CH32V30x Evaluation Board Reference

Version: V1.6

http://wch.cn

1. Overview

This evaluation board is applied to the development of the CH32V30x chip. The IDE uses the MounRiver compiler, with the option of using the on-board or independent WCH-Link for emulation and download, and provides reference examples and demonstrations of chip resource-related applications.

2. Evaluation board hardware

Please refer to the CH32V307SCH.pdf document for the schematic of the evaluation board.
CH32V307 Evaluation Board
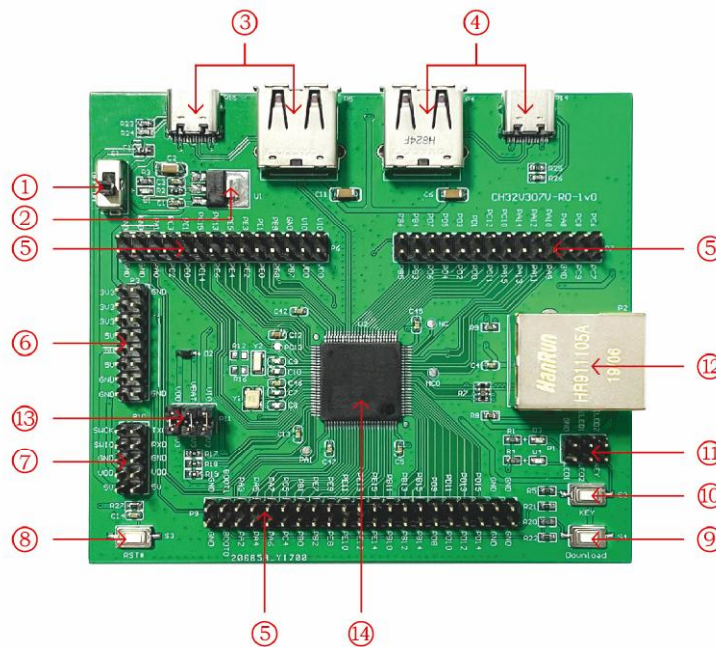
Descriptions

|			
1.Power switch	5.MCU I/O port	9.Download button	13.MCU power supply row pin
2.Voltage regulator chip	6.Power supply row pin	10.KEY	14.Master control MCU
3.USB interface	7.DUBUG interface	11.KEY and LED row pin	
4. USB interface	8.Reset button	12.Network port	

The above CH32V307 evaluation board comes with the following resources.

Motherboard - CH32V307EVT

1. Switch S1: Used to disconnect or connect external 5V power supply or USB power supply
2. Forward low dropout voltage regulator chip U1: used to realize the conversion of 5V voltage to 3.3V supply voltage available to the chip
3. USB interface P5, P15: USB communication interface PB6, PB7 of the main chip
4. USB interface P4, P14: USB communication interface PA11, PA12 of the main chip
5. MCU I/O ports P6, P7, P9: I/O pinout interface of the master control MCU

6. Power supply row pin P3: 5V, 3.3V, GND external power supply row pin

7. DEBUG interface P10: for downloading, emulation debugging

8. Button S3: Reset button for external manual reset of the master control MCU

9. Button S4: Download button, used to start download from BOOT

10. Key S2: Connects to the I/O port of the master MCU through the P1 row of pins for key control

11. KEY and LED row pin P1: P1 row pin connects to the I/O of the master control MCU to control LED and KEY

12. Network port: Network communication interface of the main chip

13. MCU power supply row pin P11: for master control MCU power supply selection

14. Master control MCU: CH32V307VCT6

CH32V307 Evaluation Board
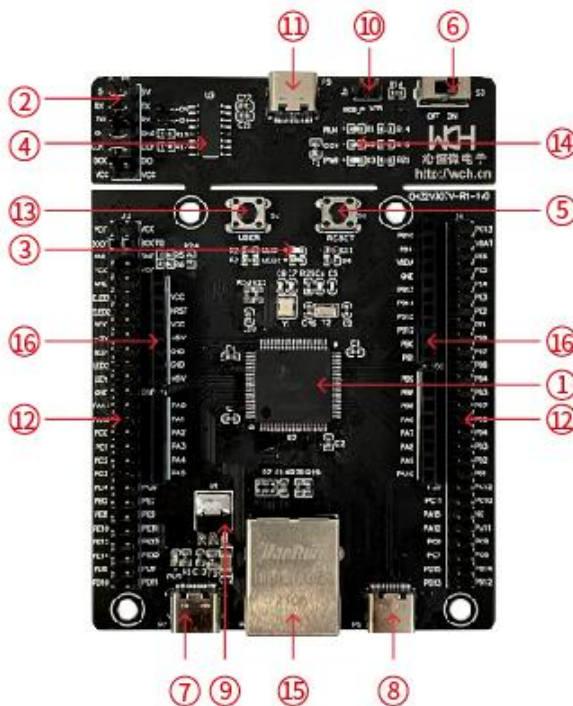
Descriptions

|			
1.Master control MCU	5.Reset button	9. Voltage regulator chip	13.USER button
2.SDI&UART interface	6.Power switch	10.Download button	14.WCH-Link LED
3.LED	7.USB2.0 full-speed interface	11.WCH-Link interface	15.Network port
4.WCH-Link MCU	8.USB2.0 high-speed interface	12.MCU I/O	16.ARDUINO

The CH32V307V evaluation board shown above comes with the following resources.

Motherboard - CH32V307EVT

1. Master control MCU: CH32V307VCT6

2. SDI & UART interface: for downloading, emulation debugging, need jumper to choose whether to use the on-board WCH-Link

3. LED: Connected to the I/O port of the master MCU through J3 pins for control

4. WCH-Link MCU: MCU that implements WCH-Link function

5. Button S1: Reset button for external manual reset of the master control MCU

6. Switch S3: Used to cut off or connect external 5V power supply or USB power supply

7. USB type-C interface P7: connect the main chip USB2.0 full-speed communication interface

8. USB interface P6: connect the main chip USB2.0 high-speed communication interface

9. Voltage regulator chip U1: used to realize the conversion of 5V voltage to 3.3V supply voltage available to the chip

10. Download interface J1: When J1 jumper is shorted, it can be used to achieve WCH-Link firmware update

11. WCH-Link interface: for connecting PC and WCH-Link function module

12. MCU I/O port: I/O pinout interface of the master MCU

13. USER button S2: Connect the I/O port of the master MCU through J3 pin for key control

14. WCH-Link indicator: including D1, D2 and D3 three LEDs, indicating the WCH-Link operation status

15. Network port: Network communication interface of the main chip

16. ARDUINO interface: convenient to connect the ARDUINO interface development board

CH32V307 Evaluation Board
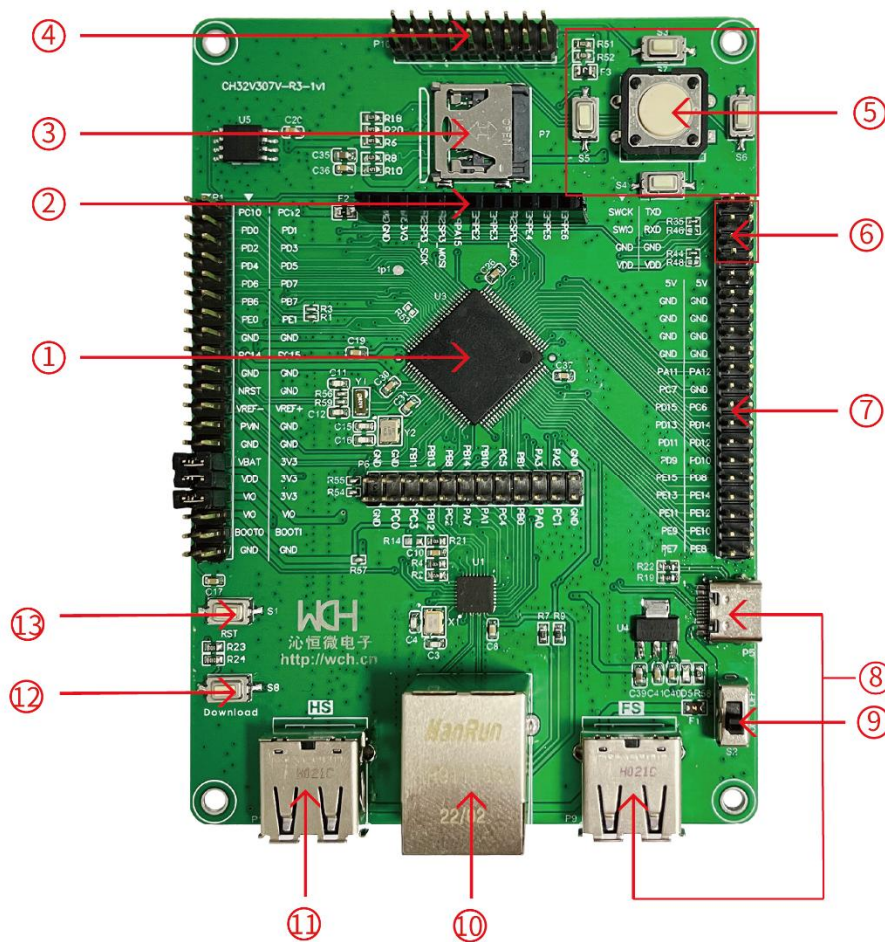
Descriptions

|			
1.Master control MCU	5. User button	8.USB full-speed interface	11.USB high-speed interface
2. Screen interface	6.DEBUG interface	9.Power switch	12.Download button
3. SD card holder	7.MCU I/O	10.Network port	13.Reset button
4. Camera interface			

The CH32V307V-R3 EVT board comes with the following resources.

Motherboard - CH32V307V-R3

1. Master control MCU: CH32V307VCT6

2. Screen interface P3: realize MCU external SPI port display

3. SD card holder P7: connect SDIO interface, demonstrate the operation of TF card through SDIO interface

4. Camera interface P10: realize MCU external camera (DVP-8bits)

5. Button: User button

6. Debugging interface P2: for downloading, simulation debugging

7. MCU I/O ports P1, P2, P6, P10: I/O pinout interface of the master control MCU

8. USB full-speed interface P5, P9: to provide electrical power, connected to the main chip USB2.0 full-speed communication interface

9. Power switch S2: Used to cut off or connect external 5V power supply or USB power supply

10. Network port P4: network communication interface of the main chip, 100 Gigabit Fiber

11. USB high-speed interface P11: provide electrical power, connected to the main chip USB2.0 high-speed communication interface

12. Download button S8: used to start the download from BOOT

13. Reset button S1: for external manual reset of the master control MCU

CH32V303 Evaluation Board
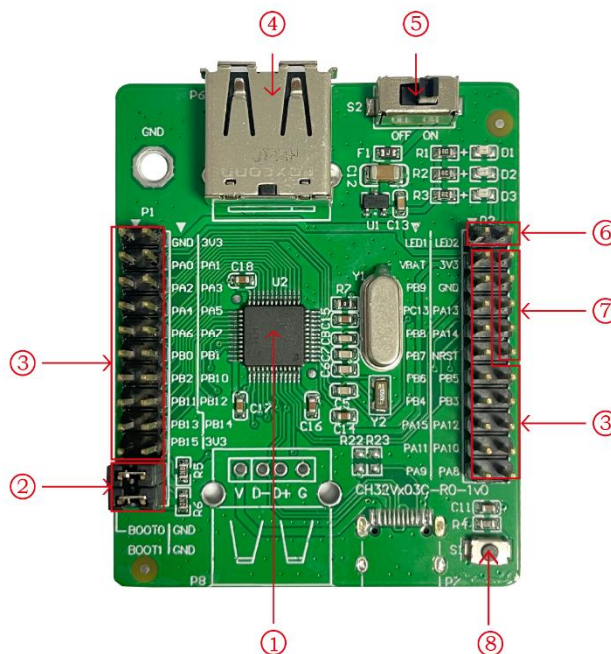
Descriptions

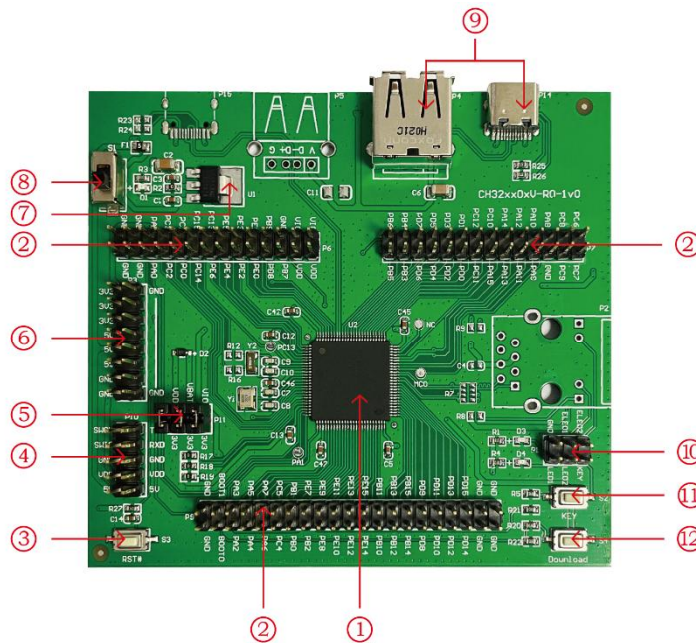|		
1.MCU	4.USB interface	7.DEBUG interface
2.Boot mode configuration	5.Power switch	8.Reset button
3.MCU I/O	6.LED	

The above CH32V303 evaluation board comes with the following resources.

Motherboard - CH32V303EVT

1. Master control MCU: CH32V303CBT6

2. Boot mode configuration P3: Select the boot mode when the chip is powered on by configuring BOOT0/1

3. MCU I/O port P1, P2: I/O pinout interface of the master control MCU

4. USB interface P6: USB communication interface PB6, PB7 of the main chip

5. Switch S2: Used to disconnect or connect external 5V power supply or USB power supply

6. LED: Connected to the main chip I/O port via pins for control

7. DEBUG interface: for downloading, simulation debugging
8. Button S1: Reset button for external manual reset of the master control MCU

CH32V303 Evaluation Board

Descriptions

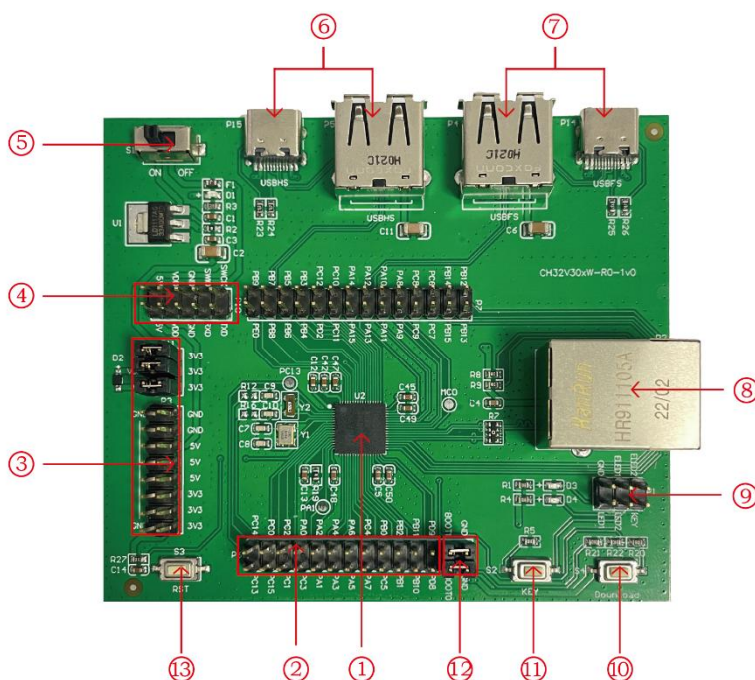| 1.Master control MCU	4.DEBUG interface	7.Voltage regulator chip	10.KEY and LED row pin
2.MCU I/O	5.MCU power supply row pin	8.Power switch	11.KEY
3.Reset button	6.Power supply row pin	9.USB interface	12.Download button

The above CH32V303 evaluation board comes with the following resources.
Motherboard - CH32V303EVT

1. Master control MCU: CH32V303VCT6
2. MCU I/O ports P6, P7, P9: I/O pinout interface of the master control MCU
3. Button S3: Reset button for external manual reset of the master control MCU
4. DEBUG interface P10: for downloading, emulation debugging
5. MCU power pin P11: for main MCU power supply selection
6. Power supply pin P3: 5V, 3.3V, GND external power supply pin
7. Forward low dropout voltage regulator chip U1: used to realize the conversion of 5V voltage to 3.3V supply voltage available to the chip
8. Switch S1: Used to disconnect or connect external 5V power supply or USB power supply
9. USB interface P4, P14: USB communication interface PA11, PA12 of the main chip
10. KEY and LED row pin P1: P1 row pin connects to the I/O of the master control MCU to control LED and KEY
11. Key S2: Connects to the I/O port of the master MCU through the P1 row of pins for key control
12. Button S4: Download button, used to start download from BOOT

CH32V307 Evaluation Board

Descriptions

|			
1.Master control MCU	4.DEBUG interface	7.USB interface	10.Download button
2.MCU I/O	5.Power switch	8.Network port	11.KEY
3.Power supply row pin	6.USB interface	9.KEY and LED row pin	12.Boot mode configuration
			13.Reset button

The above CH32V307 evaluation board comes with the following resources.

Motherboard - CH32V307EVT

1. Master control MCU: CH32V303WCU6

2. MCU I/O port P6, P7: I/O pinout interface of the master control MCU

3. Power supply row pin: for the master control MCU power supply selection

4. DEBUG interface P10: for downloading, emulation debugging

5. Switch S1: Used to disconnect or connect external 5V power supply or USB power supply

6. USB interface P5, P15: USB communication interface PB6, PB7 of the main chip

7. USB interface P4, P14: USB communication interface PA11, PA12 of the main chip

8. Network port: Network communication interface of the main chip

9. KEY and LED row pin P1: P1 row pin connects to the IO of the master MCU to control LED and KEY

10. Button S4: Download button, used to start download from BOOT

11. Key S2: Connects to the I/O port of the master control MCU through the P1 row of pins for key control

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

13. Button S3: Reset button for external manual reset of the master control MCU

3. Software Development

3.1 EVT package directory structure
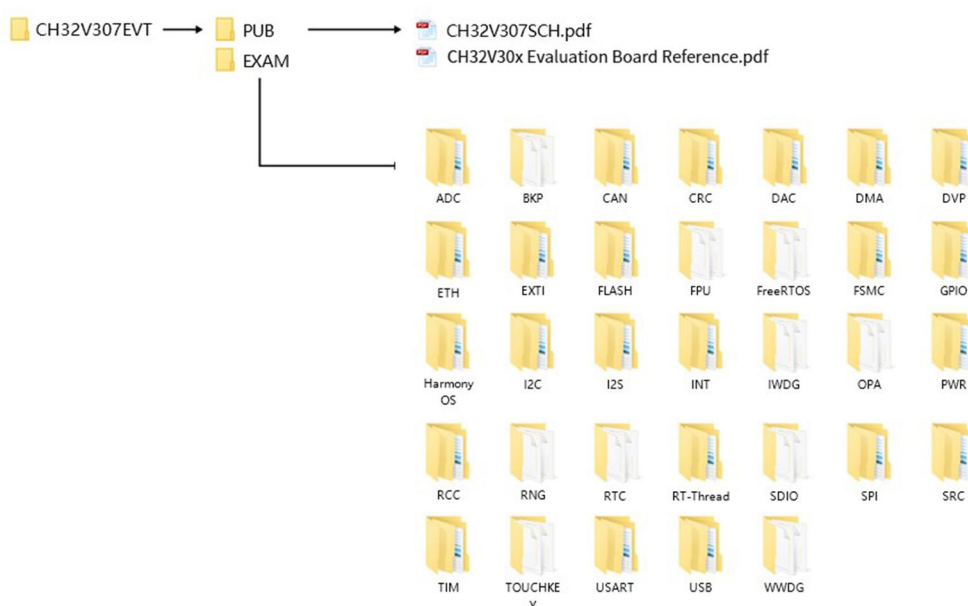
Description.

PUB folder: provides evaluation board manuals, evaluation board schematics.

EXAM folder: Provides software development drivers and corresponding examples for the CH32V307 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.
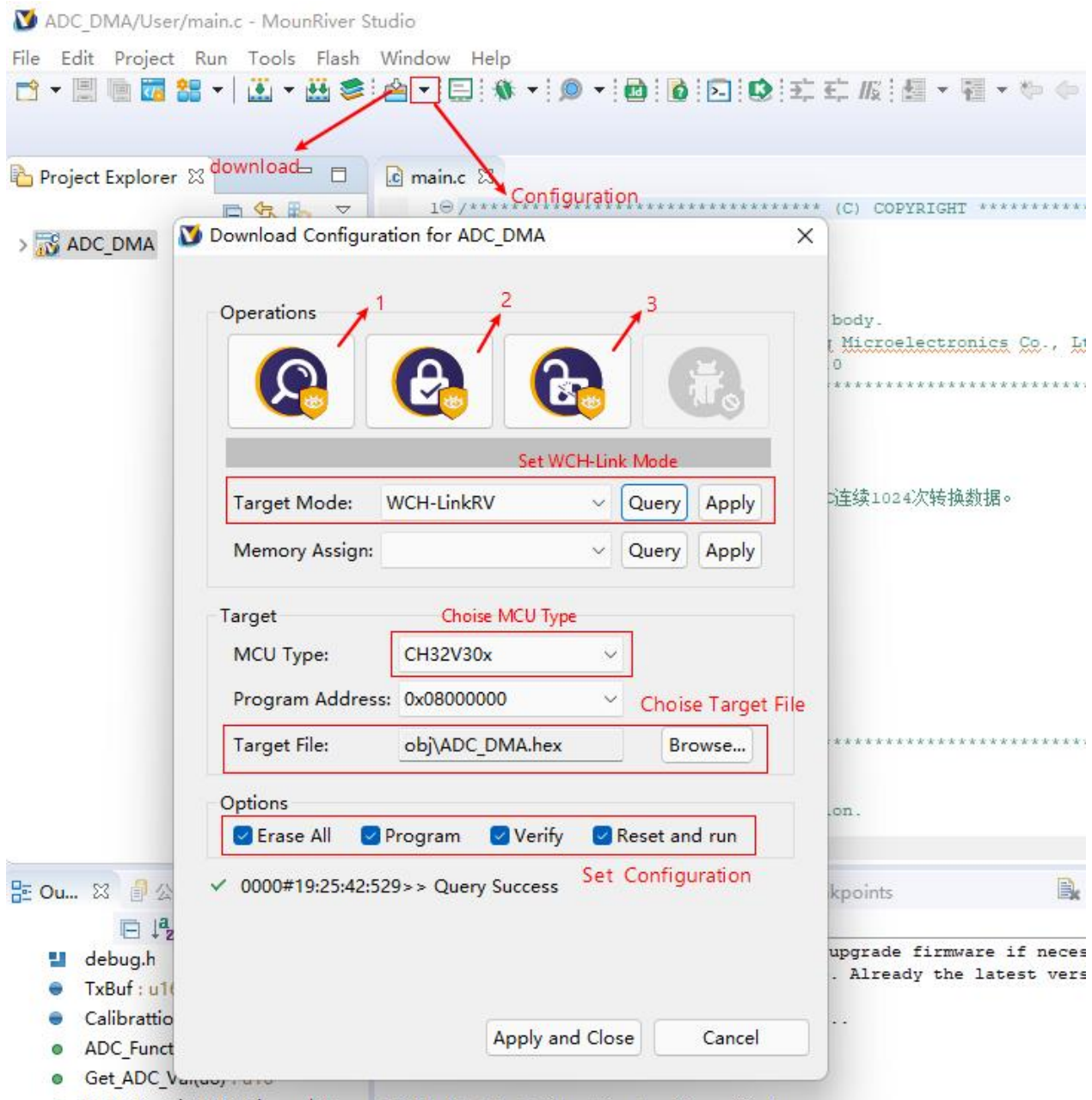
1 for querying the chip read protection status.

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.

2) WCHISPTool Download

The WCHISPTool tool is used to download the chip, supporting both USB and serial port. the USB pins are PA11 (DM), PA12 (DP) or PB6 (DM), PB7 (DP), and the serial port pins are PA9 (TX), PA10 (RX). The download process is.

(1) BOOT0 to VCC and BOOT1 to ground, connected to PC via serial or USB.

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

(3) BOOT0 is grounded, re-powered and running the APP program.

The WCHISPTool tool interface is shown in the following figure.
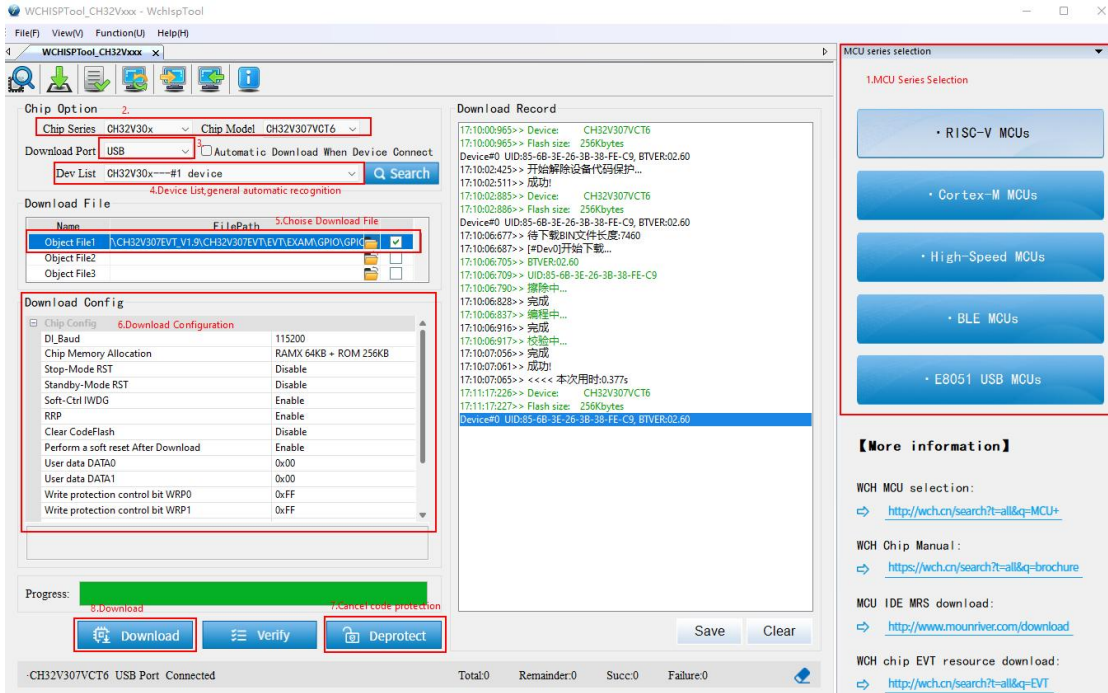
➢ Simulation

Open MounRiver Studio software for debugging configuration
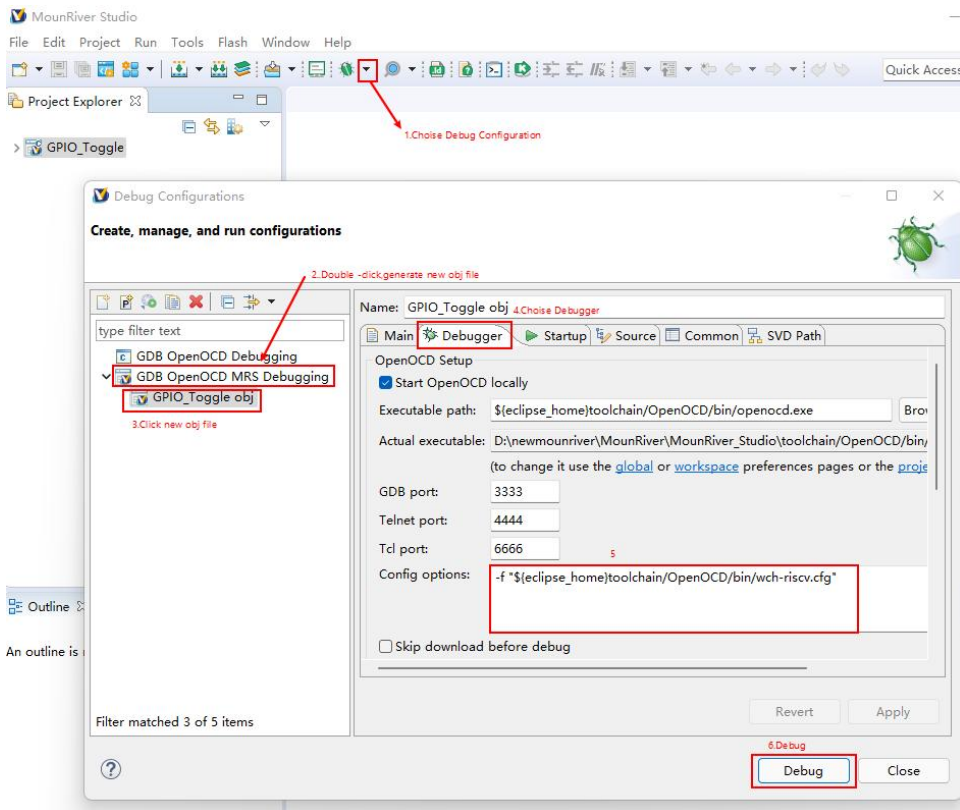
1)   Toolbar description

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


Detailed functions are as follows.

1.   Restart: After reset, the program returns to the beginning.

2.   Continue: Click to continue debugging.

3.   Terminate: Click to exit debugging.

4.   Single-step jump-in: For each key click, 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 to the function that was jumped into

7.   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;
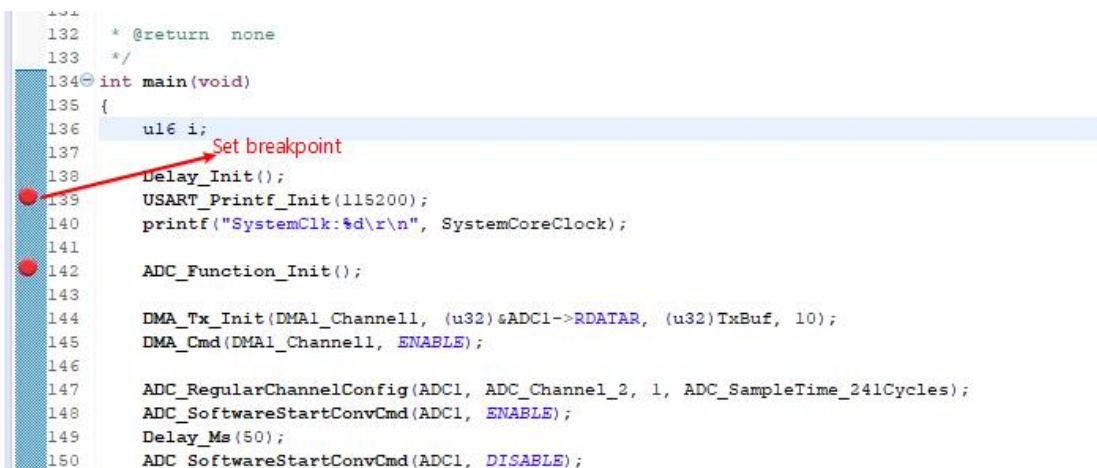
3)   Interface display

(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.
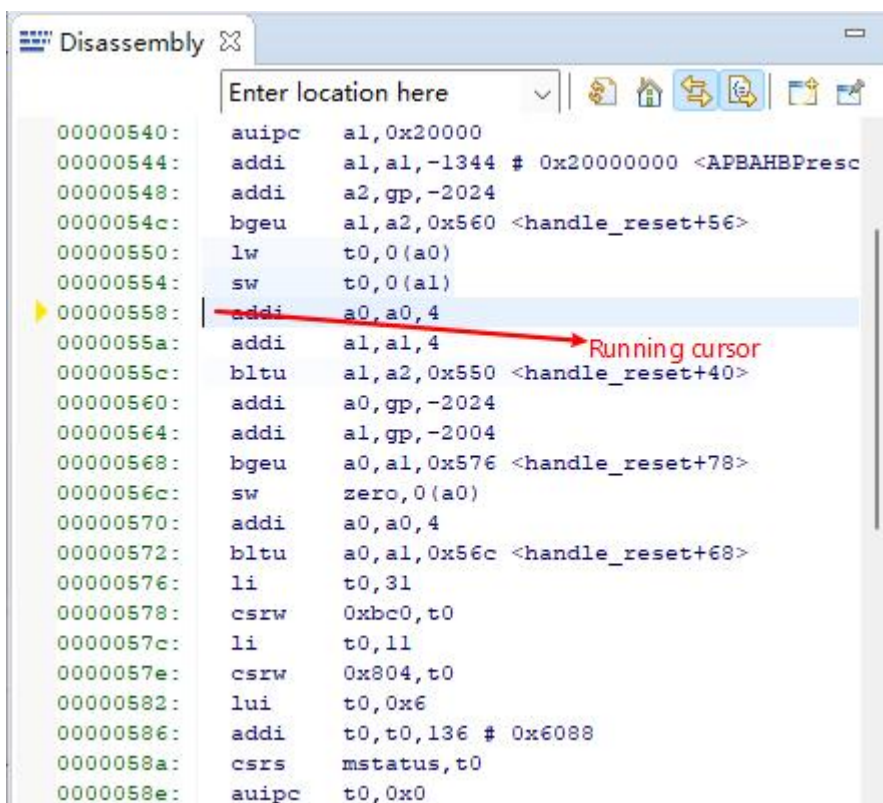
(2) Program running interface

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.
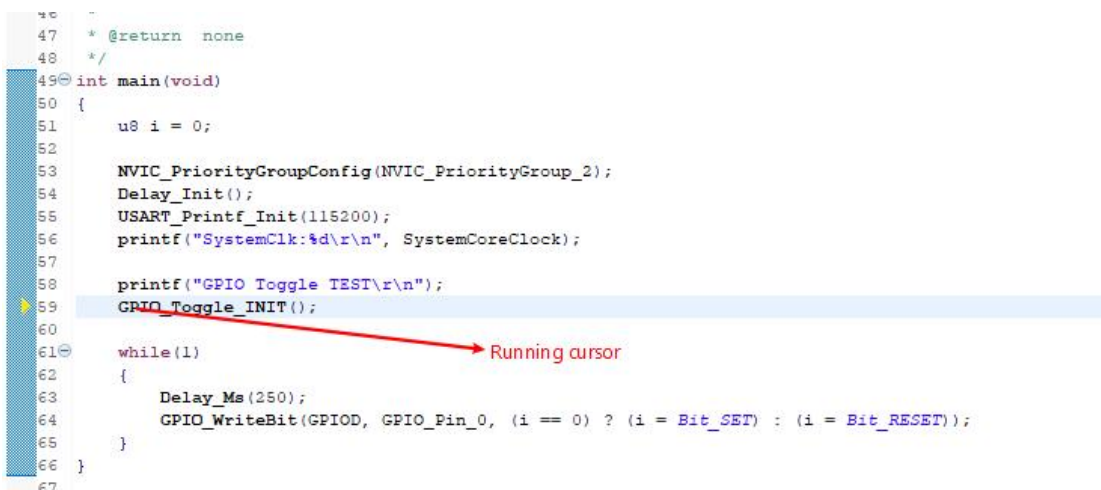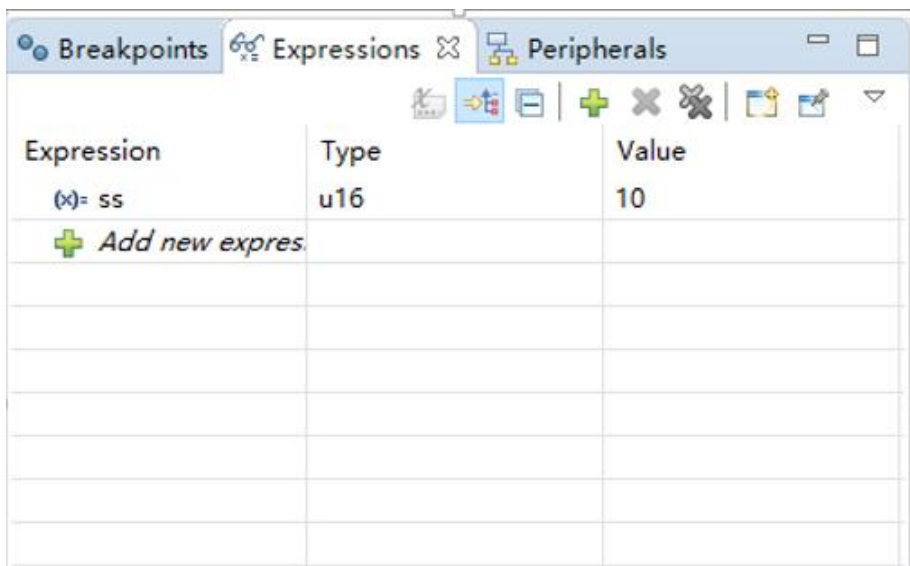

4)   Variables

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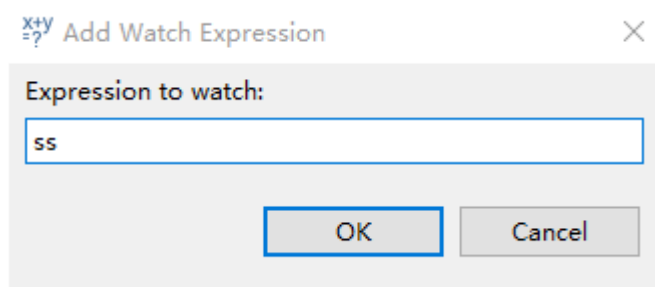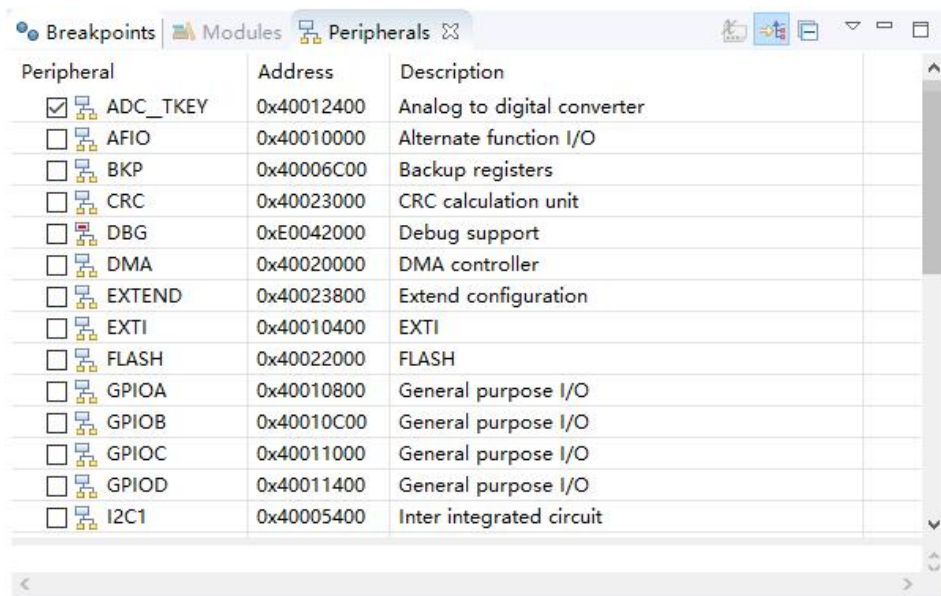
Fill in the variable name, or just click OK to add the variable you just selected to the pop-up.

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.

➢   Engineering Chip Selection

In the course of the project there are a variety of chip selection, to CH32V307 development board used chip CH32V307VCT6 as an example of engineering chip selection compilation, has achieved different peripheral functions, the steps are as follows.

1)   Click Peripheral-> inc folder ch32v30x.h file to check the chip type, as shown below, because the chip type is CH32V307VCT6, so choose CH32V30x_D8C. (Note: If you use CH32V303x series chip choose CH32V30x_D8)
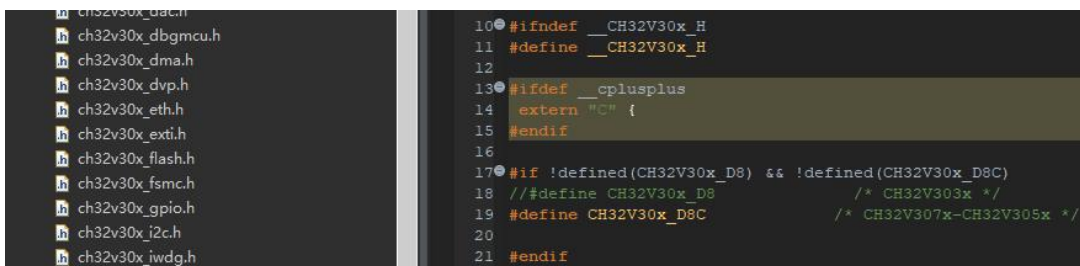

2)   Select the startup file, click on the Startup folder, select the corresponding startup file defined, as shown below, because step 1 select CH32V30x_D8C, so select the startup_ch32v30x_D8C.S file (Note: If using CH32V303x series chips select startup_ch32v30x_D8.S)
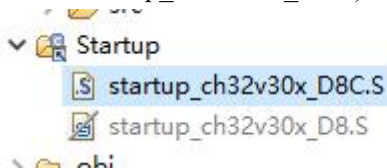
Note: In the project is not used in the file, such as in the folder file click delete, will lead to the file directly deleted to the return station, re-use needs to recompile to be able to, so for no use of the file is recommended to use the

participate / exclude compile function, to Startup folder compile / exclude a brief description. First of all, select the project right click, select the compile involved/excluded function button, take the startup_ch32v30x_D8.S file in the figure as an example, if the project status is excluded compile, click this function can be involved in compile. Anyway, if the project status is compile-in, click this function to compile-out. The same applies to folders.
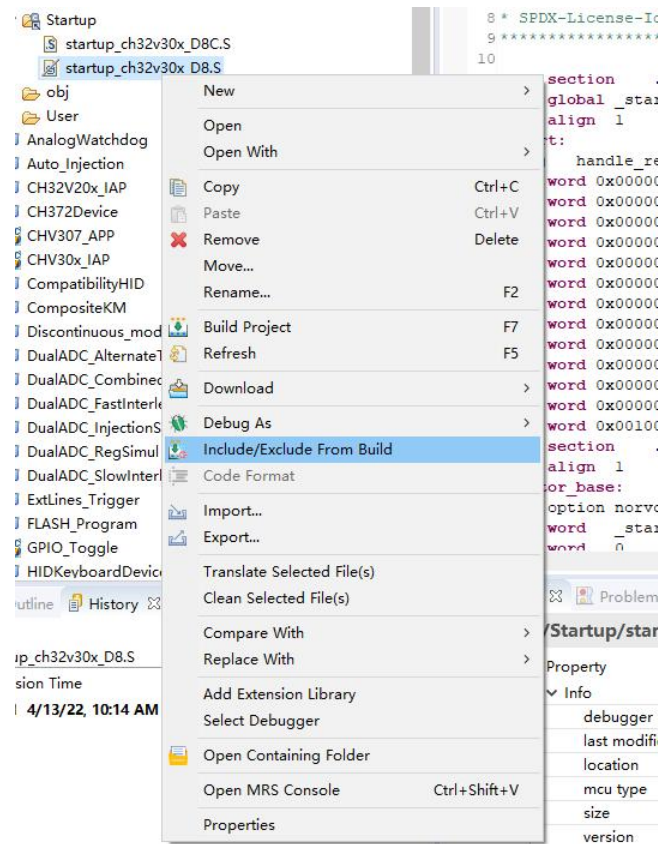
4. WCH-LinkUtility.exe Download

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

1) Connect WCH-Link

2) Select chip information

3) Add firmware

4) If the chip is read protected, you need to release the chip read protection.

5) Execute
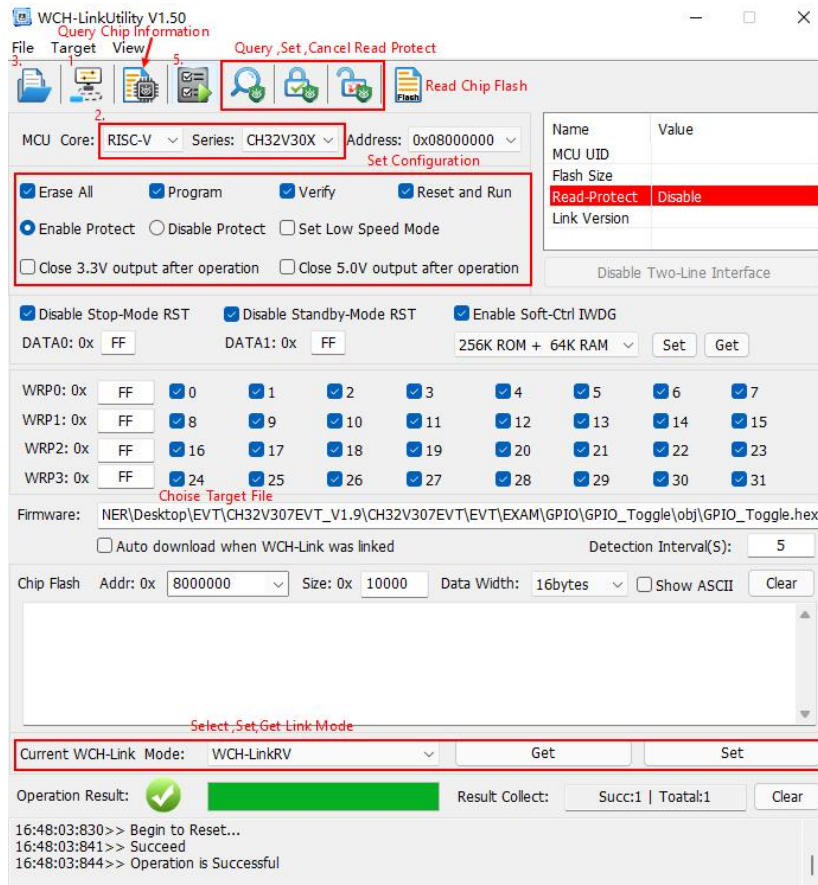
5. WCHISPTool.exe Download

The WCHISPTool tool is used to download the chip, supporting both USB and serial port. the USB pins are PA11 (DM), PA12 (DP) or PB6 (DM), PB7 (DP), and the serial port pins are PA9 (TX), PA10 (RX). The download process is:

1)   BOOT0 to VCC and BOOT1 to ground, connected to PC via serial port or USB.

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

3)   BOOT0 is grounded, re-powered and running the APP program.

The WCHISPTool tool interface is shown in the following figure.
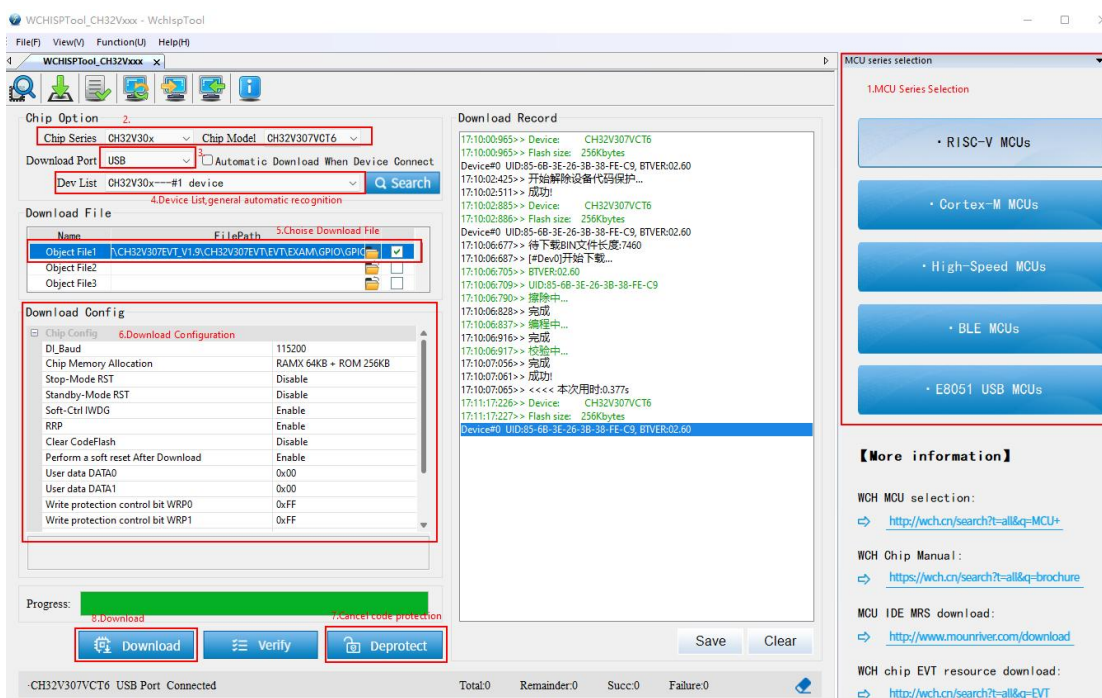
1.   Select MCU series and chip model

2.   Select the serial port download mode

3.   Identify the device, usually automatically, if it fails to identify, you need to select manually

4.   Select the firmware, select the downloaded .hex or .bin target program file

5.   Configure the download according to the requirements

6.   Click download

6. Statement of attention

1) If you use WCH-Link to download, its CON indicator should be long off, if the CON is lit, refer to WCH-Link instructions for specific switching mode.

Detailed inquiries\questions can be logged in the following.

WCH Microelectronics Community: http://www.wch.cn/bbs/forum-106-1.html

WCH official website: http://www.wch.cn/

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