HDSC 华大半导体 HUADA SEMICONDUCTOR

Cortex-M

In-Line Programmer User's Manual

This product supports the following chip models

L range	HC32L130	HC32L136	HC32L170	HC32L176	HC32L190	HC32L196
	HC32L110	HC32L072	HC32L073			
M range	HC32M140					
F range	HC32F030	HC32F146	HC32F170	HC32F176	HC32F190	HC32F196
	HC32F451	HC32F452	HC32F460	HC32F003	HC32F005	HC32F072

table of contents table of contents

1. Introduction **3**

1.1 OVERVIEW 3

1.2 Connection Overview 3

1.3 Software Operation Overview 5

2. Quick Operation **8**

3. Operation Description **10**

3.1 MCU Settings 10

3.2 MCU Flash Information 10

3.3 Automatic numbering 11

3.4 Operation 12

3.5 Information Display 14

3.6 Command Line Operation 15

4. Error Handling **17**

4.1 Reminder 17

4.2 Error 18

5. Version Information & Contacts **19**

1. summary

1.1 skim through

CM ISP (Cortex-M In-System Programmer) is an in-circuit programmer software for UW Semiconductor's (HDSC) Cortex-M series MCUs, which supports all UW Semiconductor's Cortex-M series MCU products. This article describes how to use the in-circuit programmer software (HDSC.exe) and notes on programming.

This article applies to the Online Programmer software version number V2.02.

1.2 Connection Overview

When the CM ISP Programmer software (HDSC.exe) is used, the serial module is connected to the target MCU as shown in Figure 1.

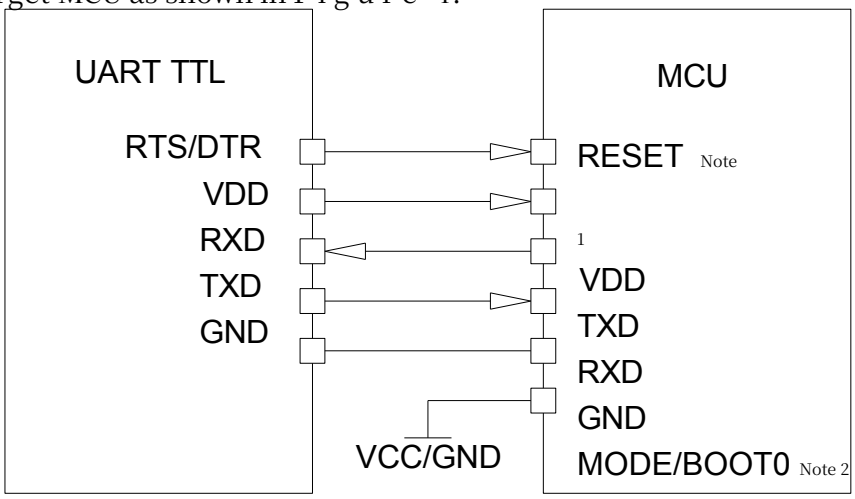


Figure 1 Serial Module and Target MCU Connection Diagram Connect the target chip to the serial module and then connect the serial module to the PC.

Notes:

1) The HC32x00x and HC32x11x series do not have a MODE/BOOT0 pin. For serial programming, you need to connect the RTS or DTR of the serial module to the RESET pin of the target MCU.
2) The connection of MODE/BOOT0 pin may be different for different chip models, please refer to Table 1 for details.

The wiring method of specific model chip and serial module is shown in Table 1:

Serial Module Pinout		power supply	ground	RXD	TXD	power supply	ground	RTS/DTR
MCU Pin	HC32x00x	VCC	GND	P31/P35	P27/P36			RESET
	HC32x11x	VCC	GND	P31/P35	P27/P36			RESET
	HC32x460	VCC	GND	PA13	PA14		MODE	
	HC32x45x	VCC	GND	PA13	PA14		MODE	
	HC32x03x	VCC	GND	PA09/PA14	PA10/PA13	MODE		
	HC32x13x	VCC	GND	PA09/PA14	PA10/PA13	MODE		
	HC32x14x	VCC	GND	P11	P12	MODE		
	HC32x07x	VCC	GND	PA14	PA13	BOOT0		
	HC32x17x	VCC	GND	PA14	PA13	BOOT0		
	HC32x19x	VCC	GND	PA14	PA13	BOOT0		

Table 1 Wiring Methods for Serial Modules and Specific Chip Models

1.3 Overview of software operation

The online programmer software operating environment is shown in Table 2.

operating system	Windows 7, Windows 8, Windows 10
Framework version	Framework 4.0 or above

Table 2 Programmer Software Running Environment

To run the software, you need to have Microsoft.NET Framework v4.0 or above installed on your computerPlease make sure that Framework 4.0 exists in the system path "C:\Windows\Microsoft.NET\Framework(64)", as shown in Figure 2.

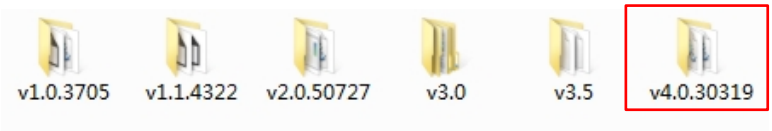


Figure 2 Framework 4.0

If the operating system is not installed, please download the corresponding version from the Microsoft website. The file directory of the folder where the online programmer software is located is shown in Figure 3.

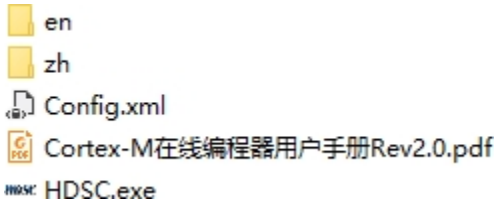


Figure 3 Online Programmer File Directory

The "en", "zh" folders contain the program language configuration files, which can be used to switch between English and Chinese in the program interface, and are not required. The "Config.xml" folder contains the user configuration file. It is generated automatically after the program is closed, and is used to save user-related settings. There is no such file for the first time.

"Cortex-M Inline Programmer User's Manual Rev2.0.pdf" is a user's manual file, which can be opened by clicking "Help" in the menu of the program interface.

"HDSC.exe" is the program execution file. This file can be run alone, but it cannot switch between English and Chinese, and only supports English display.

Double-click "HDSC.exe" to open the software, the software interface in Figure 4.

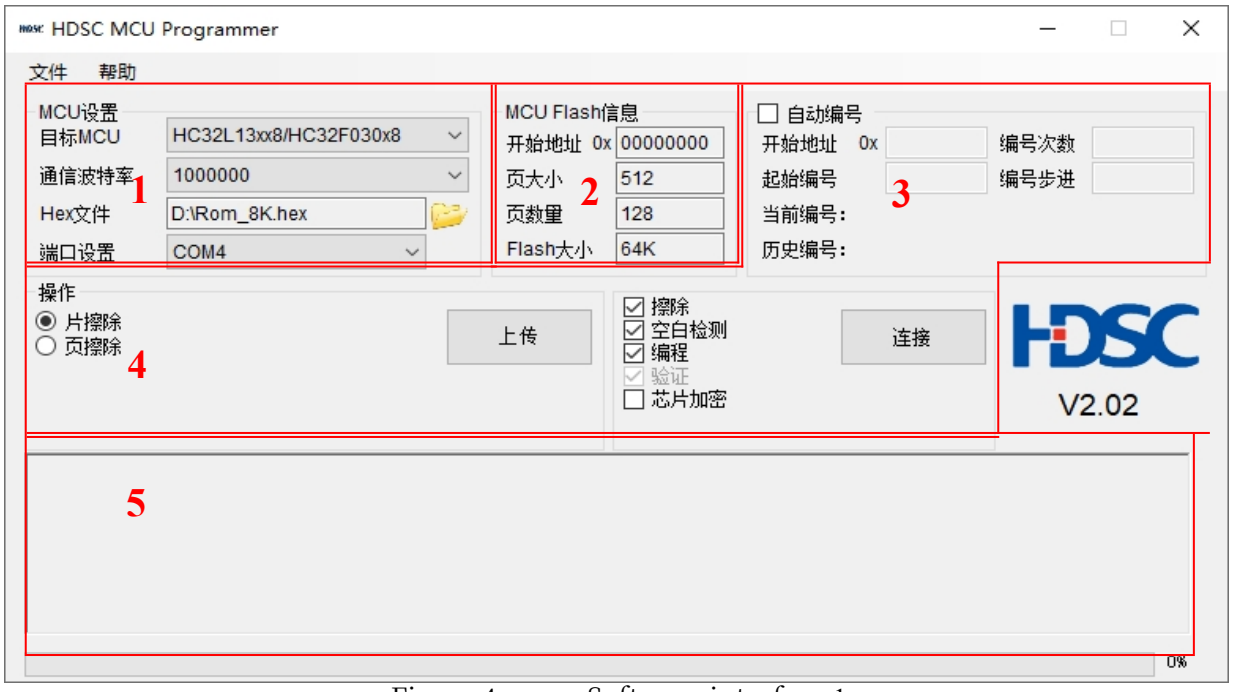


Figure 4 Software interface 1

1) **MCU Setting:** Used to set the target MCU model, crystal frequency (HC32F146xA/HC32M140xA and HC32F146x8/HC32M140x8) or communication baud rate of the selected serial port (for the rest of the series), the Hex file to be burned, and the COM port number of the PC.

2) **MCU Flash Information:** Displays the selected MCU Flash information: Start Address, Page Size, Number of Pages and Flash Size.

3) **Auto Numbering:** Used for user to number MCUs.

4) **Operation:** Operation is divided into two parts, uploading and connecting. Upload reads the target MCU Flash data and saves it as a .hex file; Connect can select the operation items you want to operate, including Erase, Blank Check, Program (Verify), Chip Encryption, after selecting the operation items, click the Connect button.

5) **Information Display:** Used to display programming information.

If you select the target MCU as HC32F460xExx/HC32F45xxExx, the software interface is shown in Figure 5.

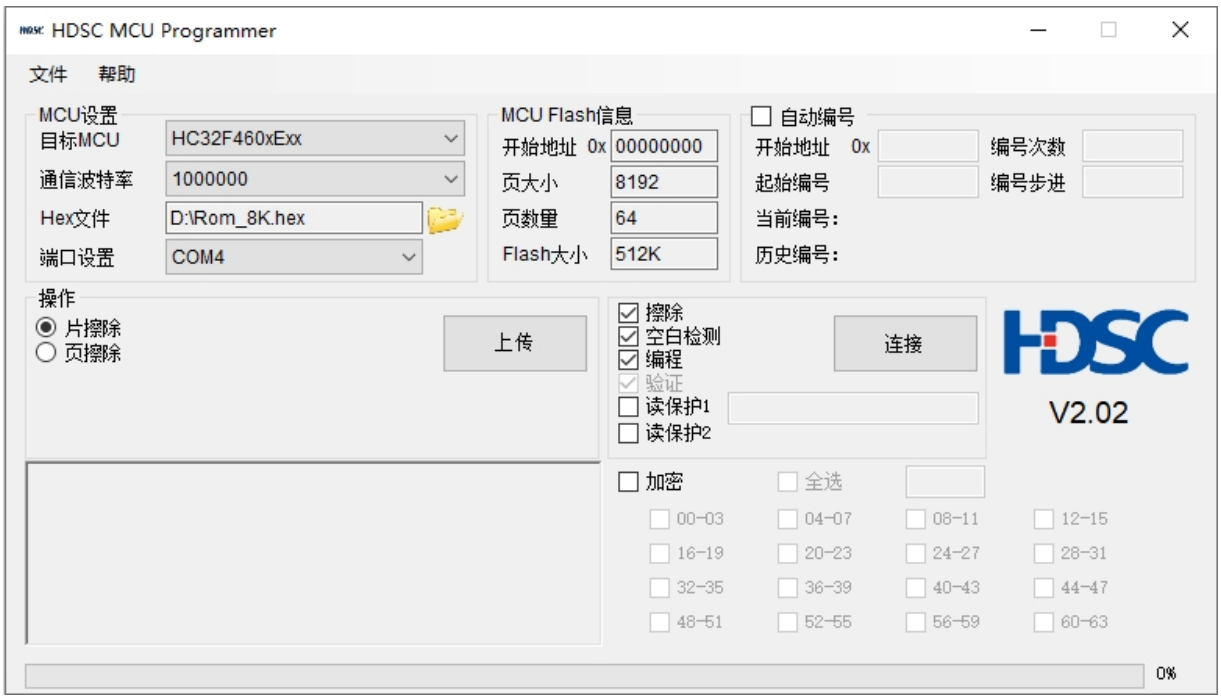


Figure 5 Software interface 2

HC32F460xExx/HC32F45xxExx has Read Protect 1, Read Protect 2, and Encrypt function, if you want to operate these functions, you need to check the corresponding option box. To operate these functions, you need to check the corresponding option boxes. For Read Protect 1, you need to input the password, and for Encryption, you need to set the encryption range of flash.

2. quick operation

The following will describe how to program quickly.

1) Connect the serial port end of the USB-to-serial cable to the serial programming pin of the target MCU, take HC32L136 series for example, the connection method is shown in Figure 6. Pull up the MODE pin of the target MCU, and then the target MCU will power on and enter the serial programming mode.

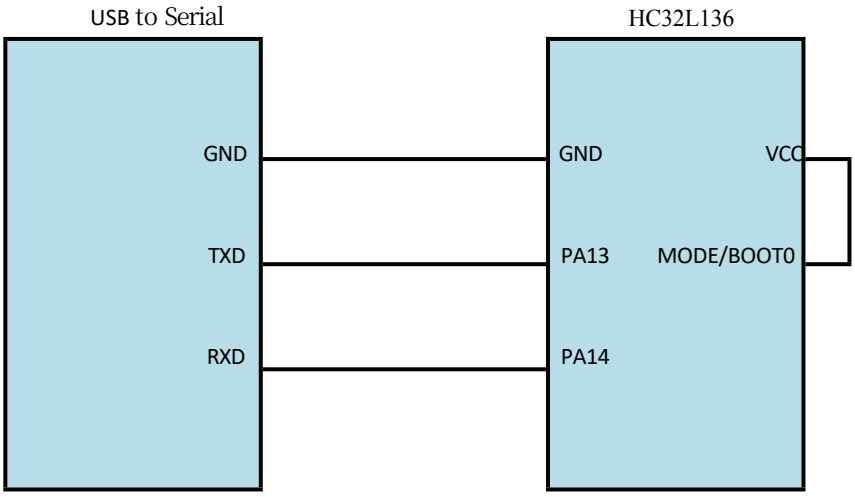


Figure 6 Hardware Connection

2) Connect the PC to the MCU target board with a USB to serial cable. Open the software, select the corresponding target MCU model, set the communication baud rate, select the programmed Hex file, and set the port to the COM port number used.

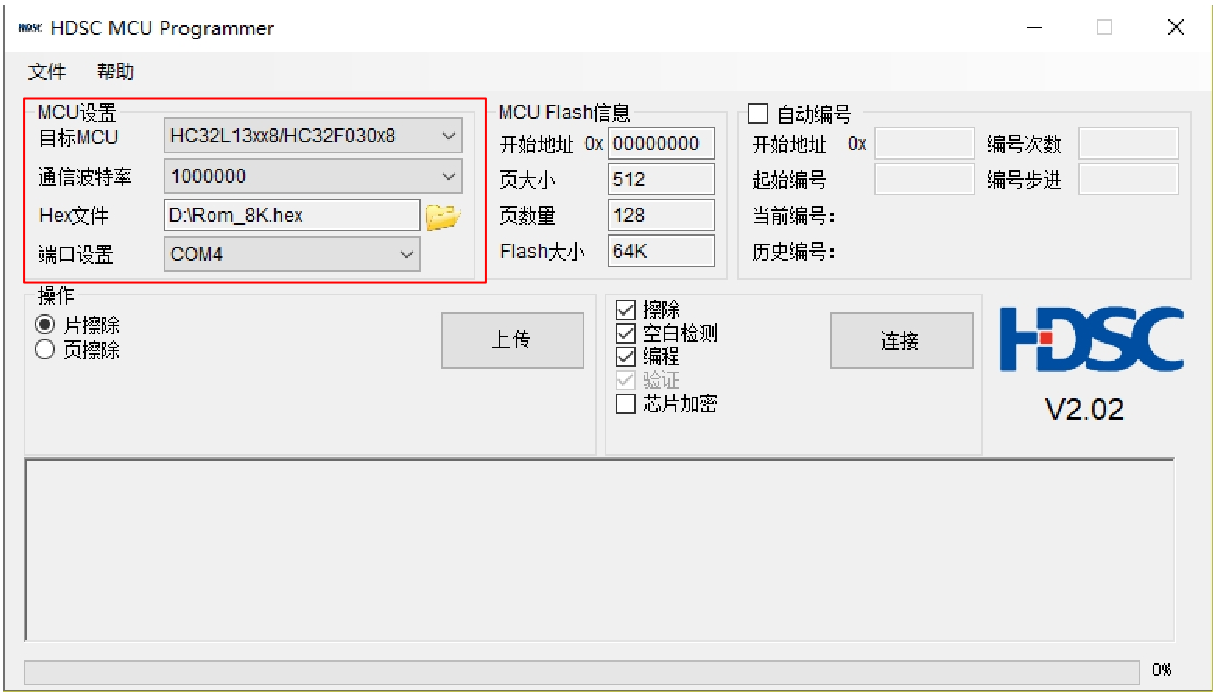


Figure 7MCU Settings

3) Select the desired action. For example, select the "Erase", "Blank Detection", "Program (Verify)" checkboxes. As shown in Figure 8 Show.

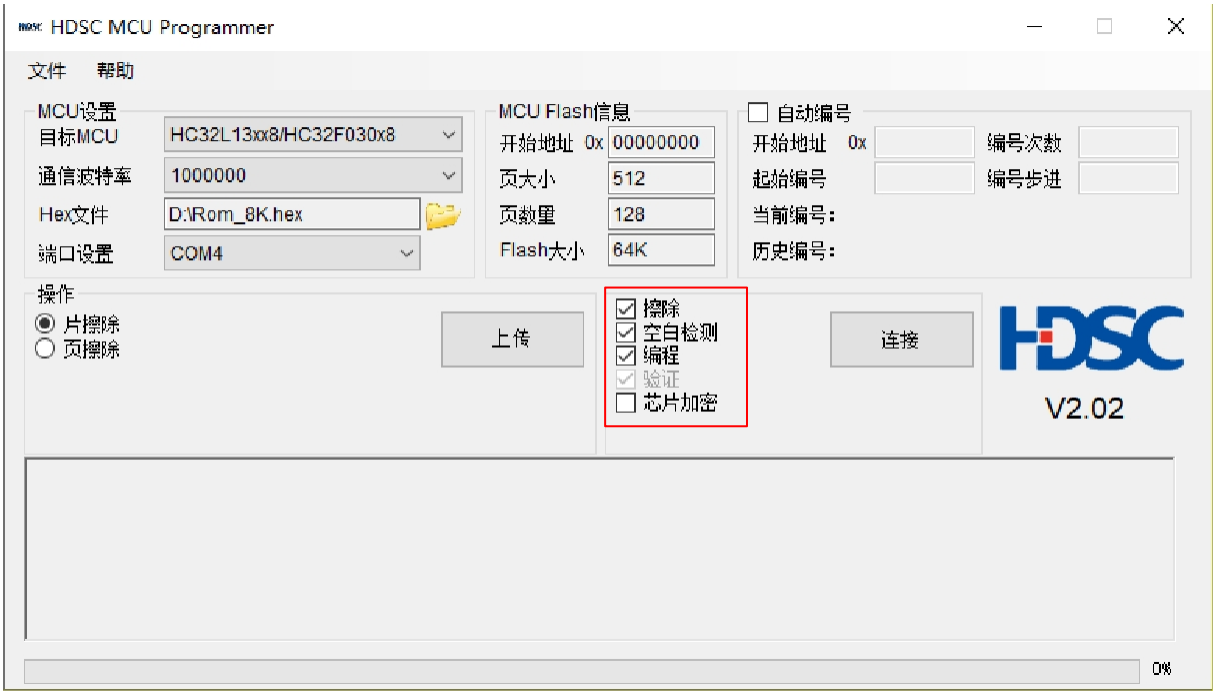


Figure 8 Selecting an operation

4) Click the "Connect" button to start programming and wait for the programming to finish.

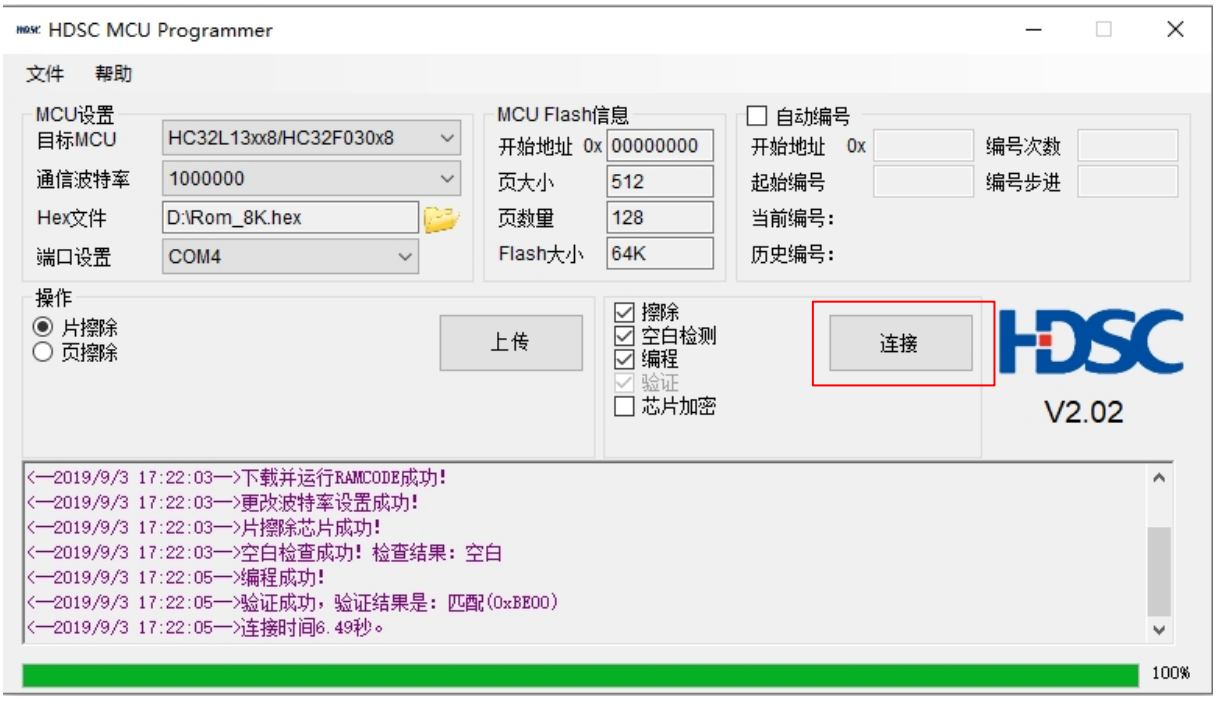
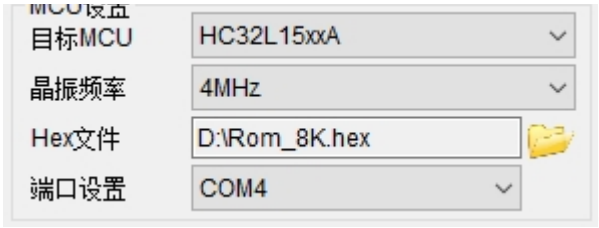


Figure 9 Connection operation

3. Operation Description

3.1 MCU Settings

Setting of MCU related information, selecting the MCU model, setting the crystal frequency or communication baud rate, selecting the Hex file to be programmed, and the corresponding port.



(math.) genus

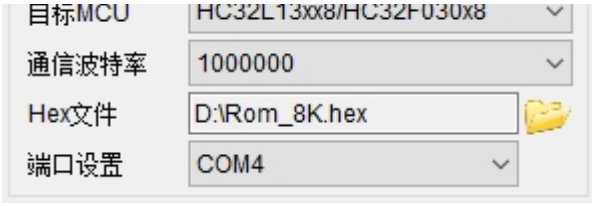


Figure 10MCU Settings

1) **Target MCU:** This drop-down box contains all the current MCU types of UW's ARM cortex-M cores, select a model corresponding to the programmed target MCU.
2) **Crystal Frequency or Communication Baud Rate:** For HC32F146xA/HC32M140xA and HC32F146x8/HC32M140x8 series MCUs, this option is to set the crystal frequency used by the target MCU; for the rest of the series MCUs, this option is to set the communication baud rate of the selected port.
3) **Hex File:** Used to select the Hex file to be programmed.
4) **Port Settings:** Sets the port number used for ISP connections.

3.2 MCU Flash Information

The MCU Flash information for the selected model displayed: start address, page size, number of pages and Flash size. As in Figure 11.

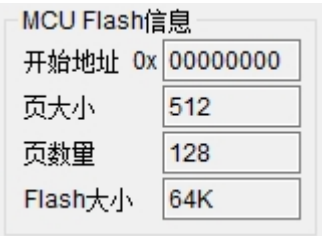


Figure 11MCU Flash Information

3.3 auto-numbering

This software comes with the function of numbering the target MCU when programming, just select the radio box "Auto Numbering" in the "Auto Numbering" group to set up the auto numbering.

Figure 12 Enabling automatic numbering

After selecting "Automatic numbering", the function of automatic numbering is enabled, fill in the corresponding parameters, the relevant parameters are described as follows:

- Start Address: Write the number to the MCU Flash address, the start number needs to occupy 4 bytes, the address must be within the MCU Flash range (according to the corresponding model of MCU), the address is in hexadecimal, from 0-F characters.
- Numbering times: how many numbers need to be written, the numbering times must be greater than 0, the value range is 1 to 999999.
- Starting Number: The Starting Number is the beginning of the number from 0 to 4,294,967,295 (0xFFFFFFFF).
- Numbered Steps: Steps between each number, values range from 0 to 999.
- Current Number: Displays the number written for this programming.
- History Number: The history number is the number that shows the last successful write.

3.4 manipulate

This section includes the main functions of this software, upload, erase, blank detection, programming (verification) and chip encryption.

Figure 13 Operation

If the target MCU is selected as HC32F460xExx/HC32F45xxExx, the following functions are displayed in addition to the above: Read Protect 1, Read Protect 2, and Encryption.

Figure 14 HC32F460xExx/HC32F45xxExx Available Operations

<**General Operations**>

- **Upload:** If the user has selected a file to burn, only the uploaded burned portion will be read;

  If the user does not select a file to burn or the address of the burned file is incorrect, the entire Flash of the upload target MCU is read.

  Content.

- **Erase:** Erase consists of two types of erase methods, slice erase and page erase, slice erase is to erase the whole chip, and page erase is to erase according to the position of the Flash page occupied by the programmed Hex file.
- **Blank Detection:** Checks if the entire chip is in a blank state (all 0xFF).
- **Programming:** Programming is the operation of programming a Hex file to the MCU.
- **Verify:** Verify that the code programmed in is correct.

<**General Protection Function**> (Protection function for chips other than HC32F460xExx/HC32F45xxExx)

- **Chip encryption:** Protect the flash data of the chip, the flash data can not be read after protection.

  -Note Note: The encryption operation of HC32x07xxAxx/HC32x17xxAxx/HC32x19xxCxx series chips is only allowed to 64

  After 64 times, the chip locks up and cannot be decrypted.

< HC32F460xExx/HC32F45xxExx Chip Protection Function

- **Read protection 1:** Read protection is applied to the FLASH area to prevent untrusted users from reading the FLASH data, and the data in the flash can be read by the key after protection.
- **Read protection 2:** Read protection is applied to the FLASH area to prevent untrusted users from reading the FLASH data, and no operation can read the data in the flash after the protection.
- **Encryption:** Encrypts FLASH data to prevent FLASH from physical parsing attacks. If the Programming option box is selected, check the Encryption option box and set the encrypted sectors, the data in these sectors will be encrypted after the set sectors are successfully programmed.

3.5 Information Display

Used to display operation information, and the progress of the operation.

Figure 15 Message Display

3.6 command-line operation

The program supports command line operations in CMD.exe or third-party programs. Take CMD.exe as an example: Open CMD.exe and enter the directory where HDSC.exe is located, as shown in Figure 16.

Figure 16 Entering the program directory

Type "HDSC" to open the HDSC.exe program, perform "MCU Setup", and then close the HDSC.exe program. As shown in Figure 17.

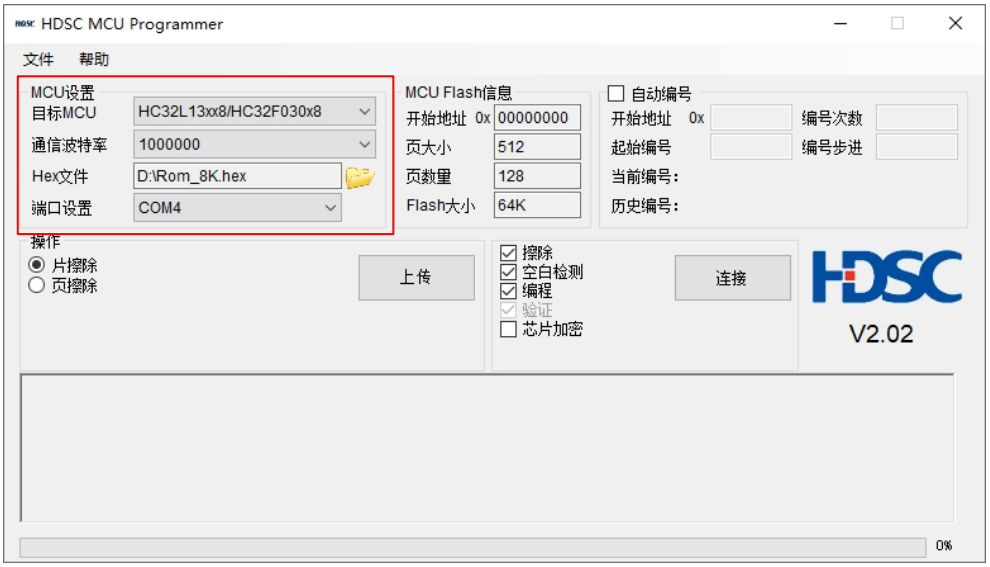


Figure 17 Making MCU Settings

Return to CMD.exe and type HDSC ?, which displays the supported operational commands. As in Figure 18.

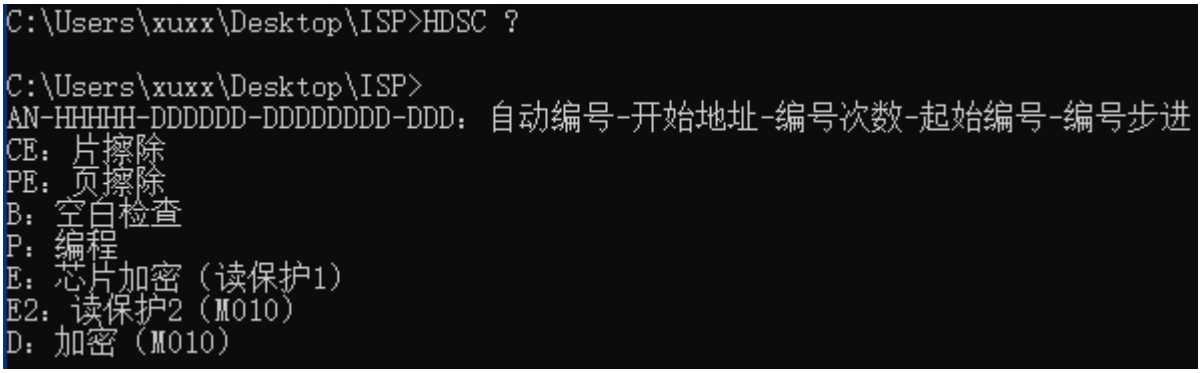


Figure 18 Supported commands

For example, enable auto numbering, set the start address to 0x2000, set the number of times to 1, set the starting number to 0, set the numbering step to 1, and at the same time, select the slice erasing, blank checking and programming, and then type "HDSC AN-2000-1-0-1 CE B P" to return to the car, and then the result of the operation is shown in Fig. 19.

Figure 19 Example operation information

Attention:

- Separate the parameters of different commands with a space.

4. error handling

4.1 draw attention to sth.

Alerts	descriptive	deal with
Connection successful	Connection successful	
MCU is encrypted and needs to be rebooted manually. MCU, after manually restarting the MCU, click the "Yes (Y)."	Prompt to manually reboot the MCU	Manually restart the MCU and click the Yes button to continue.
Auto-numbering completed	Auto-numbering complete	
Auto-numbered addresses overlap with user codes and are Will the operation continue?	Ask whether to continue automatic numbering	Click "Yes" to continue numbering, otherwise stop writing. serial number

Table 3 Hints

4.2 incorrect

error message	descriptive	deal with
Please select the Hex file to be burned	Hex file not selected	Select Hex File
Incorrect file path or invalid file	The path to the selected Hex file does not exist or the The file is invalid or occupied.	Reselect the Hex file and make sure that the Hex text is not in any way inaccessible to the user. Valid and unoccupied
Hex file format error	Hex file format error	Verify that the Hex file is correct
Hex file error! Length exceeds selected chip Flash size.	Hex File Size Exceeds Selected Chip Flash magnitude	Reselect the correct Hex file or re Choosing the right target MCU
Please install a serial port for this computer	This computer does not have a serial port	Installing a serial port
Serial port operation timeout	communications failure	Check hardware connections, check firmware Match, try re-powering
Read unsuccessful	Failed to read	Check hardware connections, check firmware Match, try re-powering
MCU Flash is encrypted	Flash is encrypted and data cannot be read	Encrypted chip, Flash data cannot be read out.
Unsuccessful chip erase	Chip Erase Failure	Check hardware connections, check firmware Match, try re-powering
Page Erase Chip Unsuccessful	Page Erase Failure	Check hardware connections, check firmware Match, try re-powering
Page Erase Chip Unsuccessful: Chip Encrypted	Encrypted chips cannot be page erased	Selector chip erase
Blank check unsuccessful	Blank check failed	Check hardware connections, check firmware Match, try re-powering
Unsuccessful test and zeroing	Failure to test and zero	Check hardware connections, check firmware Match, try re-powering
Programming doesn't work.	Programming Failure	Check hardware connections, check firmware Match, try re-powering
Verification was unsuccessful	validation failure	Check hardware connections, check firmware

Table 4 Error

5. Version Information & Contacts

dates	releases	edit a record
2017-11-10	Rev1.0	Cortex-M In-Circuit Programmer User's Manual First Edition Released
2019-4-9	Rev1.1	Add description of software version V1.4.
2019-4-15	Rev1.2	Add support for chip models
2019-9-3	Rev2.0	Support for software version 2.0
2021-12-31	Rev2.01	Model Increase

If you have any comments or suggestions during the purchase and use, please feel free to contact us.

Email: mcu@hdsc.com.cn

Website: http://www.hdsc.com.cn/mcu.htm

Address: No. 39, Lane 572, Bibo Road, Zhangjiang

Hi-Tech Park, Shanghai, 201203, P.R. China