متین گلپایگانی

۹۸۲۴۰۷۳

آزمایش۹

آز ریزپردازنده

فرکانس متر:

```
#include <mega32.h>
// Alphanumeric LCD functions
#include <alcd.h>
#include <stdio.h>
#include <delay.h>

char x[30];
unsigned long int per=0;
float freq=0;
int owf=0;
long int timer=0;
int j=0;
void period(void);
int f1=0;

// External Interrupt 1 service routine
interrupt [EXT_INT1] void ext_int1_isr(void)
{
if(j==0)
    TCNT1 = 0;
j++;
if(j!=0){
    timer = TCNT1;
    period();
}
}
// Timer1 overflow interrupt service routine
interrupt [TIM1_OVF] void timer1_ovf_isr(void)
{
owf++;
```

```
}

void main(void)
{
DDRA=(0<<DDA7) | (0<<DDA6) | (0<<DDA5) | (0<<DDA4) | (0<<DDA3) | (0<<DDA2) | (0<<DDA1) | (0<<DDA0);
PORTA=(0<<PORTA7) | (0<<PORTA6) | (0<<PORTA5) | (0<<PORTA4) | (0<<PORTA3) | (0<<PORTA2) | (0<<PORTA1) | (0<<PORTA0);

DDRB=(0<<DDB7) | (0<<DDB6) | (0<<DDB5) | (0<<DDB4) | (0<<DDB3) | (0<<DDB2) | (0<<DDB1) | (0<<DDB0);
PORTB=(0<<PORTB7) | (0<<PORTB6) | (0<<PORTB5) | (0<<PORTB4) | (0<<PORTB3) | (0<<PORTB2) | (0<<PORTB1) | (0<<PORTB0);

DDRC=(0<<DDC7) | (0<<DDC6) | (0<<DDC5) | (0<<DDC4) | (0<<DDC3) | (0<<DDC2) | (0<<DDC1) | (0<<DDC0);
PORTC=(0<<PORTC7) | (0<<PORTC6) | (0<<PORTC5) | (0<<PORTC4) | (0<<PORTC3) | (0<<PORTC2) | (0<<PORTC1) | (0<<PORTC0);

DDRD=(0<<DDD7) | (0<<DDD6) | (0<<DDD5) | (0<<DDD4) | (0<<DDD3) | (0<<DDD2) | (0<<DDD1) | (0<<DDD0);
PORTD=(0<<PORTD7) | (0<<PORTD6) | (0<<PORTD5) | (0<<PORTD4) | (0<<PORTD3) | (0<<PORTD2) | (0<<PORTD1) | (0<<PORTD0);


// Clock value: 8000.000 kHz
// Timer Period: 8.192 ms
TCCR1A=(0<<COM1A1) | (0<<COM1A0) | (0<<COM1B1) | (0<<COM1B0) | (0<<WGM11) | (0<<WGM10);
TCCR1B=(0<<ICNC1) | (0<<ICES1) | (0<<WGM13) | (0<<WGM12) | (0<<CS12) | (0<<CS11) | (1<<CS10);
TCNT1H=0x00;
TCNT1L=0x00;
ICR1H=0x00;
ICR1L=0x00;
OCR1AH=0x00;
OCR1AL=0x00;
OCR1BH=0x00;
OCR1BL=0x00;
```

```

ASSR=0<<AS2;
TCCR2=(0<<PWM2) | (0<<COM21) | (0<<COM20) | (0<<CTC2) | (0<<CS22) | (0<<CS21) | (0<<CS20);
TCNT2=0x00;
OCR2=0x00;

// Timer(s)/Counter(s) Interrupt(s) initialization
TIMSK=(0<<OCIE2) | (0<<TOIE2) | (0<<TICIE1) | (0<<OCIE1A) | (0<<OCIE1B) | (1<<TOIE1) | (0<<OCIE0) | (0<<TOIE0);

// External Interrupt(s) initialization
// INT0: Off
// INT1: On
// INT1 Mode: Rising Edge
// INT2: Off
GICR|=(1<<INT1) | (0<<INT0) | (0<<INT2);
MCUCR=(1<<ISC11) | (1<<ISC10) | (0<<ISC01) | (0<<ISC00);
MCUCSR=(0<<ISC2);
GIFR=(1<<INTF1) | (0<<INTF0) | (0<<INTF2);

lcd_init(16);

// Global enable interrupts
#asm("sei")

while (1)
      {
      if(freq!=f1){
        lcd_clear();
        lcd_puts(x);
        f1 = freq;
```

```
107
108   while (1)
109         {
110         if(freq!=fl){
111           lcd_clear();
112           lcd_puts(x);
113           fl = freq;
114         }
115         }
116 }
117
118 void period(){
119     per = timer + owf*65535;
120     owf=0;
121     freq = per / 8000000.0;
122     freq = 1/freq;
123     j=0;
124     if(freq > 1000)
125         sprintf(x,"F = %.3f KHz",freq/1000);
126     else if (freq < 1000)
127        sprintf(x,"F = %.3f Hz",freq);
128 }
```