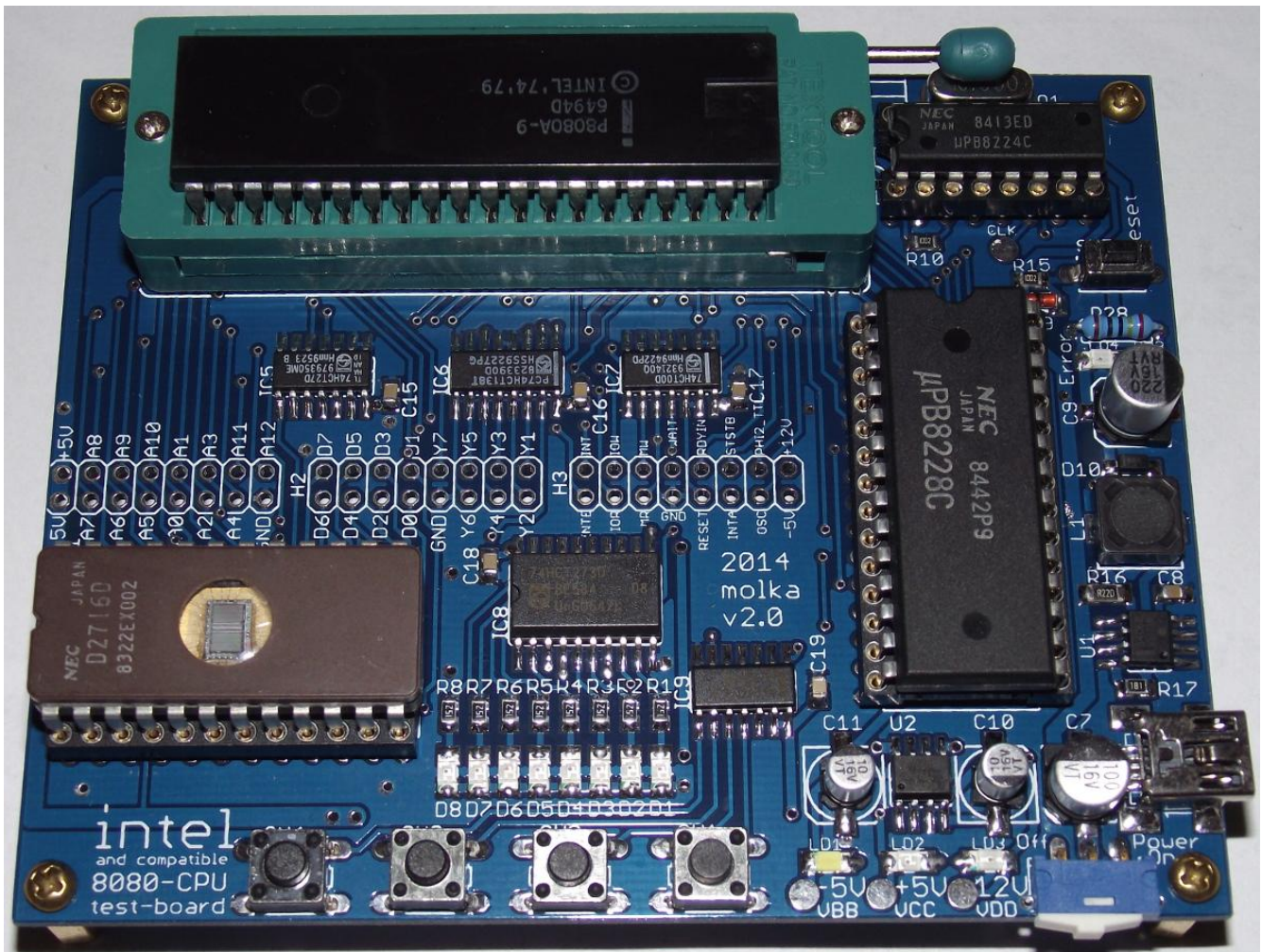


intel

MCS-80



i8080 CPU Test board User's Manual

2014-Nov-21 Ver.2.0
by molka

Overview

The i8080 test board is intended to test the working condition of Intel MCS-80 system's i8080 and compatible CPUs.

The board consists of the base components of MCS-80:

- an i8224 clock generator (provides 1.11MHz clock that is slow enough for all kinds of 8080 CPUs)
- an i8228 system controller and bus driver
- and a 40-pin ZIF socket – for i8080 CPU – provides easy replacement of the CPUs.

A 2716 2KB EPROM holds the test program. This program handles 4 push buttons – as input – and 8 LEDs – as output devices.

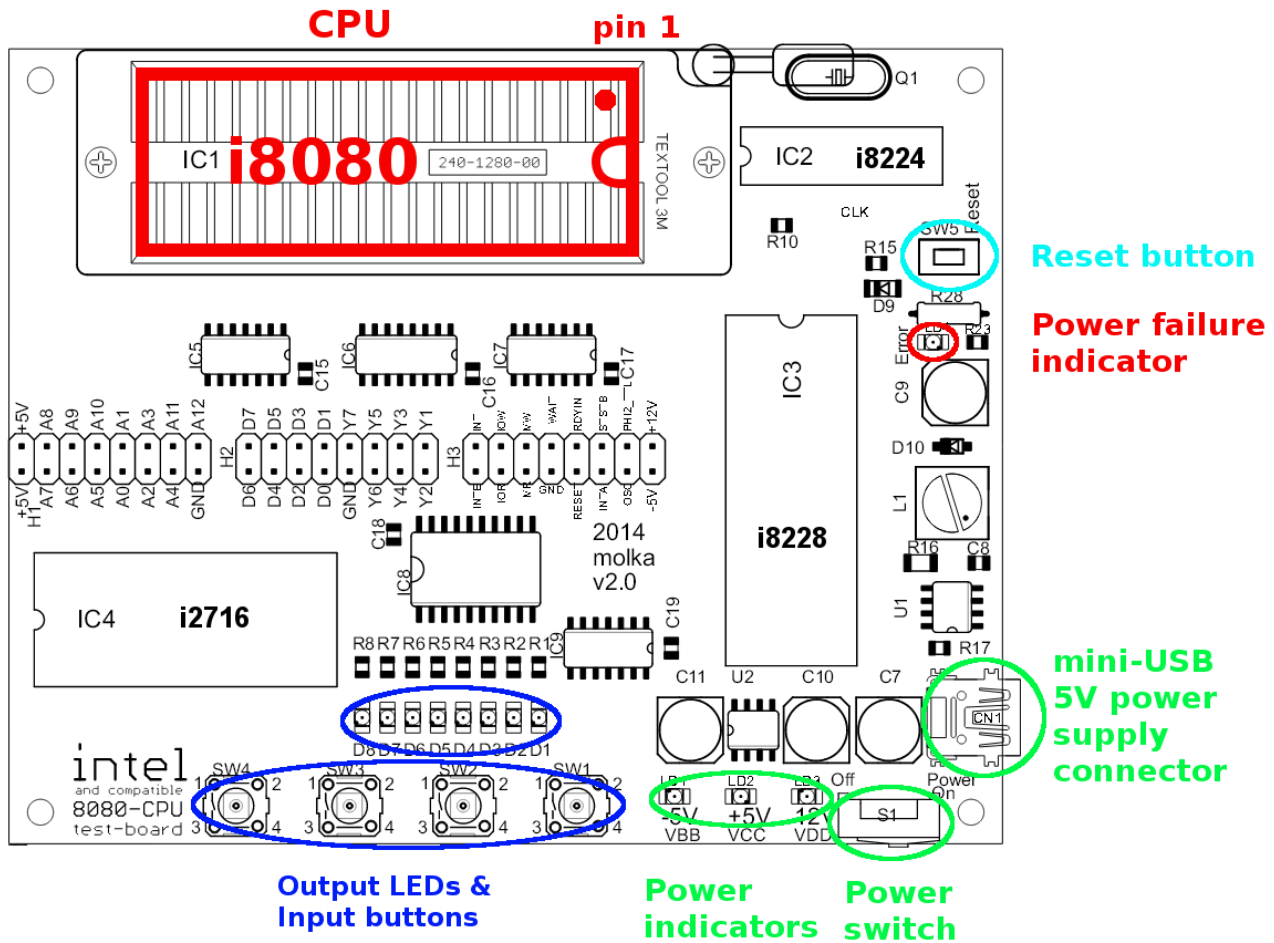
The board requires a single +5V power supply (450mA) provided through a mini-USB connector. The board contains the DC-DC converters needed for providing the -5V and +12V powers required by the CPU.

There is a power failure indicator and protection circuit implemented on the board.

When the input power level is less than 4.2V the failure indicator LED is illuminated and the +12V level is limited to 4V.

Address, data, chip select, control and power lines are attached to the three 16-pin expansion headers, so that the board may be used for other projects.

Board layout and parts



- mini-USB 5V power supply connector. The board consumes around 450mA current so a computer USB connector or cell phone charger, that can provide at least 500mA (**800mA – 1A is recommended**), can be used as power source.
- Power supply can be turned on and off by the sliding switch at the bottom right corner.
- Three LEDs, next to the power switch, indicates power level of -5V, +5V and +12V.
- The board contains a Power-Up reset circuit, but can be reset manually by pressing Reset button.
- A Red LED near the Reset button indicates power failure.
- A 40-pin ZIF socket for the i8080 CPU. **Ensure proper CPU orientation!!!** The pin-1 is at upper-right corner, next to the release lever of the socket.
- Eight output LEDs – shows simple animations, flashes – indicate that the CPU is working.
- There are four push buttons for testing inputs and changing animation sequences.

Usage

- Before changing the CPU in the ZIF socket, make sure the power is off. **All power indicator LEDs should be off!**
- Place the CPU into the socket. Ensure proper orientation to prevent damage to the test board and CPU! **Pin 1 must be at the upper-right corner**, next to the release lever of the ZIF socket. Then lock the socket by moving the level down into the lock position.
- Connect the power through the USB connector.
- The three power indicator LEDs should be illuminated.
- If the CPU is in working condition the 8 output LEDs should be flashing (1s on/1s off pattern).
- **At this point the CPU can be considered WORKING. Congrats!**
- When you press any of the four push buttons (SW1 – 4) the output LEDs copy the state of the buttons, duplicated in the low and high nibbles.
- Releasing the buttons causes one of the four different animation sequences to start, corresponding to the button released last.

Troubleshooting

- After connecting the power supply the power indicator LEDs remains off or power failure indicator LED is illuminated. Turn off the power immediately!

This may be caused by:

- The power supply is unable to provide enough current. Check that it can provide at least 500mA. (800mA to 1A recommended)
 - Thin, poor quality USB cable can also cause this problem.
 - There is short-circuit (fault) in the CPU.
- The 8 output LEDs do not start flashing.
 - Press the Reset button. If the output LEDs continue to remain off then the CPU may be faulty.

Tested CPUs:

Manufacturer

Variant

Intel

8080A, 8080A-1, 8080A-2, 8080A-9

Clones:

AMD

AM9080A, AM9080A-2, 1820-1701

CCCP

KP580BM80A

ECG

ECG8080A

MEV

8080A PC

Mitsubishi

M5L8080AP

National Semiconductors

INS8080AD, INS8080AN

NEC

D8080A, D8080AFC, D8080AFC-1

Poland

MCY7880

Siemens

SAB8080A-C

Signetics

MP8080A1

Tesla

MHB8080AC, MHB8080A

Texas Instruments

TMS8080ANL

Tungram

8080A, 8080APC

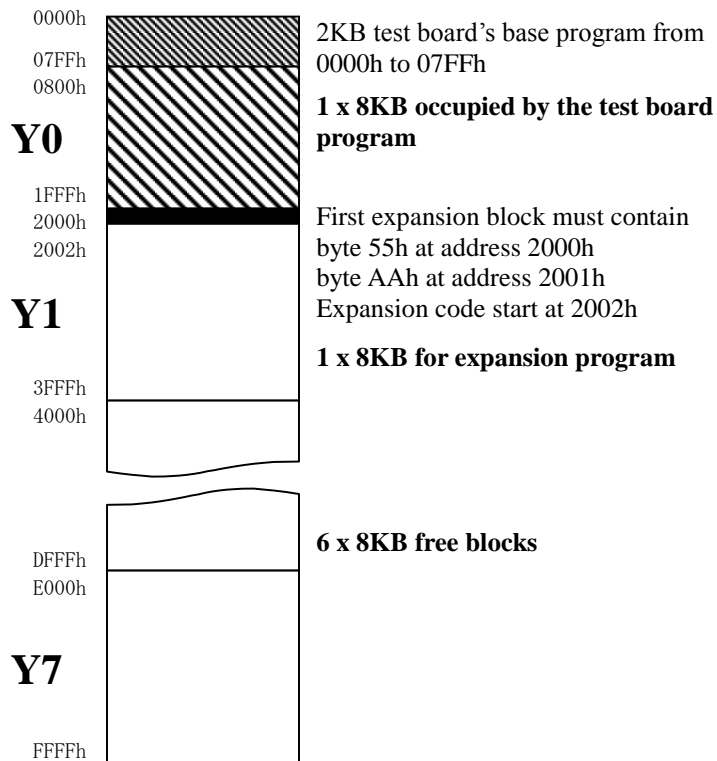
Expansion

The following lines are connected to the expansion heads (H1-3):

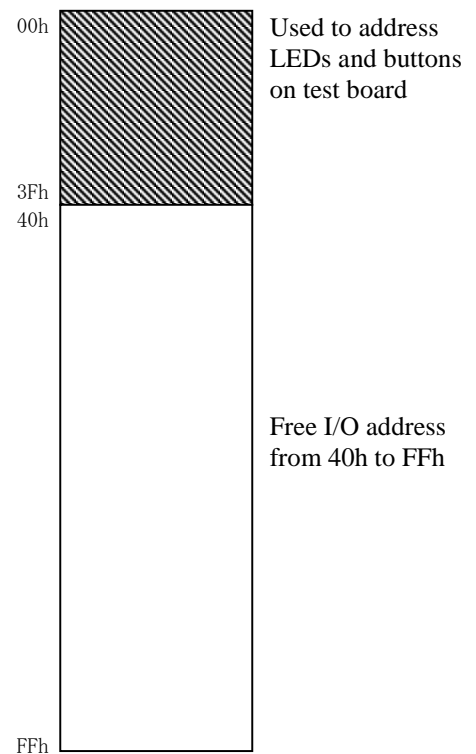
- ADDRESS A0-12
- DATA D0-7
- CHIP SELECT Y1-7
- IOR, IOW
- MEMR, MEMW
- INTE
- INT
- INTA
- RDYIN
- WAIT
- STSTB
- RESET
- OSC, Φ 2-TTL
- POWER +5V, -5V, +12V

Memory and IO organization

Memory map 64KB



I/O map 256 Byte



Thanks to CPUSHack for review and advises!

Feel free to write an e-mail to me at molnar.kalman@freemail.hu or send a PM to molka at CPU-World forum if you have any question.