7 Printers and joysticks

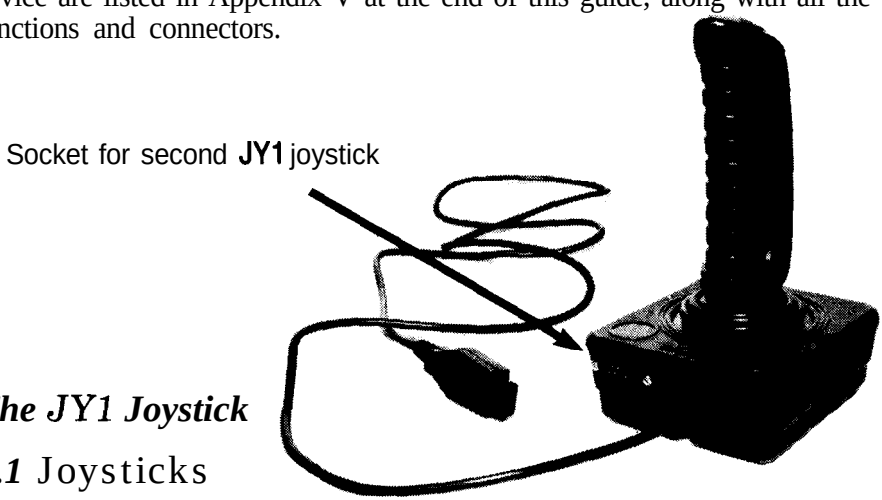
The *CPC464* requires ***no*** additional interfaces to operate ***with*** either ***one or two*** joystick ***controllers,*** and ***a*** Centronics ***compatible*** parallel printer.

Subjects covered in this chapter:

* Joysticks
* Parallel printers
* Interfacing

The AMSOFT joystick model *JY1* is an additional item that you may wish to purchase if you are using the CPC464 computer with software games which incorporate the facility for joystick control, and 'firing' within the game. The *JY1* can be plugged into the back of your computer using the 9-way socket marked USER PORTS (I/O). The Amstrad CPC 464 computer can be used with two joysticks. The second joystick should be plugged into the socket on the first joystick.

There are no special points to consider when connecting a joystick to the CPC464: the AMSOFT *JY1* will plug directly into the 9 pin socket provided at the rear of the computer, marked USER PORTS (I/O). A second joystick may be fitted if required into the socket provided in the base of the first JY1 joystick. The connections of this device are listed in Appendix V at the end of this guide, along with all the other I/O functions and connectors.



The JY1 Joystick

7.1 Joysticks

The built-in software in the AMSTRAD CPC464 supports either one or two joysticks, and these are treated as part of the keyboard and may be interrogated by I N K E Y $ and I N K E Y commands as if they were keyboard keys. Note that if there is only one fire button available on your joystick it is likely to be the 'Fire 2' in AMSTRAD CPC464 terminology.

A special function is available to inspect the joysticks directly. This is J 0 Y (0), for the first joystick, and J OY (1) for the second. The function returns a bit-significant result which indicates the state of the joystick switches at the last keyboard scan. As there are 50 keyboard scans per second the result is virtually the instantaneous state of the joystick switches.

The joysticks return values as follows where K E Y is the value to use in an I N KEY function and M I R R 0 R is the equivalent keyboard key:

First Joystick	JOY(O)	KEY	Second Joystick	JOY(1)	KEY	MIRROR
UP	Bit 0	72	UP	Bit 0	48	6
Down	Bit 1	73	Down	Bit 1	49	5
Left	Bit 2	74	Left	Bit 2	50	R
Right	Bit 3	75	Right	Bit 3	51	T
Fire 2	Bit 4	76	Fire 2	Bit 4	52	G
Fire 1	Bit 5	77	Fire 1	Bit 5	53	F

Note that when the second joystick is interrogated the CPC464 cannot tell the difference between the joystick and the indicated keyboard keys. In practice it is most unlikely that a conflict of interpretation will exist. Indeed the keyboard could be used as a substitute for the second joystick.

When using the *AMSOFT JY1*, the second joystick is identical to the first, and plugs into the socket on the side of the first joystick. No special wiring is required to allow use of the second joystick.

The 9 pin socket marked **USER PORTS (I/O)** will accept standard joysticks that work with other personal computers, athough these do not allow a second joystick to be fitted unless a special adaptor is used. However, you should not attempt to use one of these joysticks as a second joystick to be plugged into the side of the *AMSOFT JY1* joystick.

Software writers may consider providing an option at the start of their programs to enable the user to select either joystick operation or cursor key operation (Where the [COPY] key or some other nominated key could be used as a fire button).

7.2 Printer interfacing

The AMSTRAD CPC464 allows the connection and use of an industry standard 'CENTRONICS' style interface printer.

The printer cable is simply constructed as a one-to-one connection between the **PRINTER** port and parallel printer connector. Note that there are two less 'fingers' on the computer's printed circuit board than on the printer connector; permitting use of a standard printed circuit board edge connector.

The actual interface details are illustrated in Appendix V.

The cable should be constructed so that pin 1 on the computer connects to pin 1 on the printer, pin 19 on the computer to pin 19 on the printer etc., with pins 18 and 36 of the printer not connected to the computer.

In particular the lower row of fingers on the computer is numbered 19 onwards (rather than 18 onwards as one might expect given that there are 17 fingers in the upper row) in order that every wire that is used, is connected to exactly the same numbered computer edge connector finger and printer connector pin.

The computer uses the BUSY signal (pin 11) to synchronise with the printer and will wait if the printer is *OFF* LINE.

There are no user setup commands required, and the output is directed to the printer by specifying stream 8:

```
LIST #8
```

Will cause the BASIC program in the memory to be listed - as long as it is of a type suitable for listing - ie unprotected.

Within programs, the printer may be addressed by using the simple form:

```
PRINT #8,"This is sent to the printer"
```

Many printers will automatically 'wrap around' line endings if the output reaches the end of a line - check the printer manual. AMSTRAD BASIC will also wrap the output as directed by a W I D T H command. The default value of printer width is 132 and may be set to a new value as required: eg W I D T H 8 0.

If set to the special value of 255 then AMSTRAD BASIC will not 'wrap' the output and relies completely on the printer to check for line endings. BASIC maintains a counter of the position of the printer which can be interrogated by the POS function.

```
IF POS(#8)> 50 THEN GOTO 100
```

The CPC464 issues a line feed C H R $(10) and a carriage return C H R $(13) at the end of the line. The printer will usually contain a preset switch for selecting the appropriate form of input, and it will be immediately obvious what the default standard is once you attempt to print.

7.3 Graphics printing

The manual supplied with your printer will specify the control codes, which are generally in the form of the :

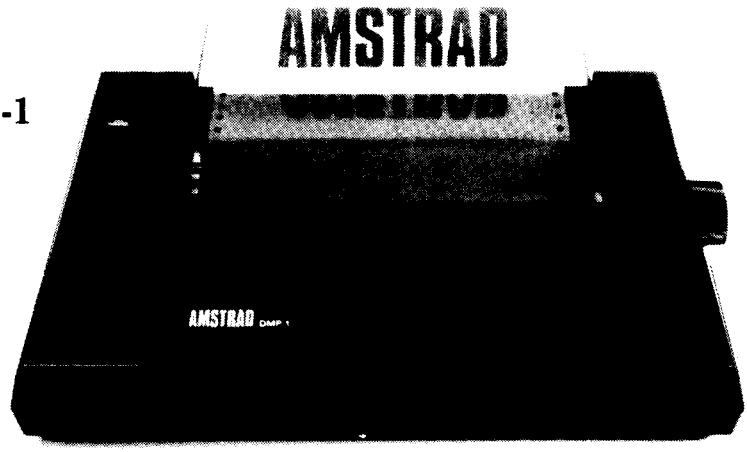
```
PRINT CHR$(n)
```

Some printers may have characters similar to many of the AMSTRAD graphics characters listed in Appendix III, but it is unlikely that the character numbers will correspond exactly, so you will have to devise your own conversion table to suit the printer in question.

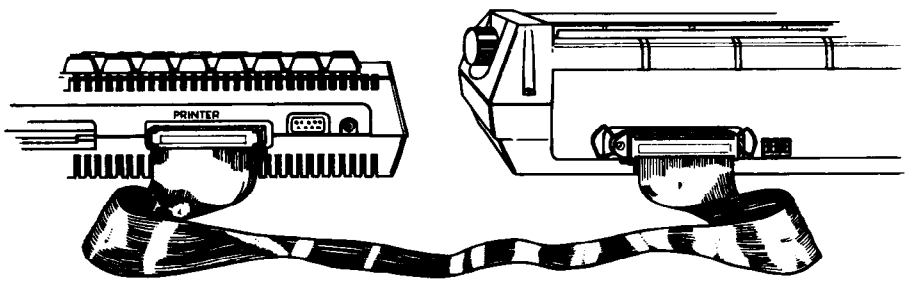
Although the printer interface is envisaged for use with low cost dot matrix printers, it will support daisywheel printers with a suitable interface, and also graphics plotters, and multi colour ink jet printers. The key to compatibility is the standard parallel interface.

Amstrad DMP-1

The Amstrad *DMP-1* printer is a low cost printer, supplied complete with the necessary cable to connect directly to the printer port on the CPC464.



* 50 **CPS print speed**
*** Plain paper operation**
*** Cable and ribbon supplied**
*** Dot graphics**
*** Tractor fed paper**



The DMP-1 is an impact dot-matrix printer using plain paper, with a maximum print speed of 50 characters per second. The customised software in the DMP-1 includes dot graphics ability, with the capability to print complete screen 'dumps'.

The low cost, versatility and features specifically customised for the CPC464 make the DMP-1 an ideal printer for all 'hard copy' requirements.

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