CH583 Evaluation Board Introduction and Application

Version: 1A

http://wch.cn

1. Overview

This evaluation board is used to develop CH583. The MounRiver compiler and the ISP tool are available. The application reference examples and demonstrations related to the chip resources are provided.

2. Hardware

For the evaluation board schematic, please refer to CH583SCH.pdf.

CH583M evaluation board is equipped with BLE antenna, indicator LED, USB interface and extension connectors for general interfaces of the chip, which are suited for the testing and verification of basic functions for customers.
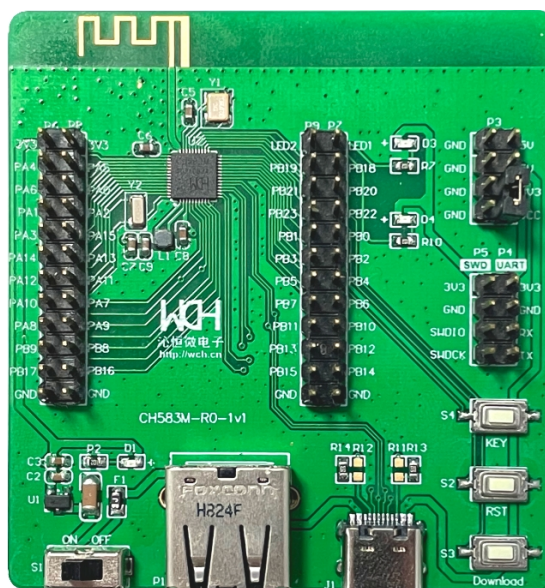

Figure 1-1 CH583M evaluation board

2.1 Functional Specification

CH583 is a 32-bit RISC microcontroller integrated with BLE wireless communication. CH583 integrates abundant peripheral resources, such as BLE communication module, full-speed USB host and device controller and transceiver, SPI, 4 UARTs, ADC, touch-key detection module, RTC, etc.

CH583 evaluation board is equipped with the following resources:

1. Switch (S1): Supply switch, used to disconnect or connect to external 5V supply or USB supply
2. RESET Button: Reset button, used for external manual reset (Note that the manual reset function of the chip needs to be enabled).
3. DOWNLOAD Button: Download button, used when downloading with ISP tool.
4. Two USB interfaces: USB communication interfaces of the main chip, with Host and Device functions.
5. Extension connector (P2/P3): including chip functional pins, power pins and LED load operation pins.

2.2 CH583 Antenna Introduction

The following is a 2.4GHz small-size PCB antenna design application matched with CH583. For the specific parameters of the antenna, please refer to the PCB design provided by our company.
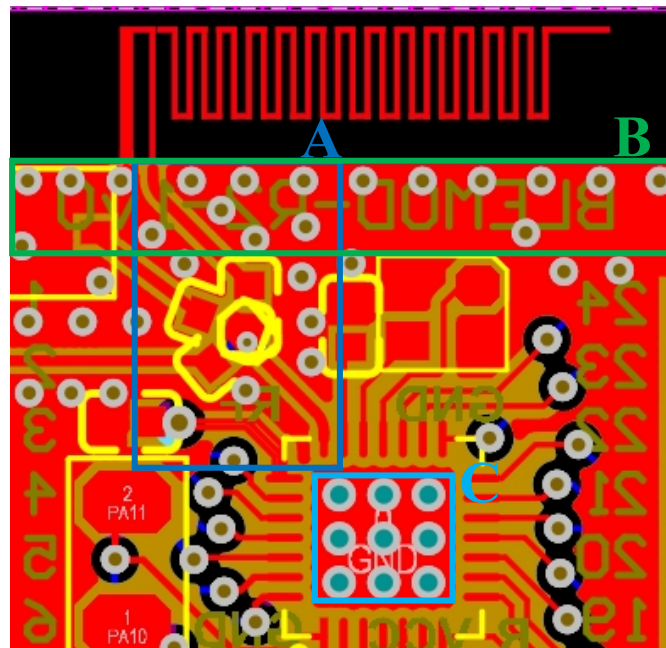

Figure 2-1 Antenna design

1. When wiring from the chip pins to the antenna feed point (area "A"), 50Ω impedance is needed. The counting factor involves parameters such as wiring width of area "A", the distance between "A" and "B", PCB thickness, the dielectric constant of board, copper thickness, thickness of the green oil and so on.

2. Area "B" is a coplanar reference ground area, the sufficient area and number of ground holes both should be guaranteed.

3. Area "C" is the ground pad at the bottom of the chip. Guarantee good grounding and heat dissipation (multiple ground holes) under the conditions allowed by manufacturing process.

4. The RF part needs to be far away from interference sources, such as crystals, power components, switching supplies, etc.

Figure 2-1 shows the antenna style of our evaluation board. The PCB thickness is 0.8mm. For details of the antenna sizes, please contact us.

3. Software

Please search and download CH583 development packet (CH583EVT.ZIP) on our website.

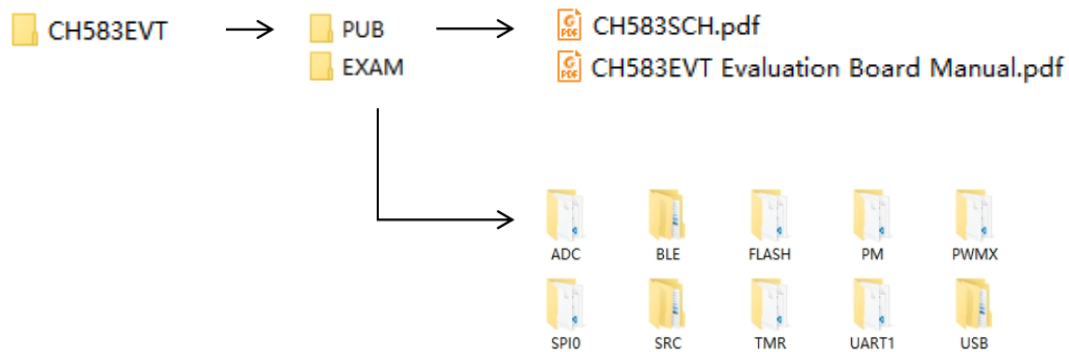## 3.1 Directory structure of EVT packet

Figure 3-1 Directory structure of EVT packet

Note:

"PUB" folder: Evaluation board manual, evaluation board schematic.

"EXAM" folder: CH583 controller software development driver and corresponding examples, classified by peripherals. Each peripheral folder contains one more functional application routine folders.

3.2 Open project

Select any peripheral project. For example, double-click on Peripheral to open BLE slave routine.
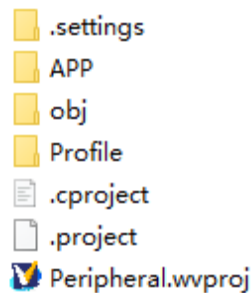

Figure 3-2 Files in "Peripheral" folder

Double-click the file, Peripheral.wvproj, to open the project in MounRiver Studio.
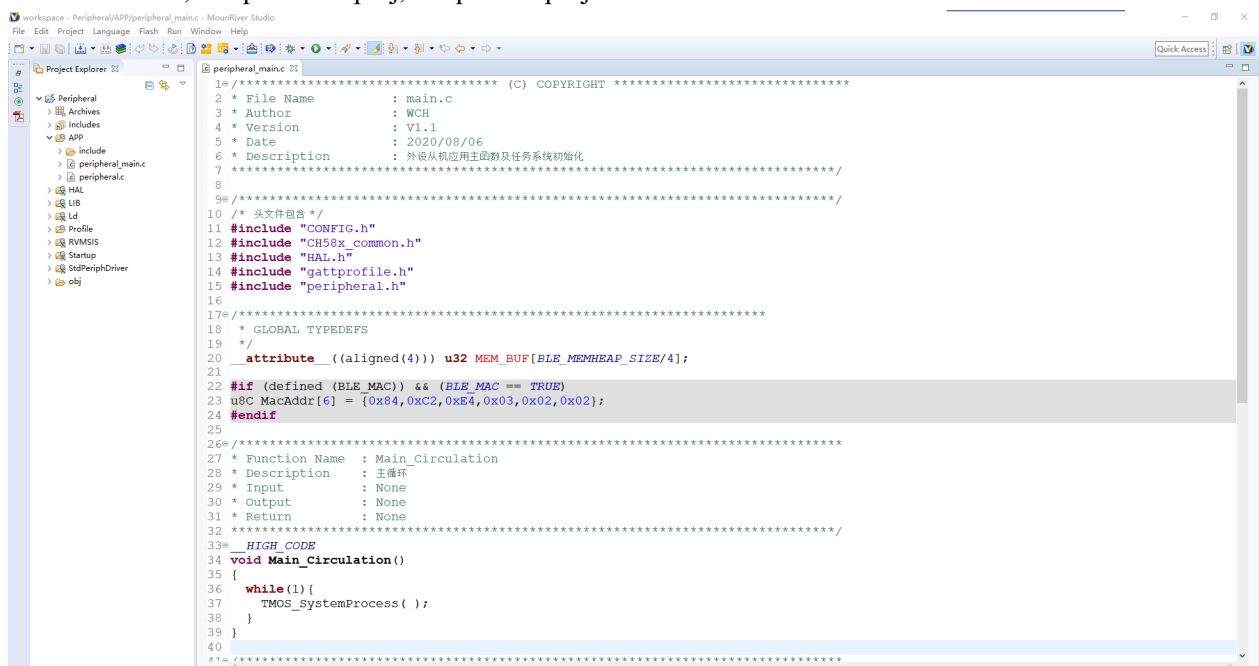

Figure 3-3 Mounriver Window after opening the file "Peripheral.wvproj"

In addition, the project can also be opened by importing the project. Open the Mounriver, then right-click on the blank area in the "projectexplorer" zone, then click Import, see Figure 3-4.
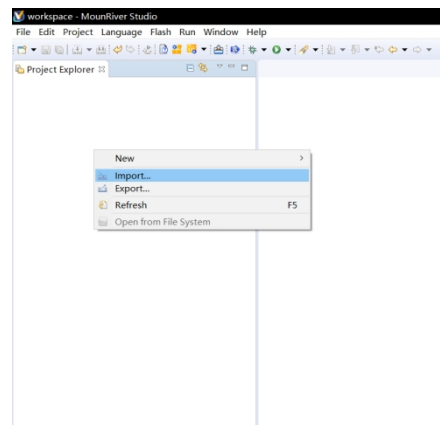

Figure 3-4 Open the menu to import

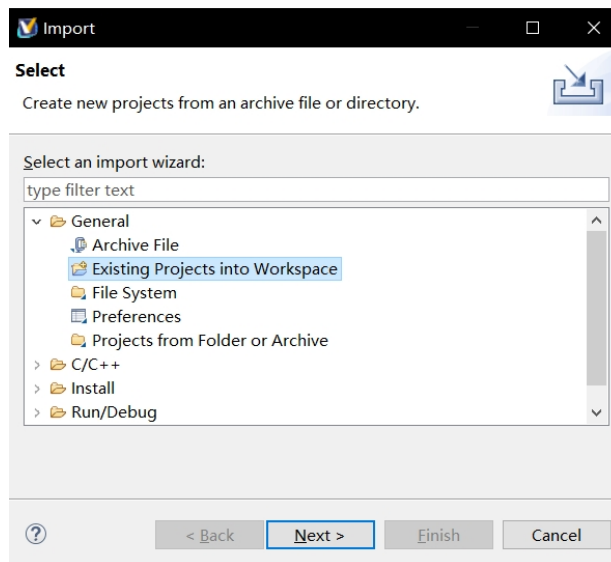Select "Existing Projects into Workspace", then click on the Next button.

Figure 3-5 Select to open the existing projects

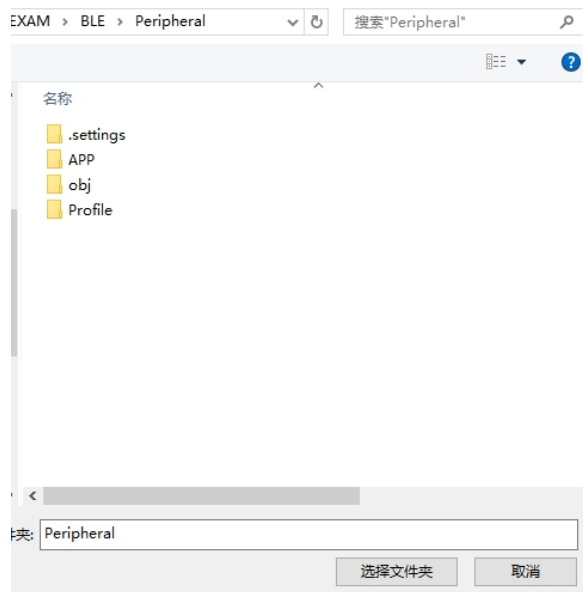Select the folder that contains the project files.

Figure 3-6 Select the project folder

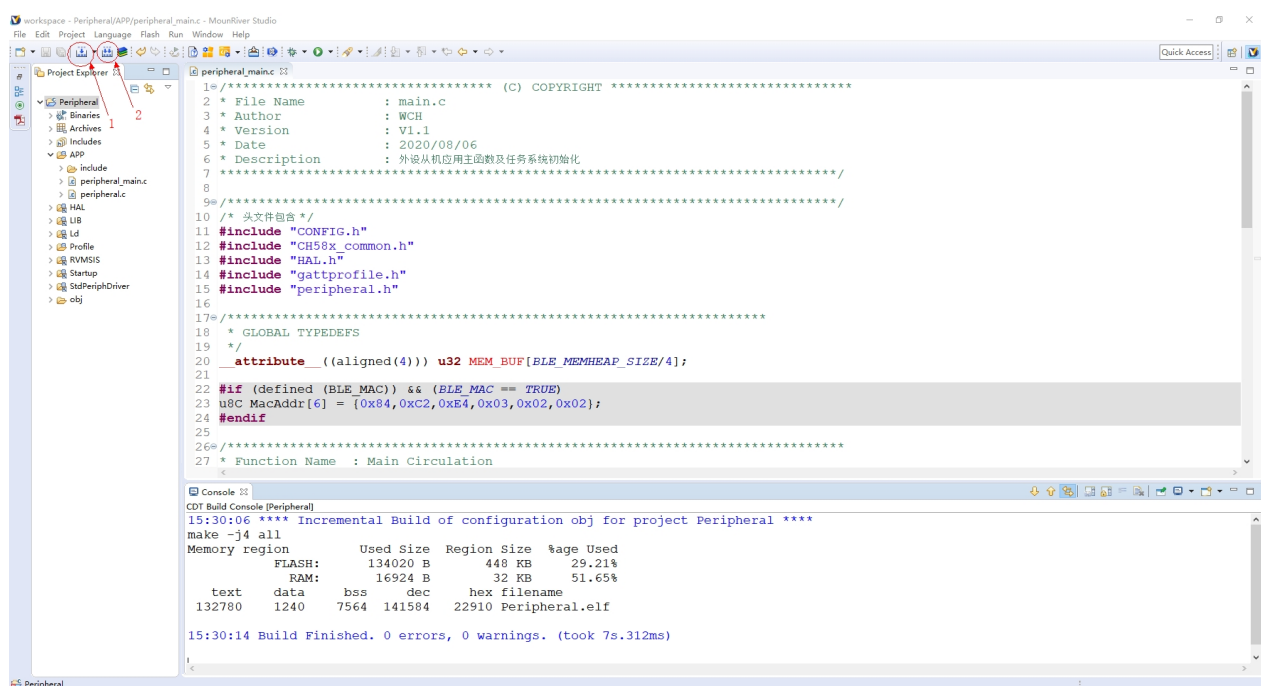In this way, the project can also be opened.

3.3 Compile

Figure 3-7 Mounriver Window

Click on the button marked as 1 to incrementally build, that is, to compile the modified part, with high speed. Or click on the button marked as 2 to rebuild, that is, to compile the selected project globally, with low speed. Here, we select rebuild, and the result is as shown in the figure.

By default, an executable file with suffix .hex is created after compilation. And the hex file can be downloaded to the evaluation board and run. Note that the Mounriver compilation settings such as the project file directory, linker and optimization level are described in the "MounRiver Studio Help Manual".

3.4 Demonstration of Routines

3.4.1 BLE Peripheral Routine

1. Open the routine: "CH583EVT\EXAM\BLE\Peripheral\Peripheral.wvproj", compile it, and open the file "Peripheral.hex" with ISP tool. Press the Download button on the board to power, and connect the board to PC via serial port (COM1 by default) to check the COM output. Open the COMTransmit tool, and set the baud rate to 115200, data bit to 8, stop bit to 1, parity bit to None, then download the program.

2. The COMTransmit tool window displays:

  " CH58x_BLE_LIB_V1.11

    Initialized..

    Advertising.."

At this time, the board BLE has started advertising.
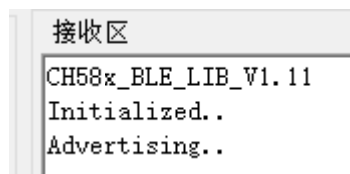
3. Open the APP "BLE Debug Tool". The following window is displayed after opening the APP:
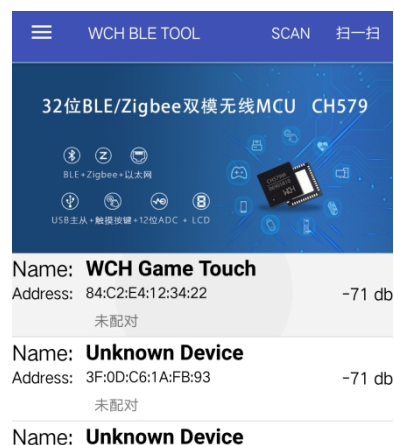
4. Click on the SCAN button to scan BLE devices, and a device named "Simple Peripheral" in the window. This device is the BLE device simulated by the routine.
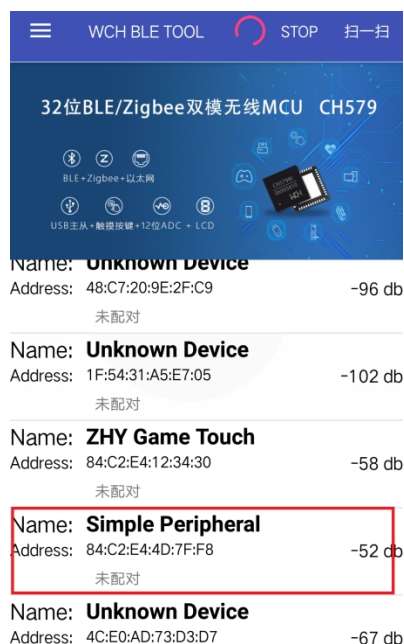
5. Click Simple Peripheral, and connect it. After successful connection, serial port outputs: "Connected..". And the APP switches to the connection completion window, and all services supported by this device are displayed, including "Generic Access", "Generic Attribute", "Device Information" and "Unknown Service".

6. The Unknown Service is a customized communication service in the program. UUID is 0xFFE0. Click on the Unknown Service, all the characteristics are displayed on the window, including "0xFFE1", "0xFFE2", "0xFFE3", "0xFFE4" and "0xFFE5", and the properties are also displayed.
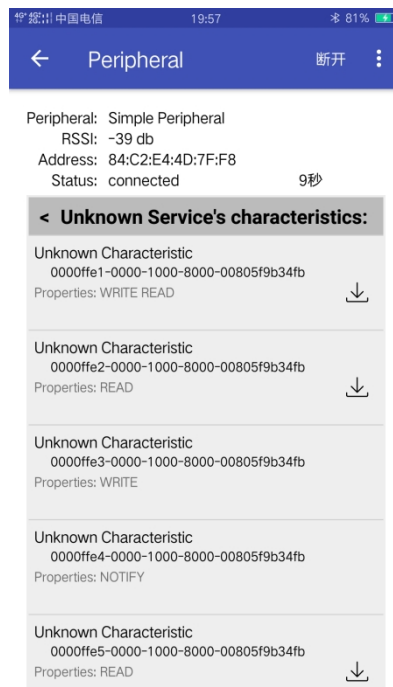
7. Click on the first characteristic, that is, "0xFFE1" service. This service has READ and WRITE properties. Enter one byte in the Transmit Input box, and click on the Send button. "profile ChangeCB CHAR1.." is transmitted. Click on the Read button to read the byte just sent.

8. Click on the "Unknown Characteristic's communication:" to return to the previous level. "0xFFE2" service has READ property and can be performed read operation. "0xFFE3" service has WRITE property and can be performed write operation.

9. Click on the "0xFFE4" service. This service has NOTIFY property, that is, actively transmit data to the host. Switch on the "Receive notification data" option button in the operation window, and the byte "0x30" sent by the device is received in the receiving box. When returned, it is needed to close the notification

(NOTIFY). Switch off the "Receive notification data" option button, and click on the "Unknown Characteristic's communication:" to return to the previous level.
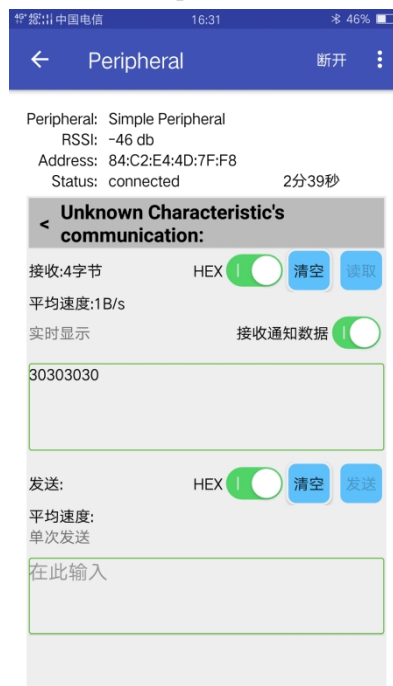
10. Click on the "0xFFE5" service. This service has authentication and read properties. It can be read only when the pairing key is entered. Click on the Read button in the Receive/Transmit window and the BLE pairing window appears (For different mobile phones, the pairing timing is different. Some mobile phones are paired after successful connection, while some are paired when pairing is needed. The default pairing code is "000000", and select the PIN code, then click OK. The host and the device will pair. This service can be operated after successful pairing, otherwise it cannot be operated or the device may disconnect.

4. ISP (take CH583 as example)

To program CH58x, both serial port and USB interface are available.

Default pin to download boot: PB22;

Download via USB: USB interface;

Download via serial port: Serial port 1 (PA8/PA9). Button-free downloading is supported.

4.1 ISP Tool

Open the link: http://www.wch.cn/downloads/WCHISPTool_Setup_exe.html, to download the tool. Follow the guidance and install the tool.
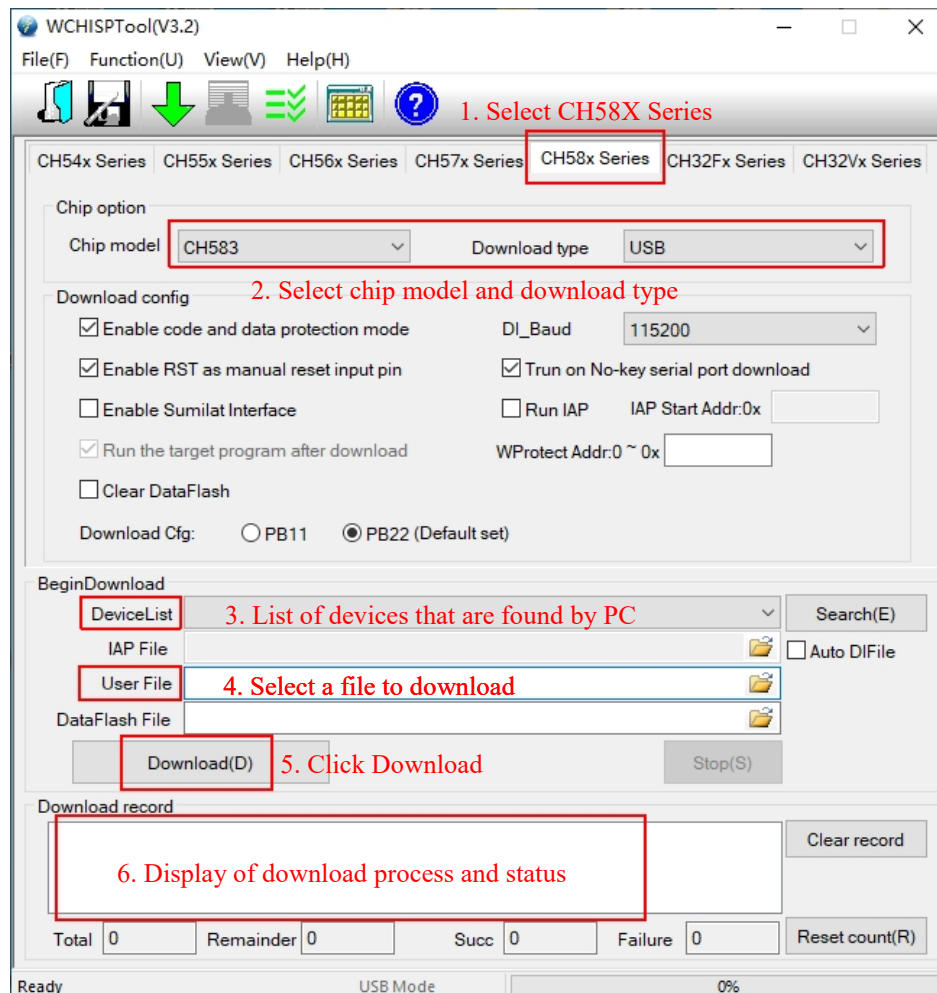

Figure 4-1 WCHISPTool Window

4.2 Download via Serial Port

Step 1: Open "WCHISPTool.exe" software. Select the chip model: CH583 (select chip model as required). Download type: SerialPort. SerialPort: Select COMx as required.

Step 2: Connect the pin PB22 of the MCU to GND (MCU is not powered on in this process).

Step 3: Supply power to the board.

Step 4: The PC-ended tool detects the available serial ports (If the required serial port is not found, please check it). Click on the Download button to execute burning.

Step 5: Check the burning results in Download record. The user codes run directly after successful downloading. You can also re-power on the board or reset the board by hardware to run the burned user codes. If it fails, please repeat steps 4-5.

Button-free download: Step 1 -> Step 4 -> Step 5.

Note: When downloading via serial port, the speed is relatively slow. Some larger codes may take tens of seconds. So downloading via USB is recommended.
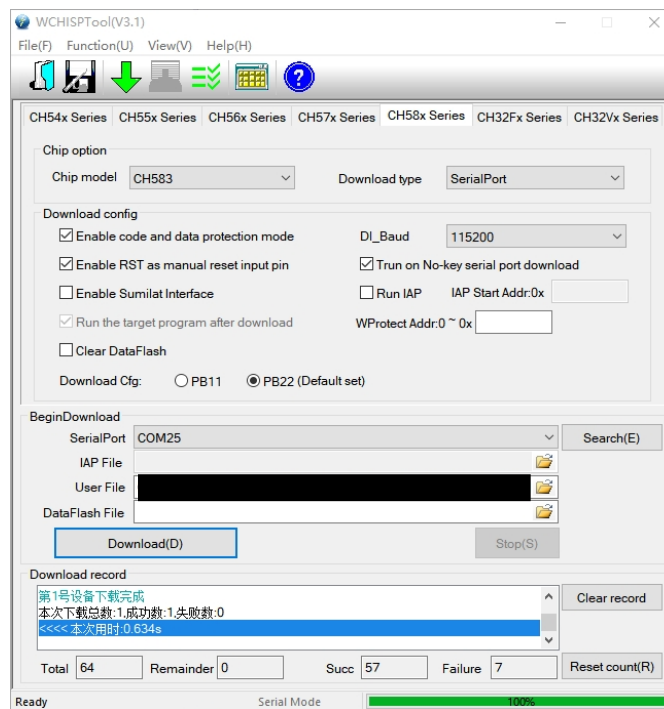
Figure 4-2 Download via SerialPort

4.3 Download via USB

Step 1: Open the "WCHISPTool.exe" software. Select the chip model: CH583 (select chip model as required). Download type: USB.

Step 2: Connect the pin PB22 of the MCU to GND (MCU is not powered on in this process).

Step 3: Connect the board to PC via USB cable to supply power to the board.

Step 4: The PC-ended tool detects USB devices (If not, please repeat steps 1-3). Click on the Download button to execute the burning.

Step 5: Check the burning results in Download record. The user codes run directly after successful downloading. You can also re-power on the board or reset the board by hardware to run the burned user codes. If it fails, please repeat steps 4-5.
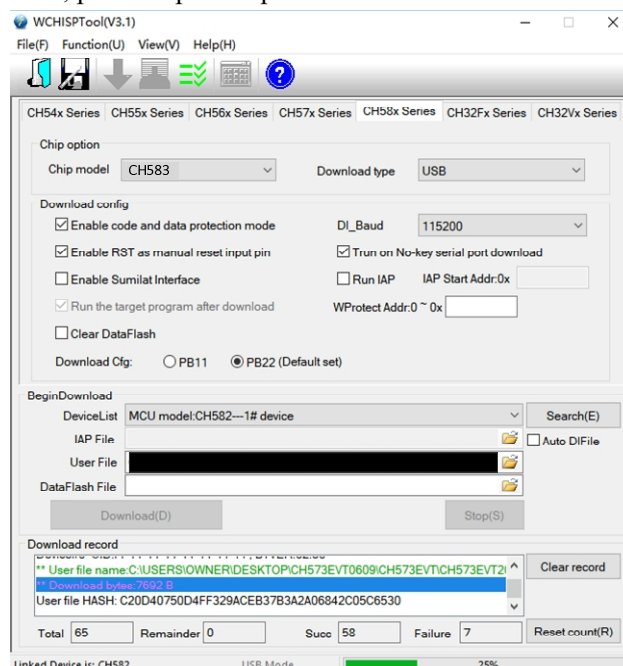

Figure 4-3 Download via USB