

```
Define CONF_WORD = 0x2118 'Internal Oscillator'
```

```
'-----
' URM37 Ultrasonic Test written by paul swingewood
' September 2010 - PIC 16F648A
'-----
```

```
' Define SIMULATION_WAITMS_VALUE = 2
```

```
All Digital
```

```
Define LCD_BITS = 4
Define LCD_DREG = PORTB
Define LCD_DBIT = 4 'Use the high order bits'
Define LCD_RSREG = PORTA
Define LCD_RSBIT = 2
Define LCD_EREG = PORTA
Define LCD_EBIT = 0
Define LCD_RWREG = PORTA
Define LCD_RWBIT = 1
Define LCD_READ_BUSY_FLAG = 1
```

```
Define LCD_COMMANDUS = 5000 'delay after LCDCMDOUT, default value is 5000
Define LCD_DATAUS = 100 'delay after LCDOUT, default value is 100
Define LCD_INITMS = 20
```

```
Define SEROUT_DELAYUS = 5000
```

```
Config RB0 = Input
Config RB1 = Input
Config RB2 = Input
Config RB3 = Input
```

```
Config RA3 = Output 'Data to URM37'
Config RA4 = Input 'Data from URM37'
Config RA5 = Output 'Toggle Pin 7 to enable sensor?'
```

```
Dim temperature As Byte
Dim dataout As Word
Dim datain As Word
```

```
startup:
Lcdinit LcdCurBlink
Lcdcmdout LcdClear
Waitms 20
```

```
start:
    Gosub setcommand
    Gosub sendcommand
    Gosub readserial
    Gosub calculatetemp
    Gosub displaydata
    Waitms 1000
```

```
Goto start
```

```
'--- sub routines ---
```

```
End
```

```
setcommand:
```

```
'Temperature - command = 11 high = 0 low = 0'
dataout = 11
Return
```

```
sendcommand:
```

```
'serial setting of port rate: 9600; parity: none; stop Bit: 1'
Serout PORTA.3, 9600, dataout
Return
```

```
readserial:
```

```
'serial setting of port rate: 9600; parity: none; stop Bit: 1'
Serin PORTA.4, 9600, datain
Return
```

```
displaydata:
```

```
Lcdcmdout LcdClear
Lcdcmdout LcdLine1Pos(1)
Lcdout "Data = ", #datain
Lcdcmdout LcdLine2Pos(1)
Lcdout "Temp = ", #temperature
Return
```

```
cal cul atetemp:  
If datain.HB >= 0xf0 Then  
    temperature = ((datain.HB - 0xf0) * 256 - datain.LB) / 10  
Else  
    temperature = ((datain.HB) * 256 - datain.LB) / 10  
Endi f  
Return
```