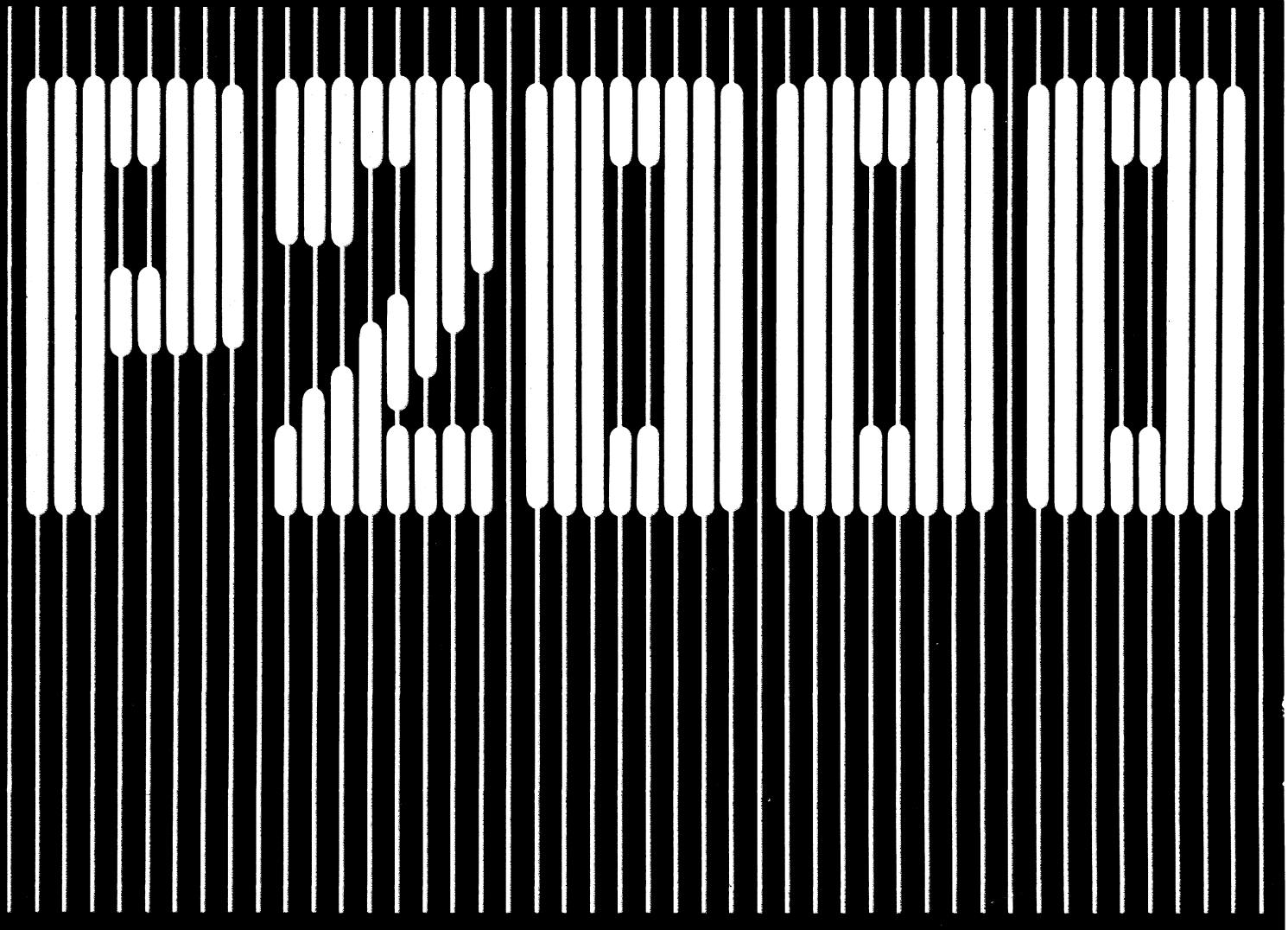
PHILIPS

P2219
CP/M
MANUALS

MICRO COMPUTER SYSTEMS



Data
Systems

PHILIPS

P2219

CP/M
MANUALS

IMPORTANT NOTE:

This software program is distributed on an
'as is' basis without any warranty or liability.

5103 992 11921

PREFACE

The Philips Micro-Computer P2500 has been designed so that programs can be run easily and efficiently by inexperienced operators - yet the experienced programmer still has an excellent development medium. The CP/M (R) Version 2.2 Operating System, as an alternative to the UCSD Operating System, adds another dimension to the capabilities of the P2500.

Philips would like to extend their thanks to Digital Research Inc. for the use of their documentation, which has been included in this manual, without changes, following the Philips' CP/M implementation description.

Note: Not all programs referred to in the Digital Research Manuals are supported under Philips implementation of CP/M.

Warning:
Use only diskettes delivered by Philips or an authorized Philips dealer. Other diskettes may be of inferior quality and are liable to damage the disk drives. If such damage occurs, the warranty will be forfeited.

PAGE LAYOUT

The pages in all P2000 manuals are arranged as follows:

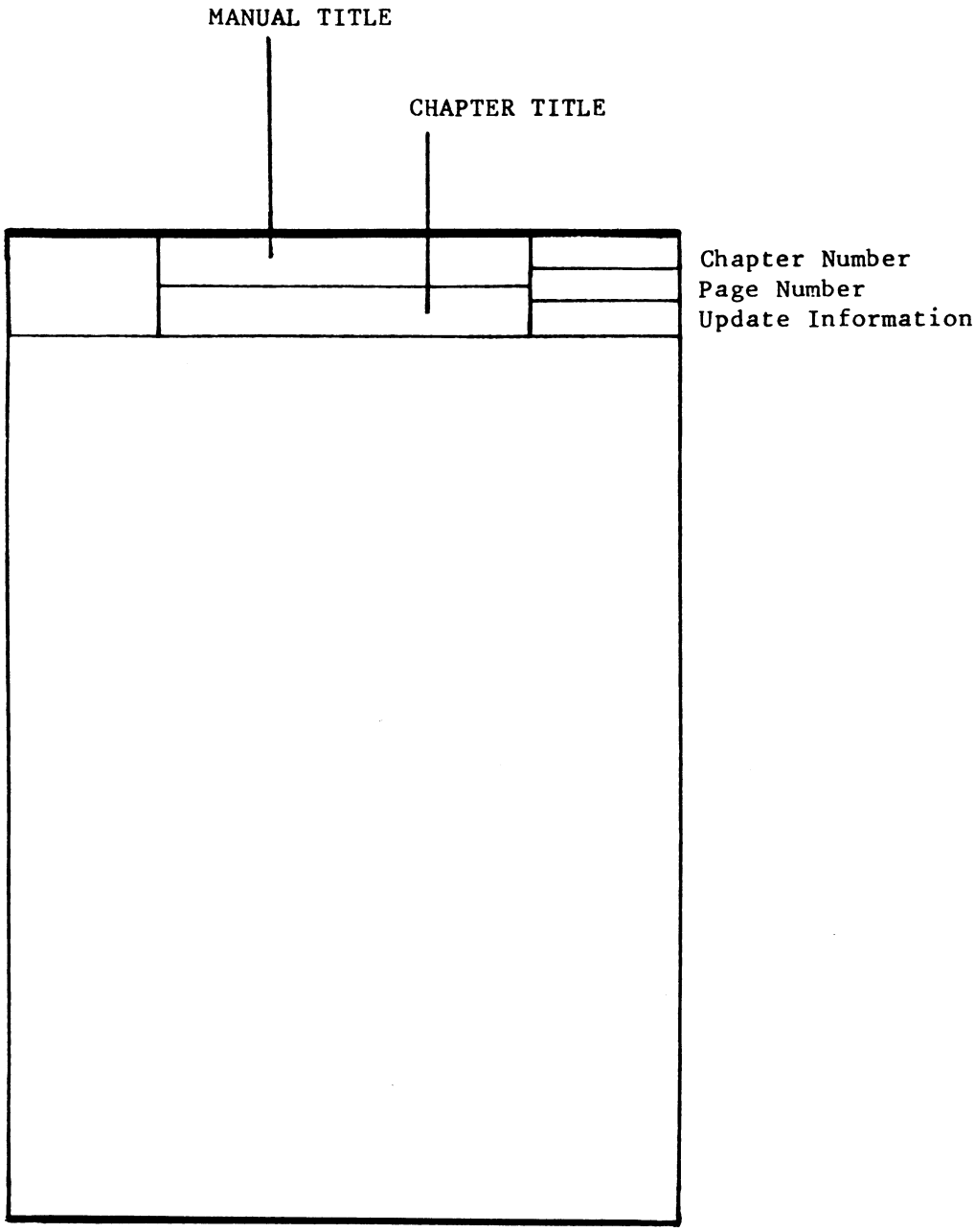


TABLE OF CONTENTS

DIGITAL RESEARCH INC. CP/M MANUALS

1 An Introduction to CP/M Features and Facilities

2 CP/M 2 User's Guide

3 ED: A Context Editor for the CP/M Disk System User's Manual

4 CP/M Assembler (ASM) User's Guide

5 CP/M Dynamic Debugging Tool (DDT) User's Guide

6 CP/M 2 Interface Guide

1 INTRODUCTION

CP/M (Control Program Monitor) has become one of the most widely used operating systems on today's micro-computers. Its comparitively small size and simple user interface have ensured its success.

Philips are supporting CP/M Version 2.2 as an alternative to the UCSD Operating System. This lets the owner of the Philips P2500, run any of the standard CP/M software packages currently available.

2 CP/M ON THE P2500

2.1 STARTING UP CP/M ON THE P2500

To invoke the CP/M Operating System Version 2.2 on the P2500, the following actions must be carried out:

1 Ensure that the machine is connected correctly and switched off.

2 Insert the SESAM key into its slot on the right hand side of the CPU unit.

3 Switch the computer on and insert the P2219 system diskette and close the flap.

4 Press the reset button.

For the very first bootstrapping of the system disk read all of the following points, for all following bootstraps, miss out point 5.

5 On the first bootstrapping, a disk initialization is carried out, and the following message displayed.

PROGRAM INITIALIZATION

PLEASE ENSURE THAT THE WRITE PROTECT TAB IS REMOVED FROM THE SYSTEM DISK

DURING THE EXECUTION OF THIS PROGRAM
DO NOT REMOVE THE DISK

PRESS < SPACE > TO CONTINUE

After the space bar has been pressed the initialization will take place, and the following message will be displayed.

INITIALIZATION IN PROGRESS

The successful completion of the initialization process is indicated by the message:

INITIALIZATION COMPLETE

If no SESAM has been inserted the program will prompt:

INSERT SESAM KEY!

PRESS <SPACE> TO CONTINUE

6. On an initialized system disk, if the wrong SESAM key (or no key) is inserted during the cold or the warm bootstrap processes the following message will be seen:

INIT ERROR

and the user will be forced to reboot with the correct SESAM key inserted.

7 When the bootstrap process is complete, the screen will display an introductory message, followed by the normal CP/M prompt:

A >

8 If it is required to alter the peripheral configuration of the system, the program CONFIG must be used (see section 2.5).
It should be noted that for any national keyboard other than UK, the correct keyboard translation table must be selected using the CONFIG utility, immediately after the system disk has been initialized

At this stage the user may select any of the available CP/M programs, in the manner described in the Digital Research Inc. documentation which is included in the last section of this manual.

Note: Before continuing the user should make a work copy of the system diskette and store the original in a safe place (see Chapter 2.5 for copying procedures).

2.2 P2219 - THE OPERATING SYSTEM SOFTWARE

The CP/M Operating System for the Philips P2500 is supplied on a 5.25 inch 'system' diskette (P2219).

A description of the operating system is to be found in the Digital Research Inc. manual 'CP/M 2 Interface Guide' which is included in the last section of this manual.

2.3 SUPPLIED SOFTWARE

The implementation of CP/M on the Philips P2500 will support the following utilities and functions:

CBI55.PHI or CBI56.PHI	:	Alternative CBIOS system programs.
CPM55.PHI or CPM56.PHI	:	Alternative operating system programs.
PBI55.PHI or PBI56.PHI	:	Alternative PBIOS system programs.
SYSCBI.PHI	:	Currently implemented CBIOS.
SYSCPM.PHI	:	Currently implemented operating system.
SYSLOAD.PHI	:	Operating system loader program.
SYSPBI.PHI	:	PBIOS system program.
ED.COM	:	Context editor for the CP/M disk system.
ASM.COM	:	CP/M Assembler.
PIP.COM	:	CP/M peripheral interchange program.
STAT.COM	:	CP/M statistical information program.
DDT.COM	:	CP/M dynamic debugging tool.
DUMP.COM	:	Program to display disk files on screen.
DUMP.ASM	:	Example assembler program
LOAD.COM	:	Program to load hex files into memory.
SUBMIT.COM	:	Automatic command processing program.
XSUB.COM	:	Utility for the SUBMIT program.
CONFIG.COM	:	Philips Utility program to change hardware configuration.
CPYDSK.COM	:	Philips Utility program to copy Disks.

WARNINGS : 1. Deletion of any one of the system programs, suffixed .PHI, will render the system disk totally unusable.

2. Renaming of the system programs, suffixed .PHI, will render the system disk unbootable.

Full descriptions of the above programs are contained in Chapter 2.5 of this manual and in the CP/M manuals 'An Introduction to CP/M Features and Facilities' and the 'CP/M User's Guide', which is part of the attached CP/M documentation.

2.4 SUPPORTED CONFIGURATION

Under the CP/M Operating System, the P2500 can support the following hardware:

1 Philips' Monitor Unit.
1 Printer (Daisy Wheel,Matrix or Ink-Jet).
4 Double track, double density 5" disk drives.
2 Single track, double density 8" disk drives.
2 Single track, single density 8" disk drives.

5 inch disks are addressed through drives A:, B:, C: and D:, with drive A containing the bootable disk.

8 inch single density disks are addressed through drives E: and F:.

8 inch double density disks are addressed through drives G:, and H:.

The Utility program 'CONFIG.COM' which is included as a standard part of the CP/M Operating System, as supplied by Philips, provides printer and national flexibility plus economy of memory. This Utility enables the user to tailor the hardware configuration of the machine, e.g. which type of printer is to be connected and whether or not eight inch diskettes are required. Another function of the program CONFIG is to allow this machine to be configured for a particular national keyboard. The program is described in detail in the next section.

Note: (concerning Philips disks)
Both 5" and 8" inch disks are available from Philips' dealers, however if 8" double density IBM 3741 format disks are required, the Philips disk must be reformatted using the Maintenance program, supplied with the P2500 System Reference Manual, which is also available from Philips' dealers.

Note: (concerning printing)
If a PRINT command is given while the printer is off-line, the following message will be displayed:

CHECK PRINTER

Possible actions:- ↵ will continue with the PRINT command
-<space> will ignore all PRINT commands until the system is rebooted.

2.5 PHILIPS UTILITIES

2.5.1 Utility: CONFIG

This program is supplied as part of the standard CP/M system for the Philips Micro-Computer P2500. Its function is to allow the user to select a particular configuration environment for the computer.

The program is invoked in the usual way, by typing in the program name against the CP/M prompt:

A > CONFIG

The program is then loaded into memory and will start automatically. The screen shown below is displayed:

```
----------------------top of screen-----------------------------
|                    CONFIGURATION PROFILE                     |
|                                                              |
|  PRINTER                  DISK                  KEYBOARD     |
|                                                              |
|  1  P2121.BIL             1  5" ONLY            1  ASCII     |
|  2  P2121.ESA             2  5" AND 8"          2  CH        |
|  3  P2123.D/A                                   3  D/A       |
|  4  P2123.F                                     4  DK/N      |
|  5  P2123.S/SF                                  5  E         |
|  6  P2123.UK/E                                  6  F         |
|  7  P2131.D/A                                   7  I         |
|  8  P2131.F                                     8  P         |
|  9  P2131.S/SF                                  9  S/SF      |
| 10  P2131.UK/E                                 10  UK/NL     |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
|                                                              |
----------------------bottom of screen-------------------------
```

The configuration set by the factory is shown

One entry in each column is highlighted in inverse video, these represent the current configuration profile. In addition, one

of the column headers is highlighted in inverse video, this indicates the column that may currently have its configuration altered by the user.

The user can control the program with the following commands:

KEY	FUNCTION
TAB	Moves the highlight to the right from column header to column header in a cyclic manner.
SUPER SHIFT/TAB	Back tab, opposite of the above.
ESC	Leaves the program without updating the previous configuration.
CARRIAGE RETURN	Accepts the user's choice for a given column, highlighting the choice in inverse video.
SUPER SHIFT/CARRIAGE RETURN	Accepts the user's selection and forces the user to cold boot the system to implement the new configuration.
BACKSPACE	Used to correct user entry in the input field.
SUPER SHIFT/BACKSPACE	Negates change made by the user for the currently selected column, clears the input field and redisplays the original selection.

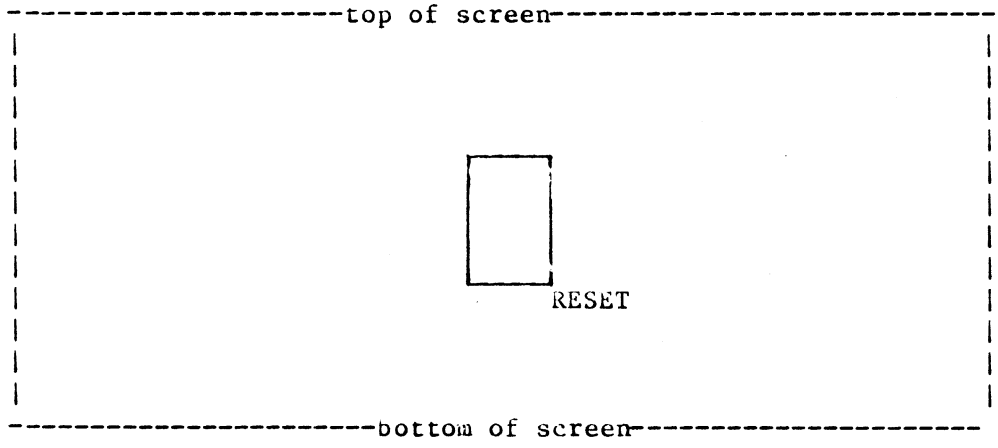
Define the configuration of your choice as follows:

- Move the highlight to the appropriate column
- Enter the number of your choice and press ⟨CR⟩

The column will remain selected and the users choice is highlighted.

When the user has set up the required configuration by means of the above commands he must accept the selection by SUPER SHIFT/CARRIAGE RETURN.

The program will then display the screen shown below and halt.



At this stage the user must press the RESET button on the front panel of the CPU, thus causing the new configuration to be implemented.

2.5.2 Utility: CPYDSK

The CPYDSK utility is unique to the Philips implementation of CP/M. The program lets the user make a copy of an entire system diskette. It replaces the method described in section 6.6 of the Digital Research Inc. manual 'An Introduction to CP/M Features and Facilities', which can be found in the last section of this manual.

The program is used in the following way:

1. After the standard CP/M prompt enter the program name

   A> **CPYDSK**

2. The program will then start and display the following message.

   DISK COPY 2.2
   Verify Copy? (Y/N)

3. After the copying process the operator may have the disk contents verified. Once this choice has been made, the program displays:

```
Source on A, Destination on B
READY? (Y/N)
```

4. The operator must ensure that the disk to be copied is now in drive A and the formatted target disk is in drive B. If he wants the copying process to start, he must enter a 'Y'. Following this action, the program displays:

```
Copying:
.........................----------->....
1                                       77
```

Each one of the 77 dots represents the track on the disk. The cursor moves sequentially to each dot as the track that it represents is being copied.

5. When the copying process is complete and the verify option has been selected, the following display is seen:

```
Verifying:
.........................----------->.....
1                                       77
```

Similar to the copying process, the cursor postion on the dots indicates which track is being verified.

6. When the disk copying (and verification if selected) is complete, the program displays the final message:

```
DISK COPY COMPLETE
```

and returns control to the CP/M operating system.

2.6 TRANSFERING FILES FROM 8" TO 5" DISKS

Most software which is written to run under the CP/M operating system, is supplied on 8" IBM 3741 format disks. The transfer of files from 8" to the P2500 5" inch disks is very simply performed by means of the standard CP/M file handling utility PIP, the details of which can be found in the CP/M manuals that form the last sections of this manual.

The Philips' P2146 Dual 8" Floppy Disk Drive Unit must first be connected to its P2061 Controller fitted in the CPU Unit (for the Controller fitting and Disk Drive address setting instructions, please refer to the P2500 System Reference Manual). As has been stated in section 2.4, the P2500 is capable of supporting 2 double density or 2 single density 8" disks.

Once the hardware configuration has been set up, the program CONFIG.COM must be used to prepare the interface software to support the 8" drives (see section 2.5.1).

THE FOLLOWING EXAMPLE ILLUSTRATES THE METHOD BY WHICH FILE TRANSFERS ARE ACHIEVED.

Example

It is required to transfer the file EXAMPLE.COM from an 8" disk in drive F: to a file of the same name on the P2500 5" disk in drive B:. The file is transfered using the following instruction:

```
A> PIP B:=F:EXAMPLE.COM
```

3 IMPLEMENTATION DESCRIPTION

3.1 SCREEN CONTROL CODES

The Basic Input Output Subsystem (BIOS), on the Philips implementation of CP/M on the P2500, contains all of the Operating System calls defined in the CP/M 2 Interface Guide, which is to be found at the end of this manual.

The system call 'CONOUT' controls the screen, and is specific to the particular console used. For the Philips unit, this routine has been implemented to include the following screen facilities:

CHARACTER MODE

The video control characters used are the same as for the ADDS REGENT 100 terminal.

CONTROL CODES (SINGLE)

cursor home	SOH	01H	
end of page	EOT	04H	
cursor forward	ACK	06H	
beeper	BEL	07H	on keyboard
backspace	BS	08H	
tabulator	HT	09H	
line feed or cursor down	LF	0AH	
delete screen	FF	0CH	
carriage return	CR	0DH	
cursor back	NAK	15H	
reset	CAN	18H	
cursor up	SUB	1AH	

All other control codes (<20H) will cause the error code 14.

CONTROL CODES (ESCAPE SEQUENCES)

Escape sequences are used to set one or more of the visual attributes when in character or mosaic graphic mode. The visual attributes are:

- low intensity character
- flashing character
- reverse video character
- underlined character

Each of the attributes takes effect from the current attribute position to the next position where an attribute is set. One character can have any combination of attributes. The escape sequence is:

ESC (1BH) 0 (30H) ABYTE

The bit interpretation of ABYTE is shown below:

bit 0	= 1	display character at low intensity
bit 1	= 1	flash character
bit 2	= X	set according to useage
bit 3	= X	set according to useage
bit 4	= 1	display character in reverse video
bit 5	= 1	display character underlined
bit 6	= X	set according to useage
bit 7	= X	set according to useage

This produces the following attribute character sequences:

UNDER -LINE bit 5	REVERSE VIDEO bit 4	FLASHING bit 1	LOW INTENSITY bit 0	ASCII CHARS	HEX. CHARS
0	0	0	0	ESC 0 @	1B 30 40
0	0	0	1	ESC 0 A	1B 30 41
0	0	1	0	ESC 0 B	1B 30 42
0	0	1	1	ESC 0 C	1B 30 43
0	1	0	0	ESC 0 P	1B 30 50
0	1	0	1	ESC 0 Q	1B 30 51
0	1	1	0	ESC 0 R	1B 30 52
0	1	1	1	ESC 0 S	1B 30 53
1	0	0	0	ESC 0 `	1B 30 60
1	0	0	1	ESC 0 a	1B 30 61
1	0	1	0	ESC 0 b	1B 30 62
1	0	1	1	ESC 0 c	1B 30 63
1	1	0	0	ESC 0 p	1B 30 70
1	1	0	1	ESC 0 q	1B 30 71
1	1	1	0	ESC 0 r	1B 30 72
1	1	1	1	ESC 0 s	1B 30 73

CONTROL CODES (SCREEN)

reverse screen	ESC 0 Z	1B 30 5A
start mosaic graphics	ESC 1	1B 31
end mosaic graphics	ESC 2	1B 32
start high resolution graphics	ESC 3	1B 33
end high resolution graphics	ESC 4	1B 34
visible cursor	ESC C	1B 43
erase to end of line	ESC K	1B 4B
roll up	ESC S	1B 53
roll down	ESC T	1B 54
next page	ESC U	1B 55
previous page	ESC V	1B 56
absolute cursor addressing (rr = row & cc = column with offsets of 20H), e.g. ESC Y 20H 20H means top left character.	ESC Y rrcc	1B 59 rr cc
invisible cursor	ESC c	1B 63
erase to end of page	ESC k	1B 6B

All other escape codes will cause the error code 0DH (wrong escape sequence)

HIGH RESOLUTION GRAPHIC MODE

The screen format is 512 (horizontal) by 256 (vertical) dots, this is slightly smaller than the standard character screen which is 640 by 288 dots. It is possible to address and set or clear each of the 131072 dots on the high resolution graphic screen as they are mapped (dot to bit) in video memory.

It is not possible to mix character mode and high resolution graphic mode as the high resolution graphic mode causes a different initialization of the video controller. For more details on high resolution graphics refer to the P2500 System Reference Manual (5103 992 30421).

The following control codes are available for use with high resolution graphics :

clear point xxy	0 xL xH y	00 xL xH y
set point xxy	1 xL xH y	01 xL xH y
clear screen	FF	0C
reset video	CAN	18
reverse screen	ESC 0 Z	1B 30 5A
end graphic mode	ESC 4	1B 34

Escape character format to set/clear a dot, this is included as a number of bytes in the write call (05H) :

FC	xL	xH	y

FC function code 0 = off, 1 = set
xL low order byte of x co-ordinate
xH high order byte of x co-ordinate
y y co-ordinate

FUNCTION CODES FOR THE VIDEO DRIVER

Bits 6 through 0 of the function code byte in the header of video driver calls can contain one of the following values:
Bit 7 must be set to zero.

00H = prepare — used to initialize the video controller hardware

01H = reset — used to clear the video and attribute memory. It also sets the video controller to character mode

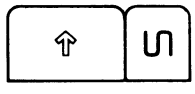
03H = status — used to obtain information about the video controller. This returns: a flag byte, the current cursor position and the character at the current cursor position. This can only be used in character mode

05H = write — used to write displayable characters or dots to the screen, send control codes to the video controller, or sound the beeper.

3.2 KEYBOARD

The keyboard codes are restricted to seven bits, those keys which would normally generate eight bit codes being totally masked, unless they are required for a given national version. In this case the eight bit code is translated into its' ISO seven bit equivalent.

The key  is used as the 'capitals lock' toggle

and  is used as the 'form feed' on/off toggle

3.2 PRINTER INTERFACE

A character translation table is associated with each printer. The tables are resident on the System Diskette. These tables can be selected by means of the program CONFIG.COM which is described in section 2.5.1 of this manual.

HEX:	23	24	27	40	5B	5C	5D	5E	5F	60	7B	7C	7D	7E
ASCII	#	$	′	@	[	\	]	^	_	`	{	|	}	~
D/A	#	$	′	§	Ä	Ö	Ü	^	_	`	ä	ö	ü	ß
F/B	£	$	′	à	°	ç	§	^	_	`	é	ù	è	¨
I	£	$	′	§	°	ç	é	^	_	ù	à	ò	è	ì
E	#	$	′	@	[	Ñ	]	^	_	`	{	ñ	}	¨
S/SF	#	¤	′	É	Ä	Ö	Å	^	_	é	ä	ö	å	ü
DK/N	#	$	′	@	Æ	ø	Å	^	_	`	æ	ø	å	~
P	£	$	′	@	Ã	Ç	Õ	^	_	`	ã	ç	õ	~
CH	£	$	′	ç	à	é	è	^	_	`	ä	ö	ü	¨
UK/NL	£	$	′	@	[	\	]	^	_	`	{	|	}	~

7 Bit ASCII Code Table

	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0		P		p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3		3	C	S	c	s
4	EOT	DC4		4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB		7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K		k	
C	FF	FS	,	<	L		l	
D	CR	GS	-	=	M		m	
E	SO	RS	.	>	N		n	
F	SI	US	/	?	O		o	↵

National variable characters are left blank, please refer to Appendix A.

Standard P2500 8 Bit Code Table

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	▗	▄	◇	°	≠	–	Ω	ë
1	SOH	DC1	!	1	A	Q	a	q	▖	▙	¡	±	Á	á	Æ	æ
2	STX	DC2	"	2	B	R	b	r	▗	▄	¢	²	´	î	Å	å
3	ETX	DC3	#	3	C	S	c	s	▖	▬	£	³	À	à	a	û
4	EOT	DC4	$	4	D	T	d	t	▚	▙	Õ	x	Â	â	Ô	ô
5	ENQ	NAK	%	5	E	U	e	u	▌	▙	¥	µ	Ä	ä	Ö	ö
6	ACK	SYN	&	6	F	V	f	v	▚	▙	¨	¶	É	é	Ó	ó
7	BEL	ETB	'	7	G	W	g	w	▚	▙	§	õ	È	è	Ò	ò
8	BS	CAN	(	8	H	X	h	x	▛	▟	¤	÷	Ê	ê	Ú	ú
9	HT	EM	)	9	I	Y	i	y	▛	▟	⌜	⌝	⊢	⊣	ø	ø
A	LF	SUB	*	:	J	Z	j	z	▛	▟	⌞	⌟	⊤	⊥	+	ı
B	VT	ESC	+	;	K	[	k	{	▛	▟	«	»	Í	í	Ω	ß
C	FF	FS	,	<	L	\	l	|	▜	▟	←	¼	Ì	ì	Ù	ù
D	CR	GS	-	=	M	]	m	}	▜	▟	↑	½	Ï	ï	Ü	ü
E	SO	RS	.	>	N	^	n	~	▜	▟	→	¾	Ç	ç	Ã	ã
F	SI	US	/	?	O	_	o	↵	▜	▟	↓	¿	Ñ	ñ	-	·

PRINTER TRANSLATION TABLE STRUCTURE

Below we have described the structure of the Printer Translation Table.

1 byte: number of levels in transparent table (1 to 3)

1 byte: number of bytes on level 1 (replaces one character with one character)

Translation Table, level 1:
(2 bytes/element: 1 entry byte, 1 exit byte)

1 byte: depth correcting table (4 = levels 2-4, starts with level 2)

1 byte: correcting byte between 2 characters
(08 = backspace)

1 byte: number of bytes on level 2 (replaces one character with two characters plus correcting byte)

Translation Table, level 2:
(3 bytes/element: 1 entry byte, 2 exit bytes)

1 byte: number of bytes on level 3 (replaces one character with three characters plus correcting byte)

Translation Table, level 3:
(4 bytes/element: 1 entry byte, 3 exit bytes)

Manual Name: P2219 CP/M Manuals

12NC: 5103 992 11921

This issue comprises the following updates:

Manual Title: P2219 CP/M Manuals

12NC: 5103 992 11921

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