CH565W/CH569WEVT Evaluation Board Manual

Version: V1.1

http://wch.cn

This evaluation board is used to develop CH565W/CH569W. For integrated development environment (IDE), MounRiver compiler is used. To simulate and download, the WCH-Link is available. In this manual, CH565/569 refers to CH565W/CH569W in QFN68 package. Compared with CH565W, CH565M in QFN40 package does not provide debug interface, eMMC interface, Gigabit Ethernet controller or BUS8 (8-bit active parallel port), in addition, CH565M lacks one set of SPI and UART and lacks 2 sets of PWMX.

When functions of CH569W Gigabit Ethernet and EMMC controllers are needed, users can select CH565WEVT evaluation board, with the main MCU replaced. For descriptions, please refer to this manual.

1. Hardware

For the schematic of CH565WEVT evaluation board, please refer to CH565WSCH.pdf.
For the schematic of CH569WEVT evaluation board, please refer to CH569WSCH.pdf.

The following figure shows the descriptions of the CH565WEVT evaluation board.

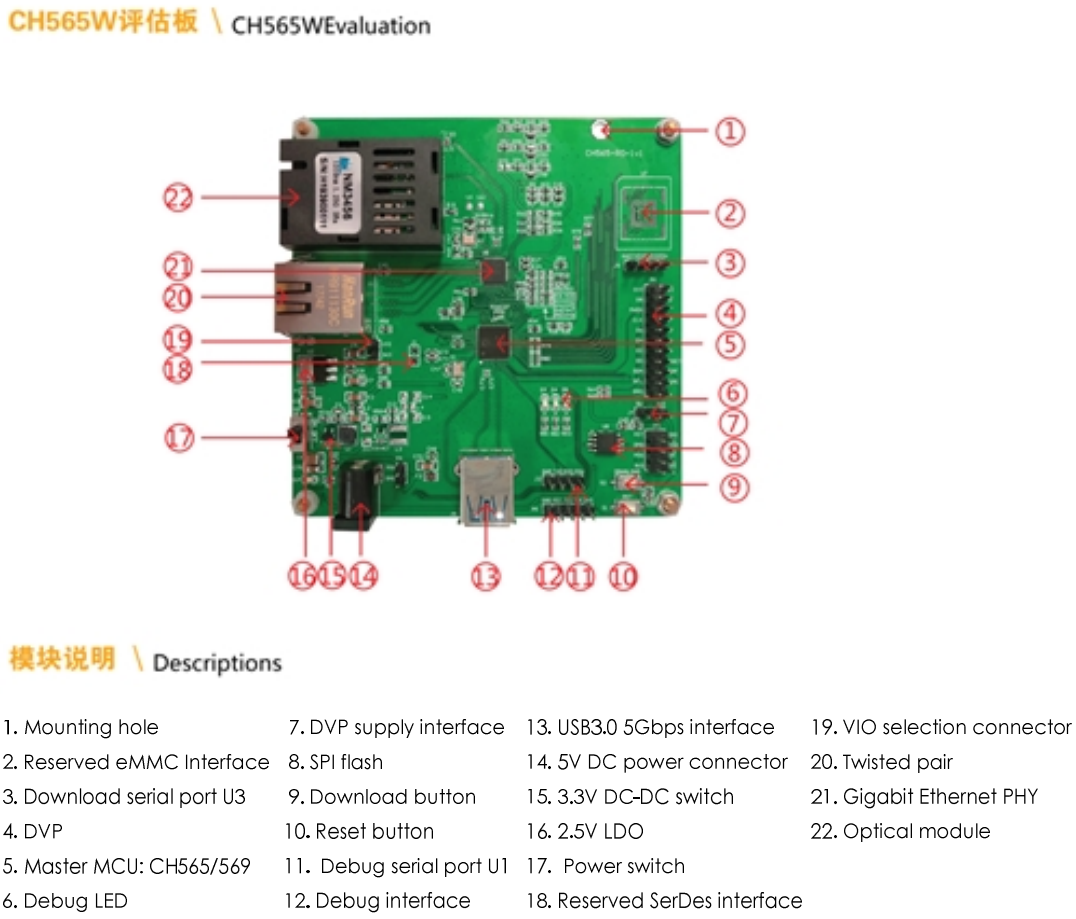

Figure 1-1 Descriptions of the CH565WEVT evaluation board

CH565W/CH569W is a 32-bit microcontroller based on RISC-V core, with multiple high-speed interfaces. The system clock frequency can be up to 120MHz. It has an internal 16KB 32-bit RAM, a 96KB 128-bit RAM and a 128-bit wide high-speed DMA for data transfer between high-speed interfaces. Compared with CH569W, CH565W provides DVP but lacks HSPI (high-speed parallel interface). CH569W lacks DVP but provides HSPI (high-speed parallel interface).

The CH565WEVT evaluation board consist of a master MCU (CH565W), USB type A interface, SPI flash, 12-bit DVP, eMMC flash, Gigabit Ethernet PHY chip, optical module, RJ45 UTP network interface (integrated network transformer), power component and so on. In addition, it also provides UART1 (for routine printf output), UART3 (for ISP download), SPI1 and debug interface. This evaluation board is powerful and resourceful, it can demo almost all functions of CH565W other than PWM output and active parallel port. The PWM output and active parallel port function of CH565W can be demonstrated with the CH569WEVT evaluation board.

The interfaces of some high-speed modules of the CH565WEVT evaluation board share pins with other peripherals, so multiple resistors are used as jumpers. The table below shows alternate function pins of the CH565WEVT evaluation board, alternate peripheral modules, their connection resistors and default functions that users need to pay attention to. When non-default functions are selected, users need to unsolder the default connection resistor and solder the connection resistor of the selected module.

Table 1-1 Alternate function interfaces of CH565WEVT evaluation board and notes

Pinout	Default function and connection resistor	Alternate function and newly added resistor	Notes
PB[18:21]/PA[0:3]	DVP DATA[7:0] R42/R51	eMMC DATA[1:7] R76/R80	R42/R51 and R76/R80 soldered simultaneously may cause signal integrity destroyed
PB[15]	Hardware reset input RST# connected directly	Ethernet PHY interrupt input R36 DVP data line[10] Network resistor R41	RST enabled/disabled by ISP tool; RST, PHY interrupt input and DVP data input cannot be enabled simultaneously
PB[3:4]	RGMII_TXD[2:1] connected directly	UART3 R87/R86	R87/R86 soldered may cause RGMII interface signal integrity destroyed
PB[11:14]	RGMII_RXD[0:1]/ RGMII_RXDV eMMC_CLK1 connected directly	SPI1_SCS SPI1_SCK SPI1_MOSI SPI1_MISO R22/R21/R20/R34	Unless SPI1 is necessary, do not solder R22/R21/R20/R34
RGMII_RXD1	UTP twisted pair mode R46	Fiber mode R45	Please refer to the user manual for Ethernet PHY related configurations.

Note: When the Ethernet function and the supporting physical layer chip are in use, due to the particularity of the Ethernet function, a large number of configuration resistors are used to configure the MDI side type,

MII side type, MII interface level, TXC clock source of the MAC side of the Ethernet physical layer and other configuration information. The Ethernet module of the CH565WEVT evaluation board is configured to be in the most commonly used mode when leaving the factory, that is, the MDI side uses UTP twisted pair, and the MII level is set to 3.3V, etc. If the user wants to modify the above parameters, please refer to the manufacturer datasheet of the physical layer and the document of the Ethernet driver routine provided by us, or directly call us for technical support of our network product line.

The following figure shows the descriptions of the CH569WEVT evaluation board.

Figure 1-2 Descriptions of the CH569WEVT evaluation board

The CH569WEVT evaluation board consist of a master MCU (CH569W), USB type A interface, DC supply connector (5mm), USB Type-C interface (only used to supply power), SPI flash, power component and so on. In addition, it also provides HSPI interface (high-speed parallel interface), SERDES interface, UART1 (for routine printf output), UART3 (for ISP download), and ISP download interface. This evaluation board is powerful and resourceful.

The HSPI interface of the CH569WEVT evaluation board share pins with other peripherals, so some resistors are used as jumpers. The table below shows alternate function pins of the CH569WEVT evaluation board, alternate peripheral modules, their connection resistors and default functions that users need to pay attention to. When non-default functions are selected, users need to unsolder the default connection resistor and solder the connection resistor of the selected module.

Table 1-2 Alternate function interfaces of CH569WEVT evaluation board and notes

Pinout	Default function and connection resistor	Alternate function and newly added resistor	Notes
PB[11:15]	HSPI R2/R22/R33	ISP download function R1/R21/R30	R2/R22/R33 and R1/R21/R30 should not be soldered simultaneously

Note: There are two cases for HSPI, choose the upper board or the lower board according to the different resistors soldered. Solder R32/R33 on the upper board, or solder R34/R35 on the lower board. R32/R33 and R34/R35 should not be soldered simultaneously.

2. Software

Please download the CH569EVT.ZIP file on our website. This file includes the routines of CH565 interfaces. For CH565 routines, please refer to CH569 routines, but note that CH565 does not provide HSPI interface.

For description of CH569EVT.ZIP, see CH569_List.txt.

"EXAM" folder: CH565 related routines, classified by peripherals and functions. The figure below shows the directory structure of CH565 routine files.

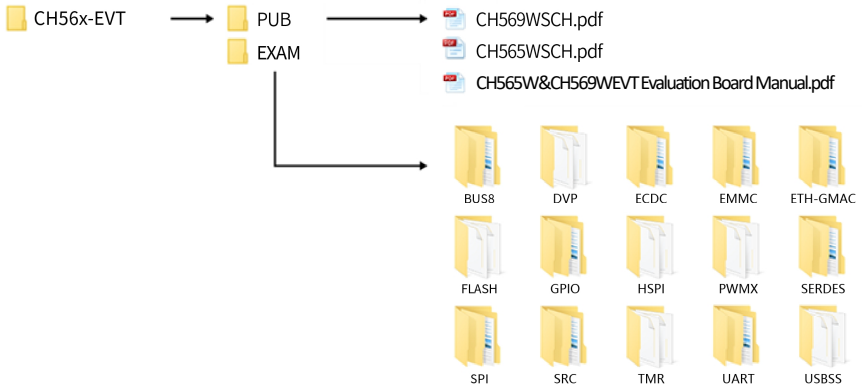

Figure 2-1 Directory structure of CH565 routine files

"SRC" folder: public files of projects.

Other folders contain the demo files for peripherals. And the corresponding IDE projects are established for reference.

The MounRiver IDE is available for CH565/CH569 development, which can be installed on our website. "MounRiver_Help.pdf" and "MounRiver_ToolbarHelp.pdf" are available for guidance.

2.1 Open project/Import project

Double-click a project file. For example: double-click "BUS8" (the 8-bit bus project).

Figure 2-2 Files in the BUS8 folder

Double-click the “BUS8.wvproj” file, to open the corresponding project in MounRiver Studio IDE.

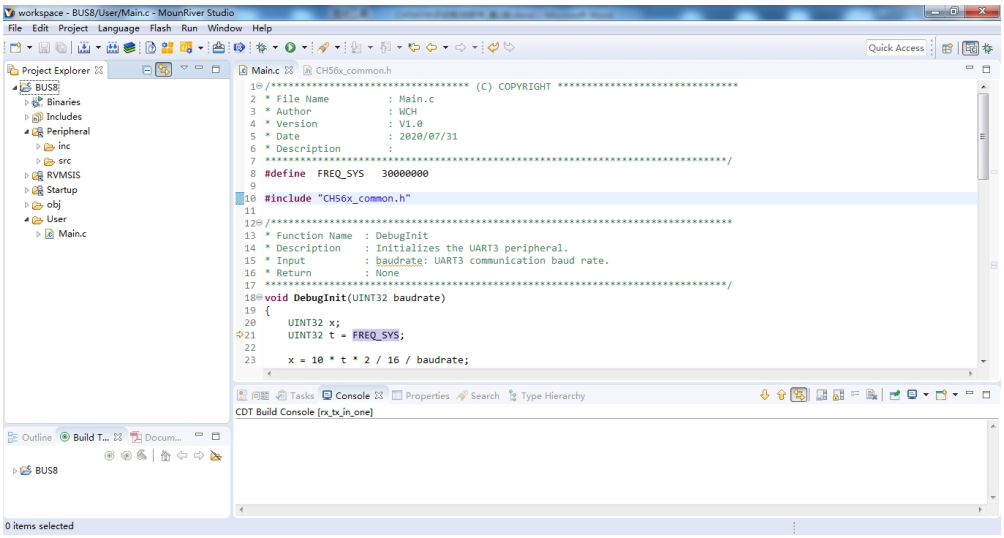

Figure 2-3 MounRiver window (open “USBHS.wvproj”)

In addition, the existing project can be opened by importing it. Open MounRiver IDE. Right-click in the blank space of the projectexplorer interface on the left, and select Import, as shown in Figure 2-4.

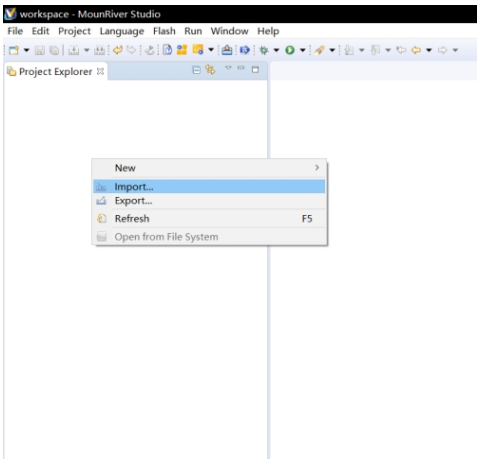

Figure 2-4 Open the import menu

Select Existing Projects into Workspace.

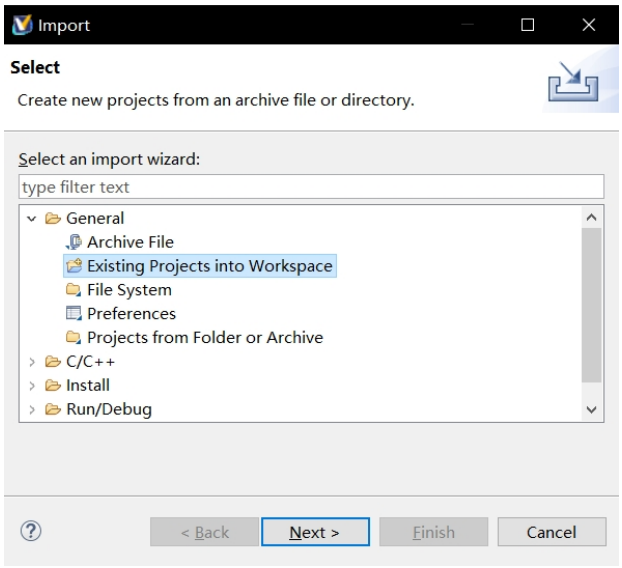

Figure 2-5 Select Existing Projects into Workspace

Select the project file.

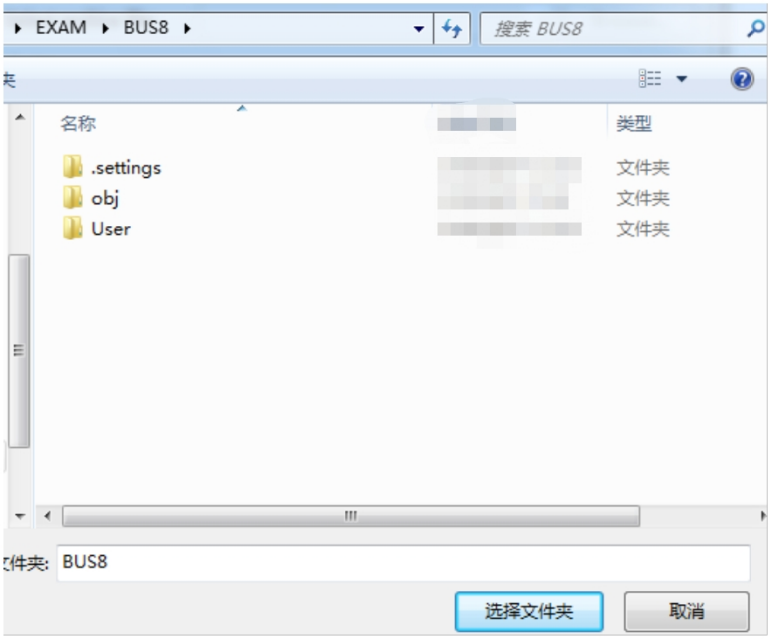

Figure 2-6 Select the project file

By importing, projects can also be opened.

2.2 Compile

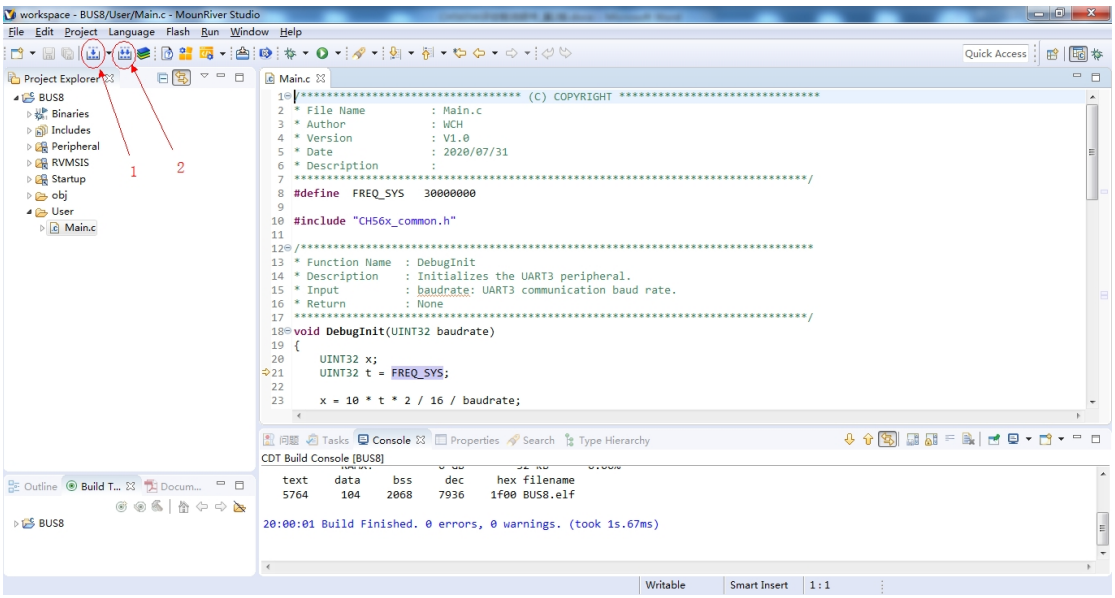

Figure 2-7 USBSS project window

Button marked as 1: Incrementally Build. Only the modified part of the selected project is compiled. Compilation is fast.

Button marked as 2: ReBuild. The selected project is compiled globally. Compilation is slow.

Select Rebuild here, and the result is shown in Figure 2-7.

By defaults, an executable .hex file is generated after compilation, which is needed to be downloaded to the evaluation board. Note that MounRiver compilation settings such as project file directory, linker, optimization level, etc. are described in the “MounRiver Studio Help Manual”.

2.3 Download

Please install the WCHISPTool tool on our website, which is used to download hex files into the flash.

The CH565W is needed to be in Download mode firstly, and then users use the ISP tool to download code. Generally, it is more convenient to set the Download type field to USB. The CH565W enters Download mode when it detects the following two situations during power-on: first, it detects that the first 16 bytes of flash are 0xff; second, it detects that the boot pin is at low level. Within 10 seconds after entering the download mode, if the chip does not communicate with the ISP tool, it will automatically exit the Download mode.

Connect the CH565WEVT evaluation board to the computer using a USB cable. As shown in the Figure 2-8, open the WCHISPTool tool, the Chip model field is set to CH565/CH569, and the Download type field is set to USB. Power off the CH565WEVT evaluation board, and then press and hold the download button on the evaluation board to power on again. In this case, the newly connected CH565W device is displayed in DeviceList box. Check "Run target program after download" and "Enable Outside-Reset" as needed. Select the generated .hex file (described in Section 2.2) in the User File selection box. Finally click "Download". After that, the program is downloaded to the main chip on the evaluation board and runs automatically.

When the Download type field is set to serial port, connect the UART3 TXD and RXD pins of the chip to the

computer through a USB-to-TTL module (For CH565EVT evaluation board, it is required to solder R86/R87 on the back with a 0 ohm resistor to ensure the serial port connection). Press and hold the download button, or connect the download configuration pin (PA5 by default) to ground and then power on the evaluation board. Open the WCHISPTool tool, as shown in the figure below, select the Chip model, set the Download type to serial port, click “Search” to select the port number connected to the evaluation board, and finally click “Download” to start the operation of downloading the codes. The specific steps and status will be displayed in the Download record box. The time to download ranges from a few seconds to more than ten seconds depending on the size of the codes.

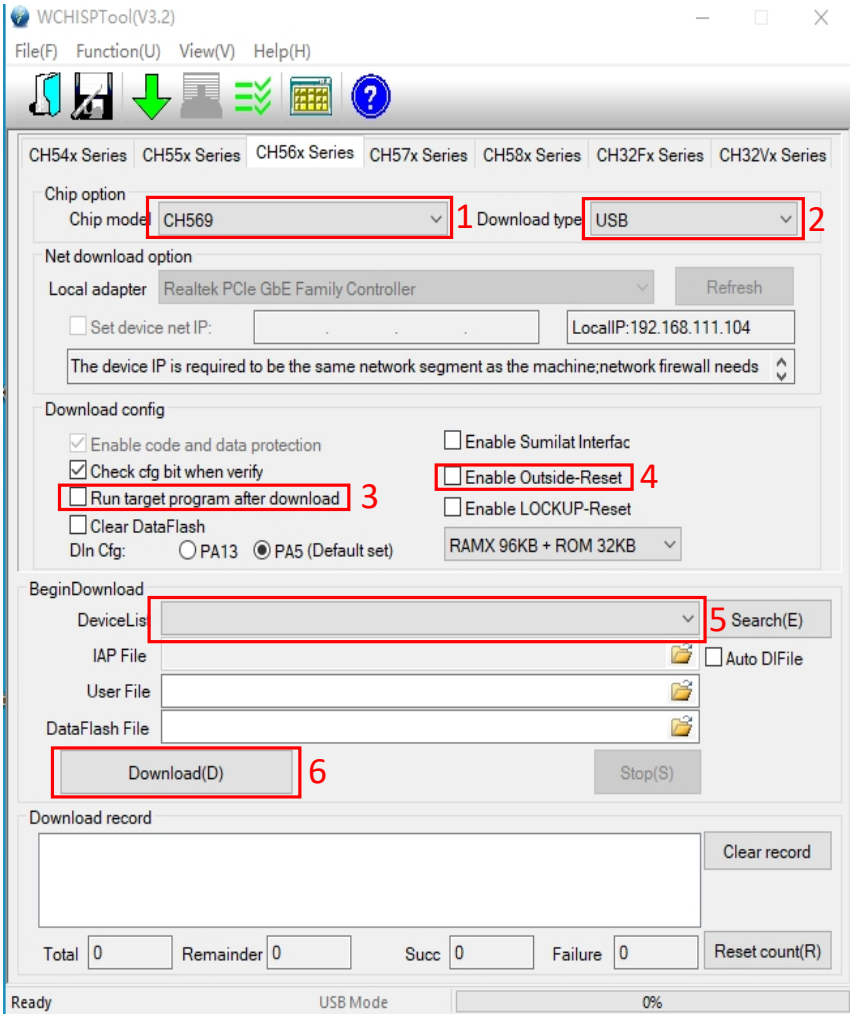

Figure 2-8 Use the ISP tool to download codes

3. Contact us

If you have any questions about using the CH565W/CH569WEVT evaluation board, please send a message to: tech@wch.cn, or call us for technical support (contact information can be found on our official website).