Provisioning a Nordic Semiconductor Thingy91 Device for Tracking

First, download nRF Connect for Desktop from the Nordic Semiconductor website: https://www.nordicsemi.com/Products/Development-tools/nrf-connect-for-desktop/download and install it on your PC.

Click the 'Downloads' button on the page and install the appropriate version for your operating system. It supports Windows 32 and 64 bit, Linux and Mac OS.

Second, navigate to the precompiled binaries page for the Thingy91:

https://www.nordicsemi.com/Products/Development-hardware/Nordic-Thingy-91

Download the latest precompiled application firmware zip file: **thingy91_fw_2024-03-13_ad2b60d2.zip** and the latest modem firmware (further down the page) **nfw_nrf9160_1.3.6.zip**. As of this writing the current version is 1.3.6, but it may be superseded as they appear to be releasing it at least one a year. Expand the thingy91 zip file, but NOT the nfw file, leave that as it is.

Next, install the SIM card that was shipped with the unit, by removing it from the card and installing it in the SIM card slot as shown in Figure 1. Save the card that it came on as it will be needed later.

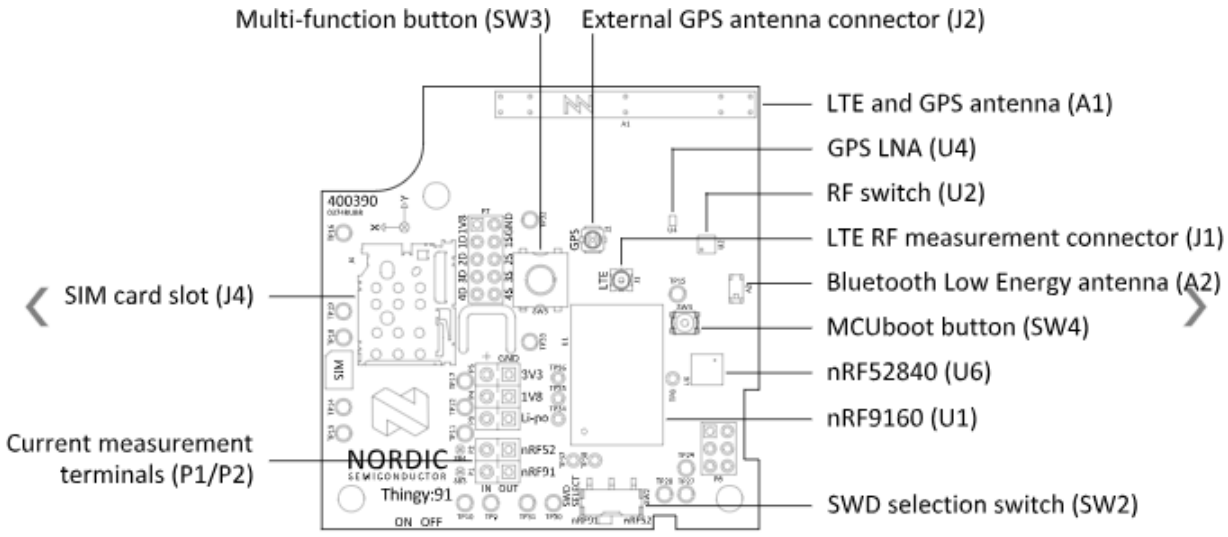
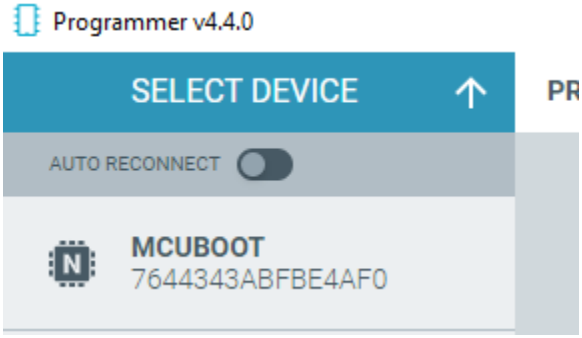


Figure 1 Hardware Diagram

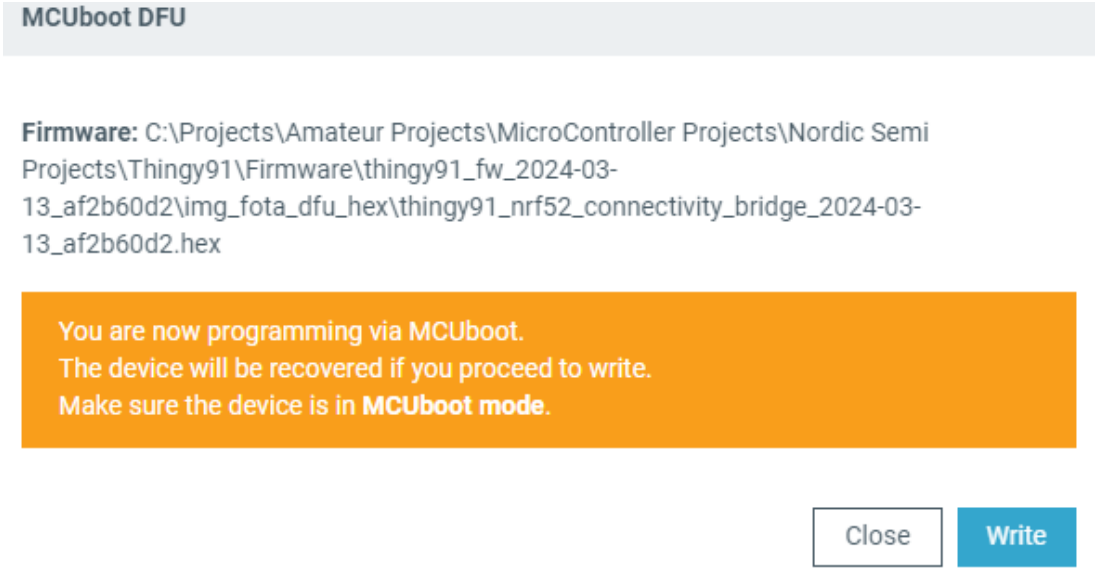
There are three phases in the provisioning process, upgrading the firmware, activating the SIM card, and enabling the tracking application. The first is done with a programmer on the PC, the remaining steps are done on nrfcloud.com.

To start the first phase, connect a micro-USB cable to it and power it on. Attaching a pair of grabbers to the switch makes it easier to turn on and off. Make sure the device is OFF. There are three separate steps in to install the upgrade.

The first step installs code in the nRF52840 processor to enable upgrading the nRF9160. Using the end of a pair of tweezers, depress the MCUboot button, holding it down while turning it on. Release the button once it is on. Be extremely careful as the button very delicate as it can be damaged if too much pressure is applied. Launch nRFConnect Desktop, and select the 'open' button for the programmer. If 'install' is showing instead, then click it and install the programmer, then you can launch it. In the top left corner, depress the 'SELECT DEVICE' button, and choose the 'MCUBOOT' entry as shown below:



From the menu select 'Add File', and navigate to the directory where the thingy91 firmware was unzipped. Choose the item: thingy91_nrf52_connectivity_bridge_2024-03-13_af2b60d2.hex, then click the 'Write' button. The following dialog will appear:

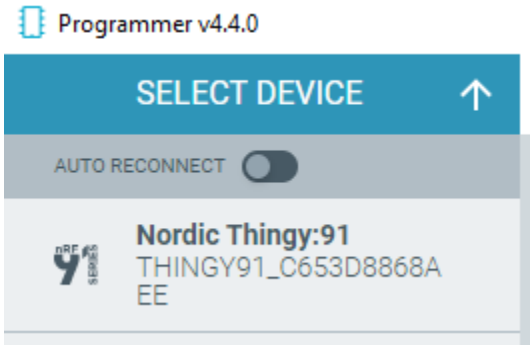


Click the 'Write' button to proceed. When completed, the message will change to:

Now click the 'Close' button and power off the device.

The second step is to upgrade the modem firmware in the nrf9160. This device has two processors, one implements the modem and the second the application.

Power off the device, and while depressing the multi-function button as illustrated in Figure 1, turn on the device, then release the button when it is on. Go to the 'SELECT DEVICE" button on the programmer, to list the devices, but this time it will be different:



This is because in the previous step we loaded code into the USB processor to be able to upgrade the device. Navigate to directory where the precompiled binaries are located and choose the modem firmware zip file **nfw_nrf9160_1.3.6.zip. DO NOT UNZIP** this file, instead point the programmer to the zip file, and not its contents. Click the write button again to program the modem code. The status will indicate 'Uploading image', this will take some time. The programming step takes about 4 minutes to complete. When complete you will get the green bar again and the approximate timing.

The thrid step is to upload the application code. Hit the 'Clear files' button first, then power off the device, repeat the steps above, but this time install the following: **thingy91_asset_tracker_v2_2024-03-13_af2b60d2.hex.** Note that this time it is the .hex file, not the .zip file that it installed.

When completed, the green LED on the device should be flashing, which indicates that it is ready for provisioning.

The second phase is to activate the SIM card. Going back to the card that in which it was shipped, turn it over and scrape off the rubber protective cover to reveal the PUK code. Write this code down.

Log in to the nrfcloud.com website, you will be at the DASHBOARD page. On the left side, select the SIM cards menu item. You will see a list of all the active cards and the amount of data remaining.

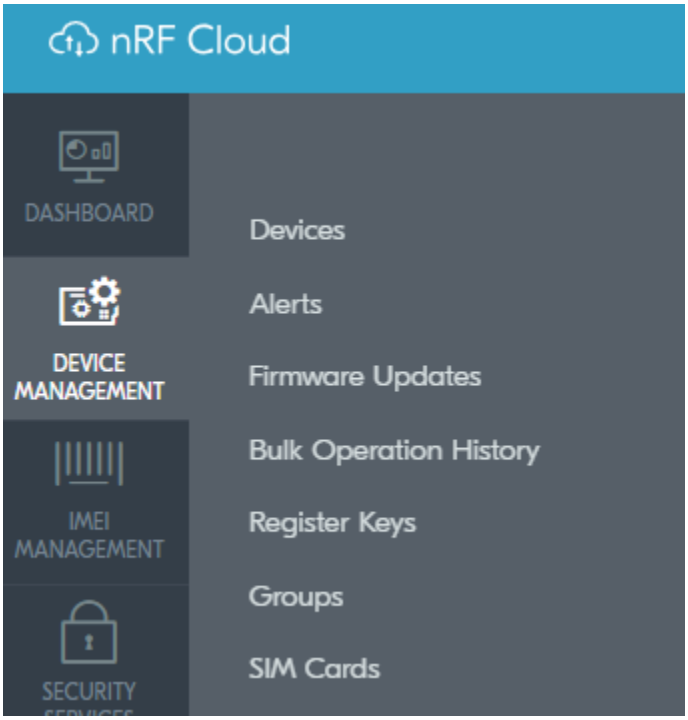
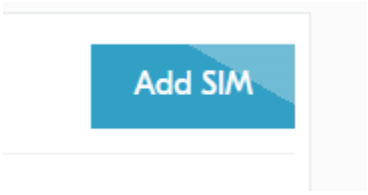


Figure 2 Device Management Menu

At the top right corner, press the 'Add SIM' button:



The form shown in Figure 3 is used to activate the SIM card. There are two entries required, the rather long number underneath the bar code on the SIM card, called the ICCID/EID code, and the PUK code that you discovered earlier.

The easiest way that I have found to get the ICCID/EID number in is to use a smart phone to scan it, then e-mail it to yourself. From the e-mail message, copy and paste it into the field.

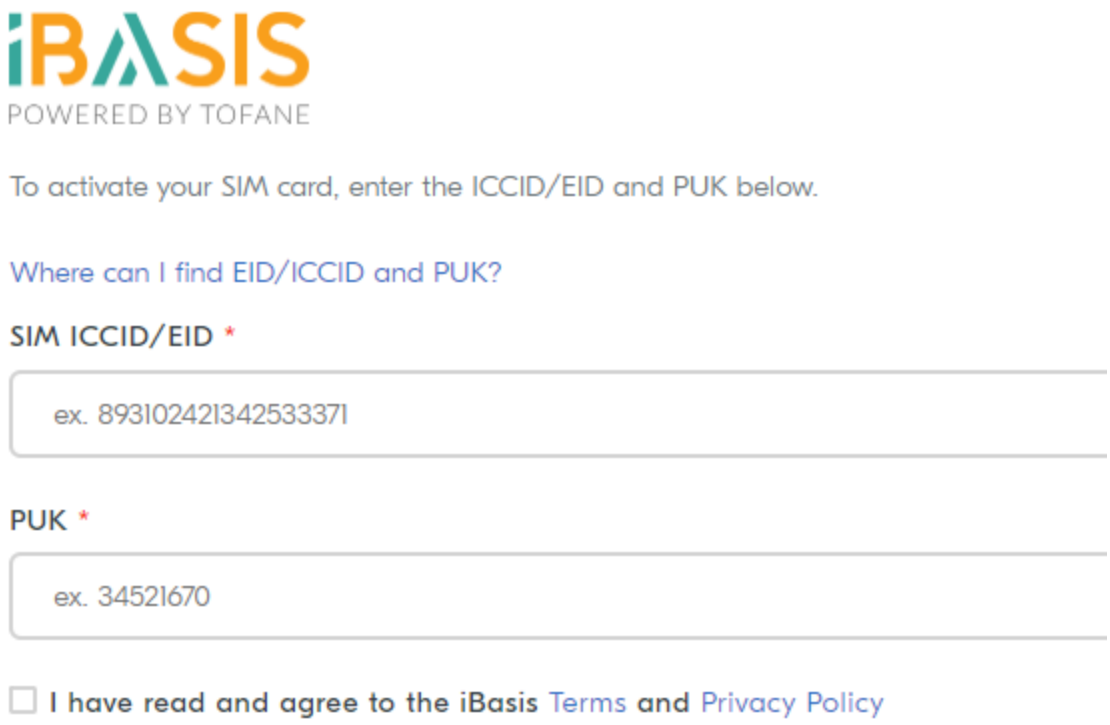
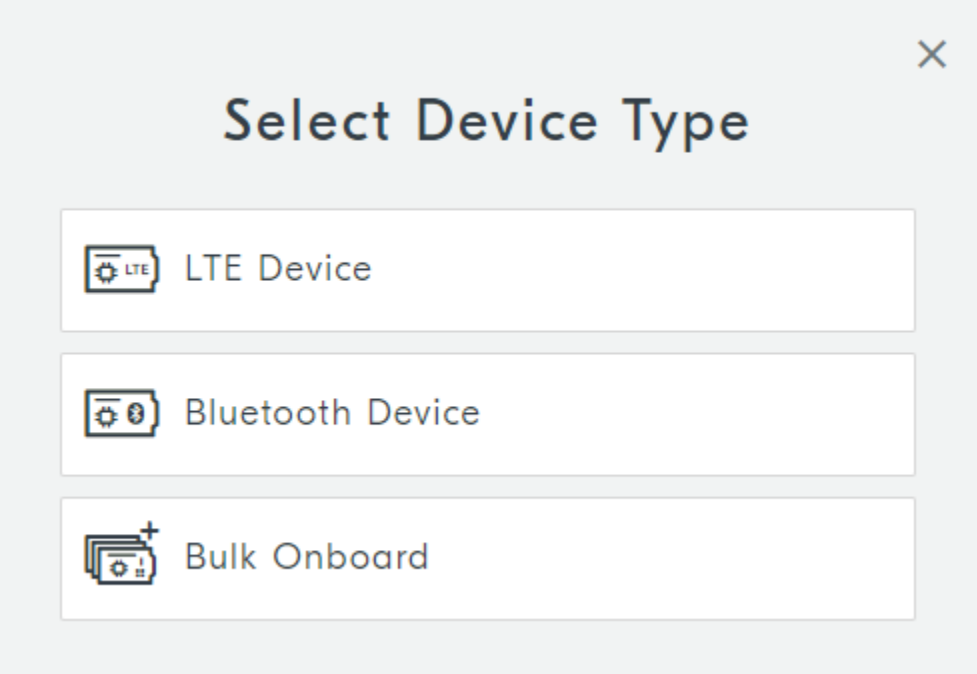


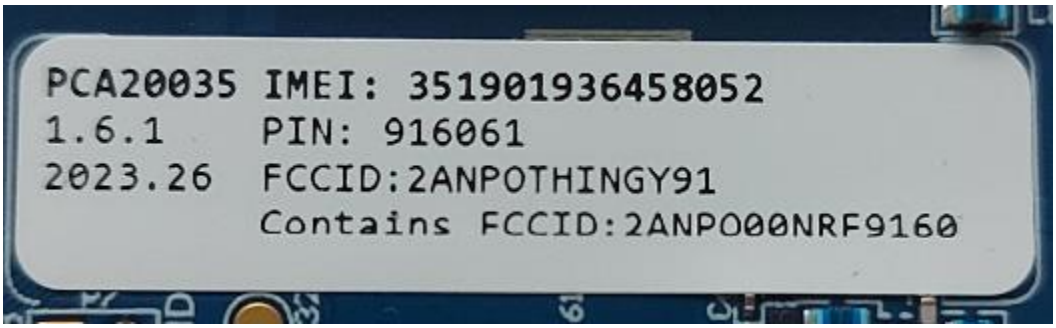
Figure 3 SIM Activation form

Once the fields are entered, check the terms box, and then click the 'Activate SIM' button. This will be enabled if it likes all the entries. A second form will appear where it asks you for details of who you are, etc, using the ADRCS Society as the company name, www.adrcs.org as the website, and ADRCS as the code for the last field.

The final phase is to install this device in the tracking application. Go back to the device management menu item in Figure 2, this time choose the “Devices” entry. A list of all the active devices will be shown, in the upper left corner, choose ‘Add Devices’. A menu will appear, select the ‘LTE Device’ at the top.



At the top of the Thingy91 board, under the antenna, is a label containing an IMEI (International Mobile Equipment Identity) and PIN number. These are required to add the device.



In the first entry entitled ‘Device ID’, enter the letters ‘nrf-‘ followed by all 15 digits of the IMEI code. Enter the PIN number on the device into the second field, and leave the ‘Sub Type’ field blank. Then click the ‘Add Device’ button. A window will appear asking about whether you need to activate an iBasis SIM, you have already completed this step, so click ‘No’.

You will be redirected to the status page. From the menu at the top, click ‘Rename Device’, erase the entry in the box, which will be the IMEI number, and add (Your call sign)-Thingy91 instead. As a last step, navigate back to the device management page, and click ‘No Groups Assigned’ on your entry. Add yourself to the ADRCS group.