

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

' File.....16F877A\_adc3.pbp  
' Started....1/7/08  
' Microcontroller used: Microchip Technology PIC16F877A  
' microchip.com  
' PicBasic Pro Code: micro-Engineering Labs, Inc.  
' melabs.com

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

' The program uses one of the analog-to-digital  
' converters,(AN4), to measure the voltage  
' on the center pin of a potentiometer (an analog signal).  
' It then converts the analog voltage into an 10-bit  
' digital value and displays the result as a  
' voltage (0-5V) on an LCD.

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

' See schematic at:  
' [http://www.cornerstonerobotics.org/schematics/pic16f877a\\_adc1.pdf](http://www.cornerstonerobotics.org/schematics/pic16f877a_adc1.pdf)

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

' adc3.pbp (the 16F88 program) is used in  
' the lesson Resistive Sensors at:  
' [http://www.cornerstonerobotics.org/curriculum/lessons\\_year2/erii23\\_resistive\\_sensors.pdf](http://www.cornerstonerobotics.org/curriculum/lessons_year2/erii23_resistive_sensors.pdf)

'-----Revisions-----

' 1/17/09: Change microcontroller from 16F88 to 16F877A

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

16F877A Pin	Wiring
RB4	LCD pin 11(DB4)
RB5	LCD pin 12(DB5)
RB6	LCD pin 13(DB6)
RB7	LCD pin 14(DB7)
RA0	Center Lead of Potentiometer
RA4	LCD Register Select(RS)
RB3	LCD Enable(E)

'-----LCD Connections-----

LCD Pin	Wiring
1	Ground(Vss)
2	+ 5v(Vdd)
3	Center of 20K Pot(Contrast)
4	RA4(Register Select,RS)
5	Ground(Read/Write,R/W)

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'          6          RB3(Enable)
'          7          No Connection(DB0)
'          8          No Connection(DB1)
'          9          No Connection(DB2)
'         10          No Connection(DB3)
'         11          RB4(DB4)
'         12          RB5(DB5)
'         13          RB6(DB6)
'         14          RB7(DB7)

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

' To free up AN0 (Pin RA0) for an analog input, the
' default four LCD Data Bits must be removed from RA0 - RA3.
' This is relocated to the upper 4 bits RB4 - RB7 in PORTB
' using the LCD DEFINE statements below. All other
' default LCD pins and functions are left unchanged.
' For details see:
' http://www.cornerstonerobotics.
org/curriculum/lessons_year2/eri116_lcd3_pot_command_and_lcd_defines.pdf
' or
' Look around page 97 in the PicBasic Pro Compiler Manual.
' The PicBasic Pro Compiler Manual is on line at:
' http://www.microengineeringlabs.com/resources/index.htm#Manuals

    DEFINE LCD_DREG    PORTB    ' PORTB - Data bit Port
    DEFINE LCD_DBIT    4        ' Set starting Data Bit to bit 4
    DEFINE ADC_BITS    10       ' Sets the number of bits in
                                ' the result to 10

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

    x          VAR WORD    ' WORD for potentiometer input
    temp_int   VAR WORD    ' Word for integer
    temp_fract VAR WORD    ' Word for fraction

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

    ADCON1 = %10000000    ' Right justifies 10-bit value of x
                          ' in 16-bit WORD. Adds "0" in the
                          ' 6 Most Significant bits of the Word,
                          ' shifting the 10-bit value of x to
                          ' the right. This changes the LCD
                          ' values to 0 - 1023.

' The ADCON1 Register is Register 11-2: ADCON1 Register,
' look around page 128 in the 16F877A datasheet.
' For Microchip PIC DATASHEETS, see:
' http://www.microchip.
com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=2046
' Select 8-bit PIC Microcontrollers, then the device from the
' drop down menu. Now download the 16F877A Datasheet.

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

    PAUSE 1000            ' Pause to allow LCD to setup
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start:

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ADCIN 0, x           ' Read analog voltage on AN0(RA0)
                    ' and stores it as x.

LCDOUT $FE,1,"POT =",DEC x
                    ' Clears LCD screen, displays
                    ' "POT =" and the 10-bit value of x

x = x * 49/10

temp_int = x/1000

temp_fract = x//1000

LCDOUT $FE,$c0,"Voltage = ",DEC temp_int, ".",DEC3 temp_fract

PAUSE 500           ' Pause 1/2 second

GOTO start          ' Go to loop label

END
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