Installing TinyUF2 bootloader on RT10xx Microcontrollers

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Install the UF2 Bootloader

At Adafruit, we really like the UF2 bootloader for installing software like CircuitPython on microcontrollers. UF2 allows you to drag-and-drop UF2 files and has a nice LED/NeoPixel indicator. No special DFU/firmware-updater software is required and you can use any computer to program a UF2-bootloader device.

But what do you do with a fresh chip, or if the UF2 bootloader on your device has become corrupted? This guide will walk you through the steps of installing the UF2 bootloader using the ROM bootloader built into all RT10xx chips using software called sdphost or sdphost.exe on your PC, Mac, or Raspberry Pi.

You only have to perform this step once for fresh-from-the factory chips, or if somehow your bootloader got corrupted. The 'USB in ROM' bootloader, thankfully, cannot be damaged, so you will never need a JLink/OpenOCD hardware dongle to perform this task.
Enter RT ROM Bootloader

Now it's time to configure your board to enable the ROM bootloader, which is sometimes called the "serial downloader". The RT series chips will start the USB ROM bootloader when certain 'strapping pins' are set on hardware boot.

On the MIMXRT1010-EVK board

- Move jumper J1 to position 3-4 so that the board can be powered from USB port J9
- Ensure jumper J27 is at position 2-3 so that reset switch SW9 resets the microcontroller. Use switch SW9 when the text below tells you to press reset.
- Use connector J9 for your USB connections. Don't use connector J41, it's a debug connector.

For the RT1010-EVK development board, find switches SW8.3 and SW8.4 and switch them to the positions shown here.
For Metro M7 RT1011

There are two jumper switches on the front of the board. Make sure they look like this, with the B0 switch set to ON and the B1 switch set to OFF.

Find SE Blank RT Family

Once you've set the jumpers for your board, plug in the board with a USB cable. You cannot just press reset, do a full hardware reboot.

Your computer should see a new USB device called **SE Blank RT Family**. Note, it is not a mountable USB device or COM port, and will not appear in the file browser.

In windows, we found it under Control Panel > Hardware and Sound > Devices and Printers

If not, check the switch positions & cables.
Run sdphost Loader

NXP now recommends using spsdk, a pip-installable set of tools, instead of sdphost.exe. We haven’t updated this guide yet, but you can check out the spsdk documentation:

SPSDK documentation on readthedocs

https://adafru.it/VCp

First, grab the right version of sdphost for your host computer. There are versions for Windows, Mac, and Linux (including for Raspberry Pi).

Head to this downloads page on github (https://adafru.it/Rle) and grab the version that is right for your Mac, PC or Raspberry Pi.

Next, download the right tinyuf2 bootloader for your particular board. Head to the tinyuf2 releases page (https://adafru.it/Rlf) and download the correct zip file, such has "tinyuf2-metro_m7_1011" for the Metro M7 RT1011.

From inside the zip file, extract the ".bin" file. Usually, putting it in the same folder as the sdphost program is easiest.

Open up a terminal window and issue two commands with sdphost, changing the name of the .bin file as appropriate:

```
sdphost -u 0x1fc9,0x0145 -- write-file 0x20206400 tinyuf2-imxrt1010_evk.bin
sdphost -u 0x1fc9,0x0145 -- jump-address 0x20207000
```

The hex numbers above are the same for any RT1010/RT1011 board.
These commands run really quickly, in well under a second. Once the `sdphost` commands finish, your board will re-connect via USB, for instance as `RT1010BOOT`. However, before you do anything else, you need to return the switches to their usual position.

On the RT1011 EVK, return switches SW8.3 and SW8.4 to the positions shown here

On the Metro M7, set B0 to OFF and B1 to ON

Then re-plug your device or use its reset button. This mode is sometimes called "FlexSPI boot".
Once again your device will connect as a BOOT device with a disk drive appearing. If it doesn't, double check the DIP switch settings and try pressing RESET twice in quick succession to activate the UF2 bootloader. If you've previously loaded software such as CircuitPython via UF2, it was not erased when you installed TinyUF2 and it will automatically be booted.

You can now drag any compatible UF2 file such as [CircuitPython](https://adafru.it/Amd) onto the drive.

To access the UF2 bootloader again at any time, press the reset button twice in quick succession. You can upgrade CircuitPython or TinyUF2 itself using the UF2 bootloader. Only if TinyUF2 becomes corrupted will you need to follow the instructions with sdphost again.

Continue installing CircuitPython by following the steps in this guide. ([https://adafru.it/Amd](https://adafru.it/Amd))