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

' File.....year3_mini_rov.pbp
' Started....2/18/13
' Microcontroller used:  Microchip Technology PIC16F88
'                        microchip.com
' PicBasic Pro Code: micro-Engineering Labs, Inc.
'                        melabs.com

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

' The program controls the thruster relays on the
' Cornerstone Robotics Year 3 Mini-ROV.
'
' If both PIC16F88 outputs to a thruster are HIGH,
' the thruster will not rotate.  If one output
' (say RB0) is HIGH and the other output (RB1)
' is LOW, the thruster will turn.  If RB0 is
' set LOW and RB1 is set HIGH, the thruster will
' turn in the opposite direction.  In the default
' position (the joystick in a neutral position),
' all PIC16F88 outputs (RB0 - RB3) to both
' thrusters are set HIGH, so the thrusters do
' not rotate.

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

      TRISB = %11110000      ' Set pins RB0-RB3 as outputs
                             ' and pins RB4-RB7 as inputs

      ANSEL = 0              ' Set Analog Select Register to
                             ' all digital I/O.

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

      PORTB = %00001111     ' With the joystick in the neutral
                             ' position (no switches are activated),
                             ' set pins RB0-RB3 to 1 (HIGH) and RB4-RB7
                             ' to 0 (LOW). HIGH to all of the thruster
                             ' outputs (RB0-RB3) turns the thrusters OFF.
                             ' A LOW to one of the thruster outputs
                             ' allows current to flow through the PNP
                             ' transistor which closes the relay which
                             ' turns the thruster ON. LOW to input
                             ' pins RB4-RB7 reflects that the input
                             ' switches are not activated.

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

start:

      IF PORTB.4 = 1 THEN GOTO forward      ' If the joystick is pushed
                                           ' forward, making pin RB4 go
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                                ' HIGH, the program jumps to
                                ' the "forward" label below.

IF PORTB.5 = 1 THEN GOTO backward
IF PORTB.6 = 1 THEN GOTO right
IF PORTB.7 = 1 THEN GOTO left
PORTB = %00001111           ' If the joystick switches are not
                             ' activated (RB4-RB7 = 0), all of
                             ' the thruster outputs are held
                             ' HIGH (RB0-RB3 = 1) which turns all
                             ' thrusters OFF.

PAUSE 5                     ' Wait 5 ms
GOTO start                  ' Program is directed back to the "start"
                             ' label.

END

forward:
    PORTB = %00011010       ' With RB0 set LOW and RB1 set HIGH, the
                             ' thruster connected to those pins will
                             ' rotate. Similarly, with RB2 set LOW and
                             ' RB3 set HIGH, the other thruster will
                             ' rotate. The input RB4 is set HIGH to
                             ' reflect the state of the switch
                             ' connected to RB4.

    PAUSE 5                 ' Wait 5 ms
    GOTO start

backward:
    PORTB = %00100101       ' Outputs reverse the direction of
                             ' the thruster rotation from
                             ' the forward direction.

    PAUSE 5
    GOTO start

right:
    PORTB = %01000110
    PAUSE 5
    GOTO start

left:
    PORTB = %10001001
    PAUSE 5
    GOTO start
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