

SCA

**PROFESSIONAL
SERIES**

**SERIAL / PARALLEL
INTERFACE**

**FOR THE AMSTRAD PCW
8256, 8512, 9512**

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61 FERRINGHAM LANE, FERRING, WEST SUSSEX
0903-700288

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1. OVERVIEW

The SCA Professional Interface will enable the PCW to connect to external printers, modems and other computer peripherals. It has a RS232 serial port for communications, and a Centronics port for printers and plotters.

The RS232 serial port is full-duplex and operates at 75 to 19200 baud. It also supports different baud rates for Transmit and Receive if required.

The standard CPM DEVICE and SETSIO commands are used to configure the serial port as required.

Full flow control for slow peripherals is supported using either hardware or software handshaking.

The Centronics parallel port is used for printers and plotters. Both ports can be used simultaneously if required.

When using the interface direct from CPM, two files will be required to configure the interface, these will be found on the disks which were supplied with the PCW:

DEVICE.COM

SETSIO.COM

A more detailed description of both ports and cable requirements are covered in the following chapters.

2. INSTALLATION

Switch off the power to the PCW.

Carefully clean the expansion port edge connector at the rear of the PCW using a clean cloth and a little methylated spirit or similar.

Push the interface onto the expansion port connector and secure it with the two screws provided.

On power-up the initial screen display should indicate the presence of a serial/parallel add-on.

3. USING THE SERIAL INTERFACE

This chapter applies to all CPM application programs including BASIC. Devices which make use of the Serial port are set by the manufacturers to work at certain speeds known as the baud rate, typically 9600 baud.

The serial interface can be easily set to any of the standard baud rates by using a CPM command. However, unless you instruct it otherwise, it will always default to 9600 baud.

If the device usually operates at 9600 baud then it should just plug in and go. Otherwise to alter the baud rate of the interface you will need to use the SETSIO command. The use of SETSIO is fully documented in the PCW Manual and is summarised below.

In CPM Direct mode i.e. at the A> prompt enter:

SETSIO

This will show the current settings of the serial interface. To change the baud rate say to 1200 baud enter:

SETSIO 1200

The baud rate can be any of: 75, 110, 300, 600, 1200, 1800, 2400, 4800, 9600 and 19200 baud, although the latter is not 100% accurate. The transmit speed can be set independently of the receive speed if required by prefixing the baud rate required with t and r.

For example;

SETSIO t75 r1200

Once the baud rate is set then you can use a modem say, but for a printer, there is one more stage to redirect the printer output - see the next chapter.

USING THE SERIAL INTERFACE [contd]

If the device does not work, then probably you will need to delve more deeply into SETSIO, to set the "framing bits" and "handshaking".

Framing includes setting the number of Data bits, Stop bits and Parity bits.

Handshaking means to allow for devices to be busy and how then to tell the computer to wait. This can be done in software or hardware.

Hardware handshaking is covered in chapter 6.

Software handshaking is simply where one end of the communications link sends a special character "XON" that tells the other end of the link to stop communicating until another special character "XOFF" is sent, meaning now continue.

If the Interface is not receiving data properly, say from a modem, you may also try changing the interrupt state.

The SETSIO options are:

n	sets the baud rate
BITS n	sets the data bits from 5 to 8
STOP n	sets the stop bits to 1, 1.5 or 2
PARITY	state sets the state to EVEN, ODD or NONE
XON	state sets Software Handshaking state to ON or OFF
HANDSHAKE	state sets Hardware Handshaking state to ON/OFF
INTERRUPT	state sets the interrupt state to ON or OFF

Several options can be combined at one time simply by inserting a comma to separate them e.g.

SETSIO 19200, HANDSHAKE OFF,

4. USING AN EXTERNAL PRINTER

This chapter deals with using an external printer with all CPM programs including BASIC.

Normally the printer output is sent to the internal printer. To redirect this output to an external printer the CPM DEVICE command is used.

To send printer output to the Parallel Port enter :

DEVICE LST = CEN

To send printer output to the Serial Port enter :

DEVICE LST = SIO

To send printer output back to the internal printer enter :

DEVICE LST = LPT

To test that this works, enter ALT P (press the ALT key and keeping it down press the P key). The computer should now "Beep" and subsequently everything that is printed on the screen will also go to the printer, e.g.

Enter DIR for a directory of the disc. To stop this printing, enter ALT P again.

The CPM PIP command can be used to send files to and from peripherals

For example, to send the file TERM.SUB to an RS232 printer enter :

PIP AUXOUT: = TERM.SUB

To receive characters from a remote terminal, enter

PIP CON: = AUXIN;

5. COMMUNICATIONS

The listing below is a simple communications program which will enable the PCW to talk to other computers.
This program works efficiently at 300 baud and may well work at 1200 although due to the speed limitations of BASIC this is not guaranteed.

```

10 GOSUB 70: initialise
20 a$=INKEY$:IF a$="" THEN 50: any key pressed?
30 OUT c%,16:IF (INP(c%)) AND 4)=0 THEN 30: previous character gone?
40 OUT c%,ASC(a$): transmit new character
50 OUT c%,16:IF INP(c%) AND 1 THEN PRINT CHR$(INP(c%)): show any incoming data
60 GOTO 20
70 D%=&HE0:C%=&HE1:OUT c%,0:OUT c%,&H18: reset UART at port address E0/E1
80 DB%=&8:SB%=&2:P%=0: define data bits, stop bits & parity
90 OUT c%,3:OUT c%,(db%-5)*64+1: data bits, receive enable
100 OUT c%,4:OUT c%,&64+8*sb%-4+p%: stop bits, parity
110 OUT c%,5:OUT c%,(db%-5)*32+138: data bits, transmit enable, DTR & RTS on
120 RETURN
130: Before trying this, use SETSIO to set the Baud Rate, and remove Handshaking.
140: Some useful bits in Control register:
150: D0 Rx character available,D2 Tx Buffer empty
160: D3 = DCD D4 = RI D5 = CTS
170: Obtain a Z80 DART data sheet for further information.

```

6. RS232 CONNECTIONS

If you are using a modem, you will require a cable with a 25 way female "D" type socket one end and a connector to fit your modem on the other end.

Please check that any power supply connections at the Modem end go to unused pins on the Interface.

Modems and modem-like equipment are referred to as Data Communication Equipment or DCE. Similarly, the computer's serial interface is usually called Data Terminal Equipment or DTE.

A custom cable, usually called a "Null Modem" cable may be required when using certain types of DTE equipment, especially printers.

To distinguish between DTE and DCE equipment you should consult the manual supplied with the equipment and look up the description of Pin 2. If this is Transmit then the equipment is DTE, otherwise it is DCE.

RS232 Serial Port pin connections

Pin	Direction	Symbol	Description
2	Out	TX	Transmit data
3	In	RX	Receive data
4	Out	RTS	Request To Send
5	In	CTS	Clear to Send
7	GND	Ground	
8	In	DCD	Data Carrier Detect
14	Out	TXB	Secondary transmit data
20	Out	DTR	Data Terminal Ready
22	In	RI	Ring Indicator

The RTS, CTS, DCD and DTR lines are involved with "Handshaking" or Hardware Flow Control. The receiving device will often require to control the pace of the transmitting device e.g. a printer's buffer may become full of data and the printer needs to tell the computer to pause whilst it prints off the buffer.

RS232 CONNECTIONS [contd]

In the case of modem handshaking, when the terminal or DTE is ready to transmit, it activates the RTS line. When the modem is ready to receive, it activates CTS. The terminal will only transmit when CTS is active.

When the modem is experiencing a bad phone line or whatever, it activates DCD. When the terminal is ready to receive it activates DTR. The modem will only transmit when DTR is active.

There is often another Handshake line called Data Set Ready or DSR on pin 6. This however, is ignored as DCD performs much the same function.

Apart from the handshaking lines there is RI, the ring indicator that indicates an incoming call for an auto answering modem.

From the above discussions we can determine a simple Null Modem cable. It could just have 5 connections:

ground

2 data lines (connect the RX lines to the TX lines),

2 Handshaking lines (connect the CTS lines to the DTR lines).

Additionally, at each end connect together RTS, DSR and DCD.

Alternatively, you could try a 7 wire cable by bringing out the RTS lines and connecting them to the other side's DSR and DCD.

Finally, a 3 wire connection may be possible if handshaking is not required: connect RTS, DSR and DCD together at both ends or disable handshaking using the SETSIO command.

7. CENTRONICS CONNECTIONS

The connections to the Parallel port are as follows:

Pin	Description
1	Strobe. An active low voltage indicates data is ready.
2	D0
3	D1
4	D2
5	D3
6	D4
7	D5
8	D6
9	D7
11	Busy. High if printer is busy.
12	Paper Out. (Not implemented in CP/M, and connected to Port B DCD)
16, 33, and 19 to 28,	are ground.