

```
'-----Title-----
' File.....16F877A_pwm1.pbp
' Started....4/25/06
' Microcontroller used:  Microchip Technology 16F877A
'                          microchip.com
' PicBasic Pro Code:  micro-Engineering Labs, Inc.
'                          melabs.com

'-----Program Description-----
' 16F877A_pwm1.pbp drives a dc motor at different speeds

'-----Schematic-----
' See schematic at:
' http://www.cornerstonerobotics.org/schematics/pic16f877a\_pwm1.pdf

'-----Related Lesson-----
' pwm1.pbp (the 16F88 program) is used in
' the lesson MOTOR CONTROL WITH PWM at:
' http://www.cornerstonerobotics.org/curriculum/lessons\_year2/erii21\_motor\_control\_pwm.pdf

'-----Comments-----
' Rather than reducing the voltage to a motor through
' a potentiometer for example, PWM cuts the time a
' motor receives voltage by turning pulses on and off
' very quickly. This pulse can feed a transistor switch
' which then drives the motor at different speeds.

'-----New PicBasic Pro Commands-----
' The PicBasic Pro Compiler Manual is on line at:
' http://www.microengineeringlabs.com/resources/index.htm#Manuals
'
' PWM Pin, Duty, Cycle
'
' Pin is the output pin for the pulse.
' Duty adjusts the amount of time the pulse is on and off.
' Duty ranges from 0 (0% on time and 100% off time)
' to 255 (100% on time and 0% off time).
' Look around page 122 in the PicBasic Pro Compiler Manual
' The Jameco motors that we tested would not turn with
' duty values less than 140 (a 55% duty cycle). See the
' Jameco gear head motor charts listed in the table.
' Cycle is the number of cycles the pulse is sent.

'-----Revision History-----
' 11/25/08 Convert from PIC16F84A to PIC16F88,
'          add PIC16F88 oscillator and ANSEL = 0 initializations.
' 1/3/09  Change MCU from 16F88 to 16F877A
```

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

```
ADCON1 = %00000110  ' Changes PORTE and PORTA analog bits to
                    ' digital operation since not using ADC
                    ' (Analog to Digital Converter)
```

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

loop:

```
PWM 0,255,200      ' Pulse sent to PORTB.0 at a duty
                    ' value of 255(100% duty cycle) for
                    ' 200 cycles. At 4MHz, each cycle
                    ' is about 5 ms long, so the total
                    ' time for 200 cycles is:
                    ' Total Time = 200*5 ms = 1000 ms or 1 sec.
```

```
PWM 0,190,200     ' Pulse sent to PORTB.0 at a duty
                    ' value of 190(75% duty cycle) for
                    ' 200 cycles. Motor rotational speed
                    ' approximately 50% of maximum rpm
                    ' for the Jameco motors used.
```

```
PWM 0,140,200    ' Pulse sent to PORTB.0 at a duty
                    ' value of 140(55% duty cycle) for
                    ' 200 cycles. Motor rotational speed
                    ' approximately 20-24% of maximum rpm
                    ' for the Jameco motors used.
```

```
GOTO loop         ' Jump to loop label and start all over
```

```
END
```