

SOC LINK Series Programmer & Simulator User Manual

Shenzhen SinOne Microelectronics Co., Ltd.



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Statement

The User Manual mainly describes the operating instructions for SOC LINK Series Programmer & Simulator. 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 <u>http://www.socmcu.com</u> to obtain the latest user manual and read it carefully.

For any problems, suggestions or comments during the use, please contact <u>0755-26652552</u> or email to <u>SOC_support@socmcu.com</u>.

The following table lists the similarities and differences between SC LINK PRO and SC LINK:

Туре	SC LINK PRO	SC LINK		
Programming Tool	SOC Programming Tool			
Keil C Plug-ins	SOC_I	<eil_setup< td=""></eil_setup<>		
Applicable product	SC95F, S	SC95F, SC92F, SC93F		
Simulation	\checkmark	√		
Online programming	\checkmark	\checkmark		
Offline programming	\checkmark	\checkmark		
ISP	\checkmark	×		
OLED display	\checkmark	×		
Output voltage	Software control	Manual control		
Multi-code	40	10		



1.1 Programmer & Simulator: SC LINK PRO



Name	All Models	Function	Description
		SOC programmer &	simulator
		Applicable to online a	and offline programming and
		simulation for SOC 8	8051 series and debugging
		of Touch Key chips	
SC LINK		Automatic IC inspect	tion without any action
PRO		Available to connect	programmer interface
		ISP upgrade	
		OLED display	
		Multi-code managem	nent
		Programming in part	ition



1.2 Programmer & Simulator: SC LINK



Name	All Models	Function Description		
SC LINK	SC LINK + 4PIN Cable	 SOC programmer & simulator Applicable to online and offline programming and simulation for SOC 8051 series and debugging of Touch Key chips Automatic IC inspection without any action Available to connect programmer interface Multi-code management Programming in partition 		



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	Equal to Supply		V	
Interface (5V)	Voltage			
Supply Voltage of Programming	3.2	3.4	V	Operating Voltage≥4.5V
Interface (3.3V)				
Length of External Programming Cable	-	60	cm	Operating Voltage≤5.0V
Capacitance Range between VDD and	-	1000	uF	Operating Voltage≤5.0V
VSS upon Programming on Board				

2.1.2 Descriptions

SC LINK PRO is designed for SOC 8051 series IC offline/online programming & simulation and TouchKey debugging.



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 mode③ RUN Lamp: Red light indicates power on

Busy Lamp: Red light, lamp flashes means IC programing in offline programming mode or firmware upgrading

© OK Lamp: Blue light indicates programming completed

© 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	VUSB
GND	ОК	NG	Busy	Start	3.3V

2.1.2.1 Function Description for Programming Interface

(1) Use 4PIN cable for ICP programming, details are shown in Figure 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) Use 5PIN cable for ISP programming, details are shown in Table 2.1.2-2.

Table 2.1.2-2		
Description for ISP Programming Interface		
Name Function Description		
VDD,VSS	Power and ground (pin) of programmed IC	
CLK,DIO	UART communication interface, connecting RX and TX of target IC	
RST	Control target IC reset in ISP mode	

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.



Figure 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.





Figure 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.



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





Figure 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.



Figure 2.2.4-1 Programming with Limited Counts Completed



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Figure 1.2.4-2 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	
	CRC Checksum of currently loaded	
CS	project (Refer to the SOC Programming	
	Tool for this checksum)	
	The programming option code of	
OP	currently loaded project (Refer to the	
	programming software for this checksum)	
SN	S/N currently written in	
	Remaining programming counts for	
	currently loaded project	
S 4	Current programming status	
54	(BUSY/OK/ERR)	
U	Currently programming voltage	
LINK	Link	
ID	The Unique ID of current programmer	
lap 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	 Check if MCU is placed correctly or if the pin is shorted or disconnected; 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 92/93/95 series, which is available for debugging, step debugging, step-over debugging and RST operations for up to 8 breakpoints (7 for users, and 1 as hidden breakpoint), to view and modify RAM and SFR and debug the program in development stage. Before using, complete the following configurations.

2.3.2 SC LINK PRO Simulation Operations

After above configurations are completed, user can perform simulation for up to 8 breakpoints, 7 for users and 1 as hidden breakpoint. 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:

	MainRun.c 🚺		
016	u8 GlobalVar Idata,GlobalVar Xdata;		
017	void main()		
018	-{		
019	RSTCFG=0x25; //LVR:2.6V,RSTPIN->IO		
000			
021	TimerOIint();		
022	GlobalVar_1data=0x10;		
023	GlobalVar_Xdata=0x30;		
024	while(1)		
025			
026	GlobalVar_Idata++;		
027	GIODALVAT_XQATA++;		
028	<pre>if(GlobalVar_Idata>=0xf0)</pre>		
029			
030	GlobalVar_Idata=0x10;		
031	}		
032	II (GlobalVar_Xdata>=0xf0)		
033			
034	GiopalVar_Xdata=0x30;		
000			
036	SFR_Set();		
037	USE_RAM_SET(GIODAIVAT_IDATA,GIODAIVAT_KDATA);		
II.			

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.



🗋 🚅 🖬 🥥 🕺	「山 亀」 ゥ ┍ 々 今 祭 務 務 (達 達 川)版 20	💌 🗟 🥐 🛛 🖸	• • •) 🚓 🖃 🔦
🕸 🖾 🕮 🧼 🗮	🗱 Target L 🔍 🔊 👗 着			
roject	Download			
Target 1	Download code to flash memory Set (void);			
	Build Output			
	Load "\\Output\\ISP_Updater" 仿真器已连接. APROM擦除成功! 编程完成,数据正确! Flash Write Done: 1024 bytes programmed. CheckSum = Oxca60 校验完成,数据正确! Flash Verify Done: 1024 bytes verified.			
	<			
	📰 Build Output 🛛 🙀 Find In Files			

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.





	P		·		
File Edit Vie	w Project Flash	Deb	ug Peripherals Tools S	SVCS Window	Help
🗋 💕 🖬 🗿	1 X 4 (B) 9	₫	Start/Stop Debug Session	Ctrl+F5	A = A = A = A = A = A = A = A = A =
s 🕮 🛱 🤘	🗟 🔤 🔤 🙀 Target	RST	Reset CPU		
🎥 🖹 🕅	₽ ₽ € ♦		Run	F5	 ■ - ※ - = -
Registers	д 💽	03	Stop		
Register	Value	{}	Step	F11	
E-Regs	14440	8	Step Over	F10	
-r0	00x00	{}},	Step Out	Ctrl+F11	ssInit.u8 length. bit ChooseSet);
r1	0x00	*{}	Run to Cursor Line	Ctrl+F10	[idata.u8 T xdata);
r2	0x00	\$	Show Next Statement		
	0x00		Preskagints	C+rl + P	
r5	00x0		Interaction Description	Cui+B	lata;
r6	0x00		Insert/Remove Breakpoint	F9	
	0x00	0	Enable/Disable Breakpoint	Ctrl+F9	
a a	0x00	0	Disable All Breakpoints		//LVR:2.6V.RSTPIN->IO
b	0x00		Kill All Breakpoints	Ctrl+Shift+F9	,,
sp	0x20		OS Support)	•
PC	0x0100		Execution Profiling))x10;
dptr1	0x0000		-)x30;
dps	00x00		Memory Map		
dpx	00x00		Inline Assembly		
dpxl	0x00		Function Editor (Open Ini F	File)	ata++;
ta	0x00		Target Settings		ata++;
ie	0 x 00		Modeless Dialog		Idata>=0xf0)
ie1	00x00				1
- in	0x00			01 1 177	T1 + 0 10

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.

After entering the simulation status, the program will stop at 0x00 address by default, that is, PC points to Page 17 of 91 V0.1



0x00. 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 incidates off, "Disassembly" window will disappear

8 E 🚳	♦ 0° 0 10 40	■ 🔯 ⋐ 🚍 🖓 💭 = = = 😨 = 🔳 = 🎌 = 🕾 =
Registers	д 🖬	D sasse 🙆 Disassembly Window
Register - Regs	Value	Show or hide the Disassembly Window
r0 	0x00 0x00	//UWR:2.6V,RSTPIN->IO C:0x000E 75F625 MOV RSTCFG(0xF6),#0x25 22: IO Init():
r2 r3	00x00 00x00	C:0x0011 1200AD LCALL IO_Init(C:00AD) 23: TimerOInit();
	00x00 00x0	C:0x0014 1200C0 LCALL Timer0lint(C:00C0) 24: GlobalVar_Idata=0x10;
	00x00 00x00	C:0X0017 750800 MOV GLobalVar_idata(0x08),#0x00 C:0X001A 750910 MOV 0x09,#0x10 25: GlobalVarXdata=0x10:
⊟ Sys a	0 x 00	
b sp	0x00 0x20	MainRun.c I
	0x0100 0x0014	018 Lu8 xdata GlobalVar_Xdata;
dptr1	0x0000 0x00	
dpx dpx1	0x00 0x00	021 RSTCFG=0X25; //LVR:2.6V,RSTPIN=>10 022 IO_Init();
mxax	0x00	ClabelVan John 0:10:
ie ie1	0x00 0x00	025 GlobalVar_Idata=0x10; 025 GlobalVar_Xdata=0x30; 026 while(1)

③ Open the "Disassembly" window and run Step

The current program stops at the function body TimerOlnit(), 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.

辭 🗟 🛞	♦ 0 0 0	
Registers	4 🖬	Disassembly
Register	Value	19: void main()
⊟-Regs		
r0	0x00	C:UX000E 75F25 MOV RSTCFG(0xF6).=0x25
-r1	00x00	22: IO_Init();
r2	0x00	C:0x0011 1200AD LCALL IO_Init(C:00AD)
r3	00x00	231 TIMETOTAL ();
r4	00x00	2: Clobal Var Taracovio
ro	0000	C:0x0017 750800 MOV GlobalVar Idata(0x08),#0x00
10	0x00	C:0x001A 750910 MOV 0x09,#0x10
E-Sue	0100	25: GlobalVar_Xdata=0x30;
- 0,75 - a	0x00	
b	0x00	MainRun c 🔽
sp	0x20	
dptr	0x0100	018 u8 xdata GlobalVar_Xdata;
PC	0x0014	019 void main()
dptr1	0x0000	020 3
dps	00x00	RSTCFG=0x25; //LVR:2.6V,RSTPIN->IO
dpx	0x00	TO Thit().
BXAX	0x00	TimerOlint();
ta	0x00	GlobalVar Idata=0x10;
ie	0x00	GlobalVar Xdata=0x30;
iel	0x00	w while(1)
ip	0x00	
-1p2	0x00	
± psv	0200	Globalvar_Idata++;
		GlobalVar_Xdata++;
		if (GlobalVar_Idata>=0xf0)
		1001
		GlobalVar_Idata=0x10;
🖻 Р., 🌏 В.,	() F., 0. , T., 📰 R., [



結 🗟 💿	新国 Q 1917 0 10 4 コ Q 2 目 Q 2 1 1 2 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2					
Registers	4 	Disassembly				
Register Regs r0 r1 r2	Value 0x00 0x00 0x00 0x00	87. void TimerOlint (void) 88. (89. TMCOMONDO 90. Concord 90. TMCOM(1); 1 90. TMCOM(1); 1				
r3 r4 r5 r6 r7	0x00 0x00 0x00 0x00 0x00 0x00	C:CX00C3 758911 NOV THOCO(0x89, 40x11 51: THO-OX11; C:CX00C6 758C11 NOV THO(0x80, 40x11 92: TLO-OX11; C:CX00C9 758A11 NOV TLO(0x80, 40x11 31: ETCO-1				
B-Sys a b sp	0x00 0x00 0x22					
dptr PC dptr1 dps dpx	0x0100 0x00c0 0x0000 0x00 0x00 0x00	(06) PI=0x11/ (06) P3=0xff; (06) ↓ (07) void Timer0Iint (void) (06) ↓				
axax ta ie ie1 ip ip2	0x00 0x00 0x00 0x00 0x00 0x00 0x00	Desc TMCON-OX00; 680 TMOD=OX11; 681 THO=0X11; 682 TLO=0X11; 683 ETO=1;				
®psv	0x00	04 EA=1; 05 TRO=1; 05 } 07				
🖬 Р., 🌏 В., 🕻						

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 Timer0Init() 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:





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Registers 🛛 📮 🔟 Disassembly	
Exp[ltref Yalue 231 TameOlini(1) Regs -000 10000 10000 -r1 0.000 0000 0000 -r2 0.000 0000 0000 -r2 0.000 0000 0000 -r2 0.000 0000 0000 -r3 0.000 0000 0000 -r4 0.000 0000 76000 -r5 0.000 76000 7600 -r5 0.000 10000 96000 -r5 0.000 10000 96000 -r6 0.000 10000 96000	
B-Sys (III)	
a 0000 b 0000 sp 020 optr 00100 008 u8 xdata GlobalVar_Xdata; PC 00001 009 void main() optr 00000 0000 /	
dps 0x00 cm RSTCFG=0x25; //LVR:2.6V,RSTPIN=>I dps 0x00 cc IQ_Init();	0
ist 0x00 005 GlobalVar Xdata=0x30; ist 0x00 0x8 while(1) ist0 0x00 0x7 (GlobalVar Idata++; * pro 0x00 0x7 (GlobalVar Idata++;	
GlobalVar_Xdata++; ou if(GlobalVar_Idata>=0xf0) ou { GlobalVar_Idata=0x10; cu GlobalVar_Idata=0x10;	

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 Figure 3.2.2, select "Run to Cursor Line" to directly stop the program at the last line of Timer0Init() 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 the address 0x00, as shown in the figure below:



🎥 🔝	♦ 0° 0 6 6	
Registers	д 	Disassembly
Register - Regs - r0 - r1 - r2 - r3 - r4	Value 0x00 0x00 0x00 0x00 0x00	124: 7C_STARTUP: L.NHP STARTUP1 127:
- r5 - r6 - r7 ⊟- Sys - a	0x00 0x00 0x00 0x00 0x00	C::00003 000 DOF Diff(0) C(:0000) C::00004 00 NOP C(:00004) C(:00004) C::000046 00 NOP C(:00004) C(:0004)
b 	0x00 0x07 0x0000 0x0000 0x0000 0x00 0x0	HainRunc Image: Constraint of the second secon
ta ie ie1 ip2 ⊕psw	0x00 0x00 0x00 0x00 0x00 0x00 0x00	030 TMOD=0X11; 031 THO=0X11; 032 TLO=0X11; 033 ET0=1; 034 EA=1; 035 ET0=1;
E D	Эс (П. т. = р [086) 087 void Timer0 (void) interrupt 1

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

 $\ensuremath{\mathbb O}$ Open Watch Windows

Click the shortcut icon "Watch Windows" to show 3 optional windows: Locals,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 2.2.4-1; When clicking "Watch1" or "Watch2", a Watch interface appears at the bottom of KEIL interface, as shown in Figure 2.2.4-2

詩 🗟 📀 🤁	₽ ()• *() ⇒ Σ	🔍 👍 🚍 🛵 💭	• 💷 • 😡 • 🔜 •	• 💷 • 📓 • 🎭 • 🔜 •					
Registers	🕑 🔀 Disa	ssembly 📈	Locals						
Register	Value	126: ?C_STI	Watch 1	STARTUP1					
- Regs r0	0x00	127:	Watch 2	?C_C51STARTUP					
	Fig. 2.2.4-1								
🖻 Р 🌍 В {} F (0 _↓ T								
Watch 1									
Name 									
😹 Locals 😹 Watch 1									

Fig. 2.2.4-2

 $\ensuremath{\mathbb C}$ 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 2.2.4-3



a b sp dptr - PC - dptr1 - dpx - dpx1 - mxax	0x30 0x00 0x20 0x0023 0x000 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x027 0x0023 0x0023 0x0023 0x000 0x00 0x00 0x00 0x0023 0x000 0x0	224 025 026 027 028 029 030 031 032	<pre>GlobalVar_Idata=0x10; GlobalVar Xdata=0x30; while(1) { GlobalVar_Idata++; GlobalVar_Xdata++; if(GlobalVar_Idata>=0xf0) { GlobalVar Idata=0x10;</pre>			
Watch 1					† 💌	
Name				Value	_	
GlobalVar_	Idata			0x0010		
GlobalVar_	Xdata			0x30		
double-cl	double-click or F2 to add>					

Fig. 2.2.4-3

In the figure above, add the variable GlobalVar_Idata and GlobalVar_Xdata, the values in Watch1 are 0x0010 and 0x30 respectively.

Besides, in C source code interface, when the mouse moves over the variable name, its value, type and address will appear as well, as shown in Figure 2.2.4-4.

/ 🗈	MainRun.c 🖬
022	TimerOlint();
023	GlobalVar_Idata=0x10;
➡024	GlobalVar_Xdata=0x30; 🧲 鼠标移动到该位置
025	while (1)
026	{
027	GlobalVar_Idata++;
028	GlobalVar_Xdata++;
029	<pre>if(GlobalVar_Idata>=0xf0)</pre>
030	1 4

Fig. 2.2.4-4

① 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 2.2.4-5.

L					
I	E-Sys	<₽>024	GlobalVar Idata=0x10;		
I	a 0x30	025	GlobalVar Xdata=0x30;		
	sp 0x20 dptr 0x0027	026	while(1)		
	PC 0x0023 dptr1 0x0000 dps 0x00 dpx 0x00 dpx1 0x00 myax 0x00	028 029 030 031	GlobalVar_Idata++; GlobalVar_Xdata++; if(GlobalVar_Idata>=0xf0) {		
ľ	🔄 Р 🌏 В { } F О., Т 🗮 К. .		GIODAIVAI Idata-0x10;		
	Watch 1				д
I	Name			Value	
I	GlobalVar_Idata			0x0010	
I	GlobalVar_Xdata			0x22	
↓ {double-click or F2 to add>					_

Fig. 2.2.4-5

In the figure above, the value of GlobalVar_Xdata is modified as 0x22.

2.3.4.2 Use Memory Window to View and Modify Variable

Open Memory Windows

Click "Memory Windows" to show 4 optional windows: Memory1 - Memory4, as shown in Figure 2.2.4-6. 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 2.2.4-7.



8t 🗉 📀 7	} ()} ()} ∛() ∛()	🗾 🔯 📑	s 🔝 🔹		• 😼 • 🔳	- 🗉 - 📓 - 🎌 - 🔜 -
Registers	C×	Disassembly			Memory 1	
Register	Value	28:			Memory 2	Xdata++;
□ Regs - r0 - r1 - r2 - r3 - r4 	0x00 0x00 0x00 0x00 0x00 0x00	C:0x002E C:0x002F C:0x0030 29: C:0x0031	E0 04 F0 C3		Memory 3 Memory 4 40VX if (Glo CLR	(DPTR, A obalVar_Idata>=0xf0) C
		Fi	g. 2.2.	4-	6	
Memory 1						
Address:						
Locals 🐺 Watch 1	Memory 1					

Fig. 2.2.4-7

3 View/modify variable by address

In Memory interface, the Address column is used to input the starting address of memory to be displayed. If the address and memory area of current variable are known, perform the following commands. Ram data area: D:xx; RAM idata area: I:xx; Ram Xdata area: X:xx.

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.

Take GlobalVar_Xdata as an example, use 0x27 as the Start Address and view the value of Xdata area, as shown in Figure. 2.2.4-8.



Fig. 2.2.4-8

In the figure above, the address value of X:0x000027 is 0x30, that is, the value of GlobalVar_Xdata is 0x30, same as the results observed in Watch1, as shown in Figure 2.2.4-3.

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 2.2.4-9

Memory 1																				
Address: X:0x	27																			
X:0x000027	: 30	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
X:0x00005A	: 00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
X:0x0008E): 00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
X:0x0000C0	: 00	0.0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
🗸 Locals 🛛	Watch	1		emo	y 1															

Fig. 2.2.4-9

2. Fill in a new value and click at any position to complete, as shown in Figure 2.2.4-10



Memory 1																		
Address: X:0x27	,																	
X:0x000027:	22	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
X:0x00005A:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
X:0x00008D:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
X:0x0000C0:	0.0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0.0
🐺 Locals 🐺 W	/atch	1	III M	emor	y 1													

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 2.2.4-11.



Fig. 2.2.4-11

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 2.2.4-12.



Fig. 2.2.4-12

2.3.5 Descriptions for External Power Supply Simulation

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 KEIL software, configure the programming options and click "Download";
- ⑤ Disconnect the power to the target board once Busy lamp of SC LINK PRO starts flashing;





© Connect the power to target board until Busy lamp turns off; when Busy lamp turns on, it enters Download mode;

After Download is completed, you can enter the simulation mode without powering on again.

2.3.6 Notes for Simulation

① The programming interface CLK and DIO will be occupied during the simulation process, and do not operate these 2 IOs in the simulated code area;

^② 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.

③ For notes of external power supply simulation, see <u>2.2.5 Descriptions for External Power Supply</u> <u>Simulation.</u>



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;

- 1. In "Open File" dialog box, locate the firmware file (.iap file) and click "Open";
- 2. Pop up the dialog box to display the current version and the version to be updated, and click "OK" button;
- 3. After the update is completed, SC LINK PRO will exit Firmware Upgrading mode automatically;
- 4. View the version information of upgraded firmware in "Programmer Information".

Note: During the process of firmware upgrading, you are not advised to perform other operations.

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";

	ink AllErase Program	Verify	SC LINK has connected
C select	Customer Option CheckSum : 0x568	B Setting	ProgramSetting Current programer needs to manually select the program voltage
PROM 65536 bytes IAP Range:	Last 1024 bytes File Len: 1638 ktop\Hex\验证使用HEX\0x00_10	34 bytes 6K.hex	CheckBank 🗖 Erase: All 💌
EPROM 0 bytes File Len: 0 bytes			Program 🔽 Verify 🔽
DROM 1024 bytes File Len: 0 bytes			Reset and Run 🔽
Setting APROM	EEPROM LDROM	SClinkProInfo	VerifyInfo
SOC. Programming Tool publishes date : 2022.01 MCULib current version:v	Current version : v1.10 .25 0.05		
SOC Programming Tool publishes date : 2022.01 MCULib current version:v publishes date/compatibi	Current version: v1.10 .25 0.05 3 version:2022.01.26	AutoUpd	ateDetect
SOC Programming Tool publishes date : 2022.01 MCUIb current version: publishes date/compatibl Programer firmware info	Current version: v1.10 .25 0.05 e version:2022.01.26 rmation: V3.08 2022.02.10	AutoUpd ViewMCL	ateDetect
SOC Programming Tool publishes date : 2022.01 MCULib current version: publishes date/compatibl Programer firmware info Copyright: Shenzhen Sin Company web: vww.soc	Current version: v1.10 .25 version:2022.01.26 rmation: V3.08 2022.02.10)ne Microelectronics Co., Ltd mcu.com	AutoUpd ViewMCL Upgrad	ateDetect ILibRecord eMCULib



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	Program Option					×
25			—Cus	tomer Option		
	WDT	Disable	•	External 32K	Disable	I
١F	System clock	Fosc/1	•	P5.2	Normal	
	LVR	4.3V	•	Vref	VDD 💌	
c	IAP Range	Code region:last 1K	•	DISJTG	Normal	
L	-		Ŧ		v	
56	-		~	-	v	
L	-		~	-	v	
L	-		∇	-	v	
L	-		Ŧ		v	
L	-		~	-	v	
L						
	Option CRC: 0x56	ав	_			

© Select programming voltage and check Erasing, Programming and Verifying, etc.;

© 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";

SOC Programming Tool v1.10 2022.0 Language Help)1.25	- • ×
LoadProject SaveProject CheckBlank	AllErase Program Verify	SC LINK has connected
IC select SC95F8616	Customer Option CheckSum: 0x569B Setting	ProgramSetting Current programer needs to manually select the program voltage
APROM 65536 bytes IAP Range: Last	: 1024 bytes File Len: 16384 bytes /Hex\验证使用HEX\0x00_16K.hex	CheckBank
EEPROM 0 bytes File Len: 0 bytes		Program ⊠ Verify ⊠
LDROM 1024 bytes File Len: 0 bytes		Reset and Run 🔽
Setting APROM EE	PROM LDROM SClinkProlr	fo VerifyInfo SerialnumberSetting(StorageArea:APROM)
Refresh 0x5AA46A6E	✓ Offline Program	Use Serialnumber
Hardware CRC Operate	AutoProgram	Increase C Decrease C Dec
Write APROM HardwareCRC	LimitProgramCount 1	Length(bit): 32
Read	ProgramProjectlistManage	StepLen:0x 1 StartValue:0x AABBCCDD
-ROM Encrypt	Download Compare	StartAddr:0x F10
Welcome to the LINK PRO!		Go to official web

^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 Program + Verify;

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.

S Configure IC option in "option" tab;

5	Program Option					×	ta
25			—Cus	stomer Option			
	WDT	Disable	•	External 32K	Disable 💌		I
١F	System clock	Fosc/1	-	P5.2	Normal		
	LVR	4.3V	•	Vref	VDD 💌		
c	IAP Range	Code region:last 1K	-	DISJTG	Normal		
	-		-	-	-		
50	-		-		~		
e	-		-		~		DI
	-		-		-		
vt	-		-	-	-		l
1	-		-	-	v		
		20					F
_	Option CRC: 0x569	B					

© 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 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.



2.4.5 Instruction for S/N

SOC Programming Tool v1.10 2022.0	01.25	- 🗆 X
LoadProject SaveProject CheckBlank	AllErase Program Verify	SC LINK has connected
C select	Customer Option CheckSum: 0x569B Setting	ProgramSetting Current programer needs to manually select the program voltage
APROM 65536 bytes IAP Range: Last	t 1024 bytes File Len: 16384 bytes	CheckBank
EEPROM 0 bytes File Len: 0 bytes	HEX1验证使用HEX10X00_16K.nex	Erase: All _
Load -		Verify 🔽
LDROM 1024 bytes File Len: 0 bytes		Reset and Run ✓
Load -		Auto
ProjectChecksum	PROM LDROM SClinkProlr	nfo VerifyInfo SerialnumberSetting(StorageArea:APROM)
Refresh 0x5AA46A6E	Gffline Program	✓ Use Serialnumber
Hardware CRC Operate	T AutoProgram	Increase Increase C Dec
Write APROM HardwareCRC	LimitProgramCount 1	Length(bit): 32
Read	ProgramProjectlistManage	StepLen:0x 1
ROM Encrypt	Download Compare	StartAddr:0x FE00
Welcome to the LINK PRO!		Go to official work

① S/N function is available for SC LINK PRO in offline mode.

⁽²⁾ Low S/N data is stored in low address, for example, write 32BITS S/N 0XAABBCCDD 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.

③ 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.

④ It is recommended to set the S/N address outside the program space so as to avoid the program code from being covered by S/N data, resulting in being unable to perform verifying operation after programming.
 ⑤ S/N supports power-off memory function.

2.4.6 Descriptions for External Power Supply Programming

Steps for external power supply programming:

- $\ensuremath{\textcircled{}}$ 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 options and click "Programming";
- ⑤ Disconnect the power to the target board once Busy lamp of SC LINK PRO starts flashing;



SOC LINK Series Programmer & Simulator User Manual



© Connect the power to target board once Busy lamp turns off; when Busy lamp turns on, it enters
 ⑦ After programming is completed, disconnect the target board to ensure that the programmed IC exits
 Programming mode.

2.4.7 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.

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:





2.4.8 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 programming in offline programming mode, see <u>2.3.6 Descriptions for External Power</u> <u>Supply</u> 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 For 95 series Flash-type IC programming, please check "Sector Block or Full Erase" for programming, otherwise it may result in programming failure.

2.4.9 Instruction for EEPROM Area Programming

① Select the programming area:

1. If both APROM and EEPROM are programmed, check "APROM+EEPROM" at the same time

2. If only EEPROM is programmed, only check "EEPROM"

APROM+EEPROM is used as the example for subsequent instructions



oadProject SaveProject CheckBlar	nk NoErase Program Verify	SC LINK PRO has connected
C select	Customer Option	ProgramSetting
C99F8730 ▼ Identificatio	CheckSum: 0x569B Setting	ProgramVoltage(V): 3.3
APROM 131072 bytes No IAP Area F	ile Len: 65536 bytes	CheckBank
Load C:\Users\li\Desk	top\Hex\验证使用HEX\0x00_64K.hex	Erase: None -
EPROM 1024 bytes File Len: 1024 b	oytes	Program 🔽
Load C:\Users\li\Desk	top\Hex\验证使用HEX\0xff_1K.hex	Verify 🔽
DROM 0 bytes File Len: 0 bytes		Reset and Run 🔽
Load -		Auto
Setting APROM	EEPROM LDROM SClinkPro	Info VerifyInfo
ProjectChecksum	OfflineProgramSetting	SerialnumberSetting(StorageArea:APROM
		_
Refresh	Giffine Program	Use Serialnumber
Refresh Hardware CRC Operate	✓ Offline Program ✓ AutoProgram	Use Serialnumber Increase Figure HEX
Refresh Hardware CRC Operate	Offline Program F AutoProgram	Use Serialnumber Increase Decrease Dec
Refresh	Offline Program AutoProgram LimitProgramCount 1	Use Serialnumber
Refresh Arrow CRC Operate	Coffline Program AutoProgram LimitProgramCount 1 ProgramProjectietUanage	I Use Serialnumber
Refresh Hardware CRC Operate	Offline Program AutoProgram LimitProgramCount 1 ProgramProjectlistManage	Use Serialnumber

^② Select EEPROM tab and configure the start address of EEPROM, this address determines the start address for programming in EEPROM. Select corresponding start address, the code programmed to EEPROM will be written from this start address. As shown in the figure below, if the start address is 0x0060, the first byte for this code (0x00) will be written in 0x0060 in EEPROM and the second byte (0x01) will be written in 0x0061 in EEPROM, and so forth until all codes are written in EEPROM.

Note: If the offset address is 0x0000, EEROPM length will be limited by the software; if the offset address is the non-zero address, the offset address + length is composed of 128 bytes at most with the former being the integer multiple of 4.

(\$) SOC Programming Tool 20210111 语言 帮助	- 🗆 X
	数据相同!
芯片选择Customer Option	烧录设置
SC92F8003 ▼ 识别 校验码: 0x3E0F 点此设置	烧录电压(V): 3.3 ▼
APROM 16384 bytes No IAP Area File Len: 0 bytes	查空 🗆
□ 载入 -	擦除选项: None ▼
EEPROM 128 bytes File Len: 16 bytes	编程 🔽
▼ 載入 C:\Users\GCB160923\Desktop\SCLink Pro\验证使用HEX\0x5	校验 🔽
LDROM 0 bytes File Len: 0 bytes	Reset and Run 🔽
载入	自动
设置 APROM EEPROM LDROM 烷录器信息	
Checksums D00000000 58 58 58 58 58 58 58 58 58 58 58 58 58	清空
Before CRC: 0xCFFA27D1	重新载入
	读取EEPROM
	-偏移地址(HEX) [0x0060 ▼

③ If the length of the code programmed into EEPROM is not a multiple of 4, the address less than a multiple of 4 will be added with 0 automatically. As shown in the figure below, the address of last 3 bytes less than a multiple of 4 is added with 0 automatically.



(S) SOC Programming Tool 20210111 语言 帮助	- 🗆 X
载入项目 保存项目 查空 不振 编程 校验	SC LINK PRO已连接
芯片选择Customer Option	烧录设置
SC92F8003 ▼ 识别 校验码: 0x3E0F 点此设置	烧录电压(V): 3.3 ▼
APROM 16384 bytes No IAP Area File Len: 0 bytes	查空 🗆
□ 载入 -	擦除选项: None ▼
EEPROM 128 bytes File Len: 84 bytes	编程 🔽
✓ 载入 C:\Users\GCB160923\Desktop\SCLink Pro\验证使用HEX\代酵	校验 ▼
LDROM 0 bytes File Len: 0 bytes	Reset and Run 🔽
载入 -	自动
设置 APROM EEPROM LDROM 烷录器信息	
Checksums 000000000 AA	/ 清空 重新载入
	读取EEPROM 偏移地址(HEX) 0x0000

^④ Load APROM and EEPROM file respectively, where, HEX file loaded in EEPROM is the file to be programmed in EEPROM (You can generate the file by the example project "EEPROM Project" provided by SOC)

SOC Programming Tool v1.10 2022.0)1.25	- 🗆 X				
LoadProject SaveProject CheckBlank	NoErase Program Verify	SC LINK PRO has connected				
IC select	Customer Option	ProgramSetting				
SC92F8003 Identification	CheckSum: 0x3E0F Setting	ProgramVoltage(V): 3.3				
APROM 16384 bytes No IAP Area File L	en: 16384 bytes	CheckBank				
Load C:\Users\li\Desktop	Erase: None -					
EEPROM 128 bytes File Len: 128 bytes	Program 🔽					
Load C:\Users\li\Desktop	\Hex\验证使用HEX\0xFF_128B.hex	Verify 🔽				
LDROM 0 bytes File Len: 0 bytes	LDROM 0 bytes File Len: 0 bytes					
Load -		Auto				
Setting APROM EE	PROM LDROM SClinkProIn	fo VerifyInfo				
ProjectChecksum	OfflineProgramSetting	SerialnumberSetting(StorageArea:APROM)				
Refresh 0x5AA46A6E	✓ Offline Program	Use Serialnumber				
Hardware CRC Operate	AutoProgram	le increase				
Write APROM HardwareCRC		C Decrease C Dec				
	LimitProgramCount 1	Length(bit): 32				
Read	ProgramProjectlistManage	StepLen:0x 1				
		StartValue:0x AABBCCDD				
-ROM Encrypt	Download Compare	StartAddr:0x FE00				
Encrypt						
Welcome to the LINK PRO!		Go to official we				

⑤ After the files are loaded, confirm the code checksum and option



Г				mer Option			-
	WDT	Disable	•	Enable XTIPLL	Disable	•	
	System clock	Fosc/2	•	P1.7	Normal	•	
	LVR	4.3V	•	Vref	VDD	•	
	IAP Range	EEPROM only	•	External crystal	Higher than12MHz	•	
			$\overline{\nabla}$		<u></u>	Ŧ	
			Ŧ			Ŧ	
			~		<u></u>	Ŧ	
			Ŧ			Ŧ	
			Ŧ			~	
						_	

© Connect SC LINK PRO, check "Program + Verify" and click "Auto"

2.4.10 Instruction for LDROM Area Programming

- ① Programming area selection:
 - If you need APROM area and LDROM area to burn at the same time, you need to check APROM+LDROM at the same time, specific IC LDROM need to see the specification to determine, some IC can directly tick LDRAM for programming, such as 95F861X. Some ics need to select the size of LDRAM above OPTION before they can be used, such as 95F873X
 - 2. If only the LDROM area is program separately, only select LDROM

The following uses APROM+LDROM, IC 95F8736 as an example.

adPi	roject SaveProject	CheckBlank	NoErase	Program \	/erify	CO LINIT TO THE	Jeonneeu	
) sel	ect		Customer O	ption		ProgramSetting		
•	Program Option						×	-
۴r			Custo	mer Option				
•	WDT	Disable	•	External 32K	Disable	•		•
	System clock	Fosc/1	•	P5.2	Normal	•		
	LVR	4.3V	•	Vref	VDD	•		
	IAP Range	EEPROM only	•	DISJTG	Normal	•		
	Boot select	APROM	•	LDROM Size	2K	•		
			Ŧ	-		Ŧ	ſ	
			Ŧ	select		OM size		
			Ŧ			v		
			Ŧ			v		
			Ŧ			Ŧ		-
l								OM
4	Option CRC: 0x76	D9				_		

② Load APROM and LDROM files respectively, where: HEX file loaded in LDROM area is the file to be program in LDROM area.



adProject SaveProject CheckBlank NoErase Program Verify	SC LINK PRO has connected			
C select Customer Option GC95F8736 Identification CheckSum: 0x76D9 Setting	ProgramSetting ProgramVoltage(V): 3.3			
PROM 129024 bytes No IAP Area File Len: 65536 bytes ✓ Load C:UsersWiDesktopHexi验证使用HEX0x00_64K.hex	CheckBank Erase: None			
EPROM 1024 bytes File Len: 128 bytesC:\Users\inDextUpPrextex 通过使用HEXX0x00_128B hex	Program 🔽 Verify 🔽			
DROM 2048 bytes File Len: 1024 bytes レ Load C:/UsersWiDesktop/Hex/验证使用HEX/0xff_1K.hex	Auto			
The following is the code decards shown in the SOC ProS1 VS: The properties its for failute users to compare with the checkane The following is the code decards with the checkane The following is the code decards with the checkane The following is the code decards with the checkane Code SNE: obs0708 Code SNE: obs0708	k interface formatio r mass pr			

- ③ File loading is complete, confirm the code checksum is correct, confirm option is correct
- ④ Connect SCLINK, select fan eraser for erasing, check "programming + Verification", and click "Automatic"

2.4.11 Multi-code Management

2.4.11.1 Introduction to Multi-code Management

Multi-code management function supports storing multiple project 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 v0.10 or later; ③ Firmware V0.1 and

later.

(2) Before using multi-code programming mode, please carefully read 2.3.10 Notes for Multi-code

Management.

2.4.11.2 Instructions for Multi-code Management

1. Add Multiple-code Project List

(1) Open SOC Programming Tool v0.10 or later, 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. (Note: It is unable to enter multi-code management in Partition Programming Mode; To exit the Partition Programming mode, refer to 2.3.11.3 Operating Procedures for Partition Programming)


🕲 SOC Programming Tool v1.10 2022. Language Help	01.25	- • ×
LoadProject SaveProject CheckBlank	NoErase Program Verify	SC LINK PRO has connected
-IC select SC95F8613 Id entification	Customer Option CheckSum: 0xD7B3 Setting	ProgramSetting ProgramVoltage(V): 3.3 -
APROM 65536 bytes IAP Range: Las	t 1024 bytes File Len: 8192 bytes \Hex\验证使用HEX\0x00_8K.hex 2	CheckBank Erase: None
EEPROM 0 bytes File Len: 0 bytes	_	Program I⊄ Verify I⊄ Reset and Run I⊄
Load		Auto
Setting APROM EE ProjectChecksum Refresh Hardware CRC Operate Write APROM HardwareCRC Read ROM Encrypt F Encrypt	COMINEProgramSetting SclinkProint OffineProgramSetting Image: Compare in the compare	o Vertlytefo SerialaumberSetting(StorageAvea APROM) Ues Serialaumber C Decrease C Decr
Welcome to the LINK PRO!		Go to official wet

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

er F	Muti Code Manage	K
ы	ProjectName is limited to 11 characters Serialnumber range : 0~39 AddProject	
- 	ReadProjectList ActiveSelectedProject CompareSelectedProject DeleteSelectedProject DeleteAllProject	
	01: 01:	-
A	03 04: 05:	
t	06: 07: 08:	
tı Ə	09: 10: 11:	
	12:	
a	15:	
V	10	
	19· 20·	
	21:	1

(4) As shown in the figure below, input the project name to be saved in "Project Name" column (English character with no more than 11 characters), then fill in the No. in "No. Range", and click "Add Code Project" to save the loaded project to SC LINK PRO.





(5) 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.).

(6) For SC LINK Pro users, up to 40 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" (Note: In offline programming mode, priority to programming shall be given to the activated project in multi-code project list), 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.

Muti Code Manage X					
ProjectName is limited to 11 characters prj20220103 6	AddProject				
ReadProjectList ActiveSelectedProject CompareSelectedProject	DeleteSelectedProject DeleteAllProject				
01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C0B					
01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C0B 02: 03: 04: 05: 05: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C0B 07: 08: 08: 08:					

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



SOC LINK Series Programmer & Simulator User Manual



Offline Programming Succeeded in Multi-Code Mode

2.4.11.3 Notes for Multi-Code Management

1. Before using the multi-code management, close the partition programming first (For partition programming, please refer to 2.3.11 Partition Programming).

2. 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.

If there is any activated project in multi-code project list, this activated project will be programmed offline.
 In each Code project downloaded, APROM and LDROM support a maximum of 128KB and 4KB respectively.

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.

2.4.12 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.





SinOne



2.5 Frequently-asked Questions and Answers

SC LINK PRO	Cause	Solution
Abnormalities		
	The programming cable is	Check if four programming cables are
	connected abnormally	connected properly
	The programming cable is too	The length of SC LINK PRO programming
	long	cable can not exceed 60cm
	CLK or DIO pins of the chips	The capacitance on the programming signal
	have 100pF capacitance to	interface may cause programming timing
	GND	error, when programming by using SC LINK
Online programming		PRO, the capacitance to GND of the
display: "Please		programmed CLK and DIO shall be within
connect MCU with the		100pF
programmer", or the	Resistance exists between	Try to avoid series resistance between the
formine programming is	SC LINK PRO programming	lead-out point of programming and the chip;
Talleo	interface and the chip	if it is unavoidable, guarantee the series
	programming interface	resistance value does not exceeds 100R,
		and minimize the programming cable upon
		programming
	CLK and DIO of chips are	In circuit design, try to avoid connecting CLK
	connected to the same digital	and DIO of the chip to the same digital tube
	tube	
Four indicators flash at	Short circuit in VDD and VSS	Troubleshoot before programming
the same time	of programming target	
	board/chip	
Busy lamp keeps	SC LINK PRO enters	Upgrade firmware
flashing in online	Firmware Upgrading mode	
programming mode		
Running lamp keeps	The supply voltage is	Check if the supply voltage of SC LINK PRO
off after power-on	abnormal	is not less than 4.5V



3. Programmer & Simulator SC LINK

3.1 Hardware Description

3.1.1 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	Equal to		V	
Interface (5V)	Supply Voltage			
Supply Voltage of Programming	3.2	3.4	V	Operating
Interface (3.3V)				Voltage≥4.5V
Length of External Programming	-	60	cm	Operating
Cable				Voltage≤5.0V
Capacitance Range between VDD	-	1000	uF	Operating
and VSS upon Programming on Board				Voltage≤5.0V

3.1.2 Descriptions

SC LINK is suitable for offline/online writing, simulation and TouchKey debugging of SOC 8051 series IC.



- 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 programing 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

(8) Select short tap cap for firing voltage tap

VDD	DIO	VSS	CLK	3.3V	voltage tap	5V
GND	ОК	NG	Busy	Start	3.3V	5V

3.1.2.1 Function Description for Programming Interface

Use 4PIN cable for ICP programming, details are shown in Figure

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

3.1.2.2 Description for Programming Voltage

The user can select the firing voltage according to the tap voltage of the short-circuit cap and the corresponding corresponding, the following is specific:

Name	Function Description
Voltago	The IC voltage tap can be selected by pin, and the tap cap can be used to select
voltage	the voltage tap
51/	Short-circuited with "voltage tap", the firing voltage is the supply voltage of SC
VC	LINK
3.3V	Short-connected with "voltage tap", the firing voltage is 3.3V

The figure on the left below is the connection mode of 5V voltage tap cap, and the figure on the right is the connection mode of 3.3V voltage tap cap





3.1.2.3 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	Busy Programming status interface, low level indicates programming is in progress	
Start	t Programming start signal interface, low level indicates valid	
3.3V	Programmer power supply, Note: Only 3.3V rather than 5V can be selected!	



3.2 Instructions for SC LINK Simulation

3.2.1 Configurations before Simulation

SC LINK provides MCU online simulation for SOC 92/93/95 series, which is available for debugging, step debugging, step-over debugging and RST operations for up to 8 breakpoints (7 for users, and 1 as hidden breakpoint), to view and modify RAM and SFR and debug the program in development stage. Before using, complete the following configurations. For details about how to install the Keil plug-in, see <u>5.1 Install Keil C</u> <u>Plug-in</u>. After installing the Keil plug-in, configure the Keil. <u>5.2 Set Keil Interface</u>.

Programing and simulation interface <u>3.3 Instructions for SC LINK Programming</u>. After the above configuration is complete, you can continue the simulation.

3.2.2 SC LINK Simulation Operations

After above configurations are completed, user can perform simulation for up to 8 breakpoints, 7 for users and 1 as hidden breakpoint. For the convenience of description, a specific example is given here to complete breakpoint simulation based on the following steps.

3.2.2.1 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:

	MainRun.c 🔳
016	u8 GlobalVar_Idata,GlobalVar_Xdata;
017	void main()
018	{
019	RSTCFG=0x25; //LVR:2.6V,RSTPIN->IO
000	To_Trit();
021	TimerOIint();
022	GlobalVar_1data=0x10;
023	GlobalVar_Xdata=0x30;
024	while(1)
025	s.
026	GlobalVar_Idata++;
027	GIODAIVAT_XQATA++;
028	if(GlobalVar_Idata>=0xf0)
029	{
030	GlobalVar_Idata=0x10;
031	}
032	if(GlobalVar_Xdata>=0xf0)
033	{
034	GlobalVar_Xdata=0x30;
035	}
036	SFR_Set();
037	Use_Ram_Set(GlobalVar_Idata,GlobalVar_Xdata);
100	

3.2.2.2 Download Program

After the programming is completed, click the shortcut icon "Download" to complete the code programming. Page 45 of 91 V0.1

http://www.socmcu.com



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.

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🧆 🖾 🕮 🧼 🗮	🗱 Target 1. 💌 🔊 📥 🖷		
oject	Download		
Target 1	Download code to flash memory Set (void);		
	Build Output		
	Load "\\Output\\ISP_Updater" 仿真器已连接. APROM擦除成功! 编程完成,数据正确! Flash Write Done: 1024 bytes programmed. CheckSum = 0xca60 校验完成,数据正确! Flash Verify Done: 1024 bytes verified.		
	📰 Build Output 🔤 Find In Files		

3.2.2.3 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.



File	Edit View	Project F	lash D	ebug	Peripherals Tools SVCS Window Help
	i 🖌 📓	8 h 🛍	50	-	◇ 巻 巻 巻 数 連 連 准 版 20
	3 🖻 🥥 B	🔍 🛤 Ta	rget 1		
RST	F 🛞 🛛 🕅) ()• ()• * ()	} 🔶	> 🖸	
Regist	ers		p 💌		MainRun.c 💌
Regi	ster	Value		012	<pre>void IO_Init(void);</pre>
= Re	egs			013	<pre>void Timer0Iint(void);</pre>
	-r0	0x00		014	<pre>void Ram Set(u8 AdressInit,u8 length,bit ChooseSet);</pre>
		0x00		015	void Use Ram Set(u8 T idata,u8 T xdata);
	-12 -r3	0x00		016	void SFR Set (void);
	-r4	0x00		017	ul6 GlobalVar Idata:
	r5	0 x 00		018	18 Xdata GlobalVar Xdata:
	r6	00x00		019	
	-r7	00x00		020	
⊟S3	7S	000		-020 	
	- h	0x00		021	
	- sp	0x20		0 22	
	dptr			023	
	PC	0x000e		024	Giopalvar_idata=0x10;
	dptr1	0x0000		025	GlobalVar_Xdata=0x30;
	dps	00x00		026	while(1)
	apx dow1	0100		027	{
	- пуау	0x00		028	GlobalVar_Idata++;
	ta	0x00		029	GlobalVar_Xdata++;
	ie	0x00		030	<pre>if(GlobalVar Idata>=0xf0)</pre>
	iel	00x00		031	{ _
	-ip	0x00		032	GlobalVar Idata=0x10;
	1p2	0x00		033	
	psw	0x00		034	if(GlobalVar Xdata>=0xf0)
				035	{
				036	GlobalVar Xdata=0x30:
				037	$\frac{G[oba]Var}{Var} \frac{Vdat}{Vdat} \frac{V(0v000027)}{V} = 0v00$
				038	SFR Set ():
				039	Use Ram Set (GlobalVar Idata GlobalVar Vdata):
				033	ope_ram_ber(Grobalval_rugra,Grobalval_rugra);

🗱 | 🗉 📀 | 79 19 19 19 10 | 🍝 | 🖸 💽 🕞 🖧 💭 - 💷 - 🕎 - 🗰 - 💷 - 🔆 🔆 - | 25 10

	anico	ue - F	IVISION-	•					
File	Edit	View	Project	Flash	Deb	ug Peripherals Tools	SVCS	Window	Help
Ľ	🞽 🛃	2	x 🖬 🛙	5 9	٩	Start/Stop Debug Session	on	Ctrl+F5	A P Q A P Q A P A P A P A P A P A P A P A P A P
٨		0		Target 1	RST	Reset CPU			
RST	E 🛛	{	0	*{} \$		Run		F5	- ■ - ※ - = -
Regis	ters			д 🖂	03	Stop			
Reg	ister		Value		{ \ }	Step		F11	
E-F	legs		, arao		8	Step Over		F10	
	r0		00x0		{}-	Step Out		Ctrl+F11	ssInit u8 length bit (hooseSet):
	r1		0x00		*{}	Run to Cursor Line		Ctrl+F10	l idata u8 T xdata):
			0x00		⇔	Show Next Statement			
			0x00			B			
			0x00			Breakpoints		Ctrl+B	data.
	r6		00x0		٠	Insert/Remove Breakpo	int	F9	laca,
	r7		00x0		0	Enable/Disable Breakpo	int	Ctrl+F9	
E 2	Sys		000		8	Disable All Breakpoints			//IVD.2 6V DETDIN_NIO
	h		0x00			Kill All Breakpoints	Ctrl	l+Shift+F9	// LVK.2.0V, K51F1N->10
	sp		0x20			OS Support			
	dptr	•	0x0100			CS Support			1.0.
	PC		0x000e			Execution Profiling		P	-)w30.
	dptr dpc	·1	0x0000			Memory Map			1230;
	- dnx		0x00			Inline Assembly			
	-dpx1		0x00			Function Editor (Open I	(ni File)		+
	mxax	:	00x0				,		
	ta		0 x 00			Target Settings			1Ld++;
	ie		00x00			Modeless Dialog			$L^{1Qata >= 0XI0}$
	in		0x00			1	1	1 1 77	

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

3.2.3 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.



3.2.3.1 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:

87 🗒 🚱 79 70 10 🔶	2 📵 🗉 🖶 🎝 💭 T 💷 T 😕 T 🗰 T 🔛 T 📓 T 😓 T
Registers 🗣 🖬	Disassembly
Register Value \square Regs \neg r0 0x00 \neg r1 0x00 \neg r2 0x00 \neg r3 0x00 \neg r4 0x00 \neg r5 0x00 \neg r6 0x00 \neg r6 0x00 \neg b 0x00 \neg b 0x00 \neg b 0x00	19: void main() 20: (1) 21: RSTCFG=0x25; 21: RSTCFG=0x25; 22: IO 22: IO 12:00AD CALL 23: IDETVID:()? 24: IODOD 25: IOLAL 12:00AD CALL 24: IODOD 25: GlobalVar_Idat=0x10? 26:0001A 750910 25: GlobalVar_Idat=0x30; 25: GlobalVar_Kdata=0x30; * MainRunc.
sp 0x20 - dptr 0x0100 - FC 0x0014 - dptr1 0x0000 - dps 0x00 - dps 0x00 - dpx 0x00 - mxax 0x00 - ta 0x00 - ta 0x00	0% Lu8 xdata GlobalVar_Xdata; 0% void main() 000 { 001 { 002 { 003 { 004 { 003 { 004 { 003 { 004 { 005 {
1e1 0x00 1p 0x00 1p 0x00 1p2 0x00 9 psv 0x00	<pre>005 GlobalVar_Xdata=0x30; 006 while(1) 007 { 008 GlobalVar_Idata++; 009 GlobalVar_Xdata++; 009 if(GlobalVar_Idata>=0xf0) 001 { 009 GlobalVar_Idata=0x10;</pre>

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.

After entering the simulation status, the program will stop at 0x00 address by default, that is, PC points to 0x00. 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.

3.2.3.2 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 incidates off, "Disassembly" window will disappear

않 🗄 🛞	♦ 0* 10 40 45										
Registers	д 🖬	D sasse 🙆 Disassembly Window									
Register	Value	Show or hide the Disassembly									
₽Regs		Window (//UR:2 EV PSTEIN-STO									
r0	00x0	C:0x000E 75F625 MOV RSTCFG(0xF6), #0x25									
r1	00x0	22: IO_Init();									
r2	0x00	C:0x0011 1200AD LCALL IO_Init(C:00AD)									
r3	0 x 00	23: TimerOIint();									
	0x00	C:0x0014 1200C0 LCALL TimerOlint(C:00C0)									
r5	0x00	23: GIDBATVAT_ILLCC#UNIO C:(0x0017 750800 MOV GIObAIVAT Idata(0x08).#0x00									
r6	0x00	C:0x001A 750910 MOV 0x09, #0x10									
r'	UXUU	25: GlobalVar_Xdata=0x30;									
= Sys	000										
a	0x00										
en	0x20	MainRun.c 💽									
dotr	0x0100	018 u8 xdata GlobalVar Xdata;									
PC	0x0014	up void main()									
dptr1	0x0000										
dps	00x00										
dpx	0x00	TO T T T T T T T T T T T T T T T T T T									
dpx1	00x0	022 10_Init();									
лхах	00x0	TimerOlint();									
ta	00x0	024 GlobalVar_Idata=0x10;									
ie	00x00	025 GlobalVar Xdata=0x30;									
iel	00x00	028 while (1)									

3 Open the "Disassembly" window and run Step



The current program stops at the function body TimerOlnit(), 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.



3.2.3.3 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:

 \odot 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 TimerOlnit() 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:



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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:

8 🗉 📀 🗄	♦ 0° -0 -0 -0	
Registers	P 🖬	Disassembly
Register -r0 -r1 -r2 -r3 -r4 -r5 -r6 -r7 -Sys	Value 0x00 0x00	23: TimerDin(); C:0x0014 120000 LCLL TimerDint(C:00C0) 24: GlobalVar_Idat=0x10; C:0x0017 750900 MOV GlobalVar Idata(0x08),#0x00 C:0x0017 750900 MOV GlobalVar Idata(0x08),#0x00 C:0x0020 75000 MOV GlobalVar_Idata(0x0027) C:0x0020 7450 MOV DPTR,#ClobalVar_Xdata(0x0027) C:0x0020 7450 MOV DPTR,#ClobalVar_Xdata(0x0027) C:0x0020 7450 MOV BDTR,#ClobalVar_Xdata(0x0027) C:0x0020 7450 MOV BDTR,#ClobalVar_Idata+:; 26: ClobalVar_Idata+:; CIMERATION CIMERATION
sp dptr -PC -dptr1 -dps -dpx -dpx1 -nxax -ta	0x20 0x0100 0x001a 0x0000 0x00 0x00 0x00 0x	<pre></pre>
e −ie −ie1 −ip −ip2 ⊕_psv	0x00 0x00 0x00 0x00 0x00	<pre>vad GiobalVar_Idata=0x10; os GiobalVar_Xdata=0x30; vad GiobalVar_Xdata=0x30; GiobalVar_Idata++; os GiobalVar_Idata++; os GiobalVar_Idata>=0xf0; if (GiobalVar_Idata=0x10; </pre>

3.2.3.4 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 Figure 3.2.2, select "Run to Cursor Line" to directly stop the program at the last line of Timer0Init() 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 Page 50 of 91 V0.1



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:

	مليد فرهد	
r 🖾 🔍	0 0 0 0 0	
Registers	д 🖸	Disassembly
Register	Value	95: TRO=1;
-Regs		C:0x00D0 D28C SETB TR0(0x88.4)
r0	0x00	961)
r1	0x00	C:0x00D2 22 RET
-r2	0x00	43: void SFR Set (void)
r3	0x00	44: (
- r4	0x00	45: PWMDTY1=GlobalVar_Idata;
r5	00x0	C:0x00D3 8509FA MOV PMMDTY1(0xFA),0x09
r6	0x00	16: PWNDTYO-GLOBALVAT_Xdata; C:NVDDE 000027 WOW DPTT fdlobalVat Xdata(0v0027)
r7	0x00	C:0X0000 FO MOVE A. OPTR
E-Sys		
a	0x00	
ъ	0x00	📩 MainRun.c 💌
sp	0x22	D1-0xff.
dptr	0x0100	
PC alternational	0x0000	085 P3=UXII/
doc	0x0000	086 L }
- dox	0x00	087 void TimerOlint (void)
-dox1	0x00	089 4
axax	0x00	099 TMCON=0X00;
ta	0x00	790 TMOD=0X11;
ie	0x00	
-iel	0x00	
ip	0x00	042 TLU=0X11;
ip2	00x0	093 ET0=1;
+ psw	0x00	034 EA=1;
		C 005 TRO=1;
		096 }
		097
		void Timer0 (void) interrupt 1
E P., 🚷 B., {) F. O. T. R.	

3.2.3.5 Reset

Click "Reset" button to reset the program with the yellow arrow pointing to the address 0x00, as shown in the figure below:



🏦 🗄 🔞	♦ 0° 10 10 10	
Registers	д 🖂	Disassembly
Register	Value	126: ?C_STARTUP: LJMP STARTUP1 127:
- Kegs	0x00	128: RSEG ?C_C51STARTUP
-r1	0x00	129:
-r2	0x00	130. STARIOFT.
	0x00	132: IF IDATALEN <> 0
	0x00	C:0x0000 02007B LJMP STARTUP1(C:007B)
r5	0x00	C:0x0003 00 NOP
-r6	0x00	C:0x0004 00 NOP
r7	0x00	C:0x0005 00 NOP
E Sys		
a	0x00	
b	0x00	MainRun c
sp	0x07	
dptr	0x000x0	084 Pl=Oxff;
- PC	0x000x0	005 P3=0xff;
dptr1	0x0000	066 -
dps	0x00	087 void Timer() Tint (void)
dpx	00x00	
dpx1	0x00	
nxax	0x00	1089 TMCON=0X00;
ta	0000	090 TMOD=0X11;
10	0000	031 TH0=0X11;
101	0x00	032 TL0=0X11;
10	0x00	P3 ET0=1:
1pz	0x00	
⊡ psv	0800	134 EA-1i
		TRU=1;
		096 }
		097
		098 void Timer0(void) interrupt 1
F P R F	}E],⊤ ≡R	

3.2.4 View and Modify Variables

3.2.4.1 Use Watch Windows to View and Modify Variables

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

 $\ensuremath{\mathbb O}$ Open Watch Windows

Click the shortcut icon "Watch Windows" to show 3 optional windows: Locals,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 3.2.4-1; When clicking "Watch1" or "Watch2", a Watch interface appears at the bottom of KEIL interface, as shown in Figure 3.2.4-2

않 🗟 🕲	₽ ()* *() > Σ	🔍 🞝 📰 🖓	• 💷 • 😡 • 🔜 •	• 💷 • 📓 • 🎭 • 🔜 •									
Registers	🕑 🗙 Disa	ssembly 😡	Locals										
Register	Value	126: ?C_ST	Watch 1	STARTUP1									
⊡Regs r0 (0x00	127:	Watch 2	?C_C51STARTUP									
Fig. 3.2.4-1													
🖻 Р 🌍 В {} F ()] _↓ T ≡ R												
Watch 1													
Name 	2 to add>												
🐺 Locals 🖉 Watch 1													

Fig. 3.2.4-2

 $\ensuremath{\mathbb C}$ 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 2.2.4-3



a 0 b 0 -b 0 -gptr 0 -PC 0 -dptr1 0 -dpx1 0 -mxax 0	x30 x00 x20 x0027 x0023 x000 x00 x00 x00 x00 x00 x00 x00 x00 x	024 025 026 027 028 028 028 029 030 030 031 032 ▲	<pre>GlobalVar_Idata=0x10; GlobalVar Xdata=0x30; while(1) { GlobalVar_Idata++; GlobalVar_Xdata++; if(GlobalVar_Idata>=0xf0) { GlobalVar Idata=0x10;</pre>		<				
Watch 1					p 💌				
Name ClabalVan Ida	+o.			Value 0w0010	_				
GlobalVar Xda	.ta			0x30					
└──〈double-click or F2 to add〉									

Fig. 3.2.4-3

In the figure above, add the variable GlobalVar_Idata and GlobalVar_Xdata, the values in Watch1 are 0x0010 and 0x30 respectively.

Besides, in C source code interface, when the mouse moves over the variable name, its value, type and address will appear as well, as shown in Figure 3.2.4-4.

/ 🗈	MainRun.c 🖬
022	TimerOlint();
023	GlobalVar_Idata=0x10;
➡024	GlobalVar_Xdata=0x30; 🧲 鼠标移动到该位置
025	while (1)
026	{
027	GlobalVar_Idata++;
028	GlobalVar_Xdata++;
029	<pre>if(GlobalVar_Idata>=0xf0)</pre>
030	1 4

Fig. 3.2.4-4

(2) 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 3.2.4-5.

L					
I	E-Sys	<₽>024	GlobalVar Idata=0x10;		
I	a 0x30	025	GlobalVar Xdata=0x30;		
	sp 0x20 dptr 0x0027	026	while(1)		
	PC 0x0023 dptr1 0x0000 dps 0x00 dpx 0x00 dpx1 0x00 myax 0x00	028 029 030 031	GlobalVar_Idata++; GlobalVar_Xdata++; if(GlobalVar_Idata>=0xf0) {		
ľ	🔄 Р 🌏 В { } F О., Т 🗮 К. .		GIODAIVAI Idata-0x10;		
	Watch 1				д
I	Name			Value	
I	GlobalVar_Idata			0x0010	
I	GlobalVar_Xdata			0x22	
1	double-click or F2 to	add>			_

Fig. 3.2.4-5

In the figure above, the value of GlobalVar_Xdata is modified as 0x22.

3.2.4.2 Use Memory Window to View and Modify Variable

② Open Memory Windows

Click "Memory Windows" to show 4 optional windows: Memory1 - Memory4, as shown in Figure 2.2.4-6. 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 2.2.4-7.



않 🗟 🚳	₽ ⊕ *0 ⇒	🗾 💽 📑	ça 🔝 🔹		• 📑 • 🖬 • 🛛	💷 • 🖼 • 🎇 • 🔜 •									
Registers	C×	Disassembly			Memory 1										
Register	Value	28:			Memory 2	Xdata++;									
- Regs	0x00	C:0x002B C:0x002E	900027 E0		Memory 3	(,#GlobalVar_Xdata(0x0027))PTR									
r1 r2	0x00 0x00	C:0x002F C:0x0030	04 F0		Memory 4 MOVX @DP	TR.A									
- r3 - r4	0x00 0x00	29:	C 2		if(Global	Var_Idata>=0xf0)									
I															
	Fig. 3.2.4-6														
Memory 1															
Address:															
🐺 Locals 🐺 Watch 1	Memory 1														

Fig. 3.2.4-7

3 View/modify variable by address

In Memory interface, the Address column is used to input the starting address of memory to be displayed. If the address and memory area of current variable are known, perform the following commands. Ram data area: D:xx; RAM idata area: I:xx; Ram Xdata area: X:xx.

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.

Take GlobalVar_Xdata as an example, use 0x27 as the Start Address and view the value of Xdata area, as shown in Figure. 3.2.4-8.



Fig. 3.2.4-8

In the figure above, the address value of X:0x000027 is 0x30, that is, the value of GlobalVar_Xdata is 0x30, same as the results observed in Watch1, as shown in Figure 3.2.4-3.

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 2.2.4-9

Memory 1																					
Address: X:0x27																					
X:0x0000	27:	30	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
X:0x0000	5A:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
X:0x0000	8D:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
X:0x0000	: 0.D	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0
Locals																					

Fig. 3.2.4-9

3 Fill in a new value and click at any position to complete, as shown in Figure 3.2.4-10



Memory 1																		
Address: X:0x27	,																	
X:0x000027:	22	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
X:0x00005A:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
X:0x00008D:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
X:0x0000C0:	0.0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0.0
🐺 Locals 🐺 W	/atch	1	III M	emor	y 1													

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

3.2.4.3 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 3.2.4-11.



Fig. 3.2.4-11

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 3.2.4-12.



Fig. 3.2.4-12

3.2.5 Descriptions for External Power Supply Simulation

Steps for external power supply simulation:

① In order to prevent SC LINK damage, please be sure to unplug the short-circuit cap of SC LINK voltage range selection in the simulation mode of external power supply firing!

© Connect the target board to the SC LINK. The target board is powered on, and the SC LINK is powered off:

③ Connect SC LINK to computer through USB cable;

④ Open keil software, configure programming options and click Download;



⑤ Disconnect the power supply of the target board when the power indicator begins to blink.



⁽⁶⁾ When the power indicator turns off, power on the target board. When the power indicator turns steady on, the Download mode is entered. The Download is complete, without electricity again into the simulation.

3.2.6 Notes for Simulation

① The programming interface CLK and DIO will be occupied during the simulation process, and do not operate these 2 IOs in the simulated code area;

^② 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.

③ For notes of external power supply simulation, see <u>3.2.5 Descriptions for External Power Supply</u> <u>Simulation.</u>

3.3 Instructions for SC LINK Programming

3.3.1 Firmware Upgrading

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

① For better experience, please visit <u>http://www.socmcu.com</u> to download the latest firmware files;

② SC LINK power off Press and hold the programming button, and then connect to the USB port of the Page 56 of 91 V0.1



computer. At this time, the RUN indicator (red light) on SC LINK will blink, indicating that the firmware upgrade mode has entered.

- ③ Open SOC Programming Tool and click "Upgrade Programmer Firmware" on "Programmer Information" menu.
- ④ In "Open File" dialog box, locate the firmware file (.iap file) and click "Open";
- (5) Pop up the dialog box to display the current version and the version to be updated, and click "OK" button;
- 6 After the firmware update is complete, disconnect the USB connection between the SC LINK and the PC to exit the firmware upgrade mode;
- ⑦ It can be used normally after being powered on again

Note:

- 1. please confirm before upgrade the firmware to upgrade the firmware file is ready;
- 2. The upgrade process is interrupted will lead to abnormal SCLINIK;
- 3. In the process of firmware upgrade, user is not recommended for other operation.

3.3.2 Steps for Online Programming

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

DadProject SaveProject CheckBlank AllErase Program	Verify
C select Customer Option SC95F8616 Identification CheckSum: 0x569E	B Setting ProgramSetting Current programer needs to manually select the program volta
APROM 65536 bytes IAP Range: Last 1024 bytes File Len: 1638 ✓ Load C:\Users\li\Desktop\Hex\验证使用HEX\0x00_16	4 bytes CheckBank Khex Erase: All
EEPROM 0 bytes File Len: 0 bytes	Program 🔽 Verify 🔽
DROM 1024 bytes File Len: 0 bytes	Reset and Run 🔽
SOC Programming Tool Current version : v1.10 publishes date : 2022.01.25 MCULib current version:v0.05 publishes date/compatible version:2022.01.26	AutoUpdateDetect
Programer firmware information: V3.08 2022.02.10	ViewMCULibRecord
Copyright: Sherizhen Sinone Microelectrolles Co., Lta Company web: www.socmcu.com	UpgradeMCULib UpgradeSClink

- 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	Program Option						×
26			-Custo	omer Option			٦
	WDT	Disable	•	External 32K	Disable	•	
F	System clock	Fosc/1	•	P5.2	Normal	▼	
	LVR	4.3V	•	Vref	VDD	▼	
c	IAP Range	Code region:last 1K	•	DISJTG	Normal	-	
			-			~	
50	-		-	**		~	
L	-		~	-		~	
L	-		-	-		~	
L			-			~	
	-		~			~	
	Option CRC: 0x569	9B					

- (5) Select programming voltage and check Erasing, Programming and Verifying, etc.;
- 6 Click "Auto Programming" button to perform corresponding programming and verifying;

3.3.3 Steps for Offline Programming

 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";

SOC Programming Tool v1.10 2022.01.25	– 🗆 X								
Language Help									
LoadProject SaveProject CheckBlank AllErase Program Verify									
Customer Option	ProgramSetting Current programer needs to								
manually select the program volt									
-APROM 65536 bytes IAP Range: Last 1024 bytes File Len: 16384 bytes	CheckBank								
☑ Load C:\Users\li\Desktop\Hex\验证使用HEX\0x00_16K.hex	Erase: All								
EEPROM 0 bytes File Len: 0 bytes	Program 🔽								
Load -	Verify 🔽								
LDROM 1024 bytes File Len: 0 bytes	Reset and Run 🔽								
Load -	Auto								
Setting APROM EEPROM LDROM SClinkProlr	nfo VerifyInfo								
ProjectChecksum OfflineProgramSetting	SerialnumberSetting(StorageArea:APROM)								
Refresh 0x5AA46A6E Offline Program	Use Serialnumber								
Hardware CRC Operate	lincrease								
Write APROM HardwareCRC	C Decrease								
LimitProgramCount 1	Length(bit): 32 💌								
Read	StepLen:0x 1								
	StartValue:0x AABBCCDD								
ROM Encrypt Download Compare	StartAddr:0x F10								
F Encrypt									
Welcome to the LINK PRO!	Go to official web								

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- 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 Program + Verify;
- 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;

SinOne

5	Program Option					×	ta
ĸ			—Cus	stomer Option			
	WDT	Disable	•	External 32K	Disable		I
١F	System clock	Fosc/1	•	P5.2	Normal		
	LVR	4.3V	•	Vref	VDD 💌		
c	IAP Range	Code region:last 1K	•	DISJTG	Normal		
L	-		-	-	_		L
Se	-		~	-	~		
e	-		~	-	_		DI
	-		~	-	_		
dv	-		Ψ.	-	_		l
	-		Ψ.	-	_		-
	Option CRC: 0x56	9B					F
~							Л

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

3.3.4 Comparison

To confirm if the programming code and configured items loaded by SC LINK 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.



3.3.5 Instruction for S/N

		CLINK has connected
oadProject SaveProject CheckBlank	AllErase Program Verify	
C select	Customer Option	ProgramSetting
SC95F8616 Identification	CheckSum: 0x569B Setting	Current programer needs to manually select the program voltage
APROM 65536 bytes IAP Range: Las	st 1024 bytes File Len: 16384 bytes	CheckBank
C:\Users\li\Deskto	p\Hex\验证使用HEX\0x00_16K.hex	Erase: All
EEPROM 0 bytes File Len: 0 bytes		Program 🔽
Load -		Verify 🔽
DROM 1024 bytes File Len: 0 bytes		Reset and Run 🔽
Load -		Auto
Setting APROM E	EPROM LDROM SClinkProlr	nfo VerifyInfo
ProjectChecksum	OfflineProgramSetting	-SerialnumberSetting(StorageArea:APROM)
Refresh 0x5AA46A6E	✓ Offline Program	✓ Use Serialnumber
Hardware CRC Operate	AutoProgram	Increase Increase Increase
		C Decrease C Dec
	LimitProgramCount 1	Length(bit): 32 💌
Read	ProgramProjectlistManage	StepLen:0x 1
20115		StartValue:0x AABBCCDD
	Download Compare	StartAddr:0x FE00
1. Encrypt		

- ① S/N function is available for SC LINK in offline mode.
- ② Low S/N data is stored in low address, for example, write 32BITS S/N 0XAABBCCDD in 0XFE00, the value written for 0XFE00 is 0XDD, the value written for 0XFE01 is 0XCC, the value written for 0XFE02 is 0XBB and the value written for 0XFE03 is 0XAA.
- ③ 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.
- ④ It is recommended to set the S/N address outside the program space so as to avoid the program code from being covered by S/N data, resulting in being unable to perform verifying operation after programming.
- (5) S/N supports power-off memory function.

3.3.6 Descriptions for External Power Supply Programming

Steps for external power supply programming:

- ① To prevent SC LINK from being damaged, remove the short-circuit cap for SC LINK voltage tap selection in external power supply programming mode.
- ② Connect the target board to the SC LINK. The target board is powered on, and the SC LINK is powered off.
- ③ Connect SC LINK to computer through USB cable;
- ④ Open SOC Programming Tool, configure the programming options and send the programming command;
- (5) Disconnect the power supply of the target board when the power indicator begins to blink.



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- When the power indicator is off, switch on the power supply of the target board. When the power indicator turns steady on, it enters the programming mode.
- (1) After the programming is completed, the target board needs to be completely powered off to ensure that the IC has been program out of the programming mode.

3.3.7 Instructions for Connecting Programmer

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

- 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:





3.3.8 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
- For notes of programming in offline programming mode, see <u>2.3.6 Descriptions for External Power</u> <u>Supply</u> 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)** When you program an IC with a Sector partition ROM, select Erasing or erasing the Sector block in the erasing option. Otherwise, the program may fail.

3.3.9 Instruction for EEPROM Area Programming

Select the programming area:
 If both APROM and EEPROM are programmed, check "APROM+EEPROM" at the same time
 If only EEPROM is programmed, only check "EEPROM"
 APROM+EEPROM is used as the example for subsequent instructions



oadProject SaveProject CheckBlank	NoErase Program Verify	SC LINK PRO has connected
C select SC95F8736	Customer Option CheckSum: 0x569B Setting	ProgramSetting ProgramVoltage(V): 3.3 •
APROM 131072 bytes No IAP Area File	CheckBank	
Load C:\Users\li\Desktop	Erase: None	
EPROM 1024 bytes File Len: 1024 byt	Program 🔽	
Load C:\Users\li\Desktop	Reset and Run ✓	
Load -		Auto
Setting APROM EI	EPROM LDROM SClinkPro	Info VerifyInfo
Setting APROM E ProjectChecksum	EPROM LDROM SClinkPro OfflineProgramSetting	Info VerifyInfo Setiang(StorageArea:APRO)
Setting APROM E ProjectChecksum Refresh Hardware CRC Operate	EPROM LDROM SClinkPro	Info VerifyInfo SerialnumberSetting(StorageArea:APRON Use Serialnumber Gelincrease Gerease Concerses Concerses
Setting APROM E ProjectChecksum Refresh Hardware CRC Operate Write APROM HardwareCRC	EPROM LDROM SClinkPro OfflineProgramSetting IF Offline Program IF AutoProgram LimitProgramCount 1	Info VerifyInfo SerialnumberSetting(StorageArea:APRO) GuesSerialnumber Guercease Cuecrease Length(bit): 32
Setting APROM E ProjectChecksum Refresh Hardware CRC Operate Write APROM HardwareCRC Read	EPROM LDROM SClinkPro	Info VerifyInfo SerialnumberSetting(StorageArea.APRO) Serialnumber G Increase C Decrease Length(bit): 32 StepLen.0x

② If the length of the code program into the EEPROM is not a multiple of 4, the address that is less than a multiple of 4 is automatically added with 0. As shown in the figure below, the last 3byte of the code automatically fills 0 for the address whose multiple is less than 4.

			Г				٦									ļ	_	
设置	APROM		E	EP	RO	1	l	l	DF	ROI	N			烧了	景器信	息	校號	1100和#
Checksums File CRC: 0x54CF313A	000002A0 58 000002B0 58 000002C0 58 000002E0 58 000002E0 58 000002E0 58	58 58 58 58 58 58	58 58 58 58 58 58 58	58 5 58 5 58 5 58 5 58 5	58 51 58 51 58 51 58 51 58 51 58 51	58 58 58 58 58 58 58 58	58 58 58 58 58	58 58 58 58 58 58	58 58 58 58 58	58 58 58 58 58 58	58 58 58 58 58 58	58 58 58 58 58 58	58 58 58 58 58	58 58 58 58 58 58	58 58 58 58 58 58			
	00000300 58 00000310 58 00000320 58 00000330 58 00000340 58 00000350 58 00000350 58 00000350 58 00000370 58	58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58 58 58 58 5	58 51 58 51 58 51 58 51 58 51 58 51 58 51 58 51 58 51	58 58 58 58 58 58 58 58 58 58 58 58 58 5	58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58	58 58 58 58 58 58 58 58 58 58			
	00000390 58	58	58	58 5	58 51	58	58	58	58	58	58	58	58	00	00			

③ Load APROM and EEPROM files respectively, where: THE HEX file loaded in the EEPROM area is the FILE to be program in the EEPROM area (users can generate it through the example Project "EEPROM Project" provided by SOC)



SOC Programming Tool v1.10 2022	.01.25			-		×		
LoadProject SaveProject CheckBlank	NoErase Program Ver	ify	SC LINK PRO ha	is conne	cted	4		
IC select	Customer Option		ProgramSetting					
SC95F8736 Identification	SC95F8736 Identification CheckSum: 0x569B Setting							
APROM 131072 bytes No IAP Area File		CheckBank						
Load C:\Users\li\Deskto		E	Frase: 🚺	lone 👻				
EEPROM 1024 bytes File Len: 1024 by	EEPROM 1024 bytes File Len: 1024 bytes							
Load C:\Users\li\Deskto		Verify 🔽						
LDROM 0 bytes File Len: 0 bytes			Reset and	I Run 🔽				
Load -				Auto				
Setting APROM E	EPROM CLDROM SClink	ProInfo	VerifyInfo	1				
ProjectChecksum	OfflineProgramSetting		SerialnumberSetting(S	StorageAr	ea:APRON	/)		
Refresh	✓ Offline Program		Use Serialnumbe	ŧr				
Hardware CRC Operate	AutoProgram		Increase	€ HE	EX			
Write APROM HardwareCRC		_ L	C Decrease	C De	90			
	LimitProgramCount 1		Length(bit):	32	~]		
Read	ProgramProjectlistManage		StepLen:0x	1				
	J	- 11	StartValue:0x	AABB	CCDD			
ROM Encrypt	Download Compare		StartAddr:0x	F10				
Welcome to the LINK PRO!				Go	to official	web		

④ File loading is complete, confirm the code checksum is correct, confirm option is correct

1	Program Option						×
25			Custom	er Option			
	WDT	Disable	•	Enable XTIPLL	Disable	•	
١F	System clock	Fosc/2	•	P1.7	Normal	•	
	LVR	4.3V	•	Vref	VDD	•	
c	IAP Range	EEPROM only	•	External crystal	Higher than12MHz	•	
L	-		Ŧ			~	
56	-		Ŧ			~	
e	-		Ŧ			~	
	-		Ŧ			~	
vt	-		Ŧ			~	
1	-		Ŧ			~	-
-	Option CRC: 0x3E	0F					

(5) Connect SC LINK PRO, check "Program + Verify" and click "Auto"

3.3.10 LDROM Area Programming Description

- ① Programming area selection:
 - If you need APROM area and LDROM area to burn at the same time, you need to check APROM+LDROM at the same time, specific IC LDROM need to see the specification to determine, some IC can directly tick LDRAM for programming, such as 95F861X. Some ics need to select the size of LDRAM above OPTION before they can be used, such as 95F873X
 - 2. If only the LDROM area is program separately, only select LDROM

The following uses APROM+LDROM, IC 95F8736 as an example.



oadPh	oject SaveProject	CheckBlank	NoErase	Program \	/erify			
C sele	ct		Customer C	Option		ProgramSetting		_
	Program Option						×	-
AF			Custo	omer Option				
•	WDT	Disable	•	External 32K	Disable	•]	•
E	System clock	Fosc/1	•	P5.2	Normal	•]	
•	LVR	4.3V	•	Vref	VDD	•]	
.D	IAP Range	EEPROM only	-	DISJTG	Normal	-]	
Г	Boot select	APROM	•	LDROM Size	2K	•]	
			~			v		
~			-	select		DM size	1	
			-	Sciect			1	
0							1	
					, 		1	
		1	<u> </u>		1		1	
	Option CRC: 0x76	D9						IOM
_								

② Load APROM and LDROM files respectively, where: HEX file loaded in LDROM area is the file to be program in LDROM area.

SOC Programming Tool v1.10 2022.01.25	- 🗆 X
LoadProject SaveProject CheckBlank NoErase Program Verify	SC LINK PRO has connected
Customer Option SC95F8736 Identification Customer Option CheckSum: 0x76D9 Setting	ProgramSetting ProgramVoltage(V): 3.3 •
APROM 129024 bytes No IAP Area File Len: 65536 bytes ✓ Load C:\Users\\nDesktop\Hex\\验证使用HEX\0x00_64K hex	CheckBank 🔽 Erase: None 💌
EEPROM 1024 bytes File Len: 128 bytes Load C:\Users\li\Desktop\Hex\验证使用HEX\0x00_128B.hex	Program 🔽 Verify 🔽
LDROM 2048 bytes File Len: 1024 bytes 「 Load C:Users\i\Desktop\Hex\验证使用HEX\0xff_1K.hex	Reset and Run
Setting APROM EEPROM LDROM SClinkProInfo The following is the code checksum shown in the SOC Pro51 V5.X The purpose is to facilitate users to compare with the checksum in th is not recommended for new users, or as a verification basis for Option: 0x001d-76d9 CodeSUM: 0x0000 CodeCRC: 0xd7978eeb EEPROM: 0x0000000 LDROM: 0xb83afff4	VerifyInfo
Welcome to the LINK PRO!	Go to official web

- ③ File loading is complete, confirm the code checksum is correct, confirm option is correct
- ④ Connect SCLINK, select fan eraser for erasing, check "programming + Verification", and click "Automatic"



3.3.11 Multi-code Management

3.3.11.1 Introduction to Multi-code Management

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

(1) Preparations: (1) SC LINK; (2) SOC Programming Tool v0.10 or later; (3) Firmware V0.1 and later.

(2) Before using multi-code programming mode, please carefully read 3.3.11.3 Notes for

Multi-Code Management.

3.3.11.2 Instructions for Multi-code Management

1.Add Multiple-code Project List

(1) Open SOC Programming Tool v0.10 or later, 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.

SOC Programming Tool v1.10 2022.	01.25	- 🗆 X
LoadProject SaveProject CheckBlank	NoErase Program Verify	SC LINK PRO has connected
IC select	Customer Option CheckSum: 0xD7B3 Setting	ProgramSetting ProgramVoltage(V): 3.3
APROM 65536 bytes IAP Range: Las	st 1024 bytes File Len: 8192 bytes p\Hex\验证使用HEX\0x00_8K.hex 2	CheckBank Erase: None
EEPROM 0 bytes File Len: 0 bytes	J	Program ▼ Verify ▼
Load - Load -		Auto
Setting APROM EI	EPROM LDROM SClinkProln OfflineProgramSetting Offline Program	fo VerifyInfo SerialnumberSetting(StorageArea:APROM) Use Serialnumber
Hardware CRC Operate	AutoProgram LimitProgramCount	C Decrease C Decrease Length(bit): 32
Read	ProgramProjectlistManage	3 StepLen:0x 1 StartValue:0x AABBCCDD
ROM Encrypt	Download Compare	StartAddr:0x F10
Welcome to the LINK PRO!		Go to official we

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





(3) As shown in the figure below, input the project name to be saved in "Project Name" column (English character with no more than 11 characters), then fill in the No. in "No. Range", and click "Add Code Project" to save the loaded project to SC LINK.

ProjectName is	Serialnumber range : 0~39	
ReadProjectLis	ActiveSelectedProject CompareSelectedProject DeleteSelectedProject DeleteAllProject	ct
00:		
00:		
01: Nam 02: 03: 04: 05: 06:	1e:prj20220101 IC:SC95F8613 PrjCRC:0x50841C08	
07: 08: 09: 10:		I
11: 12: 13:		
14: 15: 16:		
17:		
18:		

(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 users, up to 40 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" (Note: In offline programming mode, priority to programming shall be given to the activated project in multi-code project list), 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.



ProjectName is limited to 11 characters Serialnumber range : 0~39 AddProject prj20220103 6 AddProject ReadProjectList ActiveSelectedProject DeleteSelectedProject DeleteAllProject 01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C08 02: 02: 03: 03: 03: 04: 04: 03: 06: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 06: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 03: 07: 08: 09: 01: 10: 11: 11: 11: 12: 13: 14: 13: 13: 14: 13: 14: 14: 13: 14: 13: 15: 16: 17: 18: 16: 19: 20: 21: 21:	Muti Code Manage	×
ReadProjectList ActiveSelectedProject CompareSelectedProject DeleteSelectedProject DeleteAllProject 01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C08 02 02 03 04 05 05 06 Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 07 08 09 09 09 01 10 11 12 13 13 14 15 16 13 16 13 16 13 16 13 12 13 12 13 13 13 14 15 16 16 17 13 12 13 12 13 12 13 12 13 12 13 12 13 14 14 14 14 14 15 16 12 12 13 12 12 13 12 13 12 13 13 14 14 14 14 14 14 14 14 14 14 14 <	ProjectName is limited to 11 characters prj20220103 6	AddProject
01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C08 02:	ReadProjectList ActiveSelectedProject CompareSelectedProject	DeleteSelectedProject DeleteAllProject
01: Name:pr/20220101 IC:SC95F8613 PrjCRC:0x50841C08 02:		
01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C08 02:	01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C0B	
02: 03: 04: 05: 06: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 07: 08: 09: 10: 11: 12: 13: 14: 15: 16: 16: 18: 18: 19: 20:	01: Name:prj20220101 IC:SC95F8613 PrjCRC:0x50841C0B	
03: 04: 05: 06: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 07: 08: 09: 10: 11: 12: 13: 14: 15: 16: 18: 18: 19: 20: 21:	02:	
04 05: 06: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 07: 08: 09: 10: 11: 12: 13: 13: 15: 16: 16: 19: 20: 21:	04:	
06: Name:prj20220103 IC:SC95F8613 PrjCRC:0x50841C08 07:	05	
07:	06: Name:pri20220103_IC:SC95E8613_PriCRC:0x50841C08	
08: 09: 10: 11: 12: 13: 14: 15: 16: 18: 18: 19: 20: 21:	07:	
09;	08:	
10:	09:	
11:	10:	
12:	11:	
13:	12:	
14: 15: 16: 17: 18: 19: 20: 21:	13:	
15: 16: 17: 18: 19: 20: 21:	14:	
16: 17: 18: 19: 20: 21:	15:	
1/: 18: 19: 20: 21:	16:	
10 19: 20: 21:	12	
20:	10:	
21:	20	
-	21:	

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

When there is already an active multi-code project, the target project can be program and verified by offline programming.

3.3.11.3 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.In each Code project downloaded, APROM and LDROM support a maximum of 128KB and 4KB respectively.



3.3.12 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.





3.4 Frequently-asked Questions and Answers

3.4.1 Exceptions and solutions

SC LINK V3.XX	Cause	Solution
Abnormalities		
	The programming cable is	Check if four programming cables are
	connected abnormally	connected properly
	The programming cable is too	The length of SC LINK programming cable
	long	can not exceed 60cm
	The programming cable is	Check if four programming cables are
	connected abnormally	connected properly
	CLK or DIO pins of the chips	The capacitance on the programming signal
Online programming	have 100pF capacitance to	interface may cause programming timing
display: "Please	GND	error, when programming by using SC LINK,
connect MCU with the		the capacitance to GND of the programmed
programmer", or the		CLK and DIO shall be within 100pF
offline programming is	Resistance exists between	Try to avoid series resistance between the
failed	SC LINK programming	lead-out point of programming and the chip;
	interface and the chip	if it is unavoidable, guarantee the series
	programming interface	resistance value does not exceeds 100R,
		and minimize the programming cable upon
		programming
	CLK and DIO of chips are	In circuit design, try to avoid connecting CLK
	connected to the same digital	and DIO of the chip to the same digital tube
	tube	
Four indicators flash at	Short circuit in VDD and VSS	Troubleshoot before programming
the same time	of programming target	
	board/chip	
Busy lamp keeps	SC LINK enters Firmware	Power on SC LINK again
flashing in online	Upgrading mode	
programming mode		
Running lamp keeps	The supply voltage is	Check if the supply voltage of SC LINK is not
off after power-on	abnormal	less than 4.5V
The version displayed	The firmware version is	Upgrade the SC LINK firmware. For details,
on the soc	incompatible	see 3.4.2 SC LINKV3.XX Firmware Upgrade
programming tool is		
incompatible		

3.4.2 SC LINKV3.XX Firmware Upgrade

The procedure for upgrading to SC LINK V3.xx is as follows:

① Open the SOC Programming Tool and observe the firmware status of SC LINK. If the firmware version is incompatible as shown in the following figure, download the V3.xx firmware from the Official website of Sin One.



② After unplugging the SC LINK, hold down the KEY on the SC LINK and insert it into the USB port of the PC. At this time, the RUN indicator on the SC LINK keeps blinking and the firmware upgrade mode enters. Click upgrade programmer firmware of programmer information to upgrade the firmware.

LoadFloject SaveFlo	oject CheckBlank	NoErase	Program	Verify	SC LINK PRO	has connected
IC select		Customer O	ption		ProgramSettir	ng
SC95F8613	 Identification 	CheckS	um: 0xD7B3	Setting	ProgramVo	ltage(V): 3.3 💌
APROM 65536 bytes	IAP Range: Last	1024 bytes Fil	le Len: 8192 b	ytes	Ch	eckBank 🕅
✓ Load	C:\Users\li\Desktop	lHex\验证使用H	EX\0x00_8K.h	iex		Erase: None 💌
EEPROM 0 bytes Fi	le Len: 0 bytes				F	Program 🔽
Load	-					Verify 🔽
LDROM 1024 bytes	File Len: 0 bytes				Reset a	and Run 🔽
Load	-					Auto
Setting /	APROM EE	PROM	LDROM	SClinkProInfo	VerifyInfo	Ì
					_	
SOC F publish	rogramming Tool Curre les date : 2022.01.25	ent version : v1.10				
MCULi	current version:v0.05			Autolin	dateDotect	
and a link	es date/compatible ver	SIGN: 2022.01.20	2.2	VioutMC	UllibRocord	
publish	mer firmware informati			VIEWING	oubrecord	
publish Progra Copyrig	mer firmware informati	Microelectronics Co	o., Ltd	Unara	deMCUUb	
publish Progra Copyriq Compa	mer firmware informati ght: Shenzhen SinOne I ny web: www.socmcu.	Microelectronics Co com	o., Ltd	Upgra	deMCULib	

 ${}^{\scriptsize (3)}$ Select the firmware downloaded from the official website to update the firmware.

④ After upgrading the firmware, unplug SC LINK and reinsert SC LINK. Then open the SOC Programming Tool. If it can identify SC LINK, indicates that SC LINK has been successfully updated to v3.xx.

SOC Programming Tool v1.10 2022.01.25	- 🗆 X
LoadProject SaveProject CheckBlank AllErase Program	Verify SC LINK has connected
IC select Customer Option SC95F8616 Identification CheckSum: 0x569B Sett	ting ProgramSetting Current programer needs to manually select the program voltage
APROM 65536 bytes IAP Range: Last 1024 bytes File Len: 16384 byte Load C·UVsers\inDesktop\Hex\验证使用HEX\0x00_16K.hex	S CheckBank Erase: All
EEPROM 0 bytes File Len: 0 bytes Load - LDROM 1024 bytes File Len: 0 bytes Load -	Program 🔽 Verify 🖵 Reset and Run 🖵 Auto
Setting APROM EEPROM LDROM So SOC Programming Tool Current version: v1.10 publishes date : 2022.01.25 MCULib current version:v0.05	Junk Prointo Venfylnfo
publishes date/compatible version:2022.01.26 Programer firmware information: V3.08 2022.02.10 Copyright: Shenzhen SinOne Microelectronics Co., Ltd Company web: www.socmcu.com	ViewMCULibRecord UpgradeMCULib
	UpgradeSClink
Welcome to the LINK PRO!	Go to official web

Note: When upgrading firmware, long press the KEY and then insert it into the USB port of the PC to enter the firmware upgrade mode!



4. SOC Programming Tool

4.1 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&SC LINK.

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.

Your are advised to carefully read the help files before using the software and visit SinOne official website: <u>http://www.socmcu.com</u> 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.

4.2 Install SOC Programming Tool

① Double click SOC Programming Tool vx.x.exe



 $\ensuremath{{@}}$ Select "SC", "TC" or "EN", and click "OK" button

		_		عيري
License Agreement				
Please read the following important info	ormation before continu	uing.		Ċ
Please read the following License Agree agreement before continuing with the	ement. You must acce installation.	pt the terms	s of this	
SOC Programming Tool is PC based s Microelectronics Co., Ltd (SOC) for bu	oftware developed by s Irning SOC's MCU chips	Shenzhen Sir together wi	nOne th the	
Online programmer or Production prog	grammer.			
• I accept the agreement				
• <u>I accept the agreement</u> • I <u>do</u> not accept the agreement				
• I <u>accept the agreement</u> • I <u>do</u> not accept the agreement C Programming Tool				

③ View the licence, select "I Agree" and then click "Next" button


Setup - SOC Programming Tool	_		×
Information Please read the following important information before continuing		¢	
When you are ready to continue with Setup, click Next.			
SOC Programming Tool recommends using the windows10,whos path is "C:\Program Files\SOC\SOC Programing Tool",Start Men shortcut can also be created.You can change the default setting installation.	e default i u and Des) during th	nstallation ktop e	
SOC Programming Tool	t >		
< <u>B</u> ack N	ext >	否(N)

 \circledast View the installation instruction and click "Next" button

(\$) Setup - SOC Programming Tool	_		×
Select Destination Location Where should SOC Programming Tool be installed?			
Setup will install SOC Programming Tool into the following fold	ler.		
To continue, click Next. If you would like to select a different folder,	click B	rowse.	
E:\SOC Programming Tool	В	rowse	
At least 19.9 MB of free disk space is required.			
SUC Programming Tool	>	1)否	۷)

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



Setup - SOC Programming Tool	_		×
Select Start Menu Folder Where should Setup place the program's shortcuts?		¢	
Setup will create the program's shortcuts in the following Start	Menu	folder.	
To continue, click Next. If you would like to select a different folder, o	click Bro	wse.	
SOC Programming Tool	Bro	wse	
SOC Programming Tool			
< <u>B</u> ack <u>N</u> ext >	>	否 ()	N)

(5) Set the name of this folder on Start Menu with "SOC Programming Tool" by default; you can modify it as needed, then click "Next" button

Setup - SOC Programming Tool	_		×
Select Additional Tasks Which additional tasks should be performed?		¢	
Select the additional tasks you would like Setup to perform while ins Programming Tool, then click Next.	stalling SC	DC	
Additional icons:			
Create a <u>d</u> esktop icon			
🗹 Create a Quick Launch icon			
SOC Programming Tool	xt >	否((N)

 $\ensuremath{\oslash}$ Create desktop shortcut and quick launch bar shortcut by default; you can modify them as needed, then click "Next" button



Setup - SOC Programming Tool	_		×
Ready to Install Setup is now ready to begin installing SOC Programming Tool on your computer.		Q	Ð
Click Install to continue with the installation, or click Back if you want to change any settings.	review	or	
Destination location: E:\SOC Programming Tool Start Menu folder: SOC Programming Tool Additional tasks: Additional icons: Create a desktop icon Create a Quick Launch icon			
4		•	
SOC Programming Tool		否	(N)

® Double check all installation options, then click "Install" button

Setup - SOC Programming Tool	_		×
Information Please read the following important information before continuing.		¢	
When you are ready to continue with Setup, click Next.			
We highly recommend you read this manual before using SOC Prog You can also visit the homepage of SOC: http://www.socmcu.com download the latest user manual and software. Should you have any problem, suggestion or advise, please dial +8 or sent email to webmaster@socmcu.com.	grammir to view 6-755-2	ng Tool. r and 16652552	
SOC Programming Tool	:>		

(9) After installation, related notes will be displayed, click "Next" button





[®] Check/uncheck "Run SOC Programming Tool", and click "Complete" 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!

🔐 Windows 安全中	心警报		\times
💮 Windo	ws Defende	r 防火墙已经阻止此应用的部分功能	
Windows Defende 功能。	r 防火墙已阻止所	f有公用网络和专用网络上的 usbhidioc MFC Application 的某些	
(8)	名称(N):	usbhidioc MFC Application	
	发布者(P):	未知	
	路径(H):	C:\program files (x86)\soc\soc programming tool\soc programming tool1.exe	
允许 usbhidioc MF	C Application ₹	E这些网络上通信:	
□ 专用网络,例	如家庭或工作网	洛(R)	
☑ 公用网络, 例 (U)	如机场和咖啡店	中的网络(不推荐,由于公用网络通常安全性很小或者根本不安全)	
<u>允许应用通过防火增</u>	有何风险?		
		允许访问(A) 取消	



4.3 Software Interface

SOC Programming Tool v1.10 2022.01.25	× (8)s	OC Programming Tool v1.10 2022.01.25	- 🗆 X]
Language Help 1 2	- Lanc	luage Help	
SCU	INK PRO has connected		SC LINK PRO has connected
LoadProject SaveProject CheckBlank AllErase Program venity	Loa	dProject SaveProject CheckBlank AllErase Program	Verify
IC select Customer Option Progr	ramSettingIC	select Customor Ontion	DreasonCotting
SC95F8616 Identification CheckSum: 0x569B Setting	rogramVoltage(V): 3.3 💌	295 Program Option	×
APROM 65536 bytes IAP Range: Last 1024 bytes File Len: 32768 bytes	CheckBank	Customer Option	
C:\Users\ii\Desktop\Hex\0xAA_32K.hex	Frace: All	WDT Disable External	32K Disable -
		System clock Fosc/1	25.2 Normal
EEPROM 0 bytes File Len: 0 bytes	Program 🔽		
Load	Verify 🔽	LVR 4.3V	vrer VDD
LDROM 1024 bytes File Len: 128 bytes	Reset and Run 🔽	IAP Range Code region:last 1K DIS. RC	JTG Normal
▼ Load C:\Users\\\Desktop\Hex\检证使用HEX\0xFF_128B.hex	Auto	- · · ·	
	3/	- · · · ·	
Setting APROM EEPROM LDROM SClinkProInfo	VerifyInfo 3	Sel	
ProjectChecksum OfflineProgramSetting Serialnum	mberSetting(StorageArea:APROM)	roject	
Refresh 0x34ECFF01 Offline Program Use	e Serialnumber	· · ·	· · ·
Hardware CRC Operate	rease @ HEX	ardw.	-
Write APROM HardwareCRC	C Dec		
LimitProgramCount 1	Length(bit): 32 v		
Read	StepLen:0x 0	Option CRC: 0x569B	
ProgrammogecussivianageS	StartValue:0x 0	ProgramProjectiistivanage	StartValue:0x 0
ROM Encrypt Download Compare	StartAddr:0x 0	DM Encrypt Download Compar	e StartAddr:0x 0
Encrypt		Encrypt	
		come to the LINK RDOL	
Welcome to the LINK PROL			
Welcome to the LINK PROT SOC Programming Tool v1.10 2022.01.25 Language Help	- X	DC Programming Tool v1.10 2022.01.25 Jage Help	Go to official web
Welcome to the LINK PRO! Image: Soc Programming Tool v1.10 2022.01.25 Language: Help LoadProject SaveProject CheckBlank AllErase Program Verify SC LII IC select Customer Option Program SC69F9616 Verify ConteckLum: 0x5696 Setting Program F Load CWsensWDesktop/Hexkib IE R/HEX0x00_BK hex EEPROM 0 bytes File Len: 0 bytes File Len: 0 bytes LDROM 1024 bytes File Len: 0 bytes EEPROM LDROM 1024 bytes File Len: 0 bytes Constant Setting APROM EEPROM LDROM Setting APROM EEPROM LDROM SclinkProinfo	NK PRO has connected	DC Programming Tool v1.10 2022.01.25 age Help Project SaveProject Project Customer Option Sef5810B Customer Option CheckSum: 0x5598 Settin ROM 65538 bytes CheckSum: Load Customer Option PROM 6144 bytes File Len: Load C:UsersWDesktopHextig 世界HEX0xFF_1288 hex XOM 0bytes File Len: Load C Setting APROM EEPROM LDROM	SC LINK PRO has connected
Welcome to the LINK PRO! • 50C Programming Tool v1.10 2022.01.25 Language Help LoadProject SaveProject CheckBlank AllErase Program Venty SC LI Costect Costect Costect Costect Customer Option F Load CVUsersWDestdopHextbit [20,7]HEX0x00_9K hex EEPPC0M 0bytes F Load CVUsersWDestdopHextbit [20,7]HEX0x00_9K hex EIPROM LOROM 1024 bytes File CRC MAROM EEPPCOM Load Concester Co	NK PRO has connected	DC Programming Tool v1.10 2022.01.25 arge Help Broject SaveProject CheckBlank NoErase Program V select Clastomer Option CheckSum: 0x600B Settin GROM 65538 bytes No MP Area File Len: 0 bytes Load Clastomer Option CheckSum: 0x600B Settin CROM 6144 bytes File Len: 128 bytes Load Clastomer Option Clastomer Option CheckSum: 0x600B Settin Setting APROM EEPROM LDROM SClastomer Clastomer Option Sclastomer Clastomer C	SC LINK PRO has connected

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) ProgramSetting 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.

6) EEPROM Code File Window:

Display the loaded or read code in current EEPROM.



No.	Function Name	Function Descriptions
1	Load Project	Load saved project file (with the extension of ". socprj")
2	Sava	Save Program Code, ProgramSetting (Chip Model, Programming Area, S/N,
2	Save	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	LDROM Load	Load program codes to LDROM
10	Programming	Select programming voltage as needed
10	Voltage	
11	Auto	Perform automatic operations (Null Checking, Erasing, Programming, Check,
	7000	Reset and Run) as needed;
12	Programming	Select if it is required to encrypt, write/read CRC and to display the checksum of
	Option	currently loaded project when programming
		1. Automatic Programming: Check it to automatically detect MCU in offline
	Offline	programming mode, and perform programming automatically if detected, with no
13	Programming	need to press START button.
	Option	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.
		Write a group of number in MCU Flash:
		Optional
14	S/N Settings	User-defined start value
	C C	User-defined step value
		User-defined store address
		Hexadecimal increment mode by default
	EEPROM	
15	Offset	User-defined the start address to write EEPROM
	Address	
	Option	
16	Settings	Set MCU programming configurations



4.4 Function Descriptions

4.4.1 Descriptions for S/N

SOC Programming Tool v1.10 2022.01.25	– – ×
Language Help	
LoadProject SaveProject CheckBlank AllErase Program Veri	SC LINK PRO has connected
Customer Option	ProgramSetting
SC92F8003 Identification CheckSum: 0x3E0F Setting	ProgramVoltage(V): 3.3 -
APROM 16384 bytes No IAP Area File Len: 16384 bytes	CheckBank
C:\Users\li\Desktop\Hex\验证使用HEX\0x00_16K.hex	Erase: All
EEPROM 128 bytes File Len: 0 bytes	Program 🔽
Load -	Verify 🔽
LDROM 0 bytes File Len: 0 bytes	Reset and Run 🔽
Load -	Auto
Setting APROM EEPROM LDROM SClink	Prolnfo VerifyInfo
ProjectChecksum OfflineProgramSetting	SerialnumberSetting(StorageArea:APROM)
Refresh 0x34ECFF01 🔽 Offline Program	✓ Use Serialnumber
Hardware CRC Operate AutoProgram	Increase Increase Increase Increase
Write APROM HardwareCRC	O Decrease O Dec
LimitProgramCount 1	Length(bit): 32 💌
Read ProgramProjectlistManage	StepLen:0x 1
	StartValue:0x AABBCCDD
Compare Download Compare	StartAddr:0x F10
L costo	
Welcome to the LINK PRO!	Go to official web

 \odot The S/N function is currently available for SC LINK PRO in offline mode only.

© Low S/N data is stored in low address, for example, write 32 BITS S/N 0XAABBCCDD 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.

③ 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.

It is recommended to set the S/N address outside the program space so as to avoid the program code from being covered by S/N data, resulting in being unable to perform verifying operation after programming.

4.4.2 MCU Library Upgrading

With SOC Programming Tool, IC model programmable and corresponding configuration parameters can be set by using MCU library file; When any new IC is introduced or the configuration parameters of current IC are adjusted, SOC will update the library file and publish it on the official website (http://www.socmcu.com).

To update MCU library:

① Download the latest MCU library file in SinOne official website (<u>http://www.socmcu.com</u>).

② Open SOC Programming Tool and click "Upgrade Chip Library File" on "Programmer Information" Menu.

③ Locate MCU library file (.mculib/.mcux file) in "Open File" dialog box, and click "Open".

④ After upgrading is completed, restart SOC Programming Tool.



4.4.3 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 <u>2.3.1</u> <u>Firmware Upgrading</u>

4.4.4 Check Offline Programming Options

Figure 4.4.6 shows settings of SOC Programming Tool offline programming options, only valid in SC LINK PRO offline mode.

nguage Help		
oadProject SaveProject CheckBlan	k AllErase Program Verify	SC LINK PRO has connected
C select	Customer Option	ProgramSetting
SC92F8003 Identificatio	n CheckSum: 0x3E0F Setting	ProgramVoltage(V): 3.3 -
APROM 16384 bytes No IAP Area File	e Len: 16384 bytes	CheckBank
Load C:\Users\li\Deskt	op\Hex\验证使用HEX\0x00_16K.hex	Erase: All
EEPROM 128 bytes File Len: 0 bytes		Program 🔽
Load -		Verify 🔽
DROM 0 bytes File Len: 0 bytes		Reset and Run 🔽
Load -		Auto
Setting APROM E	EEPROM LDROM SClinkProlr	ıfo Verifylnfo
ProjectChecksum	OfflineProgramSetting	-SerialnumberSetting(StorageArea:APROM)
Refresh 0x34ECFF01	✓ Offline Program	✓ Use Serialnumber
Hardware CRC Operate	AutoProgram	Increase Increase Increase
Write APROM HardwareCRC	11	C Decrease C Dec
	LimitProgramCount 100	Length(bit): 32 💌
Read	ProgramProjectlistManage	StepLen:0x 1
DOM Essent	H	StartValue:0x AABBCCDD
ROW Encrypt	Download Compare	StartAddr:0x F10

Fig. 4.4.6 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.

4.4.5 Security Encryption

4.4.5.1 Security Encryption Functions and Features

All IC of SinnOne have encryption function, among which the 95F series, 92L series and part of 92F series IC allow users to choose whether to enable the security encryption function, while other series forcibly enable the security encryption function by default and users cannot disable it. For IC models with configurable security encryption function, you can select whether to encrypt the IC securely by configuring the Encryption control in the "ROM Encryption" option on the host computer interface.



adProject SaveProject CheckBlank	NoErase Program Verify	SC LINK PRO ha	s connected
C select CC95F8616B	Customer Option CheckSum: 0x569B Setting	ProgramSetting ProgramVoltaç	ge(V): 3.3 💌
IPROM 65536 bytes No IAP Area File L	en: 0 bytes	Check	Bank rase: None 💌
EPROM 6144 bytes File Len: 0 bytes		Proj	aram I✓ /erify I✓
DROM 0 bytes File Len: 0 bytes		Reset and	Run 🔽
Setting APROM EE ProjectChecksum Refresh 0x34ECFF01	PROM LDROM SClinkProln OfflineProgramSetting G Offline Program	fo VerifyInfo SerialnumberSetting(S Vse Serialnumber	 itorageArea:APROM
Hardware CRC Operate	AutoProgram	Increase Decrease Length(bit):	© HEX C Dec
Read ROM Encrypt	ProgramProjectlistManage	StepLen:0x StartValue:0x	1 AABBCCDD
Encrypt encrypt	Download Compare	StartAddr:0x	F10

Security encryption features of SinOne series IC are as follows (configurable IC for security encryption function) :

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

4.4.5.2 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:

SOC Programming Tool v1.10 2022.01.25	- 🗆 ×	SOC Programming Tool v1.10 2022.01.25	- 🗆 X
Language Help		Language Help	
LoadProject SaveProject CheckBlank SectionErase Program Verify	SC LINK PRO has connected	LoadProject SaveProject CheckBlank SectionErase Program Verify	SC LINK PRO has connected
IC select Customer Option SC95F8616B Identification CheckSum: 0x46BA Setting	ProgramSetting ProgramVoltage(V): 5	IC select	ProgramSetting
APROM 64512 bytes No IAP Area File Len: 32768 bytes	CheckBank	APROM 64512 bytes No IAP Area File Len: 32768 bytes	CheckBank
C:\Users\li\Desktop\Hexi验证使用HEX\0x00_32K.hex	Erase: Sector	✓ Load C:\Users\\ii\Desktop\Hex\\检证使用HEX\0x00_32K.hex	Erase: Secto
EEPROM 6144 bytes File Len: 0 bytes	Program 🔽	EEPROM 6144 bytes File Len: 0 bytes	Program 🔽
Load -	Verify 🔽	Load -	Verify 🔽
LDROM 1024 bytes File Len: 1024 bytes	Reset and Run 🔽	LDROM 1024 bytes File Len: 1024 bytes	Reset and Run 🔽
C:\Users\li\Desktop\Hex\验证使用HEX\0x58_1K.hex	Auto	✓ Load C:\Users\\\Desktop\Hex\验证使用HEX\0x58_1K.hex	Auto
Setting APROM EEPROM LDROM SClinkProIn	fo VerifyInfo	Setting APROM EEPROM LDROM SClinkProInt	o VerifyInfo
ProjectChecksum OfflineProgramSetting	SerialnumberSetting(StorageArea:APROM)	ProjectChecksum	SerialnumberSetting(StorageArea:APROM)
Refresh 0x34ECFF01 🔽 Offline Program	Use Serialnumber	Refresh 0x34ECFF01 🔽 Offline Program	Use Serialnumber
Hardware CRC Operate	C Increase C Dec	Hardware CRC Operate	Increase Increase
Write APROM HardwareCRC	Length(bit): 32	Write APROM HardwareCRC	Length(bit): 32
Read ProgramProjectlistManage	StepLen:0x 1	Read ProgramProjectlistManage	StepLen:0x 1
ROM Encrypt Download Compare	StartAddr:0x F10	ROM Encrypt Download Compare	StartAddr:0x F10
[✓ Encrypt		Encrypt	
Welcome to the LINK PRO!	Go to official web	Welcome to the LINK PRO!	Go to official web

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. 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.



4.4.5.3 The relationship between the encryption of the programmed IC and

the erasure of the programming area

- This relationship applies only to the IC whose security encryption function can be configured. To prevent users from forgetting to set the secure encryption mode, the "encryption" setting in the ROM encryption option is automatically checked
- 2. Whether the burned IC is encrypted or not will have different effects on THE APROM and LDROM of IC, and the corresponding relationship is as follows:

Programming area IC encryption	APROM	LDROM	APROM+LDROM
Not encrypted	The LINK will forcibly erase APROM before rewriting	The LINK will forcibly erase LDROM before rewriting	The LINK will forcibly erase APROM+LDROM before rewriting
Encrypted	The LINK will forcibly erase APROM before rewriting	The LINK will forcibly erase APROM+LDROM before rewriting	The LINK will forcibly erase APROM+LDROM before rewriting

4.5 ICP Online Programming

Take using SC LINK PRO program SC92F8003 as an example.

- ① Connect SC LINK PRO to SC92F8003 with 4PIN cables in the right direction.
- © 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 SC92F8003 in the example.

adProject SaveProject CheckBlan	k AllErase Program Verify	SC LINK PRO has connected
select	Customer Option	ProgramSetting
C92F8003 Identificatio	CheckSum: 0x3E0F Setting	ProgramVoltage(V): 5
PROM 16384 bytes No IAP Area File	Len: 8192 bytes	CheckBank
Load C:\Users\i\Deskt	op/Hex\验证使用HEX\0x00_8K.hex	Erase: All
EPROM 128 bytes File Len: 0 bytes		Program 🔽
Load -		Verify 🔽
DROM 0 bytes File Len: 0 bytes		Reset and Run 🔽
Load -		Auto
Setting APROM E	EPROM LDROM SClinkProlr	nfo VerifyInfo
rojectChecksum	OfflineProgramSetting	SerialnumberSetting(StorageArea:APROM)
Refresh 0x34ECFF01	Giffine Program	Use Serialnumber
lardware CRC Operate	AutoProgram	@ Increase @ HEX
Write APROM HardwareCRC		C Decrease C Dec
	LimitProgramCount 1	Length(bit): 32 💌
Read	Descent	StepLen:0x 1
		StartValue:0x AABBCCDD
OM Encrypt	Download Compare	StartAddr:0x F10

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;



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SOC Programming Tool v1.10 2022.0	1.25			-	<
LoadProject SaveProject CheckBlank	AllErase	Program	Verify	SC LINK PRO has connected	*
IC select SC92F8003	Customer C	Option Sum: 0x3E0F	Setting	ProgramSetting	٦
APROM 16384 bytes No IAP Area File L	en: 8192 bytes			CheckBank	
Load C:\Users\li\Desktop' EPROM 128 bytes File Len: 0 bytes	∖Hex\验证使用I	HEX\0x00_8K.h	ex	Erase: All Program	
				Verify 🔽	
LDROM 0 bytes File Len: 0 bytes				Reset and Run 🔽	
Setting APROM EEPROM LDROM SCIInkProl		Info VerifyInfo	_		
ProjectChecksum Refresh 0x34ECFF01	OfflineProgram	Setting		SerialnumberSetting(StorageArea:APROM)-	
Hardware CRC Operate	AutoProg	ram		C Decrease	
Write APROM HardwareCRC	LimitProg	ramCount 1	Ţ	Length(bit): 32	1
Read	Progra	amProjectlistMana	age	StepLen:0x 1 StartValue:0x AABBCCDD	
ROM Encrypt	Download	C	ompare	StartAddr:0x F10	
Welcome to the LINK PRO!				Go to official w	eb

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;

SOC Programming Tool v1.10 2022.01.25	- 🗆 🗙
Language Help	
LoadProject SaveProject CheckBlank AllErase Program Verify	SC LINK PRO has connected
IC select Customer Option	ProgramSetting
SC92F8003 Identification CheckSum: 0x3E0F Setting	ProgramVoltage(V): 5
APROM 16384 bytes No IAP Area File Len: 16384 bytes	CheckBank
✓ Load C:\Users\li\Desktop\Hex\检证使用HEX\0xAA_16K.hex	Erase: All
EEPROM 128 bytes File Len: 0 bytes	Program 🔽
Load -	Verify 🔽
LDROM 0 bytes File Len: 0 bytes	Reset and Run 🔽
Load -	Auto
Setting APROM EEPROM LDROM SClinkProInfo	verifyInfo
Checksums 90000000 AA	Clear
00000050 AA	Reload
00000000 AA A	READ
Welcome to the LINK PRO!	Go to official web

3. Set up S/N function as needed (if no need, skip this step);

4. Click "Programming" button to program the code file and corresponding settings to MCU;

5. SOC Programming Tool will pop up a window, showing the progress of "Programming". After the programming is completed, the window will prompt the programming is succeeded.

SOC Programming Tool v1.10 2	022.01.25	—	×
canguage Help			n i
		Verifing files	A
LoadProject SaveProject CheckB	Mank AllErase Program Verify		• •



 \times

SOC Programming Tool v1.10 2022.01.25

anguage	Help							
LoadProject	SaveProject	CheckBlank	AllErase	Program	Verify	1	Verification is complete with same data!	•
10 1 1							B 0.00	

6. Programming is completed.



5 Keil C Plug-ins

5.1 Install Simulation Plug-ins

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



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

Setup - SOC_KEIL_Setup -	x
Information Please read the following important information before continuing.	Ì
When you are ready to continue with Setup, click Next.	
This plugin automatically detects the KEIL installation directory in your computer, installing the plugin under the C51 directory of the KEIL's installation path, and you can modify these default settings during installation.	
< <u>B</u> ack <u>N</u> ext > 否(N)

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



🔇 Setup - SOC_KEIL_Setup 💶 🗆 🗙
Select Destination Location Where should SOC_KEIL_Setup be installed?
Setup will install SOC_KEIL_Setup into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
F:\keil4\C51\SOC_KEIL_Setup Browse
At least 35.8 MB of free disk space is required.
< <u>B</u> ack <u>N</u> ext > 否(N)

^④ Set the name of this folder on Start Menu with SOC_KEIL_SCLINKPRO in default. You can modify the name as needed, then click "Next" button

Setup - SOC_KEIL_Setup	_ = ×
Select Start Menu Folder Where should Setup place the program's shortcuts?	
Setup will create the program's shortcuts in the following Start M	1enu folder.
To continue, click Next. If you would like to select a different folder, clic	ck Browse.
SOC_KEIL_Setup	Browse
< <u>B</u> ack <u>N</u> ext >	否(N)

6 Confirm the installation path and click "Next" button



Setup - SOC_KEIL_Setup	×
Ready to Install Setup is now ready to begin installing SOC_KEIL_Setup on your computer.	
Click Install to continue with the installation, or click Back if you want to review change any settings.	or
Destination location: F:\keil4\C51\SOC_KEIL_Setup Start Menu folder: SOC_KEIL_Setup	•
	· · ·
< <u>B</u> ack Instal	否(N)

 \odot For installation, click "Next" and then click "Install" to complete the installation, and read related help information

Setup - SOC_KEIL_Setup =	×
Information Please read the following important information before continuing.	Z
When you are ready to continue with Setup, click Next.	
1.For any questions, suggestions or comments on the using, please contact us with 0755-26652552,552 or E-MAIL:support@socmcu.com. 2.Open KEIL software for the first time. If there is a network communication dialog, please select Public Network to avoid missing important notifications and updates related to the too!!	
Next >	





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!

5.2 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 8051 Driver", and then check "Run to main(), as shown in the figure below:

levice Target Output Listing User C51	A51 BL51 Locate BL51 Misc Debug Utilitie
C Use <u>Simulator</u> Settings □ Limit Speed to Real-Time	Settings
Load Application at Startup Initialization File: Edit	Load Application at Startup Initialization File: Load Application at Startup Initialization at Startup Initialization File: Load Application
Restore Debug Session Settings Image: Set in the set of the set	Restore Debug Session Settings I✓ Breakpoints I✓ Watchpoints I✓ Memory Display
CPU DLL: Parameter: S8051.DLL	Driver DLL: Parameter: S8051.DLL
Dialog DLL: Parameter: DP51.DLL p51	Dialog DLL: Parameter: TP51.DLL p51

② Click "Utilities" and select "SOC 8051 Driver" from "Use Target Driver for Flash Programming", as shown in the figure below:



vice Target	Output L	isting User	C51 A51	BL51	Locate BL51 Misc	Debug Ut	111t1
Configure Flash	Menu Comm	and					
Use Targe	t Driver for Fla	sh Programming					
	SOC 8051 D	iver	▼ Se	ettings	✓ Update Target be	fore Debugging	1
Init File:					Edit	1	
and the	1					1	
O Use Extern	al Tool for Fla	sh Programming					
Command:							
Command: Arguments:							
Command: Arguments:	- Run Inder	rendent					
Command: Arguments:	🗌 Run Indep	pendent					
Command: Arguments:	🗖 Run Inde;	pendent					
Command: Arguments:	🗖 Run Inde;	pendent					
Command: Arguments:	🗖 Run Inde;	pendent					
Command: Arguments:	🗖 Run Inder	pendent					
Command: Arguments:	🗖 Run Inder	pendent					

③ Click "Settings" to enter "Programming Option Information Interface", as shown in the figure below:

SOC 8051 Driver V1.10 2022.01.26					_		×
Update Language Help							
Chip Select		Option Checks	Gum: Ox5B (Option CRC: 0x3E	0F;		
SC32F8003	WDT	Disable	•	Enable XTIPLL	Disable		•
APROM	System clock	Fosc/2	•	P1.7	Normal		•
Program Settings	LVR	4.3V	•	Vref	VDD		•
Program Voltage(V): 3.3	IAP Range	EEPROM only	•	External crystal	Higher than	12MHz	•
Erase: None 💌			Ŧ				~
✓ Program			Ŧ				-
Verify			<u></u>				-
Reset and Run			~				-
Encryption		 	<u> </u>		 		-
Write CRC			Ŧ				~
					0	к	

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 MCU Library: Upgrade ".socmculib" library file provided by SOC. Select "Upgrade MCU Library", select the library file to be upgraded, and click "Open" to complete the upgrading.

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

S 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.



-				·		
<u>File E</u> dit <u>V</u> iew <u>P</u> roj	ject Fl <u>a</u> sh <u>D</u> ebug	Pe <u>r</u> ipherals <u>T</u> ools	<u>S</u> VCS <u>W</u> indow	<u>H</u> elp		
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🗇 🏥 🕮 🧼 🔜 🖡	Target 1	💌 👗 📥 🐂				
Project	Download					
🗆 🔁 Target 1	Download code t	o flash memory $3=($)x25;		//LVR:2.6V,	RSTPIN->IC
🗄 🚘 Courco Gro	022	TO Thit	() •			

5.3 Notes for Keil C Plug-ins

① Before using Keil C to create SOC MCU project, please visit SinOne official website (<u>http://www.socmcu.com</u>) 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.

⁽²⁾ SOC MCU head file already contains the common name of SFR, so please uncheck "Define 8051 SFR Names" in A51 column of project setting when using Keil C to create SOC MCU project to avoid error reporting.

evice Tar	get Out	put List	ing User	C51	A51	BL51	Locate	BL51 Mis	c Debug	Utilitie:
- Condition:	Accomble	· Control Sv	mbole							
Sat-		Control Sy	110013							
Reset:	<u> </u>									
		a			-					
 Macro pro Stand 	cessor – lard	Special	Function Reg	gisters						
MPI		I Defir	ne 8051 SFR	Names						
1 140 -										
	- L									
1_ 141 E	l									
Include	L									
Include Paths										
Include Paths Misc Controls										
Include Paths Misc Controls Assembler		51 SET (SI	MALL) DEBU	IG EP						
Include Paths Misc Controls Assembler control string		951 SET (SI	MALL) DEBU	IG EP						
Include Paths Misc Controls Assembler control string		051 SET (SI	MALL) DEBU	IG EP						



6 Revision History

Revision	Changes	Date
V0.1	Initial Release.	March 2022