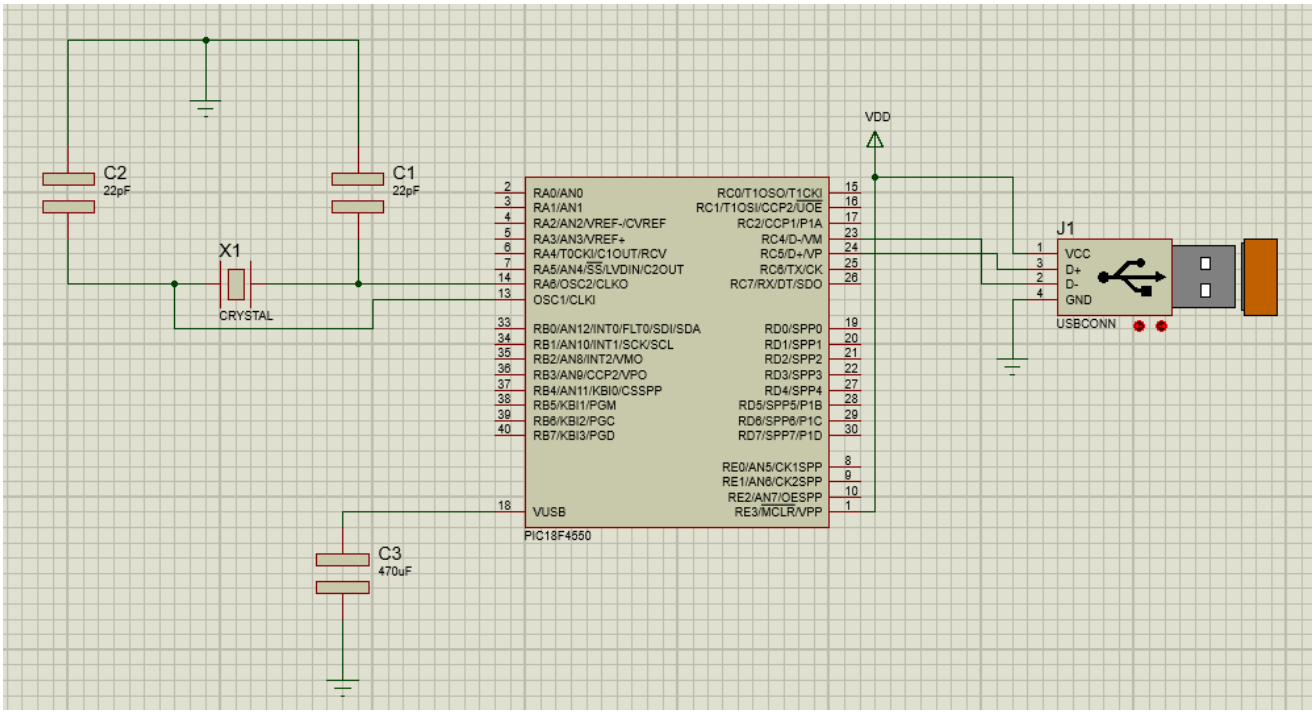
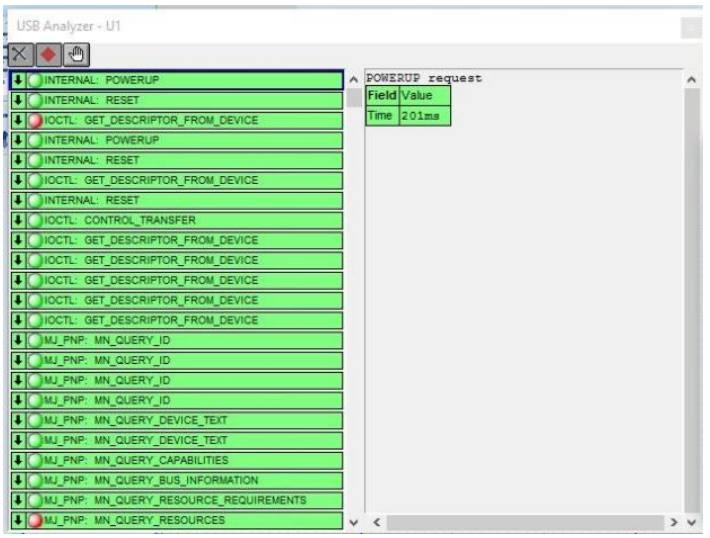
Report Lab 04

E/15/271

1. Screenshots of the Design (proteus design)



2. Screenshots of Tera Term Terminal



3. Code from MPLAB for the Lab Task

```
/** INCLUDES *******************************************************/
#include "system.h"
#include <stdint.h>
#include <string.h>
#include <stddef.h>
#include "usb.h"
#include "app_led_usb_status.h"
#include "app_device_cdc_basic.h"
#include "usb_config.h"

/** VARIABLES ******************************************************/

static bool buttonPressed;
static char buttonMessage[] = "Button pressed.\r\n";
static uint8_t readBuffer[CDC_DATA_OUT_EP_SIZE];
static uint8_t writeBuffer[CDC_DATA_IN_EP_SIZE];
uint8_t count = 0;
/*********************************************************************
* Function: void APP_DeviceCDCBasicDemoInitialize(void);
*
* Overview: Initializes the demo code
*
* PreCondition: None
*
* Input: None
*
* Output: None
*
********************************************************************/
```

```
void APP_DeviceCDCBasicDemoInitialize()
{
   line_coding.bCharFormat = 0;
   line_coding.bDataBits = 8;
   line_coding.bParityType = 0;
   line_coding.dwDTERate = 9600;

   buttonPressed = false;
}

/********************************************************************
* Function: void APP_DeviceCDCBasicDemoTasks(void);
*
* Overview: Keeps the demo running.
*
* PreCondition: The demo should have been initialized and started via
*   the APP_DeviceCDCBasicDemoInitialize() and APP_DeviceCDCBasicDemoStart() demos
*   respectively.
*
* Input: None
*
* Output: None
*
*******************************************************************/
void APP_DeviceCDCBasicDemoTasks()
{
   /* If the USB device isn't configured yet, we can't really do anything
    * else since we don't have a host to talk to.  So jump back to the
    * top of the while loop. */

   if(mUSBUSARTIsTxTrfReady() == true)
```

```
{
   putrsUSBUSART("\0");
}

while(1){
   if( USBGetDeviceState() < CONFIGURED_STATE )
   {
      return;
   }

   /* If we are currently suspended, then we need to see if we need to
    * issue a remote wakeup.  In either case, we shouldn't process any
    * keyboard commands since we aren't currently communicating to the host
    * thus just continue back to the start of the while loop. */
   if( USBIsDeviceSuspended()== true )
   {
      return;
   }



   /* Check to see if there is a transmission in progress, if there isn't, then
    * we can see about performing an echo response to data received.
    */
   if( USBUSARTIsTxTrfReady() == true)
   {
      uint8_t i;
      uint8_t numBytesRead;

      numBytesRead = getsUSBUSART(readBuffer, sizeof(readBuffer));

      /* For every byte that was read... */
```

```
        for(i=0; i<numBytesRead; i++,count++)
        {
          if( (readBuffer[i]> 96) && (readBuffer[i]< 123))
          {

              writeBuffer[count] = readBuffer[i]- 32;

          }else{

              writeBuffer[count] = readBuffer[i];

          }
        }

        if(readBuffer[i]==0x0A || readBuffer[i]==0x0D)
        {
          /* After processing all of the received data, we need to send out
           * the "echo" data now.
           */
          putUSBUSART(writeBuffer,count);
          count = 0;
        }
      }

      CDCTxService();
    }
}
```

4. Problems and issues you encountered and how you solved them

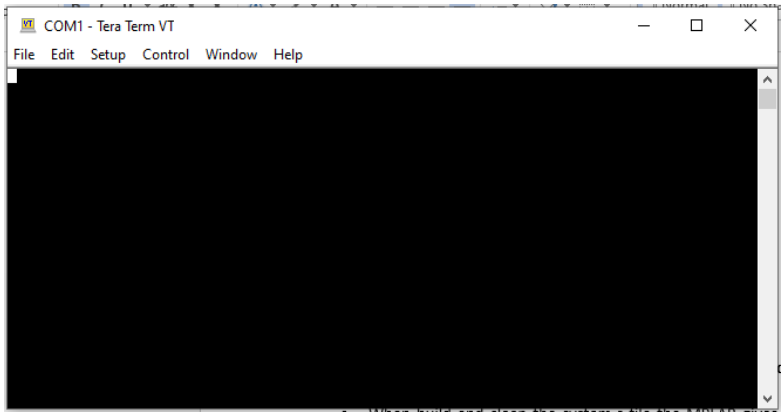
- When build and clean the system.c file the MPLAB gives some errors and warnings. After changing the c99 standard to c90 standards it built successfully.
- Then the USB COM port does not appear in the device manager so update the mplab library to 2018 version (mla_v2018_11_26) and after reinstalling the virtual USB setup, then the problem was resolved.

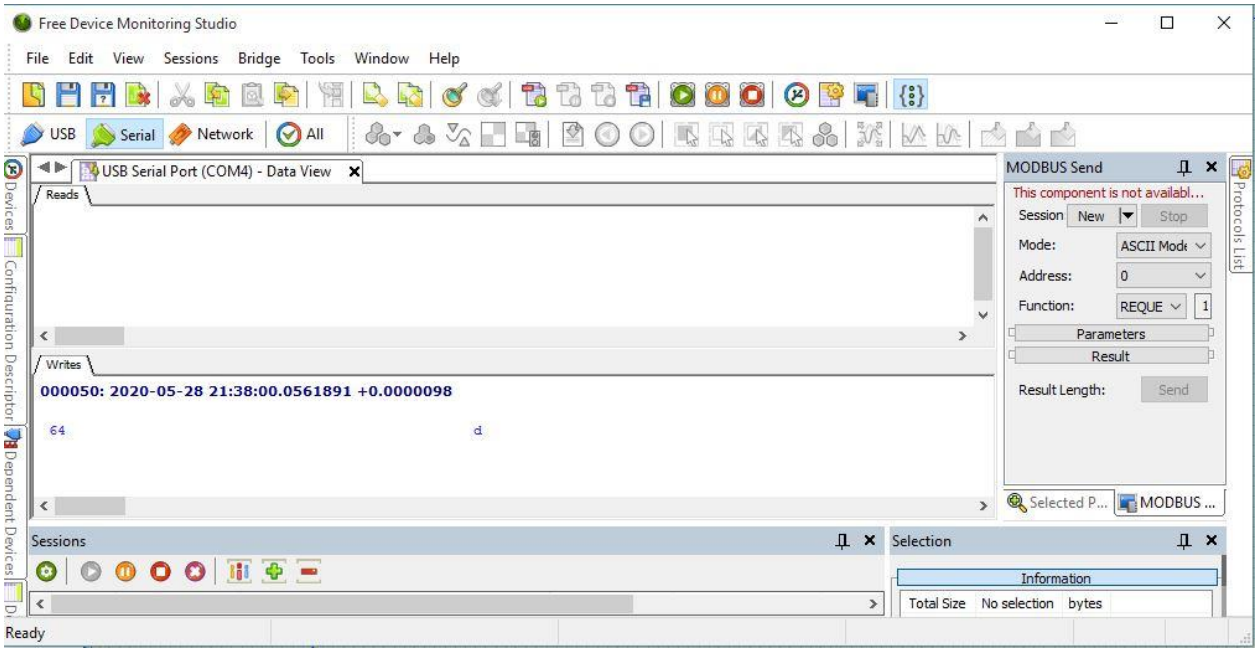
5. Explain followings

- **Give a letter you typed and what is observed on the Tera Term**

  The letter isn't shown at tera term because anything does not appear in the tera terminal until the enter is pressed

- **Give screenshots of the USB monitor relevant to the letter you type and the letter displayed on the Tera Term.**





- **One type of packet is IN and other is OUT. Explain each case discussing why they become IN and OUT packets.**

  In – This packet notifies the USB device that host wants to read information.

  Out – This packet notifies the USB device that host wants to write information**.**

  So in this case when a packet is IN it gets an error and when the packet type is OUT it run properly in the tera terminal.