PIC Microcontroller (Lab 1)

An introduction

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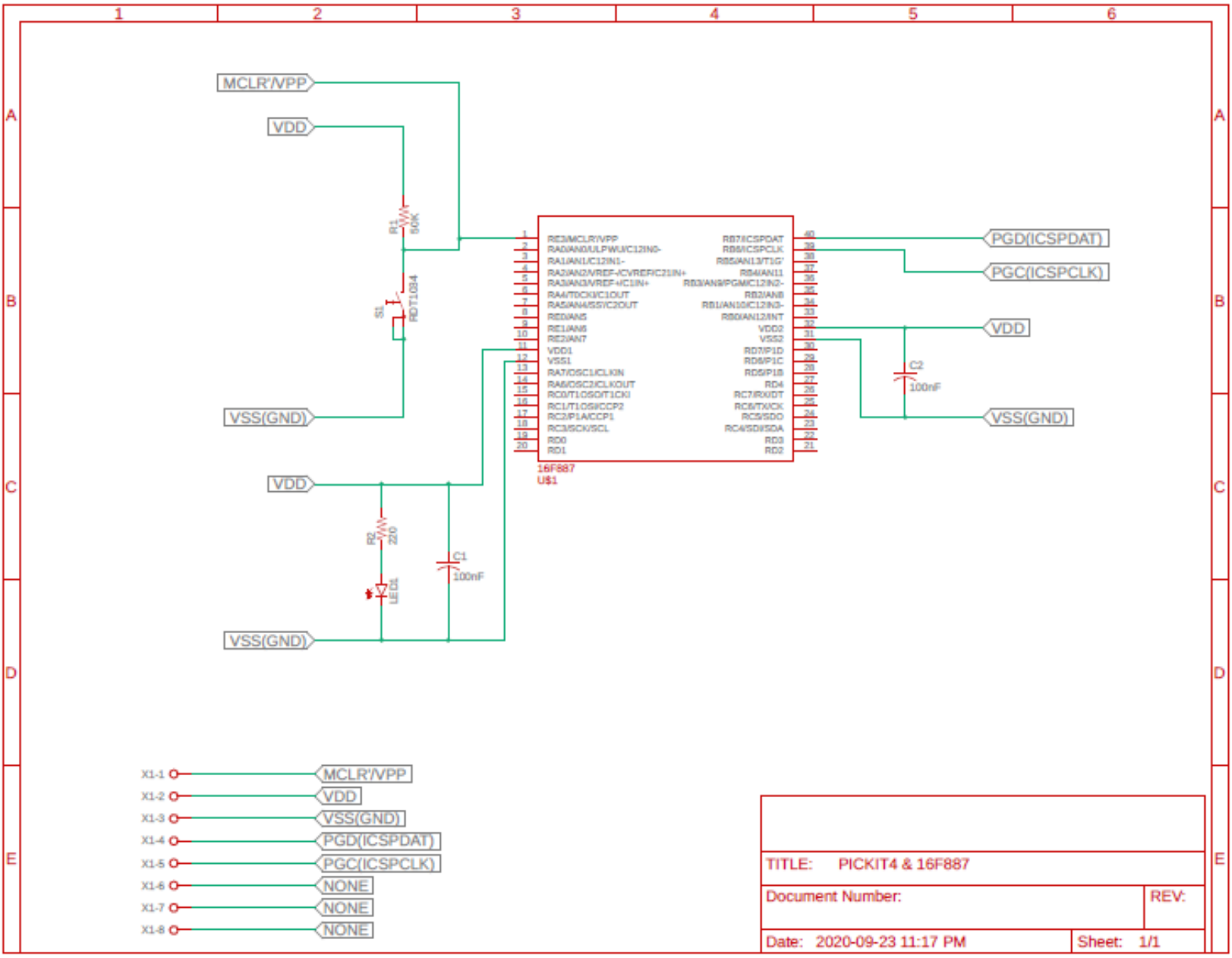
1.0 Purpose

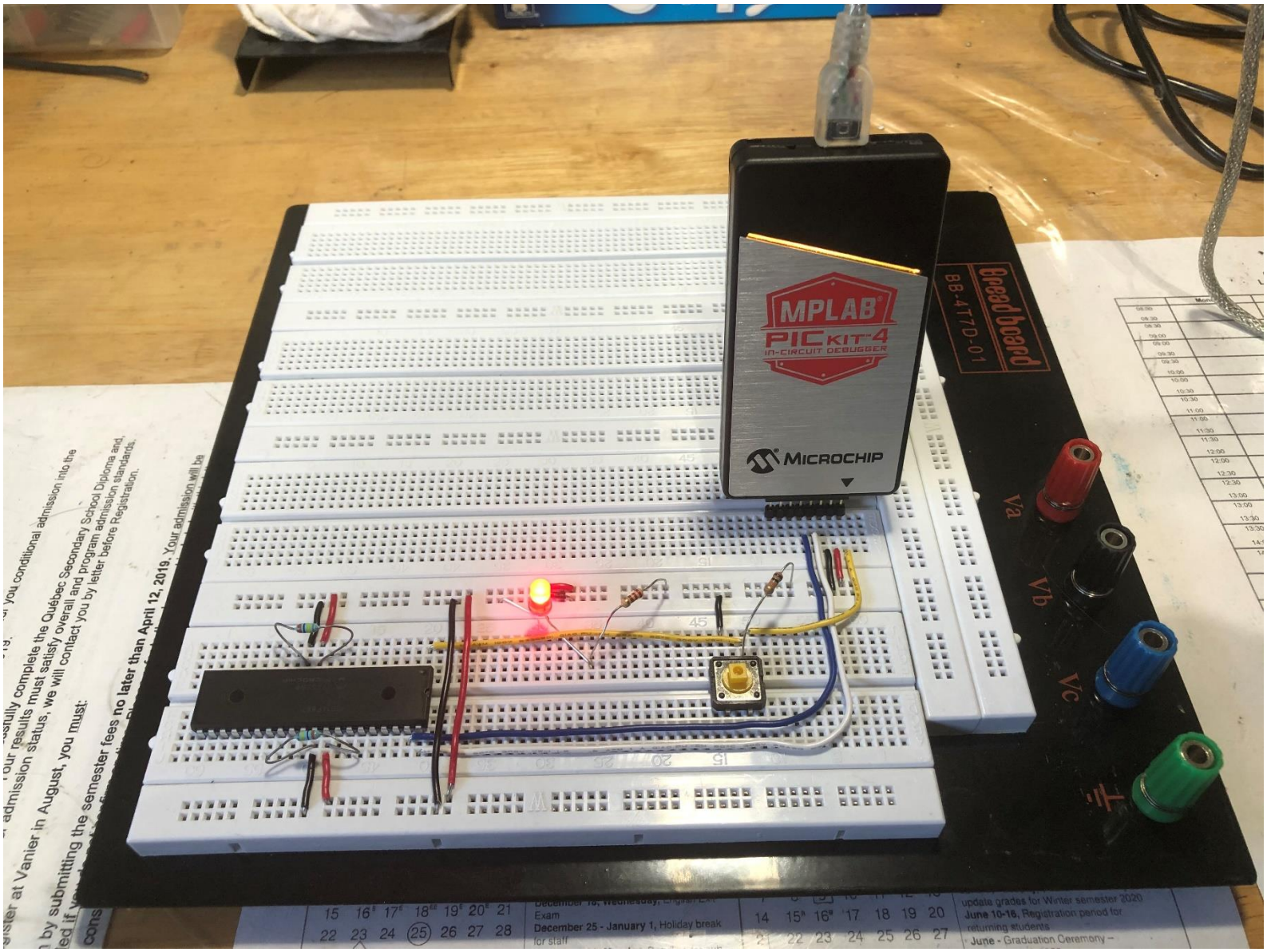
- Create simple PIC microcontroller circuit using PIC 16F887.
- Learn to use PICKIT 4 programmer/debugger with PIC 16F887.
- Learn to use MPLAB X IDE.
- Load basic program onto PIC 16F887 using MPLAB and PICKIT 4.

2.0 Pre-Lab

Creating PIC prototype circuit



Prototype circuit schematic using PIC 16F887 and PICKIT4 (shown above)



Circuit from schematic programmed and working (shown above)

3.0 EXPERIEMNTAL RESULTS

Questions from the Procedure section:

PART B:

18a) ***MPASM™*** *is an assembler that was and is the standard assembler for the 8-bit PIC® microcontroller family. It is included with MPLAB® X IDE and can be used alone or in conjunction with a C compiler for mixed-language projects.*
https://microchipdeveloper.com/mpasm:start

MPLINK *is a linker which combines multiple object files into one executable hex file.*
https://www.mikrocontroller.net/attachment/61104/MPLINK_TUTORIAL.pdf#:~:text=MPLINK%20is%20a%20linker%20which,code%**20produced**%20from%20source%20files.

b) ***MP2HEX*** *simply converts the data in the object file (from your project sources) into a hex file.*
https://www.microchip.com/forums/m161787.aspx#:~:text=MP2HEX%20simply%20converts%20the%20data,value%20in%20the%20output%20file.

A **COFF** will typically contain debugging information (line numbers, symbols, etc.) that is useful when running the code in the IDE. The **HEX** file just contains the program's binary data, and is what you'd typically use to program the microcontrollers for production.
https://stackoverflow.com/questions/3418932/microchip-pic-c18-programming-file-format-coff-vs-hex#:~:text=A%20COFF%20will%20typically%20contain,program%20the%20microcontrollers%20for%20production.

4.0 CONCLUSION

- Purpose of this lab has been achieved.
- Understood how to create a simple microcontroller circuit.
- Understood how to use PICKIT4.
- Understood how to interface PICKIT4 with PIC16F887.
- Understood basic workflow of MPLAB X IDE.
- Understood how to load a basic program onto the PIC16F887.
- Problem: 50k-ohm pull-up resistor on /MCLR pin replaced with 10k-ohm resistor instead.
- Problem: (1st attempt) programming PIC failed due to wiring problem. Push button-switch was wired incorrectly (shorting /MCLR + VDD with VSS).