'----Title-----' File.....16F877A\_servo1.pbp ' Started....1/8/08 ' Microcontroller used: Microchip Technology 16F877A microchip.com ' PicBasic Pro Code: micro-Engineering Labs, Inc. melabs.com '-----Program Desciption-----' Basic servo program with the format for controlling ' servo pulses using PicBasic Pro PULSOUT command. ' Servo cycles between counterclockwise and ' clockwise positions. '-----Related Lesson-----' servol.pbp (the 16F88 program) is used in ' the lesson PIC PROGRAMMING 3 SERVOS at: ' http://cornerstonerobotics. org/curriculum/lessons\_year2/erii13\_pic\_programming3\_servos.pdf ' servol.pbp is also used in the lesson HACKING SERVOS at: ' http://www.cornerstonerobotics. org/curriculum/lessons\_year2/erii17\_hacking\_servos.pdf '-----Comments-----' WITH THE PIC16F877A, MAKE SURE TO HAVE SEPARATE POWER ' SUPPLIES FOR THE PIC AND THE SERVO. MAKE SURE TO ' HAVE A COMMON GROUND BETWEEN THE PIC AND SERVO. We use one 9V ' battery and two 78L05 voltage regulators. See ' discussion about voltage regulators at: ' http://cornerstonerobotics. org/curriculum/lessons year2/erii3 diodes power supplies voltage reg.pdf ' Also, initialize the state of PORTB, (PORTB = 0), as LOW ' since that will set the correct polarity of the ' PULSOUT statement. ' Discussion about basic servo pulse control may be found ' at www.seattlerobotics.org/guide/servos.html or ' www.geocities.com/hobby\_robotics/was.htm ' Servos may be modified or hacked to allow ' for continuous rotation so they can be used ' as motors on small robots. The book ' Amphibionics by Karl Williams gives an ' in depth treatment on how to modify servos. ' Also see Lesson 17 in the Year Two curriculum ' on the cornerstonerobotics.org web site. '----New PicBasic Pro Commands----

' The PicBasic Pro Compiler Manual is on line at: ' http://www.microengineeringlabs.com/resources/index.htm#Manuals ' PULSOUT pin, period ' This command sends a pulse to pin for the period defined. ' For example: Sends a pulse out on pin RBO for 2.0 ms. PULSOUT 0,200 The period,(200), is multiplied by the increment for a 4 MHz oscillator (10 us) to get a pulse out time of 2.0 ms. ' Look around page 121 in the PicBasic Pro Compiler Manual ' Another PBP command that may be substituted for PULSOUT ' is PAUSEUS. See: ' http://cornerstonerobotics.org/code/servo2.pdf '-----Revision History-----' 1/1/09 Change from 16F88 to 16F877A '-----PIC Connections-----' See schematic at: ' http://www.cornerstonerobotics.org/schematics/pic16f877a\_servo\_1\_2\_3.pdf PIC16F877A Pin Wiring 1 \_\_\_\_\_ \_\_\_\_\_ Servo Control Wire RB0 Vdd +5 V Vss Ground 4.7K Resistor to +5 V MCLR '-----Variables----i VAR BYTE ' BYTE for counter variable, i '-----Initialization-----PORTB = %0000000 ' Eqivalent to: PORTB = 0 ' Sets all PORTB pins to LOW(0 volts) ' Make certain to include this ' initialization as it sets the ' proper polarity of pulses in ' the PULSOUT command. ' To set just one pin such as RBO, to ' LOW, enter PORTB.0 = 0. '-----Main Code----start:

|                               | Counterclockwise position:<br>Send signal 40 times. To change the time<br>the servo remains in one position, change<br>from 40 to another value.                                     |
|-------------------------------|--|
|                               | Pulse Width:<br>Sends a pulse out on pin RB0 for 1.0 ms.<br>The period,(100), is multiplied by the<br>increment for a 4 MHz oscillator (10 us)<br>to get a pulse out time of 1.0 ms. |
|                               | Pulse Interval:<br>Pause 20 ms less pulse width (1.0 ms)<br>This equation keeps the period of<br>the servo pulse a constant 20 ms, HIGH<br>for 1 ms and LOW for 19 ms = 20 ms.       |
|                               | Go back to the FOR statement and do<br>next count  |
| <b>FOR</b> i = 1 <b>TO</b> 40 | Send clockwise signal 40 times   |
|                               | Pulse Width:<br>Sends a pulse out on pin RB0 for 2.0 ms.<br>The period,(200), is multiplied by the<br>increment for a 4 MHz oscillator (10 us)<br>to get a pulse out time of 2.0 ms. |
|                               | Pulse Interval:<br>Pause 20 ms less pulse width (2.0 ms)<br>This equation keeps the period of<br>the servo pulse a constant 20 ms, HIGH<br>for 2 ms and LOW for 18 ms = 20 ms.       |
|                               | Go back to the FOR statement and do<br>next count  |
| GOTO start                    | Makes the program run forever.   |

END