

Práctica #1 Puertos E/S
Introducción a los Microcontroladores
Fernando Aguilar Sánchez

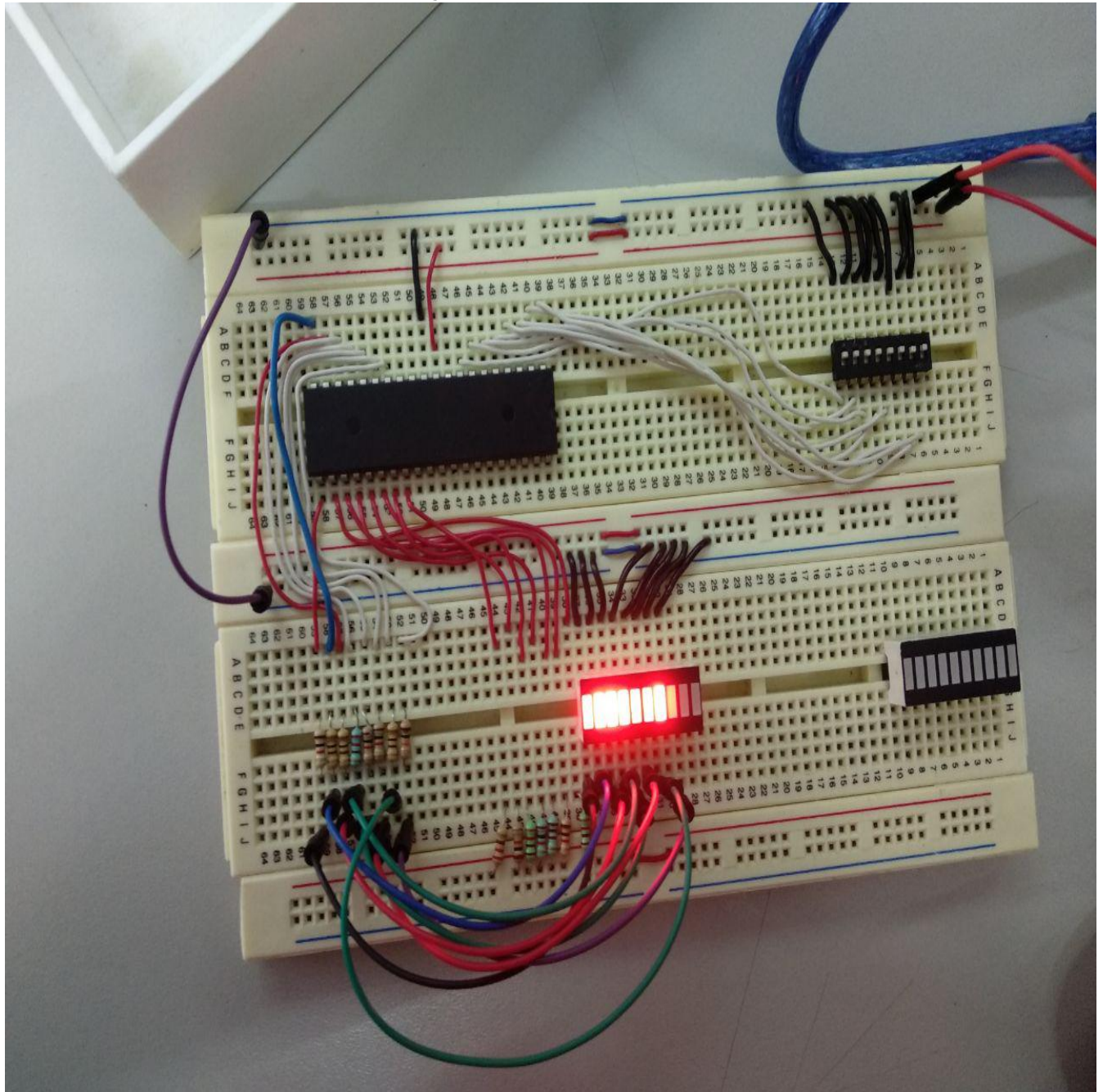
Jorge Gómez Reus

Índice

| | |
|----------------------|----------|
| 1. Protoboard | 2 |
| 2. Código | 2 |
| 3. Circuito | 5 |

1. Protoboard

Figura 1: ProtoBoard



2. Código

```
1 #include <mega8535.h>
2
3 void main(void)
4 {
5     // Input/Output Ports initialization
6     // Port A initialization
7     // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=In Bit2=In Bit1=In Bit0=In
8     DDRA=(0<<DDA7) | (0<<DDA6) | (0<<DDA5) | (0<<DDA4) | (0<<DDA3) | (0<<DDA2) | (0<<DDA1) | (0<<DDA0);
9     // State: Bit7=T Bit6=T Bit5=T Bit4=T Bit3=T Bit2=T Bit1=T Bit0=T
10    PORTA=(0<<PORTA7) | (0<<PORTA6) | (0<<PORTA5) | (0<<PORTA4) | (0<<PORTA3) | (0<<PORTA2) | (0<<PORTA1) | (0<<
        PORTA0);
11
12    // Port B initialization
13    // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=In Bit2=In Bit1=In Bit0=In
14    DDRB=(0<<DDB7) | (0<<DDB6) | (0<<DDB5) | (0<<DDB4) | (0<<DDB3) | (0<<DDB2) | (0<<DDB1) | (0<<DDB0);
15    // State: Bit7=P Bit6=P Bit5=P Bit4=P Bit3=P Bit2=P Bit1=P Bit0=P
16    PORTB=(1<<PORTB7) | (1<<PORTB6) | (1<<PORTB5) | (1<<PORTB4) | (1<<PORTB3) | (1<<PORTB2) | (1<<PORTB1) | (1<<
        PORTB0);
17
18    // Port C initialization
19    // Function: Bit7=In Bit6=In Bit5=In Bit4=In Bit3=In Bit2=In Bit1=In Bit0=In
20    DDRC=(0<<DDC7) | (0<<DDC6) | (0<<DDC5) | (0<<DDC4) | (0<<DDC3) | (0<<DDC2) | (0<<DDC1) | (0<<DDC0);
21    // State: Bit7=T Bit6=T Bit5=T Bit4=T Bit3=T Bit2=T Bit1=T Bit0=T
22    PORTC=(0<<PORTC7) | (0<<PORTC6) | (0<<PORTC5) | (0<<PORTC4) | (0<<PORTC3) | (0<<PORTC2) | (0<<PORTC1) | (0<<
        PORTC0);
23
24    // Port D initialization
25    // Function: Bit7=Out Bit6=Out Bit5=Out Bit4=Out Bit3=Out Bit2=Out Bit1=Out Bit0=Out
26    DDRD=(1<<DDD7) | (1<<DDD6) | (1<<DDD5) | (1<<DDD4) | (1<<DDD3) | (1<<DDD2) | (1<<DDD1) | (1<<DDD0);
27    // State: Bit7=0 Bit6=0 Bit5=0 Bit4=0 Bit3=0 Bit2=0 Bit1=0 Bit0=0
28    PORTD=(0<<PORTD7) | (0<<PORTD6) | (0<<PORTD5) | (0<<PORTD4) | (0<<PORTD3) | (0<<PORTD2) | (0<<PORTD1) | (0<<
        PORTD0);
29
30    // Timer/Counter 0 initialization
31    // Clock source: System Clock
32    // Clock value: Timer 0 Stopped
33    // Mode: Normal top=0xFF
34    // OCO output: Disconnected
35    TCCR0=(0<<WGM00) | (0<<COM01) | (0<<COM00) | (0<<WGM01) | (0<<CS02) | (0<<CS01) | (0<<CS00);
36    TCNT0=0x00;
37    OCR0=0x00;
38
39    // Timer/Counter 1 initialization
40    // Clock source: System Clock
41    // Clock value: Timer1 Stopped
42    // Mode: Normal top=0xFFFF
43    // OC1A output: Disconnected
44    // OC1B output: Disconnected
45    // Noise Canceler: Off
46    // Input Capture on Falling Edge
47    // Timer1 Overflow Interrupt: Off
48    // Input Capture Interrupt: Off
49    // Compare A Match Interrupt: Off
50    // Compare B Match Interrupt: Off
51    TCCR1A=(0<<COM1A1) | (0<<COM1A0) | (0<<COM1B1) | (0<<COM1B0) | (0<<WGM11) | (0<<WGM10);
52    TCCR1B=(0<<ICNC1) | (0<<ICES1) | (0<<WGM13) | (0<<WGM12) | (0<<CS12) | (0<<CS11) | (0<<CS10);
53    TCNT1H=0x00;
54    TCNT1L=0x00;
55    ICR1H=0x00;
```

```

56 ICR1L=0x00;
57 OCR1AH=0x00;
58 OCR1AL=0x00;
59 OCR1BH=0x00;
60 OCR1BL=0x00;
61
62 // Timer/Counter 2 initialization
63 // Clock source: System Clock
64 // Clock value: Timer2 Stopped
65 // Mode: Normal top=0xFF
66 // OC2 output: Disconnected
67 ASSR=0<<AS2;
68 TCCR2=(0<<WGM20) | (0<<COM21) | (0<<COM20) | (0<<WGM21) | (0<<CS22) | (0<<CS21) | (0<<CS20);
69 TCNT2=0x00;
70 OCR2=0x00;
71
72 // Timer(s)/Counter(s) Interrupt(s) initialization
73 TIMSK=(0<<OCIE2) | (0<<TOIE2) | (0<<TICIE1) | (0<<OCIE1A) | (0<<OCIE1B) | (0<<TOIE1) | (0<<OCIE0) | (0<<
    TOIE0);
74
75 // External Interrupt(s) initialization
76 // INT0: Off
77 // INT1: Off
78 // INT2: Off
79 MCUCR=(0<<ISC11) | (0<<ISC10) | (0<<ISC01) | (0<<ISC00);
80 MCUCSR=(0<<ISC2);
81
82 // USART initialization
83 // USART disabled
84 UCSRB=(0<<RXCIE) | (0<<TXCIE) | (0<<UDRIE) | (0<<RXEN) | (0<<TXEN) | (0<<UCSZ2) | (0<<RXB8) | (0<<TXB8);
85
86 // Analog Comparator initialization
87 // Analog Comparator: Off
88 // The Analog Comparator's positive input is
89 // connected to the AIN0 pin
90 // The Analog Comparator's negative input is
91 // connected to the AIN1 pin
92 ACSR=(1<<ACD) | (0<<ACBG) | (0<<ACO) | (0<<ACI) | (0<<ACIE) | (0<<ACIC) | (0<<ACIS1) | (0<<ACIS0);
93 SFIOR=(0<<ACME);
94
95 // ADC initialization
96 // ADC disabled
97 ADCSRA=(0<<ADEN) | (0<<ADSC) | (0<<ADATE) | (0<<ADIF) | (0<<ADIE) | (0<<ADPS2) | (0<<ADPS1) | (0<<ADPS0);
98
99 // SPI initialization
100 // SPI disabled
101 SPCR=(0<<SPIE) | (0<<SPE) | (0<<DORD) | (0<<MSTR) | (0<<CPOL) | (0<<CPHA) | (0<<SPR1) | (0<<SPR0);
102
103 // TWI initialization
104 // TWI disabled
105 TWCR=(0<<TWEA) | (0<<TWSTA) | (0<<TWSTO) | (0<<TWEN) | (0<<TWIE);
106
107 // Main Program
108 while (1)
109 {
110     PORTD=PINB;
111 }
112 }

```

3. Circuito

Figura 2: Simulación

