PIC18F4550

Bootloader Installation
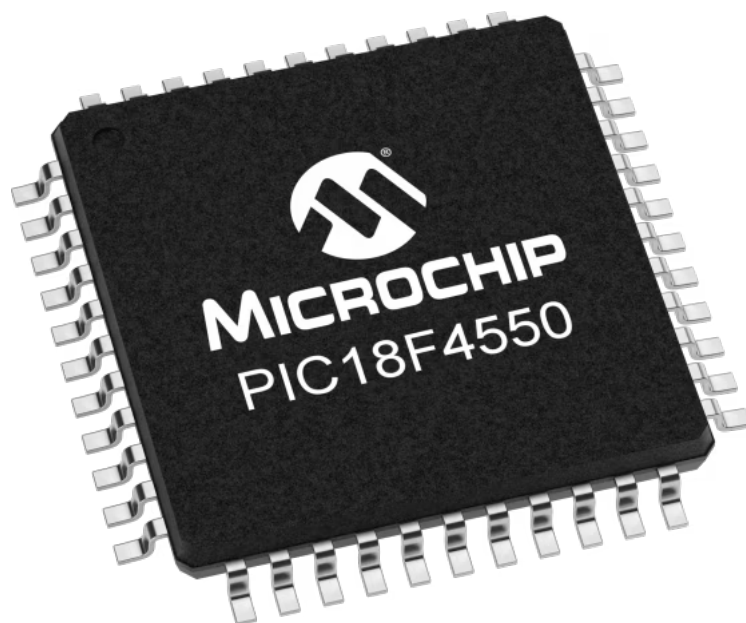
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Logsun Systems

Contents

Chapter 1

Getting Started...

1.1 Pre-requisites

Before we start, its always better to collect the tools and other necessory stuff required to achive end result.

- PIC18F4550 Developement Board

- PICKIT-3

- PICKIT-3 PC Application

- Bootloader Hex file

- Bootloader device driver

- PDFSUSB Application [For hex file upload]

- LED blink demo hex file [Optional]

1.2 Brief Procedure

We have provided you the folder with alll the *installation* files, *Hex* files and *drivers*. Please Navigate to that folder and then follow the procedure given bellow.

1. Install the *PICKIT-3 PC Application*

2. Connect the *PICKIT-3* with *PIC18F4550* micro-controller.

3. Open the *PICKIT-3 PC Application* installed in Step 1.

4. Upload the *Bootloader hex file* into PIC18F4550 micro-controller.

5. Remove the *PICKIT-3* Programmer from micro-controller.

6. Install the *Bootloader Device Drivers* on the Windows.

7. Put the PIC18F4550 Microcontroller in the program mode.

8. Open the PDFSUSB Application

9. Select the microcntroller

10. Select the LED blink demo hex file or any other hex file you want to upload on the micro-controller.

11. Click on the Program button, and wait for the hex file to get upload in the micro-controller.

12. Reset the micro-controler to observe the output.

This is the brief procedure for power users who are used to the *Microchip's* and *PIC microcontroller's* eco-system.

If you are not familier with this eco-system or you find the above procedure hard, don't worry, I have given the detailed and step-wise procedure in later part of this document, which will guide you to make your PIC bootloader experience buttery smooth.

Chapter 2

Installing PICKIT-3 Application

2.1 About this chapter

This chapter guides you step-by-step to install the *PICKIT-3 Application.* Follow the procedure as mentioned bellow and at the end you will end up with *PICKIT-3 Application* installed in your PC succesfully.

2.2 Requirements

- PIC18F4550 micro-controller board with *ICSP* connector
- PICKIT-3 Programmer
- USB cable to coonect prograamer to PC.
- Jumper wires / Ribbon Cable to connect PICKIT-3 to micro-controller board.
- PICKIT-3 PC application
- Bootloader's Hex File
- PC/Laptop to run the application.

2.3 Installation Procedure

1. Navigate to the *PICKIT-3 Application's* setup file location and double click on the exe file. After opening the exe file, a new window will appear as shown in figure 2.1.
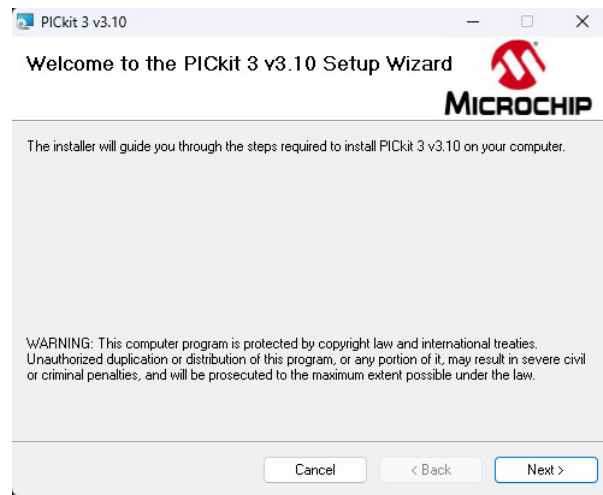
Figure 2.1: Welcome Page

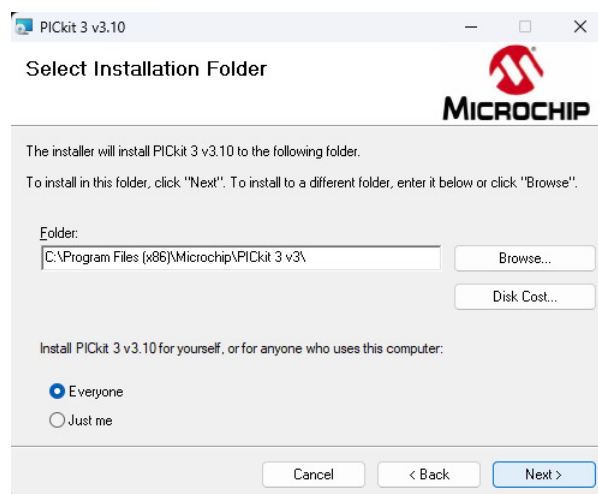2. On this window, click on the *Next* button.

Figure 2.2: Select Installation Location

3. As we don't need to change the default location, just click on the *Next* button, without changing any option shown in figure 2.2.
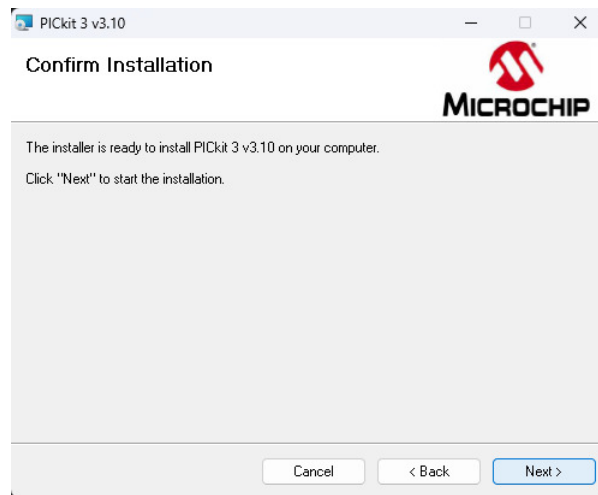
Figure 2.3: Confirm Installtion

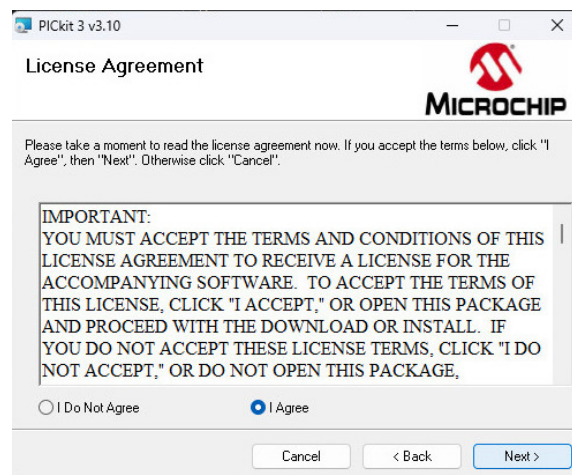4. Here, the installer is all set to install the application on the PC, click on the *Next* button.

Figure 2.4: License Agreement

5. Next window appeared is of *License Agreement*, Select the *I Agree* radio button and then click on *Next*. [Refer Figure 2.4.]
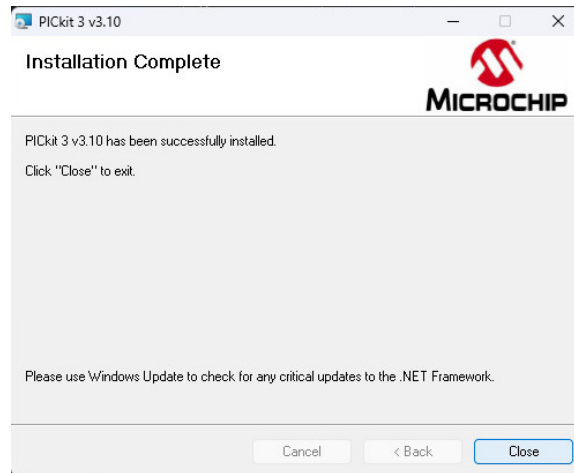
Figure 2.5: Installation Complete

6. We are now at last stage of our installation. At the end of the installation, the installer present you the window as shown in the figure 2.5. Click on the *Close* button to close the installer.

Congratulations !!! ... You have successfully installed the *PICKIT-3 Application* on your PC.

2.4　Uploading Bootloader

Now you have installed the apllication, it's time to use that application to upload the PIC USB bootloder in to the *PIC18F4550* micro-controller.
　Follow the steps given bellow to upload the USB bootloader.

1. If PIC18F4550 micro-controller is powerd ON, turn it OFF.

2. Connect the PICKIT-3 to micro-controller.

3. Now turn ON the micro-controller.

4. Connect the *PICKIT-3* to PC using USB Cable.

5. Open the *PICKIT-3 Application* we have installed in section 2.3. A new Window will appear as shown in Figure 2.6.
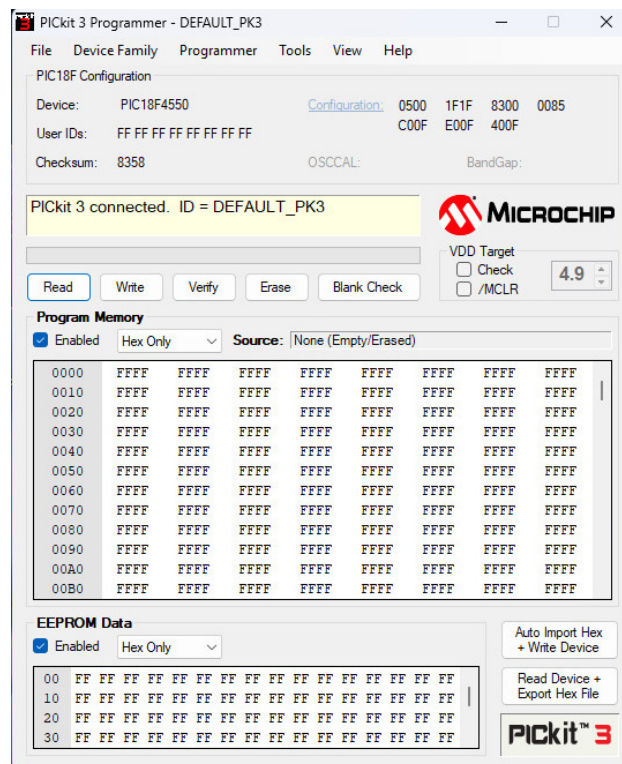

Figure 2.6: PICkit-3 Application

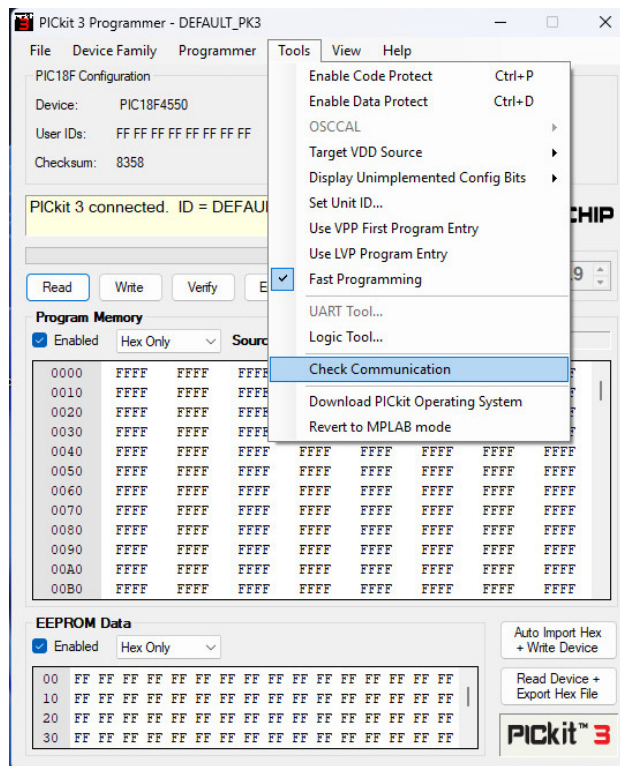6. Now Navigate to `Tools -> Check Communication` as shown in the Figure 2.7.

Figure 2.7: Check Connected Devices

7. The application will detect the PICKIT-3 and the micro-controller connected through it as shhown in the Figure 2.8.
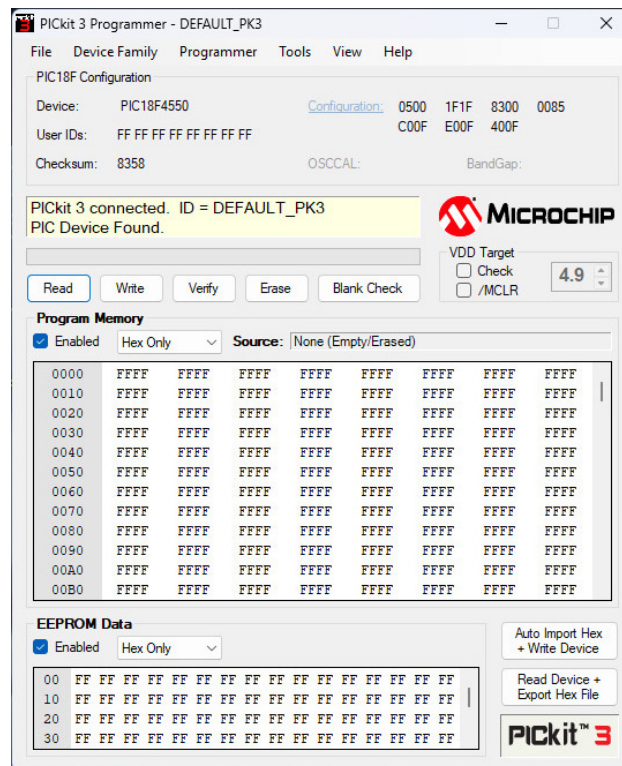
Figure 2.8: Device Detected

8. Now We need to select the hex file of the bootloader. To do so, navigate to `File -> Import File` *Add image here(Pending)*

9. Now navigate to the location where you have stored the bootloader's hex file and select the hex file as shown in the Figure 2.9. Here the filename of the hex file is `PIC-USB-4550-BOOT.hex`
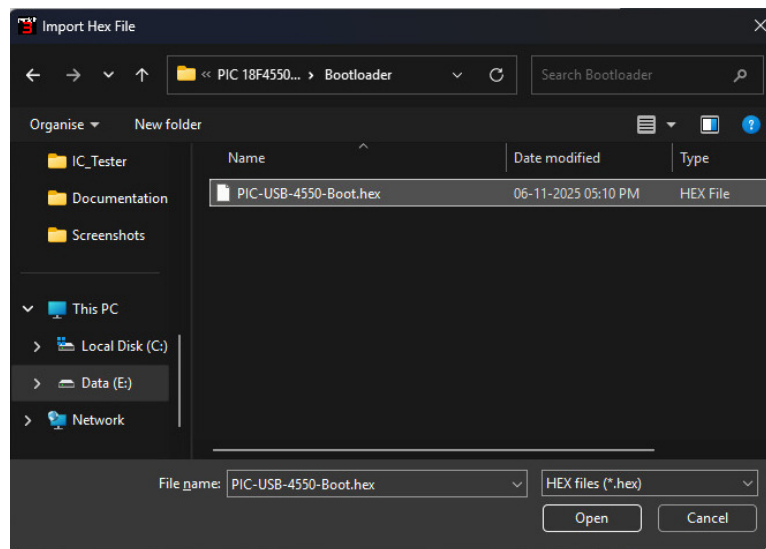
Figure 2.9: Select bootloader hex file

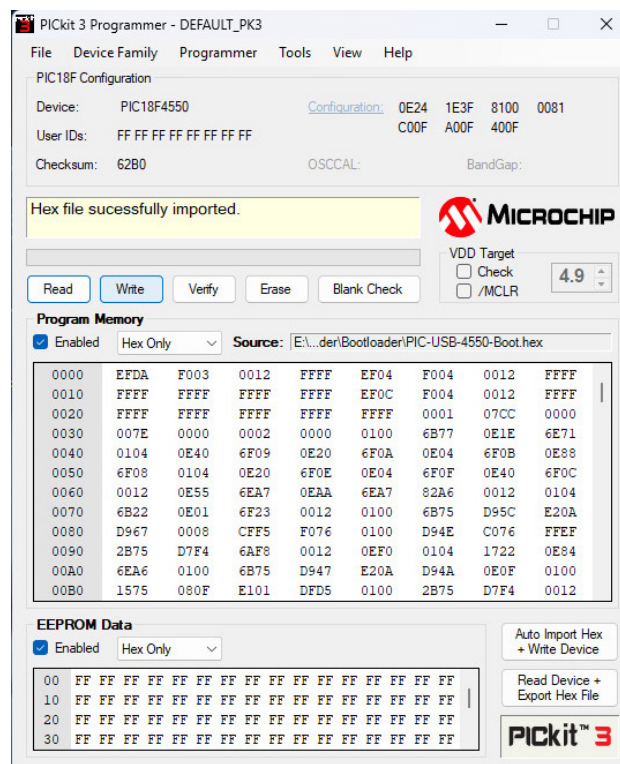10. Now Click on the *Write* button as shown in the figure 2.10.

Figure 2.10: Write Hex File

11. Once hex file gets written on the micreocontroller successfully, the success message gets displayed on the application's message window as shown in figure 2.11.
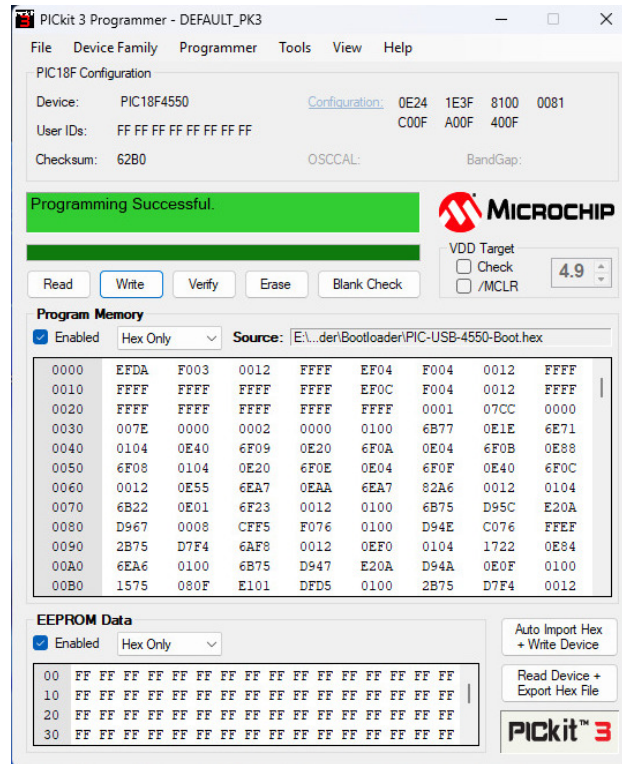

Figure 2.11: Hex File Uploaded Succesfully

12. Done !!!. The bootloader is succesfully get uploaded into the microcontroller. Now close the Application

13. Remove the *PICKIT-3* from PC as well as from micro-controller.

Chapter 3

Installing MCHPFSUSB v2.2 USB Framework

3.1 About this Chapter

In this chapter we are going to install the MCHPFSUSB USB Framework of version 2.2. This Framework provides USB bootloader drivers as well as firmware hex file upload tool.

   Following steps guide you to install the MCHPFSUSB USB Framework on your PC.

3.2 Installation Procedure

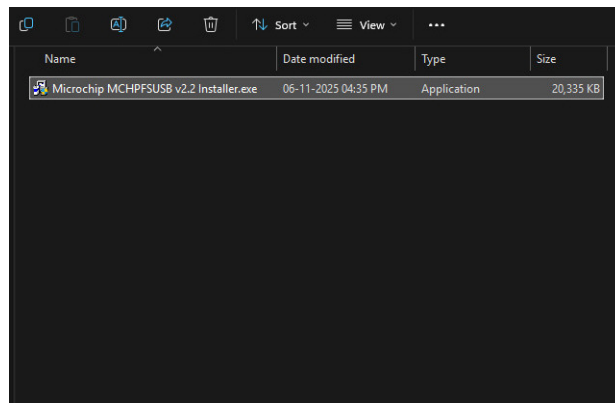1. Navigate to the MCHPFSUSB installer folder and run the setup file as shown in the Figure .

Figure 3.1: Select Setup File

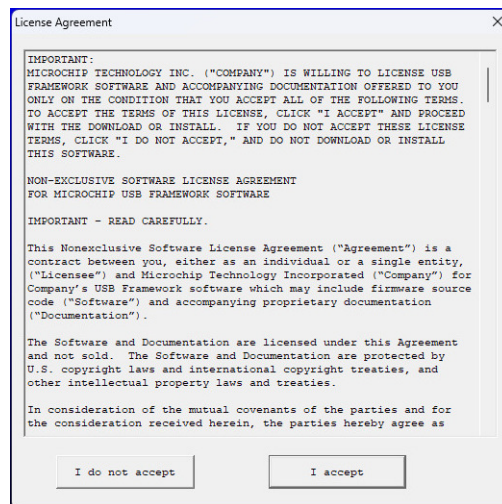2. Installer will invoke and ask you for the License Agreement as shown in the Fuigure 3.2. Click on *'I Accept'*.

Figure 3.2: License Agreement

> [Note]: There are two different license agreement and simmilar window appears for tow times and every time you have to Accept the Agreement

3. Then the installer present you the welcome window as shown in Figure 3.3. Which warns you close any other open window before proceeding in installation. So close all other windows as instructed in the installer and then click on *Next* button.
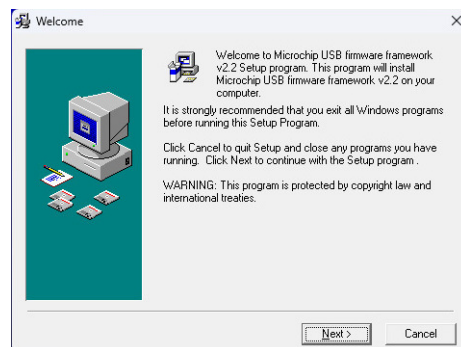

Figure 3.3: Welcome Window

4. In the next window of the installer you have to choose the destinaton location. Don't change anything and click on the *Next* button. [Ref. Figure 3.4.
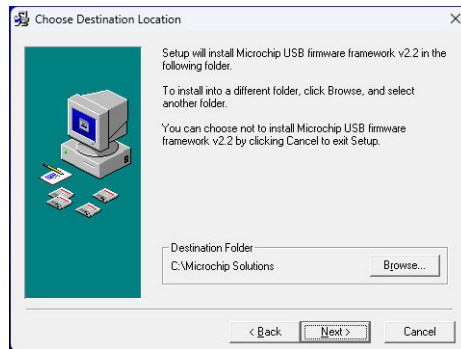
Figure 3.4: Choose Installtion Location

5. It's good practice to keep the backup of the files which are already present on the computer and will get replace in further installation process. The setup is asking whether to take backup or not. By defualt *Yes* option is selected, which is a good choice so we will not change anything on this page and click on *Next* to move ahead. [Ref. Figure 3.5]
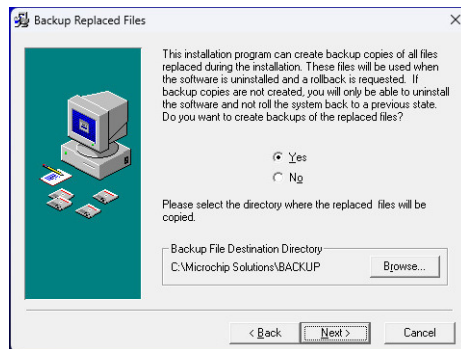

Figure 3.5: Take a Backup

6. At this point installer is ready to install the **MCHPFSUSB Framework** on your PC. In this window it will take confirmation from you as shown in the Figure 3.6. Click on *Next* button.
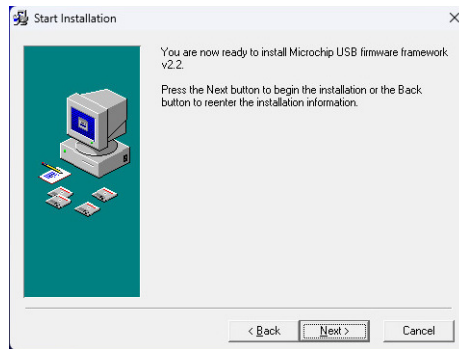
Figure 3.6: Setup Confirmation

7. The installation is now started and will install the all necessory files and tools on your PC. [Ref. Figure 3.7]
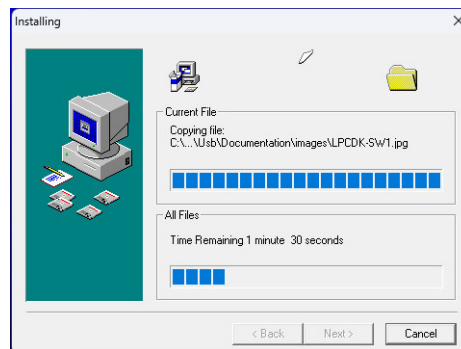

Figure 3.7: Installation in Progress

8. After installation process gets completed, the installer will present you the finishing window as shown in the Figure 3.8.
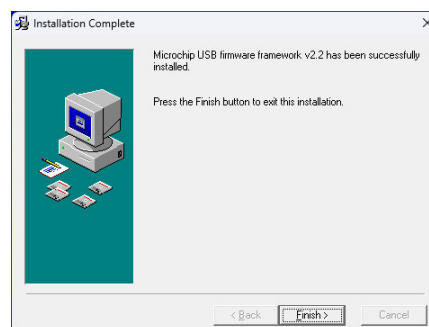

Figure 3.8: Installation Complete

Click on the *Finish* button to close the installer.

Chapter 4

Installing Driver

4.1 About this Chapter

In last chapter 3 we have completed the **MCHPFSUSB Framework**. Now it's time to install the drivers required to use *PIC USB Bootloader*.

For this you will required to connect the PIC18F4550 micro-controller to PC on which we have uploaded the bootloader's hex file, previously. [`Refer section 2.4`]

4.2 Requirements

- PIC18F4550 micro-controller with bootloader

- PC or laptop to install driver

- USB cable to coonect mico-controller board to PC/Laptop

4.3 Installation Procedure

1. Connect the PIC18F4550 microcontroller to the PC using USB cable. Also connect the Power supply to controller board and turn the board ON.

2. Now we need to put the controller into bootloader mode / Programming mode.

3. To put the board into the Programming moed, press and hold the User button connected to **PB4** pin, and then press and release the **Reset** button. then release the **User button**.

4. Now right click on *This PC*, click on *Manage*, then select *Device Manager*.
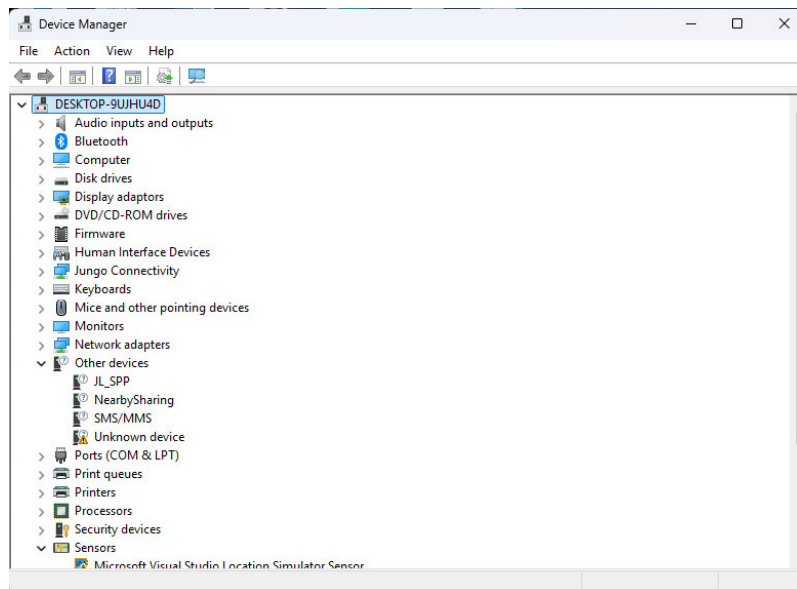
Figure 4.1: Device Manager

5. The device manager will show unknown device as shown in figure 4.1. as we have not installed the driver yet.
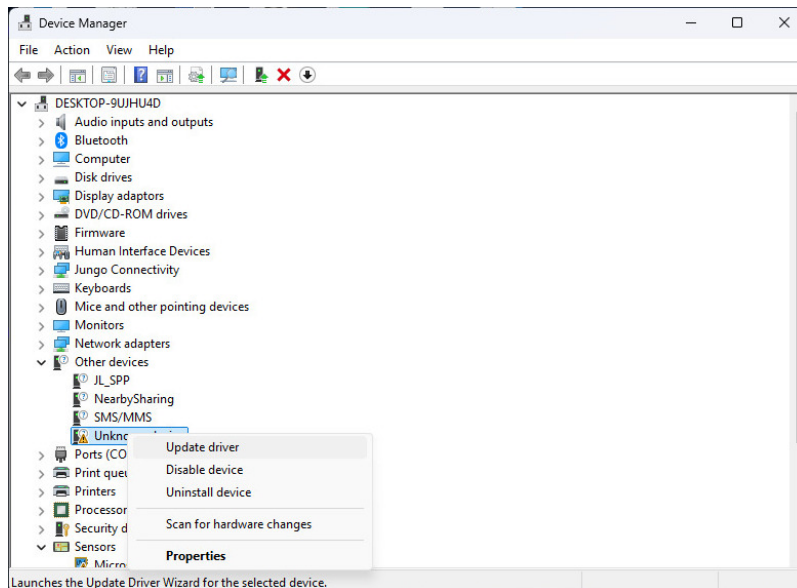

Figure 4.2: Update Driver

6. Right click on the *Unknown Device* and select *Update Driver* as shown in figure 4.2.
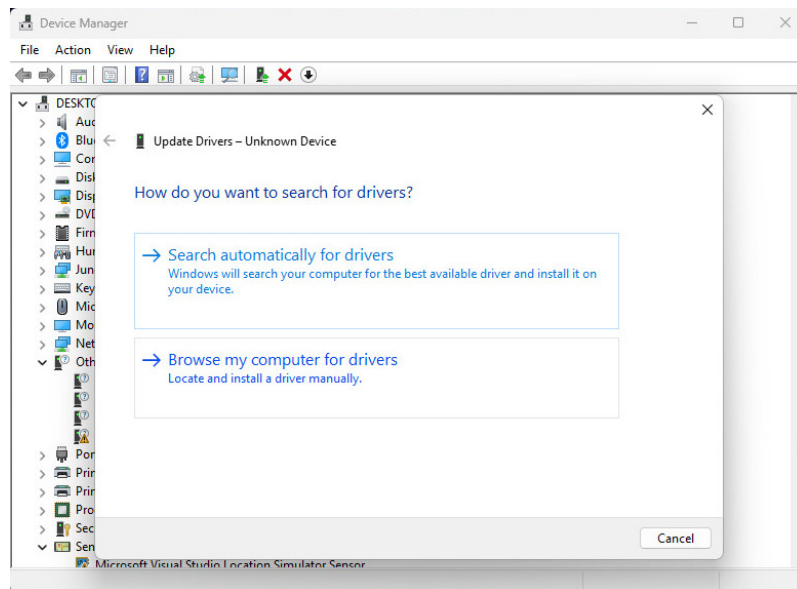
Figure 4.3: Browse Folder

7. On next window select *Browse my computer for drivers*, as shown in figure 4.3.
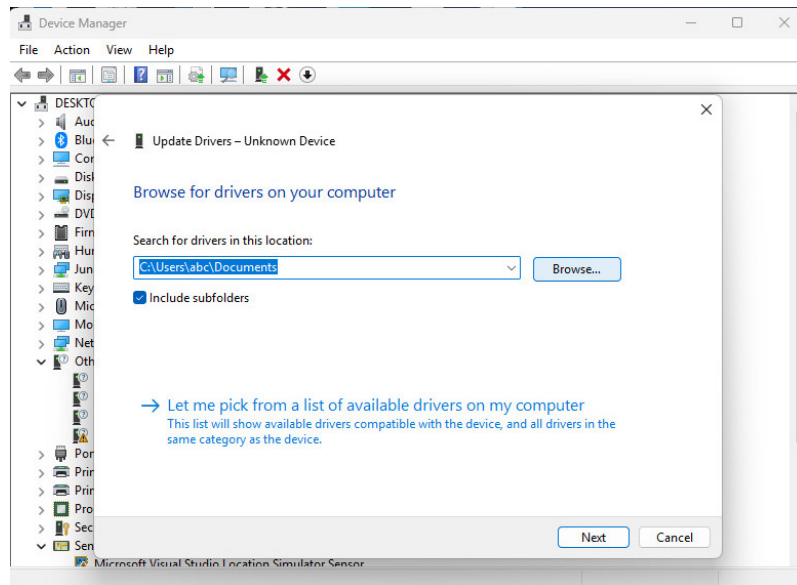

Figure 4.4: Driver Location

8. Now *Device Manager* asks for the driver location. to select the driver folder, click on *Browse* button as shown in the figure 4.4.
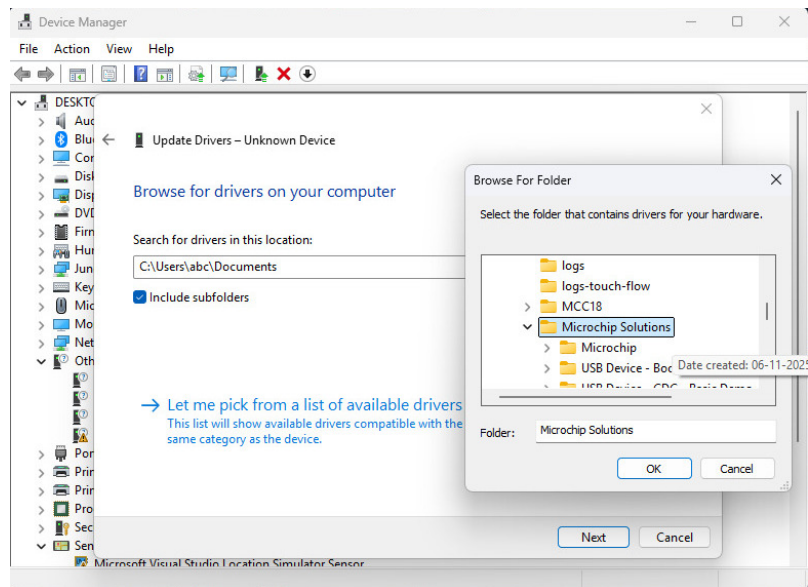
Figure 4.5: Select Folder

9. After clicking on *Browse* button, navigate to `C:\Microchip Solutions` as shown in figure 4.5.
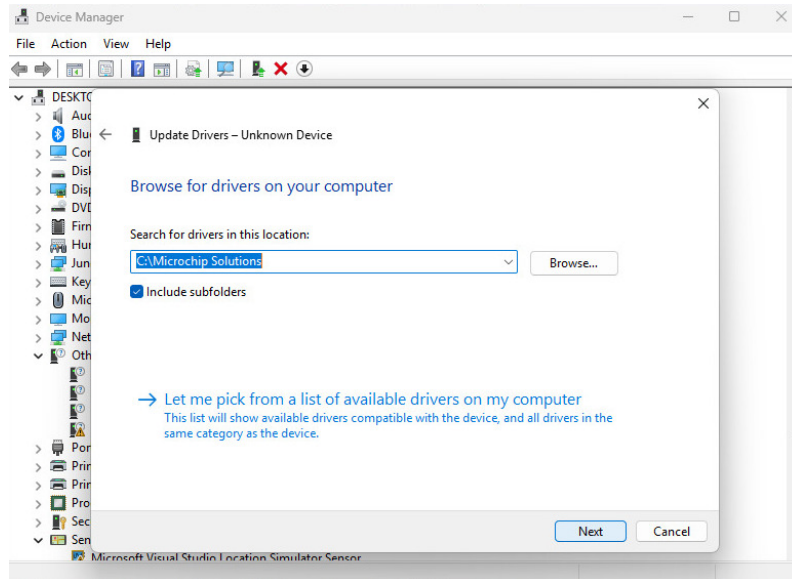

Figure 4.6: Include Subfolders

10. Make sure that *Include Subfolders* option is selected as shown in the figure 4.6 and then click on *Next* button.
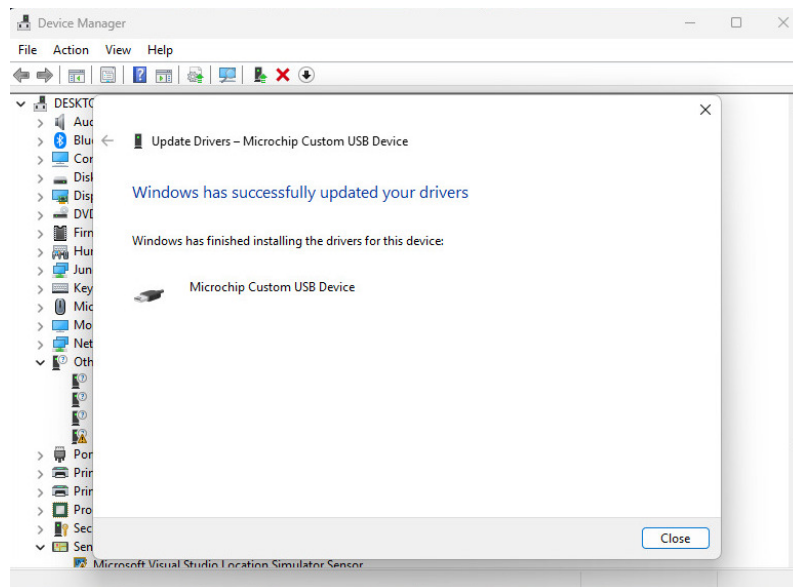
Figure 4.7: Driver Installed

11. Now wait for some time to driver gets installed. Once the drivers get installed on the PC, the device manager will show you the window as shown in figure 4.7. Click on the *Close* button to close the driver installer window.
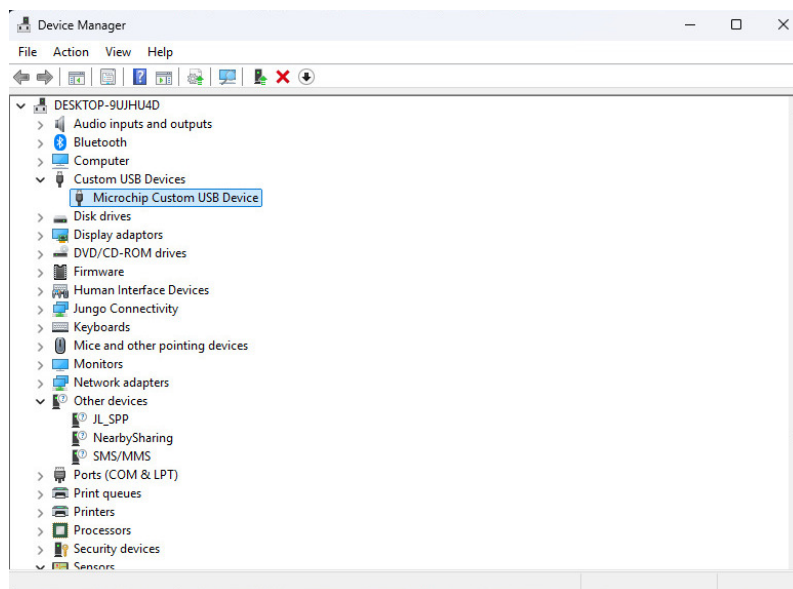

Figure 4.8: Confirm the installed driver

12. you can now see the controller is detected by *Device Manager* as `Microchip`

`Custom USB Device` as shown in figure 4.8. Which confirms that driver installation is succesfull.

Chapter 5

Uploading Firmware Hex File

5.1 About this chapter

In last Chapter we have installed the drivers, so our micro-controller with USB bootloader will get detected by *Device Manager*.

Now we can upload the *Hex* file of the *Firmware* we have written for the **PIC18F4550** micro-controller. If you don't have the firmware hex file, you can write simple application/firmware in **MPLAB IDE** and generate the hex file by compiling source code.

5.2 Requirements

- PIC18F4550 micro-controller with USB bootloader

- USB cable to connect micro-controller board with PC/Laptop

- Power Adapter for mico-controller board `[If Required]`

- **PDFSUSB** PC Application to upload firmware hex file

- Firmware hex file to upload

- PC/Laptop

You will not required to install the *PDFSUSB* PC application separately as its get installed along with MCHPFSUSB USB Framework. Please refer the chapter 3 for *MCHPFSUSB USB Framework* installtion procedure if you have not installed it yet.

5.3 Procedure

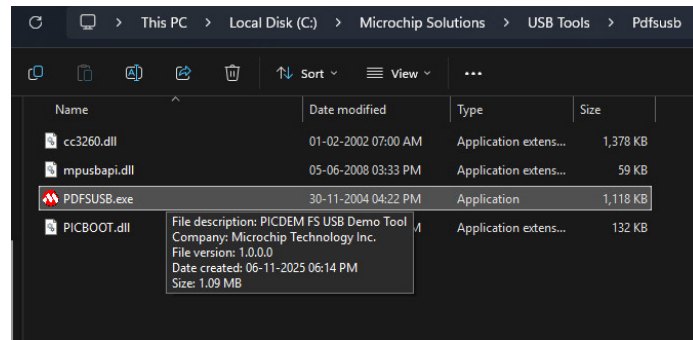1. From your PC/Laptop navigate to `This PC -> Local Disk(C:) -> Microchip Solutions -> USB Tools -> Pdfusb`

Figure 5.1: Locate Application exe file

2. At this location you can find the `PDFUSB.exe` file, as shown in figure 5.1.
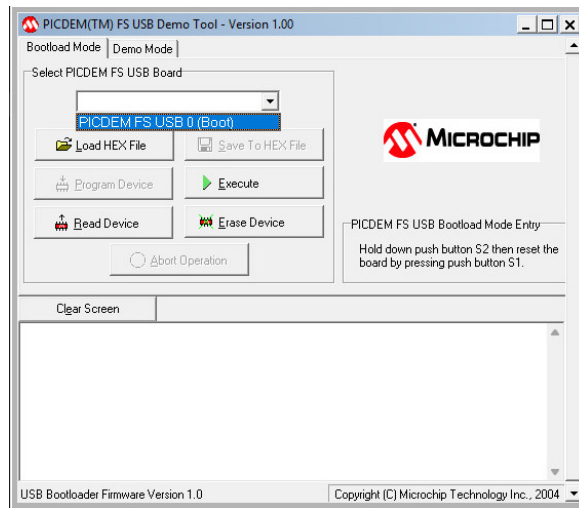

Figure 5.2: Select Micro-controller Device

3. A new window will open, at this window, select the microcontroller device as shown in the figure 5.2.
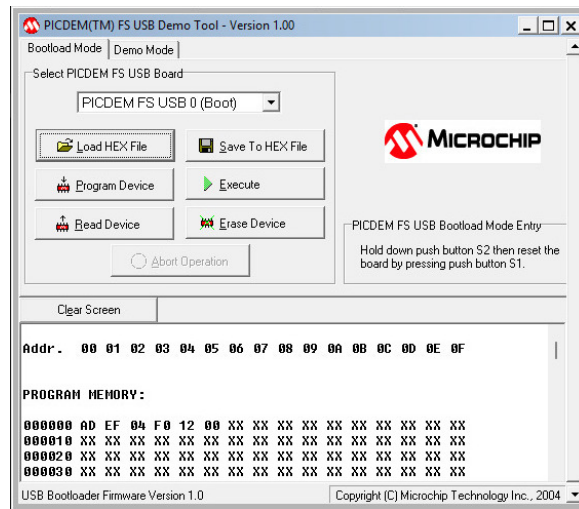
Figure 5.3: Load Hex File

4. As shown in figure 5.3, click on the *Load Hex File* button and select the hex file of your firmware.

5. The hex file contents can be seen in the white text area, situated at the bottom side of the application. Which also ensures that the hex file is uploaded succefully.

6. now click on the *Program Device* button so, the hex file we have selected in prevois step is get uploaded in to the micro-controller.

7. After hex file gets uploaded succesfully, you can click on the *Execute* button from the application or push the *Reset* button on the micro-controller board to start execution of the firmware.

Appendix A

Schematic