[1]RB0 INT

- RB0, must be initialized for input.
- The interrupt source must be set to take place either on the falling or the rising edge of the signal.[using option reg]
- (INTF in the INTCON Register) must be initially cleared
- INTE & GIE bit in the INTCON Register must be enables

OPTION_REG REGISTER (ADDRESS 81h, 181h)

R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1
RBPU	INTEDG	T0CS	T0SE	PSA	PS2	PS1	PS0
bit 7							bit 0

INTCON REGISTER (ADDRESS 0Bh, 8Bh, 10Bh, 18Bh)

R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-x
GIE	PEIE	TMR0IE	INTE	RBIE	TMR0IF	INTF	RBIF
bit 7							bit 0

[2]Port-B Bits 4-7 Status Change Interrupt

- Port-B lines4-7 must be initialized for input
- The interrupt source must be set to take place either on the falling or the rising edge of the signal.[in option REG]
- pull-ups on port-B should be disabled in the OPTION register.
- (RBIF in the INTCON Register) must be initially cleared.
- GIE & RBIE bit in the INTCON Register must be enabled

OPTION_REG REGISTER (ADDRESS 81h, 181h)

R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1	R/W-1
RBPU	INTEDG	T0CS	T0SE	PSA	PS2	PS1	PS0
bit 7							bit 0

INTCON REGISTER (ADDRESS 0Bh, 8Bh, 10Bh, 18Bh)

R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-x
GIE	PEIE	TMR0IE	INTE	RBIE	TMR0IF	INTF	RBIF
bit 7							bit 0

TMR0 interrupt

- clrwdt
- GIE & T0IE must be enabled in INTCON reg
- Instruction cycle is selected using **T0CS in Option Reg**
- PSA is assigned to TMR0
- Initial value is put in TMR0 Reg
- Prescaler is chosed

[3]ADC

ADRESH - Result High Register ADRESL - Result Low Register

1. Configure the PIC I/O lines to be used in the conversion. All analog lines are initialized as input in the corresponding TRIS registers.

2. Select the ports to be used in the conversion by setting the PCFGx bits in the ADCON1 register. Selects right- or left-justification.

3. Select the analog channels, select the A/D conversion clock, and enable the A/D module.

4. Wait the acquisition time.

5. Initiate the conversion by setting the GO/DONE bit in the ADCON0 register.

6. Wait for the conversion to complete.

7. Read and From the above two regs.

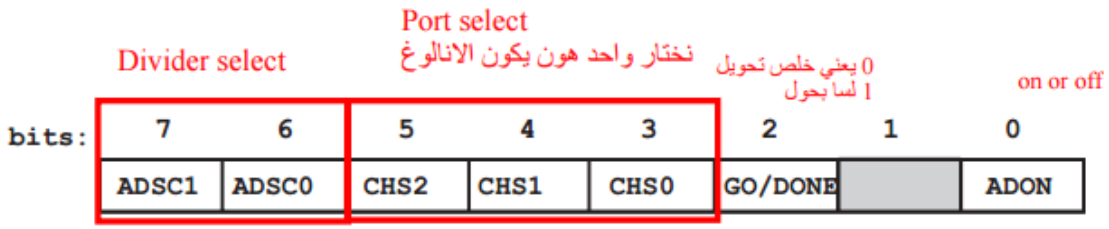


Figure 1: ADCON0

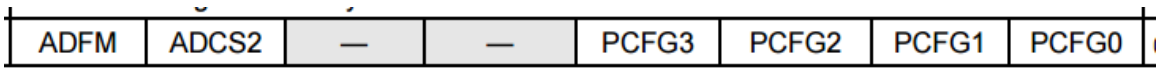


Figure 2: ADCON1

[4]Capture Module

Note that is has CCP1CON(for configuration), (CCPR1L and CCPR1H)(for data)

To capture either two consecutive rising or falling edges and calculate their difference in order to measure the period.

1. CCP1(RC2) pin: Configured for input.
2. Timerl: 16-bit operation, use instruction cycle clock as clock source, prescaler set to 1
3. Capture on every rising edge. Write the value 0x05 into the CCPICON,
4. Disable the CCPl interrupt. Clear the CCP1iE bit of the PIE1 register.
5. Wait until CCP1IF is enabled inside PR1 Register

CCP1CON REGISTER/CCP2CON REGISTER (ADDRESS 17h/1Dh)

U-0	U-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0
—	—	CCPxX	CCPxY	CCPxM3	CCPxM2	CCPxM1	CCPxM0
bit 7							bit 0

Figure 3:Step3

U-0	U-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0	R/W-0
—	—	T1CKPS1	T1CKPS0	T1OSCEN	T1SYNC	TMR1CS	TMR1ON
bit 7							bit 0

Figure 4: Enable the timer1 (T1Con)

[5]Compare Mode

The C language version of the program is as follows:

```
#include <p18F8720.h>
void main (void)
{
        TRISCbits.TRISC2 = 0;                   /* configure CCP1 pin for output */
        T3CON = 0xC9;                           /* turn on TMR3 in 16-bit mode, prescaler is 1 */
        CCP1CON = 0x09;                         /* configure CCP1 pin to set high initially but pull low on match*/
        CCPR1 = TMR3 + 0x0640;                  /* start CCP1 compare with delay equals 1600*/
        PIR1bits.CCP1IF = 0;                    /* clear CCP1IF flag */
        while (1) {
                while (!(PIR1bits.CCP1IF));
                PIR1bits.CCP1IF = 0;
                CCP1CON = 0x08;
                CCPR1 += 0x0960;                /* start CCP1 compare with delay equals 2400*/
                while (!(PIR1bits.CCP1IF));
                PIR1bits.CCP1IF = 0;
                CCP1CON = 0x09;
                CCPR1 += 0x0640;                /* start CCP1 compare with delay equals 1600*/
        }
}
```

[6]The PWM period can be calculated using the following formula:

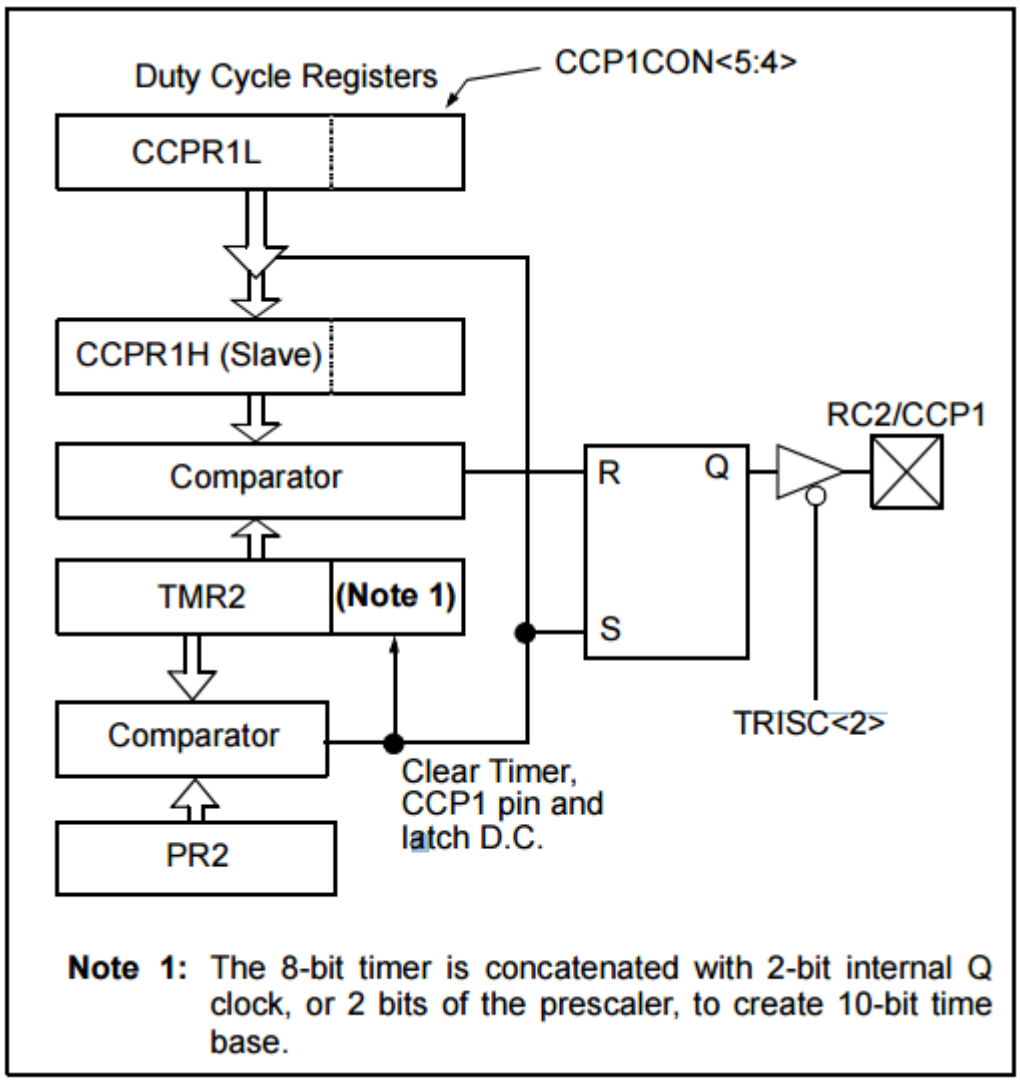
PWM period =[(PR2)+ 1] x 4 x Tosc x (TMRy prescale factor)

The PWM duty cycle can be calculated using the following formula:

PWM duty cycle= (CCPRxL:CCPxCON<5:4>) x Tosc x (TMRy prescale factor)

The following steps should be taken when configuring the CCP module for PWM operation:

1. Set the PWM period by writing to the PR2
2. Set the PWM duty cycle by writing to the CCPR1L register and CCP1CON<5:4> bits.
3. Make the CCP1(RC2) pin an output.
4. Set the TMR2 prescaler value and enable TMR2 by writing to T2CON register.
5. Configure the CCP1CON module for PWM operation.



Note 1: The 8-bit timer is concatenated with 2-bit internal Q clock, or 2 bits of the prescaler, to create 10-bit time base.