Updating Hardware Devices Using a Programmer

Requirements:
- Computer in a location where the device re-programming will happen.
- Download and install the free software.
- PIC programmer. Either supplied by NLED or NLED will provide a purchase link.
- USB Cable. Either mini or micro USB depending on the PIC programmer.
- Programming harness. 5-pin cable with connector(2.54mm/0.1" dupont type) on each end. One end may have gold spring pins, those pins are extremely delicate, be careful.

Software and Programmer Setup:
1. Download MPLABX for Windows, MacOS, or Linux. https://www.microchip.com/mplab/mplab-x-ide
2. Start Install, select the 'MPLABX IPE', the option 'MPLABX IDE' does not need to be installed. There are some check boxes during installation to choose what is installed, otherwise both programs are installed.
3. Once installed. Launch the MPLABX IPE software. Note, if you are using a high DPI / 4K monitor the program will have scaling issues. There are compatibility options to fix it, depends on OS.
4. Plug in the PIC programmer into the computer using a USB cable. USB hubs or extenders may not function correctly with the programmer.
5. Connect the programming harness to the PIC programmer.
6. Wait a second, under the IPE's 'Tool' the programmer should appear in the drop down, no action is required.
7. Ensure the IPE's 'Family' drop down says 'All Families'.
8. Under the IPE's 'Device' drop down, type in the name of the processor being programmed. NLED would provide the name for the processor.
9. Press the 'Connect' button in the IPE program. Since no device is connected it will show a red message stating 'Target device was not found...'. Once the Tool / Programmer is connected to the software, it will stay connected as long as the software is running.
10. On the 'Hex File' row, click the 'Browse' button, use the file dialog to find and select the .HEX file provided by NLED.
11. The software is now ready to start programming/updating devices.

Device Programming:
1. Start by preparing all the devices that need updating.
2. Locate the 5-pin row of holes on the device circuit board, usually labeled 'ICSP'. Usually located near the processor. This is the programming header.
3. Locate the dot near the programming header, that indicates pin #1.
4. On the PIC programmer where the programming harness mates. There is a triangle with a '1' next to it, that indicates pin#1. Note what color wire is connected to that pin, and/or line it up with the markings on the programming harness.
5. Power up the device to be updated. Be extremely careful when device is powered on, touching components may cause damage to the device or to the user.
6. Line up pin#1 of the programming harness to pin#1 of the device's programming header, which is indicated with a dot. Connect the programming harness to the device. If the programming harness has spring pins, carefully press the pins into the holes and hold it there.
7. In the MPLABX IPE software, press the 'Program' button. Wait several seconds as the process runs.

8. When complete the MPLABX IPE software will show 'Programming complete' in blue text.
9. Ensure the connected device that was just programmed starts up and begins to function.
10. If it is running correctly, power it off, and disconnect the device from the programming harness.
11. If additional devices are also to be reprogrammed, setup the next device and power it up.
12. Repeat the programming steps, by connecting programming harness to the next device. And press the 'Program' button. The Tool / Programmer does not need to be connected(via the Connect/Disconnect button) again, it stays connected as long as the software is running.

Fig. 1 – Software UX Description

1. Select the device to be programmed. Family set to 'All Families' and Device set to the processor to be programmed. NLED will supply the device name.
2. Connects to device programmer. Once the name appears, press connect.
3. Shows the output messages. If the device is powered and connected to the programmer, the messages will be all in black. If the 'Target Device' is found, the connections are correct.
4. Once connected the 'Browse' button is used to select the supplied HEX file.
5. Once the device is connected, the HEX file is loaded, the 'Program' button starts the programming process. Wait until it is complete.
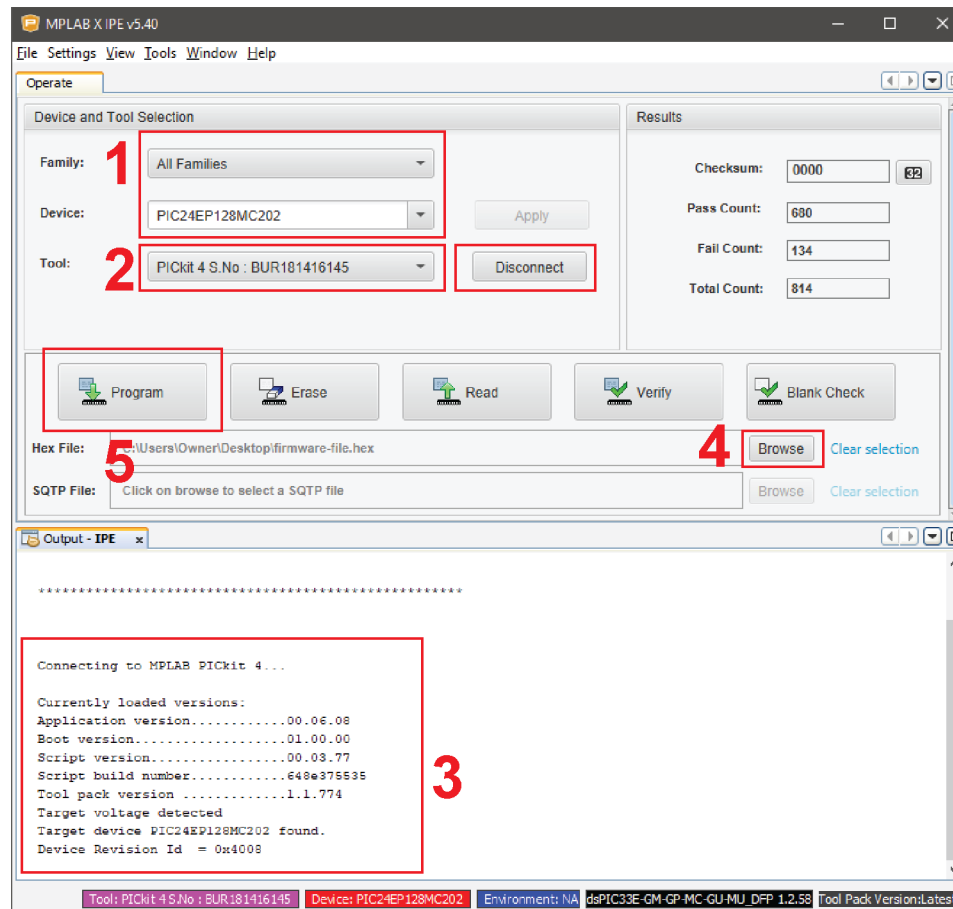
Fig. 1

Fig. 2 - Troubleshooting

- Device is not powered up.
- Programming harness is inserted the wrong way.
- Programming harness has a bad connection. Try to re-seat it.