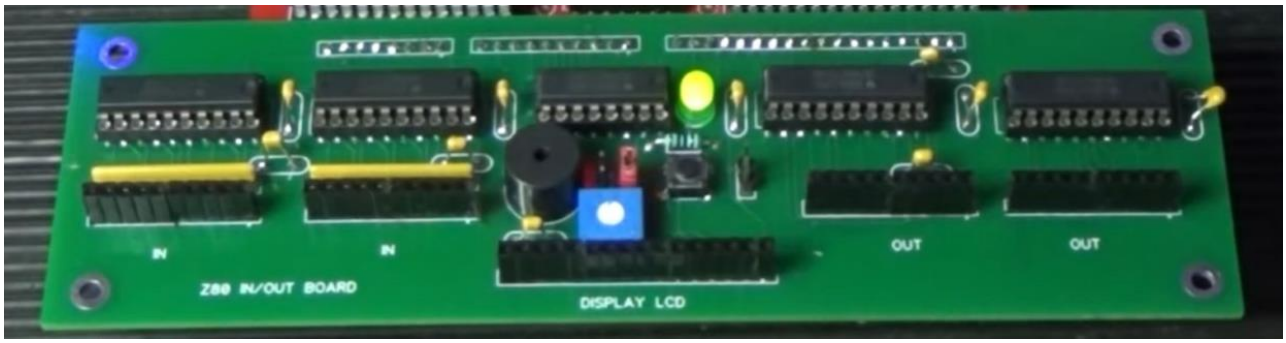
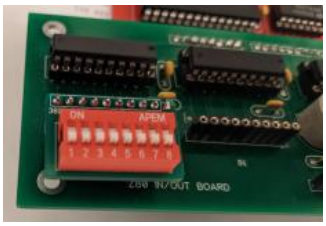
- Z80 I/O Expansion board for Z80 Minicomputer Grant Searle Z80 Project
- 4 Input ports (8 bit)
- 4 output ports (8 bit)
- LCD 2 x 16 interface HD44780
- On board User interface (button, LED, buzzer)
- PCB with all Test points for Debug
- Microsoft BASIC 4.7



I/O Expansion Board



Dip Switch PCB

LED PCB

DESCRIPTION

The Z80 I/O Expansion board is a daughter board to be plugged on the Z80 Minicomputer board in order to extend the I/O capability of the Z80. It offers:

- 4 8-bit INPUT ports based on SN74HCT245
- 4 8-bit OUTPUT ports based on SN74HCT374
- User interface with a LED, buzzer and input butto

The board decodes the I/O operation of Z80 thanks to a 74HCT138 and is designed in order to learn Z80 hardware functions, interfaces and working principles, thanks to debug pins to be connected to a logic analyzer or to an oscilloscope. The board is exploiting a customized version of the Microsoft BASIC (version 4.7) stored on the on board EEPROM and accept commands on the RS-232 serial interface on the main board.

TECHNICAL DATA

PARAMETER	DESCRIPTION	VALUE			UNIT
		MIN	TYP	MAX	
P	Power Consumption (Main+daughter)	1.7	1.8	2	W
f_{clock}	Clock Frequency (Main board)		7.372		MHz
B_r	Serial port Baud rate 8,N,1 (Main board)		115200		Bit/s
V_{IN}	Power Supply Voltage (Main board)		+12		V
I_{IN}	Power Supply Current (Main board)		150		mA

PCB TECHNICAL DATA

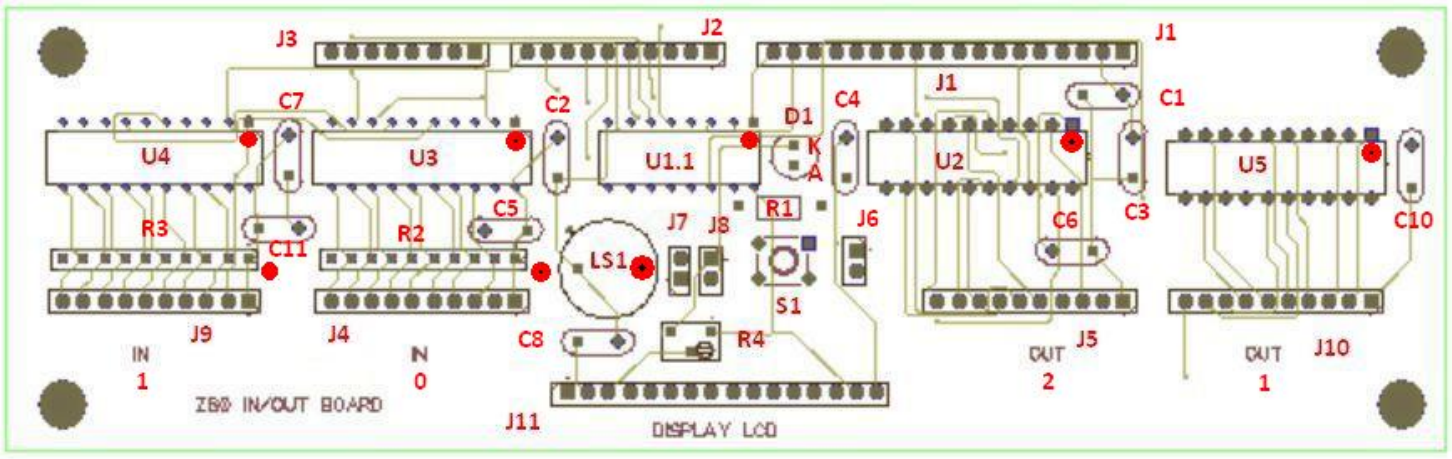
PARAMETER	VALUE	UNIT
Dimensions Lenght x Width Colors	110 x 128 GREEN	mm
PCB thickness (RED, YELLOW)	1.6	mm
Layers	2	
Surface finish	HASL	
Copper Weight Material Details	1 FR4-Standard Tg 130-140C	oz

BILL OF MATERIALS

- **C1,C2,C3,C4,C5,C6,C7, C8, C10, C11** : 100nF ceramic [10]
- **D1**: led diode green [1]
- **LS1** buzzer piezo +5V [1]
- **J1** header female 18 pin (signal bus) MOUNT BOTTOM SIDE [1]
- **J2**: header female 10 (I/O Interface) MOUNT BOTTOM SIDE [1]
- **J3**: header female 8 (I/O Interface) MOUNT BOTTOM SIDE [1]
- **J8,J6,J7**: header male 2 pin (LED,SWITCH,BUZZER) [3]
- **J4,J5,J9, J10**: header female 10 (I/O Interface) [4]
- **J11**: header female 16 (LCD Interface)
- **R1** 390 ohm [1]
- **R2,R3**: resistive network 10Kohm [2]
- **R4** potentiometer 10Kohm [1]
- **S1** tactile switch [1]
- **U1.1**: 74HCT138 [1]
- **U2, U5**: SN74HCT374 [2]
- **U3, U4**: SN74HCT245 [2]
- **Z1.1**: 16 pin socket [1]
- **Z2,Z3,Z4,Z5**: 20 pin socket [4]

ASSEMBLY INFORMATION

Please use sockets and mount IC with PIN1 as indicated by the point as per following figure. J1, J2 and J3 are mounted BOTTOM side.



PCB Top view with references

HARDWARE MODIFICATION on Z80 Minicomputer board

In order to obtain the power supply from Z80 Minicomputer main board these 2 modifications are needed on the Z80 minicoputer board::

1) Connect PIN 1 of J6 connector of the Z80 board to C12 positive terminal (+5V)
2) Connect PIN 2 of J6 connector of the Z80 board to C12 negative terminal (GND)

POWER UP AND SOFTWARE TEST

Connect the I/O board to Z80 board trough J1, J2, J3 connectors. Power up the Z80 board follow the indications on the Z80 Minicomputer Datasheet. Insert jumpers on J8,J6,J7: header male to test the on-board LED,SWITCH and BUZZER. Connect the LCD HD77480 on the J11 connector. Trim the R1 potentiometer to adjust LCD contrast.

BASIC CODE SAMPLES

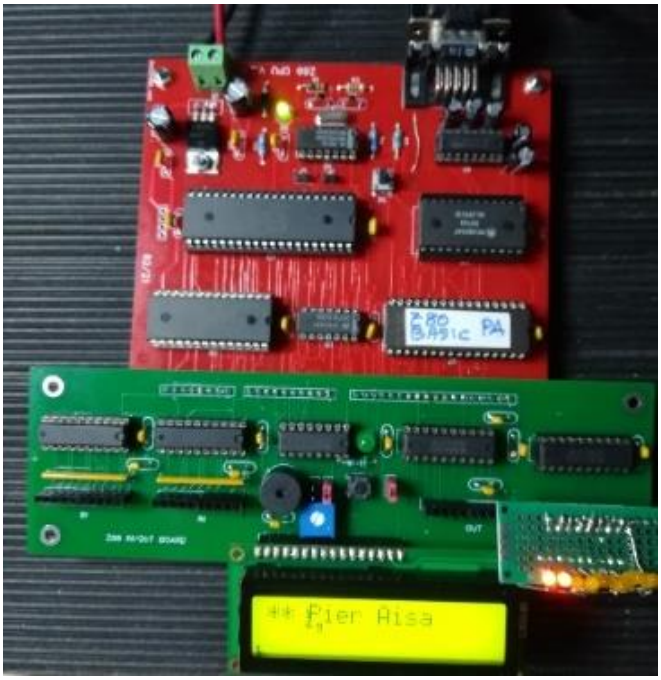
Download Source Code Link: https://www.pieraisa.it/php/forumshareinsertdb.php?file=../forum_share/KITS/Z80.BASIC.Code.samples.zip

- PierAisa.Z80.Assistente mentale.txt
- PierAisa.Z80.Calcolatrice.txt
- PierAisa.Z80.Dadi.txt
- PierAisa.Z80.IO.test.txt
- PierAisa.Z80.Poker.txt
- PierAisa.Z80.Tris.txt

```
10 REM * Lampeggio LED a 0.5 secondi *
5 PRINT "Premere CTRL+C per uscire"
10 GOSUB 100
20 OUT 0,1
30 GOSUB 100
40 OUT 0,0
50 GOTO 10
95 REM ** Subroutine che imposta il ritardo **
100 FOR A = 0 TO 300
110 NEXT A
120 RETURN
```

ADDITIONAL INFORMATION

The following figure represents the Expansion board mounted on the Z80 Minicomputer board driving the LCD display.



ORDERING INFORMATION

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