

SOC LINK Series Programmer & Simulator User Manual (ARM Version)

Shenzhen SinOne Microelectronics Co., Ltd.

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Statement

The User Manual mainly describes the operating instructions for SOC LINK Series Programmer & Simulator (ARM version). Before use SOC LINK simulation or mass production development, please carefully read the user manual of related products and timely update programmer firmware and development tools to the latest version.

The Company reserves the right of final interpretation of all products.

Please refer to the following link for the latest specification of related products:

<http://www.socmcu.com/>

Please visit the following link for the latest development tools:

<http://www.socmcu.com/>

1 Introduction to Programmer & Simulator Tools

Self-developed by Shenzhen SinOne Microelectronics Co., Ltd. (hereinafter referred to as "SOC"), SOC MCU development/mass production tools are composed of online development tools, mass production programmers and PC software. Online development kits are used for developing and debugging and mass production programmer is used for batch programming of chips.

Before using the tool, it is recommended to visit <http://www.socmcu.com> to obtain the latest user manual and read it carefully.

For any problems, suggestions or comments during the use, please contact [0755-26652552](tel:0755-26652552) or email to SOC_support@socmcu.com.

The following table lists the functions of SC LINK PRO:

Type	SC LINK PRO
Programming Tool	SOC Programming Tool Enhance
KEIL C Plug-ins	SOC_KEIL_MDK_Setup
Applicable product	SC32F
Simulation	√
Online programming	√
Offline programming	√
OLED display	√
Output voltage	Software control
Multi-Code	24

1.1 Programmer & Simulator: SC LINK PRO



Name	All Models	Function Description
SC LINK PRO	SC LINK PRO + 4PIN Cable	• SOC programmer & simulator • Applicable to online and offline programming and simulation for SOC ARM series and debugging of Touch Key chips • Automatic IC inspection without any action • Available to connect programmer interface • OLED display • Multi-Code management

2. Programmer & Simulator SC LINK PRO

2.1 Hardware Description

2.1.1 Specifications

Parameter Name	Min	Max	Unit	Test Conditions
Operating Voltage	4.5	5.5	V	
Operating Current (idle)	-	70	mA	Operating Voltage =5.0V
Output Current	-	400	mA	Operating Voltage =5.0V Supply Current≥500mA
Supply Voltage of Programming Interface (5V)	Equal to Supply Voltage		V	
Supply Voltage of Programming Interface (3.3V)	3.2	3.4	V	Operating Voltage≥4.5V
Length of External Programming Cable	-	60	cm	Operating Voltage≤5.0V
Capacitance Range between VDD and VSS upon Programming on Board	-	1000	uF	Operating Voltage≤5.0V

2.1.2 Descriptions

SC LINK PRO is designed for SOC ARM series IC offline/online programming & simulation and TouchKey debugging.



- ① USB Interface: Used for connecting PC and power supply
- ② Programming buttons: Programming start in offline programming mode; Keep holding and power on will enter firmware upgrading mode
- ③ RUN Lamp: Red light indicates power on
- ④ Busy Lamp: Red light, lamp flashes means IC programming in offline programming mode or firmware upgrading
- ⑤ OK Lamp: Blue light indicates programming completed
- ⑥ NG Lamp: Red light means programming failed
- ⑦ Cable Interface: The cable interface below is sorted subject to the actual sequence with the function category distinguished by the font color: blue for programming interface, black for programmer interface and red for power output interface

VDD	DIO	VSS	CLK	RST	CEN
GND	OK	NG	Busy	Start	3.3V

2.1.2.1 Function Description for Programming Interface

Use 4PIN cable for ICP programming, details are shown in Table 2.1.2-1.

Table 2.1.2-1

Descriptions for ICP Programming Interface	
Name	Function Description
VDD,VSS	Power and ground (pin) of programmed IC
CLK,DIO	Programming signal interface, connecting tCLK and tDIO of target IC

2.1.2.2 Description for Programming Voltage

The voltage can be switched automatically by programmer based on the upper computer, which becomes valid only upon **Programming/Null Checking/Erasing**.

2.1.2.3 Function Descriptions for Programmer Interface

Name	Function Descriptions
GND	SC LINK PRO signal ground
OK	Programming status interface, low level indicates programming is completed
NG	Programming status interface, low level indicates programming failed
Busy	Programming status interface, low level indicates programming is in progress
Start	Programming start signal interface, low level indicates valid
3.3V	Programmer power supply, Note: Only 3.3V rather than 5V can be selected!

2.2 SC LINK PRO OLED Display

SC LINK PRO programmer comes with an OLED display for programming information. Supported functions are as follows::

- ① Display USB connection status and the UID of current programmer after connecting to PC;
- ② Display the name of currently programmed IC in offline programming mode;
- ③ Display the programming Option checksum of the loaded code;
- ④ Display CRC checksum of the loaded code;
- ⑤ Display the programming state after offline programming is completed;
- ⑥ Display the programming count allowed in limited programming mode after power-on;
- ⑦ Save the limited programming count and sequence number after power-down;
- ⑧ Display the voltage of current programming in online mode;

2.2.1 Display Connection Status in Online Programming Mode

When SC LINK PRO is in online programming mode, OLED will display "LINK: USB" to indicate that it is currently connected to PC, and will display SOC LOGO, the unique ID (UID) of current programmer and currently default programming voltage, as shown in Figure 2.2.1.

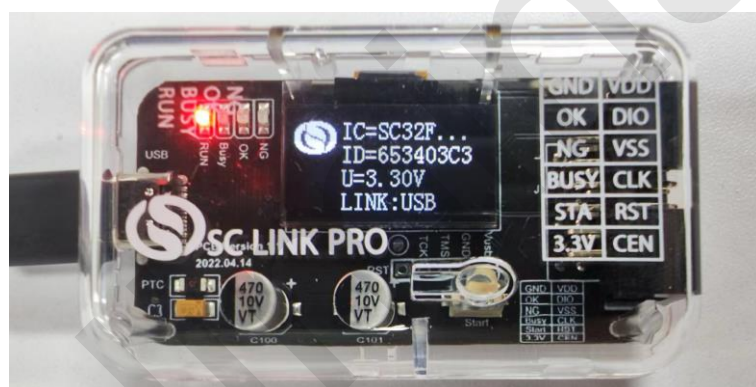


Fig. 2.2.1 SC LINK PRO Display View

2.2.2 Conventional Programming Display in Offline Mode

In offline programming mode of SC LINK PRO, OLED will display the downloaded project file that has been preloaded, including IC name, CRC Checksum (CS), Programming Option (OP) and Programming Status (SA). Figure 2.2.2 shows the display with programming succeeded, in which OK is displayed and blue light is on.

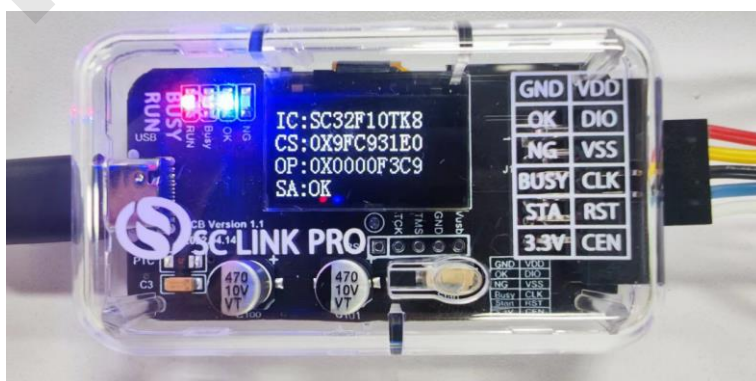


Fig. 2.2.2 SC LINK PRO Display under Conventional Offline Programming

2.2.3 S/N Programming Display

- ① First download the project code checked with limited programming to SC LINK PRO, then use offline programming mode to display IC name, CRC Checksum (CS), Programming Option (OP) and Programming Status (SA) during power-on and programming process. Figure 2.2.3-1 shows programming in progress; once the programming is completed, the S/N currently written in will be displayed, as shown in Figure 2.2.3-2.
- ② S/N programming supports power-off memory function.

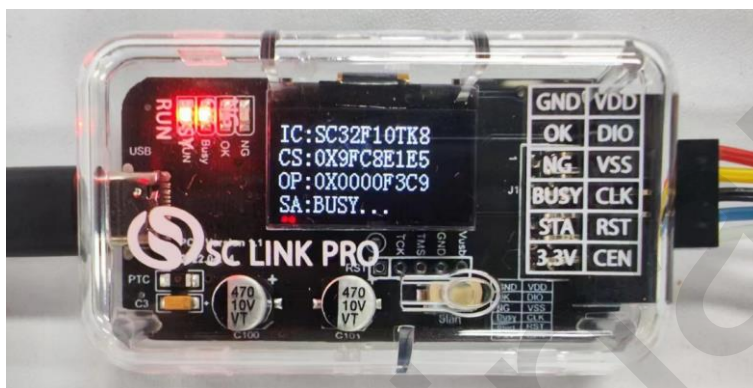


Fig. 2.2.3-1 SC LINK PRO S/N Offline Programming in Progress



Fig. 2.2.3-2 SC LINK PRO S/N Offline Programming Completed

2.2.4 Limited Programming Count Display

- ① First download the project code checked with limited programming to SC LINK PRO, every time when programming button is pressed, OLED will display the remaining programming counts until the maximum is used up, and then Error status will appear, as shown in Figure 2.2.4-1 and 2.2.4-2.
- ② Limited programming mode supports power-off memory function.

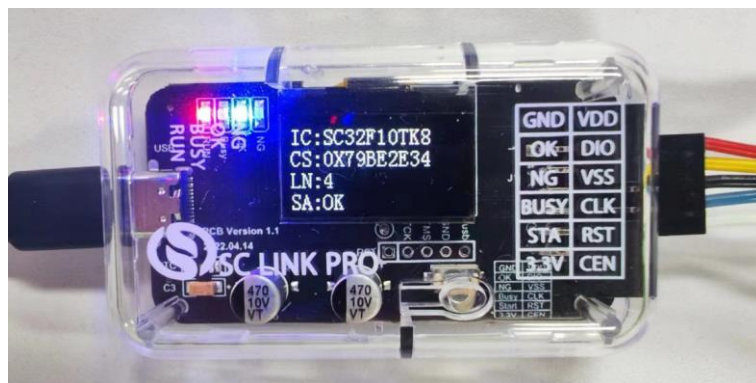


Fig. 2.2.4-1 Programming with Limited Counts Completed

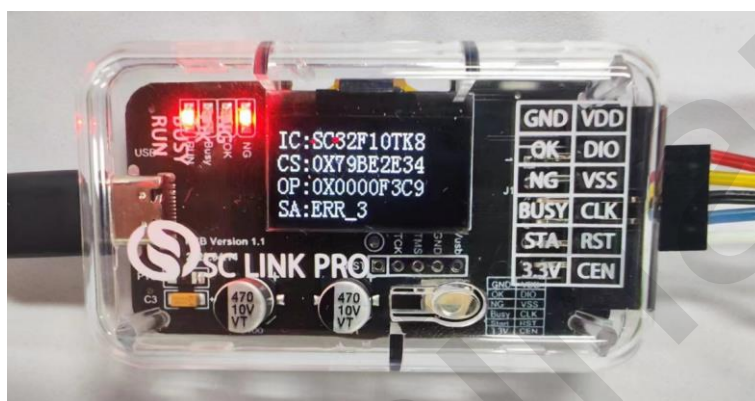


Fig. 2.2.4-2 Programming Failed with Limited Counts Used Up

2.2.5 Description for Display Names on SC LINK PRO OLED

A variety of code names are displayed on SC LINK PRO OLED with related interpretations and meanings shown as follows:

Code Name	Meanings
IC	IC name of currently loaded project
CS	CRC Checksum of currently loaded project (Refer to the SOC Programming Tool for this checksum)
OP	The programming option code of currently loaded project (Refer to the programming software for this checksum)
SN	S/N currently written in
LN	Remaining programming counts for currently loaded project
SA	Current programming status (BUSY/OK/ERR)
U	Currently programming voltage
LINK	Link
ID	The Unique ID of current programmer
Iap Update	Enter IAP mode for firmware upgrading

2.2.6 Description for Error Code of Programming

When MCU programming fails, NG indicator will light on with error type displayed on OLED. Meanings for error codes are shown as follows:

Error Code	Descriptions for Error Code	Solutions
ERR_1	The connection between SC LINK PRO and the signal pin of programmed IC is abnormal and unable to enter JTAG	1. Check if MCU is placed correctly or if the pin is shorted or disconnected; 2. Check if the programming cable is connected improperly;
ERR_2	Programming error	Please try again;
ERR_3	The limited count of programming is 0;	Please download the project file again;
ERR_5	S/N programming error	Please check if the address programming is out of range
ERR_6	Error in Flash data downloaded	Please replace SC LINK PRO and try again

2.3 SC LINK PRO Simulation

2.3.1 Configurations before Simulation

SC LINK PRO provides MCU online simulation for SOC ARM series, which is available for debugging, step debugging, step-over debugging and RST operations for up to 3 breakpoints, to view and modify RAM and SFR and debug the program in development stage. Before using it, you must first download the Keil simulation plug-in from the official website. For detailed instructions on installing the Keil plug-in, see [4.1 Install Simulation Plug-ins](#). After installing the plug-in, configure Keil in the [4.2 Set Keil Interface](#).

For details on the programming and simulation interface, see [2.4 Instructions for SC LINK PRO Programming](#). Only after completing these configurations can you proceed to the simulation step.

2.3.2 SC LINK PRO Simulation Operations

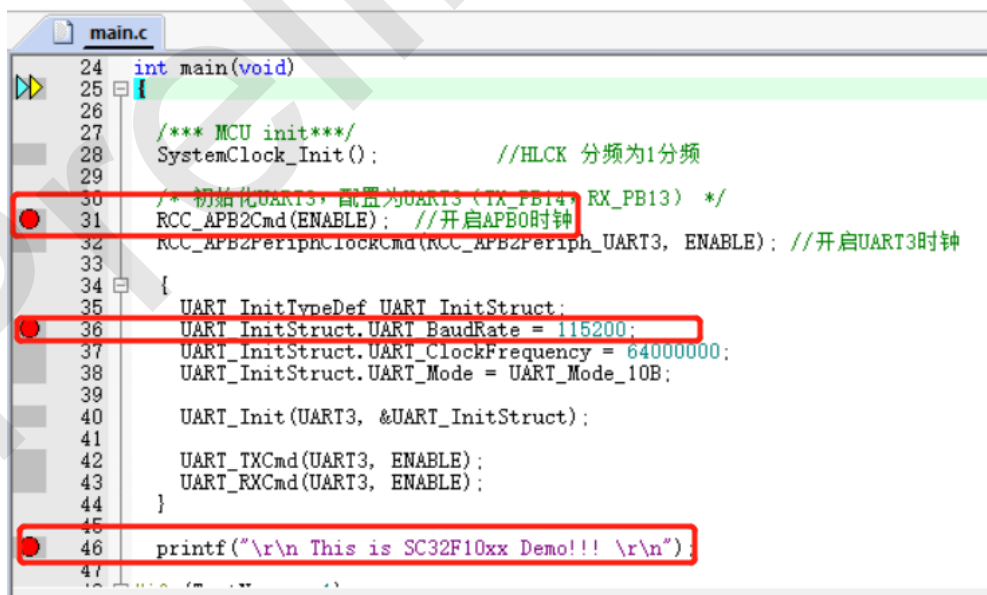
After above configurations are completed, user can perform simulation for up to 3 breakpoints. For the convenience of description, a specific example is given here to complete breakpoint simulation based on the following steps.

2.3.2.1 Set/Delete Breakpoint

Breakpoint Setup: Double click the left mouse on source program line of the preset breakpoint, or press “F9” button, or click the shortcut icon “Insert/Remove breakpoint” (on the right of “Debug” button). When the red block appears on the left of the line, the setting is succeeded.

Breakpoint Cancel: Before pre-cancelling the breakpoint, double click the left mouse, or press “F9” button, or click the shortcut icon “Insert/Remove breakpoint” (on the right of “Debug” button). When the red block disappears on the left of the line, the setting is succeeded.

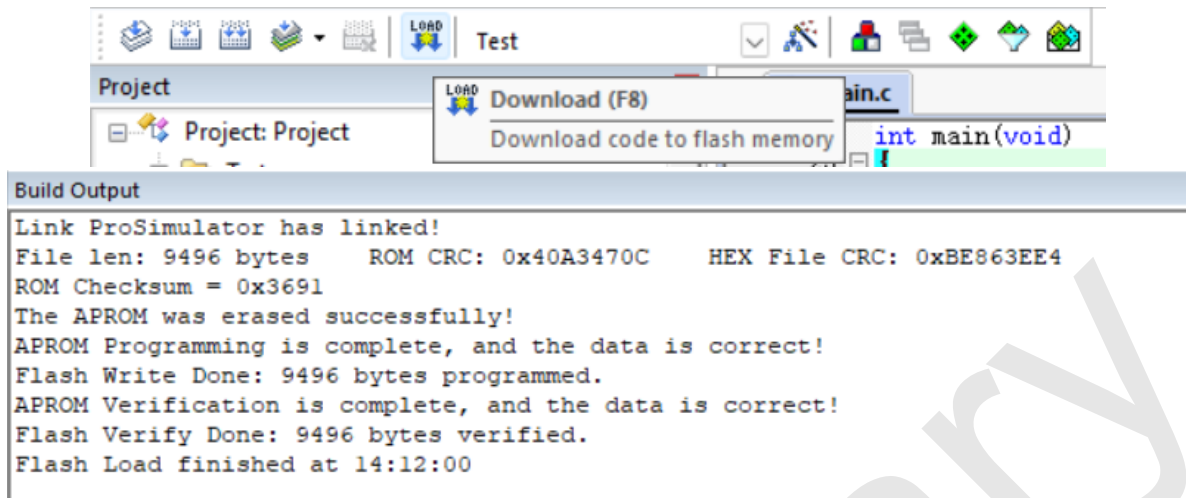
Note: Before simulation, it is required to pre-set the breakpoint. The breakpoint can be set/deleted during the simulation process, as shown in the figure below:



2.3.2.2 Download Program

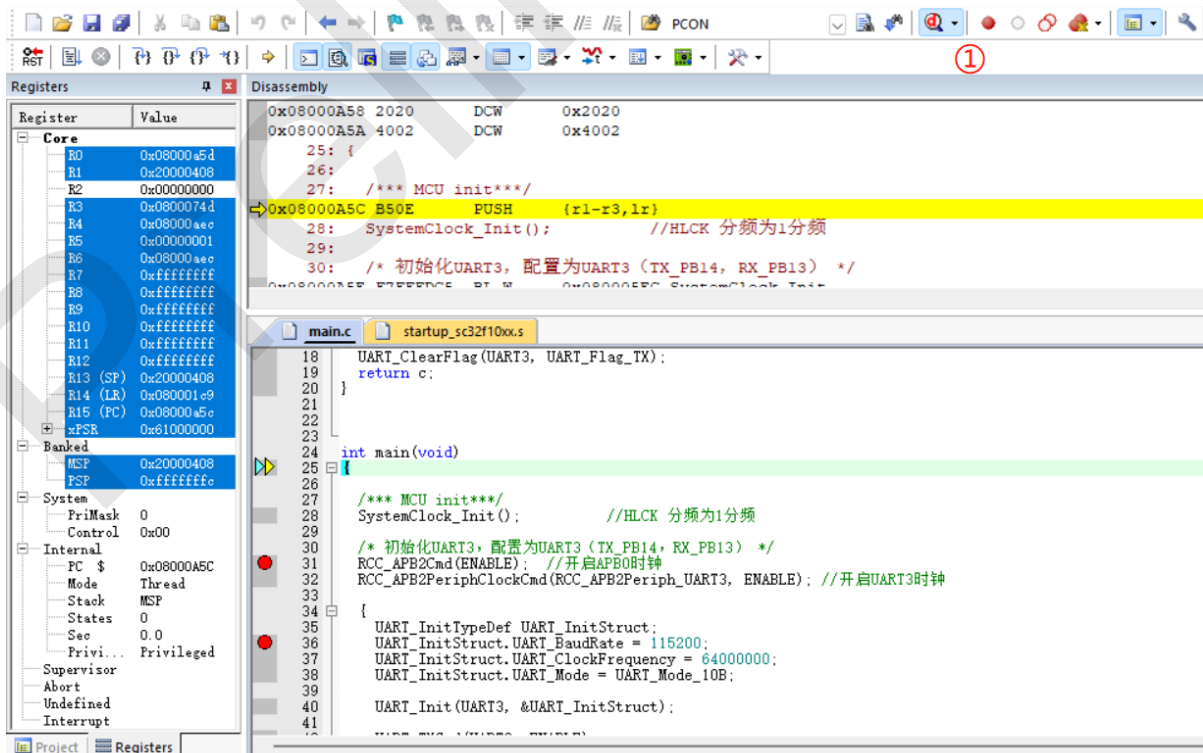
After the programming is completed, click the shortcut icon “Download” to complete the code programming. The programming depends on “ProgramSetting” in “Programming Option”, check “Programming” and “Verifying” to program and then verify “Download” process and output relevant information in “Build OutPut” Window.

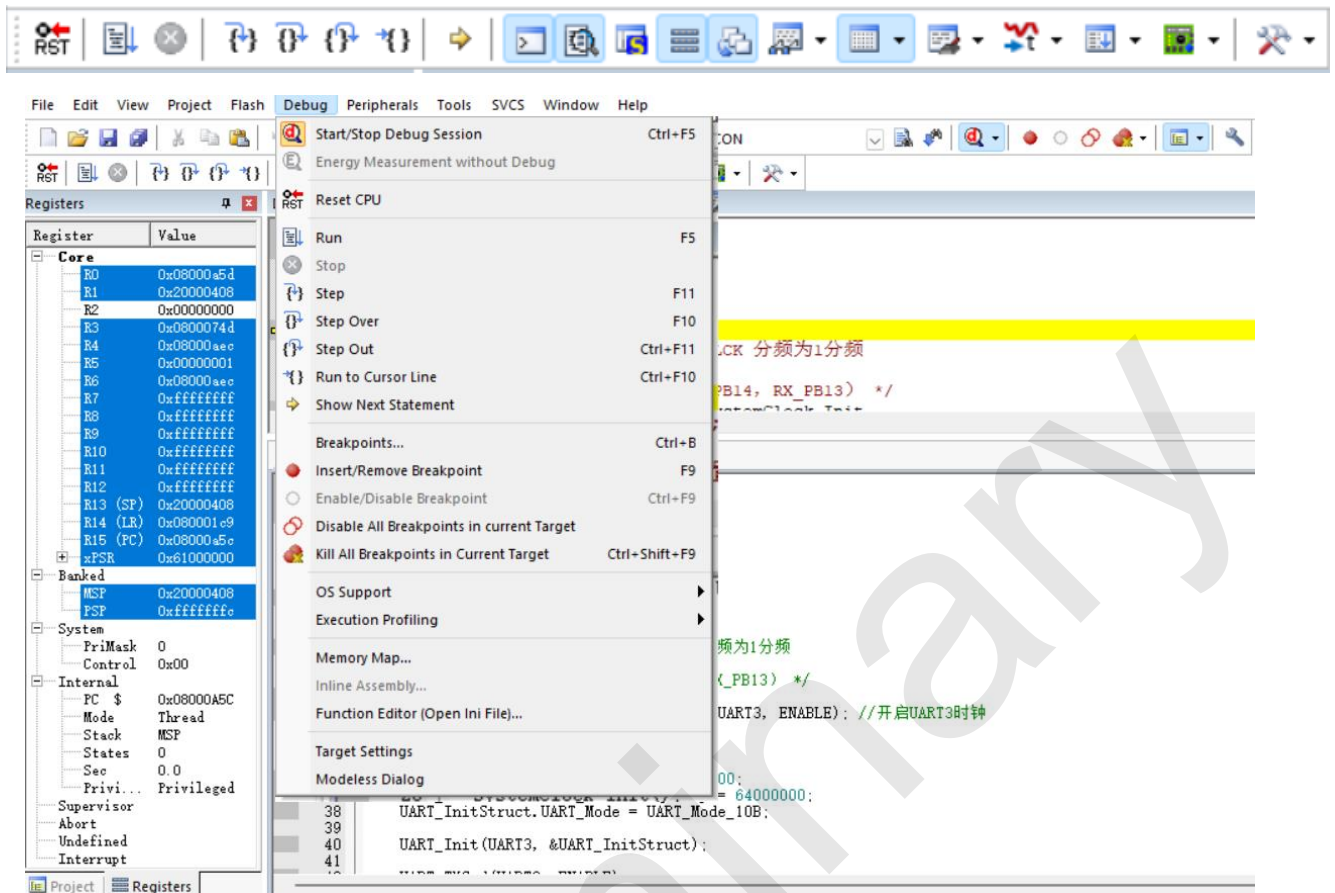
Note: If Download fails, an error message is displayed. Or else, Download succeeds.



2.3.2.3 Enter/Exit Simulation

After the program Download succeeds, click the shortcut icon “Start/Stop Debug Session” button, or press the shortcut key “Ctrl+F5” or click “Debug-> Start/Stop Debug Session”, as shown in the figure below. After entering correctly, “D” button is in sunk state indicating it is open; click it again to exit the debug and “D” button is in smooth state indicating it is closed. After entering the simulation debugging interface, debug-related menus will be added on the toolbar, including Reset, Run, Stop, Pause, Step, Step Over, Step Out, Run to Cursor Line, Show Next Statement, Command Window, Disassembly Window, Symbol Window, System Register Window, Call Stack Window, Observation Window, Memory Window and Serial Port Window, etc. Menus in the toolbar mentioned above can be found in current “Debug” menu bar. For ease of operations, subsequent operations are performed from the toolbar.





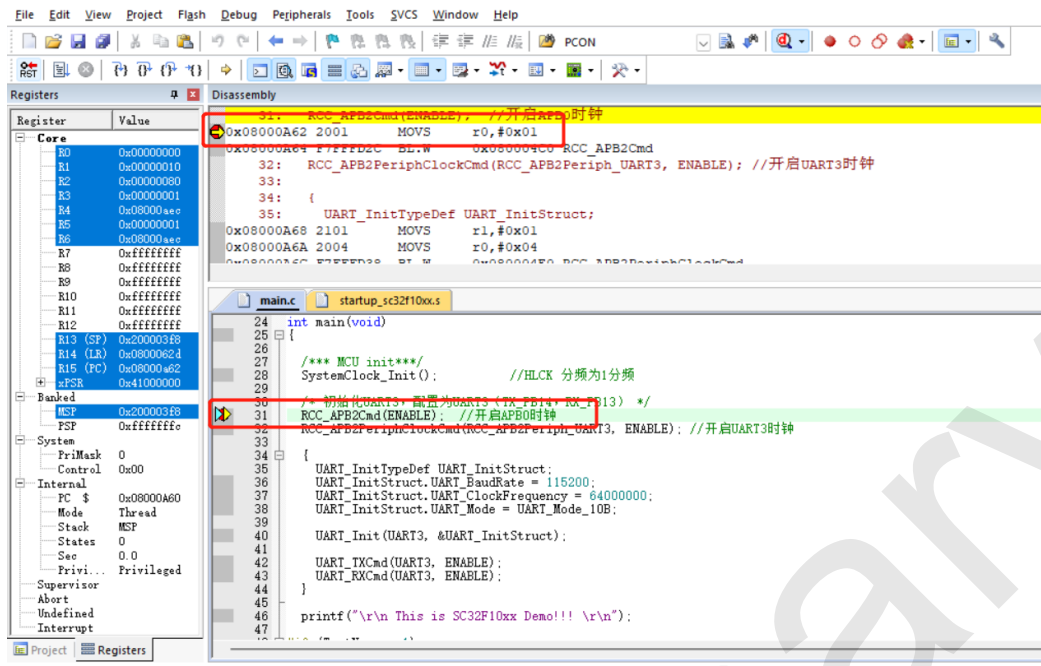
If it fails to enter the debugging interface, please check if the configuration is correct before simulation.

2.3.3 Simulation Run Operations

Once entering the simulation status, you can perform a series of simulation operations, including Full-speed Run to Breakpoint (Run), Step Track (Step), Step Over, Run to Cursor Line and Reset.

2.3.3.1 Full-speed Run to Breakpoint (Run)

Set up the breakpoint before entering the simulation status, click the shortcut icon "Run" button or "F5" to run to the breakpoint at full speed, as shown in the figure below:



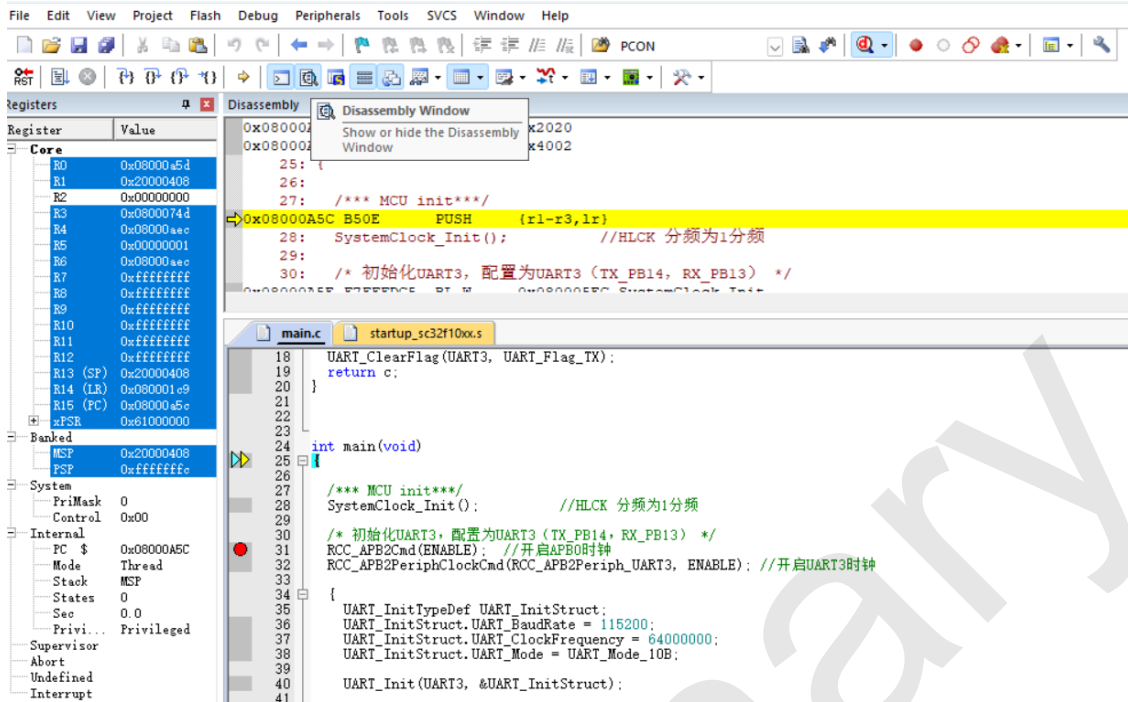
In the figure above, when running at full speed to the first breakpoint and stopping at this breakpoint, a yellow debugging arrow appears to the left of the breakpoint, pointing to the current stop line. If you open the Disassembly window, such yellow debugging arrow also appears, pointing to the PC address of current program.

When running at full speed to the first breakpoint, it will run from this address to the first breakpoint before stopping. Compared with other simulation operations, the execution speed is the fastest.

2.3.3.2 Step Track (Step)

Step Track means the program stops after executing a line each time.

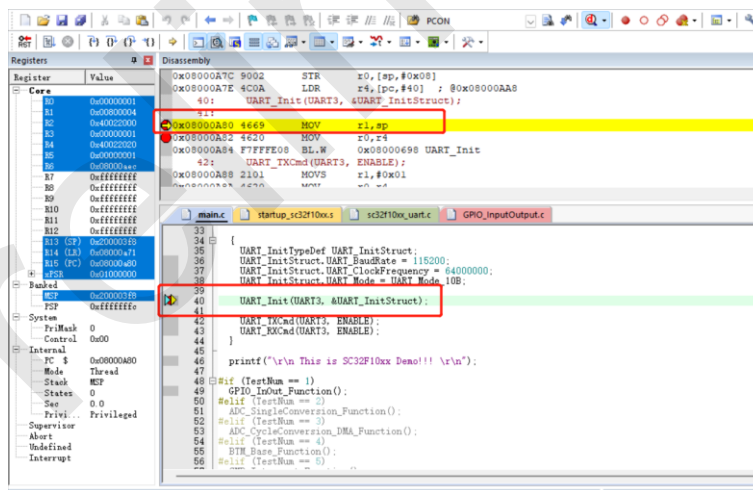
- ① Click the shortcut icon "Stop" button or press the shortcut key "F11", the program will run one step at a time. It should be noted that the step running process will be different in C Source Program window for "Disassembly" window to be open or closed by default. It is recommended to keep "Disassembly" window in open state during the Step process.
- ② Open/close "Disassembly" window. Click the shortcut icon "Disassembly Window", the sunk state indicates on, "Disassembly" window will appear at this time, and disassemble the current program line; the smooth state incitates off, "Disassembly" window will disappear

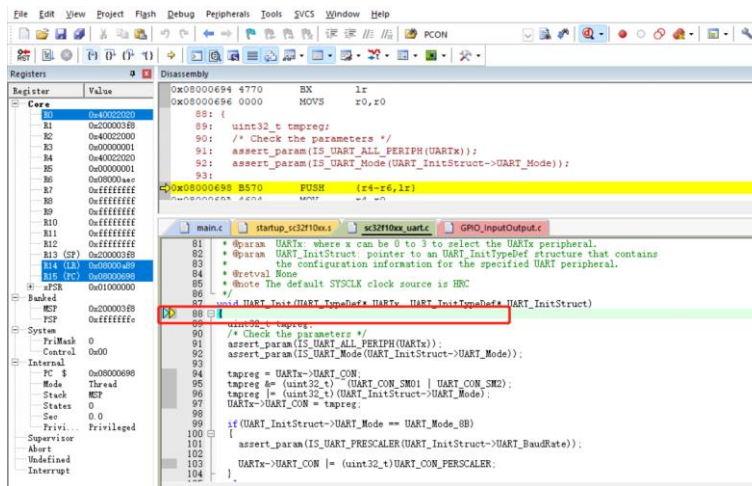


③ Open the “Disassembly” window and run Step

The current program stops at the function body `UART_Init(UART3, &UART_InitStruct)`, press F11 to execute the program line that current yellow arrow points to, and then the arrow will point to the next line. The result is shown below. Press F11 repeatedly to execute the program line by line.

Open the “Disassembly” window and execute the disassembly line by default; To execute the source code line, left click the source code interface.





2.3.3.3 Step Over

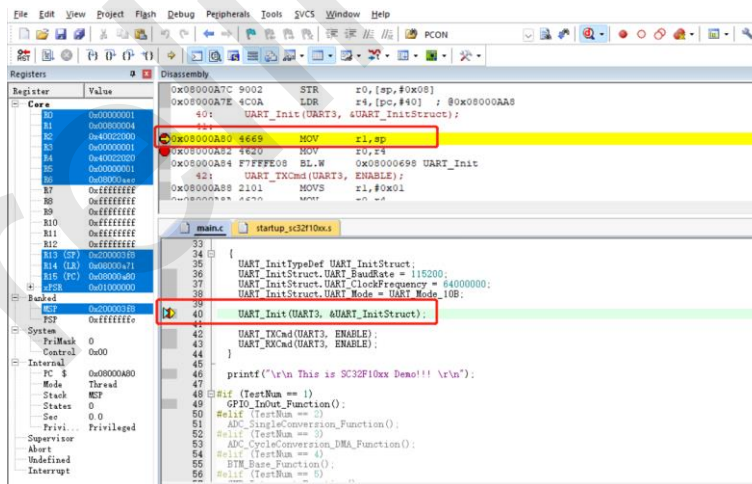
When executing the program to a subfunction or CALL/LCALL in the assembly, the operation will run the subfunction at full speed to the next command rather than stepping into the subfunction.

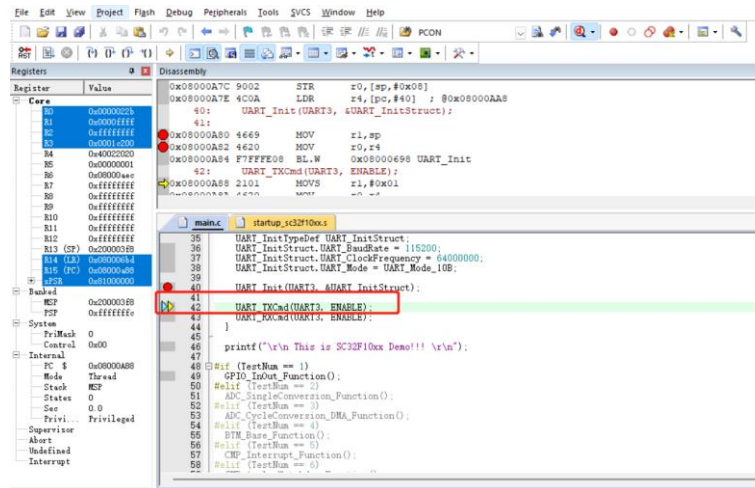
Note:

- ① If the position where the program is executed is not a subfunction, the operation will obtain the same result as that of step track;
- ② If any breakpoint exists in the subfunction, the program will stop at the breakpoint first.

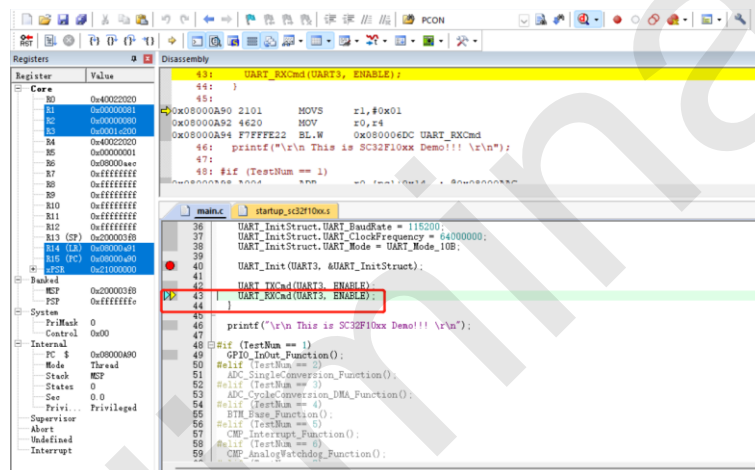
Click the shortcut icon "Step Over" or the shortcut key "F10".

Still take the current breakpoint stopping at UART_Init(UART3, &UART_InitStruct) as an example, press F10, keep the cursor outside the function and run this function at full speed, then the yellow arrow will point to the next line, as shown in the figure below:





Continue pressing F10 and observe the Disassembly window, its running results will be the same as that of Step Track, as shown in the figure below:



2.3.3.4 Run to Cursor Line

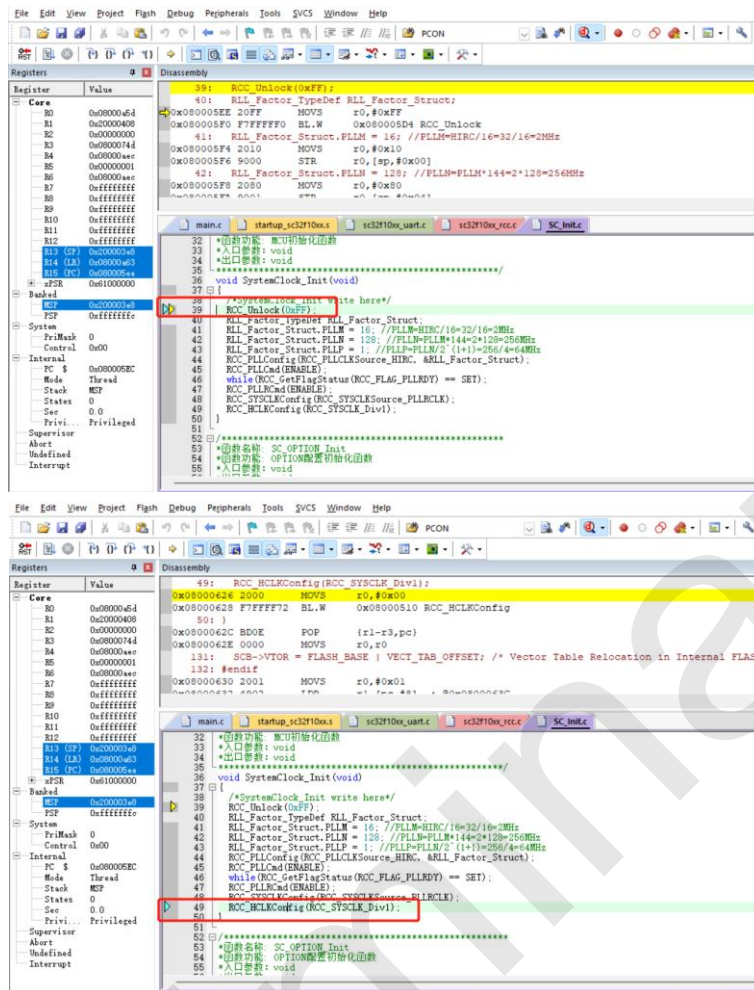
If the simulation efficiency between breakpoints through Step Track or Step Over is low and expected to run to the source line directly, run Run to Cursor Line.

Press the shortcut icon “Run to Cursor Line” or the shortcut key “Ctrl+F10”.

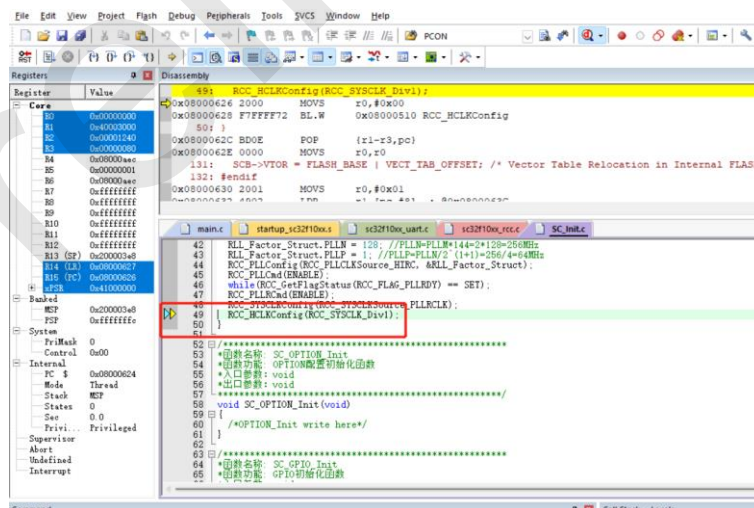
For example, as shown in the figure below, select “Run to Cursor Line” to directly stop the program at the last line of SystemClock_Init() function.

Position Cursor: Left click the program line preset and a blue arrow appears indicating the line is selected, as shown in the figure below:

Note: The preset program line must be operable from the line with current yellow arrow, otherwise running to the cursor will become invalid.

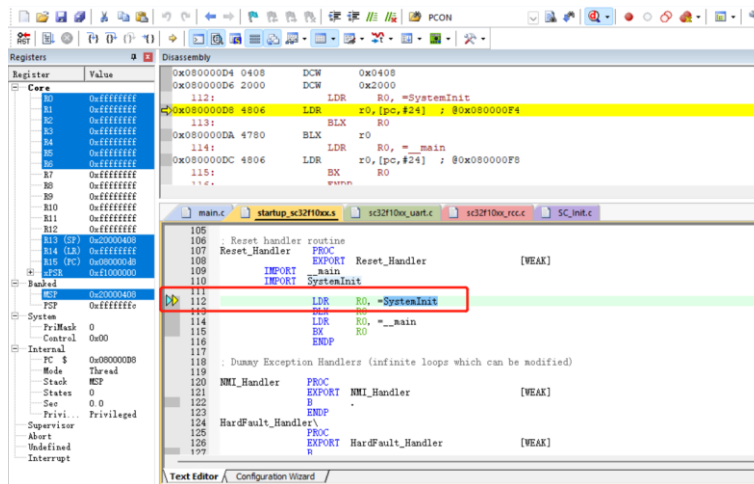


Press Ctrl+F10 and run to the cursor line at full speed before stopping, then the yellow arrow will appear at positioned cursor line, as shown in the figure below:



2.3.3.5 Reset

Click "Reset" button to reset the program with the yellow arrow pointing to SystemInit, as shown in the figure below:



2.3.4 View and Modify Variables

2.3.4.1 Use Watch Windows to View and Modify Variables

In simulation debugging mode, view or modify current variable by Watch Windows

① Open Watch Windows

Click the shortcut icon "Watch Windows" to show 2 optional windows: Watch1, Watch2, Any Window icon with light yellow background indicates it is checked, and a sub-window appears at the bottom of KEIL interface, as shown in Figure 2.3.4-1; When clicking "Watch1" or "Watch2", a Watch interface appears at the bottom of KEIL interface, as shown in Figure 2.3.4-2.

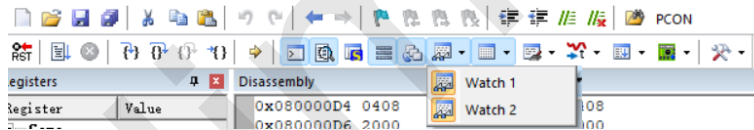


Fig. 2.3.4-1

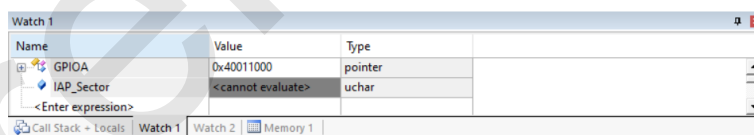


Fig. 2.3.4-2

② Fill in the variable to be pre-viewed/pre-modified

In the "Name" column, enter the Name of a variable that must exist in the source code, otherwise it is invalid. At this time, the value of current variable appears in corresponding "Value" column, as shown in Figure 2.3.4-3

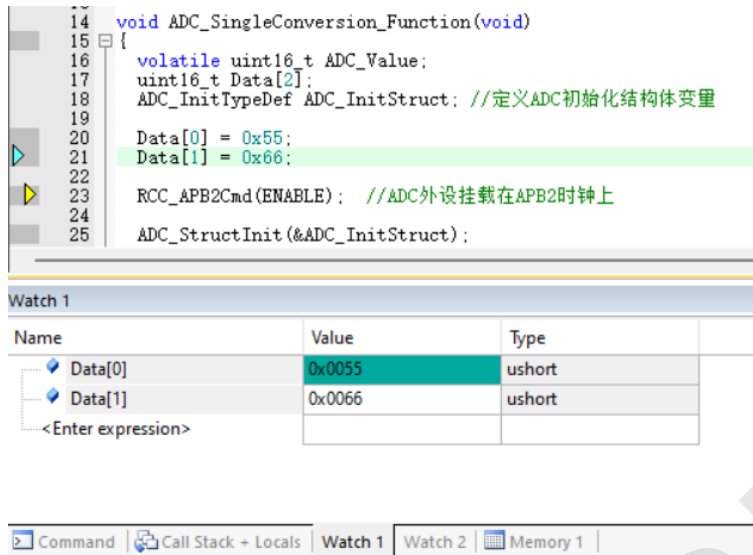


Fig. 2.3.4-3

In the figure above, add the variable Data[0]、Data[1], the values in Watch1 are 0x0055 and 0x0066 respectively.

Besides, in C source code interface, when the mouse moves over the variable name, its value and type will appear as well, as shown in Figure 2.3.4-4.

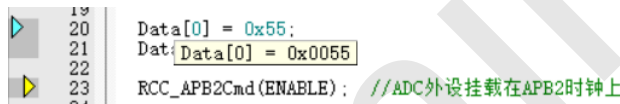


Fig. 2.3.4-4

③ Modify the value of variable

In the “Value” column of the variable to be modified, double click and modify the value, then click the left mouse at any position, the variable column will turn to dark color, as shown in Figure 2.3.4-5.

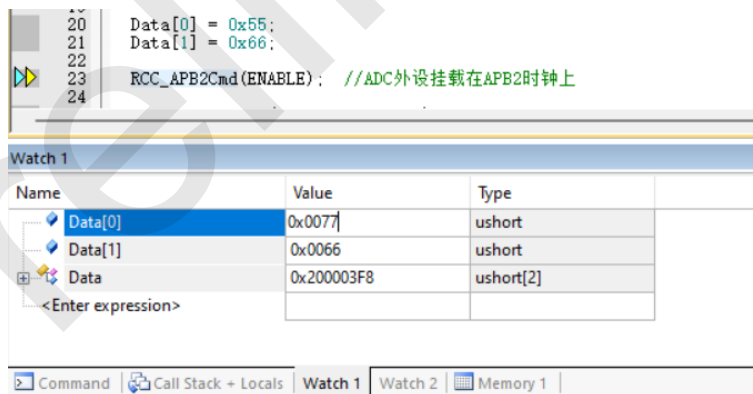


Fig. 2.3.4-5

In the figure above, the value of Data[0] is modified as 0x77.

2.3.4.2 Use Memory Window to View and Modify Variable

① Open Memory Windows

Click “Memory Windows” to show 4 optional windows: Memory1 - Memory4, as shown in Figure 2.3.4-6. Any Window icon with light yellow background indicates it is checked, and a sub-window appears at the bottom of KEIL interface; when clicking any window, a Memory interface appears at the bottom of KEIL interface, as shown in Figure 2.3.4-7.

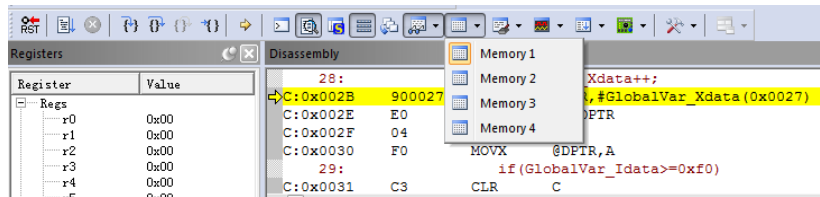


图 2.3.4-6

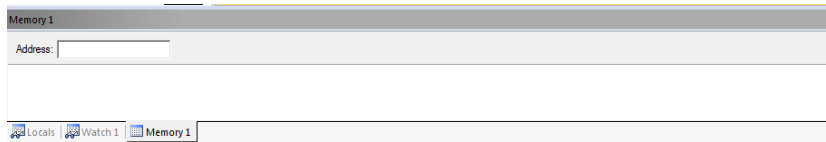


Fig. 2.3.4-7

② View/modify variable by address

In Memory interface, the Address column is used to input the starting address of memory to be displayed.

After completing the commands above, the value of variable beginning with Start Address will be displayed, and you can also double-click to modify it.

For example: Data[0] is the RAM area, the address is 0x200003F8, use 0x200003F8 as the starting address, and check the value of the RAM area, as shown in Figure 2.3.4-8.

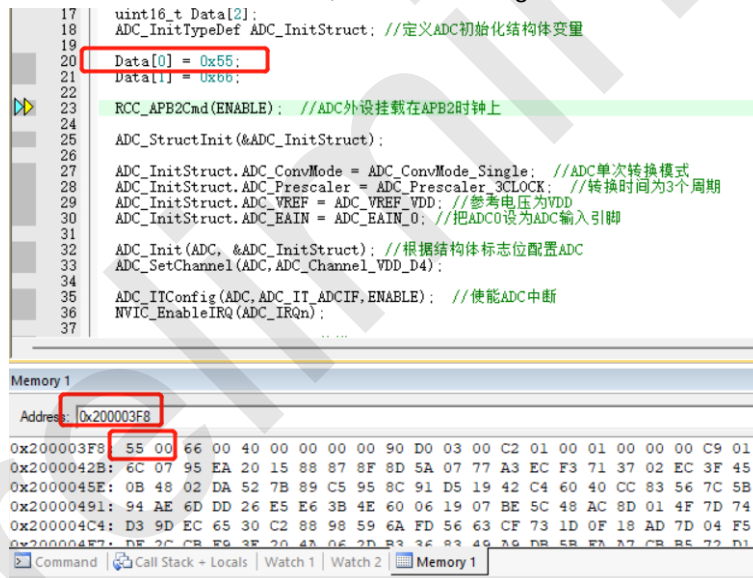


Fig. 2.3.4-8

In the figure above, the value of address 0x200003F8 is 0x55, and the value of address 0x200003F9 is 0x00. That is, the value of Data[0] is 0x0055, which is the same as the observation result of Watch1 in Figure 2.3.4-3.

Likewise, you can also modify the value of variable here, shown as follow:

1. Double click the value of the address in Memory to modify, as shown in Figure 2.3.4-9

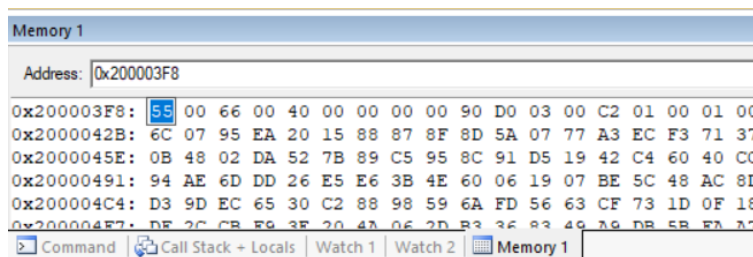


Fig. 2.3.4-9

2. Fill in a new value and click at any position to complete, as shown in Figure 2.3.4-10

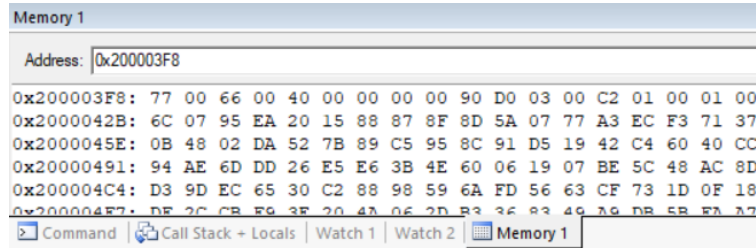


Fig. 2.3.4-10

Note: If the variable address is not clear, we recommend using Watch Windows.

2.3.4.3 View and Modify SFR

- ① Open Watch Windows

Same as the Watch window opened in viewing and modifying variables.

- ② Fill in SFR name to be pre-viewed/pre-modified

Fill in SFR name to be operated in "Name" column, this SFR must exist in the head file, otherwise it is invalid. At this time, the value of this SFR appears in corresponding "Value" column, as shown in Figure 2.3.4-11.

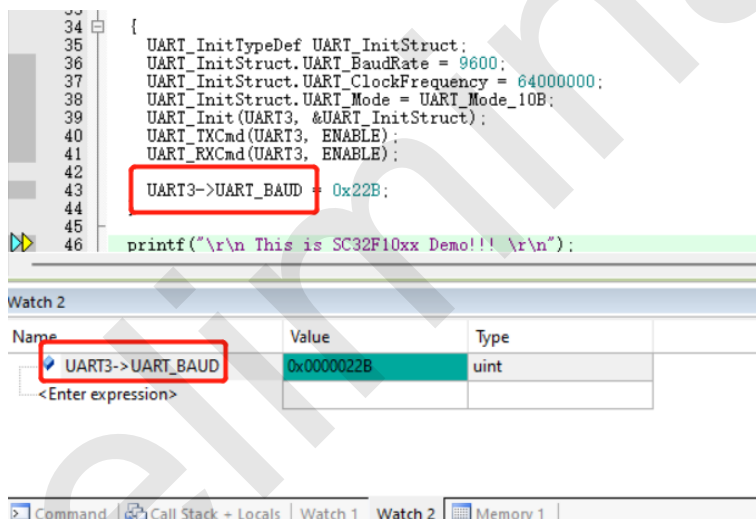


Fig. 2.3.4-11

In the "Value" column of the SFR to be modified, double click and modify the value, then click the left mouse at any position, the variable column will turn to dark color, as shown in Figure 2.3.4-12.

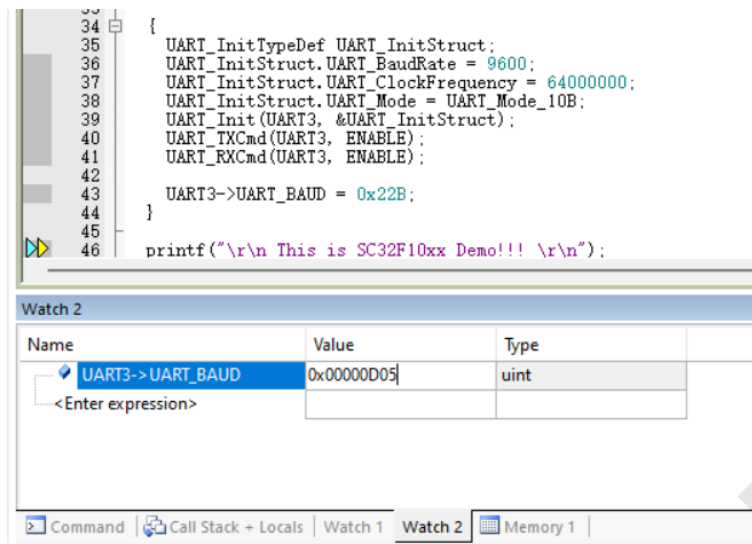


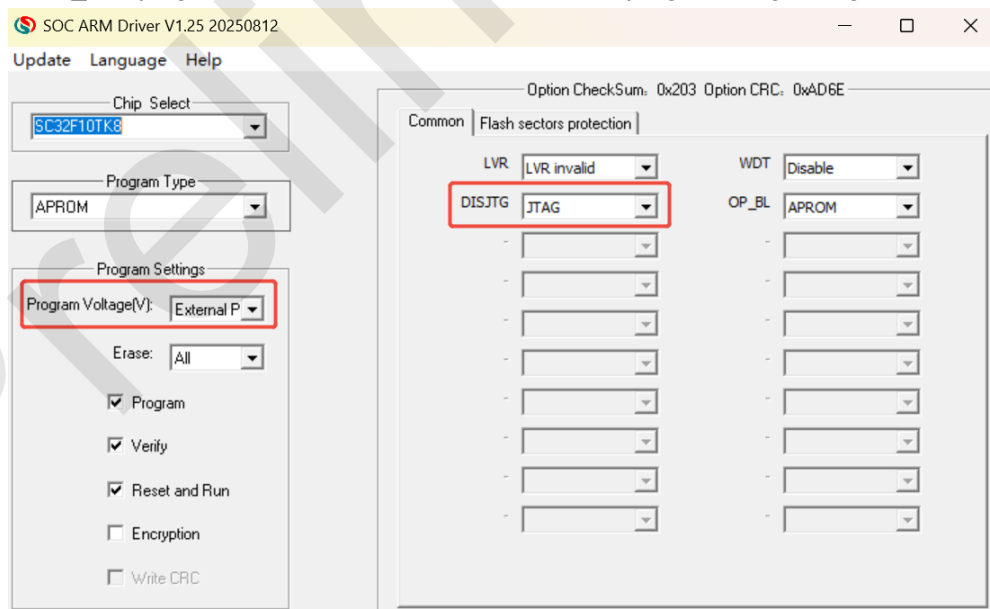
Fig. 2.3.4-12

2.3.5 Descriptions for External Power Supply Simulation

External power supply simulation has special requirements for IC settings. Please read the precautions and operating steps carefully before performing simulation in this mode.

Steps for external power supply simulation:

- ① Power on the target board with external power supply;
- ② Connect the target board with SC LINK PRO in power-off state;
- ③ Connect SC LINK PRO to PC via USB;
- ④ Open the SOC_Keil plug-in and select External Power for the programming voltage level;



- ⑤ configure the programming options and click "Download";
- ⑥ After Download is completed, you can enter the simulation mode.

2.3.6 Notes for Simulation

- ① This function is only valid for ICs whose DIO/CLK programming port has been configured as JTAG.

Users can first set the DIO/CLK programming port to JTAG mode in normal programming mode (modify it in programming OPTION);

- ② When the programming voltage is set to External Power, the plug-in will force the "DISJTG" in the programming OPTION setting to be set to JTAG. Under this function, the CLK/DIO port can only be used as a programming port and has no other functions. During simulation, do not operate these two IO ports in the simulated code area;
- ③ During the simulation process, do not disconnect USB or programming interface directly to avoid Keil breakdown. To disconnect USB or programming interface, exit Debut mode first;
- ④ For notes of external power supply simulation, see [2.3.5 Descriptions for External Power Supply Simulation](#).

2.4 Instructions for SC LINK PRO Programming

2.4.1 Firmware Upgrading

The firmware of SC LINK PRO features online upgrading to add new functions or correct problems. Specific methods for firmware upgrading are shown below:

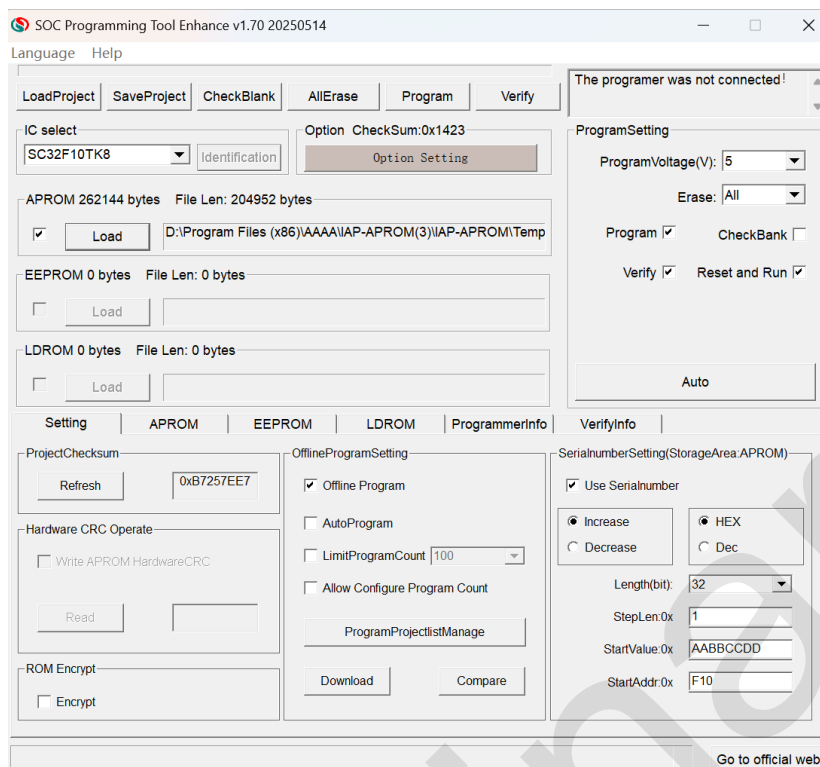
- ① For better experience, please visit <http://www.socmcu.com> to download the latest firmware files;
- ② There are 2 ways to enter IAP update mode. You are advised to select **Mode 1** for there is no need to plug SC LINK PRO:
 - (1) **Mode 1:** After connecting SC LINK PRO to PC, open SOC Programming Tool and click “**Upgrade Programmer Firmware**” on “**Programmer Information**” menu. At this time, Busy lamp on SC LINK PRO (red) will flash, indicating that it enters Firmware Upgrading mode;
 - (2) **Mode 2:** In power-off state of SC LINK PRO, long press “Programming” button, connect it to PC USB, at this time, Busy lamp on SC LINK PRO (red) will flash, indicating that it enters Firmware Upgrading mode;
- ③ In “Open File” dialog box, locate the firmware file (.iap file) and click “Open”;
- ④ Pop up the dialog box to display the current version and the version to be updated, and click “OK” button;
- ⑤ After the update is completed, SC LINK PRO will exit Firmware Upgrading mode automatically;
- ⑥ View the version information of upgraded firmware in “**Programmer Information**”.

Note:

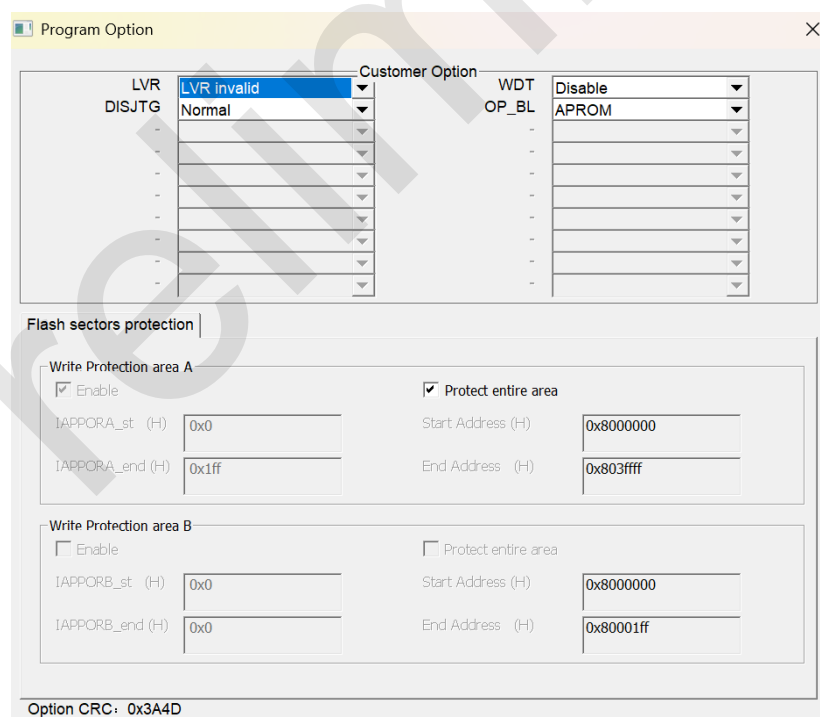
1. Before upgrading the firmware, please make sure that the firmware file (.iap file) to be upgraded is ready;
2. Interruption of the upgrade process will cause the programmer to malfunction;
3. During the process of firmware upgrading, you are not advised to perform other operations;
4. When the 51 series firmware V1.18 and above (HW_SCLINKPRO_VX.XX) and the ARM series firmware (HW_SCLINKPRO_MX.XX) are cross-upgraded, the offline programmer information and multi-code project information downloaded by the programmer will be formatted.

2.4.2 Steps for Online Programming

- ① Connect SC LINK PRO with the programming interface of target board;
- ② Connect SC LINK PRO to PC via USB cable, open SOC Programming Tool and select IC model from the drop-down list of “Chip Select”;



- ③ Check the target area to be programmed and click “Load” to load the code file to be programmed (HEX/BIN file);
- ④ Configure IC option in “option” tab;

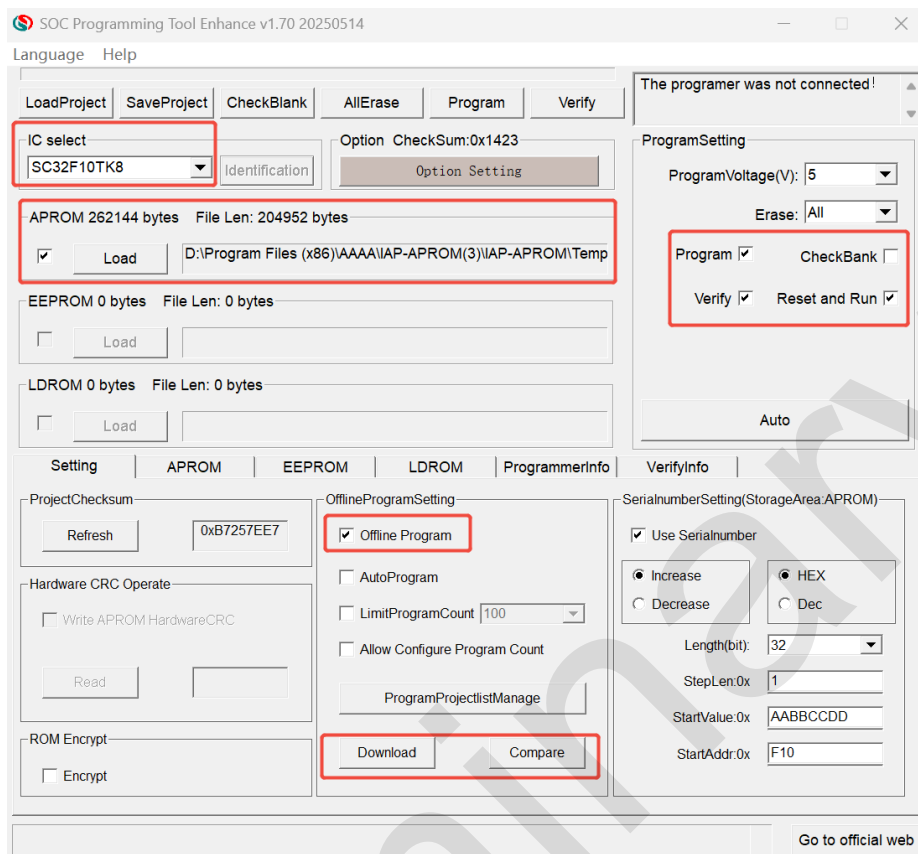


- ⑤ Select programming voltage and check Erasing, Programming and Verifying, etc.; For details about the selection of erasure options, please read: [2.4.4.1 Erase Option Description](#);
- ⑥ Click “Auto Programming” button to perform corresponding programming and verifying;

2.4.3 Steps for Offline Programming

- ① Connect SC LINK PRO to PC via USB cable, open SOC Programming Tool and select IC model from

the drop-down list of “Chip Select”;



- ② Check the programming area, click “Load” to load the code file to be programmed (HEX/BIN file);
- ③ Check the operation checkbox in “ProgramSetting”, such as Erase+Program + Verify; For details on the erase options, please read: [2.4.4.1 Erase Option Description](#). Please note that when programming offline, for securely encrypted ICs, only the full erase option can be selected; otherwise, the programming will fail!
- ④ Select Programming mode: Check “Auto Programming” for automatic programming mode, and uncheck for manual programming mode:
 1. In manual programming mode, press the button to program;
 2. In auto programming mode, SC LINK PRO will complete IC detection and programming automatically after power-on.
- ⑤ Configure IC option in “option” tab;

Program Option

×

LVR

DISJTG

-

-

-

-

-

-

-

LVR invalid

Normal

Customer Option

WDT

OP_BL

-

-

-

-

-

-

-

Disable

APROM

Flash sectors protection

Write Protection area A

☒ Enable

☒ Protect entire area

IAPPORA_st (H)

0x0

Start Address (H)

0x8000000

IAPPORA_end (H)

0x1ff

End Address (H)

0x803ffff

Write Protection area B

☐ Enable

☐ Protect entire area

IAPPORB_st (H)

0x0

Start Address (H)

0x8000000

IAPPORB_end (H)

0x0

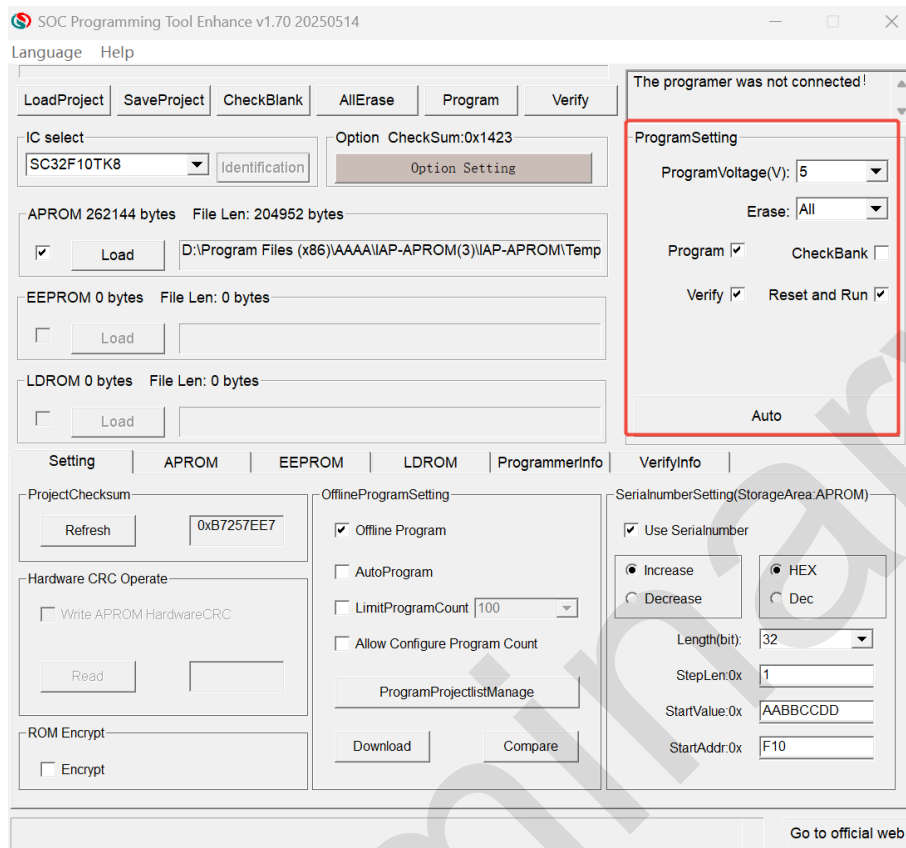
End Address (H)

0x80001ff

Option CRC: 0x3A4D

- ⑥ Click "Download" button and download the code file to SC LINK PRO;
- ⑦ Disconnect SC LINK PRO with PC USB, and use the external power supply via USB to power SC LINK PRO to start programming.

2.4.4 Programming Settings Description



Programming Options	Function Description
Programming Voltage	Programming voltage selection in online and offline programming modes, for programming voltage settings under external power supply programming, please refer to 2.4.7 Descriptions for External Power Supply Programming .
Erase	Erase the data in the selected programming regions, please refer to 2.4.4.1: Erase Options Description .
Program	Download the program into the target chip
Verify	Verify whether the programmed data in the chip is correct
Reset and Run	In online programming and external power supply programming modes, if this option is selected, the device will automatically power cycle and reset to run the program after programming is completed.

2.4.4.1 Erase Options Description

When programming ARM series chips, it is necessary to erase. The following is an explanation of different erasure options; please select the appropriate one according to the actual situation:

erasure options	Description of Programming & Erasure Options
None	No erasure, customers are advised not to select this option during programming; otherwise, it may result in programming failure.
Sector	Sector erasure, erases data in the corresponding sectors based on the programming area and program size.
All	Full erasure, erases all data in the programming area checked on the host

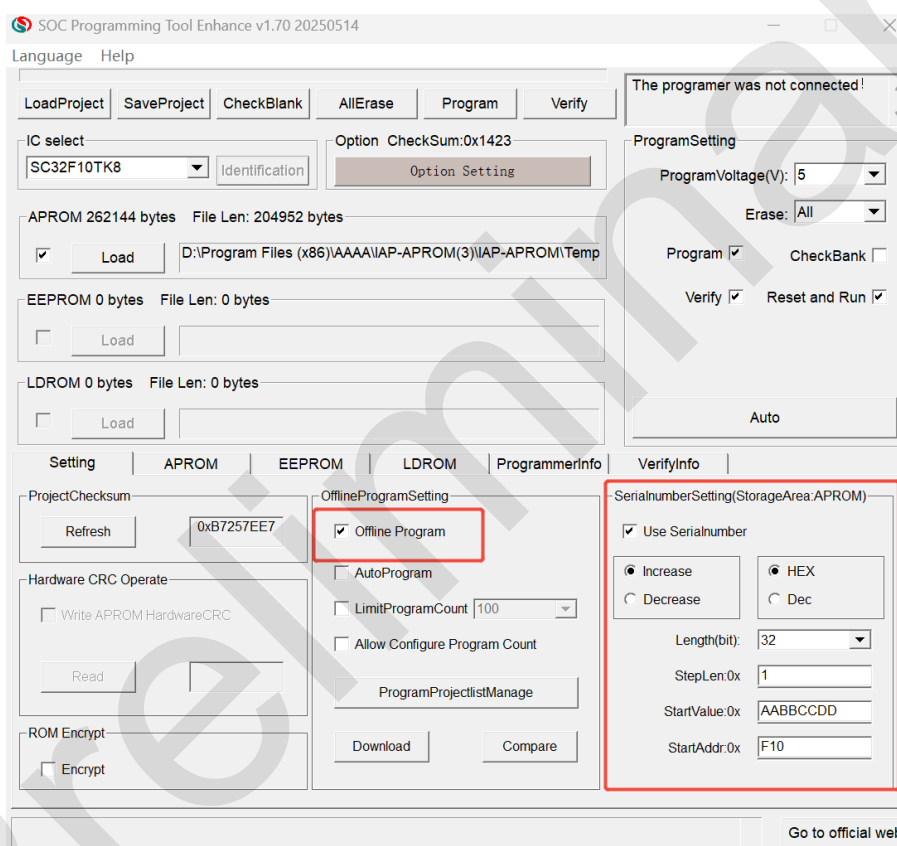
computer.

Note: During offline programming, for ICs with secure encryption enabled, only the "All" option can be selected for erasure; otherwise, programming failure will occur!

2.4.5 Comparison

To confirm if the programming code and configured items loaded by SC LINK PRO are correct, connect SC LINK PRO to PC via USB and open SOC Programming Tool, and then click "Compare" button to check if the current programming configurations and programming codes loaded consistent with the contents loaded in SC LINK PRO.

2.4.6 Instruction for S/N



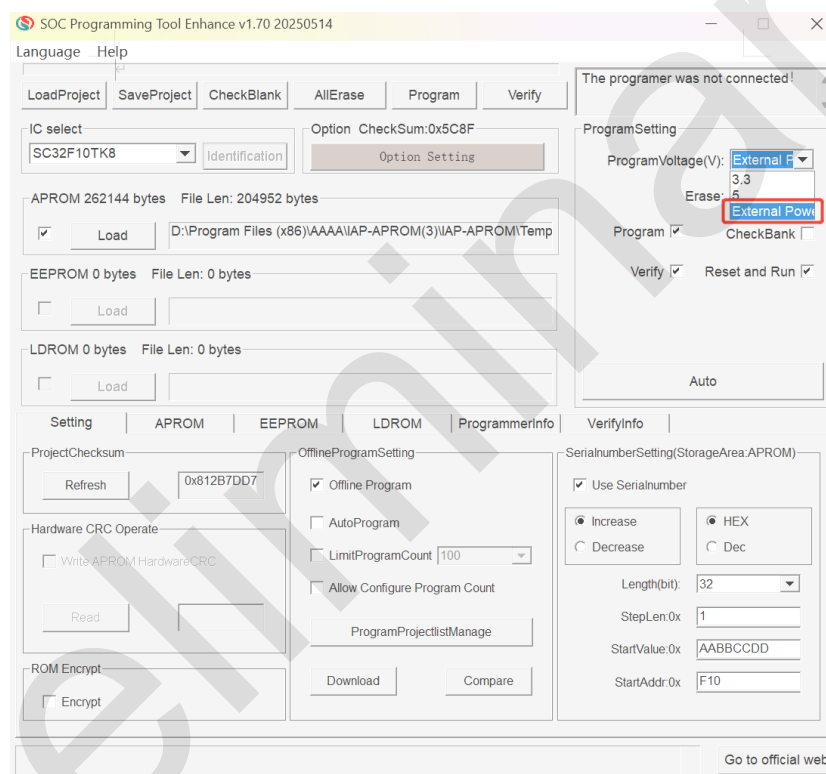
- ① S/N function is available for SC LINK PRO in offline mode.
- ② S/N data is stored in the APROM, and the storage address can be set via the start address.
- ③ Low S/N data is stored in low address, for example, write 32BITS S/N 0XAABBCDD in 0X0F10, the value written for 0X0F10 is 0XDD, the value written for 0X0F11 is 0XCC, the value written for 0X0F12 is 0XBB and the value written for 0X0F13 is 0XAA.
- ④ The S/N must be 4 bytes in length with the start address of a multiple of 4 (such as 0F10H, 0A04H, etc.), otherwise, an error will be reported upon programming
- ⑤ The S/N address must not be set in the sector space where the code is loaded. That is, the start address of the S/N must be set outside the sector corresponding to the program code; otherwise, abnormal offline programming will occur.
- ⑥ Customers can obtain the S/N data by reading the corresponding address in APROM through the IAP read operation.
- ⑦ S/N supports power-off memory function (**not supported in multi-CODE mode**).

2.4.7 Descriptions for External Power Supply Programming

External power supply programming has special requirements for IC settings. Before performing programming in this mode, please carefully read the precautions and programming steps.

Steps for external power supply programming:

- ① Power on the target board with external power supply;
- ② Connect the target board with SC LINK PRO in power-off state;
- ③ Connect SC LINK PRO to PC via USB;
- ④ Open SOC Programming Tool, **configure the programming voltage options and click “External Power”**;



- ⑤ Configure the programming options and click "Auto";
- ⑥ After programming is completed, disconnect the target board to ensure that the programmed IC exits Programming mode.

NOTE:

1. This function is only valid for ICs whose DIO/CLK programming port has been configured as JTAG. Users can first set the DIO/CLK programming port to JTAG mode in normal programming mode (modify it in programming OPTIONS);
2. When the programming voltage is set to External Power, the plug-in will force the "DISJTG" in the programming OPTION setting to be set to JTAG. Under this function, the CLK/DIO port can only be used as a programming port and has no other functions. If these two IO ports need to be used in the program, please do not select this mode for programming.

Program Option

LVR

LVR invalid

DISJTG

JTAG

Customer Option

WDT

Disable

OP_BL

APROM

Flash sectors protection

Write Protection area A

☒ Enable

☒ Protect entire area

IAPPORA_st (H)

0x0

Start Address (H)

0x8000000

IAPPORA_end (H)

0x1ff

End Address (H)

0x803ffff

Write Protection area B

☐ Enable

☐ Protect entire area

IAPPORB_st (H)

0x0

Start Address (H)

0x8000000

IAPPORB_end (H)

0x0

End Address (H)

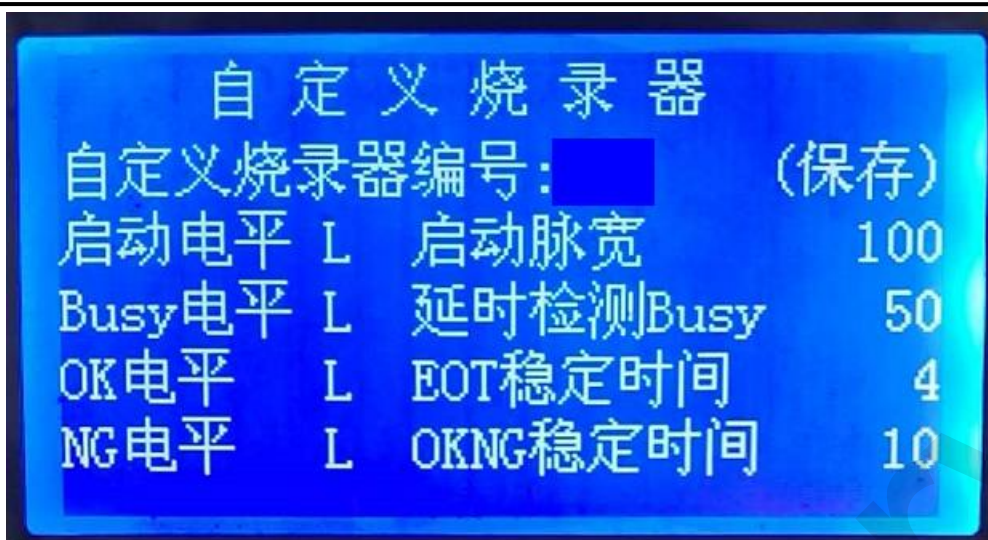
0x80001ff

Option CRC: 0x72E1

2.4.8 Instructions for Connecting Programmer

For ease of operation, we use programmer control interface to control IC programming with software programming instead of manual programming.

- ① Please use manual programming mode with unchecking "Auto Programming" option when downloading the programming program in SOC Programming Tool.
- ② Start in programmer control interface is the start input channel for programming and valid in low level. It is recommended to release the pull-down operation of start after detecting low level of busy interface signal is output when starting the programming for start;
- ③ After decrease the level for start, detect NG signal interface, OK signal interface and busy signal interface; low level in NG signal interface indicates programming is failed, low level in OK signal interface indicates programming is succeeded and low level in busy signal interface indicates programming in progress; only one signal interface can be output in low level at a time; if more than two signal interfaces have low levels at the same time or all single interfaces have high levels, programming shall be stopped.
- ④ Programmer programming-related parameters are set as follows:



2.4.9 Notes for Programming

- ① Overload protection and reminds:
 1. A maximum output current of SC LINK PRO is 400mA; if the load exceeds this range, self-resettable fuse will be enabled;
 2. If overload occurs, please perform IC programming in external power supply mode
- ② For notes of external power supply programming mode, see [2.4.7 Descriptions for External Power Supply Programming](#);
- ③ In any programming mode, any pin of programmed IC connected to other power-on system will result in programming failure;
- ④ For IC on-board programming, you are advised to remove the peripheral capacitance of programming pin CLK and DIO.
- ⑤ SOC Programming Tool does not support the partition programming function.
- ⑥ **For IC programming, please check “Sector Block or Full Erase” for programming, otherwise it may result in programming failure.**

2.4.10 Multi-code Management

2.4.10.1 Introduction to Multi-code Management

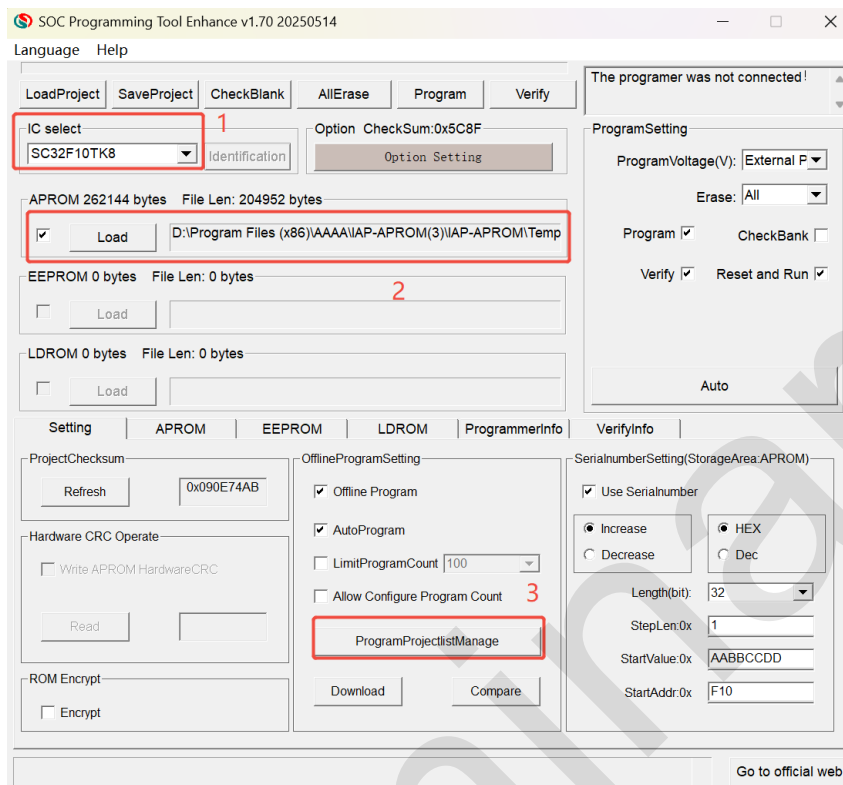
Multi-code management function supports storing multiple projects on SC LINK PRO so as to facilitate batch programming for multiple project codes. Before using multi-code management, please confirm the following:

- (1) Preparations: ① SC LINK PRO; ② SOC Programming Tool v1.35 or later; ③ Firmware M2.00 and later.
- (2) Before using multi-code programming mode, please carefully read [2.4.10.3 Notes for Multi-code Management](#).

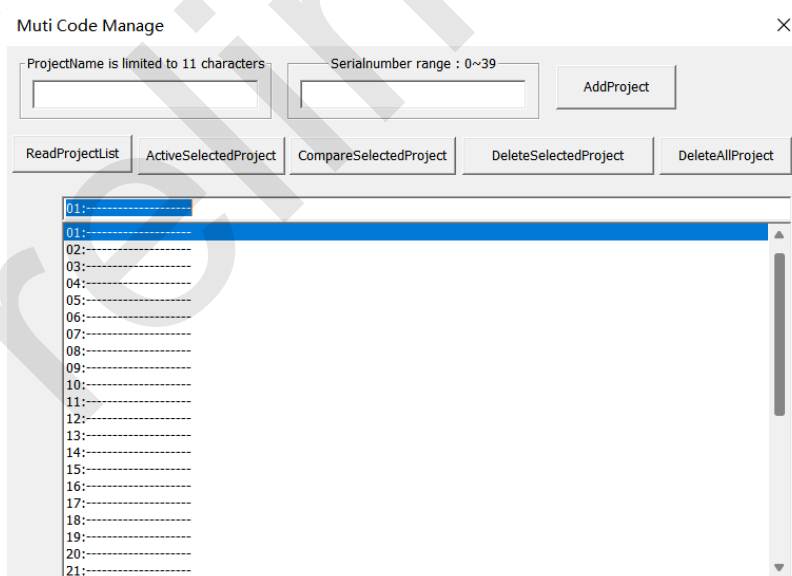
2.4.10.2 Instructions for Multi-code Management

1、Add Multiple-code Project List

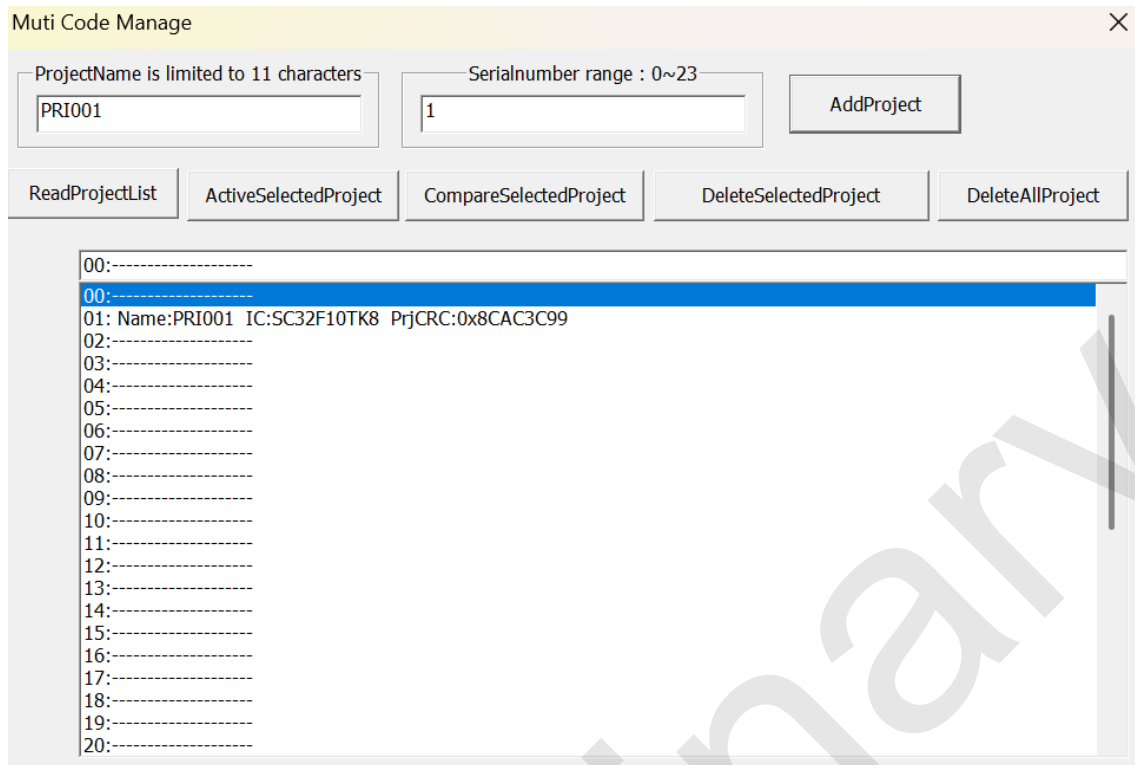
(1) Open SOC Programming Tool, as shown in the figure below, select the target chip model, load the target programming code to APROM or other area and confirm the project ProgramSettings, then click “Programming Project List Management” button to enter Multi-code Management page.



(1) Then enter “Multi-code Management” page, it is empty for first use (no project list), as shown in the figure below.



(2) As shown in the figure below, input the project name to be saved in “ProjectName is limited to 11 characters”, then fill in the No. in “Serialnumber range”, and click “AddProject” to save the loaded project to SC LINK PRO.

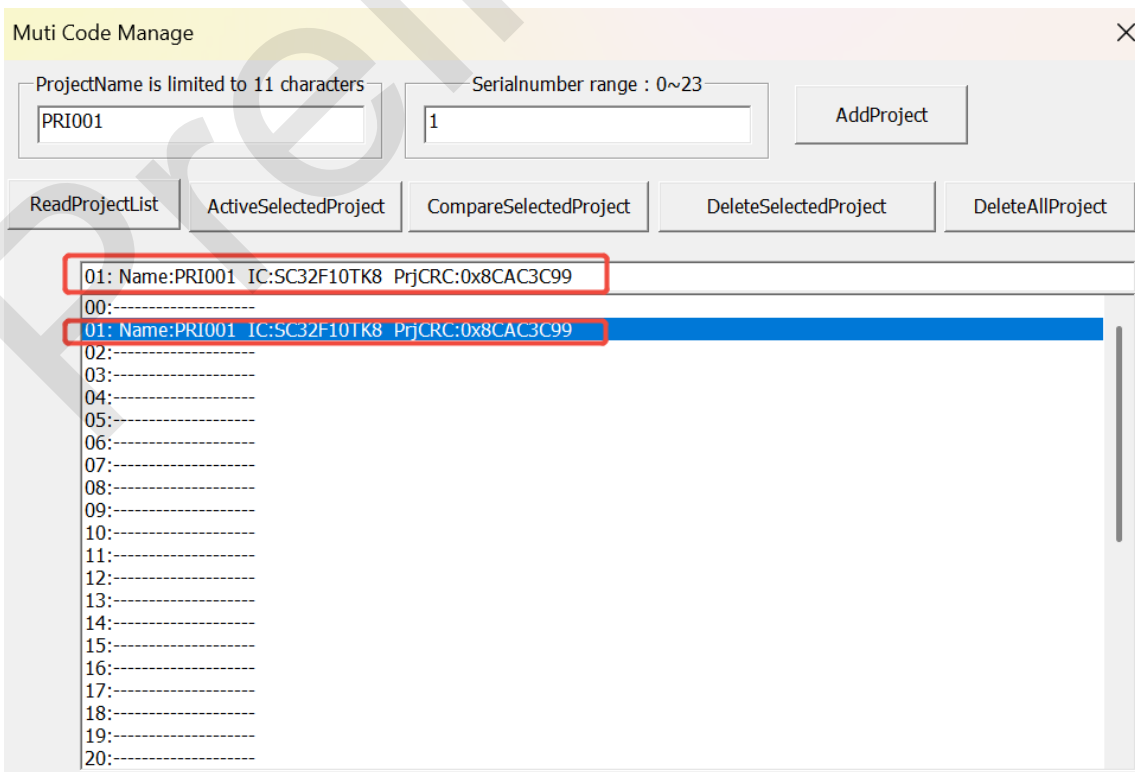


(4) After adding the code project, you can see the information of the added project (including project No., project name, IC name and CRC of target code project, etc.).

(5) For SC LINK Pro users, up to 24 Code projects can be added, all of which can be saved to the external memory of the programmer.

2、Activate Multi-code Project List

(1) If at least one Code project is added to the project list, select this project and click "Activate Selected Project", then you can see the information of activated project in the text box at the upper of the project list; if the text box is empty, no project is activated. A project is activated as shown in the figure below.



3、Delete Multi-code Project List

(1) Delete the selected project. For multiple project lists, you can delete unnecessary multi-code projects; select a project and click “Delete Selected Project” to delete the selected code project from the memory of the programmer.

(2) Delete all projects. For multiple project lists, you click “Delete All Projects” to delete all multiple-code projects added.

4、Read Multi-code Project List

After the programmer has added and stored multiple-code projects, you can click “Read Project List” through online programming tool to obtain the information of added project list.

5、Compare Multi-code Project List

After a project is added to the multi-code project list, select the project to be compared and then click “Compare Selected Project” to compare it with the current loaded project or project code. If yes, the data is the same. If not, it indicates that the data of currently activated project is inconsistent with that of loaded project code. Besides, you can also compare the CRC in the project list with the checksum of the loaded project code.

6、Exit Multi-code Management

When multi-code management is not required, delete the activated multi-code projects or all projects to exit multi-code management and restore the normal programming mode.

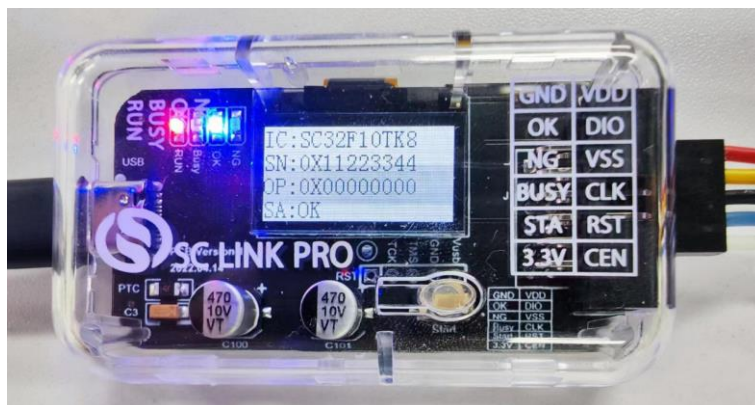
7、Programming Multi-code Project

For the multi-code project already activated, you can program and check the target project in offline programming mode.

As shown in the figure below, black characters on the white background are displayed on OLED, indicating that it enters Multi-code Project Programming mode. After pressing “Programming” button, you can see the programming is succeeded. At this time, the project code activated in Multi-Code project list has already been programmed to the target IC.



Offline Programming in Multi-Code Programming Mode



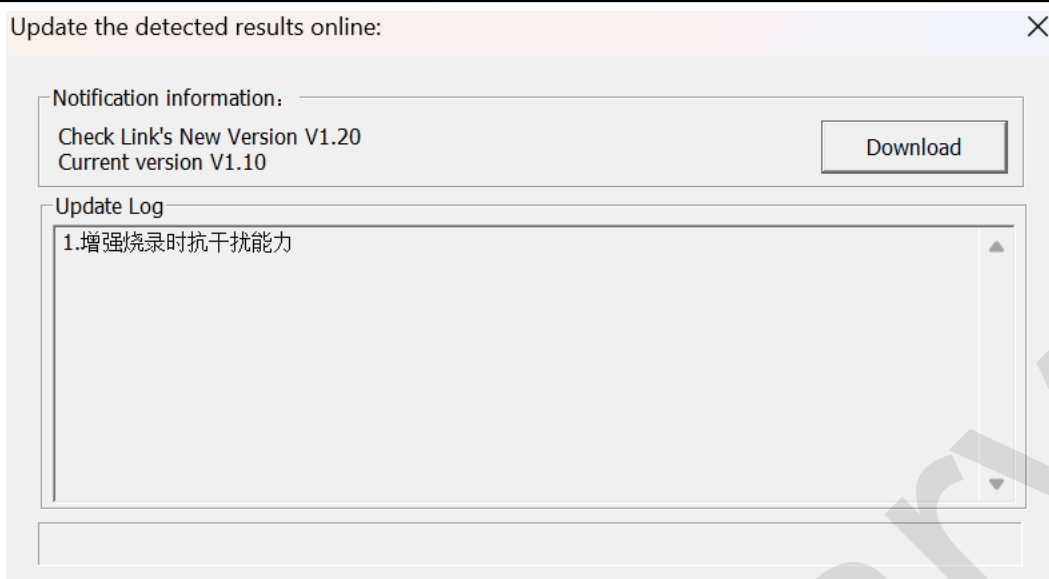
Offline Programming Succeeded in Multi-Code Mode

2.4.10.3 Notes for Multi-Code Management

- 1、 If there is no activated project or no project at all in Multi-code Project list, the multi-Code management is invalid. At this time, it is in ordinary programming mode, and the project code downloaded offline will be programmed.
- 2、 If there is any activated project in multi-code project list, this activated project will be programmed offline.
- 3、 When there is an activated project in the multi-code project list, the user can cancel the activated state by deleting the corresponding project, or by directly downloading the project code again to cancel the multi-code activation. At this point, the system enters normal programming mode, and the offline programming will program the most recently downloaded project code.
- 4、 In each Code project downloaded, APROM supports a maximum of 512KB.
- 5、 When the black characters on the white background are displayed on OLED in offline programming mode, it indicates it is currently the multi-code in activated state and will program this activated project code; Displaying the white characters on the black background on OLED indicates that it is in normal programming mode currently.。

2.4.11 Automatic Upgrading Detection

SOC Programming Tool supports featuring online upgrade detection, can automatically detect the version of programming tool, MCU library and SC LINK PRO firmware under the circumstance of user PC connecting to the network; when a new version is found, the system will prompt user the new version detected and provide the download address. The figure below shows the popped-up online detection update dialogue box.



2.5 Frequently-asked Questions and Answers

SC LINK PRO Abnormalities	Cause	Solution
Online programming display: “Please connect MCU with the programmer”, or the offline programming is failed	The programming cable is connected abnormally	Check if four programming cables are connected properly
	The programming cable is too long	The length of SC LINK PRO programming cable can not exceed 60cm
	CLK or DIO pins of the chips have 100pF capacitance to GND	The capacitance on the programming signal interface may cause programming timing error, when programming by using SC LINK PRO, the capacitance to GND of the programmed CLK and DIO shall be within 100pF
	Resistance exists between SC LINK PRO programming interface and the chip programming interface	Try to avoid series resistance between the lead-out point of programming and the chip; if it is unavoidable, guarantee the series resistance value does not exceed 100R, and minimize the programming cable upon programming
	CLK and DIO of chips are connected to the same digital tube	In circuit design, try to avoid connecting CLK and DIO of the chip to the same digital tube
Four indicators flash at the same time	Short circuit in VDD and VSS of programming target board/chip	Troubleshoot before programming
Busy lamp keeps flashing in online programming mode	SC LINK PRO enters Firmware Upgrading mode	Upgrade firmware
Running lamp keeps off after power-on	The supply voltage is abnormal	Check if the supply voltage of SC LINK PRO is not less than 4.5V
Running lamp keeps flashing in online programming mode	Power supply abnormal	Check whether the power supply module of SC LINK PRO is abnormal.
Running lamp keeps flashing in offline programming mode	Power supply abnormal	Check whether the power supply module of SC LINK PRO is abnormal.
	Abnormal data downloaded for offline programming	Re-download the programming data to SC LINK PRO
	Programming count limit is set to 0	Reconfigure the programming count limit as required and download it to SC LINK PRO
	Invalid S/N	Set the S/N to a valid address

3 SOC Programming Tool

3.1 Overview

Developed by Shenzhen SinOne Microelectronics Co., Ltd. (hereinafter referred to as “SOC”), SOC Programming Tool is designed for PC tools of SOC series programming, which shall be used together with SC LINK PRO.

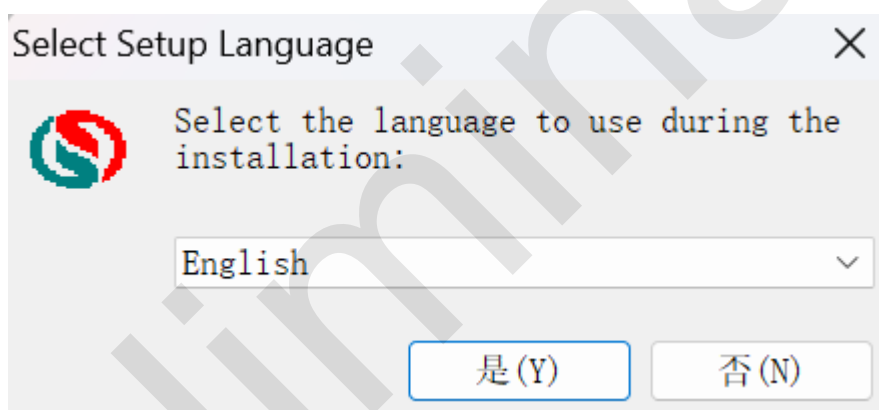
The software supports windows xp/2000/vista/7/10/11 operating systems. By default, it is installed in the directory of “C:\Program Files\SOC\SOC Programming Tool” and created in Start Menu and desktop shortcut, you can modify these default settings during installation.

You are advised to carefully read the help files before using the software and visit SinOne official website: <http://www.socmcu.com> to obtain the latest MCU manual and software version.

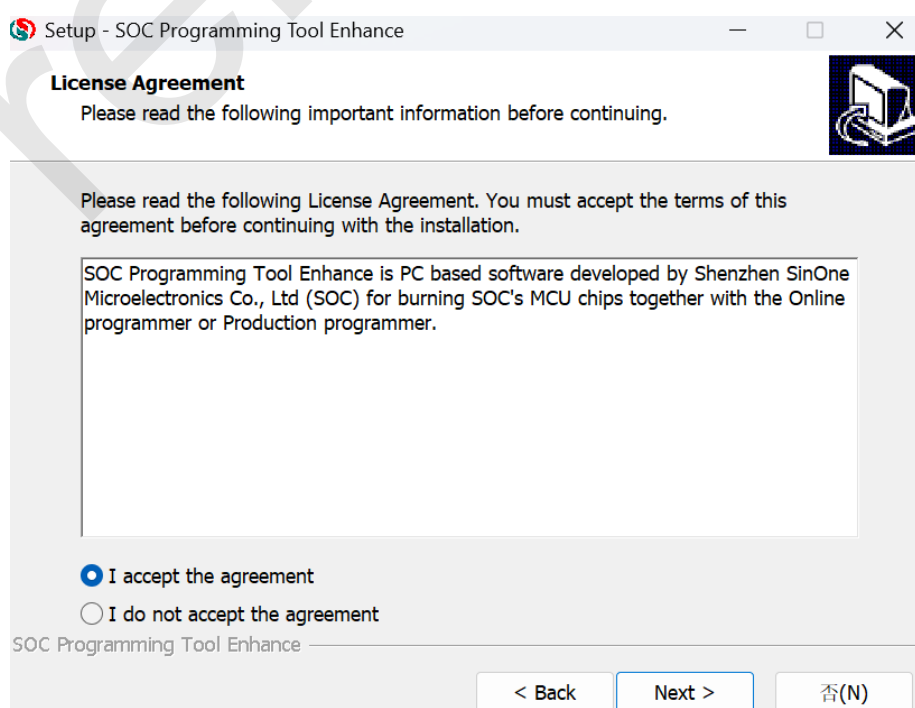
For any question, suggestion or opinion, call 0755-26652552 or email to: SOC_support@socmcu.com.

3.2 Install SOC Programming Tool

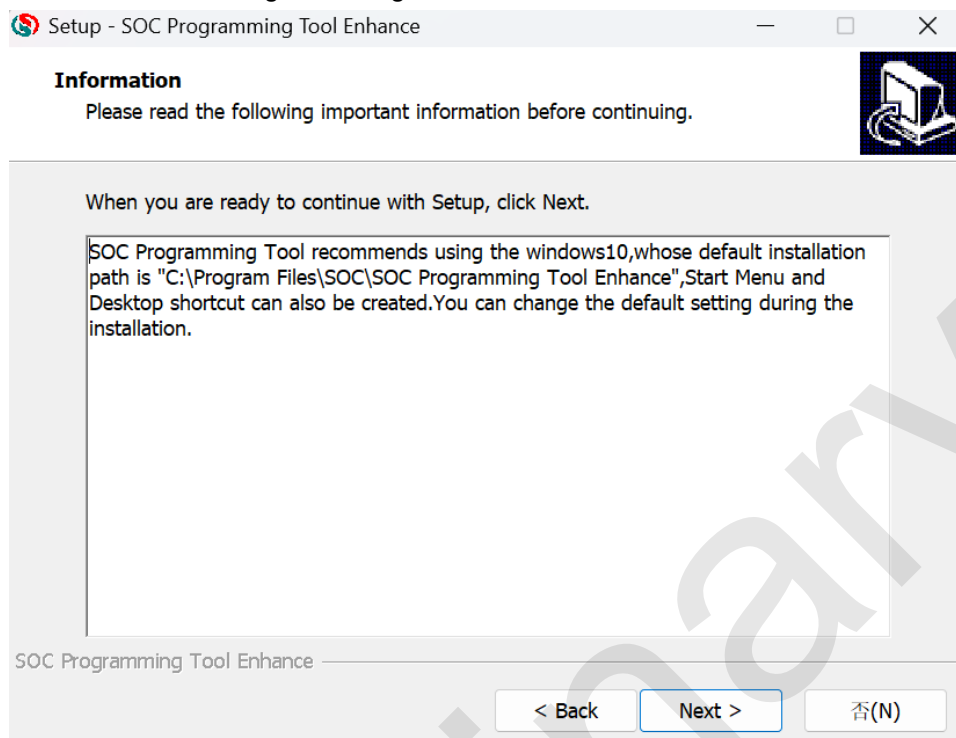
- ① Double click SOC Programming Tool vx.x.exe



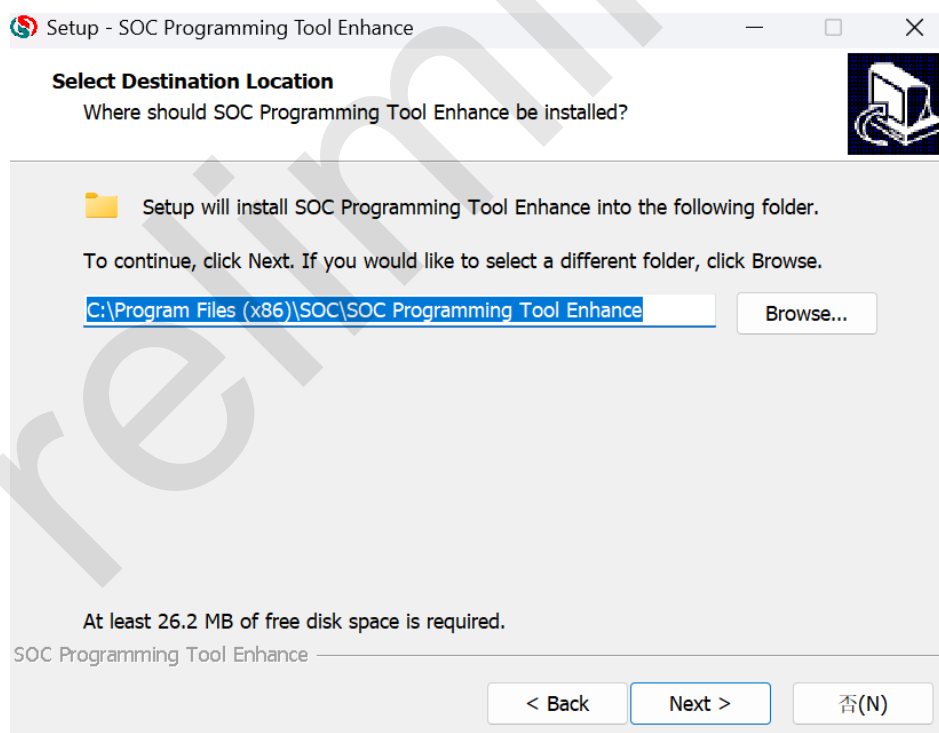
- ② Select “SC”, “TC” or “EN”, and click “Y” button



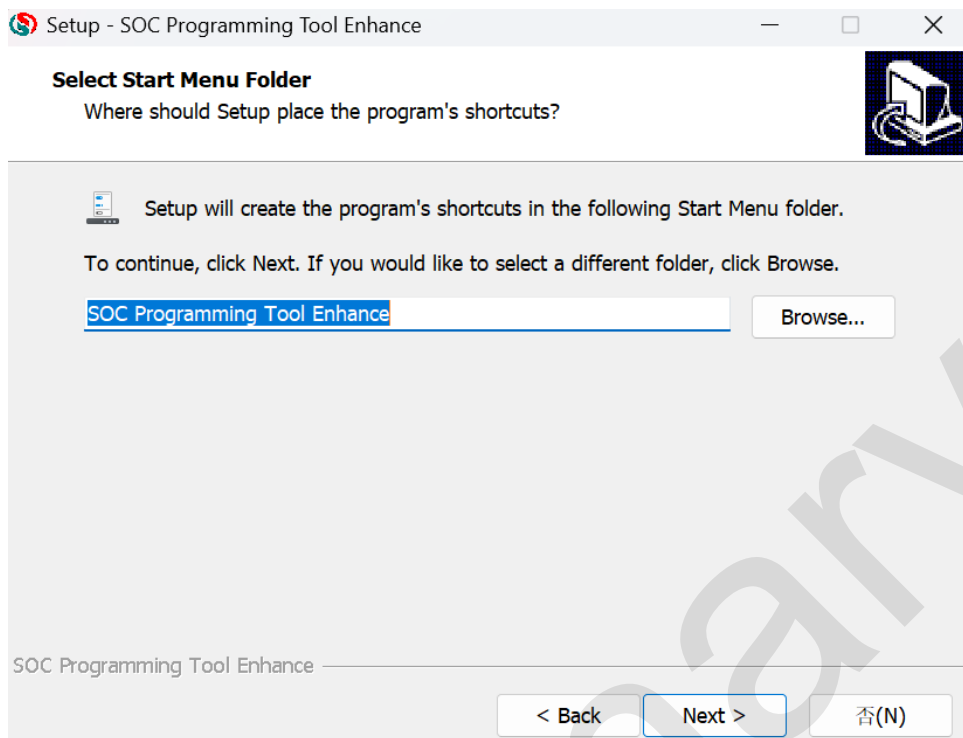
- ③ View the licence, select “I agree the agreement” and then click “Next” button



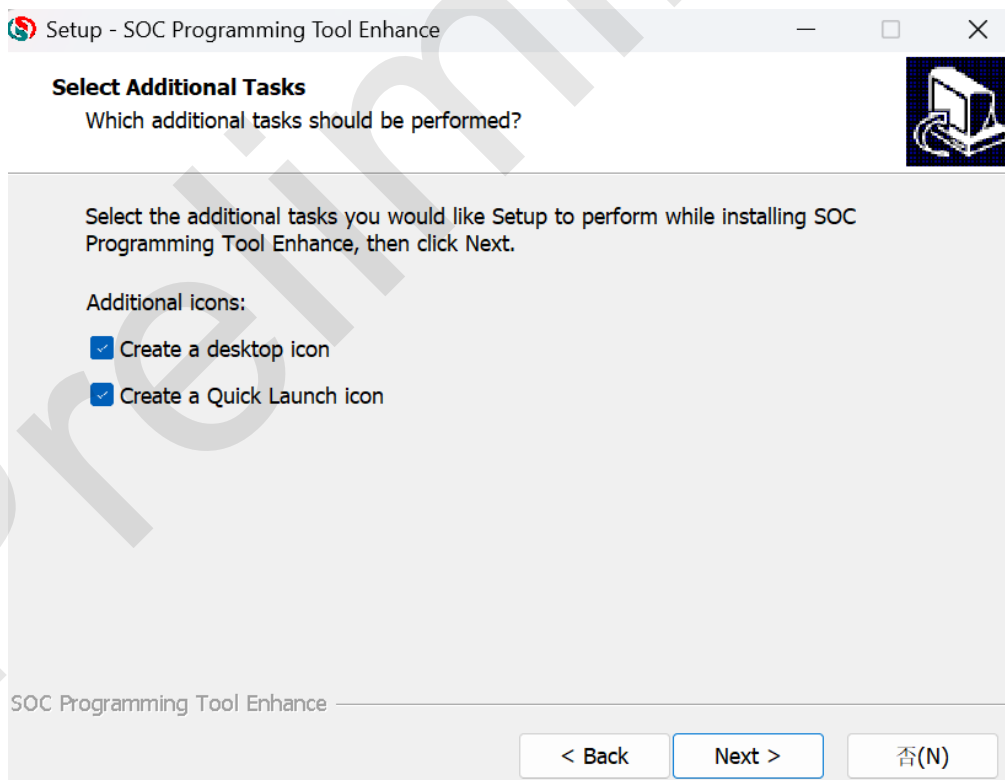
- ④ View the installation instruction and click “Next” button



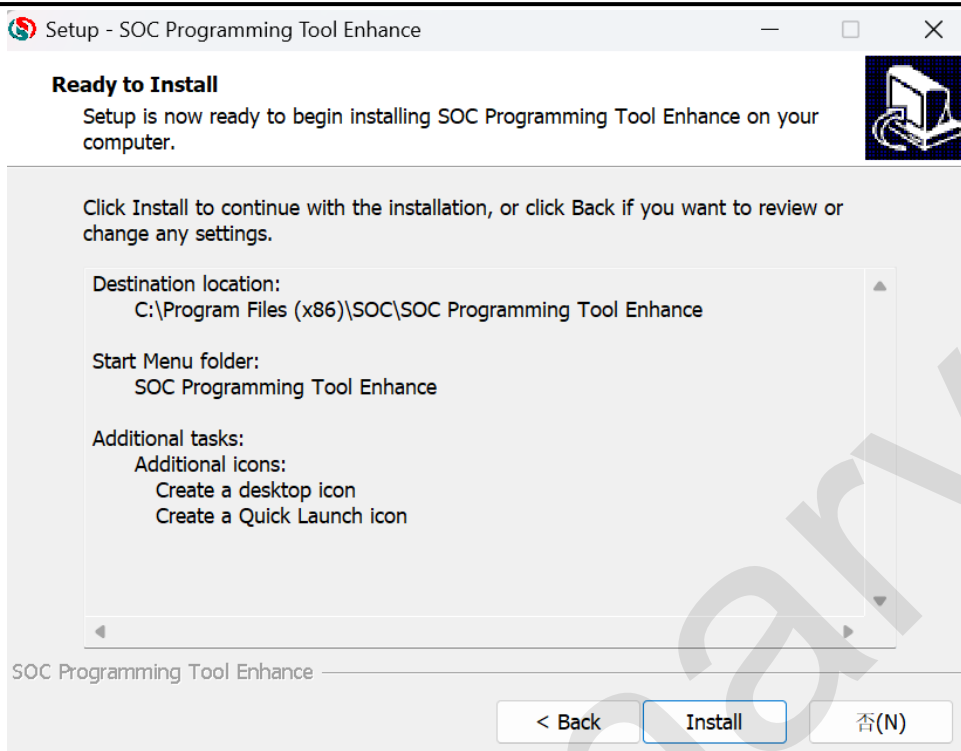
- ⑤ The default installation path is in “C:\Program Files (x86)\SOC\SOC Programming Tool Enhance ”, and you can modify it as needed , then click “Next” button



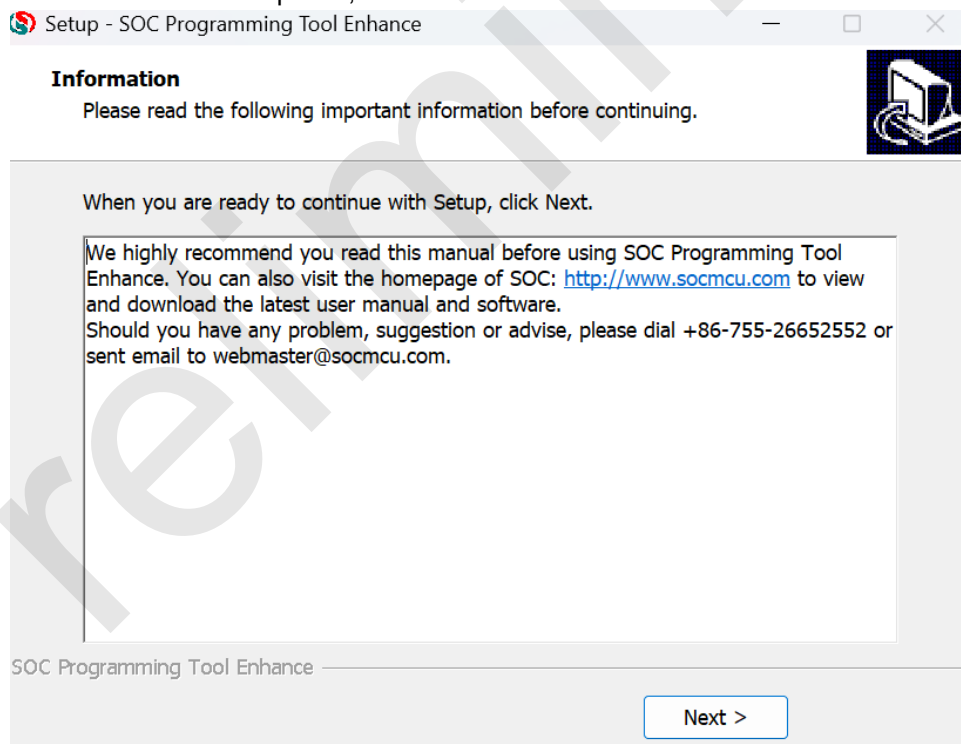
- ⑥ Set the name of this folder on Start Menu with “SOC Programming Tool Enhance” by default; you can modify it as needed, then click “Next” button



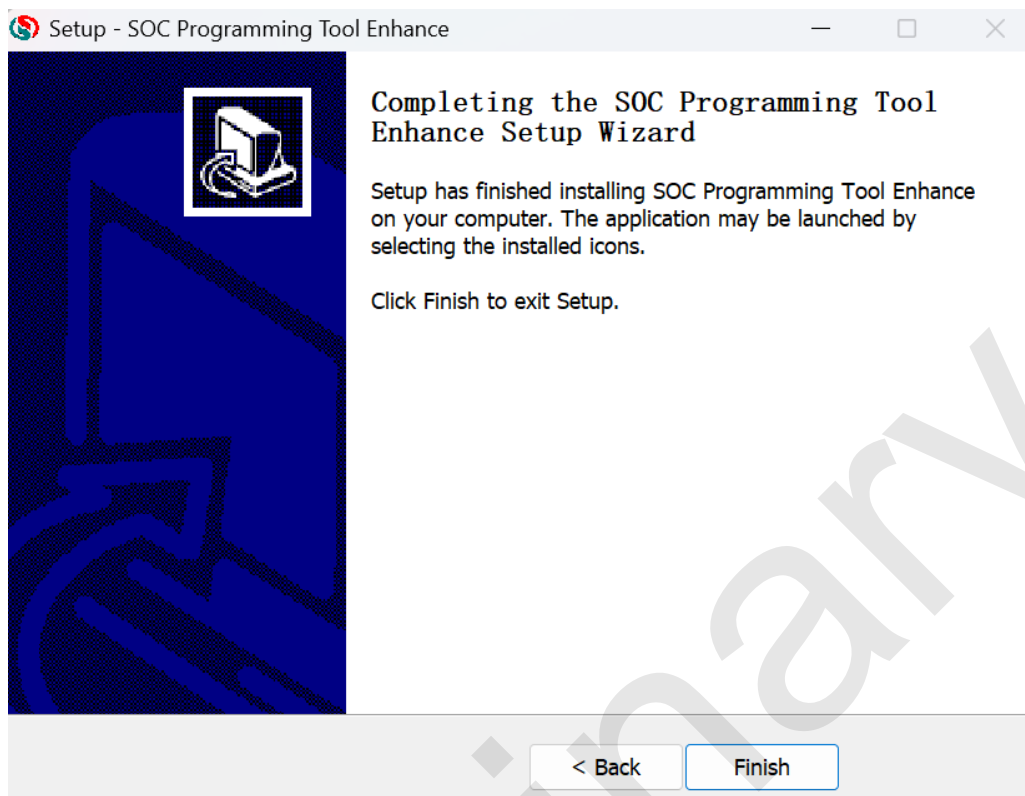
- ⑦ Create desktop shortcut and quick launch bar shortcut by default; you can modify them as needed, then click “Next” button



- ⑧ Double check all installation options, then click “Install” button

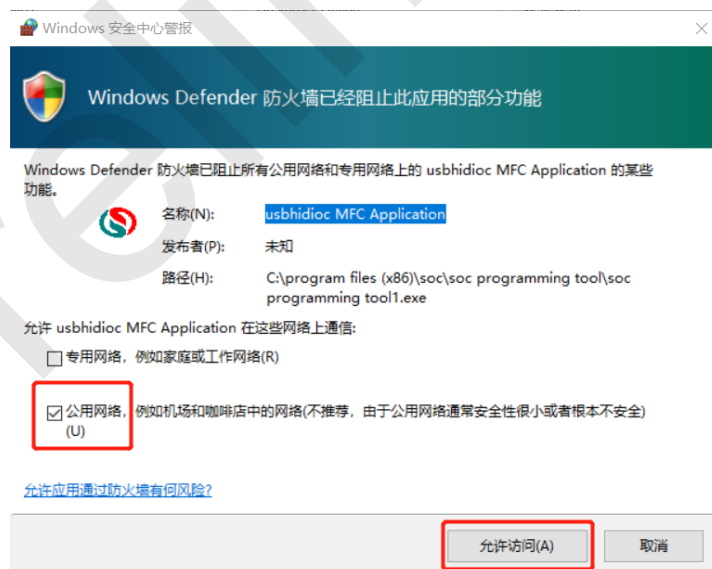


- ⑨ After installation, related notes will be displayed, click “Next” button

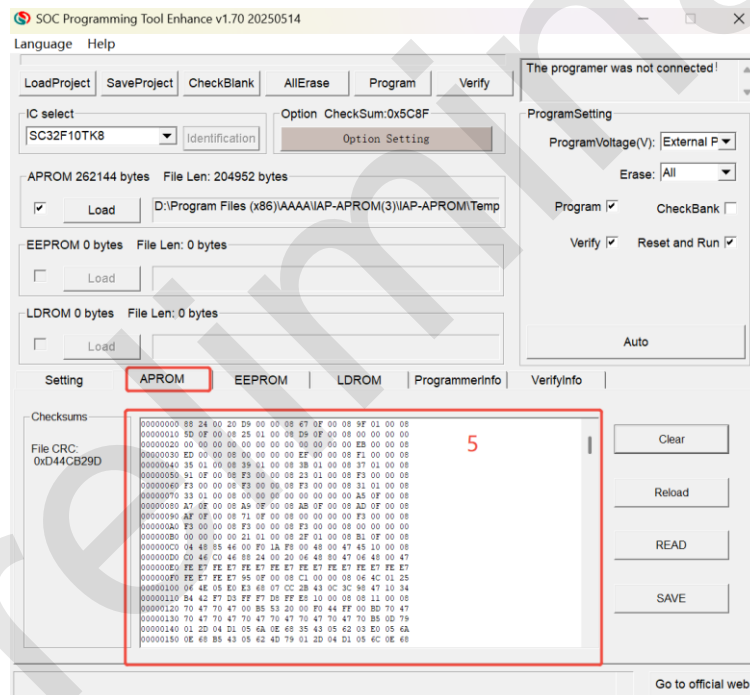
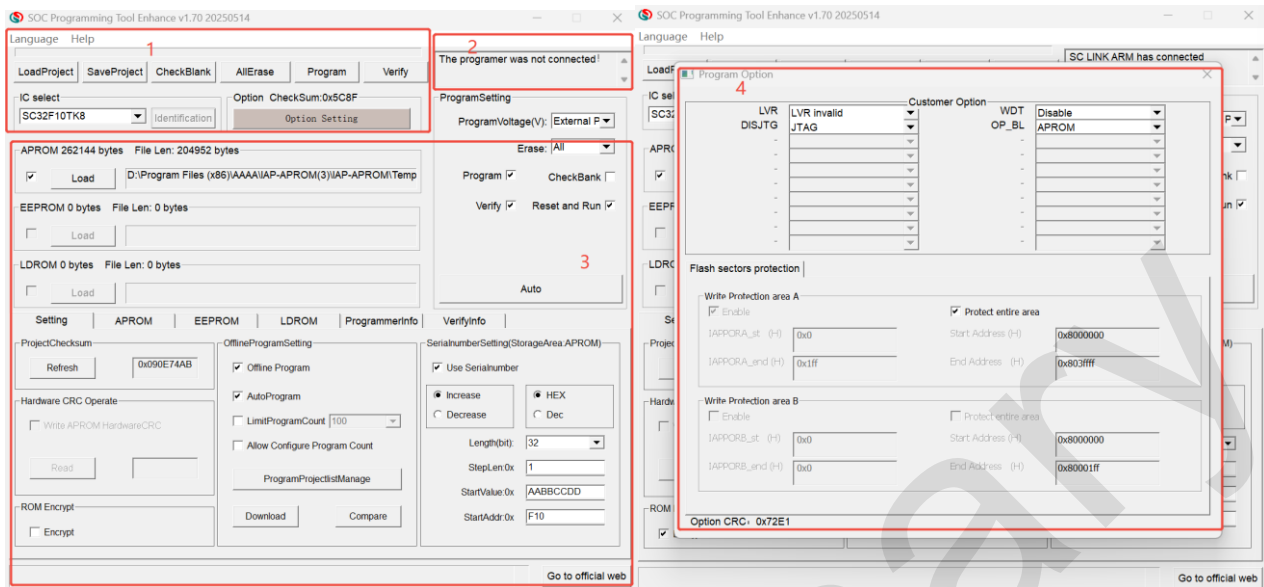


- ⑩ Check/uncheck “Run SOC Programming Tool Enhance”, and click “Finish” to complete.

Note: After installation, if any network communication message pops up upon opening SOC Programming Tool for the first time, please select “Public Network” to avoid missing important notifications and updates related to the tool!



3.3 Software Interface



1) Menu Bar and Operation Buttons and Progress Bar Display Area:

Menu Bar and Shortcut button: Load Project, Save, Programming, Verify, Auto, Erasing, Null Checking and Help.

2) Operating Prompt Bar:

Display the operating prompt information during the operation process.

3) Program Setting Interface:

Chip Model Option, File Load, Programming Area, S/N, Auto Programming, Offline Programming Options, etc.

4) Option Setting Interface

Set corresponding WDT, System Clock and LVR for different MCU model as needed.

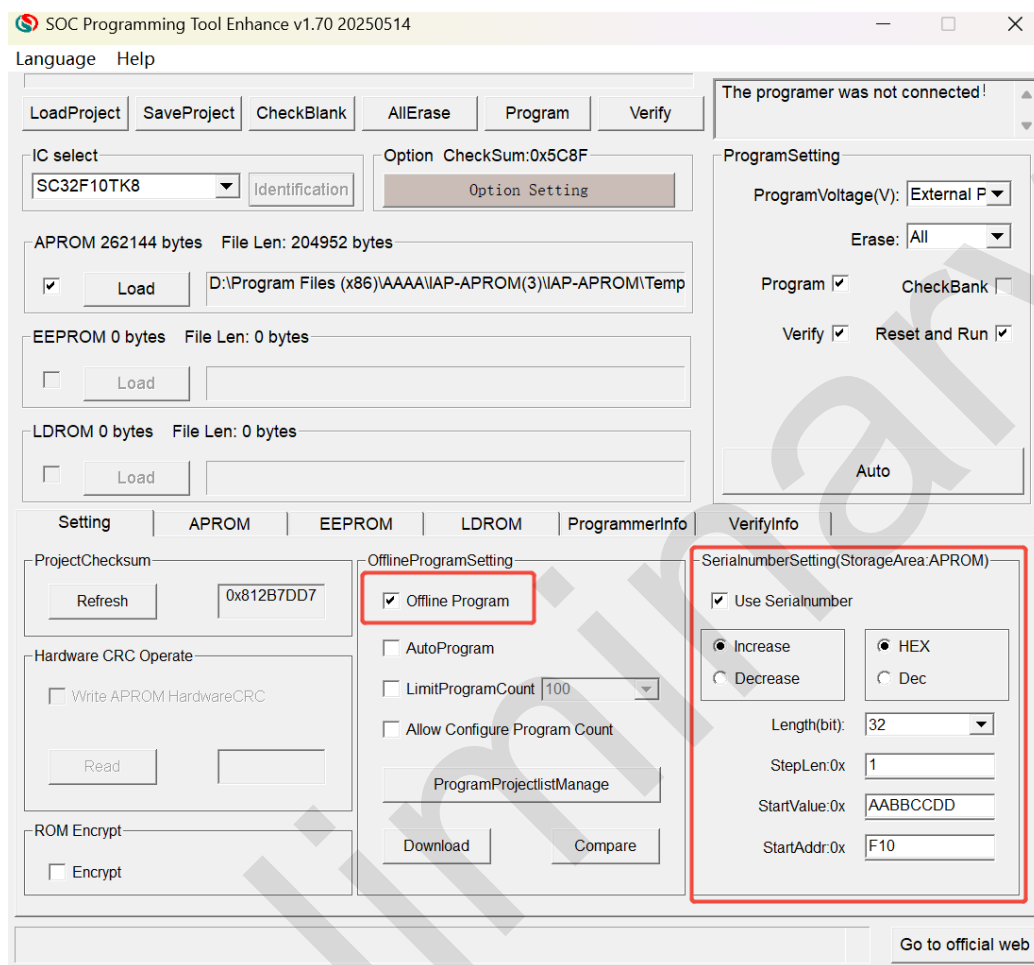
5) APROM Code Display Window:

Display the loaded or read code in current APROM.

No.	Function Name	Function Descriptions
1	Load Project	Load saved project file (with the extension of ". socprj")
2	Save	Save Program Code, ProgramSetting (Chip Model, Programming Area, S/N, Programming Options, etc.) as the project file (with the extension of ". socprj")
3	Null Checking	Check if the program code exists in MCU
4	Erasing	Erase the code in MCU
5	Programming	Program the loaded program code and settings to MCU
6	Verify	Check if MCU is programmed correctly
7	APROM Load	Load program codes to APROM
8	EEPROM Load	Load program codes to EEPROM
9	Programming Voltage	Select programming voltage as needed
10	Auto	Perform automatic operations (Null Checking, Erasing, Programming, Check, Reset and Run) as needed;
11	Programming Option	Select if it is required to encrypt, write/read CRC and to display the checksum of currently loaded project when programming
12	Offline Programming Option	1. Automatic Programming: Check it to automatically detect MCU in offline programming mode, and perform programming automatically if detected, with no need to press START button. 2. Limit programming counts: Check it to set the limit programming count with the upper limit of 1,000,000. If the limit is exceeded, the programmer will stop programming.
13	S/N Settings	Write a group of number in MCU Flash: Optional User-defined start value User-defined step value User-defined store address Hexadecimal increment mode by default
14	Option Settings	Set MCU programming configurations

3.4 Function Descriptions

3.4.1 Descriptions for S/N



- ① The S/N function is currently available for SC LINK PRO in offline mode only.
- ② The S/N is stored in APROM, with its storage address configurable via the start address.
- ③ Low S/N data is stored in low address, for example, write 32 BITS S/N 0XAABBCDD in 0X0F10, the value written for 0X0F10 is 0XDD, the value written for 0X0F11 is 0XCC, the value written for 0X0F12 is 0XBB and the value written for 0X0F13 is 0XAA.
- ④ The S/N must be 4 bytes in length with the start address of a multiple of 4 (such as 0F10H, 0A04H, etc.), otherwise, an error will be reported upon programming.
- ⑤ The S/N address must not be set in the sector space where the code is loaded. That is, the start address of the S/N must be set outside the sector corresponding to the program code; otherwise, abnormal offline programming will occur.
- ⑥ Customers can obtain the S/N data by reading the corresponding address in APROM through the IAP read operation.

S/N supports power-off memory function (not supported in multi-CODE mode).

3.4.2 Firmware Upgrading

The firmware of SC LINK PRO features online upgrading to add new features or correct problems.

Firmware upgrading method: For the methods for SC LINK PRO firmware upgrading online, see [2.4.13](#)

[Firmware Upgrading](#)

3.4.3 Check Offline Programming Options

Figure 3.4.6 shows settings of SOC Programming Tool offline programming options, only valid in SC LINK PRO offline mode.

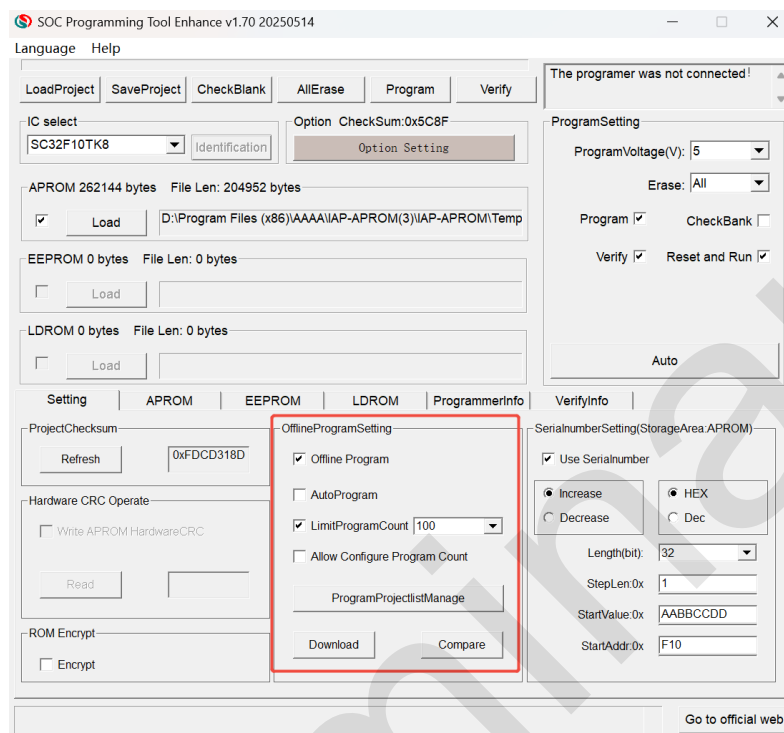


Fig. 3.4.6 Settings of Offline Programming Options

Functions are described as follows:

1. Auto Programming: Check it for the programmer to detect IC automatically; perform programming automatically if detected without any triggering action.
2. Limit programming counts: Check it to set the limit programming count with the upper limit of 1,000,000. If the limit is exceeded, the programmer will stop programming.

3.4.4 Project Function

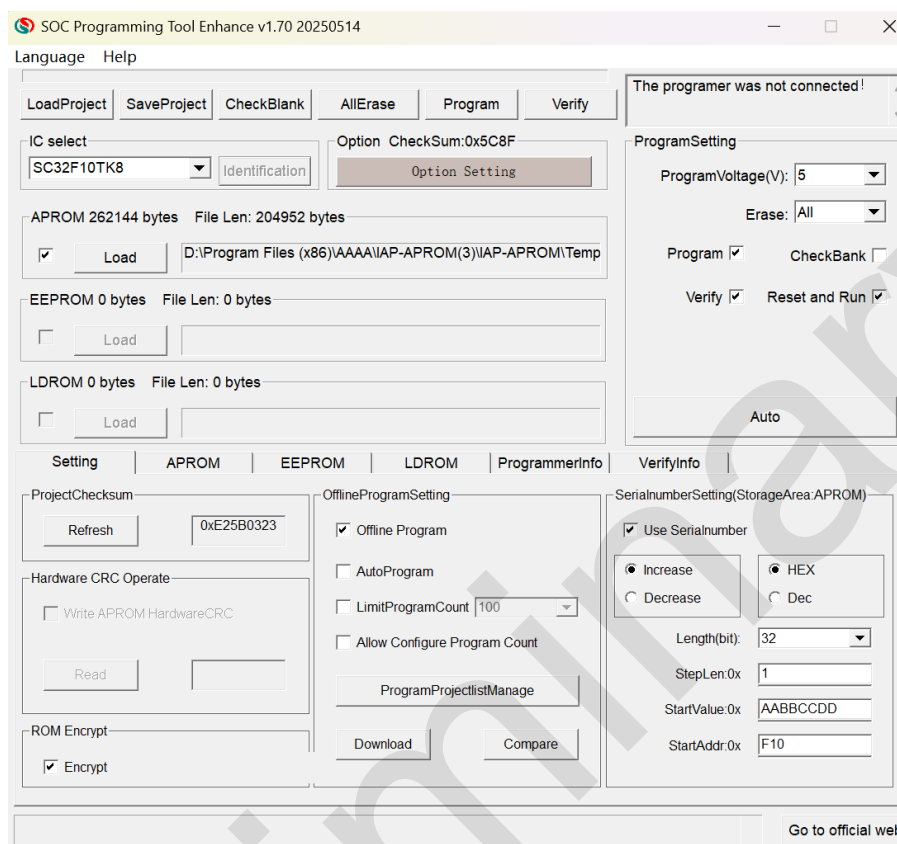
The SOC Programming Tool provides project saving and loading functions. Users can save a programming project that includes configured OPTION settings, programmed HEX file, and programming configurations. Once the project is saved and reloaded, the OPTION settings and certain programming configurations cannot be modified. This prevents third-party users from mistakenly changing OPTION settings, code, or related programming options during mass production.

3.4.4.1 Project Saving Operation Steps

1. Select the target areas to be programmed and click Load to import the code file (HEX/BIN file).
2. Configure the relevant OPTION settings according to actual requirements.
3. Configure the programming options under Programming Settings, including: programming voltage, erase, program, and verify.
4. If offline programming is required, enable and configure the relevant offline programming options.
5. Click Save Project to save the programming project as a file with the extension .socprj.

3.4.4.2 Project Loading Function Description

Click Load Project to load the required project for mass production.

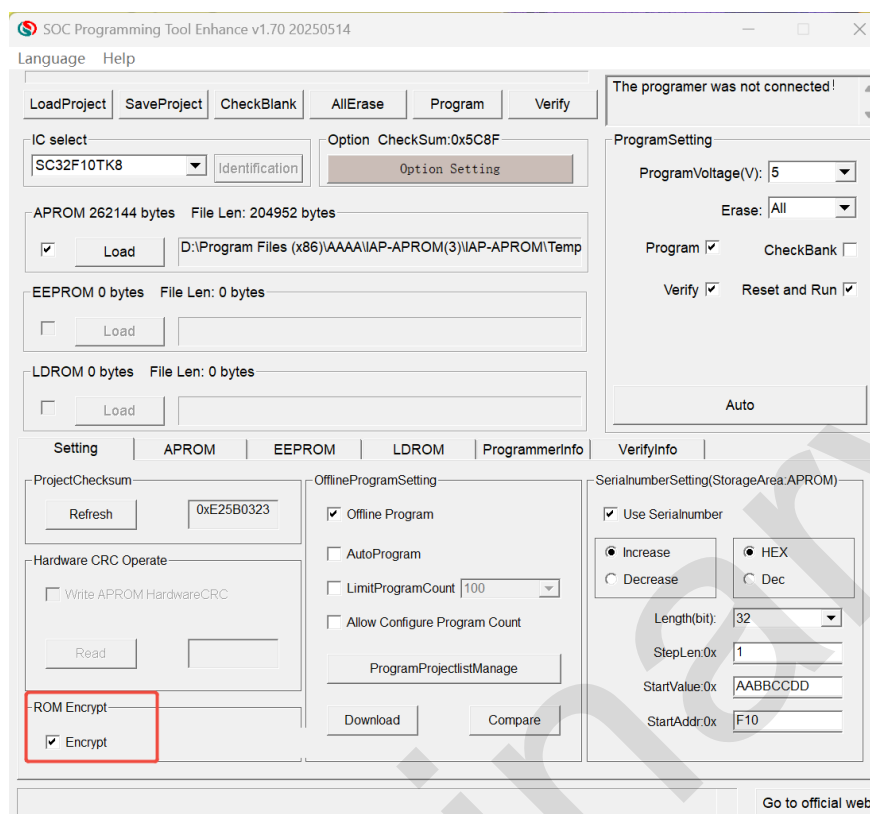


1. Programming area, programming code, OPTION settings, and offline-related settings cannot be modified within a project. To make changes, please save a new project;
2. Settings such as programming voltage, auto programming, and S/N start value (when the S/N option is selected during project saving) can be modified according to actual requirements;
3. If the option "Allow configuration of programming count limit" was selected when saving the project, the programming count limit can be modified after loading the project.

3.4.5 Security Encryption

3.4.5.1 Security Encryption Functions and Features

All IC of SinOne have encryption function, mainly providing read-protection encryption for APROM. You can select whether to encrypt the IC securely by configuring the Encryption control in the "ROM Encryption" option on the host computer interface.



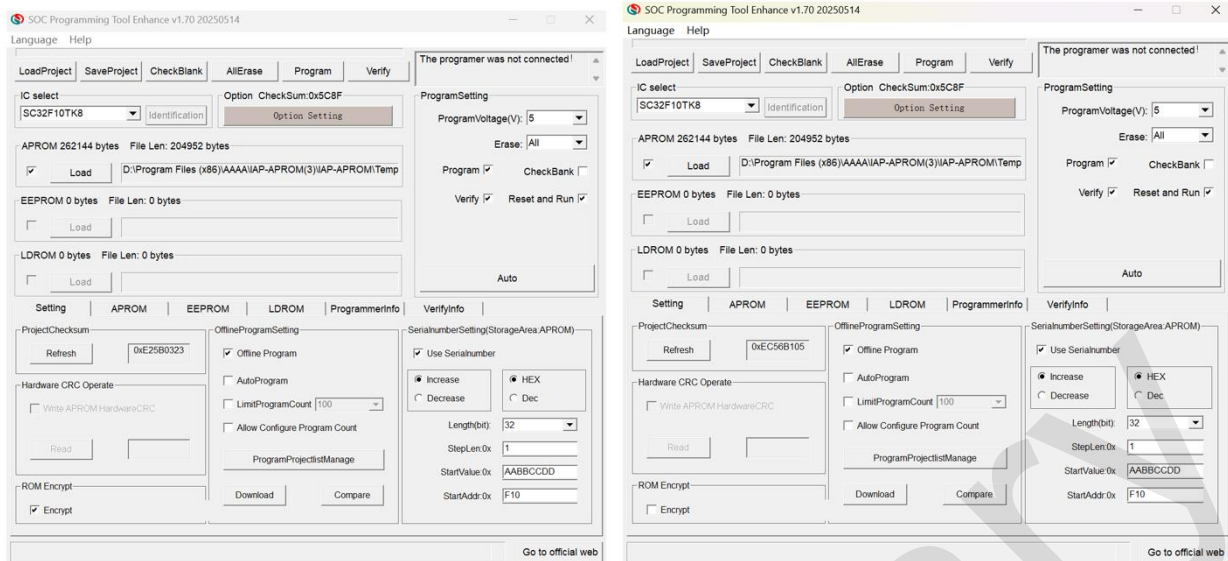
Security encryption features of SinOne series IC are as follows:

1. Regardless of whether the security encryption function is selected, as long as the user through the programmer to an encrypted IC, the programmer will be forced to erase, and then perform write operation.
2. The only way to enable secure encryption is to check secure encryption and execute the programming operation.
3. The only way to disable secure encryption is to turn it off and execute the programming operation.
4. Secure encryption does not affect IAP functionality

Programming Method	Programming operation on an encrypted IC
Online Programming	Sector erase cannot be performed on the IC. During online auto programming, the host will forcibly perform a full erase of APROM before programming the IC
Offline Programming	If sector erase is selected in the programming options, programming cannot be executed normally. The user must select full erase to perform offline programming correctly.

3.4.5.2 Secure encryption procedure

When the "encryption" option in the chip model IC of the burning interface is lit up, if you want to turn off the encryption function, you should deselect "encryption"), the configuration interface is as follows:

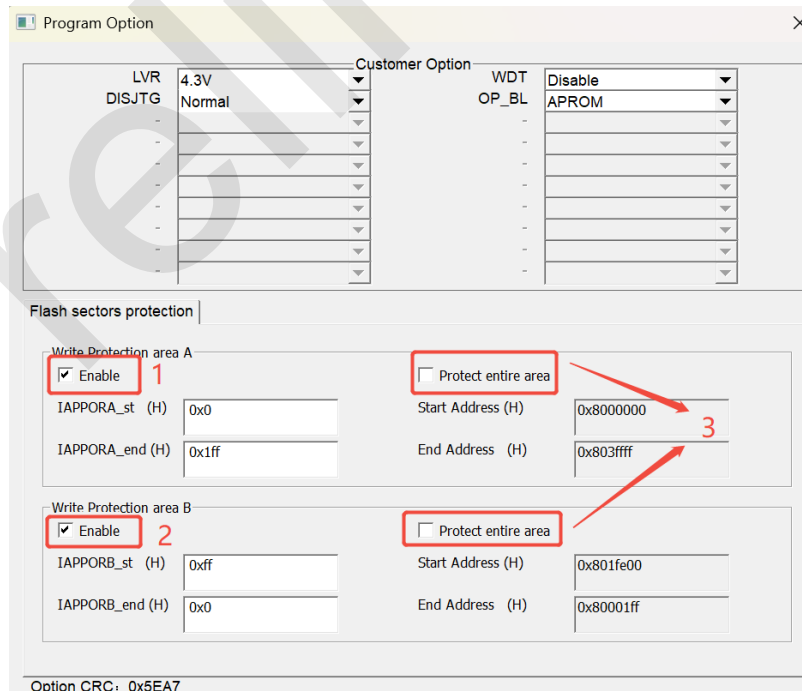


Left: enable encryption Right: disable encryption

If you want to use encryption, after configuring "encryption", the "programming" operation will be triggered. The encrypted configuration will be written to the chip by the writer, and the encryption configuration will be completed.

3.4.6 AB Sector Write Protection Encryption

By default, the SinnOne ARM series chips allow global IAP operations on APROM at factory settings. The chip provides two groups of flash write-protection areas (A and B). These areas can be configured by sector units with a defined start address, and IAP operations are prohibited within the protected regions. Users can freely configure the prohibited IAP regions through the OPTION settings on the host computer.



Program Option

Customer Option

LVR 4.3V

DISJTG Normal

WDT Disable

OP_BL APROM

Flash sectors protection

Write Protection area A

☒ Enable

IAPPORA_st (H) 0x0 4

IAPPORA_end (H) 0x1ff 5

☐ Protect entire area

Start Address (H) 0x8000000 6

End Address (H) 0x803ffff 7

Write Protection area B

☒ Enable

IAPPORB_st (H) 0xff 8

IAPPORB_end (H) 0x0 9

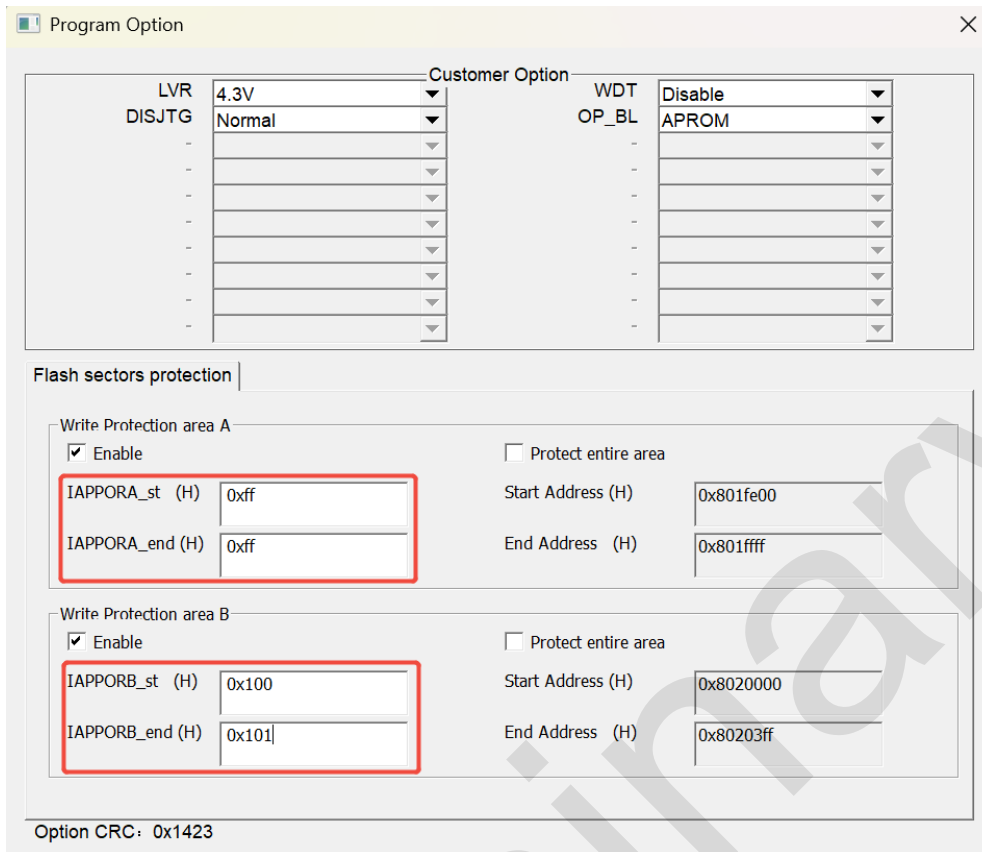
☐ Protect entire area

Start Address (H) 0x801fe00 10

End Address (H) 0x80001ff 11

Option CRC: 0x5EA7

No	Function Descriptions
1	Prohibit IAP operations in Region A, check to enable Region A protection.
2	Prohibit IAP operations in Region B, check to enable Region B protection.
3	Prohibit IAP operations in APROM, check to enable APROM protection.
4	Region A start S/N setting for prohibited IAP operations.
5	Region A end S/N setting for prohibited IAP operations.
6	Region A start address for prohibited IAP operations: Actual protected start address = Flash base address + [Start sector number × 0x200].
7	Region A end address for prohibited IAP operations: Actual protected end address = Flash base address + [(End sector number + 1) × 0x200 – 1].
8	Region B start S/N setting for prohibited IAP operations.
9	Region B end S/N setting for prohibited IAP operations.
10	Region B start address for prohibited IAP operations: Actual protected start address = Flash base address + [Start sector number × 0x200].
11	Region B end address for prohibited IAP operations: Actual protected end address = Flash base address + [(End sector number + 1) × 0x200 – 1].



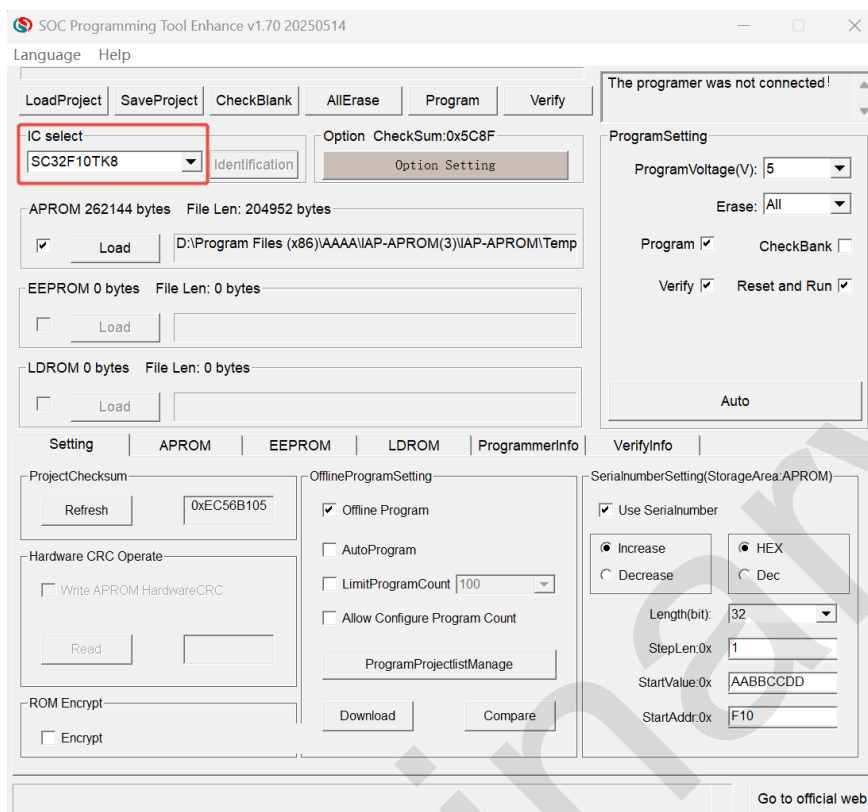
The screenshot shows the 'Program Option' dialog box. It has a 'Customer Option' section at the top with various dropdown menus. Below this is the 'Flash sectors protection' section, which is divided into two parts: 'Write Protection area A' and 'Write Protection area B'. Each part has an 'Enable' checkbox and a 'Protect entire area' checkbox. For 'Write Protection area A', the 'IAPPORA_st (H)' and 'IAPPORA_end (H)' fields are highlighted with a red box, showing '0xff'. The 'Start Address (H)' is '0x801fe00' and the 'End Address (H)' is '0x801fff'. For 'Write Protection area B', the 'IAPPORB_st (H)' and 'IAPPORB_end (H)' fields are highlighted with a red box, showing '0x100' and '0x101' respectively. The 'Start Address (H)' is '0x8020000' and the 'End Address (H)' is '0x80203ff'. At the bottom, the 'Option CRC' is '0x1423'.

Taking the above figure as an example, after configuring the start and end S/N for the AB write-protection regions and performing the programming operation into the IC, the following APROM regions are prohibited from IAP operations: 0x0801FE00–0x0801FFFF and 0x08020000–0x08203FF.

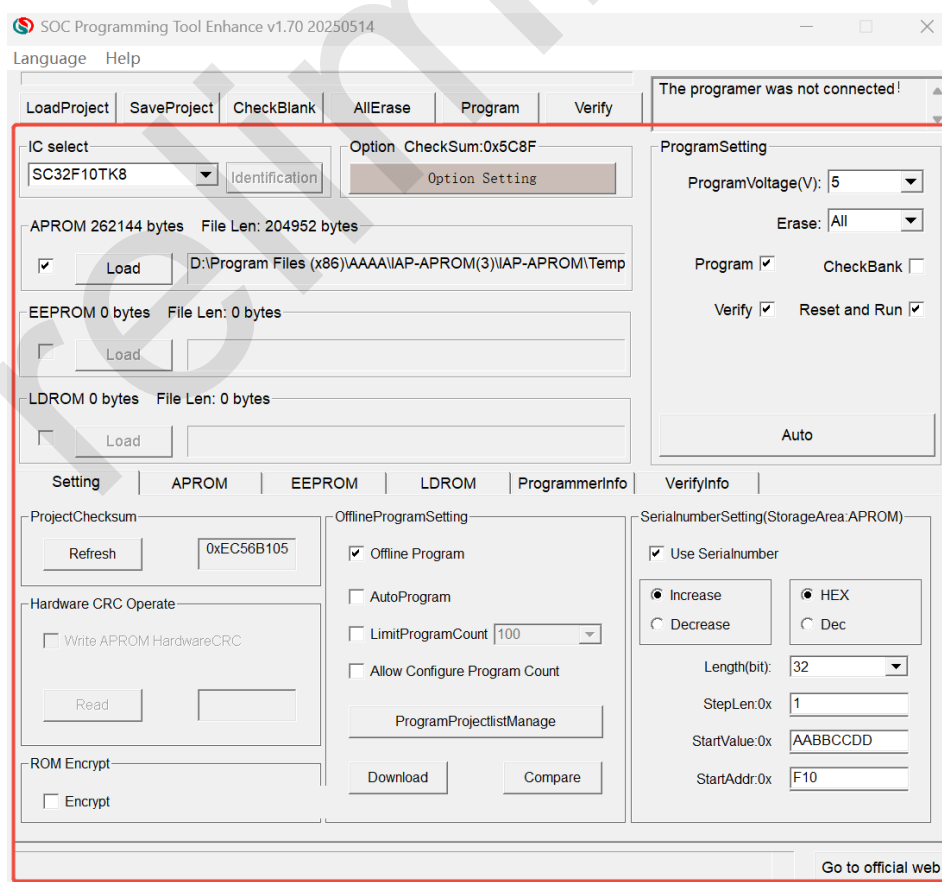
3.5 Development programming procedure

Take using SC LINK PRO program SC32F10TK8 as an example.

- ① Connect the SC LINK PRO to the SC32F10TK8 with the 4PIN cables in the correct direction.
- ② Connect online programmer SC LINK PRO to PC with USB cable.
- ③ Open SOC Programming Tool.
- ④ Select the chip model to be programmed at the drop-down list of “Chip Select”, such as SC32F10TK8 in the example.

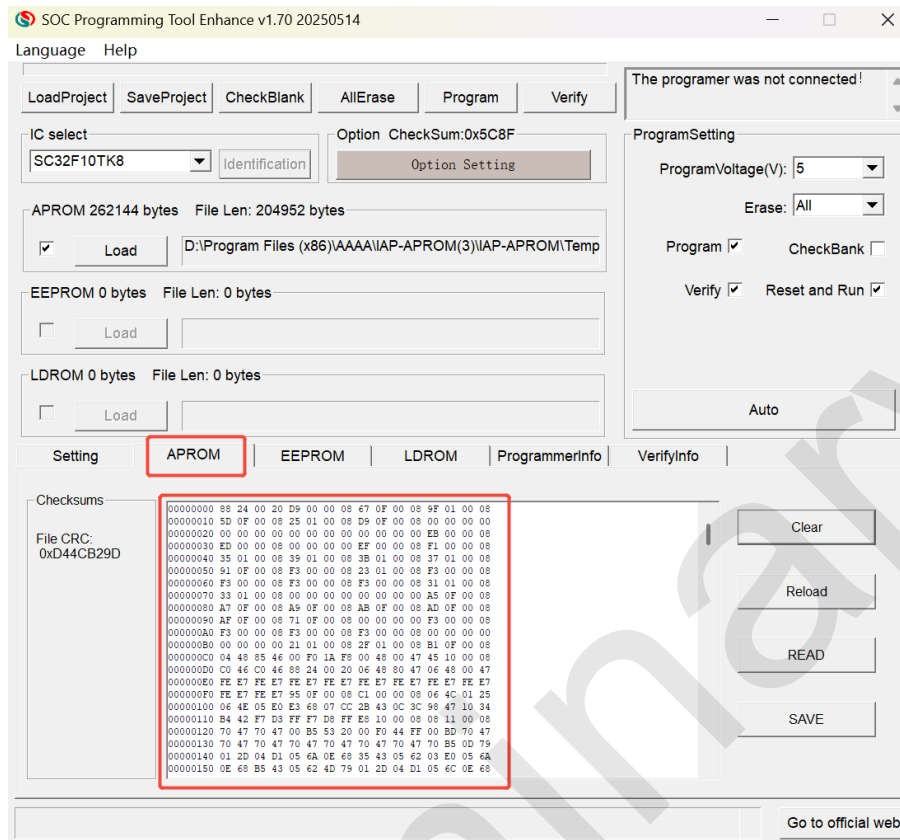


1. After the chip model is selected, its related interface contents (such as programming type, ProgramSetting, etc.) will be adjusted based on its resources automatically;

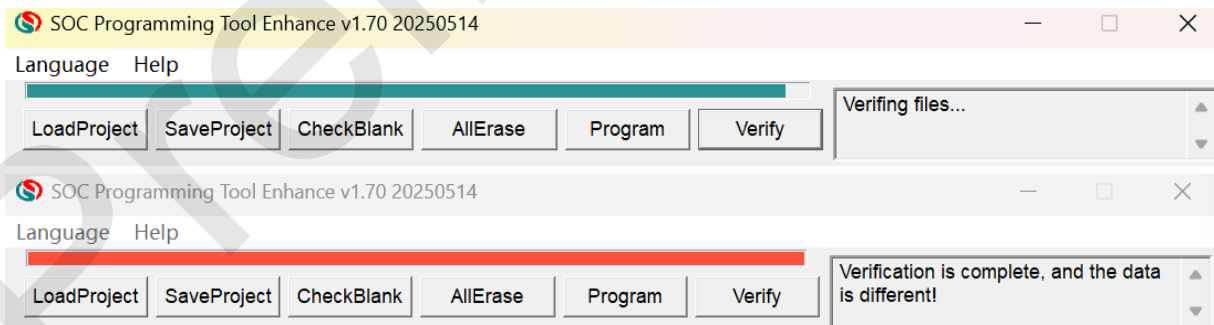


2. Check corresponding programming area, click "Load" and locate the code file to be loaded (.hex file or bin file) in the popped-up window, then click "Open" to display the program codes in

corresponding area. The figure below shows the HEX file loaded after selecting APROM;



3. Configure the S/N function if needed. (If the S/N is not required and only applies to offline programming, this step can be skipped) ;
4. Click “Auto” to program the code file and the corresponding settings into the MCU
5. The SOC Programming Tool will display a “Programming” progress window. Once programming is completed and verification confirms that the data matches, the code has been successfully programmed.

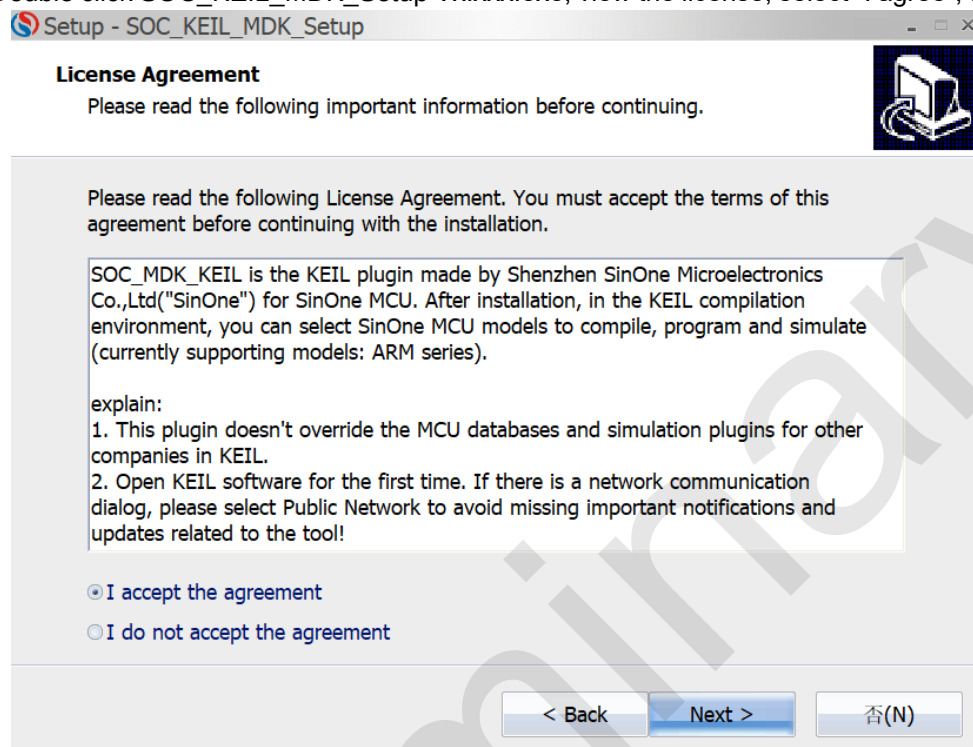


6. Programming is completed.

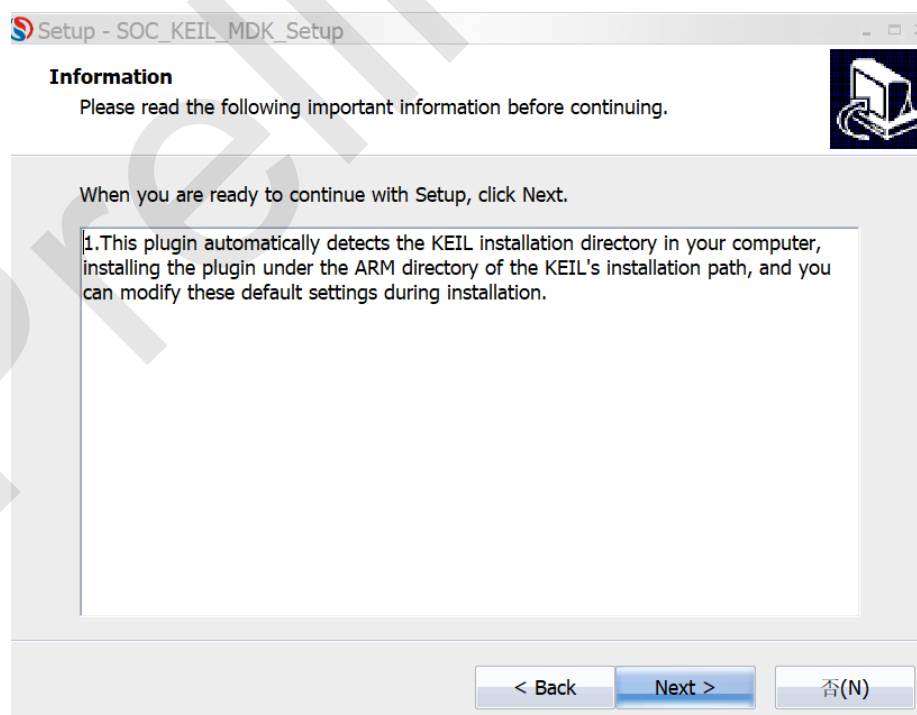
4 Keil C Plug-ins

4.1 Install Simulation Plug-ins

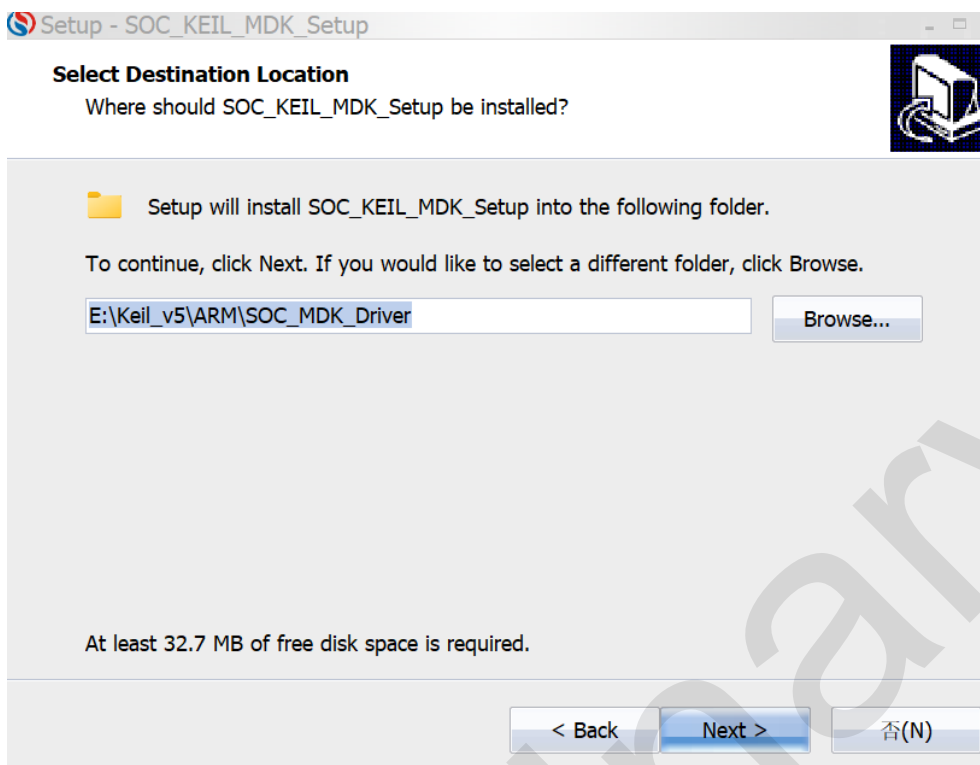
- ① Double click SOC_KEIL_MDK_Setup Vx.xxx.exe, view the license, select "I agree", then click "Next"



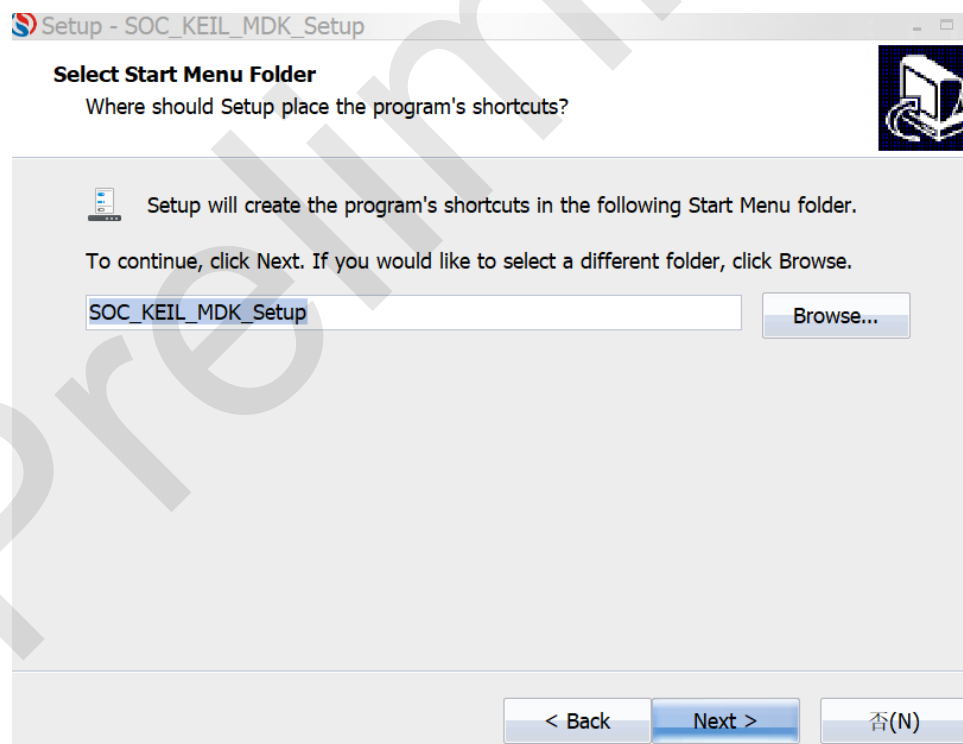
- ② View the license, select "I agree", then click "Next"



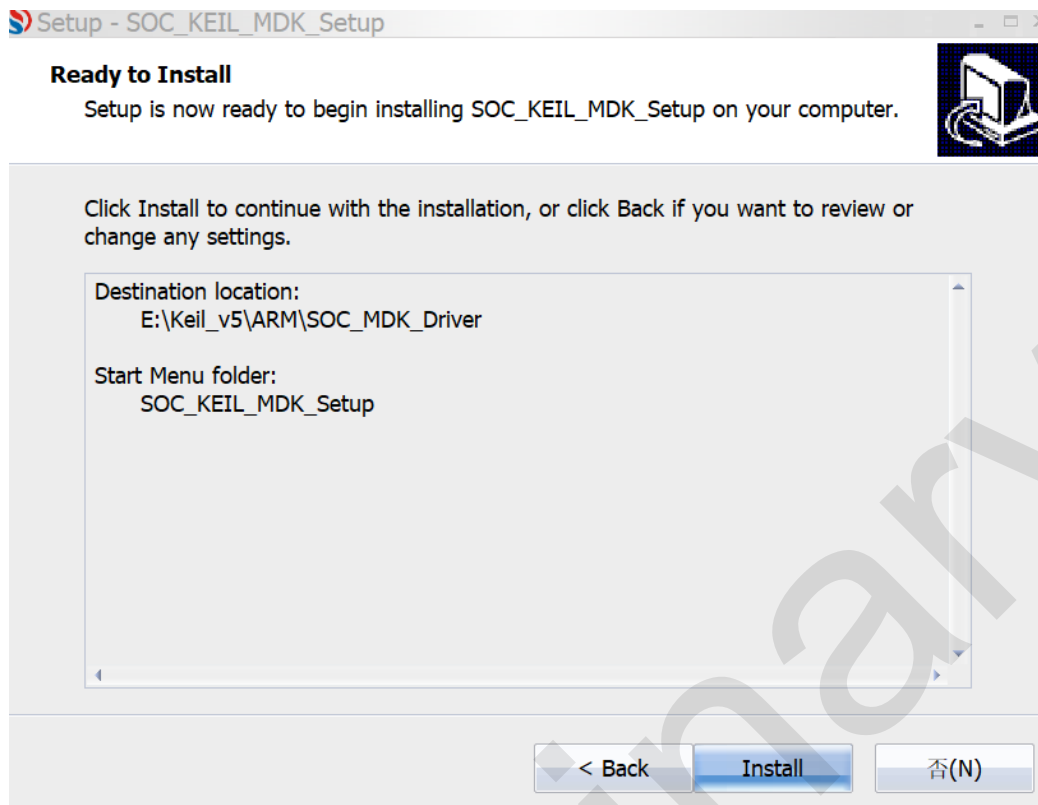
- ③ The default installation path is in the directory for Keil installed, you can modify this path, then click "Next" button



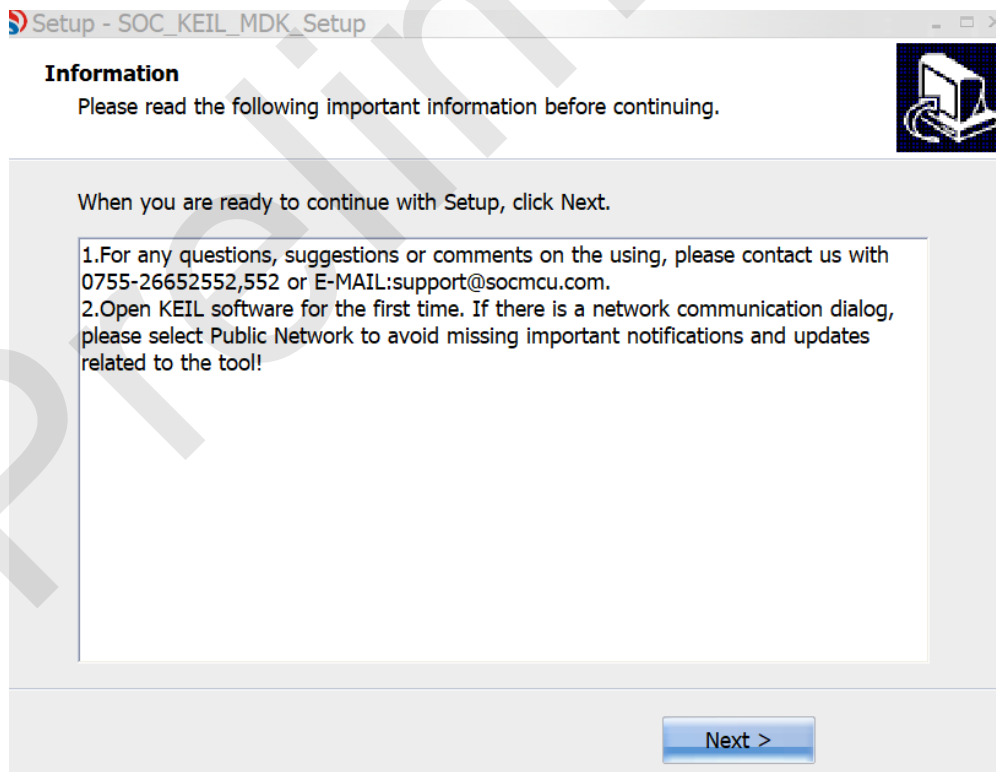
- ④ Set the name of this folder on Start Menu with SOC_KEIL_MDK_Setup in default. You can modify the name as needed, then click “Next” button

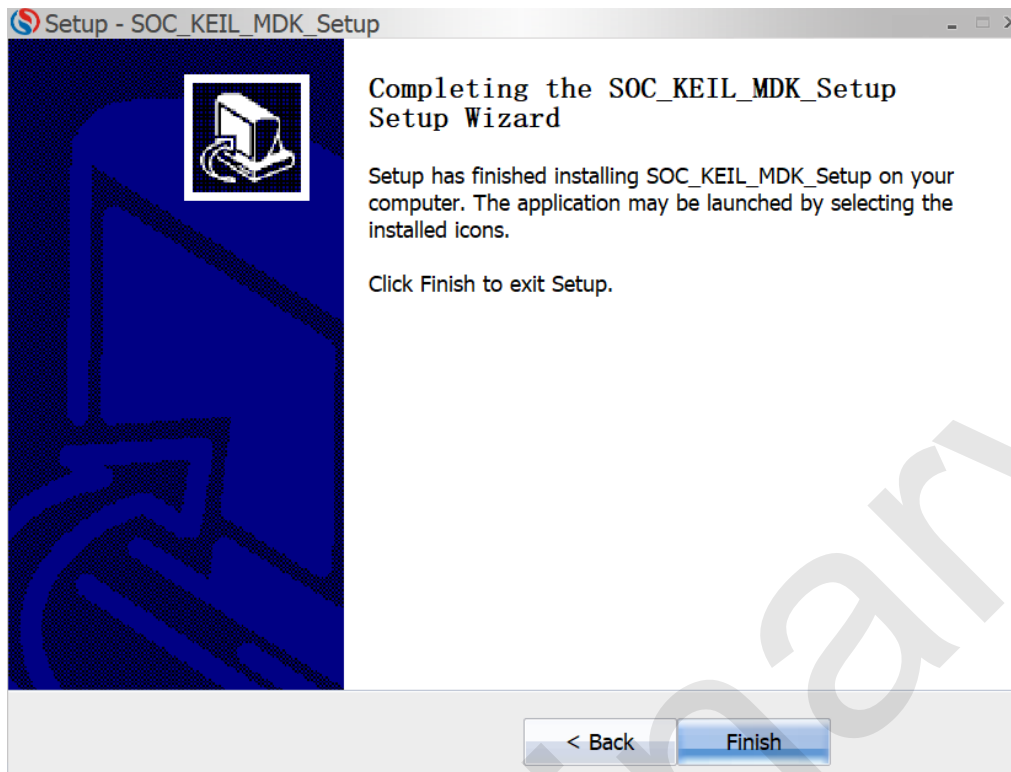


- ⑤ Confirm the installation path and click “Next” button



- ⑥ For installation, click “Next” and then click “Install” to complete the installation, and read related help information.

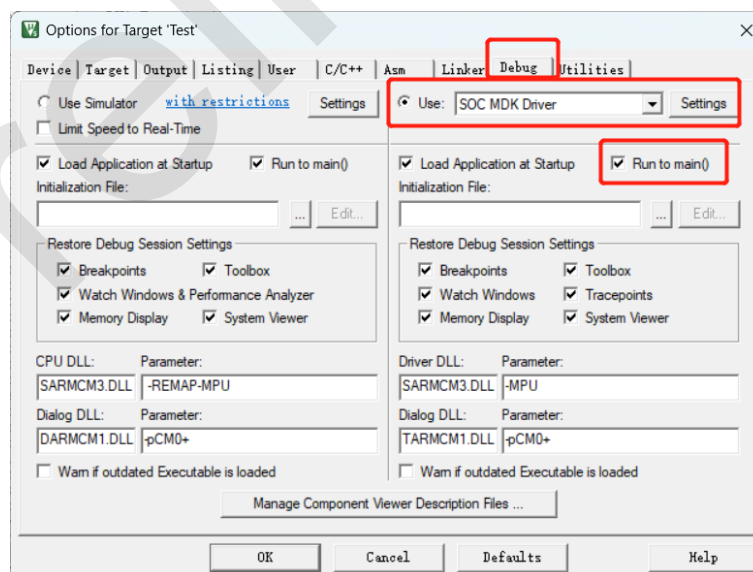




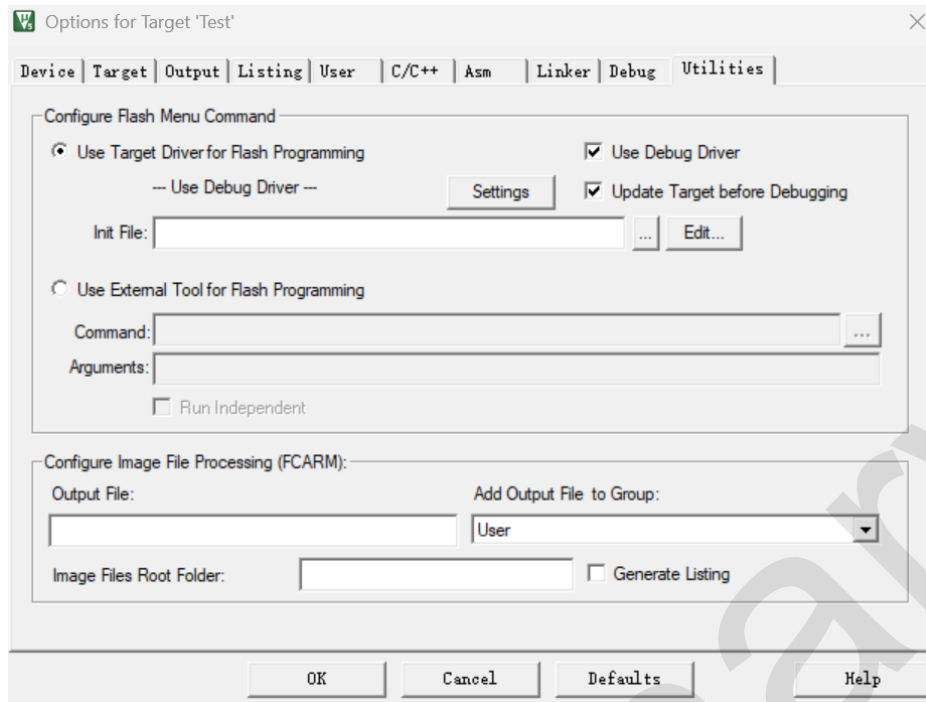
Note: After installation, if any network communication message pops up upon opening KEIL software for the first time, please select “Public Network” to avoid missing important notifications and updates related to the tool!

4.2 Set Keil Interface

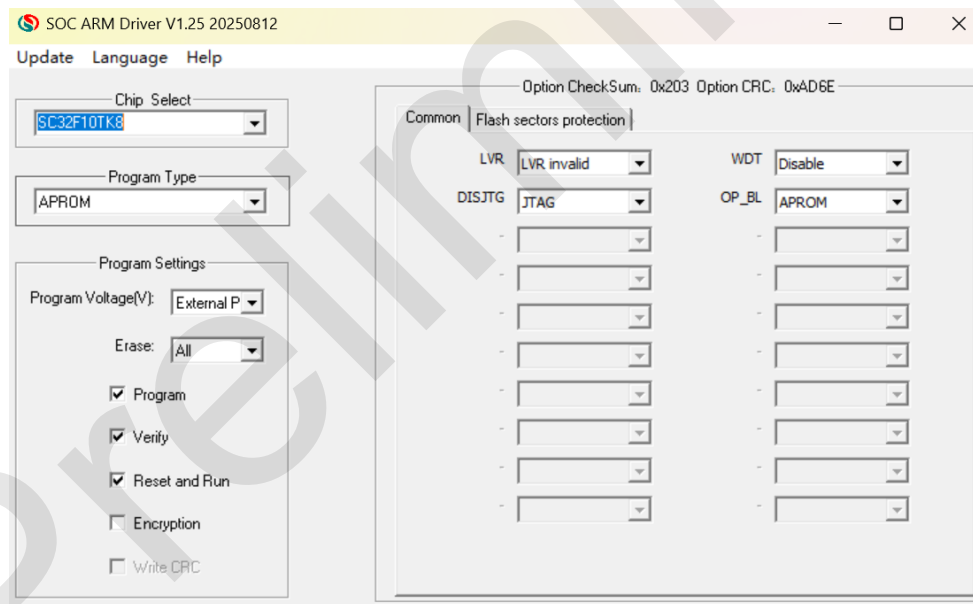
- ① Open Keil project file, click the shortcut icon “Target Option”, select “Debug” in “Target Option” interface, click “Use” and select “SOC MDK Driver”, and then check “Run to main()”, as shown in the figure below:



- ② Click “Utilities” and select “Use Target Driver for Flash Programming”, as shown in the figure below:



- ③ Click “Settings” again to enter “Programming Option Information Interface”, as shown in the figure below:



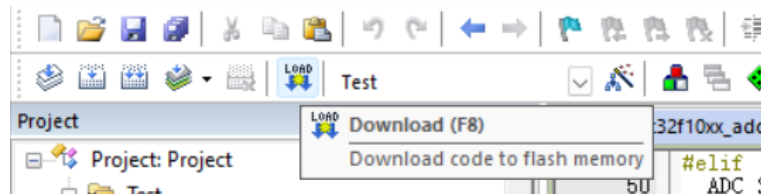
- ④ Programming Option Information Configuration.
1. Chip Select: Select IC name for pre-programming or simulation.
 2. ProgramSetting: Select automatic programming, including erasing, programming, verifying, etc.
 3. Programming Options: Set Code Option as needed.
 4. Programming Area: APROM or EEPROM.
 5. Upgrade: Upgrade the library file.
 6. Help: Version-related information.

Note: If the required IC model is not found in chip option or the corresponding model found can not be simulated, it is required to click “Upgrade” to enter the upgrade interface.

Upgrade Firmware: Upgrade the firmware of programmer provided by SOC.

⑤ Download shortcut key

“Download” will perform IC operations according to programming Option configurations, not only programming code and Code Option selected, but also erasing, programming and verifying according to ProgramSetting shown in the figure below.



4.3 Notes for Keil C Plug-ins

Before using Keil C to create SOC MCU project, please visit SinOne official website (<http://www.socmcu.com>) to download and install the latest SOC Keil C library file. After installation, SOC MCU model library file, MCU head file and Demo program will be stored in SOC folder under Keil C installation directory.

5 Revision History

Revision	Changes	Date
V0.1	Initial Release.	August 2025