

9. DEMONSTRATION DISK

The disc includes the following programs:

TIME.COM

TIME.SUB

To obtain the time and set the system clock. Rename this to PROFILE.SUB to have the time read automatically when the system is turned on, i.e. enter REN PROFILE.SUB TIME.SUB
A sample BASIC program that displays the system time.

GETIME.BAS

TERM.SUB

To use a spare Terminal and Centronics printer, Enter TERM for these to replace the Amstrad console and printer.

TERMX.SUB

RSTEST.BAS

Enter TERMX to restore the Amstrad peripherals. This BASIC program tests out the Interface on a terminal, and gives the source code to show how to access the serial port using the IN and OUT instructions.

CLOCK.COM

An On-Screen digital clock display

VDU.COM

A Terminal Emulation Program

VDU.OVL

VDU.DOC

Overlay for above
View this file for instructions on VDU.COM

The on-screen clock program and the VDU program are supplied free of charge courtesy of their authors. We have not found any major problems when using either program however because it is third party software we are not in a position to offer assistance with their use.

The CP/M files DEVICE.COM and SETSIO.COM will be required to set-up the Interface. These files will be found on the Amstrad System Disks supplied with the PCW.

PCW 9512 USERS

Should first make a copy of the demonstration disk using the 8000 copy program as supplied by Amstrad.

SCA PROFESSIONAL PLUS

SERIAL/PARALLEL

INTERFACE

With Real Time Clock and Calendar

FOR THE AMSTRAD PCW

8256, 8512, 9512

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1. INTRODUCTION

The SCA Professional Plus Interface will enable the PCW to connect to external printers, modems and other peripherals. It has a serial RS232 port for communications, and a parallel port for Centronics type printers and plotters, also a Real Time Clock and Calendar.

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 Hardware or Software Handshaking.

The Centronics Parallel port is used for printers and plotters. The Serial and Parallel ports may be used simultaneously.

The Clock has battery back-up and is able to pass the time and date to the PCW's operating system on power-up. This enables the CPM Time Stamping facility to be used without having to manually set time and date each session.

The disk contains the TIME program, also several demonstration programs including an on-screen digital clock display and a Terminal Emulation program.

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2. INSTALLATION

With the POWER SWITCHED OFF

The interface is installed simply by pushing it on to the edge connector at the back of the computer, then securing it with the two screws provided.

AMSTRAD is a trademark of AMSTRAD Consumer Electronics PLC.
CP/M is a trademark of Digital Research Inc.
Original TIME program courtesy of RSDA Ltd.
Original CLOCK program courtesy of D.W.Clements.
VDU program courtesy of Philip Wade.

3. USING THE SERIAL INTERFACE

This chapter applies to all CP/M 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 CP/M command. However, unless you instruct it otherwise, it will always default to 9600 baud.

If the device 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 CP/M 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 allowing 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 it sends another special character "XOFF" 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 1200, HANDSHAKE OFF

4. USING AN EXTERNAL PRINTER

This chapter deals with using an external printer with all CP/M programs including BASIC.

Normally the printer output is sent to the internal printer. To redirect this output to an external printer the CP/M 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 will "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 CP/M 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 an example of a simple communications program which will enable the PCW to talk to other computers.

This program works well at 300 baud and may work at 1200 baud although this is not guaranteed due to the speed limitations of Basic.

A Simple Communications Program

```
10 GOSUB 70:initialise
20 a$=INKEY$:IF a$="" THEN 50:IF any key pressed?
30 OUT c%,16:IF (INP(c%) AND 4)=0 THEN 30:previous character gone?
40 OUT d%,ASC(a$):transmit new character
50 OUT c%,16:IF INP(c%) AND 1 THEN PRINT CHR$(INP(d%)):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, DIR & RTS on
120 RETURN
130: Before trying this, use SETSIO to set 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 = RID5 = 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 usually called 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, 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, just disable Handshaking using the SETSIO command.

7. CENTRONICS CONNECTIONS

The cable consists of two 36 way Centronics or IEEE488 type plugs with up to 6 feet of ribbon cable.

The connections 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)
	Pins 16, 33 and 19 to 28 are tied to ground.

8. THE CLOCK

The Interface clock has its own rechargeable battery so that it will maintain the correct time and date even if the computer is not used for several weeks.

A program called TIME.COM obtains the time (minutes and hour) and date (day, month, and year with leap year correction) and then passes this data to the system.

The CP/M DATE command can then be used to determine the current time down to the second. This time could be up to half a minute out as the interface does not supply seconds. A sample program shows you how to call CP/M to get the current time.

To re-set the time or date enter:

TIME S and then enter the details as requested. Seconds will be reset automatically.

Time and Date Stamping

To use CP/M time stamping 3 programs are required from the CP/M system disks:

INITDIR.COM, SET.COM, and DIR.COM.

First initialise a formatted disk by entering

INITDIR A: [for the A drive.]

This provides space for the extra date information. Next decide what type of time stamping you require, that is;

File Creation, File Update, or File Access. eg: enter

SET [CREATE=ON] to record when the file was initially created, or:

SET [UPDATE=ON] for when the file was last amended.

Whenever this information is required you simply enter

DIR [FULL] to obtain a complete directory.