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' URM37 Ultrasonic Test written by paul swingewood
' September 2010 - PIC 16F628A
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' 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 command As Byte
Dim highbyte As Byte
Dim lowbyte As Byte
Dim sum As Byte
Dim temperature As Byte

startup:
Lcdinit LcdCurBlink
Lcdcmdout LcdClear
Waitms 20

start:
    Gosub setcommand
    sum = command + highbyte + lowbyte
    Gosub sendcommand
    Gosub readserial
    Gosub calculatetemp
    Gosub displaydata
    Waitms 1000
Goto start
'--- sub routines ---
End
setcommand:
'Temperature - command = 11 high = 0 low = 0'
command = 11
highbyte = 0
lowbyte = 0
Return

sendcommand:
'serial setting of port rate: 9600; parity: none; stop Bit: 1'
Serout PORTA.3, 9600, command, highbyte, lowbyte, sum

Return

readserial:
'serial setting of port rate: 9600; parity: none; stop Bit: 1'
Serin PORTA.4, 9600, command, highbyte, lowbyte, sum
Waitms 500
Return

displaydata:

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Ldcmdout LcdClear
Ldcmdout LcdLine1Pos(1)
Lcdout command, highbyte, lowbyte, sum
Ldcmdout LcdLine2Pos(1)
Lcdout temperature, "degrees"

Return

calculatetemp:
If highbyte >= 0xf0 Then
    temperature = ((highbyte - 0xf0) * 256 - lowbyte) / 10
Else
    temperature = ((highbyte) * 256 - lowbyte) / 10
Endif
Return
```