

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

' File.....adc1.pbp
' Started....1/7/08
' Microcontroller used: Microchip Technology PIC16F88
' 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 8-bit
' digital value (0 to 255) and displays it on an LCD.

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

' See schematic at:
' http://www.cornerstonerobotics.org/schematics/pic_programming_adc1.pdf

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

' adc1.pbp is used in the lesson Resistive Sensors at:
' http://www.cornerstonerobotics.org/curriculum/lessons_year2/erii23_resistive_sensors.pdf

'-----New PicBasic Pro Commands-----

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

' ADCIN Channel,Variable
' Reads analog value into Channel (one of the AN inputs),
' converts the analog value to a digital value and
' stores the result in Variable.
' Look around page 45 in the PicBasic Pro Compiler Manual

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

16F88 Pin	Wiring
RA0	LCD pin 11(DB4)
RA1	LCD pin 12(DB5)
RA2	LCD pin 13(DB6)
RA3	LCD pin 14(DB7)
RA4	Center Lead of Potentiometer
RB4	LCD Register Select(RS)
RB3	LCD Enable(E)

' See schematic for the other usual PIC connections

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

LCD Pin	Wiring
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'          -----          -----
'          1              Ground(Vss)
'          2              + 5v(Vdd)
'          3              Center of 20K Pot(Contrast)
'          4              RB4(Register Select,RS)
'          5              Ground(Read/Write,R/W)
'          6              RB3(Enable)
'          7              No Connection(DB0)
'          8              No Connection(DB1)
'          9              No Connection(DB2)
'         10              No Connection(DB3)
'         11              RA0(DB4)
'         12              RA1(DB5)
'         13              RA2(DB6)
'         14              RA3(DB7)

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

' To free up AN4 (Pin RA4) for an analog input, the
' default LCD Register Select (RS) function must be
' removed from RA4. This is relocated to PORTB.4
' 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/erii16\_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_RSREG    PORTB    ' PORTB - RS port
    DEFINE LCD_RSBIT    4        ' Bit 4 - RS bit

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

    x VAR BYTE        ' Byte for potentiometer input

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

    ANSEL = %00010000    ' Leaves AN4 in analog mode, but
                        ' changes other 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              Analog              RA4
'          AN5              Digital              RB6
'          AN6              Digital              RB7

' For the ANSEL Register table, look at the

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' PIC16F88 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 16F88 Datasheet.
' The ANSEL Register is Register 12-1: ANSEL Register,
' look around page 113 in the 16F88 datasheet.

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

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

    PAUSE 1000                  ' Pause to allow LCD to setup

start:

    ADCIN 4, x                  ' Read analog voltage on AN4 and
                                ' convert to 8-bit digital value
                                ' and store as x.

    LCDOUT $FE,1,"POT =",#x    ' Clears LCD screen, displays
                                ' "POT =" and the 8-bit value of x

    PAUSE 500                   ' Pause 1/2 second

    GOTO start                  ' Go to loop label

END
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