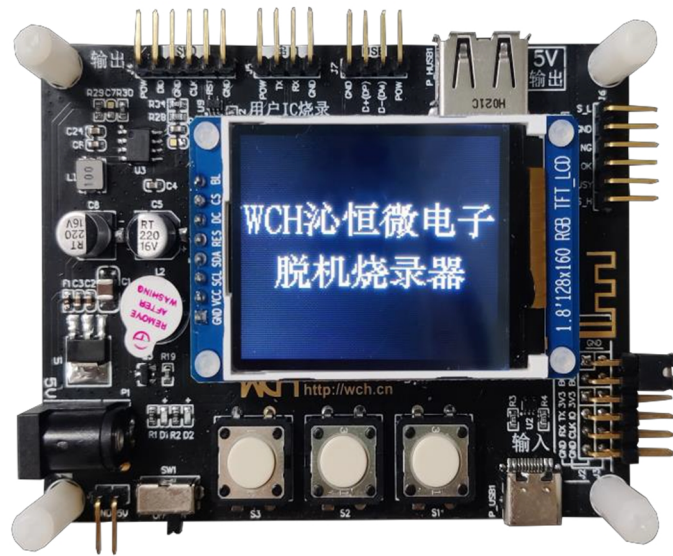




# WCH-MCU-DL User Manual

V3.1

<https://wch-ic.com>



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# 1. Product Functions and Parameters

WCH-MCU-DL is an offline, batch programming tool for programming WCH series chips. Currently, it supports chip models include CH54x, CH55x, CH56x, CH57x, CH58x, CH32F/V and other series.

The WCH-MCU-DL provides 3 download modes, namely USB, serial port and SWD, among which USB and serial port are suitable for all chips, and SWD mode is only suitable for CH32F/V series chips.

WCH-MCU-DL supports machine programming, rolling code function, custom information writing.

*Note:*

1. CH554, CH552 and CH551 need to set the WCH-MCU-DL to 5V output mode or select 5V hardware version when using WCH-MCU-DL, and pay attention to whether the current minimum system supports 5V power supply.

2. CH32F/V series chips only support rolling code and custom information writing in SWD mode.

## 1.1 Product Functions

### Basic functions:

- Support WCH full range of MCU chip programming
- Chip ISP configuration word write
- Configure output voltage
- 3 interface recording methods (some chips only support one or two)
- Flash user program files add

### Expand optional functions:

- Dataflash area (if there is one) file add
- Configurable time of power outage delay
- Custom display chip name
- Power on and pause the existing programs inside the chip

### Advanced functions:

Machine control to realize automatic programming and writing

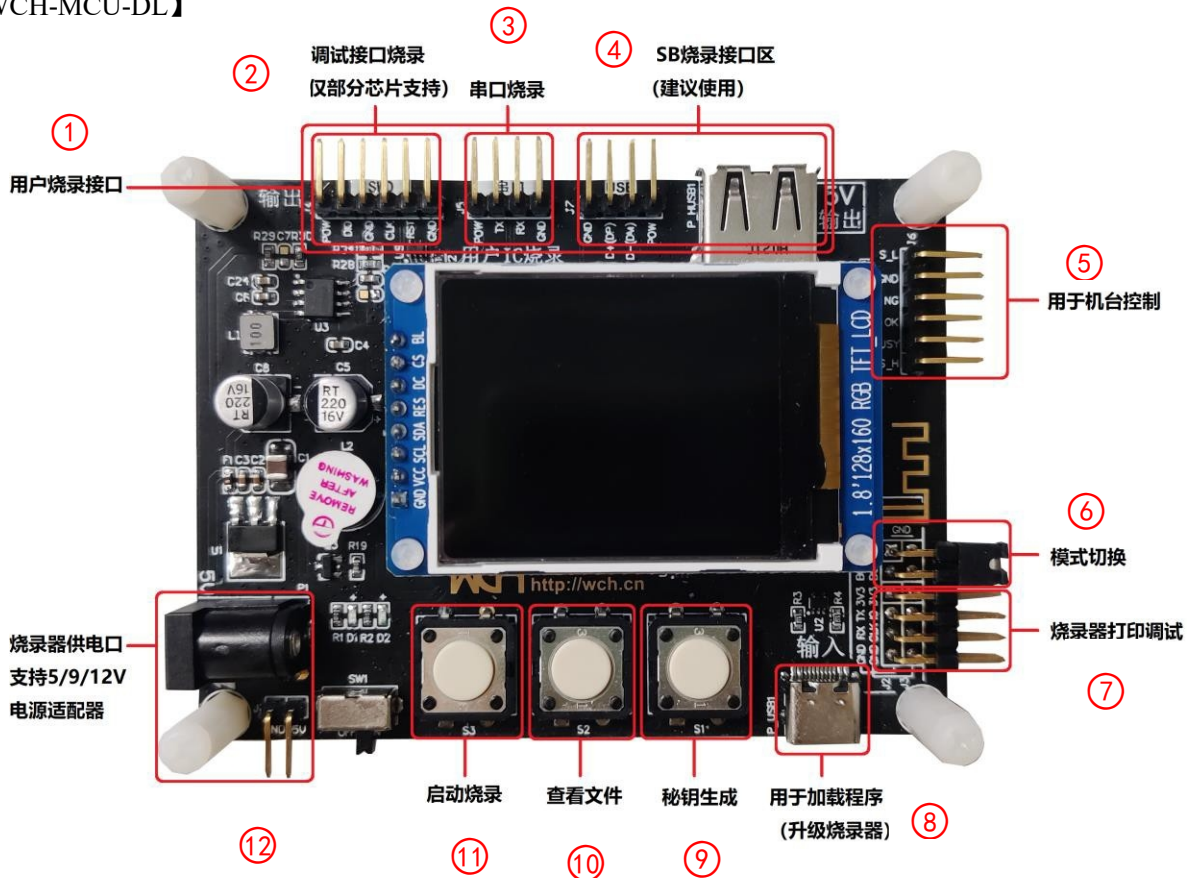
Rolling code & online custom data writing

## 1.2 Product Parameters

Size(mm)	91 mm* 68 mm* 1.6 mm
Suits	<ol style="list-style-type: none"> <li>1. Power adapter (5V 2A, length 1.5 m).</li> <li>2. USB cable (type A male to male).</li> <li>3. TYPE-C cable (type A male to type C male).</li> <li>4. LCD screen (special screen for WCH-MCU-DL).</li> <li>5. Nylon stud (M3, M2).</li> <li>6. Nylon nut (M3, M2).</li> <li>7. Nylon screws (M3, M2).</li> <li>8. Acrylic plate (for WCH-MCU-DL)</li> </ol>

## 2. Hardware Description

### 【WCH-MCU-DL】



- 1- User programming interface
- 2- Debug interface programming (only supported by some chips)
- 3- Serial port programming
- 4- USB programming interface (recommended)
- 5- Machine control interface
- 6- Mode switching
- 7- Programmer online/debug interface
- 8- Used for loading programs (update programmer)
- 9- Secret key generation
- 10- View button
- 11- Program button
- 12- Programmer power port, support 5/9/12V power adapter

### 2.1 Mode Switching

There are three modes of WCH-MCU-DL: Program mode, check mode and upgrade mode. Default programming mode: BOOT0 short GND, BOOT1 suspended. Check mode: BOOT1 short GND, press S3 to check the chip program. When BOOT0 shorts 3V3 and BOOT1 shorts. GND can manually upgrade the firmware of the recorder through the WCHISPTOOL, refer to Chapter 7.

BOOT0	BOOT1	Mode
BOOT0 short GND	BOOT1 suspended	Program mode
BOOT0 suspended	BOOT1 short GND	Check mode
BOOT0 short 3V3	BOOT1 short GND	Upgrade mode

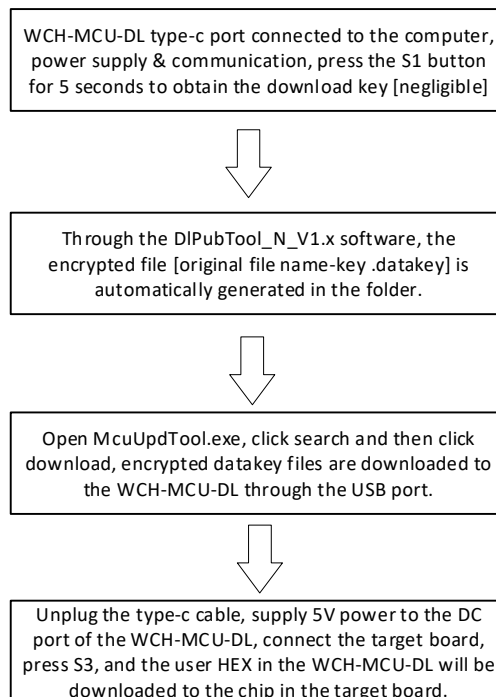
## 2.2 DIP Adapter Board Design Considerations

1. The programming object of the WCH-MCU-DL is the chip, and the WCH-MCU-DL does not provide the peripheral circuit of the chip.
2. During the programming process, the chip voltage needs to be stable. Example: CH57X series 3.3V chip, in order to ensure the chip voltage stability, it is recommended to add LDO to 3.3V.
3. For the chip without built-in high-frequency crystal oscillator, external crystal oscillator is required, otherwise it cannot be Programed normally. For example: 32m crystal oscillator must be attached to CH571/3, CH58X.
4. It is recommended to apply the DC power adapter to power the WCH-MCU-DL. If you use type-c to power the WCH-MCU-DL, you must use a charger. For example, if you use a computer and other communication equipment to connect the type-c port to power the WCH-MCU-DL, click the Program button S3, and you can't Program it normally.

*Note: In order to ensure voltage stability, the quality and length of the connection between the recorder and the chip should be considered.*

## 3. Software Function Description

### 3.1 Program Procedure



## 3.2 DIPubTool\_N\_V2.X Software Generation WCH-MCU-DL Specific Files

### 3.2.1 Chip Model Selection and ISP Configuration Byte Parameters

Open DIPubTool\_N\_V2.X.EXE and select the corresponding chip series && specific chip model. As shown in the figure below:



Note: DIPubTool\_N\_V2.X.EXE interface configuration information must be consistent with the parameters in WCHISPTool.EXE, this part directly affects the chip function, how to check must consult the relevant chip program developers.

### 3.2.2 Configure Output Voltage of WCH-MCU-DL

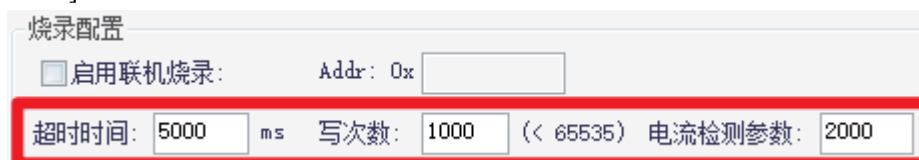
This configuration is required. When the screen printing version on the back of the WCH-MCU-DL contains "PWRCFG", you can configure the programming interface area through this configuration item.

POW pin output voltage. When there is no "PWRCFG" version, it is the hardware fixed voltage version, and the configuration item must be consistent with the hardware voltage version. (The program automatically detects the hardware version and compares it with the configuration item)



### 3.2.3 WCH-MCU-DL Configuration

The current detection parameter defaults to 2000, [If the target board has a large load it may report error U3, it can be modified to 50000].



#### Timeout time:

The time to retry after a problem occurs during the programming process, recommended as default.

#### Write count:

The total number of times the WCH-MCU-DL is allowed to program after loading the user program this time (counted only if the program is successful).

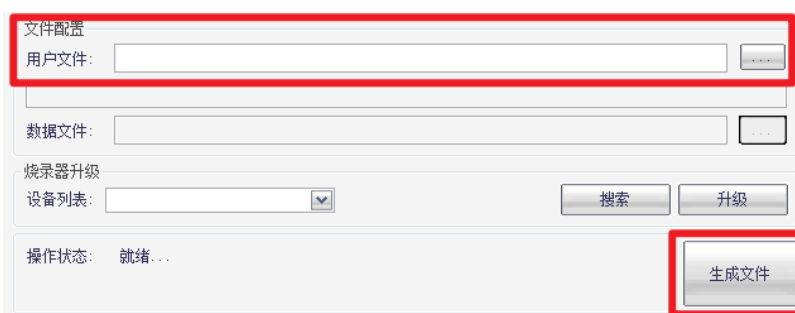
#### Current detection parameter:

The WCH-MCU-DL automatically detects the amount of current passing through the POW pin, and if it exceeds this threshold, it will disconnect the external power supply and stop the programming process to protect the target board and the WCH-MCU-DL itself.

Configuration selection	Recommended configuration value	Recommended configuration value
Timeout Time	5000	1-65535 Optional/Units 20ms
Write count	1000	1-65535 Optional &&0 means infinite
Current detection parameter	50000	2000-65535 Optional

### 3.2.4 Add User Program to Generate WCH-MCU-DL -Specific Files

Click [...] on the [user File] line. Button, select the HEX or BIN file, and click "generate File" to generate a special datakey file for WCH-MCU-DL in the DIPubTool\_N\_V2.X.EXE folder. The datakey file naming rule is: original document name-key .datakey. Example: original file: [CH551\_DEMO.hex], key: c4cbd626e4fd, generation file: CH551\_DEMO-c4cbd626e4fd.datakey; if there is no key, the generation file is: CH551\_DEMO.datakey



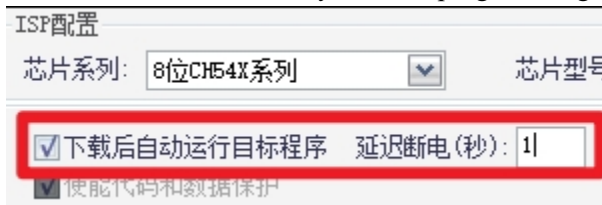
## 3.3 [Optional] DIPubTool\_N\_V2.X Software Optional Function Items

DIPubTool\_N\_V2.X optional features need to be selected and configured before step 4.1.4, after configuring the following optional features, perform step 4.1.4.

After configuring the following optional items, execute step 4.1.4, if the file name or secret key has not been changed, it will overwrite the datakey file generated before.

### 3.3.1 [Optional] Download Completion Delayed Power Outage Function

This function can be checked on demand. Checking the option of "Automatically run target program after download", a delayed power-off time configuration will appear, so that users can check the running status of the programmed program according to the running time of the target board after the programming is completed. If you don't check the box, the power will be cut off automatically after the programming is finished.



Note: This function is only available for CH54X, CH55X, CH56X, CH57X, CH58X chips that can only be downloaded by serial or USB.

### 3.3.2 [Optional] Customize the Chip Model Name Displayed on the WCH-MCU-DL

This function can be checked as desired. When the "Custom Chip Name" option is checked, you can customize



the chip model displayed on the WCH-MCU-DL screen by up to 8 bytes.



### 3.3.3 [Optional] Enable Power on and off Pause Mode

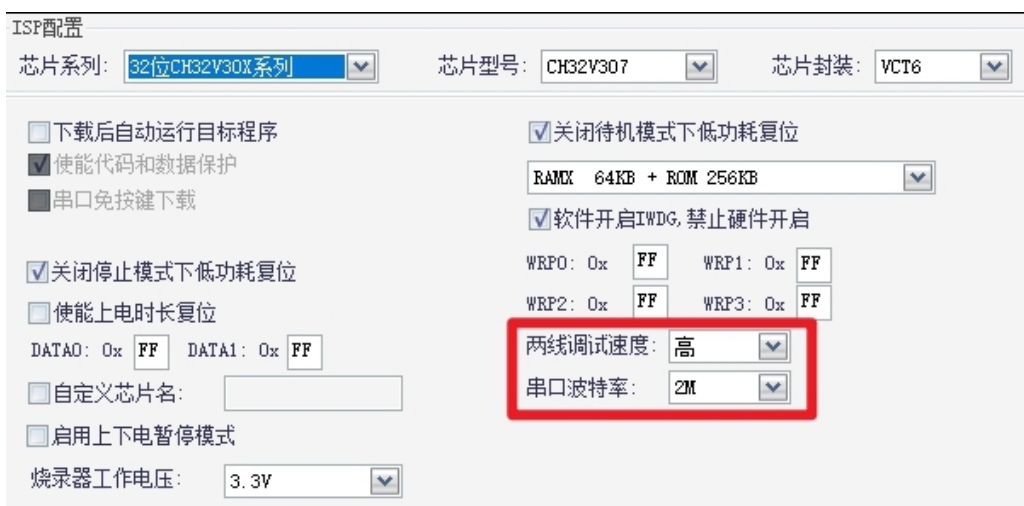
This function is optional and can be skipped if this is not needed. Check "enable power on and off pause mode" to enable this feature. This function is used when the current internal program of the chip causes the programming failure (before programming sleep, watchdog, closing debugging programming port, etc.). Enabling this function will avoid this failure by enabling this function immediately before the power on the WCH-MCU-DL stops.



Note: If checked, it will lead to an increase in programming time.

### 3.3.4 [Optional] Set the Programming Speed of 2-wire Debugging or Serial Port

This function is optional and can be skipped if this is not needed. The WCH-MCU-DL supports some chips to modify the download speed of the recorder. If it is not modified or cannot be modified, it defaults to the highest speed.



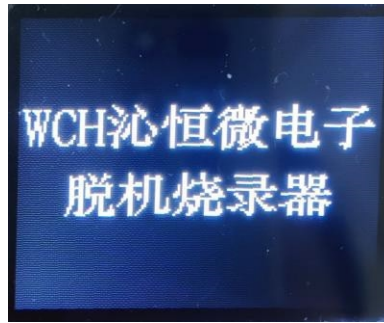
Note: When the wire is poor or too long, resulting in programming failure, you can adjust this option to reduce the programming speed of the corresponding interface and enhance the adaptability of the wire, but it will slow down the programming speed.

### 3.3.5 [Optional] Production-specific WCH-MCU-DL -specific Files (Secret Key Function)

This function is optional and can be skipped if this is not needed.



If you need to use the download secret key production, you need to use a communicable type-c cable, one end connects to the WCH-MCU-DL type-c port, the other end connects to the computer USB port. Under normal circumstances, the red and green lights of the WCH-MCU-DL are always on and the buzzer sounds once. At the same time, the WCH-MCU-DL's display shows [WCH CHENHENG MICROELECTRONICS WCH-MCU-DL], as shown in the figure.



After pressing the S1 button for 5 seconds, the first line of the display screen displays [download key] and the second line displays 12 hexadecimal characters. Note that [the type-c must communicate with the computer to generate the key] as shown below.



Note:

1. The key is one-time. Once you re-press S1 to generate the key, or the firmware [original file name-key .datakey] has been downloaded once, you must do it again.
2. If the key function is not used, the generated datakey file can be used many times by the WCH-MCU-DL.
3. To prevent downloading due to mis-operation of the S1 key on the WCH-MCU-DL to generate a new key, it is recommended to remove S1.
4. The WCH-MCU-DL will generate the download key only if you connect to the computer through a communicable Type-C cable.

### 3.3.6 [Optional] Online Function (Serial Port Input Custom Data) and Rolling Code Function

This function is optional and can be skipped if this is not needed.

This function is mainly used to fill the custom data file or automatic rolling code in the dataflash area (which exists), and the CH32 series chip (without dataflash) fills the custom data or rolling code data into the specified flash address. For more details, please refer to Chapter 8: "Roll Code function & Custom Information" section.

#### Enable the online programming function:

When online, if the serial port data is not received, the data is programmed in the data file bin file, which is used to add fixed data in the specified location of the program (the address box to the right of the online programming option). When receiving serial port data, it will replace the serial port data to the "data file" and merge and download.

#### Enable the roll code function:

To enable the roll code function, you need to enable the online function and fill in the address. When roll code is enabled, the 6 bytes of data added by the roll code will be combined with databin data programming.

*Note: if the chip contains a dataflash region, the data file and the above operation data will be stored in the dataflash region, which will be limited by the chip dataflash size. If the chip does not have a dataflash region (CH32 series chips), the above data will be stored in the flash designated area.*

### 3.3.7 [Optional] Upgrade the WCH-MCU-DL Itself

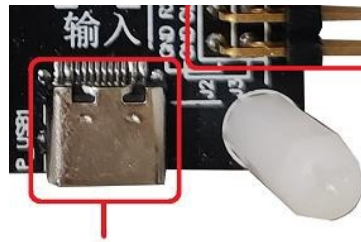
This function is optional and can be used to upgrade the WCH-MCU-DL. You can skip this step if you normally use the software to generate special files.

This function is used to upgrade the program version of the WCH-MCU-DL itself using the software DIPubTool\_N\_V2.X internal firmware. If the program version is up-to-date, there is no need to pay attention to it. The more detailed upgrade section of the recorder program can be moved to Chapter 7: "WCH-MCU-DL master upgrade [3 methods]" section.

## 3.4 Use McuUpdTool.EXE Software to Load Special File into WCH-MCU-DL

### 3.4.1 WCH-MCU-DL Connected to PC

Through type-C cable or double C cable, one end is connected to the USB port of the computer, and the other end is connected to the type-c port of the WCH-MCU-DL. As shown below:

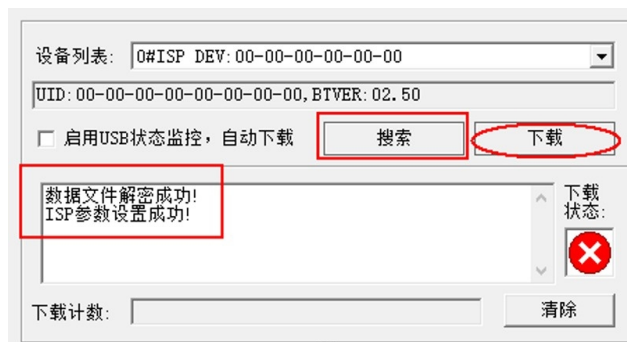


用于加载程序  
(升级烧录器)

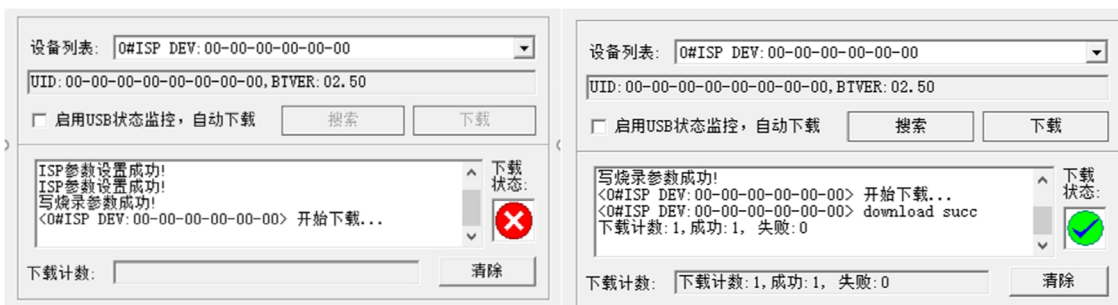
Note: If you use the key feature, you have successfully connected during the key generation process, ignoring this step.

### 3.4.2 Download Special Files to WCH-MCU-DL

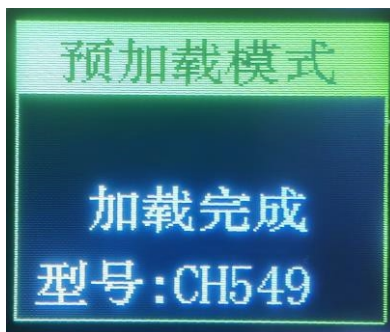
Move the generated [original file name-key .datakey] to the MCU\_UpdTool.EXE directory file [ignore if it already exists]. After the WCH-MCU-DL is connected to the computer normally, open the software MCU\_UpdTool.EXE on the computer, and click "search" (usually automatically load, no need to click to search). If successful, it will be displayed as shown below:



Then click "download", as shown in the following figure [downloading on the left and successful download on the right]:



When loading is complete, the display screen of the WCH-MCU-DL displays information, as shown in the following figure:



Note: After starting the key function, the datakey file can only be downloaded once. If you download it again using MCU\_UpdTool.EXE, you will be prompted that the key does not match and the display screen shows [No key]. If you need to update the firmware or the number of downloads, you must start over.

## 4. Program User Firmware

The last step of offline programming is to download the user firmware pre-existing in the WCH-MCU-DL to the target board. At present, USB&& serial port is suitable for all WCH chip models. The default download mode of WCH-MCU-DL is USB transmission, because USB transmission is faster than serial port. In addition, for the CH32F/V series, there are three ways to download: USB&& serial port && SWD. When the serial port and USB interface are used to program the chip, the target chip is required to enter BootLoader (that is, programing mode or ISP mode, in which the ISP tool can program it) hereinafter referred to as ISP mode, and entering this mode requires the target chip to pull up or pull down the ISP configuration pin before powering up. Note: the WCH-MCU-DL with pre-stored firmware is powered by P1 [DC port] or J1 pin [5V GND] 5V [must choose one of the two, not PC]. If you don't know how to download the configuration foot, refer to WCHISPTool.exe, such as CH579 download configuration foot:

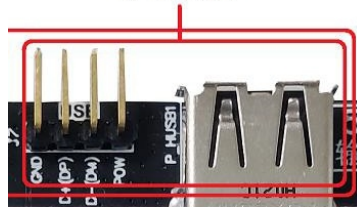


Download WCHISPTool.exe as follows: [http://www.wch.cn/downloads/WCHISPTool\\_Setup\\_exe.html](http://www.wch.cn/downloads/WCHISPTool_Setup_exe.html)

## 4.1 USB Download

Download USB, and connect the USB interface of the target chip through the four pins [POW,D+,D-,GND] at J7 on the EPAD or P\_HUSB1 of the USB master port, as shown below:

USB烧录接口区  
(建议使用)



WCH-MCU-DL motherboard USB P\_HUSB1 has the ability to provide external power supply, the external power supply voltage is determined according to the optional version of the recorder: 5V WCH-MCU-DL output 5V voltage, 3.3V WCH-MCU-DL output 3.3V voltage, configurable voltage version is determined by the configuration, the same as the J7 pin POW pin.

After connecting the corresponding chip through the USB port or the J7 pin D+/D -, press the off-line recorder S3 button to start the recording.

*Note: Since most of WCH chips can be configured as D+ pins for ISP configuration pins, the recorder has been independently optimized and will pull up D+ pins before POW pins power on the target board, so as to automatically control the target board to enter ISP mode (no manual pull-up target board D+ pins).*

## 4.2 Serial Port Download

The J5 of the WCH-MCU-DL is a serial port upgrade interface. Connect with the target chip through J5 [GND, POW, TX, RX] serial port. The API is shown below:

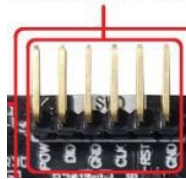


After connecting with the serial port of the target chip through J5, the offline recorder is triggered by short pressing the S3 button of the WCH-MCU-DL.

## 4.3 SWD Download (For CH32 Series)

The J4 EPAD of the WCH-MCU-DL is the SWD download location. If the CH32F/V series is downloaded through SWD, connect J4 [GND, SWCLK\_OUT, SWIO\_OUT, POW] to the target SWD download interface. The SWD download port is shown in the figure:

调试接口烧录  
(仅部分芯片支持)



After the connection between the J4 pin on the WCH-MCU-DL development board and the target SWD interface is completed, press the S3 button to download the CH32F/V series offline.

Note:

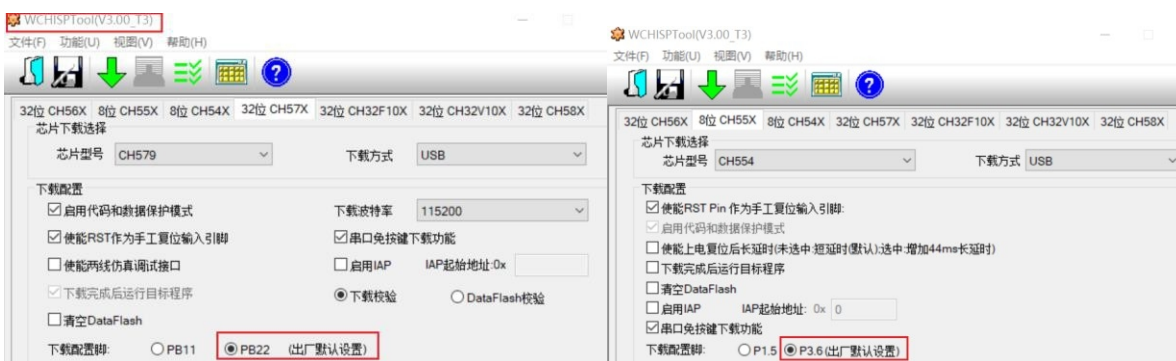
1. This SWD programming method is only for CH32F/V series chips, not for other chips.
2. CH32 has read protection, power-off and power-up operation. Therefore, it must be controlled by the J4 power supply of the offline recorder. (Soft reset mode is now added to enable and remove read protection.)
3. The output voltage of the recorder corresponds to the demand for power supply of the target board.

### 4.4 Download Configuration Pin and chip Program Interface Description

Configure download pin

Type	Download configuration pin		
CH54X	CH546 & CH547 & CH548 & CH549 <input checked="" type="checkbox"/> P51-VCC		
CH55X	CH551 & CH552 & CH554 <input checked="" type="checkbox"/> P36-VCC		
	CH558 & CH559 <input checked="" type="checkbox"/> P46-GND		
CH57X	CH577 & CH578 & CH579 <input checked="" type="checkbox"/> PB22-GND		
	CH571F & CH573 <input checked="" type="checkbox"/> PB22-GND		
CH32F/V	CH32F/V <input checked="" type="checkbox"/> BOOT0-VCC/BOOT1-GND		

Note: If you don't know about the download configuration pin, refer to WCHISPTool.exe, for example, CH554 download configuration pin P36 connects to VCC, CH579 download configuration pin PB22 connects to GND.



Download WCHISPTool.exe as follows: [http://www.wch.cn/downloads/WCHISPTool\\_Setup\\_exe.html](http://www.wch.cn/downloads/WCHISPTool_Setup_exe.html)

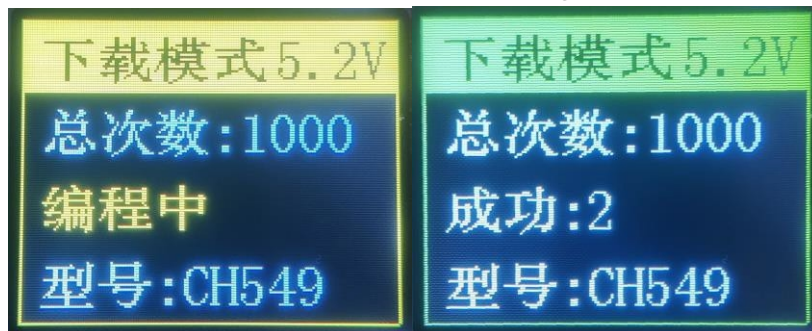
USB program interface

Type	Serial port pin		
CH54X	CH546 & CH547 & CH548 & CH549—P30/P31		
CH55X	CH551—P30/P31	CH552 & CH554—P16/P17	CH555
	CH558 & CH559—P02/P03		

CH57X	CH577 & CH578 & CH579—PA8/PA9	
	CH571 & CH573—PA8/PA9	
CH32	CH32F/V—PA9/PA10	

## 4.5 Download Process and Effect Demonstration

The above three interface programming modes can only be connected to one at the same time, that is, the WCH-MCU-DL can only program one-to-one. After connecting the corresponding recording interface, press the S3 button of the WCH-MCU-DL (the button is valid at low level), or trigger the WCH-MCU-DL through the machine control interface J6, and the display will display [programming]. After a few seconds, the display will display [successful] and refresh [success: xx] times, as shown in the figure below:



## 5. Check Function

BOOT1 and GND short connection, enter the check mode, through the S3 button to achieve verification. The offline recorder verification function is to check and compare the pre-stored firmware in the offline recorder with the firmware in the target board to determine whether it is exactly the same.

Through the serial port, USB two ways of verification, connection and download the same when programming.

## 6. Machine Controlled WCH-MCU-DL

The WCH-MCU-DL is connected to the recorder to realize machine programming. The running status of the recorder can be processed and viewed through the [START, BUSY, OK, NG] signal of J6 on the WCH-MCU-DL. [S\_H] input more than 50ms high level signal or [S\_L] input more than 50ms low level signal [either one].

[BUSY] the high level of the pin indicates programming.

[OK] the high level of pin indicates correct programming.

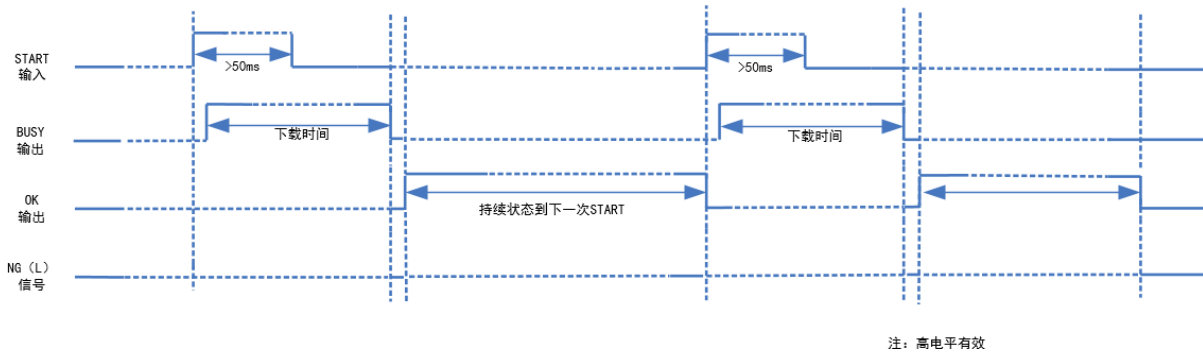
[NG] the high level of the pin indicates a programming failure.

*Note:*

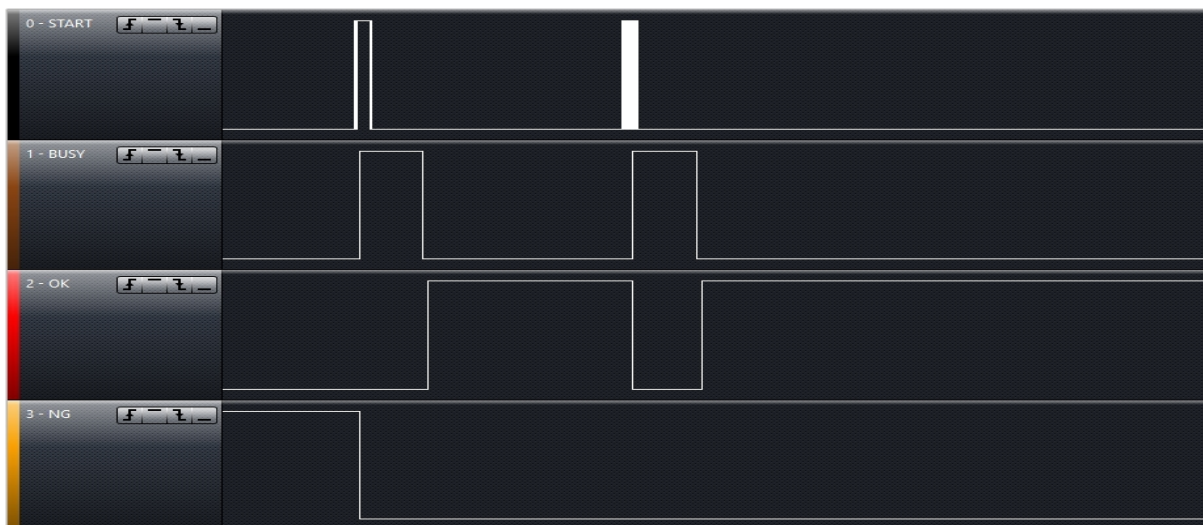
1. [BUSY, OK, NG] is the IO input signal
2. [BUSY, OK, NG] is the IO output signal, which is effective at high level.
3. Button S3 cannot trigger the download timing.

The four lines [START, BUSY, OK, NG] in the sequence diagram below are successful sequence diagrams, as shown below:

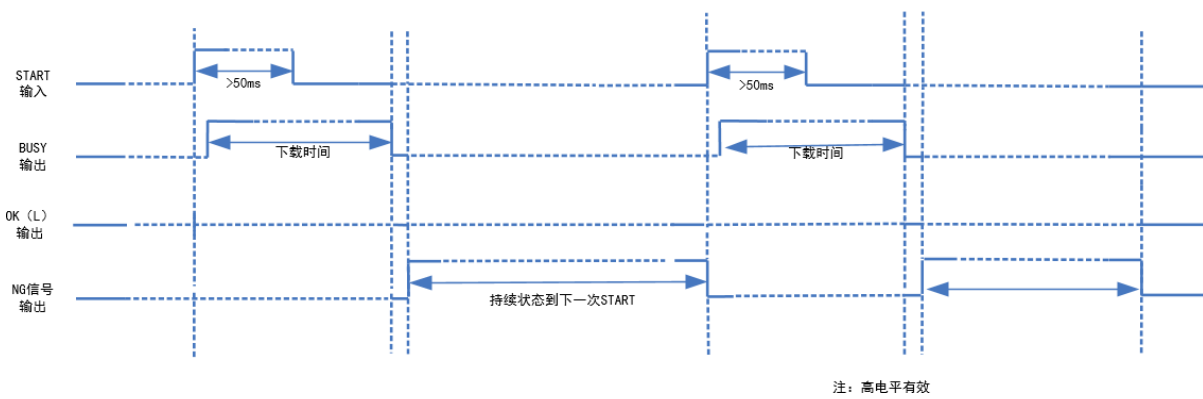




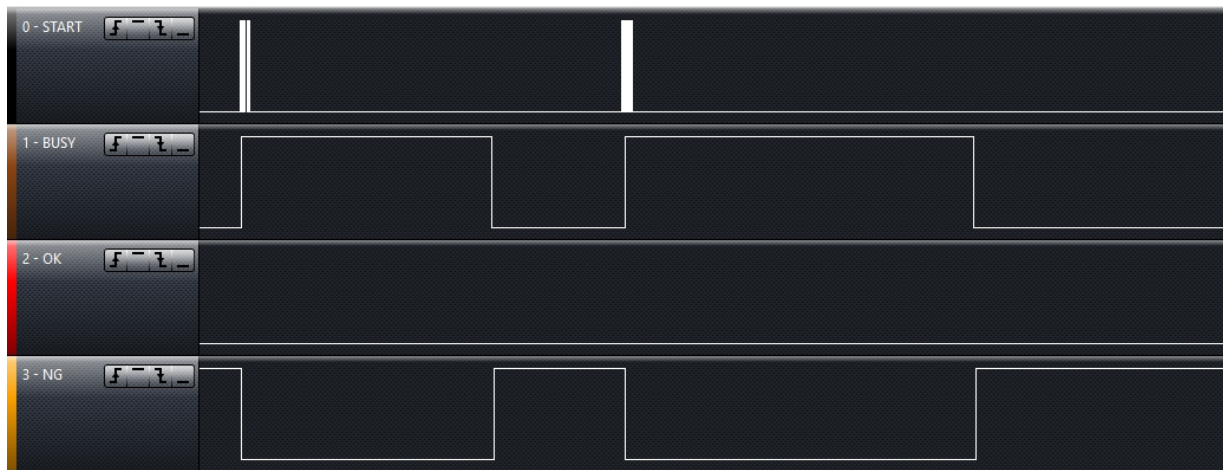
Screenshot of successful actual logic analyzer:



Failure sequence diagram, as shown below:



Screenshot of failed actual logic analyzer:

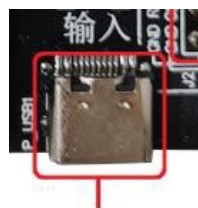


## 7. WCH-MCU-DL Program Upgrade

### 7.1 Use the USB Method of WCHISPTool

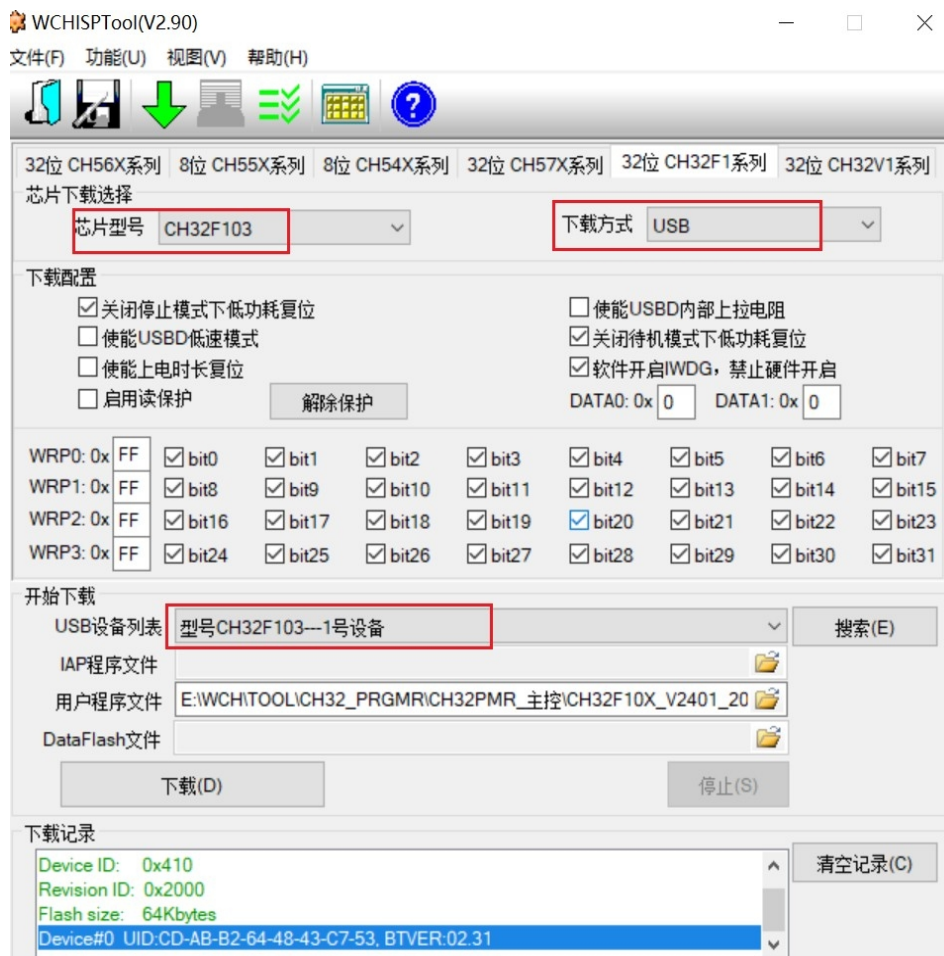
Step 1: The master firmware of the WCH-MCU-DL can be upgraded through the USB mode of CH32Fx, and BOOT1 is connected to GND, BOOT0 and VCC33.

Step 2: Connect one end to the USB master port on the P\_HUSB1 on the development board, and one end to the computer USB port, as shown in the following figure:



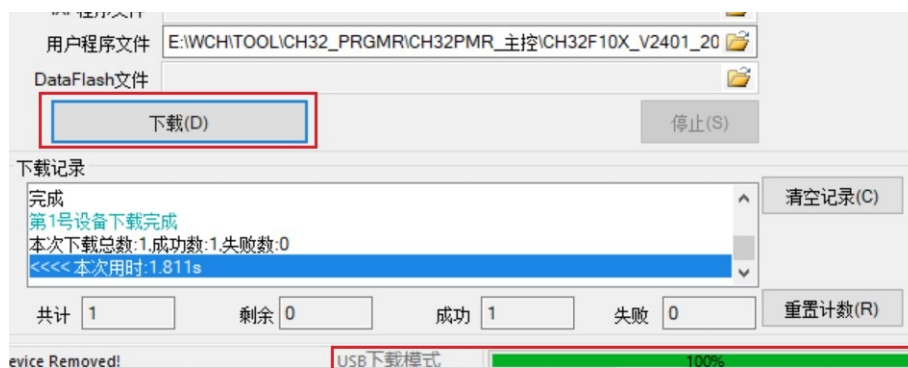
用于加载程序  
(升级烧录器)

Step 3: Open [WCHISPTool], select the USB download mode of CH32Fx, and add the updated WCH-MCU-DL HEX to the user program file, and then click the "unprotect" button, as shown below:



Download WCHISPTool.exe as follows: [http://www.wch.cn/downloads/WCHISPTool\\_Setup\\_exe.html](http://www.wch.cn/downloads/WCHISPTool_Setup_exe.html)

Step 4: Click "download" to show that the download is successful, as shown below:



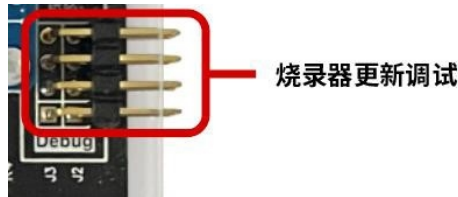
Step 5 [Last step]: Connect the BOOT0 on the WCH-MCU-DL EPAD to GDN, and after powering up the WCH-MCU-DL, you can see the version information on the display, which is currently V2600.

## 7.2 Use the Serial Port of WCHISPTool

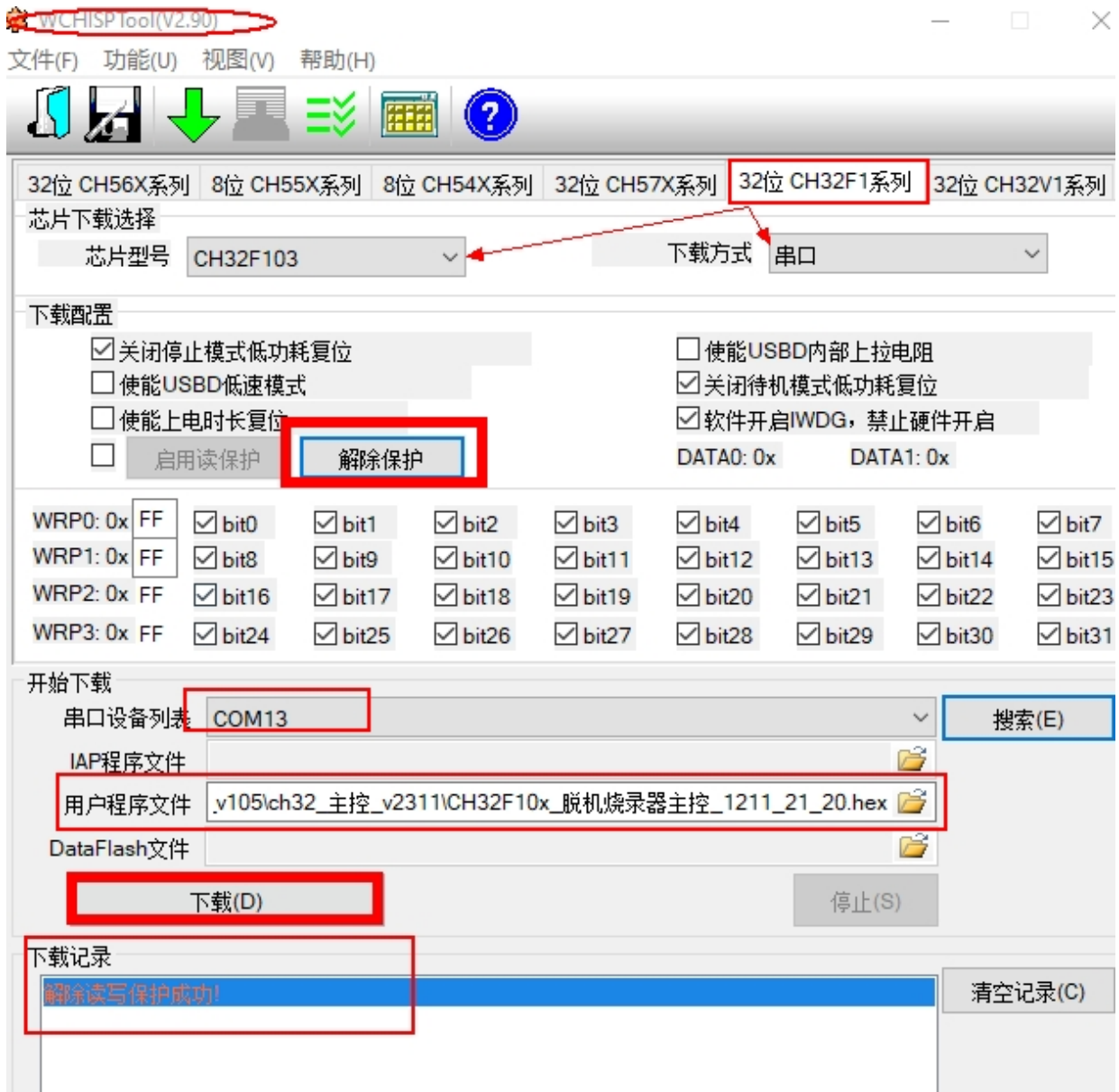
Step 1: The master firmware of the WCH-MCU-DL can be upgraded through CH32Fx serial port, and BOOT1 is connected to GND, BOOT0 and VCC33.

Step 2: Use the USB to serial port tool, one end is connected to the USB port of the computer, and the other end is connected to the serial port on J2 on the development board [3V3Magne GND TX RX], as shown in the following

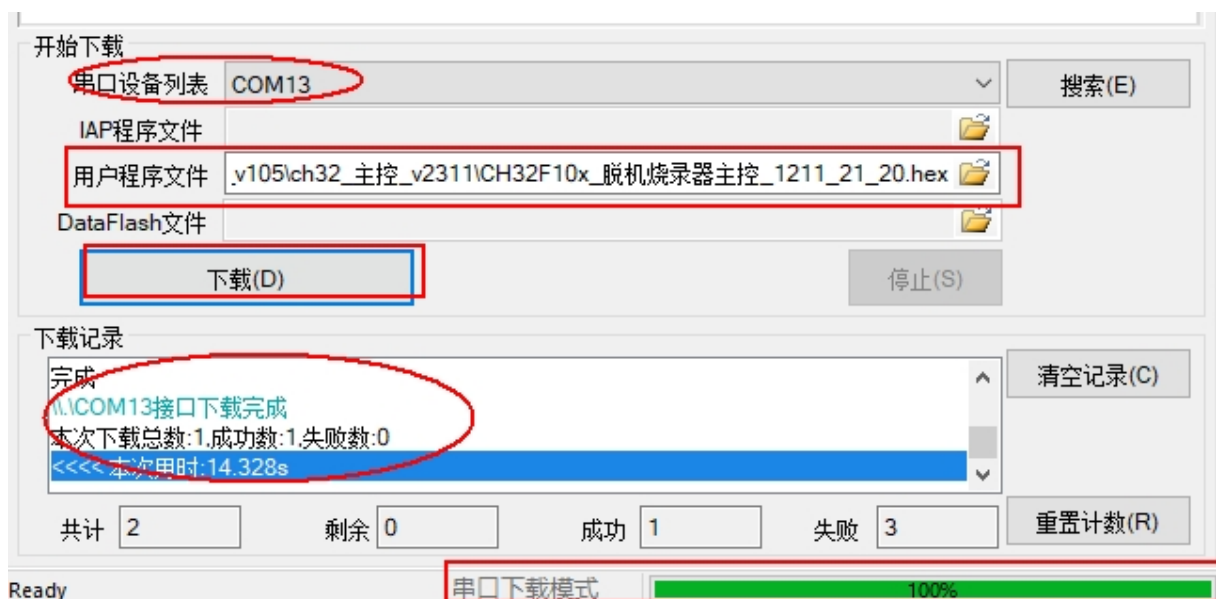
figure:



Step 3: Open [WCHISPTOOL], select the CH32F103 serial port download mode, select the HEX that needs to be updated, and click "Unprotect" LOG area to show that the protection has been unprotected successfully, as shown below:



Step 4: Power up the WCH-MCU-DL again, and click "download" to show that the download is successful, as shown below:

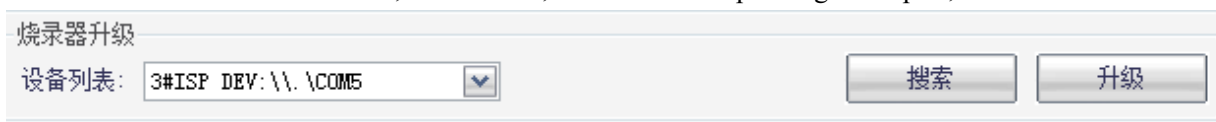


Step 5 [Last step]: Connect the BOOT0 on the WCH-MCU-DL EPAD to GDN, and after powering up the WCH-MCU-DL, you can see the version information on the display, which is currently V2600.

### 7.3 WCH-MCU-DL Self-update

Step 1: The main firmware of the WCH-MCU-DL can be upgraded through CH32 serial port, that is, BOOT1 and GND are connected short, and BOOT0 is connected to VCC33.

Step 2: Open [DIPubTool\_N\_V1.X.EXE] software, use USB to serial port tool, USB connect computer, serial port connect J2 of WCH-MCU-DL EPAD, click search, select the corresponding serial port, as shown below



[DIPubTool\_N\_V1.X.EXE] the software has built-in main CH32 firmware. Click the [upgrade] button to automatically upgrade the firmware of the master CH32 in the software. Display the prompt message in the operation status bar [obtain the device information through the serial port successfully], and then there will be a prompt message [programming ...], after waiting for about 10 seconds, a dialog box [WCH-MCU-DL upgraded successfully] will pop up. The details are as follows:



[last step]: Connect the BOOT0 on the WCH-MCU-DL EPAD to GDN, and after powering up the WCH-MCU-DL, you can see the version information on the display, which is currently V2600.

## 8. Rolling Code Function & Custom Information

The function of online programming and rolling code function is to add custom storage data to MCU. The online function needs to cooperate with the computer, use communicable serial port tools, write custom data and trigger programming by serial port. Roll code function is to fill in the initial value and step value, offline programming automatic rolling data. The similarity between the two functions is that the address is determined by the address

box that enables online programming, so to use the rolling function, you need to click on online programming to fill in the address.

## 8.1 Online Programming - Serial Port Customization

Online programming is to write user-defined information to the specified address bit of the programming chip dataflash through the serial port J2 of the WCH-MCU-DL. Currently, the CH32 series does not support online features. Step 1: PC software needs to be configured first to turn on the online function. This step is completed in the process of encrypting the file datakey generation, not a separate step. Where Addr is the starting address of dataflash and Len is the length of the open space.

Note: the data file must be loaded, otherwise the datakey cannot be generated, as shown below:



Step 2: Connect the WCH-MCU-DL J2 of CH32 through the USB to serial port tool or other serial port, and open the serial port tool with a baud rate of 115200. Other parameters as shown in the figure, follow the specified HEX format [0x24 LED + DATA + CRC (data sum) + 0x23], for example:



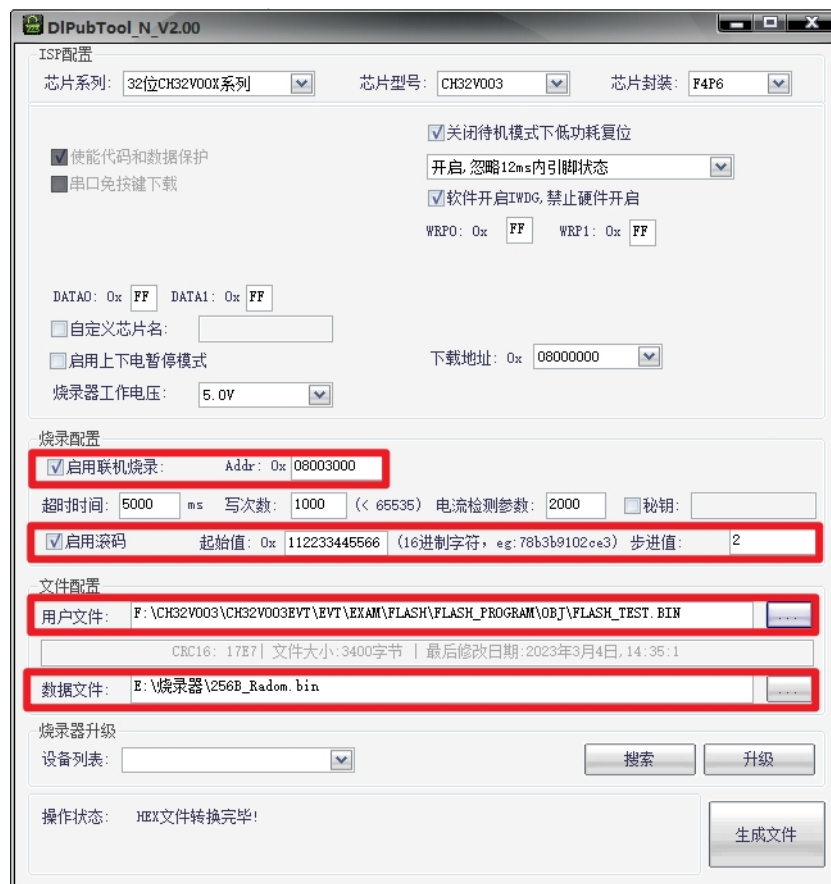
If the input data is incorrect, the LOG error returned by the serial port is as follows:

- |                                 |                |
|---------------------------------|----------------|
| a. Non-compliance with protocol | \$*END*A*#     |
| b. Data validation error        | \$*END*B*##    |
| d. Download successful          | \$*END*D*#     |
| e. Download timeout             | global_timeout |

## 8.2 Rolling Code Function

Rolling code function: add 12-bit hexadecimal HEX to the chip flash, and the data is automatically updated by the step value. The rolling code function is the basis of online recording. The data written into flash is limited to 12-bit HEX, and the data is changed by the step value. At this time, the data is automatically generated by the offline recorder and written into the flash of the chip without external serial port.

First, check "enable online recording", enter the parameters, and then select "start rolling Code", and enter the parameters, as shown in the following figure:



Note the rule that if the step value is 1, when the initial value is 0x112233445566, the first generation is 112233445566, the second is 12 2233445566, and the third is 132233445566.

Note: Online programming can only put a maximum of 255 custom data.

When online, if the serial port data is not received, the data of the bin file is programmed, which is used to add fixed data in a certain location of the program (where 256bytes are aligned and enough space is guaranteed). When the serial port data is received, it will replace the serial port data into databin, merge and download, when rolling code is enabled.

Rolling code self-increasing 6-byte data merge databin data programming 32-bit series rolling code requires address 256byte alignment and databin file length not exceeding 512byte length, and ensures that the specified address has 256byte alignment space (more than 256 integer multiples).

Other series of chips require 8-byte alignment.

## 9. FAQ

### 9.1 Why is the WCH-MCU-DL Download Unsuccessful?

Answer: Mainly have: 1. WCH-MCU-DL power supply; 2. Chip board or seat; 3. Selection & wiring; 4. WCH-MCU-DL hardware.

#### 9.1.1 Power Supply:

Downloading the user program to the WCH-MCU-DL uses the type-c port. Downloading the user program to the specified chip through the WCH-MCU-DL uses the DC port of P1 to supply power, and the power of the adapter is 5V/1A.

#### 9.1.2 Selection & Connection:

1. Whether the DIPubTool\_N\_V1.xx configuration information and the programming chip model are exactly the same, make sure that the chip and the display the chip model consistency.
2. Whether the user firmware is downloaded to the WCH-MCU-DL (check the firmware name in the WCH-MCU-DL through the button S2).
3. Whether the wiring between the WCH-MCU-DL and the chip pin is correct & communication.

#### 9.1.3 A Board or Seat that Programs a Chip:

The programming chip board or seat needs to be designed according to the chip reference schematic of the response, such as CH554T, in the power supply and lead out USB or serial port, but also need Pin19, Pin20 to connect two 0.1uF capacitors to work properly. For all chips, the first programming is successful, and the second programming is not successful, mainly because the BootCH57X series of the chip detects whether PB22 is connected to GND and enters Boot mode. The easiest way to test is whether the chip board or seat can be successfully downloaded through the WCHISPTool on PC.

#### 9.1.4 WCH-MCU-DL Hardware:

WCH-MCU-DL whether there is a problem with the hardware of the entire board, such as whether to jump P2 download mode, that is, BOOT0-GND.

### 9.2 How to Supply Power to the WCH-MCU-DL?

Answer:

1. During the configuration process, the WCH-MCU-DL type-c mother port provides power & & communication, and the PC connects the WCH-MCU-DL through the communicable type-c.
2. During the programming process, the power is supplied by the DC port 5V/1A on the WCH-MCU-DL P1. If the type-c master port is used for power supply, the adapter can be used instead of PC.

### 9.3 Is it Necessary to Use a Key for Offline Downloading?

Answer: Not necessarily. If you don't use it, you can uncheck the key. Note that the key function is not enabled, the generated datakey file can be downloaded and used indefinitely, pay attention to security.



## 9.4 How to Check Whether the WCH-MCU-DL Hardware is Good or Bad?

Answer: Through the type-c, one end is connected to the PC, and the other end is connected to the type-c port of the WCH-MCU-DL. Open the DTPubTool\_N\_V1.X.EXE, and the display screen of the offline recorder displays the following information:



## 9.5 How to Determine Whether the Type-c Cable Connects the WCH-MCU-DL to PC is Communicable?

Answer: WCH-MCU-DL and PC pass, open [McuUpdTool.EXE] software, and the display screen of WCH-MCU-DL displays information [preloading mode loading ...]. Or download WCHISPTool [[http://www.wch.cn/downloads/WCHISPTool\\_Setup\\_exe.html](http://www.wch.cn/downloads/WCHISPTool_Setup_exe.html)] and open WCHISPTool after installation. The software is shown in the screenshot:



At this time, the display screen of the WCH-MCU-DL displays the message [preload mode], which means that the WCH-MCU-DL and PC are connected successfully and can communicate.



## 9.6 What is the Function of the S2 Button of the WCH-MCU-DL?

Answer: Check the original file name, check code & file size recorded by the user. S2 presses once to display the name of the original file programmed by the user; S2 presses twice to display the check code & file size. If the file programmed by the user is ADC.BIN, the display screen shows ADC. As shown below:



## 9.7 How to Generate a Random Key?

Answer: Press the WCH-MCU-DL S1 button for more than 5 seconds to generate a random key.

## 9.8 How to Download the Firmware Manually?

Answer: Short press the S3 button. The S3 button has two functions, check & & download. Check when BOOT1 and GND are short, and download mode when BOOT1 is not connected to GND.

## 9.9 Why Cannot the DIPubTool\_N\_V1.X.EXE software be opened on PC?

Answer: download the tooling WCHISPTool, after installation, be sure to close the WCHISPTool, and then open the DIPubTool\_N\_V1.X.EXE.

Link: [http://www.wch.cn/downloads/WCHISPTool\\_Setup\\_exe.html](http://www.wch.cn/downloads/WCHISPTool_Setup_exe.html)

## 9.10 ISP Configuration Description



A: as shown in the figure above, the current DIPubTool\_N\_V1.X software configuration information is copied from WCHISPTool software. There are generally 8 items, as follows:

Option 1: Enable code and data protection mode

Option 2: No-key serial port download

Option 3: Clear DataFlash

Option 4: Enable RST as manual reset input pin

Option 5: Enable reset long delay time

Option 6: Enable crystal oscillator

Option 7: Enable internal pull-up resistor of P0 port during system reset

Option 8: Download configuration pin

The option 1 is enabled by default, which means that the downloaded firmware cannot be read. The other 7 options can be configured. Generally, please refer to WCHISPTOOL.EXE for configuration information. If not necessary, default options.

*Note:*

*Option 4: It should not be checked unless otherwise specified when the RST Pin is alternate.*

*Option 7: There is a requirement for the internal pull-up resistor of the P0 port during system reset.*

*Option 8: Generally, the download configuration pin is not recommended to be modified. This pin is used to go into the BOOT, unless otherwise specified.*