into drive A.
- 2) Switch the machine on.
- 3) At the prompt:

ENTER NEW DATE

enter today's date.

- 4) At the prompt:

ENTER NEW TIME

enter today's time.

The system will now give the prompt

A>

and you should

- 5) Enter

FDISK

- 6) Select option

3

to delete the existing DOS partition.

DOS will warn you that all your existing data on disk will be destroyed.

If you have not made backup copies of your DOS files and do not want to continue, you should enter

N

and then backup your DOS files and start this task again.

If you are certain that you have saved all your DOS programs and data prior to starting this task,

- 7) Enter

Y

followed by

<ESC>

This will return you to the FDISK menu displayed earlier.

- 8) Select option

1

to create a new DOS partition.

- 9) At the prompt:

DO YOU WISH TO USE ENTIRE FIXED DISK FOR DOS

enter

N

- 10) At the prompt:

ENTER PARTITION SIZE

enter the number of cylinders discussed in the note below.

- 11) At the prompt:

ENTER STARTING CYLINDER NUMBER

enter

0

followed by

<ESC>

4.2 Loading DOS

You should perform the following steps to install DOS on your PC:

- 1) Insert the DOS diskette into drive A.

- 2) Switch the machine on.

- 3) At the prompt:

ENTER NEW DATE

enter today's date.

- 4) At the prompt:

ENTER NEW TIME

enter today's time.

The system will now give the prompt A> and you should enter:

- 5) Enter

FORMAT C: /S /V

This will format the hard disk on drive C.

- 6) Enter

COPY A: *.* C:

This will copy all the files from drive A to drive C.

4.3 Loading the Pick system

You should perform the following steps to install Pick on your PC:

- 1) Insert the Pick system diskette 1 into drive A.
- 2) Switch the machine on, or if the machine is already switched on press the three keys:

<CTRL> <ALT>

simultaneously.

- 3) Load the diskettes as they are requested at the subsequent prompts. The system will display details of the accounts and files as they are loaded on to the machine.
- 4) At the prompt:

PLEASE ENTER THE TIME

enter the time in the form

09:30:00

- 5) At the prompt:

PLEASE ENTER THE DATE

enter the date in the form

01 JAN 1989

The system will now perform some initialisation and then it will display the logon banner and invite you to logon.

5 Operations - 2 - routine

Most of the operational aspects of the Pick operating system are the same, no matter whether you are using a large implementation on a mainframe or PC PICK. These are covered in others in the *MB-Guide to Operations and Systems Management*.

An account called

PICK-SETUP

is provided to simplify the setting of the system parameters. This is actually a synonym account for the SYSPROG account and it offers the user facilities to:

- * initialise the ABS frames

- * change the country code for the date format
- * change the keyboard type for the monitor terminal
- * change the SHUTDOWN delay. This is the pause between flushing frames to disk and closing down when the machine is powered-off
- * change the current date
- * change the current time
- * restore any accounts from backing storage
- * update any account to the current version of the operating system
- * create any new accounts
- * assign or change any passwords

These setup facilities - together with an option to change the monitor features and to check the installed serial cards - are also offered when the systems boots up. [3.1]

5.1 Power-up

The general sequence of operations when starting up the machine is

- * switch on all the printers and terminals which will be used by the system.
- * switch on the central processing unit, that is, the computer itself.

In most cases, the operating system will load - or **boot** - itself automatically when it is switched on. It may also go through standard testing procedure, checking that the memory and the disks are functioning properly.

Version 3.1 offers a range of setup facilities during the coldstart - as mentioned above. These include an option to change the monitor features and to check the installed serial cards.

If it required to perform some standard processing each time the system is switched on, this may be placed in the USER-COLDSTART Proc which is held on the SYSPROG-PL file. This Proc is executed whenever the system is rebooted.

5.2 Power-off

In most cases, it is better and less harmful to the hardware **not** to switch off the machine at the end of the day's business, simply switching off the printers and the terminals but leaving the CPU running. But, in some organisations, there may be reasons of security and safety which require all the equipment to be switched off overnight.

If you do propose to switch off the machine, the general sequence of operations when closing the system down at the end of the day is

- * first confirm that there are no users (use LISTU for this) and that the spooler is inactive (use LISTPEQS or SP-STATUS for this).

- * issue the TCL command which closes down the system. This will be something like:

POWER-OFF
SHUTDOWN

and you may be asked to confirm that you want to proceed.

- * after issuing the command, the system checks that the printer is inactive and that all other users are logged off. As it proceeds, the virtual memory frames are flushed back to disk, the disk heads are parked and the system halts with a message

Disk heads positioned ready for moving.

- * switch off the CPU.
- * switch of all the printers and terminals which are connected to the system.

Some users simplify the process by creating an account called POWER-OFF which is a synonym for the SYSPROG account. The system can then be closed down simply by logging to this account:

LOGTO POWER-OFF

The POWER-OFF command checks that the printer and other users are not active. On release 3.1, the command

HALT-SYSTEM

will close down the system no matter whether the spooler and other users are active or not.

The system must not be closed down just by switching off the CPU. This will lose any frames of virtual memory which have not been flushed back to disk and may cause GFES.

On release 3.1, the command

SET-SHUTDOWN-DELAY n

will impose a delay of n seconds between flushing the contents of memory to disk and shutting down the system. The delay may be any integer in the range 1 to 65536 seconds. If n is omitted, then a value of 512 is assumed.

This delay allows those systems with a hard disk cache facility to ensure that the cache store has been completely flushed before shutting down the system.

The interval may also be set via the PICK-SETUP utility.

5.3 Booting from disk / diskette

You should perform the following steps to reboot Pick on your PC:

- 1) Insert the Pick diskette 1 into drive A.
- 2) Switch the machine on, or if the machine is already switched on press the three keys:

`<CTRL> <ALT> <DEL>`

simultaneously.

- 3) Load the diskettes as they are requested at the subsequent prompts.

When the operating system has been reloaded, you will be asked:

`ALL / FILES / EXECUTE`

you should enter:

`X`

The system will now perform some initialisation and then it will display the logon banner and invite you to logon.

5.4 Moving between DOS / Pick

The DOS FDISK utility is provided to move from one partition to another. Pick has a look-alike facility to switch from Pick to DOS (or any other partition). This facility is invoked by the command

`FDISK`

and then the utility interacts conversationally to switch the active partition when the machine is next booted up. After switching the partition, it is necessary to reboot the machine.

When moving from Pick to DOS, the sequence of operations is

- 1) use FDISK to make the DOS partition the active partition, then
- 2) reboot the machine by issuing the TCL command:

`REBOOT`

This facility may only be able to the SYSPROG account.

Some users simplify the process by creating an account called DOS which is a synonym for the SYSPROG account. A logon Proc called DOS is then established on the MD of the SYSPROG account with the following contents:

```
PQ
HFDISK
STON
H2<          <=== Option 2 [Change partition]
H1<          <=== Activate partition 1
H<ESC><      <=== <ESC> character
H0<          <=== Leave FDISK menu
P
HREBOOT
P
```

Don't forget the < character where it is shown at the end of the data lines.

A switch to the DOS partition may then be made simply by logging to this account:

```
LOGTO DOS
```

When moving from DOS to Pick, the sequence of operations is

- 1) use FDISK to make the Pick partition the active partition, then
- 2) reboot the machine by pressing the keys

```
<CTRL> <ALT> <DEL>
```

simultaneously.

It is possible to simplify the process by creating a DOS batch file which will invoke the DOS FDISK utility and automatically switch to the Pick partition. Copies of the necessary software can be obtained from *MB Training and Consultancy Services*.

5.5 COPYDOS / COPYPICK

Releases before 3.1 had a pair of utilities which performed the transfer of data between Pick and DOS

- * COPYDOS a program running from the Pick partition which pulled DOS data across to a Pick file.
- * COPYPICK a program running from the DOS partition which pulled Pick data across to a DOS file.

These utilities are still available. Release 3.1 introduced two new utilities: EXPORT and IMPORT. In practice, the older COPYDOS and COPYPICK seem much faster than their newer counterparts.

Note that these utilities are only supported for MS-DOS and PC-DOS and similar operating systems. They may not be suitable for use with other operating systems such as DR-DOS. The command to copy a DOS file across and save it on a Pick

file is

```
COPYDOS dosfile {(options)}
```

where **dosfile** is the name of the DOS file (including the drive letter, the path and any extension) and **options** are any of:

```
O   to overwrite any existing items
M   to establish the data as a number of items
F   to flag specific data strings
T   to translate specific data strings
R   to specify that the DOS data is in random mode
S   to specify that the DOS data is in sequential mode.
```

The processor then responds with

```
TO:(
```

to which the user will enter the name of the Pick file and an item in which the data is to be placed.

By default, the <RETURN><LINE FEED> sequence which delimits the lines of a DOS record are converted to the <ATTRIBUTE MARK> in the Pick items.

A typical sequence might look like this:

```
COPYDOS a:\stock\colours
TO:(COLOURFILE WORK1
```

If the item name is omitted, then the DOS file name will be used: **colours** in this example.

If the item already exists on the Pick file, the action is abandoned.

When you use these Pick/DOS commands, you must pay particular attention to which require a drive letter for the DOS filename and which do not. COPYDOS handles any file on any disk and the command may include a drive letter in the filename, as illustrated here.

Care should be taken when using DOS 4.01 and above in which the DOS file is more than 32MB away from the start of the DOS partition. COPYDOS is unable to handle such files.

The COPYPICK utility runs in the DOS partition and pulls data from the Pick partition and uses the data to create a file on the DOS partition.

The utility is invoked by the DOS command:

```
COPYPICK
```

and performs conversationally, asking for:

- * the version of Pick which is running in the Pick partition.

* the options:

- D to display detailed messages,
- S to display summary messages,
- I to include the Pick item-id as the first line of the DOS file
- N to transfer a range of items with sequential numeric item-ids. At a subsequent prompt, the user will enter the range of item-ids, such as

0001-0123

to transfer Pick items 0001 to 0123 inclusive.

- * the name of the account from which the data is to be taken,
- * the name of the file from which the data is to be taken. This may be in any of the forms:

filename
DICT filename
filename,subfilename

- * the destination of the data within the DOS partition. This may include a drive letter, a subdirectory path, a filename and an extension, as required.
- * the item-id of the source item. This may be a single item-id or * for all items on the file. If a range of numeric item-ids is to be specified, the N option may be used. If several distinct item-ids are to be transferred, each should be entered individually as this prompt is repeated.

By default, the <ATTRIBUTE MARK> which delimits the attributes in the Pick items is converted to the <RETURN><LINE FEED> sequence which separates the lines of a DOS record.

5.6 EXPORT / IMPORT

Release 3.1 has two verbs

- * IMPORT a program running from the Pick partition which pulled DOS data across to a Pick file.
- * EXPORT a program running from the Pick partition which pushed data from Pick files across to a DOS file.

The major difference between these and the COPYDOS/COPYPICK features described above is that both EXPORT and IMPORT run from within the Pick partition. As mentioned above, the older utilities are still available and in practice, they seem much faster than their newer counterparts.

To pull data from the DOS partition to create a new item on the Pick partition, the IMPORT command is

IMPORT drive:dosfilename {(options)}

This command requires the drive letter and the normal DOS subdirectory and filename (and extension) to identify the required file. The use of the DOS wild card characters - * and ? - in the filename is not supported. The destination of the data is specified in response to a

TO: (

prompt, much as with the standard COPY verb. There are numerous options allowing you to specify the nature of the source data, any action to be taken in translating character strings, and what is to be done if the DOS item is too large for a single Pick item.

When you use these Pick/DOS commands, you must pay particular attention to which require a drive letter for the DOS filename and which do not. IMPORT does use a drive letter in the source filename.

To push data from a Pick file to the DOS partition to create a new DOS file, the command is

EXPORT filename {itemlist} {(options)}

The itemlist is optional and may a select-list, an explicit list or * to export all the items on the file.

The destination of the data is specified as a DOS filename (without a drive letter) in response to a specific message of the form

COPY PICK ITEM 'xxx' TO DOS FILE:

The data will be written to the currently active diskette. There are numerous options allowing you to specify any action to be taken in translating character strings, combining several items into a single DOS file, and many more.

When you use these Pick/DOS commands, you must pay particular attention to which require a drive letter for the DOS filename and which do not. EXPORT handles the current diskette and does not use a drive letter in the target filename.

It is particularly important that you get the DOS filename correct. Pick does not verify that the name conforms to the DOS rules for filenames, and if you give an invalid response, you may create files which are inaccessible through DOS. For example, if you give a response such as

A:\FILE.EXT

Pick will create a file with that name, but this will be inaccessible in the DOS partition since DOS will interpret this as file FILE.EXT on the root directory of drive A:

5.7 DIR file listing

A version of the DOS DIR command is available from within the Pick partition. The DIR output shows the names, extensions and sizes of the DOS files:

CNOTES	.TXT	10
DAT	.EXE	117
G0	.BAT	177
G0	.EXE	1071
G0	.TXT	3
G0FORM	.EXE	313
G0FORM2	.EXE	171
README	.TXT	7
FRAME	.BAT	110
FRAME	.EXE	3
FRAME	.TXT	76
USER	.DOC	11

The format of the command is:

```
DIR {\subdirectory} {(options)}
```

For example,

```
DIR
DIR \STOCK
```

The drive is the one which is currently attached, and the subdirectory is expressed in the normal DOS manner but without a drive letter. If no diskette is attached, the process will abort.

The options are specified in the Pick manner:

```
P  sends the output to the printer,
N  suppresses the pause at the foot of each screen.
W  is equivalent to the DOS /W switch for wide output,
    displaying just the names (and extensions) of 5 files
    on each line.
```

```
DIR (P
DIR (WP
DIR \STOCK (P
```

When you use these Pick/DOS commands, you must pay particular attention to which require a drive letter for the DOS filename and which do not. DIR handles the current diskette and does not use a drive letter in the filename.

6 Operations - 3 - devices

A simple PC/XT or PS/2 usually has a number of connectors at the back:

- * a parallel connector. This is where your parallel printer may be connected.

- * a serial connector. This is where your serial printer, a modem or another terminal may be connected.
- * a mouse connector. This will not be used in connection with your Pick system.

The unused connectors and expansion slots permit a number of additional peripheral devices to be attached to your Pick PC system:

- * diskette drives.
- * 0.25" streamer cartridge tape drives.
- * serial I/O cards. These will allow more ports to be linked to your system.
- * serial printers. A serial printer may be attached to any serial port on the system.
- * parallel printers. Pick PC systems can support up to three parallel printers.

Any extra devices will be connected by removing the CPU cover and installing adapters or hardware cards for what the hardware manufacturer calls **options**. The screens which Version 3.1 display during a coldstart allow you to define the serial card configuration.

Complete details about these devices and their installation on your system are given in the documentation with is supplied with the unit, in the hardware reference manual for your computer and in the Peripheral Installation Guide which comes with your Pick Systems documentation.

We mention some relevant points below.

6.1 SET- and T- verbs

In addition to the hard disk, the PC may be fitted with any or all of

- * 3.5" diskette drive,
- * 5.25" diskette drive,
- * 0.25" streaming cartridge tape drive,
- * 8 mm DAT tape,
- * 0.5" reel to reel tape supported by proprietary software,

but only one of these may be active at any one time, and that only by a single user. Each diskette drive is identified by a letter A or B.

To indicate which device is to be active, you will use one of the commands:

SET-FLOPPY (AS

to use drive A and standard density diskettes (360K bytes for 5.25" drives, and 720K for 3.5: drives).

SET-FLOPPY (AH
to use drive A and high density diskettes (144MB for 3.5"
drives only).

SET-FLOPPY (BS
to use drive B and standard density diskettes (360K bytes
for 5.25" drives, and 720K for 3.5" drives).

For 0.25" streaming cartridge tape, the commands are:

SET-SCT
to use the 0.25" streaming cartridge tape drive.

SET-SCT (M
to use the 0.25" streaming cartridge tape drive and
allocate the maximum available space for the tape buffer.
This speeds up the use of the tape and, by reducing the
number of start/stops of the tape, reduces the risk of
parity errors.

T-RETEN
to wind and rewind the tape in order to even out the
stress and tension in the medium.

The 0.5" reel to reel tape has a set of command such as

SET-HALF
SET-1/2

according to the implementation and the software which is
used.

Note that Pick regards all backing storage devices as if they
were magnetic tape. All the commands for handling these
devices are of the form

T-READ
T-DET

and even

T-REW to position the read/write heads at the first
sector.

Typical sequences using the backing storage devices are shown
below.

High density diskette on Drive A	
SET-FLOPPY (AH	
T-REW	to position at the first sector
:	} commands to use the device
:	} go here
T-REW	
T-DET	to release the device for others

0.5" SCT device	
SET-SCT	
T-RETEN	
T-REW	to position at the start of the tape
:	} commands to use the device
:	} go here
T-REW	
T-DET	to release the device for others

Further details on the use of these devices is given in the *MB-Guide to backing storage*.

6.2 Diskette format

The two operating systems still adhere to their individual diskette formats: Pick having a plain sequence of sectors and DOS having

- + the boot record,
- + the file allocation tables and
- + the root directory at the front.

For this reason, Pick diskettes are generally unacceptable to DOS, and any attempt to read a Pick diskette under DOS will produce the message

General failure reading drive A
Abort, Retry, Fail?

R83 version 3.1 and later, are more sympathetic towards DOS diskettes than hitherto.

The TCL command

FORMAT

will format the current diskette, writing a sequence of empty sectors on to the diskette. There are several options available:

- D to format diskettes for DOS. The control sectors are first written to the diskette in the DOS format;
- F to format the diskette without surface verification. This performs a physical check on the diskette;
- V to carry out surface verification without formatting the diskette.

If the D option is not specified, the diskette will be formatted for use with the Pick operating system.

The routine displays a message as to whether there are any errors on the disk or whether it is suitable for use with the Pick operating system.

The diskettes are formatted as a sequence of 512-byte sectors:

- * a standard density 5.25" diskette is double-sided / 40 tracks per side / 9 sectors per track and therefore holds 368,640 bytes,
- * a high density 5.25" diskette is double-sided / 80 tracks per side / 9 sectors per track and therefore holds 737,280 bytes,
- * a standard density 3.5" diskette is double-sided / 80 tracks per side / 9 sectors per track and therefore holds 737,280 bytes,
- * a high density 3.5" diskette is double-sided / 80 tracks per side / 18 sectors per track and therefore holds 1,474,560 bytes.

Diskettes formatted for DOS use 7168 bytes for the DOS control sectors mentioned above.

The

DISKCOPY

utility copies any type of diskette, like to like, sector by sector. This needs less attention than the equivalent DOS command, reading in all blocks of the source diskette before demanding the target diskette. Options allow

- F to format the target diskette before copying
- C to compare the two diskettes after copying
- R to repeat the copying to produce several target diskettes from one source diskette.

Since there is no facility for changing drive or density during the action, this and the DISKCOMP utility require that both the source and the target diskettes be of the same type and of the same density.

As mentioned, there is no facility for copying, say, a standard-density diskette to a high-density diskette. It is, however, a fairly simple matter to modify the source code of the DISKCOPY program to allow this.

The

DISKCOMP

utility compares, sector for sector, two similar diskettes. There is only one option:

- P to output the comparison report to the printer.

Since there is no facility for changing drive or density during the action, this and the DISKCOPY utility require that

both the source and the target diskettes be of the same type and of the same density.

6.3 Magnetic tape

Magnetic tape is a more attractive backing storage device than is diskettes since it has a greater capacity and this is particularly valuable when performing file-saves.

The Pick operating system supports a range of magnetic tape devices:

- * 0.25" streaming cartridge tape drive,
- * 8 mm DAT tape,
- * 0.5" reel to reel tape supported by proprietary software,

If you will need to use SCT tapes to transfer data to other systems, care should be taken about the compatibility of the tapes. Most SCT drives have capacities of 60MB, 90MB, 125MB or 150MB. In general, a higher density drive can read lower density tapes (for example, a 150MB drive can read 125 MB tapes), but the reverse is not true (for example, a 60MB drive cannot read a 125 MB tape).

Not all SCT devices are compatible with the Pick operating system. The current list of devices which can be used with your system will be shown in your Pick Peripheral Installation Guide. All acceptable devices use the QIC-24 data interchange, and the drive interface is either QIC-02, QIC-36, or QIC-60.

Because of the absence of any standard format for SCT tapes, you may experience difficulties when moving SCT data between your Pick PC system and another Pick system.

Many problems have been reported by users of SCT devices concerning the reliability of the units, however, experience (and the Pick Systems Technical Support Bulletin H/W 6 August 1990) suggest that the following general hints are appropriate here:

- * do not use a tape more than fifty times.
- * clean the tape head after every eight hours of use. Too much cleaning can abrade the heads.
- * use a tape drive cleaning kit as directed by the manufacturer.
- * ensure that the equipment is in a static-free environment.
- * wherever possible, the tape device should be used when all no other users are logged on.
- * use the M option with the SET-SCT command. This uses the maximum available memory for the tape buffers and

thereby reduces the number of writes (and hence the number of times that the tape has to stop and start) which results in increased tape reliability. The use of the M option may degrade the response to other users.

- * if a disk-file is so organised that the system has to wait whilst the data is read from disk, this may disrupt the tape-write activity and result in parity errors.
- * parity errors may be reduced by using the T-RETEN command to retension the tape before use. Pick Systems suggest that two T-RETEN operations should be carried out before using the tape.
- * use good quality tapes. 3M DC600A or DEI Series II Gold tapes are recommended for drives up to 90 MB, and 3M 6150 or DEI Series II Gold for drives from 125 up to 150 MB.
- * if a file-save extends over to a second reel, there may be problems when doing restores from the second reel.
- * always use the T-VERIFY command to verify the contents of the tape. If this is not available, then use a dummy SEL-RESTORE

```
SEL-RESTORE MD *
ACCOUNT NAME: ZZZZZZZZZZ
FILE NAME: ZZZZZZZZZZZZ
```

We discuss this and other related topics in the *MB-Guide to backing storage*.

6.4 Printers

Two types of printer interface are used: *serial* and *parallel*.

A serial printer can be attached to any serial port on your system. The STARTPTR command is then used to declare the port a printer and to associate a specific form-queue(s) with the printer.

Up to three parallel printers may be attached to a PC system.

Slave printers can be attached to any port which is provided with an auxiliary output port. When the slave printer is activated, all output sent to the screen may also be sent to the slave printer. The appropriate terminal reference manual will give details of the control sequences which will activate and deactivate the slave printer. These control sequences can be generated by means of the @(-n) function in Basic (and Procs).

6.5 Back-up

The operational aspects of the operating system, including File-save / file-restore and Account-save / account-restore are covered in others in the *MB-Guide* series:

File-save and file-restore
Files: monitoring and sizing
Operations and systems management
Security
The spooler

6.6 Systems programming

The Pick assembler is available for those who wish to write their own processing routines in the R83 assembly language.

It is not easy to use the current reference literature to learn the language, and a good knowledge of 8088/8086 assembly language is also required for anyone wishing to make effective use of R83 Pick assembler.

Anyone who is familiar with the architecture of the PC and its processor can utilise a number of user-exits in order to access the processor's facilities from a Pick Basic program. These user-exits offer facilities such as:

- * write to specific memory location (poke),
- * read from specific memory location (peek),
- * access the ROM BIOS services,
- * handle the memory mapped monitor,
- * read/write floppy diskette sectors,

and so on.

The interested reader should study the contents of the Basic programs which are held in the BP file of SYSPROG. These apply a number of DOS/Pick and Pick/PC user-exits:

U00B9	U413C
U014A	U613B
U014B	U713B
U0153	U90BA
U10B9	UA0BA
U1153	UB0BA
U20B9	UC0BA
U213E	UD0BA
U2153	UE0BA
U313C	UF05B
U313E	UF070

With a little imitation and a certain amount of ingenuity, it should be possible for the experienced Pick programmer to produce device drivers to order.

Unfortunately, the Pick user-exits are orders of magnitude slower than their 8088 assembly language counterparts, and these techniques are, therefore, limited.

7 Bibliography

The following books may be of interest in conjunction with the present *MB-Guide*:

PICK REFERENCE MANUAL: (Pick Systems)

PERIPHERAL INSTALLATION GUIDE: (Pick Systems)

THE PICK OPERATING SYSTEM: Roger Bourdon (Addison-Wesley)

THE PICK OPERATING SYSTEM: Malcolm Bull (Chapman and Hall)

THE NEW DOS 4.0: K.W.Christopher et al (Wiley)

INSIDE THE IBM PC: Peter Norton (Prentice-Hall)

LE LIVRE DU PICK: (BCM Belgium) for details of Pick Assembler

PROGRAMMER'S GUIDE TO THE IBM PC & PS/2: Norton (Microsoft Press)

8 Glossary

The following terms are used in this *MB-Guide*:

Diskette: any floppy diskette backing storage device. On most implementations, this includes 3.5" diskettes and 5.25" floppy diskettes.

Tape: any backing storage device which uses magnetic tape as the storage medium. On most implementations, this includes 0.5" reel-to-reel magnetic tape and 0.25" streamer cartridge tape.

In the commands shown in this *MB-Guide*, such as:

MONO {switches}

COPYDOS dosfile {(options)}

the following conventions have been used:

- * information enclosed in braces is optional and may be omitted or included, as appropriate.
- * Information shown in UPPER-CASE letters must be entered as shown.
- * Information shown in lower-case letters will be replaced by the actual data,
- * all other information, including parentheses, should be entered as shown.

Index

8086/8088 assembly language 41

<CTRL><ALT> 10

@ function with negative argument in Basic 16

Access 3

Advanced Pick release 1

Applications software 8

Assembly language 41

Back-up 40

Basic 5

Basic language 5

Bibliography 42

Booting from disk / diskette 29

Booting the computer 27

BP file on SYSPROG 41

BUFFERS 10

Cable 8

Calendar 17

Cartridge tape: see Tape 43

CD command 21

Clock 17

Coldstart 27

COLOR 16

Colour 15

Colour with the @ function 16

Colours 16

Comparing diskettes 38

COPYDOS 30

COPYDOS / COPYPICK 30

Copying diskettes 38

COPYPICK 31

Creating DOS partitions 23

DEFINE-TERMINAL 12

Devices 8, 34

DIR 34

DIR file listing 34

Directories 18

Disk heads positioned ready for moving 28

Disk space 9

DISK-USAGE 9

Disk: see Diskette 43

Disk; See DISKETTE 37

DISKCOMP 38

DISKCOPY 38

Diskette 37, 43

Diskette format 37

Diskette formats 38

DOS date command 17

DOS directories 18

DOS filenames 22

DOS files 18

DOS subdirectories 18

DOS time command 17

Drive letter 21

Editor 5

Expansion slot 35

EXPORT 33

EXPORT data to DOS 32

EXPORT routine 32

Extension in DOS filenames 22

File naming conventions 18

Filenames in DOS 22

Floppy disk: see Diskette 43

Foreign keyboards 14

FORMAT 37

Formatting diskettes 37

FUNCTKEYS file 13

Function keys 12, 13

GFE 10

Glossary 43

Graphics 15

HALT-SYSTEM 28

Hard disk 8

Hardware 2, 8

Hardware option 35

IMPORT 32

IMPORT routine 32

Jet, 6

Keyboard 13

KEYBOARDS file 14

Loading DOS 25

Loading the Pick system 26

Magnetic tape 39

Magnetic tape: see Tape 43

Memory mapped monitor 41

Modem 8, 35

MONO 17

Mouse 35

Moving between DOS / Pick 29

Moving data between DOS / Pick 29, 30, 32, 33

Multi-port board 8

Open Architecture release 1

Operations 23, 26

Operations 34

Overflow frames 9

Parallel connector 34

Parallel printer 40

Parity errors 39

PC hardware 8

Peek 41

Peripherals 8

Pick assembler 41

Pick hardware 2

Pick releases 1
Pick software 3
PICK-SETUP 26
Poke 41
POVF 9
POWER-OFF 28
Power-off 27
Power-up 27
Prime/Information 1
Printer 40
Printers 40
Procs 6
PS/2 hardware 8

R83 release 1
Reality 1
REBOOT 29
Rebooting the system 10
Revelation 1
ROM BIOS 41
Runoff 6

Screen effects in Basic 16
SCT: see Tape 43
Serial card 8
Serial connector 35
Serial printer 40
SET- and T- verbs 35
SET-BAUD 12
SET-DATE 18
SET-DATE-EUR 18
SET-DATE-FORMAT 18
SET-DATE-STD 18
SET-FLOPPY 35
SET-FUNC 12
SET-FUNC verb 13
SET-KBRD 13
SET-KBRD verb 14
SET-SCT 36
SET-SCT (M 36
SET-SCT command 39
SET-SHUTDOWN-DELAY 28
SET-TIME 18
Setting up 23
SHUTDOWN 28
Slave printer 40
Software 3, 7
Spooler 7
Streamer cartridge tape: see Tape 43
System calendar 17
System clock 17
System generation tools 7
Systems programming 41

T-DET 36
T-READ 36
T-RETEN 36
T-RETEN command 40
Tape 43
Tape parity errors 39
TCL 4

Term-types 10
Terminal characteristics 10
Terminals 10

Ultimate 1
Universe 1
Update Processor 7
USER-COLDSTART 27
User-exit 41

Virtual memory 10

Wild card characters in DOS filenames 23
Word processing 6

MB-Guides

The booklets in the *MB-Guide* series cover a range of fundamental topics of interest to users and those responsible for running Pick systems.

Each *MB-Guide* deals with a specific aspect of the operating system and the booklets represent an economical introduction to the various topics and the whole series forms an integrated presentation of the subject matter.

The booklets are intended to be a working document and, for this reason, space is provided for the user's notes, and the reader is encouraged to amend the booklet so that it applies to his/her own system.

It is anticipated that the series of *MB-Guides* will be of special interest to new users, and it should prove useful for software houses and others who are responsible for the instruction of their clients and staff in the fundamental aspects of the Pick operating system.



Malcolm Bull

Training and Consultancy Publications

015

00X

P
i
c
k

o
n

t
h
e

P
C