

# CH32X035 Evaluation Board Reference

Version: V1.3

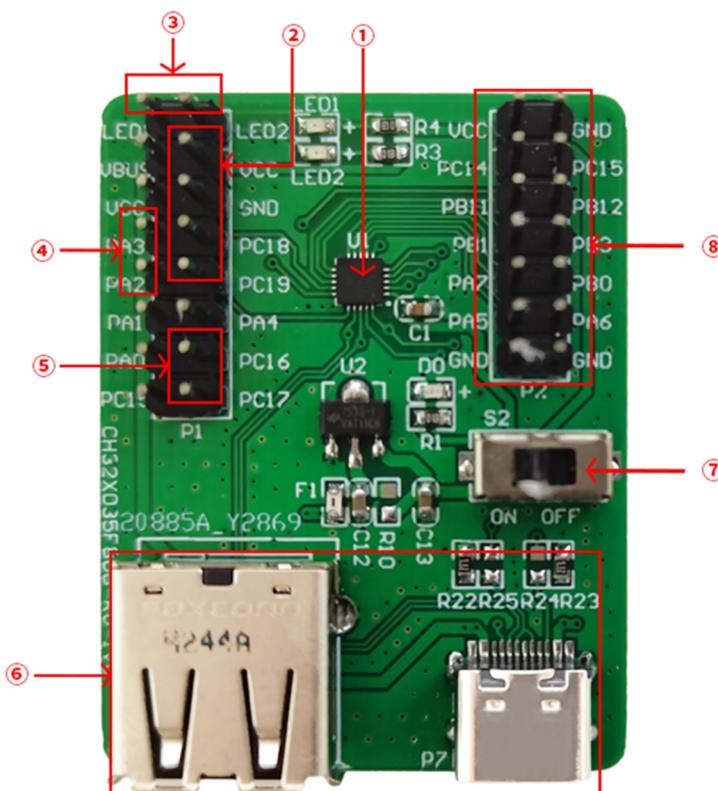
<https://wch-ic.com>

## 1. Overview

This evaluation board is applied to the development of the CH32X035 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 CH32x035\_SCH.pdf document for the schematic of the evaluation board.  
CH32x035 Evaluation Board



Description

- |                 |                                    |                 |
|-----------------|------------------------------------|-----------------|
| 1.MCU           | 2. SDI interface                   | 3. LED          |
| 4.Serial port 2 | 5. Boot mode configuration/USB pin | 6.USB interface |
| 7.Switch        | 8. MCU I/O                         |                 |

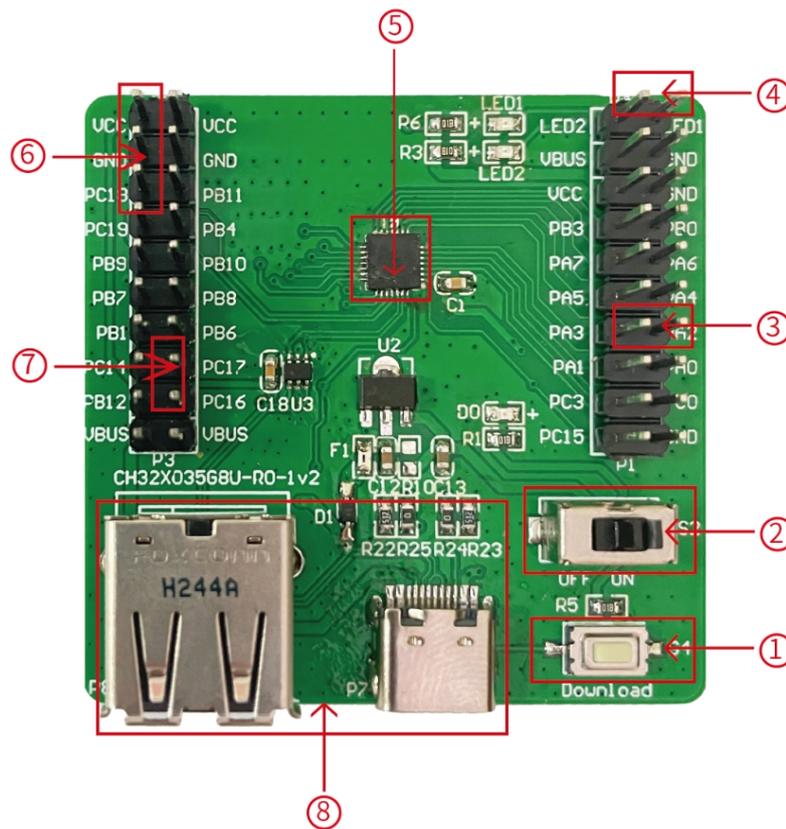
The above CH32x035 evaluation board comes with the following resources.

Motherboard - CH32x035EVT

1. MCU: CH32X035F8U6
2. SWD interface: for downloading, simulation debugging
3. LED: connected to the main chip I/O port for control through pins

4. Serial port 2: for printing and serial communication (Note: EVT printing default serial port 1, need to select serial port 2 in Debug.c)
5. Boot mode configuration/USB pin: select the boot mode when the chip is powered on by configuring BOOT0/1
6. USB interface P7, P8: the main chip's USB communication interface PC16, PC17
7. Switch S2: used to cut off or connect external 5V power supply or USB power supply
8. MCU I/O port: the I/O interface of the main control MCU

### CH32x035 Evaluation Board



#### Description

- |                    |                  |                  |
|--------------------|------------------|------------------|
| 1. Download button | 2. Switch        | 3. Serial port 2 |
| 4. LED             | 5. MCU           | 6. SDI interface |
| 7. USB pin         | 8. USB interface |                  |

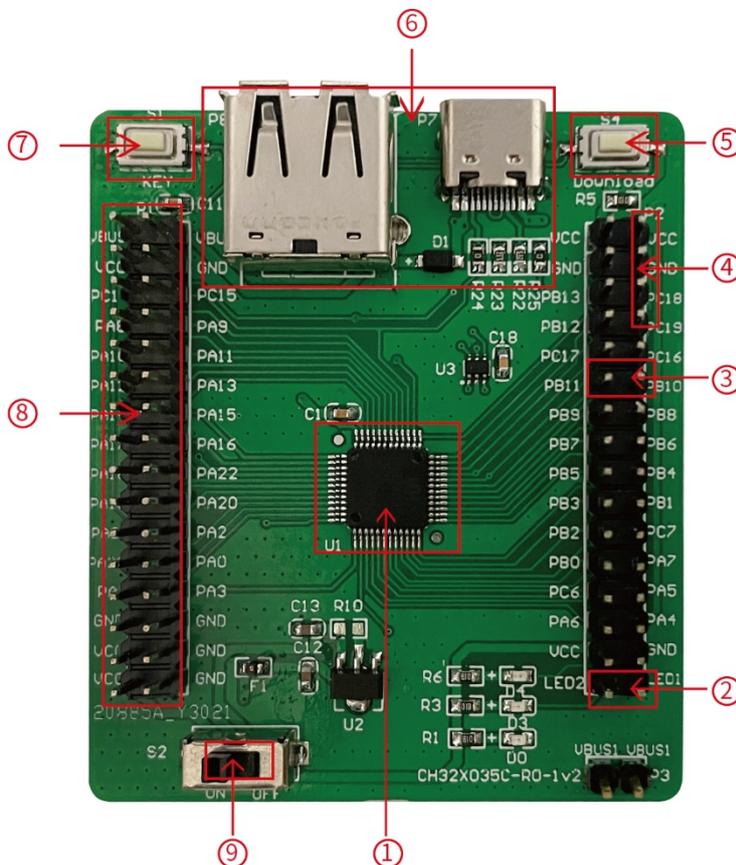
The above CH32x035 evaluation board comes with the following resources.

#### Motherboard - CH32x035EVT

1. Download button: selects the boot mode when the chip is powered up
2. Switch S2: for disconnecting or connecting external 5V power supply or USB power supply
3. Serial port 2: for serial communication and printing (note: default serial port 1 is used as the print pin in EVT, PB10-TX, PB11-RX)
4. LED: connected to the main chip IO port via pins for control
5. MCU: CH32X035G8U6
6. Debug interface: for downloading, emulation and debugging

- 7. USB pins: through the configuration of PC17 can choose the boot mode when the chip is powered on
- 8. USB interface P7, P8: USB communication interface PC16, PC17 of the main chip

CH32x035 Evaluation Board



Description

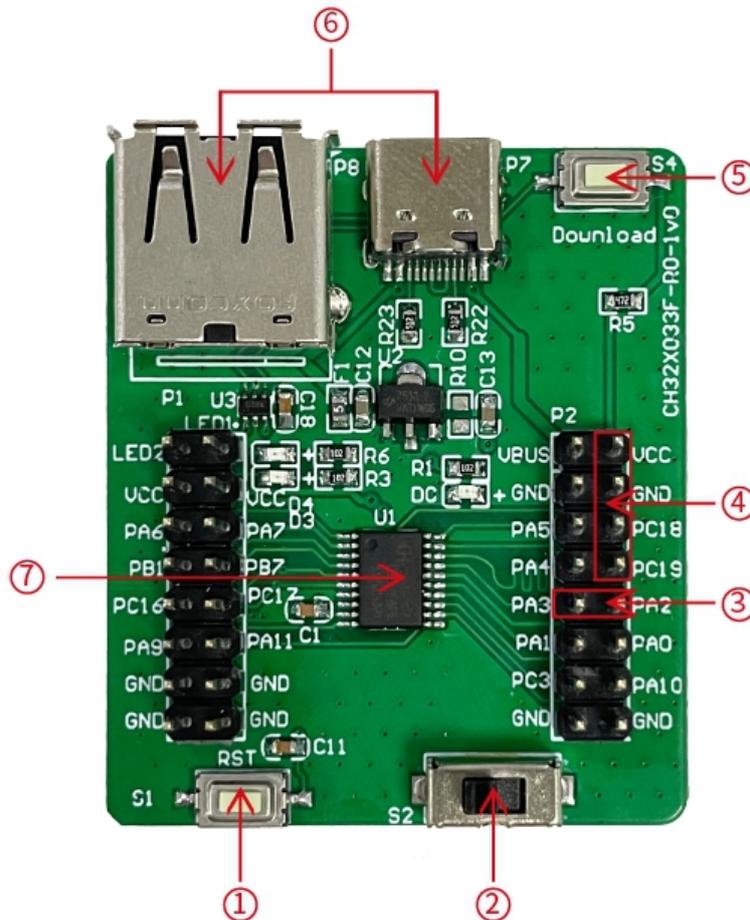
- |                  |                    |                  |
|------------------|--------------------|------------------|
| 1. MCU           | 2. LED             | 3. Serial port 1 |
| 4. SDI interface | 5. Download button | 6. USB interface |
| 7. Reset button  | 8. MCU I/O         | 9. Switch        |

The above CH32X035 evaluation board comes with the following resources:

Motherboard - CH32X035EVT

- 1. MCU: CH32X035C8T6
- 2. LED: Connected to the main chip IO port via pins for control
- 3. Serial port 1: For serial communication and printing
- 4. Debug interface: For downloading, emulation and debugging
- 5. Download button: Select the boot mode when the chip is powered on
- 6. USB interface P7, P8: USB communication interface PC16, PC17 of the main chip
- 7. Reset button: For external manual reset of the MCU
- 8. MCU I/O: Main MCU I/O pinout
- 9. Switch S2: For disconnecting or connecting external 5V power supply or USB power supply

## CH32x033 Evaluation Board



## Description

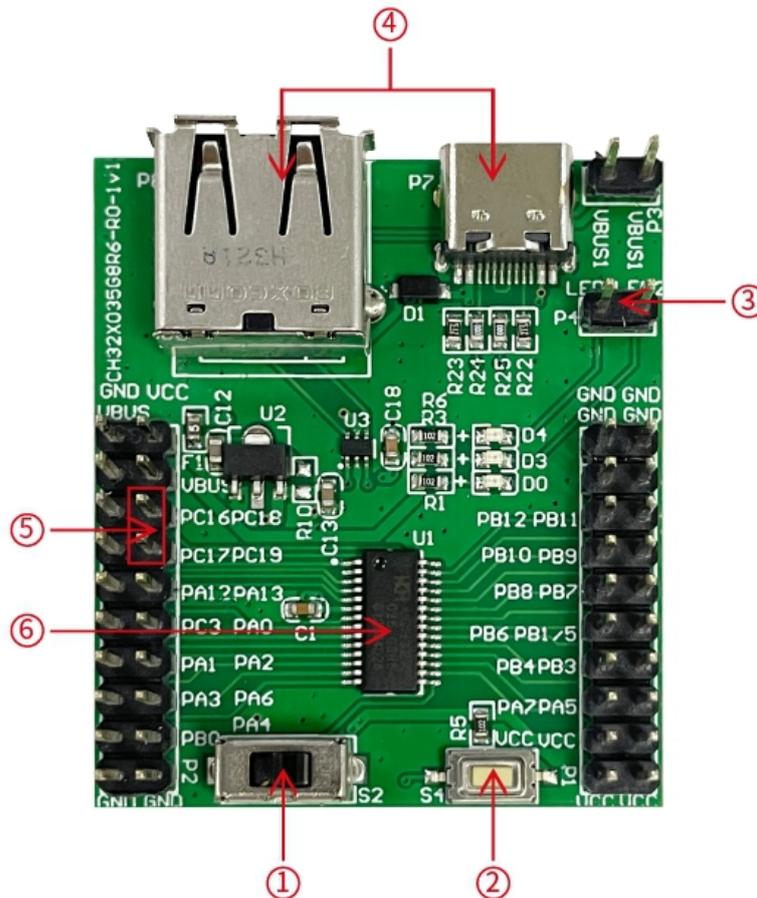
- |                  |                    |                  |
|------------------|--------------------|------------------|
| 1. Reset button  | 2. Switch          | 3. Serial port 2 |
| 4. SDI interface | 5. Download button | 6. USB interface |
| 7. MCU           |                    |                  |

The above CH32X033 evaluation board comes with the following resources:

Motherboard - CH32X033EVT

1. Reset button: For external manual reset of the MCU
2. Switch S2: For disconnecting or connecting external 5V power supply or USB power supply
3. Serial port 2: For serial communication and printing (Note: The default serial port 1 is used as the print pin in EVT, PB10-TX, PB11-RX)
4. Debug interface: For downloading, emulation and debugging
5. Download button: Select the boot mode when the chip is powered on
6. USB interface P7, P8: USB communication interface PC16, PC17 of the main chip
7. MCU: CH32X033F8P6

## CH32x035 Evaluation Board



Description

- |                  |                    |        |
|------------------|--------------------|--------|
| 1. Switch        | 2. Download button | 3. LED |
| 4. USB interface | 5. SDI interface   | 6. MCU |

The above CH32X035 evaluation board comes with the following resources:

Motherboard - CH32X035EVT

1. Switch S2: For disconnecting or connecting external 5V power supply or USB power supply
2. Download button: Select the boot mode when the chip is powered on
3. LED: Controlled by pins connected to the IO port of the main chip
4. USB interface P7, P8: USB communication interface PC16, PC17 of the main chip
5. Debug interface: For downloading, emulation and debugging
6. MCU: CH32X035G8R6

## 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 CH32x035 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)

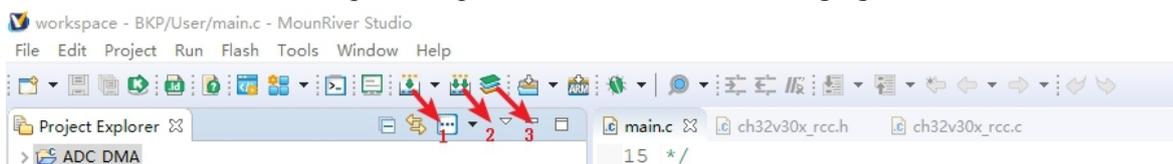
#### 3.2.1 Open Project

➤ 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.

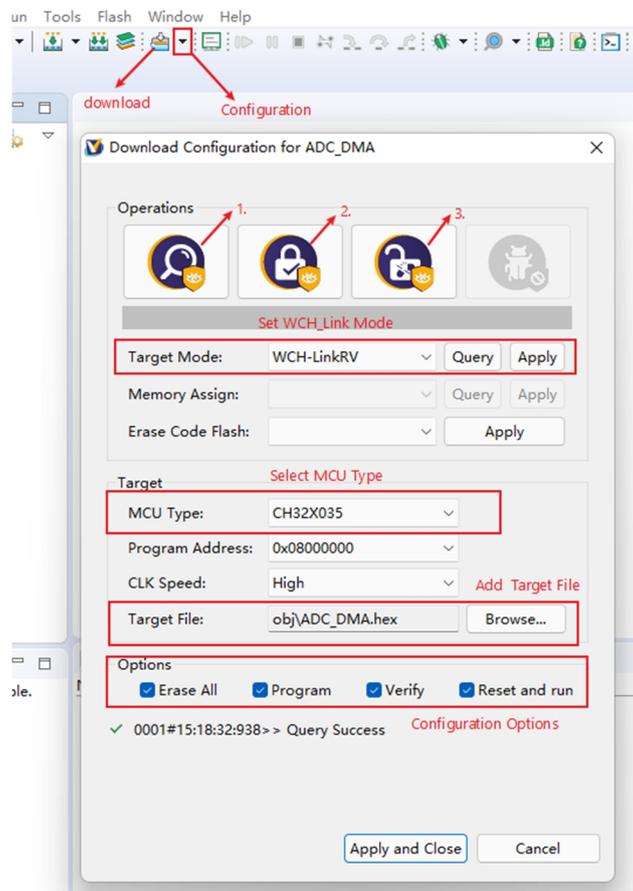
Compile option 3 is All Build, which performs global compilation for all projects.

#### 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;



```

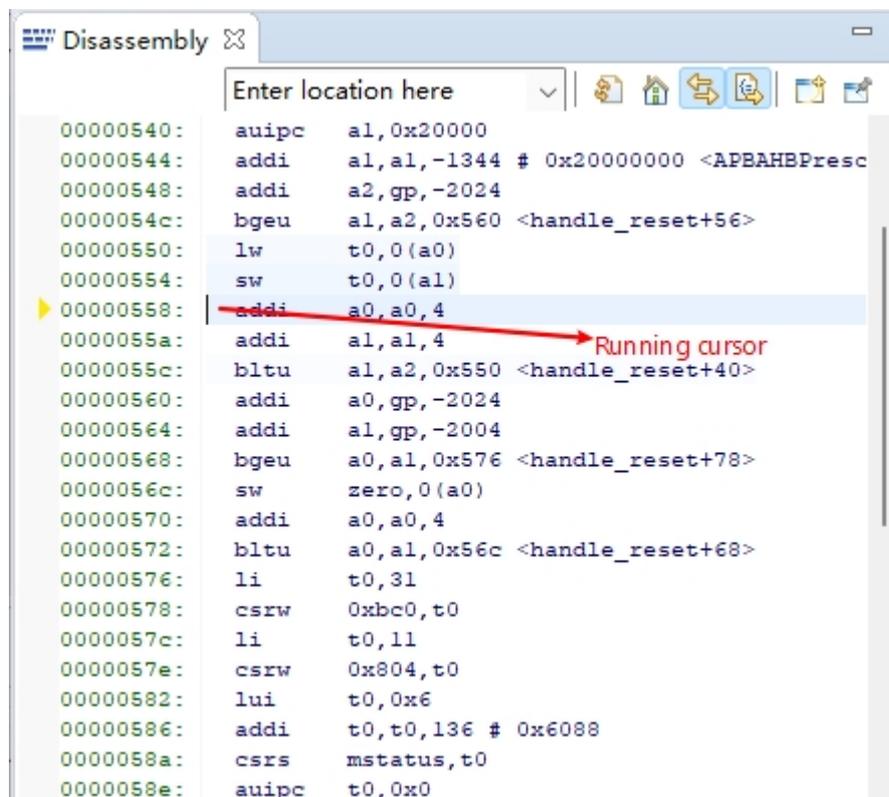
132  * @return none
133  */
134  int main(void)
135  {
136      ul6 i;
137
138      Delay_Init();
139      USART_Printf_Init(115200);
140      printf("SystemClk:%d\r\n", SystemCoreClock);
141
142      ADC_Function_Init();
143
144      DMA_Tx_Init(DMA1_Channel1, (u32)&ADC1->RDATAR, (u32)TxBuf, 10);
145      DMA_Cmd(DMA1_Channel1, ENABLE);
146
147      ADC_RegularChannelConfig(ADC1, ADC_Channel_2, 1, ADC_SampleTime_241Cycles);
148      ADC_SoftwareStartConvCmd(ADC1, ENABLE);
149      Delay_Ms(50);
150      ADC_SoftwareStartConvCmd(ADC1, DISABLE);

```

## 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.



```

Disassembly
Enter location here
00000540: auipc  a1, 0x20000
00000544: addi   a1, a1, -1344 # 0x20000000 <APBAHBPresc
00000548: addi   a2, gp, -2024
0000054c: bgeu  a1, a2, 0x560 <handle_reset+56>
00000550: lw    t0, 0(a0)
00000554: sw    t0, 0(a1)
00000558: addi  a0, a0, 4
0000055a: addi  a1, a1, 4
0000055c: bltu  a1, a2, 0x550 <handle_reset+40>
00000560: addi  a0, gp, -2024
00000564: addi  a1, gp, -2004
00000568: bgeu  a0, a1, 0x576 <handle_reset+78>
0000056c: sw    zero, 0(a0)
00000570: addi  a0, a0, 4
00000572: bltu  a0, a1, 0x56c <handle_reset+68>
00000576: li    t0, 31
00000578: csrw  0xbc0, t0
0000057c: li    t0, 11
0000057e: csrw  0x804, t0
00000582: lui   t0, 0x6
00000586: addi  t0, t0, 136 # 0x6088
0000058a: csrs  mstatus, t0
0000058e: auipc  t0, 0x0

```

## (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.

```

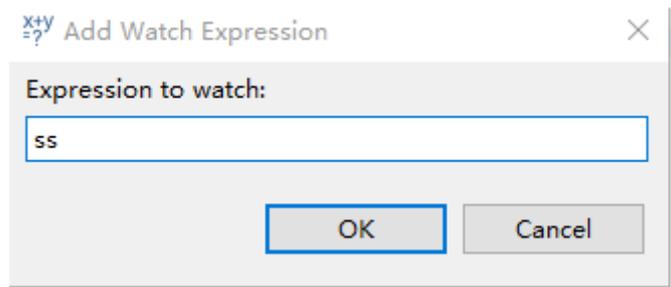
46  -
47  * @return none
48  */
49  int main(void)
50  {
51      u8 i = 0;
52
53      NVIC_PriorityGroupConfig(NVIC_PriorityGroup_2);
54      Delay_Init();
55      USART_Printf_Init(115200);
56      printf("SystemClk:%d\r\n", SystemCoreClock);
57
58      printf("GPIO Toggle TEST\r\n");
59      GPIO_Toggle_INIT();
60
61      while(1)
62      {
63          Delay_Ms(250);
64          GPIO_WriteBit(GPIOD, GPIO_Pin_0, (i == 0) ? (i = Bit_SET) : (i = Bit_RESET));
65      }
66  }
67

```

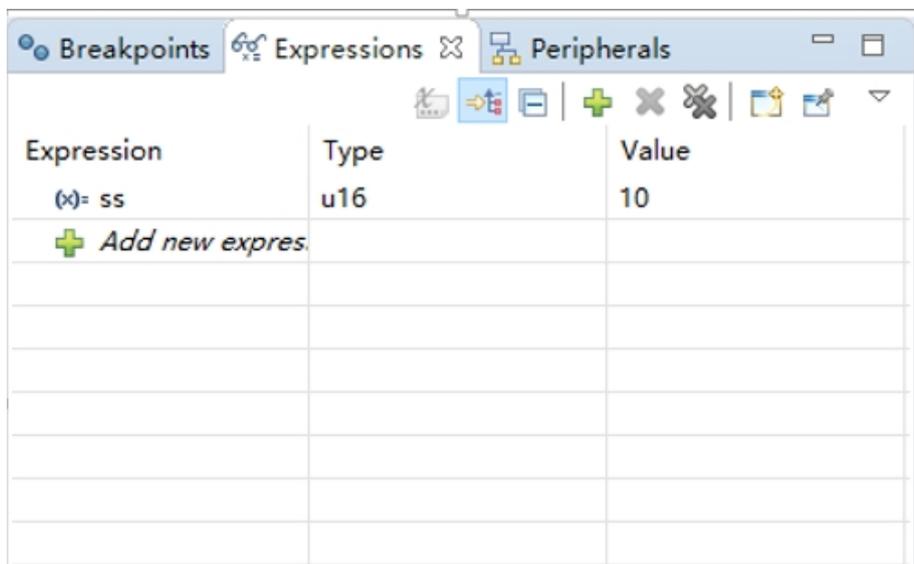
Running cursor

4) Variables

Hover over the variable in the source code to display the details, or select the variable and right-click add watch expression

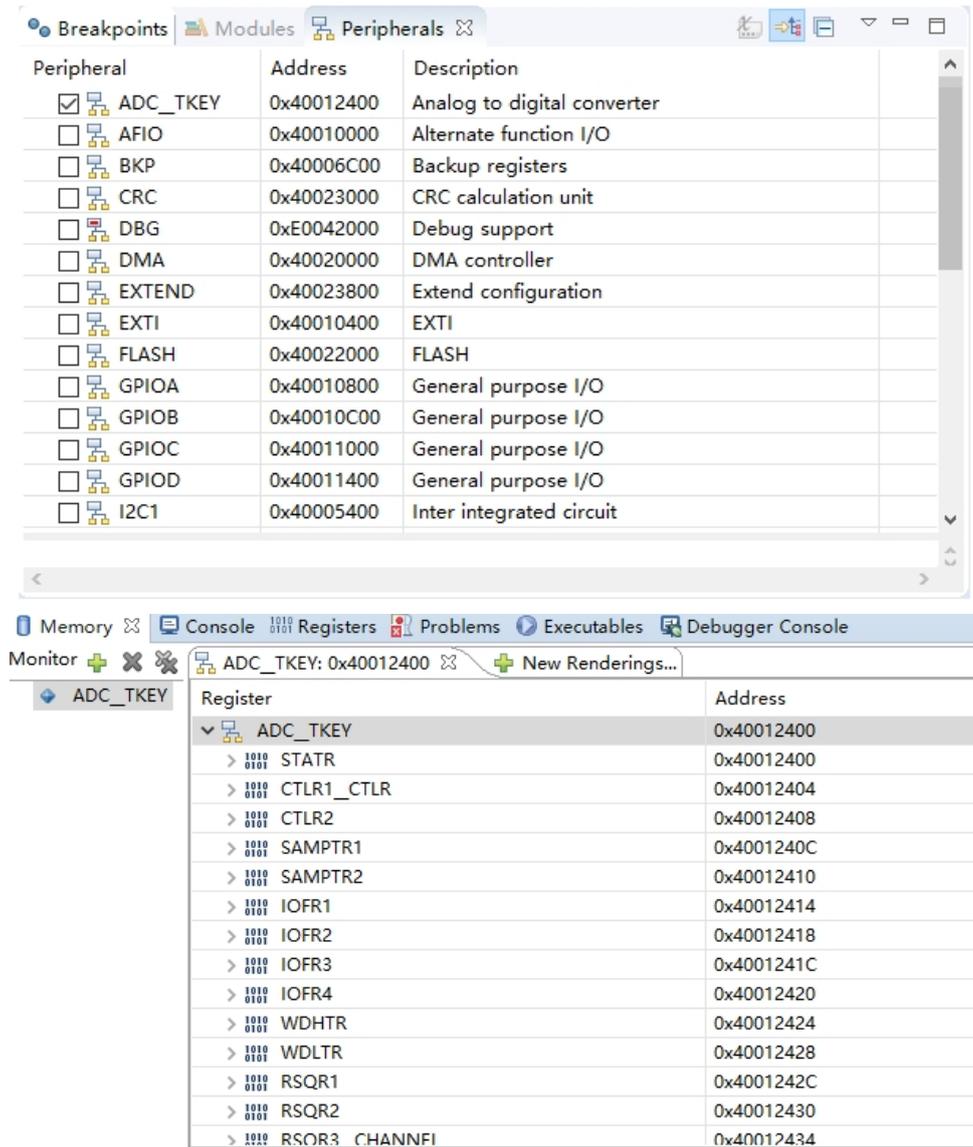


Fill in the variable name, or just click OK to add the variable you just selected to the pop-up.



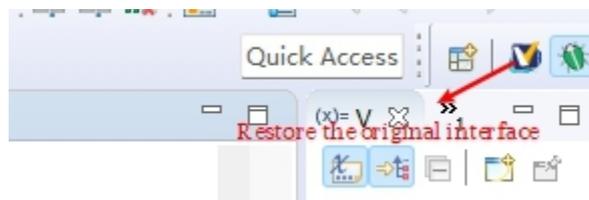
5) Peripheral registers

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.

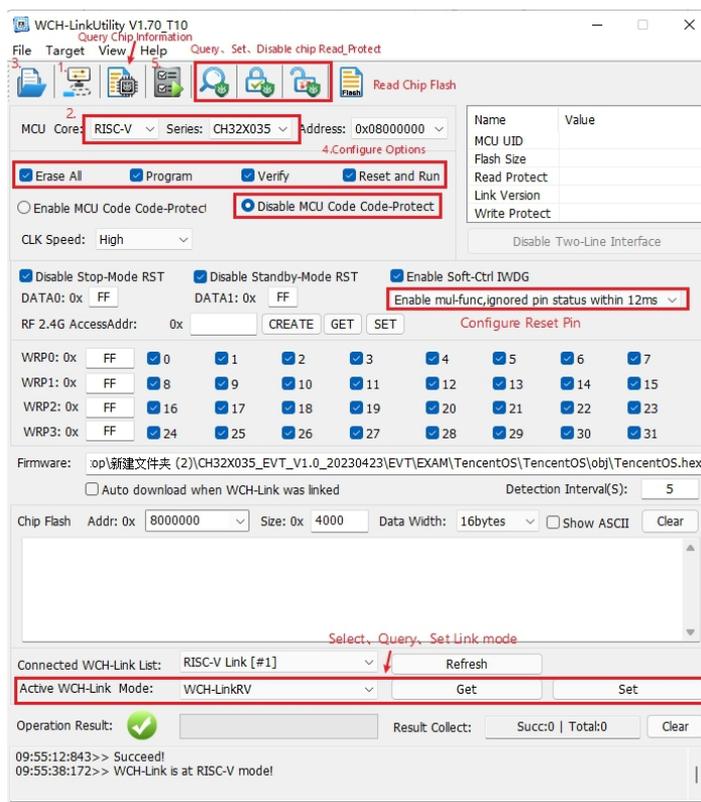


(2) For documentation to access the compiler, click F1 to access the help documentation for detailed instructions.

## 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

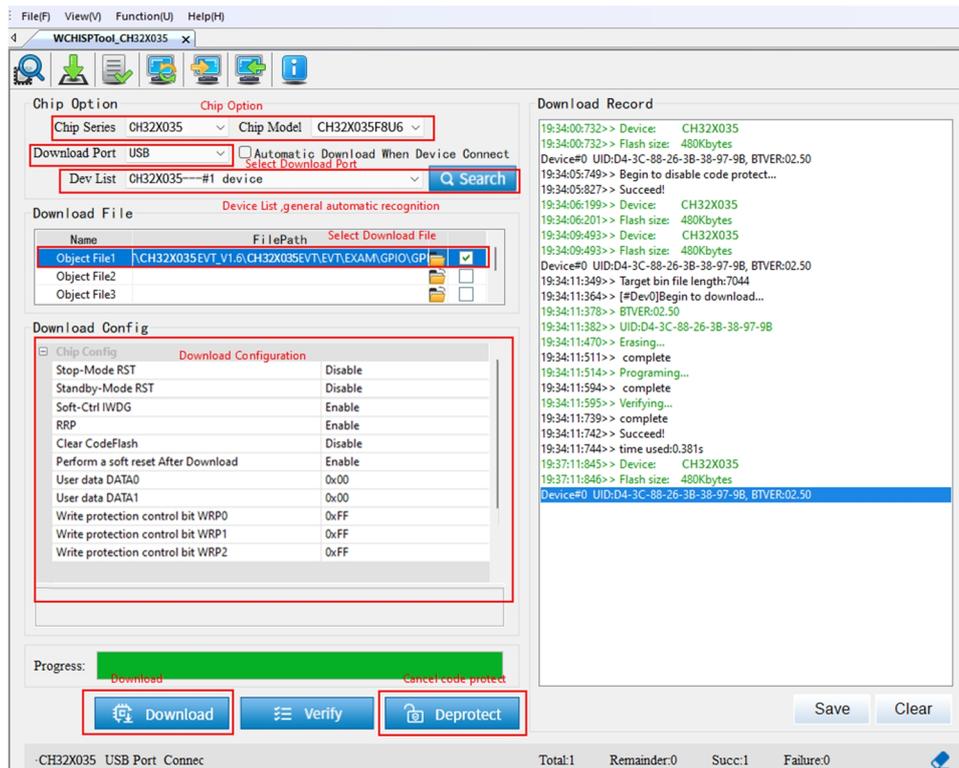


## 5. WCHISPTool.exe Download

The WCHISPTool tool is used to download the chip, supporting both USB and serial port. The USB pins are PC16 (DM), PC17 (DP), and the serial port pins are PA2 (TX), PA3 (RX). The download process is:

- (1) Press and hold the Download button to connect the USB or serial port to the PC; the chip powers up and detects USB\_P (PC17) high level to enter BOOT;
- (2) Release the Download key. Open WCHISPTool tool, select the corresponding download method, choose to download firmware, check the chip configuration, and click download;

The WCHISPTool tool interface is shown in the following figure.



1. Select MCU series and chip model
2. Select USB or 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, refer to WCH-Link instructions for specific switching mode. 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>