CH32L103 Evaluation Board Reference

Version: V1.0

https://wch-ic.com

1. Overview

This evaluation board is applied to the development of the CH32L103 chip. The IDE uses the MounRiver compiler, with the option of WCH-Link for emulation and download, and provides reference examples and demonstrations of applications related to chip resources.

2. Evaluation Board Hardware

Please refer to the CH32L103SCH.pdf document for the schematic of the evaluation board.
CH32L103 Evaluation Board
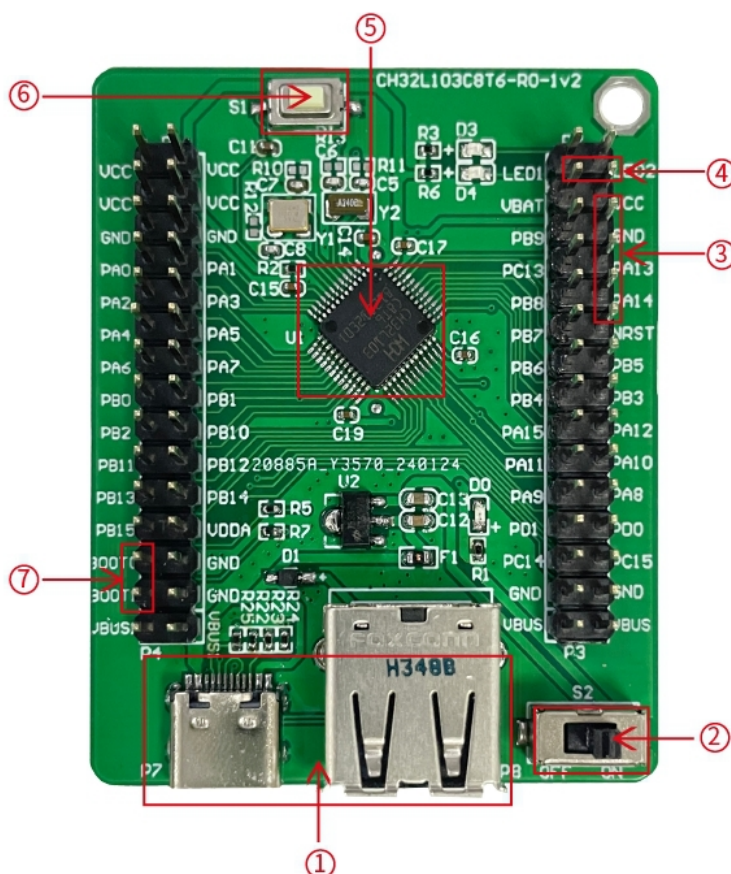
Description

1. USB master/slave interface P_HUSB   2. Power switch   3. SDI interface

4. LED   5. Main control MCU   6. Reset button

7. Boot mode configuration

The above CH32L103 evaluation board is equipped with the following resources:

Motherboard-CH32L103EVT.

1. USB interface P7, P8: USB communication interface PA11, PA12 of the main chip.

2. Switch S2: Used to cut off or connect external 5V power supply or USB power supply.

3. Debug interface: Used for download, simulation and debugging.

4. LED: Control by connecting the pin to the IO port of the main chip.

5. Main control MCU:CH32L03C8T6.

6. Button S1: Reset button for external manual reset of main MCU.

7. Boot mode configuration: Select the boot mode when the chip is powered on by configuring BOOT0/1

3. Software Development

3.1 EVT package directory structure
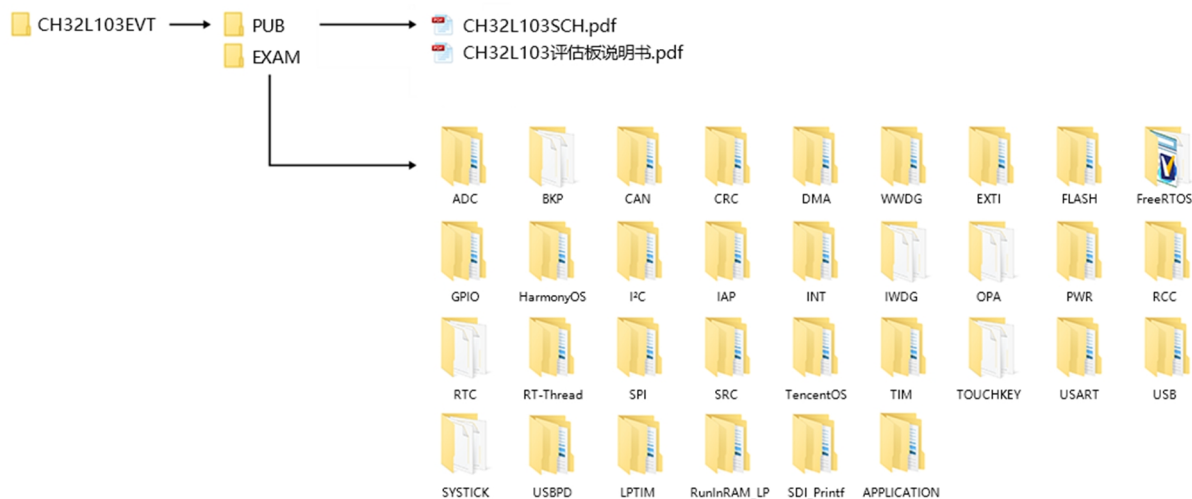
Description:

PUB folder: provides evaluation board manuals.

EXAM folder: Provides software development drivers and corresponding examples for the CH32L103 controller, grouped by peripheral. Each type of peripheral folder contains one or more functional application routines folders.

3.2 IDE Use-MounRiver

Download MounRiver_Studio, double click to install it, and you can use it after installation. (MounRiver_Studio instructions are available at the path: MounRiver\MounRiver_Studio\ MounRiver_Help.pdf and MounRiver_ToolbarHelp.pdf)

3.2.1 Open Project

➢ Open project:

1) Double-click project file directly with the suffix name .wvproj under the corresponding project path.

2) Click File in MounRiver IDE, click Load Project, select the .project file under the corresponding path, and click Confirm to apply it.

3.2.2 Compilation

MounRiver contains three compilation options, as shown in the following figure.
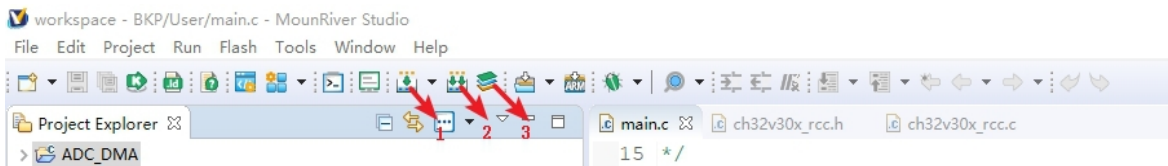
Compile option 1 is Incremental Build, which compiles the modified parts of the selected project.

Compile option 2 is ReBuild, which performs a global compilation of the selected project.

Compile option 3 is All Build, which performs global compilation for all projects.

3.2.3 Download/Simulation

➢ Download

1) Debugger download

Connect to the hardware via WCH-Link (see WCH-Link instructions for details, path: MounRiver\MounRiver_Studio\ WCH-Link instructions.pdf), click the Download button on the IDE, and select Download in the pop-up interface, as shown in the figure below.
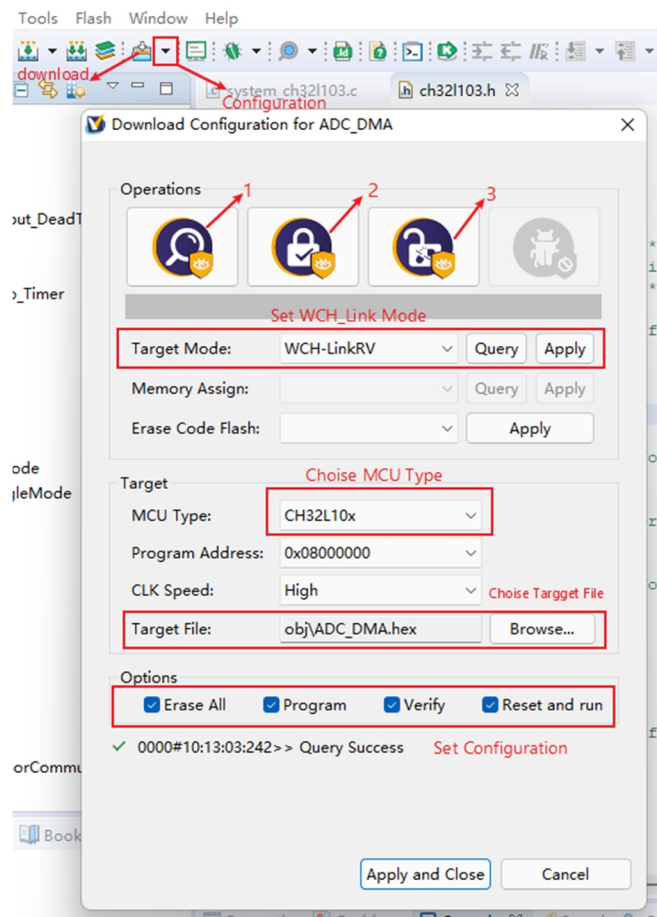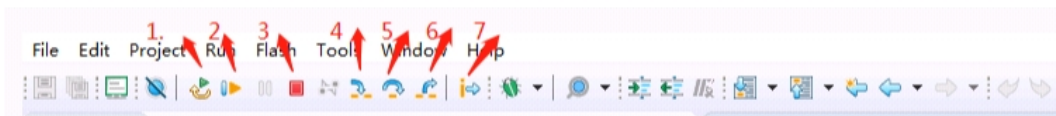

1 For querying the chip read protection status.

2 For setting the chip read protection and re-powering the configuration to take effect.

3 For lifting the chip read protection and re-powering the configuration to take effect.

➢ Simulation

1) Toolbar description

Click Debug button in the menu bar to enter the download, see the image below, the download toolbar.

Detailed functions are as follows.

    (1) Reset: After reset, the program returns to the very beginning.

    (2) Continue: Click to continue debugging.

    (3) Terminate: Click to exit debugging.

    (4) Single-step jump-in: Each time you tap a key, the program runs one step and encounters a function to enter and execute.

    (5) Single-step skip: jump out of the function and prepare the next statement.

    (6) Single-step return: return the function you jumped into

    Instruction set single-step mode: click to enter instruction set debugging (need to use with 4, 5 and 6 functions).

2)   Set breakpoints

Double-click on the left side of the code to set a breakpoint, double click again to cancel the breakpoint, set the breakpoint as shown in the following figure;
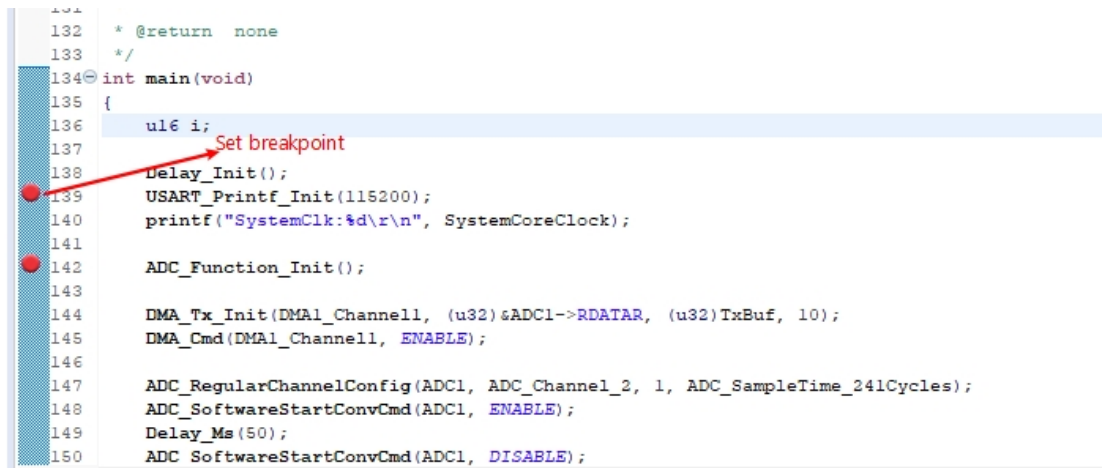

3)   Interface display

    (1) Instruction set interface

    Click on the instruction set single-step debugging can enter the instruction debugging, to single-step jump in for example, click once to run once, the running cursor will move to view the program running, the instruction set interface is shown as follows.
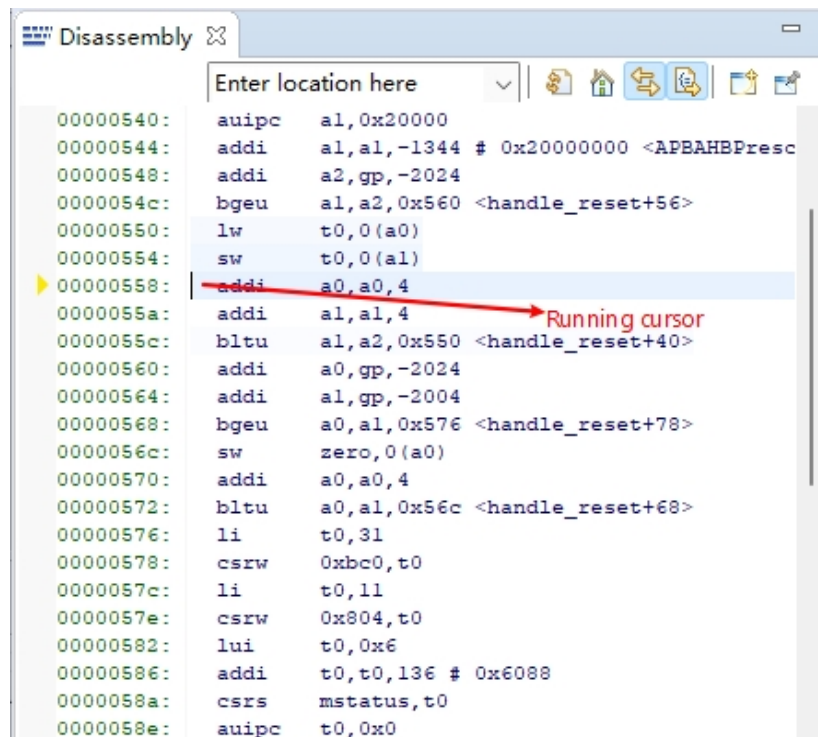
(2) Program running interface

It can be used with instruction set single-step debugging, still take single-step jumping in as an example, click once to run once, the running cursor will move to view the program running, the program running interface is shown as follows.
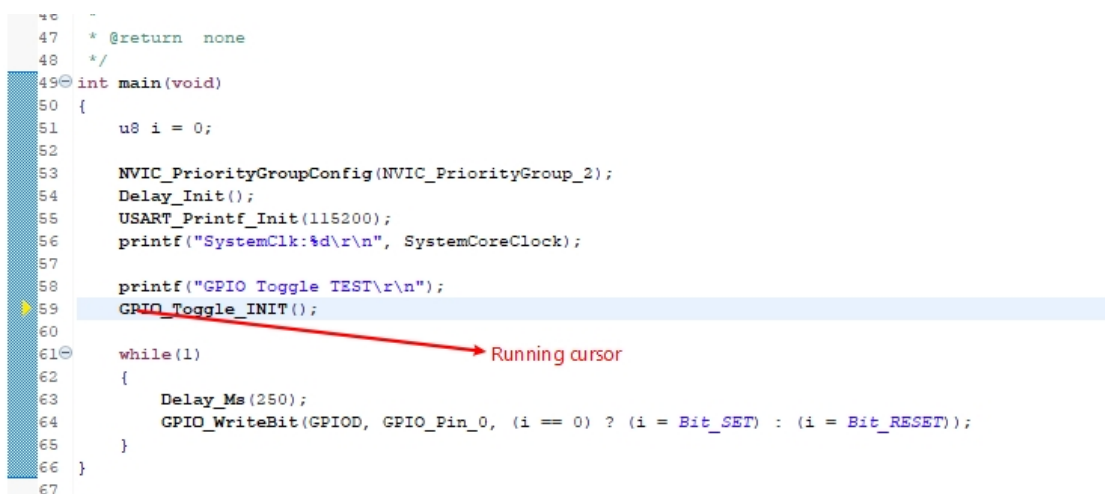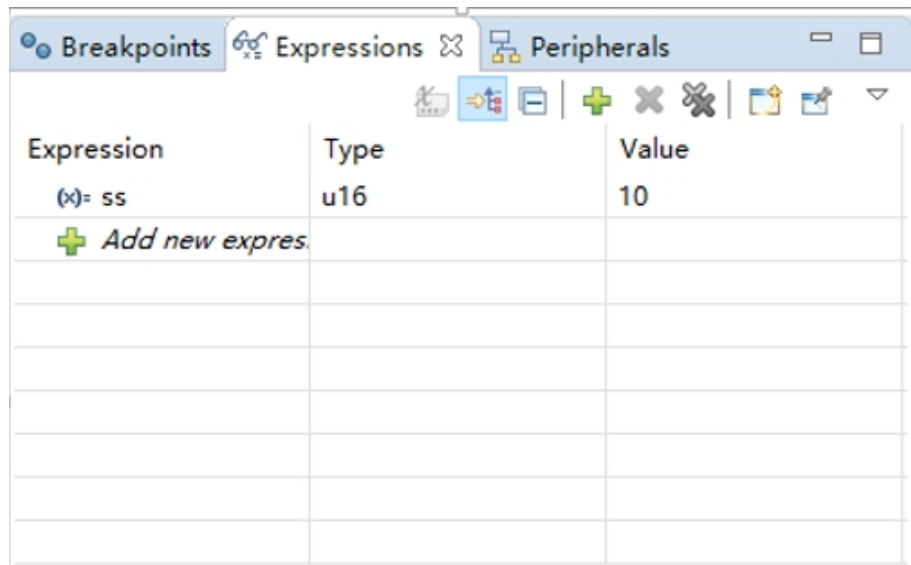

4) Variables

Hover over the variable in the source code to display the details, or select the variable and right-click add watch expression
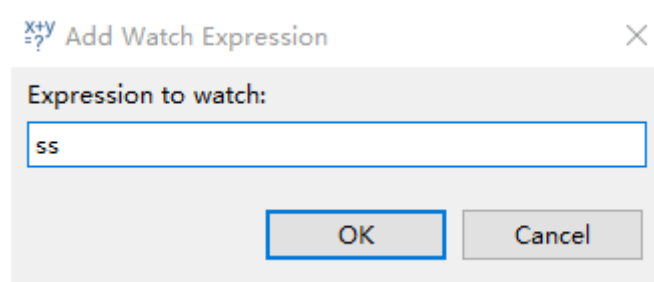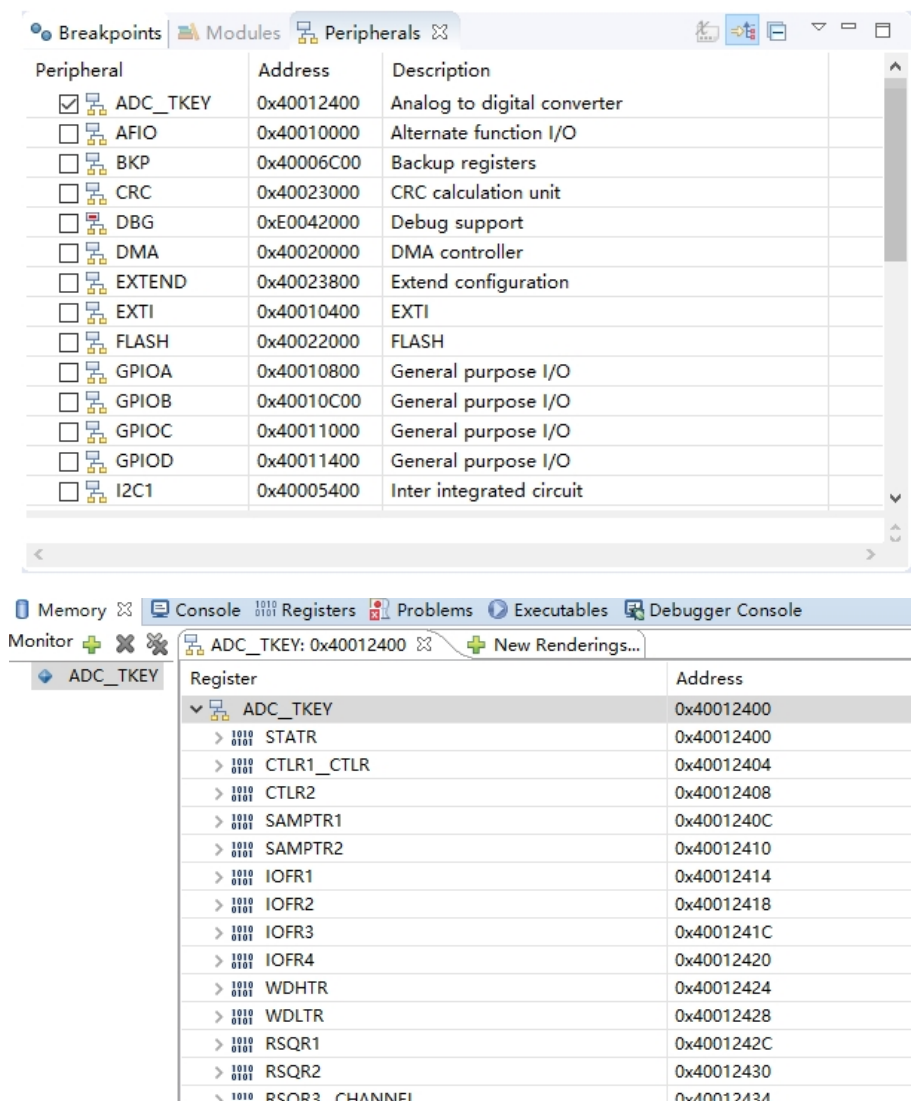
Fill in the variable name, or just click OK to add the variable you just selected to the pop-up.
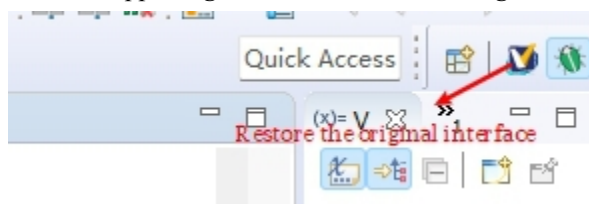

5)   Peripheral registers

In the lower left corner of IDE interface Peripherals interface shows a list of peripherals, tick the peripherals will display its specific register name, address, value in the Memory window.

Note:

(1) When debugging, click the icon in the upper right corner to enter the original interface.

(2) For documentation to access the compiler, click F1 to access the help documentation for detailed instructions.

➢   Project chip selection

There are many kinds of chip selection in the project. Take the chip CH32L103C8T6 used in the CH32L103x development board as an example to select and compile the engineering chip to achieve different peripheral functions. The steps are as follows:

1) Select the startup file, click the Startup folder, and select the startup file corresponding to the definition. As shown in the following figure, select the startup_ch32l103.S file.


2) Note: For conflicting / useless files, it is recommended to use the participate / exclude compilation function to briefly describe the files in the Startup folder. First of all, select the project file in the folder, right-click, select the participate / exclude compilation function button, take the startup_ch32l103.S file in the figure as an example, if the project status is to exclude compilation, click this function to participate in the compilation. Similarly, if the project status is to participate in compilation, click this function to exclude compilation. (Note: folders are also applicable).
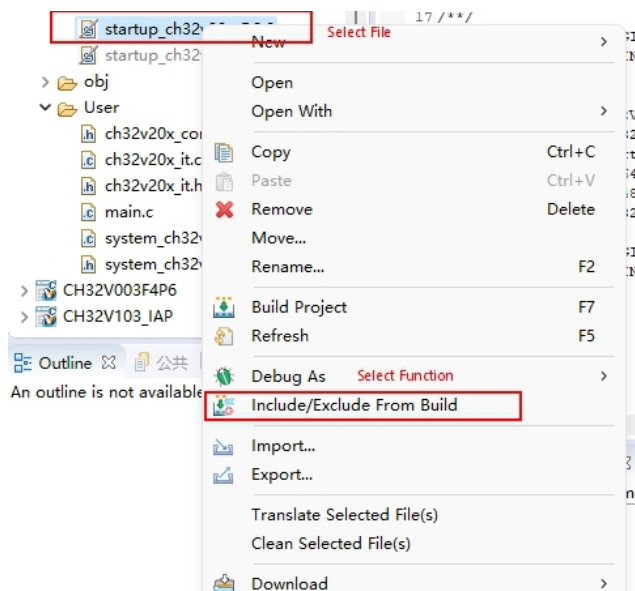
4. WCH-LinkUtility.exe Download

The download process for the chip using the WCH-LinkUtility tool is:

1)   Connect WCH-Link;

2)   Select chip information;

3)   Add firmware;

4)   Set the configuration. If the chip is read protection, you need to remove the chip read protection;

5)   Execute.
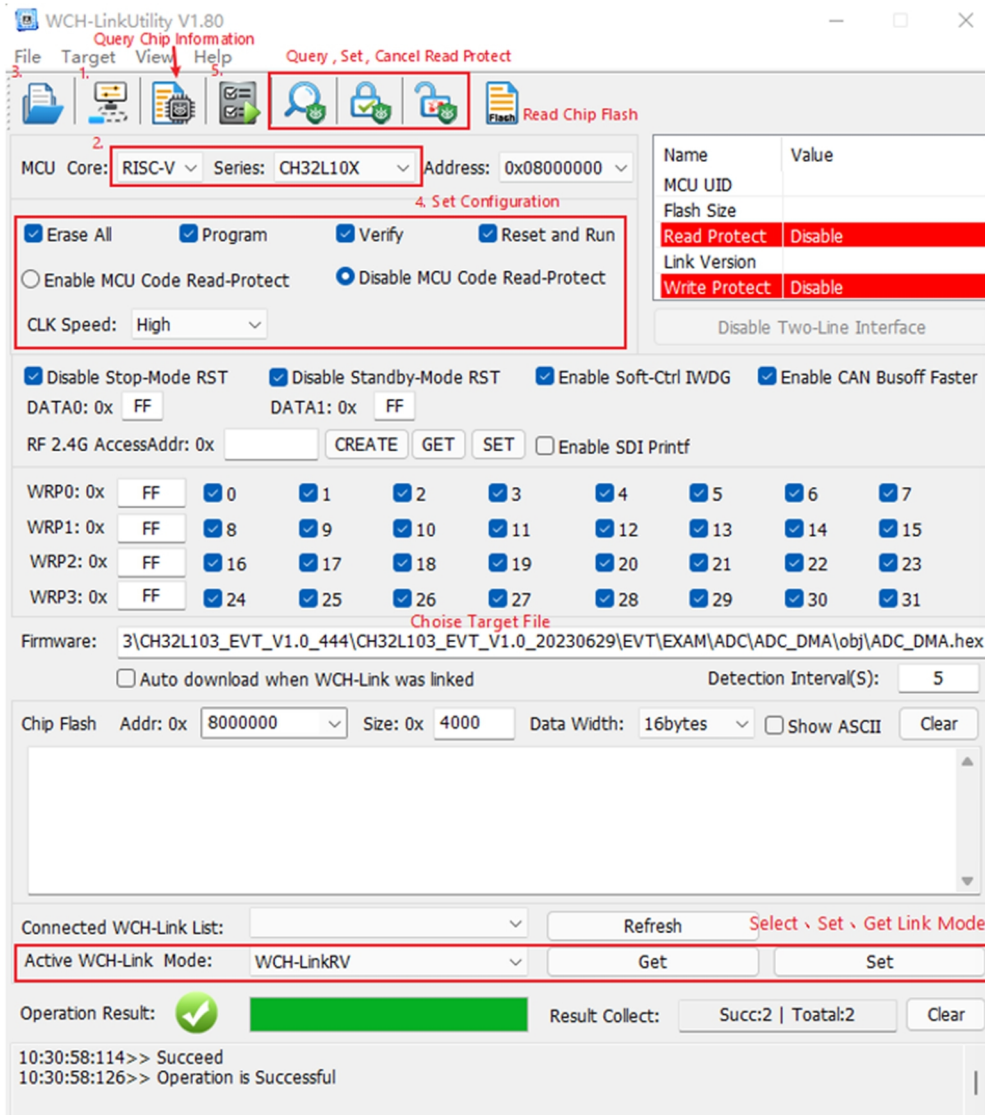
5. WCHISPTool.exe Download

Use WCHISPTool tool to download the chip, support USB and serial port download methods. The USB pin is PA11 (DM), PA12 (DP), and the serial port pin is PA2 (TX), PA3 (RX). The download process is as follows:

(1) BOOT0 is connected to VCC, BOOT1 and connected to PC through serial port or USB.

(2) Open the WCHISPTool tool, select the appropriate download method, select download firmware, check the chip configuration, and click download.

(3) BOOT0 ground, power on again, and run the APP program.

The WCHISPTool tool interface is shown in the following figure.
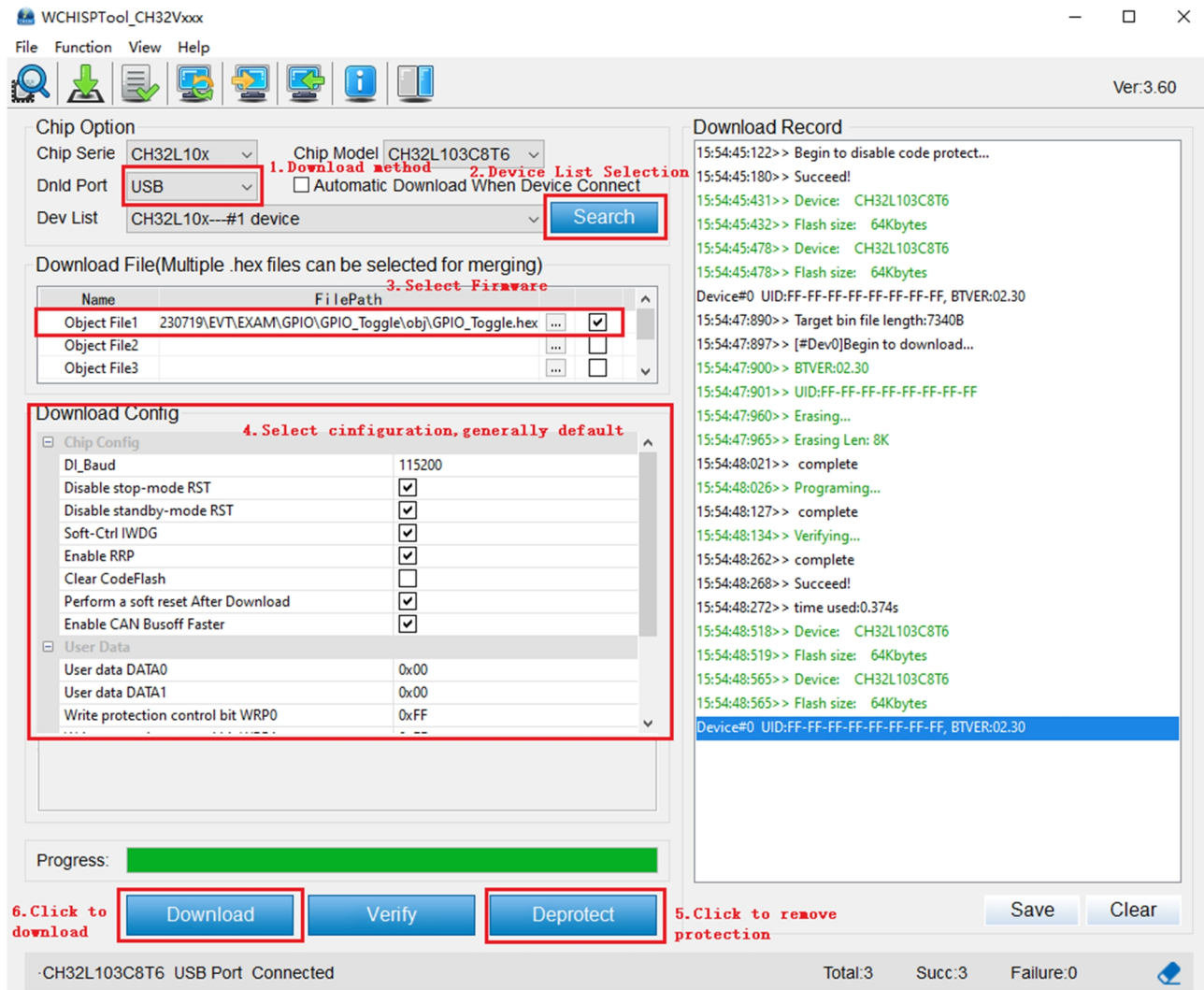
1.   Select USB or serial port download method.

2.   Equipment list selection, identify equipment, generally automatic identification, if unable to identify, need to select manually.

3.   Select firmware, select downloaded .hex or .bin object program file.

4.   Download configuration as required.

5.   Unprotect the code.

6.   Click download.

5. Statement of Attention

1) When using WCH-Link to download, refer to the WCH-LinkUserManual for details on how to switch modes.

    Detailed inquiries\questions can be logged in the following.

WCH official website: https://www.wch-ic.com/

WCH-LINK instructions for use: https://www.wch-ic.com/products/WCH-Link.html