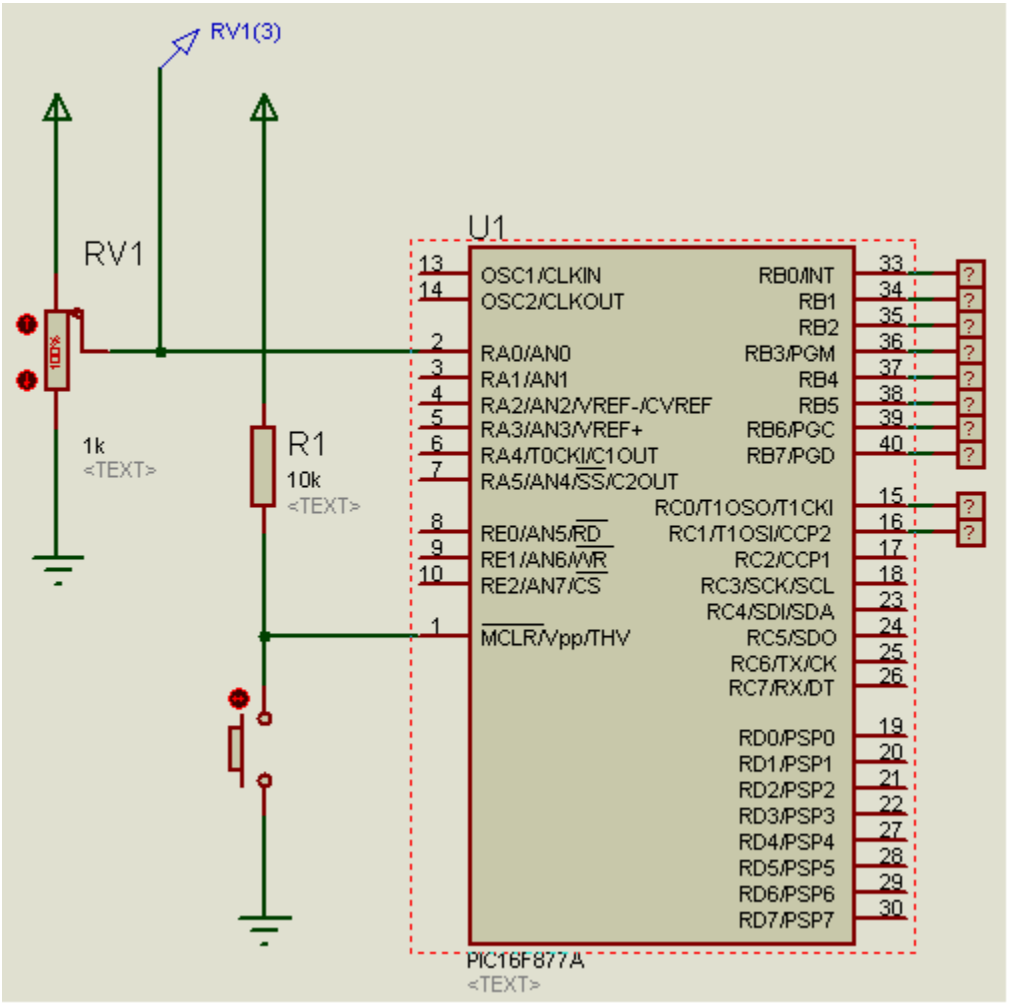
In Campus Activity 2
ECPE402
Nov 16, 2021 | 0100P – 0330P

Construct the circuit below in Proteus.



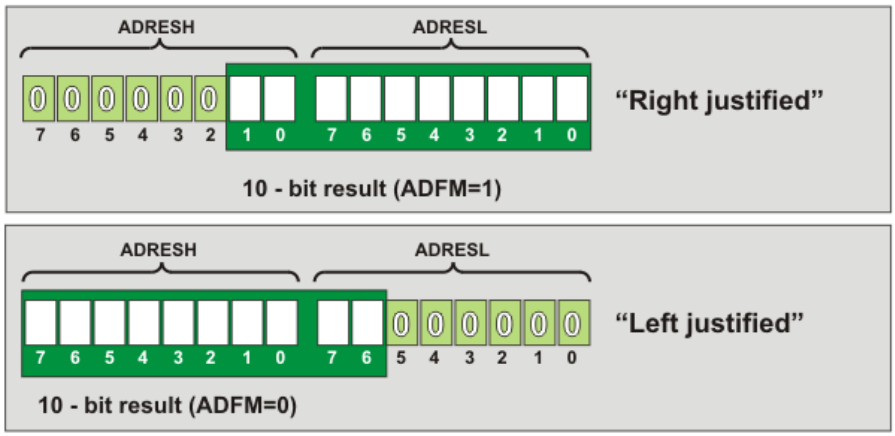
Note:

- The oscillator to be used is 8 MHz
- Use POT-HG component for the potentiometer
- Use voltage probe mode to measure the voltage across the potentiometer

For the detailed discussion of ADCON0 and ADCON1 of PIC16F877A, read page 127 of the datasheet.

A/D Result Format (ADCON0)

The digital result of the 10-bit ADC module is stored in the registers ADRESH and ADRESL with two formats namely left justified and right justified as shown below.



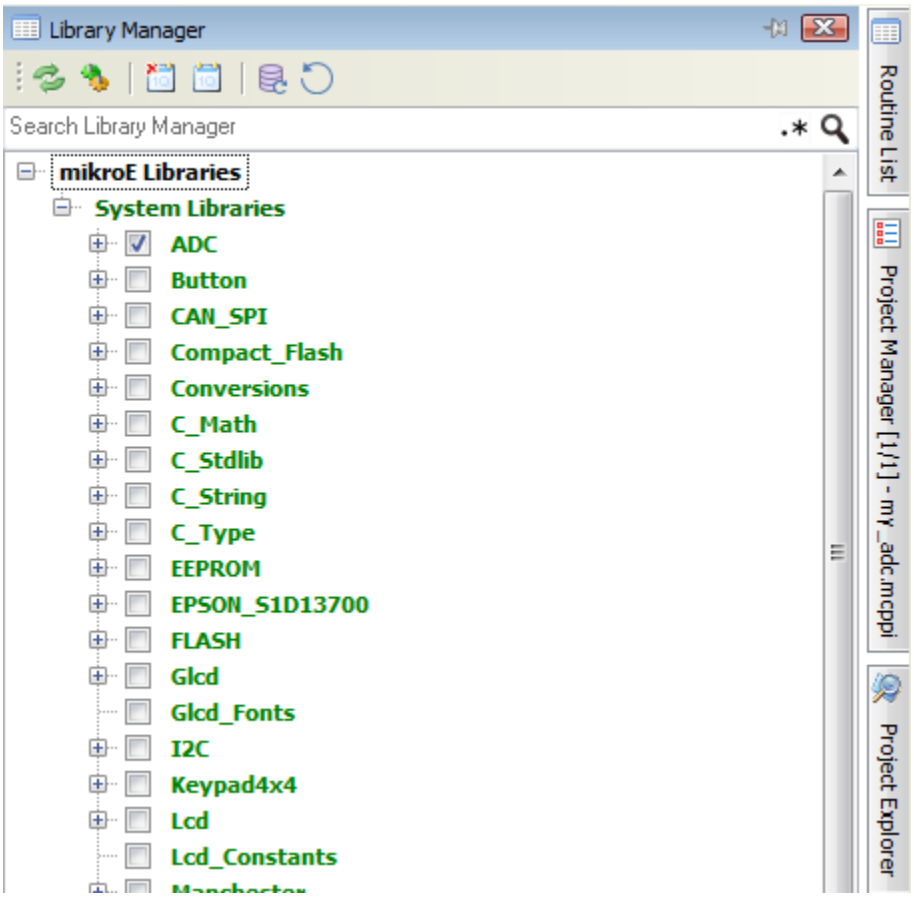
Source: https://www.mikroe.com/ebooks/pic-microcontrollers-programming-in-assembly/analog-modules

Create a project named my_adc in MikroC and encode the program below

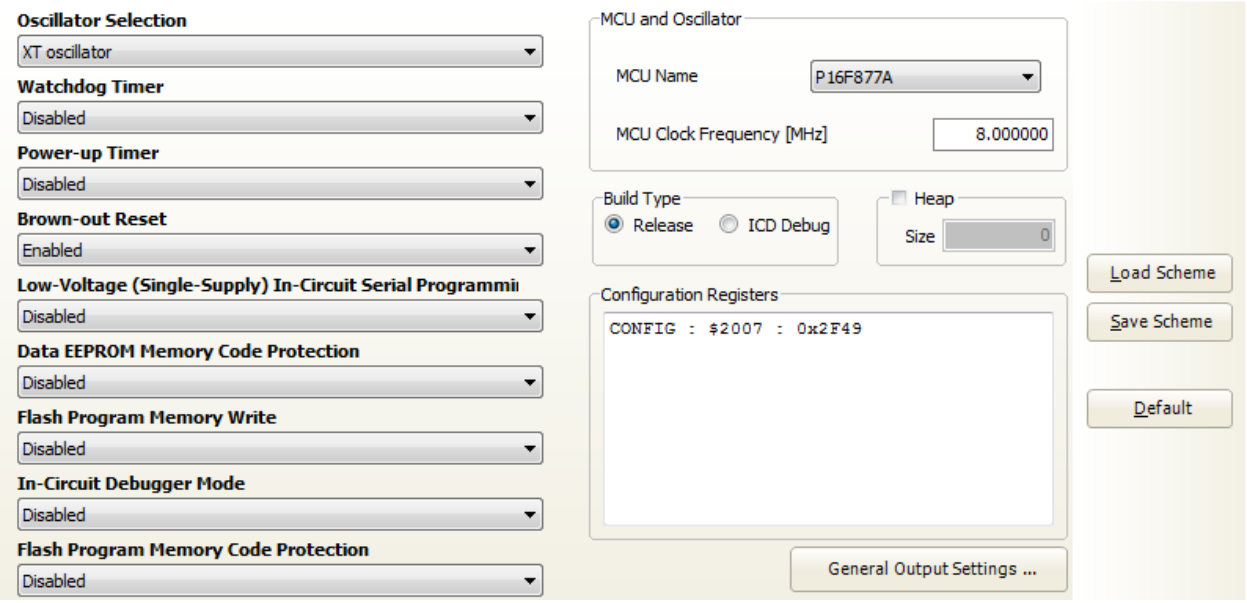
```
unsigned int digital_value;

void init_adc_module()
{
   /*
      ADCS1:ADCS0 (bit 7:6) = 00, clock conversion is Fosc/
                              if ADCS2 = 0 of ADCON1
      CHS2:CHS0 (bit 5:3) = 000, only AN0 is selected
      GO/DONE' (bit 2) = 0, A/D conversion not in progress
      ADON (bit 0) = 0, A/D converter module is shut-off and consumes no
operating current

      Default: ADCON0 = 0x00
   */
   ADCON0 = 0x00;

   /*
      ADFM (bit 7) = 1, right justified
      ADCS2 (bit 6) = 0, clock conversion is Fosc/2
                         if ADCS1:ADCS0 = 00 of ADCON0
      PCFG3:PCFG0 (bit 3:0) = 1110, only AN0 is will be configured
                                    as an analog input pin
   */
   ADCON1 = 0x8E;
}
```

```
void init_port()
{
   TRISA.B0 = 0;     // RA0/AN0 = input pin
   TRISB.B0 = 1;     // RB0 = input pin

   /*
      Digital value of the analog input
      RD1:RD0 = Bit 9:8
      RC7:RC0 = Bit 7:0
   */

   TRISB = 0x00;        // PORTB = output port
   TRISC.B0 = 0;        // RC0 = output pin
   TRISC.B1 = 0;        // RC1 = output pin

   PORTB = 0x00;
   PORTC = 0x00;
}

void main()
{
   init_port();
   init_adc_module();

   while (1)
   {
      /*
        read channel 0 of the ADC module
        to read channel 1, use ADC_Read(1)
      */
      digital_value = ADC_Read(0);   // read channel 0, if

      PORTB = digital_value;
      /*
         shifting the 10-bit value 8 bits position to the right
         so that bit 9 and bit 8 is positioned to bit 1 and bit 0
         respectively
      */
      PORTC = digital_value >> 8;
   }
}
```

Make sure to check the ADC library of MikroC in order to use the function ADC_Read() as shown below.



Configure the project by clicking Project -> Edit Project and follow the configuration below



Compile the program.

Simulate the circuit in Proteus by adjusting the potentiometer using the arrow up and arrow down symbols. While adjusting the resistance, observe the voltage and its digital equivalent in Port B and Port C.