

## Quick start for the CDP1802 Microprocessor kit

### 1. Memory and I/O layouts

8000-FFFF	User RAM
7000	GPIO1 LED
7100	PORT0 input port
7101	PORT1 output port, digit driving
7102	PORT2 output port, segment driving
7200-7203	LCD registers
7300	INS8250 UART
0000-6FFF	Monitor ROM

2. User code is executed by R0 as the program counter. R1 is for interrupt vector, R2 is for STACK pointer.

3. Running program with BREAK POINT is made with Long branch to location 2756H

CPU registers will be saved to user registers. We can examine them with key REG after user code has been executed.

For example,

```
BRK: EQU 2756H
```

```
8000 F8 01 LDI 1
8002 C0 27 56 LBR BRK
```

We can enter hex code, F8, 01, C0, 27, 56, then press PC, GO. The user code will be executed and jump to monitor program at location 2756. The service code will save CPU registers to user register. We can press REG D, to see its content.

4. The built-in delay subroutine for user testing is loaded on the RESET automatically. We can call it by using a given register directly.

For example,

```
7000 gpio1: EQU 7000H
```

```
f001 delay: equ 0f001h
```

```
8000 ORG 8000h ; R0 IS PROGRAM COUNTER
```

```

8000 f8 f0      ldi high(delay)
8002 b3        phi r3
8003 f8 01     ldi low(delay)
8005 a3        plo r3

8006 7b  LOOP:  SEQ  ; SET BIT Q
8007 d3        sep r3  ; call delay
8008 7a        REQ  ; CLEAR BIT Q
8009 d3        sep r3  ; call delay
800a 30 06     BR LOOP ; REPEAT

```

First, we need to set location of delay subroutine. It was f001, loaded by r3.

Then we can call it using SEP r3 instruction.

The delay subroutine is shown below.

```

f000 d0      RET_DELAY: sep r0

f001 f8 64   delay: LDI 100
f003 a6      PLO R6

f004 f8 00   DELAY1: LDI 0
f006 a7      PLO R7
f007 27      DELAY2: DEC R7
f008 87      GLO R7
f009 3a 07   BNZ DELAY2

f00b 26      DEC R6
f00c 86      GLO R6
f00d 3a 04   BNZ DELAY1

f00f 30 00   BR RET_DELAY

```

We can adjust delay at location f002. Default value after RESET was 64H or 100. Please note, R6 and R7 are used for delay subroutine. Return to main code was done via r0.

5. Function keys:

COPY	Enter Start, End and Destination used with key + and GO
TEST	Test 10ms tick, SW1 when selects 10ms tick, the GPIO1 LED will be counted at 10Hz rate.
DUMP	Display memory on 9600 bit/s terminal.
LOAD	Load Intel Hex file. <b>Need 1ms character delay</b> . Tested with tera terminal

REG	Display user registers. Use with key 0-F.
PC	Set display address to 8000
ADDR	Set address entry mode
DATA	Set data entry mode
+	Increment display address
-	Decrement display address
INS	Insert one byte and shift 512 bytes down
DEL	Delete one byte and shift 512 bytes up
Q LED	Make Q LED flashing
GO	Jump from monitor program to user code, R0 is program counter
INT	Interrupt LOW
EF1	Test pin, EF1, active LOW
EF2	Test pin, EF2, the EF3 and EF4 are on the expansion header
USER	User key, see schematic for hardware wiring.

6. Install/Remove the LCD must be done when the kit is POWER OFF!

7. Mechanical size: 167x170mm

Monitor update, please visit [kswichit.com](http://kswichit.com) on the CDP1802 page.

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PS: The COSMAC CPU, CDP1802 was suggested by Leonard Rose.