

Lecture (08)

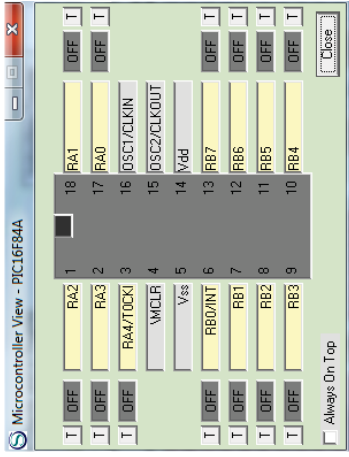
PIC16F84A

2X7 segments display interface

Dr. Ahmed M. ElShafee

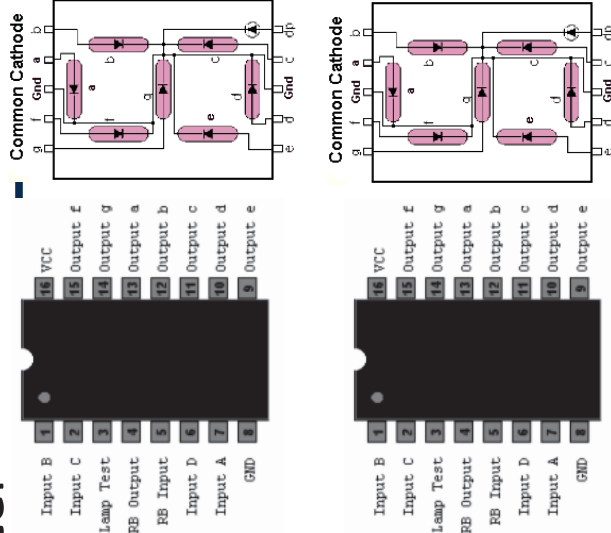
- PressControlledUpDown2X7SegmentDecodedCounter

PressControlledUpDown2X7SegmentDecodedCounter



Microcontroller View - PIC16F84A

1	RA2	OFF	I
2	RA3	OFF	I
3	RA4/TOCK1	OFF	I
4	WCLR	OFF	I
5	Vss	OFF	I
6	RB0/INT	OFF	I
7	RB1	OFF	I
8	RB2	OFF	I
9	RB3	OFF	I
10	RB4	OFF	I
11	RB5	OFF	I
12	RB6	OFF	I
13	RB7	OFF	I
14	Vdd	OFF	I
15	OSCC2/CLKOUT	OFF	I
16	OSCC1/CLKIN	OFF	I
17	RA0	OFF	I
18	RA1	OFF	I

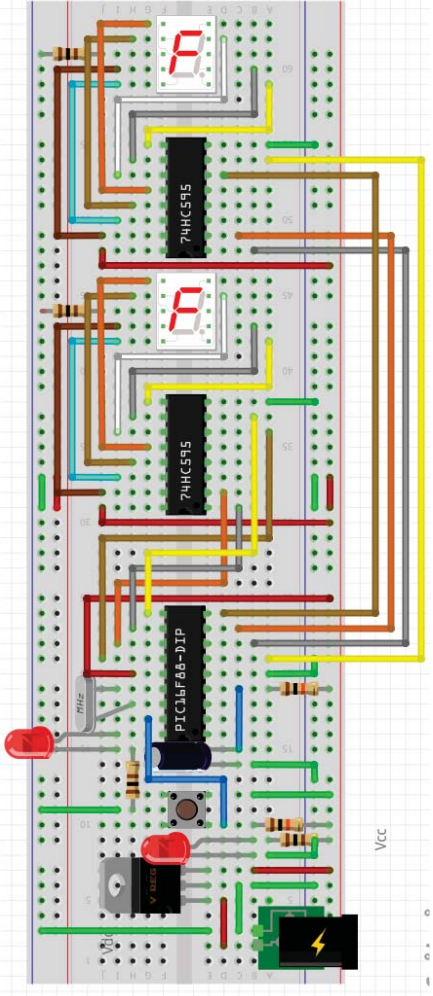


Common Cathode

Input B 16 VCC
Input C 15 Output f
Lamp Test 14 Output g
RB Output 13 Output a
RB Input 12 Output b
Input D 11 Output c
Input A 10 Output d
GND 9 Output e

Common Cathode

Input B 16 VCC
Input C 15 Output f
Lamp Test 14 Output g
RB Output 13 Output a
RB Input 12 Output b
Input D 11 Output c
Input A 10 Output d
GND 9 Output e



- Display decimal number of 2 digits on 7 segments

symbol	Binary	Will display
45	0010 1101	2 D

- So we need to use 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
-----	-----------

```

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 shirt of tens
// combine them again
// write data to port B
// switch status of port RA1
// delay
}
}

```

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

9

```

// 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);
}
}

```

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

11

```

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;
}
}
}

```

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

10

```

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

```

```

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;}
}
}
}
}

```

Dr. Ahmed ElShafee, ACU Spring 2014, Information Security

11

```

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),...