

PERFECT STEERING PIC CODE

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TRISB = %10000011          'B0, B1, and B7 as inputs
TRISA = %00000             'Defines all A ports as outputs
'=====
'Define Ports
key_serial  Var  PORTB.0          'keypad serial interface input
key_valid   Var  PORTB.1          'keypad serial interface valid line
dc_mtr      Var  PORTB.2          'DC motor PWM output
step_pulse  Var  PORTB.4          'pulse output to stepper driver
step_dir    Var  PORTB.5          'stepper direction (CW or CCW)
full_half   Var  PORTB.6          'Full(7.5 deg, low) or half(3.75 deg, high)
limit       Var  PortB.7          'limit switch input
'=====
'Define Variables
key_value   Var  BYTE            'code byte from keypad
step_pos    Var  BYTE
new_step_pos Var  BYTE
step_period Var  BYTE
reset       Var  BYTE
speed      Var  WORD            'motor speed as dependant on position
I          Var  WORD
pauseL     Var  WORD
on_time    Var  WORD            'PWM duty cycle on time
off_time   Var  WORD            'PWM duty cycle off time
T          Var  WORD
'=====
'Define constants
max_speed   Con  9
CW          Con  0
CCW         Con  1
key_mode    Con  0              '2400 baud rate for serial connection
key_1       Con  $30            'Hexidecimal codes for keys on keypad
key_2       Con  $31
key_3       Con  $32
key_4       Con  $34
key_5       Con  $35
key_6       Con  $36
key_7       Con  $38
key_8       Con  $39
key_9       Con  $41
key_0       Con  $44
key_star    Con  $43
key_pound   Con  $45

'Define Initial Conditions
Low dc_mtr
T=1800          'DC PWM period is set to 1800 microseconds
speed=4
reset=5
Low step_pulse
Pause 10
High step_pulse
step_pos=0
step_period=10
Low full_half
Goto welcome
'=====
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regular:
    pauseL=1000
    Gosub pause_run
    lcdout $FE, 1,"1 = 7.5 deg LEFT"
    lcdout $FE, $C0,"2 = 7.5 deg RIGHT"

regular_wait:
pauseL=100
Gosub pause_run
While (key_valid=0)
    SERIN key_serial, key_mode, key_value
    Goto regular_loop
Wend
While (limit=1)
    Gosub limit_loop
Wend
Goto regular_wait

regular_loop:
If (key_value==key_1) Then
    rpm=6000
    position=position-8
    new_step_pos=step_pos-1
    Gosub pause_run
    Gosub move
Endif
If (key_value==key_2) Then
    rpm=6000
    position=position+8
    new_step_pos=step_pos+1
    Gosub pause_run
    Gosub move
Endif
If (key_value==key_pound) Then
    lcdout $FE, 1,"Now in Perfect"
    ' lcdout $FE, $C0, "Steering Mode"
    pauseL=1000
    Gosub pause_run
    Goto perfect
Endif
If (key_value==key_0) Then
    Low dc_mtr
    Goto initial
Endif
pauseL=100
Gosub pause_run
Goto regular_wait

'=====

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perfect:
    pauseL=1000
    Gosub pause_run
    lcdout $FE, 1,"1=7.5 deg LEFT"
    lcdout $FE, $C0,"2=7.5 deg RIGHT"

perfect_wait:
pauseL=100
Gosub pause_run
While (key_valid=0)
    SERIN key_serial, key_mode, key_value
    Goto perfect_loop
Wend
While (limit=1)
    Gosub limit_loop
Wend
Goto perfect_wait

perfect_loop:
If (key_value==key_1) Then
    new_step_pos=step_pos-1
    speed=speed-1
    Gosub move
    Gosub pause_run
    Goto perfect
Endif
If (key_value==key_2) Then
    new_step_pos=step_pos+1
    speed=speed+1
    Gosub move
    Gosub pause_run
    Goto perfect
Endif
If (key_value==key_pound) Then
    lcdout $FE, 1,"Now in Regular"
    ' lcdout $FE, $C0, "Steering Mode"
    pauseL=1000
    Gosub pause_run
    Goto regular
Endif
pauseL=100
Gosub pause_run
Goto perfect_wait
' =====
```

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welcome:
    Pause 1000
    lcdout $FE, 1, "Welcome to"           'Displays welcome screen for
    lcdout $FE, $C0, "PERFECT STEERING"  '3 seconds
    Pause 3000

initial:
    lcdout $FE, 1, "Press * for"         'waits for user to send
    lcdout $FE, $C0, "initial speed"     'default initial speed
initial_loop:
SERIN key_serial, key_mode, key_value
    If (key_value==key_star) Then
        pauseL=100
        Gosub pause_run
    Else
        Goto initial_loop
    Endif
Goto decision

decision:
    lcdout $FE, 1, "Perfect: 1"
    lcdout $FE, $C0, "Regular:2"
decision_wait:
pauseL=100
Gosub pause_run
While (key_valid=0)
    SERIN key_serial, key_mode, key_value
Wend
Goto decision_wait

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limit_loop:
Low dc_mtr
speed=0
If (step_pos<0) Then
    step_dir=CW
    For I=1 to reset
        Gosub step_motor
    Next
Endif
If (step_pos>0) Then
    step_dir=CCW
    For I=1 to reset
        Gosub step_motor
    Next
Endif
Goto initial

move:
If (new_step_pos>step_pos) Then
    step_dir=CW
Else
    step_dir=CCW
Endif
step_pos=new_step_pos
Gosub step_motor
return

step_motor:
    Low step_pulse
        PauseL=100
        Gosub pause_run
    High step_pulse
return

run:
    on_time=T/2/max_speed*speed+T/3
    off_time=T-on_time
    High dc_mtr
    Pauseus on_time
    Low dc_mtr
    Pauseus off_time
return

pause_run:
    For I=1 to pauseL
        Gosub run
    Next
Return

```