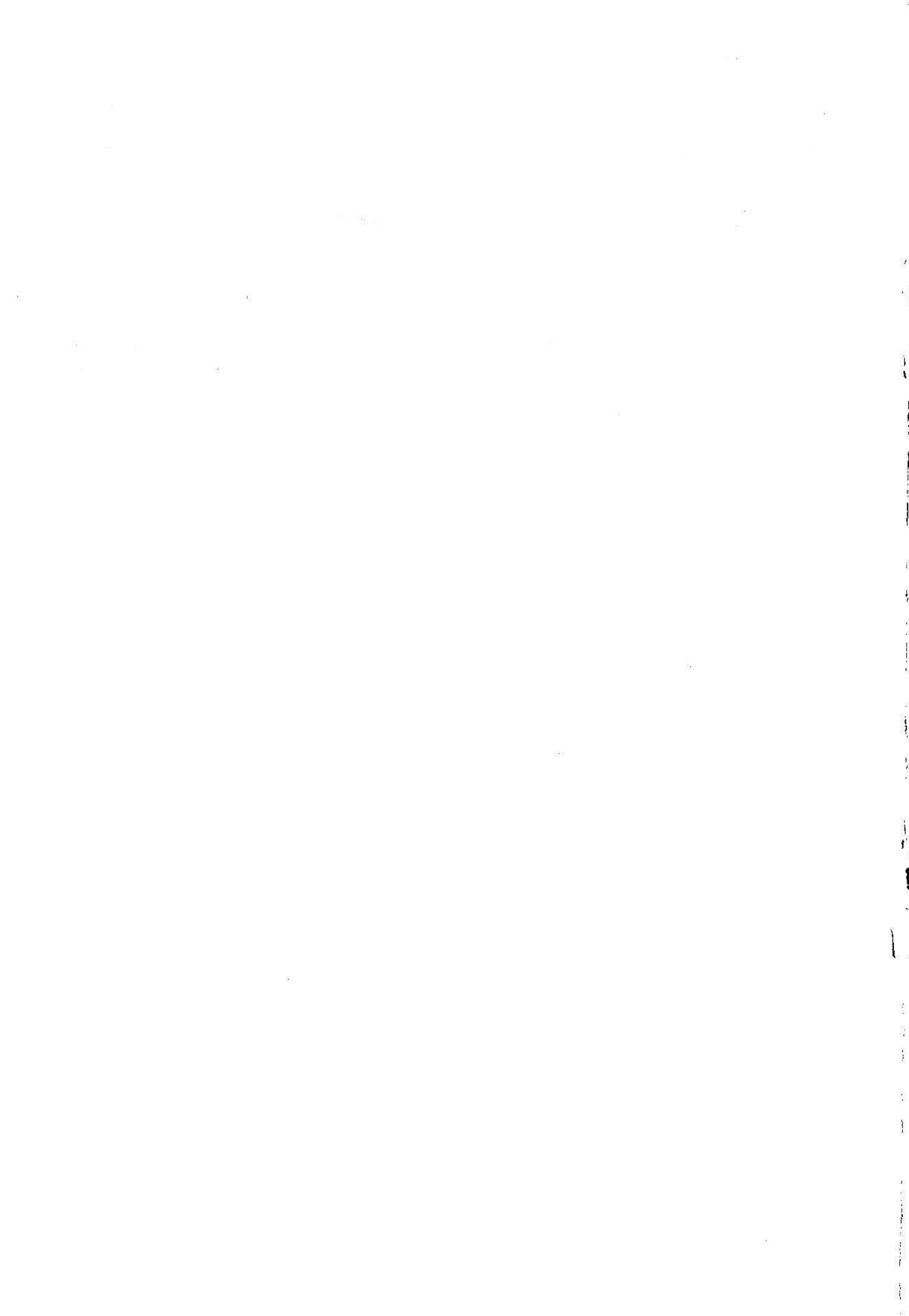

**CENTRONICS
PRINTER
INTERFACE
INSTRUCTIONS**



Printer Software Manual

WARNING! . . . Ensure your Spectrum power supply is disconnected before attaching the printer interface to the expansion port.

When the interface is connected to the expansion port, connect your printer to the interface, referring to the manufacturer's instruction handbook for details.

Software Loading Instructions

1. Connect the ear socket of the computer to the ear socket of your tape recorder.
2. Set the volume control as per Sinclair manual.
3. Adjust the tone control to maximum.
4. Type LOAD " "
5. Start the tape recorder.
6. Follow the on screen instructions:

Stop the tape when the 'STOP THE TAPE' message appears.

The software on the tape supports 3 kinds of printers:

EPSON Printers. Or ones with EPSON control codes like the Brother HR5, etc.

MCP (Multi Colour Printer) 4 colour type printers.

AP 100A Graphic printer.

When the question "WHICH PRINTER ARE YOU USING" appears press E for EPSON, M for MCP types and A for AP 100A.

If your printer is not one of the above then type E for EPSON. The software should still drive this printer for normal text output but may not be able to create a high resolution screen copy. This is due to the control codes different printers use which the high resolution routine needs to know.

The printer software is designed to operate between 25000 and 64600 and is (EPSON 541), (MCP 671) or (AP 100A 522) bytes long. This is to allow compatability with commercial software packages which use the printer, e.g. Tasword, Devpac.

Type in an address where you want the software to run; then press enter. When you are using the printer from your own programs it is best to put the software as high up in the memory as possible (64600 is a good location) giving maximum possible room for the BASIC program. The top of BASIC (RAMTOP) memory will be lowered to below this address which means that if you type NEW or CLEAR the code remains in the computer. However it will need re-initialising by typing:—

```
RANDOMISE USR [Load address] (Enter)
```

It might be a good idea to include this as the first line of your programs since then you won't have any problem if the printer software has been un-initialised by typing CLEAR or NEW.

EXAMPLE LOADING SEQUENCE . . .

```
LOAD " "
```

```
"STOP THE TAPE"
```

```
"WHICH PRINTER ARE YOU USING ?" E
```

```
"INPUT PROGRAM START ADDRESS ?" 64600
```

```
"START THE TAPE"
```

The computer will search through the tape until it comes to the right version for your printer. This version will LOAD and then automatically initialise itself. Remember that the LOADER software will still be in the memory so type NEW and then RANDOMISE USR [Load address].

Operating Manual

For a quick test, type LPRINT "Hello world" (ENTER)

The printer should print 'hello world'

If nothing happens then refer to the appendix.

EXAMPLE PROGRAM 1

```
10 RANDOMISE USR 64600: REM When load address = 64600.
20 INPUT "NAME ?";N$
30 INPUT "ADDRESS ?";A$
40 INPUT "AGE ?";Y$
50 LPRINT "YOUR CREDENTIALS:—"
60 LPRINT
70 LPRINT N$;" LIVES AT"
80 LPRINT A$
90 LPRINT "AND IS ";Y$;" YEARS OLD."
```

The software revector all LPRINT statements and LLIST commands. Advanced users might also be familiar with the concept of streams (See Microdrive and interface 1 manual). If you are not familiar with them then miss out this section.

Stream 3 is the stream associated with printer and this is in fact where the software changes part of the BASIC system variables. Hence while LPRINT AND LLIST automatically refer to channel 3, other statements can be referred to channel 3 by using the # instruction.

For example all of these instructions refer to the printer:—

LPRINT	OPEN #2,"P": PRINT
LLIST	OPEN #2,"P": LIST
PRINT #3	OPEN #N,"P": PRINT #N
LIST #3	OPEN #N,"P": LIST #N

Printing to channel 3 will output to the printer. Also opening a channel to device 'P' will redirect the output to the software. The value of N can be between 4 and 15.

These instructions work with or without interface 1. If you have an interface 1 then you can also use the devices 'M', 'N', 'T' and 'B'.

EXAMPLE PROGRAM 2.

```
10 RANDOMISE USR 64600: REM When load address = 64600.
20 PRINT "SCREEN OR PRINTER ('S' OR 'P')"
```

30 INPUT d\$

```
40 LET device = 2: REM default to screen.
50 IF d$ = "p" OR d$ = "printer" THEN LET device = 3
60 PRINT # device; " 7 Times Table: —"
70 PRINT # device
80 FOR i = 1 TO 12
90 PRINT # device; i; " X 7 = "; i*7
100 NEXT i
110 OPEN # 12, "P"
120 LIST # 12
```

Using the Printer with Commercial Software

To use the printer software with a commercial program package it will not be possible to use the BASIC loader program, which comes with this product. However it is possible to **LOAD** in just the **CODE** part of the program thus incorporating it with the commercial product. Some commercial products have a provision for printer driver routines. They can be saved with the controlling software. (For example **TASWORD** has a set of options for printer drivers and will call the start up routine). If the commercial product does not support external printer driver software, **BUT** still uses the printer streams (stream 3) then the software can be loaded as normal and then the commercial software loaded in afterwards. This is necessary every time the commercial program is to be used.

If the software does support printer drivers then follow this procedure:

First load the commercial program: **LOAD "COMMERCIAL PROGRAM"** then load the code for your printer, e.g.

```
LOAD "EPSON"CODE [Load address]
```

The code now needs to be initialised by calling the load address:—

```
RANDOMISE USR [Load address]
```

Then RUN the commercial software as normal and change the interface addresses so that the commercial program knows that the driver software is present. A new copy containing the printer software can then be saved. (For your own personal use PLEASE)

Notes for changing TASWORD are included at the back of this manual as an example of how to incorporate the printer drivers.

High-Resolution Screen Copies

There is a built in high resolution copy routine built into the software. This will ONLY work if the printer is one of those specified. i.e. if your printer is an EPSON, MCP or AP 100A then the routine will work. If your printer is another type then there is a chance that the software will not work. (This may also be the case for 'EPSON LOOKALIKES' etc, which may use some EPSON controls but NOT all of them.)

To do a screen copy type: `LPRINT CHR$ 31;"P"`

The screen will now be copied onto the printer. If it is not then the software is unable to make your printer print graphics e.g. a Daisy wheel etc.

Line Feeds

Some printers issue a line feed when the carriage return is sent. If your printer is in this category then it may print on every other line. On the other hand the printer may need the software to send a linefeed also. Hence the printer may print everything on ONE single line. If your printer does either then you can set the software to output a line feed or not.

EXAMPLE:

`LPRINT CHR$ 31;"L0"`

Removes the line feeds.

`LPRINT CHR$ 31;"L1"`

Sends both a line feed and a carriage return.

MCP Notes

The Spectrum INK command is fully supported in the MCP software, with the software selecting the nearest pen colour. If the printer is reset or switched off then it may be necessary to reset the routine by RANDOMISE USR [Load address], this will reset the software's INK counter.

The MCP Hi-res copy can produce half width and half height copies also. There are two more commands available to control the size of the printout.

LPRINT CHR\$ 31;"W0"	Sets half width.
LPRINT CHR\$ 31;"W1"	Sets full width.
LPRINT CHR\$ 31;"H0"	Sets half height.
LPRINT CHR\$ 31;"H1"	Sets full height.

To reset all these values to their default values (including line feed setting) then type:

LPRINT CHR\$ 31; CHR\$ 0	Reset all values.
--------------------------	-------------------

Output of Printer Control Codes

In all the printer drivers, certain characters which are to be sent to the printer are first interpreted. For example when you want to print standard Spectrum graphics (codes 128 to 143) the EPSON and AP 100A will print these by entering GRAPHICS mode, the MCP printer will ignore the graphics. Or if you send the code 221 then the printer software will send each of the letters I N V E R S E respectively. Hence if you simply want to send the code 130 to the printer, and not have it interpreted then you need use another specialised command:

```
LPRINT CHR$ 30;CHR$ 130
```

In this example the value 130 will be sent to the printer and not interpreted. Note the code 30 will not be sent to the printer.

The codes which are interpreted are as follows:

6	Comma
16	INK
22	AT
23	TAB
30	Send next code without interpreting it.
31	Send a command to the printer routines.
128-143	Standard Spectrum graphics.
144-164	User defined graphics.
165-255	Spectrum keywords.

Hence any printer data needing these codes has to be prefixed with a CHR\$ 30. (This ALSO includes codes 30 and 31). If you are in any doubt about whether the code is interpreted then use the prefix CHR\$ 30.

EXAMPLE:

On the EPSON the line spacing can by set be sending certain control codes:

```
10 LPRINT CHR$ 27;;          REM Send ESC code.
20 LPRINT "3";:             REM Select line spacing
                             command.
30 LPRINT CHR$ 30;CHR$ 216: REM Set 1 inch line spacing.
```

CHR\$ 216 would usually send 'CIRCLE' to the printer but the CHR\$ 30 sent the 216 code instead.

Interface One Compatability

All the printer drivers are compatible with interface 1 and microdrives e.g.

```
10 OPEN #4;"M";1;"NUMBERS"
20 FOR L=1 TO 255
30 PRINT #4;STR$ L;
40 NEXT L
50 CLOSE #4:REM Write a file to the microdrive 1.
60 OPEN #4;"M";1;"NUMBERS"
70 MOVE #4 TO #3
80 CLOSE #4: REM Output the contents of that file to the printer
```

APPENDIX:

Suitable Printers

For text: All centronics parallel printers

For text and hi-res screen copy:

EPSON printers. Brother HR 5 AP-100A

For text and colour and hi-res:

MCP 4 colour printers and derivatives e.g. Tandy etc.

WHAT TO DO WHEN NOTHING WORKS

1. Is the printer connected according to manufacturer's instructions.
2. Is the printer on line and ready.
3. Is there any paper in the printer.
4. Is software loaded in a suitable place.
5. Are you using the correct syntax. (Sinclair manual chapter 21).
6. Check interface and printer connections.

Incorporating with TASWORD

The TASWORD program provides a space for user print routines. This space is 632 bytes long. This space is at 57856 but TASWORD moves the code to 64736 when it is run. Hence the load address is 57856 and the run address is 64736. As only text output is required the EPSON code will be used. Note AP100A can be used also as it does not send a line feed, BUT MCP cannot as it is too long. However the EPSON code will still run the MCP printer. The procedure is as follows:

LOAD "" (Load TASWORD from tape)

Exit TASWORD by using STOP and b and ENTER.

LOAD "EPSON"CODE 57856

RUN (Re-enter TASWORD)

Select 'g' option from menu (STOP g ENTER)

Press ENTER after the first screen of information. Then press 'y' to reset printer codes.

Change Code one to 30 and press ENTER.

Press ENTER twice to leave codes two and three the same.

Type 64736 for interface code four and press ENTER.

Leave the carriage return as 13.

Change the linefeed to 0 if your printer gives a linefeed automatically, or else just press ENTER.

Set the left margin as you wish and press ENTER to return to main menu.

Use option 't' ENTER to save the new version of TASWORD.

You now have your own customised version of TASWORD to use with your printer.



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INSTRUCTIONS FOR CUSTOMISED COPY OF "TASWORD TWO" FOR USE WITH THE DK'TRONICS CENTRONICS PRINTER INTERFACE EPSON PRINTERS OR EPSON TYPE PRINTERS.

- (1) LOAD TASWORD TWO.
- (2) LOAD "EPSON" CODE 52720
- (3) RANDOMIZE USR 52720
- (4) RUN TASWORD and use the define graphics/printer facility (obtained by pressing STOP and then the G key) to specify the following interface control codes:

Interface control code 1: 0
code 2: 0
code 3: 0
code 4: 52853

Printer carriage return = 13

Printer linefeed = 0

- (5) Enter basic by pressing the STOP control key and then the B key.
- (6) Change lines 710 and 790 in TASWORD TWO to read 52720,12815
- (7) SAVE TASWORD AS PER INSTRUCTIONS IN TASWORD MANUAL (page 7)