TIMEX

USER'S GUIDE
to CP/M®

FDD
3000

AVISO IMPORTANTE

EXISTEM MONITORES E TELEVISORES NO MERCADO QUE, AO EMITIREM FORTES
RADIAÇÕES ELECTROMAGNÉTICAS, PROVOCAM INTERFERÊNCIAS NO SISTEMA FDD 3000
IMPEDINDO O SEU CORRECTO FUNCIONAMENTO E CORROMPENDO "DISKETTES".

ASSIM, ANTES DE COLOCAR QUALQUER MONITOR OU TELEVISOR SOBRE A UNIDADE
TIMEX FDD 3000, DEVE CERTIFICAR-SE QUE ESSE FENÓMENO NÃO SE VERIFICA,
PROCEDENDO DO SEGUINTE MODO:

1. LIGUE TODO O SEU SISTEMA, COLOCANDO INICIALMENTE O TELEVISOR OU O
    MONITOR AO LADO, AFASTADO, DO SISTEMA TIMEX FDD 3000.

2. CONFIRME QUE O SEU SISTEMA FAZ "BOOT", PRESSIONANDO O BOTÃO DE
    "RESET" DO TIMEX FDD 3000.

3. FAÇA UMA CÓPIA PARA UMA "DISKETTE" VIRGEM, DE UM QUALQUER PROGRAMA
    E GUARDE O ORIGINAL EM LUGAR SEGURO.

4. USANDO A "DISKETTE" DE CÓPIA, COLOQUE AGORA O MONITOR OU O TELEVISOR
    SOBRE O SISTEMA FDD 3000, PROCURANDO A POSIÇÃO MAIS FAVORÁVEL QUE
    NÃO PROVOQUE INTERFERÊNCIAS, ISTO É, O SISTEMA FDD 3000 FAZ "BOOT"
    DE FORMA NORMAL. NOTE QUE ESTA SITUAÇÃO, PODERÁ SER CONSEGUIDA SÓ
    AO FIM DE ALGUMAS TENTATIVAS.

5. EM CASO DE INSUCESSO NESTA OPERAÇÃO, NUNCA DEVERÁ COLOCAR SOBRE O
    SISTEMA TIMEX FDD 3000, O SEU MONITOR OU TELEVISOR.
    NO ENTANTO, PODERÁ CONSTATAR QUE NA MAIORIA DOS CASOS, ELEVANDO O
    MONITOR OU O TELEVISOR NA PERPENDICULAR, O EFEITO DE INTERFERÊNCIA
    TENDERÁ A DESAPARECER. CABERÁ AO UTILIZADOR ESCOLHER A MELHOR
    SOLUÇÃO.

PARA QUALQUER ESCLARECIMENTO ADICIONAL, CONTACTE O SEU REVENDEDOR
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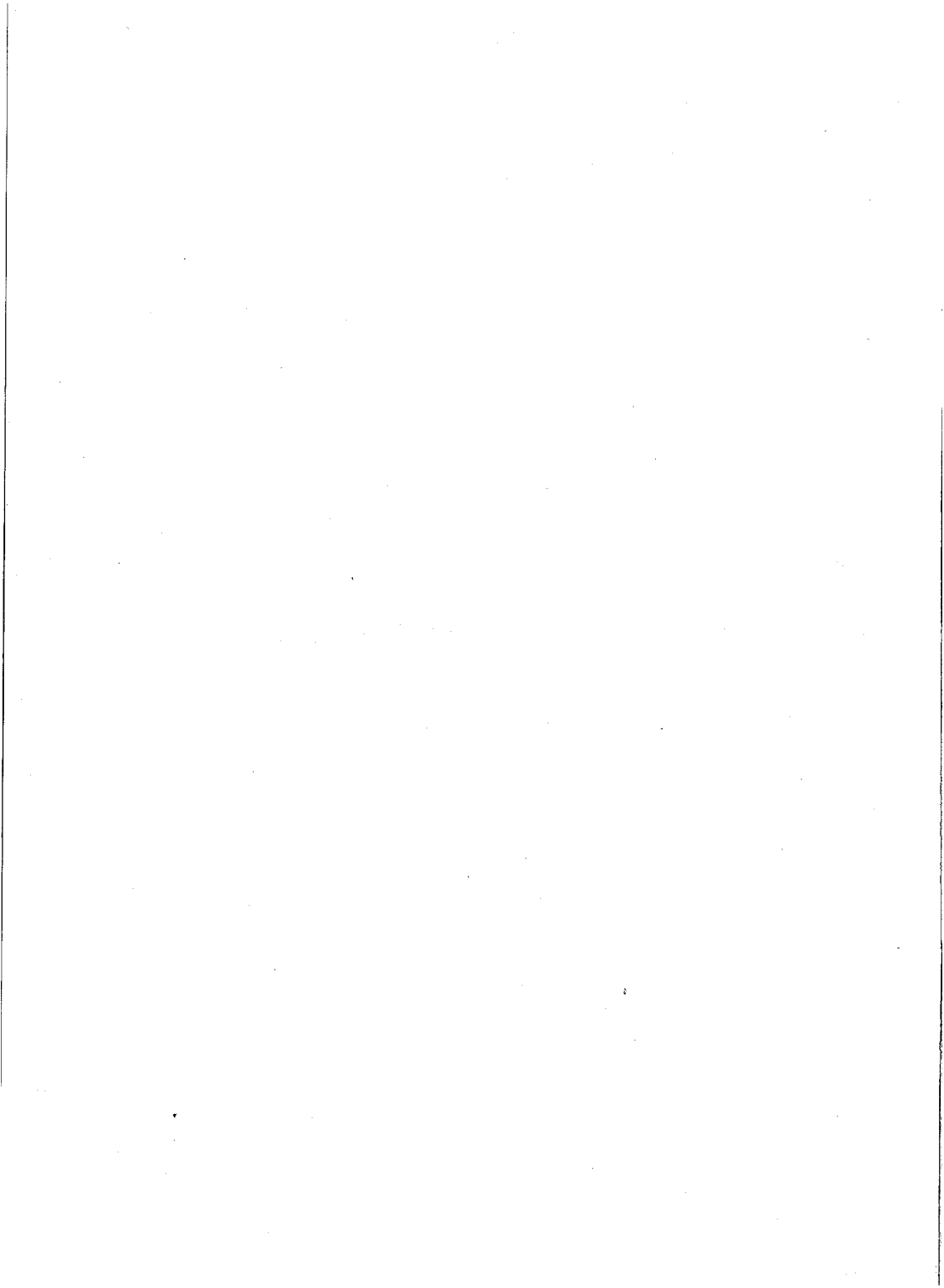   APARTADO 2
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TIMEX

CP/M* Version 2.2

for the

TIMEX 3000 F.D.D.

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About this manual,

This manual is not intended as a learning or even as a reference guide for CP/M it merely gives you enough information to get you started and it describes some features inherent to the hardware.

If you are an application user it maybe sufficient, if you are a software writer it most certainly won't. In any case the Digital Research CP/M manual or some other appropriate literature, referenced later in this manual, will surely be of invaluable help.

This manual starts by briefly describing the hardware and the software included in your system, then it shows you how to get the system up and how to obtain a copy of your CP/M master disk. The CP/M command structure is then summarized along with its resident commands and the utilities programs resident on your disk.

The initial sections of this manual refer to two slightly different hardware setups:

- One where a terminal is emulated by a TC computer and therefore the software (monitor program) to emulate this terminal is loaded from T.O.S.

- The other possible setup uses a full keyboard (the TIMEX Terminal 3000). In this case the software is resident in an internal ROM and there is no need to use T.O.S. at all.

A Foreword:

      The Control Program for Microcomputers, commonly known as CP/M, was developed by Digital Research Inc. as an operating system for systems based on the 8085 Intel microprocessor.

      This operating system has an overall advantage over all other operating systems. It is capable of operating in any hardware environment.

      This feature made CP/M one of the most popular operating systems yet and literary thounsands of applications have been written to run under CP/M.

      CP/M was later adapted to run with the Z80 microprocessor but many of the utilities programs are still prepared to work with the 8085 set of instructions, such is the case of the ASM and the DDT programs provided with your CP/M diskette.

      Due to its popularity and from the feedback it got from users Digital Research Inc. has since released upgraded versions of the CP/M. The version supplied in your disk is VERSION 2.2.

I — THE BASIC SYSTEM

The basic CP/M system consists of hardware, what you can physically perceive, and the software, which is the interface between the machine and you, the user.

Only for users with the TIMEX 3000 Terminal :

THE HARDWARE

This includes a TIMEX FDD 3000 unit that incorporates a controller, two disk drives, a console (in this case a dedicated keyboard, the TIMEX Terminal 3000), a Visual Display Unit and a diskette that contains the basic software to get your system going. Possibly a printer is also included in your package.

THE SOFTWARE

The CP/M master disk, which besides the CP/M operating system has the following standard CP/M utility programs:

- ASM.COM
- DDT.COM
- STAT.COM
- PIP.COM
- MOVCPM.COM
- ED.COM

- COPY.COM
- FORMAT.COM
- CONFIGUR.COM

Only for users with a TC computer as a console :

THE HARDWARE

Again this includes a TIMEX FDD 3000 unit with 64k RAM, a Visual Display unit and possibly a printer but here the console is emulated by a TC computer.

4 - If you own an RS 232_C printer, such as the TIMEX
    2080, you can connect it to the RS 232_C input,
    labelled 'CH_A', at the rear of the controller.

5 - Now switch on the peripherals and last turn on the
    Floppy power supply and the computer.

6 - Put the diskette with the monitor program in drive A
    and press the controller reset button.

7 - Press the interface reset button.

A few seconds after, the following message will appear on the
screen:

          *** MONITOR EMULATOR for the TC 2068 Version P1.0 ***

                    ** Copyright by TMX PORTUGAL **

               Please put the CP/M diskette in drive A
               Then press the controller reset button

          The monitor program has now been loaded into your TC
computer. Do not press any keys !! and read on.

   I I I — B o o t i n g C P / M .

          Now all that you need to do is to insert the CP/M
diskette in drive A and then press the controller reset button
you will then see the following logo on the screen:.

               CP/M Version 2.2 Copyright by
               DIGITAL RESEARCH, Inc.

               Cbios Version A1.o copyright by TMX PORTUGAL

A>

          Where the A> prompt means that CP/M is ready, waiting
for your command. For example, type "DIR" followed by ENTER:

A>DIR

A: FORMAT   COM : COPY   COM : PIP   COM : ED   COM
A: STAT   COM : ASM   COM : ZSID   COM : DDT   COM
A: DSKFIX   COM : RMAC   COM : LINK   COM : MOVCPM COM
A: CONFIGUR COM

The screen will display the names of all the programs on your CP/M master disk.

This command and the rest of the CP/M commands will be explained later.

But first, you should...

MAKE A COPY OF YOUR CP/M MASTER DISK!!!

and save the original in a safe, dry, non-magnetic place. In fact, it is a good idea to make more than one copy.

Copying a CP/M disk is a two-step process. The first step is to use the FORMAT program to prepare a blank disk to accept data. Next, you use the COPY program to copy the master disk onto the newly formatted back-up disk.

IV — Formatting a backup disk

When CP/M is up and running and you still have the CP/M Master Disk in drive A:, type after the A> prompt:

A>FORMAT

and press key ENTER. The CP/M will respond by displaying:

*** TC COMPUTERS CP/M DISK FORMAT version 1.0 ***
        Copyright by TMX PORTUGAL

ATTENTION: This program erases and formats
           the diskettes in the specified drive

Select drive (A: B: C: D:) or Q to return to CP/M

Type 'B'. The FORMAT program will then ask you to put the diskette to be formatted in to the specified drive and to press ENTER.

A new message appears:

Format: (Y/N)?

Once you have made sure that you have a blank diskette inserted in the correct drive then answer affirmatively by typing in 'Y'.

When the FORMAT operation is completed, the disk will stop and the message :

Format completed
Another format (Y/N)?

If you want format another diskette type 'Y' or type 'N' if you do not.

V — Copying the master disk

Now you are ready to copy your CP/M Master disk with the COPY program,

Type:

A>COPY

After a few seconds, the CP/M will display:

*** TC COMPUTERS CP/M COPY Version 1.0 ***
Copyright by TMX PORTUGAL

Copy utility can be used to transfer.

TYPE:
S)YS   — To copy system [track 0 to 1]
A)LL   — To copy whole disk [track 0 to 39]

Type A to indicate that you want copy the whole disk. The system answers:

Copy all as been selected

Source drive ----->

type A to copy from drive A:

Destinaton drive --->

type B to copy to drive B:, the program then answers:

Press ENTER to copy or Q to reboot CP/M

Now you must press ENTER to start to copy the master diskette. When the copy is completed the COPY program displays the following message:

Copy completed
bytes total disk space 160k
bytes used by system 12k
bytes available on disk 148k

Another copy (Y/N)?

If you don't need another copy type 'N'. Since the disk in drive B: is an exact copy of the CP/M master disk remove it from drive B: and insert it into drive A:. Check the CP/M booting process according to previous section. If the backup works sucessfully, you will not need to re-use the CP/M master disk again.

If for some reason you to use only one drive then the 'COPY' program will instruct you as to when to change diskettes, for further details see the 'UTILITIES' section below.

You should now store it in a safe, dry, nonmagnetic place.

WARNING

Do not switch the controller off or on with the diskettes inserted. If you do transient peaks may cause irreparable loss of data on your disk.

VI — At the keyboard.

Now that you got the CP/M master diskette safe and your newly copied diskette in drive A: you needn't reload the monitor program again but type in ^C to let CP/M now you have changed diskettes (see below).

You can now start to type in a few commands. However, if you are using a TC computer as a console bear in mind that the keys have different functions to those described on the keyboard.

Henceforth the control key is abreviated by the '^' symbol.

For users with a TC computer as a console a control function is typed by holding both shift keys down and simultaneously pressing the key you desire.

For users with a TIMEX 3000 terminal the control functions are achieved by holding the control key down and simultaneously pressing the key you desire.

Here is a list of CP/M line editing functions that will help you to edit commands:

BACKSPACE — Backspaces the cursor one character position. Erases the character behind the cursor. (Also invoked with ^H)

DEL — Erases the last character from the internal buffer and echoes it to the console (The display may look somewhat confusing).

^X — Backspaces to the beginning of the line, deleting the line.

^R — Retypes the current line.

^U — Deletes the current line, prints a '#' and moves to a new line.

^J — Terminates input, same as ENTER.

^E — Terminates a line. The cursor moves on to the beginning of the next line, but the line is not interpreted until ENTER is pressed.

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Output control :

There are two control functions that CP/M uses to control output to the printer and the screen.

^S   – Suspends character output and program execution until any key is pressed.

^P   – Echoes character output to the printer as well as to the screen. Character "echo" to the printer continues in effect until ^P is typed once more.

Changing diskettes, "Warm boot" and ^C.

There is one more control character that CP/M recognizes:

^C   – Every time this character is typed in CP/M responds with a "Warm boot" causing CP/M to be loaded from disk to memory.

When using T.O.S. you are allowed to change diskettes indiscriminately. However this is not possible with CP/M since certain diskette directory information is kept in memory at all times. So when you change diskettes this information must be re-read onto memory.

Therefore you should make sure that you type in ^C AFTER you change diskette. If you don't and you attempt to write on a changed diskette CP/M will answer:

BDOS ERR ON X: DISK R/O

Where X: is a disk drive (A: to D:) and 'R/O' means read only. In this case type ENTER and a warm boot will be executed. No error should occur if merely attempt to read a changed diskette.

VII — The CP/M Command structure.

After you have "Booted" CP/M or after a warm boot you will see the "A>" prompt, this means that CP/M is ready for your next command. The letter "A" means drive A: is the current logged in drive. If no drive name is specified CP/M looks for transient commands and filenames in the currently logged in drive.

To change the currently logged in drive you type the letter corresponding to the drive you wish to select followed by a colon. Suppose you wanted to log in drive B: then you would type at the prompt:

B: Followed by enter.

The system will answer:

B>   Showing that drive B: is now selected.

To get back to drive A: you repeat the above sequence typing in 'A:' plus ENTER instead of 'B:'

You mustn't try this example if you do not have drive B: connected to the system or CP/M will "hang up" on you and you will have to press the reset button on the controller.

By now you have probably noticed that CP/M accepts commands in lower or upper case and furthermore it "folds" the characters you type in i.e. it converts lower case characters to upper case .

So, if you type in, say, 'hello' in lower case CP/M answers:

HELLO?

As you see it "folded" the characters you typed and added a question mark meaning, it does not know any command called 'HELLO'.

Actually there are very few commands that CP/M does recognize initially. These are called the resident or built in commands. DIR is an example of a resident command.

However CP/M is structured so that certain disk files can be executed as commands, these are called transient commands.

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Examples of these are the files on your disk STAT.COM, DDT.COM and in fact any file on the currently logged disk that has filetype 'COM' CP/M will try to execute when you type in its name.

When you duplicated your CP/M master disk, you typed in 'FORMAT' and 'COPY' these are not resident commands they are disk files with the extension 'COM' and are equivalent to commands. Note that you only type in the file name but not its extension.

This structure allows you to write in assembler your own commads which CP/M will execute as soon as you type in its name.

If you know assembler and you want to try to start to develop your own commands you should consult one of the recommended books on how to use the text editor and the assembler.

VIII — File name specifications and wildcards.

Files are specified by typing their names (up to 8 characters) optionally followed by a period '.' and the file type or extension up to 3 characters. It is also possible to indicate the drive in which the file is located. If no drive is specified the currently logged drive is assumed.

So if you'd wish to refer to a file in drive B: named 'EXAMPLE.TST' and your currently logged in drive was A: you would type in, after 'A>':

DIR B:EXAMPLE.TST <ENTER>

However, through the use o 'WILDCARDS', you can refer to one or more files with a single specification. The two wilcard characters that CP/M uses are the question mark '?' and the asterisk '*'.

The question mark replaces any single character and the asterisk replaces any string of characters when searching the directory for file name match. T.O.S. users will be familiar with this concept.

So, say, you wanted to see all the files located in drive B: that had the extension '.COM' and that your currently logged drive was A:, then you would type:

DIR B:????????.COM

or

DIR B:*.COM

As another example if you wanted to see all the files on the currently logged drive whose name started with the letter 'C' you would type:

DIR C*.*

Note that '*.*' is equivalent to '????????.???' and to no argument at all. Did you notice the small difference from the T.O.S. templates ?

IX — The resident commands.

If you have been following our step by step method you have already used quite a few of the resident commands. Here is their list and a brief description of their uses.

The **DIR** command.

This command has already been described to some extent in the above section. So we will only point out that if no files match the file specification that you've entered CP/M will answer:

NO FILE

Also note that this command gives no information about file size or to as how much space you have left on your diskette. For this information you should use the transient command '**STAT**'. (See below).

The **ERA** command

The **ERA** command is used to ERAse file from the disk. You should be particularly careful when you use this command as CP/M does not ask for confirmation of your request. It will not wise to experiment with this command until you become familiar with the system and have your own test files.

All the wildcards mentioned above are valid with the use of this command. If you type:

ERA *.*

CP/M will ask : '**ALL (Y/N)?**'

If you don't wish to erase all the files on the currently logged drive type: 'N'

Also if your diskette is hardware write protected and you attempt to erase a file, or in fact any disk write operation, the system will execute a warm boot and display the following error message:

Diskette hardware protected

The **REN** command.

This command is used to RENAme files. The syntax of the command is :

REN newname=oldname

You can precede the first file specification with the drive name. For example if you wanted to change the name of a file 'TEMP.OLD' in drive B: and your currentely logged drive was A: then you would enter:

REN B:temp.new=temp.old

Use of wildcards is not allowed with this command.

The **TYPE** command .

This command is used to display the contents of text files on the screen. You can use ^P to "echo" character output to the printer. A file specification, must be included and wildcards are not allowed.

This command is intended to be used with ASCII text files only. If use it with code files such as the files with 'COM' as the extension, the result will be very messy indeed.

The **SAVE** command.

Perharps the most complex of the resident commands. It will not be of any use to you unless you are a machine code programmer.

The **SAVE** command places 256 byte blocks, otherwise referred to as memory pages, onto to the disk from the T.P.A. (Temporary Program Area). This 'area' starts at 100H.

The syntax of the command is:

SAVE n filename

The number of memory pages you wish to SAVE is denoted by the number 'n'

VII — CP/M UTILITIES

As mentioned previously all the files on the CP/M master disk that have the extension '.COM' function as commands. To invoke them you type out their filename (without the extension) sometimes follow it with one or more arguments and finally ENTER.

The utilities supplied on your disk fall into two categories most are standard CP/M and you should consult Digital 's Research manual or some other relevant literature on the details of their usage. Below is a brief description of their functions.

STAT - The stat command is a simple way to display available space. It can also be used to display and modify device assignements.

PIP - Stands for 'Peripheral Interchange Program'. As the name implies it transfers files between two devices.

ED - This allows you to create, edit and alter text files.

ASM - An 8080 assembler . The Z80 accepts all the 8080 instructions (though the converse is not true) but they do have different mnemonics.

DDT - Dynamic Debug Tool . A disassembler with trace facilities. Once more it works with 8080 instructions and does not recognize instructions exclusive to the Z80.

The other 3 utility programs are hardware dependent and hence not CP/M standard. These are described in some detail below:

FORMAT - As the name implies it is used to format new diskettes. It will irreversibly erase any information that was contained on the disk.

Since this utility was already described above ('How to make a backup') it will only be pointed out that it is a good idea to ensure that your master disk is hardware write protected so that you will not accidentally erase the information it contains.
Also you should bear in mind that the newly formatted diskette does not have the operating system so if you just formatted a diskette in drive A: you will need to introduce a system diskette before you can proceed.

COPY   – Again this has been described above. If select ALL the whole diskette (files and system tracks) will be copied If you select SYS only the system tracks will be copied.

If for some reason you wish to use only one drive you should select A: for both source and destination drives ,then press <ENTER> and the program will ask you to introduce the master and the slave diskettes alternatively.

CONFIGUR   – This utility permits you to change the RS 232C protocol characteristics . You can change them temporarily so if you reboot the system (cold start) the system you revert to its previous characteristics (typing in ^C i.e. warm boot will have no effect) or you can save them on the disk. In this case every time you boot from that disk you set the serial channels to the protocol you saved onto that disk.

To use this utility type in its name then move the cursor, by using the arrow keys, to the field whose value you wish to alter, type 'A' to indicate that you wish to Alter it. Then type in the new value followed by enter. After you have altered all the parameters type in 'S' if you wish to save the changes on disk or 'E' if you only want to keep them temporarly.

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