

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

' File.....step\_mot\_hi\_torque.pbp  
' Started....2/13/09  
' Microcontroller Used: Microchip Technology 16F88  
' microchip.com  
' PicBasic Pro Code: micro-Engineering Labs, Inc.  
' melabs.com  
' Stepper Motor Used: Jameco #237623

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

' Program drives stepper motor with about 1.4 times the  
' torque as in step\_mot1.pbp.

'-----Schematic-----'

' Use the same schematic as step\_mor1.pbp. See schematic at:  
'  
' [http://www.cornerstonerobotics.org/schematics/pic\\_programming\\_step\\_mot1.pdf](http://www.cornerstonerobotics.org/schematics/pic_programming_step_mot1.pdf)

'-----Related Lesson-----'

' step\_mot\_hi\_torque.pbp is used in the lesson Stepper Motor Control with  
' a PIC at:  
' [http://www.cornerstonerobotics.org/curriculum/lessons\\_year2/erii\\_stepper\\_motor.pdf](http://www.cornerstonerobotics.org/curriculum/lessons_year2/erii_stepper_motor.pdf)  
' Lesson also includes a section on how to figure out how to hook  
' up a stepper motor with six leads when a data sheet for the  
' motor is unavailable.

'-----Comments-----'

' WITH THE PIC16F88, BE CERTAIN TO HAVE SEPARATE POWER  
' SOURCES FOR THE PIC AND THE STEPPER MOTOR. MAKE SURE  
' TO HAVE A COMMON GROUND BETWEEN THE PIC AND MOTOR.

'---PicBasic Pro Compiler Manual---

' The PicBasic Pro Compiler Manual is on line at:  
' <http://www.microengineeringlabs.com/resources/index.htm#Manuals>

'-----PIC Connections-----'

PIC16F88 Pin	Wiring
RB0	Stepper Motor Control Wire 1
RB1	Stepper Motor Control Wire 2
RB2	Stepper Motor Control Wire 3
RB3	Stepper Motor Control Wire 4
Vdd	+5 V
Vss	Ground
MCLR	4.7K Resistor to +5 V

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

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Delay   VAR   WORD   ' WORD for variable Delay

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

TRISB = %00000000   ' Sets all PortB pins to output

OSCCON = $60        ' Sets the internal oscillator in the
                   ' 16F88 to 4 MHz

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

Delay = 5           ' Sets Delay variable to 5(msec)
                   ' Delay changes the rotational speed
                   ' of the motor. Check for the minimum
                   ' Delay value of your motor.
                   '
                   '   Delay Value      Approx. No-load Current
                   '   -----
                   '   Jameco #237623 Stepper Motor
                   ' -----
                   '   20                1.43 A
                   '   10                1.13 A
                   '   6                 0.72 A
                   '   5                 0.60 A
                   '   4                 0.40 A
                   '   3                 0.19 A
                   '   2                Motor Stops Operating
                   '                   Properly

loop:

PORTB = 12          ' Equivalent to PORTB = %00001100
                   ' in binary. Makes pin RB3 and RB2 HIGH and
                   ' all other PORTB pins LOW. This sends a
                   ' HIGH signal to the NPN transistors
                   ' connected to pins RB3 & RB2. The NPN
                   ' transistors ground the ends of the coils
                   ' connected to them, activating those 2 coils.
                   ' All other coils are off.

PAUSE Delay        ' PAUSE in milli-seconds so
                   ' PAUSE Delay is a pause of 5(ms)

PORTB = 6           ' Equivalent to PORTB = %00000110
                   ' in binary. Makes pin RB2 and RB1 HIGH and
                   ' all other PORTB pins LOW. This sends a
                   ' HIGH signal to the NPN transistors
                   ' connected to pins RB2 & RB1. The NPN
                   ' transistors ground the ends of the coils
                   ' connected to them, activating those 2 coils.
                   ' All other coils are off.

PAUSE Delay

PORTB = 3           ' Equivalent to PORTB = %00000011
                   ' in binary. Makes pin RB1 and RB0 HIGH and
                   ' all other PORTB pins LOW. This sends a

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                                ' HIGH signal to the NPN transistors
                                ' connected to pins RB1 & RB0.
PAUSE Delay

PORTB = 9                       ' Equivalent to PORTB = %00001001
                                ' in binary. Makes pin RB3 and RB0 HIGH and
                                ' all other PORTB pins LOW. This sends a
                                ' HIGH signal to the NPN transistors
                                ' connected to pins RB3 & RB0.

PAUSE Delay

GOTO loop                       ' Start process over again

END
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