

INSTRUCTIONS

INPUT-OUTPUT

PERIPHERAL

INPUT-OUTPUT PERIPHERAL

This peripheral allows your computer to receive and send data by means of simple electrical or electronic devices through eight channels at the same time, and these can be processed with programs set by you. It receives this data through the four input channels and with the four output channels it can activate and type of electric or electronic circuit and at the same time all this operation can be visualised on the monitor screen.

The fact that your computer can receive and transmit data means that it can be used for the control of many transmit data means that it can be used for the control of many "intelligent" systems:

- Control of lights both in sequence and in random order.
- Watering system control with internal timer (by program).
- Creation of preventive and intelligent alarms which switch lights on and off at different times and protect doors and windows by starting up a siren if one of them opens, etc.

OPERATING INSTRUCTIONS

The input and output channels function with the instructions "IN" and "OUT" respectively followed by the peripheral address which in this model is "61441". In the case of outputs, a number is added which specifies which we wish to function or to stop functioning.

SALIDAS

OUT 61441,n

To define "n", the binary numbering system has been used giving a lower value to the SA output and a higher value to the SD output. In order to form this number. we give "1" to the outputs we wish to activate and "0" to those we do not wish to activate.

ASSIGNATION TABLE

SA	SB	SC	SD	DECIMAL No	INSTRUCTIONS	CONNECTED	OUTPUTS				
0	0	0	0	0	OUT 61441,0	-	-	-	-		
1	0	0	0	1	OUT 61441,1	SA	-	-	-		
0	1	0	0	2	OUT 61441,2	-	SB	-	-		
1	1	0	0	3	OUT 61441,3	SA	SB	-	-		
0	0	1	0	4	OUT 61441,4	-	-	SC	-		
1	0	1	0	5	OUT 61441,5	SA	-	SC	-		
0	1	1	0	6	OUT 61441,6	-	SB	SC	-		
1	1	1	0	7	OUT 61441,7	SA	SB	SC	-		
0	0	0	1	8	OUT 61441,8	-	-	-	SD		
1	0	0	1	9	OUT 61441,9	SA	-	-	SD		
0	1	0	1	10	OUT 61441,10	-	SB	-	SD		
1	1	0	1	11	OUT 61441,11	SA	SB	-	SD		
0	0	1	1	12	OUT 61441,12	-	-	SC	SD		
1	0	1	1	13	OUT 61441,13	SA	-	SC	SD		
0	1	1	1	14	OUT 61441,14	-	SB	SC	SD		
1	1	1	1	15	OUT 61441,15	SA	SB	SC	SD		

INPUTS

Inputs are read with the "IN" function followed by the address of the peripheral. If it is preceded by "PRINT", the number stating the inputs activated will be seen on the screen. To define this number, the binary number system has been used giving a value of 16 to "EA", 32 to "EB", 64 to "EC" and 128 to "ED" when each of the four previous inputs has been set to "1". In this way the number obtained will be the sum of 15 plus the weights of the inputs activated.

ASSIGNATION TABLE

EA	EB	EC	ED	No. OBTAINED	Inputs activated			
0	0	0	0	15	-	-	-	-
1	0	0	0	31	EA	-	-	-
0	1	0	0	47	-	EB	-	-
1	1	0	0	63	EA	EB	-	-
0	0	1	0	79	-	-	EC	-
1	0	1	0	95	EA	-	EC	-
0	1	1	0	111	-	EB	EC	-
1	1	1	0	127	EA	EB	EC	-
0	0	0	1	143	-	-	-	ED
1	0	0	1	159	EA	-	-	ED
0	1	0	1	175	-	EB	-	ED
1	1	0	1	191	EA	EB	-	ED
0	0	1	1	207	-	-	EC	ED
1	0	1	1	223	EA	-	EC	ED
0	1	1	1	239	-	EB	EC	ED
1	1	1	1	255	EA	EB	EC	ED

With the following program the activated inputs will appear on the screen of your television set and this will give you an example which will help you to understand the functioning of this peripheral

```
5 REM "INPUTS"
10 LET A= IN 61441
20 CLS
30 IF A>> 128 THEN LET A=A-128: PRINT AT 12,5;
```

```

      "INPUT D ACTIVATED"
40 IF A>> 64 THEN LET A=A-64: PRINT AT 10,5;
      "INPUT C ACTIVATED"
50 IF A>> 32 THEN LET A=A-32: PRINT AT 8,5;
      "INPUT B ACTIVATED"
60 IF A>> 16 THEN LET A=A-16: PRINT AT 6,5;
      "INPUT A ACTIVATED"
70 PAUSE 10
80 GOTO 10

```

NOTE: It is possible that with an IN function some of the four less significant bits will go to zero as a result of internal signals inside the Spectrum. This is of no importance since they are not necessary for detecting the activate inputs. (See above example.)

ELECTRICAL CHARACTERISTICS OF INPUTS AND OUTPUTS

INPUTS

Each input channel can be activated by connecting a continuous or alternating current between 4.5 and 50 volts into its terminals.

Continuous current is recommended because of the corresponding polarisation (+ or -).

4.5 to 50 volts.....Input activated
 0 volts.....Input deactivated

OUTPUTS

Each output channel includes a relay (switch) which is open at the deactivated and closed at the activated position.

SA..._/_...[Contact off] Deactivated position
 SA..._-...[Contact on] Activated position

The maximum intensity which can be taken by the contacts is 1 amp.

NOTE: Both the input and output channels are electrically insulated from the computer and in this way any device connected to them cannot affect its functioning.