# CPIM Plus" 

## Operating System for MSX2-Computers

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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 ( 61 K 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 compatibilty 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

## 1. Starting with CP/M Plus

### 1.1 Requirements

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

- A MSX2 computer, with a 128 K Video RAM (VRAM), a minimum of 128 K 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 64 K program memory or it is without mapper, a memory card which contains at least 128 K and an imbuilt mapper must be added. Ask your dealer about it.

- At least one internal or external $3.5^{\prime \prime}$ 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.

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:

| BS or DELETE | erases last typed character |
| :--- | :--- |
| CTRL-X | erases all typed characters |
| RETURN | execution of command line |
| CTRL-W | repeats last command line |
| CTRL-P | switches Printer on/off for protocoll <br> restart of CP/M (Warm boot). Often |
| CTRL-C | 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 $C P / M$ 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
DISKCOPY 1.2
(C) 1987 RVS Datentechnik

Enter source drive? A
Enter target drive? B 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 MSDOS), 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:

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:

| LOOK1 | file name LOOK1, no file type specification |
| :--- | :--- |
| 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
$D A * . C O M \quad$ 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 additonal 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>SBOW 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 OR 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 | DIR specification |
| specification |  |  |

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 $C P / M$, 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 <br> deletion. <br> Read Write: The opposite to RO. The file may be changed or <br> deleted. By default all files are RW. |
| :--- | :--- |
| RW | System file: The file is invisible and will not be displayed in DIR <br> command. <br> Non-system file: The file will be displayed in DIR command (default). |
| DIR | These attributes give a sophisticated backup mechanism, which <br> works together with PIP: a special option of PIP copies only the <br> files, which have been changed since last copying. After copying <br> the archive attribute is turned on to indicate that there is a backup. |
| F1...F4 ON/OFF 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:
Console
List device
Auxiliary device
name:
CON:
LST:
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) RS232 interface (if available)

| CRT | CON: |
| :--- | :--- |
| LPT | LST: |
| LPT1 |  |
| RS232 | AUX: |
| NULL |  |

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
COLOR $n, m, j, k \quad$ sets foreground color $n$ and background color $m$ for character display 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 |
| 5 | light blue | 13 | magenta |
| 6 | dark red | 14 | gray |
| 7 | cyan | 15 | white |

Example:
$A>C O L O R$ 2,1 green text and black background
$A>C O L O R$ 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.

Example:

## A>COPYSYS

COPYSYS 1.2
(c) RVS Datentechnik

```
Enter source drive: A CP/M system disk in drive A
Enter target drive: B new disk in drive \(B\)
Insert disks and press any key!
```


## 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

$C P / M$ to $M S X$ 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 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>DATR 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 ail devices with their properties, baud rates and the current assignments
DEVICE NAMES
DEVICE VALUES
displays all physical devices and their properties DEVICE logical displays the current assignments displays which physical device is assigned to the specified logical device
DEVICE physical displays properties and parameters of the specified physical device

## Example:

A>DEVICE
Physical Devices:

| CRT | NONE | 10 | LPT | NONE | 0 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| LPT1 | NONE | 0 | RS232 | 300 |  |

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
DEVICE logical=physical from all physical devices 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, ... assignment of more than one physical device to a logical device

## Examples

| A $>$ DEVICE | LST:=NULI | 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 | switches on XON/XOFF protocol |
| :--- | :--- |
| NOXON | switches off XON/XOFF protocol |
| baudrate | sets baudrate. Baudrate must be one of the follwing values: |


| 50 | 75 | 110 | 300 | 600 |
| :--- | :--- | :--- | :--- | :--- |
| 1200 | 2000 | 2400 | 3600 | 4800 |
| 7200 | 9600 | 19200 |  |  |

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

## Change console characteristics

| DEVICE CONSOLE [options] | displays or changes the console <br> characteristics (number of lines and <br> 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 $=\mathrm{n}$ | 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 |
| :---: | :---: | :---: |
| $A>D I R$ | 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 | display of user defined attributes F1, F2, F3, F4 |
| :---: | :---: |
| DATE | display of time and date stamps |
| DIR | no display of system files |
| DRIVE=ALL | display of files in all drives |
| DRIVE=(A,B,...) | display of files in drive $\mathrm{A}, \mathrm{B}, \ldots$. |
| DRIVE=d | display of files in drive d |
| EXCLUDE | display of all files which do not meet the specification |
| FF | outputs a form feed to printer if the printer is on (CTRL-P). <br> 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 (5...65536) 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 $=(0,1, \ldots$ ) | display of files in listed user areas $0,1, .$. |
| USER=n | display of files in user area |

Examples:

| A>DIR | *. COM | [EXCLUDE] |
| :--- | :--- | :--- |$\quad$ display of all files which have not type COM

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.

## Example:

## A>DISKCOPY

DISKCOPY 1.2
(C) 1987 RVS Datentechnik

Enter source drive: A disk to be copied
Enter target drive: $\mathbf{B}$ 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 ${ }^{\text {DUMP }}$ 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

## 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 $(\Leftarrow \Uparrow \Rightarrow \downarrow)$ 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 $\Leftarrow \quad$ cursor left (one column)
CTRL-D or $\Rightarrow \quad$ cursor right (one column)
CTRL-E or $\Uparrow \quad$ cursor up (one line)
CTRL-X or $\downarrow \quad$ 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 |

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 or/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 writes marked block in text file on disk. EDIT will ask for output file name.
CTRL-KR reads text file from disk (insert text at cursor position). Edit will ask for input file name.

## Search and Replace

| CTRL-QF | searches string <br> CTRL-QA <br> replaces string <br> CTRL-L |
| :--- | :--- |
|  | After CTRL-QF or CRTL-QA the editor asks for the search string. If CTRL- <br> QA was entered the editor asks for the replace string. After that you can <br> 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 postion |
| (without B or G option EDIT will search from cursor position to end of text) |  |
|  | N replacement without asking for confirmation |

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.

## Example:

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

If your disk drive can work with double sided disks the foliowing 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 specified file
GET FILE specification[options] redirects the console input (CON:) to the specified file with options

## switches back to input from console <br> GET 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:
$\mathrm{ECHO} \quad$ 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 atter 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).

## Example:

A>GET FILE PROFILE.SUB[SYSTEM] gets input on the system level from
PROFILE.SUB

## HELP

## Display help information

| HELP | starting HELP program <br> displays all available information about topic |
| :--- | :--- |
| HELP topic | dELP 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 [CREATE]

## HELP.DAT for editing

 converts the text file HELP. DAT to the help file HELP.HLPAll 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 64 K , 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:

| 0 | USA (ASCII) | 6 | Sweden |
| :--- | :--- | :--- | :--- |
| 1 | Germany | 7 | Italy |
| 2 | MSX (8-Bit) | 8 | Spain |
| 3 | France | Japan |  |
| 4 | Great Britain | 10 | Norway |
| 5 | Denmark | 11 | Netherlands |

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


## PATCH

## Installation of patches

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

## PIP

## Copying and transfering files

PIP
PIP destination=source
entering PIP command mode
transfering 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:

$$
\begin{aligned}
& \text { A>PIP } \quad \mathrm{B}:=\mathrm{A}: * \text {. } \quad \text { copies all files from drive } \mathrm{A} \text { to drive } \mathrm{B} \\
& A>P I P \quad \text { PRN: }=\text { READ } M E \text { produces a listing of text file READ.ME } \\
& \text { A>PIP TEST.TXT: =AUX: receives input from AUX: device into the file TEST.TXT. } \\
& \text { Note that input data must end with EOF character CTRL-Z }
\end{aligned}
$$

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.

## Examples:

```
A>PIP entering PIP command mode
*B:=A:*.* same command as above
*
```

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[GO]

## 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.TXTmCHAPTER1.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 formieed characters from the file for reformating
$N \quad$ 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 Tis used)

## Conversion

L converts upper case charcaters to lower case
U converts lower case characters to upper case
$Z \quad$ resets bit 7 (most significant bit) in every byte

## Extracting a part

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

## Other options

A 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.
C 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 $n$
H checks data for proper Intel HEX file
$1 \quad$ checks data for proper Intel HEX file and removes :00 records
O 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: $=\mathbf{A}$ : * * [V] | copies all files with verification |
| :---: | :---: | :---: |
| $A>P I P$ |  | copies system files |
| A $>\mathbf{P I P}$ | 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=LONGT | EXT.TXT[SChapter 1^zoChapter 2^z] 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 <br> data to the specified file |
| :--- | :--- |
| PUT CONSOLE FILE specification[options] | same as above but with additional <br> options |
| PUT PRINTER FILE specification | redirects printer (LST:) output data <br> to the specified file |
| PUT PRINTER FILE specification[options] | same as above but with additional <br> options |
| PUT CONSOLE CONSOLE | terminates output redirection for <br> console |
| PUT PRINTER PRINTER | terminates output redirection for <br> 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:
ECHO output data is also displayed/printed (default)
NO ECHO output data is not displayed/printed
FILTER makes CTRL-characters visible (e.g. form feed is translated to ${ }^{\wedge} \mathrm{L}$ )
NO FILTER leaves CTRL-characters unchanged (default)
SYSTEM redirection 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 ${ }^{\text {d }}$ DIR | ALL] |  | stant 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 specifiy 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 *. BAR=*. 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 | sets SYS attribute. Changes the file to a system file (invisible in DIR command) <br> sets DIR attribute (default). Changes the file to a non-system-file. |
| :--- | :--- |
| DIR | sets RO (Read Only) attribute (file cannot be changed or deleted) <br> Rets RW (Read Write) attribute (file can be changed or deleted, default) <br> RW |
| ARCHIVE=ON | switches archive attribute on to signal that there is a backup existing. When PIP is <br> used with option A, it will not copy this fite. In this case PIP assumes that there is <br> already a backup. When PIP is used with option A to copy a file with archive <br> attribute off, PIP switches on the archive attribute to signal that there is a backup. |
| ARCHIVE=OFFswitches archive attribute off to signal that there is no backup existing. By default <br> after file creation archive attribute is off. In this case PIP with option A will copy the <br> file. |  |
| Fn=ON | turns on user defined attribute Fn ( $n=1 . .4$ ). <br> turns off user defined attribute Fn ( $n=1 \ldots 4$ ). |

Example:

A>SET *.COM[SYS,RO]

## Disk label

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

## Password protection for disks

SET d:[PASSWORD=password]
SET d:[PASSWORD=<RETURN>
SET d:[PROTECT=ON]
SET d:[PROTECT=OFF]
assigns the specified password to disk in drive d removes password from disk in drive d enables password protection for files 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 tums 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 $P$ SET HELP.COM[PASSWORD=SYSOP] | protecting file HELP.COM with <br> password SYSOP |
| :--- | :--- |
| A:HELP.COM Protection=READ, Password=SYSOP |  |

## Assigning default password

SET [DEFAULT=xxx] sets password $x x x$ as default used for file access when a password is needed and has not been entered.

## Time and date stamps

SET [kind=ON]
SET [kind=OFF]
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 |  |
| :--- | :--- | :--- |
| 7 | 8 | number of data bits |
| E O N I | parity: Even Odd None Ignore |  |
| 1 | 2 |  |
| number of stop bits |  |  |

Example:
A>SETCOM 8N2
8 data bits, no panity, 2 stop bits

## SETDEF

## Set search path for command and batch files

Syntax:
SETDEF display search order
SETDEF [options] set option for searching COM and SUB files
SETDEF d:,e: ... [options] search on drive $d, e, \ldots$ 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

## Examples:

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)]
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 ${ }^{\wedge}$ prefix, e.g. enter ${ }^{\wedge} \mathrm{C}$ for CTRL-C or ${ }^{\wedge} \mathrm{M}$ 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 $\$ 1=\mathrm{B}: *$. TXT | contents of batch file TEST.SUB |
| :--- | :--- |
| SHOW $\$ 1$ |  |
| A>SUBMIT TEST A: | starting the batch file TEST.SUB with the <br> 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 first input line
<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 ${ }^{\wedge}$ as prefix. For example: CTRL-Z is written as ${ }^{\wedge} Z$.

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
TYPE specification
TYPE specification [option]
displays the entered text file displays the specified text file(s) 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 $n \quad$ 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>
4A>DIR
user area is displayed in system prompt
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...OFFh). The international ISO character sets use 7 bits (values $0 . . .7 \mathrm{Fh}$ ) for the internal codes (code values 80h...OFFh are used for inverse video).

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

ASCII character set (ISO for USA):

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

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

Changed characters in different languages:

|  | uage: |  | nge | c | aracter | ers: |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | nal code | 23 | 24 | 40 | 5B 5C | 5C 5D | 5E | 60 | 7B |  |  | 7 |
| 0 | ASCII | \# | \$ | @ | [ 1 | 1 ] | $\wedge$ |  | \{ | 1 | \} | ~ |
| 1 | Germany | \# | \$ | § | Ä Ö | O Ü | $\wedge$ |  | ä | ö | ü | B |
| 2 | MSX | \# | \$ | @ | [ 1 | 1 ] | $\wedge$ |  | \{ | 1 | \} | $\sim$ |
| 3 | France | \# | \$ | à | - $¢$ | ¢ § | $\wedge$ |  | é | ù | è |  |
| 4 | Great Britain | £ | \$ | @ | [ 1 | 1 ] | $\wedge$ |  | \{ | 1 | \} | $\sim$ |
| 5 | Denmark | \# | \$ | @ | F $\varnothing$ | $\bigcirc$ A | $\wedge$ |  | $\boldsymbol{\text { ® }}$ | $\varnothing$ | á | $\sim$ |
| 6 | Sweden | \# | \$ | É | Ä Ơ | $\bigcirc$ O A | Ü | é | ä | ö | $a$ | ü |
| 7 | Italy | \# | \$ | @ | - 1 | $\$ é & $\wedge$ | ù | a | d | è | $i$ |  |
| 8 | Spain | Pt | \$ | @ | i N | $\underline{N}$ i | $\wedge$ |  |  | n | \} | $\sim$ |
| 9 | Japan | , | \$ | @ | [ $\#$ | \# ] | $\wedge$ |  | \{ | 1 | \} | $\sim$ |
| 10 | Norway |  | \$ | É | Æ $\varnothing$ | $\varnothing$ A | Ü | é | $\boldsymbol{\text { ® }}$ | $\varnothing$ | a | ü |
| 11 | Netherlands | £ | \$ | @ | [ IJ | IJ ] | $\wedge$ |  | 1 | ij | \} | $\sim$ |

## A. 2 Graphic characters

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

The character codes 128... 255 (80h..OFFh) 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 |  | 01 | next character is a graphic character |
| CTRL-G | BELL | 07 | beep |
| CTRL-H | BS | 08 | back space |
| CTRL-I | TAB | 09 | next tab position |
| CTRL-J | LF | OA | next line (line feed) |
| CTRL-L | FF | OC | clear screen (form feed) |
| CTRL-M | CR | OD | carriage retum |

## VT52 ESC sequences

| characters: | codes: | meaning: |
| :---: | :---: | :---: |
| ESC A | 1841 | cursor up |
| ESC B | 1 B 42 | cursor down |
| ESC C | 1 B 43 | cursor right |
| ESC D | 1B44 | cursor left |
| ESC H | 1 B 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 (0..17h) column $\times$ ( $0 \ldots . .4 \mathrm{Fh}$ ) |
| ESC ${ }^{\text {j }}$ | 1B6A | store cursor position |
| ESC $k$ | 1B 4B | cursor to last stored position |
| ESC E | 1845 | erase screen and cursor home |
| ESC J | 1B4A | erase to end of screen |
| ESC d | 1B64 | erase to begin of screen |
| ESC K | 1B 4B | erase to end of line |
| ESC 0 | 1B6F | erase to begin of line |
| ESC I | 1B6C | erase line |
| ESC L | 1B4C | insert line |
| ESC M | 1B4D | delete line |
| ESCe | 1B65 | cursor on |
| ESC f | 1866 | cursor off |
| ESC p | 1B70 | inverse video on (n.a. in MSX character set) |
| ESC q | 1B71 | inverse video off (n.a. in MSX character set) |
| ESC v | 1876 | scrolling and cursor to the next line (automatic CR LF) when character output occurs at the end of screen |
| ESC w | 1B77 | cursor stays at the end of the last line (no scrolling when character output occurs at the end of screen) |

A-3

## 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 |
| TAB | 09 | CTRL-1 |
| RETURN | OD | CTRL-M |
| ESC | 1B | CTRL-[ |
| $\pi$ | 1E | CTRL-^ |
| リ | 1F | CTRL- |
| $\Rightarrow$ | 1 C | CTRL- ${ }^{-}$ |
| $\epsilon$ | 1D | CTRL-] |
| SELECT | 18 | CTRL-X |
| INS | 12 | CTRL-R |
| HOME | OB | CTRL-K |
| CLEAR | ${ }^{0} \mathrm{C}$ | CTRL-L |
| BREAK | 03 | CTRL-C |
| DEL | 7F |  |
| F1...F10 | defined b | 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

## 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
name: }\quad1\mathrm{ to }8\mathrm{ characters except special characters (see above)
type: 0 to 3 characters except special characters (see above)
password: }1\mathrm{ to }8\mathrm{ characters except special characters (see above)
d: }1\mathrm{ letter (drive name A...P)
```

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

## 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) |
| C | 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/l 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 |
| TXT | text: general |
| XRF | cross-reference data |
| \$\$\$ | temporary data |

## Appendix D: Command overview

| COLOR ** | sets screen and cursor colors |
| :---: | :---: |
| COPYSYS** | copies operating system (make boot disk) |
| CPMTOMSX ** | transfers files from CP/M to MSX disk |
| DATE | sets and displays time and date |
| DEVICE | assigns input/output devices and changes baudrate |
| DIR* | displays contents on disk |
| DIRS * (DIRSYS) | displays unvisible system files on disk |
| DISKCOPY** | copies disks |
| DUMP | displays binary files |
| ED | line oriented text editor |
| EDIT ** | full screen text editor |
| ERA (ERASE) | deletes files |
| FORMAT ** | formats disks |
| GENCOM | generates extensions |
| GET | console input redirection (input from file) |
| HELP | displays help information |
| HEXCOM | converts Intel-Hex file to COM file |
| INITDIR | prepares disk for using time and date stamps |
| LANGUAGE ** | changes character set |
| LIB | manages program code libraries |
| LINK | links object programs to executable COM files |
| MAC | macro assembler for 8080 assembly language |
| MSXTOCPM ** | transters files from MSX to CP/M disks |
| PATCH | patches CP/M |
| PIP | transfers or copies files |
| PUT | console or printer output redirection (output to file) |
| REN * (RENAME) | changes names of files |
| RMAC | macro assembler for 8080 assembly language (generating REL files) |
| SAVE | saves memory contents on disk |
| SET | sets attributes, passwords and time stamps |
| SETCOM ** | changes RS232 parameters |
| SETDEF | sets search path for COM and SUB files |
| SETFKEYS ** | assigns function keys |
| SHOW | displays disk capacity and informations |
| SID | symbolic debugging tool for 8080 machine code |
| SUBMIT | executes batch files |
| TERMINAL ** | terminal program for communication purposes |
| TYP* (TYPE) | displays text files |
| USE ** (USER) | changes current user area |
| XREF | generates cross-reference file |

## 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.

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 SCr-A and SCC-B. Note that only channel $A$ is buffered (IRQ-ariven) by CP/M. By default SCC-A is assigned to the logical device AUK: .

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 3 Mrl (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 128 K 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 disabelina the usage of VRAM or mapper-memory. Use the utility program VMRAM for that purbose.

ViRRAM DD disables VRAM and MRAM usage, so no RAM disk is available VIRAM DE disables VIRAM and enables MRAM usage.
VITRAM ED enables VRAM and disables MRAM usage.
VMIRAM EE enables VRAM and MRAM usage, so the maximum capacity is available.

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

To get additional information use the HELP proqram.
Munich, October 1987
RVS Datentechnik

