ZDP User Guide

TORCH
COMPUTERS

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INTRODUCTION

Your TORCH Z80 Disc Pack transforms your BBC micro into a powerful twin processor business machine. As well as providing two 400K disc drives which may be used by the BBC Disc Filing System for storing BBC Basic programs, it allows you to run the full range of CP/M compatible applications software, such as language compilers, (PASCAL, BCPL, FORTRAN, etc.) Word Processors, (WORDSTAR, MAILMERGE, SPELLSTAR, etc.) and a wide range of business software currently available.

Supplied with the disc pack is the Z80 processor card, (which fits neatly inside your BBC micro), two 400K disc drives, the TORCH CPN operating system, (a 16K ROM containing a CP/M compatible "look alike"), and 64K of RAM located on the Z80 card. As the 6502 processor in the BBC machine handles all the peripheral and I/O devices, this means that nearly 63K of RAM is available to the user when running CPN programs.

This User Guide is intended to give you enough information to connect the Z80 Disc Pack to your BBC micro, and exploit the capabilities of this powerful combination to the full. A description of the TORCH CPN commands and the free utility software is provided, together with a brief outline of the TORCH disc system and how it may be used for storing your BBC Basic programs. Please read ALL of the assembly instructions carefully before connecting the Z80 Disc Pack to your BBC micro.

CONTENTS

ASSEMBLY INSTRUCTIONS

Note: Before connecting your Z80 Disc Pack to the BBC
machine, it is important to confirm that the BBC machine has
been upgraded properly from model A to B, and that all the
modifications (where necessary) have been carried out correctly.
Your Acorn dealer should upgrade your BBC machine for you.

UPGRADING THE BBC MACHINE

The following components are the disc interface components
which must be fitted to the BBC machine before connecting the
Disc Pack. All of the following items are available as a kit from
TORCH computers.

Disc Interface Kit

Circuit Location. (BBC pcb).	Type number.
IC78	8271
IC79	7438
IC80	7438
IC81	74LS393
IC82	74LS10
IC83	CD4013B
IC84	CD4013B
IC85	CD4020B
IC86	74LS393
IC87	74LS123
IC88	Disc Filing System (DFS) ROM
IC51	V1.2 Machine Operating System (MOS) carrier.
	(Butterfly pcb)
	(or ROM)

The following points must also be checked on the BBC machine before connecting the Disc Pack:

1) IC76 (74LS163), and IC77 (74LS00), should have been fitted when the machine was upgraded from model A to B.

2) If the BBC printed circuit board is issue number 3, the following link positions must be confirmed:

IC89 pin 9 is connected via a wire link to IC78 PIN 11. (To make the link bend the pins up).

Links S12 and S13 are broken.

3) If the BBC printed circuit board is issue number 4:

Links S9, S12, and S13 are broken.

NOTE: (The issue number of the pcb is printed to the right of the ACORN symbol.)

Having checked that your BBC machine has been upgraded to a model B and that the Disc Interface kit has been fitted correctly, (i.e. no bent under pins etc) you can now connect your Disc Pack by carefully following the procedures given below.

INSERTING THE ROMS *(Refer to Figure 1.)*

Please carry out all these instructions carefully, and do not rush them. If you have any doubts at any stage do not hesitate to contact your dealer.

DISCONNECT THE MAINS POWER SUPPLY AND COMPLETELY REMOVE ANY SOURCE OF MAINS ELECTRICAL CONNECTION FROM THE BBC MACHINE AND THE DISC PACK.

Carefully remove the lid from your BBC micro computer.

Remove the three keyboard retaining bolts, and remove the keyboard to reveal the main PCB and ROMS.
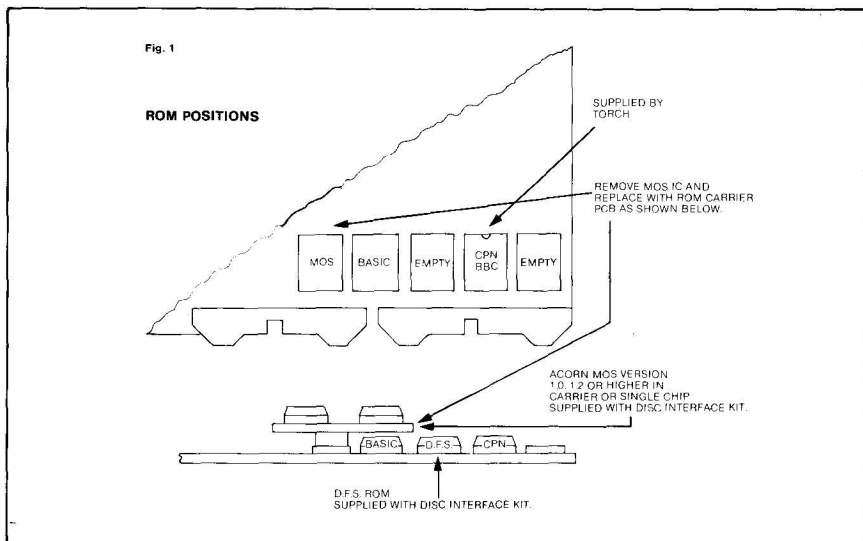
A) The MOS carrier PCB (part of the Disc Interface kit) should be plugged into the fifth socket from the right hand side of the PCB (First remove the MOS ROM already in this socket). If you already have a MOS version 0S1.2 then this need not be changed.

B) The DFS ROM should be plugged into the socket immediately to the right of the BBC BASIC interpreter ROM.

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If your dealer has already fitted a Disc Interface kit, then the above ROMS will already have been fitted.

C) Fit the CPN ROM (supplied with the Disc Pack) in the second socket from the right hand side of the PCB.

Great care should be taken when inserting or removing ROMS. (All ROMS should be fitted with the notch facing downwards).

Fig. 1

ROM POSITIONS

SUPPLIED BY TORCH

REMOVE MOS IC AND REPLACE WITH ROM CARRIER PCB AS SHOWN BELOW.

| MOS | BASIC | EMPTY | CPN BBC | EMPTY |

ACORN MOS VERSION 1.0, 1.2 OR HIGHER IN CARRIER OR SINGLE CHIP SUPPLIED WITH DISC INTERFACE KIT.

BASIC D.F.S. CPN

D.F.S. ROM SUPPLIED WITH DISC INTERFACE KIT.

CONNECTING THE POWER SUPPLY (Refer to Figure 2)

As the power supply in the Disc Pack is used to power the BBC machine as well, the BBC power supply should be disconnected by removing the seven power leads from the spade terminals on the edge of the PCB. If you wish you may remove the power supply completely; however, if you do not remove the BBC power supply, then the ends of the leads should be wrapped separately in insulating tape and secured safely within the unit.

Connect the power supply in the Disc Pack to the BBC computer by passing the white lead provided through the power unit socket at the rear of the machine.
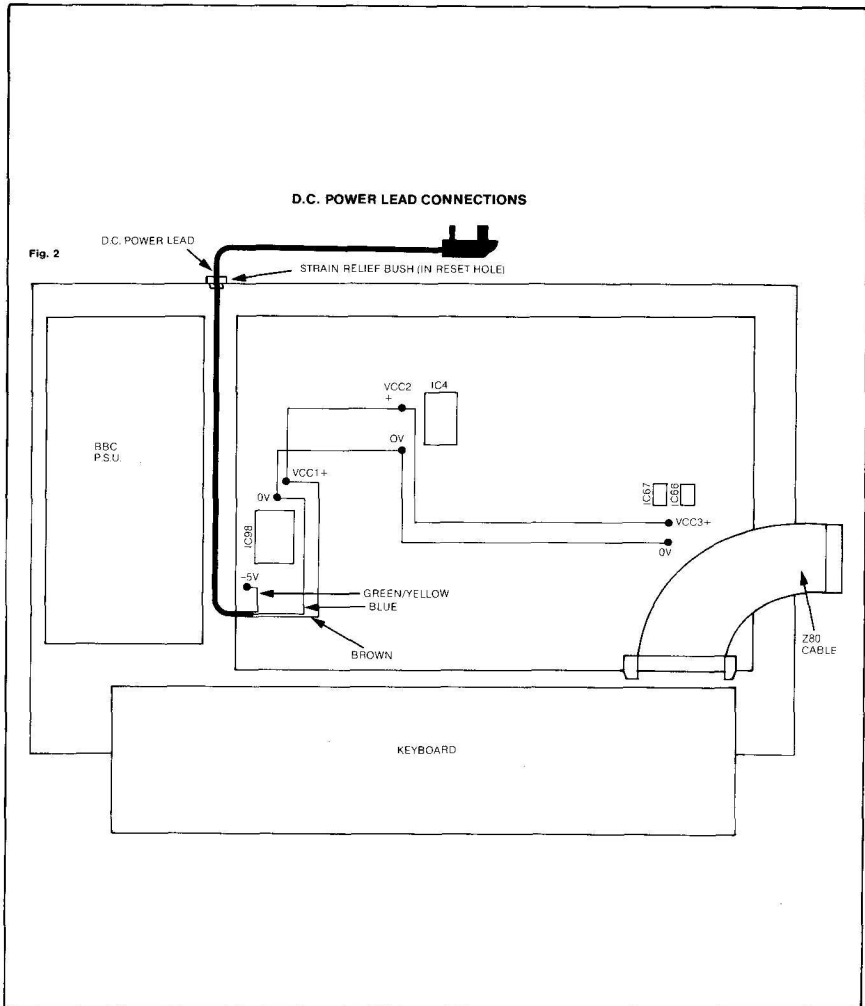
Connect the spade terminals as follows:

Blue leads (3 off) to the three spade terminals on the BBC board marked 0V.

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Brown leads (3 off) to the three spade terminals on the BBC board marked VCC1, VCC2, and VCC3.

Green and yellow lead to the spade terminal marked –5V.
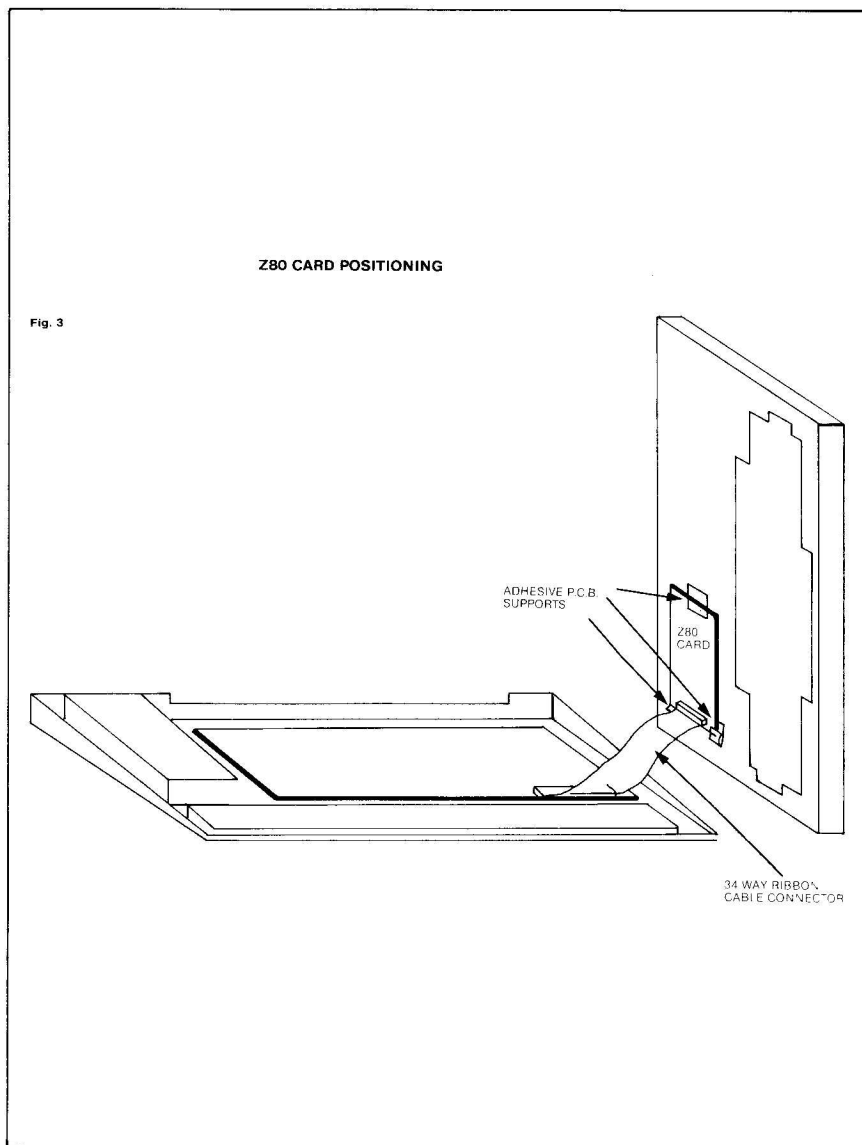
IMPORTANT NOTE

Before switching on, the power lead should always be first plugged into the Disc Pack and then connected to the BBC machine: this is because the Earth connection for the BBC machine is provided through the Disc Pack and damage may be caused if this procedure is not followed.

D.C. POWER LEAD CONNECTIONS

Fig. 2

D.C. POWER LEAD

STRAIN RELIEF BUSH (IN RESET HOLE)

BBC P.S.U.

VCC2 +   IC4

0V

VCC1+

0V

IC98

IC67   IC66

VCC3+

0V

–5V

GREEN/YELLOW
BLUE

BROWN

Z80 CABLE

KEYBOARD

INSTALLING THE Z80 EUROCARD
(Refer to Figure 3)

The Z80 Eurocard should be mounted on the lid of the BBC box using the self-adhesive mounts provided. It should be situated above the RAM area with its connector at the right hand side of

Z80 CARD POSITIONING

Fig. 3

ADHESIVE P.C.B. SUPPORTS

Z80 CARD

34 WAY RIBBON CABLE CONNECTOR

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the box. It is important to mount the Z80 card in this manner so that the 200mm cable provided will be of sufficient length to connect the Z80 card to the TUBE interface on the BBC machine. The following procedure should then be followed.

A) Connect one end of the Z80 ribbon cable to the TUBE connector on the BBC micro.

B) Re-attach the keyboard using the two bolts removed previously, using the small piece of card provided to protect the ribbon cable from any chaffing by the underside of the keyboard.

C) With the lid of the BBC box almost fitted, connect the Z80 ribbon cable to the Z80 card, and screw down the lid of the BBC box.

CONNECTING THE DISC PACK TO YOUR BBC COMPUTER

If you have followed the above procedures correctly you can now connect the Disc pack to your BBC computer.

A) Connect the white DC power lead from the Disc Pack into the matching socket on the back of the BBC computer. (**As stated above always connect this lead to the Disc Pack first before switching on**).

B) Connect the grey ribbon cable with connector into the socket labelled "DISC INTERFACE" on the BBC machine. (Ensure the connector is fitted the right way round).

C) Plug the mains cable into the Disc Pack and connect the 3 pin plug into a mains supply. (250 Volts AC 50 HZ in Europe, 110V 60 HZ in North America.)

After checking that all the connections have been made correctly, switch on the Disc Pack which will also switch on the BBC machine; you should hear two short "beeps" and then see the message:

> Torch Computer System (v n)
>
> CPN
>
> 0A>

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You are now in the CPN operating system and can load and run CPN software on your BBC microcomputer.
To leave the CPN operating system and enter BBC BASIC type:

*BASIC `return`

Your BBC micro computer has now returned to its normal mode of operation.

TROUBLESHOOTING

This section tells you what to do if your BBC computer and Disc Pack do not function properly after assembly. Given below are the fault symptoms and possible causes.

No screen display and no response to keyboard

Check that the power lead from the Disc Pack to the BBC machine is not faulty, and also that the Disc Pack is connected to a suitable mains supply. (250 Volts AC 50 HZ in Europe, 110 Volts 60 HZ in North America.)

Continuous "beep" and no response to keyboard

Check that the ROM carrier PCB has been plugged in correctly and that all the ROMS have been fitted in the correct positions and the right way round.

CPN operating system o.k. but Disc Drives not working

A) Confirm all link positions are correct for that particuiar issue of BBC printed circuit board.

B) Check that the Disc Interface components have been fitted in the correct location, and that all ICs have been inserted the right way round. (If any are found to be the wrong way round then they should be replaced as they have probably been damaged).

D) Check that the connector from the Disc Pack to the BBC Disc interface socket has been plugged in correctly.

Intermittent operation or faulty display

The most common cause of these symptoms is that the BBC computer is not functioning properly due to overheating after the new components have been fitted. For this reason it is essential

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to use the power unit supplied with the Disc Pack rather than the ˈ one in the BBC computer.

As a general rule, all modifications should be checked carefully and your dealer consulted if necessary.

CPN COMMANDS

INTRODUCTION

The TORCH CPN operating system which is a CP/M "look alike" has much more flexibility than conventional CP/M. It has more "built in" commands and is easier to use. The most significant advantage of the TORCH CPN operating system, is that it is stored in ROM (Read Only Memory) rather than on disc. This means that on "power up" the TORCH disc pack and BBC micro are automatically ready to accept instructions typed in at the keyboard.

NOTE: To enter a command, type the appropriate word on the keyboard and press **return** (Upper or lower case letters may be used when typing in a command). Note that commands may be abbreviated as shown in the description of each command.

Built In Commands

HELP (H)

This command will list all the commands available and the information they require.

FOREGROUND (F)

The F command is used to change the foreground colour of the screen, that is, the colour in which characters appear. The colour is indicated by a number from 0 to 15 as follows:

0 Black	8 Black/white flashing
1 Red	9 Red/cyan flashing
2 Green	10 Green/magenta flashing
3 Yellow	11 Yellow/blue flashing
4 Blue	12 Blue/yellow flashing
5 Magenta	13 Magenta/green flashing
6 Cyan	14 Cyan/red flashing
7 White	15 White/black flashing

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To change the colour of the foreground to your liking, type F
< space> followed by the number of the colour required.

EXAMPLE: enter F 1 **return** sets the foreground to red.

BACKGROUND (B)

This is used in exactly the same way as the F command except
that it changes the background colour and uses the same colour
codes.

EXAMPLE: enter B 4 **return** this sets the background to blue.

NOTE: if the screen appears to go blank you have probably set
the foreground to the same colour as the background and you
cannot see the type.

MODE

The MODE command allows the user to change the format of the
screen. This means that you can increase or decrease the
character size.

To use a MODE command enter MODE followed by a number
from the table below and press **return**. The number selects
the screen format that you wish to use.

The codes for the different screen formats are as follows:

0   80x32 text (or graphics).   4   40x25 text (or graphics).

1   40x32 text (or graphics).   5   20x32 text (or graphics).

2   20x32 text (or graphics).   6   40x25 text.

3   80x25 text.   7   40x25 teletext display.

Where 80 x 32 means 80 columns by 32 lines.
The Teletext display (mode 7 above), is the mode used for the
British Telecom PRESTEL System. When the Disc Pack is first
switched on the screen appears in mode 0.
Once a MODE command has been issued it will remain in this
mode of operation until:

a) A new mode command is given.

b) An application program changes the screen mode.

c) The BREAK key on the BBC machine is pressed.

NOTE: Changing the mode clears the screen, selects a white foreground on a black background, and puts up the TORCH announcement, version number and a 0A> prompt.

VDU

The VDU command may be used to send given control codes to the screen driver. (The screen driver is part of the operating system software, and is used to print and draw on the screen). There are various functions available with this command which are listed below with their appropriate number codes.

To use the VDU command enter VDU followed by the number code required.

FUNCTION CODES		FUNCTION
0		Null (does nothing)
1	1	Send character to printer
2		Enable printer (switch printer on.)
3		Disable printer (switch printer off.)
4		Separate Cursor
5		Join Cursors
6		Enable VDU Driver
7		Ring Bell
8		Cursor Left
9		Cursor Right
10		Cursor Down
11		Cursor Up
12		Clear Text Area
13		Move Cursor To Start Of Line
14		Page Mode On
15		Page Mode Off
16		Clear Graphics Area
17	1	Define Text Colour
18	2	Define Graphics Colour
19	5	Define Colour Relationship
20		Reset Colour Relationships
21		Disable VDU Driver
22	1	Select Mode
23	9	Define Character
24	8	Define Graphics Window
25	5	Plot

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26		Reset Windows
27		(escape)
28	4	Define Text Window
29	4	Define Graphics Origin
30		Home Text Cursor
31	2	Position Text Cursor
127		Delete Character
<N>		Any ASCII printable character code.

(For an explanation of second column of numbers see following examples.)

EXAMPLES:

VDU 65 **return** Sends the character with ASCII value 65 to the screen. (i.e. prints the letter A).

VDU 7 **return** This produces a short "beep" on the speaker.

VDU 12 **return** The current text area is cleared and set to the current background colour.

VDU 2, 1, <N>, 3 **return** The printer is enabled, the character N is sent to the printer, and the printer is then disabled. For further programming information on any of the above functions, refer to the TORCH programmer's guide.

NOTE: Some number codes have following characters to complete the command.

EXAMPLE: VDU 22,2 **return** will set screen MODE 2, but will not switch on the printer.

If not enough characters have been entered to complete the command, then the operating system will add zeros until it is complete.

EXAMPLE: VDU 22 **return** will set screen MODE 0 because the operating system added a 0 to complete the command.

The second column of characters in the table above are the characters required to complete each individual command.

EXAMPLE: VDU 2,1,27,1,81,1,3 **return** sets 132 column print mode (ESC Q) on the TORCH . matrix printer. This mode causes the printer to print in smaller (compressed) characters. (Refer to printer manual for ESC codes.)

NOTE: If SUPERVDU or another "Termulator" is loaded, the effects will be different. For example VDU 27, 27, 65, 51, will select ADM31 popular terminal mode if SUPERVDU is loaded.

KEY (*KEY)

The KEY command is used to program the red function keys along the top of the keyboard. This means that any of these keys may be programed to represent a given set of characters chosen by the user. An example of this might be a company's name and address, or any piece of text that may have to be typed or printed frequently.

To use the key command: enter KEY followed by the number of the key you wish to program, and the characters you wish it to represent. *KEY may also be used as the KEY command.

EXAMPLE: If you wish the third key to produce the word TORCH,

ENTER: KEY 2 TORCH **return**
Note: The keys are numbered f0 to f9.

To include spaces at the beginning of the string, the whole string must be enclosed in quotes.

EXAMPLE: To set key 0 to produce -------123-------
(spaces are represented by -)

Type: Key 0 "-------123-------" **return**

This tells the computer where the string of characters begins and ends, otherwise it would ignore the spaces. If you wish to include a quote within the string it is necessary to press the quote key twice.

EXAMPLE: To set key 0 to produce -------"xxx"-------

Type: KEY 0 "   " "xxx" "   "   **return**

If you want to include a carriage return in your string you have to find another way of telling the computer to make a carriage return since to press **return** would close the current command. To do this you may use IM to mean carriage return where I represents the character on the bottom of the key marked 'I

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USER

The USER command is used to allocate a number (as a label), to a particular group of files on a disc. The reason one might do this, (especially in the case of a hard disc), is that if there are a lot of files on a disc, the user is able to select only the files required by specifying the user number of that group of files. User numbers may be selected from any number between 1 and 31.

EXAMPLE: User 5 `return` will only allow access to the files with user number 5 and 0, note that files with user number 0 are always available to the user as well as the selected user number.

VIEW

The VIEW command is used to display a picture file on the screen, it takes a file that uses the VDU control functions, and outputs them to the screen driver which displays them on the screen.

EXAMPLE: VIEW NEWPIX.PIC `return` will display the contents of that file on the screen.

If no extension is given, the extension .PIC is assumed.

EXAMPLE: VIEW PIECHART `return` will display
PIECHART.PIC

NOTE: Some picture files terminate with the VDU code 21 (disable screen) so that commands can be issued without corrupting the display. VDU 6 will restore that output. (For details of filename syntax see next section FILES and FILENAMES.)

FORMAT

The FORMAT command is used to divide a floppy disc into tracks and sectors before the disc may be used. FORMAT may also be used to wipe an old disc clean. To format a disc enter FORMAT `return` and specify the drive to be formatted as per the screen instructions.

NOTE: A disc may be formatted in CPN and then used for BBC BASIC programs. For further information on this command see section on the TORCH Disc System.

EXAMPLE: To set key 0 to set the foreground colour of the screen to blue, and the background to cyan:

Type: KEY 0 F 4 IM B 6 IM

Pressing key 0 then gives F 4 and B 6 commands which will change the foreground and background colours of the screen.

NOTE: On "power on" the following keys are defined:

f0	QUIT	IM
f1	HELP	IM
f2	NO	IM
f3	YES	IM
f9	BEGIN	IM

BASIC

On "power up" the Z80 Disc Pack and BBC machine are reset to the TORCH CPN operating system, enter BASIC **return** to operate in BBC BASIC mode.

*CPN

The *CPN command returns control to the CPN operating system when using BBC BASIC. Enter *CPN **return** to use CPN.

TIME

The TIME command is used to set the time of the real time clock in the computer, and to display the time on the screen. To set the time, type TIME followed by the hours, minutes, and seconds, of the actual time, i.e. 09:40:30 **return**

The time will then be set when the user presses the space bar. To read the time, enter TIME **return** the screen will then display the time.

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DUPLICATE (DUP)

DUPLICATE will copy the entire contents of Disc Drive B to Disc Drive A and is particularly useful for making backup copies of discs. Before the contents of the source disc are copied to the destination disc the DUPLICATE command formats the destination disc.
(Disc Drive A is the left hand drive. Disc Drive B is the right hand drive.)

COPY

COPY is used to make a copy of a file either onto another disc or to make another copy of the file on the same disc.

EXAMPLE: COPY A:SYS.MAN TO B:SYS.MAN `return` will copy the file called SYS.MAN from disc A to disc B.

To make a second copy of the file on the same disc enter:

COPY SYS.MAN TO SYS1.MAN `return`

The COPY command is particularly useful for making backups of single files rather than all the files on a disc.

Another example of the COPY command is where it may be used to copy a group of files with "ambiguous" filenames.

EXAMPLE: COPY B: DG*.* to A: `return`

Where * represents any characters that follow the DG and the dot. All of the filenames below would be copied by the above command:

> DGALIVAN
> DG.COM
> DGOVLY1.OVR
> DGMSGS.OVR
> DGCUSTOM.COM

NOTE: It is also possible to rename files when using the COPY command. (For details of filename syntax see next section FILES and FILENAMES.)

DELETE (DEL)

The DELETE command removes files from a disc once they are
no longer required. DELETE followed by the filename will remove
that file from the disc. Before doing so it will ask the user to
confirm that he does want to delete "filename"?

EXAMPLE: DEL A:SYS.MAN `return` will delete the file
         SYS.MAN from the disc in drive A.

An option available with the DELETE command is the [u] option.
If the filename is followed by this option, then the file will be
deleted unconditionally, that is, without the user being asked if he
wants to delete the file.

NOTE: If a file is protected by the [r] option of the PROTECT
command, then the DELETE command will not affect it.

DIR

DIR is used to display a table of all the files on a disc on the
screen.

EXAMPLE: DIR B: `return` will display all the files stored on
disc B. If you want to display information on a particular file enter
DIR followed by the filename.

EXAMPLE: DIR A:SYS.MAN `return` will display information on
the file called SYS.MAN.

There are three options available with the DIR command:

[L]   will display the length of that file.

[P]   will tell the user if the file is protected, and if it is, how the file
is protected, i.e. if the file is read only, or read/write.

[S]   will display the space left on that disc.

EXAMPLE: DIR A:SYS.MAN [L] `return` will tell the user the
length of the file called SYS.MAN (in kbytes).

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RENAME

The RENAME command is used to rename a file, which might be useful if you wanted to regroup information or put outdated information into storage, and release the filename to use again.

EXAMPLE: RENAME SYS.MAN AS DISC.MAN `return` will change the filename from SYS.MAN to DISC.MAN.

NOTE: You must always have the same number of new names as there are files to rename.

* RENAME {OLDNAME NEWNAME

TYPE

The TYPE command is used to display the text in a file.

EXAMPLE: TYPE SYS.MAN `return` will display the contents of the file called SYS.MAN.

When looking at the contents of a file it is possible to stop the screen scrolling and observe the current display of text by holding the CTRL and SHIFT key down at the same time. Pressing the escape key will also stop the screen scrolling, and a message will be displayed on the screen asking the user if he wishes to stop the program or carry on. The user responds to this by pressing the Y or N key for yes or no respectively.

PRINT

The PRINT command is used to print out information from files onto a printer. This is used the same way as the TYPE command.

EXAMPLE: PRINT SYS.MAN `return` will make the printer print the contents of the file called SYS.MAN.

NOTE: *FX followed by the correct code to select a printer must be entered before the PRINT command to tell the computer what type of printer is connected to it.

*FX 5, 1 Selects a parallel printer.

*FX 5, 2 Selects a serial printer.

When using the serial port, the BAUD RATE (bits per second) may be selected by use of the *FX commands listed in the following table:

*FX 7, X Set up receive baud rate.

*FX 8, X Set up transmit baud rate.

Where X is one of the following:

1	75	baud		5	2400	baud
2	150	baud		6	4800	baud
3	300	baud		7	9600	baud
4	1200	baud		8	19200	baud

COMMAND (C)

The COMMAND command, may be used to output the contents of a file, to the computer as a series of commands.

Comprehensive facilities are available for argument substitution.

EXAMPLE: C BEGIN.DOC **return** will take this filename and use it as the input stream to the computer.

If no extension is given then a default of .SUB is assumed. For further information refer to the section: "Preparing Command Files".

INPUT

The INPUT command is used to enter a text file to the computer and store it on disc.

The syntax used is: INPUT followed by the filename, followed by **return**.

The user may then enter text which will be stored in this file. After the text has been entered press END or CTL Z to return to the command line. To display the text after it has been stored on disc use the TYPE command as described above.

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EXAMPLE: INPUT SYS.MAN `return`. After entering this the user would now be able to write a text file called SYS.MAN. All the cursor control keys on the keyboard of the BBC machine are functional, as marked.

NOTE: As soon as one of the screen editing keys has been pressed, a second cursor known as the editing cursor will appear on the screen. This will disappear from the screen every time a carriage return is entered but will reappear when one of the edit keys is pressed again.

PROTECT

The protect command is used to protect files in various ways depending on the option selected from the following:

s: File is invisible to the DIR command.
u: This option cancels the s option.
e: Is execute only.
r: File is read only.
w: File is read/write. (cancels r option).

The command syntax is:

PROTECT "filename " [options]

EXAMPLE: PROTECT TORCHTEL.COM [r] `return`

This will make the file TORCHTEL.COM read only. This means it cannot be deleted or modified until another PROTECT command has been used.

PROTECT B:*.COM [s]

This makes all the files on drive B with extension .COM (program files) into system files, which means in effect that they do not appear on the directory, but may still be used.

PROTECT without any options will display the protection assigned to the specified file(s).

EXAMPLE: PROTECT B:TORCHTEL.COM `return` will display TORCHTEL.COM and any other protection that might be assigned to that file.

CPN FILES AND FILENAMES

When a piece of text or data is to be taken from the computer and stored on disc, it has to be put in a "file" on the disc. This file has to have a name so that the computer can identify it at a later date, retrieve it's contents, and load it back into the computer. Filenames are made up of:

(1 to 8 characters). (0 to 3 characters,) where a character is defined as: a letter from A to Z, a number from 0 to 9, or any of the following: @, £, $, &, -, /.

Examples of filenames:

        GALLIVAN.DES
        DISC.TXT
        JMB/RA
        DEMO-1
        Z.X
        LETTER.001
        REM.

NOTE: In the above example GALLIVAN.DES, GALLIVAN is the filename, and .DES is known as the extension. If the extension is omitted, the CCCP operating system, or the current program may add one. (This is explained further below).

Within these limits the user may name his/her own files according to their own system. Any filenames that do not conform to the above requirements would be invalid and would not be accepted by the system.

AMBIGUOUS FILENAMES

Where it is desirable to include a file within a certain group, without giving it a precise name you can use what is called an "ambiguous" filename. This makes use of two characters.

        ? and *.

These characters may be used to represent whichever character

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the keyboard. The operating system will then execute this file as a series of commands.

EXAMPLE: A file called SYS.COM may be executed by entering:

SYS `return`

A file called SYS.SUB may be executed as a command file by entering SYS `return` provided the file SYS.COM does not exist.

the user desires them to. Thus, ? in any position in a filename means "any character".

EXAMPLE: SYS.??? means SYS. followed by any characters.

What this means is that a file starting with SYS. may have any optional extension, and will still be recognised by the operating system.

The * character in any position has the same effect but it can mean any number of characters.

EXAMPLE: *.COM means all files with a .COM extension.

. means all files on the default disc drive.

The default disc drive (A), is the drive the computer will access on "power on," or after a reset, unless the logged on drive is changed. (See section: Torch Disc System.)

NOTE: When using the COPY command, (see section on commands) the disc drive name A or B becomes part of the filename.

EXAMPLE: A:SYS.MAN

Where A: is the disc drive,
SYS is the filename,
.MAN is the extension.

The name of the disc drive becomes part of the filename so that the operating system knows exactly on which disc drive it will find the file called SYS.MAN.

COMMAND FILES AND SUBMIT FILES

If a filename is entered at the beginning of the command line without an extension, the TORCH operating system will add the extension .COM and then look for this on the disc. If it finds it, then it will load it and run it. If the operating system adds the .COM extension to a filename, looks for it, and doesn't find it on the disc, then it will add the extension .SUB; it will then look for this on the disc. This is known as a SUBMIT file. Such a file will have in it a sequence of commands written as text. When it finds it, the operating system will use this file as it's input rather than

UTILITY PROGRAMS

Your Z80 Disc Pack is supplied with a system disc containing utility programs. The utility programs provided are listed below with a brief description of each program and its function. To use any of the utility programs, put the system disc in drive A and type the name of the utility followed by `return`.

NOTE: Backup copies should be taken of all system programs before use.

As it is TORCH policy to upgrade and improve existing software, some versions of the Utility programs described below may not have all the features of future versions. However, all present software will be supported in future upgrades. (Software upgrades will be available from your dealer for a small handling charge.)

The following programs are described in this section:

1) FONT.
2) EXEC.
3) TORCHBUG.
4) RS423.COM
5) MUSIC.
6) MAPDISC.
7) POKEDISC.
8) RDACORN/WRTACORN

FONT

This program allows the user to design character sets for special use or just for personal preference. The program is menu driven and should be self explanatory.

When FONT is run it will ask the user if he wants to modify an existing FONT file, or to create a new one from the current character font. Either enter the name of the file to be modified, or press `return` to create a new FONT file. Font will then display a list of options from which the user may design his own character font.

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When selecting a character to be re-defined, the ASCII character code (in Hex), should be entered. Alternatively, enter = followed by the character to be selected.

The selected character is defined on an 8x8 grid around which a cursor is moved and is used to re-define the character. The cursor movement is controlled by the keys on the numeric key pad. Key 5 reverses the field of the pixel (picture element) under the cursor, all the keys around key 5 i.e. 4, 6, 8, and 2, are used to move the cursor left, right, up, and down, respectively. The character to be defined is shown in parentheses above the grid box in mode 0, 1, and 2 sizes. At the bottom of the screen is a box showing the current character font for reference. While editing the character, a number of commands are available to alter the grid quickly; all of these commands are listed on the screen when the program is run.

The W command allows the user to allocate a filename to the new character font and save it on disc.

If a filename is given the extension .COM then this file may be saved and run as a command file.

EXAMPLE: To set up a font called GOTHIC.COM enter GOTHIC followed by `return`, and the TORCH will add the .COM extension itself and load and run the file. (For an explanation of the syntax used for naming files, see the section on FILES and FILENAMES.)

NOTE: FONT is not limited purely to producing character sets, it may also be used to produce graphic fonts to produce pictures or circuit diagrams for example. This is achieved by redefining the characters of the current font as graphic characters.

EXEC

The EXEC command allows the user to specify upto approximately 120 characters that will be 'typed' after execution of a SUB file. The effect of any such command is exactly as though the characters in question had been read from the keyboard buffer.

NOTE: If SUPERVDU or other termulators are to be loaded with a command (SUB) file, then the EXEC command should be used.

Operation

The characters following the EXEC command are programmed
into function key 8 and, if it is sufficiently long also into function
key 7. The codes for key 8 (and 7 if necessary) are added to the
keyboard 'typeahead' buffer. When the Torch next tries to read
input from the command line in interactive mode the soft key
definitions will be read and expanded. The format for the
parameter given to EXEC is the same as that used by the
function keys (i.e. vertical bar is an escape character).

Restrictions

Only one EXEC command may be included in any SUB file or
sequence of such files. This limits the total command length that
may be EXECed.

The keyboard buffer is not cleared before execution of the
program so it is advisable to include a control-X (entered as |X)
as the first character in the buffer. Similarly a carriage return
should be included at the end of the string if it is intended that
the command should be terminated by one. This may not, of
course, always be the case (see below).

The keys 8 and sometimes 7, are used by EXEC and therefore
may not be set by the user when EXEC files are used. The key
definition resulting from EXEC will of course remain in keys 8 and
7 and may be reused as necessary. If the string involved is
sufficiently short only key 8 will be affected.

Help screen

If the EXEC command is invoked without any parameters, then a
screen of information describing the command will be displayed.

Examples

Set up a SUB file which may be easily invoked by a user with
little or no experience of computers, which will set up a printer
and a yellow foreground on the screen and will leave the user in
an MBASIC program called ACCOUNTS.

Since the program is to be run as a 'turnkey' system. (i.e.
automatically runs a specific program on power on). the file will
be named 'BEGIN.SUB'. This allows it to be executed by simply
typing the CTRL+BEGIN keys together, with the disc in drive A.

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The contents of this file might be as follows (lines beginning with a semicolon are comments):

```
; Set up a parallel printer
*FX 5,1
; Set up screen
Mode 0
F 3
; Now run the accounts package
EXEC IXMBASIC ACCOUNTS IM
; Note that the IX clears the line of any unnecessary letters
  while the
; SUB file is being obeyed and the IM is necessary to ensure
that
; the command will be entered
; Also note that while EXEC need not be the last command in
; a file there may only be one EXEC and it will not take effect
; until all other commands have been executed.
```

This file (with or without the comments) will have the desired effect.

A programmer wishes to have a simple method of editing and assembling programs using WordStar, M80 and L80. The following submit file (called UPDATE.SUB) will set up function keys 4 and 5 to invoke the assembler, key 8 to invoke WordStar and leave the programmer in WordStar at the end of the file. It is assumed that the program under development is on drive B with the assembler etc. on drive A. Further, this programmer always begins files with a 'ruler line' on the second line of the file. Tab stops are set up by a sequence of control keys whenever the file is altered.

```
; Set up key 4 to assemble the program.
KEY 4 M80 = B:$1
; and key 5 to do the link
KEY 5 L80 B : $1,b:$1/n/e
; now invoke WordStar
EXEC WS B:$1.MAC I M I X I OF I OV I OT
```

This file is invoked by a command of the form UPDATE EXEC to allow editing of the file EXEC.MAC.

TORCHBUG (monitor and debugging aid)

Aim of program

To provide a simple debugger program capable of loading files
(either object code or Intel Hex), modifying and testing the code,
and then saving the resulting program.

Operation

TORCHBUG is invoked as an ordinary COM file. It loads and
relocates itself automatically at the top of the free store. If a
filename is given on the command line as a parameter then that
file will be loaded at 0100H but not executed. From TORCHBUG
the following command keys may be used.

HELP (Function key 1) This key will always reveal some
information about what options are available from the part of the
program in use. It usually leaves the user in the same mode as if
no key had been pressed, but an exception to this is the Modify
command where the program will return to the TBUG> prompt if
help is requested.

QUIT: (Function key f0) This key returns the user to the 0A>
command line. A cold boot is performed, removing TORCHBUG
from the system but preventing SAVE being used. N.B. Because
the save command will not work after TORCHBUG has been run,
always use the S command from TORCHBUG. (A "cold boot"
refers to a condition whereby the 6502 is reset.
This is the same effect as pressing the master reset button at the
rear of the TORCH.)

G   Go. This command allows the user to execute a program from
any memory location. The address to go from should be entered
as a hexadecimal number terminated by a carriage return.

I   Load Intel hex file. The name of a hex file will be prompted for
and should be entered in the format outlined below. Errors
detected in the standard hex format will cause the file to stop
loading with an error message. The file will be displayed as it
loads.

L   Load COM file. The program will prompt for a filename and
then the first location in memory from which the program should
be loaded. No checks are made to prevent overwriting of the
CPN etc.

M   Modify memory. This command allows dumping and modifying of blocks of memory. The first address will be prompted for as in G above. Memory is displayed in blocks of 16 bytes in HEX format followed by the sixteen characters made from those numbers with the MSB set to zero and non printing characters displayed as '.'.

To change memory locations copy the new values onto the line with the cursor and press `return`. If fewer than 16 hex numbers are entered then only the first few bytes of that block may be modified. The line will then be redisplayed and may be modified further if necessary. If '.' is entered on the line then the program will return to the TBUG prompt. To display the next 16 bytes of memory simply press `return` without modifying anything. Holding `return` down will allow large areas of memory to be displayed. WARNING — any entries other than those specified above (or HELP) will cause the current line of memory to be cleared to 0.

R   Register display and modify. After invoking this command the user is requested to enter the name of a register. Registers AF,BC,DE,HL,IX,IY,SP, and PC, may be modified by this command and except for IX,IY the first letter is sufficient to identify the register. Upper or lower case may be used. If register name X is entered the main register set and the alternative register set will be exchanged in the register buffer.

Pressing CR on its own will display the current value of all registers in the register buffer.

S   Save file. This command allows areas of memory to be saved to disc. The user is prompted for filename and also for the first and last addresses to be saved. This means that programs need not be saved from location 0.

All filenames entered when using TORCHBUG (except the optional one on the command line) have the following format. Optional drive name A or B followed by ':', up to 8 character name, then optionally '.' and 3 character extension. If the extension is omitted it always defaults to '.COM'. The filename is taken to be as entered without any uppercasing. This last point allows access to any files consisting of printing characters only.

All hexadecimal numbers except those used by modify are of the following format: any number of characters consisting only of 0-9 and A-F or a-f, terminated by any other character. Numbers entered to modify a block of memory must contain exactly 2 digits.

The command line prompt in TORCHBUG is always TBUG>.

Example of use

A software package is available to allow customisation of WordStar for the Torch computer. This consists of the files WSPAT.HEX (an Intel Hex file) and WSCUSTOM.COM. (For an explanation of WSCUSTOM.COM see the separate document ·Patching WordStar for the Torch.) To produce a copy of WordStar for the Torch the following procedure should be used:

Install WordStar without selecting any terminal but installing whichever printer driver is appropriate to your own installation. Assuming that the disc in drive A now contains the files mentioned above, TORCHBUG.COM and a WordStar file (here called WS.COM) enter the following:

TORCHBUG W.S.COM

The TBUG> prompt should appear. WordStar is now in memory so the patch file should be loaded by pressing I. The prompt 'Filename:' will appear and WSPAT.HEX should be entered. N.B. If no extension is given then the file type will default to '.COM'. The hex file will load and be linked automatically into the existing program. The next stage is to save the patched version of WordStar by pressing S and then a new filename such as WS1.COM to save the patched WordStar. The start address should be given as 0100 and the end address as 3f00. The name under which WordStar is saved should not already exist on the disc as TORCHBUG will never delete an existing file.

RS423.COM

RS423.COM allows Data to be received through the serial port on the BBC machine. This facility allows the Disc Pack and BBC machine to communicate with other computers which have an RS423 interface.

This program is run by typing: RS423 "filename." **return**. The file 'filename' is opened, and the program waits for characters to come in on the RS423 port. The TORCH reads the characters as they come in and puts them in the file, using the RTS line to prevent the sender going too fast. If no characters are sent for more than 5 seconds, the TORCH asks if the end of file has been reached, if so closes the file and returns to the command line.

The RS423 program running on a TORCH can be treated as a printer which will record output sent to it onto disc. Text files are therefore easily sent to the TORCH by simply printing them to it.

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Object files (.COM files) should be sent using a utility which
sends binary characters to the serial port on the other computer.

MUSIC

The TORCH music system consists of two programs, one of
which plays music files, whilst the other is used in creating them.

MUSIC: The MUSIC program plays standard TORCH music files,
the format of which is described below. TORCH music files
usually have the extension .MUS.

EXAMPLE: MUSIC B:CHARIOTS.MUS
             MUSIC B:CHARIOTS

either of the above commands will play the music file named:

      B:CHARIOTS.MUS

NOTE: The default extension is .MUS
(For explanation of filename syntax see section on FILES AND
FILENAMES.)

Music Compressor (MUSCMPX)

This program compresses a TORCH music manuscript file, (these
normally have the extension .MSC) to give a TORCH music file,
(normally with the extension .MUS) for use with music.

EXAMPLE: To compress the file B:CHARIOTS.MSC into the file
             B:CHAR.MUS enter the command:

             MUSCMPX B:CHARIOTS B: CHAR

NOTE: The default extension is .MSC
Both programs will give full instructions if run without specifying
a filename.

Description of music files

A music file is an ordinary text file. With the exception of
comments (see below), it is free format, with spaces and newlines
being used to separate items. The program MUSCMPX will
remove all unnecessary characters from a music file.

The file consists of a mixture of note descriptors and special
items. These are described below. The end of file is detected
automatically.

Note Descriptors

A note descriptor is a sequence of four items. These are:

        (1) Channel Code.
        (2) Dynamic Mark.
        (3) Note Name.
        (4) Length.

The channel code controls the channel and range that are used. There are three channels and two ranges, as shown in the table. A channel can only produce one note at a time, and the notes indicated in the file for a channel are automatically queued.

Code	Channel	Range
*	1	Bass
1	1	Normal
2	2	Normal
3	3	Normal

The dynamic mark controls the volume of a note. There are 8 dynamic marks permitted:

ff	loudest
f	.
mf	.
mp	.
p	,
pp	.
ppp	quietest
r	silent

The note name is specified as an uppercase letter from A to G, followed by # or b if required to indicate sharp or flat (names such as Cb OR F# will be accepted). These names indicate the octave from the middle C to the B above. Following the name by + or − signs will respectively raise or lower the note one octave. The range of notes available is:

        Normal Range   B-- to D++++

        Bass Range   C----- to D#

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*If the dynamic mark is 'r', then the note name should also be so.
The length is a number from 1 to 255 indicating the length of the
note in units of 50 ms, i.e. 20 indicates one second.*

Whilst the TORCH will automatically queue notes on a channel,
there is a limit to the amount that can be queued, and it is
recommended that notes be kept in their "real" order. The file
can be conveniently formatted to aid this. For example, here is
the start of "Chariots of Fire".

1 f Db+	8	2 r r	32	3 r r	
1 f Gb+	8			32	
1 f Ab+	8				
1 f Bb+	8				
1 f Ab+	24	2 f Ab-	4	3 f Db-	48
		2 f Db	4		
		2 f F	4		
		2 f Ab	4		
		2 f Db+	4		
		2 f Ab	4		
1 f F+	24	2 f F	4		
		2 f Db	4		
		2 f Ab-	4		
		2 f Db	4		
		2 f F	4		
		2 f Ab	4		
1 f F+	16	2 f Db+	4	3 f Db-	48
		2 f Ab	4		
		2 f F	4		
		2 f Db	4		
1 f Db+	8	2 f Ab-	4		
		2 f Db	4		
1 f Gb+	8	2 f Bb-	4		
		2 f Db	4		
1 f Ab+	8	2 f Gb	4		
		2 f Ab	4		
1 f Bb+	8	2 f Bb	4		
		2 f Db+	4		

The Torch will indicate if it detects any item in the wrong place,
but will not attempt to rectify the fault.

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Special items

The following special items are available:

  (1) Comments
  (2) Repeat marks
  (3) Debug mode

Comments are indicated in one of two ways. Firstly, a semicolon indicates that all text until the end of the line containing the semicolon is a comment. Secondly, anything within braces { } is also a comment (except within the first kind of comment). Braces may not be nested, but may contain new lines. This second kind of a comment is known as a "debug remark", as it is handled specially in debug mode.

Repeat marks are used to allow the repetition of part of a tune. Up to ten independent repeat systems may be active at any one time. The number of the repeat system (0 to 9) is indicated by # in the following description:

Four items are used to control repeats. These have the following effects when found whilst playing the tune:

  7#

  All previous information about this repeat system is forgotten, the system is marked "first time", and this location is noted.

  8#   If this system is marked "first time", it is changed to "second time", and a jump is made to just after the location of the noted 7#. Otherwise it is ignored.

  10#   If this system is marked as "second time", then a jump is made to just after the location of the first 11# beyond this point in the file. Otherwise it is ignored.

  11#   Ignored (see 10#).

The first item found for any repeat system MUST be a 7#.

Debug mode is provided to allow the notes being played to be viewed on the screen. It is entered whenever the item 121 is found whilst a turne is being played, and left whenever a 120 is found. Debug mode has two effects. Firstly, all debug remarks (see above) are displayed as they are reached during the playing. Secondly, whenever a note is played, details about it are displayed on the screen.

N.B. It has been found that the extra processing involved in debug mode may have the effect of delaying some notes slightly (normally by about 1 length unit).

A cell with a grey dot in the centre: this indicates that this cell has got multiple uses. i.e. Two files "think" they own this sector.

As well as the full map of the disc (containing the above symbols), being displayed with the F option, there is also a full option menu displayed. All the options available are displayed on the menu.

The 12 options available on the full menu are as follows:

G, M, U, 2 and 3 display their specific sectors, (as described on the screen). Note that options 2 and 3 display blocks L2 and L3 respectively. (L2 and L3 blocks are described in the TORCH Technical Document no: SYS-B-O1)

A   Re-displays the main map of the disc.

N   Allows scanning of another disc.

Q   Quits the program.

W   Writes the allocation map back to the disc (after it has been modified).

T   Tidies the map, that is, it erases all garbage sectors from the disc, and fixes all un-allocated sectors. *NOTE*: After using T, use the W option to put back the "fixed" map. When the T option is selected, the message "Tidied" is displayed on the screen.

H   Displays a file handle. That is, it displays all the information associated with a particular file.
When the H option is selected, the number displayed following the H is the handle number of the file. i.e. Its position in the directory.

The following are additional symbols that may appear on the map after the H option (described above) has been selected:

A completely blue cell: this is a data sector for that file.

A cell with a blue horizontal line: this sector is an L3 block for that file.

A cell with a blue vertical line: this sector is an L2 block for that file.

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MAPDISC

Each disc used on the TORCH system has an allocation map, which shows exactly which parts (sectors) of the disc are being used.

MAPDISC has two functions:

1) To allow the user to view the allocation map of the disc and look at the status of the sectors on the disc.

2) To allow the user to check that the map is correct, and if necessary attempt to correct it against the disc.

When MAPDISC is run it will first ask the user to enter the drive to be scanned and then display an allocation map of that disc showing the sectors that are allocated. For a full map of the disc, option F should be selected; this looks at the directory on the disc, and for each file it notes which sectors that file uses. It then sets up a full map on the screen of the disc. The symbols shown on a full map of the disc may be interpreted as follows:

A cell completely shaded in grey: this is a data sector that has been allocated and is used.

A completely empty cell: this is an unused and unallocated sector.

A cell with a grey horizontal line: this means there is an allocated L3 block in that sector.

A cell with a grey vertical line: this means there is an allocated L2 block in that sector.

A cell with a grey x: this is a cell that has been allocated but is not used. (garbage).

A cell with a grey u: this means that this sector is un-allocated but is in use.

A blue cell with a white U: this sector is part of the file but is unallocated on the map (irrespective of use).

A blue cell with a white dot in the middle: this is a sector used in that file and is also used by another 1 or more files.

NOTE: the above symbols only appear on the map when the H option (described above) is selected.

P   This option will allocate the entire map as if used. Again to implement this on the disc, the W (write) option described above, should be selected. Note that when the P option is selected, the message "Protected" is displayed on the screen.

Type Ahead

If MAPDISC is in the middle of drawing a map of a disc, and a key is pressed, which is a valid option, (as described above), then MAPDISC will break off from drawing the map of the disc, and execute the option selected. A message is displayed on the screen telling the user if MAPDISC is drawing a map, or if it is interrupted whilst doing so. Note that when a particular option is selected, a message may be displayed on the top left hand side of the screen. This message is: "working" or "drawing map".

Using Mapdisc with the Hard Disc Pack

When using MAPDISC with the hard disc pack the map of the disc is displayed in one piece rather than two as in the case of the floppy disc. The figures on the top right hand side of the screen indicate the tracks that are currently being displayed. Note that only part of the map is displayed at any one time, and that other parts of the map may be viewed by scrolling left, and right by using the following keys:

[< ({   Any of these keys will scroll the map to the left.

] >) }   Any of these keys will scroll the map to the right.

When the map reaches end of scroll in either direction, that function will be disabled, (i.e. scrolling in that direction) and the relevant scroll option (left or right) will disappear from the menu.

Another option available with the hard disc, but not with the floppy, is the "scrunch" option. Scrunching a map causes the

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entire map to be compressed horizontally until it fits on the screen. This is done by allowing each square to represent the appropriate sector, on all of a number of consecutive tracks. The symbol displayed in the square is the "most important" symbol of those that would be displayed on a complete map. The order for determining the "most important" symbol is:

Multiply allocated sectors in a specific file (when using the H option). (Blue square with a white dot.)

Unallocated sectors in a specific file. (A blue cell with a white U).

Multiply allocated sectors on the disc. (A cell with a grey dot).

Unallocated sectors on the disc (but used). (A cell with a grey U).

L2 Blocks in a specific file. (A cell with a blue vertical line).

L3 Blocks in a specific file. (A cell with a blue horizontal line).

Data sectors in a specific file. (A completely blue cell).

Allocated but not used sectors (Garbage). (A cell with a grey X).

L2 Blocks on the disc. (A cell with a grey vertical line).

L3 Blocks on the disc. (A cell with a grey horizontal line).

Data sectors on the disc. (A cell shaded in grey).

Unused sectors. (A completely yellow cell).

When using MAPDISC with the hard disc, all the options available are listed on the menus.

POKEDISC

POKEDISC allows the user to scan a disc and change the contents of the sectors directly, without using the normal file structure.

When using POKEDISC, the typeahead facility is suppressed, in that, it will only "remember" the first letter that is typed. Issue 3, of POKEDISC may be used with floppy discs only. Issue 4, may be used with the hard disc and floppy disc.

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At any time POKEDISC is displaying 1 sector of the disc. This sector may be displayed in one of four modes, each of which is selected by its relevant letter key. These four modes are as follows:

D   This selects the DIR mode which displays the 16 directory entries.

K   This mode displays the sector as a set of 256 characters. If the character is not a character that may be displayed on the screen, then a hexadecimal code will be displayed instead. For instance, a carriage return would be displayed as 0D. A yellow character indicates that the most significant bit of the character is set. A space with the most significant bit of it's byte set would be represented by the symbol of a square bracket on its side.

H   This mode displays the entire sector as 256 pairs of hexadecimal digits.

M or N   Either of these letter keys will select mixed mode, this displays one eighth of the sector at a time. The particular part of the sector being displayed is shown at the top right hand of the screen, and also down the left hand side. Example BYTES 00 to 1F. The 32 bytes being displayed are treated as 16 words, (each of two bytes) each word is displayed as 16 bits, 4 hex digits, 2 characters, and possibly a sector address if valid. Note: because of the way the Z80 processor handles words, the least significant byte is the first character.

Moving around the disc

A number of keys may be used to move around the disc. The letter keys A and B are used to select disc drive A OR B. If a hard disc is used, then B will cause the user to be asked to enter the surface required. Some of the keys listed below will have different functions depending on which issue of POKEDISC is being used.

The 0 key selects: cylinder (track) 0, Issue 3.
                   cylinder 0, side 0, sector 0, (0:0:0) Issue 4.

The S key moves to the other side of the disc.
The R key moves down 1 track.
The C key moves up 1 track.
The E key moves down 1 sector.
The X key moves up 1 sector.

When using issue 4 of POKEDISC, the E and X keys may be used to move to another track if necessary.

When in mixed mode (i.e. when option M or N is selected), the W key is used to move down 2 Bytes, and the Z key is used to move up 2 Bytes.

The J key (followed by 4 digits) is used to move to a particular sector, whose location is determined by the 4 digits that follow the J. When using an issue 4 version of POKEDISC, the J followed by the cylinder number and a colon, the side number and a colon, and the sector number, are entered, to "jump" to a specific part of the disc. Also, the delete key may be used with issue 4.

EXAMPLE: Issue 3: J0516

             Issue 4: J5:1:6

This would move the user to cylinder 5, side 1, sector 6.

The QUIT key, which is the first red function key at the top left of the keyboard, (key f0), is used to quit a particular option, or to quit the program entirely.

The COPY key, will display a further menu with more options, all of which are selected by using the appropriate control code as described below.

Control R: This option allows the user to define specific sector addresses to the red function keys along the top of the keyboard. Control R followed by the QUIT key, (red function key f0) will bring the user back to the menu.

Control T: save the current sector in a special buffer.

Control S: This option is used to copy the contents of the buffer (referred to above) back to the screen.

Control U: Any editing that has just taken place will be cancelled and the sector re-read from the disc.

Control B: This option allows the user to actually start editing the sector. Once in this mode, none of the above options will be operational except the cursor control keys.

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Control E: This finishes the editing operation, and returns the user to the normal mode of operation for POKEDISC.

Control L This moves the cursor to the start of the current line.

RETURN: This moves the cursor to the start of the next line.

NOTE: When editing, it is possible to change anything in the sector that is displayed on the screen by typing any valid character at that point. Whilst editing a character, the escape key may be used to enter a hex code. Also the " key, and the ' key may be used to set, and clear, respectively, the most significant bit of a character.

The valid keys for the "entry" field of a directory display are 2, 3, D, and N. Those for attributes of a file are: R, W, S, U, E, and G.

The TORCH will interrogate the user before it writes back to the disc any editing that may have taken place on a particular sector.

RDACORN AND WRTACORN

These utility programs are provided to enable the user to convert files from Acorn DFS format to TORCH CPN format and vice versa. There may be numerous occasions when manipulation of files between the two operating systems becomes a useful facility. A typical example of this is where a text file prepared in BBC BASIC could be written into a TORCH CPN file and edited using a word processor such as WordStar. If the user also has access to a TORCH microcomputer then BBC files could be written into CPN and transmitted to a remote TORCH using the communications package TORCH MAIL. (Once received at the remote end the file could be converted back into BBC BASIC format.)

WRTACORN

WRTACORN is used to convert files from TORCH CPN disc format to Acorn DFS disc format. When run, WRTACORN asks the user to enter the name of the CPN file, and the name to be assigned to it when it is written into Acorn format. After a file has been written into Acorn format from CPN it is stored on the disc as a text file, therefore the DFS command *EXEC should be used

to load and run it. (For information on DFS commands see Appendix A.)

NOTE: It is essential to put the Acorn DFS format disc in disc drive A (the left hand drive), and the TORCH CPN format disc in disc drive B (the right hand drive) If this procedure is not followed then one or both of the discs may be corrupted.

RDACORN

RDACORN is used to convert files from Acorn DFS format to TORCH CPN disc format. Before the Acorn file is converted to CPN format, it should first be converted to a text file using the *SPOOL command. (See Appendix A for information on DFS commands.) RDACORN is used in the same way as WRTACORN i.e. by entering the name of the file to be converted, and the new name to be assigned after being written into CPN format.

NOTE: As in the case of WRTACORN the Acorn DFS format disc must be placed in drive A, and the CPN format disc in drive B or the discs may be corrupted.

LOADING A FILE FROM DISC

To load a file from disc, place the disc with your program on, in
disc drive A, carefully closing the door of the disc drive, ensuring
that the disc is fully inserted into the drive. To load your program
type the filename of the program and press `return`. If you want
to find out the names of the files (programs) stored on a disc, type
DIR and then press `return`. The VDU will then display the
contents of the disc. For details of other disc commands, refer to
the section on COMMANDS. For details of the Acorn DFS
commands used in BBC BASIC see APPENDIX A.

SAVING A FILE ON DISC

Before a file can be saved on disc the disc has to be "formatted".
This process prepares the disc to receive data. The disc is
divided into 80 tracks, track 0 being at the outside edge of the
disc, track 79 being at the inside edge of the disc. The tracks on
both sides of the disc are divided into 10 sectors, and each
sector can store 256 bytes (characters) of data. It is in these
sectors that the files (or data) are stored. The number of sectors
required to store any given file will depend entirely on the length
of the file.

To format a disc, place it in disc drive A, type FORMAT and press
`return`. The computer will now instruct you via the vdu to tell it
which disc drive you are using, type A or B and the computer will
now format the disc as described above. During this formatting
process your TORCH automatically checks that no errors have
occurred. Should any errors occur during this formatting process,
the computer will display on the vdu an error message, so you
should then check that you have placed a disc in the correct
drive, i.e. the one designated above, or try another disc in case
you have a faulty or corrupted disc in the machine. For
explanation of error messages see section on disc errors.

NOTE: A disc may be formatted in CPN and immediately used in
BBC BASIC mode for loading and saving BASIC programs.

IMPORTANT

It should be noted that the formatting process completely clears
the disc of any files that are on it. Care should be taken not to put
the wrong disc into the machine. The FORMAT command is used

TORCH DISC SYSTEM

Data and programs used on the TORCH system are stored on mini floppy discs or hard discs. Floppy discs are constructed from a thin piece of plastic sheet, treated with a magnetic compound which allows the storage and retrieval of data to and from the disc. When the disc is placed in the DISC DRIVE it is spun at high speed, the heads of the disc drive read and write data to and from the disc. Great care should be taken when handling discs as they are easily damaged.

The following points should be remembered when handling discs:

1. Always store the discs in the protective envelopes provided when not in use.

2. Avoid bending the discs.

3. Insert into disc drives carefully.

4. Don't touch exposed area of disc.

5. Don't expose disc to extreme temperatures or magnetic fields.

6. Avoid getting smoke or other contaminents on the surface of the disc.

7. Don't switch the power to the TORCH on or off without first removing the disc(s).

To load a program on the TORCH system a disc should be inserted into one of the Disc Drives. The left hand drive is drive A and the right hand drive is drive B. When using only 1 disc drive, the user will normally use drive A. This is because the CPN operating system automatically "defaults" to drive A on "power on." Disc Drive A is referred to as the logged disc drive: this may be changed if required. (see section on COMMANDS).

for erasing data off old discs and for formatting new discs prior to saving data on them.

To prevent losing important programs, (and a lot of time!) either by loss or damage to the disc, or by accidental erasure of data from the disc, it is recommended that "backup" copies are made of all important discs. Discs may also be Write Protected to prevent data accidentally being written over an existing file. All TORCH system and utility programs should be backed up, and write protected.

Making Backup Copies of Discs

A useful exercise in making backup copies, would be to copy the disc that came with your TORCH system. It is good practice also, to make backup copies of the discs you have been using at the end of each day.

To Duplicate a Disc

1. Put the disc to be copied into drive B. This is called the "source" disc.

2. Put the blank disc into drive A. This is called the "destination" disc.
3. Type DUP and press `return`

The screen will then display the following instructions:

"Press RETURN to continue or any other key to abandon"

When you press `return` your TORCH will then format disc A and duplicate the contents of disc B onto disc A.

Whilst it is doing this it continuously checks for errors; should an error occur during this process an error message will be displayed on the screen, such as:

Disc A Track 1D   error 0E

In the event of this happening, try taking the destination disc out of the drive and putting it back in again; it could be that the disc was not aligned in the drive properly. Repeat the above procedure to copy the contents of disc B onto disc A. For an explanation of disc errors see section entitled DISC ERRORS.

Write Protecting a Disc

To prevent a disc having data written onto it accidently, or its data accidently wiped off, a square of adhesive paper should be placed over the small notch or cut out on the side of the disc. This cutout is known as the WRITE PROTECT NOTCH. Adhesive patches to cover the write protect notch are supplied with the blank discs.

Disc Errors

When the TORCH is reading or writing data to or from the disc, it is continuously checking for errors.

If an error occurs during a read operation, the TORCH operating system attempts to re-read the track up to 5 times.

If an error occurs during a write operation, the operating system will re-format the track, and then attempt to re-write the data up to 5 times.

If no error has occurred during a write operation, the data that has just been written onto the disc is verified for integrity and if any data corruption has occurred, the track will again be re-written up to 5 times. Every second attempt at re-writing the track, the operating system will re-format the track. If after 5 re-tries of either re-reading or re-writing, there is still an error, then an error signal such as the one below will be printed on the screen:

DISC A track 1D   error 0E

This tells the user the disc drive that failed, the track that failed, and the hex error code, in that order.

Note: The track number that is given in this error message is a hexademical value, and is actually twice the true track number, plus the side number. In the case of the example above, this would actually be Track 14 Side 01.

Normally all of the above operations of re-reading and re-writing are "invisible" to the user until, after the fifth attempt at re-reading or re-writing, it has abandoned the operation and printed the error message.

To monitor the above operations as they take place, and determine where and when an error is occurring, type in the following before performing a read or write operation:

[SYSTEM 16]

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Press **return** and continue as normal. If an error occurs now, the operating system will immediately print an error message such as the one below:

DISC A track 08   re-reading

This time the error message is printed to the screen as soon as an error occurs, and informs the user each time that a re-reading, re-writing, or re-formatting operation takes place. As before after 5 attempts at re-reading, and re-writing, then the operation will be abandoned. In which case the user will have to try again.

A similar instruction to [SYSTEM 16] is [SYSTEM 64]; in this case the operating system will continue to attempt to re-read, re-write, or re-format data even after 5 attempts have failed. This process will continue unless the following error message is displayed:

DISC A track 08   unrecoverable   error 18

This error message only occurs after 5 attempts at re-formatting a track have failed. In this situation, (which is very rare) there is either a serious fault with the disc, or with the disc drive itself, and the user should try another disc before consulting a dealer.

NOTE: To set more than one system function at a time add the two function numbers together. e.g. to have both [SYSTEM 16] and [SYSTEM 64] set, type [SYSTEM 80]. Any form of reset will remove these functions (e.g. CTRL C). [SYSTEM 0] may also be used to remove these functions.

PREPARING COMMAND FILES

A command file contains a set of characters which can be presented to the TORCH as though they were typed at the keyboard. Command files are prepared using the INPUT command, or a word processor such as Typewriter or Wordstar.

EXAMPLE: Reset the TORCH and insert a blank formatted disc into drive A. Enter the following lines of text, each terminated by **return**

```
INPUT BEGIN.SUB
F 6
B 4
HELP
```

Now enter a control- Z (press control and Z together) followed by **return**. After a slight delay, the prompt 0A> will appear. The file BEGIN.SUB now exists on the disc. Check this by using the DIR command or the TYPE command.

To enter the contents of BEGIN.SUB as a sequence of commands, use the command:

```
C BEGIN.SUB
```

BEGIN.SUB should be loaded from disc, and the commands F 6 (Foreground cyan), B 4 (Background blue), and HELP should be executed. The TORCH will then be ready for commands from the keyboard.

When using command files, facilities are available for argument substitution, and inserting comments into the file which would then be displayed on the screen when the file is executed. Where a dollar sign ($) followed by a number appears as part of the text in a command file, the argument corresponding to that number will be substituted in the text of the command file. Where dollar zero ($0) appears, the name of the command file is substituted. The filename may be followed by up to nine arguments, which are separated by spaces and terminated by the lines end.

Special characters may be inserted into the argument using backslash \ followed by a letter:

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\n :newline   (moves to a new line).

\s :space   (inserts a space into that argument).

\0 :null argument   (that argument is ignored).

EXAMPLE: C TEST XXX TXT RU/sN

In this example TEST is the filename, XXX is argument 1, TXT is argument 2, and RU N is argument 3. Note that to incorporate a space into the argument RU N,\s was used when entering the file, as an actual space may not be used within an argument, but is used to separate arguments.

To copy files of a specified name from drive B to drive A, for example for making backups, enter the file BACKUP.SUB containing:

    ; Backing up $1
    DEL A:$1 {u
    COPY B:$1 TO A:
    VDU 7
    followed by control Z and **return**.

The command file C BACKUP *.DOC will display the words "Backing up *.DOC", delete all files on disc A with the .DOC extension, copy all files from disc B with the .DOC extension to disc A, and then sound a bell on the speaker, to tell the user that the backing up operation has been completed. (The old version of the files were first deleted from disc A and then replaced with the new version from disc B). Using the above procedures the user may write their own command files for various purposes.

APPENDIX A

DFS and UTILS COMMANDS

This appendix is a guide to the ACORN DFS and UTILS
commands that are available on your BBC micro with the TORCH
Z80 Disc Pack.
Listed below is each command and a brief outline of its function.

NOTE:The DFS command parameters given in the examples
below have the following meanings:

<fsp> .... file specification.
<afsp> .... ambiguous file specification.
<src> .... source.
<drv> .... drive.
<dest> .... destination.
<dir> .... directory.

NOTE: When operating the BBC computer with your Disc Pack in
BBC Basic mode, the Disc System operates as a Dual Drive
double sided system. This means that the drive number specified
will be in the range of 0 to 3. (See below for an explanation of File
Specifications.) The drive number given must be preceded by a
colon (:). The drives (surfaces) are numbered as shown below:

Left hand drive: Drive 0
                  Drive 2

Right hand drive: Drive 1
                   Drive 3

EXAMPLE: To display a catalogue of the files on the left hand
drive, surface 2 enter:

    *CAT : 2 `return`

IF a drive (surface) number is omitted the current drive is
assumed. For an in-depth explanation of the Disc Filing System
refer to the Acorn manual.

FILE SPECIFICATION

A file specification consists of of:

>   :drv.dir.filename

EXAMPLE: *EXEC:1.C.MYTORCH `return`

will EXEC the file MYTORCH on directory C of drive 1. For further information on filename syntax refer to the BBC user guide.

COMMANDS

*ACCESS <afsp> (L) `return`

Locks or unlocks a file.

EXAMPLE: *ACCESS MYTORCH L locks the file MYTORCH
　　　　　　*ACCESS MYTORCH unlocks it.

A locked file cannot be saved to, deleted, wiped, renamed, or destroyed. Although it may be formatted.

*BUILD <fsp> `return`

Creates an ASCII (text) file directly from the keyboard.

EXAMPLE: *BUILD TORTXT displays line numbers which allow the user to enter data as text. After the ESCAPE key has been pressed the file TORTXT exists on the disc and may be accessed via the DFS commands *EXEC *LIST or *TYPE.

*CAT <drv> `return`

Gives a catalogue of a disc on the screen.

EXAMPLE: *CAT 1 gives a catalogue of drive 1
　　　　　　*CAT gives a catalogue of the current dirve.

For Cardbox **Copy** A: *.* to B: *.*
etc (space) (space)(space)

*COMPACT <drv> `return`

Tidies the disc in the named drive so that all free space is moved to the end.

EXAMPLE: *COMPACT 1 will tidy the disc in drive 1.

*COPY <src drv><dest drv> <afsp> `return`

Allows a file to be copied from one drive to another or from one drive to itself.

EXAMPLE: *COPY 0 1 SPATS copies SPATS from a source disc on drive 0 to a destination disc on drive 1.

*One file — **Copy** A: Filename — B: Filename* (Space)

*DELETE<fsp> `return`

Directly removes an unlocked file from the catalogue of a disc. Note that a deleted file cannot be revived.

EXAMPLE: *DELETE PHILBY `return` will remove PHILBY from the current disc in use.

*DESTROY <afsp> `return`

Removes all unlocked files specified.

The *ENABLE command must be entered immediately before *DESTROY or it will not work.

EXAMPLE: *ENABLE
                    *DESTROY *.* will remove all the files on the disc.
Note that destroyed files cannot be revived.

*DIR <letter> `return`

Changes the current directory name.

EXAMPLE: *DIR G sets the current directory to G. Any saved file will be prefixed with the letter G.

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To copy one file REN B: ?
Then Copy A Filename To B File.
Then del Rename.

*DRIVE <number> `return`

Selects the current drive in use.

EXAMPLE: *DRIVE 1 sets the current drive to 1 so any command
not specifying a drive will log onto drive 1.

*DUMP <fsp> `return`

Produces a listing in hex of the file on the screen.

EXAMPLE: *DUMP SPATS will produce a hex listing of the file
SPATS CTRL-N will select paging mode.

*ENABLE `return`

Allows the irreversible command *DESTROY to be used. It is a
safety lock.

*INFO <afsp> `return`

Displays the following information on the specified file(s):
directory, filename, access, load, address, execution address,
length in bytes, and start sector.

EXAMPLE: *INFO *.* displays the above information on all the
files on the current disc.

*LIB <drv> <dir> `return`

Sets the library to the specified drive and directory.

EXAMPLE: *LIB:1.C sets the library to drive 1, directory C.

*LIST <fsp> `return`

Displays an ASCII (text) file created with the *BUILD command.

EXAMPLE: *LIST TORTXT will display the contents of the file
TORTXT.

*RENAME <old fsp> <new fsp> `return`

Changes the name of a file.

EXAMPLE: *RENAME ALPHA BETA will rename the file ALPHA as BETA.

*TITLE <disc name> `return`

Retitles the disc with a new name. (Up to 12 characters).

EXAMPLE: *TITLE "TORCH DISC" will display the words "TORCH DISC" on future *CATs of the discs.

*TYPE <fsp> `return`

Displays a text file on the screen without line numbers.
EXAMPLE: TYPE TXT will display the contents of the file TXT as a text file. CTRL-N may be used to select paging mode.

*WIPE <fsp> `return`

Removes specified files from a catalogue after asking permission for each file. It is only possible to remove unlocked files.

EXAMPLE: *WIPE *.C* wipes all files beginning with C.

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