APENDIX A

SIMULATION CODE
$regfile = "m16def.dat"
$crystal = 4000000
$hwstack = 40
$swstack = 16
$baud = 19200
$framesize = 26

'------------------------------------------------------

Dim D As Single
Dim M As Single
Dim C As Single
Dim L As String * 7
Dim Haz As Byte
Dim I As Byte
Dim Si As String * 7
Dim B As String * 7
Dim E As String * 7
Dim Di As Single

'------------------------------------------------------

'speed
Dim L0 As Byte
Dim L1 As Byte
Dim L2 As Byte
Dim L3 As Byte
Dim Med0 As Byte
Dim Med1 As Byte
Dim Med2 As Byte
Dim Med3 As Byte
Dim Med4 As Byte
Dim Med5 As Byte
Dim V0 As Byte
Dim V1 As Byte
Dim V2 As Byte
Dim V3 As Byte
Dim Vs0 As Byte
Dim Vs1 As Byte
Dim Vs2 As Byte
Dim S0 As Byte
Dim S1 As Byte
Dim S2 As Byte
Dim Me0 As Byte
Dim Me1 As Byte
Dim Me2 As Byte
Dim Hi0 As Byte
Dim Hi1 As Byte
Dim Hi2 As Byte
'-------------------------
Dim Z As Byte
Dim N As Byte
'-------------------------

Config Lcd = 16 * 4
'-------------------

Config Lcdpin = Pin, Db4 = Portc.4, Db5 = Portc.5, Db6 = Portc.6, Db7 = Portc.7, E = Portc.0, Rs = Portc.1
'-----------------------------------

Config Timer0 = Counter, Edge = Falling, Prescale = 1
Config Timer1 = Pwm, Pwm = 8, Compare A Pwm = Clear Down, Compare B Pwm = Clear Down, Prescale = 1024

'Config Timer1 = Pwm, Pwm = 8, Compare B Pwm = Clear Down, Prescale = 1024
'-----------------------------------

Config Portb = Input
Config Porta = Input
Config Portd = Output
'-----------------------------------

Z = 10
'-----------------------------------

'dis:
Vs0 = 0
Vs1 = 1
Vs2 = 2
S0 = 3
S1 = 4
S2 = 5
Me0 = 6
Me1 = 7
Hi0 = 8
Hi1 = 9
Hi2 = 10

'speed:
L0 = 0
L1 = 10
L2 = 20
L3 = 30

Med0 = 40
Med1 = 60
Med2 = 70
Med3 = 80
Med4 = 90
V0 = 100
V1 = 150
V2 = 200
V3 = 255

Programa:
C = Counter0
M = 1 / 1000
C = C * 1.08
C = C * M
C = C / 2
C = C * 340
Di = C * 100

If Pina.0 = 0 Then
Cls
Stop Counter0
Locate 1 , 1
Lcd " stop checking "
Locate 2 , 2
Lcd "num of pulse " ; Counter0 ;
Locate 3 , 3
Lcd "Distance"
Locate 4 , 4
Lcd Di
Counter0 = 0
Cursor Off

'------------------------------------------------------

Elseif Pina.0 = 1 Then
Cls
Start Counter0
'Locate 1, 1
'Lcd "start checking"
Locate 2, 2
'Lcd "num of pulse " ; Counter0 ;
'Locate 3, 3
Lcd "distance,pl=" ; Counter0;

Locate 3, 3
Lcd Di
If Counter0 = 10 Then
Stop Counter0
End If
End If

Cursor Off
If Pina.4 = 0 Then

Pwm1a = 0
Pwm1b = 0
Portd.0 = 0
Portd.1 = 0
Portd.6 = 0
Portd.7 = 0

Else

Z = Pwm1a

End If

Locate 4, 4
Lcd "speed= " ; Pwm1a

End If

If Counter0 >= Vs0 And Counter0 <= Vs2 And Z >= L0 And Z <= L3 Then

Portd.0 = 0
Portd.1 = 1
Pwm1b = 30
Portd.6 = 1
Portd.7 = 0
Pwm1a = 60
Ellof Counter0 >= Vs0 And Counter0 <= Vs2 And Z >= Med0 And Z <= Med4 Then
Portd.0 = 0
Portd.1 = 1
Pwm1b = 30
Portd.6 = 1
Portd.7 = 0
Pwm1a = 60

Ellof Counter0 >= Vs0 And Counter0 <= Vs2 And Z >= V0 And Z <= V3 Then
Portd.0 = 0
Portd.1 = 0
Pwm1b = 40
Portd.6 = 0
Portd.7 = 0
Pwm1a = 40
Locate 1, 1
Lcd "backward, right"

Elseif Counter0 >= S0 And Counter0 <= S2 And Z >= L0 And Z <= L3 Then
Portd.0 = 0
Portd.1 = 0
Pwm1b = 0

Portd.6 = 0
Portd.7 = 1
Pwm1a = 30

Locate 1, 1
Lcd "forward, stop"

Elseif Counter0 >= S0 And Counter0 <= S2 And Z >= Med0 And Z <= Med4 Then
Portd.0 = 1
Portd.1 = 0
Pwm1b = 30
Portd.6 = 1
Portd.7 = 0
Pwm1a = 30

Locate 1, 1
Lcd "backward,right"

Elseif Counter0 >= S0 And Counter0 <= S2 And Z >= V0 And Z <= V3 Then
    Portd.0 = 1
    Portd.1 = 0
    Pwm1b = 40

Locate 1, 1
Lcd "backward,right"

Elseif Counter0 >= Me0 And Counter0 <= Me1 And Z >= L0 And Z <= L3 Then
    Portd.0 = 0
    Portd.1 = 0
    Pwm1b = 0
Portd.6 = 1
Portd.7 = 0
Pwm1a = 100
Locate 1, 1
Lcd "forward, stop"

Elseif Counter0 >= Me0 And Counter0 <= Me1 And Z >= Med0 And Z <= Med4 Then
Portd.0 = 0
Portd.1 = 0
Pwm1b = 0

Portd.6 = 0
Portd.7 = 1
Pwm1a = 60
Locate 1, 1
Lcd "forward, stop"

Elseif Counter0 >= Me0 And Counter0 <= Me1 And Z >= V0 And Z <= V3 Then
Portd.0 = 0
Portd.1 = 1
Pwm1b = 0
Portd.6 = 1
Portd.7 = 0
Pwm1a = 60
Locate 1, 1
Lcd "backward, left"

Elseif Counter0 >= Hi0 And Counter0 <= Hi1 And Z >= L0 And Z <= L3 Then
Portd.0 = 0
Portd.1 = 0
Pwm1b = 0

Portd.6 = 1
Portd.7 = 0
Pwm1a = 200
Locate 1, 1
Lcd "go fast, stop"

Elseif Counter0 >= Hi0 And Counter0 <= Hi1 And Z >= Med0 And Z <= Med4 Then
Portd.0 = 0
Portd.1 = 0
Pwm1b = 0
Portd.6 = 1
Portd.7 = 0
Pwm1a = 200
Locate 1, 1
Lcd "gofast2, stop "

Elseif Counter0 >= Hi0 And Counter0 <= Hi1 And Z >= V0 And Z <= V3 Then
Portd.0 = 0
Portd.1 = 0
Pwm1b = 0

Portd.6 = 1
Portd.7 = 0
Pwm1a = 255
Locate 1, 1
Lcd "gofast3, stop "

End If
Goto L
L:
Return
Goto Programa
End

'end program