

## 109062318 簡弘哲

### 1. Stack changes before and after ThreadCreate call

According to .map file, the address of \_ThreadCreate is 00AE, so I set a breakpoint there and SP is 0x09 now

Version 2.1.32 & Dynamic Interface x | testpreempt.hex

The screenshot displays the Proteus IDE interface. The top window shows the assembly code for the program, with a breakpoint set at address 00AE. The stack pointer (SP) is 0x09. The bottom panel shows the hardware simulation interface, including a DAC, ADC, and a 7-segment display.

**Assembly Code Window:**

Address	Instruction
000A7H	POP 02FH
000A9H	POP 0F0H
000ABH	POP 0E0H
000ADH	RET
000AE*	MOV A,#0FH
000B0H	CJNE A,35H,04H
000B3H	MOV 82H,#0FFH
000B6H	RET
000B7H	MOV R7,#01H
000B9H	JBC 0AFH,02H
000BCH	MOV R7,#00H
000CEH	MOV A,#0FCH
000C3H	ADD A,37H
000C5H	JC 41H
000C7H	MOV R6,37H
000C9H	MOV 0F0H,R6
000CBH	INC 0F0H
000CDH	MOV R6,#01H

**Hardware Simulation Interface:**

- DI / LD:** Buttons for digital input/output.
- AND Gate Enabled:** Checkmark.
- Key Bounce Enabled:** Checkmark.
- Pulse:** Button.
- 5.0 V output:** DAC output.
- Scope:** Oscilloscope.
- DAC:** Digital-to-Analog Converter.
- ADC:** Analog-to-Digital Converter.
- Motor Enabled:** Checkmark.
- 7-segment display:** Shows 8888.

After I press step button several times, I came to the red block part, which change the SP to 0x3F(SP address = 81H)

Version 2.1.32 & Dynamic Interface x | testpreempt.hex

The screenshot shows the Proteus ISIS simulation environment. The assembly code window is open, displaying the following instructions:

```

00FFH MOV 36H,37H
0102I SJMP 04H
0104I INC 37H
0106I SJMP 0B9H
0108I MOV 38H,81H
010BI MOV A,36H
010DI SWAP A
010EI ANL A,#0F0H
0110I MOV R6,A
0111I ADD A,#3FH
0113I MOV 81H,A
0115I PUSH 82H
0117I PUSH 83H
0119I MOV A,#00H
011BI PUSH 0E0H
011DI PUSH 0E0H
011FI PUSH 0E0H
0121I PUSH 0E0H
0123I MOV A,36H
  
```

A breakpoint is set at instruction 0113I. The SP register is highlighted at 0x3F. The hardware interface at the bottom shows a keypad, a 4-digit display showing '8888', and various control buttons.

## 2. Producer running

According to .map file, the address of \_Producer is 0014, so I set a breakpoint there, and the red block corresponds to the code that I init the variable ch='A'

Version 2.1.32 | testpreempt.hex

The screenshot shows the Proteus ISIS simulation environment. The assembly code window is open, displaying the following instructions:

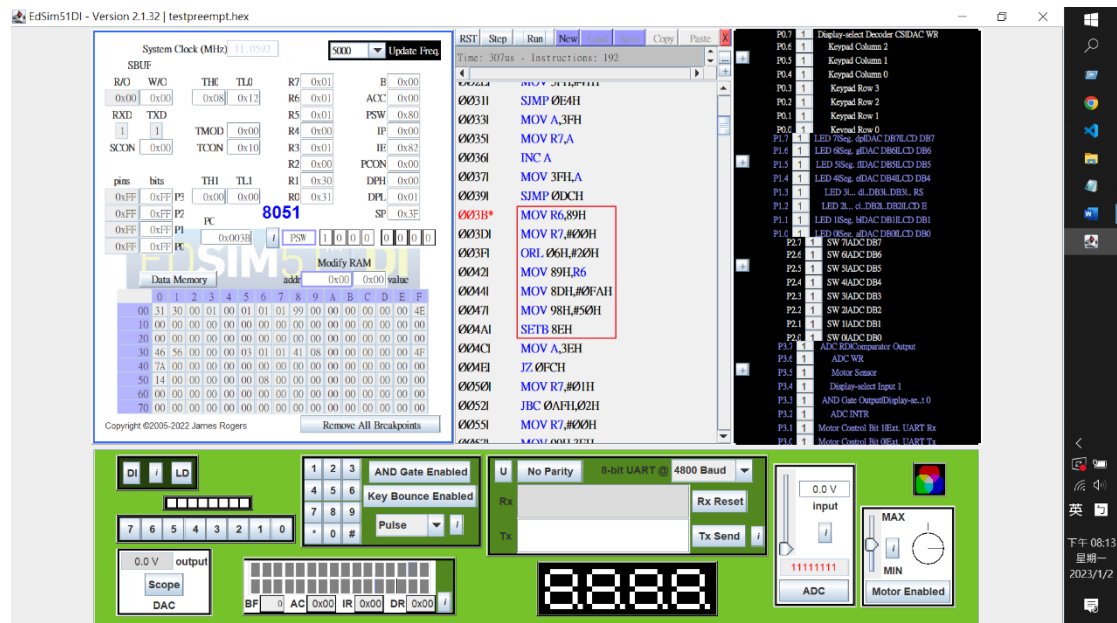
```

ORG 0000H
0000I LJMP 007DH
0003I RETI
ORG 000BH
000BI LJMP 0084H
000EI LJMP 0066H
0011I LJMP 000EH
0014I MOV 3FH,#41H
0017I MOV A,3EH
0019I JNZ 0FCH
001BI MOV R7,#01H
001DI JBC 0AFH,02H
0020I MOV R7,#00H
0022I MOV 3EH,3FH
0025I MOV A,R7
0026I RRC A
0027I MOV 0AFH,C
0029I MOV A,#5AH
002BI CINE A,3FH,05H
  
```

A breakpoint is set at instruction 0014I. The SP register is highlighted at 0x4F. The hardware interface at the bottom shows a keypad, a 4-digit display showing '8888', and various control buttons.

### 3. Consumer running

According to .map file, the address of \_Consumer is 003B, so I set a breakpoint there and the red block corresponds to the code that I initialize TMOD, TH1,...



#### 4. Interrupt triggering

We can observe TH0, TL0 since T0 is for preemption. We have "TMOD |= 0x20" in Consumer, which choose mode 2(8-bit auto reload) for timer

## 5. Typescript

```
daneil@MS-DanielNB:/mnt/d/Profile/Daniel/OneDrive/桌面/OS Project/Checkpoint 2$ make clean
rm *.hex *.ihx *.lnk *.lst *.map *.mem *.rel *.rst *.sym
rm: cannot remove '*.ihx': No such file or directory
rm: cannot remove '*.lnk': No such file or directory
make: *** [Makefile:25: clean] Error 1
daneil@MS-DanielNB:/mnt/d/Profile/Daniel/OneDrive/桌面/OS Project/Checkpoint 2$ make
sdcc -c testpreempt.c
testpreempt.c:24: warning 158: overflow in implicit constant conversion
sdcc -c preemptive.c
preemptive.c:82: warning 85: in function ThreadCreate unreferenced function argument : 'fp'
sdcc -o testpreempt.hex testpreempt.rel preemptive.rel
```