## CH32V3xx Evaluation Board Reference

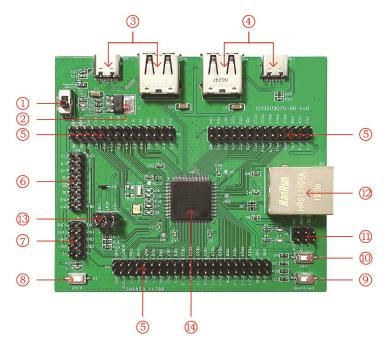
Version: V1.9 https://wch-ic.com

# 1. Overview

This evaluation board is applied to the development of the CH32V30x/CH32V317 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
<ul><li>2.Voltage regulator chip</li><li>3.USB interface</li><li>4. USB interface</li></ul>	6.Power supply row pin 7.DUBUG interface 8.Reset button	10.KEY 11.KEY and LED row pin 12.Network port	14.Main control MCU

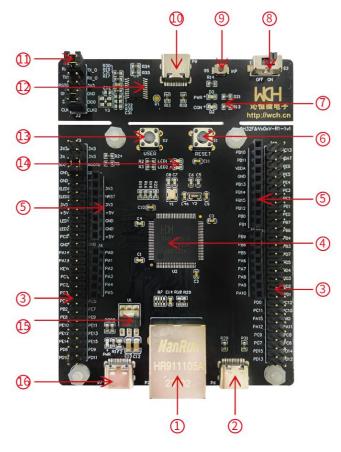
The above CH32V307 evaluation board comes with the following resources.

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 main 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 main control MCU
- 9. Button S4: Download button, used to start download from BOOT
- 10. Key S2: Connects to the I/O port of the main 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 main 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 main control MCU power supply selection
- 14. Main control MCU: CH32V307VCT6

CH32V307 Evaluation Board



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

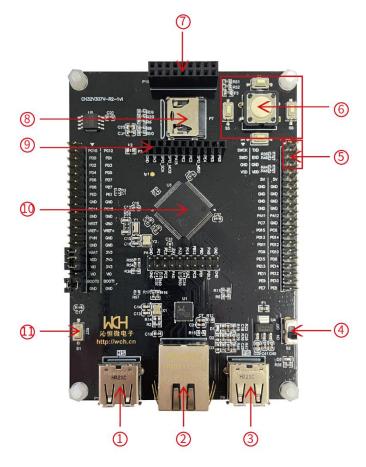
The CH32V307V evaluation board shown above comes with the following resources.

Motherboard - CH32V307EVT-R1

- 1. Network port: Network communication interface of the main chip
- 2. USB interface P6: Connected to the main chip USB high-speed communication interface
- 3. MCU I/O port: I/O output interface of main control MCU
- 4. Main control MCU: CH32V307VCT6
- 5. ARDUINO interface: Easy to connect development boards with ARDUINO interface

- 6. Reset button: For external manual reset of the main MCU
- 7. WCH-LinkE indicator: Indicates WCH-LinkE operation status
- 8. Power switch S3: For disconnecting or connecting external 5V power supply or USB power supply.
- 9. WCH\_LinkE IAP Button: WCH\_LinkE Upgrade Button
- 10. WCH-LinkE interface: For connection between PC and WCH-LinkE function module
- 11. SDI&UART interface: Used for download, simulation and debugging, need jumper to choose whether to use onboard WCH-LinkE or not.
- 12. WCH-LinkE MCU: MCU that realizes WCH-LinkE function.
- 13. USER button S2: Connect the I/O port of the main MCU through J3 pin for key control
- 14. LED: Connected to the IO port of the main MCU through J3 pin for control
- 15. Voltage regulator chip U1: Used to realize the conversion of 5V voltage to 3.3V supply voltage available to the chip.
- 16. USB interface P7: Connects to the main chip USB full-speed communication interface

### CH32V307 Evaluation Board



### Descriptions

- 1. USB high-speed interface
- 2. Network port
- 3. USB full-speed interface

4. Power switch5.DEBUG interface6. User button

7. Camera interface

8. SD card holder
 9. Screen interface

10. Main control MCU 11. Reset button

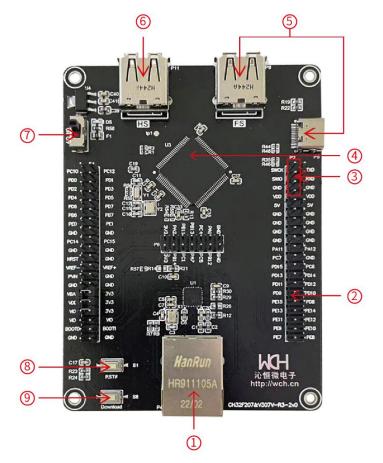
The CH32V307V-R2 EVT board comes with the following resources.

Motherboard - CH32V307V-R2

1. USB interface P11: Connects to the main chip USB high-speed communication interface

- 2. Network port: Network communication interface (Gigabit) of the main chip
- 3. USB interface P9: Connects to the main chip USB full-speed communication interface
- 4. Power switch S2: Used to disconnect or connect external 5V power supply or USB power supply.
- 5. Debugging interface: For downloading, simulation debugging
- 6. Button: User button
- 7. Camera interface P10: Realize MCU external camera (DVP-8bits)
- 8. SD Card Holder P7: Connects to the SDIO interface and demonstrates the operation of a TF card through the SDIO interface.
- 9. Screen interface P3: Realize MCU external SPI port display screen
- 10. Main control MCU: CH32V307VCT6
- 11. Reset button S1: For external manual reset of the main control MCU

### CH32V307 Evaluation Board



### Descriptions

- 1. Network port
- 2. MCU I/O
- 3. Debug interface
- 4. Main control MCU
- 5、USB full-speed interface
- 6、USB high-speed interface
- 7. Power switch
- 8. Reset button
- 9. Download button

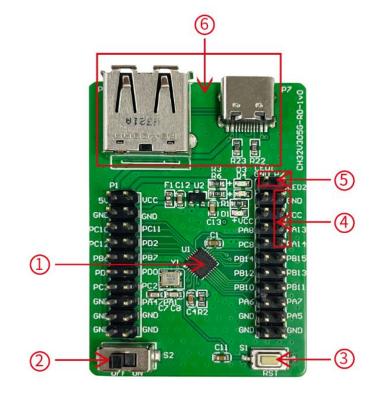
The CH32V307V-R3 EVT board comes with the following resources.

Motherboard - CH32V307EVT-R3

- 1. Network port: Network communication interface of the main chip (100MB)
- 2. MCU I/O port: I/O port of the main control MCU.
- 3. Debugging interface: For downloading, simulation debugging

- 4. Main control MCU: CH32V307VCT6
- 5. USB interface P9, P5: Connect to the main chip USB full-speed communication interface
- 6. USB interface P11: Connect to the main chip USB high-speed communication interface
- 7. Power switch S2: Used to disconnect or connect external 5V power supply or USB power supply.
- 8. Button S1: Reset button for external manual reset of the main MCU.
- 9. Button S8: Download button, used to start the download from the BOOT

CH32V305 Evaluation Board



Descriptions

1. M	CU	
4. D	ebug interface	

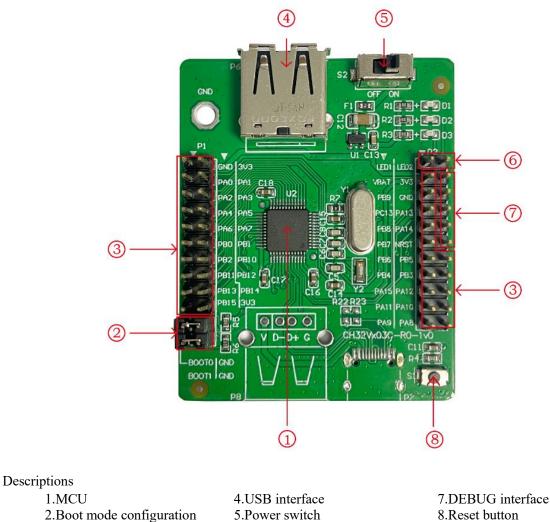
- Power switch
   LED
- 3. Reset button
- 6. USB interface

The CH32V305 EVT board comes with the following resources.

Motherboard - CH32V305EVT

- 1. Main control MCU: CH32V305GBU6
- 2. Power switch S2: Used to disconnect or connect external 5V power supply or USB power supply.
- 3. Button S1: Reset button for external manual reset of the main MCU.
- 4. Debugging interface: For downloading, simulation debugging
- 5. LED: Controlled by connecting to the IO port of the main chip via pins
- 6. USB interface P7, P8: USB communication interface PB6, PB7 of the main chip

### CH32V303 Evaluation Board



1.MCU

3.MCU I/O

5. Power switch 6.LED

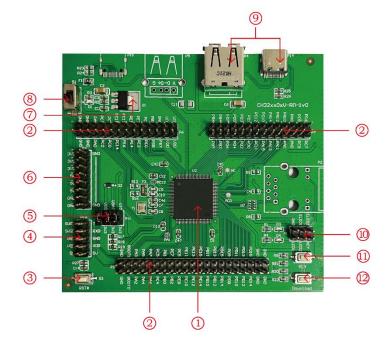
8.Reset button

The above CH32V303 evaluation board comes with the following resources.

Motherboard - CH32V303EVT

- 1. Main 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 main 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 main control MCU

### CH32V303 Evaluation Board



### Descriptions

1.Main control MCU	4.DEBUG interface	7.Voltag
2.MCU I/O	5.MCU power supply row pin	8.Power
3.Reset button	6.Power supply row pin	9.USB i

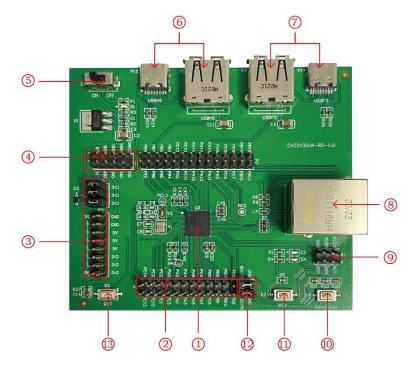
Voltage regulator chip Power switch JSB interface 10.KEY and LED row pin 11.KEY 12.Download button

The above CH32V303 evaluation board comes with the following resources.

Motherboard - CH32V303EVT

- 1. Main control MCU: CH32V303VCT6
- 2. MCU I/O ports P6, P7, P9: I/O pinout interface of the main control MCU
- 3. Button S3: Reset button for external manual reset of the main 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 main control MCU to control LED and KEY
- 11. Key S2: Connects to the I/O port of the main MCU through the P1 row of pins for key control
- 12. Button S4: Download button, used to start download from BOOT

### CH32V303 Evaluation Board



Descriptions

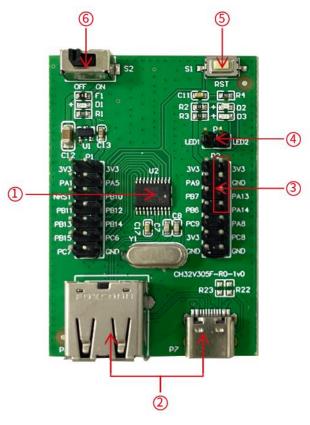
1.Main control MCU 2.MCU I/O 3.Power supply row pin 4.DEBUG interface 5.Power switch 6.USB interface 7.USB interface8.Network port9.KEY and LED row pin

10.Download button11.KEY12.Boot mode configuration13.Reset button

The above CH32V30x evaluation board comes with the following resources. Motherboard - CH32V30xEVT

- 1. Main control MCU: CH32V303WCU6
- 2. MCU I/O port P6, P7: I/O pinout interface of the main control MCU
- 3. Power supply row pin: for the main 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 main 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 main 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 main control MCU

### CH32V305 Evaluation Board



### Description

Main control MCU
 LED pin

USB interface
 Reset button

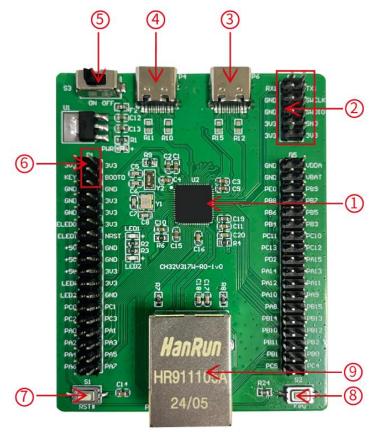
DEBUG interface
 Power switch

The above CH32V30x evaluation board comes with the following resources:

Motherboard - CH32V30xEVT

- 1. Main control MCU: CH32V305FBP6
- 2. USB interface: USB communication interface of the main chip
- 3. DEBUG interface: For downloading, emulation debugging
- 4. LED pin: The pin is connected to the IO of the main control MCU to control the LED.
- 5. Reset button: Used for external manual reset of the main control MCU
- 6. Power switch: Used to cut off or connect external 5V power supply or USB power supply.

### CH32V317 Evaluation Board



### Descriptions

- 1. Main control MCU
- 2. DEBUG interface 5. Power switch 6. Boot mode configuration
- 3. USBFS 7. Reset button
- 4. USBHS 8. Key

9. Network port

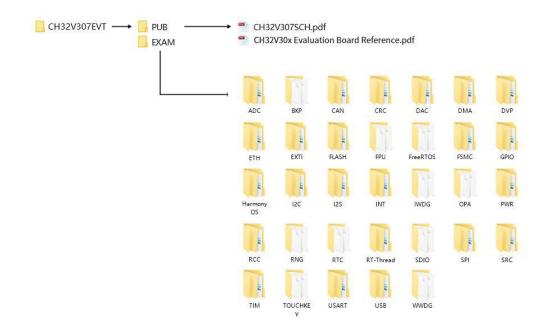
The above CH32V317 evaluation board comes with the following resources:

Motherboard - CH32V317EVT

- 1. Main control MCU: CH32V317WCU6
- 2. DEBUG interface: For downloading, emulation debugging
- 3. USBFS: USBFS communication interfaces PA11, PA12
- 4. USBHS: USBHS communication interface PB6, PB7
- 5. Power switch: Used to cut off or connect external 5V power supply or USB power supply.
- 6. Boot mode configuration: Configure BOOT0 to select the boot mode when the chip is powered on.
- 7. Reset button: Used for external manual reset of the main control MCU
- 8. Key: Connect to the IO port of the main MCU through the key pin for key control.
- 9. Network port: The network communication interface of the main chip.

## 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.

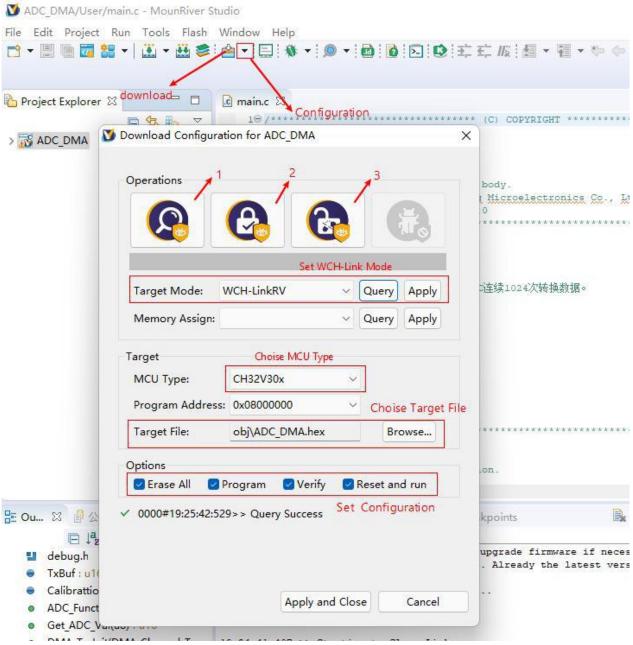
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> 😂 ADC_DMA	15 */

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.

All Device Using Option 2.       Download Port Using Option 2.		MCU series selection	•		WCHISPTool CH32Vxxx x
Chip Series       OH2V30x       Chip Model       CH32V307/016         Download Port       USB       Automatic Download When Device Connect         Device       USB Series       Charles Series       Connect         Device       USB Series       Connect       Charles       Connect         Device       USB Series       Connect		1.MCU Series Selection		]	
Nowmload Port       USB       Automatic Download When Device Connect         Deviced UD0395>> Flash dze: 2560bytes       Deviced UD0395>> Flash dze: 2560bytes         Deviced UD0395>> Plash dze: 2560bytes       Control Cont			Download Record		hip Option 2.
4.Device Ust general automatic recognition       177.002.351>- 20.021         Name       F11.0Path       S.Chorse Download File         Name       F11.0Path       S.Chorse Download File         Object File       CH320.00757 VI SISCHER, 20.00757 VI SISCHER, 20.001         Object File       CH320.00757 VI SISCHER, 20.001         VIDES HSISCHER, 20.001       FIBH SIZE ZISCHER, 20.001	MCUs	· RISC-V MCUs	17:10:00:965>> Flash size: 256Kbytes Device#0 UID:85-68-3E-26-3B-38-FE-C9, BTVER:02.60	tic Download When Device Connect	ownload Port USB $\sim$ <sup>3</sup> Automat
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User data DATA1     0x00       Write protection control bit WRP0     0xFF       Write protection control bit WRP1     0xFF       OutFine     0xFF       Write protection control bit WRP1     0xFF       Write protection control bit WRP1     0xFF       Ogress:     3.00wnload       Acametrode protection     write protection		Lmore Information			
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### ➤ Simulation

Open MounRiver Studio software for debugging configuration

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∰ Outline & An outline is	Image: Second	Name:       GPIO_Toggle obj 4Choise Debugger         Main * Debugger       Startup * Source Common * SVD Path         OpenOCD Setup       Start OpenOCD locally         Executable path:       \$(eclipse_home)toolchain/OpenOCD/bin/openocd.exe         Actual executable:       Dhewmounriver\MounRiver\MounRiver_Studio\toolchain/Open         (to change it use the global or workspace preferences pages or       GDB port:         3333       Telnet port:       4444         Tcl port:       6666       \$         Config options:       If *\$(eclipse_home)toolchain/OpenOCD/bin/wch-riscv.cfg*         Skip download before debug	
	Filter matched 3 of 5 items	Revert	Apply
	Filter matched 3 of 5 items	Revert 6.Debug	Apply Close

#### 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;

```
* @return none
132
133
     *1
134 int main(void)
135 {
        ule i;
Set breakpoint
136
137
         Delay_Init();
        USART_Printf_Init(115200);
 39
140
        printf("SystemClk:%d\r\n", SystemCoreClock);
141
142
        ADC Function Init();
143
        DMA_Tx_Init(DMA1_Channell, (u32)&ADC1->RDATAR, (u32)TxBuf, 10);
144
145
        DMA_Cmd(DMA1_Channell, ENABLE);
146
147
        ADC_RegularChannelConfig(ADC1, ADC_Channel_2, 1, ADC_SampleTime_241Cycles);
148
        ADC_SoftwareStartConvCmd(ADC1, ENABLE);
149
        Delay_Ms(50);
        ADC SoftwareStartConvCmd(ADC1, DISABLE);
150
```

- 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	23		
	Enter lo	cation here	
00000540:	auipc	a1,0x20000	4.5-
00000544:	addi	al, al, -1344	# 0x20000000 <apbahbpresc< td=""></apbahbpresc<>
00000548:	addi	a2,gp,-2024	
0000054c:	bgeu	al, a2, 0x560	<handle_reset+56></handle_reset+56>
00000550:	lw	t0,0(a0)	_
00000554:	SW	t0,0(al)	
00000558:	addi	a0,a0,4	
0000055a:	addi	al,al,4	Running cursor
0000055c:	bltu	al,a2,0x550	<handle_reset+40></handle_reset+40>
00000560:	addi	a0,gp,-2024	
00000564:	addi	al,gp,-2004	
00000568:	bgeu	a0,a1,0x576	<handle_reset+78></handle_reset+78>
0000056c:	SW	zero,0(a0)	
00000570:	addi	a0,a0,4	
00000572:	bltu	a0,a1,0x56c	<handle_reset+68></handle_reset+68>
00000576:	11	t0,31	
00000578:	CSTW	0xbc0,t0	
0000057c:	li	t0,11	
0000057e:	CSTW	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.

40		
47	*	@return none
48	*/	
490	int	main (void)
50	{	
51		u8 i = 0;
52		
53		NVIC_PriorityGroupConfig(NVIC_PriorityGroup_2);
54		<pre>Delay_Init();</pre>
55		USART_Printf_Init(115200);
56		<pre>printf("SystemClk:%d\r\n", SystemCoreClock);</pre>
57		
58		<pre>printf("GPIO Toggle TEST\r\n");</pre>
59		<pre>GPIO_Toggle_INIT();</pre>
60		
610		while (1) Running cursor
62		
63		Delay_Ms(250);
64		<pre>GPIO_WriteBit(GPIOD, GPIO_Pin_0, (i == 0) ? (i = Bit_SET) : (i = Bit_RESET));</pre>
65		3
66	}	
67		

### 4) Variables

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

<sup>x+y</sup> Add Watch Expression	$\times$
Expression to watch:	
ss	
ОК	Cancel

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

• Breakpoints	🛠 Expressions 🛛 🚼	Peripherals 🛛 🗖
Expression (x)= ss	Type u16	E   ♣ ※ ‰   ➡ ≅ ♥ Value 10
Add new		

### 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.

eripheral	Address	Description		
	CEY 0x40012400	Analog to digital converter		- 1
	0x40010000	Alternate function I/O		
🗆 🛃 ВКР	0x40006C00	Backup registers		
	0x40023000	CRC calculation unit		
DBG	0xE0042000	Debug support		
	0x40020000	DMA controller		
	0x40023800	Extend configuration		
口 品 EXTI	0x40010400	EXTI		
E REASH	0x40022000	FLASH		
	0x40010800	General purpose I/O		
	0x40010C00	General purpose I/O		
	0x40011000	General purpose I/O		
	0x40011400	General purpose I/O		
口 品 I2C1	0x40005400			
		Inter integrated circuit		>
Memory X 📮 C	Console 1000 Registers	🕄 Problems 🕡 Executables 🖳 Debug	gger Console	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 1000 Registers		gger Console	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 1000 Registers	🕄 Problems 🕡 Executables 🖳 Debug 2400 🛛 🐥 New Renderings	gger Console dress	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console IIII Registers	와 Problems 🕡 Executables 😨 Debug 2400 않 👍 New Renderings) Ad		>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 웲 Registers ADC_TKEY: 0x40012 Register ~ 많 ADC_TKEY > 배 STATR	Problems 🕡 Executables 🔀 Debug 2400 🕸 👍 New Renderings Ad 0x4 0x4	dress	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console IIII Registers ADC_TKEY: 0x40012 Register ~ ADC_TKEY > IIII STATR > IIII STATR > IIII CTLR1_CTLR	Problems 🕡 Executables 😨 Debug 2400 🛛 💠 New Renderings Ad 0x4 0x4	dress 40012400 40012400 40012404	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console IIII Registers ADC_TKEY: 0x40012 Register Carbon Carbon ADC_TKEY IIII STATR IIII STATR IIII CTLR1_CTLR IIII CTLR2	Problems	dress 40012400 40012400 40012404 40012408	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console IIII Registers ADC_TKEY: 0x40012 Register Carter ADC_TKEY IIII STATR IIII CTLR1_CTLR IIII CTLR2 IIII SAMPTR1	Problems Debug New Renderings	dress 40012400 40012400 40012404 40012408 4001240C	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console IIII Registers ADC_TKEY: 0x40012 Register Carbon Statr IIII STATR IIIII STATR IIIIII STATR IIIIII STATR IIIIII STATR IIIIII STATR IIIIII STATR IIIIII STATR IIIIII STATR IIIIIIIIII STATR IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Problems Debug New Renderings Ad Ox4	dress 40012400 40012400 40012404 40012408 4001240C 40012410	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 1000 Registers	Problems Sexecutables Debug New Renderings Ad Ox4	dress 40012400 40012400 40012404 40012408 4001240C 40012410 40012414	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 1000 Registers ADC_TKEY: 0x40012 Register Call ADC_TKEY ADC_TKEY ADC_TKEY ADC_TKEY MIN STATR MIN CTLR1_CTLR MIN CTLR2 MIN SAMPTR1 MIN SAMPTR2 MIN IOFR1 MIN IOFR2	Problems Executables Debug New Renderings Ad Ox4	dress 40012400 40012400 40012404 40012408 4001240C 40012410 40012414 40012418	>
Memory X 📮 C	Console 1000 Registers ADC_TKEY: 0x40012 Register CLR1_CTLR MINOUS STATR MINOUS CTLR1_CTLR MINOUS SAMPTR1 MINOUS SAMPTR2 MINOUS SAMPTR3	Problems Executables Debug New Renderings  Ad  Ox4  Ox4  Ox4  Ox4  Ox4  Ox4  Ox4  Ox	dress 40012400 40012400 40012404 40012408 4001240C 40012410 40012414	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 100 Registers ADC_TKEY: 0x40012 Register ADC_TKEY ADC_TKEY ADC_TKEY ADC_TKEY ADC_TKEY STATR	Problems Executables Debug New Renderings  Ad  Ox4  Ox4  Ox4  Ox4  Ox4  Ox4  Ox4  Ox	dress 40012400 40012400 40012404 40012408 4001240C 40012410 40012414 40012418 4001241C	>
Memory 🛛 📮 🕻 nitor 💠 🗶 🔆	Console 1000 Registers ADC_TKEY: 0x40012 Register CLR1_CTLR MINOUS STATR MINOUS CTLR1_CTLR MINOUS SAMPTR1 MINOUS SAMPTR2 MINOUS SAMPTR3	Problems Executables Debug Value Signal Problems New Renderings Ad Ox4	dress 40012400 40012400 40012404 40012408 4001240C 40012410 40012414 40012418 4001241C 4001241C 40012420	>

#### Note:

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

> IIII RSQR2

> III RSOR3 CHANNEL



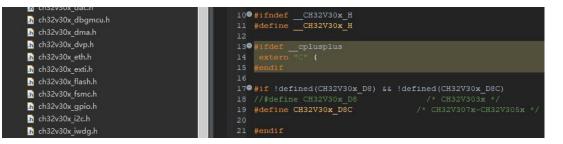
0x40012430

0x40012434

- (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.

 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)



 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.

startup_ch32v30			10	*********
B startup_cn32v3	UXL	New	>	section
		New		global _sta:
🔁 User		Open		align 1
AnalogWatchdog		Open With	>	t: handle r
Auto_Injection	100	Carry	Ctrl+C	word 0x0000
		Сору		word 0x0000
A		Paste	Ctrl+V	word 0x0000
	×	Remove	Delete	word 0x0000
CHV30x_IAP		Move		word 0x0000
CompatibilityHID		Rename	F2	word 0x0000
CompositeKM				word 0x00000
Discontinuous_mod	*	Build Project	F7	word 0x0000
DualADC_Alternate1	2	Refresh	F5	word 0x0000
DualADC_Combined	2	Download	>	word 0x0000
DualADC_FastInterle				word 0x0000
DualADC_InjectionS	Ø	Debug As	>	word 0x00100
DualADC_RegSimul	1	Include/Exclude From Build		section
DualADC_SlowInterl	T	Code Format		align 1
ExtLines_Trigger	2	Income	or_base:	
FLASH Program	20	Import		word star
GPIO Toggle	4	Export		word 0
HIDKeyboardDevic		Translate Selected File(s)		
		Clean Selected File(s)	X Problem	
utline 🗐 History 🔀		cical selected file(s)		-
		Compare With	>	Startup/star
ip_ch32v30x_D8.S		Replace With	Property	
sion Time		A115 A 1 11	✓ Info	
4/13/22, 10:14 AM		Add Extension Library		
		Select Debugger	debugger	
		Open Containing Folder	last modifi	
				location
		Open MRS Console	Ctrl+Shift+V	mcu type
		Properties		size
	_	•		version

## 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

Query Chip Information	Query ,Set ,C	an cel Read Protect	t ead Chip Flash			
2. MCU Core: RISC-V · · ·	Name MCU UID Flash Size	Value				
🛛 Erase All 🛛 🔽 Prog	iram 🔽 Vei	rify 🛛 🔽 Re	set and Run	Read-Protect	Disable	
• Enable Protect O Disa	ble Protect 🗌 Set	Low Speed Mode	e	Link Version		
Close 3.3V output after	operation 🗌 Clo	se 5.0V output af	ter operation	Disable	e Two-Line Int	erface
Disable Stop-Mode RST	🕝 Disable Star	dby-Mode RST	Enable Soft	t-Ctrl IWDG		
DATA0: 0x FF	DATA1: 0x	FF	256K ROM +	64K RAM V	Set Ge	et
WRPO: 0x FF 🛛 🖸 0	<b>1</b>	2 3	<b>4</b>	2 5	6	7
WRP1: 0x FF 🛛 🛛 8	<b>2</b> 9	<b>1</b> 10	1 212	13	14	15
WRP2: 0x FF 21	6 217	18	9 20	21	22	23
WRP3: 0x FF 22	4 25 Target File	26 22	7 🛛 28	29	30	31
	EVT\CH32V307EV1	_V1.9\CH32V307		GPIO\GPIO_T	oggle\ <mark>obj\GPI</mark>	D_Toggle.he
Auto downle	oad when WCH-Lin	k w <mark>as linke</mark> d		Detecti	on Interval(S)	5
Chip Flash Addr: 0x 800	10000 v Siz	e: Ox 10000	Data Width: 1	6bytes 🗸	Show ASCI	I Clear
	ielect ,Set,Get Link I	Mode				4
Current WCH-Link Mode:	WCH-LinkRV	~	G	et	S	et
Operation Result: 😡			Result Collect	: Succ:	1   Toatal:1	Clear
6:48:03:830>> Begin to F	the loss					

# 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.

WCHISPTool_CH32Vxxx ×			MCU series selection
	0		1.MCU Series Selection
hip Option 2.		Download Record	
	odel CH32V307VCT6 v matic Download When Device Connect	17:10:00:965>> Device: CH32V307VCT6 17:10:00:965>> Flash size: 256Kbytes Device≠0 UID:85-6B-3E-26-3B-38-FE-C9, BTVER:02.60	· RISC-V MCUs
Download File	Q Search     automatic recognition     Schoise Download File	17:10:02:423>> 开始解除设备代码保护 17:10:02:511>> 成功 17:10:02:883>> Device: CH32V307VCT6 17:10:02:883>> Flash size: 256Kbytes Device#0 UD8-568-3E-35-38-38-7E-02.8 EVER:02.60	• Cortex-M MCUs
		17:10:06:677>> 待下载BIN文件长度;7460 17:10:06:687>> (#Dev0)开始下载 17:10:06:705>> BTVER:02.60 17:10:06:709>> UID:85-68-3E-26-3B-38-FE-C9	• High-Speed MCUs
Jownload Config		17:10:06:790>> 擦除中 17:10:06:828>> 完成	
Chip Config 6.Download Configuration		17:10:06:837>> 编程中 17:10:06:916>> 完成	BLE MCUs
DI Baud	115200	17:10:06:916>> 完成 17:10:06:917>> 校验中	
Chip Memory Allocation	RAMX 64KB + ROM 256KB	17:10:07:056>> 完成	
Stop-Mode RST	Disable	17:10:07:061>> 成功!	
Standby-Mode RST	Disable	17:10:07:065>> <<<< 本次用时:0.377s	• E8051 USB MCUs
Soft-Ctrl IWDG	Enable	17:11:17:226>> Device: CH32V307VCT6 17:11:17:227>> Flash size: 256Kbytes	
RRP	Enable	Device#0 UID:85-6B-3E-26-3B-38-FE-C9, BTVER:02.60	
Clear CodeFlash	Disable		
Perform a soft reset After Download	Enable		[Nore information]
User data DATA0	0x00		
User data DATA1	0x00		WOLL HOLE
Write protection control bit WRP0	0xFF		WCH MCU selection:
Write protection control bit WRP1	0xFF w		http://wch.cn/search?t=all&q=MCU+
			WCH Chip Manual:
			https://wch.cn/search?t=all&q=brochu
			indis//wchich/searchite-anod-procho
Progress:			MCU IDE MRS download:
8.Download	7:Cancel code protection		MCU IDE MKS download:
🛱 Download 💈	🗉 Verify 🔯 Deprotect	Save	Clear > http://www.mounriver.com/download

- 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

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

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