

USING TIMERS

IN PIC - 'C'



PIC-Timers Modules



❖ TIMER-0

❖ TIMER-1

❖ TIMER-2



The "Timer0" Module Features:



- 8-bit timer/counter
- Readable and writable
- 8-bit software programmable prescaler
- Internal (4 Mhz) or external clock select
- Interrupt on overflow from FFh to 00h
- Edge select (rising or falling) for external clock

Prescaler – Frequency Divider:

We can use Prescaler for further division of the system clock.

The options are:

- ✓ 1:2 Prescaler
- √ 1:4
- √ 1:8
- √ 1:16
- √ 1:32
- √ 1:64
- ✓ 1:128
- √ 1:256



"OPTION" Register & Initialization:



OPTION_REG REGISTER

RAV-1	RM41	RAV-1	RAV-1	R/W-1	R/W-1	R/W-1	RM-1
RBPU	INTEDG	TOCS	T0SE	PSA	PS2	PS1	PS0
it 7	INTEDO	1000	TOOL	1.90	1.02	1.01	, J

- PSA=0; // Prescaler is assigned to the Timer0 module
- PS0=1; // Prescaler rate bits
- •PS1=1; // are set to "111"
- •PS2=1; // which means divide by 256
- TOSE=0; // rising edge
- •TOCS=0; // Internal instruction cycle clock

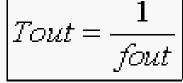


Timer Calculation:



If using INTERNAL crystal as clock, the division is performed as follow:

$$fout = \frac{fclk}{4 * Prescaler * (256 - TMR0) * Count}$$
 where $Tout = \frac{1}{fout}$





Timer Calculation:



Sample calculation for EXTERNAL crystal as clock source :

$$fout = \frac{fclk}{\text{Prescaler}*(256 - TMR0)*Count} = \frac{100kHz}{256*(256 - 0)*8} = 0.19Hz$$

$$Tout = \frac{1}{fout} = \frac{1}{0.19} = 5.243 \,\text{sec}$$

fout = 0.19 Hz (Output frequency) \rightarrow Tout = 5.243 sec (Pelay on the output)



Timer0 Example: "C" Code.



```
1
    #include<pic.h>
    int Count=0;
    void main (void)
5 F (
      TMRO=0;
                           //TMRO initiation
6
      TOCS=0:
                           //Choosing to work with internal CLK
7
                           //Reacting on Low2High edge
      TOSE=0:
8
                            //Choosing to work with a Prescaler
9
     PSA=D:
     PSO=1;
10
                            //Prescaler value divides in 256
     PS1=1:
11
      PS2=1:
12
      while (1)
13
14 -
        while (!TOIF);
                           //Stays here 256 times and then TOIF=1
15
       TOIF=0;
                           //Reseting the Overflow Flag
16
        Count++;
                           //Incresing by 1
17
        if (Count==15)
18
19 🗏
          Count "0;
                             /When Count reaches 15 - Reseting to 0
20
21
22
23
```

QUERIES??





12/2 RVM Complex, Near PSG Arts, Avinashi Road, SITRA, Coimbatore – 14

www.manfreetechnologies.com | info@manfreetechnologies.com | 9944766990 | 9751509702

