

'-----Title-----'

' File.....4331_encdr4_wo.pbp
' Started....1/10/10

' Microcontroller Used: Microchip Technology 18F4331
' Available at:
' <http://www.microchipdirect.com/ProductDetails.aspx?Category=PIC18F4331>
' or <http://www.digikey.com/>
' Motor Controller Used: Xavien 2 Motor Driver "XDDCMD-1
' Available at: http://encodergeek.com/Xavien_Amplifier.html
' Motor and Encoder Used: Small Motor with Quadrature Incremental Encoder
' Available at: http://encodergeek.com/DCMtr_SMALL.html
'
' PicBasic Pro Code: micro-Engineering Labs, Inc.
' melabs.com

'-----Program Description-----'

' Program ramps up the motor power to full power and
' then slows the motor down as it approaches target position
' (Diff = 0). If the starting position is close to the target,
' the motor will ramp-up then ramp-down power without
' necessarily reaching full power.
' This program is comment free.

```
DEFINE LCD_DREG PORTD
DEFINE LCD_DBIT 4
DEFINE LCD_BITS 4
DEFINE LCD_RSREG PORTE
DEFINE LCD_RSBIT 0
DEFINE LCD_EREG PORTE
DEFINE LCD_EBIT 1
DEFINE LCD_LINES 2
DEFINE LCD_COMMANDUS 2000
DEFINE LCD_DATAUS 50
DEFINE ADC_BITS 8
DEFINE ADC_CLOCK 3
DEFINE ADC_SAMPLEUS 50
DEFINE CCP2_REG PORTC
DEFINE CCP2_BIT 1
```

'-----Variables-----'

```
target          VAR WORD
mot_pwr         VAR WORD
position        VAR WORD
diff            VAR WORD
diff_start      VAR WORD
```

'-----Initialization-----'

```
CCP1CON = %00111111
ANSEL0 = %00000000
```

```
ANSEL1 = %00000000
TRISA = %00011111
LATA = %00000000
TRISB = %00000000
TRISC = %00000000
QEICON = %10001000
PORTC.0 = 1
PORTC.1 = 0
```

'-----Main Code-----'

```
PAUSE 500
PORTC.0 = 0
target = 32000
```

```
POSCNTH = 127
POSCNTL = 0
```

```
GOSUB choose_ramp_up
```

loop:

```
GOSUB set_motor_direction
GOSUB full_pwr_and_ramp_down
GOTO loop
END
```

choose_ramp_up:

```
position = 256 * POSCNTH + POSCNTL
IF target >= position THEN
diff_start = target - position
ELSE
diff_start = position - target
ENDIF

IF diff_start >= 360 THEN
GOSUB full_ramp_up
ELSE
GOSUB short_ramp_up
ENDIF
RETURN
```

full_ramp_up:

```
GOSUB set_motor_direction
GOSUB calculate_diff
mot_pwr = (diff_start - diff) + 75

IF mot_pwr < 255 THEN
GOSUB lcd

GOTO full_ramp_up
ELSE
mot_pwr = 255
```

```
        GOSUB lcd
    ENDF
    RETURN
```

short_ramp_up:

```
    GOSUB set_motor_direction
    GOSUB calculate_diff
    mot_pwr = (diff_start - diff) + 75

    IF (diff_start)/2 <= diff THEN

        GOSUB lcd

        GOTO short_ramp_up
    ELSE
    ENDF
    RETURN
```

set_motor_direction:

```
    position = 256 * POSCNTH + POSCNTL
    IF target < position THEN
    PORTC.3 = 1
    ELSE
    PORTC.3 = 0
    ENDF
    RETURN
```

full_pwr_and_ramp_down:

```
    GOSUB calculate_diff
    SELECT CASE diff
        CASE IS = 0
            PORTC.0 = 1
            GOSUB lcd
        CASE IS > 180
            PORTC.0 = 0
            mot_pwr = 255
            GOSUB lcd
        CASE IS <= 180
            PORTC.0 = 0
            mot_pwr = diff + 75
            GOSUB lcd
    END SELECT
    RETURN
```

calculate_diff:

```
    position = 256 * POSCNTH + POSCNTL
    IF target >= position THEN
    diff = target - position
    ELSE
    diff = position - target
    ENDF
```

RETURN

lcd:

```
HPWM 2, mot_pwr, 20000
LCDOUT $FE, $80, "Pwr=",DEC3 mot_pwr," Df=",DEC5 diff
LCDOUT $FE, $C0, "T=",DEC5 target," Ps=", DEC5 position
RETURN
```