

Lecture (08)

PIC16F84A

2X7 segments display interface

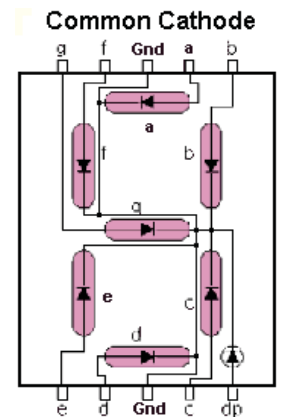
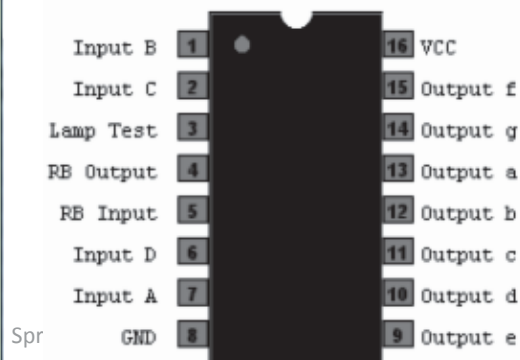
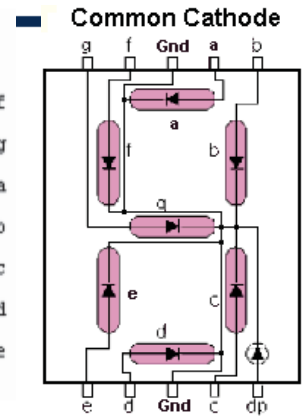
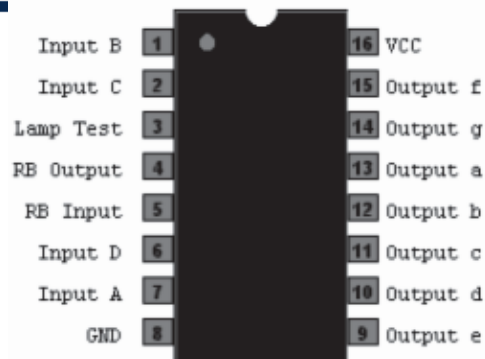
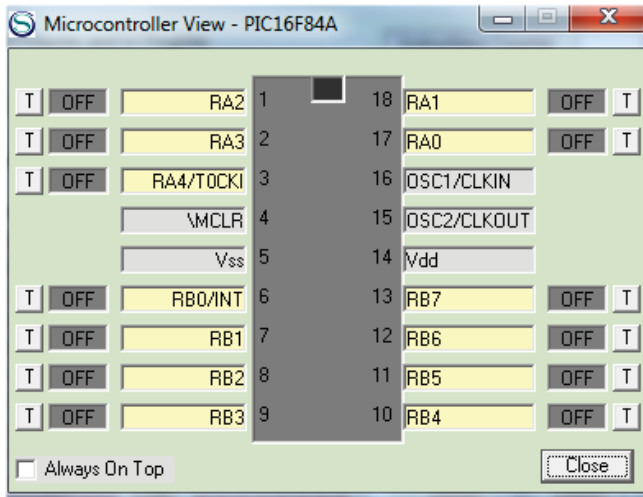
Dr. Ahmed M. ElShafee

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

-
- PressControlledUpDown2X7SegmentDecodedCounter

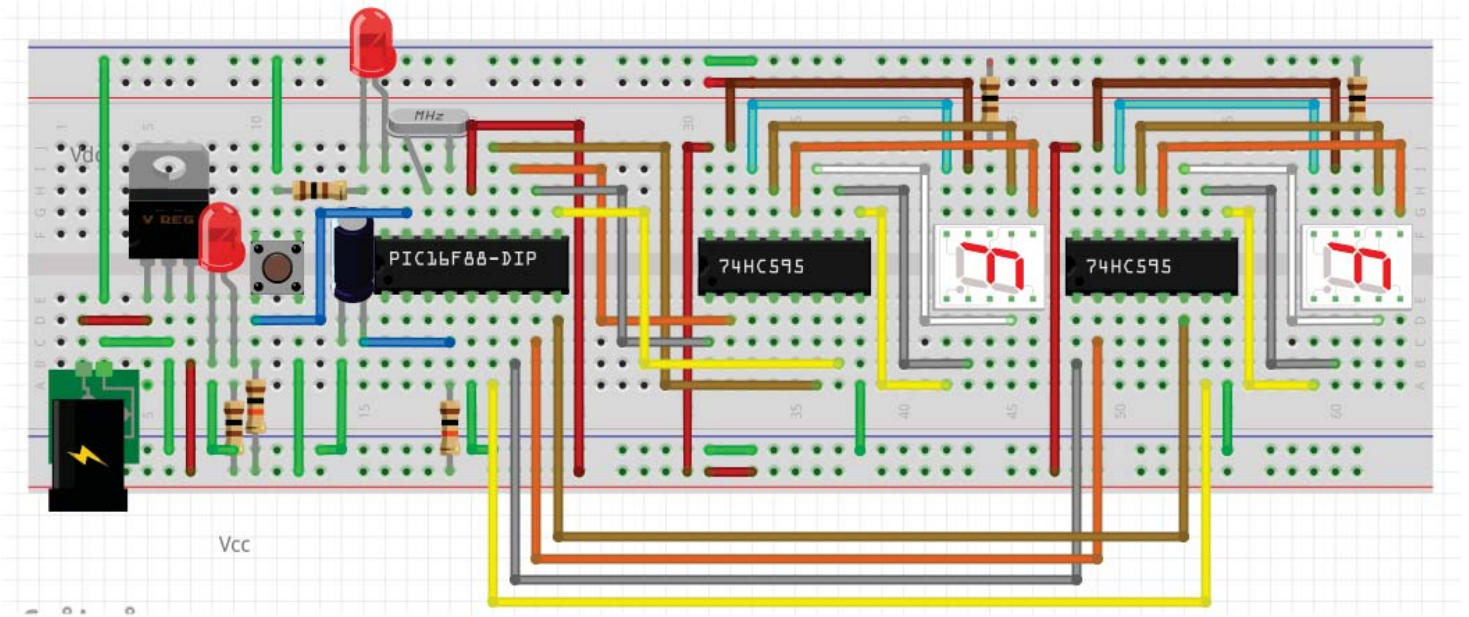
PressControlledUpDown2X7SegmentDecodedCounter

-



PIC16F84A	RB0	RB1	RB2	RB3	RB4	RB5	RB6	RB7
74LS48 (2)	Input A	Input B	Input C	Input D				
74LS48 (1)					Input A	Input B	Input C	Input D

74LS48	Output a	Output b	Output c	Output d	Output e	Output f	Output g
7Segment	a	b	c	d	e	f	g



o

Dr. Ahmed ElShafee, ACU Spring 2014, Practical Applications CS II

- Display decimal number of 2 digits on 7 segments

symbol	Binary	Will display
45	0010 1101	2 D

- So we need to used Binary Coded Decimal

- **Display decimal number as 4 separated numbers (BCD)**

- Example display 45
- Ones = 5 → portB 0 ~ 3
- Tens = 4 → portB 4 ~ 7
- To get tens= number/10, divide without remainder
- To get ones = number % 10, remainder of 10

4	0100
5	0101

- Combine both numbers, then write new number to port b

4 5	0100 0101
-----	-----------

v

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

```
void main(void) {  
    // set directions of port A & B  
  
    //initialize counter with 0  
  
    //endless loop, main loop  
  
    {  
        // check RA0 case 1  
  
        {  
            // increment counter with over flow  
  
        }  
  
    }  
}
```

```
// check RA0 case 2  
  
    {  
        // decrement counter with over flow  
  
    }  
}
```

```

// get ones

// get tens

// left shift of tens

// combine them again

// write data to port B

// switch status of port RA1

// delay

    }
}

```

9

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

```

void main(void) {
    // set directions of port A & B
    TRISB=0x00;
    TRISA=0b00011101;
    //initialize counter with 0
    int counter=0;
    //endless loop, main loop
    while(1)
    {
        // check RA0 case 1
        if(RA0==1)
        {
            // increment counter with over flow
            if(counter<99)
                counter++;
            else
                counter=0;
        }
    }
}

```

```

// check RA0 case 2
else
    {
        // decrement counter with over flow
        if(counter>0)
            {counter=counter-1;}
        else
            {counter=99;}
    }

```

```

// get ones
    int c1=counter%10;
// get tens
    int c2=counter/10;
// left shirt of tens
    int c=(c2<<4)&0xf0;
// combine them again
c=c|c1;
// write data to port B
    PORTB=c;
// switch status of port RA1
    RA1=~RA1;
// delay
    delay_ms(500);
    }
}

```

11

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

```

void main(void) {
    TRISB=0x00;
    TRISA=0b00011101;
    int counter=0;
    while(1)
    {
        if(RA0==1)
        {
            if(counter<99)
                counter++;
            else
                counter=0;
        }
        else
        {
            if(counter>0)
                {counter=counter-1;}

```

```

        else
            {counter=99;}
        }
        int c1=counter%10;
        int c2=counter/10;
        int c=(c2<<4)&0xf0;
        c=c|c1;
        PORTB=c;
        RA1=~RA1;
        delay_ms(500);
    }
}

```

Thanks,..
See you next week (ISA),...