```
'--------------Title-------------

' File......serin2_pwm_wait.pbp
' Started....12/23/08
' Microcontroller used:  Microchip Technology PIC16F88
'                          microchip.com
' PicBasic Pro Code: micro-Engineering Labs, Inc.
'                      melabs.com

'--------Program Desciption--------

' Program uses SERIN2 command to receive command from
' the PC to control the rotational speed of a motor.

' ----Terminal Program Options-----

' HyperTerminal - 9600 baud 8N1, Flow control = None
'
' To download TeraTerm Pro 3.1.3, see:
' http://www.ayera.com/teraterm/download.cfm
' and download TeraTerm Pro Web 3.1.3.
'
' The terminal program must be the active window for this
' program to work.

'---------Related Sites----------

' See: http://www.melabs.com/resources/samples/pbp/ser2mod.bas

'----------Connections-----------

' 16F88 Pin      Function       Name Given       Wiring
'                                In Program
' --------  -----------      ---------     ---------
'
'   RB4                        PWMout       1K Resistor to Base
'                                           of 2N2222A transistor
'   RB2     Receiver Pin     PICSI        MAX232 Pin 9
'   RB5     Transmit Pin     PICSO        MAX232 Pin 10
'
' See the schematic for the PIC power and MCLR connections


' MAX232 Pin  Datasheet          Function and Wiring
'             Designation
' ---------   --------   ---------------------------------
'
'  Pin 7      T2OUT      Receive Data to Male RS232 DB9 Pin 2
'  Pin 8      R2IN       Transmit Data from Male RS232 DB9 Pin 3
'  Pin 9      R2OUT      Receive Data to PIC RB2
'  Pin 10     T2IN       Transmit Data from PIC RB5
'
' See schematic at:
' http://cornerstonerobotics.org/schematics/pic_programming_serin2_pwm.pdf
```

```
'-----------Revisions------------

' 9/21/10 Initiatize RB5 to HIGH

'---------Constants/Defines-------

    DEFINE OSC      8       ' Defines oscillator setting at 8 MHz.
                            ' For SEROUT2, an oscillator speed faster
                            ' than 4MHZ may be required for reliable
                            ' operation at 9600 baud and above.

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

    InputData   VAR   BYTE     ' Variable to receive input data
    PulseWidth  VAR   BYTE     ' Variable for pulse width
    MODE        VAR   WORD     ' WORD for MODE value
    pinin       VAR   PORTB.2  ' Names PORTB.2 name as pinin
    pinout      VAR   PORTB.5  ' Nmaes PORTB.5 name as pinout
    PWMout      VAR   PORTB.4  ' Names PORTB.4 as PWMout

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

    ANSEL = 0               ' Changes analog bits to digital.
                            ' See table below.

'   Analog Bit     Analog or Digital       PIC16F88 Pin
'   -----------    -----------------       -------------
'      AN0             Digital                 RA0
'      AN1             Digital                 RA1
'      AN2             Digital                 RA2
'      AN3             Digital                 RA3
'      AN4             Digital                 RA4
'      AN5             Digital                 RB6
'      AN6             Digital                 RB7


    OSCCON = $70            ' Sets the internal oscillator in the
                            ' 16F88 to 8 MHz

    TRISB = %11101111       ' Sets RB4 to output

    PORTB = %00100000       ' Sets PIC transmit pin RB5 to HIGH

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

    MODE = 84               ' Set RX/TX speed to 84 for 9600 baud
                            ' MODE = 188 (4800 baud)
                            ' MODE = 396 (2400 baud)
                            ' See appendix in manual for other
                            ' MODE examples.

    PulseWidth = 255        ' Set initial value for PulseWidth

' Instructions sent to terminal program
```

```
    SEROUT2 pinout, MODE, ["          Instructions:",10,13]
    SEROUT2 pinout, MODE, [" ",10,13]
    SEROUT2 pinout, MODE, ["After the bell tone from the computer speaker,
",10,13]
    SEROUT2 pinout, MODE, ["the program waits for you to type in the",10,
13]
    SEROUT2 pinout, MODE, ["letter a then a number between 0 and 255,",10,
13]
    SEROUT2 pinout, MODE, ["then hit the enter key.",10,13]
    SEROUT2 pinout, MODE, ["The number is assigned to the variable
InputData",10,13]

start:

    SEROUT2 pinout, MODE, [7]
                        ' Sends a bell tone to computer speakers.

    SERIN2 pinin,MODE,[WAIT("a"),DEC InputData]
                        ' Format:SERIN2 Pin,Mode,[Item1]
                        ' Pin = pinin,(RB2), Declared in variables
                        ' Mode = 84 (9600 baud rate)
                        ' [Item1] = [Modifier WAIT("a"), which
                        ' makes the program wait
                        ' for the letter a to be typed in, then
                        ' DEC InputData, the input data.
                        ' The Jameco motor that we used would
                        ' not turn with PWM Duty values less
                        ' than 170 (a 67% duty cycle).

    SEROUT2 pinout,MODE,[DEC InputData,10,13]
                        ' Format:  SEROUT2 Pin, Mode, [Item1]
                        ' Pin = pinout,(RB5), Declared in Variables
                        ' Mode = 84 (9600 baud rate)
                        ' [Item1] = [DEC InputData, 10, 13]
                        ' Transmits decimal value of InputData, 10
                        ' (the ASCII codes for line feed),
                        ' and 13 (the ASCII code for carriage return)
                        ' to the PC.

    PulseWidth = InputData
                        ' Set PulseWidth = InputData

    PWM PWMout,PulseWidth,1000
                        ' Format: PWM Pin,Duty,Cycle
                        ' Pin = PWMout,(RB4), Declared in variables
                        ' Duty = PulseWidth, a variable with
                        ' values between 0(0%) and 255(100%).
                        ' Cycle = 1000, PWM signal sent out RB4
                        ' for 1000 cycles, then the motor stops.


    GOTO start

END
```