M20

EIGHTBIT EMULATOR
User Guide

olivetti L1

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PREFACE

This manual describes the EIGHTBIT emulation package offered on the M20 product to allow Zilog Z80®(and Intel 8080®) instruction sets to be used. By means of this utility, software initially written for Z80-based CP/M® Operating Systems may run on the M20 without modification.

The manual is a complete User Guide and provides a description of how to prepare and use the emulator. In the Appendices, EIGHTBIT Terminal Control codes and escape sequences are listed with function keys, and, error messages.

REFERENCES: CP/M® Operating System Manual Copyright © 1983, by Digital Research

CP/M® Operating System Command Library Copyright ©1982, by Digital Research

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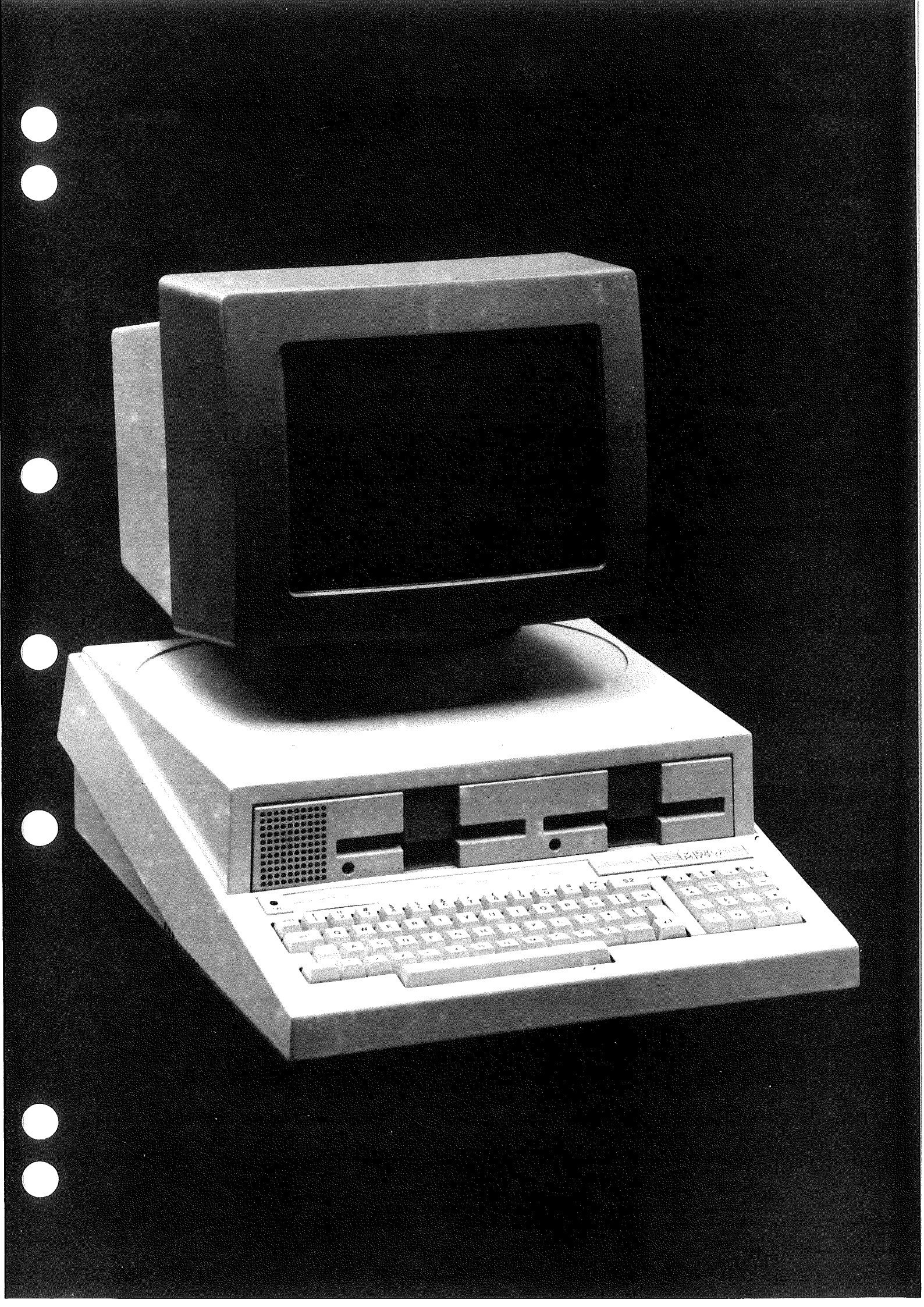

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1. GENERAL CONCEPTS

ABOUT THIS CHAPTER

Some general concepts on EIGHTBIT, as well as software requirements and M20 jumper settings are provided in this chapter.

CONTENTS

INTRODUCTION

EIGHTBIT is an M20 PCOS native utility. It permits the M20 user to acquire and use existing programs prepared both for the CP/M Operating System and the Zilog Z80 instruction set (which includes the Intel 8080 instruction set). These programs can be acquired from commercial sources, other users, or can be programs written by the user for previous hardware.

The programs to be used must perform all operations via BDOS and/or BIOS. Commercially distributed programs intended for use with various hardware should not present problems.

The instructions for the use of EIGHTBIT presume that the user is familiar with the use and operation of the M20 and PCOS.

Since PCOS despription and instructions are covered in the PCOS USER GUIDE, that information in not repeated in this publication.

The use of the CP/M Operating System and CP/M Application Program assumes the user to be familiar with CP/M, or, to have the appropriate CP/M and Application Software manuals available. It further assumes that the Operating Instructions are also available for reference.

The Appendices to this publication are intended for users who wish to down-load programs for use with the M20.

SOFTWARE REQUIREMENTS

To use EIGHTBIT, the user requires:

PCOS System Diskette with EIGHTBIT loaded as one of the available utilities.

CP/M System Diskette with CP/M System in Z80 or Intel 8080 object code recorded on an M20 formatted diskette.

Program Diskette with Z80/8080 instruction set object code program recorded on an M20 formatted diskette. This diskette and the CP/M System Diskette can, as a user option, be the same diskette.

PCOS and CP/M refer to M20 drivers as follows:

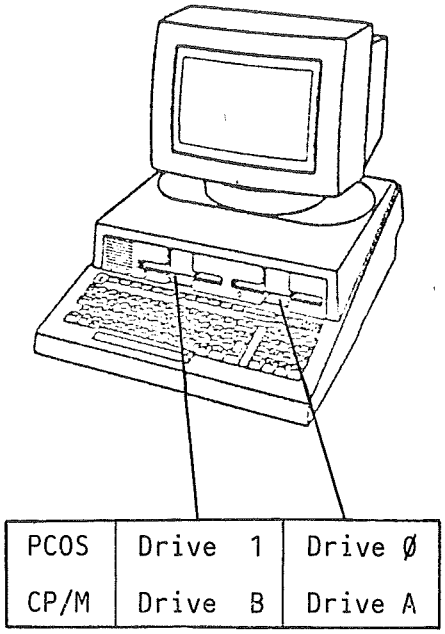

Figure 1-1 PCOS and CP/M drivers.

JUMPERS

M20 Jumpers must be set as follows:

P to P1

P2 to N2

R to R1

S2 to S

T2 to T

(N,N1,R2,S1 and T1 are "open")

If your M20 has a 'Y' block and you want to use a peripheral cable, then, the jumpers shown below must be connected.

Y2 to Y23

Y4 to Y21

Y6 to Y19

Y8 to Y17

Y10 to Y15

Y12 to Y13

If, on the other hand, a modem is used, then no action is required on the jumpers. If your M20 does not have a 'Y' block, then a modem must be used.

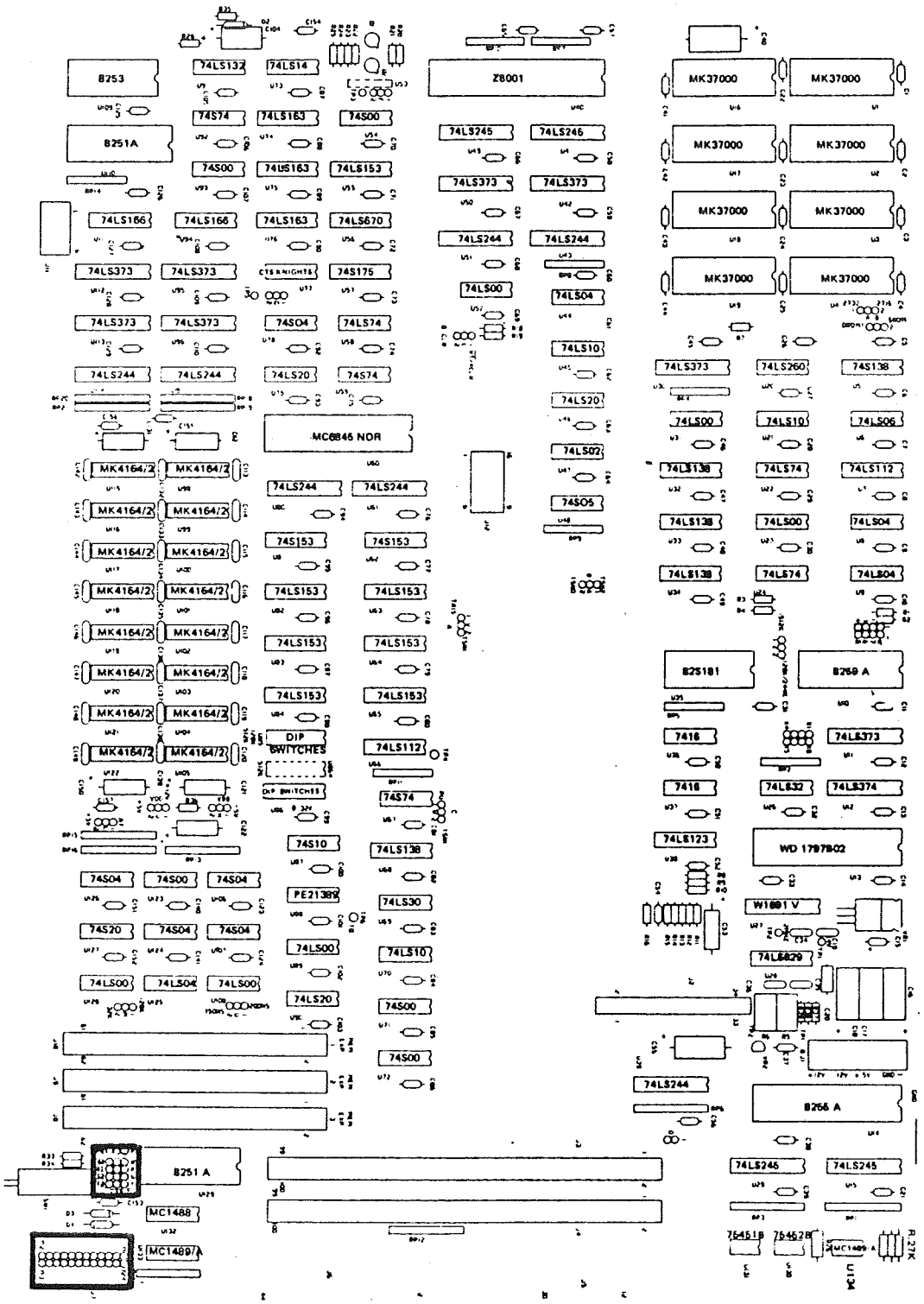

Figure 1-2 Motherboard, showing jumper locations

LICENSE FEES-COPYRIGHT

A user who moves a CP/M Operating System to the M20 (which has been licensed to another CPU model), is required, under license granted by Digital Research, to amend that license. Digital Research does make a small charge for amending the original license.

A user who has acquired a CP/M Operating System not yet licensed for use with any other model CPU for that user, may indicate the M20 as the initial CPU when returning the license to Digital Research.

A user who acquires the CP/M Operating System through Olivetti will also receive license for its use through Olivetti.

Application programs distributed by Olivetti will be licensed to the user through Olivetti under license granted by the owner thereof. Programs which are down-loaded by the user may be subject to license and/or copyright protection. Attention should be given to the restrictions of the license furnished by the program vendor, and, any previsions pertaining to amending that license in changing the CPU to which the programs are licensed, etc.

2. HOW TO RUN EIGHTBIT

ABOUT THIS CHAPTER

This chapter describes how to invoke EIGHTBIT, to prepare diskettes and to set-up the emulator parameters.

CONTENTS

USING EIGHTBIT

EIGHTBIT can be invoked from PCOS as a standard utility anytime PCOS is at the ready (as indicated by > on the screen). If the M20 has been running BASIC, the user must first exit BASIC entering:

system CR

before invoking EIGHTBIT.

The instruction sequence is as follow:

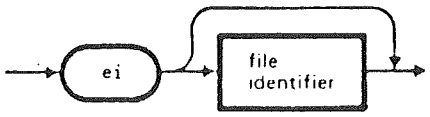

Figure 2-1 To invoke EIGHTBIT

Where:

SYNTAX ELEMENT	MEANING
file identifier	The name of the file containing the CP/M operating system. This file must not be password protected and the extension must be ".sys". If omitted, the system will search for the "cpm.sys" on drive Ø by default.

M20 will then prompt:

```
MOUNT DISK-->d:filename
      when ready, press <ret>
      Q to quit
```

and the user must remove PCOS diskette, insert the CP/M system diskette on the indicated drive, and then press CR .

The following sequence is recommended when the M20 is turned on with the intention of using a CP/M program:

1 - Insert PCOS/EIGHTBIT diskette in drive 1 (left)

2 - Turn M20 on.... will bootstrap and load PCOS

3 - At PCOS ready, indicated by >
enter: ei CR

4 - EIGHTBIT will be loaded into memory and will display the mount disk message.

5 - Insert diskette with file "cpm.sys"
in drive 0 (right)

press: CR

Note: The CP/M Operating System can be on a separate diskette with the CP/M utilities, as distributed, or the CP/M Operating System can be on the same diskette with one or more Application Programs. For easier use, the user should have put CP/M Operating System on to the user's Application Program diskettes. See CP/M Instructions for the use of SYSGEN.

At this point the PCOS diskette may be removed. The M20 is now running under the CP/M Operating System. Drive 1 is now available for the mounting of diskettes with filename "cpm.dat" or "cpm.sys".

Follow CP/M Operating Instructions and the Operating Instructions for the Application Program to be used.

DISKETTE PREPARATION

As previously mentioned in chapter 1, to run EIGHTBIT the user requires:

EIGHTBIT (PCOS) diskette.

- The PCOS System diskette, with the EIGHTBIT utility included, is distributed by Olivetti.

- EIGHTBIT may be distributed as a PCOS utility not on a PCOS diskette. It can be moved via the PCOS utility FCopy.

CP/M System diskette (M20 CP/M format)

- CP/M distribution diskette (filename "cpm.sys").

CP/M Program diskette (M20 CP/M format)

- Diskettes can be prepared locally following the instructions for CP/M FILE DOWN-LOAD TO CP/M FILE ON M20. See Appendix A.

Remarks

Programs down-loaded locally may vary from the performance of programs down-loaded for distribution by Olivetti due to tailoring which may have been included to enhance operation. The program will execute properly.

CP/M programs can reside on the same diskettes as the CP/M Operating System or can be kept on a separate diskette at user option.

CNEW UTILITY

Empty diskettes for the CP/M M20 environment are initialised by the PCOS utility program, CNEW. This program creates the necessary PCOS file which is the CP/M "diskette". The CP/M directory is set to empty.

The instruction sequence is as follows:

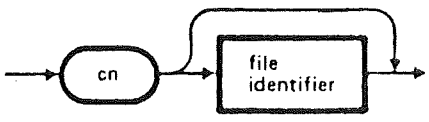

Figure 2-2 Initialisation by CNEW Utility.

Where:

SYNTAX ELEMENT	MEANING
file identifier	The name of the CP/M diskette to be initialised. A password is not allowed. The file extension may be either ".dat" or ".sys". The extension ".sys" is reserved for diskettes which contain the CP/M operating systems. If omitted, the system will search for the file "cpm.dat" on drive Ø by default.

M20 will then prompt:

```
MOUNT DISK-->d:filename
        when ready, press <ret>
        Q to quit
```

and the user must insert the CP/M diskette on the indicated drive, and then press CR . "Q" returns to PCOS without affecting the diskette.

Remarks

The diskette must have been formatted using the PCOS utility VFormat before using CNEW.

Any existing PCOS file must first be deleted using the PCOS utility VNew.

EMULATOR PARAMETERS

A "cold" or "warm" boot of CP/M causes the emulator to check the parameters stored on the CP/M diskette, "cpm.sys", and to reinitialise the emulator to follow those parameters.

The utility, CSET, is used to set the parameters on the CP/M diskette (PCOS file with filename "cpm.sys").

EIGHTBIT has "fast" and "slow" emulation set by a parameter. In "fast" mode EIGHTBIT emulates BDOS calls and some BDOS subroutines. It also uses an abbreviated BIOS transfer vector. The use of the "fast" emulation will cause problems with programs which attempt to redefine BDOS entry point (such as DDT) and with MICROSOFT BASIC under CP/M. Those programs should be run with emulation speed set to "slow".

CSET UTILITY

Emulator Parameters are set by use of PCOS utility CSET.

The instruction sequence is as follows:

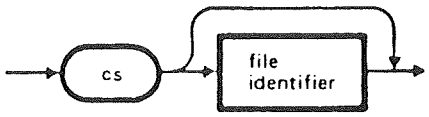

Figure 2-3 CSET Instruction Sequence

Where:

SYNTAX ELEMENT	MEANING
file identifier	The name of a CP/M system diskette. A password is not allowed. The file extension must be ".sys". If omitted, the system will search for the file "cpm.sys" on drive Ø by default.

The program will display the current parameters and will permit change to those parameters. If no change is to be made, only CR is required. The current parameter will be unchanged and the next parameter displayed.

The parameters and their possible values are as follows:

PARAMETERS	VALUES
Printer	serial/parallel
Baud Rate	50 - 19200
RS232C Char length	5 - 8 bits
Parity	Enabled/Disabled
Parity	Odd/Even
Number Stop bits	1, 1.5, 2
Mode	Half/Full Duplex
Protocol	Xon/Xoff Etx/ack NONE
Physical Control	BUSY,DTR,RTS
Communications	Async/Sync
Cursor Blink	Yes or NO
Emulation Speed	Fast or Slow (DDT and MICROSOFT BASIC need Slow)

A. CP/M FILE DOWN-LOAD TO CP/M FILE ON M20

ABOUT THIS APPENDIX

This appendix describes how to down-load a CP/M file to a CP/M file on M20 by using the SENDFILE and RCVFILE utilities.

CONTENTS

SYSTEM CONNECTION

Down-load of CP/M files from host system to the M20 system requires connecting the M20 directly to the host via RS232C interface.

M20 jumpers are set-up for peripheral type connection to the CPU.

SOFTWARE REQUIRED

The following two programs:

- CP/M Special utility, SENDFILE

- Special utility, RCVFILE

must be present both on the Host System and the M20 respectively.

PROCEDURE FOR DOWN-LOADING

To down-load a CP/M file from Host to M20, the following steps are necessary:

- Load PCOS.

- Load the RS232 command into memory by entering:

  rs CR

- Set the parameters of the emulator using the CSET utility (See chapter 2, "Emulator Parameters").

- Invoke EIGHTBIT by entering:

  ei CR

  to activate the EIGHTBIT emulator environment.

- When the prompt A > is displayed, the user must enter:

  RCVFILE [d:]filename.ext CR

  where d = A for M20 drive Ø
  = B for M20 drive 1
  [ ] = optional

If the drive is the one in which RCVFILE is inserted, d: can be omitted.

M20 replies:

WHEN READY HIT <CR>

and no action must be taken until Host system is prepared for transmission.

- On Host, with the SENDFILE program on drive A and the diskette with file to be transmitted on drive B, at CP/M prompt A>the user must key-in:

SENDFILE B:filename.ext

without depresssing CR .

- On M20, the user must now depress CR .

M20 replies:

TRANSFER ACTIVE

The user must wait approximately 5 seconds and then, on the Host, depress CR .

If communication is established, shortly the M20 will reply:

DATA BEING RECEIVED

When transmission is completed and after M20 has timed out, M20 will respond with the number of records received and returns to A>.

If a transmission error, both the M20 and the host system must be turned off. Complete start up, including the invoking of EIGHTBIT, etc., must be repeated.

If filename used with RCVFILE is the same as a filename already on the receiving diskette, RCVFILE will ask if it is to be overwritten.

SENDFILE, RCVFILE

CP/M utility SENDFILE is distributed as a source listing on the CP/M Release diskette. As it must be executed on the host system, not the M20, it may need to be customised to the host used.
It is currently set (and distributed) for an ALTOS ASC8000-1.

The object of this program is to place the characters of the file on the RS232C output lines. The program must send the characters without enforcing parity. The method available on the ALTOS was to utilise the RS232C printer port.
The CBIOS of the ALTOS does not enforce parity. The program passes output directly to the printer routine of the CBIOS to ensure that the CP/M BDOS does not provide parity.
Parity in the high order bit of the character would be FATAL.

The location of the CBIOS on a host system may be determined by utilising the CBIOS listing and knowledge of the size of the host CP/M (ie: 32K,64K, etc.).

RCVFILE is distributed as a utility on the CP/M Release diskette.

SENDFILE is used to transmit files from host to M20.

B. KEY ASSIGNMENT/ TRANSACTION TABLES

ABOUT THIS APPENDIX

This appendix provides keyboard and screen parameters to be set-up, and, key assignment/translation tables.

CONTENTS

CONFIGURING PROGRAMS TO TERMINAL FEATURES

EIGHTBIT assumes the keyboard and video to be a SOROC IQ 140.

Thus, whenever a software package requires installation by input of configuring parameters, those parameter answers pertaining to the terminal (keyboard/screen) should be based upon the list of EIGHTBIT Terminal Commands.

Note that screen width should be defined as 80 characters and screen height should be defined as 25 lines.

Also note that the inverse video and normal video of EIGHTBIT are different than that of the SOROC IQ 140.

TERMINAL COMMANDS

KEYBOARD ENTRIES	CHARACTER	VIDEO RESPONSE
SHIFT 1	'1'	
SHIFT 2	%0A	Cursor DOWN 1 row
SHIFT 3	'3'	
SHIFT 4	%08	Backspace
SHIFT 5	%1E	Homes without Clear
SHIFT 6	%0C	Cursor RIGHT 1 character
SHIFT 7	%1D	Cursor LEFT 1 character
SHIFT 8	%0B	Cursor UP 1 row
SHIFT 9	%1F	New Line (CR/LF)
CTRL ! \	%1C	
CTRL - ^	%1E	Homes without Clear
CTRL _ 0	%1F	New Line (CR/LF)
CTRL HOME	%7F	
↵	%0D	CR
S1	%09	TAB
S2	%1B	Starts ESCape sequence

ESCAPE SEQUENCE

KEYBOARD ENTRIES	VIDEO RESPONSE
S2 = r c	Sets cursor row: r=ROW + %20 c=COLUMN + %20
S2 T	CLEAR to end of line
S2 ;	CLEAR and HOME
S2 Y	CLEAR to end of screen
S2 +	CLEAR and HOME
S2 1	set tab at current column
S2 2	Clears Tab at current column
S2 3	Clears all Tabs
S2 I	Back Tab
S2 i	Forward Tab
S2 E	Insert Line
S2 j	Reverse Video
S2 k	Normal Video
S2 R	Delete Line
S2 Q	Insert Character
S2 W	Delete Character
S2 *	CLEAR and HOME
S2 :	CLEAR and HOME

S2 t	CLEAR to end of line
S2 y	CLEAR to end of screen
S2 X	CLEAR and HOME
S2 f	Ignore next 4 output characters
S2 G	Ignore next output character

SPECIAL KEY ASSIGNMENTS

KEY COMBINATION	ACTION
COMMAND ?/	alpha shift lock
COMMAND RESET	goes to MONITOR (ROM only)
COMMAND S	will pause video until any other key is pressed
COMMAND C	Clears input buffer
CTRL RESET	reboots PCOS
CTRL numeric +	numeric shift lock
CTRL numeric -	numeric shift unlock

C. ERROR MESSAGES

ERROR MESSAGES

This appendix shows possible error messages emitted by the M20, running under CP/M operating system.

ERROR 90 = INVALID FILE SPECIFIED

The CP/M filename is incorrect.

ERROR 91 = WRONG NUMBER OF PARAMETERS

More that one parameter was specified.

ERROR 95 = INVALID PARAMETER TYPE

The filename specified is invalid.

ERROR xx = FILE CANNOT BE OPENED

The specified file cannot be accessed. Check PCOS error codes for value of xx and further explanation.

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