

***STC*** *micro*<sup>™</sup>

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# **STC Tool Instruction Manual**

**Date of update: 2022/3/9**

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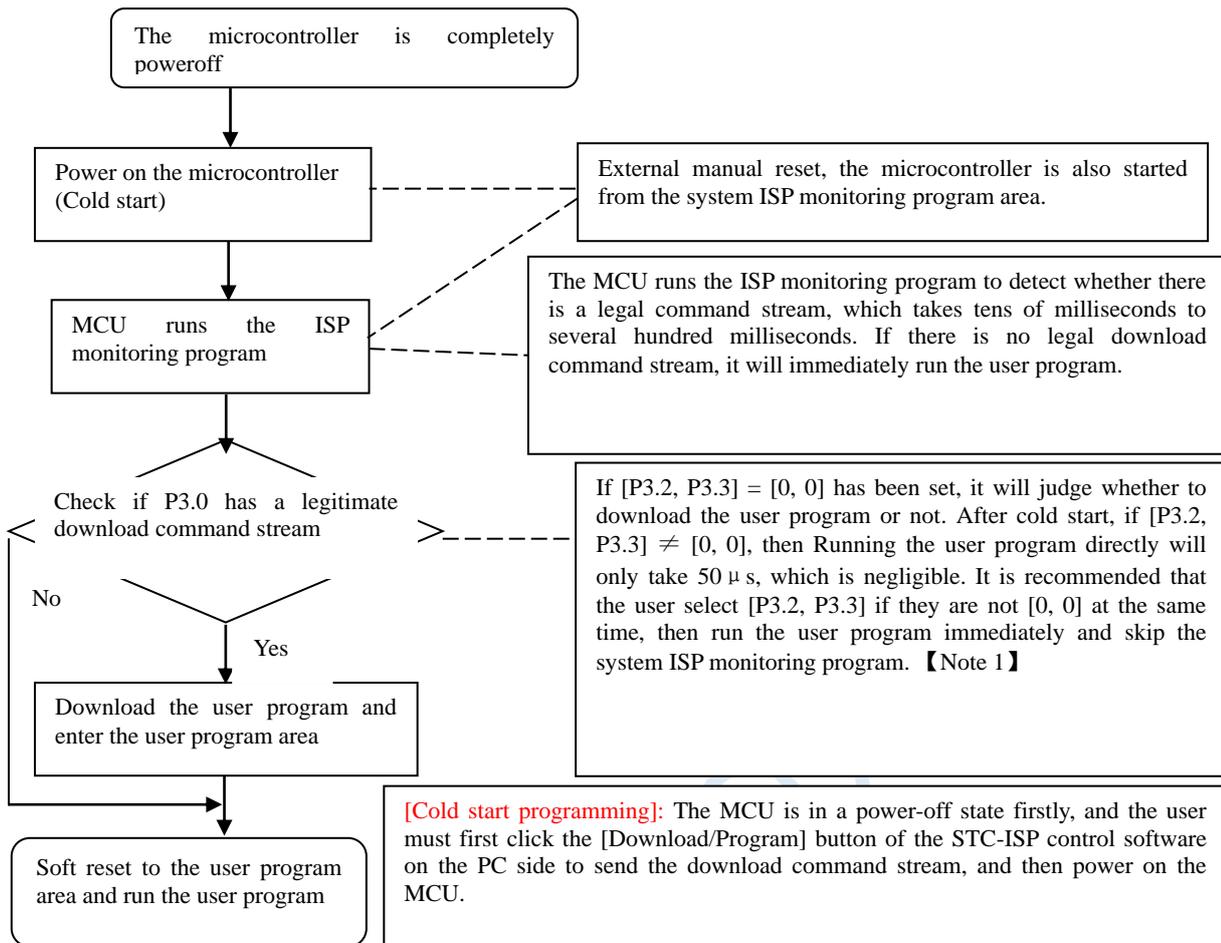
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## 1 Overview

U8W/U8W-Mini is a series of programming tools that integrates online download and offline download. STC Universal USB to Serial Port Tool is a programming tool that supports online download and online simulation.

Tool type	Online Download	Offline download	Burner download	Online simulation	Price(CNY)
U8W	support	support	support	Need to set pass-through mode	100 yuan
U8W-Mini	support	support	not support	Need to set pass-through mode	50 yuan
Universal USB to serial port	support	not support	not support	support	30 yuan

## 2 System Programmable (ISP) Process Description

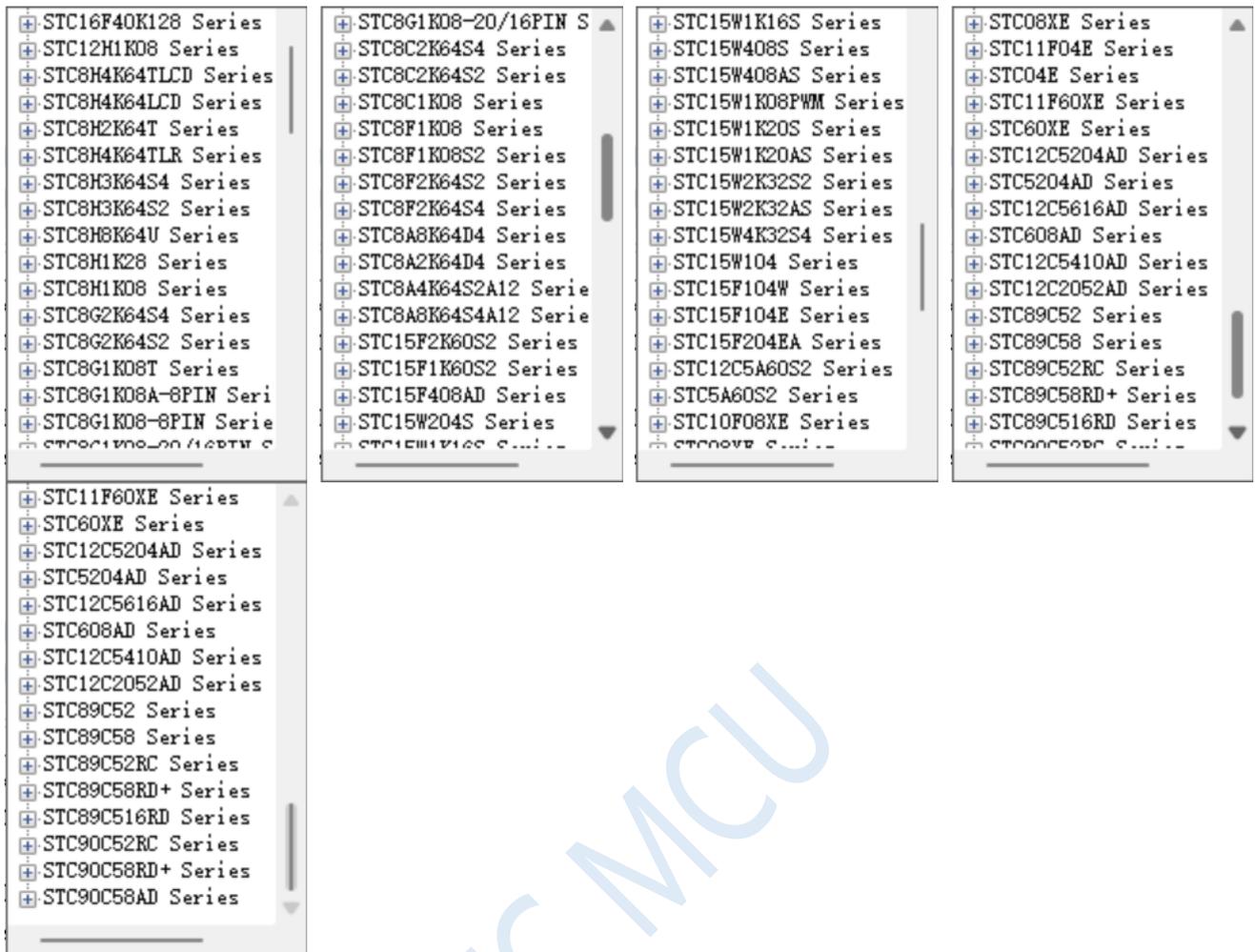


Note: Because [P3.0, P3.1] is used for download/simulation (download/simulation interface is only available [P3.0, P3.1]), it is recommended that users put serial port 1 on P3.6/P3.7 Or P1.6/P1.7, if the user does not want to switch and insists on using P3.0/P3.1 to work or communicate as the serial port 1, be sure to check the "Next cold start, when downloading the program, The program can be downloaded only when P3.2/P3.3 is 0/0". 【Note 1】

【Note 1】: The programming protection pins of STC15, STC8 and later new chips are P3.2/P3.3, and the programming protection pins of earlier chips are P1.0/P1.1.

### 3 USB type online/offline download tool U8W/U8W-Mini

The application range of U8W/U8W-Min can support all current MCU series of STC, and the Flash program space and EEPROM data space are not restricted. Support includes the following and upcoming STC full series chips:



The offline download tool can be used for downloading without the computer, and can be used for mass production and remote upgrades. The offline download board can support multiple functions such as automatic increment, download limit, and encrypted transmission of user programs.

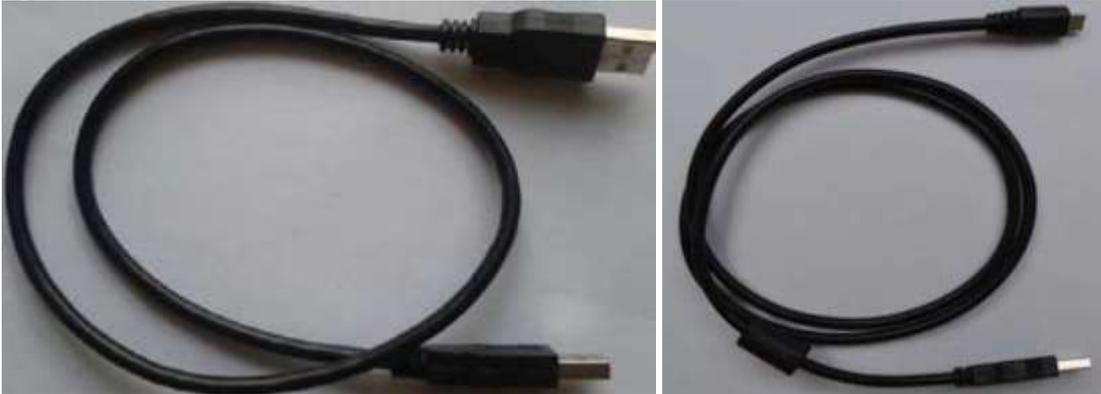
The following picture shows the front and back views of U8W tools and the front and back views of U8W-Mini:



In addition, some wires and tools are used together as follows, such as:

- (1) Two-end male USB cable (shown on the left in the figure below) and USB-Micro cable (shown on the right in the

figure below):



Note: This USB cable is a USB enhanced cable specially customized by our company, which can ensure that the download can be successful when directly powered by USB. On the market, some relatively low-quality two-end male USB cables have too much internal resistance and cause a large voltage drop (for example, the voltage of the USB when it is empty is about 5.0V. When using a low-quality USB cable to connect U8W/U8W-Mini/U8 /U8-Mini, the voltage to our download board may drop to 4.2V or lower, causing the chip to be in a reset state and fail to download successfully).

(2) The download cable connecting U8W/U8W-Mini to the user system (ie the connecting cable between U8W/U8W-Mini and the target MCU on the user board), such as

As shown below:



U8W/U8W-Mini and User systems are independent Power supply cable

U8W/U8W-Mini to The user's system power supply wiring

User system gives U8W/U8W-Mini Power supply cable

### 3.1 Install U8W/U8W-Mini driver

The U8W/U8W-Mini download board uses a CH340 USB-to-serial universal chip. This saves the trouble that some computers without a serial port must buy a USB to serial port tool to download. But CH340 is the same as other USB-to-serial tools, the driver must be installed before use.

Obtain the driver by downloading the STC-ISP software package

The following is the download location of the STC-ISP software package provided on the STC official website (www.STCMCUDATA.com):



After downloading, decompress, the path of CH340 driver installation package is stc-isp-15xx-v6.87K\USB to UART Driver\CH340\_CH341:

↓ 下载 > stc-isp-15xx-v6.87K > USB to UART Driver > CH340\_CH341

名称	修改日期
ch341ser	2020/5/9 15:03

Download the driver manually through STC's official website or in the latest STC-ISP download software

Download the driver manually on the official website of STC or in the latest STC-ISP download software. The download link of the driver is: U8 programmer USB to serial port driver (<http://www.stcmcu.com/STCISP/CH341SER.exe>). The driver address on the website and STC-ISP download software is shown in the figure below:

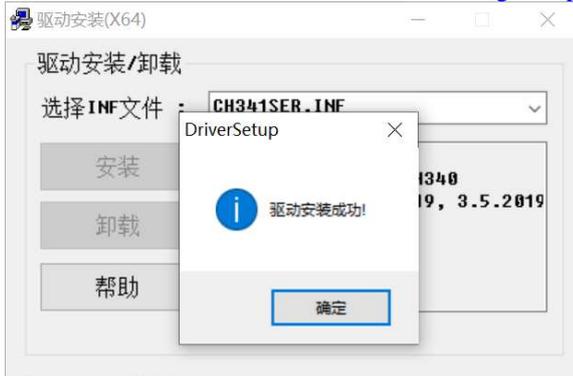


#### Install U8W/U8W-Mini driver

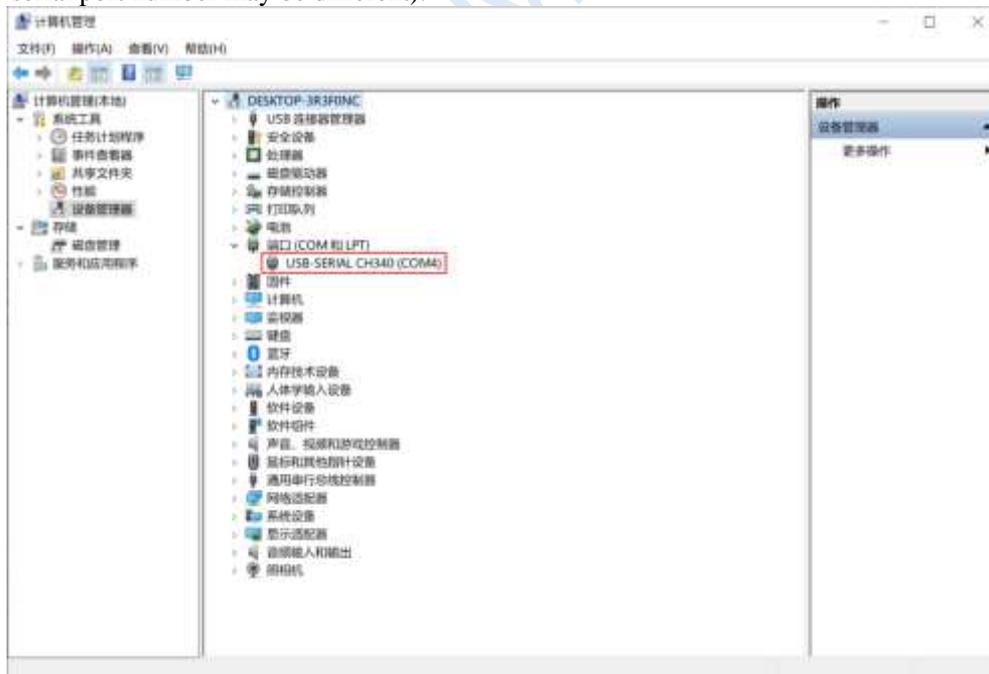
After the driver is downloaded to the machine, double-click the executable program and run it. The interface shown in the figure below appears, click the "Install" button to start the automatic driver installation:



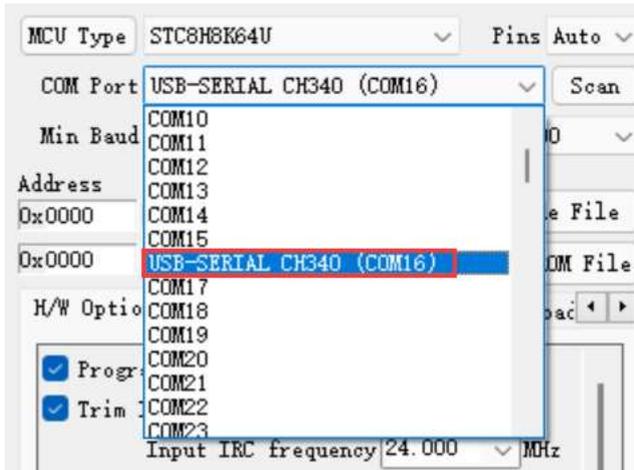
Then the driver installation successful dialog box pops up, click the "OK" button to complete the installation:



Then use the USB cable provided by STC to connect the U8W/U8W-Mini download board to the computer, open the device manager of the computer, and under the port device category, if there is a device similar to "USB-SERIAL CH340 (COMx)", it means U8W/U8W-Mini can be used normally. As shown in the figure below (different computers, the serial port number may be different):



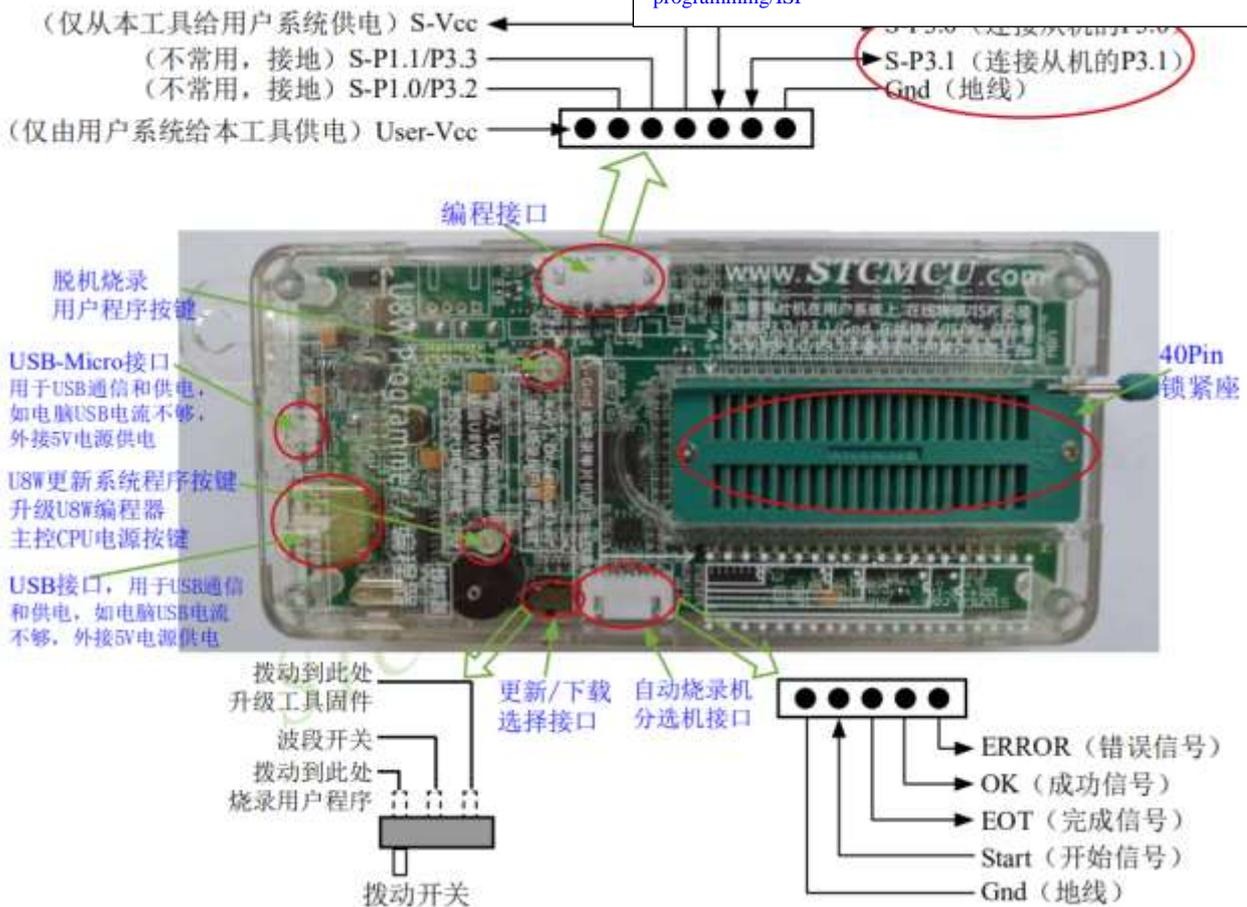
Note: When using STC-ISP to download software later, the selected serial port number must be the corresponding serial port number, as shown in the figure below:



### 3.2 U8W function introduction

The main interfaces and functions of U8W tools are described in detail below:

If the MCU is on the user system, P3.0/P3.1/Gnd must be connected during online programming/ISP, and P3.0/P3.1 of the target MCU should not be connected to any other lines during online programming/ISP



**Programming interface:** Use different download cables to connect the U8W download board and the user system according to different power supply methods.

**U8W update system program button:** used to update U8W tools. When there is a new version of U8W firmware, you need to press this button to update the U8W main control chip (note: you must first set the toggle switch on the update/download selection interface Toggle to upgrade tool firmware).

**Offline download user program button:** Start offline download button. First, the PC downloads the offline code to the U8W board, and then uses the download cable to connect the user system to the U8W, and then press this button to start the offline download (the user code will also start to download every time the power is turned on).

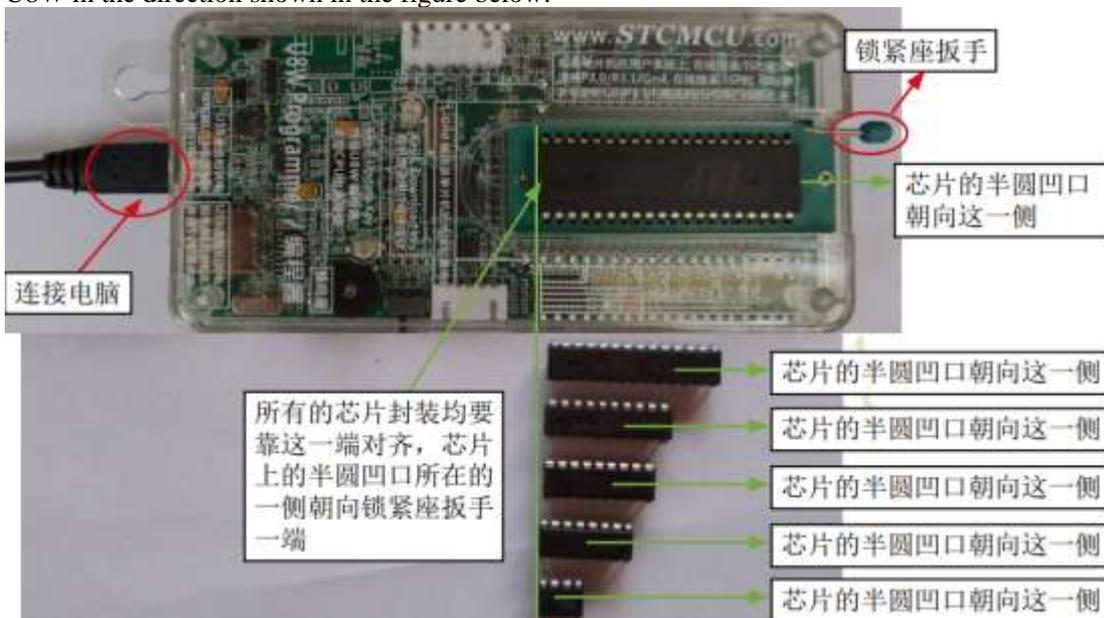
**Update/download selection interface:** When you need to upgrade the underlying firmware of U8W, you need to switch this toggle switch to the firmware upgrade tool. When you need to program the target chip through U8W, you need to turn the toggle switch to Burn the user program.

(Please refer to the figure above for the connection of the toggle switch)

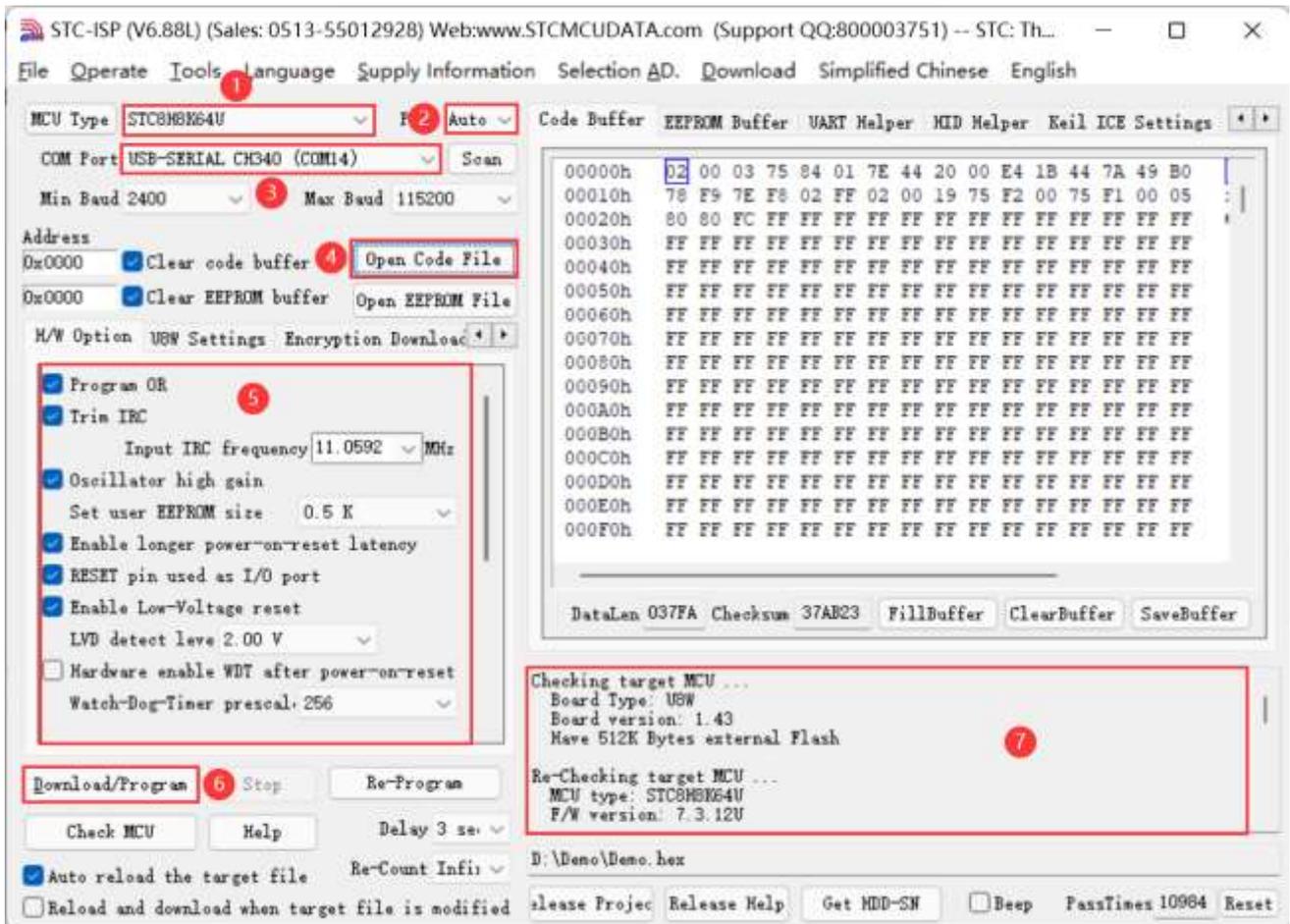
**Automatic burner/sorter interface:** It is a control interface used to control the automatic burner/sorter for automatic production.

### 3.3 U8W online download instructions

The target chip is installed on the U8W locking base and connected to the computer by U8W for online download. First use the USB cable provided by STC to connect the U8W to the computer, and then install the target MCU on the U8W in the direction shown in the figure below:



Then use STC-ISP to download the software to download the program, the steps are as follows:



- 1 Select the MCU model;
- 2 Select the number of pins. When the chip is directly installed on the U8W to download, be sure to select the correct number of pins, otherwise the download will fail;
- 3 Select the serial port number corresponding to U8W;
- 4 Open the target file (HEX format or BIN format);
- 5 Set the hardware options;
- 6 Click the "Download/Program" button to start burning;
- 7The step information of the programming process is displayed, and the message "Completed!" is displayed when the programming is completed.

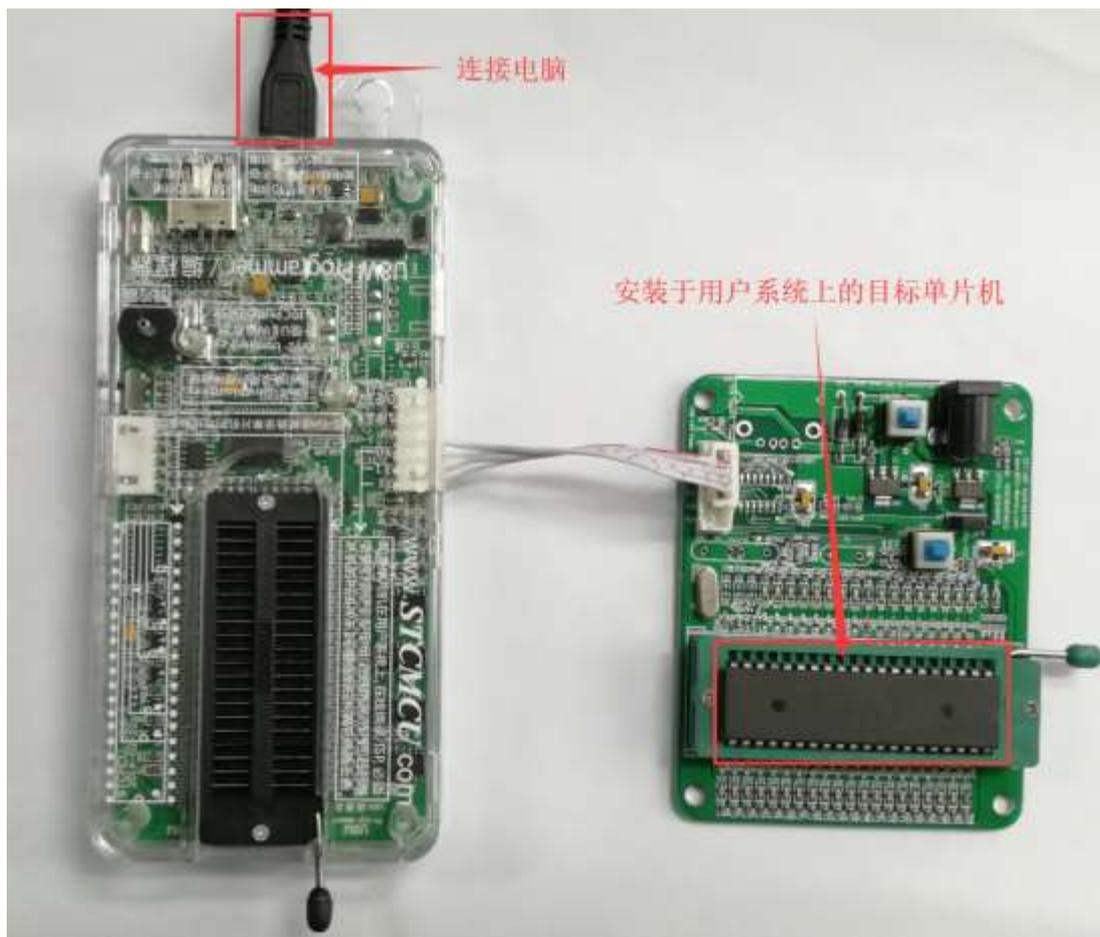
When there is the version number information of the output download board and the corresponding information of the external Flash in the information box, it means that the U8W download tool has been correctly detected.

During the downloading process, the 4 LEDs on the U8W download tool will be displayed in marquee mode. After the download is complete, if the download is successful, All 4 LEDs will be on and off at the same time; if the download fails, all 4 LEDs will be off.

It is recommended that users use the latest version of STC-ISP to download the software (please pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).

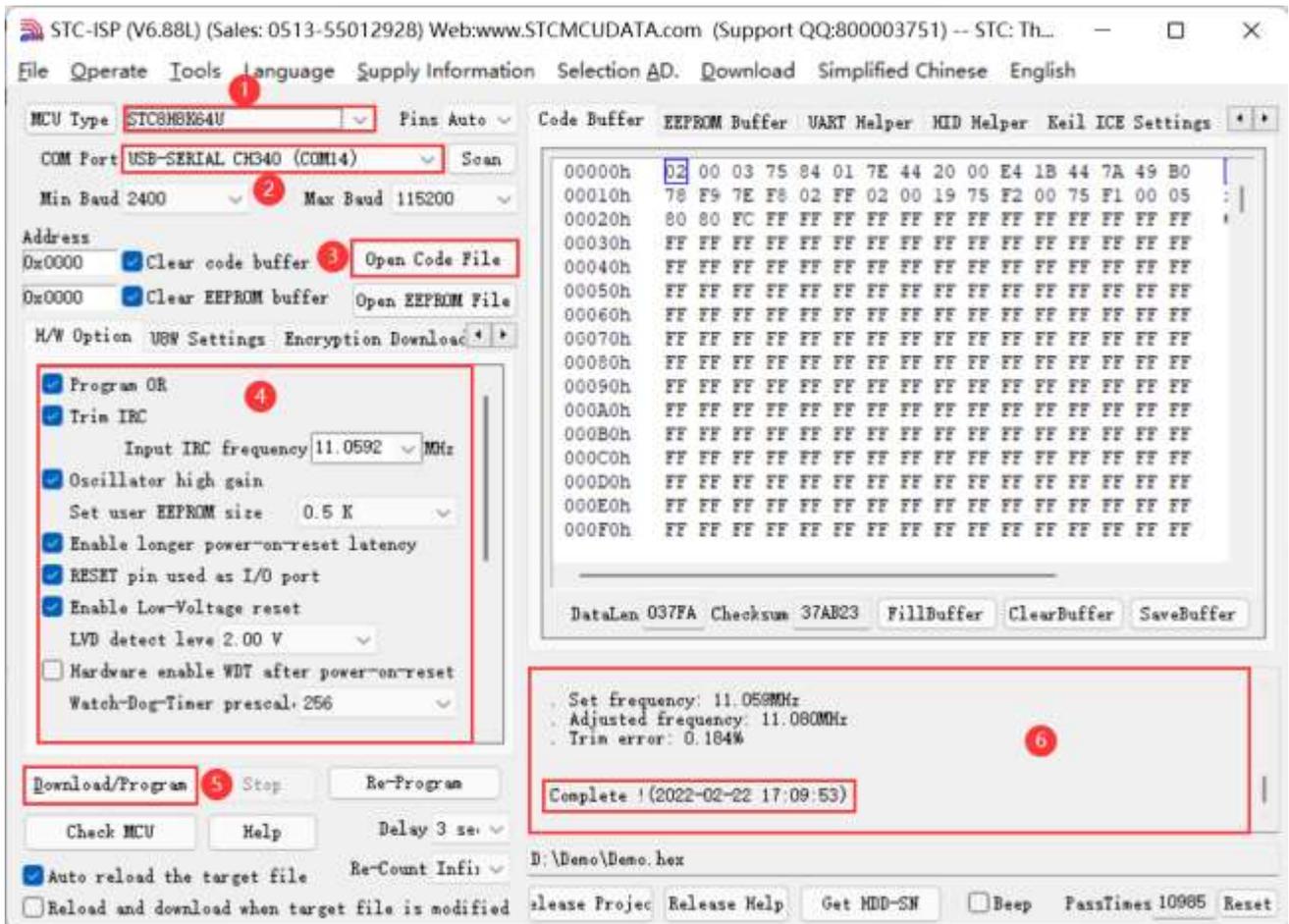
**The target chip is connected to U8W through the user system leads and U8W is connected to the computer for online download**

Firstly, use the USB cable provided by STC to connect U8W to the computer, and then connect U8W to the target MCU of the user system through the download line. The connection method is shown in the following figure:



Then use STC-ISP to download the software to download the program, the steps are as follows:

1. Select the MCU model;
2. Select the serial port number corresponding to U8W;
3. Open the target file (HEX format or BIN format);
4. Set hardware options;
5. Click the "Download/Program" button to start burning;
6. The step information of the programming process is displayed, and the message "Completed!" is displayed when the programming is completed.



When there is the version number information of the output download board and the corresponding information of the external Flash in the information box, it means that the U8W download tool has been correctly detected.

During the download process, the 4 LEDs on the U8W download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

It is recommended that users use the latest version of STC-ISP to download the software (please always pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).

### 3.4 U8W offline download instructions

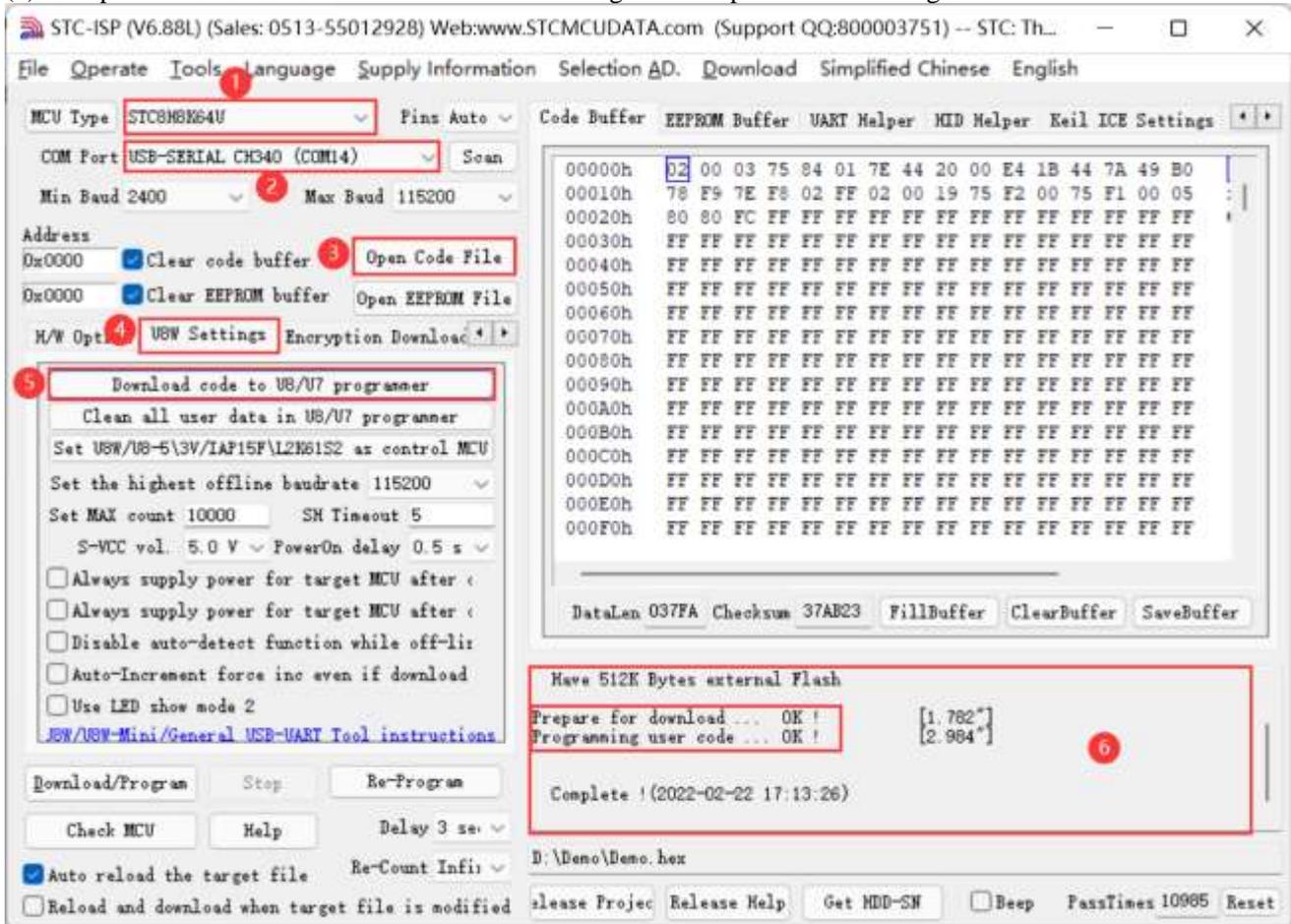
The target chip is installed on the U8W socket and locked and connected to the computer via USB to power the U8W for offline download

The steps to use USB to power U8W for offline download are as follows:

(1) Use the USB cable provided by STC to connect the U8W download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:



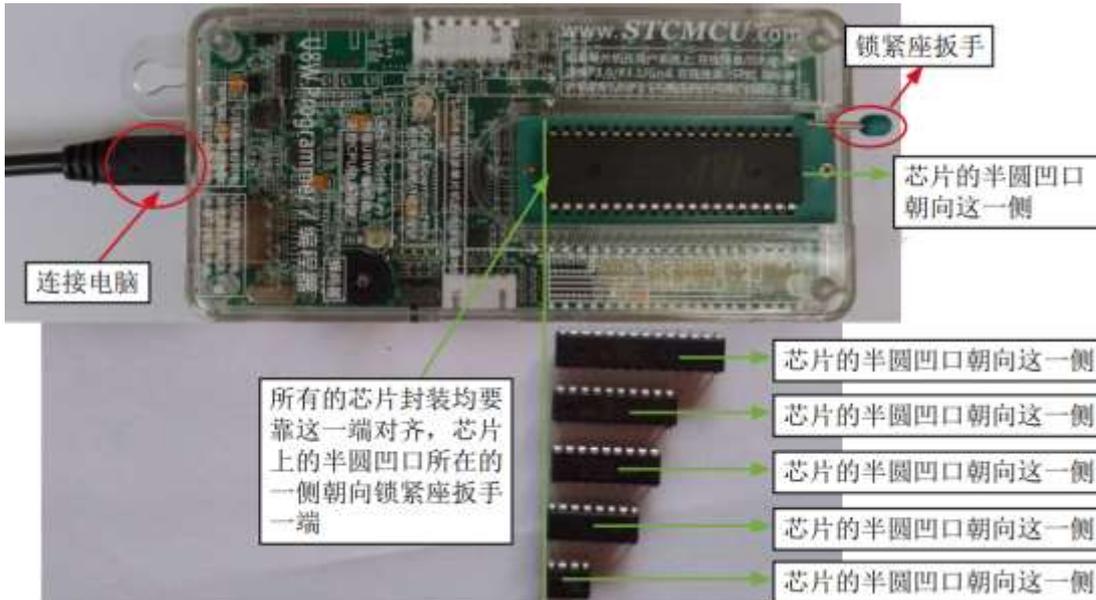
1. Select the MCU model;
2. Select the serial port number corresponding to U8W;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip working voltage; click the "Download user program to U8/U7 programmer for offline download" button ;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

According to the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W download tool.

It is recommended that users use the latest version of STC-ISP to download the software (please always pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is

strongly recommended that users download the software from the official website <http://www.STCMCU.com>).

(3) Place the target MCU in the U8W download tool in the direction shown in the figure below, as shown in the figure below:



(4) Then press and release the button as shown in the figure below to start offline download:



During the downloading process, the 4 LEDs on the U8W download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

Offline download plug and play burning function introduction:

1. After completing the above steps (1) and (2), U8W is in the plug-and-play programming state by default when it is connected to the computer and powered on;
2. Put the chip into the programming socket according to the instructions in step (3). While tightening the socket wrench, U8W will automatically start programming;
3. Display the burning process and burning result through the indicator light;
4. After programming is completed, loosen the wrench and take out the chip;
5. Repeat steps 2, 3 and 4 for continuous programming, eliminating the need to press the button to trigger the programming action.

**The target chip is connected to U8W by the user system lead and connected to the computer via USB to supply power to U8W for offline download.**

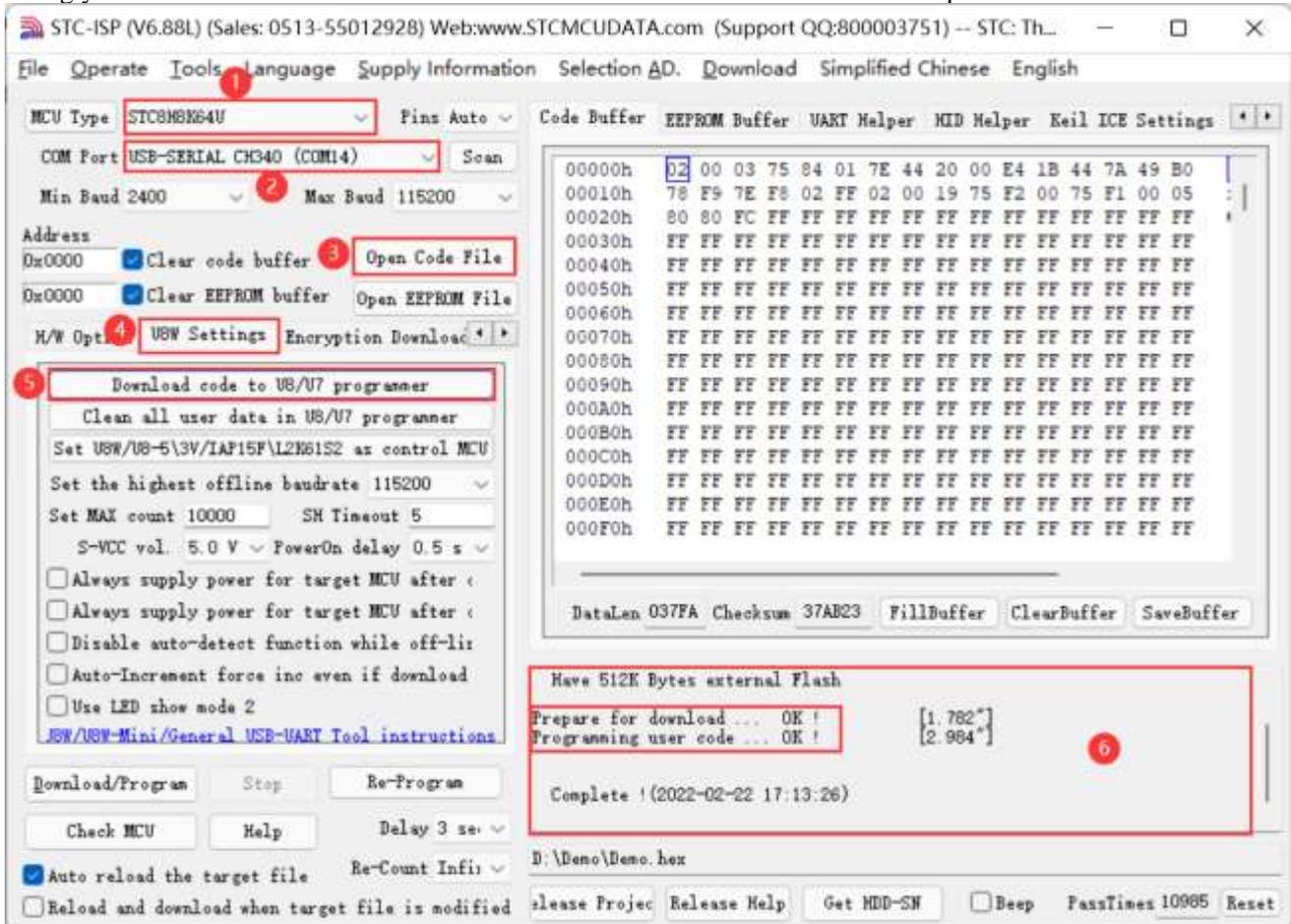
The steps for offline download using USB to supply power to U8W are as follows:

- (1) Use the USB cable provided by STC to connect the U8W download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:

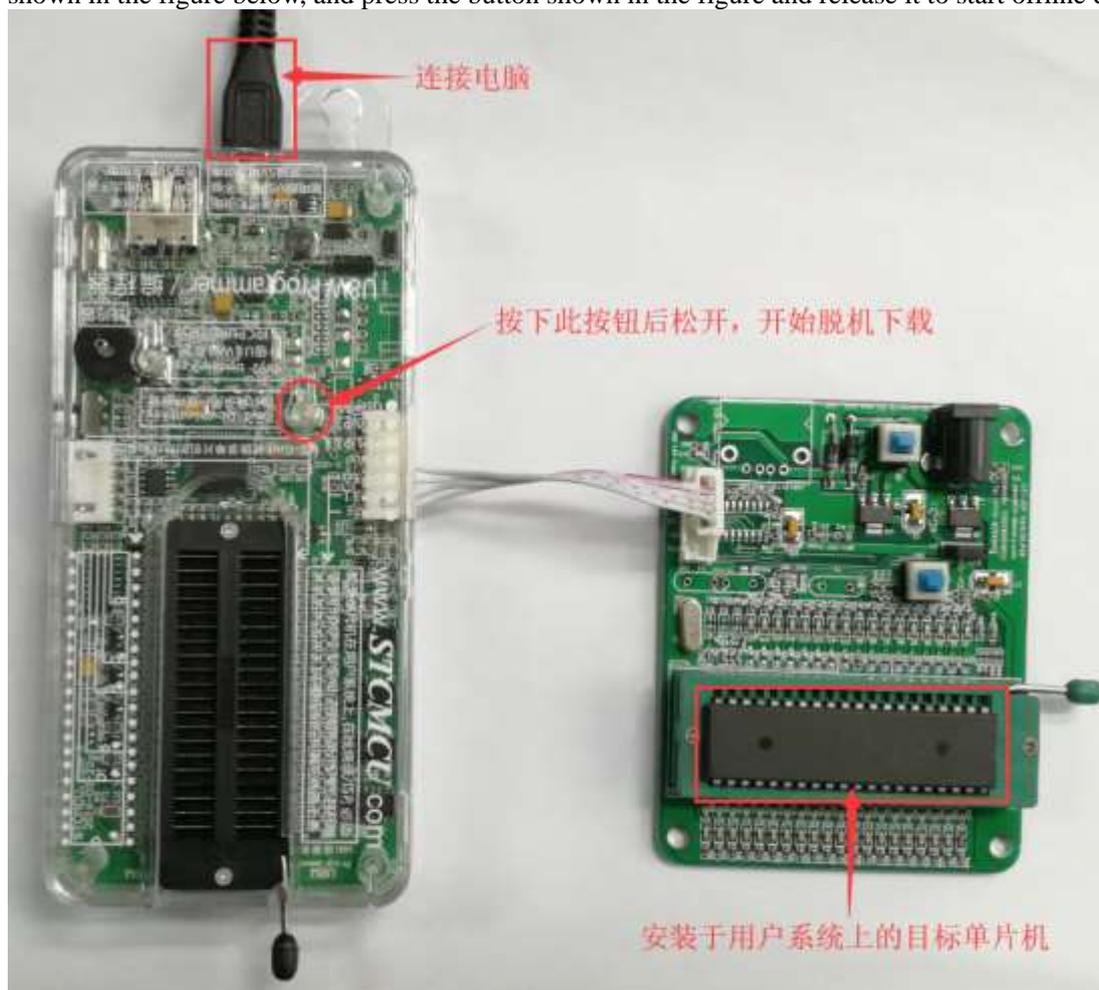
It is recommended that users use the latest version of STC-ISP to download the software (please always pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).



1. Select the MCU model;
2. Select the serial port number corresponding to U8W;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip operating voltage; Click the "Download user program to U8/U7 programmer for offline download" button;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

According to the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W download tool.

(3) Then use the cable to connect the computer, connect the U8W download tool and the user system (target MCU) as shown in the figure below, and press the button shown in the figure and release it to start offline downloading:



During the downloading process, the 4 LEDs on the U8W download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

**The target chip is connected to U8W by the user system lead, and the user system supplies power to U8W for offline download**

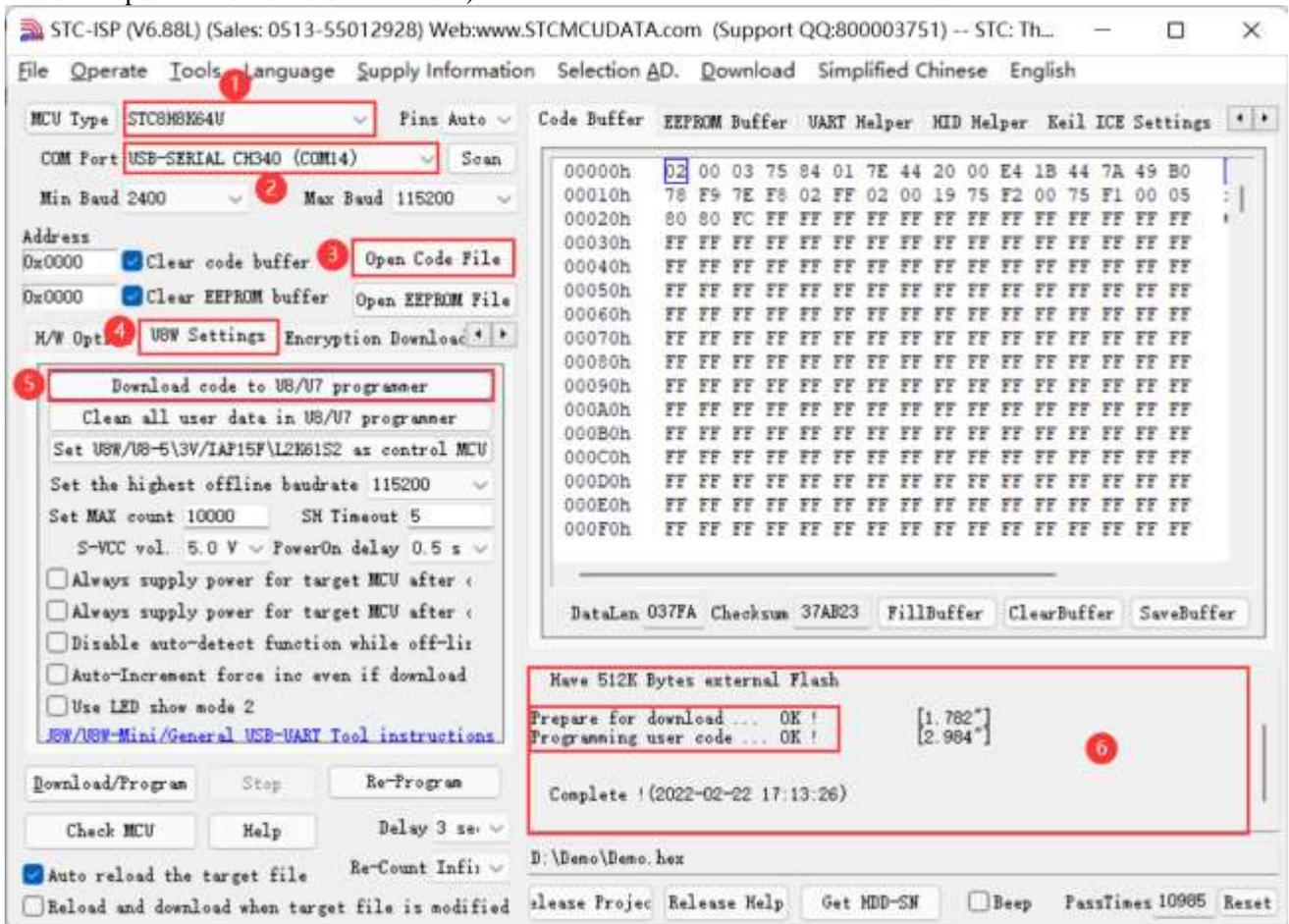
(1) Firstly, use the USB cable provided by STC to connect the U8W download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:

It is recommended that users use the latest version of STC-ISP to download the software (please always pay attention to the updates of the STC-ISP download software on the STC official website

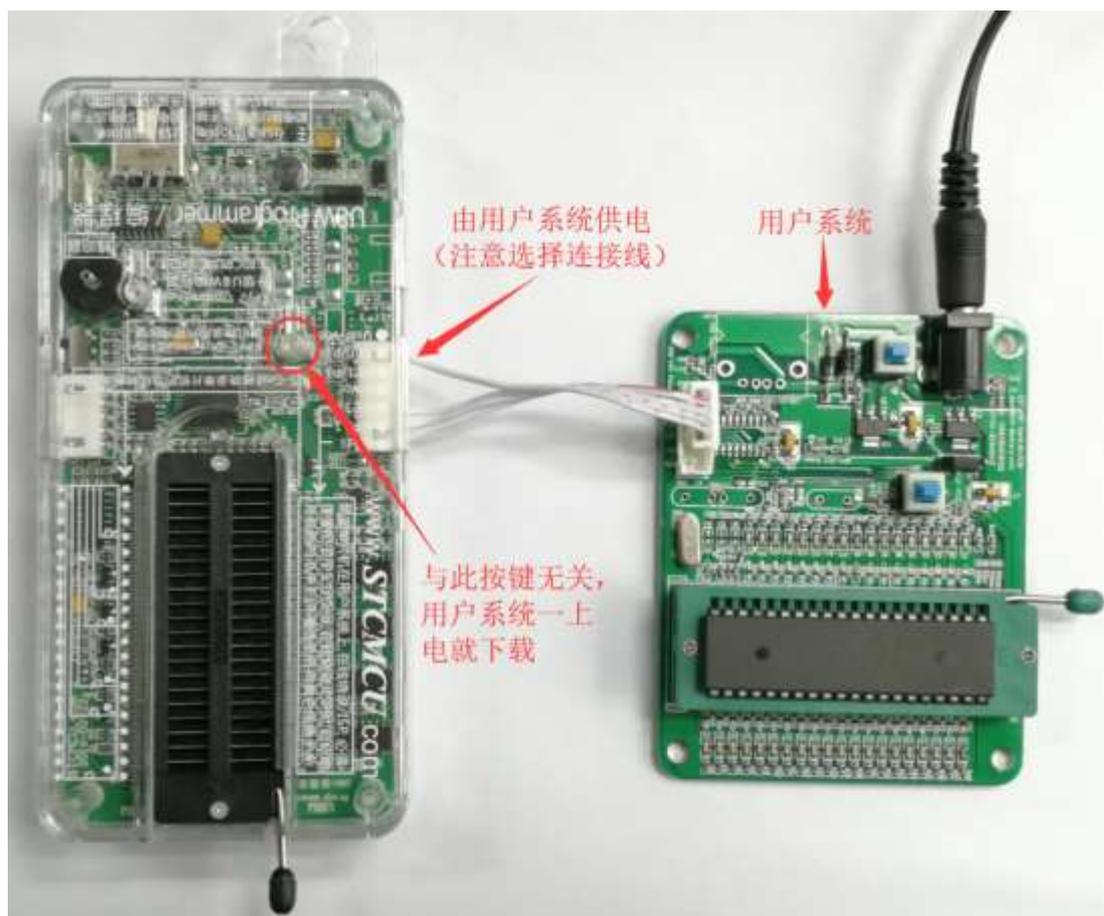
<http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).



1. Select the MCU model;
2. Select the serial port number corresponding to U8W;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip operating voltage; Click the "Download user program to U8/U7 programmer for offline download" button;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

According to the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W download tool.

(3) Then connect U8W to the user system as shown in the figure below, supply power to the user system, and then start offline downloading:



During the downloading process, the 4 LEDs on the U8W download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

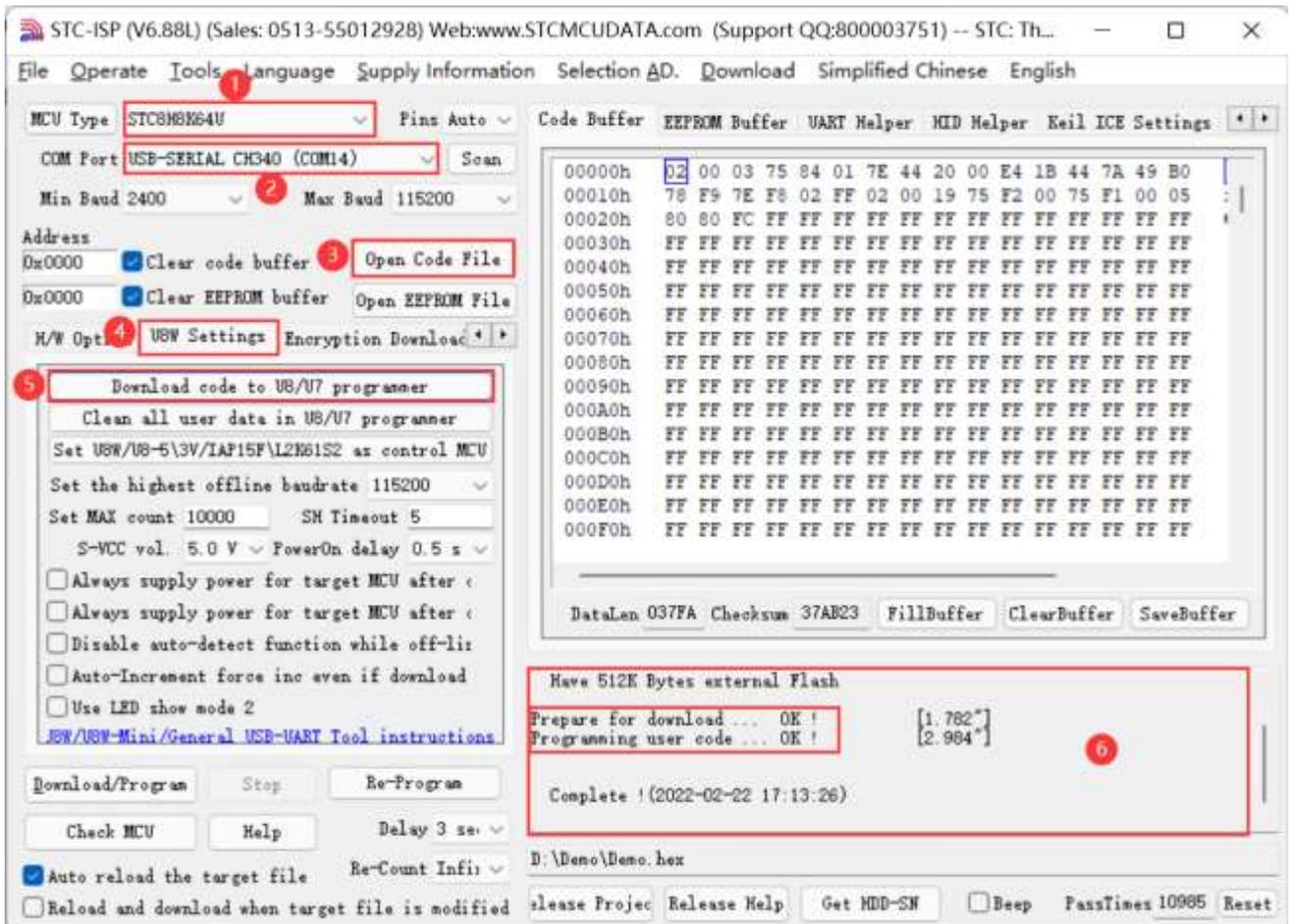
**The target chip is connected to U8W by the user system lead, and U8W and the user system are independently powered for offline download**

(1) Firstly, use the USB cable provided by STC to connect the U8W download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:

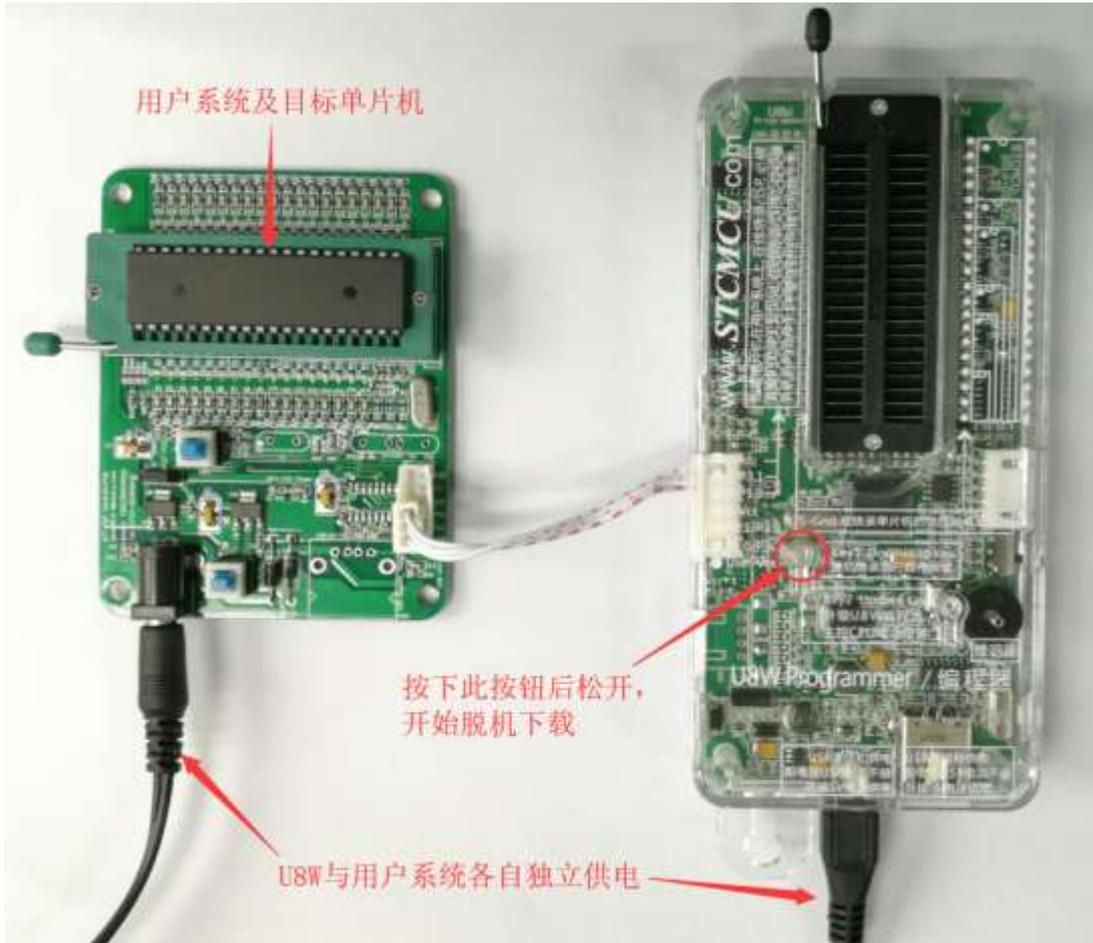
It is recommended that users use the latest version of STC-ISP to download the software (please always pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).



1. Select the MCU model;
2. Select the serial port number corresponding to U8W;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip operating voltage; Click the "Download user program to U8/U7 programmer for offline download" button;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

According to the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W download tool.

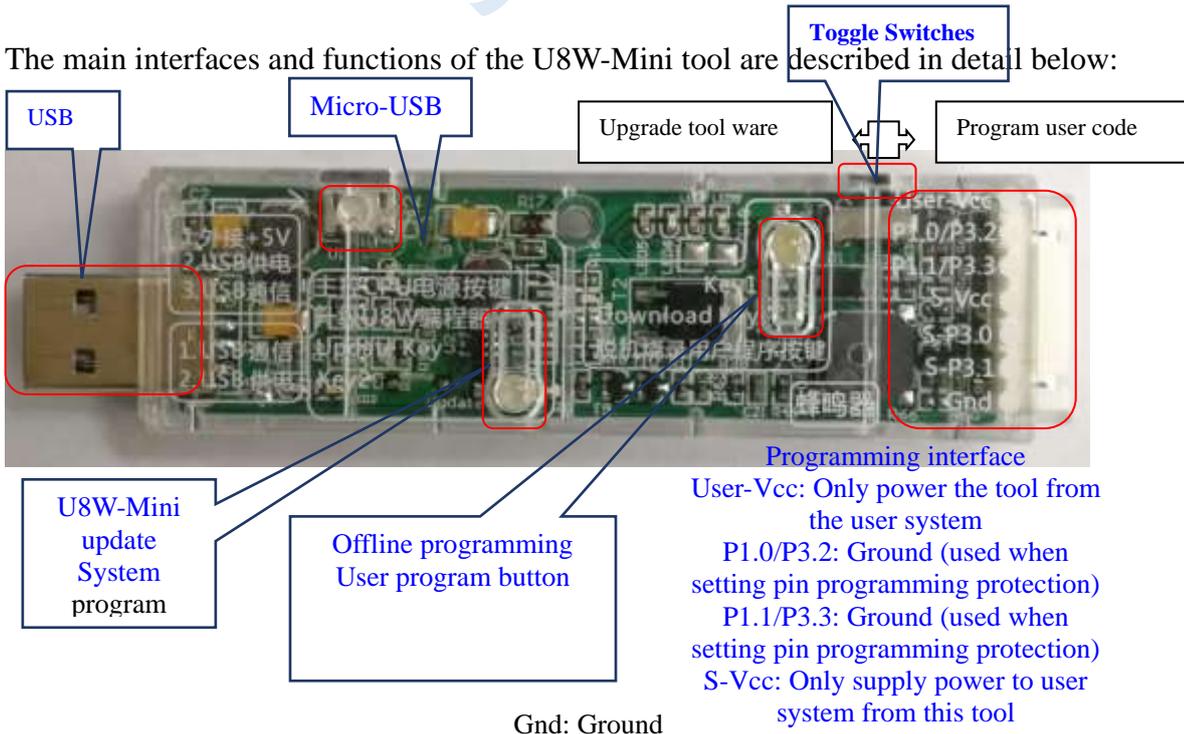
(3) Then connect U8W to the user system as shown in the figure below, and press the button shown in the figure first and then release it, ready to start offline download, and finally power on/on the user system to download the user program Officially begin:



During the downloading process, the 4 LEDs on the U8W download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

### 3.5 U8W-Mini's function introduction

The main interfaces and functions of the U8W-Mini tool are described in detail below:



**Programming interface:** According to different power supply methods, use different download cables to connect the U8W-Mini download board and the user system.

**U8W-Mini update system program button:** used to update U8W-Mini tools. When there is a new version of U8W firmware, you need to press this button to update the U8W-Mini main control chip (**note: you must first select update/download The toggle switch on the interface is moved to the upgrade tool firmware**).

**Offline download user program button:** Start offline download button. First, the PC downloads the offline code to the U8W-Mini, and then uses the download cable to connect the user system to the U8W-Mini, and then press this button to start the offline download (the user will also start downloading immediately every time the power is turned on Code).

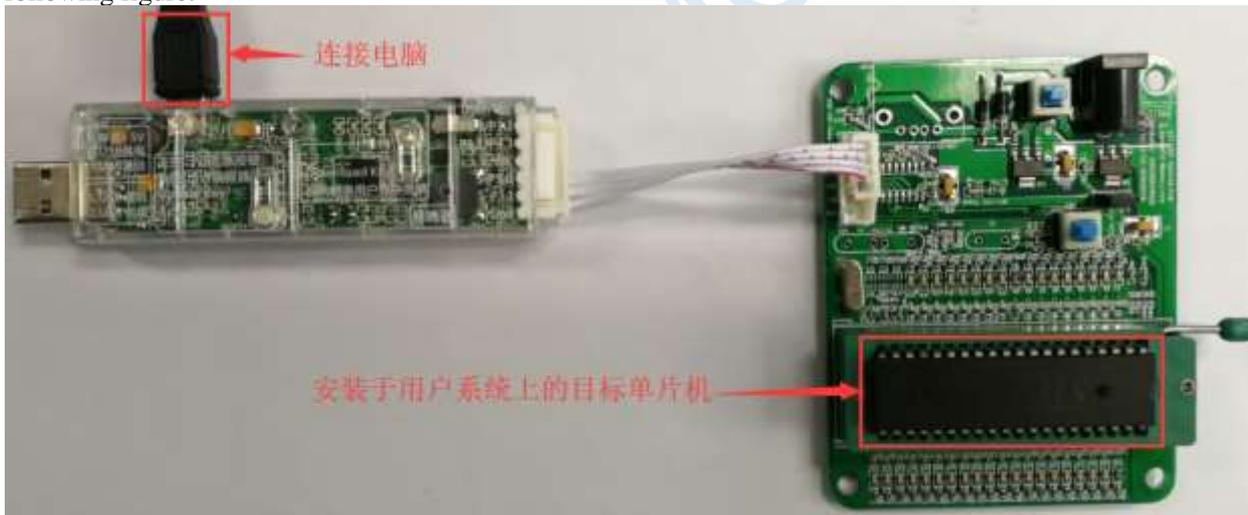
**Update/download selection interface:** When you need to upgrade the underlying firmware of U8W-Mini, you need to move this toggle switch to the firmware of the upgrade tool. When you need to program the target chip through U8W-Mini, you need to Toggle the switch to burn the user program. (Please refer to the figure above for the connection of the toggle switch)

**USB interface:** The USB interface has the same function as the Micro-USB interface. Users can connect one of them to the computer as needed.

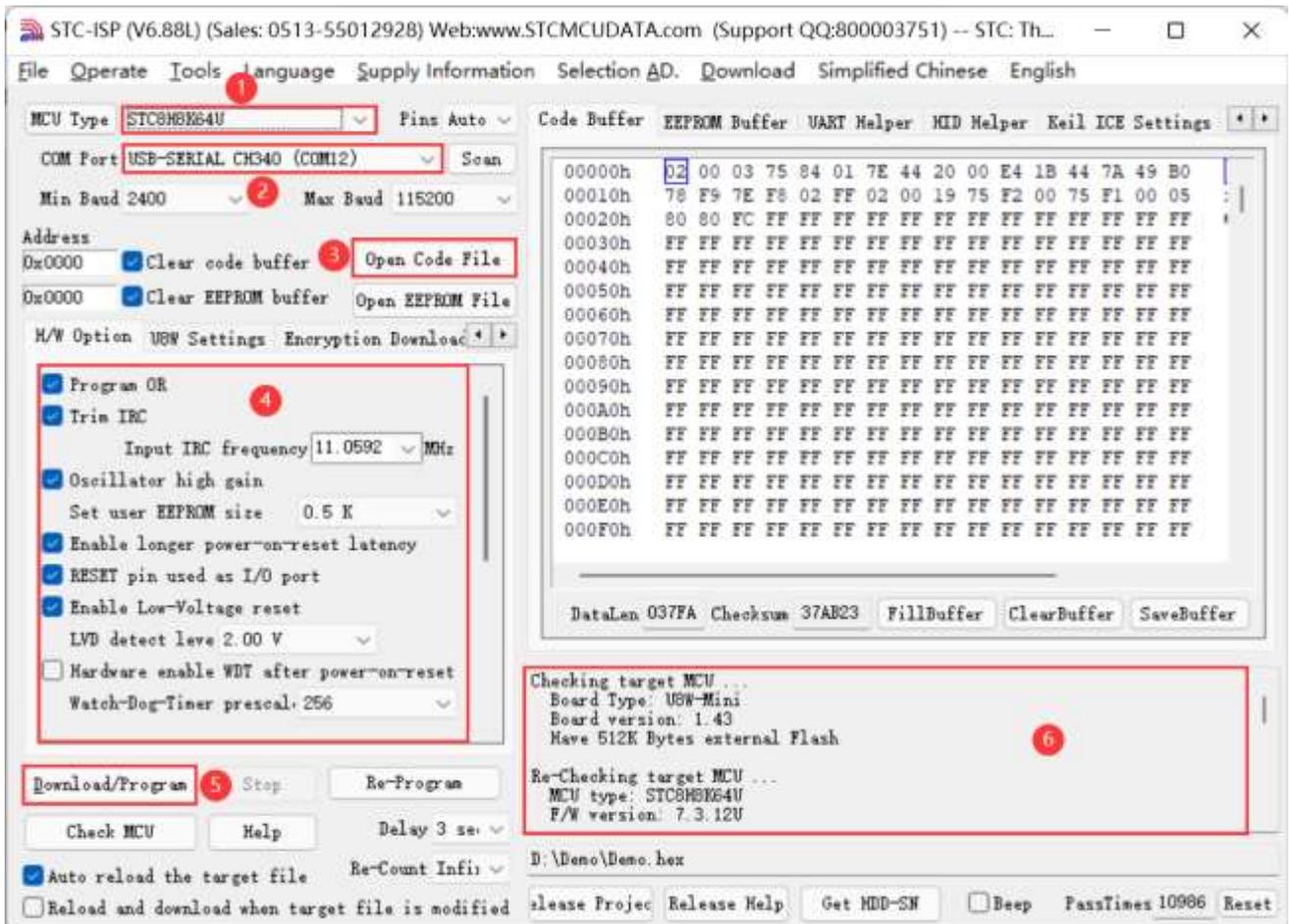
### 3.6 U8W-Mini online download instructions

**The target chip is connected to the U8W-Mini through the user system lead, and the U8W-Mini is connected to the computer for online download**

Firstly, use the USB cable provided by STC to connect the U8W-Mini to the computer, and then connect the U8W-Mini to the target MCU of the user system through the download cable. The connection method is shown in the following figure:



Then use STC-ISP to download the software to download the program, the steps are as follows:



1. Select the MCU model;
2. Select the number of pins. When the chip is directly installed on the U8W-Mini to download, be sure to select the correct number of pins, otherwise the download will fail;
3. Select the serial port number corresponding to U8W-Mini;
4. Open the target file (HEX format or BIN format);
5. Set the hardware options;
6. Click the "Download/Program" button to start burning;
7. The step information of the burning process is displayed, and the message "Completed!" is displayed when the burning is completed.

When there is the version number information of the output download board and the corresponding information of the external Flash in the information box, it means that the U8W-Mini download tool has been correctly detected.

During the downloading process, the 4 LEDs on the U8W-Mini download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

It is recommended that users use the latest version of STC-ISP to download the software (please pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software on the official website <http://www.STCMCUDATA.com>).

### 3.7 U8W-Mini offline download instructions

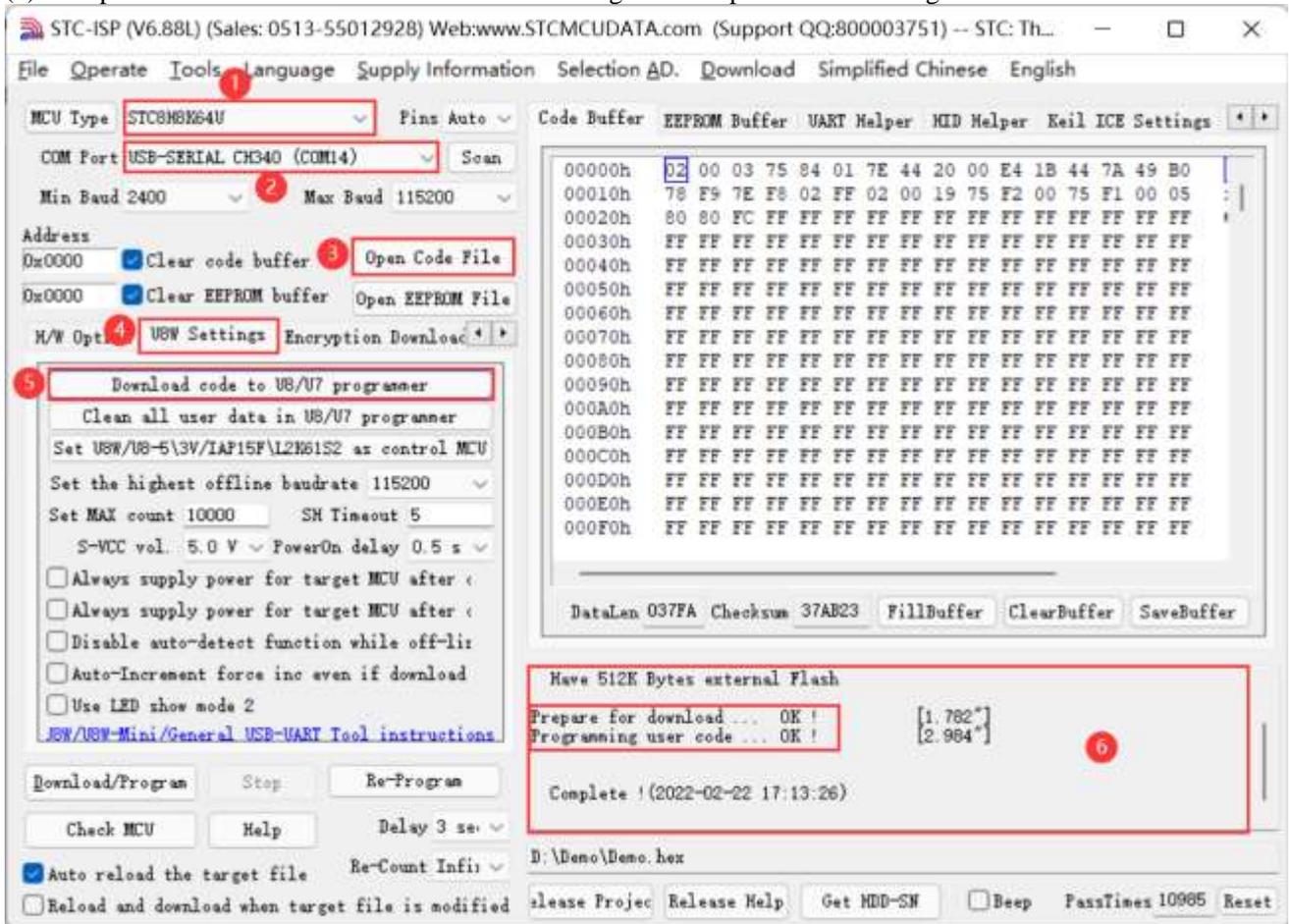
**The target chip is connected to the U8W-Mini by the user system lead and connected to the computer via USB to power the U8W-Mini for offline download.**

The steps for offline download using USB to power the U8W-Mini are as follows:

- (1) Use the USB cable provided by STC to connect the U8W-Mini download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:

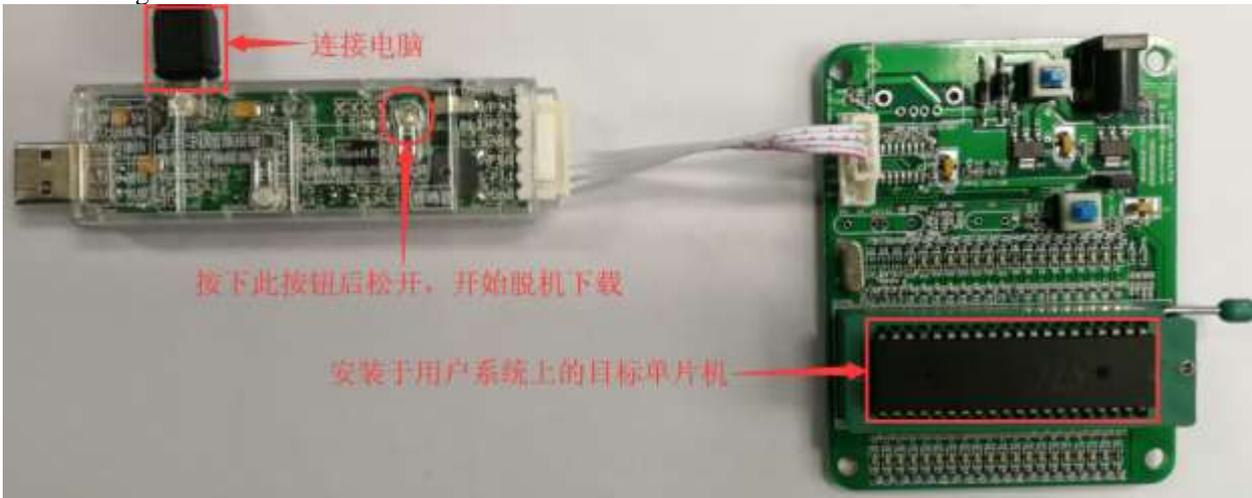


1. Select the MCU model;
2. Select the serial port number corresponding to U8W-Mini;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip working voltage; click the "Download user program to U8/U7 programmer for offline download" button ;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

Follow the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W-Mini download tool.

It is recommended that users use the latest version of STC-ISP to download the software (please pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is

strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).  
 (3) Then use the cable to connect the computer, connect the U8W-Mini download tool and the user system (target MCU) as shown in the figure below, and press the button shown in the figure and release it to start offline downloading :



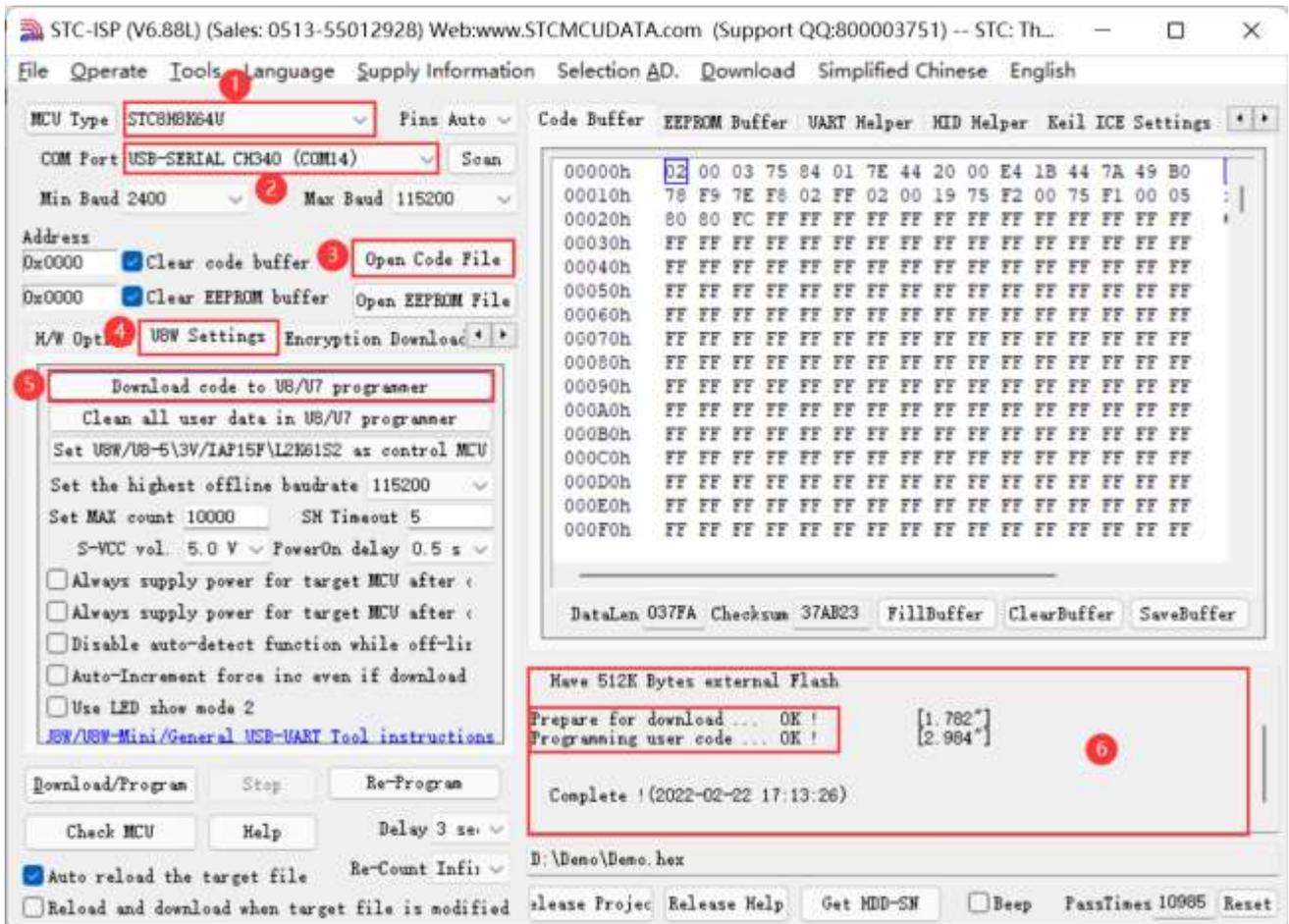
During the downloading process, the 4 LEDs on the U8W-Mini download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

**The target chip is connected to the U8W-Mini by the user system lead, and the U8W-Mini is powered by the user system for offline download.**

(1) Firstly, use the USB cable provided by STC to connect the U8W-Mini download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:

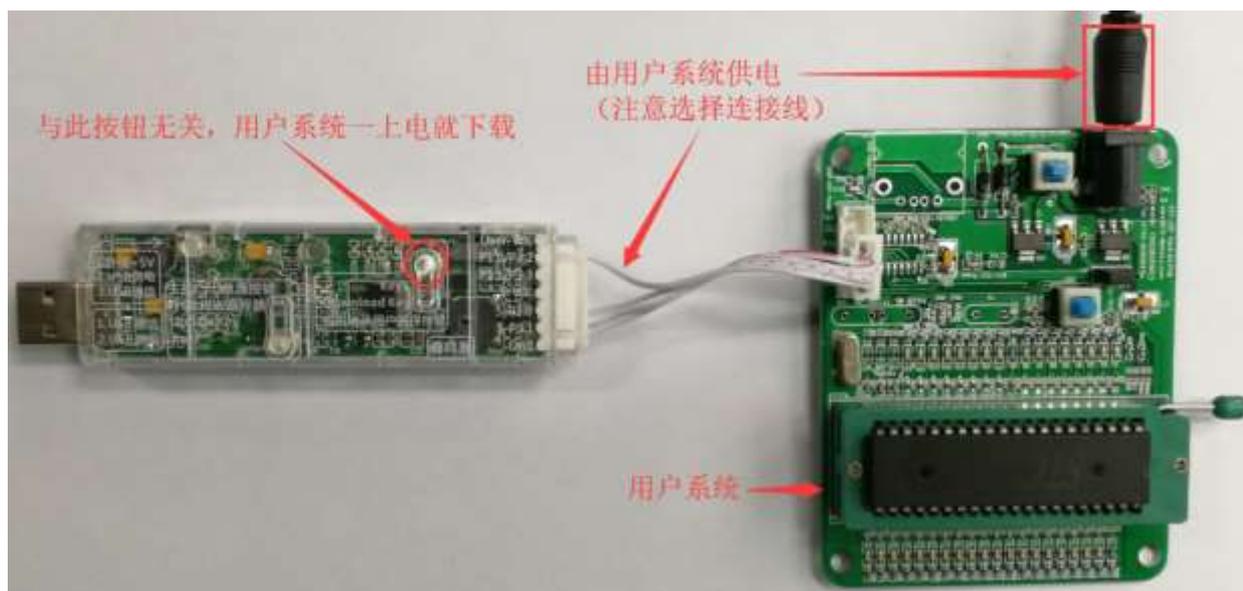


1. Select the MCU model;
2. Select the serial port number corresponding to U8W-Mini;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip working voltage; click the "Download user program to U8/U7 programmer for offline download" button ;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

Follow the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W-Mini download tool.

It is recommended that users use the latest version of STC-ISP to download the software (please pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>) Software used).

(3) Then connect U8W-Mini to the user system as shown in the figure below. Once the user system is powered on, it will start offline downloading:



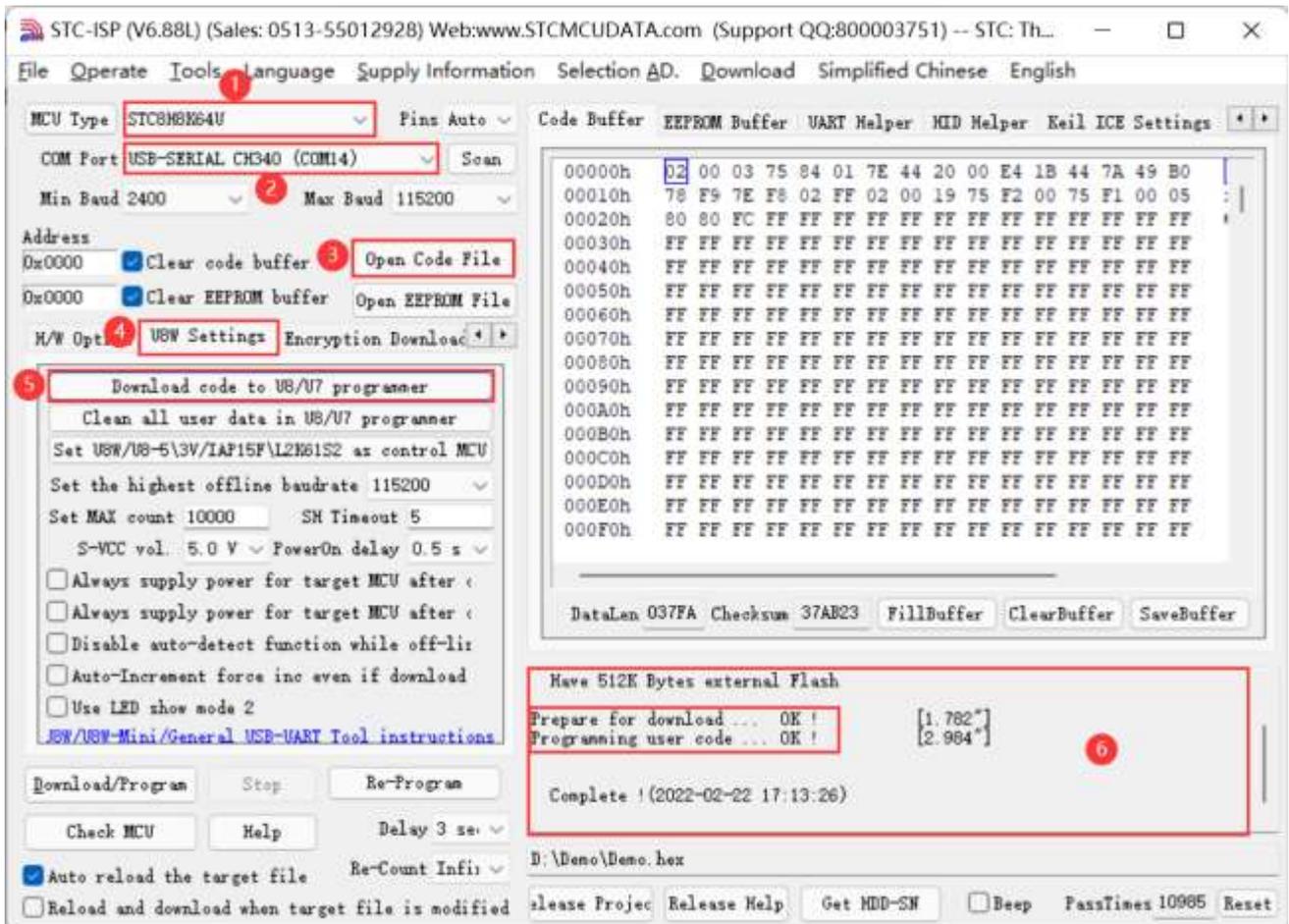
During the downloading process, the 4 LEDs on the U8W-Mini download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

**The target chip is connected to U8W-Mini by the user system lead, and U8W-Mini and the user system are independently powered for offline download.**

(1) Firstly, use the USB cable provided by STC to connect the U8W-Mini download board to the computer, as shown below:



(2) Set up in the STC-ISP download software according to the steps shown in the figure below:

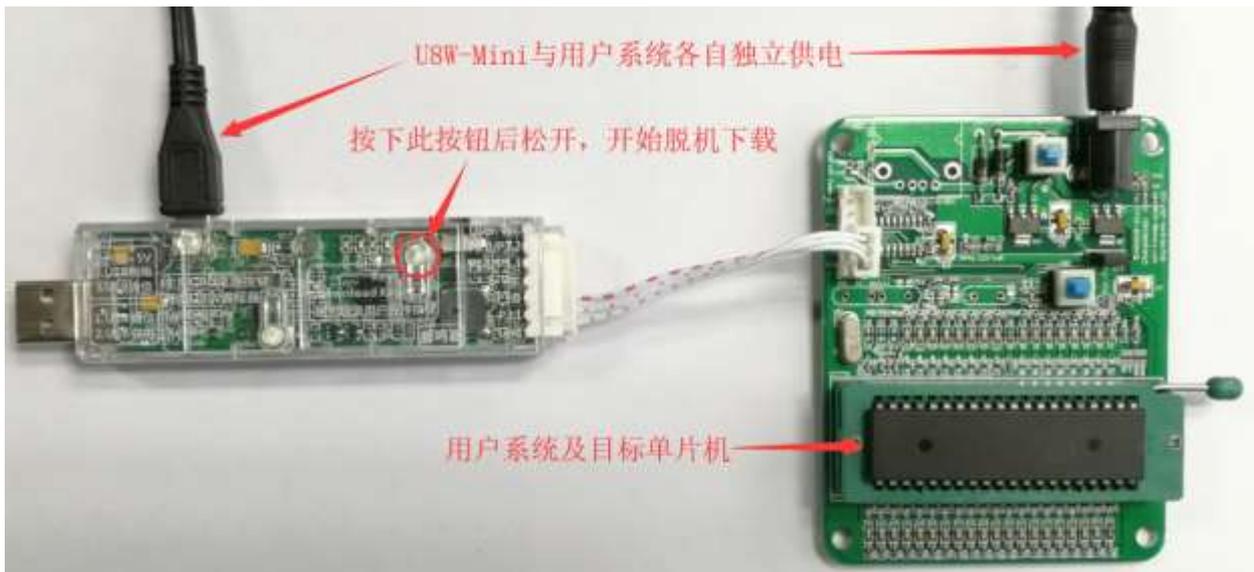


1. Select the MCU model;
2. Select the serial port number corresponding to U8W-Mini;
3. Open the target file (HEX format or BIN format);
4. Set the hardware options;
5. Select the "U8W Offline/Online" tab, set the offline programming options, pay attention to the S-VCC output voltage matches the target chip working voltage; click the "Download user program to U8/U7 programmer for offline download" button ;
6. The step information of the setting process is displayed, and the prompt "Completed!" is displayed after the setting is completed.

Follow the steps in the above figure, after the operation is completed, if the download is successful, it means that the user code and related setting options have been downloaded to the U8W-Mini download tool.

It is recommended that users use the latest version of STC-ISP to download the software (please pay attention to the updates of the STC-ISP download software on the STC official website <http://www.STCMCUDATA.com>. It is strongly recommended that users download the software from the official website <http://www.STCMCUDATA.com>).

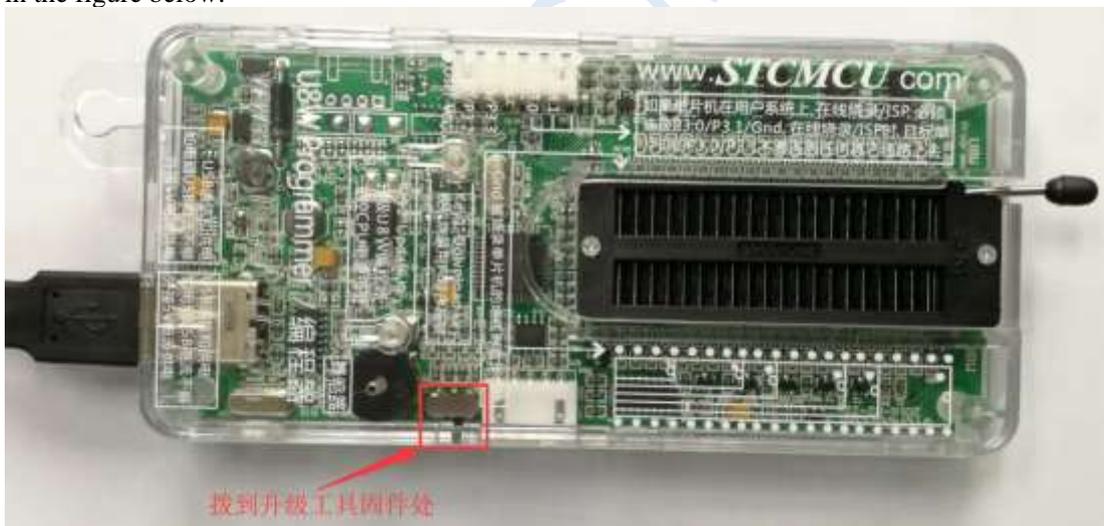
(3) Then connect U8W-Mini to the user system as shown in the figure below, and press the button shown in the figure first and then release it, ready to start offline download, and finally power on/on the user system to download The user program officially starts:



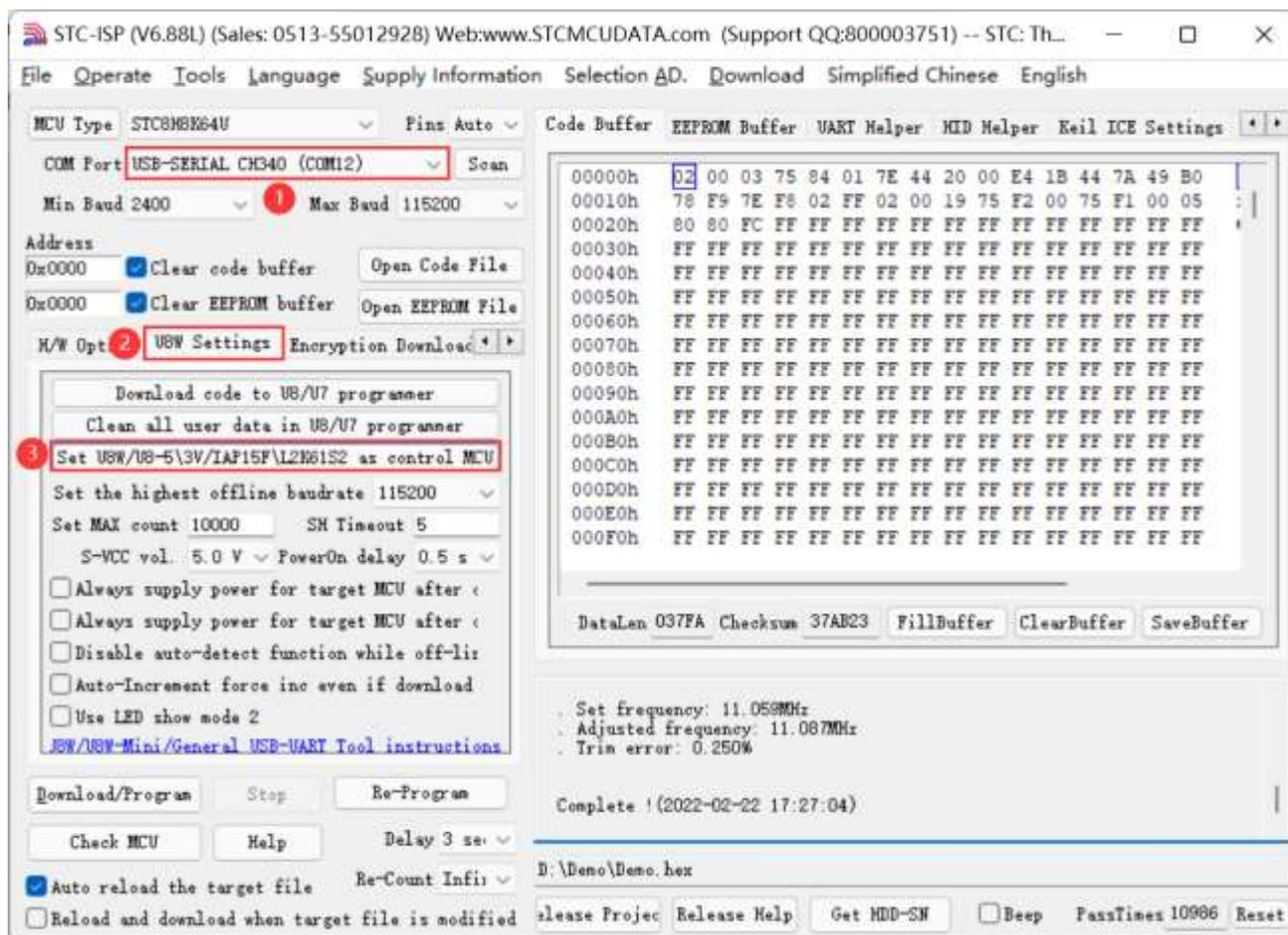
During the downloading process, the 4 LEDs on the U8W-Mini download tool will be displayed in marquee mode. After the download is complete, if the download is successful, the 4 LEDs will be on and off at the same time; if the download fails, all the 4 LEDs will be off.

### 3.8 Make/Update U8W/U8W-Mini

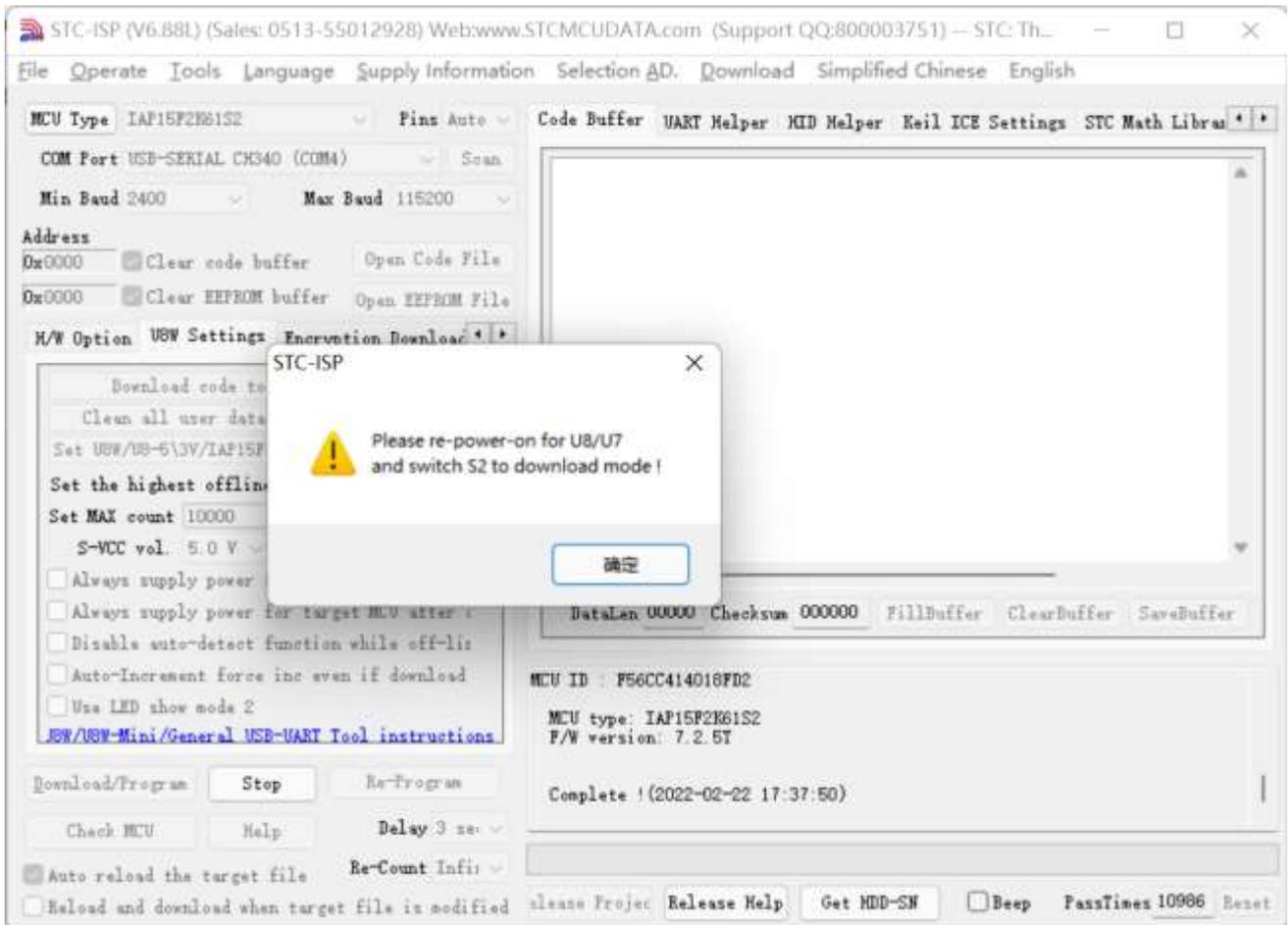
The process of making U8W/U8W-Mini download master is similar. To save space, the following uses U8W as an example to describe how to make U8W download master. Before making the U8W download master, you need to dial the "Update/Download Selection Interface" of the U8W download board to "Upgrade Tool Firmware", as shown in the figure below:



Then click the "Set U8W/U8-5V/U8-3V as the offline download master chip" button on the "U8W Offline/Online" page in the STC-ISP download program, as shown in the figure below: **(Note: Be sure to select The serial port corresponding to U8W)**



When the following screen appears, it indicates that the U8W control chip is made:



After the production is completed, do not forget to dial the "Update/Download Selection Interface" of U8W back to the "Burn User Program" mode, and power on the U8W download tool again, as shown in the figure below: (Otherwise, programming will not be performed normally)



### 3.9 U8W/U8W-Mini set through mode (can be used for simulation)

To use U8W/U8-Mini for simulation, you must first set U8W/U8-Mini to pass-through mode. The method of U8W/U8W-Mini to realize USB to serial port pass-through mode is as follows:

1. First, the U8W/U8W-Mini firmware must be upgraded to v1.37 and above;

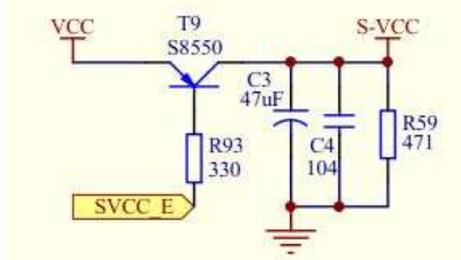
2. After U8W/U8W-Mini is powered on, it is in normal download mode. At this time, press and hold the Key1 (download) button on the tool and do not release it. Press the Key2 (power) button again, and then release the Key2 (power) button. Then release the Key1 (download) button, U8W/U8W-Mini will enter the USB to serial port pass-through mode. (Press Key1 → Press Key2 → Release Key2 → Release Key1);
3. The U8W/U8W-Mini tool that enters the pass-through mode is just a simple USB to serial port and does not have the offline download function. If you need to restore the original functions of U8W/U8W-Mini only need to press the Key2 (power) button separately again.

### 3.10 Reference circuit of U8W/U8W-Mini

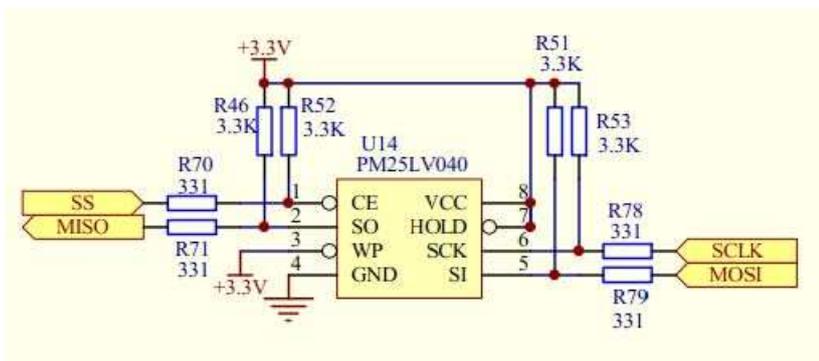
USB online/offline download board U8W/U8W-Mini provides users with the following common control interfaces:

Pin function	Port	Function description
Power control pin	P2.6	Low effective
Download communication pin	P1.0	Serial port RXD, connect to the TXD of the target chip (P3.1)
	P1.1	Serial port TXD, connect to RXD of target chip (P3.0)
Programming button	P3.6	Low effective
display	P3.2	LED1
	P3.3	LED2
	P3.4	LED3
	P5.5	LED4
External serial Flash control pin	P2.4	Flash CE Pin
	P2.2	Flash SO Pin
	P2.3	Flash SI Pin
	P2.1	Flash SCLK Pin
Automatic burning tool Sorter signal	P3.6	Start signal
	P1.5	Completion signal
	P5.4	OK signal (good signal)
	P3.7	ERROR signal (defective product signal)
Buzzer (BEEP) control	P2.5	High effective (sound at high level)

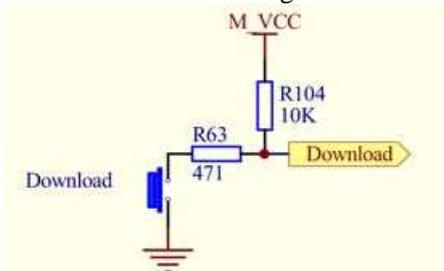
Reference circuit diagram for power control part:



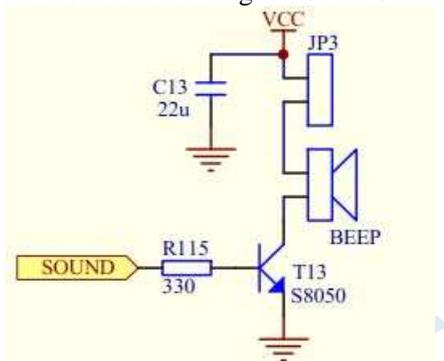
Reference circuit diagram of Flash control part:



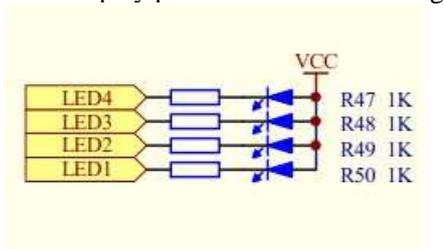
This Flash memory is required when the user program is larger than 41K  
The reference circuit diagram of the button part:



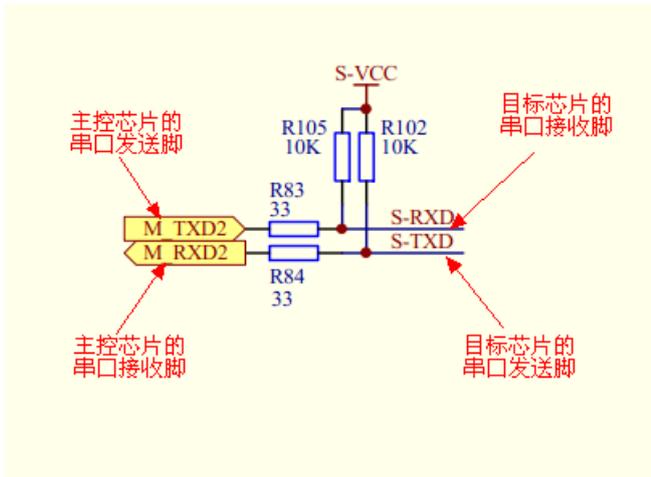
Reference circuit diagram of the buzzer part:



LED display part reference circuit diagram:



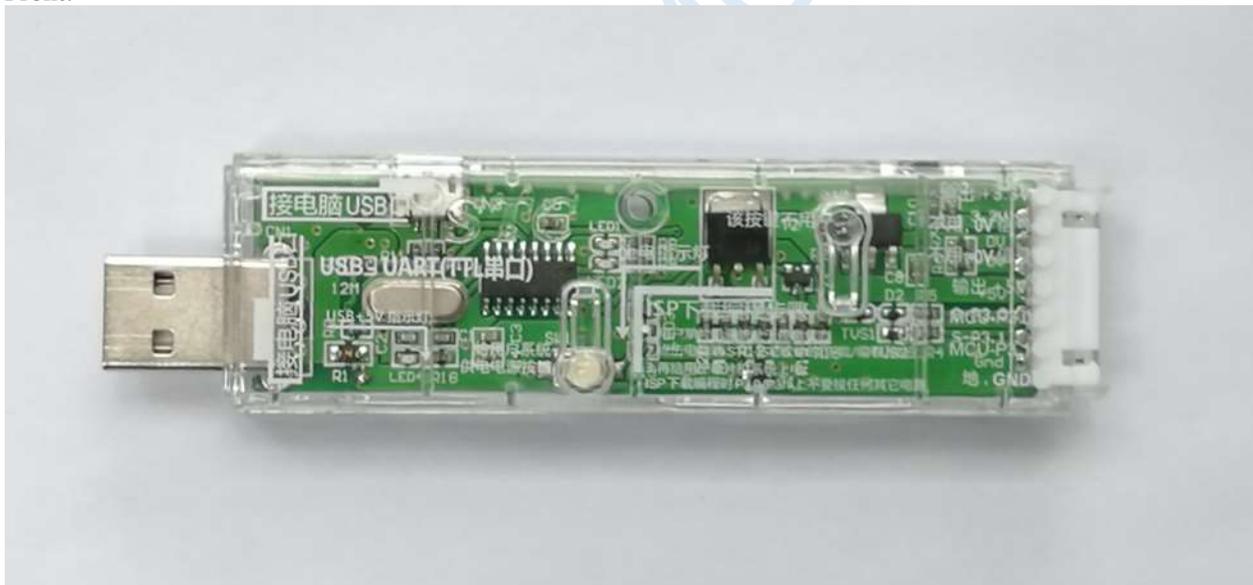
Reference circuit diagram of serial port communication pin connection part:



## 4 STC Universal USB to Serial Tool

### 4.1 Appearance of STC Universal USB to Serial Tool

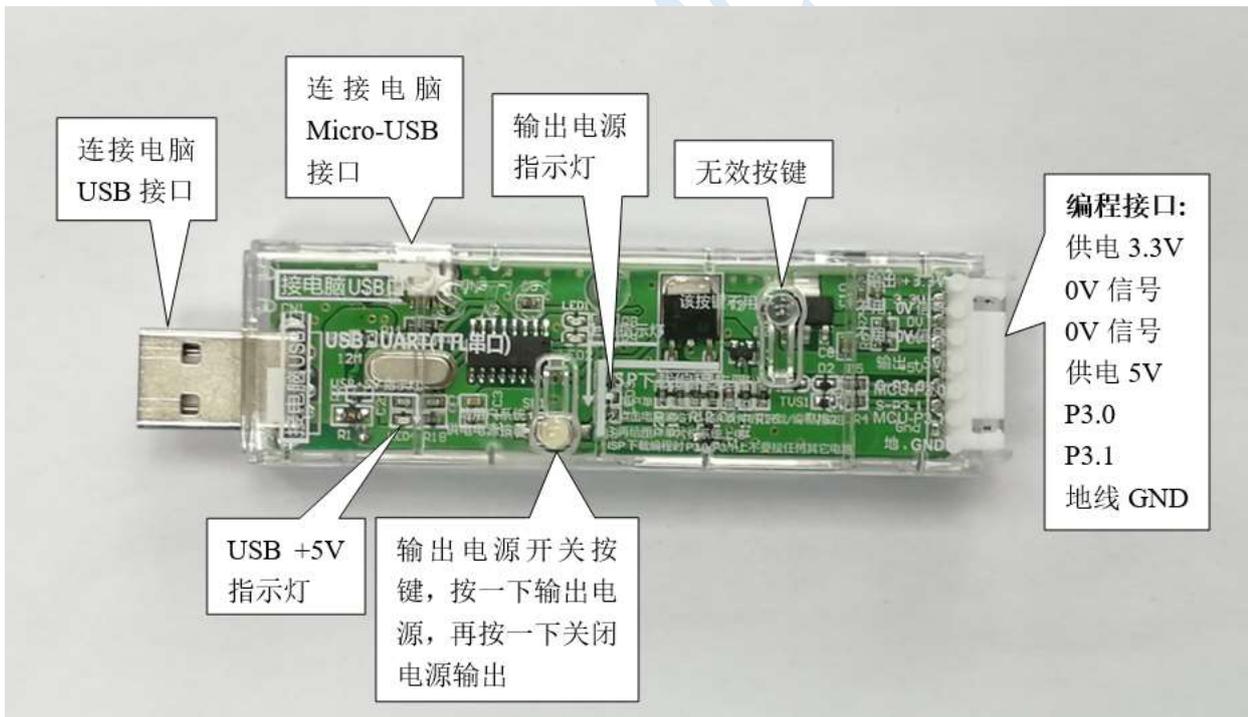
Front:



Back:



## 4.2 STC general USB to serial tool layout diagram



Here, the "power switch" needs to be explained:

The function of this button is the same as the self-locking switch. When the switch button is pressed for the first time, the switch is turned on and held, that is, self-locking. When the switch button is pressed for the second time, the switch turns off the power. In view of the characteristics of self-locking switches that are easily damaged during use, we have designed a set of circuits that use light touch switches to replace self-locking switches to increase the service life of the tools.

For STC microcontrollers, if you want to perform ISP download, you must receive the serial port command at power-on reset to start executing the ISP program, so the correct steps to download the program to the MCU using the STC universal USB to serial tool are:

1. Use STC universal USB to serial port tool to connect the MCU to be burned with the computer;
2. Open STC's ISP to download the software;
3. Select the MCU model;
4. Select the serial port corresponding to the STC Universal USB to Serial Tool;
5. Open the target file (HEX format or BIN format);
6. Click the "download/program" button in the ISP download software;
7. Press the "power switch" on the STC Universal USB to Serial Tool to power the MCU, and the download can start.

**【Cold start burning】**

In addition, the USB interface has the same function as the Micro-USB interface, and the user can connect one of the interfaces to the computer as needed.

The 0V signal pin of the programming interface has a 470 ohm resistor grounded. It can be downloaded only when P1.0/P1.1=0/0 or P3.2/P3.3=0/0 is set. You can set P1.0, P1 .1 or P3.2, P3.3 are connected to the 0V signal pin.

## 4.3 STC Universal USB to Serial Tool Driver Installation

STC general USB to serial port tool uses CH340 USB to serial chip (can plug in crystal oscillator, more accurate), just download the general CH340 serial driver and install it. The following is the CH341SER serial driver provided by STC official website (www.STCMCUDATA.com) Download location:

STC-ISP下载编程烧录软件

- [STC-ISP软件V6.87K版](#)
- [STC开发/烧录工具说明](#)
- STC超强工具包, 已含89系
- 使用该软件的Keil仿真设置向Keil中添加STC器件/头文件和仿真驱动
- [STC-ISP V6.87K请测试](#)
- [STC-ISP软件升级原因](#)
- [STC-ISP V6.87K简化版](#)

After downloading, decompress, the path of CH340 driver installation package is stc-isp-15xx-v6.87K\USB to UART Driver\CH340\_CH341:

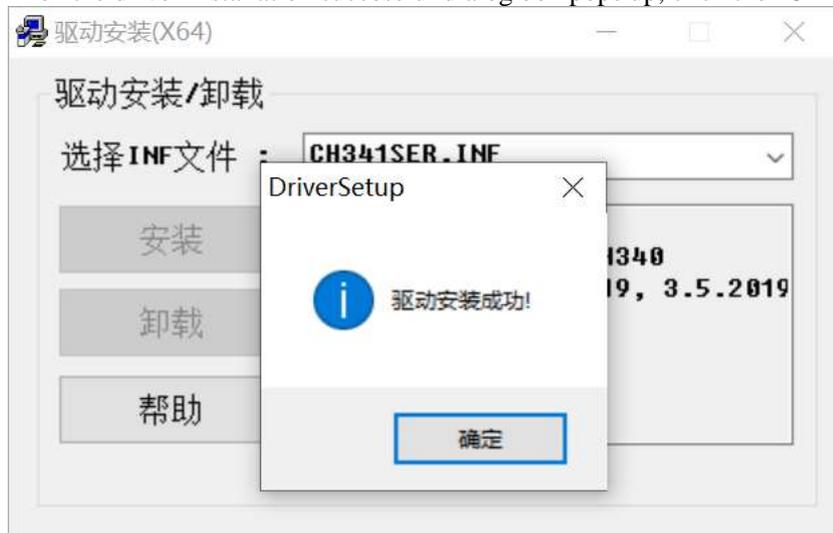
j > 下载 > stc-isp-15xx-v6.87K > USB to UART Driver > CH340\_CH341

名称	修改日期
 ch341ser	2020/5/9 15:03

Take the CH341SER serial port driver provided by STC official website as an example, double-click the "CH341SER.exe" installation package, and click the "Install" button on the pop-up main interface to start installing the driver:



Then the driver installation successful dialog box pops up, click the "OK" button to complete the installation:



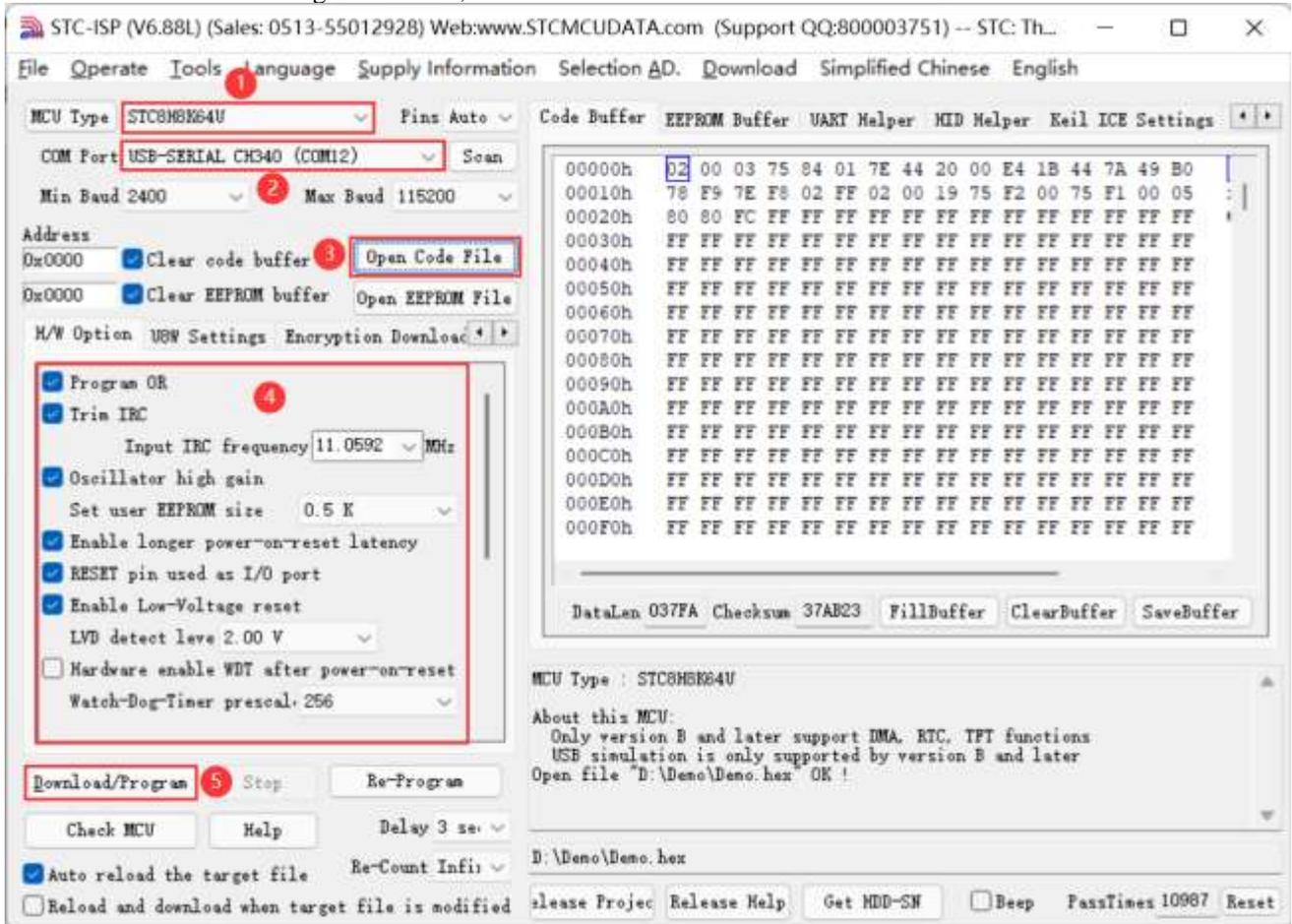
## 4.4 Use STC universal USB to serial port tool to download program to MCU

1. Use the STC universal USB to serial port tool to connect the MCU to be burned to the computer:

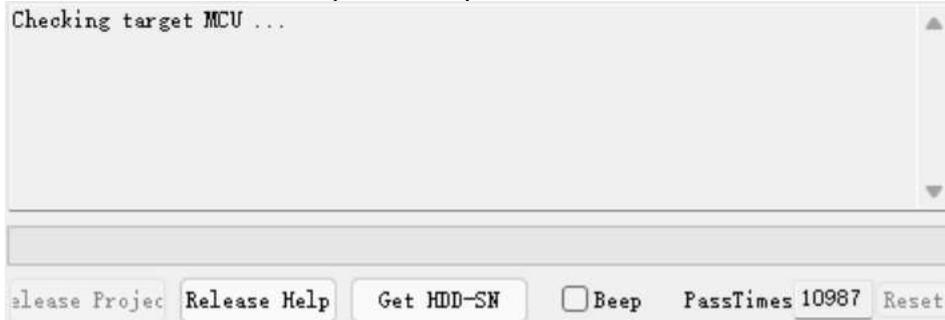


2. Open the STC-ISP software;

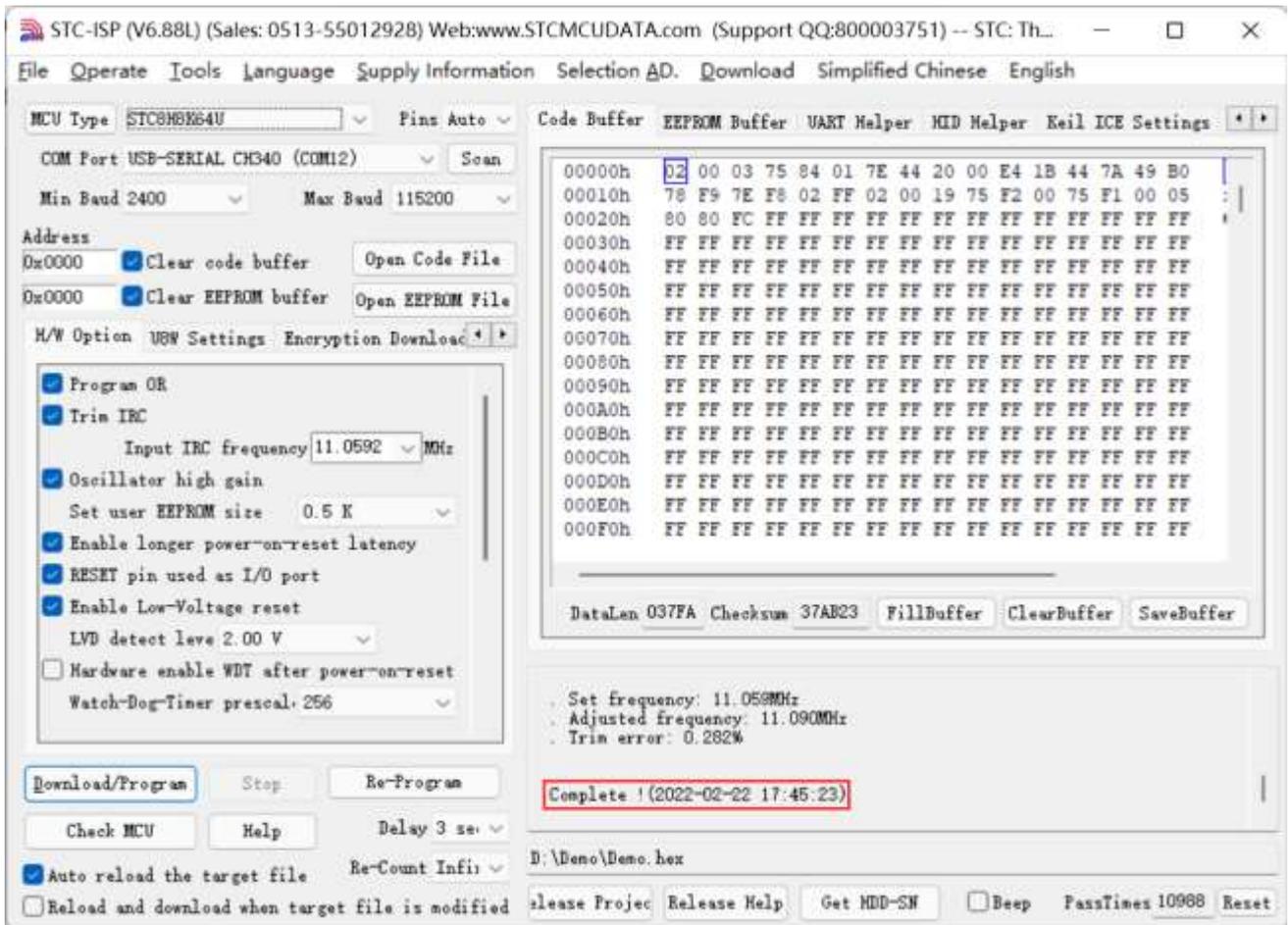
3. Select the model corresponding to the burning chip;
4. Select the serial port number recognized by the STC universal USB to serial tool (when the STC universal USB to serial tool is correctly connected to the computer, the software will automatically scan and identify the serial port named "USB-SERIAL CH340 (COMx)", the specific COM The number will vary from computer to computer). When multiple USB-to-serial cables are connected to the computer, they must be selected manually;
5. Load the burning program;
6. Set burning options;
7. Click the "Download/Program" button;



8. When the prompt box in the lower right corner displays "Checking target MCU...", press the "power switch" on the STC universal USB to serial port tool to power on the MCU, and then start downloading [Cold Start Programming];



9. Wait for the download to end. If the download is successful, the prompt box in the lower right corner will display "Complete!"



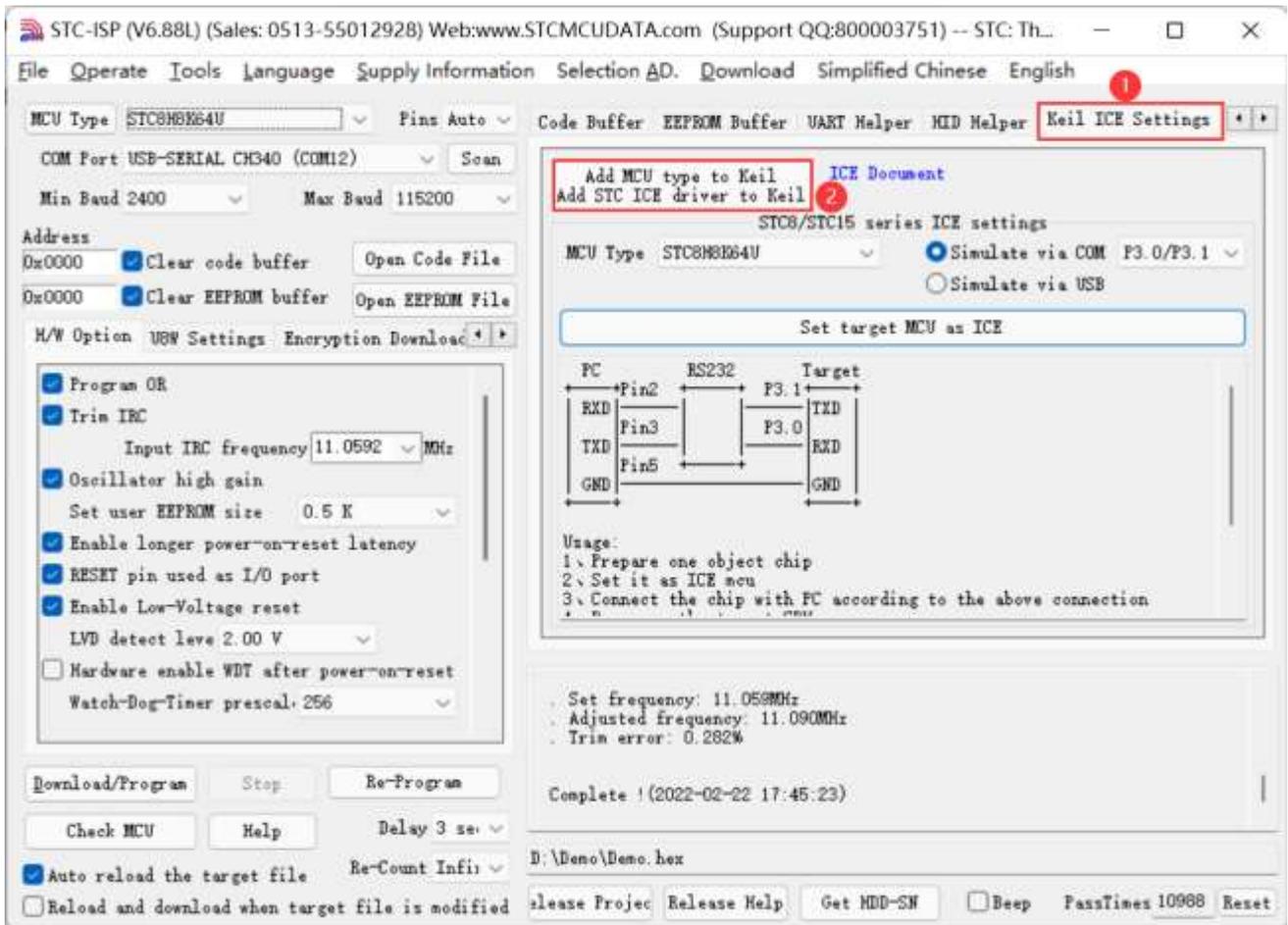
## 4.5 Use STC universal USB to serial port tool to simulate user code

The current STC simulation is based on the Keil environment, so if you need to use the STC universal USB to serial port tool to simulate user code, you must install the Keil software.

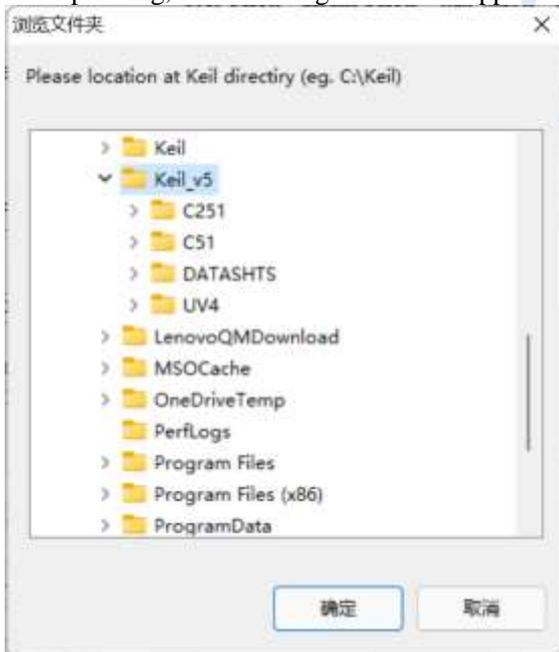
After the Keil software is installed, you also need to install the STC simulation driver. The installation steps of STC's simulation driver are as follows:

Firstly, open STC-ISP to download the software;

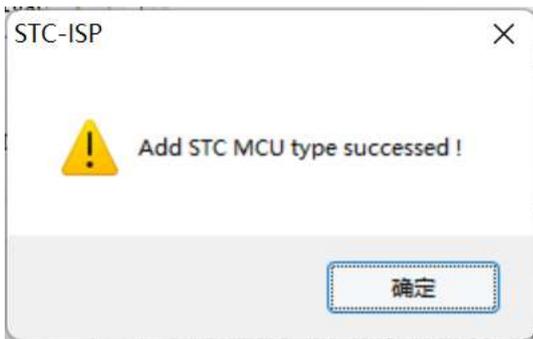
Then click the "Add MCU Type to Keil / Add STC ICE driver to Keil" on the "Keil ICE settings" page in the functional area on the right side of the software:



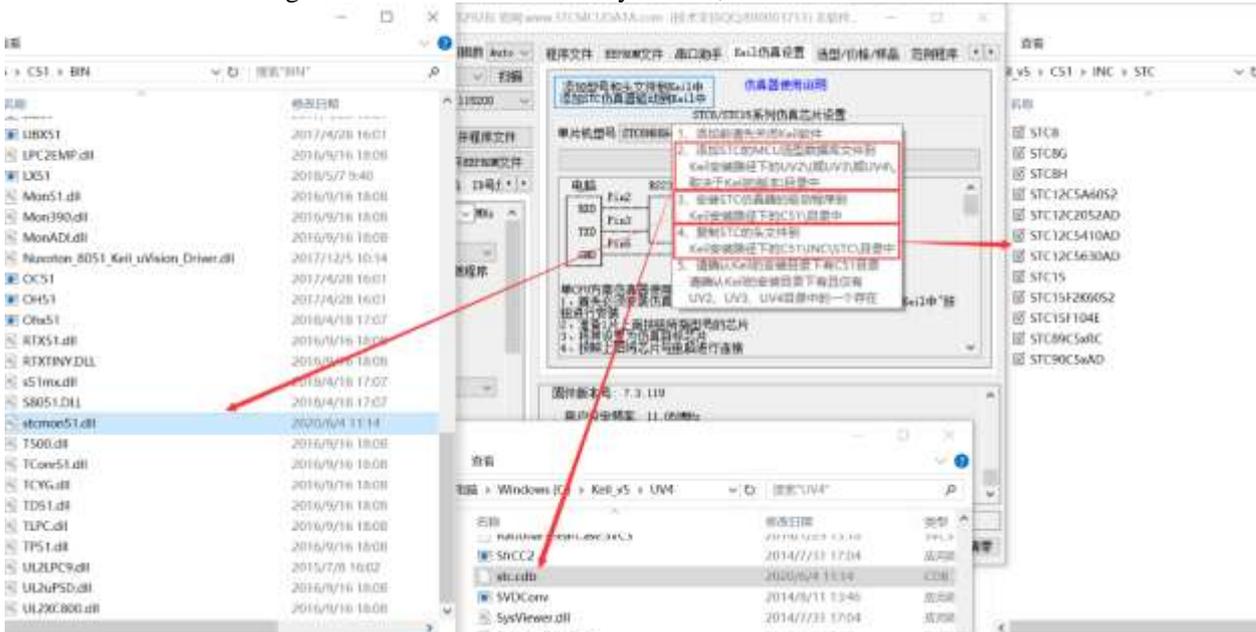
After pressing, the following screen will appear:



Locate the directory to the installation directory of the Keil software, and then confirm. After the installation is successful, the following prompt box will pop up:

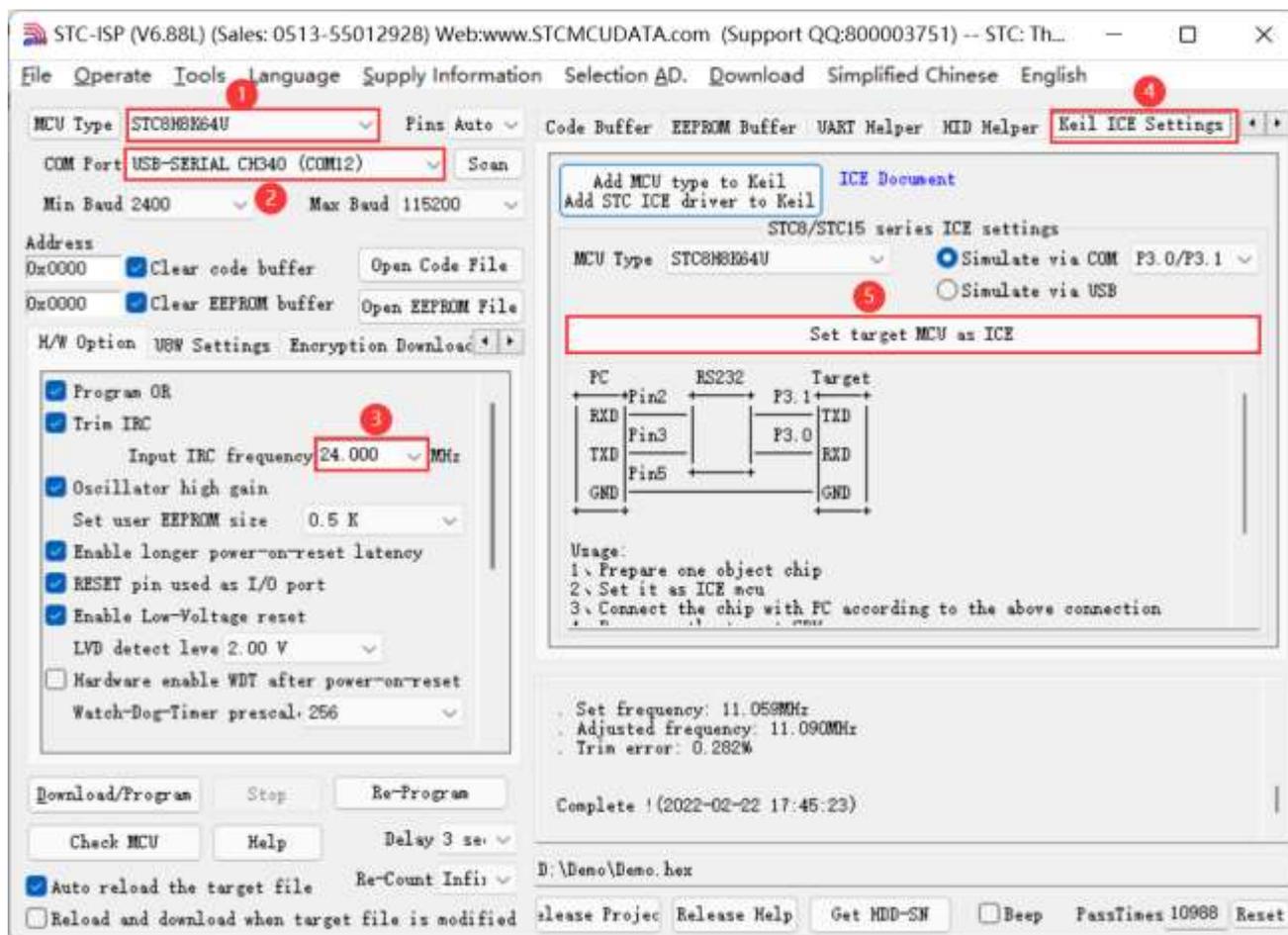


You can see the following files in the relevant directory of Keil, which means that the driver is installed correctly.



Since in the default state, the main control chip of STC is not an emulation chip and has no emulation function, if simulation is needed, the main control chip of STC needs to be set as an emulation chip. The steps of making a simulation chip are as follows:

- Firstly, use STC universal USB to serial port tool to connect the MCU to the computer;
- Then open STC's ISP to download the software, and select the serial port number corresponding to the serial port tool in the serial port number drop-down list;
- Select the MCU model;
- Select the IRC frequency of the user program to run, and the frequency selected when making the simulation chip is consistent with the frequency set by the simulated user program, in order to achieve the real running effect.

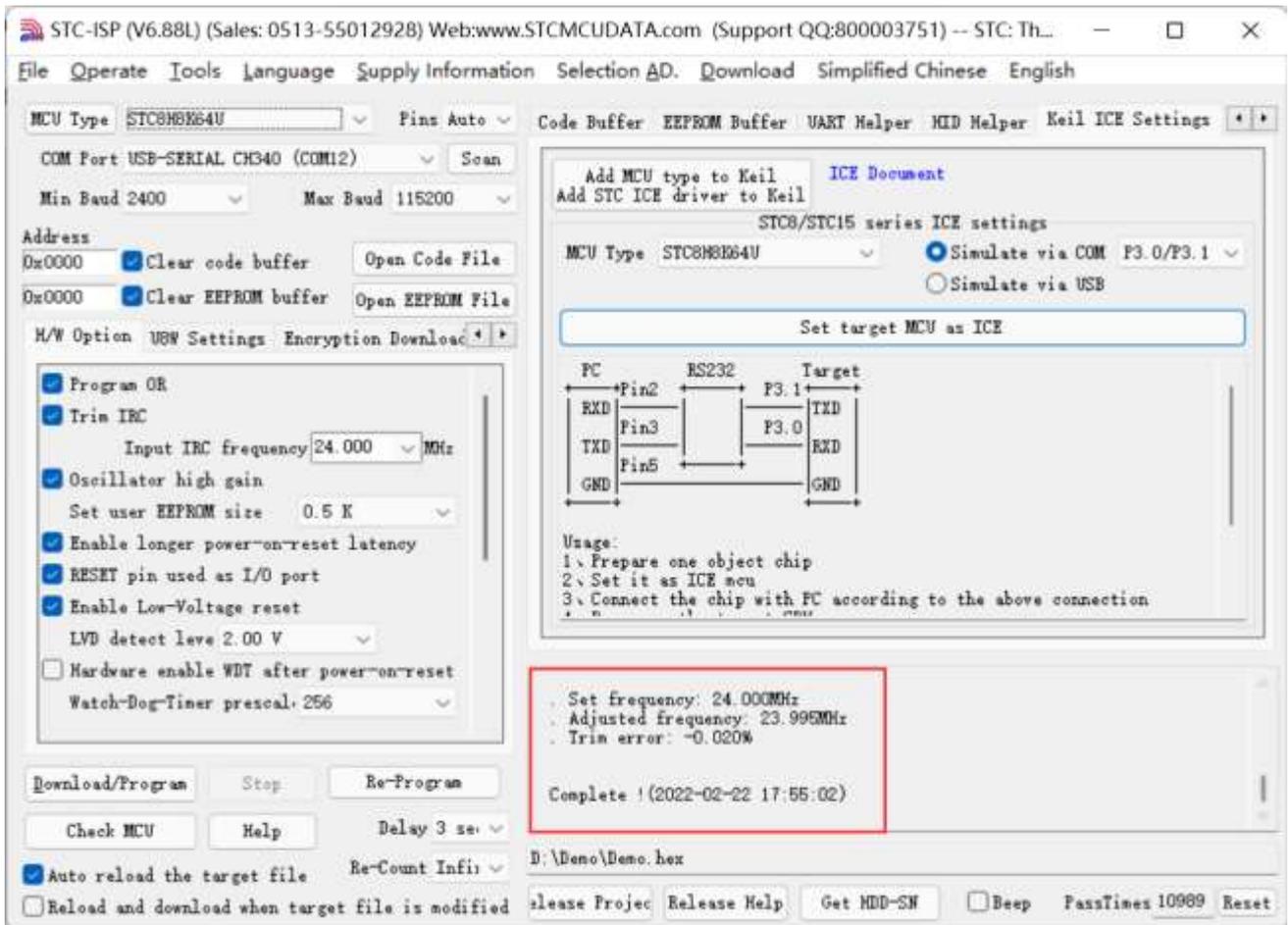


Then click the "Set target MCU as ICE" button on the "Keil ICE Settings" page in the right functional area of the software. After pressing, the following screen will appear:



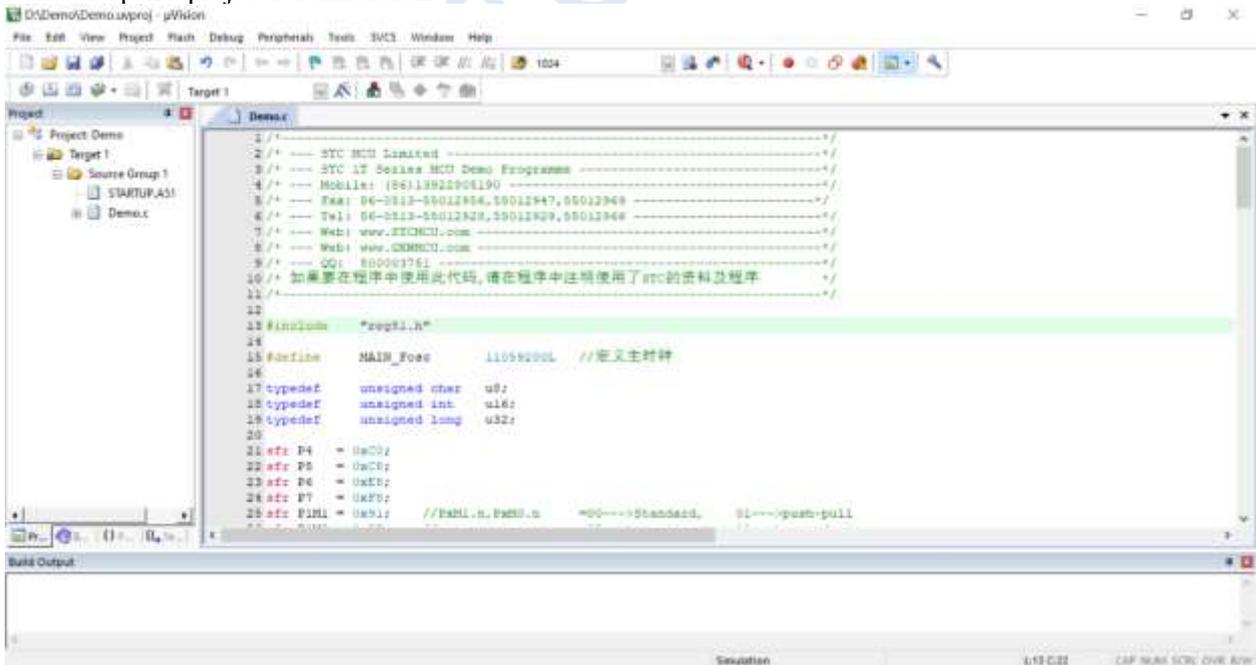
Next, you need to press the "power switch" on the STC Universal USB to Serial Tool to supply power to the MCU [cold start], and you can start to make the simulation chip.

If the setting is successful, the following screen will appear:



At this point, the simulation chip has been made successfully.

Next we open a project for simulation:

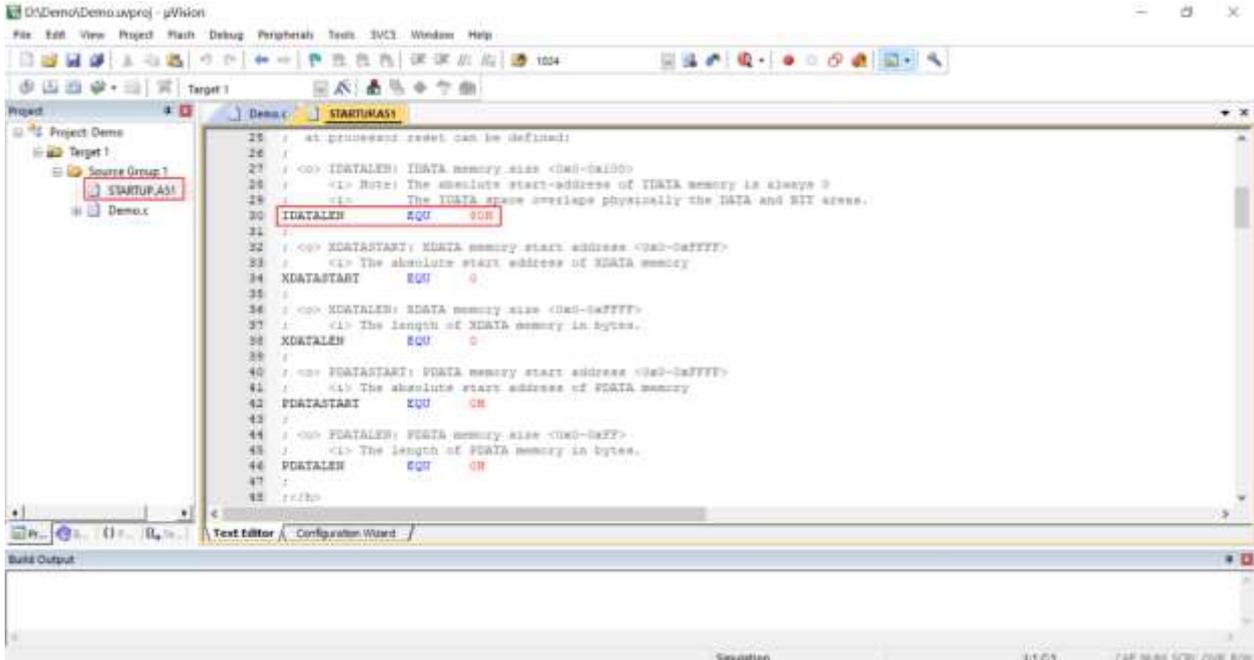


Then make the following project settings:

An additional note:

When a C language project is created and the startup file "STARTUP.A51" is added to the project, there is a macro

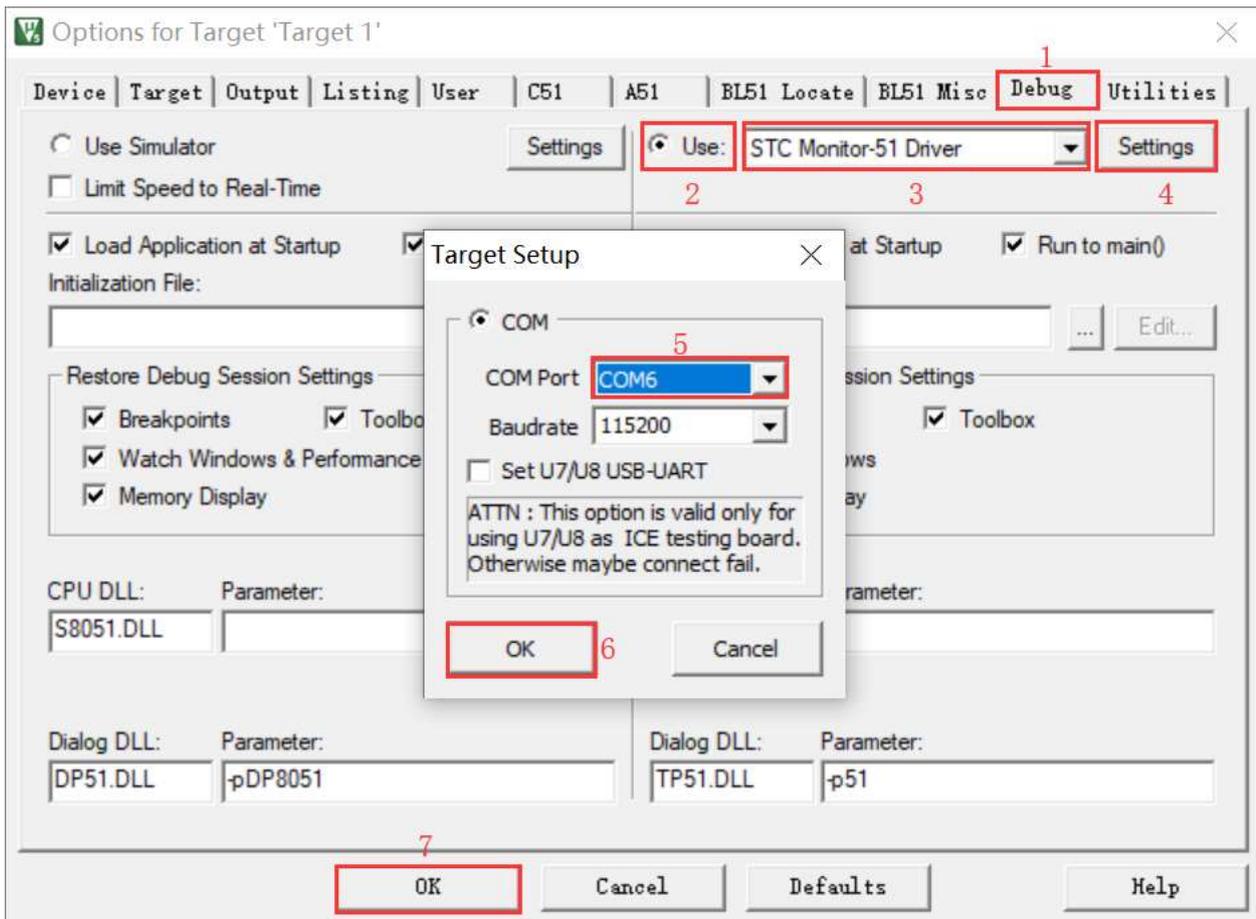
definition named "IDATALEN", which is used to define the size of IDATA. The default value is 128, which is 80H in hexadecimal, and it is also the size of IDATA that needs to be initialized to 0 in the startup file. So when IDATA is defined as 80H, the code in STARTUP.A51 will initialize the RAM of 00-7F of IDATA to 0; similarly, if IDATA is defined as 0FFH, it will initialize the RAM of 00-FF of IDATA to 0.



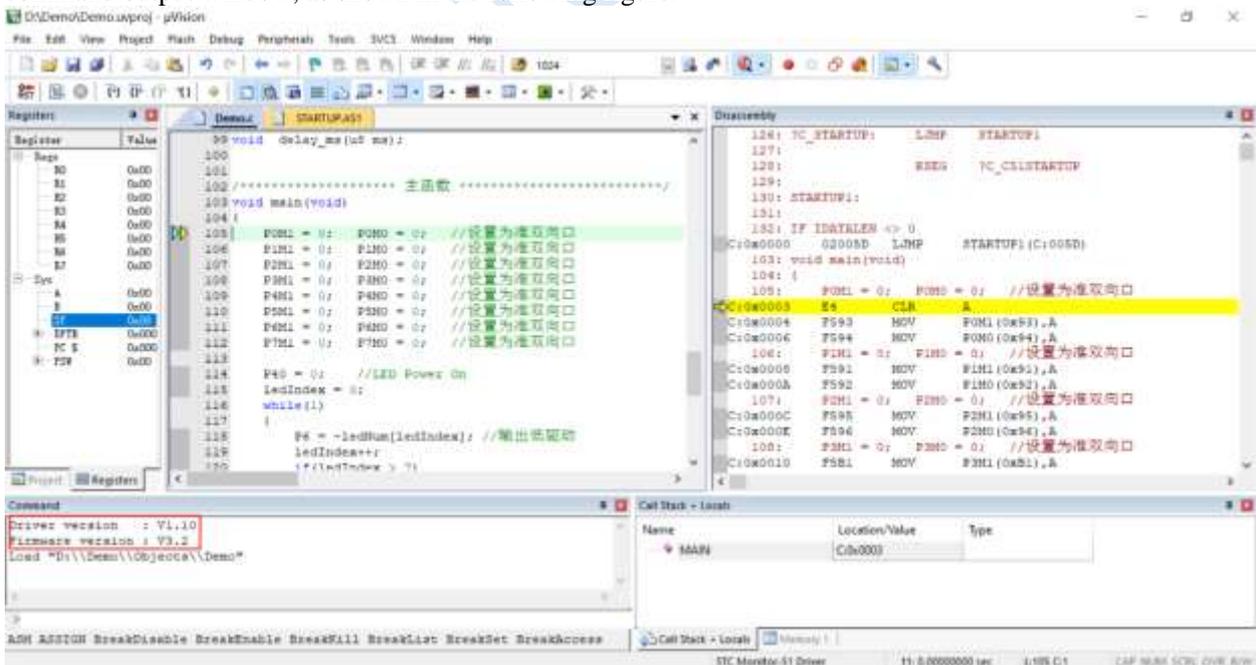
The IDATA size of the STC8H series microcontroller we selected is 256 bytes (00-7F DATA and 80H-FFH IDATA), but because the last 17 bytes of RAM have written ID numbers and related test parameters, If users need to use this part of data in the program, they must not define IDATALEN as 256.

Press the shortcut key "Alt+F7" or select "Option for Target 'Target1'" in the menu "Project" to configure the project in the "Option for Target 'Target1'" dialog box:

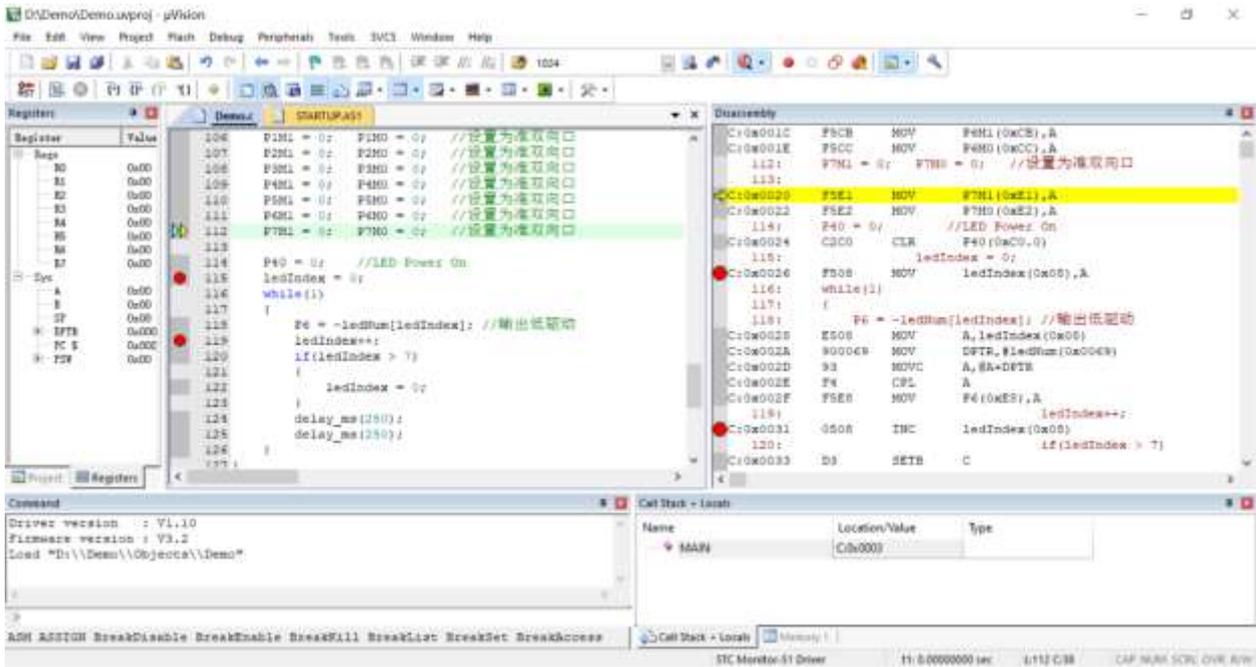
- Step 1. Enter the project setting page and select the "Debug" setting page;
  - Step 2. Select the hardware emulation "Use ..." on the right;
  - Step 3. Select "STC Monitor-51 Driver" item in the simulation driver drop-down list;
  - Step 4. Click the "Settings" button to enter the serial port settings screen;
  - Step 5: Set the port number and baud rate of the serial port. The serial port number should be the serial port corresponding to the STC universal USB to serial port tool. The baud rate is generally 115200 or 57600.
- Make sure to complete the simulation settings.  
The detailed steps are shown in the figure below:



After finishing all the above work, you can press "Ctrl+F5" in Keil software to start simulation debugging. If the hardware connection is correct, you will enter a debugging interface similar to the following, and display the current simulation driver version number and the current simulation monitoring code firmware version number in the command output window, as shown in the following figure:



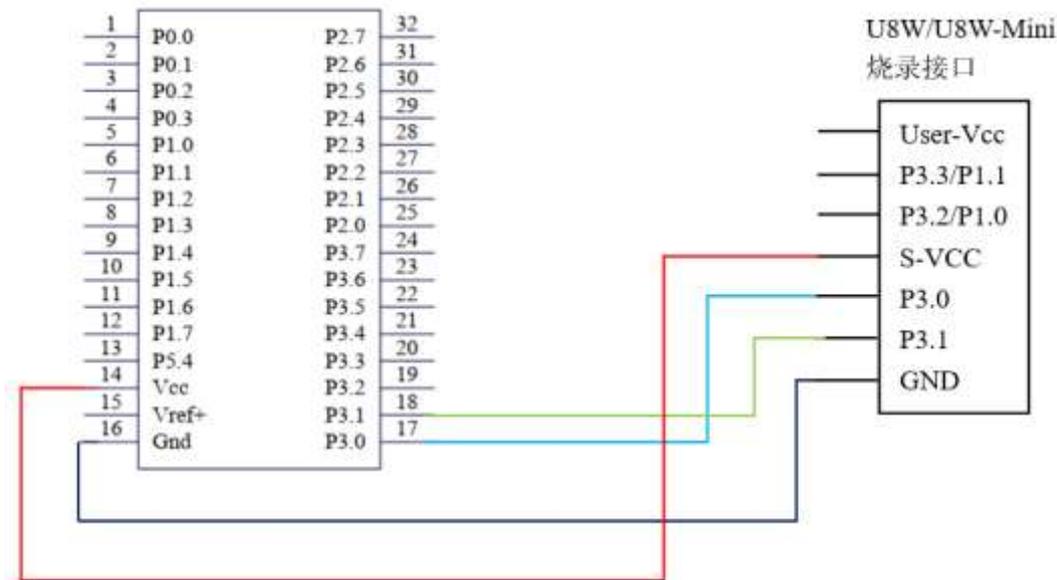
During the simulation debugging process, you can perform multiple operations such as resetting, running at full speed, single stepping, and setting breakpoints.



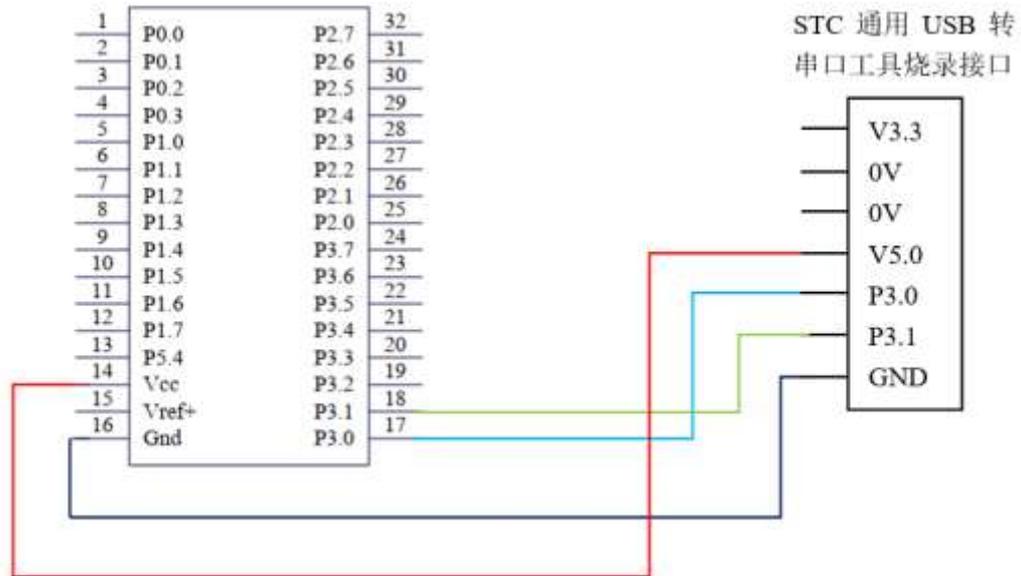
As shown in the figure above, multiple breakpoints can be set in the program, and the maximum number of breakpoint settings currently allowed is 20 (in theory, any number can be set, but setting too many breakpoints will affect the speed of debugging).

## 5 Application circuit diagram

### 5.1 U8W tool application reference circuit diagram



## 5.2 STC Universal USB to Serial Tool Application Reference Circuit Diagram



STC MC