UWB device firmware update

Version 1.1 (2023.01.01)

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1 Overview

Users can update the firmware of the research and innovation UWB module in the following ways, please download it according to the model you selected.

Table 1.1 A list of upgrade methods for YCHIOT dev-kit series

	已购源码客户	未购源码的客户
Applicable models	Mini3 Mini3s Mini3sPlus Mini4sPlus Mini4 Mini5 Protag(STM32)	Mini3 Mini3s Mini3sPlus Mini4sPlus Mini4 Mini5 Protag(STM32)
Update method	Download the firmware by using the Keil	Download the .hex file upgrade program for the module
Tools & Software	hardware: ST-LINK Debugger software: Keil MDK	hardware: ST-LINK Debugger software: ST-LINK Utility
Reference	Chapter 4	Chapter 2

Table 1.2 YCHIOT commercial product series upgrade methods

	Anchor upgrade	Tag upgrades
Applicable models	ProAnc (STM32)	ProCard (NRF52832) Protag (NRF52832).
Update method	Download the .hex file upgrade program for the module	Download the .hex file upgrade program for the module
Tools & Software	HARDWARE: ST-LINK Software: ST-LINK Utility	HARDWARE: J-LINK SOFTWARE: J-FLASH
Reference	Chapter 4	Chapter 3

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2 Upgrade by ST-LINK Utility

2.1 About STM32 ST-LINK Utility

The main function of the STM32 ST-LINK Utility software is mass production (a tool for downloading codes in batches). It is also a more practical tool, when we need to view the chip FLASH data, we can quickly locate and find the data we want (provided that no protection is added).

The STM32 ST-LINK Utility software includes the ST-Link driver. If you install STM32 ST-LINK Utility software, your ST-Link does not need to install drivers separately, and can be used directly (such as Keil, IAR online debugging, downloading, etc.).

STM32 ST-LINK Utility software can quickly read STM32 chip model, ID, version and other information in addition to fast reading FLASH data.

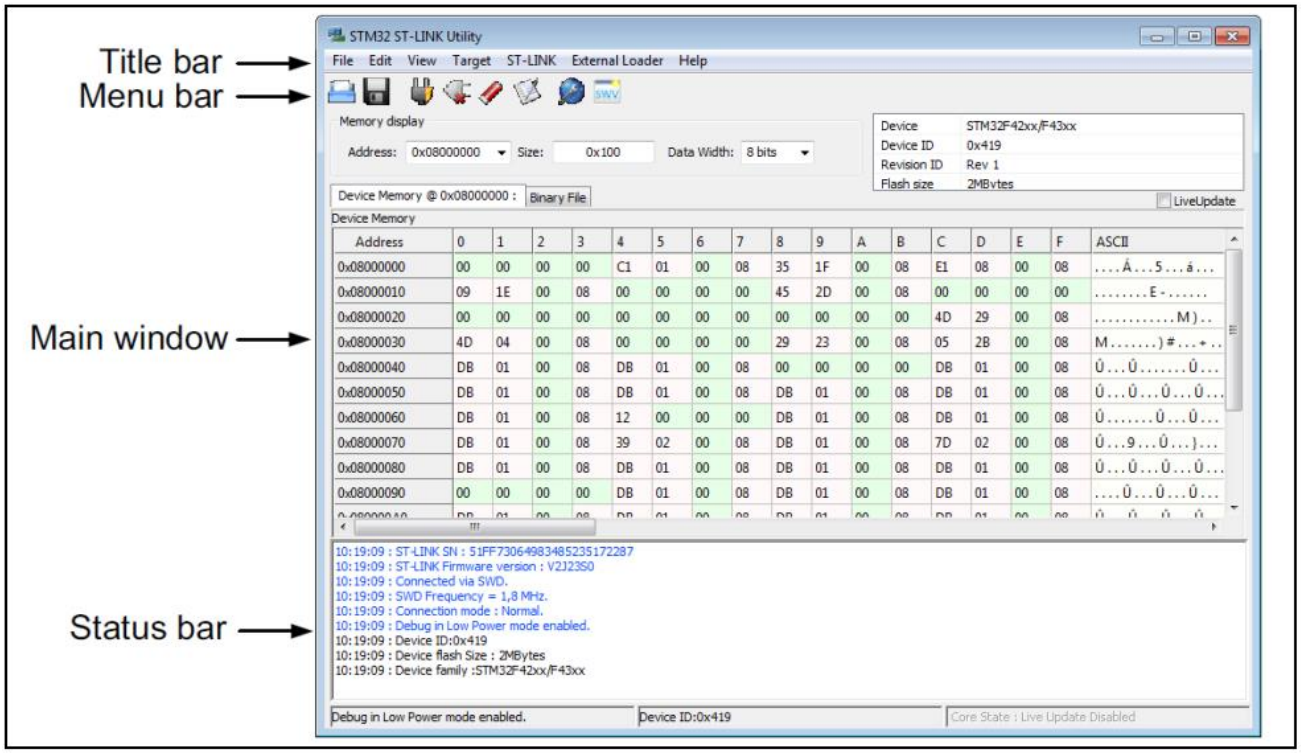

Figure 2.1 STM32 ST-LINK Utility interface

2.2 Software installation

The STM32 ST-LINK Utility integrated development environment is relatively simple

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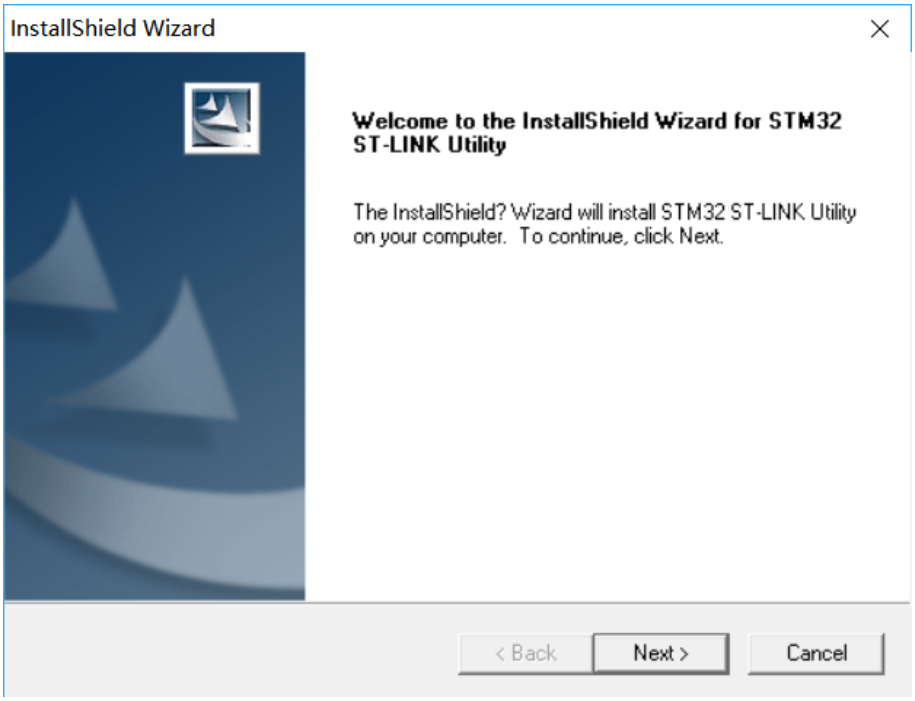
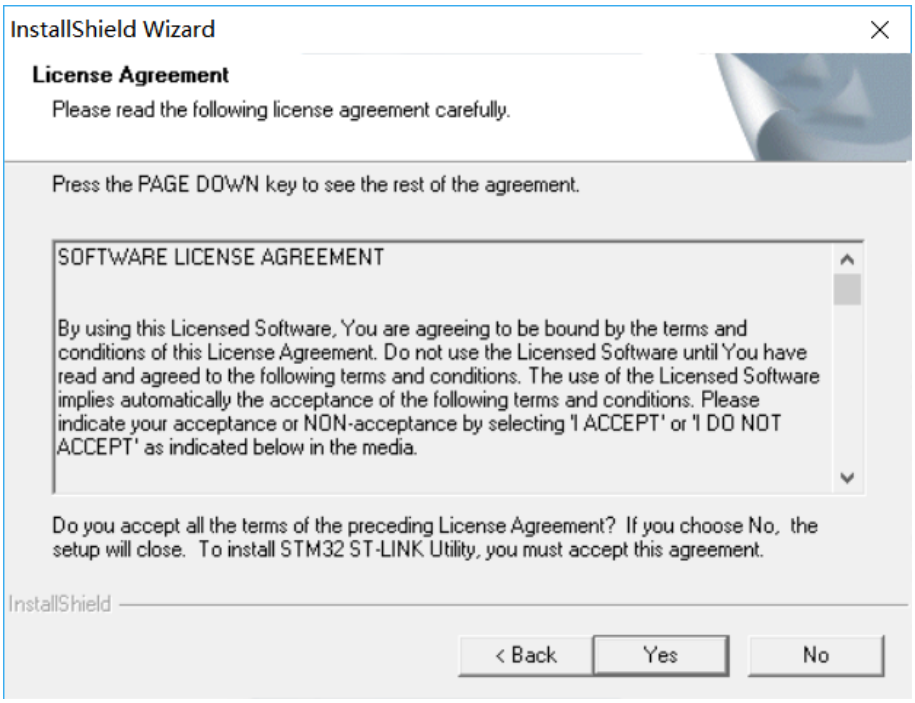
to install (basically all the way down). Take the "STM32 ST-LINK Utility v3.1.0 setup.exe" software downloaded above as an example.

1. Unzip the software, double-click "STM32 ST-LINK Utility v3.1.0.exe" to enter the process of preparing for installation (extraction).
2. Go to the installation wizard and click "Next".



3. Agree to the license and click "Yes".



4. Select the installation path (default here) and click "Next".

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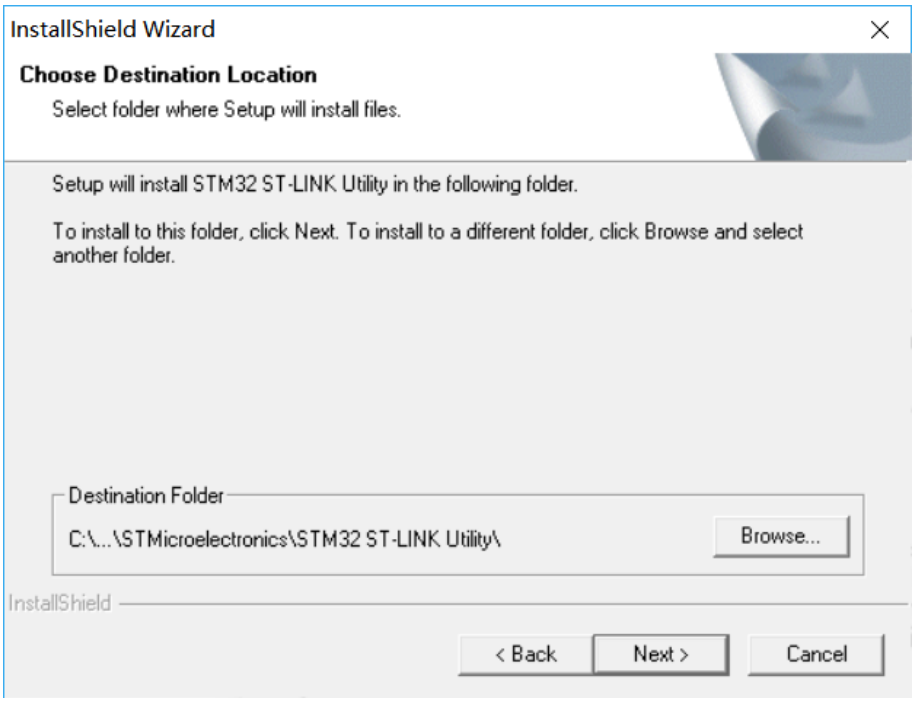

5. Enter the installation process, less than a minute.

6. At the end of the installation, prompt "Install Driver", click "Next", and finally click "Finish" to complete the installation.

7. Click "Finish" to complete the installation of the host computer software and ST-LINK driver.

8. Check the version: Open Software - > Help - > About, you can see that the version is updated.

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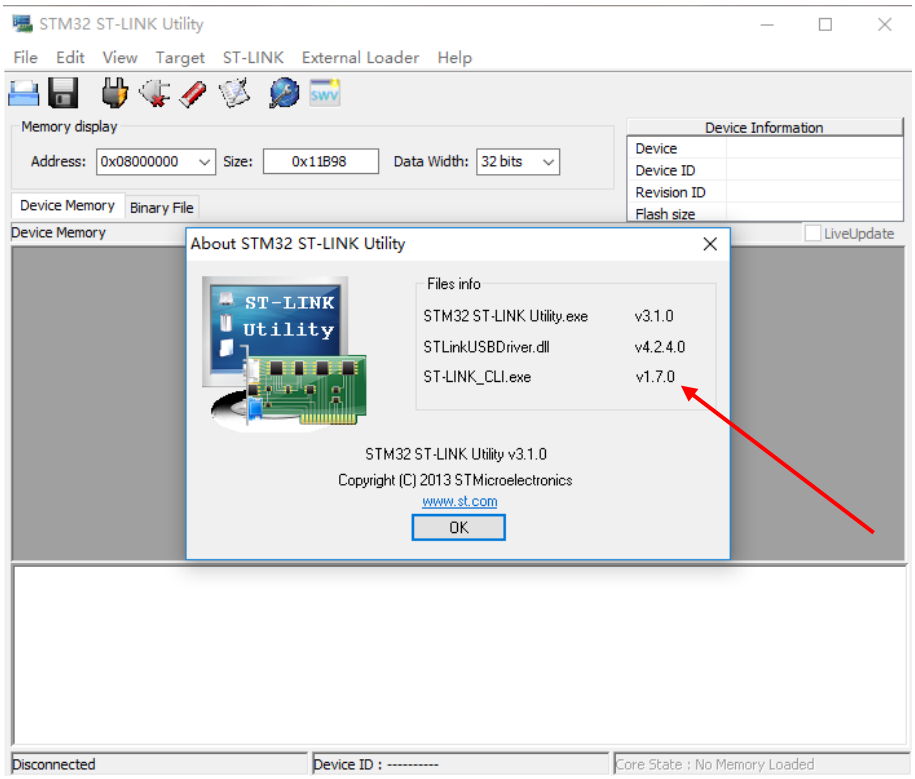
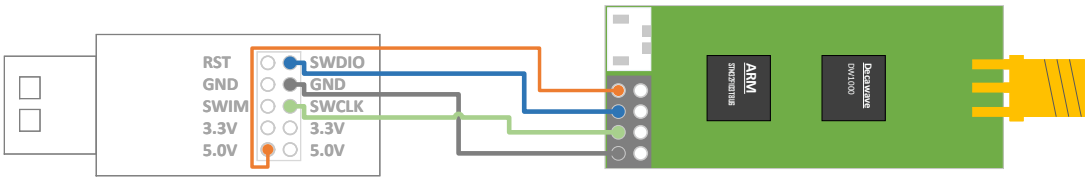


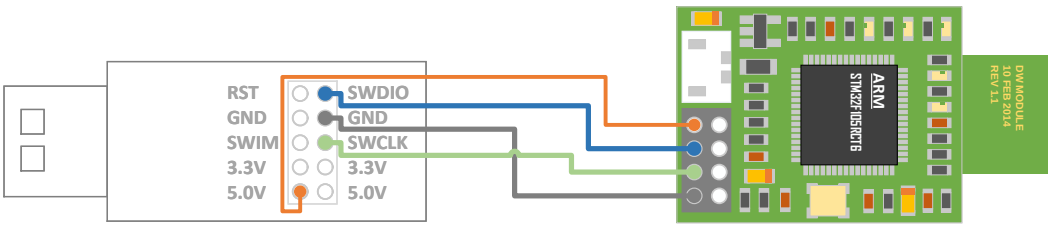
2.3 Upgrade steps

2.3.1 Hardware connection

The Mini3s/Mini3sPlus hardware connection method is shown in the figure below.



The hardware connection method of Mini3/M ini 4/Mini5 is shown in the figure below.



The hardware connection method of Mini4sPlus is shown in the figure below.

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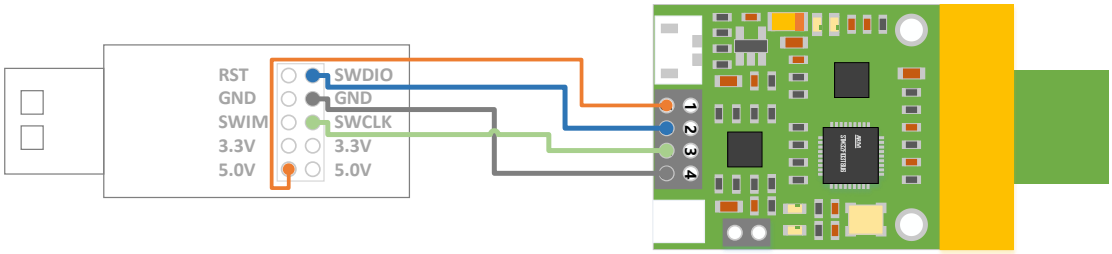

The connection method between the wall-mounted anchor and the downloader: unscrew the screws on the anchor and open the cover. Connect the ST-LINK V2 downloader to the J-TAG base of the main control board of the anchor through a flat cable

The connection method between the anchor with waterproof cast aluminum shell and the downloader: open the cast aluminum shell of the anchor and connect the ST-LINK V2 downloader to the J-TAG base of the main control board of the anchor through the flat cable. Since there are many styles of J-TAG pin, please refer to the definition of J-TAG pin on the PCB. The SWD download mode requires VCC SWDIO SWCLK GND.

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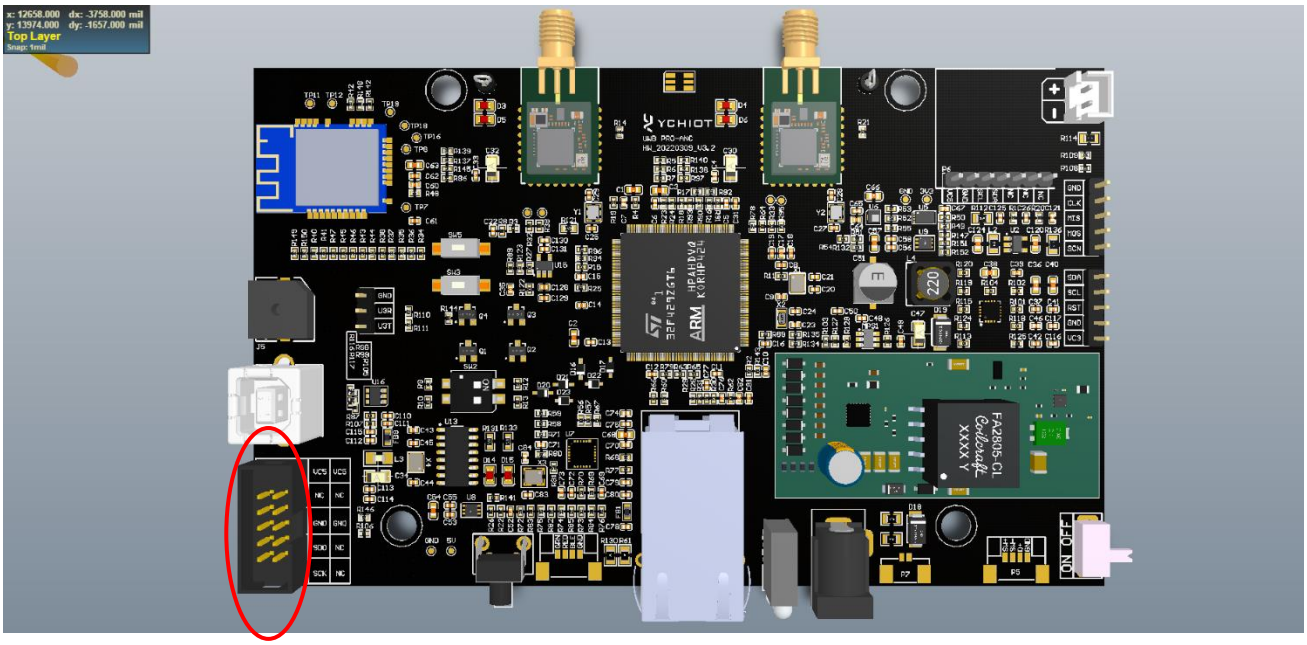
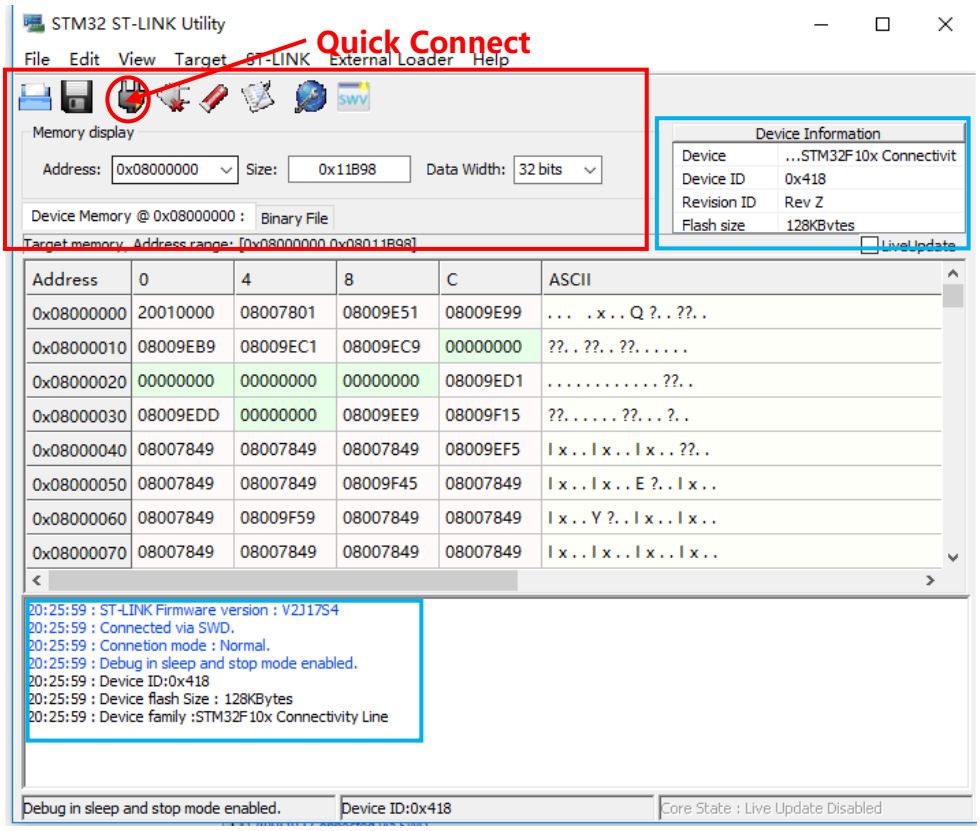


2.3.2 Software connection

Open the STM32 ST-LINK Utility software and connect the chip: Target-> Connect or click the connection shortcut button directly (as shown below). NOTE: THE PREMISE OF READING FLASH INFORMATION IS THAT NO READ PROTECTION IS ADDED. Before clicking the "Quick Connect", you can set the address, size, and data width.



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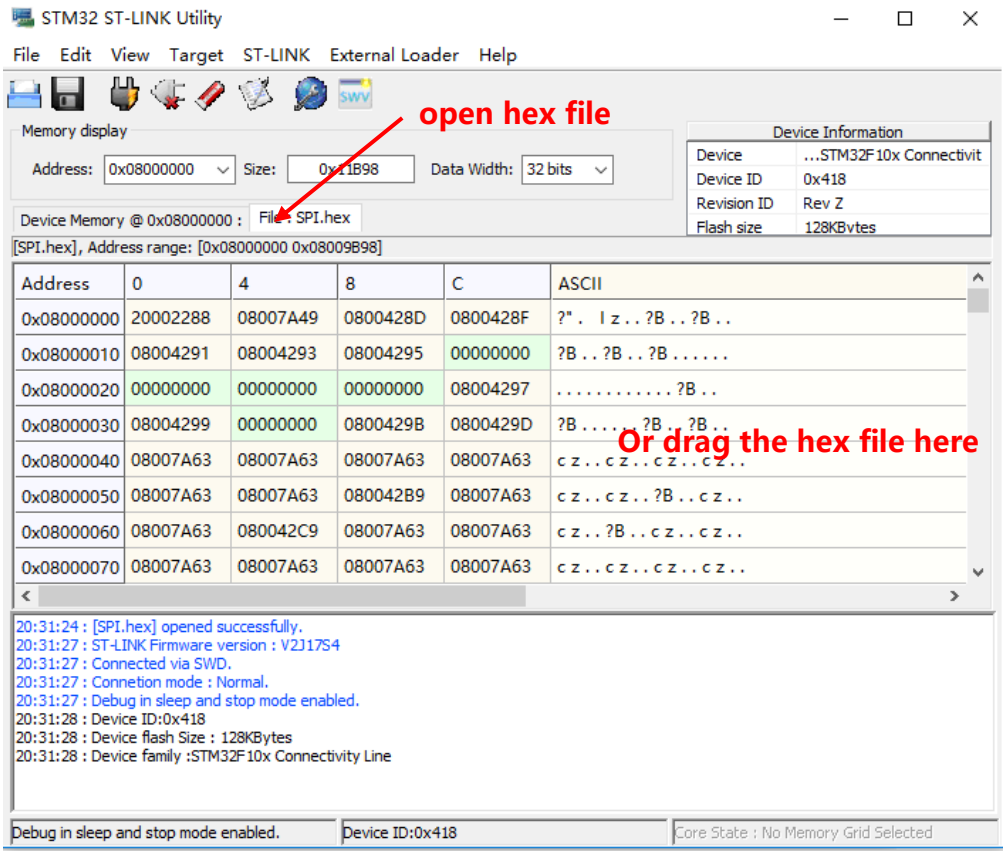
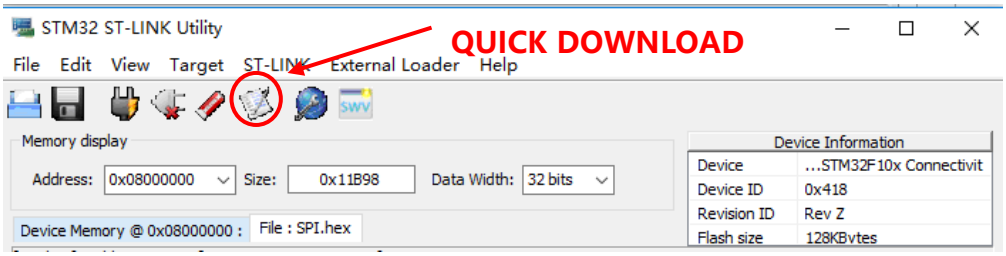
2.3.3 Load Hex

After connecting the chip in the previous step and correctly identifying the chip, open the program (hex) file that needs to be downloaded. Open hex files can be opened from the menu bar (File -> Open File) or directly drag the hex file to the FLASH area.



2.3.4 Download Hex

After opening the hex file in the previous step, click "Download" (Target -> Program, or you can directly click the QUICK DOWNLOAD shortcut button, as shown below).



A pop-up confirmation window, such as hex file path, verification method, etc., confirm that the information is correct, click "Start" to start the download program. For example, I named the executable hex file "SPI.hex", which is located on the desktop.

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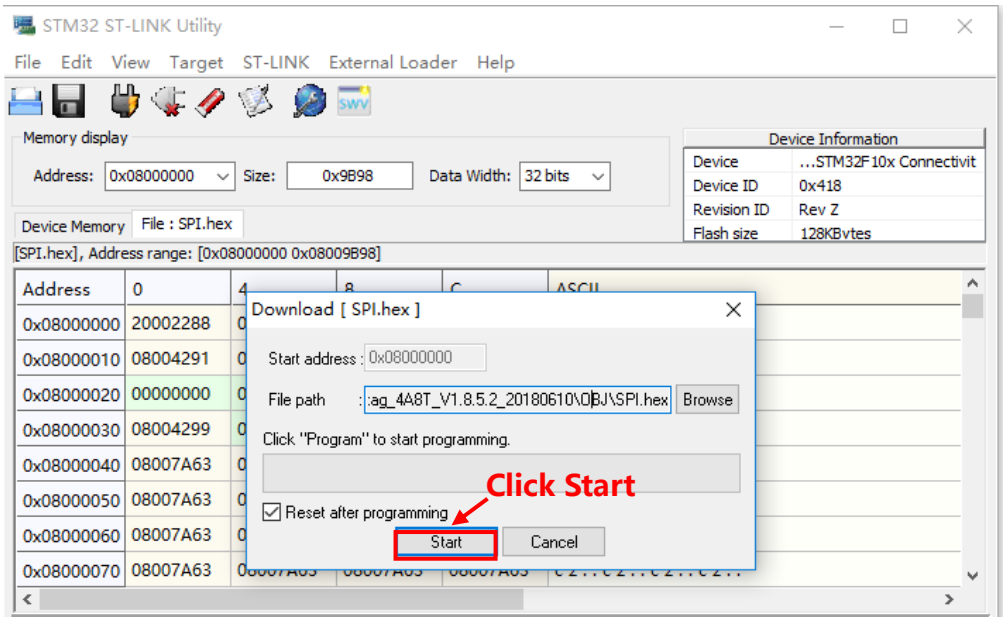
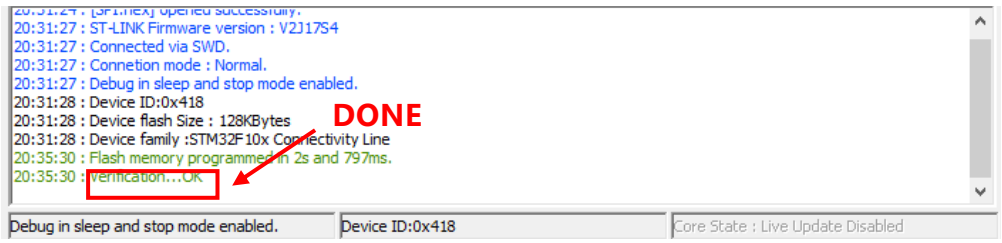


The length of the download process is related to the size of the program, which is generally fast, and the appearance of "Verification... OK", indicating that the download was successful.



2.4 Configuration UWB parameters

After updating the firmware, you also need to use the AT command to configure the rate, channel, and address of the UWB device so that the module can be used normally. For specific operation, please refer to the user manual AT command configuration method of each UWB device.

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3 Upgrade by J-FLASH

3.1 J-Flash introduction

J-Flash is a separate Flash ISP programming software released by SEGGER (J-LINK emulator manufacturer), which supports flashing HEX and BIN format files to the Flash of a single-chip microcomputer.

J-Flash is integrated into the J-LINK driver, and when we install the J-LINK driver, we also install J-Flash.

Note: Sections 3.2 and 3.3 are operated using the J-LINK V9.0 downloader

3.2 Install J-LINK driver

Double-click JLink_Windows_V646驱动 to start the installation and click NEXT

Figure 3.2.1 JLINK driver installation

Click [I Agree] to continue the installation

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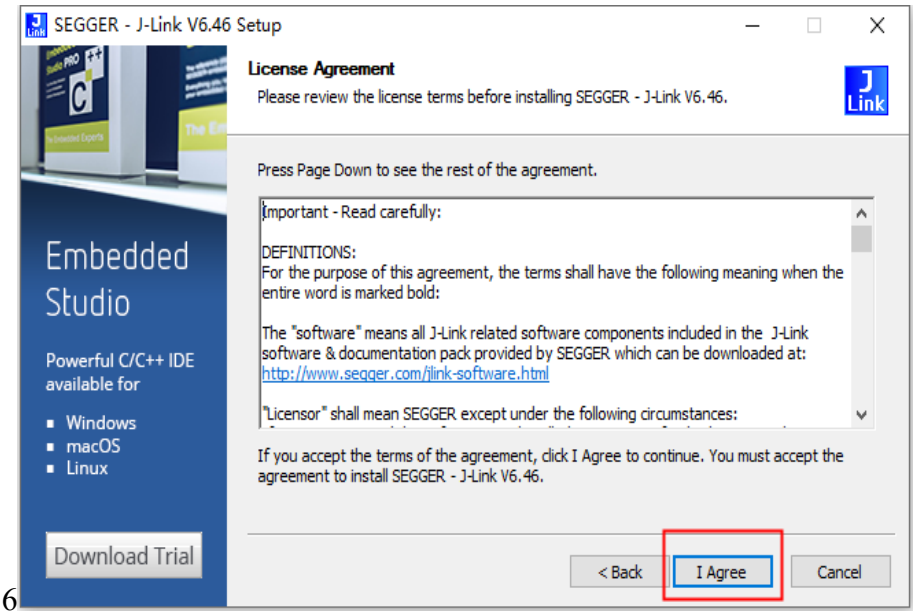

图 3.2.2 JLINK 驱动安装

Set the installation options of the J-LINK driver, recommend the default installation method, and click [Install] to start the installation

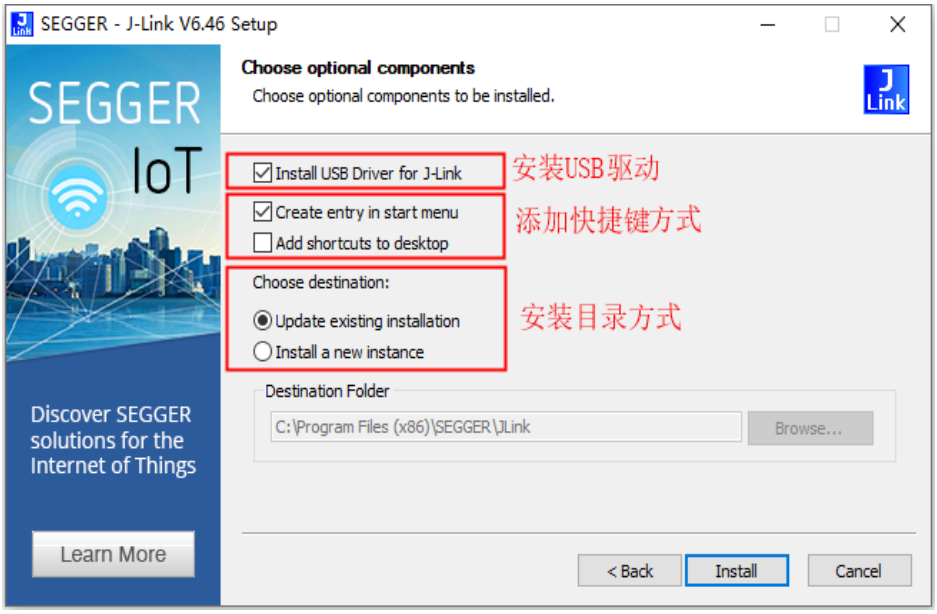

Figure 3.2.3 JLINK driver installation

The installation process pops up as shown in Figure 3.2. 4, click OK

Note: The "Keil MDK-ARM" check box appears because the MDK development software is installed on this computer. If there is other development software in the computer, other check items may appear, but you can not check it. If you do not check

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the items, you can also click [OK] directly

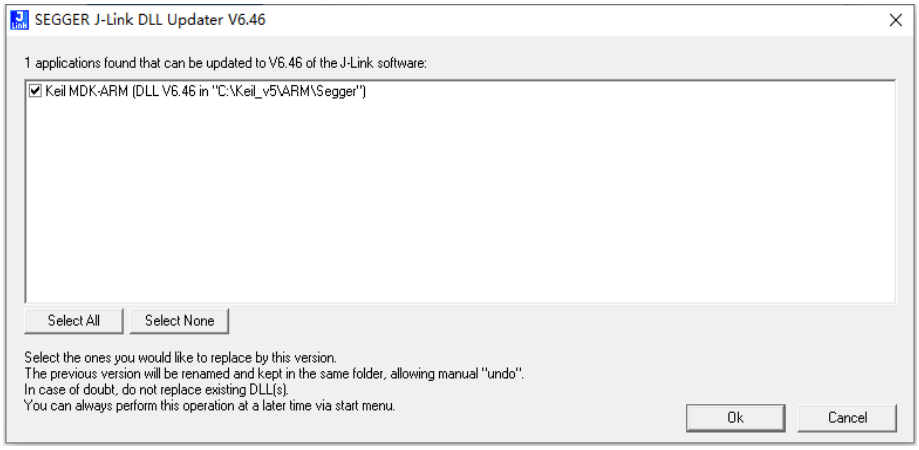

Figure 3.2.4 JLINK driver installation

Click [Finish] to complete the installation of the J-LINK driver

Figure 3.2.5 JLINK driver installation

3.3 Steps of upgrading by J-Flash

Find the J-LINK installation directory, the default installation location is shown in Figure 3.3.1, and double-click to open the J-Flash software

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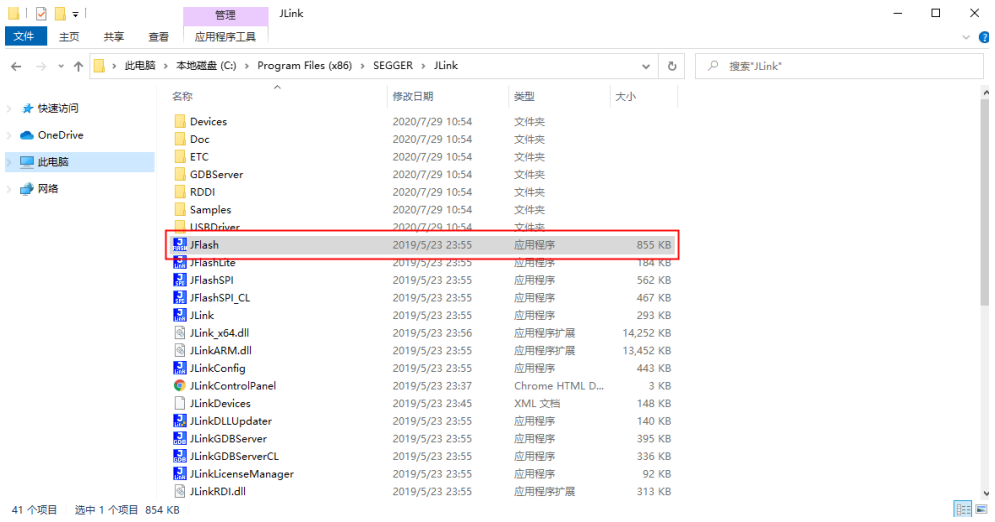

Figure 3.3.1 Installation directory

After the software starts, a pop-up will pop up as shown in Figure 3.3.2, you can select the last retained J-Flash project, or you can choose to create a new project. Here we select Create a new project and click [Start J-Flash].

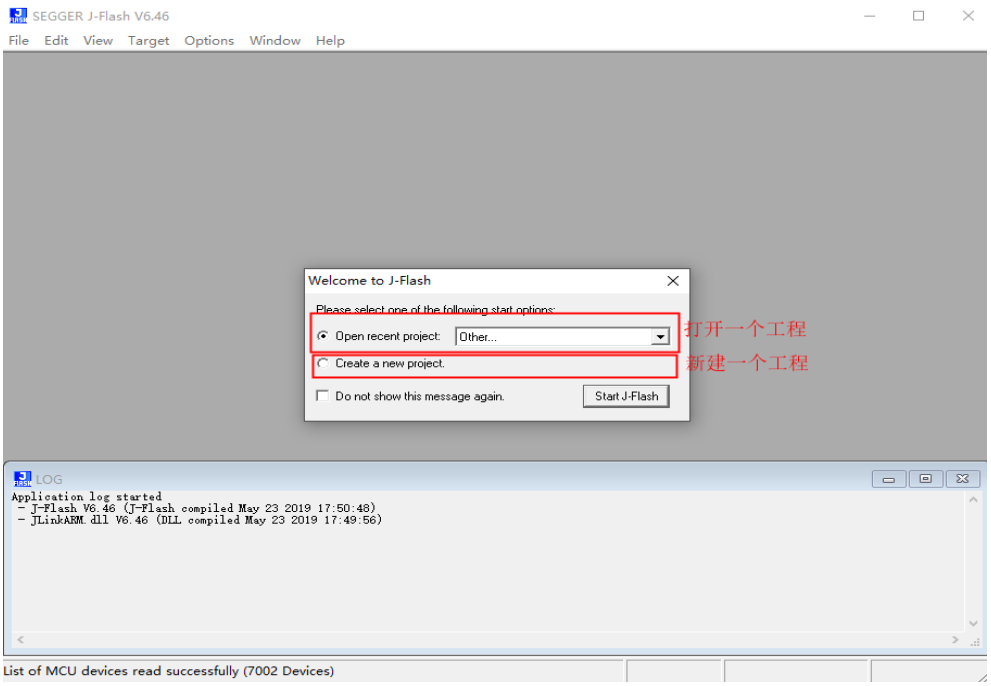

Figure 3.3.2 J-Flash

As shown in Figure 3.3.3, click [...]

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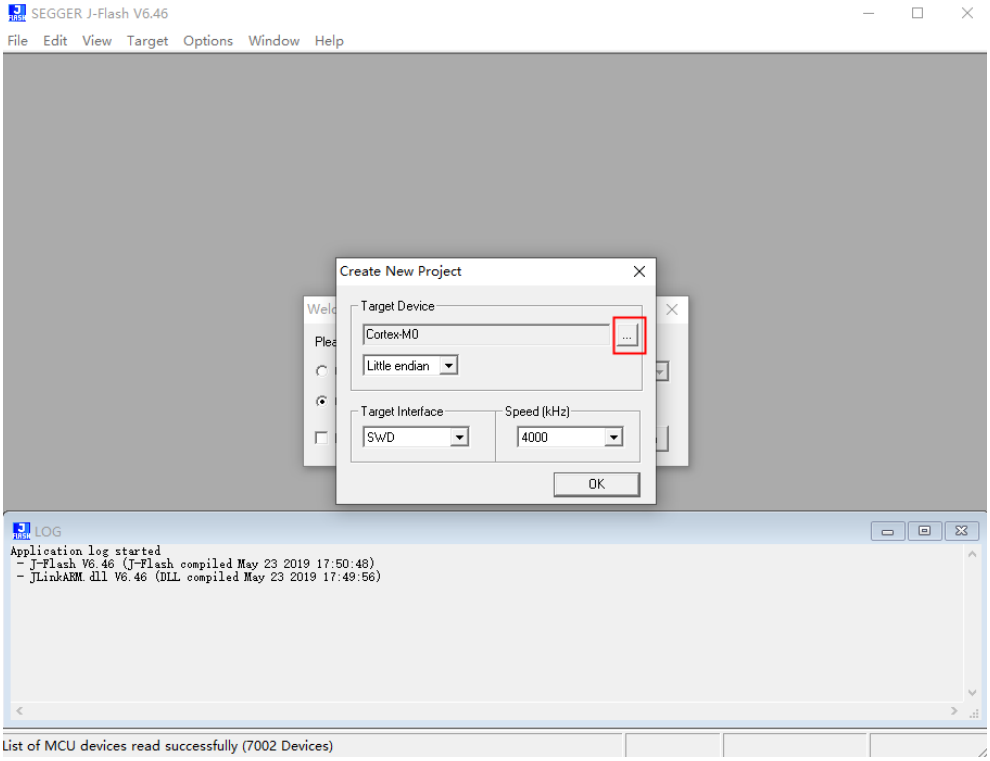

Figure 3.3.3 J-Flash

Then click the drop-down arrow as shown in Figure 3.3.4 to find Nordic Semi as shown in Figure 3.3.5

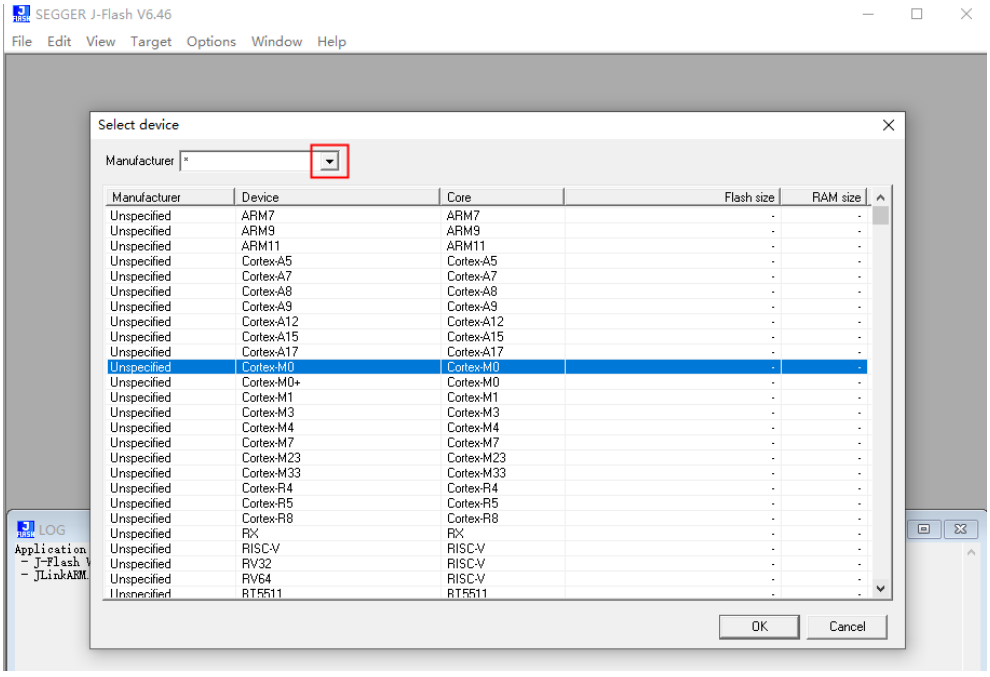

Figure 3.3.4 J-Flash

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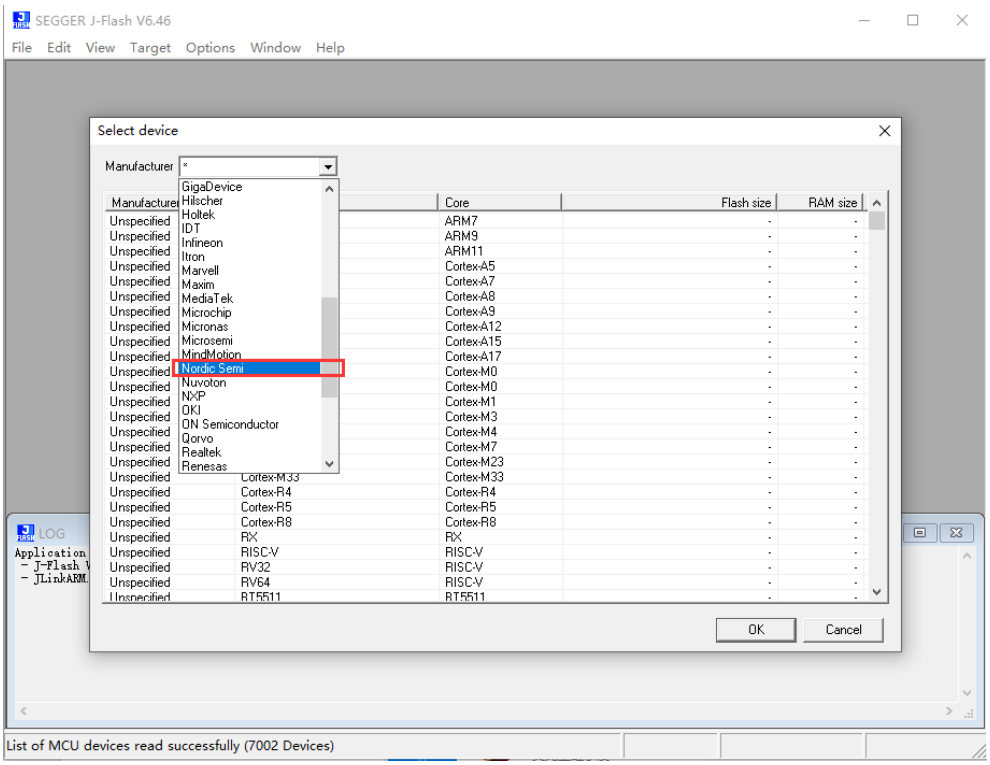

Figure 3.3.5 J-Flash

After clicking Nordic Semi, select the nRF52832_xxAA chip and click [OK] as shown in Figure 3.3.6

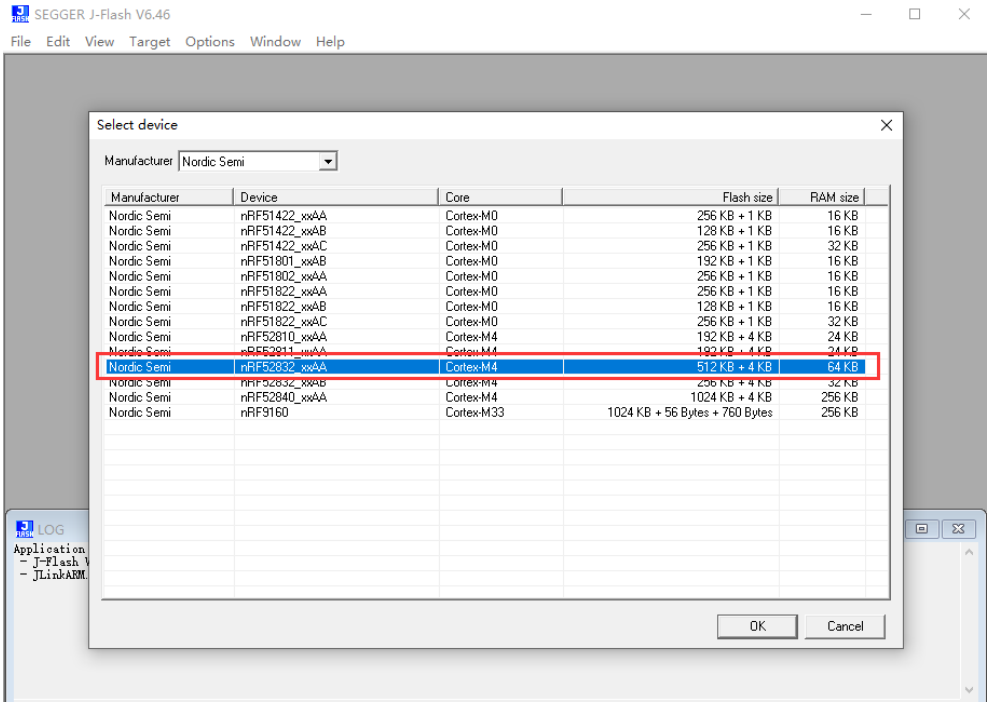

Figure 3.3.6 J-Flash

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Click OK again, as shown in Figure 3.3.7

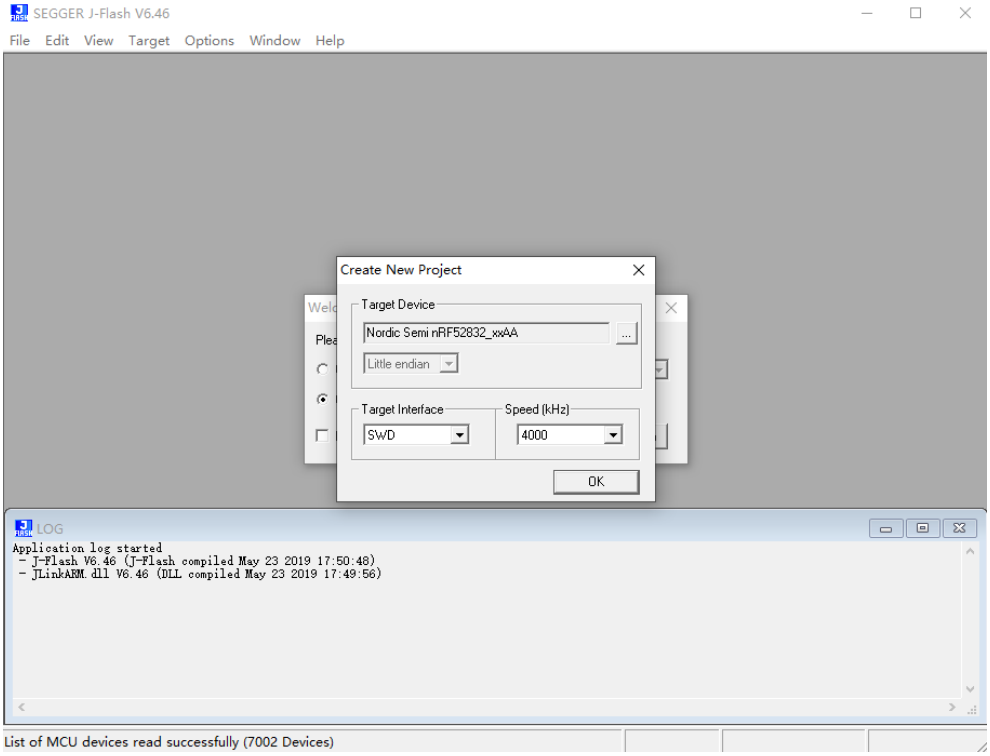

Figure 3.3.7 J-Flash

The following interface appears, as shown in Figure 3.3.8

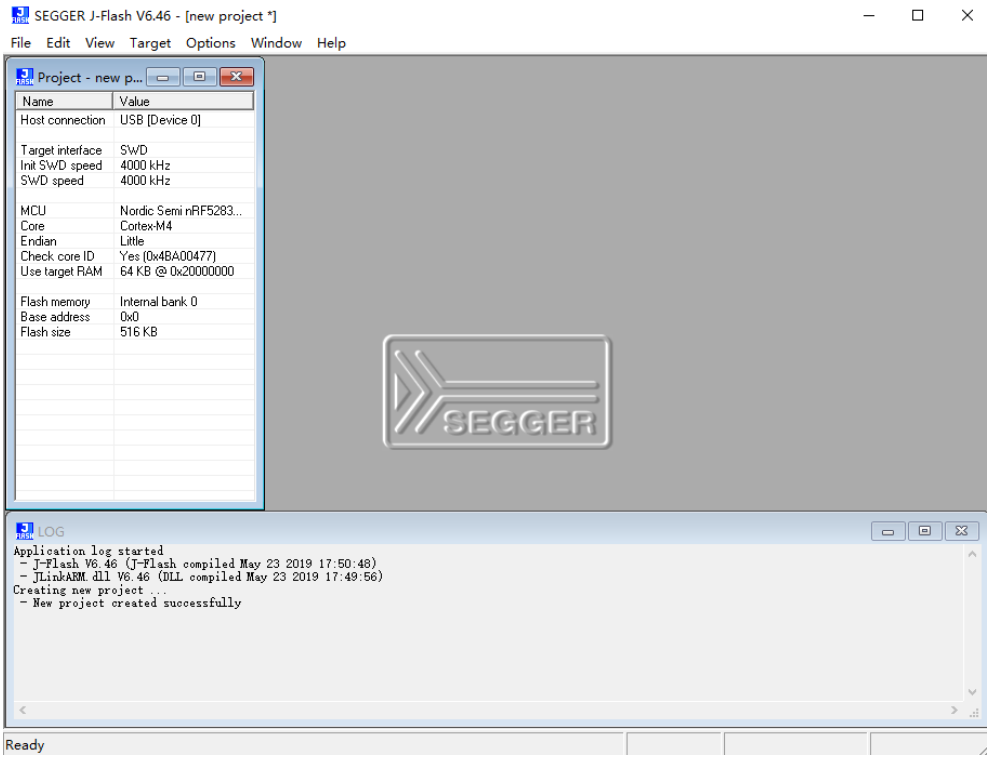

Figure 3.3.8 J-Flash

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nRF52832 requires the download of two hex files, one (application nrf52832_qfaa.hex) and one (application), s132_nrf52_6.1.0_softdevice.hex the entire download process is described below.

Run "File->Open data file" to find the protocol stack hex file, or drag the hex file directly into the J-Flash software

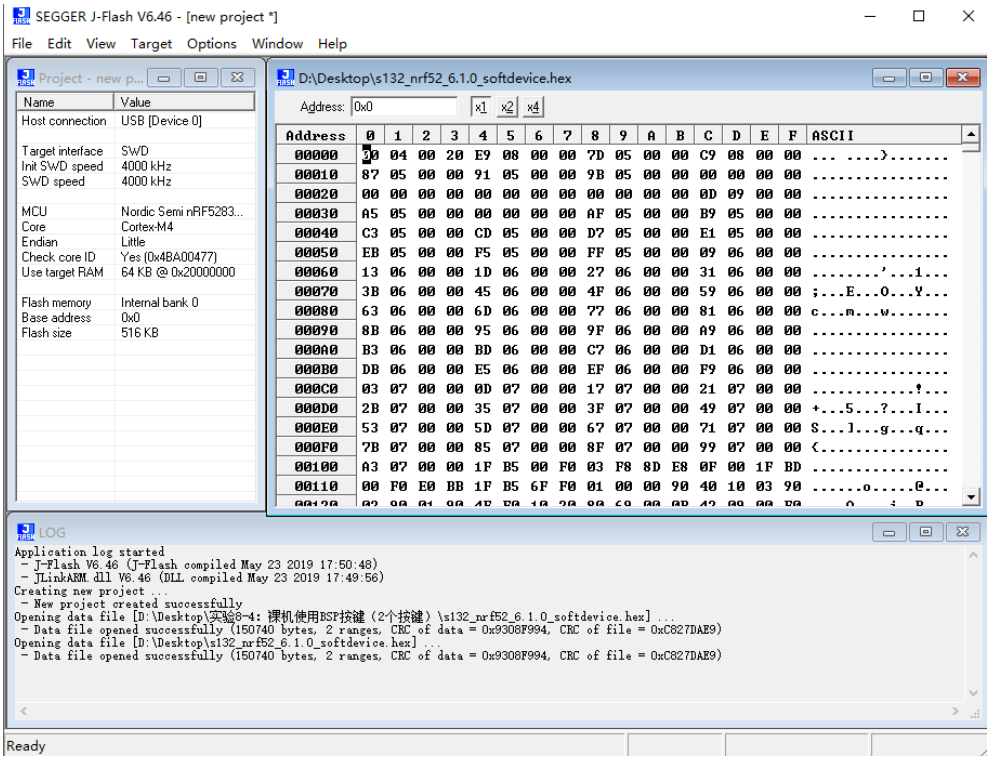

Figure 3.3. 9 J-Flash

Plug JLINK into the download port of the target board (Note: the download line should not exceed 10cm, the pin of the download port should be corresponding, the target board must be powered on), and then execute "Target->Connect", if the connection is successful, the content displayed is shown in Figure 3.3.10

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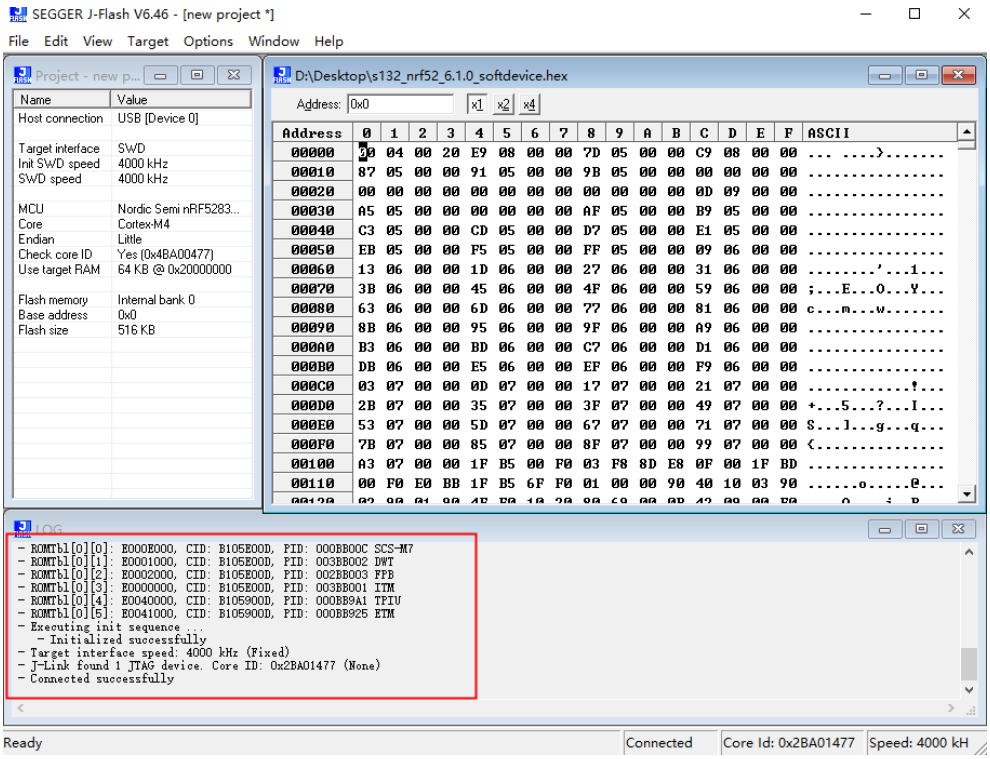

Figure 3.3.10 J-Flash

Press the shortcut key F4 or execute "Target->Manual Programming->Erase Chip" to erase the chip, as shown in Figure 3.3.1 1, the chip is erased successfully, click OK

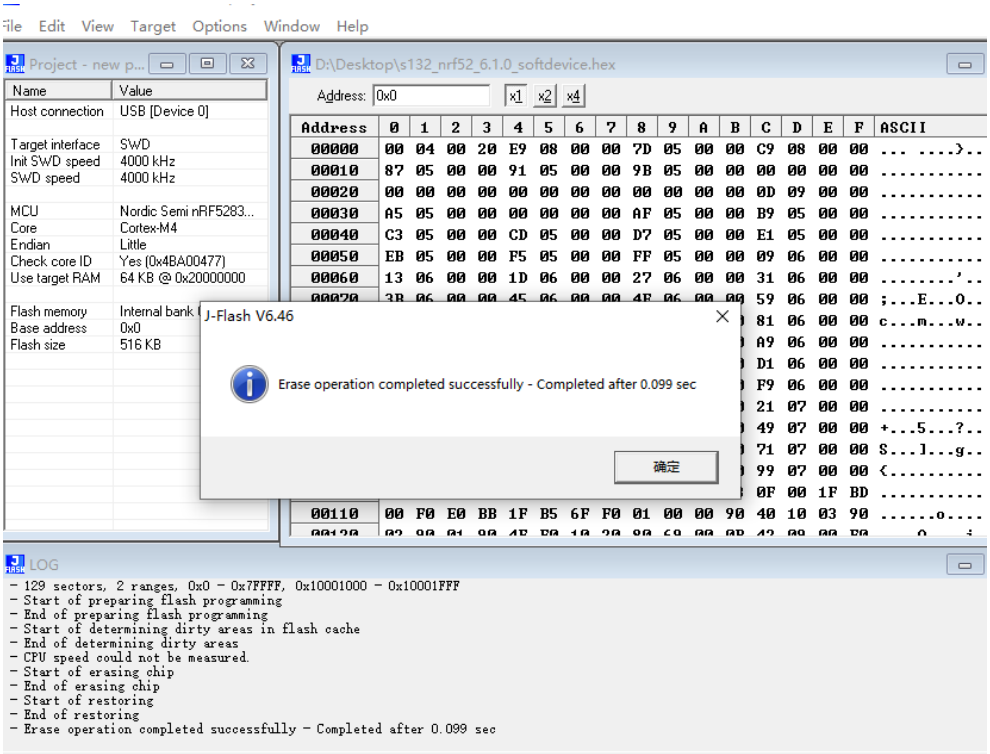

Figure 3.3.11 J-Flash

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Press the shortcut key F7 or run "Target->Production programming" to program the protocol stack hex, as shown in Figure 3.3.12, the hex download is successful, click OK

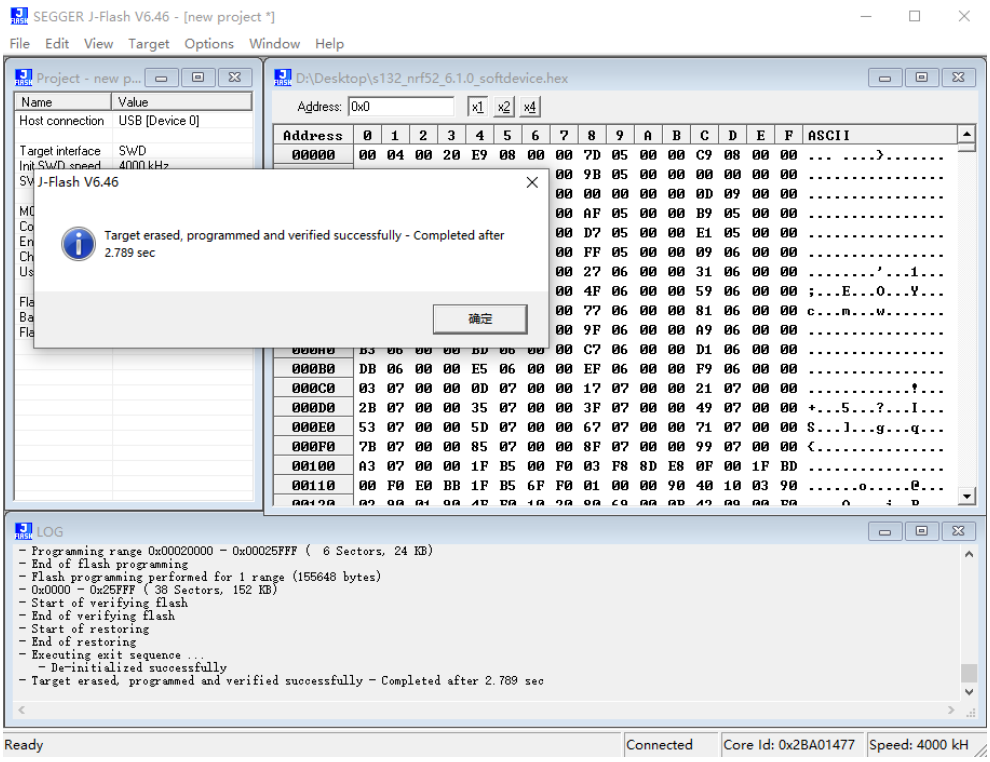

Figure 3.3.12 J-Flash

Execute "File-> Open data file" to locate the application hex file, or drag the hex file directly into the J-Flash software, as shown in Figure 3 As shown in 3.13.

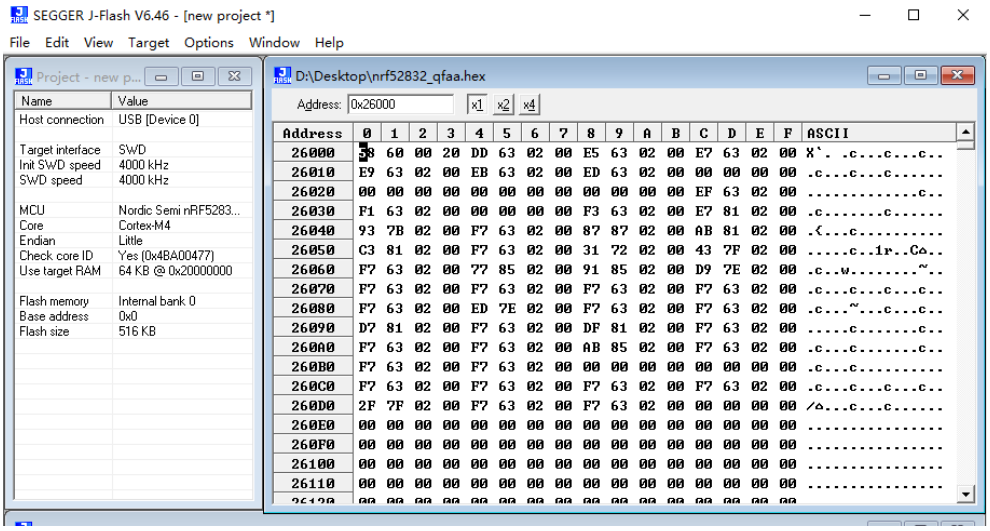

Figure 3.3.13 J-Flash

Press the shortcut key F7 or execute "Target->Production Programming" to program

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the application hex, as shown in Figure 3.3.12, the hex download is successful, click OK.

Then press the shortcut key F9 or run "Target->Manual Programming->Start Application" to run the programmed program.

When closing J-Flash, it will prompt whether to save the current project, here we can save the project configured this time, so that the next time you use it, you can directly open the saved project in the welcome interface, without configuring the project again.

3.4 Configuration UWB parameters

After updating the firmware, you also need to use the AT command to configure the rate, channel, and address of the UWB device so that the module can be used normally. For specific operation, please refer to the user manual AT command configuration method of each UWB device.

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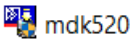
4 Upgrade by Keil

4.1 Develop software

Two pieces of software are required, the Keil5 installation software mdk520 and Keygen. Please note that enterprise users are requested to purchase genuine Keil software, and YCHIOT will not bear any consequences if there is a legal dispute caused by using Keygen.

4.2 Install KEIL 5

Double-click 

to start the installation and click Next

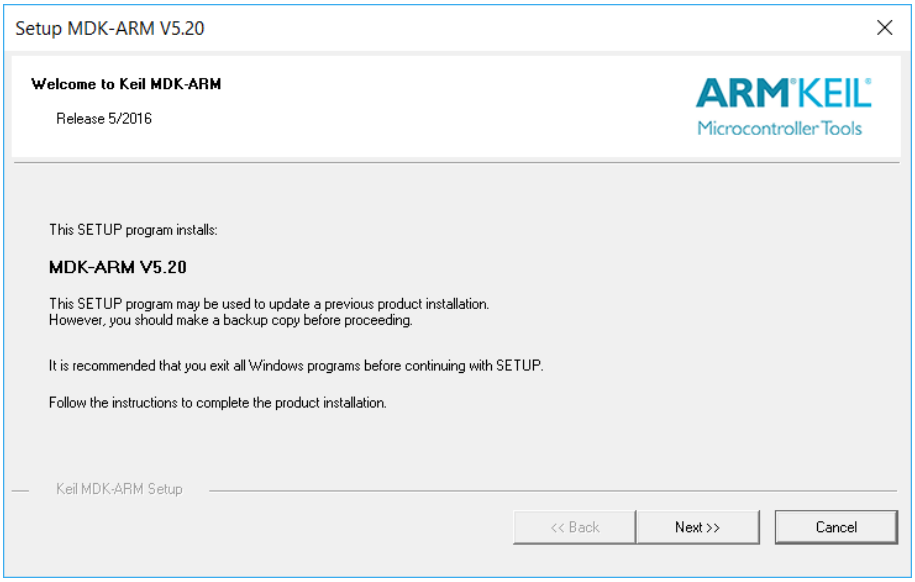


Figure 4.2.1 MDK520 installation startup screen

Select I agree to all terms of the preceding License Agreement, click Next;

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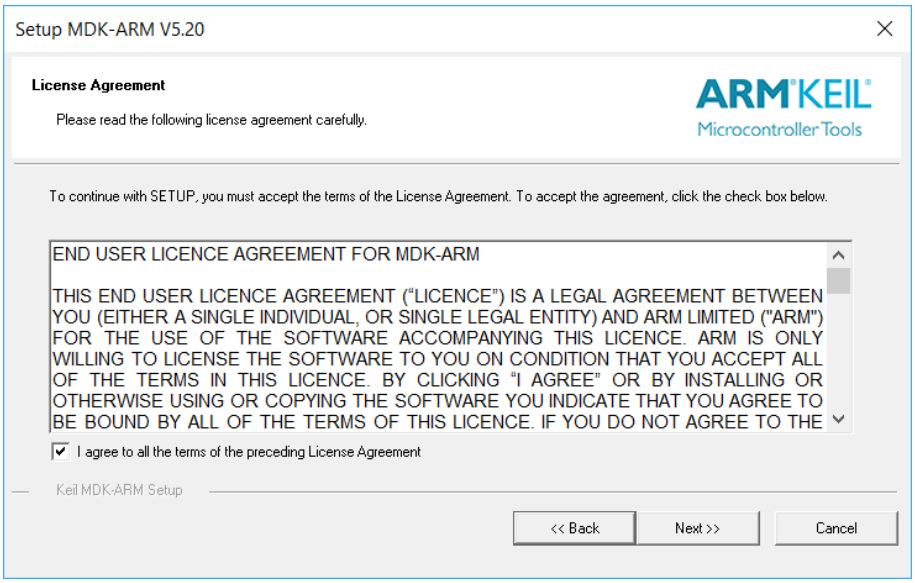

Figure 4.2.2 mdk520 License Agreement screen

Select the appropriate installation path to install Keil5, if there are no special requirements, install it according to the default path.

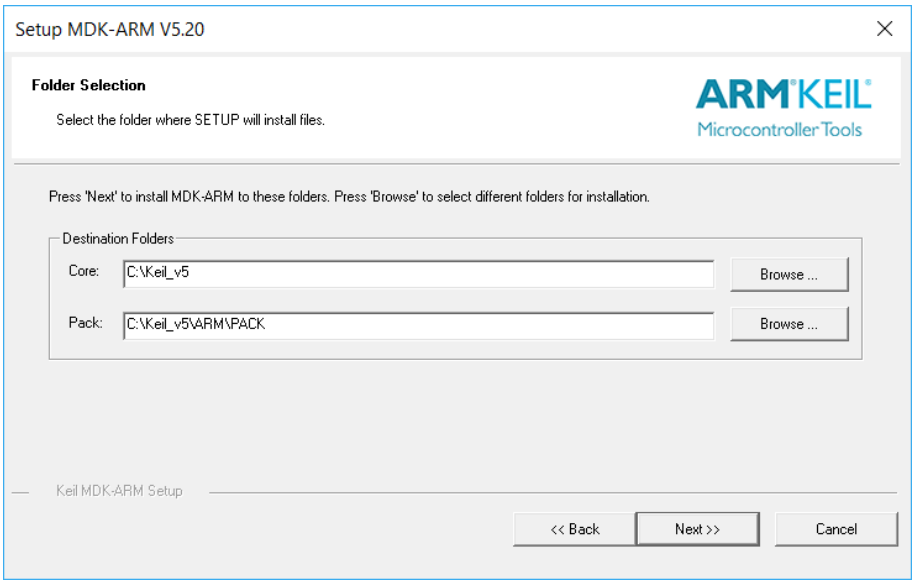

Figure 4.2 3 MDK520 Select the installation path

Fill in personal information, which can be filled in at will, and do not need to fill in real information.

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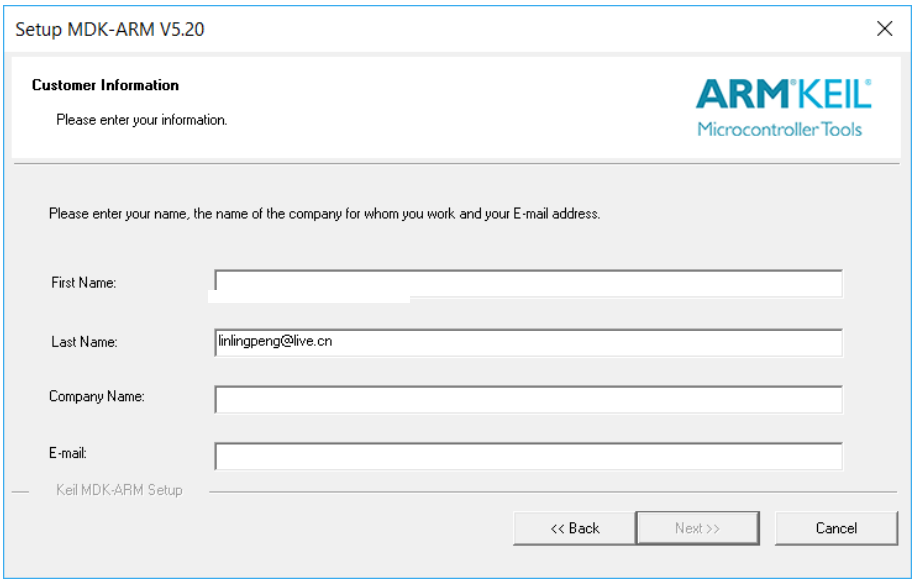

Figure 4.2.4 The MDK520 information filling interface

Until completion, the desktop generates a Keil shortcut icon, and the installation prompt of the pack automatically pops up.

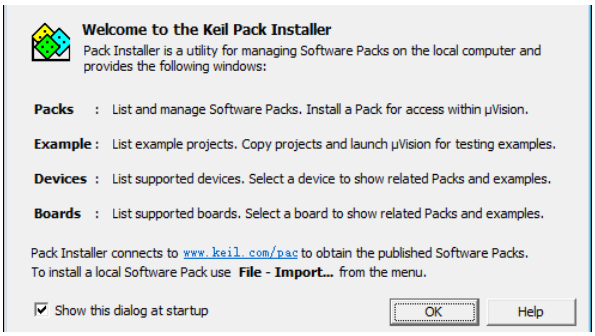

Figure 4.2.5 Pack Installer

4.3 KEIL 5 PACK INSTALLATION

Click OK to enter the package installation interface (if it does not pop up, click on the menu bar).

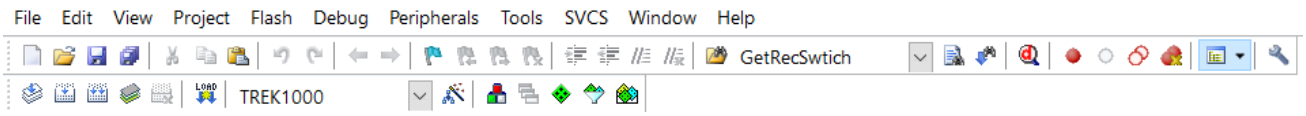

Figure 4.3.1 Keil 5 Menu Bar

In the Pack column, all the types of single-chip microcomputers are listed, and there

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is an Install button on the right side of each single-chip microcomputer, to develop which single-chip microcomputer, click the corresponding Install, and the corresponding package will be automatically installed. For the single-chip microcomputer used in the device hardware, select the corresponding model as shown in the following table. Taking STM32F103T8U6 as an example, the project packages that must be downloaded are:

ARM::CMSIS
Wedge::ARM_Complier
Keil::MDK-Middleware
Wedge::STM32F1xx_DFP

Table 4.3.1 List of core microcontrollers of different UWB devices

MODEL	MAIN CONTROL SINGLE-CHIP MICROCOMPUTER
Mini3	STM32F103T8U6
Mini3s	STM32F103T8U6
Mini3sPlus	STM32F103T8U6
Mini4sPread	STM32F103T8U6
Mini4	STM32F103RCT6
Mini5	STM32G070RBT6
ProAnc (STM32).	STM32F103RCT6
ProCard (NRF52832)	NRF52832
Protag (NRF52832).	NRF52832
Protag (STM32).	STM32F103T8U6

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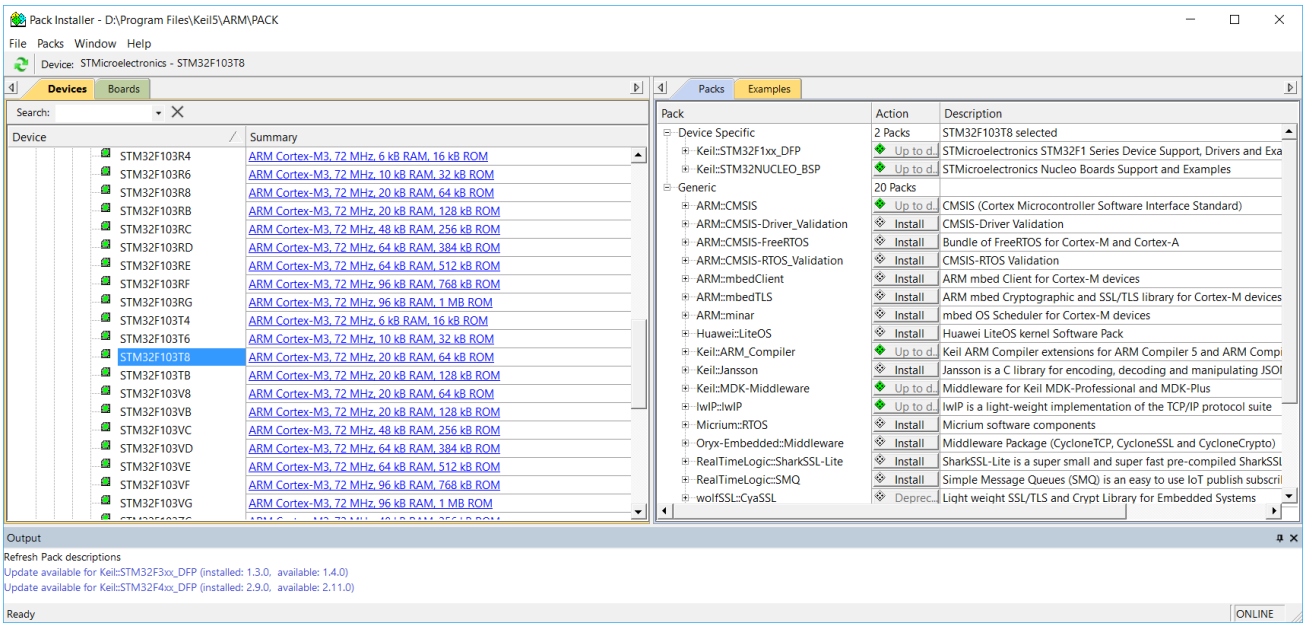

Figure 4.3 2 Firmware library installation selection

If users cannot update Pack Device normally, you can choose manual installation, find the single-chip microcomputer model to be developed, the summary bar will appear blue words, click will automatically link to the download page. Click the Download button to download, double-click the downloaded Keil.STM32F1xx_DFP.2 1.0, start the installation, the same effect as the previous automatic installation.

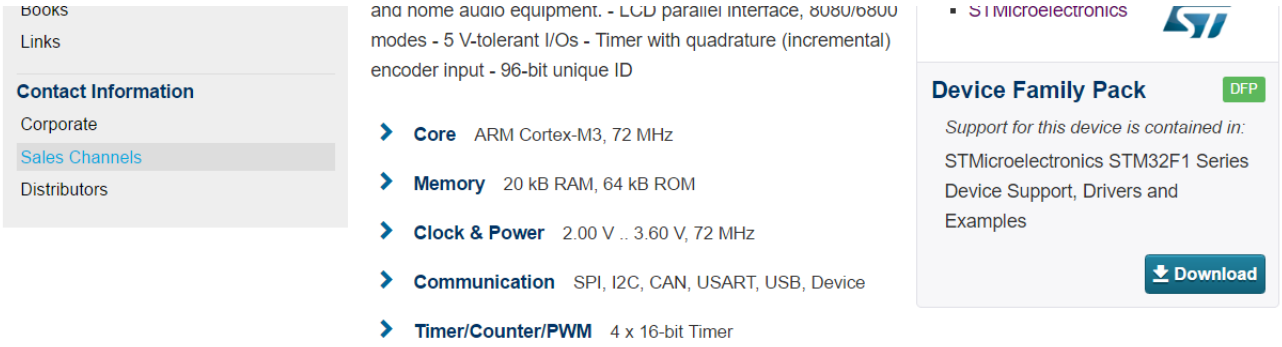

Figure 4.3 3 Install the Device Pack manually

4.4 Keygen cracks

Please note that enterprise users are requested to purchase genuine Keil software, and the company will not bear any consequences if there is a legal dispute caused by the use of Keygen!!! Open Keil5 as an administrator and open License Management.

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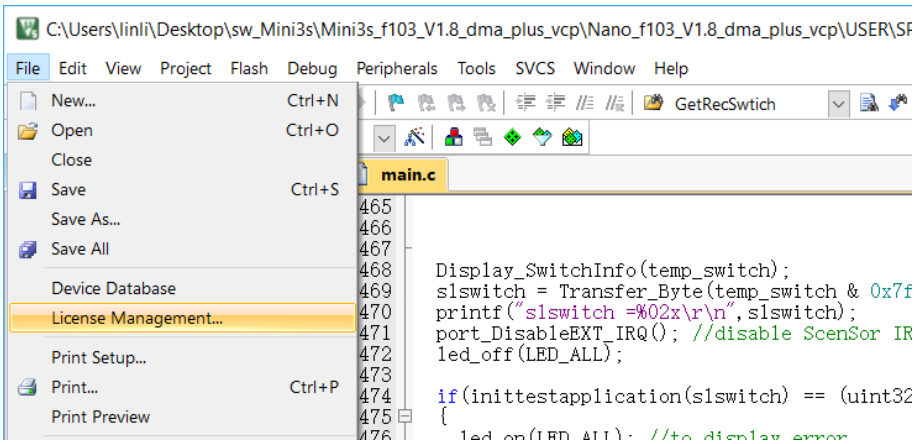

Figure 4.4.1 Opening License Management

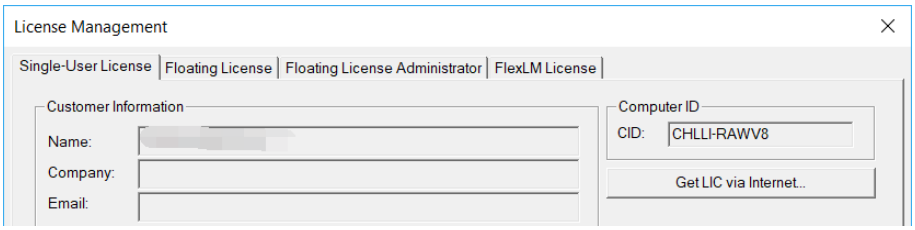

Figure 4.4.2 License Management interface

Copy the CID, open the crack file, Keil_ARM_MDK_5.00_Keygen_serial_Crack and click Generate to generate a Keygen

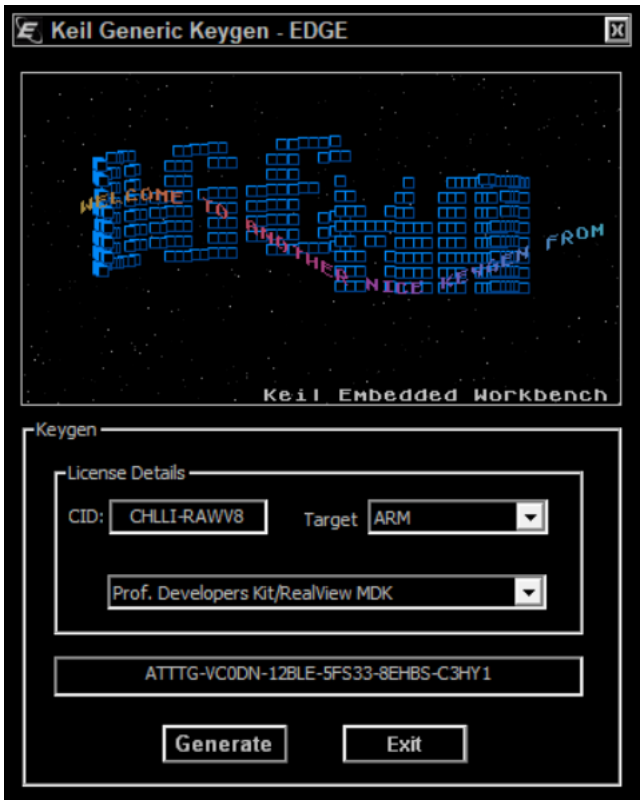

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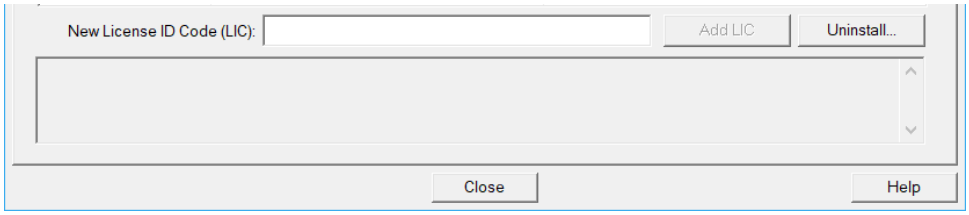
Figure 4.4.3 Screenshot of how to use the keygen

Fill in Keil's LIC with the obtained Keygen, click Add LIC, and the crack is successful.



4.5 Open the project

Under the Project->MDK folder, open the project, and the interface is shown in the following figure.

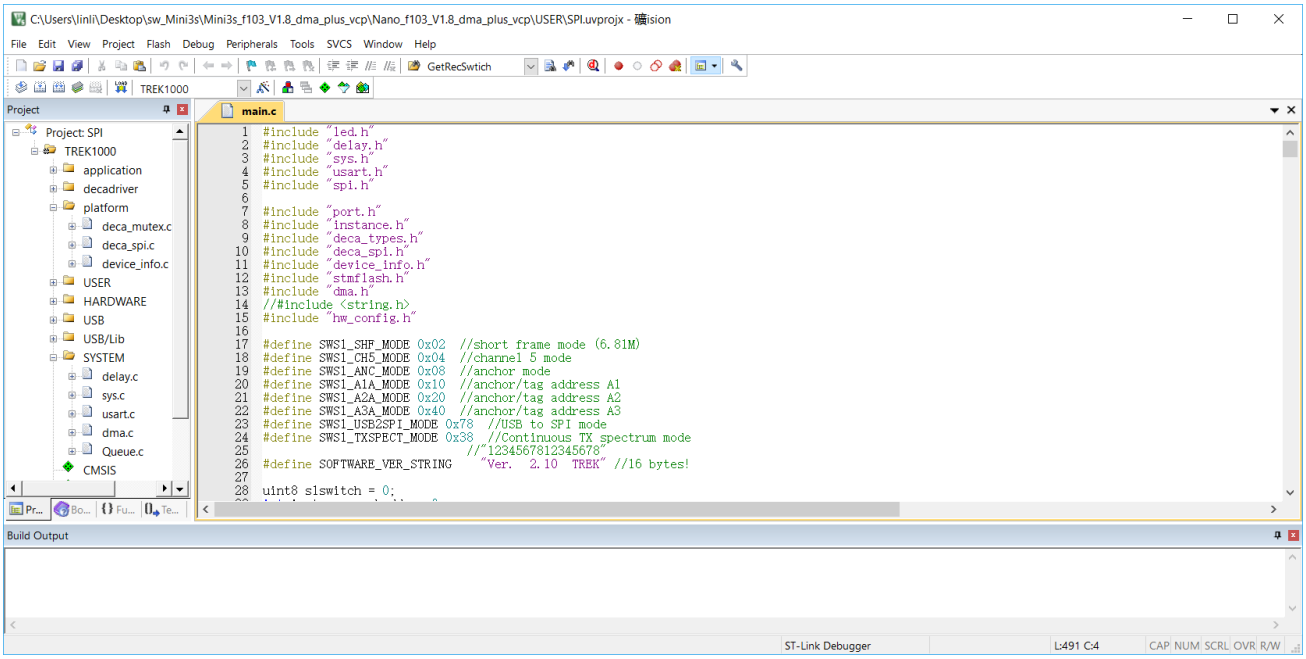


Figure 4.5 Developing the project file interface

4.6 Compile and download

In Target->Debug, select the downloader as ST-LINK Debugger, set the hardware emulation to ST-Link, and click Settings, SWD download method, speed is 4M.

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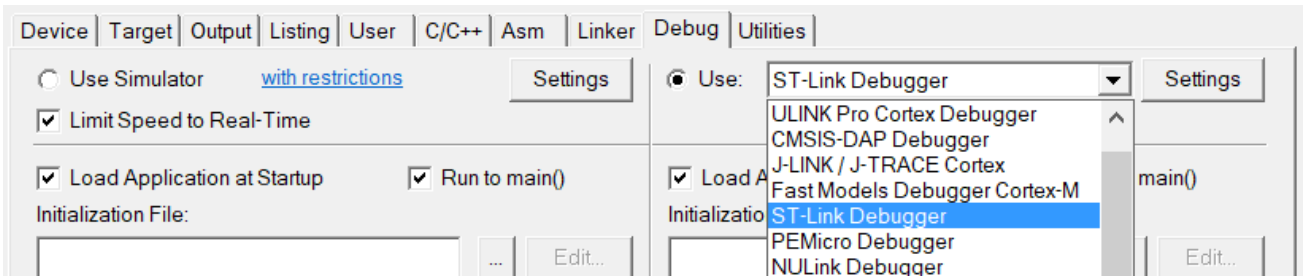

Figure 4.6.1 Downloader settings

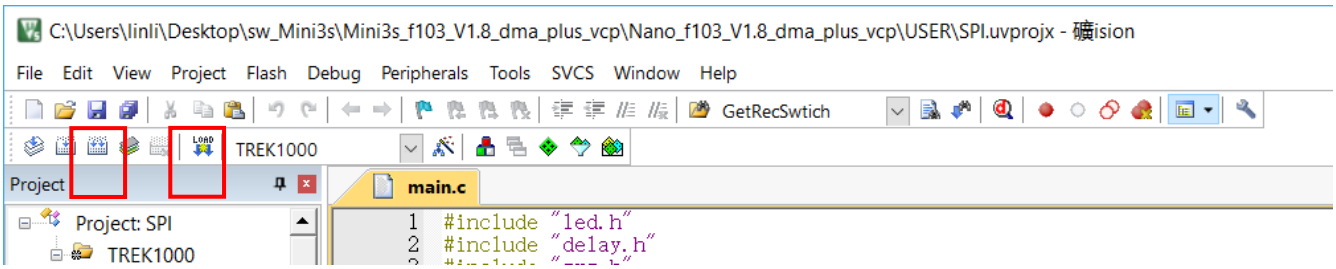

Figure 4.6.2 Compile and download buttons

When finished, close it, click "Build " to complete the compilation; Click "Download " to consider the download successful.

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5 Document Management Information Sheet

Subject	YCHIOT uwb device firmware update
Version	V1.1
Reference documents	[1] IEEE802.15.4-2011 or "IEEE Std 802.15.4™-2011" (Revision of IEEE Std 802.15.4-2006). IEEE Standard for Local and metropolitan area networks - Part 15.4: Low-Rate Wireless Personal Area Networks (LRWPANs). IEEE Computer Society Sponsored by the LAN/MAN Standards Committee. Available from http://standards.ieee.org/ [2] Qorvo DW3000 Datasheet www.Qorvo.com [3] Qorvo DW3000 User Manual www.Qorvo.com [4] Partron (Now manufactured by Abracon) Dielectric Chip Antenna, P/N ACS5200HFAUWB (Now ACA-107-T), www.digikey.com also see www.abracon.com
Creation time	2018/06/01
Founder	Lynn
Latest release date	2023/01/01

Modifier	Date	Document change history
Lynn	2018-06-01	V1.0 Release of V1.0 documentation
Lynn	2023-01-01	V1.1 ■ Support the device Mini4/Mini5/PROANC ■ Change to YCHIOT new document style

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