THISTHING ALTERNATIVE FIRMWARE FOR EXPERT SLEEPERS DISTING MK 1 and 2

Note: you must be using version 0.2.0 or higher ThisThing if you have a mk 2.

INSTRUCTIONS

What you need

1 Disting mk I or mk II
1 PicKit3 - http://www.microchip.com/Developmenttools/ProductDetails.aspx?PartNO=PG164130&utm_source=&utm_medium=MicroSolutions&utm_term=&utm_content=DevTools&utm_campaign=PICkit+3
Computer, USB connection

Identifying Disting Model

It is very important that you know if you Disting is a mk1, or a mk2. The procedure for programming these models is somewhat different.

As of today, we only support the mk1 and mk2

To identify your disting, you need to determine which PIC CPU is on the PCB.

The PIC CPU is clearly marked, and is right next to the six gold pins where you connect your PickIt programmer.

The mk1 disting uses the MX150 F128B model CPU. The mk2 uses MX170F256B.

For now, you MUST have the mk1 or mk2

Test PickIt3

Install the software

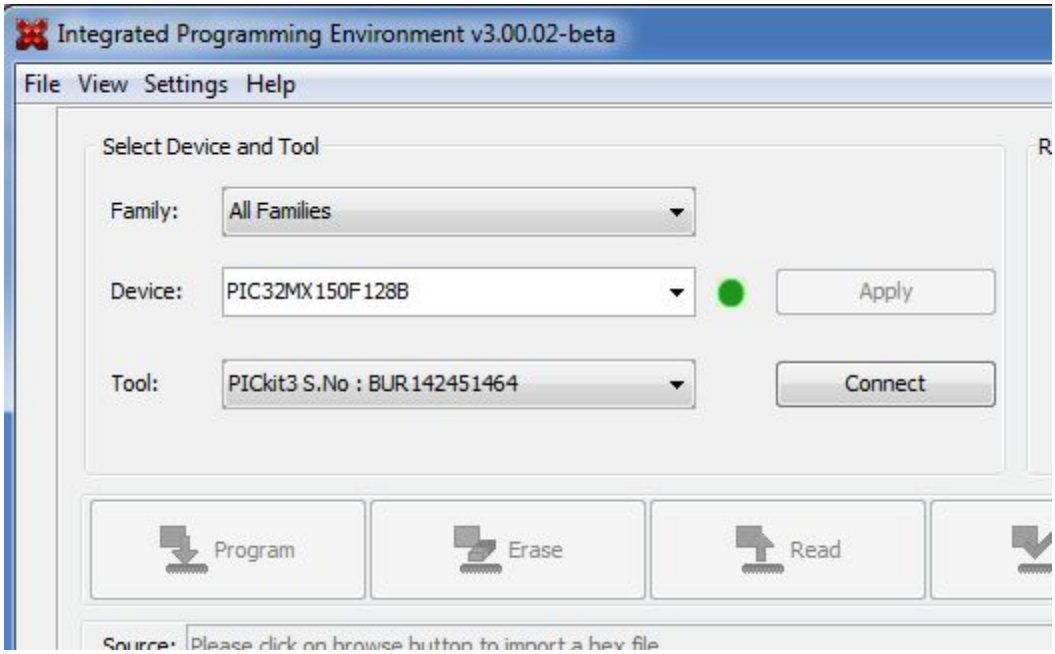
Download and install the MPLAB IPE software. you can get it here:
http://www.microchip.com/pagehandler/en-us/family/mplabx/

Pick the MPLAB X IDE Beta 3. Once you download it, you can install everything, or just the IPE. Other versions of MPLAB may work, but this is the only one we have used.

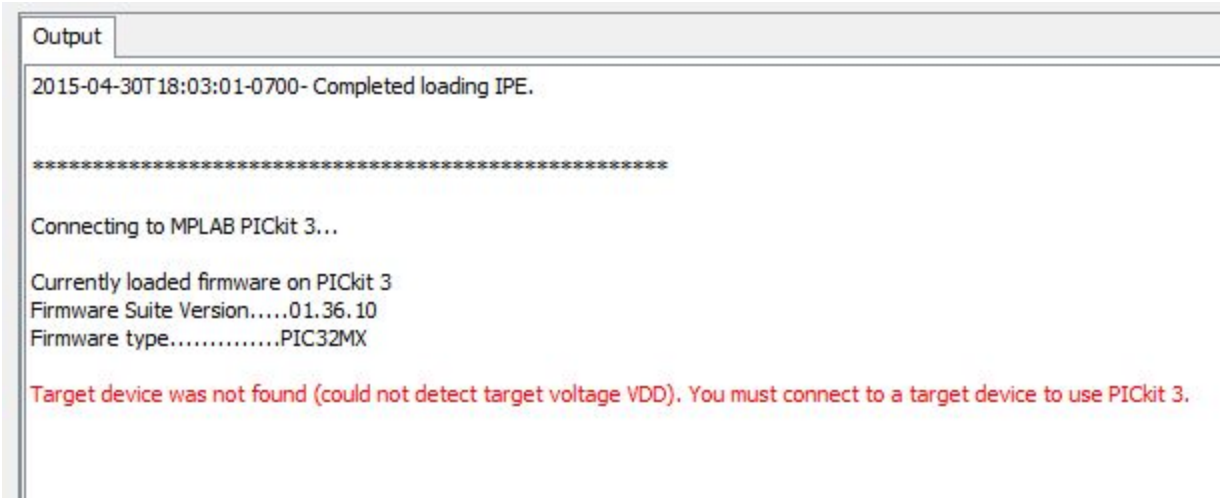
Test that it works

Plug the Pickit3 into a USB port on your computer.
Run the IPE software.

Enter the correct device, as seen below. If the Pickit is recognized you should see its serial number displayed in the “Tool” menu.



Assuming all is well so far, press the “Connect” button. It will chug for awhile, and display something like this:

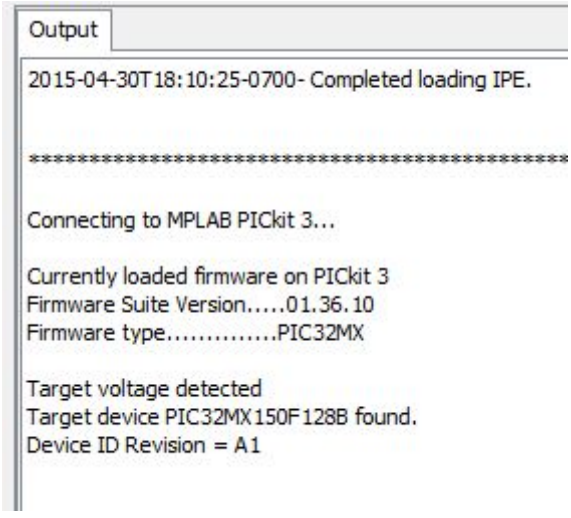


As you can see, it was able to read some information from the pickit3, but it can't go farther, because it needs power from the disting.

Note that if you enter the wrong CPU type, you will get a warning message: "Target Device ID does not match expected Device ID". If this happens, look more carefully at your disting - you may have misidentified the model.

So now you should plug the pickit into the disting. The writing on the pickit should face the same direction as the components on the dising (Here's a picture: https://www.muffwiggler.com/forum/userpix2/1111_img_0002_1.jpg)

Power up the disting. Now you should be able to connect. Now you should see this:



Backing Up Disting Firmware

Introduction

You must save off the factory firmware, as it has calibration values that may get lost.

It is very important that you never lose this data, and *very important that you remember which disting goes with which file*.

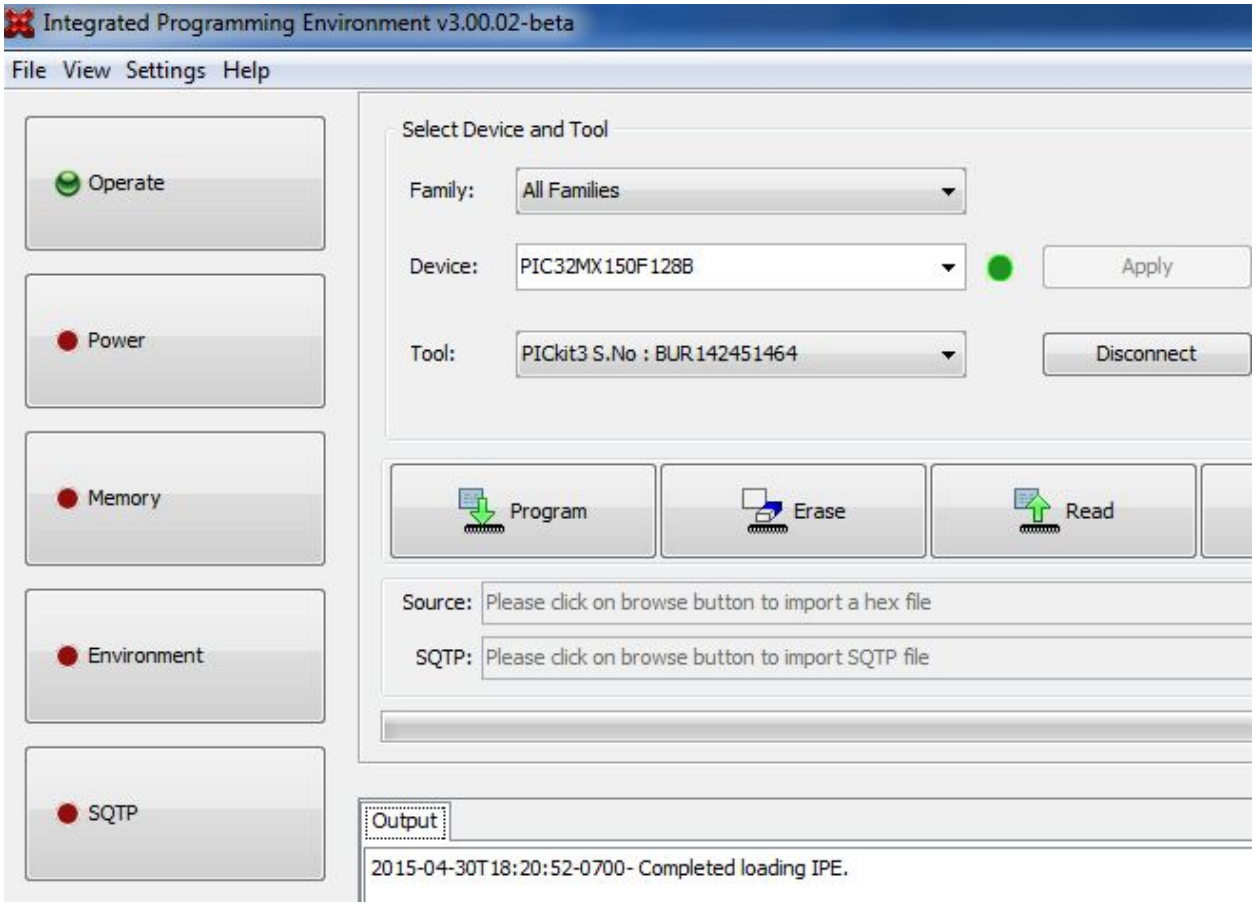
One might stick a label on the disting identifying it...

Backup Procedure

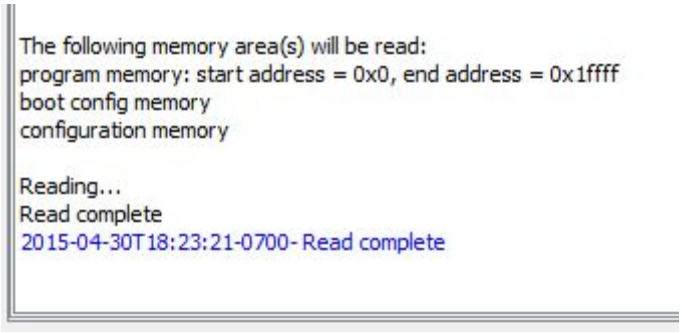
Run the IPE software again, verify that the Device type is still correct (it should remember that), and connect to the disting.

From the “Settings” menu, pick “Advanced Mode”.

It will prompt you for a password, and tell you what it is. do it. Now you will see an even uglier UI:



Press the “Read” button. It should chug away for a few seconds and say:



Now, you must save this data to a safe location. Select “File / Export / Hex” from the menu, and save this somewhere. Check the file on disk.

Note: the above illustration is for the mk1. the mk2 disting will give a similar display, but the end address will be 0x3ffff, since it has more memory. In any case if you get “read complete” things are good.

Flashing New Firmware

Introduction

These instructions will tell you how to program the flash on a disting. Two cases in particular are covered here: restoring the factory firmware, and programming our new ThisThing firmware.

Before doing this, you MUST save off the factory firmware from your disting. If you have not done so, stop now and do it.

As far as I know, it is impossible to damage your disting by re-programming it. Even if you totally mess it up, you should be able to restore the factory firmware.

Preparation

You have, or course, already determined you have a mk1 or 2 disting, and have backed it up.

You also have a .hex file containing ThisThing firmware that you wish to flash onto your disting.

These instructions assume that you have already connected your Pickit3 to your disting, and to your computer, and that the disting is powered up.

Part 1: setup

This initial setup is used in both cases (ThisThing firmware and factory firmware)

Run the IPE software on your computer.

Verify that “Device” is set to the appropriate CPU for your Disting: “PIC32MK150F128B” for mkI, or “PIC32MK170F256B” for mkII . It should have remembered this from last time. If not, set it correctly.

Press the “Connect” button, and verify that connection is successful.

Select the firmware file you wish to use.

- Next to the “source” field in the middle of the screen is a “browse” button.

- Browse to the hex file you want.
- After confirming it, you should see a message at the bottom indicating that the file was loaded correctly.

Part2 - ThisThing firmware

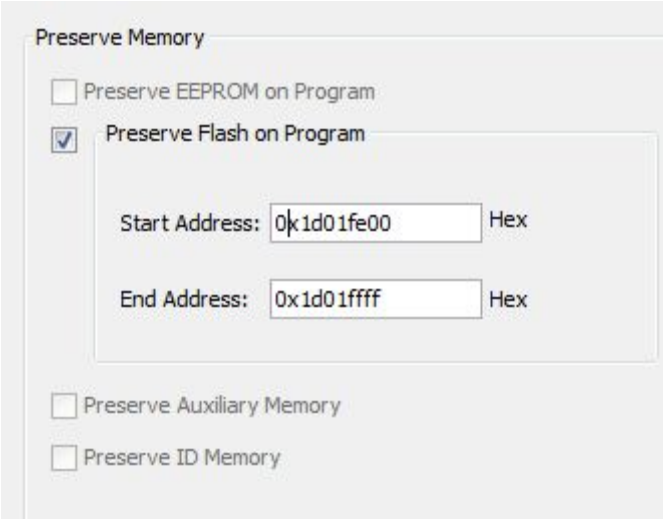
You must do some extra stuff in order to preserve the factory calibration settings

Go into advance mode in the IPE user interface. This is documented in the instructions for backing of the factory firmware.

Press the “Memory” button.

There is a section on the right “Preserve Memory” (picture follows)

- Check the box that says “Preserve Flash on Program.
- Enter the start address: 0x1d01fe00 for mkI, or 0x1d03fe00 for mkII.
- Enter the end address: 0x1d01ffff for mkI, or 0x1d03ffff for mkII.



(Unfortunately the IPE software will not remember these settings. You must enter them every time)
Now press the “Operate” button to get back to the programming UI.

press the “Program” button in the middle of the screen.

In the status area, you should see it doing its thing:

```
Preserving Program Memory from 0X1D01FE00 to 0X1D01FFFF
2015-09-13T15:31:06-0700- Programming...

The following memory area(s) will be programmed:
program memory: start address = 0x0, end address = 0x1ffff
boot config memory
configuration memory

Device Erased...
Programming/Verify complete
2015-09-13T15:31:20-0700- Programming complete
Pass Count: 3
```

After this, the disting should re-boot and run our firmware.

Part 3 - Power up and diagnostics

When you apply power to the disting with this firmware you should first see the small LEDs count from 0 up to 15.

After that it will search flash memory for the calibration data. If the data is found and looks good. the Letter “C” will show for a little while.

On the mkII, if the calibration data is not found, a vaguely “X” shaped pattern will flash.
On the mkI, if the calibration data is not found, the software will reboot after the count from 0 to 15, so it will just keep counting over and over.

After that the product proper will start. As expected, the top knob will select from 16 different functions, and the LEDs will display which one is selected.

If you get the flashing “X”, or infinite reboot, you should:

- Reprogram the factory firmware to restore the calibration data.
- Reprogram my firmware, making sure to correctly type in the addresses in the “Preserve Memory” area.