GETTING STARTED with HT32SX

1 INTRODUCTION

The HT32SX is a System-in-Package device build for the Internet of Things providing a **ready-to-use** connectivity solution. It means that you will have strong reduction in your BOM cost, aiming a fast integration, simple design and **time-to-market** advantages. It provides both uplink (transmit) and downlink (receive) network communications. As a SigFox™ Monarch enabled device, it allows globetrotter devices to seamlessly roam across the planet taking advantage of the global SigFox™ network coverage without need of reconfiguration, this setup is done automatically.

The system provides an ARM Cortex M0+ 32bit, the STM S2-LP low power transceiver and an RF Front-End module combining all the advantages, integration, energy efficiency and convenience of advanced semiconductor packaging technology into a single chip with a 50Ω RF TX/RX interface.

1.1 About this document

The purpose of this document is to guide the user and explain how to access the SigFox™ network using the HT32SX. You can find all the technical documents and firmware examples in HT Micron's GitHub website (https://github.com/htmicron/ht32sx). In this user manual we'll use the hardware setup based on HT32SX evaluation board (HT32SX_DK) and the first application that send a message to the

1.2 Requirements

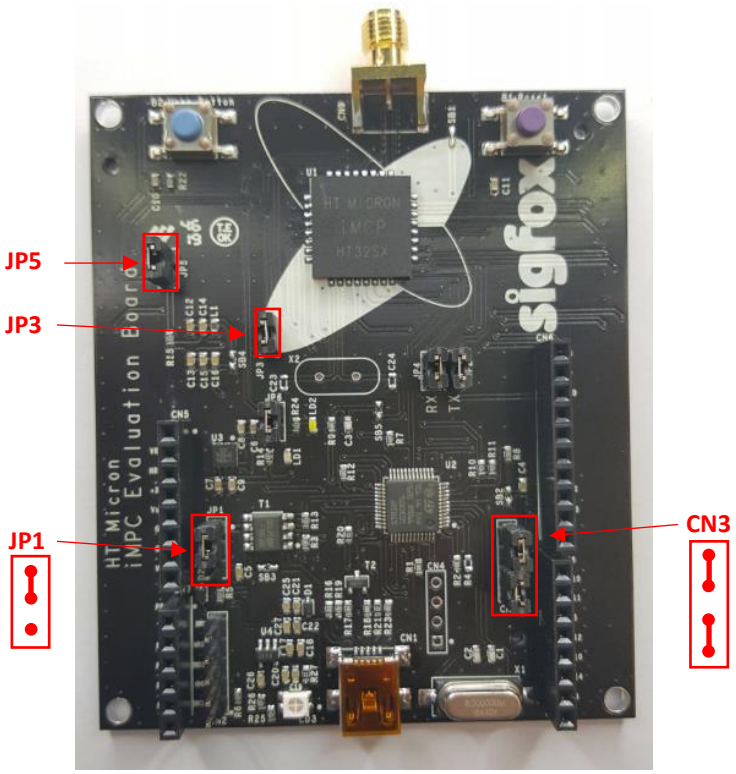
To follow this manual, you will need:

- Windows OS® (7, 8 and 10), Linux 64-bit, or macOS®
- USB cable: Type-A to Mini-B
- HT32SX_DK board
- 915MHz antenna

2 HARDWARE SETUP

Before start to use your HT32SX Evaluation Board with the application example, check the following:

- JP1 must be connected between pins 1 and 2 to use the USB power source
- JP3 and JP5 connected
- CN3 pins (1-2) and (3-4) connected



For a more detailed description of this board setup and configuration, please visit https://github.com/htmicron/ht32sx .

3 SOFTWARE SETUP

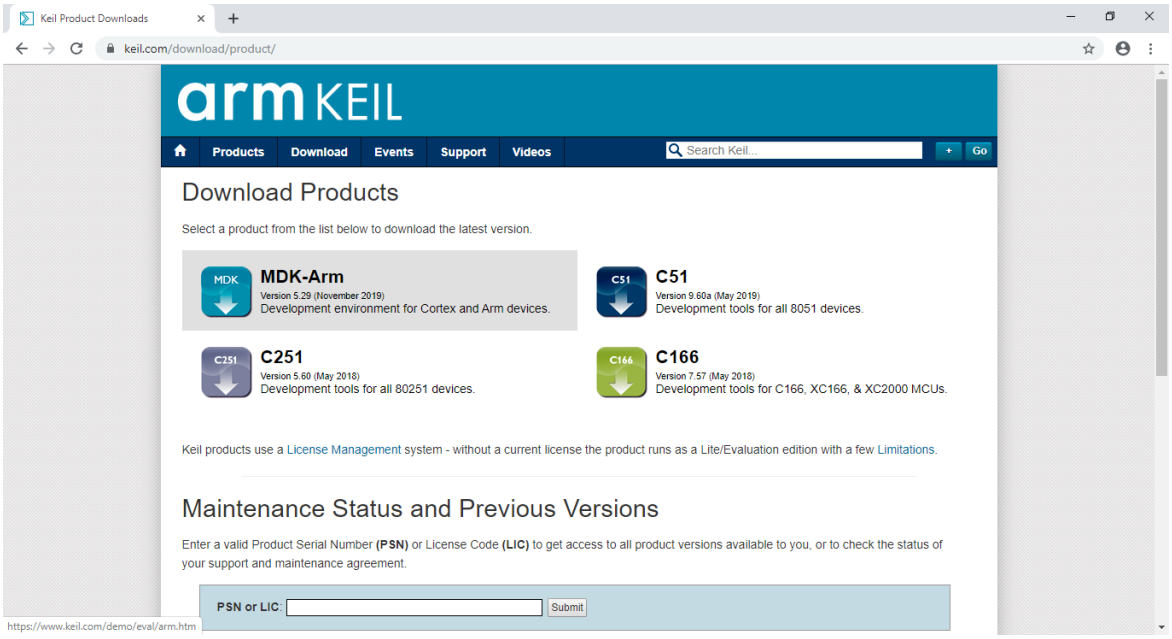
This section describes the necessary software to develop for the **iMCP – HT32SX**. It also details some specific situations with the default IDE (Arm KEIL).

Also, these programs are recommended:

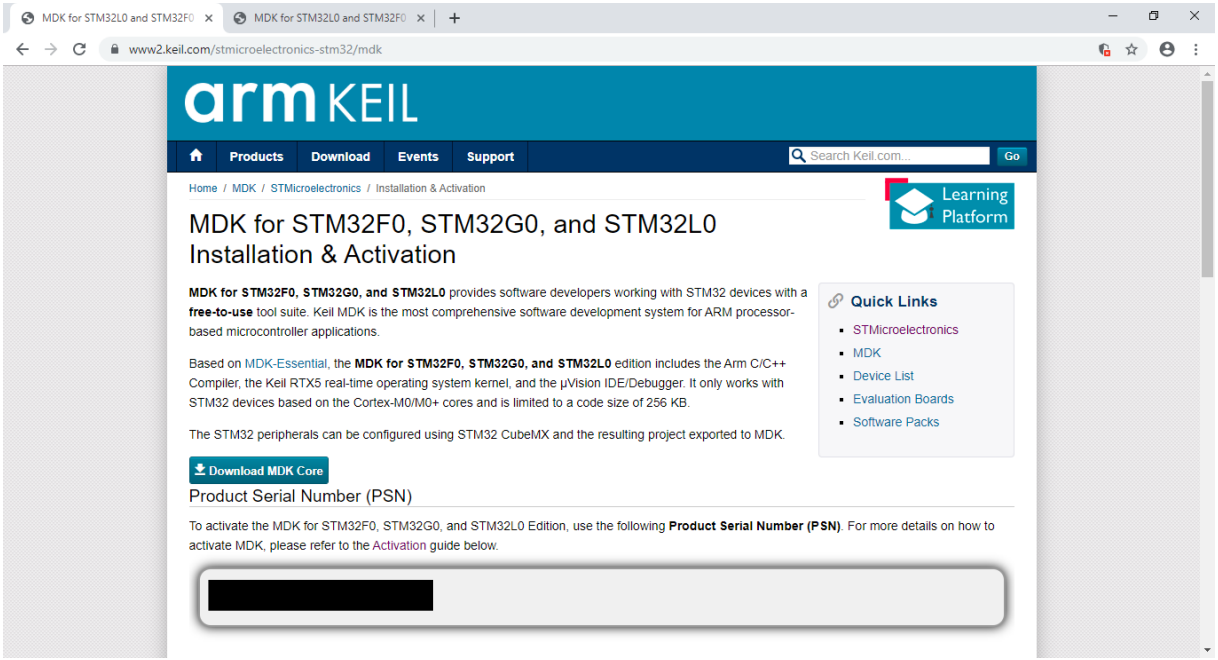
- GIT (for Windows, *git-scm.com* is recommended)
- STM32 ST-LINK (www.st.com/en/development-tools/stsw-link004.html)
- IDEs:
  - ARM KEIL MDK (https://www.keil.com/download/product/),
    - FREE license on: http://www2.keil.com/stmicroelectronics-stm32
  - STM32CubeIDE (https://www.st.com/en/development-tools/stm32cubeide.html)

3.1 Keil uVision

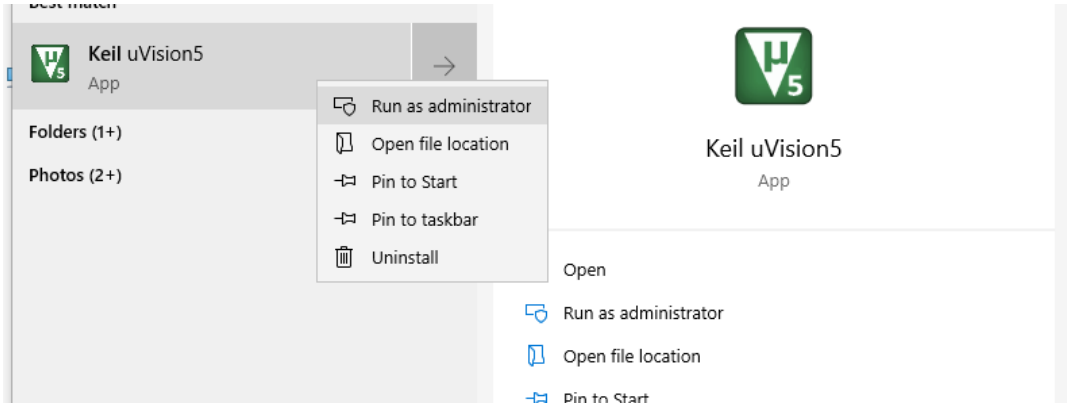
Install the ARM Keil from the above link, or from http://www2.keil.com/download/product:



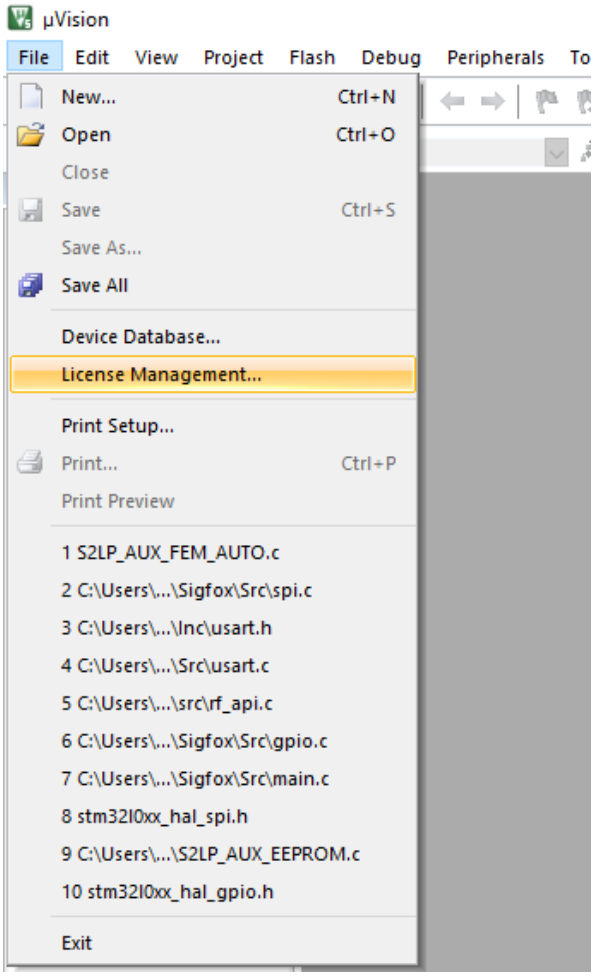
Access http://www2.keil.com/stmicroelectronics-stm32/mdk to get the serial number to use in the next steps. Copy it.



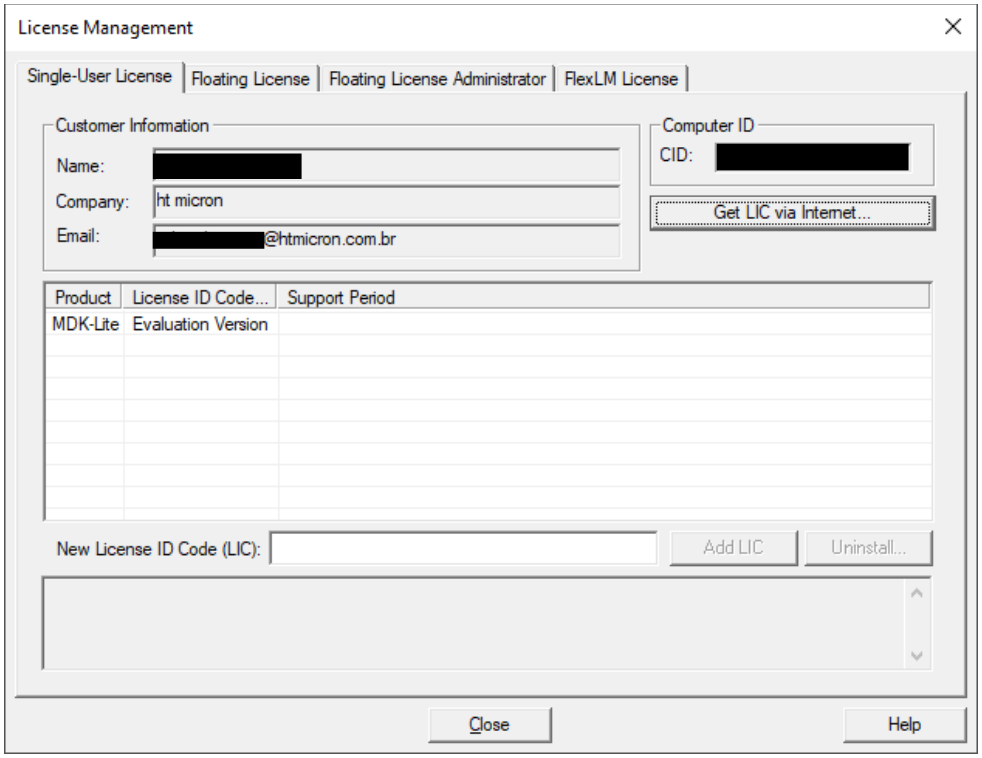
Open Keil as administrator.



Open the File > License Manager.

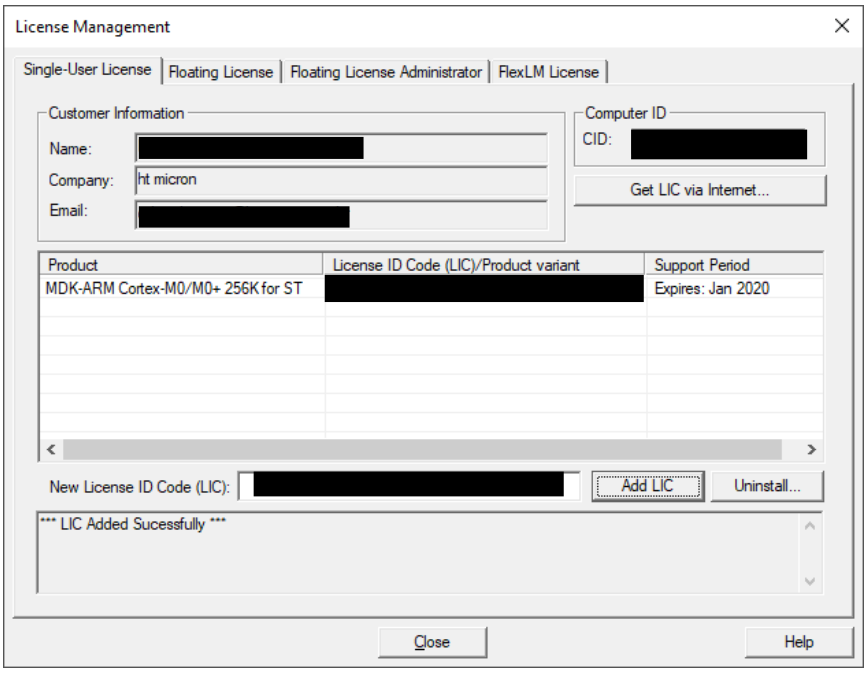


Click in Get LIC from internet.



It will open a formulary in the Keil website. Fill the form (using the serial copied in a previous step), and the LIC will be sent to your e-mail.

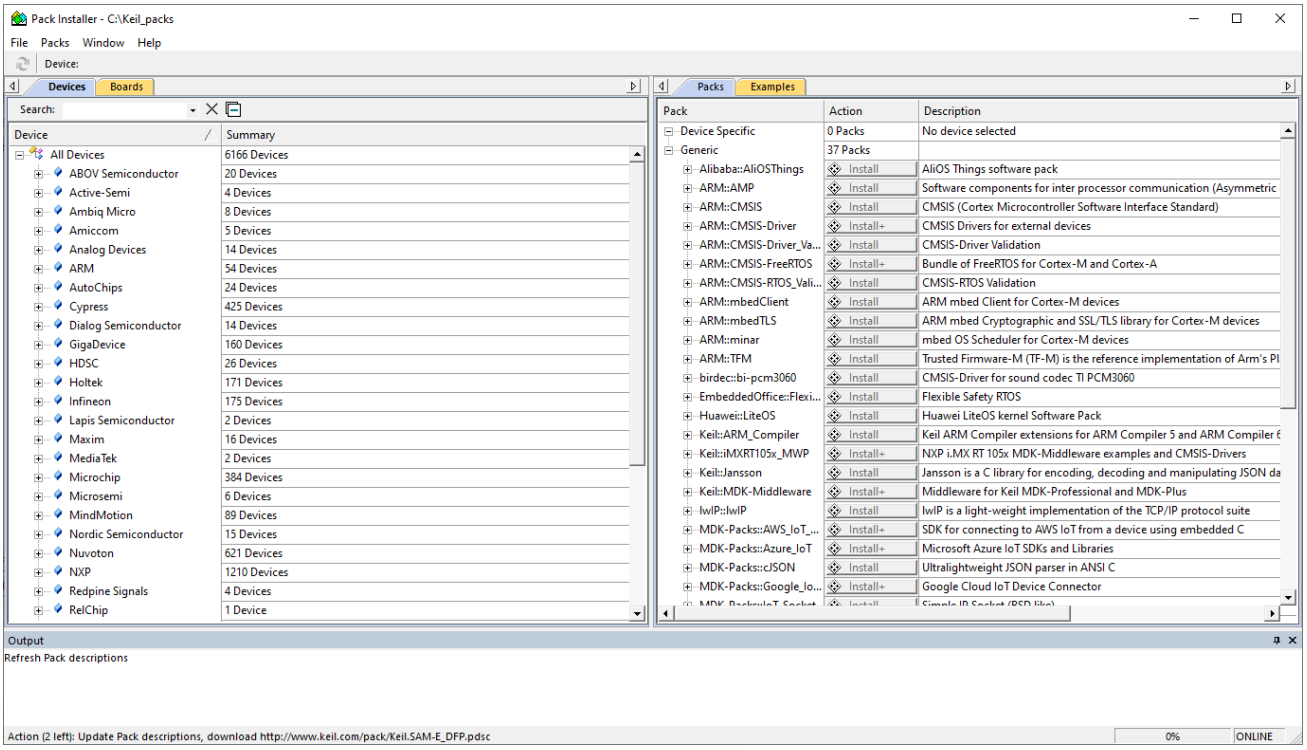
Insert the LIC in the License Manager and click in Add LIC:



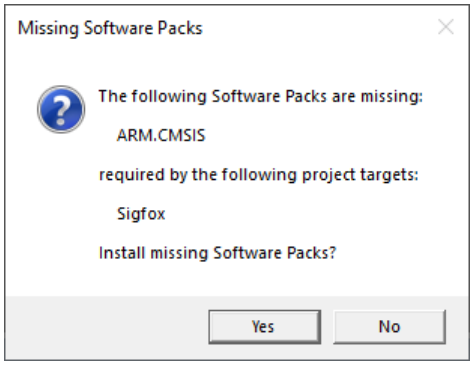
Close the License Manager and open the sample project downloaded from GitHub in the Keil software.

https://github.com/htmicron/ht32sx/tree/master/applications/Generic_Push_Button/Keil%20uVision

It will bring an alert about missing packages. Click in the Install button and wait for the package manager to finish updating the internal lists and installing the package.

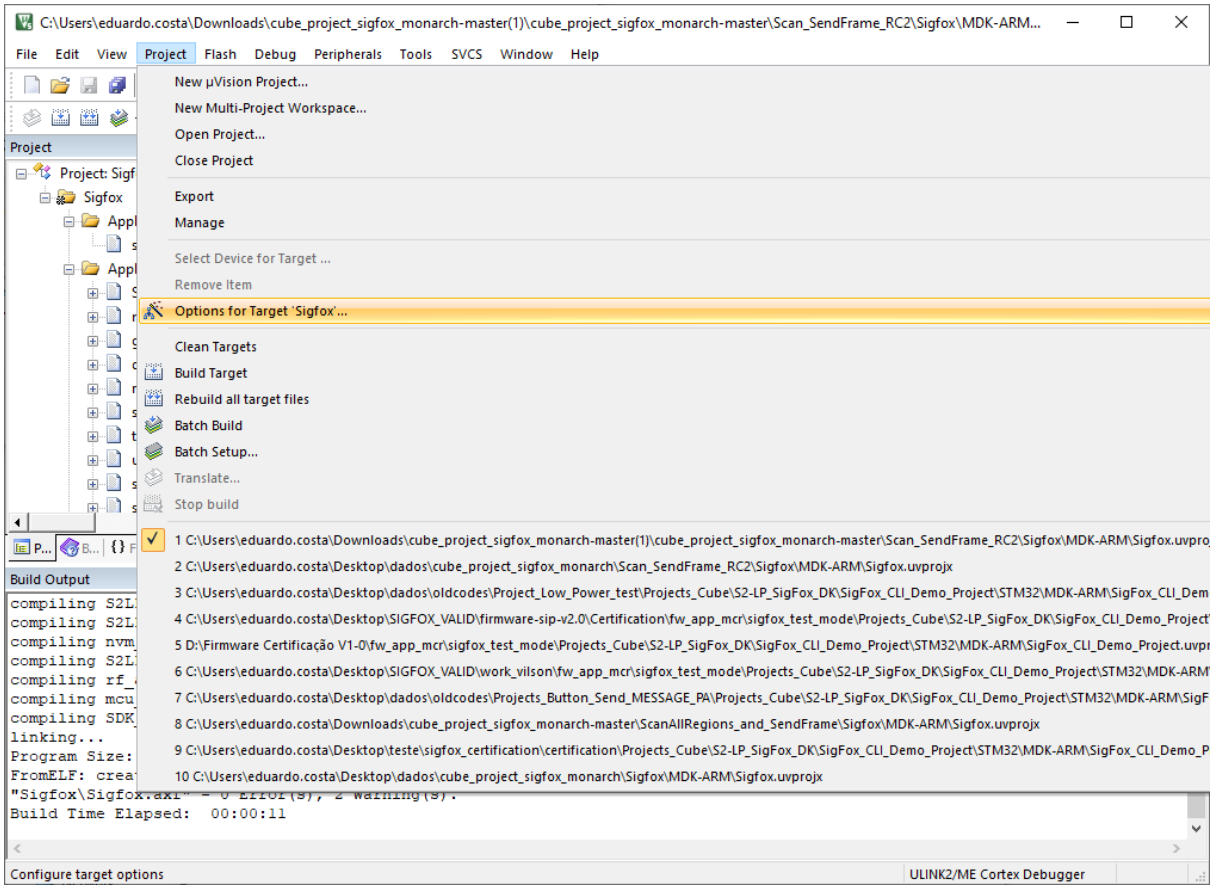


After installing the first missing package, install the second one:

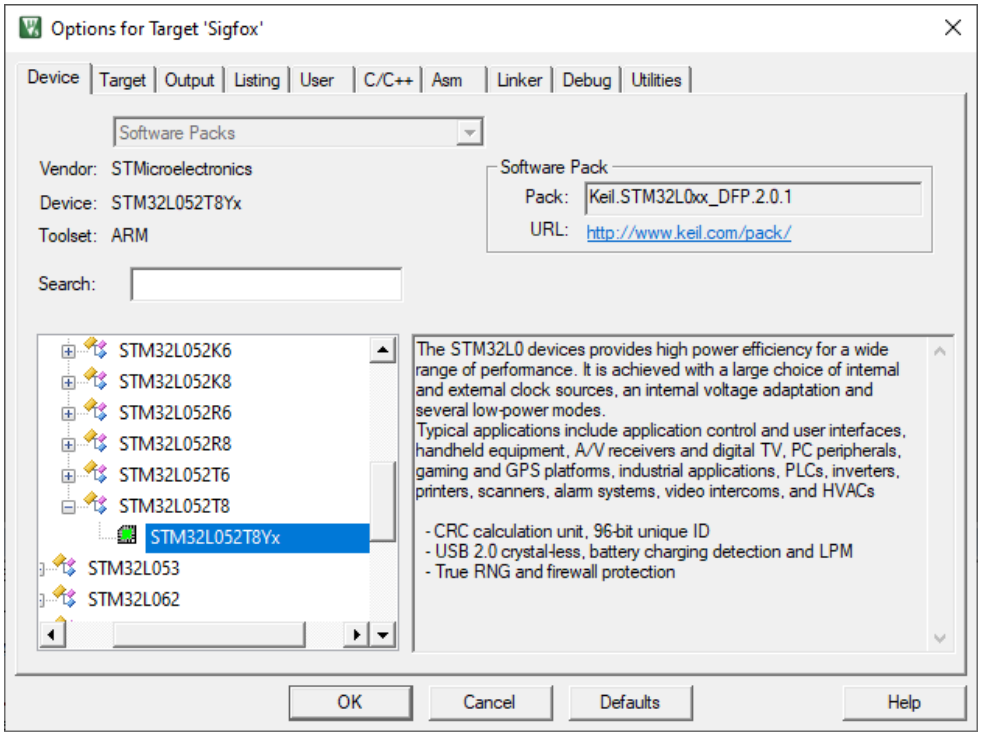


Also, select the Keil ARM Compiler from the list after this one finishes:

Closes the Keil and everything related open. After that, open the Keil project again. At this point, you may be able to build the code. If you get an error about the wrong device being selected, do the following: go to project →options for target Sigfox:



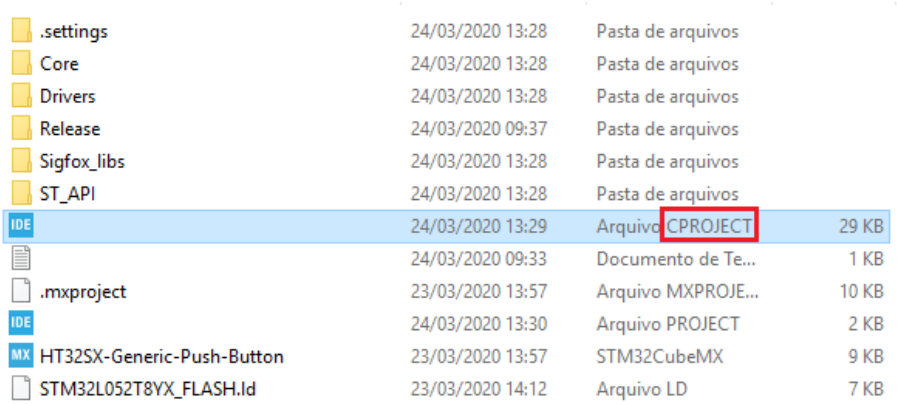
Then, go to the first tab:



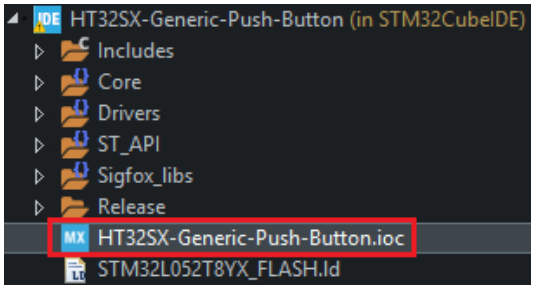
Select the device STM32L052T8Yx and press OK. Finally, change the "configRegion" routine to configure device to your current region. Doing that, you will be able to send messages to your current region.

3.2 STM32CubeIDE

- Open the directory where you cloned the repository, click on *"firmware_applications"* and select an example that you want to use in your project (in this case, we are going to open the Generic Push Button one).
- Select the **STM32CubeIDE** directory and double-click the ***"cproject"*** file:



- To open the **STM32CubeMX GUI**, double-click the ***".ioc"*** file:



4 APPLICATION CODE

4.1 Code repository

The code is available at the GitHub™

https://github.com/htmicron/ht32sx/tree/master/firmware_applications/Push_Button/Sigfox , branch *version_1.0*. To clone it, use:

```
git clone --single-branch --branch version_1.0
https://github.com/htmicron/ht32sx/tree/master/firmware_applications/Push_Button/Sigfox.git
```

Additional to the code, we also distribute the compiled program in the *hex* format at the same repository in the GitHub.

5 SIGFOX REGISTRATION

If **you do not have a SigFox account** and just received an Evaluation Board:

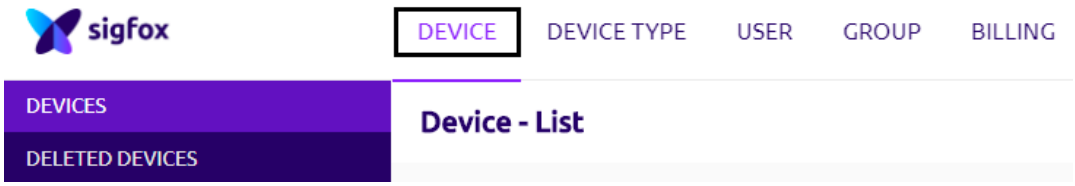
- Go to SigFox Buy (https://buy.sigfox.com/activate) and select your country.
- If you do not know the device **ID** and **PAC**, open a serial terminal and run one of our GitHub examples. That information should be shown as the image below:

```
Sigfox Monarch CLI
ID: FEDCBA98 - PAC: 0102030405060708
```

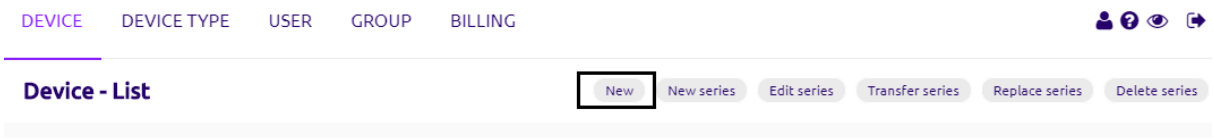
- Fill all spaces, follow the steps and an account shall be created with your device registered on it.

On the other hand**, if you already have a SigFox account:**

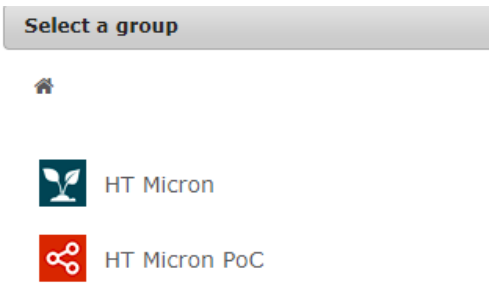
- Go to SigFox Backend (https://backend.sigfox.com) , access your account and click on *"Device"*:



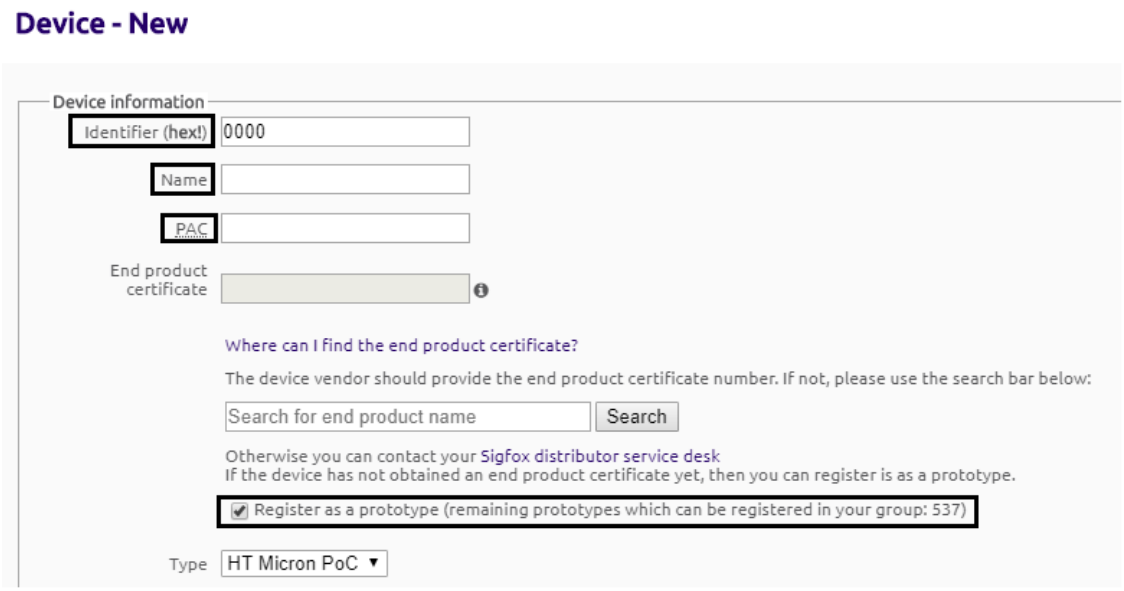
- Then click *"New"* to register a new device:



- Select the group which your device will be part of:



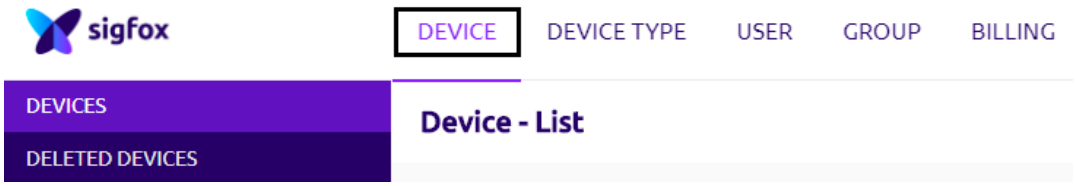
- Fill the underlined fields with your device ID & PAC and choose a name for it.
- Finally, click *"ok"* and your device will be Fill the underlined fields with your device ID & PAC and choose a name for it:



- Finally, click *"ok"* and your new device will be registered.

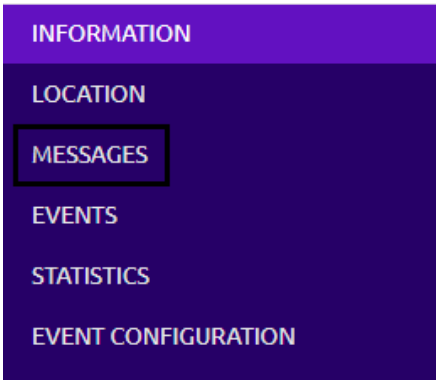
6 SIGFOX MESSAGES

- Open SigFox Backend website (https://backend.sigfox.com), where all your message will be shown.
- Click *"Device"*:



- Search for your device ID and click on it:

- Then click *"Messages"* and all messages received by that device shall be shown:



7 REFERENCES

For additional information about SigFox libraries designed by ST Microelectronics, please refer to the UM2173 document (note: the function names still the same, but the code was adapted to use in the iMCP design, so it is different from the one distributed by ST).

8 CONTACT INFORMATION

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