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Welcome to CP/M Plus, the operating system for ambitious MSX users.

A lot of work has been put into this CP/M implementation giving it high fidelity, power and performance. We hope you enjoy the results:

- three times faster screen display
- a fast RAM disk (drive M) that uses VRAM and free mapper-memory (120K capacity with a minimum configuration).
- inverse video for programs like WordStar and Multiplan
- VT52 video control for easy installation of application programs
- maximum work area for application programs (61K TPA)
- ISO character sets for different languages (for communication purposes and for programs like WordStar and Multiplan)
- buffered RS232 (optional) for communication purposes
- BIOS error messages do not destroy the display of application programs
- different text and cursor colors (optional)

The basic structure of MSX-DOS and CP/M Plus are very similiar with the exception that CP/M Plus has a lot of new features: The Help system for inexperienced users, password protection for disks and files, input/output redirection to and from disk files, file attributes and search paths, and much more.

A lot of utility programs are included in the CP/M Plus package. A full screen text editor, a VT52 terminal program and an assembler development system.

For our CP/M users a lot of software is available that does not cause compatibility problems. Application programs like WordStar, dBASE, Multiplan, compilers and interpreters for BASIC, PASCAL, MODULA, C, FORTRAN, COBOL, FORTH, LISP.

We hope you enjoy CP/M Plus!

RVS Datentechnik, June 1987

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1. Starting with CP/M Plus

1.1 Requirements

To run CP/M Plus the following equipment is necessary:

 A MSX2 computer, with a 128K Video RAM (VRAM), a minimum of 128K program memory and an imbuilt mapper.

Most MSX2 computers with 128k program memory (or more) have an imbuilt mapper. For example CP/M runs on Philips VG8235, VG8250, VG8280 or Sony HB700. If your MSX2 computer has only 64K program memory or it is without mapper, a memory card which contains at least 128K and an imbuilt mapper must be added. Ask your dealer about it.

- At least one internal or external 3.5" disk drive (single or double sided).
- A Video Monitor, which is capable of displaying an 80 column text.

To improve your work you may add:

A parallel printer (MSX or Non-MSX).

Additional disk drives (This CP/M-System supports up to 6 MSX disk drives).

A MSX RS232 interface (This RS232 Interface must meet the MSX hardware specifications, but no ROM-resident software is required).

1.2 Booting CP/M

CP/M Plus comes with two single sided 3.5" disks, the CP/M system disk and the programmer's utilities disk. To start CP/M:

- Turn the power on for the periphals and computer.
- Insert the CP/M system disk in drive A.
- Press the reset button on the computer.

Now CP/M is booting. After some messages the prompt is displayed:

A>

The system prompt A> signals that CP/M is ready and awaiting your commands.

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If the prompt is not displayed check the system components (computer, monitor, disk drive and cabeling) and repeat the above steps. If you are not successful contact your dealer.

1.3 First steps with CP/M

When the prompt appears it is possible to enter a command line. A command line consists of a command optionaly followed by some parameters. The RETURN key (on some keyboards ENTER or CR) closes the command line and transmits it to CP/M for execution.

Example:

The command DIR (Directory) displays the contents on the disk. Enter **DIR** and press the RETURN-key:

A>DIR

The answer will look like this:

A:DATE	COM	:DEVICE	COM	:DUMP	COM
A:ED	COM	:GET	COM	:HELP	COM
A:DISKCOPY	COM	:INITDIR	COM	:PIP	COM
A:PUT	COM	:FORMAT	COM	:SET	COM
A:SETDEF	COM	:SHOW	COM	:SUBMIT	COM
A:READ	ME				

A>

When entering commands there is no difference to be found between the upper case and the lower case characters.

The control keys can be used for correcting errors:

erases last typed character
erases all typed characters
execution of command line
repeats last command line
switches Printer on/off for protocoll
restart of CP/M (Warm boot). Often
used to terminate or abort programs

A complete description of all control keys may be found in the appendix B.

1.4 READ.ME

The system disk contains a text file entitled READ.ME which contains the description of new features, not documented in this manual, and error corrections. To display the text enter the following command:

A>TYPE READ.ME

1.5 Backup your disks

To protect you from making mistakes resulting in disk damage you should make copies of your original CP/M disks. When you have made the copies do not use the original disks any more. You are advised to work with your copies. However it is illegal to give the copies further to other people.

To make copies of your CP/M disks you must first format two 3.5" disks (single sided) and then copy the CP/M disks. This is described in the following paragraphs.

Formating disks

Your computer is unable to store any data on new blank disks until they have been formated. To format a disk use the FORMAT program of CP/M, which is nearly identical to the FORMAT command of MSX-DOS or MSX-BASIC.

If you have made typing errors during the following steps press the CTRL-C key to clear and start the procedure again.

• Put the CP/M system disk in drive A and enter the following commands:

A>FORMAT start of FORMAT Program Drive name? (A,B) A enter A

 If your disk drive is able to work with double sided disks the following question will appear:

```
1-single sided
2-double sided
? 1
```

enter 1

• This message will then follow:

Strike a key when ready

Insert the new disk in drive A, then type any key. Now the disk will be formated.

 When the formating process is completed the following message will appear:

Format complete! Format another disk? (Y/N)

Remove the formated disk and type Y to format the next disk and repeat the procedure. After formating the second disk enter N to finish.

Copying disks

To copy a disk use the DISKCOPY program on the system disk. Use the "write protect guard" on the original disks to protect you from mistakes.

- Insert the write protected CP/M system disk in drive A. If you have two disk drives, insert a blank formated disk in drive B.
- Enter the following commands:

A>DISKCOPY	start DISKCOPY program
DISKCOPY 1.2 (c) 1987 RVS Datentechnik	
Enter source drive? A Enter target drive? B	enter A enter B
Insert disks and press any key!	press the RETURN key

Now the disks are being copied.

 If you are only working with one disk drive the following message will appear:

insert disk for drive B and type any key when ready

Then you must insert the formated new disk (destination disk) and type a key.

And if following message appears:

insert disk for drive A and type any key when ready

you must re-insert the original disk (source disk) and type any key.

When the disk is copied the program asks you to:

Copy another disk? (Y/N)

Type Y in order to copy the second disk and than insert the second disk (programmers utilities) in drive A repeating the procedure. After copying the second disk enter N to end the copying.

2. Features of CP/M Plus

We assume that you are already familiar with MSX-DOS (or CP/M 2.2 or MS-DOS), therefore you know what a file and a filename are. If not, please look for some introductionary material on this matter.

2.1 What is similiar to MSX-DOS?

Comparing MSX-DOS and CP/M there are a lot of similiar or identical features to be found.

Disk drives

In CP/M and MSX-DOS the disk drives have the names A, B ... The name of current default drive is always displayed in the system prompt. For example:

A>

If you want to switch to another drive you simply enter the drive name followed by a colon. For example:

A>**B:** B>

Drive simulator

Like MSX-DOS the RVS-CP/M Plus system uses a drive simulator for drive B, if you are working with one disk drive. If you switches to drive B, the simulator asks you to insert the diskette for drive B, if you switch back to drive A, the simulator asks you to insert the diskette for drive A. All application programs "think" that you have two disk drives, which is often usefull for copying data (cf. 1.5).

RAM disk

The RVS-CP/M Plus system has a imbuilt RAM disk with the drive name M (M for Memory). Because the data on drive M are stored in the computer memory, access to the RAM disk is quicker than it is to real disks. However when you switch off or reset the computer all data on the RAM disk is erased.

Files and file names

All data stored on disk is organised in files. Every disk file has an unique specification. The file specification has the following components:

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The first component is the name of the drive, where the disk containing the file is inserted. If you do not specify the drive name, CP/M seaches for the file on the disk in the current default drive.

The second component is the filename, which has 1 to 8 characters (letters, digits or some special characters, cf. appendix C)

The third component is the file type identifier with up to 3 characters which are used to identify the type of file. For example: TXT for texts or COM for commands or programs. You must seperate the type specification with a period from the file name.

Examples:

10011	file name LOOK1, no file type specification
LOOK1	
DATE.COM	file name DATE, file type COM (command)
M:DATE.COM	file name DATE, file type COM in drive M:

A lot of file types have standard type specifications like COM or TXT, which are listed in Appendix C.

Wildcards

If you want to specify a group of files (e.g. for copying) then use the wildcard characters: question mark? for an arbitrary character, asterix * for an arbitrary character sequence.

Examples:

LOOK?.COM	all files of type COM and name starting with LOOK followed by one character
*.COM	all files of type COM
.	all files
DA*.COM	all files of type COM and name starting with DA

Program files

Files containing executable programs have the file type specification COM (Command). For example:

DATE.COM

To start such a program you simply enter the name in the command line without type specifier:

A>DATE displays current time and date

Some programs need additional parameters on the command line. Such parameters must be entered on the same line after the program name seperated by one or more spaces. For example:

A>SHOW M: displays the current capacity of drive M (RAM disk). M: is the parameter, you can also enter A:

Text files

Text files contain readable texts. Such texts are created with a text editor like EDIT (cf. EDIT description). You can display text files using the TYPE command (for example TYPE READ.ME displays the text file READ.ME).

Standard text files contain plain ASCII (or ISO) text. A text line ends with a CR and a LF character, the end of the text is marked with a CTRL-Z character.

Batch files

Batchfiles are text files containing command lines. When you start a batch file, the command lines are executed. Batch files have the type specification SUB (in MSX-DOS it is BAT). To start the batch file XXX.SUB you must enter:

A>SUBMIT XXX

After the cold boot CP/M looks on the boot disk as to whether or not there is a batch file with the name PROFILE.SUB. If there is, CP/M starts the batch file automatically. (In MSX-DOS the equivalent name is AUTOEXEC.BAT).

Note that with CP/M for batch file execution the program file SUBMIT.COM must be available on the disk. CP/M loads this program before batch processing. The current disk must not be write protected, since CP/M creates an intermediate file for batch processing (cf. SUBMIT description).

CP/M Commands

CP/M Plus is a very powerful operating system which offers several commands and utility programs. A description of these commands may be found in chapter 3. Here is just a short description of the most important commands (which have equivalents in MSX-DOS).

CP/M command:	purpose:	MSX-DOS command:
DIR specification	displays all disk files which meet the specification	DIR specification
ERA specification REN new.typ=old.typ PIP destination=source	erases the specified file(s) from disk changes the name of file "old" to "new" copies file(s) with specification "source"	DEL specification REN old.typ new.typ COPY source destination
TYPE specification	to destination displays the specified text file displays current time and date	TYPE specification TIME

If there is no drive name in the specification, the commands work on the current drive. Pay attention to the different order of parameters in REN and PIP.

The commands DIR, ERA, REN and TYPE are resident commands. They are always present in the computer's memory when you enter CP/M commands.

The commands PIP and DATE are (unlike MSX-DOS) not resident and must be loaded from the disk for execution like other programs. Such commands are called "transient". To use transient commands, the necessary program files must be available on the current disk or on a disk in another drive, which you must specify.

In some cases with resident commands, when a special option is needed, a transient part must be loaded from the disk.

New options for the above commands and other commands are further described in chapter 3.

2.2 New Features in CP/M Plus

In the following section we want to direct your attention to special features in CP/M, not found in MSX-DOS. We have given no full description of these features, however we tell you which commands to use. If you are interested in these features refer to the command description in chapter 3.

Getting Help

Using the HELP program you can ask for information about CP/M commands and it's options. When you start HELP a list of available topics is displayed. When you need information enter the topic and the answer will be displayed.

File Attributes

You can mark the files with special "flags" or "attributes". Some of these attributes have a special meaning others you can use as you wish. To set or change attributes use the SET command.

The available attributes are:

RO	Read Only: This attribut protects the file against changes or deletion.
RW	Read Write: The opposite to RO. The file may be changed or deleted. By default all files are RW.
SYS	System file: The file is invisible and will not be displayed in DIR command.
DIR	Non-system file: The file will be displayed in DIR command (default)
ARCHIVE ON/OFF	These attributes give a sophisticated backup mechanism, which works together with PIP: a special option of PIP copies only the files, which have been changed since last copying. After copying the archive attribute is turned on to indicate that there is a backup.
F1F4 ON/OFF	User defined attributes

User areas

A CP/M disk has up to 16 different user areas. User areas are disks in a disk (a feature similiar to subdirectories in other operating systems). The user areas are numbered from 0 to 15.

All files on the disk may be transfered using PIP in one of these user areas. After begin the user area 0 is activated. With the USER command you can switch to another user area.

Only the files in the current user area can be accessed. There is one usefull exception: system files in user area 0 (SYS attribute) are accessible from all user areas.

Time and date stamps

If you prepare a disk with INITDIR command you can ask CP/M to record the time and date of file creation, file access or file update using the SET command. A special option of DIR command displays these time stamps.

Password protection

With SET command you can give passwords to disks and files. Only the people who know the passwords have access to the disks or files. In file specifications the password must be added with a colon separating the description (e.g. A:DATE;SECRET)

Search paths

When you are starting programs or batch files and you have not specified a drive, CP/M will search on the current disk drive for these program or batch files. With the SETDEF command you can tell CP/M to search over more than one drive.

Devices

CP/M makes a distinction between logical and physical devices. The logical devices are:

logical device:	name:	
Console List device	CON: LST:	
Auxiliary device	AUX:	

The device CON: is used for entering commands and displaying results. The device LST: is used for printing. All logical devices can be accessed through the PIP command as a source or destination of data.

All logical devices are assigned to one or more physical devices. The available physical devices are different from system to system.

The following physical devices are available:

physical device:	name:	assigned logical device:
keyboard and monitor screen MSX printer (parallel port) Non-MSX printer (parallel port)	CRT LPT LPT1	CON: LST:
RS232 interface (if available)	RS232 NULL	AUX:

CP/M gives you the possibility to change the device assignments with the DEVICE command. For example you can use a terminal via RS232-Port as console device (CON:) or a serial printer as list device (LST:).

Device redirection to files

You can redirect device output data (for CON: or LST:) to a disk file using the PUT command. This is usefull when you want to record data for further processing instead of printing it.

It is also possible to supply input data (for CON:) through a disk file, it looks as if an invisible ghost is typing the keys (cf. GET command).

Character Sets

Your CP/M system is for international usage and offers different character sets.

The MSX character set contains specific characters for European and American languages. However a lot of software (e.g. WordStar), printers and communication devices work with other characters sets (7 Bit according to ISO specification).

You can switch with the LANGUAGE command to one of these character sets to work with such software or devices.

File exchange between CP/M and MSX

Some programs run with CP/M as well as with MSX-DOS. It is possible to process data with CP/M programs and MSX programs. Therefore it is possible to transfer files from MSX to CP/M and vice versa. Use the utility programs MSXTOCPM and CPMTOMSX for file transfer, because CP/M disks are unreadable for MSX-DOS and vice versa.

Single sided and double sided disks

If you have a disk drive for single and double sided disks you should know that the DISKCOPY program is unable to copy from a source disk to a different formated destination disk. Use the PIP program for copying all files. If you want to use a double sided boot disk, use COPYSYS for copying the CP/M system to the new disk.

3. Commands and utility programs

In this section you will find the description of the commands and utility programs in alphabetical order. Resident commands are marked as "resident", the programs which are added by RVS Datentechnik are marked as "RVS".

Note that no description of the programmers utilities is given. Refer to CP/M programmers utilities guide (cf. appendix E).

COLOR (RVS)

Set screen colors

COLOR n, m	sets foreground color n and background color m for character display
COLOR n, m, j, k	sets foreground color n and background color m for character display and foreground color j and background
	color k for cursor display

The following colors are available:

0	transparent	8	medium red
1	black	9	light red
2	medium green	10	dark yellow
3	light green	11	light yellow
4	dark blue	12	dark green
	light blue	13	magenta
6	dark red	14	gray
7	cyan	15	white
	dark red	14	gray

Example:

A>COLOR 2,1 green text and black background A>COLOR 5,1,1,15 blue text and white cursor

COPYSYS (RVS)

Copy CP/M

COPYSYS start system copy program

To make a boot disk you must copy the operating system onto the disk (system tracks and CPM3.SYS) using COPYSYS. COPYSYS is able to copy the operating system onto disks in a different format than original disk. COPYSYS will not destroy any files already on the disk.

When working with one disk drive, enter A as source drive and B as destination drive. The drive simulator will ask you to change the disks during copying.

A>COPYSYS 1.2 (c) RVS Datentechnik Enter source drive: A Enter target drive: B Insert disks and press any key!

CP/M system disk in drive A new disk in drive B

CPMTOMSX (RVS)

File transfer from CP/M to MSX disks

CPMTOMSX starts file transfer program

CP/M disks and MSX disks have the same physical format but a different logical format. Therefore CP/M disks are not readable for MSX-DOS and vice versa. To transfer files use CPMTOMSX or MSXTOCPM. Use wildcards for multiple file transfers.

When working with one disk drive, enter A as source drive and B as destination drive. The drive simulator will ask you to exchange the disks during copying. Use the "write protect guard switch" on the source disk to avoid mistakes.

To abort CPMTOMSX press CTRL-C.

Example:

A>CPMTOMSX

CP/M to MSX file transfer 1.1 (c) 1986 RVS Datentechnik Enter source file: A:*.* all files of CP/M disk A: Enter target file: B: to MSX disk in drive B: Insert disks and press <cr> to continue! press RETURN to copy ...

DATE

Control of time and date

DATE	displays current time and date
DATE mo/dd/yy hh:mi:ss	sets date to month mo, day dd, year yy and
	time to hour hh, minute mi and second ss
DATE SET	sets time and date in dialog

A>DATE SET

```
Enter today's date (MM/DD/YY):
Enter the time (HH:MM:SS): 10:15:00
Press any key to set time
A>
```

DEVICE

Device parameters and assignments

CP/M makes a distinction between logical and physical input/output channels. CP/M has five logical channels in three devices with the following device names:

CON:	console device (input and output channel)
AUX:	auxiliary device (input and output channel)
LST:	listing device (output channel)

In DEVICE program you can use the following additional names to specify logical channels:

CONIN:	console input
KEYBOARD:	console input
CONOUT:	console output
AUXIN:	auxiliary input
AUXOUT:	auxiliary output
PRINTER:	list output

The following physical devices are available:

CRT:	keyboard input and monitor screen output
LPT:	MSX Printer (parallel port)
LPT1:	Non MSX printer with 7 bit country specific character set (parallel port)
RS232:	serial interface (only with MSX RS232 plugged in)
	(default parameter: 300 Baud, 8 data bits, no parity, 1 stop bit)

For every physical device it is specified whether it is an input or an output device, a parallel or a serial device and the values of specific parameters (like baudrate) for serial devices.

Display of device assignments and parameters

DEVICE	displays all devices with their properties, baud rates
	and the current assignments
DEVICE NAMES	displays all physical devices and their properties
DEVICE VALUES	displays the current assignments
DEVICE logical	displays which physical device is assigned to the specified logical device
DEVICE physical	displays properties and parameters of the specified physical device

A>DEVICE

```
Physical Devices:
I=Input, O=Output, S=Serial, X=Xon-Xoff
CRT NONE IO LPT NONE O
LPT1 NONE O RS232 300 IOS
Current Assignments:
CONIN: = CRT
CONOUT: = CRT
AUXIN: = RS232
AUXOUT: = RS232
LST: = LPT
Enter new assignment or hit RETURN
```

Change of assignments

DEVICE logical=NULL	disconnect the locical device specified
	from all physical devices
DEVICE logical=physical	assignment of physical device to a logical
	device, all inputs or outputs for the logical
	device are processed through the physical
DEVICE logical=physical1, physical2	2, assignment of more than one physical
	device to a logical device

Examples

A>DEVICE	LST:=NULL	useful if there is no printer connected
A>DEVICE	CON:=RS232	use of an external terminal as console

Changing parameters of physical devices

DEVICE physical [options]	parameter setting for a physical device
DEVICE logical=physical [options]	parameter setting and assignment

For serial devices (RS232) you have the following options for parameter setting:

XON NOXON baudrate	switche	s off XON	I/XOFF pro I/XOFF pro audrate mi	otocol	e of the follwing values:
	50 1200 7200	75 2000 9600	110 2400 19200	300 3600	600 4800

Example:

A>DEVICE RS232[9600] set baudrate 9600 for RS232

Change console characteristics

DEVICE	CONSOL	E [options]
--------	--------	-------------

displays or changes the console characteristics (number of lines and number of columns).

Some programs (e.g. TYPE) refer to these console characteristics for output formating. The following options are available:

PAGE	displays the current characteristics
COLUMNS=n	sets column number to n
LINES=n	sets line number to n

DIR and DIRS (DIRSYS) (resident)

Displaying files on a disk

DIR specification	displays the names of all the files (exept system files)
	in the current user area which meet the specification.
	If no specification is entered, all files on current disk
	are displayed. If only a drive name is specified, all
	files of that drive are displayed.
DIRS specification	same like DIR for system files.

Examples:

A>DIR *.COM display of all COM-files in A: A>DIR M: display of all files in drive M:

Only the files in the current user area are displayed (cf. USER). CP/M makes a distinction between system files (attribute SYS) and ordinary files (attribute DIR), cf. SET in order to change the attributes.

DIR and DIRSYS are resident commands. You can enter options for DIR command, only if the transient program DIR.COM is available on the disk.

Displaying contents of disk with additional informations

DIR specification [options]	DIR with additional options
DIR spec1 spec2 [options]	DIR with multiple file specifications and
	options

The following options are available with the transient DIR command:

ATT DATE DIR DRIVE=ALL DRIVE=(A,B,) DRIVE=d EXCLUDE	display of user defined attributes F1, F2, F3, F4 display of time and date stamps no display of system files display of files in all drives display of files in drive A,B, display of files in drive d display of all files which do not meet the specification
FF	outputs a form feed to printer if the printer is on (CTRL-P).
	If LENGTH=n is used, output of form feed occurs every n-th line
FULL	display in alphabetical order with file sizes, attributes, date stamps
LENGTH=n	display format n (565536) lines
MESSAGE	display of drive and user area
NOPAGE	no display stops after page length
NOSORT	display in ordinary order, not alphabetically sorted
RO	displays only files with read only attribute
RW	displays only files with read write attribute
SIZE	display of file names and file sizes
SYS	displays only system files (like DIRSYS)
USER=ALL	displays files in all user areas
USER=(0,1,)	display of files in listed user areas 0,1,
USER=n	display of files in user area

Examples:

A>DIR	*.COM	[EXCLUDE]	display of all files which have not type COM
A>DIR	*.COM	[SYS]	display of all system files with type COM
A>DIR	[MESS	AGE, USER=(0,4,5)]	display of all files in user area 0,4,5

DISKCOPY (RVS)

Copy disks

DISKCOPY starts diskcopy program

DISKCOPY copies disks track by track. The source disk must have the same format as the destination disk. Note: DISKCOPY erases all files which are already on the destination disk

When working with one disk drive, enter A as source drive and B as destination drive. The drive simulator will ask you to exchange the disks during copying. Use the "write protect guard switch" on the source disk to avoid mistakes.

To abort DISKCOPY press CTRL-C.

.

A>DISKCOPY

```
DISKCOPY 1.2
(c) 1987 RVS Datentechnik
Enter source drive: A disk to be copied
Enter target drive: B new disk
Insert disks and press any key!
...
```

DUMP

Displaying contents of a binary file

DUMP specification displays the specified file in hex numbers

Example:

A>DUMP READ.ME

ED

Line oriented text editor

This old fashioned line editor is very difficult to use. In your system there is an easy to use screen editor (cf. EDIT) which is preferable for text editing. If you are interested in ED look at additional information on CP/M (cf. Appendix E) or use HELP.

EDIT (RVS)

Edit text files

EDIT filename starts the editor for editing the specified file. If no file type is entered, the file type TXT will be assumed. If the specified file does not exist, a new file will be created.

To make a new text file enter the file name in the EDIT command line:

A>EDIT TEST.TXT

After start of EDIT the headline displays the current page, line and column numbers; the rest of the screen is blank.

Enter text lines by pressing RETURN at the end of every line.

Delete mistyped characters with BS or DEL key.

Use the arrow keys ($\Leftarrow \hat{1} \Rightarrow \downarrow$) to move the cursor to the location you want.

The editor has an insert mode. To switch on/off the insert mode press CTRL-V. If the insert mode is on, the head line displays "Ins" and all typed characters or lines are inserted at the cursor position.

Press ESC to terminate. The editor asks you for an output file name. Press RETURN to store the text in the input file.

EDIT handles standard CP/M text files: the maximum line length is 127 characters, the lines end with CR and LF, the end of the file is marked with CTRL-Z. The text file contains readable ASCII characters (or 7 Bit ISO). All CTRL-characters exept TAB, CR, LF and CTRL-Z are filtered off.

The editor offers several possibilities. For entering commands use the control keys (similiar to WordStar). The following commands are available:

Cursor movement

CTRL-S or \Leftarrow CTRL-D or \Rightarrow CTRL-E or ↑ CTRL-X or ↓	cursor left (one column) cursor right (one column) cursor up (one line) cursor down (one line)
CTRL-A	cursor left (one word)
CTRL-F	cursor right (one word)
CTRL-R	cursor up (one screen)
CTRL-C	cursor down (one screen)
CTRL-W	cursor left (one screen)
CTRL-Z	cursor right (one screen)
CTRL-QS	cursor to the left margin
CTRL-QD	cursor to the right margin
CTRL-QE	cursor to the top line of screen
CTRL-QX	cursor to the bottom line of screen

CTRL-QR	cursor to the beginning of file
CTRL-QC	cursor to the end of file
CTRL-U CTRL-I or TAB	cursor to the previous TAB position cursor to the next TAB position

Indentation

CTRL-T	turns indent mode on/off (displayed in head line "Ind"). When using indent
	mode in entering RETURN, the cursor moves to the column on the next line,
	where the left margin of the last line is located.

Delete and Insert

BS, DEL	deletes the character left of cursor
CTRL-G	deletes the character under the cursor
CTRL-QBS	deletes the line left of the cursor
CTRL-QY	deletes the line right of the cursor
CTRL-Y	deletes the line
CTRL-V	turns insert mode on/off
CTRL-N	inserts an empty line

Save and Terminate

CTRL-KX or ESC	saves file and terminates editing
CTRL-KQ	terminates editing without saving file
CTRL-KS	saves file without terminating editing

EDIT asks for an output file name before saving. If RETURN is entered, the input file will be used as the output file.

Block operations

CTRL-KB	enters a block marker at the beginning or at the end of the block. If you enter a third block marker, the first and second are removed. Block markers may be deleted as ordinary characters.
CTRL-QB	cursor to the begin of block
CTRL-QK	cursor to the end of block
CTRL-KC	copies block to current cursor position
CTRL-KV	moves block to current cursor position
CTRL-KY	deletes block
CTRL-KW CTRL-KR	writes marked block in text file on disk. EDIT will ask for output file name. reads text file from disk (insert text at cursor position). Edit will ask for input file name.

Search and Replace

CTRL-QF CTRL-QA CTRL-L	searches string replaces string repeats last specified search/replace operation.		
	After CTRL-QF or CRTL-QA the editor asks for the search string. If CTRL- QA was entered the editor asks for the replace string. After that you can enter some options:		
	 U does not differentiate between the upper and the lower case G searches on the hole file B searches backward from cursor position (without B or G option EDIT will search from cursor position to end of text) N replacement without asking for confirmation S searches only in specified columns 		
Other			
CTRL-O	displays memory capacity		

ERA (ERASE) (resident)

Erasing of files from disk

ERA specification		erases all specified files in current user area
ERA specification	[CONFIRM]	erases files asking for confirmation before
		erasing a file

The ERA command CONFIRM is transient and must be loaded from the disk.

Example:

A>**ERA *.TST** ERASE *.TST (Y/N)? **Y**

FORMAT (RVS)

Format blank new disks

FORMAT

starts format program

Before use, new blank disks must be formated. Note: FORMAT will erase all data stored on a disk. Type CTRL-C to abort FORMAT.

A>FORMAT start of FORMAT Program Drive name? (A, B) A enter A

If your disk drive can work with double sided disks the following question will appear:

1-single sided 2-double sided ? 1 enter 1 or 2 Strike a key when ready insert the new disk and type any key

GENCOM

Handling RSX extensions for COM files

Refer to CP/M Plus programmers guide and programmers utility guide (cf. Appendix E).

GET

Console input from a disk file

GET FILE specification	redirects the console input (CON:) to the
GET FILE specification[options]	specified file redirects the console input (CON:) to the
GET CONSOLE	specified file with options switches back to input from console

Instead of entering "GET " you may also enter "GET CONSOLE INPUT FROM". When redirecting console input to a file CP/M reads every character required for input from this file.

If you enter no options in the GET command, the input redirection is delayed until the next program has been started. At the end of the program the input redirection is terminated. Consequently no redirection occurs on the command level.

The following options are available:

ECHO	echoing inputs to display (default)
NO ECHO	no echoing of inputs
SYSTEM	starting input by file immediatly

If you use the SYSTEM option, input redirection occurs on the command level immediatly after entering the GET command. The redirection will be terminated by the end of the input file, or by using the GET CONSOLE command (written in file).

A>GET FILE PROFILE.SUB[SYSTEM]

gets input on the system level from PROFILE.SUB

HELP

Display help information

HELP	starting HELP program
	displays all available information about topic
HELP topic subtopic [option]	displays information about subtopic of topic

With HELP you can ask for information on topics such as CP/M commands. There is a lot of information on commands and their options. Examples on how to use the commands are available.

The help information is stored in the disk file HELP.HLP.

If you enter no topic on the command line, the HELP program is started, and a list of available topics is displayed. Enter one topic, or RETURN to terminate the HELP program. Topics may be abbreviated with two or more letters.

The following options are available:

NOPAGE	disables the display stops after screen page
LIST	disables display stops and eliminates extra line between
	headings for printing with CTRL-P

Example:

A>HELP DIR [NOPAGE] displays help information about DIR command

Adding information to HELP file

HELP [EXTRACT]	converts the help file HELP.HLP in the text file
• •	HELP.DAT for editing
HELP [CREATE]	converts the text file HELP.DAT to the help file
	HELP.HLP

All help information is stored in the file HELP.HLP in a special format. To edit help information it must be converted to a text file. Than you can use an text editor for changing the text. Caution: The editor must be able to edit files larger than 64K, so you cannot use EDIT.COM. If you want to use EDIT, you must disconnect HELP.DAT using PIP in several parts and after that reconnect these parts.

Topics are included in HELP.DAT as plain text with following headline:

///ntopicname

where n is the level of topic (1 for main, 2 for first subtopic ... 8). Topics must be ordered alphabetical, subtopics must follow the main topic in alphabetical order.

HEXCOM

Converting HEX file to COM file

HEXCOM filename converts the specified file from Intel-HEX format into a COM file.

Refer to CP/M programmers utilities guide (cf. Appendix E).

INITDIR

Preparing disk directory for time and date stamps

INITDIR d: prepares directory on the disk in the drive d for time and date stamps

If you want to have time and date stamps available for every file (time of creation, changes or access) on the disk, you must prepare the disk by INITDIR. Using time and date stamps reduces the number files which may be stored on the disk. After INITDIR use the SET command for choosing the kind of stamps.

If the disk is already prepared for stamps, INITDIR will ask you whether or not you want to remove the stamps.

Example:

A>INITDIR A:

LANGUAGE (RVS)

Change character set

LANGUAGE n enable character set n

The following character sets are available:

USA (ASCII)	6	Sweden
Germany	7	Italy
MSX (8-Bit)	8	Spain
France	9	Japan
Great Britain	10	Norway
Denmark	11	Netherlands
	Germany MSX (8-Bit) France Great Britain	Germany 7 MSX (8-Bit) 8 France 9 Great Britain 10

All character sets except MSX (language 2) are 7-Bit character sets according to the ISO specification (cf. Appendix A for character codes).

Note: In some character sets special characters (like brackets) are not available. If you need these characters (e.g. for entering CP/M commands), use the characters of the current set with the same internal code (cf. Appendix A).

LIB

Handling of object program libraries

Refer to CP/M programmers utilities guide (cf. Appendix E).

LINK

Linker

Refer to CP/M programmers utilities guide (cf. Appendix E).

MAC

Macro Assembler

Refer to CP/M programmers utilities guide (cf. Appendix E).

MSXTOCPM (RVS)

File transfer from MSX to CP/M disks

MSXTOCPM starts file transfer program

CP/M disks and MSX disks have the same physical format but a different logical format. Therefore MSX disks are not readable for CP/M and vice versa. To transfer files use MSXTOCPM. Use wildcards for multiple file transfer.

When working with one disk drive, enter A as source drive and B as destination drive. The drive simulator will ask you to exchange the disks during copying. Use the "write protect guard switch" on the source disk to protect you against mistakes.

To abort MSXTOCPM press CTRL-C.

Example:

A>MSXTOCPM

MSX to CP/M file transfer 1. (c) 1986 RVS Datentechnik	1
Enter source file: A:*.* Enter target file: B:	transfer all files from MSX disk A to CP/M disk B
Insert disks and press <cr> to continue! </cr>	press RETURN to copy

PATCH

Installation of patches

Refer to CP/M programmers utilities guide (cf. Appendix E).

PIP

Copying and transfering files

PIPentering PIP command modePIP destination=sourcetransfering data from destination to source

PIP is a universal file copy and file transfer program. It copies all data from the source to the destination.

Source of information may be:

- one or more disk files (wildcards in specification)
- the logical devices CON: or AUX:
- or the following pseudo devices:

EOF: gives end of file character CTRL-Z NUL: gives 40 Null characters (binary 0)

Destination of information may be:

- a disk drive
- a disk file
- the logical devices CON: AUX: LST:
- the pseudo device:
 - PRN: for printing text files via LST: with 60 lines per page and line numbers.

Examples:

A>PIP	B:=A:*.*	copies all files from drive A to drive B
A>PIP	PRN:=READ.ME	produces a listing of text file READ.ME
A>PIP		receives input from AUX: device into the file TEST.TXT. Note that input data must end with EOF character CTRL-Z

When using the PIP command mode, you can enter all PIP commands without repeating the word "PIP". You enter the source, the destination and the options. Press RETURN to terminate the PIP command mode.

```
A>PIP entering PIP command mode
*B:=A:*.* same command as above
enter RETURN to terminate
A>
```

Copying files from one user area to another

PIP destination[Gn]=source[Gm]	copies from source in user area m to
	destination in user area n

Example:

A>PIP A: [G1] = EDIT.COM[G0]

Combining different files into one file

PIP destination=source1,source2,... combines files source1, source2,... to make the destination file

Note: For combining binary files use the option O (s. below)

Example:

A>PIP LONGTEXT.TXT=CHAPTER1.TXT,CHAPTER2.TXT,CHAPTER3.TXT

Options

PIP destination=source[options] PIP with options. Note: All above forms of PIP may be used with options (specified after each source for combining files)

There are options to format text files, to perform upper/lower case conversion or line numbering during transfer. Multiple options may be combined by entering the letters without delimiters. The following options are available:

Text formating

Pn	include a form feed character every n'th line
Tn	replaces TAB characters (CTRL-I) with so many spaces as needed to give a TAB position in every n'th column
Dn	deletes all characters in every line after the column n
F	removes all formfeed characters from the file for reformating
N	line numbering. The line numbers start with 1 and are placed at the beginning of every line (followed by a colon)
N2	like N exept that the 6 digit line numbers are shown with leading zeros (followed by a TAB or spaces when option T is used)

Conversion

	converts upper case charcaters to lower case
L	convens upper case charcalers to lower case
U	converts lower case characters to upper case

- Z resets bit 7 (most significant bit) in every byte
 - 26

Extracting a part

- Sstring^AZ transfer starts when the specified string is found (enter CTRL-Z at the end of the search string)
- Qstring² transfer is terminated when the specified string is transfered (enter CTRL-Z at the end of the search string)

Other options

Α	copies files which have been changed or created since the last copying. PIP uses the archive attribute (cf. SET) for this purpose: after copying a file the archive attribute is turned on. If the archive attribute is already on, the file will not be copied.
С	forces PIP, in multiple file copy, to ask for confirmation before copying a file
E	for text files: displays all characters being transfered
Gn	specifies source in user area n
Н	checks data for proper Intel HEX file
1	checks data for proper Intel HEX file and removes :00 records
0	ignores EOF characters (CTRL-Z) . Necessary for combining binary files
R	copies files with SYS attribute (otherwise they are not included)
v	verify correct copying by comparing the source file with the destination file after copying

W copies to write-only files (RO Attribute)

Examples:

A>PIP	B:=A:*.*[V]	copies all files with verification
A>PIP	B:=A:*.*[R]	copies system files
A>PIP	TEST.TXT:=AUX[EU]	records AUX: data to file TEST.TXT, displays data on console screen and performs lower to upper case conversion
A>PIP	CHAPTER1.TXT=LONGTEXT.TXT[SChapter 1^ZQChapter 2^Z] creates the file CHAPTER1.TXT which contains	

creates the file CHAPTER1.TXT which contains that part of LONGTEXT.TXT which is enclosed beween the words "Chapter 1" and "Chapter 2"

PUT

Redirect listing or console output to a disk file

PUT CONSOLE FILE specification	redirects console (CON:) output data to the specified file
PUT CONSOLE FILE specification[options]	same as above but with additional options
PUT PRINTER FILE specification	redirects printer (LST:) output data to the specified file
PUT PRINTER FILE specification[options]	same as above but with additional options
PUT CONSOLE CONSOLE	terminates output redirection for console
PUT PRINTER PRINTER	terminates output redirection for printer

Instead of "PUT CONSOLE" you may also enter "PUT CONSOLE OUTPUT TO".

When redirecting the output to a file CP/M records every character that has been output into the file.

If you enter no options, the output redirection is delayed until the next program is started. At the end of the program the output redirection is terminated. Consequently no redirection occurs on the command level .

The following options are available:

ECHOoutput data is also displayed/printed (default)NO ECHOoutput data is not displayed/printedFILTERmakes CTRL-characters visible (e.g. form feed is translated to ^L)NO FILTERleaves CTRL-characters unchanged (default)SYSTEMredirection starts immediatly

If you use the SYSTEM option, output redirection occurs also on command level immediatly after entering the PUT command. The redirection must be terminated by PUT CONSOLE CONSOLE or PUT PRINTER PRINTER.

Example:

A>PUT CONSOLE FILE DIR.TXT redirect output to DIR.TXT Putting console output to file: DIR.TXT A>DIR[ALL] start of DIR Directory of disk A: A>TYPE DIR.TXT display the recorded data

REN (RENAME) (resident)

Change file name

REN new.typ=old.typ	gives the file a new name
REN newspec=oldspec	changes all names of the group of files specified by
	oldspec, to the names specified by newspec

When REN is used for a group of files the transient program REN.COM is required. If you enter REN without parameters REN.COM is started and asks for parameters.

When you specify a group of files for renaming (using wildcards) the form in oldspec and newspec must be identical. Use the same wildcards in their same positions.

Examples:

A>REN README.TXT=READ.ME A>REN

Enter New Name: TEST.BAK Enter Old Name: TEST.TXT

A>REN *.BAK=*.TXT

RMAC

Macro Assembler

Refer to CP/M programmers utilities guide (cf. Appendix E).

SAVE

Save memory contents into a disk file

SAVE prepares CP/M for saving memory contents after terminating next program

When the next program is terminated CP/M asks for the memory addresses and the file name.

SET

Managing attributes, time and date stamps, passwords

Set drive attributes

SET d:[RO]	gives disk drive d: the read only attribute (write protected)
SET d:[RW]	gives disk drive d: the read write attribute (not write protected)

If you set the read only (RO) atttribute, the disk is write protected until the next CTRL-C or disk change. After cold boot all drives are simply read write, unless they are physical write protected.

Set file attributes

SET specification [options]	sets the specified attributes for the
	specified files.

The following options are available:

SYS DIR	sets SYS attribute. Changes the file to a system file (invisible in DIR command) sets DIR attribute (default). Changes the file to a non-system-file.
RO	sets RO (Read Only) attribute (file cannot be changed or deleted)
RW	sets RW (Read Write) attribute (file can be changed or deleted, default)
ARCHIVE=ON	switches archive attribute on to signal that there is a backup existing. When PIP is used with option A, it will not copy this file. In this case PIP assumes that there is
	already a backup. When PIP is used with option A to copy a file with archive
	attribute off, PIP switches on the archive attribute to signal that there is a backup.
ARCHIVE=OFF	switches archive attribute off to signal that there is no backup existing. By default after file creation archive attribute is off. In this case PIP with option A will copy the
	file.
Fn=ON	turns on user defined attribute Fn (n=14).
Fn=OFF	turns off user defined attribute Fn (n=14).

Example:

A>SET *.COM[SYS,RO]

Disk label

SET d:[NAME=labeIname.typ]	the disk in drive d is given the name
-	"labelname.typ" (same syntax as filename).

Password protection for disks

SET d:[PASSWORD=password]	assigns the specified password to disk in drive d
SET d:[PASSWORD= <return></return>	removes password from disk in drive d
SET d:[PROTECT=ON]	enables password protection for files
SET d:[PROTECT=OFF]	disables password protection for files

If a disk has no password protection, anyone who can use the SET program has access to the protected files. If the disk has a password on it's own, SET asks for the password before accessing the disk. Therefore to protect your files you should also protect the disks.

Protect files by passwords

SET spec [PROTECT=option]	sets password protection for the specified files (spec)

The following options are available:

ON	turns on password protection for the specified files
OFF	turns off password protection for the specified files
READ	password necessary for all kinds of file access
WRITE	password necessary for writing, deleting or renaming the files
DELETE	password necessary for deleting or renaming the files
NONE	deletes passwords

Before using password protection for files you must have already enabled the password protection for the disk with SET d:[PROTECT=ON].

Assigning passwords to files

SET spec [PASSWORD=xxx] the specified files (spec) are given the password xxx

Note: If a file is protected with a password, the password must always be entered in the file specification using a colon.

Example:

A>SET HE	LP.COM[PASSWORD=S	YSOP]	protecting file HELP.COM with password SYSOP
A:HELP.COM	Protection=READ,	Password=	=SYSOP
A>HELP; SY	SOP		starting HELP requires password

Assigning default password

SET [DEFAULT=xxx]	sets password xxx as default used for file access when a password is needed and has not been entered.
Time and date stamps	
SET [kind=ON]	turns on the specified kind of time stamping for

turns on the specified kind of time stamping for
the disk in the current default drive
turns off the specified kind of time stamping for
the disk in the current default drive

For usage of time and date stamps the disk must be prepared with INITDIR. The following kinds of stampings are available:

CREATE	the time and date of file creation will be recorded for every file
ACCESS	the time and date of last access will be recorded for every file
	(cannot be used together with CREATE)
UPDATE	the time and date of last change will be recorded for every file

SETCOM (RVS)

Set RS232 parameters

SETCOM string sets additional RS232 parameters.

Note: set baudrate and XON/XOFF protocol with the DEVICE command.

The string may contain the following characters:

possible characters	meaning
78	number of data bits
EONI	parity: Even Odd None Ignore
12	number of stop bits

Example:

A>SETCOM 8N2 8 data bits, no parity, 2 stop bits

SETDEF

Set search path for command and batch files

Syntax:

	display search order
SETDEF [options]	set option for searching COM and SUB files
SETDEF d:,e: [options]	search on drive d, e, for COM and SUB files
SETDEF *	search only default drive (default)

When specifying a search order for drives you can use an asterix character * for specification of current default drive. When you enter a command after specification of search order, the command file is searched on every drive in the specified list until found. You can use SETDEF to tell CP/M that SUB files should be executed (as you can with command files) by entering the name, without entering "SUBMIT".

The following options are available:

ORDER=(typ)	Specification of file type for execution if you enter only a file name (by default COM)
ORDER=(typ,typ)	The type may be COM or SUB. If you enter two types you always enter a precedence
TEMPORARY ≕ d:	specifies the drive to be used for temporary files (by default the current default drive)
DISPLAY	starting a program the following information is displayed: drive name, file name, file type and user area.
NO DISPLAY	no information is displayed (default)
PAGE	stops display after screen page is full
NO PAGE	no stops after screen page

A> SETDEF M,*	when you enter a command CP/M searches first on drive M: for command file before searching on current drive.
A>SETDEF[ORDER=	(SUB, COM) 1
·	when you enter a command CP/M searches first for a SUB file to execute. If not found CP/M searches for a COM file.
SETFKEYS (RVS)	
Set function keys	

SETFKEYS filename assigns the function keys with strings from the specified file.

The text file must contain lines, with the function key definitions in the following format:

F1:string F2:string F3:string ...

The strings may have up to 16 characters. To enter CTRL-characters use the exponentiation character ^ prefix, e.g. enter ^C for CTRL-C or ^M for RETURN.

SHOW

Displaying disk drive information

SHOW d:	displays capacity available on disk in drive d
SHOW d:[option]	displays optional information on disk in drive d

The following options are available:

DIR	displays number of free directory entries
DRIVE	displays physical disk parameters
LABEL	displays disk label
SPACE	displays capacity of disk
USERS	displays the user areas filled and the number of files located there

Examples:

A>SHOW A: A: RW, Space: 62k A>SHOW [DIR] A: Number of free directory entries: 42

SID

Symbolic debugging tool

Refer to CP/M SID users guide (cf. Appendix E).

SUBMIT

Execution of batch files

SUBMIT filename starts the specified batch file SUBMIT filename par1, par2... starts batch file with one or more parameter

Batchfiles are a special sort of text files containing CP/M command lines. When you start a batch file, these command lines are executed. Batch files have the file type SUB. To write a batch file use a text editor such as EDIT.

With SETDEF ORDER it is possible to declare SUB files to be default command files. In this case you must not enter SUBMIT to start a batch file. You simply enter the file name as with the start of a COM file.

After cold boot CP/M looks on the boot disk for a batch file with the name PROFILE.SUB. If there is one, CP/M starts this batch file automatically.

For batch processing the file SUBMIT.COM must be available on the disk. CP/M creates for batch processing an intermediate file with the name \$\$\$.SUB. Therefore the current disk must not be write protected.

SUB files contain plain text CP/M command lines. The commands may have constant parameters which are written in the SUB file.

Example:

PIP A:=B:*.TXT SHOW A:

You can also use variable parameters which are entered when you start the SUB file. When using such variable parameters, the places where the parameters should be inserted must be marked as \$1 (parameter 1), \$2 (parameter 2),...

Example:

PIP \$1=B:*.TXT SHOW \$1	contents of batch file TEST.SUB
A>SUBMIT TEST A:	starting the batch file TEST.SUB with the replacement of \$1 by A:

Batch files may also be used to supply programs (started by the batch file) with input data (like GET). Data input lines are marked with a lesser-sign < at the beginning of the line.

Example:

PIP	start of PIP program
<a:=b:*.txt< td=""><td>first input line</td></a:=b:*.txt<>	first input line
<a:=b:*.sub< td=""><td>second input line</td></a:=b:*.sub<>	second input line
<	last input line (RETURN terminates PIP)

If you want to include control characters in a SUB file you must use the exponentiation character ^ as prefix. For example: CTRL-Z is written as ^Z.

TERMINAL (RVS)

Terminal program

TERMINAL [options] starts terminal program TERMINAL filename [options] starts terminal program and records the received data in the specified file

With the terminal program it is possible to use your computer as a terminal (VT52 emulation) connected via RS232 to a host computer: the program receives and displays data from device AUX: (RS232). If you type any keys, the character codes will be transmitted to AUX. Type CTRL-C to exit the terminal program (another key may be chosen as exit-key).

If a file name is entered on the TERMINAL command, the received data will be recorded in computer memory and stored on the disk after exit.

The following options are available:

- ^{*}K use CTRL-K as exit-key. You can use any CTRL-key instead of K (default CTRL-C)
- L add line feed character LF after receiving CR
- H half duplex mode (default is full duplex mode)
- N no display (for receiving binary files)

Use DEVICE command to change the baudrate, SETCOM to set the transmission parameters and SETFKEYS to setup the function keys for communication.

Examples:

A>TERMINAL TEST.TXT [HL] A>TERMINAL TEST.COM [N]

TYPE (TYP) (resident)

Display of text files

TYPE filename	displays the entered text file
TYPE specification	displays the specified text file(s)
TYPE specification [option]	displays the specified text file(s) with option

Note: Only the first form of the TYPE command is resident. For TYPE command with wildcards or options the program file TYPE.COM is required.

The following options are available:

PAGE stops display after screen page NOPAGE displays continuously

Example:

A>TYPE READ.ME [NOPAGE]

USER (USE)

Set current user number

USER n

switches to user area n (n=0...15)

Every CP/M disk has 16 user areas, which appear to be 16 disks in a disk. By default every file is located in the user area 0. You can use PIP to copy files from one user area to another. When you switch to a user area other than 0, the current user area is displayed in system prompt.

If you switch to user area n only files which are located in this user area can be accessed. For example: DIR says "no file" if you switch to an empty user area, even if the disk may contain a lot of files in other user areas.

There is one exeption: System files (SYS attribute, cf.. SET) located in user area 0 accessable from all user areas.

Example:

A>USER	4	switching to user area 4
4A>		user area is displayed in system prompt
4A>DIR		user area 4 contains no files until you have copied some
		into it

XREF

Cross-reference utility

Refer to CP/M programmers utilities guide (cf. Appendix E).

Appendix A: Character set

There are different character sets available. After cold boot the MSX character set is used. To switch to a different character set use the LANGUAGE command.

A.1 Text characters

For information on the MSX character set refer to your computer manual. The MSX character set uses 8 bits for internal codes (values 0...0FFh). The international ISO character sets use 7 bits (values 0...7Fh) for the internal codes (code values 80h...0FFh are used for inverse video).

The following table contains a list of ASCII characters and their internal codes. The marked characters (•) are different in other ISO character sets.

ASCII character set (ISO for USA):

0 SP 0 @• P `• p 1 ! 1 A Q a q 2 " 2 B R b r 3 #• 3 C S c s	hex	20	30	40	50	60	70
5 % 5 E U e u 6 & 6 F V f v	0 1 2 3 4 5 6 7 8 9 A B C D E	SP ! # • \$ • %	1 2 3 4 5 6 7 8 9 : ; < = >	A B C D E F G H I J K L M N	P Q R S T U V W X Y Z [\ .]	、 a b c d e f g h i j k l m n	q r t u v w x y

The different characters and their internal codes are listed in the following table.

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Changed characters in different languages:

lang	juage:	changed characters:											
inte	rnal code	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	ASCII	#	\$	@	[١]	۸	•	{	1	}	~
1	Germany	#	\$	§	Ä	Ö	Ü	۸	•	ä	Ö	ü	ß
2	MSX	#	\$	@	[١]	۸	•	{		}	~
3	France	#	\$	à	o	Ç	§	۸	•	é	ù	è	••
4	Great Britain	£	\$	@	[١]	۸	•	{		}	~
5	Denmark	#	\$	@	Æ	Ø	Å	^	•	æ	ø	å	~
6	Sweden	#	\$	É	Ä	Ö	Å	Ü	é	ä	Ö	å	ü
7	Italy	#	\$	@	0	١	é	۸	ù	à	ò	è	ì
8	Spain	Pt	\$	@	i	Ñ	Ś	۸	•	••	ñ	}	~
9	Japan	#	\$	@	[¥]	۸	•	{		}	~
10	Norway	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Netherlands	£	\$	@	[IJ]	۸	•	{	ij	}	~

A.2 Graphic characters

There are 32 graphic characters available in all character sets (internal video codes 00...1Fh). To output these characters use the code CTRL-A (hex 01) as prefix and the character codes 40...5Fh (cf. your computer manual).

The character codes 128...255 (80h..0FFh) are used for inverse video in all 7 Bit character sets. However in the MSX character set there are additional graphic and foreign language characters found in this range (cf. manual of your computer).

A.3 Control Characters

The control characters for video control emulate a VT52 terminal. Note: The ESC sequence for inverse video is not available in the MSX character set.

control characters					
character:	name:	code:	meaning:		
CTRL-A CTRL-G CTRL-H CTRL-I CTRL-J CTRL-L CTRL-L	BELL BS TAB LF FF CR	01 07 08 09 0A 0C 0D	next character is a graphic character beep back space next tab position next line (line feed) clear screen (form feed) carriage return		

VT52 ESC sequences

characters:	codes:	meaning:
ESC A	1B 41	cursor up
ESC B	1B 42	cursor down
ESC C	1B 43	cursor right
ESC D	1B 44	cursor left
ESC H	1B 48	cursor home
ESC I	1B 49	cursor up with scrolling when in line 0 (backward LF)
ESC Y ypos xpos	1B 59 20+y 20+x	cursor to line y (017h) column x (04Fh)
ESC j	1B 6A	store cursor position
ESC k	1B 4B	cursor to last stored position
ESC E	1B 45	erase screen and cursor home
ESC J	1B 4A	erase to end of screen
ESC d	1B 64	erase to begin of screen
ESC K	1B 4B	erase to end of line
ESC o	1B 6F	erase to begin of line
ESC I	1B 6C	erase line
ESC L	1B 4C	insert line
ESC M	1B 4D	delete line
ESC e	1B 65	cursor on
ESC f	1B 66	cursor off
ESC p	1B 70	inverse video on (n.a. in MSX character set)
ESC q	1B 71	inverse video off (n.a. in MSX character set)
ESC v	1B 76	scrolling and cursor to the next line (automatic CR LF) when character output occurs at the end of screen
ESC w	1B 77	cursor stays at the end of the last line (no scrolling when character output occurs at the end of screen)

Appendix B: Control keys

B.1 Codes for special keys

The character codes found on the special keys of the MSX keyboard are:

special key	hex code	control code
BS	08	CTRL-H
ТАВ	09	CTRL-I
RETURN	0D	CTRL-M
ESC	1B	CTRL-[
Î	1E	CTRL- [^]
1)	1F	CTRL
⇒	1C	CTRL-\
⇐	1D	CTRL-]
SELECT	18	CTRL-X
INS	12	CTRL-R
HOME	0B	CTRL-K
CLEAR	0C	CTRL-L
BREAK	03	CTRL-C
DEL	7F	
F1F10	defined by	SETFKEYS command

B.2 CP/M control keys

In CP/M command mode the following CTRL key functions are available:

- CTRL-A cursor left (one charcter)
- CTRL-B cursor to begin of line
- CTRL-C abort program (after CTRL-S) and re-start CP/M command mode
- CTRL-E new line without transfer line to CP/M
- CTRL-F cursor right (one character)
- CTRL-G delete character under cursor
- CTRL-H delete character left of cursor
- CTRL-I cursor to next TAB position
- CTRL-J same as RETURN
- CTRL-K delete to the end of line
- CTRL-M transfer command line to CP/M
- CTRL-P Printer on/off (LST-Device)
- CTRL-Q continue after display stop (CTRL-S)
- CTRL-R re-type command line
- CTRL-S stops display
- CTRL-U discard command line
- CTRL-W repeat last command line
- CTRL-X delete to the begin of line

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Appendix C: File names

C.1 Special characters

The following characters have a special meaning and must not be used in file names, file types or passwords:

- parenthesis: used for options in command line ()
- asterix: wildcard character
- comma: separates multiple parameters ,
- period: separates type specification .
- : colon: marks drive and device names
- ; ? semicolon: separates passwords
- question mark: wildcard character
- [] brackets: used for options in command line

C.2 General form of file specification

A file specification may have following formats:

```
name
name.typ
name; password
name.typ;password
d:name
d:name.typ
d:name;password
d:name.typ;password
nomo:
           1 to 8 characters except special characters /s
                                                     - 1-
```

name:	1 to 8 characters except special characters (see above)
type:	0 to 3 characters except special characters (see above)
password:	1 to 8 characters except special characters (see above)
d:	1 letter (drive name AP)

In file names and file types there is no distinction between upper and lower case characters.

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C.3 Standard file types

The following file type specifications are widely used:

ASM	text: assembler source program
BAK	backup file
BAS	BASIC program
COM	executable program (8080 or Z80 machine code)
С	text: C program
DOC	text: general
FOR	text: FORTRAN source program
HEX	text: binary data in Intel-HEX
HLP	help information used by HELP.COM
IRL	indexed REL-file
LIB	program library (relocatable object code)
MAC	text: assembler source program
OVL	overlay file
PAS	text: Pascal source program
PLI	text: PL/I source program
PRN	text: Listing file
REL	linkable object program (generated by compiler or assembler)
RSX	system extension
SUB	text: batch file
SYM	symbol table information (generated by compiler or assembler)
SYS	CP/M Plus system file
тхт	text: general
XRF	cross-reference data
<u>ድ</u> ድድ	tomporany data

\$\$\$ temporary data

Appendix D: Command overview

COLOR ** COPYSYS ** CPMTOMSX ** DATE DEVICE DIR * DIRS * (DIRSYS) DISKCOPY ** DUMP ED EDIT ** ERA (ERASE) FORMAT ** GENCOM GET HELP HEXCOM INITDIR LANGUAGE ** LIB LINK MAC MSXTOCPM ** PATCH PIP PUT REN * (RENAME) RMAC SAVE SET SETCOM ** SETDEF SETFKEYS ** SHOW	macro assembler for 8080 assembly language (generating REL files) saves memory contents on disk sets attributes, passwords and time stamps changes RS232 parameters sets search path for COM and SUB files assigns function keys
SETDEF	sets search path for COM and SUB files
	assigns function keys displays disk capacity and informations
SID SUBMIT	symbolic debugging tool for 8080 machine code executes batch files
TERMINAL **	terminal program for communication purposes
TYP [*] (TYPE) USE ** (USER)	displays text files changes current user area
XREF	generates cross-reference file

resident
 added by RVS (not belonging to standard CP/M Plus)

Appendix E: Bibliography

Additional information on CP/M Plus may be found in the CP/M documentation of Digital Research.

How to use CP/M commands:

CP/M-Plus User's Guide, Digital Research, 1982

How to use CP/M entry points in assembly language programs:

CP/M-Plus Programmer's Guide, Digital Research, 1982 CP/M-Plus System Guide, Digital Research, 1982

How to use CP/M programmers utilities:

Programmer's Utilities Guide for the CP/M Family, Digital Research, 1982 SID User's Guide, Digital Research, 1981

Ask your dealer about additional information dealing with CP/M Plus.

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Welcome to CP/M Plus!

We hope that you enjoy this powerful operating system.

The following new features are not explained in the manual:

1. Support of Philips Serial Communications Controler (SCC)

There are two RS232 channels available with device names SCC-A and SCC-B. Note that only channel A is buffered (IRQ-driven) by CP/M. By default SCC-A is assigned to the logical device AUX:.

To setup data, parity and stop bits for SCC use the programs SETSCCA and SETSCCB which use the same syntax as SETCOM.

Note: The jumpers of SCC must select base adress 3XH (factory setting).

2. Memory usage of RAM disk

After start CP/M looks for a slot, which contains a mapper-memory with a maximum capacity. CP/M uses 128K of this memory by itself, the rest is used by the RAM-disk. The RAM-disk uses also all available video-RAM (VRAM).

You can reduce the RAM-disk by disabeling the usage of VRAM or mapper-memory. Use the utility program VMRAM for that purpose.

The maximimum capacity depends on the maximum mapper-memory size. $\mbox{CP/M}$ supports up to 1 MB for RAM disk.

To get additional information use the HELP program.

Munich, October 1987 RVS Datentechnik