

متین گلپایگانی

۹۸۲۴۰۷۳

آزمایش ۱۰

آز ریزپردازنده

طراحی ساعت با کریستال 32.768KHz و تایمر ۲

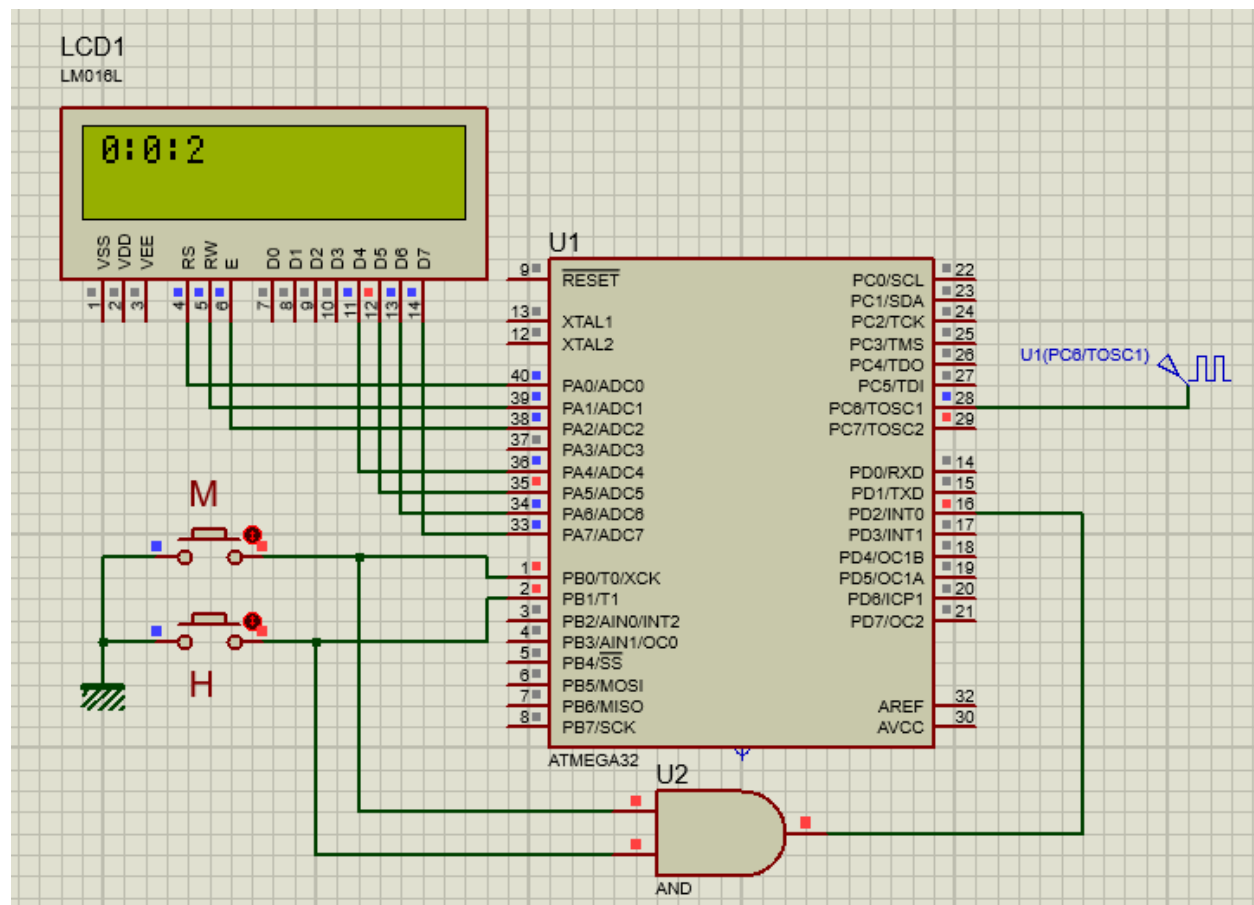
```
24 #include <mega32.h>
25 #include <alcd.h>
26 #include <stdio.h>
27
28 int sec=0;
29 int min=0;
30 int hour=0;
31 char time[15];
32
33 // Timer2 overflow interrupt service routine
34 interrupt [TIM2_OVF] void timer2_ovf_isr(void)
35 {
36     sec++;
37     if(sec == 60){
38         sec = 0;
39         min++;
40     }
41     sprintf(time,"%d:%d:%d",hour,min,sec);
42     lcd_clear();
43     lcd_puts(time);
44 }
```

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46 // External Interrupt 0 service routine
47 interrupt [EXT_INT0] void ext_int0_isr(void)
48 {
49     if(PINB.0 == 0){
50         min++;
51     }
52     else if(PINB.1 == 0){
53         hour++;
54     }
55 }
56
57
58 void main(void)
59 {
60
61     DDRA=(0<<DDA7) | (0<<DDA6) | (0<<DDA5) | (0<<DDA4) | (0<<DDA3) | (0<<DDA2) | (0<<DDA1) | (0<<DDA0);
62     PORTA=(0<<PORTA7) | (0<<PORTA6) | (0<<PORTA5) | (0<<PORTA4) | (0<<PORTA3) | (0<<PORTA2) | (0<<PORTA1) | (0<<PORTA0);
63
64     DDRB=(0<<DDB7) | (0<<DDB6) | (0<<DDB5) | (0<<DDB4) | (0<<DDB3) | (0<<DDB2) | (0<<DDB1) | (0<<DDB0);
65     PORTB=(0<<PORTB7) | (0<<PORTB6) | (0<<PORTB5) | (0<<PORTB4) | (0<<PORTB3) | (0<<PORTB2) | (1<<PORTB1) | (1<<PORTB0);
66
67     DDRC=(0<<DDC7) | (0<<DDC6) | (0<<DDC5) | (0<<DDC4) | (0<<DDC3) | (0<<DDC2) | (0<<DDC1) | (0<<DDC0);
68     PORTC=(0<<PORTC7) | (0<<PORTC6) | (0<<PORTC5) | (0<<PORTC4) | (0<<PORTC3) | (0<<PORTC2) | (0<<PORTC1) | (0<<PORTC0);
69
70     DDRD=(0<<DDD7) | (0<<DDD6) | (0<<DDD5) | (0<<DDD4) | (0<<DDD3) | (0<<DDD2) | (0<<DDD1) | (0<<DDD0);
71     PORTD=(0<<PORTD7) | (0<<PORTD6) | (0<<PORTD5) | (0<<PORTD4) | (0<<PORTD3) | (0<<PORTD2) | (0<<PORTD1) | (0<<PORTD0);
72
73     TCCR0=(0<<WGM00) | (0<<COM01) | (0<<COM00) | (0<<WGM01) | (0<<CS02) | (0<<CS01) | (0<<CS00);
74     TCNT0=0x00;
75     OCR0=0x00;
76
77     TCCR1A=(0<<COM1A1) | (0<<COM1A0) | (0<<COM1B1) | (0<<COM1B0) | (0<<WGM11) | (0<<WGM10);
78     TCCR1B=(0<<ICNC1) | (0<<ICES1) | (0<<WGM13) | (0<<WGM12) | (0<<CS12) | (0<<CS11) | (0<<CS10);
79     TCNT1H=0x00;
80     TCNT1L=0x00;
81     ICR1H=0x00;
82     ICR1L=0x00;
83     OCR1AH=0x00;
84     OCR1AL=0x00;
85     OCR1BH=0x00;
86     OCR1BL=0x00;
87
88     // Timer/Counter 2 initialization
89     // Clock source: TOSC1 pin
90     // Clock value: PCK2/128
91     // Mode: Normal top=0xFF
92     // OC2 output: Disconnected
93     ASSR=1<<AS2;
94     TCCR2=(0<<PWM2) | (0<<COM21) | (0<<COM20) | (0<<CTC2) | (1<<CS22) | (0<<CS21) | (1<<CS20);
95     TCNT2=0x00;
96     OCR2=0x00;
97
98     // Timer(s)/Counter(s) Interrupt(s) initialization
99     TIMSK=(0<<OCIE2) | (1<<TOIE2) | (0<<TICIE1) | (0<<OCIE1A) | (0<<OCIE1B) | (0<<TOIE1) | (0<<OCIE0) | (0<<TOIE0);
100
101     GICR=(0<<INT1) | (1<<INT0) | (0<<INT2);
102     MCUCR=(0<<ISC11) | (0<<ISC10) | (1<<ISC01) | (0<<ISC00);
103     MCUCSR=(0<<ISC2);
104     GIFR=(0<<INTF1) | (1<<INTF0) | (0<<INTF2);
105
106     // Alphanumeric LCD initialization

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```
105
106 // Alphanumeric LCD initialization
107 // Connections are specified in the
108 // Project|Configure|C Compiler|Libraries|Alphanumeric LCD menu:
109 // RS - PORTA Bit 0
110 // RD - PORTA Bit 1
111 // EN - PORTA Bit 2
112 // D4 - PORTA Bit 4
113 // D5 - PORTA Bit 5
114 // D6 - PORTA Bit 6
115 // D7 - PORTA Bit 7
116 // Characters/line: 16
117 lcd_init(16);
118
119 // Global enable interrupts
120 #asm("sei")
121
122 while (1)
123 {
124     if(min == 60){
125         min = 0;
126         hour++;
127     }
128     if(hour == 24)
129         hour = 0;
130 }
131
132
```



LCD1
LM016L

