ProWriter User Manual

Category	Content
Key word	ProWriter Instructions
Abstract	This paper introduces the application method of ProWriter which is the upper computer software of the programmer in SinoWealth.

Interpretation:

online	mean	The state of the programmer or Simulator device after being powered on and connected to the PC through a USB cable. At this time, the device name and firmware version information will be displayed on the ProWriter software UI.
offline	mean	The programmer or Simulator device is powered on but not online.

Revision history:

Version	Date	Modify content
V1.0	2020/04/09	First draft.
V2.0	2021/09/07	Add an introduction to SinoLink Pro.
V2.1	2022/06/30	Add an introduction to Pro06C. Add relevant instructions for the LED status indicator light during Pro06C/B/A writing.
V3.0	2023/11/22	Add an introduction to SinoLink Plus. Revised some descriptive information. Add nopf programming instance section. Add nopf creating instance section. Add FAQ section. Add specialized vocabulary definitions.

Directory

Chapter 1 ProWriter Introduction

1.1 General Description

ProWriter is a programmer upper computer software suitable for MCU of Sinowealth, which can support online or offline programming of 8-bit, 32-bit chip and OTP chip realized by mass production programmer Pro06A, Pro06B, Pro06C, Pro03A as well as the online programming of simulators such as JET51A, SinoLink, SinoLink Pro and SinoLink Plus. This article will introduce the installation and use of the software.

1.2 Operation Environment

ProWriter could run on Win8 and above.

We recommend the usable capacity of memory is not smaller than 2G.

We recommend the usable capacity of Hard-disk is not smaller than 64G.

1.3 Programmer supported by ProWriter

Prowriter is used to program MCU of Sinowealth, which should be done in combination with the hardware Programmer, such as Pro06B, Pro06C, Pro06A, Pro03A, JET51A, SinoLink, SinoLink Pro and SinoLink Plus.

Table 1.3.a Comparison of functions of various programmers

Tool	Target MCU	Support channels Number	Mass production offline programming
Pro06C	8/32 bit Flash	4	√
Pro06B	8/32 bit Flash	4	√
Pro06A	8bit Flash	4	√
Pro03A	OTP	4	√
SinoLink Plus	8/32 bit Flash	1	√
SinoLink Pro	8/32 bit Flash	1	√
SinoLink	8/32 bit Flash	1	×
JET51A	8bit Flash	1	×

Chapter 2 Software Installation

2.1 Software Download and Installation

The latest version of ProWriter can get from the Sinowealth's official website (https://en.sinowealth.com/homes).

After downloading, simply install the program directly.

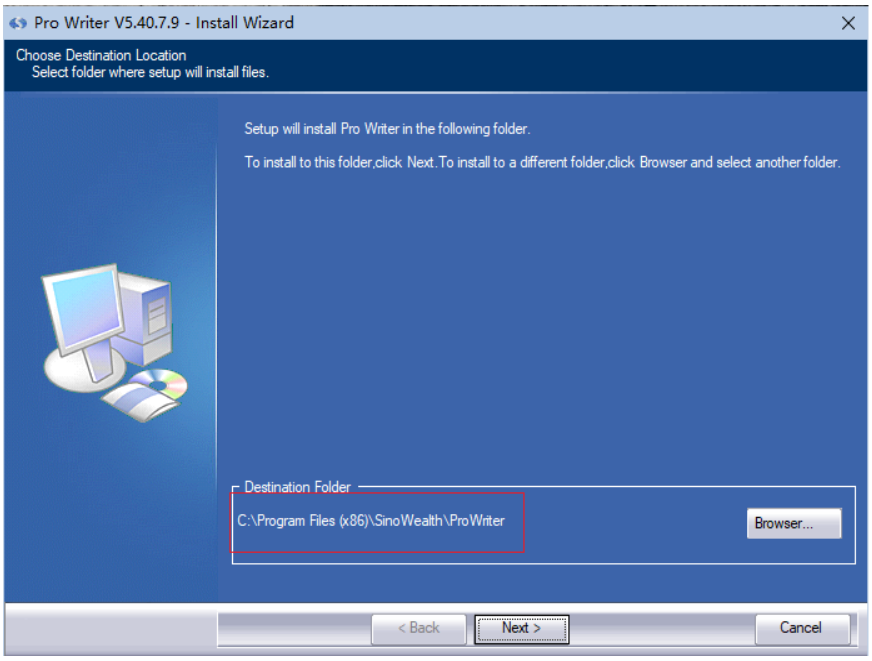

Figure 2.1.a Default Installation Path

2.2 USB Driver Installation

The Sinowealth's Programmer with USB interface JET51A, Pro03A, and Pro06A do not require the installation of USB drivers (using the Windows built-in driver), and SinoLink Plus and Pro06C do not require the installation of USB drivers in Win8 and above OS.

SinoLink, SinoLink Pro and Pro06B require the installation of corresponding USB drivers. The latest driver package is included in the ProWriter installation package, as shown in Figure 2.2.a. Users can choose the corresponding USB driver for installation based on their own PC OS.

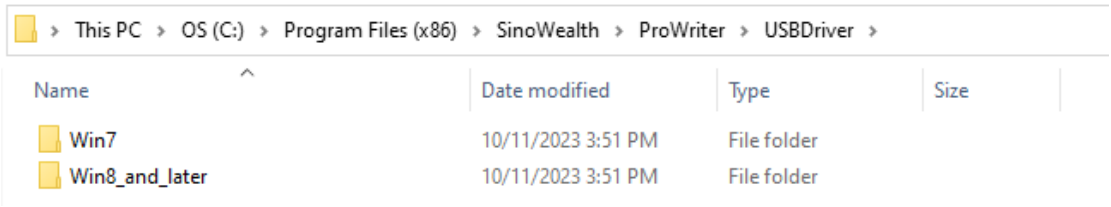

Figure 2.2.a USB Driver Package

Now Taking the installation of the USB driver for SinoLink under the Win8-64 bit OS as an example to demonstrate the installation process.

- Select the USB driver matches the OS.

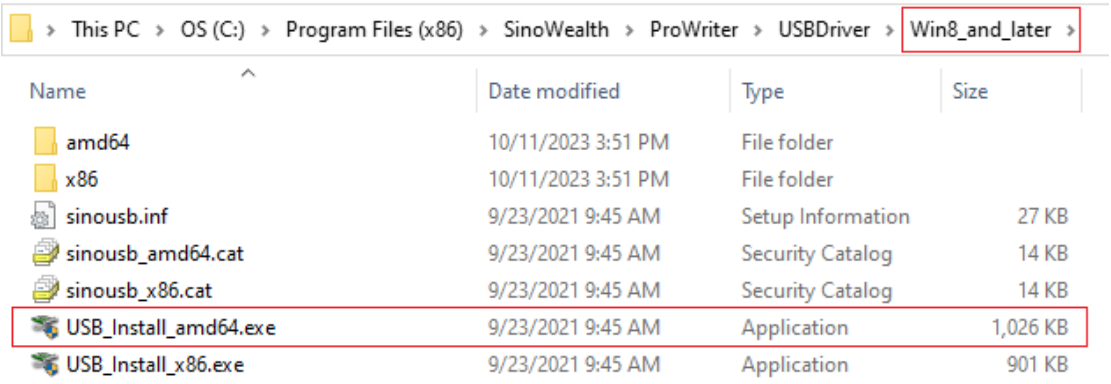

Figure 2.2.b USB driver list for Win8

- Execute the USB driver installer.

After the USB driver is installed, when the programmer is connected to the PC via USB, the device name will be displayed at the appropriate location in the device manager.

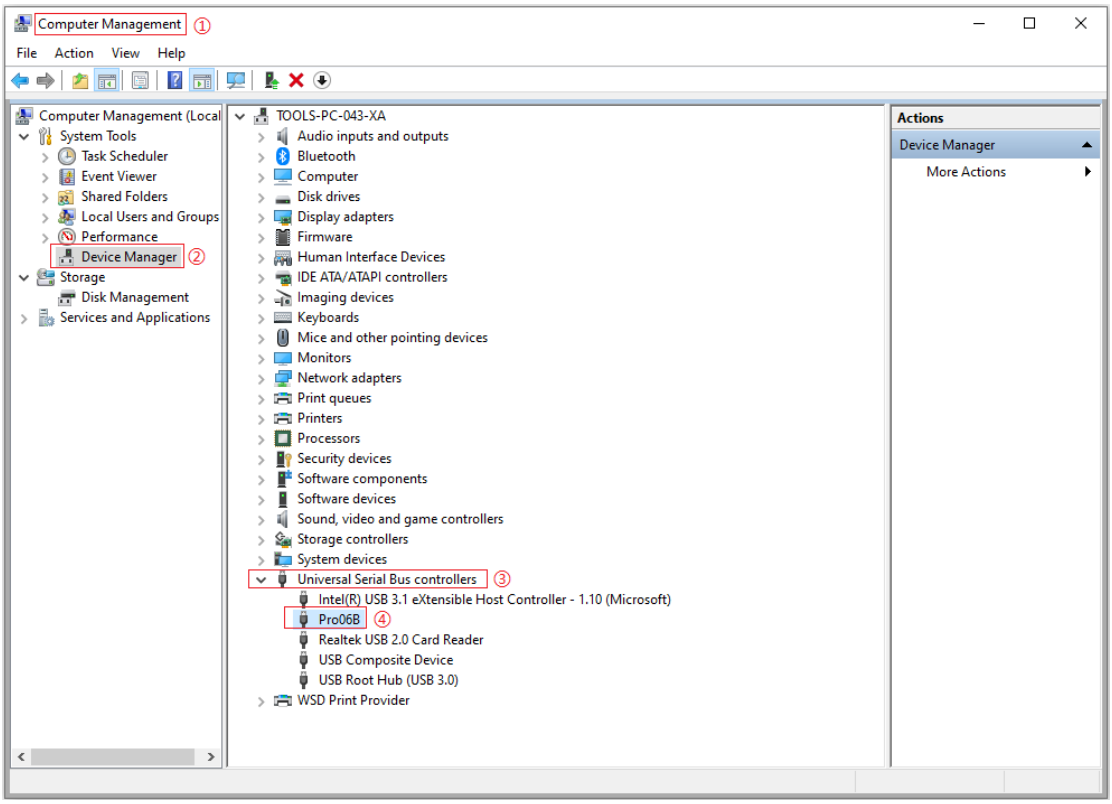

Figure 2.2.c Display after Pro06B is connected after USB driver installation

Chapter 3 Introduction of Programmers

ProWriter can cooperate with multiple programmers to complete the programming work. In this chapter we will provide a detailed description of the programmers it supports.

3.1 Pro06C programmer Introduction

3.1.1 Circuit Structure Introduction

Pro06C can support mass production programming of Sinowealth's entire series of 8bit/32bit MCU, and can support up to 4 channels of simultaneous programming. When performing a programming operation, it is often used in conjunction with the customer's chip programming adapter board, and the circuit connection is shown in Figure 3.1.1.a.

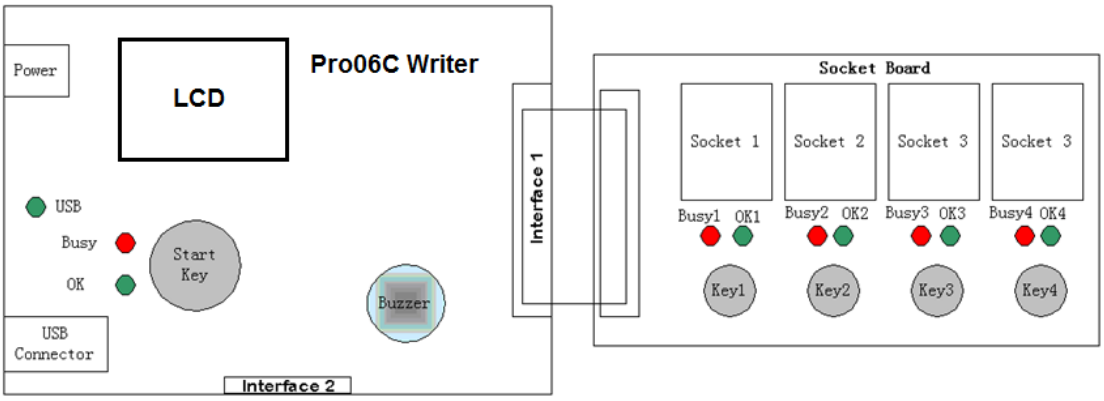

Figure 3.1.1.a Program Circuit Diagram for Pro06C

- **Power**
  Connect to DC regulator power supply (+12~15V).
- **LCD**
  Display chip name, code checksum, socket selection information, programming mode configuration information, pass / fail times, USB connection status, working status and programming interface type information.
- **USB Indicator Light**
  This indicator light shows the USB connection status. The light on indicates

the connection is normal, and the light off indicates the connection is disconnected.

- **Start Key**
  The main button for controlling the start of programming. Effective in online mass production mode or offline waiting button mode. When this button is pressed, it can start the programming operation of all selected channels.
- **Socket 1~4**
  There are 4 program slots.
- **Key 1~4**
  Key1 has the same function as the Start Key, while Key2~4 controls the corresponding channel respectively.
- **Interface1/2**
  The pins used for programming or indicating the status during programming. There are four channels to choose.

1	VDD1	TCK1/SWCLK1	2
	GREEN1	TDI1	
	RED1	TMS1	
	KEY1	TDO1/SWE1/SWDIO1	
	GND	GND1	
	VDD2	TCK2/SWCLK2	
	GREEN2	TDI2	
	RED2	TMS2	
	Key2/TDA2	TDO2/SWE2/SWDIO2	
	GND	GND2	
	VDD3	TCK3/SWCLK3	
	GREEN3	TDI3	
	RED3	TMS3	
	Key3/TDA3	TDO3/SWE3/SWDIO3	
	GND	GND3	
	VDD4	TCK4/SWCLK4	
	GREEN4	TDI4	
	RED4	TMS4	
	Key4/TDA4	TDO4/SWE4/SWDIO4	
39	GND	GND4	40

Figure 3.1.1.b Interface 1 of Pro06C

1	GRN1	RED1	2
	KEY1	RST1	
	GRN2	RED2	
	KEY2	RST2	
	GRN3	RED3	
	KEY3	RST3	
	GRN4	RED4	
	KEY4	RST4	
	NC	NC	
	NC	NC	
	OK	Busy	
	START	NC	
25	VDD	GND	26

Figure 3.1.1.c Interface 2 of Pro06C

Table 3.1.1.a Programming Interface (For example, Socket 1)

Chip Type	Interface Type	Programming Pins
ARM	SWD	VDD1 SWCLK1 SWDIO1 GND1
Andes	AICE	VDD1 TCK1 TDO1 GND1
8051	JTAG	VDD1 TCK1 TDI1 TMS1 TDO1 GND1
	SWE	VDD1 SWE1 GND1

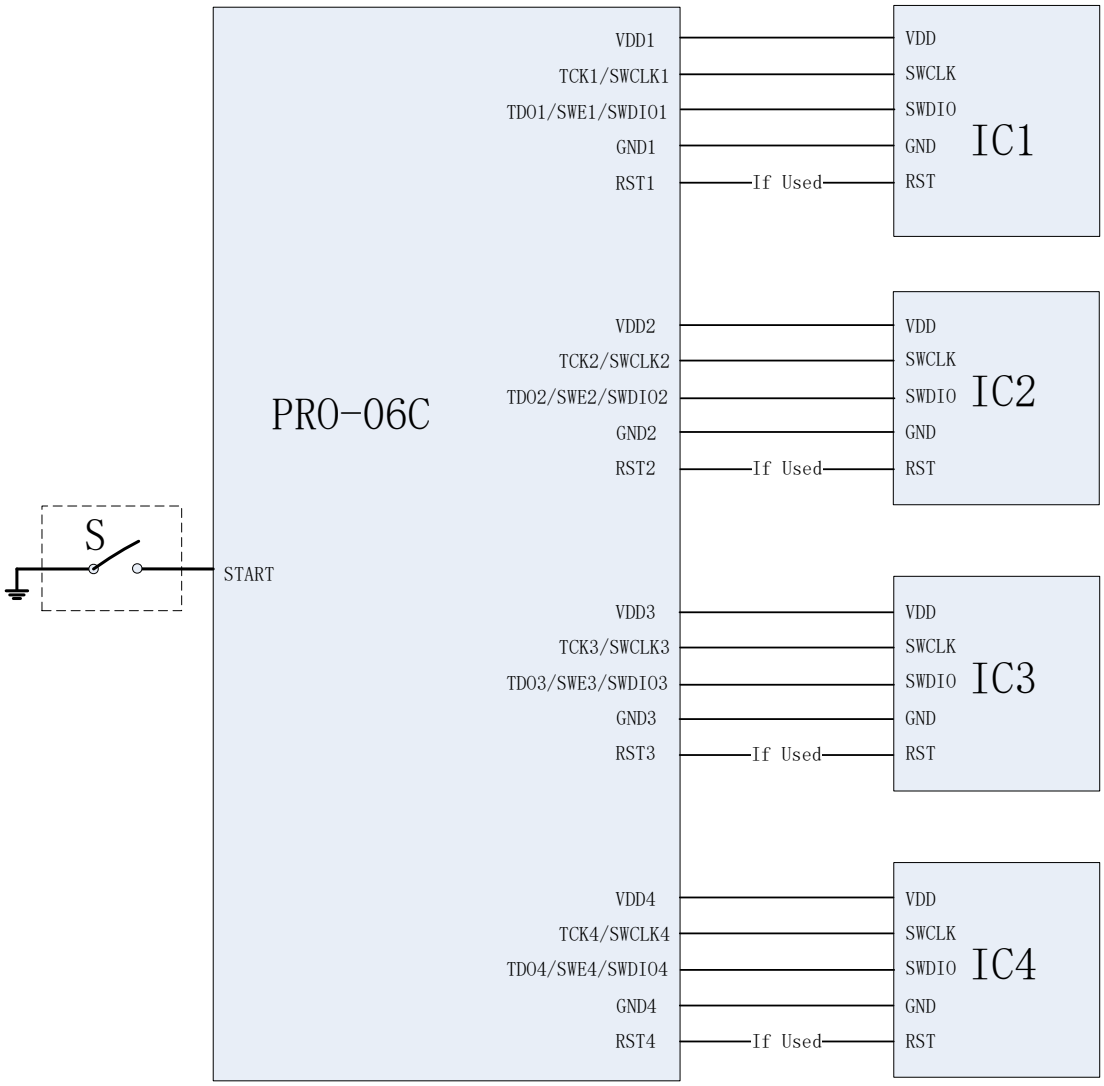

Figure 3.1.1.d SWD Interface of Arm Core

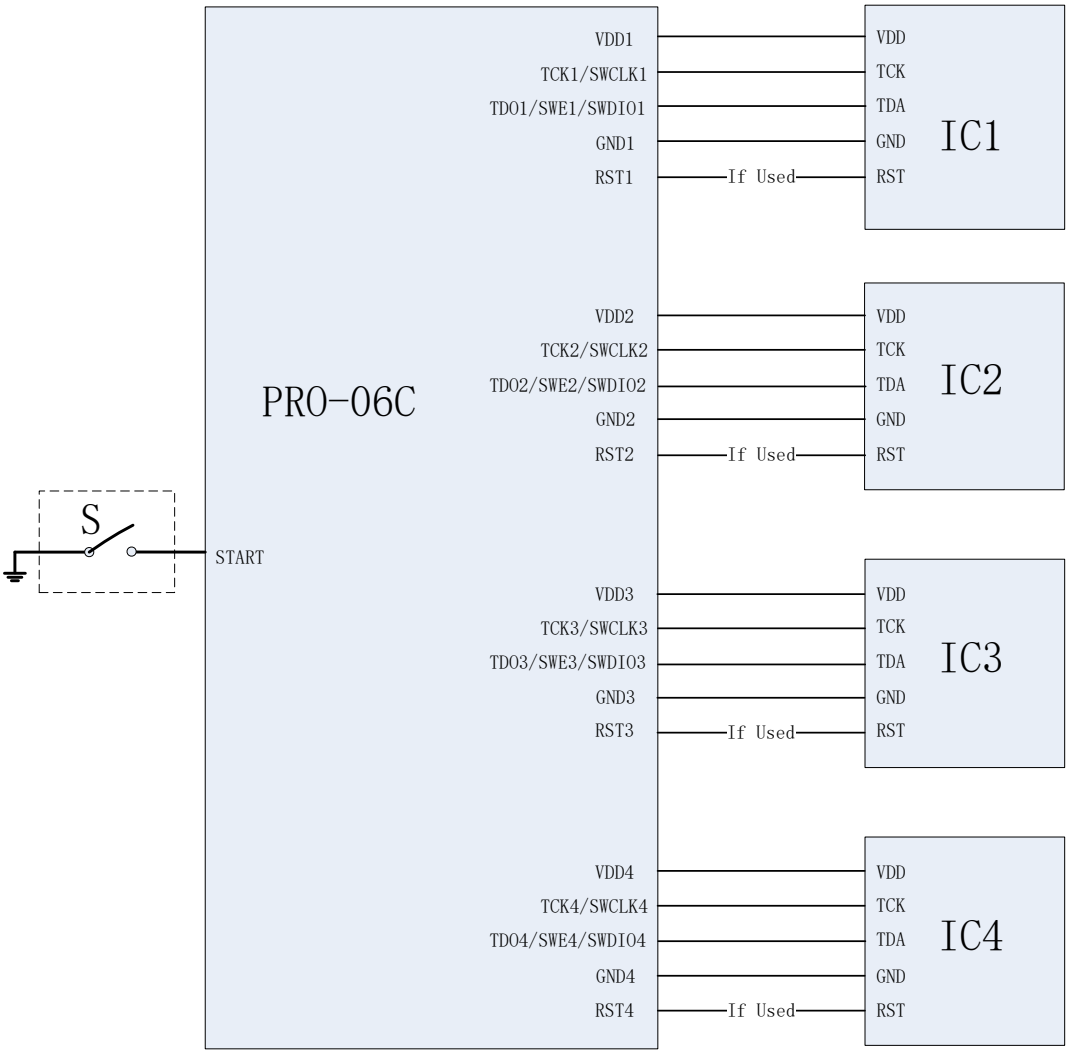

Figure 3.1.1.e AICE Interface of Andes Core

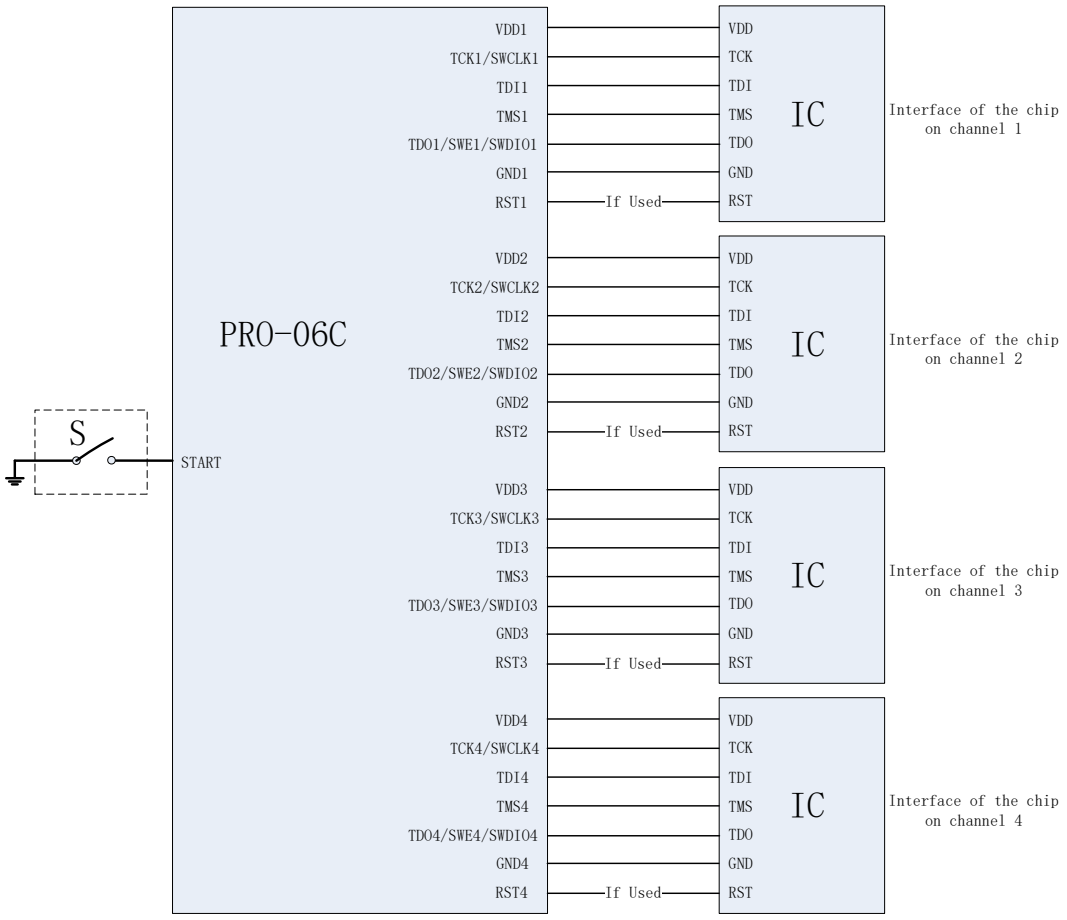

Figure 3.1.1.f JTAG Interface of 8051 Core

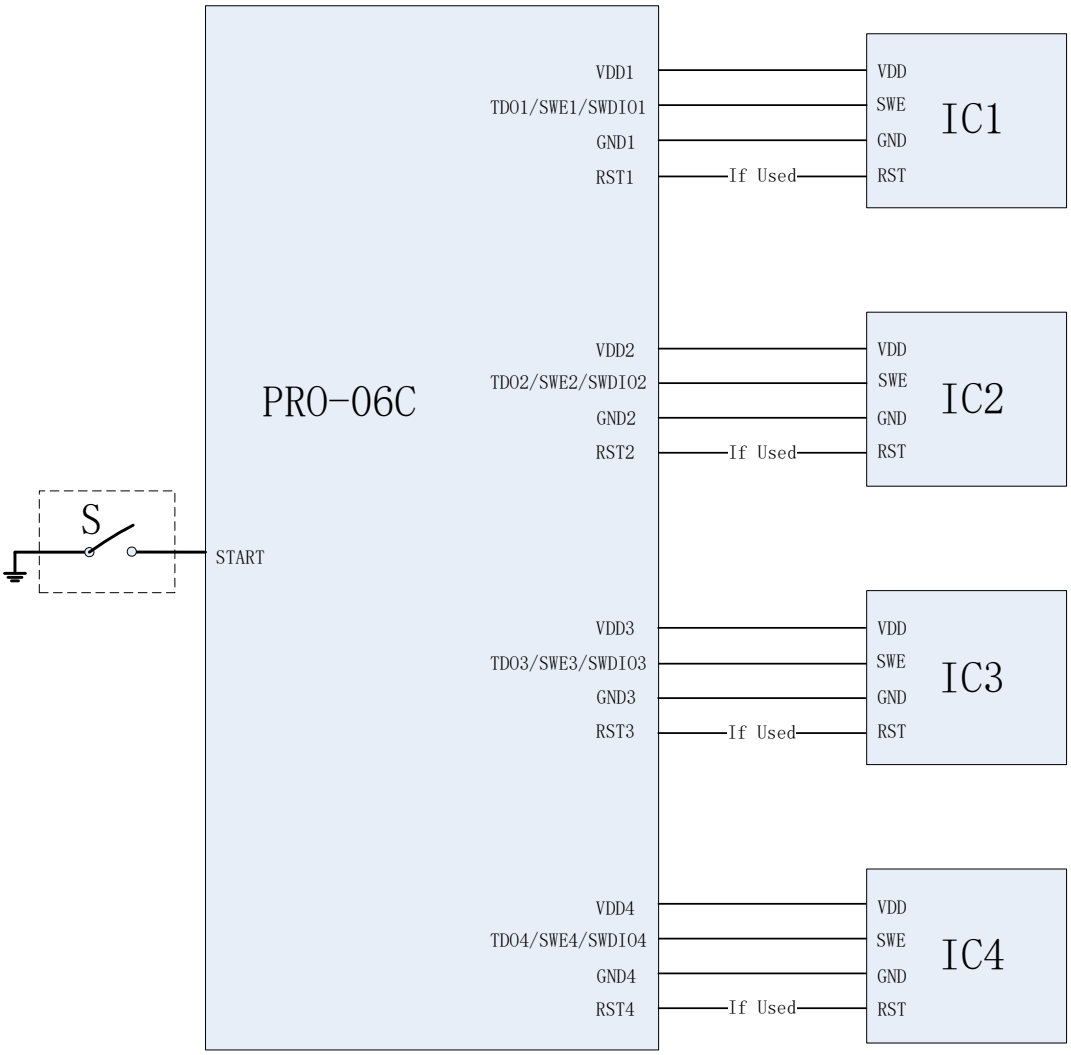

Figure 3.1.1.f SWE Interface of 8051 Core

Note:

1. GREENn in interface 1 and GRNn in interface 2 are the same signal, i.e. green LEDn. Used to indicate the OK signal of channel n, which lights up during high level voltage.

2. REDn in interface 1 and REDn in interface 2 are the same signal, i.e. red LEDn. Used to indicate the Busy signal of channel n, which lights up during high level voltage.

3. The number n (1-4) after the interface pin represents the corresponding Socket (channel), with a total of 4 channels.

4. When using the "Connect with ResetPin" function, it is necessary to connect the ResetPin of the chip to the corresponding RSTn in interface 2.

5. The START signal in interface 2 is the Start Key driver pin (input) of the Pro06C device, which is led out for customer convenience, such as connecting to their automated burning platform. Connecting this signal to GND is equivalent to pressing the Start Key.

6. The OK signal in interface 2 is the green LED driver pin (output) of the Pro06C device, which is led out for customer convenience, such as connecting to their automated burning platform. When this pin outputs a high-level voltage, the green LED of the Pro06C device will light up. This signal is used to indicate the total OK signal of the 4 channels, which means that the signal is only valid when the OK signals of all 4 channels are valid.

7. The Busy signal in interface 2 is the red LED driver pin (output) of the Pro06C device, which is led out for customer convenience, such as connecting to their automated burning platform. When this pin outputs a high-level voltage, the red LED of the Pro06C device will light up. This signal is used to indicate the total Busy signal of the 4 channels, which means that as long as one channel's Busy signal is valid, this signal is valid.

8. The VDD signal in interface 2 has a fixed level voltage of approximately 3.3V relative to GND.

3.1.2 Onboard programming

The Pro06C supports on-board programming, which means the user can first weld the chip to the user circuit board and then program the chip. It should be noted that when programming the chip Onboard, each programming line must be separated from the user's circuit.

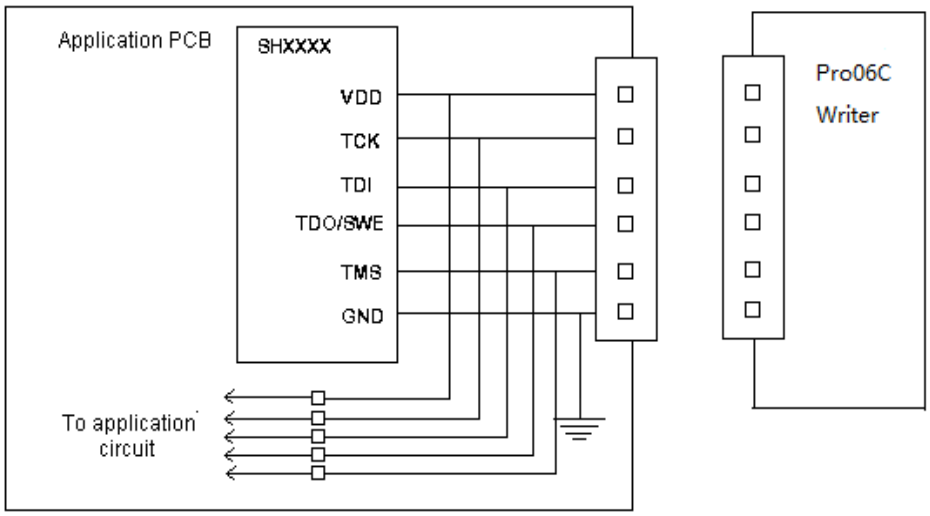

Figure 3.1.2.a Schematic Diagram of On-board Programming

3.1.3 Offline working status

Offline programming steps:

step1: Install ProWriter.

step2: Configure and download the offline programming project in the online working state.

step3: Disconnect the USB and restart the power to enter the offline programming mode.

step4: Insert the target MCU into the chip slot on the chip adapter board or connect the MCU program pin to the Pro06C program interface.

step5: Perform offline programming operation according to the "Wait for key press" or "Auto Detect" option checked during Step2.

step6: Remove the MCU that has been programmed.

step7: Return to Step4 to perform the next target MCU programming.

Note:

- The Pro06C has the function of offline programming, which can support one drag four programming at most.
- After the Pro06C is powered on, it can perform self-test. If the self-test fails, LCD will prompt error. At this time, offline programming cannot be performed. You can only download parameters online again and then perform offline programming. If the self-test passes, the LCD will display the name of the MCU to be programmed, the code checksum, socket selection information, programming mode configuration information, pass / fail times, USB connection status and programming interface type information.
- Red LED and green LED are used to indicate the programming status. If the red LED is on and the green LED is off, it indicates that programming is in progress. If the red LED is off and the green LED is on, it indicates the programming has been successfully completed. If both the red LED and green LED flash simultaneously, it indicates that an error occurred during the programming process. When the chip on a certain channel is removed, both the green LED and red LED corresponding to that channel will be off, indicating that it is waiting for the next programming operation.
- The buzzer is used to alert the programming status. In the manual programming mode, when the programming is successful, the buzzer will give a short low tone, and when

the programming fails, the buzzer will give three short high tones. In case of any channel programming error, the buzzer will give an alarm.

3.1.4 The programmer LED display

1) LCD display

When the Pro06C is powered on, if the target project has been downloaded to the programmer correctly, the LCD will display the name of the target MCU, the code checksum, socket selection information, Programming mode configuration information, pass / fail times, USB connection status and programming interface type information, otherwise an error will be prompted.

During the Programming process, the LCD will display the currently executing operation items for each selected channel, and the corresponding Programming results will also be displayed after the operation is completed.

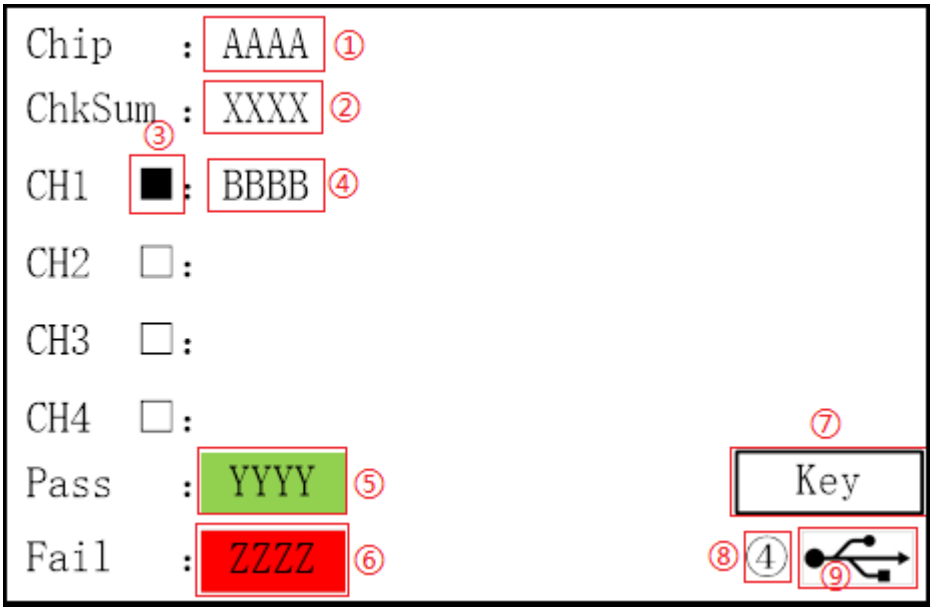

Figure 3.1.4.a Schematic diagram of Pro06C LCD display content

- ①The chip name is displayed here.
- ②The code checksum is displayed here.
- ③The hollow box "□" represents that the corresponding channel is not selected; The black solid box "■" indicates that the corresponding channel has been selected; The green solid box "■" represents the successful operation performed on the corresponding channel; The red solid box "■" indicates that

the operation performed on the corresponding channel has failed.

- ④Display the currently executing operation or the results of the operation execution.
- ⑤Display the cumulative number of successful programming attempts, which will only be counted if 'Program' is checked. And once the 'Download' operation is executed again, the count will be reset to zero.
- ⑥Display the cumulative number of programming failures, which will only be counted if 'Program' is checked. And once the 'Download' operation is executed again, the count will be reset to zero.
- ⑦Display offline programming configuration information:

  Key represents " Wait for key press ", which means whether to start burning is controlled by whether the key is pressed or not. Auto represents "Auto Detect", which means whether to start programming is determined by whether the programmer has (automatically) detected that a chip has been placed OK.

- ⑧Display programming interface information

  ④represents four-wire mode (JTAG), ①represents single-wire mode (SWE), and ②represents two-wire mode (SWD or AICE).

- ⑨Display the communication status of the USB port. Highlighting indicates that the USB cable is connected, while weak highlighting indicates that the USB cable is not connected.

2) LED indicator lights on Pro06C

There are two LED indicators for programming status on the Pro06C device: red LED and green LED. Their silk screen markings are Busy and OK respectively, and the corresponding control interfaces (drivers) are Busy pin and OK pin of Interface2.Both of them are lighted by high level voltage.

Table 3.1.b Pro06C LED indicator light state definition

Red LED	Green LED	State
Off	Off	Waiting for
On	Off	Programming
Off	On	Program success
flashing	flashing	Program Error

3) LED indicator lights on each programming channel

The LED indicators on each programming channel need to be integrated by the user on their chip programming adapter board. Like the LED indicator lights on the Pro06C, there are two LED indicator lights, namely red LED and green LED, which are lit at a high level, And the definition of indicator light status is also consistent. The only difference is that its control interface (driver) is REDn and GREENn in Interface1, then REDn and GRNn in Interface2.

4) Time sequence diagram of Busy and OK light during program

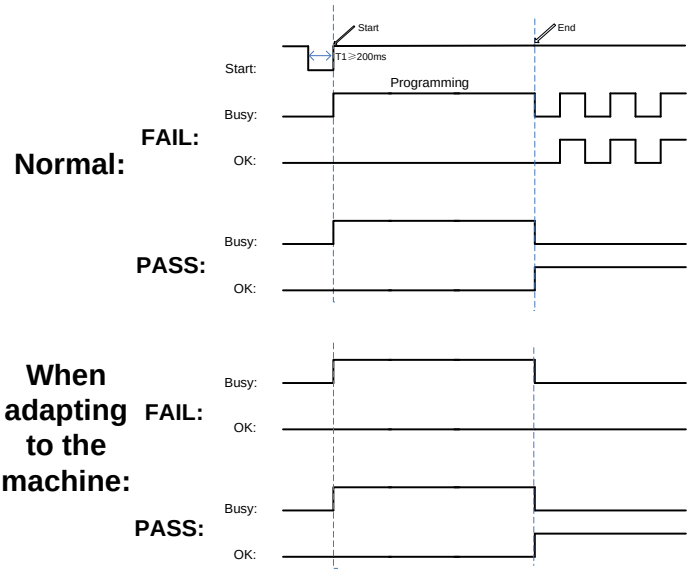

Figure 3.1.4.b Time sequence diagram of Busy and OK light during programming

3.2 Pro06B programmer Introduction

3.2.1 Circuit Structure Introduction

Pro06B can support mass production programming of Sinowealth's entire series of 8bit/32bit MCU, and can support up to 4 channels of simultaneous programming. When performing a programming operation, it is often used in conjunction with the customer's chip programming adapter board, and the circuit connection is shown in Figure 3.2.1.a.

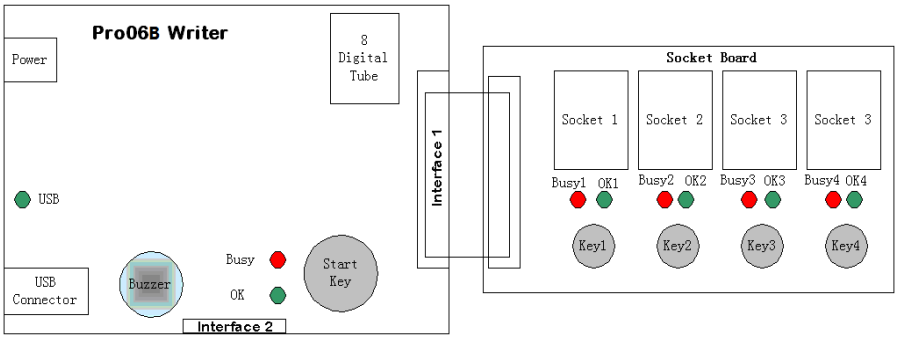

Figure 3.2.1.a Program Circuit Diagram for Pro06B

- **Power**
  Connect to DC regulator power supply (+15V).
- **8-Digital Tube**
  Display chip name, working status (error type coding), code checksum, data checksum and other information.
- **USB Indicator Light**
  This indicator light shows the USB connection status. The light on indicates the connection is normal, and the light off indicates the connection is disconnected.
- **Start Key**
  The main button for controlling the start of programming. Effective in online mass production mode or offline waiting button mode. When this button is pressed, it can start the programming operation of all selected channels.
- **Socket 1~4**
  There are 4 program slots.
- **Key 1~4**
  Key1 has the same function as the Start Key, while Key2~4 controls the corresponding channel respectively.

■ **Interface1/2**

The pins used for programming or indicating the status during programming. There are four channels to choose.

1	VDD1	TCK1/SWCLK1	2
	Green1	TDI1	
	Red1	TMS1	
	Key1/TDA1	TDO1/SWE1/SWDIO1	
	GND	GND1	
	VDD2	TCK2/SWCLK2	
	Green2	TDI2	
	Red2	TMS2	
	Key2/TDA2	TDO2/SWE2/SWDIO2	
	GND	GND2	
	VDD3	TCK3/SWCLK3	
	Green3	TDI3	
	Red3	TMS3	
	Key3/TDA3	TDO3/SWE3/SWDIO3	
	GND	GND3	
	VDD4	TCK4/SWCLK4	
	Green4	TDI4	
	Red4	TMS4	
	Key4/TDA4	TDO4/SWE4/SWDIO4	
39	GND	GND4	40

Figure 3.2.1.b Interface 1 of Pro06B

1	GREEN1	RED1	2
	KEY1	RESET1	
	GREEN2	RED2	
	KEY2	RESET2	
	GREEN3	RED3	
	KEY3	RESET3	
	GREEN4	RED4	
	KEY4	RESET4	
17	VDD	GND	18

Figure 3.2.1.c Interface 2 of Pro06B

Table 3.2.1.a Programming Interface (For example, Socket 1)

Chip Type	Interface Type	Programming Pins
ARM	SWD	VDD1 SWCLK1 SWDIO1 GND1
Andes	AICE	VDD1 TCK1 TDA1 GND1
8051	JTAG	VDD1 TCK1 TDI1 TMS1 TDO1 GND1
	SWE	VDD1 SWE1 GND1

Note:

1. ‘Green1’ means channel 1 ‘OK’ signal

2. ‘Red1’ means channel 1 ‘Busy’ signal

3. The Numbers 1 to 4 represent each channel.

4. When using the reset mode, please connect the Resetn interface of the corresponding channel.

3.2.2 Onboard programming

The Pro06B supports on-board programming, which means the user can first weld the chip to the user circuit board and then program the chip. It should be noted that when programming the chip Onboard, each programming line must be separated from the user's circuit. As shown in figure 3.2.2.a.

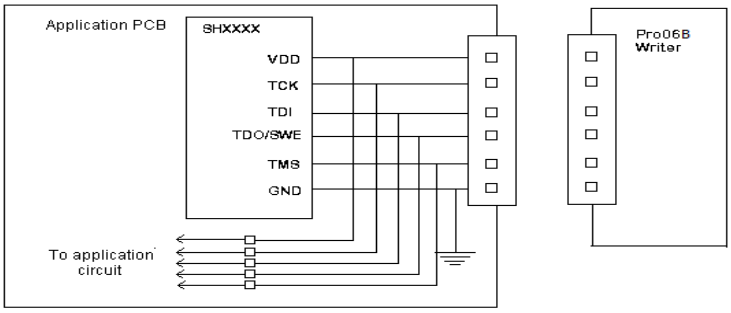

Figure 3.2.2.a Schematic Diagram of On-board Programming

3.2.3 Offline working status

Offline programming steps:

step1: Install ProWriter.

step2: Configure and download the offline programming project in the online working state.

step3: Disconnect the USB and restart the power to enter the offline programming mode.

step4: Insert the target MCU into the chip slot on the chip adapter board or connect the MCU program pin to the Pro06B program interface.

step5: Perform offline programming operation according to the "Wait for key press" or "Auto Detect" option checked during Step2.

step6: Remove the MCU that has been programmed.

step7: Return to Step4 to perform the next target MCU programming.

Note:

- The Pro06B has the function of offline programming, which can support one drag four programming at most.

- After the Pro06B is powered on, it can perform self-test. If the self-test fails, the Digital tube will display "EF." indicating an error. At this time, offline programming cannot be performed. You can only download parameters online again and then perform offline programming. If the self-test passes, the Digital tube will display the name of the IC device to be programmed, the checksum of programming code.
- Red LED and green LED are used to indicate the programming status. If the red LED is on and the green LED is off, it indicates that programming is in progress. If the red LED is off and the green LED is on, it indicates the programming has been successfully completed. If both the red LED and green LED flash simultaneously, it indicates that an error occurred during the programming process. When the chip on a certain channel is removed, both the green LED and red LED corresponding to that channel will be off, indicating that it is waiting for the next programming operation.
- The buzzer is used to alert the programming status. In the manual programming mode, when the programming is successful, the buzzer will give a short low tone, and when the programming fails, the buzzer will give three short high tones. In case of any channel programming error, the buzzer will give an alarm.

3.2.4 The programmer LED display

1) Digital tube display

When the Pro06B is powered on, if the target project has been downloaded to the programmer correctly, the digital tube will display the model of the target MCU, otherwise "EF." will be displayed to prompt the user to download the target project first.

Table 3.2.4.a Pro06B LED display character definition

Character	Meaning
Eb	Blank Check Error
EP	Program Error
EU	Verify Error
EE	Part Number Error
Eo	Program Limit
EC	No Detect IC
EL	Lot ID Error
EF	Flash Parameter Error
ES	Security Error
En	Enter Mode Error
E-00	Erase Error
E-02	Option Error

E-03	Security Code Error
E-04	Customer ID Error
E-05	Serial Number Error
E-06	E2PROM Error
E-07	Boot Error
E-08	OTP ID Error

2) LED indicator lights on Pro06B

Table 3.2.4.b Pro06B LED indicator state definition

Red LED	Green LED	State
Off	Off	Waiting for
On	Off	Programming
Off	On	Program success
flashing	flashing	Program Error

3) LED indicator lights on each programming channel

The LED indicators on each programming channel need to be integrated by the user on their chip programming adapter board. Like the LED indicator lights on the Pro06C, there are two LED indicator lights, namely red LED and green LED, which are lit at a high level, And the definition of indicator light status is also consistent. The only difference is that its control interface (driver) is Redn and Greenn in Interface1, then REDn and GREENn in Interface2.

4) Time sequence diagram of Busy and OK light during programming

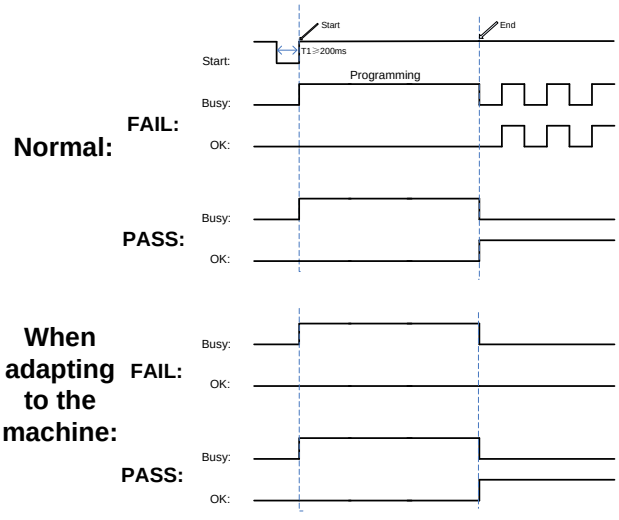

Figure 3.2.4.a Time sequence diagram of Busy and OK light during programming

3.3 Pro06A programmer Introduction

3.3.1 Circuit Structure Introduction

Pro06A can support mass production programming of Sinowealth's entire series of 8bit MCU, and can support up to 4 channels of simultaneous programming. When performing a programming operation, it is often used in conjunction with the customer's chip programming adapter board, and the circuit connection is shown in Figure 3.3.1.a.

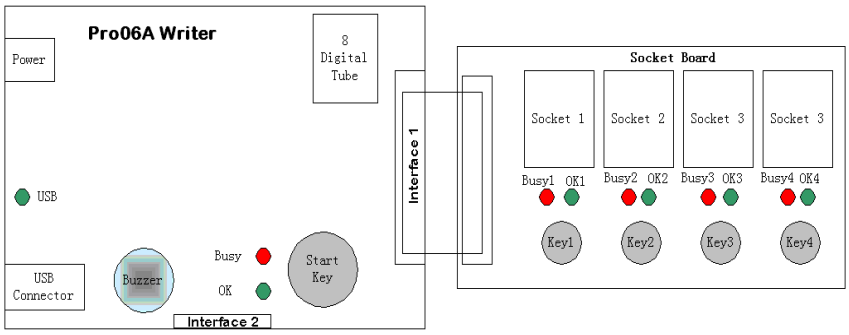

Figure 3.3.1.a Program Circuit Diagram for Pro06A

- **Power**
  Connect to DC regulator power supply (+15V).
- **8-Digital Tube**
  Display chip name, working status (error type coding), code checksum, data checksum and other information.
- **USB Indicator Light**
  This indicator light shows the USB connection status. The light on indicates the connection is normal, and the light off indicates the connection is disconnected.
- **Start Key**
  The main button for controlling the start of programming. Effective in online mass production mode or offline waiting button mode. When this button is pressed, it can start the programming operation of all selected channels.
- **Socket 1~4**
  There are 4 program slots.
- **Key 1~4**
  Key1 has the same function as the Start Key, while Key2~4 controls the corresponding channel respectively.

■ **Interface1/2**

The pins used for programming or indicating the status during programming. There are four channels to choose.

1	VDD1	TCK1	2
	Green1	TDI1	
	Red1	TMS1	
	Key1	TDO1/SWE1	
	GND	GND1	
	VDD2	TCK2	
	Green2	TDI2	
	Red2	TMS2	
	Key2	TDO2/SWE2	
	GND	GND2	
	VDD3	TCK3	
	Green3	TDI3	
	Red3	TMS3	
	Key3	TDO3/SWE3	
	GND	GND3	
	VDD4	TCK4	
	Green4	TDI4	
	Red4	TMS4	
	Key4	TDO4/SWE4	
39	GND	GND4	40

Figure 3.3.1.b Interface 1 of Pro06A

1	GREEN1	RED1	2
	KEY1	RESET1	
	GREEN2	RED2	
	KEY2	RESET2	
	GREEN3	RED3	
	KEY3	RESET3	
	GREEN4	RED4	
	KEY4	RESET4	
17	VDD	GND	18

Figure 3.3.1.c Interface 2 of Pro06A

Table 3.3.1.a Programming Interface (For example, Socket 1)

Chip Type	Interface Type	Programming Pins
8051	JTAG	VDD1 TCK1 TDI1 TMS1 TDO1 GND1
	SWE	VDD1 SWE1 GND1

Note:

1. ‘Green1’ means channel 1 ‘OK’ signal.

2. ‘Red1’ means channel 1 ‘Busy’ signal.

3. The Numbers 1 to 4 represent each channel.

4. When using the reset mode, please connect the Resetn interface of the corresponding channel.

3.3.2 Onboard programming

The Pro06A supports on-board programming, which means the user can first weld the chip to the user circuit board and then program the chip. It should be noted that when programming the chip Onboard, each programming line must be separated from the user's circuit. As shown in Figure 3.3.2.a.

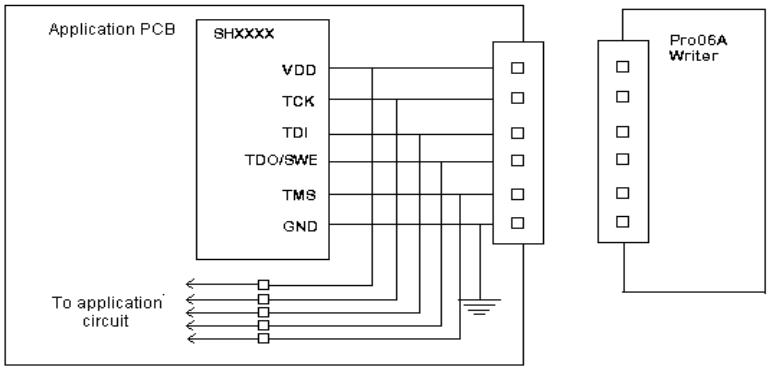

Figure 3.3.2.a On-board programming circuit

3.3.3 Offline working status

Offline programming steps:

step1: Install ProWriter.

step2: Configure and download the offline programming project in the online working state.

step3: Disconnect the USB and restart the power to enter the offline programming mode.

step4: Insert the target MCU into the chip slot on the chip adapter board or connect the MCU program pin to the Pro06A program interface.

step5: Perform offline programming operation according to the "Wait for key press" or "Auto Detect" option checked during Step2.

step6: Remove the MCU that has been programmed.

step7: Return to Step4 to perform the next target MCU programming.

Note:

- The Pro06A has the function of offline programming, which can support one drag four programming at most.
- After the Pro06A is powered on, it can perform self-test. If the self-test fails, the Digital tube will display "EF." indicating an error. At this time, offline programming cannot be performed. You can only download parameters online again and then perform offline programming. If the self-test passes, the Digital tube will display the name of the IC device to be programmed, the checksum of programming code.
- Red LED and green LED are used to indicate the programming status. If the red LED is on and the green LED is off, it indicates that programming is in progress. If the red LED is off and the green LED is on, it indicates the programming has been successfully completed. If both the red LED and green LED flash simultaneously, it indicates that an error occurred during the programming process. When the chip on a certain channel is removed, both the green LED and red LED corresponding to that channel will be off, indicating that it is waiting for the next programming operation.
- The buzzer is used to alert the programming status. In the manual programming mode, when the programming is successful, the buzzer will give a short low tone, and when the programming fails, the buzzer will give three short high tones. In case of any channel programming error, the buzzer will give an alarm.

3.3.4 The programmer LED display

1) Digital tube display

When the Pro06A is powered on, if the target project has been downloaded to the programmer correctly, the digital tube will display the model of the target MCU, otherwise "EF." will be displayed to prompt the user to download the target project first.

Table 3.3.4.a Pro06A LED display character definition

Character	Meaning
Eb	Blank Check Error
EP	Program Error
EU	Verify Error
EE	Part Number Error
Eo	Program Limit
EC	No Detect IC

EL	Lot ID Error
EF	Flash Parameter Error
ES	Security Error
En	Enter Mode Error
E-00	Erase Error
E-02	Option Error
E-03	Security Code Error
E-04	Customer ID Error
E-05	Serial Number Error
E-06	E2PROM Error
E-07	Boot Error
E-08	OTP ID Error

2) LED indicator lights on Pro06A

Table 3.3.4.b Pro06A LED indicator state definition

Red LED	Green LED	State
Off	Off	Waiting for programming
On	Off	Programming
Off	On	Program success
flashing	flashing	Program Error

3) LED indicator lights on each programming channel

The LED indicators on each programming channel need to be integrated by the user on their chip programming adapter board. Like the LED indicator lights on the Pro06C, there are two LED indicator lights, namely red LED and green LED, which are lit at a high level, And the definition of indicator light status is also consistent. The only difference is that its control interface (driver) is Redn and Greenn in Interface1, then REDn and GREENn in Interface2.

4) Time sequence diagram of Busy and OK light during programming

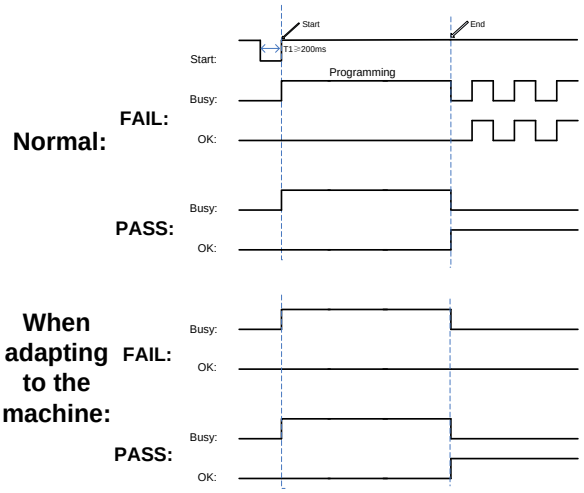

Figure 3.3.4.a Time sequence diagram of Busy and OK light during programming

3.4 Pro03A programmer Introduction

3.4.1 Circuit Structure Introduction

Pro03A can support mass production programming of Sinowealth's entire series of OTP MCU, and can support up to 4 channels of simultaneous programming. When performing a programming operation, it is often used in conjunction with the customer's chip programming adapter board, and the circuit connection is shown in Figure 3.4.1.a.

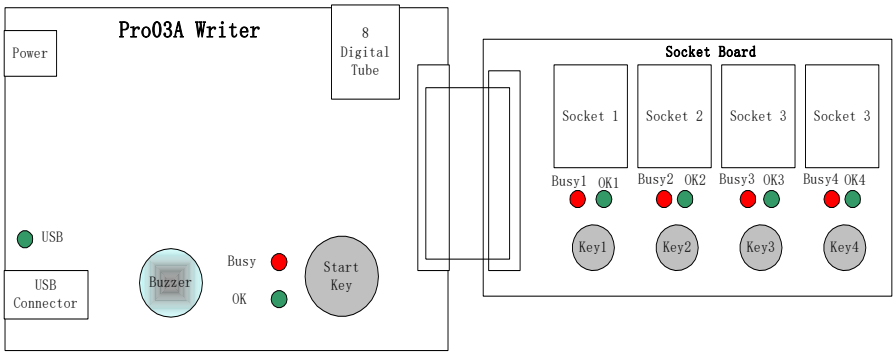

Figure 3.4.1.a Program Circuit Diagram for Pro03A

- **Power**

  Connect to DC regulator power supply (+15V).

- **8-Digital Tube**
  Display chip name, working status (error type coding), code checksum and other information.
- **USB Indicator Light**
  This indicator light shows the USB connection status. The light on indicates the connection is normal, and the light off indicates the connection is disconnected.
- **Start Key**
  The main button for controlling the start of programming. Effective in online mass production mode or offline waiting button mode. When this button is pressed, it can start the programming operation of all selected channels.
- **Socket 1~4**
  There are 4 program slots.
- **Key 1~4**
  Key1 has the same function as the Start Key, while Key2~4 controls the corresponding channel respectively.
- **Interface1/2**

  The pins used for programming or indicating the status during programming.

1	VDD1	VPP1	2
	SCK1	RLED1	
	KEY1	GLED1	
	SDA1	GND1	
	VDD2	VPP2	
	SCK2	RLED2	
	KEY2	GLED2	
	SDA2	GND2	
	VDD3	VPP3	
	SCK3	RLED3	
	KEY3	GLED3	
	SDA3	GND3	
	VDD4	VPP4	
	SCK4	RLED4	
	KEY4	GLED4	
	SDA4	GND4	
39	VCC	GND	40

Figure 3.4.1.b Connection interface between Pro03A and OTP MCU adapter

Note:

The Numbers 1 to 4 represent each channel. EX_VPP, EX_VDD, EX_SCK, EX_SDA, EX_GND should be connected to the corresponding VPP, VDD, SCK, SDA and GND pins on the OTP chip respectively.

3.4.2 Onboard programming

The Pro03A supports on-board programming, which means the user can first weld the chip to the user circuit board and then program the chip. It should be noted that when programming the chip Onboard, each programming line must be separated from the user's circuit.

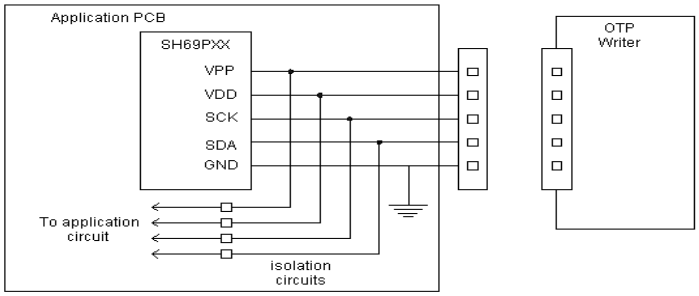

Figure 3.4.2.a On-board programming circuit

3.4.3 Offline programming

Offline programming steps:

step1: Install ProWriter.

step2: Configure and download the offline programming project in the online working state.

step3: Disconnect the USB and restart the power to enter the offline programming mode.

step4: Insert the MCU to be programmed into the chip slot on the chip adapter board or connect the MCU program pin to the Pro03A program interface.

step5: Perform offline programming operation according to the "Wait for key press" or "Auto Detect" option checked during Step2.

step6: Remove the MCU that has been programmed.

step7: Return to Step4 to perform the next MCU program.

Note:

- The Pro03A has the function of offline programming, which can support one drag four programming at most, Each channel is independent of each other.
- After the Pro03A is powered on, it can perform self-test. If the self-test fails, the Digital tube will display "EF." indicating an error. At this time, offline programming cannot be performed. You can only download parameters online again and then perform offline programming. If the self-test passes, the Digital tube will display the name of the IC device to be programmed, the checksum of programming code.
- Red LED and green LED are used to indicate the programming status. If the red LED is on and the green LED is off, it indicates that programming is in progress. If the red LED is off and the green LED is on, it indicates the programming has been successfully

completed. If both the red LED and green LED flash simultaneously, it indicates that an error occurred during the programming process. When the chip on a certain channel is removed, both the green LED and red LED corresponding to that channel will be off, indicating that it is waiting for the next programming operation.

- The buzzer is used to alert the programming status. In the manual programming mode, when the programming is successful, the buzzer will give a short low tone, and when the programming fails, the buzzer will give three short high tones. In case of any channel programming error, the buzzer will give an alarm.

3.4.4 The programmer LED display

1) Digital tube display

After powering on Pro03A, if the project has been downloaded to the programmer correctly, the digital tube will display the chip model to be programmed, otherwise, "EF." will be displayed to prompt the user to download the program. If it is online, the "PC" will be displayed circularly.

The meaning of various characters which is displayed in the digital tube during the programming operation is shown in the following table:

Table 3.4.4.a Pro03A LED display character definition

Character	Meaning
Eb	Blank Check Error
EP	Program Error
EU	Verify Error
EE	Part Number Error
Eo	Program Limit
EC	No Detect IC
EL	Lot ID Error
EF	Flash Parameter Error
ES	Security Error

2) LED indicator lights on Pro03A

Table 3.4.4.b Pro03A LED indicator state definition

Red LED	Green LED	State
Off	Off	Waiting for programming
On	Off	Programming
Off	On	Program success
flashing	flashing	Program Error

3) LED indicator lights on each programming channel

The LED indicators on each programming channel need to be integrated by the user on their chip programming adapter board. Like the LED indicator lights on the Pro06C, there are two LED indicator lights, namely red LED and green LED, which are lit at a high level, And the definition of indicator light status is also consistent. The only difference is that its control interface (driver) is RLEDn and GLEDn.

3.5 SinoLink Plus Introduction

3.5.1 Introduction to Features

SinoLink Plus has the following characteristics:

1) Support the programming and debugging for all of the 8-bit or 32-bit flash MCUs of SinoWealth.
2) Supports two types of programming voltages: 3.3V and 5V.
3) Powered by USB.
4) No need to install USB driver under Window8 and above.

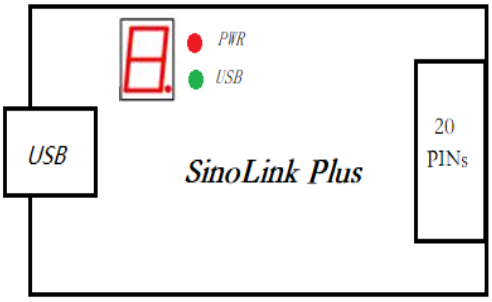

Figure 3.5.1.a Circuit Diagram for SinoLink Plus

1	VDD	3. 3V	2
	NC	RXD	
	TDI	TXD	
	TMS/SWDIO	GND	
	TCK/SWCLK	SWE	
	NC	KEY	
	TDO	NC	
	RST	NC	
	LED_GREEN	NC	
19	LED_RED	GND	20

Figure 3.5.1.b Interface of SinoLink Plus

When the USB is connected, the red light will be on first, and then the green light will be on, which means the USB connection is successful.

The digital tube displays "1", indicating that the current operation is in single-wire (SWE) mode. The digital tube displays "2", indicating that the current operation is in two-wire (SWD) mode, which is used to program for ARM core chip. The digital tube display "4" indicates that the current operation is in four-wire (JTAG) mode.

- **8-Digital Tube**

Display chip name, working status (error type coding), code checksum, program interface mode and other information.

- **Start Key**
  The master button controls the starting of the program, used when programming offline. Press this button to start programming all channels.

Table 3.5.1.a Programming Interface

Chip Type	Interface Type	Programming Pins
ARM	SWD	VDD SWCLK SWDIO GND
Andes	AICE	VDD TCK TMS GND
8051	JTAG	VDD TCK TDI TMS TDO GND
	SWE	VDD SWE GND

3.5.2 Programming interface conversion board

The 20 pin programming interface on the Sinolink Plus board is compatible with the standard 20 pin JTAG programming interface.

In order to be compatible with early programming interfaces, this programming interface conversion board was specially made.

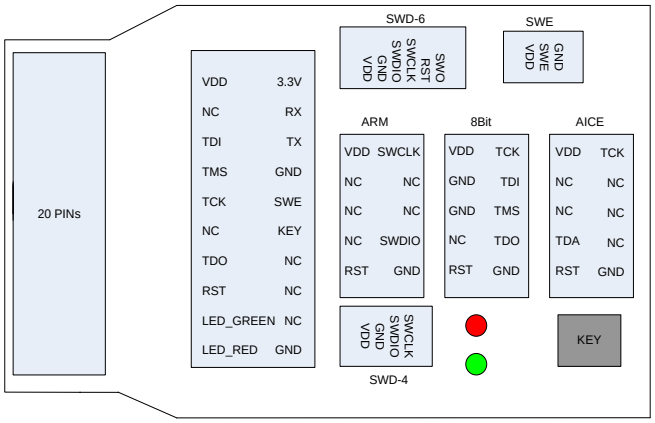

Figure 3.5.2.a Programming interface conversion board of SinoLink Plus

Schematic diagram of electrical characteristics association of Programming interface conversion board						
20Pin	ARM	8 Bit	AICE	SWD-6	SWD-4	SWE
VDD	VDD	VDD	VDD	VDD	VDD	VDD
NC						
TDI		TDI				
TMS	SWDIO	TMS	TDA	SWDIO	SWDIO	
TCK	SWCLK	TCK	TCK	SWCLK	SWCLK	
NC						
TDO		TDO		SWO		
RST	RST	RST	RST	RST		
LEDG						
LEDR						
3.3V						
RX						
TX						
GND						
SWE						SWE
KEY						
NC						
NC						
NC						
GND	GND	GND	GND	GND	GND	GND

Figure 3.5.2.b Schematic diagram of electrical characteristics association of Programming interface conversion board

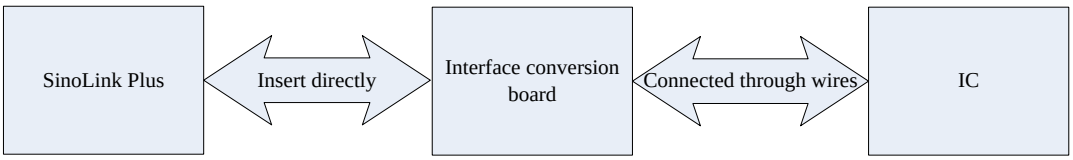

Figure 3.5.2.c Schematic diagram of interface conversion board wiring method

3.5.3 Offline working status

Offline programming steps:

step1: Install ProWriter.

step2: Configure and download the offline programming project in the online working state.

step3: Disconnect the USB and restart the power to enter the offline programming mode.

step4: Connecting the SinoLink Plus adapter board.

step5: Insert the target MCU into the chip slot on the chip adapter board or connect the MCU program pin to the SinoLink Plus adapter board 'S program interface.

step6: Press the key on the SinoLink Plus adapter board to start programming.

step7: Remove the MCU that has been programmed.

step8: Return to Step5 to perform the next target MCU programming.

Note:

- The SinoLink Plus has offline programming function.
- After the SinoLink Plus is powered on, it can perform self-test. If the self-test fails, the Digital tube will display "EF." indicating an error. At this time, offline programming cannot be performed. You can only download parameters online again and then perform offline programming. If the self-test passes, the Digital tube will display the name of the IC device to be programmed, the checksum of programming code and program interface type.
- Red LED and green LED are used to indicate the programming status. If the red LED is on and the green LED is off, it indicates that programming is in progress. If the red LED is off and the green LED is on, it indicates the programming has been successfully completed. If both the red LED and green LED flash simultaneously, it indicates that an error occurred during the programming process. When the chip on a certain channel is removed, both the green LED and red LED corresponding to that channel will be off, indicating that it is waiting for the next programming operation.

3.5.4 The programmer LED display

1) Digital tube display

When the SinoLink Plus is powered on, if the target project has been downloaded to the programmer correctly, the digital tube will display the model of the target MCU, otherwise "EF." will be displayed to prompt the user to download the target project first.

The meaning of various characters displaying in the digital tube during the programming operation are shown in the following table:

Table 3.5.4.a SinoLink Plus display character definition

Character	Meaning
Eb	Blank Check Error
EP	Program Error
EU	Verify Error
EE	Part Number Error
Eo	Program Limit
EC	No Detect IC
EL	Lot ID Error
EF	Flash Parameter Error
ES	Security Error
En	Enter Mode Error
E-00	Erase Error
E-02	Option Error
E-03	Security Code Error
E-04	Customer ID Error
E-05	Serial Number Error
E-06	E2PROM Error
E-07	Boot Error
E-08	OTP ID Error

2) LED indicator light (on the programmer)

Table 3.5.4.b SinoLink Plus LED indicator state definition

Red LED	Green LED	State
Off	Off	Waiting for
On	Off	Programming
Off	On	Program success
flashing	flashing	Program Error

3.6 SinoLink Pro Introduction

3.6.1 Introduction to Features

SinoLink Pro has the following characteristics:

1) Support the programming and debugging for all of the 8-bit or 32-bit flash MCUs of SinoWealth.

2) Supports two types of programming voltages: 3.3V and 5V.

3) Powered by USB.

4) Automatically install USB drive when connected to the network.

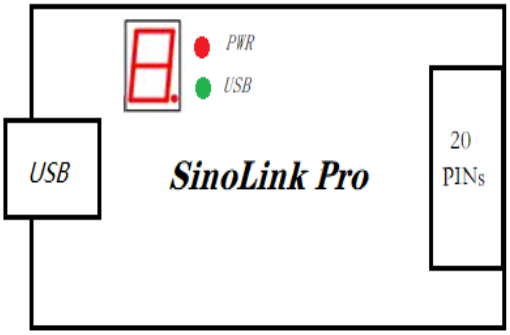

Figure 3.6.1.a Circuit Diagram for SinoLink Pro

1	VDD	3. 3V	2
	NC	RXD	
	TDI	TXD	
	TMS/SWDIO	GND	
	TCK/SWCLK	SWE	
	NC	KEY	
	TDO	NC	
	RST	NC	
	LED_GREEN	NC	
19	LED_RED	GND	20

Figure 3.6.1.b Interface of SinoLink Pro

When the USB is connected, the red light will be on first, and then the green light will be on, which means the USB connection is successful.

The digital tube displays "1", indicating that the current operation is in single-wire (SWE) mode. The digital tube displays "2", indicating that the current operation is in two-wire (SWD) mode, which is used to program for ARM core chip. The digital tube display "4" indicates that the current operation is in four-wire (JTAG) mode.

- **8-Digital Tube**
  Display chip name, working status (error type coding), code checksum, program interface mode and other information.
- **Start Key**
  The master button controls the starting of the program, used when programming offline. Press this button to start programming all channels.

Table 3.6.1.a Programming Interface

Chip Type	Interface Type	Programming Pins
ARM	SWD	VDD SWCLK SWDIO GND
Andes	AICE	VDD TCK TMS GND
8051	JTAG	VDD TCK TDI TMS TDO GND
	SWE	VDD SWE GND

3.6.2 Programming interface conversion board

The 20 pin programming interface on the Sinolink Plus board is compatible with the standard 20 pin JTAG programming interface.

In order to be compatible with early programming interfaces, this programming interface conversion board was specially made.

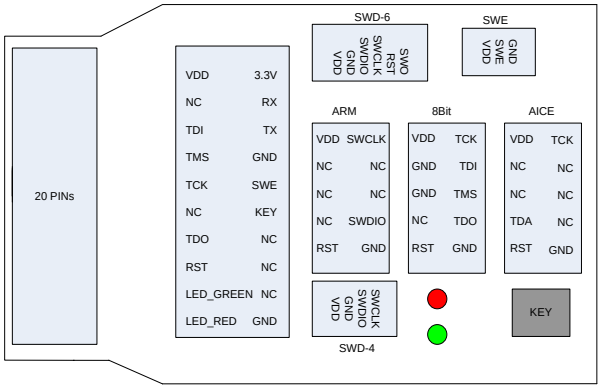

Figure 3.6.2.a Programming interface conversion board of SinoLink Pro

Schematic diagram of electrical characteristics association of Programming interface conversion board						
20Pin	ARM	8 Bit	AICE	SWD-6	SWD-4	SWE
VDD	VDD	VDD	VDD	VDD	VDD	VDD
NC						
TDI		TDI				
TMS	SWDIO	TMS	TDA	SWDIO	SWDIO	
TCK	SWCLK	TCK	TCK	SWCLK	SWCLK	
NC						
TDO		TDO		SWO		
RST	RST	RST	RST	RST		
LEDG						
LEDR						
3.3V						
RX						
TX						
GND						
SWE						SWE
KEY						
NC						
NC						
NC						
GND	GND	GND	GND	GND	GND	GND

Figure 3.6.2.b Schematic diagram of electrical characteristics association of Programming interface conversion board

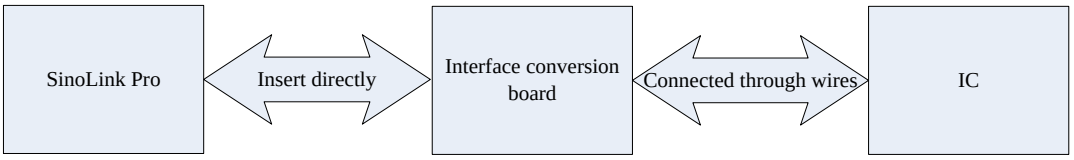

Figure 3.6.2.c Schematic diagram of interface conversion board wiring method

3.6.3 Offline working status

Offline programming steps:

step1: Install ProWriter.

step2: Configure and download the offline programming project in the online

working state.

step3: Disconnect the USB and restart the power to enter the offline programming mode.

step4: Connecting the SinoLink Pro adapter board.

step5: Insert the target MCU into the chip slot on the chip adapter board or connect the MCU program pin to the programming interface of SinoLink Pro adapter board.

step6: Press the key on the SinoLink Pro adapter board to start programming.

step7: Remove the MCU that has been programmed.

step8: Return to Step5 to perform the next target MCU programming.

Note:

- The SinoLink Pro has offline programming function.
- After the SinoLink Pro is powered on, it can perform self-test. If the self-test fails, the Digital tube will display "EF." indicating an error. At this time, offline programming cannot be performed. You can only download parameters online again and then perform offline programming. If the self-test passes, the Digital tube will display the name of the IC device to be programmed, the checksum of programming code and program interface type.
- Red LED and green LED are used to indicate the programming status. If the red LED is on and the green LED is off, it indicates that programming is in progress. If the red LED is off and the green LED is on, it indicates the programming has been successfully completed. If both the red LED and green LED flash simultaneously, it indicates that an error occurred during the programming process. When the chip on a certain channel is removed, both the green LED and red LED corresponding to that channel will be off, indicating that it is waiting for the next programming operation.

3.6.4 The programmer LED display

1) Digital tube display

When the SinoLink Pro is powered on, if the target project has been downloaded to the programmer correctly, the digital tube will display the model of the target MCU, otherwise "EF." will be displayed to prompt the user to download the target project first.

The meaning of various characters displaying in the digital tube during the

programming operation are shown in the following table:

Table 3.6.4.a SinoLink Pro display character definition

Character	Meaning
Eb	Blank Check Error
EP	Program Error
EU	Verify Error
EE	Part Number Error
Eo	Program Limit
EC	No Detect IC
EL	Lot ID Error
EF	Flash Parameter Error
ES	Security Error
En	Enter Mode Error
E-00	Erase Error
E-02	Option Error
E-03	Security Code Error
E-04	Customer ID Error
E-05	Serial Number Error
E-06	E2PROM Error
E-07	Boot Error
E-08	OTP ID Error

2) LED indicator lights on SinoLink Pro

Table 3.6.4.b SinoLink Pro LED indicator state definition

Red LED	Green LED	State
Off	Off	Waiting for
On	Off	Programming
Off	On	Program success
flashing	flashing	Program Error

3.7 SinoLink Introduction

SinoLink has the following characteristics:

1) Support the programming and debugging for all of the 8-bit or 32-bit flash MCUs of SinoWealth.

2) Supports two types of programming voltages: 3.3V and 5V.

3) Powered by USB.

4) Automatically install USB drive when connected to the network.

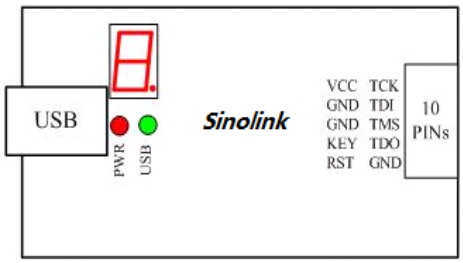

Figure3.7.a Circuit Diagram for SinoLink

1	VDD	TCK/SWCLK	2
	GND	TDI	
	GND	TMS	
	KEY/TDA	TDO/SWE/SWDIO	
9	RST	GND	10

Figure 3.7.b Interface of SinoLink

When the USB is connected, the red light will be on first, and then the green light will be on, which means the USB connection is successful.

The digital tube displays "1", indicating that the current operation is in single-wire (SWE) mode. The digital tube displays "2", indicating that the current operation is in two-wire (SWD) mode, which is used to program for ARM core chip. The digital tube display "4" indicates that the current operation is in four-wire (JTAG) mode.

Table 3.7.a Programming Interface

Chip Type	Interface Type	Programming Pins
ARM	SWD	VDD SWCLK SWDIO GND
Andes	AICE	VDD TCK TDA GND
8051	JTAG	VDD TCK TDI TMS TDO GND
	SWE	VDD SWE GND

3.8 JET51A Introduction

JET51A has the following characteristics:

- Support the programming and debugging for all of the 8-bit flash MCUs of SinoWealth.
- Firmware can be upgraded online.
- Supports two types of programming voltages: 3.3V and 5V.
- Powered by USB.
- No need to install USB driver under Windows.

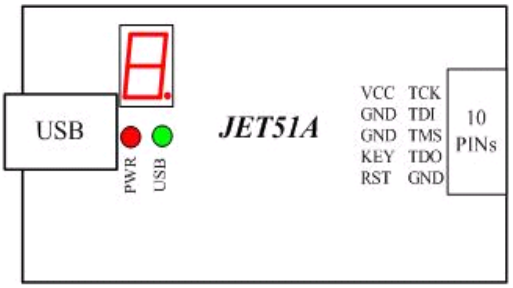

Figure 3.8.a Circuit Diagram for JET51A

1	VDD	TCK	2
	GND	TDI	
	GND	TMS	
	TDA	TDO/SWE	
9	RST	GND	10

Figure 3.8.b Interface of JET51A

When the USB is connected, the red light will be on first, and then the green light will be on, which means the USB connection is successful.

The digital cube display "1" indicates that it is currently in single-wire mode (SWE), while the display “4” indicates that it is currently is in 4-wire mode (JTAG).

Table 3.8.a Programming Interface

Chip Type	Interface Type	Programming Pins
8051	JTAG	VDD TCK TDI TMS TDO GND
	SWE	VDD SWE GND

Chapter 4 Software UI introduction

After running the programmer software ProWriter, the user interface shown in Figure 4.0.a will appear.

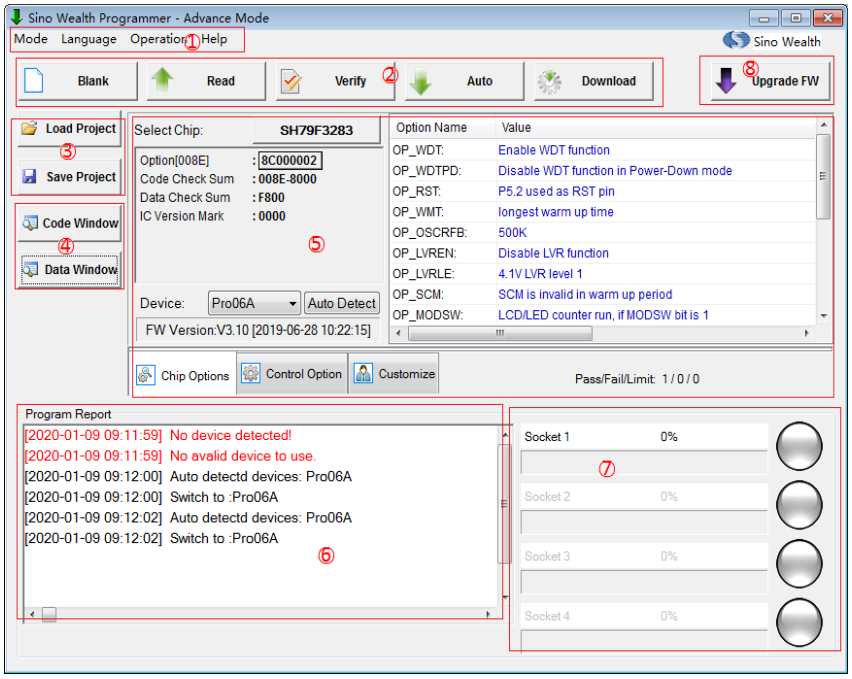

Figure 4.0.a ProWriter main UI

We present the introduction in turn according to the Numbers in the figure.

4.1 Main menu bar

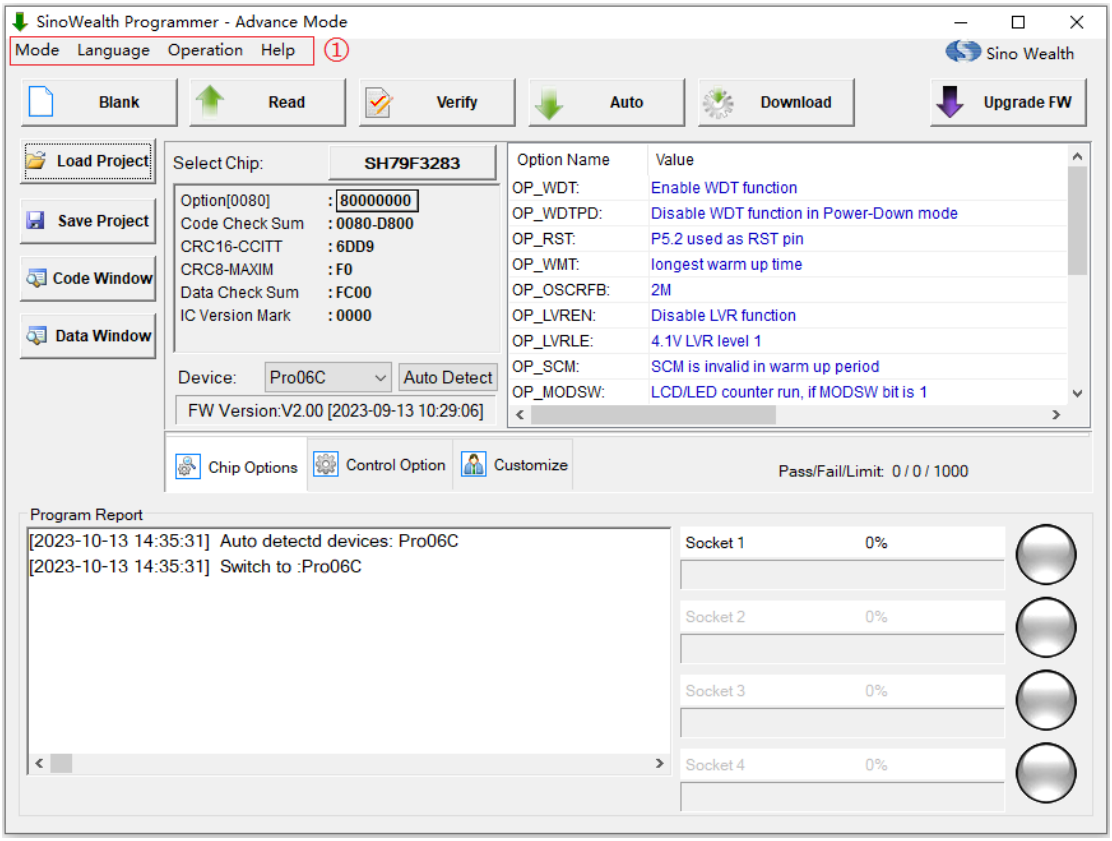

Figure 4.1.a Main menu column

- **Mode**

  It can be configured as advance mode and mass production mode, and the default mode is advance mode. The mass production mode UI is shown in Figure 4.1.b.

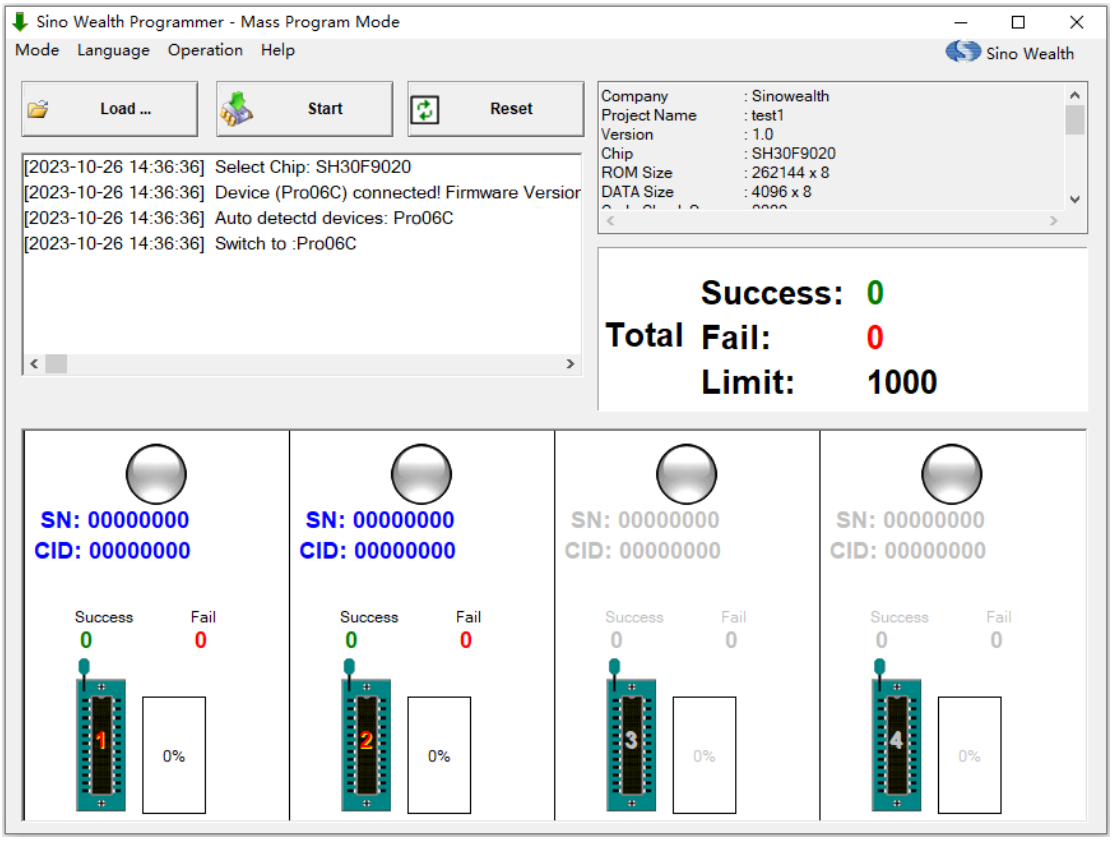

Figure 4.1.b Mass program mode

■ **Language**

It supports both Chinese and English, can be switched in real time, default is Chinese. The main UI of Chinese mode is shown in figure 4.1.c.

Figure 4.1.c Chinese main UI

- **Operation**

  Including update software version and register manage.

- **Help**

  - Help: Open the user manual of ProWriter.
  - About: Display the information of current software version.

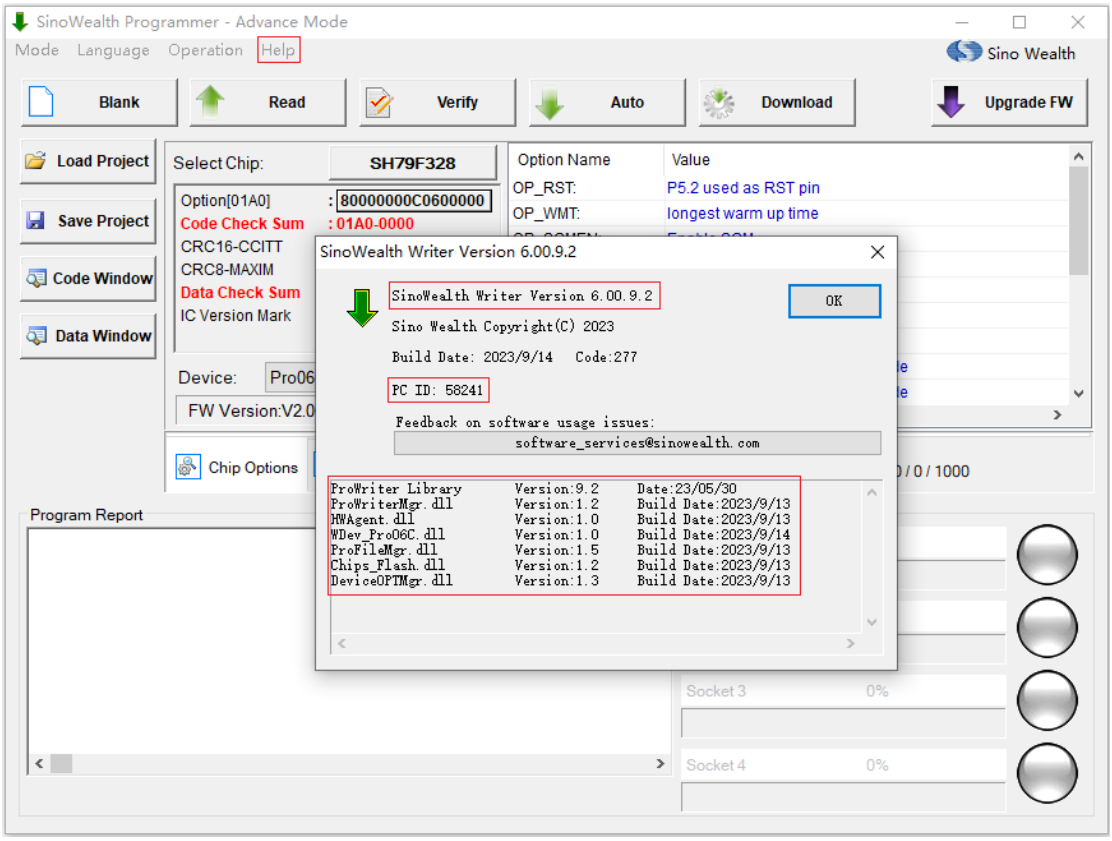

Figure 4.1.d Help and about display UI

4.2 Common operation buttons

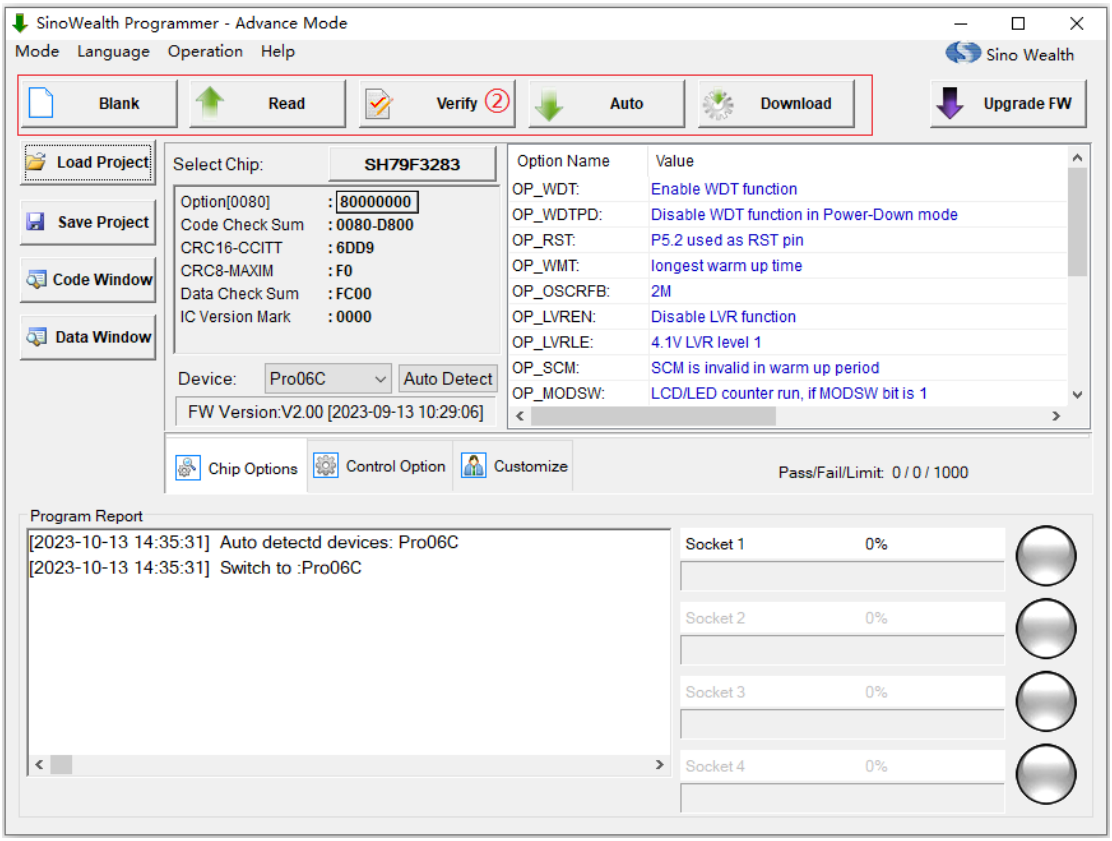

Figure 4.2.a Common operation buttons

4.2.1 Blank

Check whether the code area and data area in the current MCU are all 0, and only check the storage area that has been checked. If the storage area is all 0, the blank success, otherwise, the blank failed. If the data read in the code encryption area are all 0, it will also show that the blank is successful.

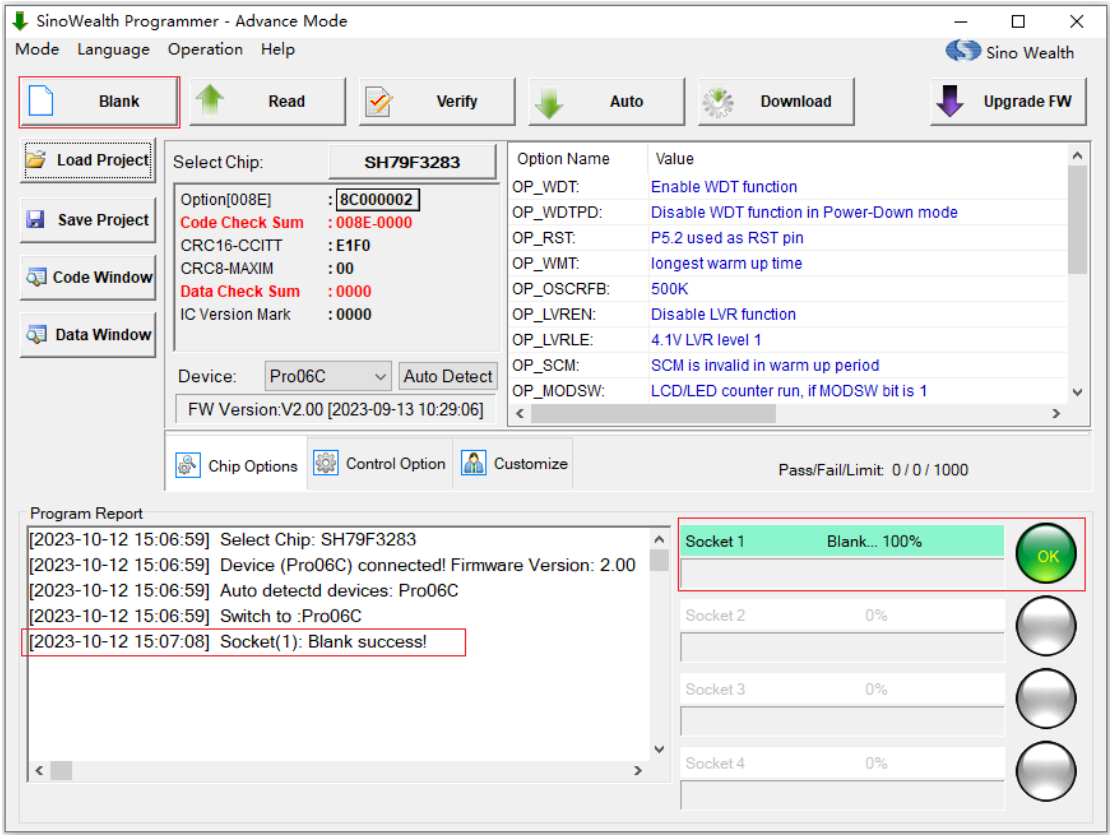

Figure 4.2.1.a 'Blank' operation and display UI

4.2.2 Read

Read and display the project information in the currently connected MCU. When reading, it is required that the chip options match the actual IC, and the hardware connection is correct.

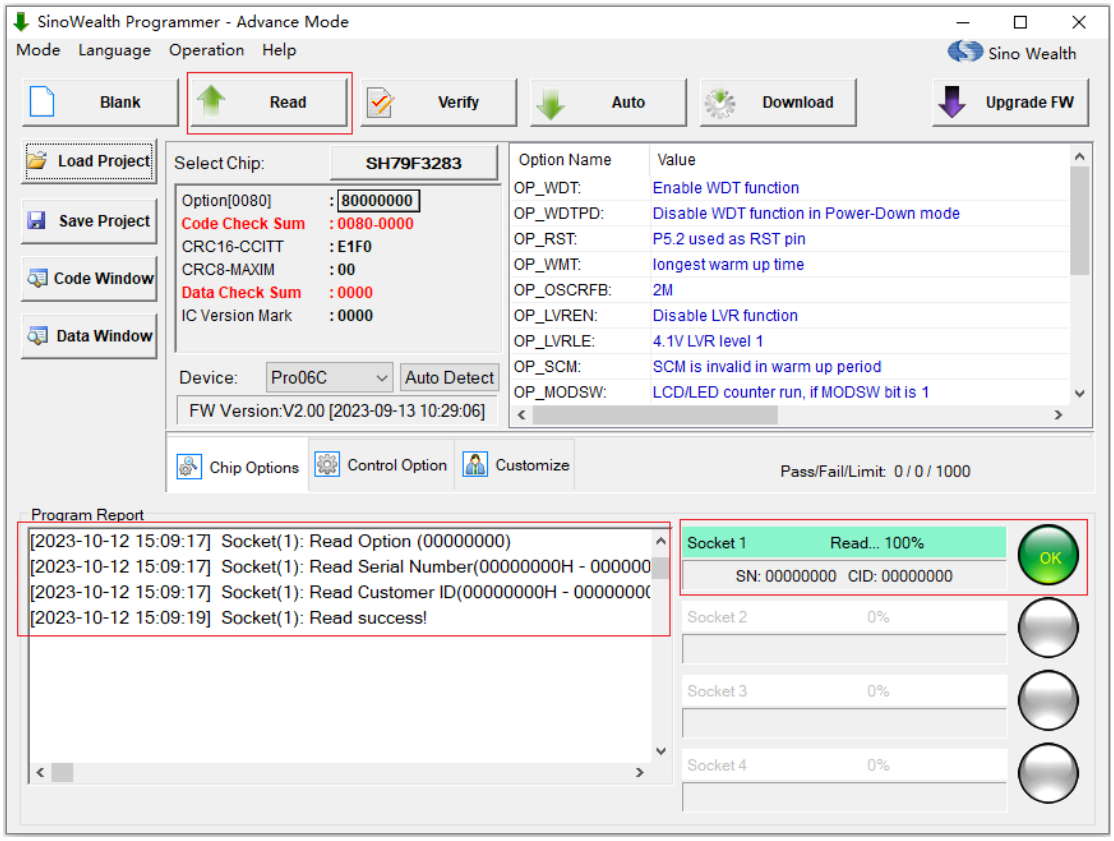

Figure 4.2.2.a 'Read' operation and display UI

4.2.3 Verify

For the selected storage area, compare whether the information in the current MCU is consistent with the information on the current screen of the ProWriter. If it is consistent, the verify success; otherwise, the verify fails.

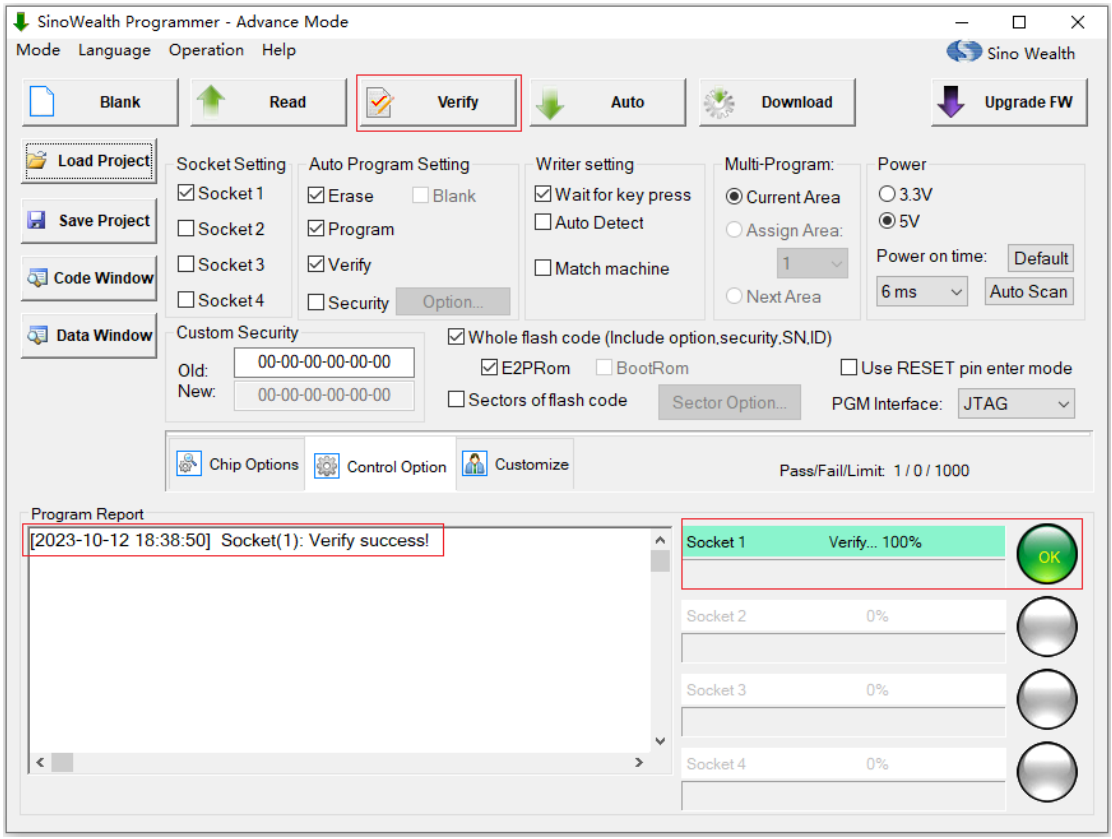

Figure 4.2.3.a 'Verify' operation and display UI

4.2.4 Auto

Perform the selected operations (such as erase, program, verify, and Security) from top to bottom according to the contents checked in the 'Auto Program Settings' column.

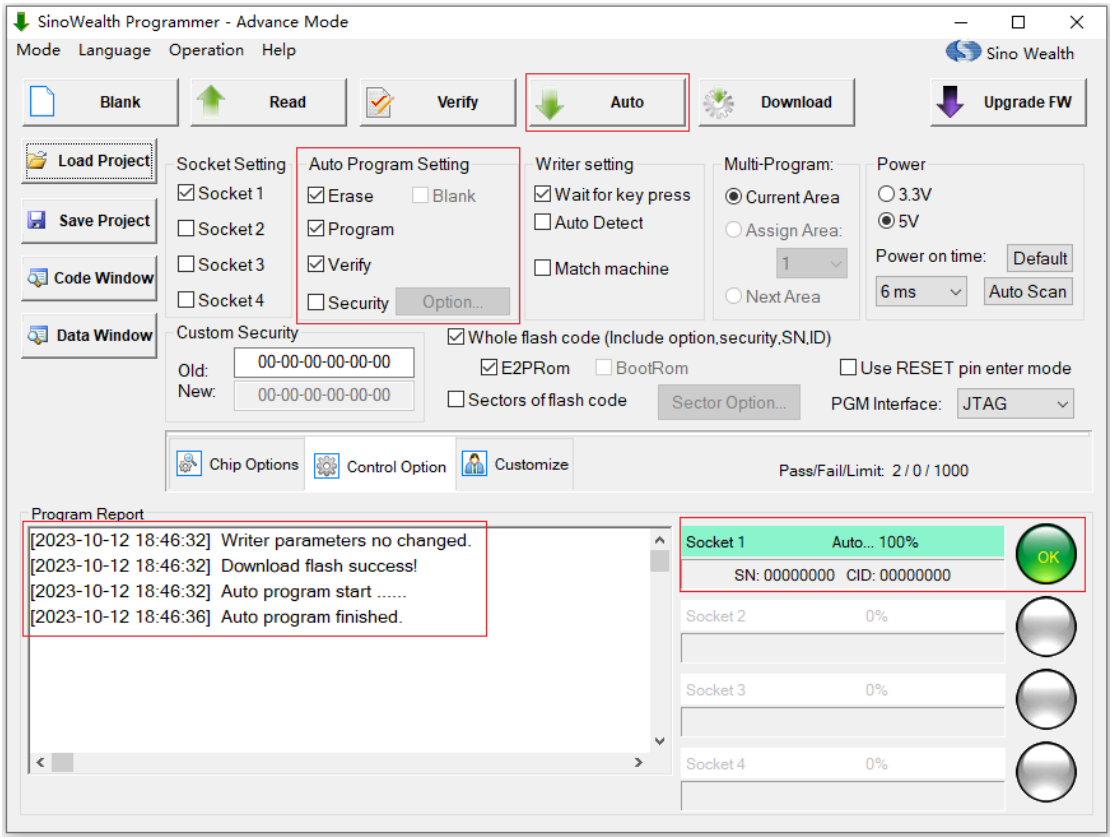

Figure 4.2.4.a 'Auto' operation and display UI

- **Erase**

Erase the selected Flash storage area.

- **Program**

Program customer data, customer code and customer information to the corresponding flash storage area that has been checked.

- **Verify**

For the selected flash storage area, check whether the information in the chip is consistent with the information displayed on the current UI.

- **Security**

To encrypt the code area. The code sector you want to encrypt can be selected through the UI that can be opened by clicking on the "Option..." button.

There are many kinds of encryption. For example, Ultra Security for Program Memory, Ultra Security for BootRom, MOVC Inhibit, Lock bit, SSP Security, etc.

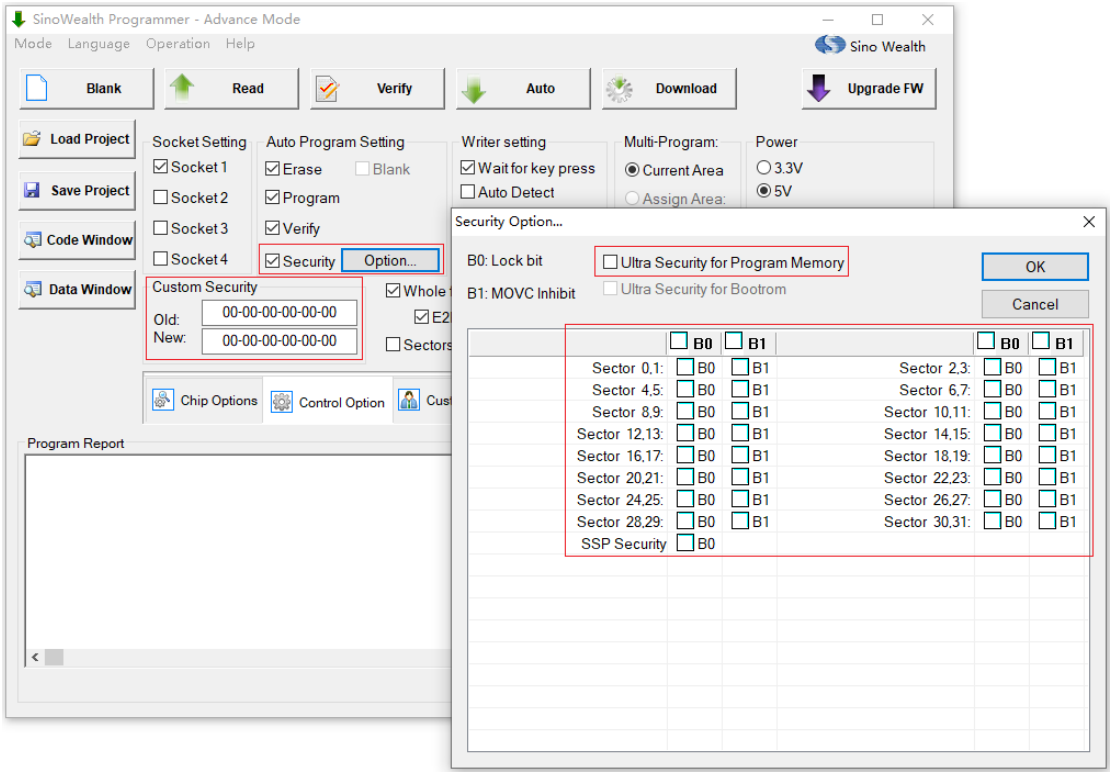

Figure 4.2.4.b 'Security' option UI

4.2.5 Download

Download the configuration information of the current UI to the programmer. Before performing the 'download' operation, it is important to focus on the offline programming configuration items: 'Wait for key press' and 'Auto Detect'.

- **Wait for key press**

If the ' Wait for key press ' is already checked, the programmer will not start programming directly when it detects that a new chip has been connected in offline mode. It will only start programming when it detects that the 'Start Key' is pressed.

- **Auto Detect**

If the ' Auto Detect ' is already checked, the programmer will automatically start the programming action directly when it detects that a new chip has been connected in offline mode.

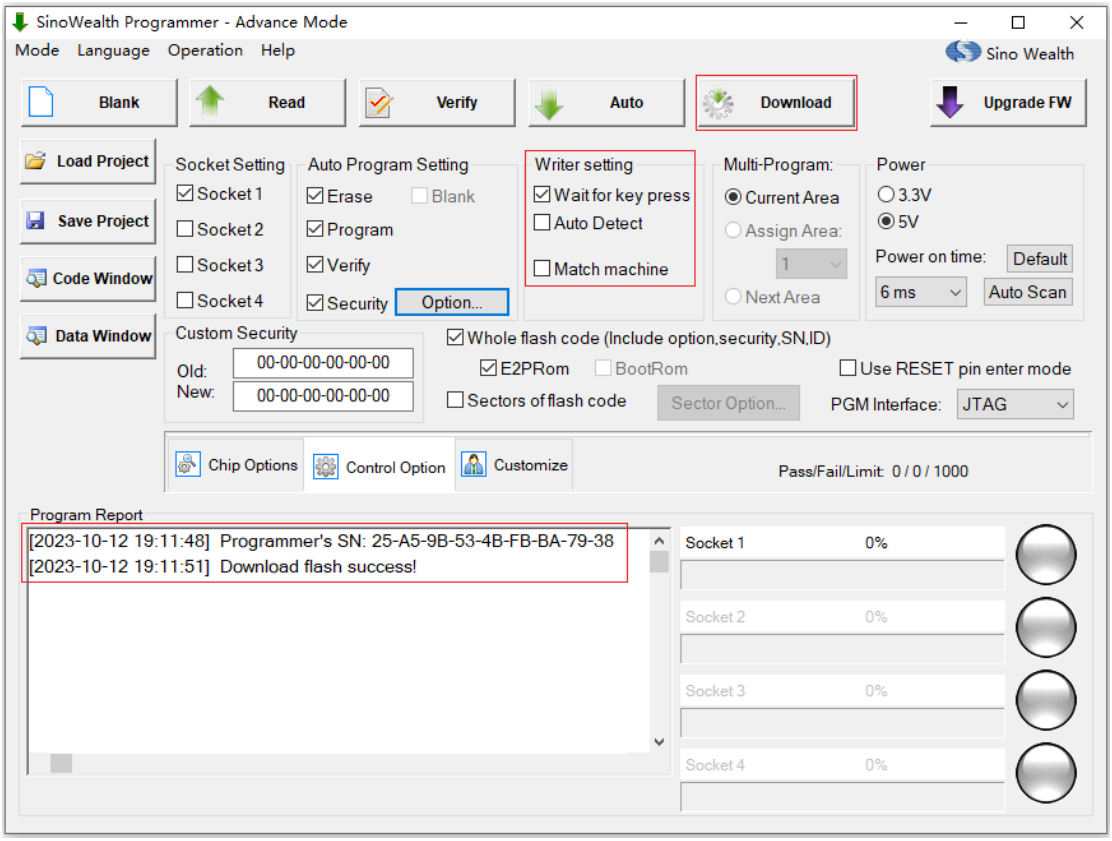

Figure 4.2.5.a 'Download' operation and display UI

4.3 Load project and save project

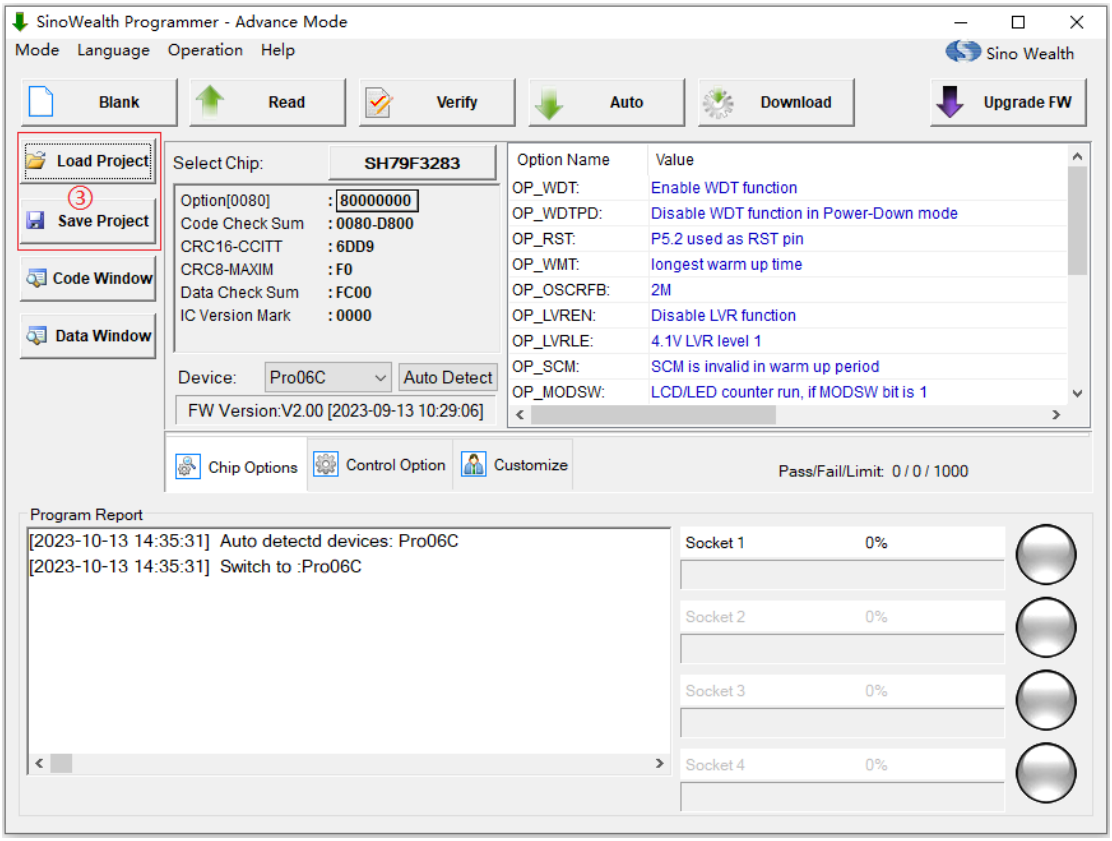

Figure 4.3.a Load project and Save project

4.3.1 Load Project

Load the project file that will be programmed. The project file formats supported include nopf, opf, hex, bin. The project files can only be loaded once. If you need to load other project files, you need to restart the ProWriter software.

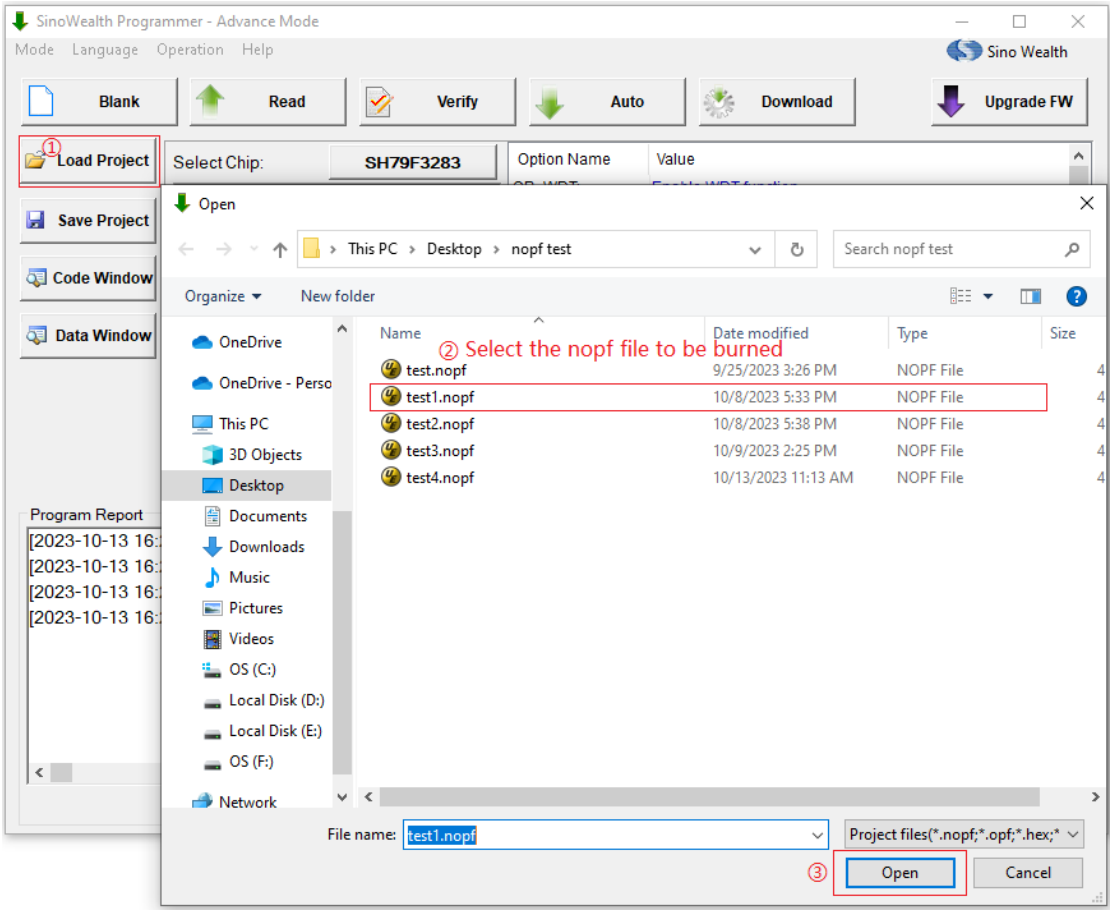

Figure 4.3.1.a Load project file example

4.3.2 Save Project

Save the configured parameters and code information on the ProWriter software UI as project files in nopf or opf format.

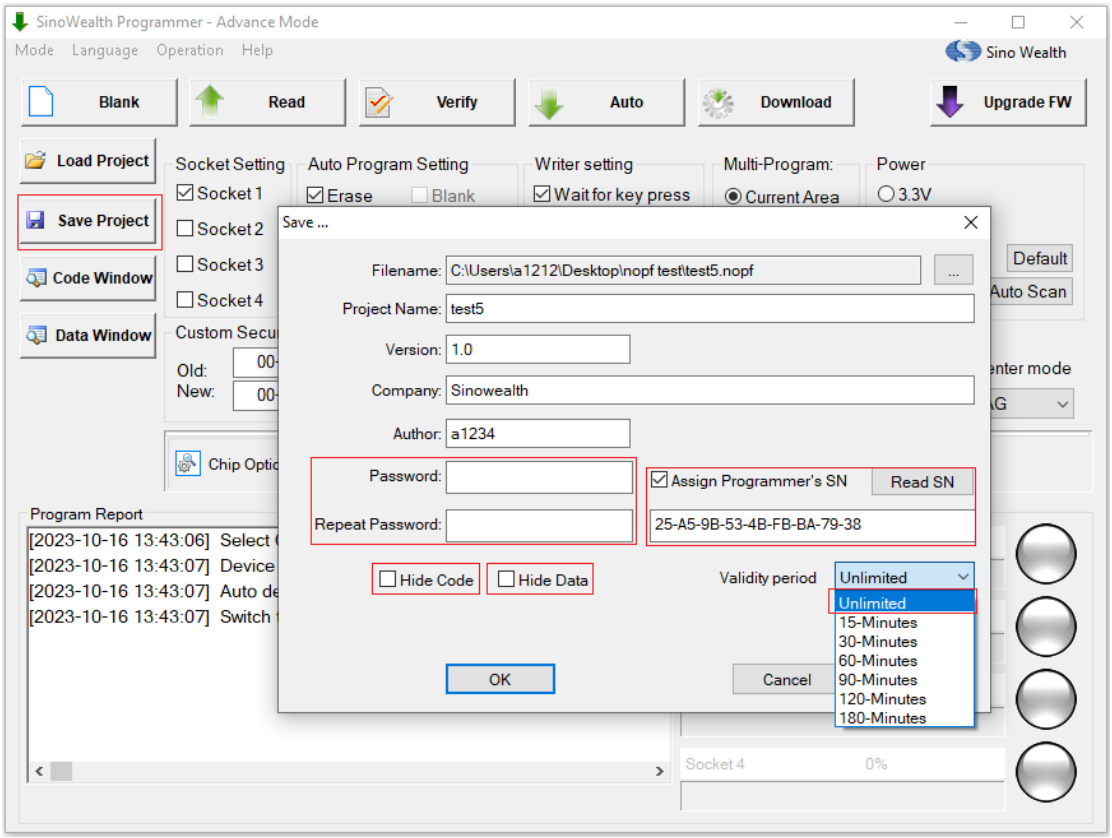

Figure 4.3.2.a Save project file example

When saving a project, you can configure the filename, project name, and set the password.

When saving a project, the customer can set the Assign programmer's SN, which means that the programmer that assigns a serial number will program the project file. Using other programmers will not load the project file normally. Click the 'Read SN' button to load the serial number of the current programmer.

When saving a project, the customer can set the hide code or hide data.

After loading the 'Hide Code' project, the UI will not display the 'Code Window' button, which makes it impossible to view the relevant code, thus achieving the function of 'Hide Code'.

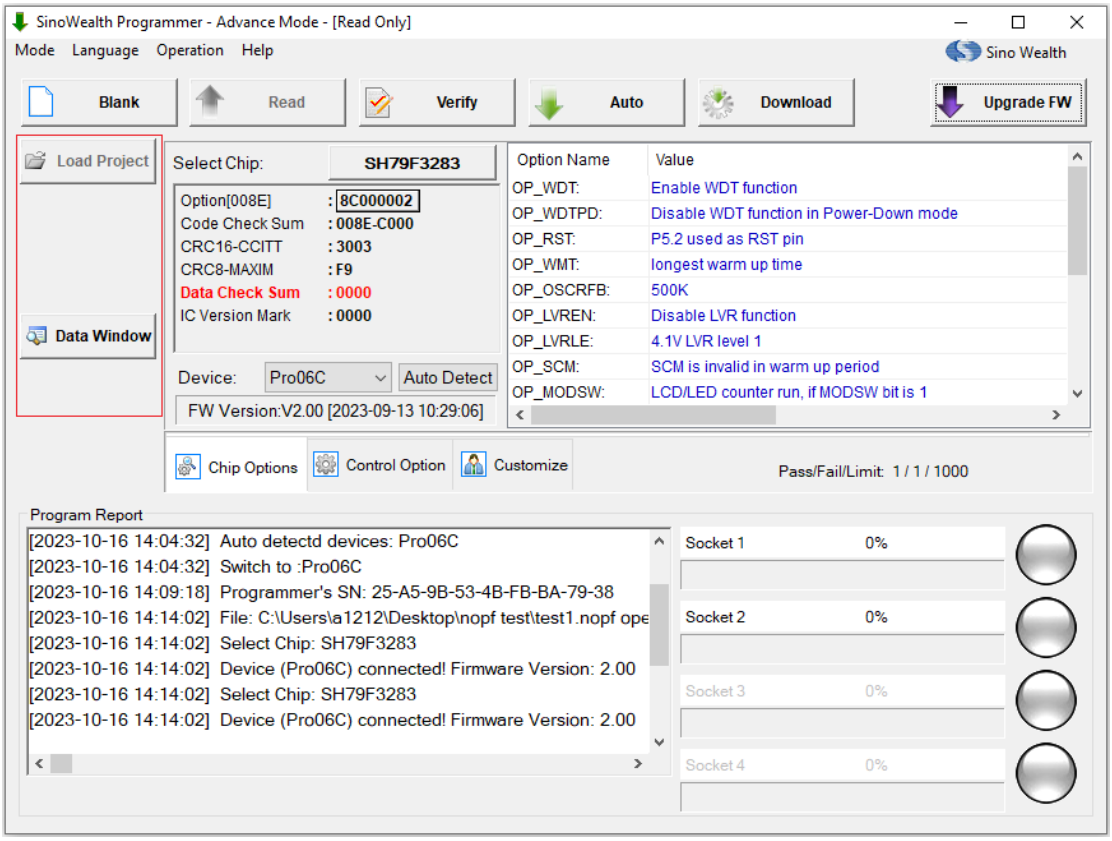

Figure 4.3.2.b Load project file example about 'Hide Code'

When saving a project, the validity period of the project file can be set. In this way, expired project files will not be able to load properly, and a prompt will be displayed indicating that the authorization has expired.

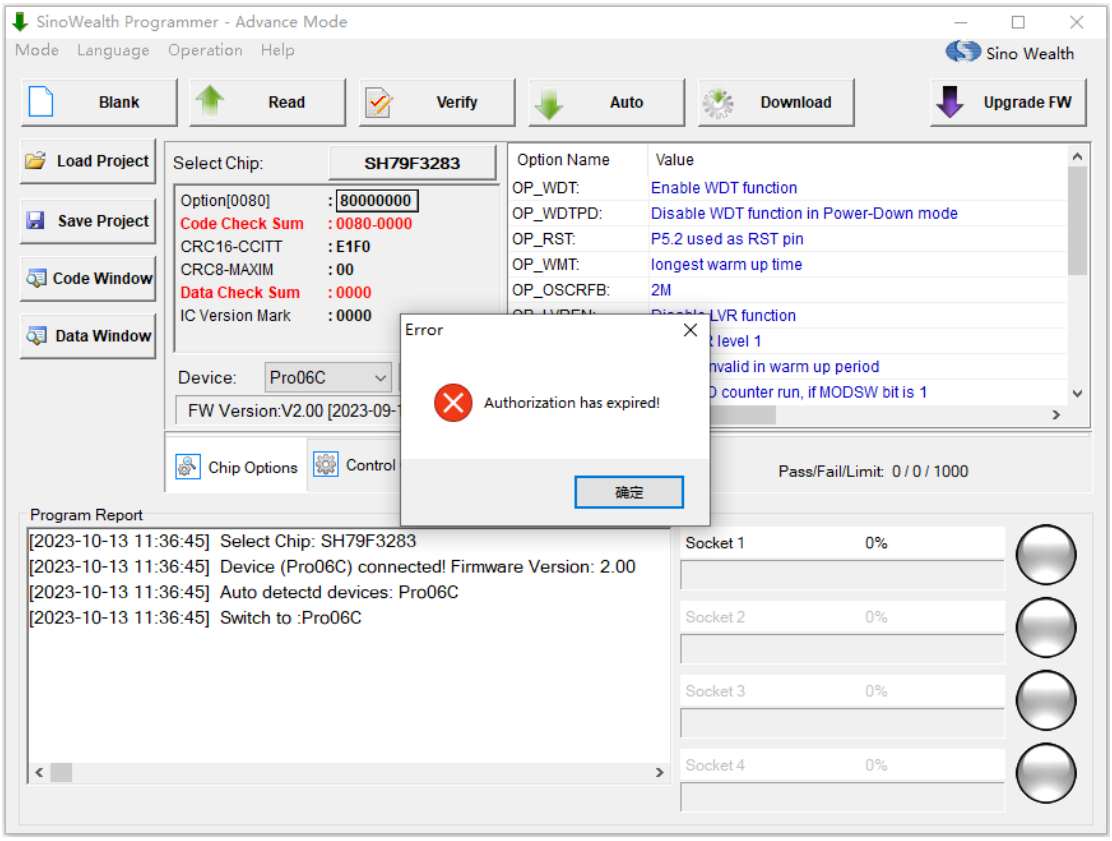

Figure 4.3.2.c Load project file example about 'Authorization has expired'

4.4 Load Code and load Data

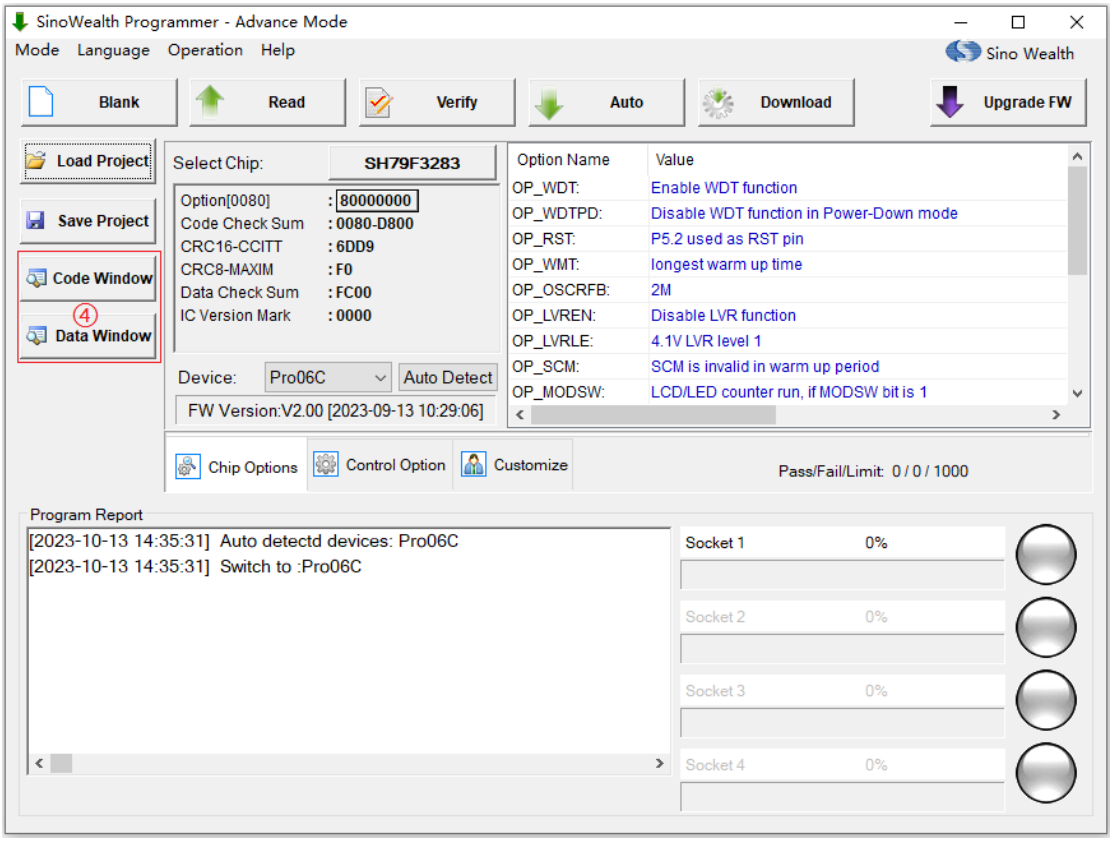

Figure 4.4.a Load Code and Load Data

4.4.1 Load Code

Code Window——Load the user code to be programmed. The code file supports two formats: 'hex', 'bin'.

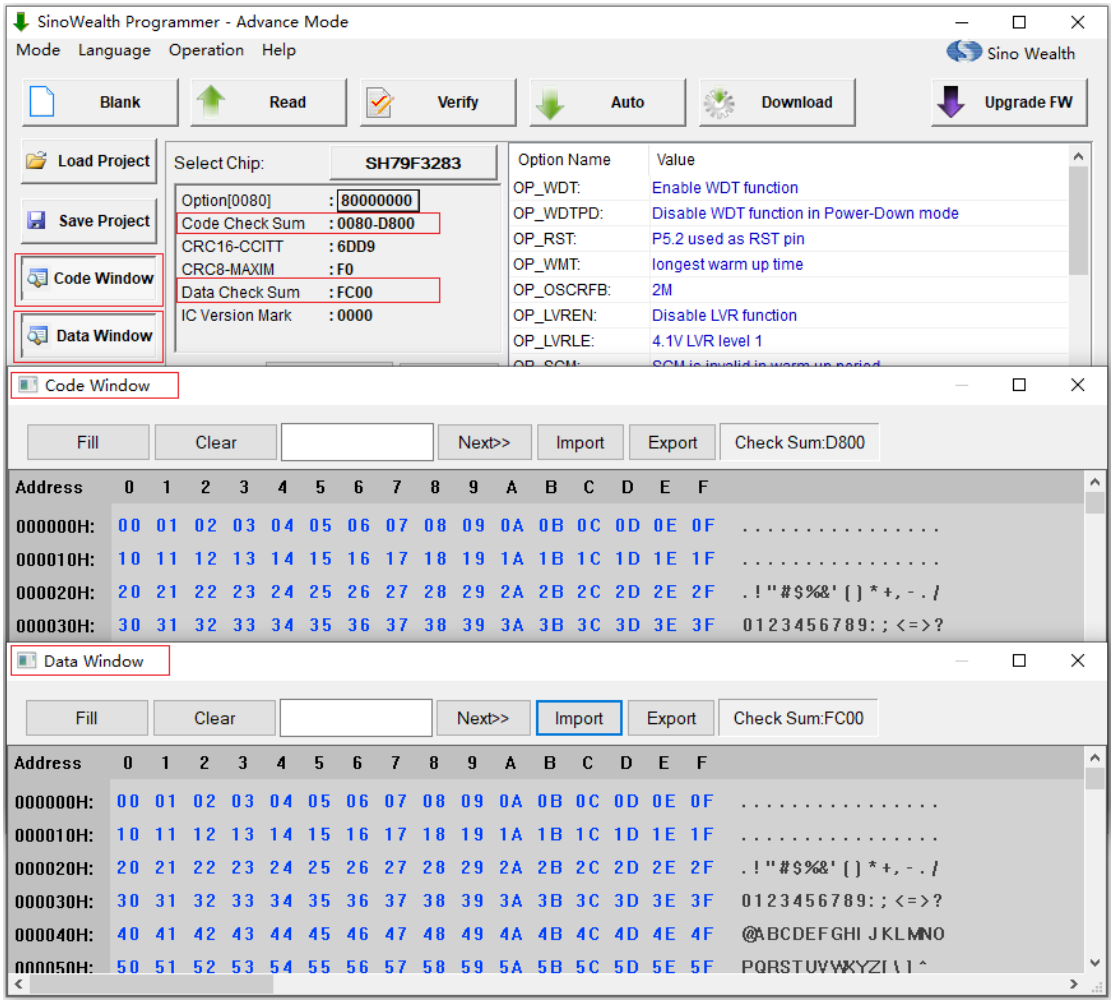

Figure 4.4.1.a Load Code and Load Data Operation UI

Clicking the 'Code Window' button will pop up a code window, which can display the following content or perform the following operations:

- **Fill**

  Fill the whole or a segment of the code storage buffer with a value (value range: 00H ~ FFH).

- **Clear**

  Clear the value of the whole code store buffer.

- **Search box**

  Search a value (00H ~ FFH) in the whole code storage area, and click 'Next' to jump to the next address of the value.

- **Import**

Import the file of the specified format (supporting three formats of .hex /.bin /.obj) into the code window.

- **Export**

Export the current buffer data (supporting three formats of .hex/.bin/.obj) and save it.

- **Check Sum**

Display the checksum of the current code storage area in real time.

4.4.2 Load Data

Data Window——Load the user data to be programmed. The data file supports two formats: 'hex', 'bin'.

The 'Load Data' UI and operation are similar to the 'Load Code' UI and operation, so the explanation is omitted.

4.5 Programming information configuration area

4.5.1 Chip options UI

Choosing the right chip is the first step of programming. Click the button of chip model on the right side of 'Select Chip' to pop up the Chip selection window. Please see the example description in Chapter 5.1 for more details.

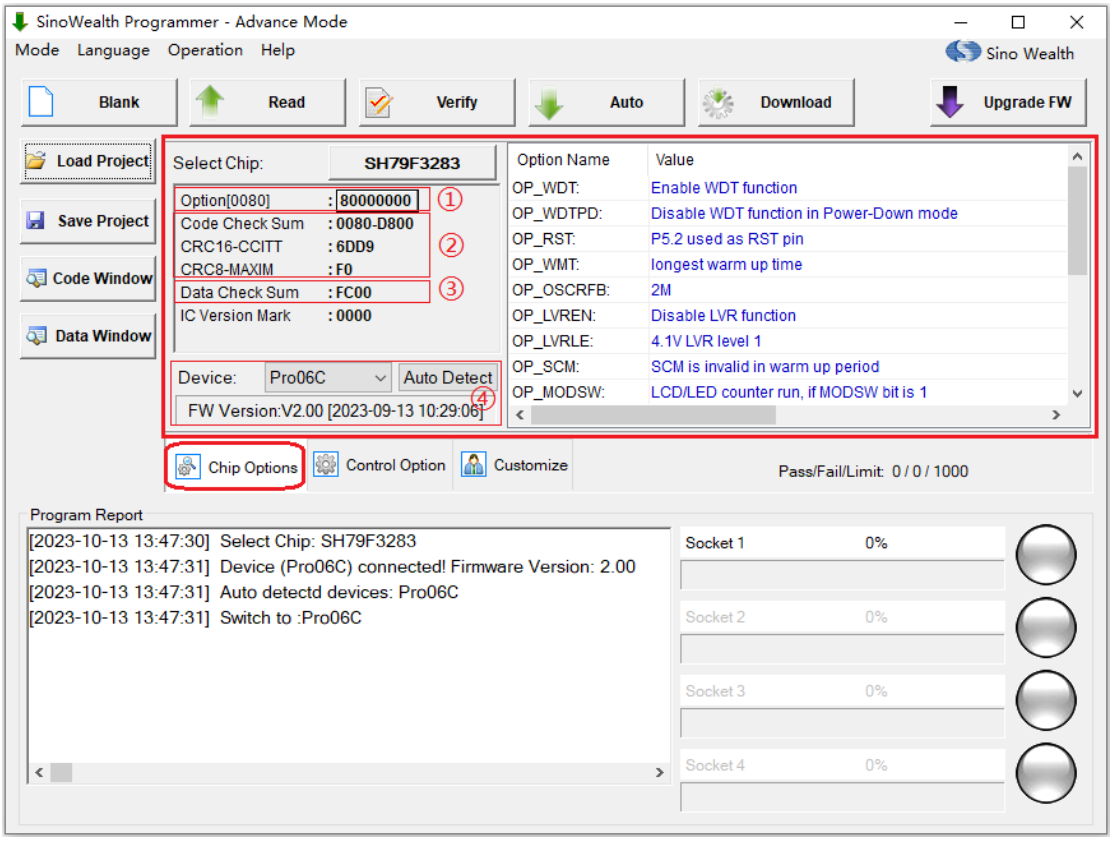

Figure 4.5.a 'Chip options' Sub UI

- **①Code option**

Configure the project according to the code options provided by the chip. When setting, just click the options, all the options available will be listed, and then click the required options.

- **②Code check sum**

XXXX - YYYY: XXXX is the code option value checksum, YYYY is the code checksum.

- **③Data check sum**

E2 data's checksum.

- **④Programming device display**

Display information about the currently connected programmer. If no information is displayed, please click the "Auto Detect" button.

4.5.2 Control option UI

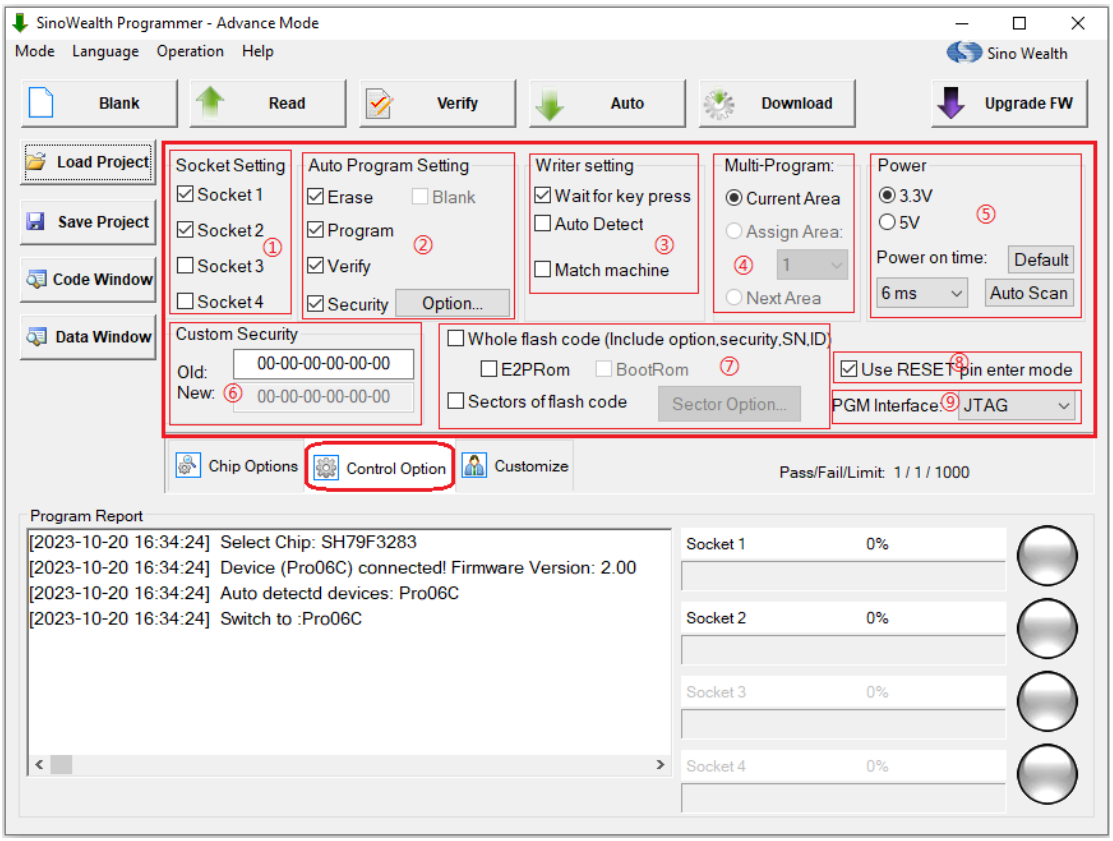

Figure 4.5.2.a 'Control option' sub UI

- **①Socket Setting**

  You can check the required program channel here.

- **②Auto Programming Setting**

  Configure the specific action items to be performed when clicking 'Auto' button.

- **③Writer setting**

  In mass production programming mode, a new programming needs to be triggered after each chip change. The trigger mode can be configured as either “Auto Detect” or “Wait for key press”. Check the “Match machine” to set that the LED lights are all off and no longer flash in case of programming error.

- **④Multi-Program**

  The programming area corresponds to the relevant storage area in the

target MCU. This configuration is only applicable to OTP MCU, not flash MCU.

- **Current area**——The block to be Programmed is the current block.
- **Assign area**——The block to be Programmed is specified by user.
- **Next area**——The block to be Programmed is the next block.

■ **⑤Power**

Configure the power supply mode of the target MCU when programming.

■ **⑥Customer security code settings**

Edit and set the customer security code. It is used to encrypt the whole chip. Please be aware that this code can be set only after the security function is enabled.

■ **⑦Flash programming area configuration**

Configure the region to program by checking.

- **Whole Flash code**——include code, option, Customer information, Security information
- **E2PROM**——Customer data storage area
- **Sectors of flash code** ——Customer code storage area

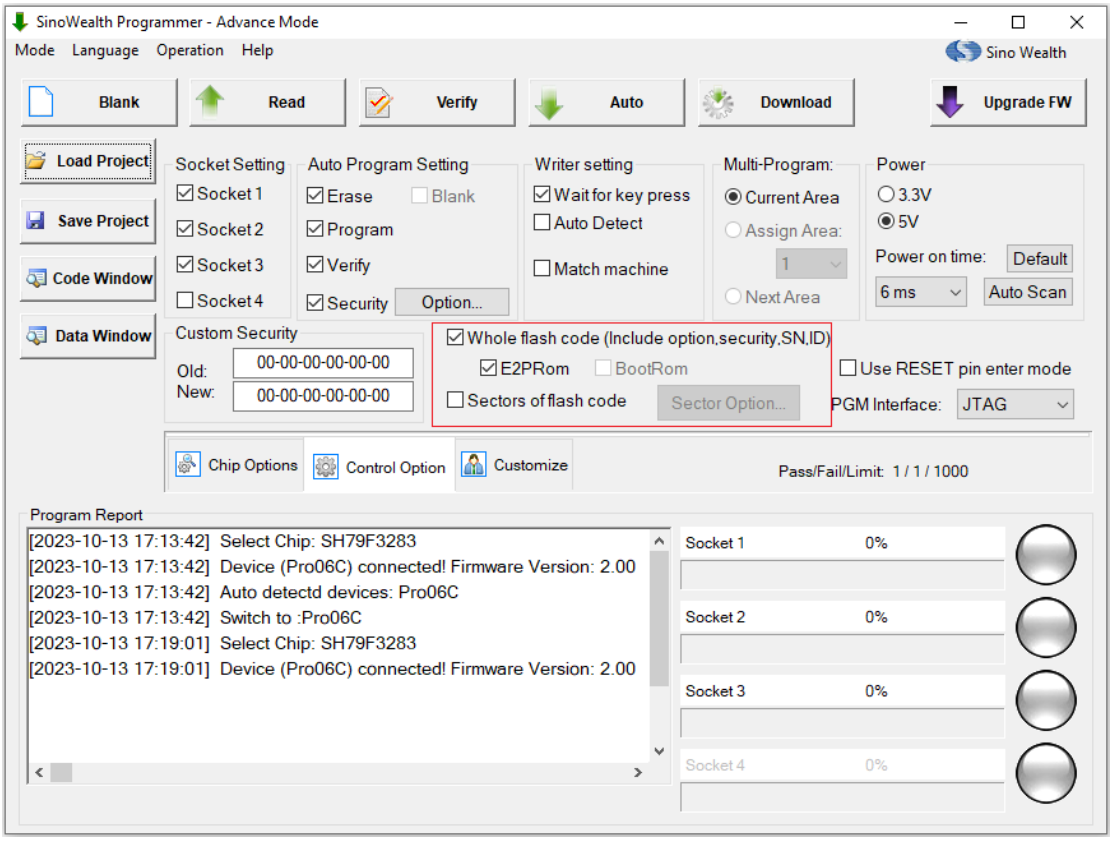

Figure 4.5.2.b Programming Area Configuration

■ **⑧The check option of reset pin**

If checked, the reset pin in the programmer interface should be connected with the reset pin of the target MCU when programming.

■ **⑨Program interface setting**

Configure the interface mode of programming.

4.5.3 Customize UI

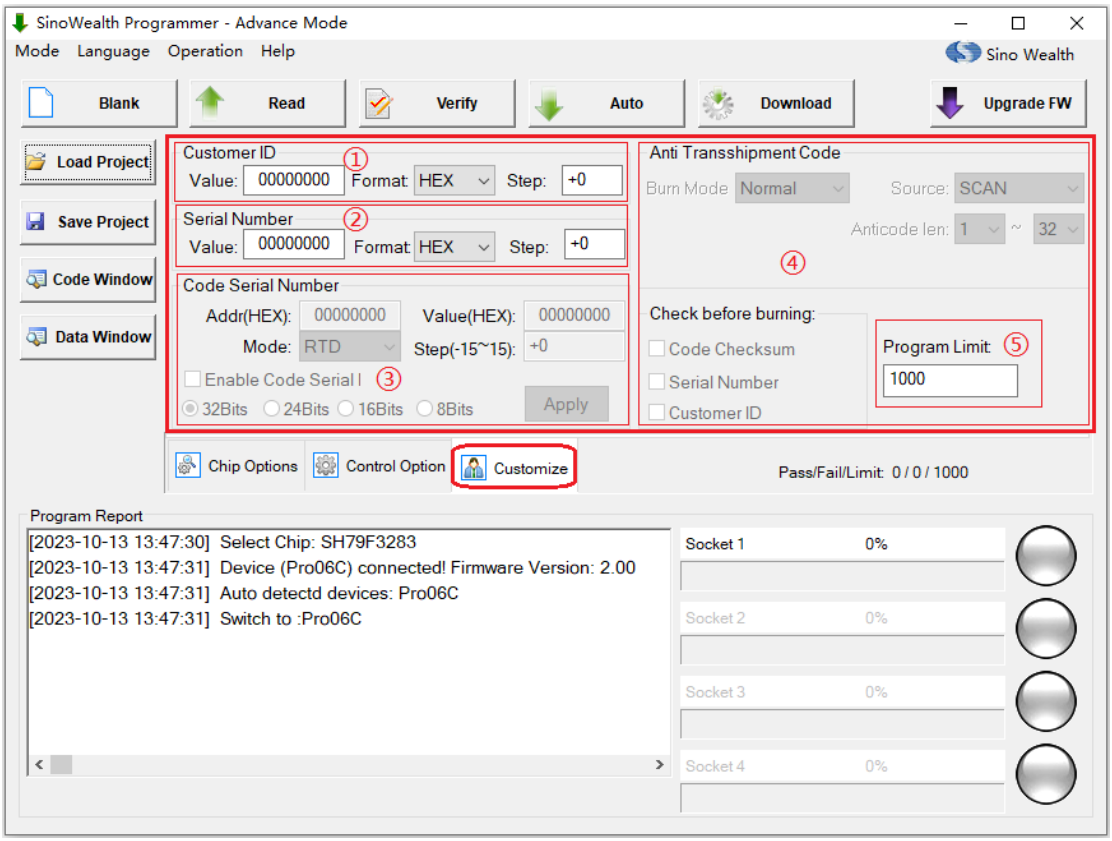

Figure 4.5.3.a 'Customize' sub UI

- **①Customer ID**
  - The length of CID is 4bytes.
  - Input and display formats support both decimal and hexadecimal.
  - The step size can be set freely as actual needs, and the recommended range is: - 99 ~ + 99.
- **②Serial Number**
  - The length of Serial Number is 4bytes.
  - Input and display formats support both decimal and hexadecimal.
  - The step size can be set freely as actual needs, and the recommended range is: - 99 ~ + 99.
- **③OTP product code serial number**

This functional module is specifically designed for consideration to OTP MCU because its user code cannot access serial number. This function module can be used instead of accessing the serial number in the user code.

- The serial number setting supports self-increment or self-decrement, and step size Settings range from -15 to 15.
- The starting serial number can be specified.
- The length of serial number supports 4 specifications: 8 bits, 16 bits, 24 bits and 32 bits.
- The format of serial number supports both RTD and RTNW.

  RTD: The serial number is stored in the specified location of ROM as 'little Endian'. A word contains 2 bytes of the serial number. This format only supports 16 bits and 32 bits.

  RTNW: The serial number is stored in the specified location of ROM as 'little Endian'. A word holds only one byte of the serial number and places it in the lower byte of word, with its high byte fixed at 0xD0. This format supports four lengths: 8 bits, 16 bits, 24 bits and 32 bits.

■ **④Anti Transshipment Code related information or options**

■ **⑤Program limit**

Set the upper limit of program times. When program reaches the set value, program will not continue. '0' means no limit.

4.6 Program Report

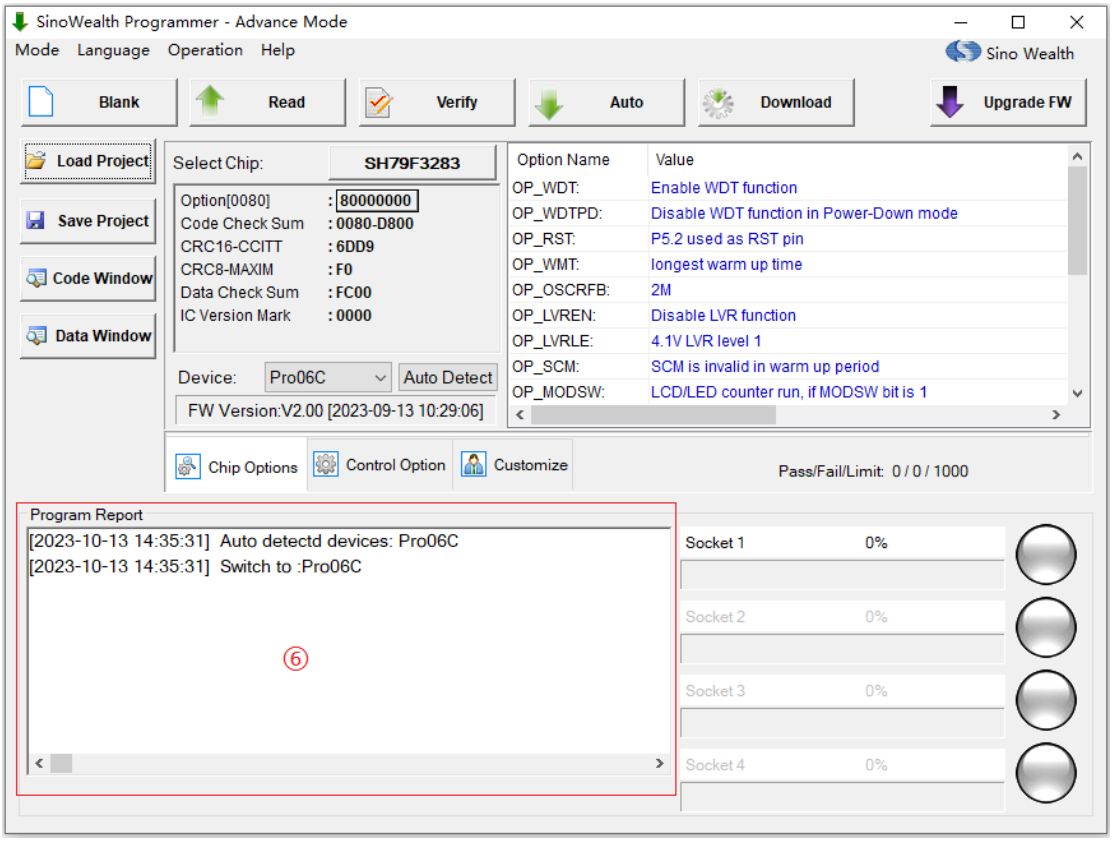

Figure 4.6.a Program report

The information of log can be printed in real time here. The red information means an error, which needs special attention. The time of the current operation is shown in brackets.

4.7 Status display area of each channel

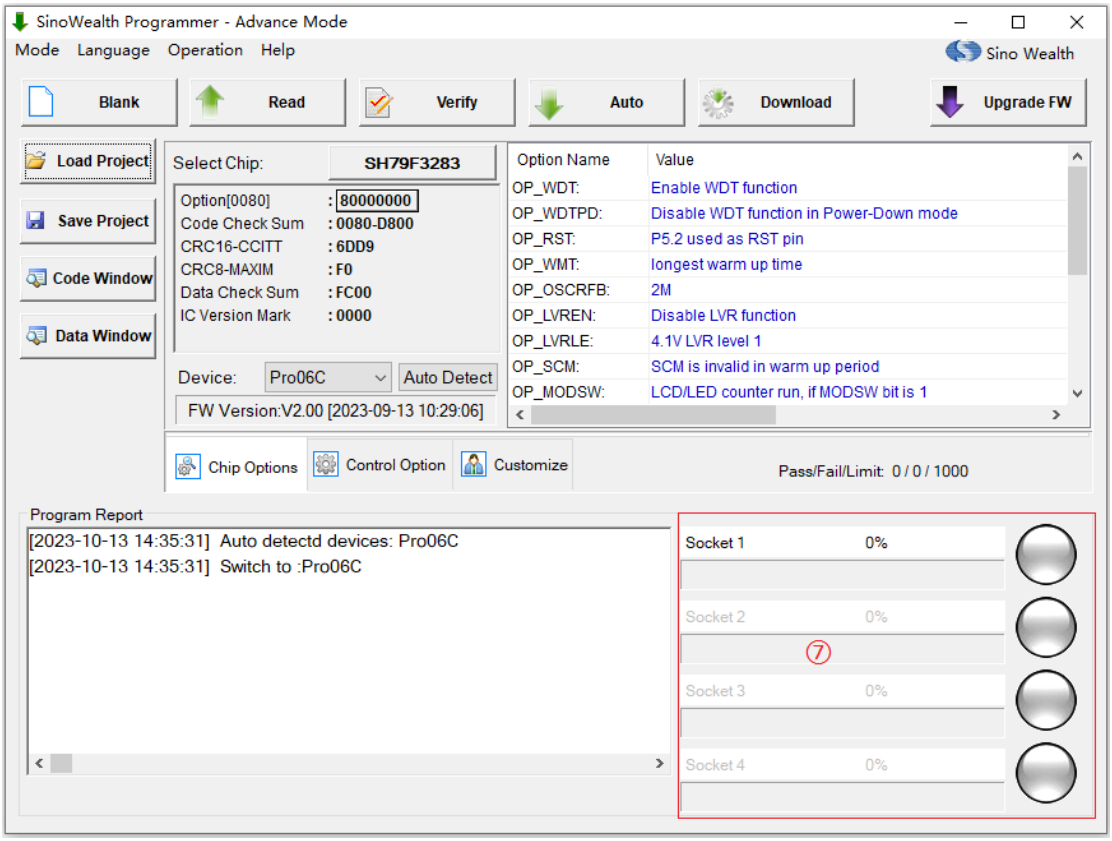

Figure 4.7.a area of each channel Status display

Display the status and final result of each channel in real time. The red means error, green means success. This bar will only be displayed when the corresponding socket is selected.

4.8 Programmer firmware upgrade

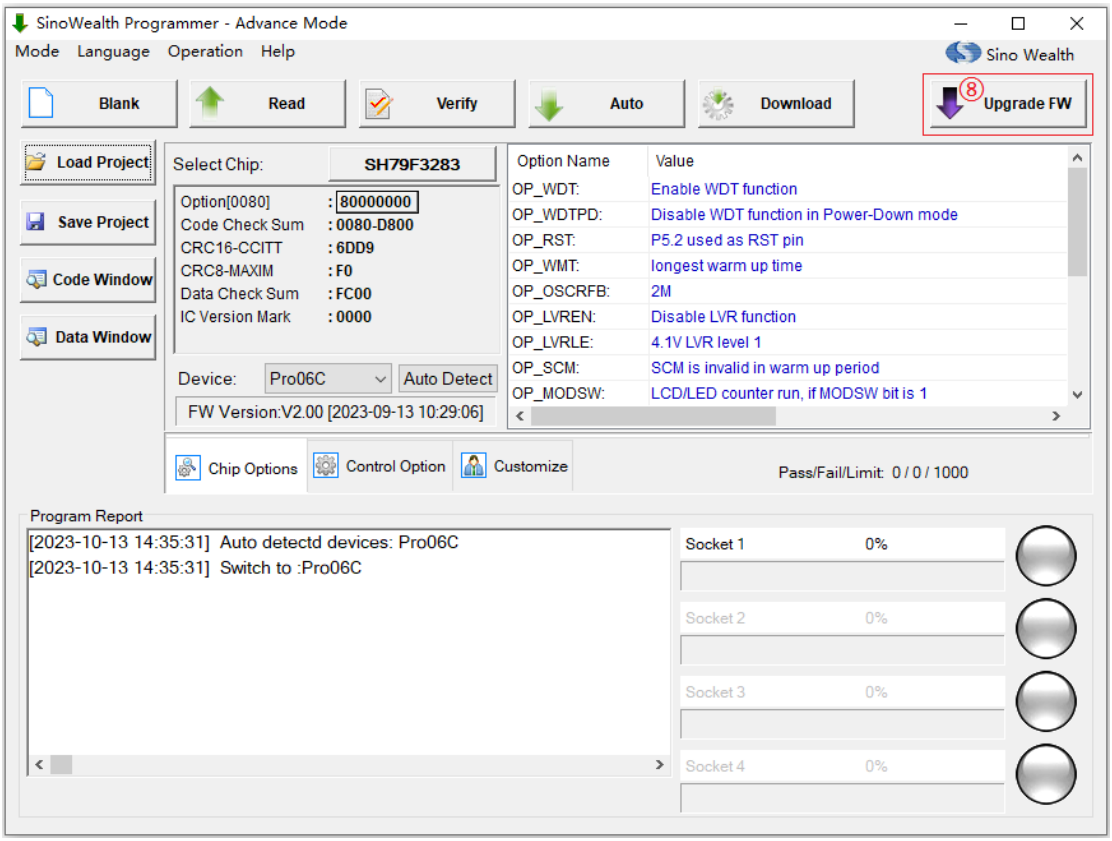

Figure 4.8.a Programming device firmware upgrade

Here the user can add and update the firmware version of the programmers. The firmware versions of all programmers or emulators are stored in the folder named firmware under the installation root directory of ProWriter.

4.9 UI of the simulator in online mode

SinoLink Pro/Plus can support programming in offline mode with only a single channel. But only the "Wait for key press" method is supported, and the "Auto Detect" method is not supported.

When the simulator is online, "Auto Detect" or "Wait for key press" option will not be displayed.

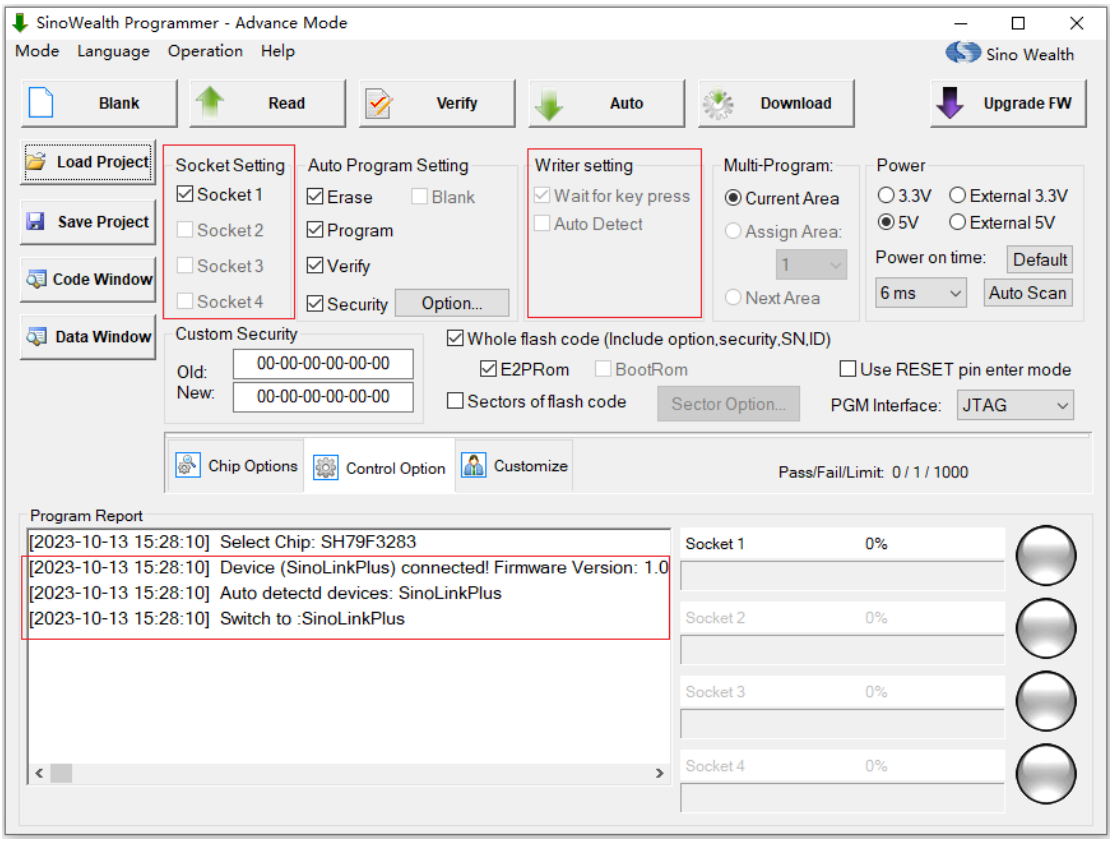

Figure 4.9.a UI of the SinoLink Plus in online mode

SinoLink/JET51A does not support programming in offline mode.

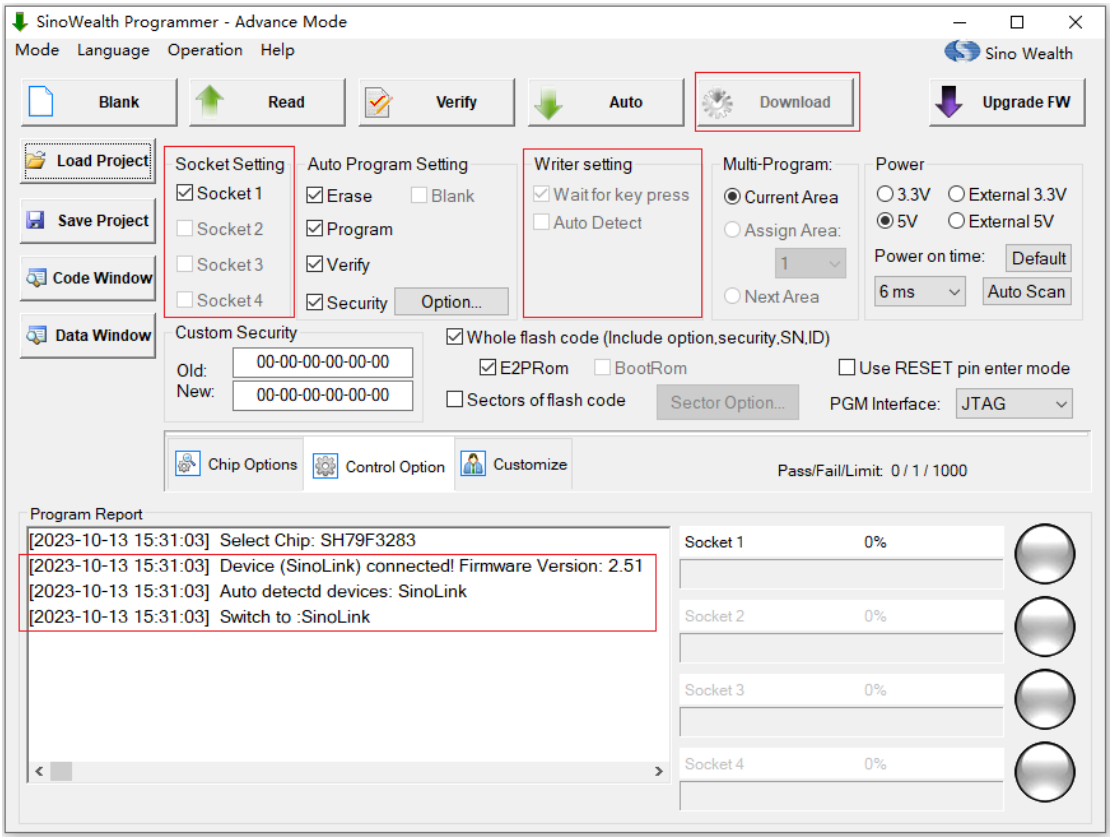

Figure 4.9.b UI of the SinoLink in online mode

Chapter 5 ProWriter Program example

In this chapter, we will introduce two examples of programming chips. One is how to program nopf files, and the other is regular, configuring parameters in the ProWriter UI and downloading and programming to the chip.

5.1 How to program nopf file to the chip

5.1.1 Connecting the programmer

Power on the programmer and connect it to the PC via USB.

5.1.2 Loading nopf file

Open the ProWriter software and load the nopf file through the "Open Project" button on its UI.

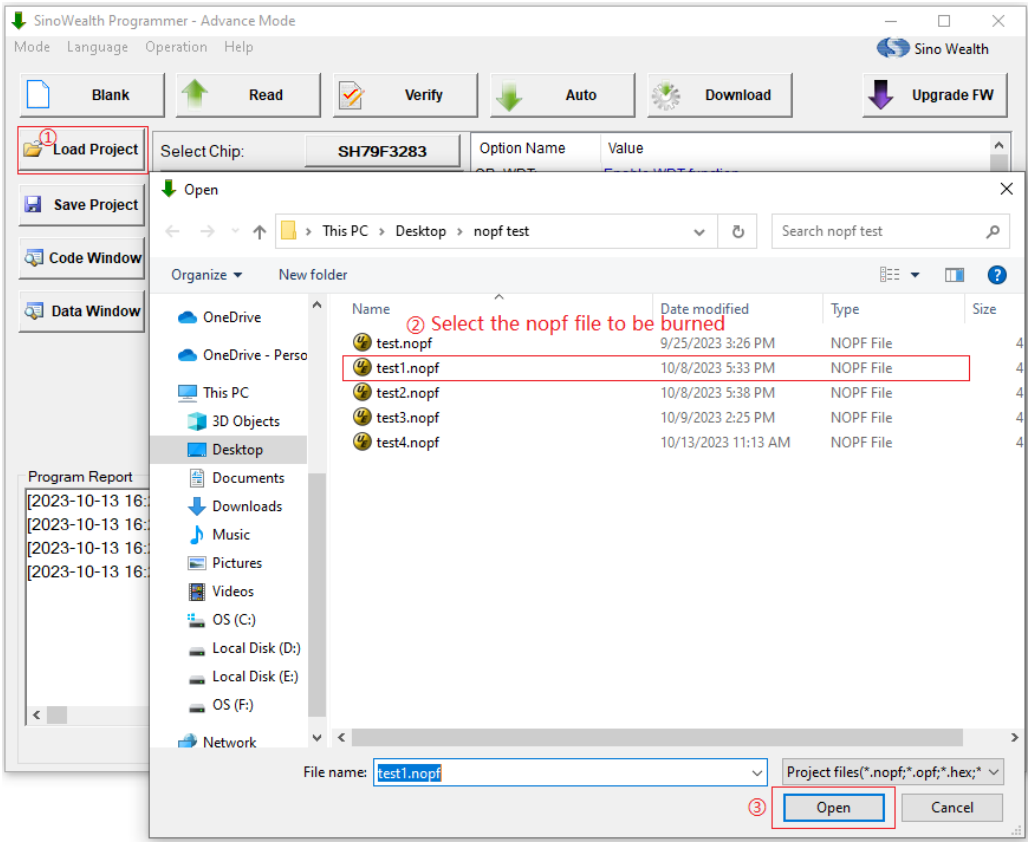

Figure 5.1.2.a Loading nopf file _1

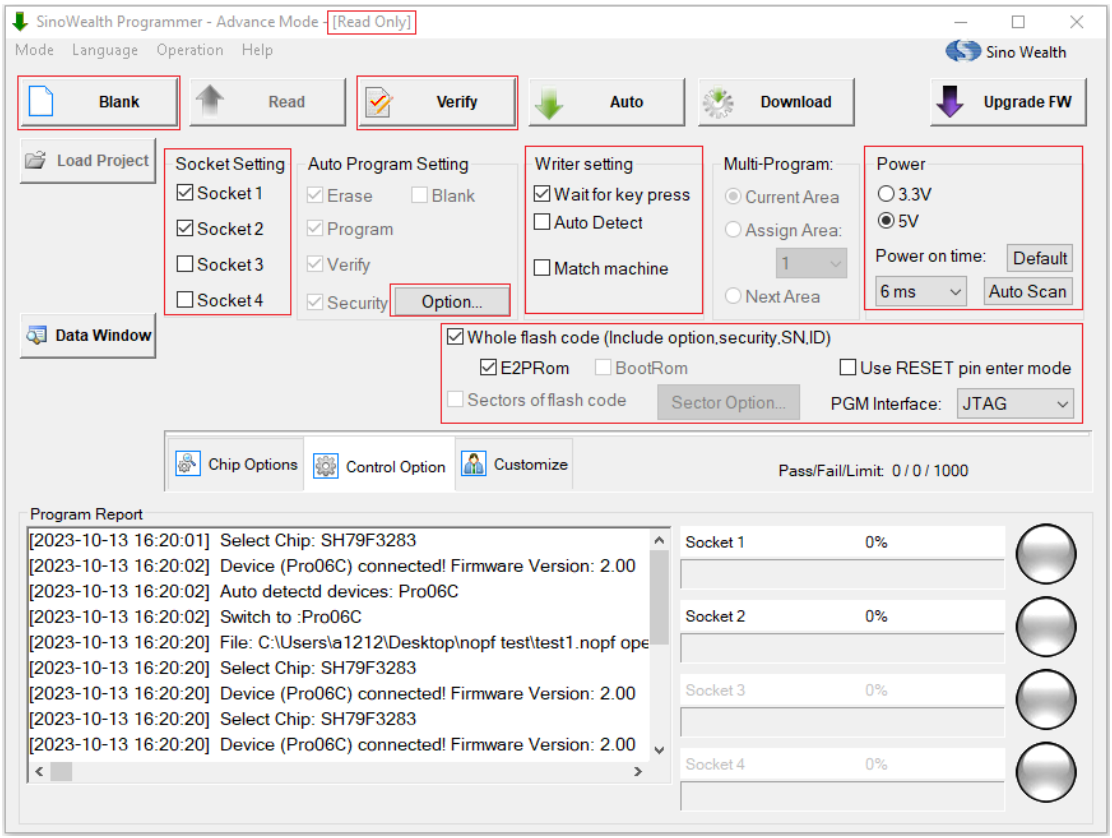

Figure 5.1.2.b Loading nopf file _2

Note:

Although the loaded nopf file is 'read-only', there are still some operations that can be executed, such as 'Blank'. Some parameters can also be configured or modified, such as 'PGM Interface', 'Power on time', 'Use RESET pin enter mode', etc.

5.1.3 Download parameters

Download programming related configuration parameters to the programmer. For details, please refer to Chapter 4.2.5 of this article.

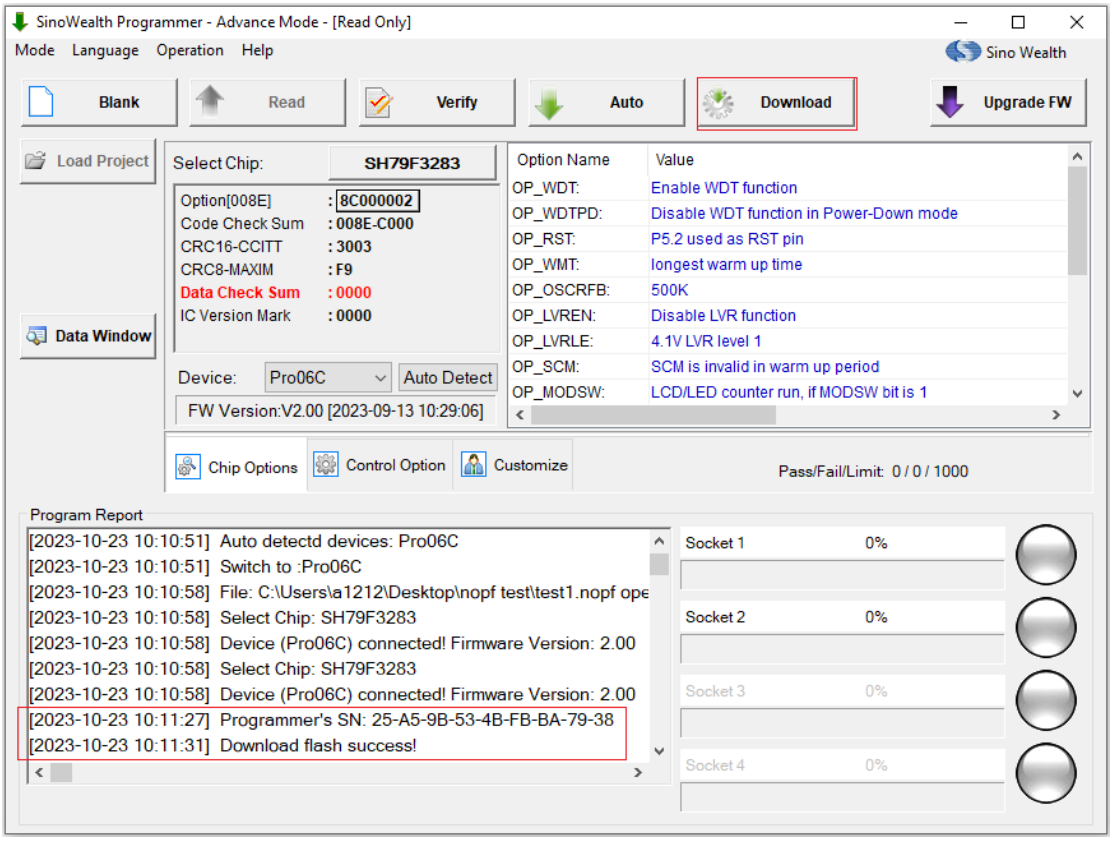

Figure 5.1.3.a Download programming parameters to the programmer

5.1.4 Execute programming

The programming methods can be divided into two types: 'online programming' and 'offline programming'.

Online programming

In online mode, after connecting the programmer to the chip to be programmed, click 'Auto' to achieve 'online programming'.

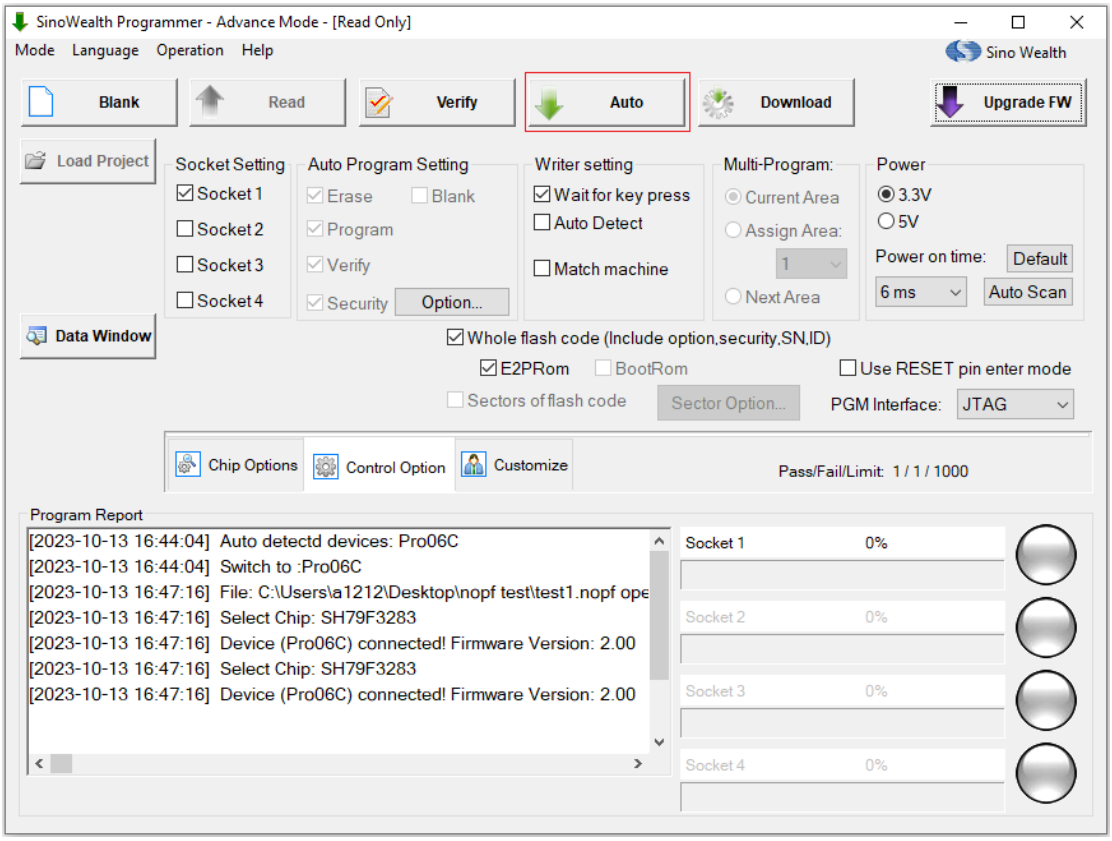

Figure 5.1.4.a Programming nopf files in online mode

offline programming

Disconnect the USB, power on the programmer again, and the programmer automatically enters the 'offline programming' mode.

At this time, according to the different configurations of the 'Writer Setting' option during the 'Download', there will be two situations:

- Checked 'Auto Detect': Once the programmer detects that a new chip has been connected, it will automatically start programming.
- Checked 'Wait for key press': When the programmer detects that a new chip has been connected, it will not directly start programming. It will only start programming when the "Start Key" is pressed.

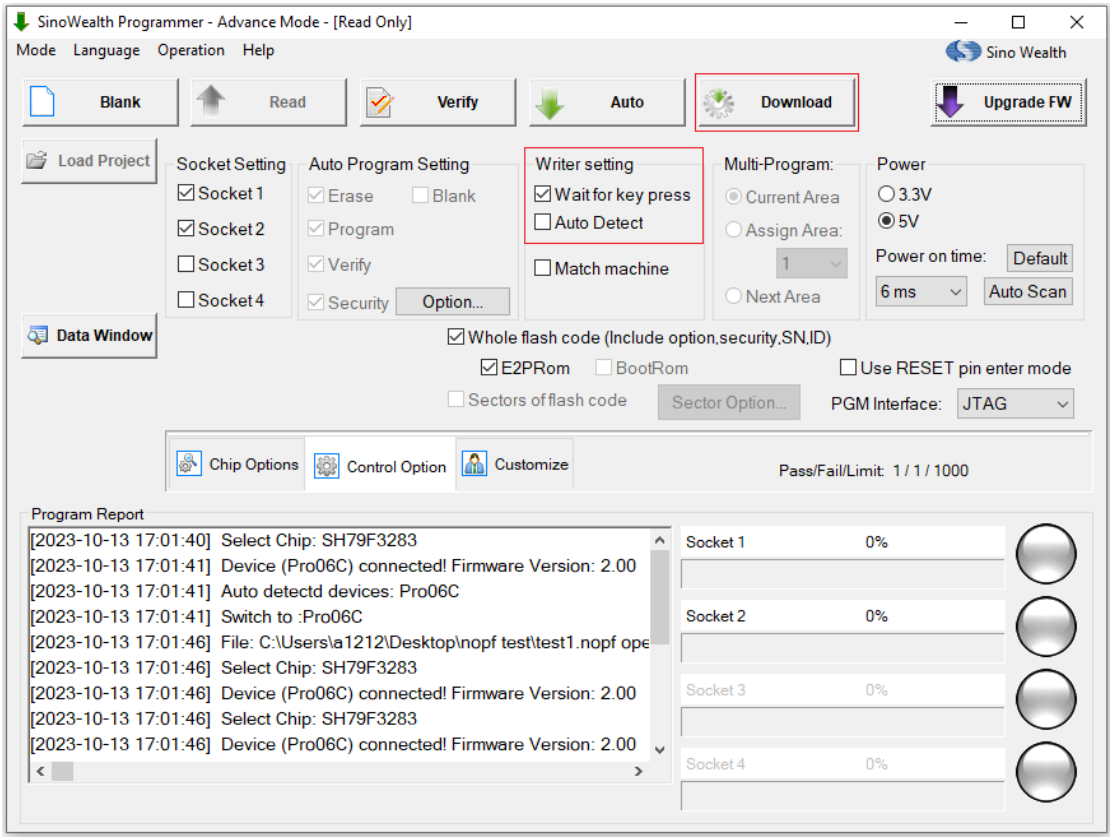

Figure 5.1.4.b Programming nopf files in offline mode

5.2 Configure on the ProWriter UI directly and program to the chip

5.2.1 Chip Name Configuration

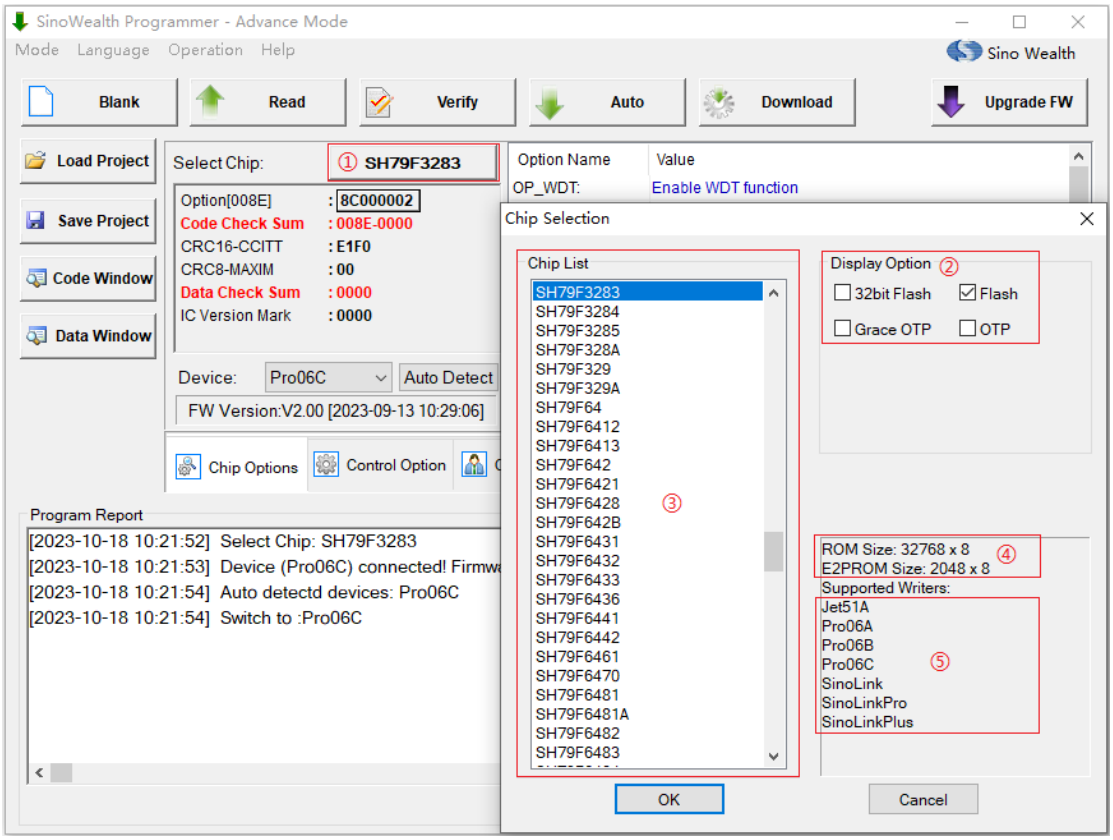

Figure 5.2.1.a Chip Name Configuration

- ② Area is the flash type selection area.
- ③Area displays all currently supported MCU types. If there are no required types, please update to the latest version of ProWriter software.
- ④ Area displays the ROM and E2PROM sizes of the currently selected MCU.
- ⑤ Area displays all programmer that support the current chip.

5.2.2 Channel (socket) setting

Pro06C supports up to 4 programming channels at the same time, and users can check it according to actual needs.

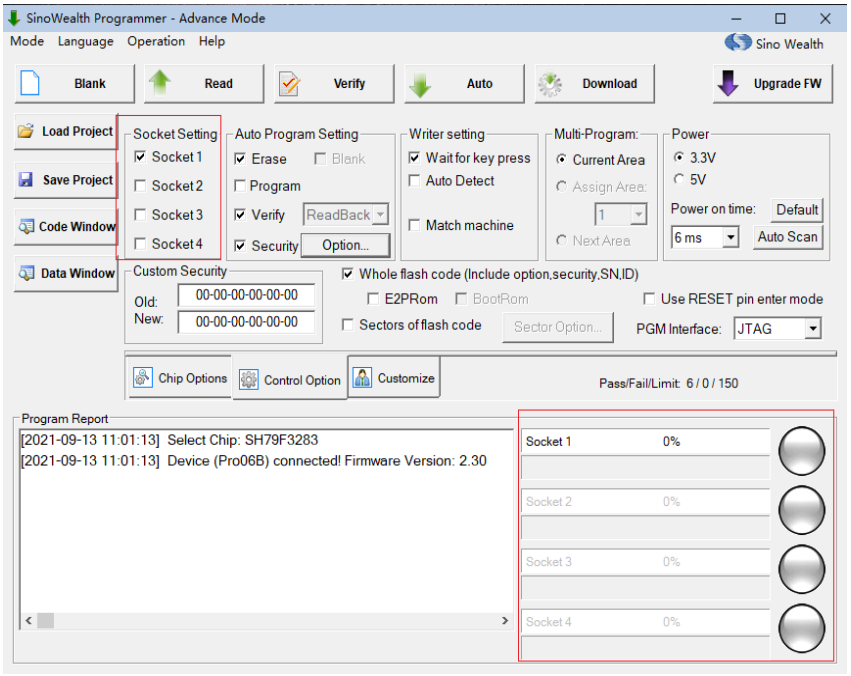

Figure 5.2.2.a Socket setting and display

5.2.3 Configure 'Power' and 'Power on time'

Configure the power supply for the MCU to be programmed during the programming process. The default value for 'Power on time' is 6ms.

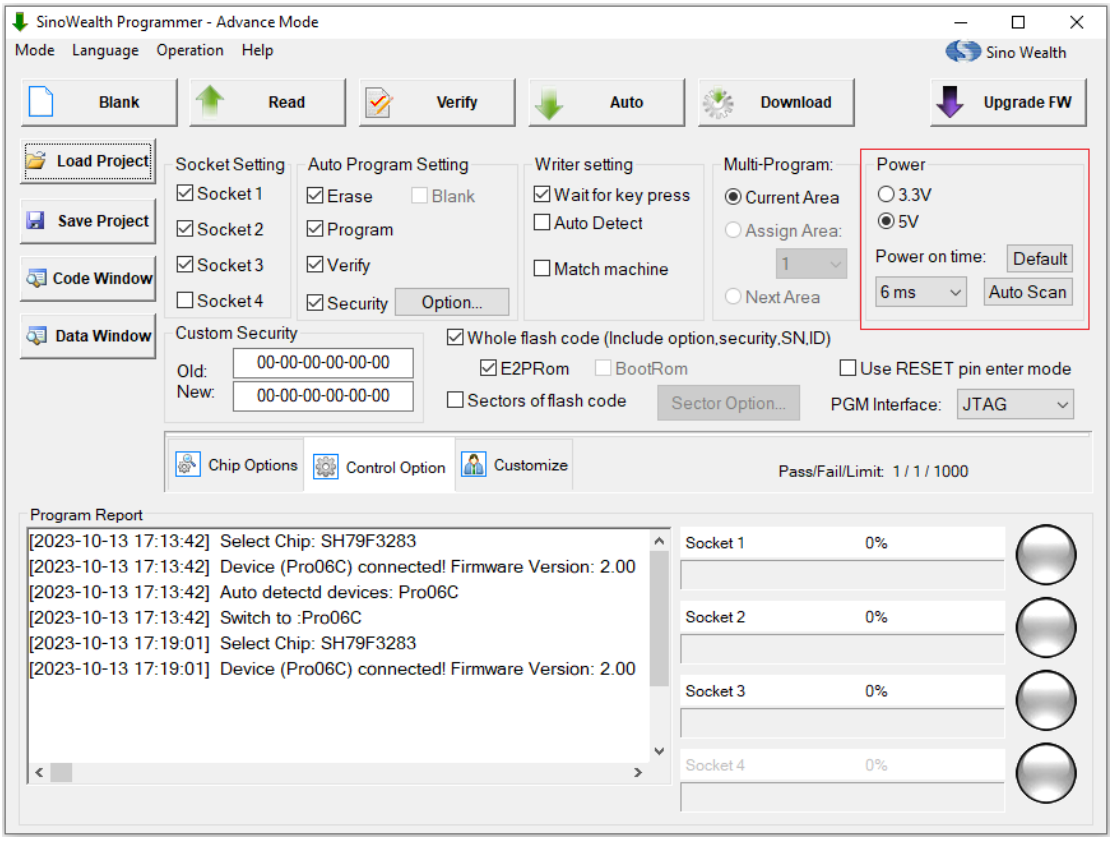

Figure 5.2.3.a 'Power' setting

5.2.4 Configure programming interface

The programming interfaces supported by different MCU models vary, and users can configure them according to their actual needs. Some chips only support one interface, so there is no need to configure it.

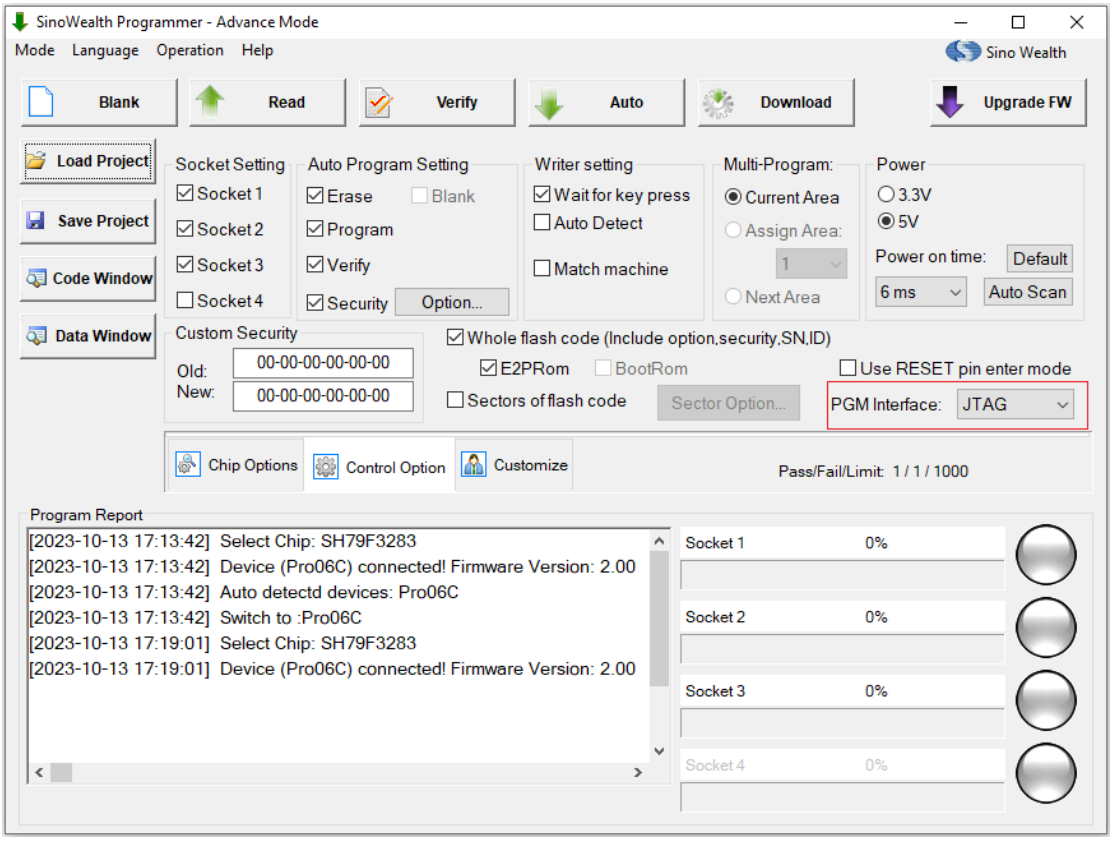

Figure 5.2.4.a 'PGM Interface' setting

5.2.5 Configure 'Use RESET pin enter mode'

If the user needs to use the RESET pin to enter the programming mode, they can check "Use RESET pin enter mode".

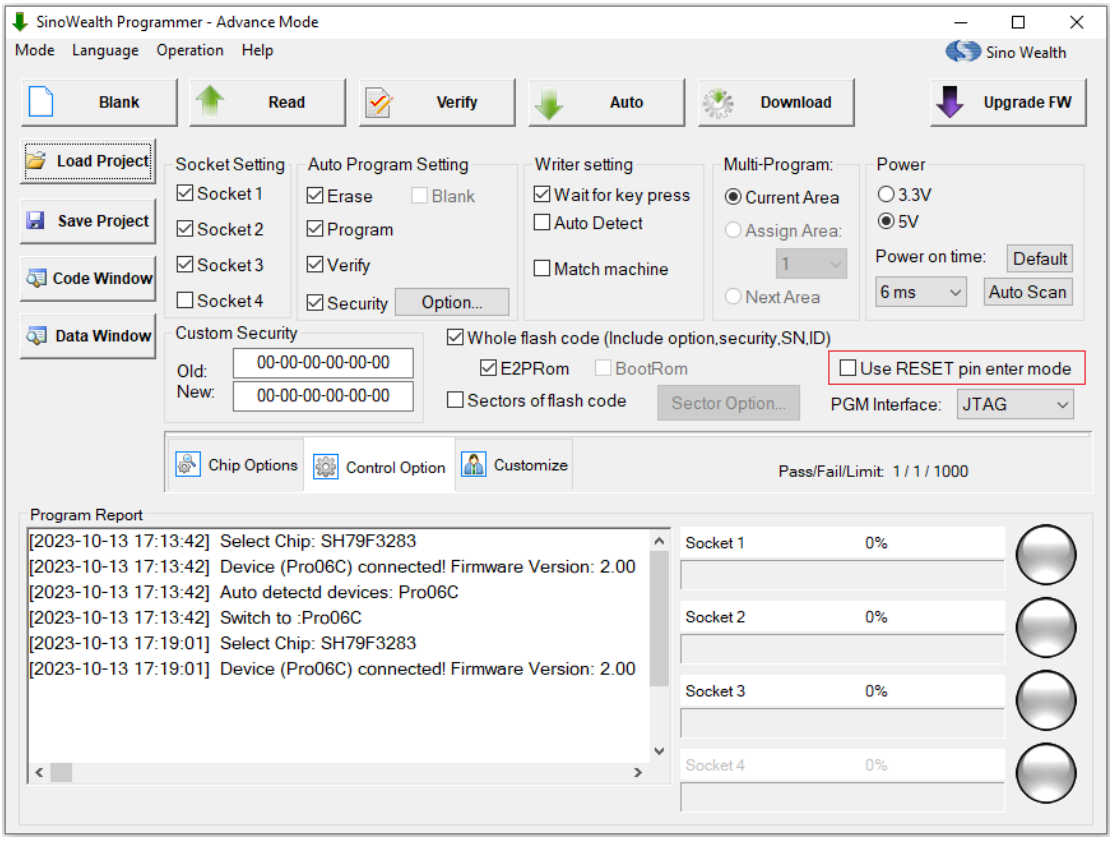

Figure 5.2.5.a 'Use RESET pin enter mode' setting

5.2.6 Configure the flash block to be programmed

The area to be programmed corresponds to the block in the target MCU flash. Users should check and configure according to their actual needs.

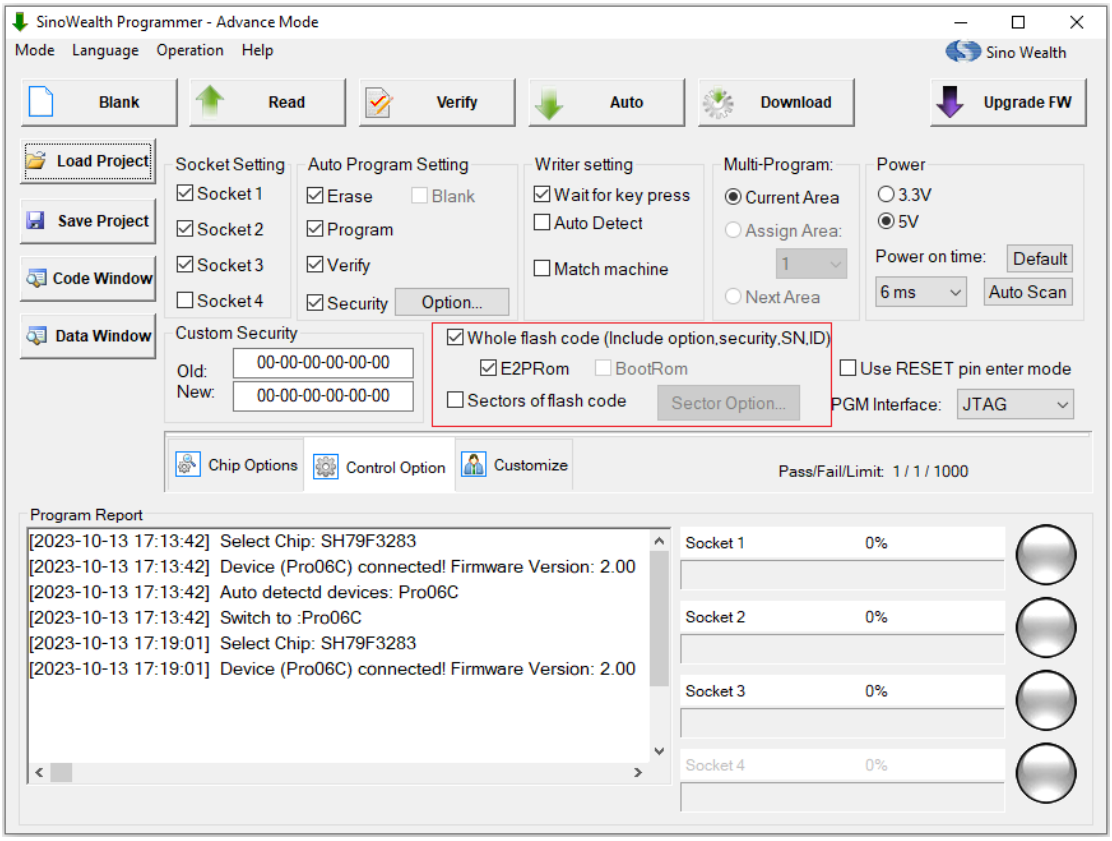

Figure 5.2.6.a Configure the flash block to be programmed

5.2.7 Custom Security

Optional configuration items. Please note that you can only set the 'Custom Security' after checking the 'Security' option under the 'Auto Program Setting' column.

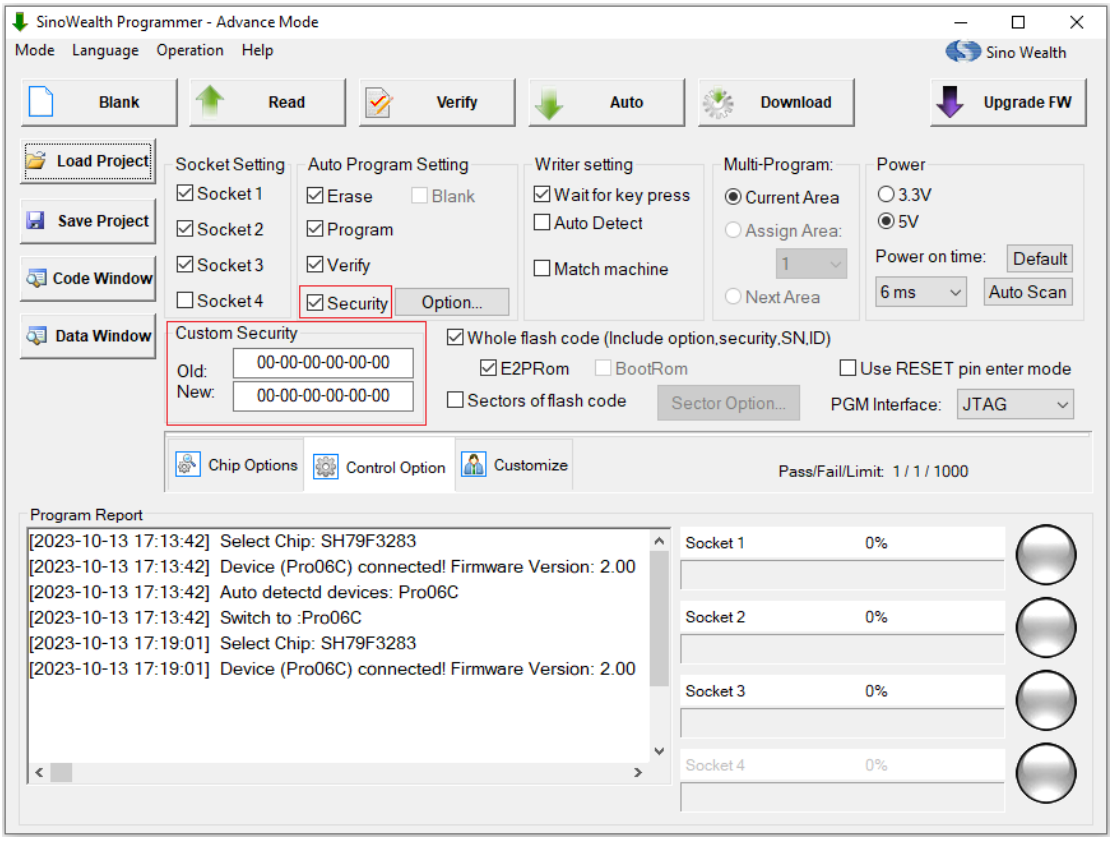

Figure 5.2.7.a Configure 'Custom Security'

5.2.8 Configure customer information

Optional configuration items. Set customer identification code (CID), serial number (SN), and programming limit information.

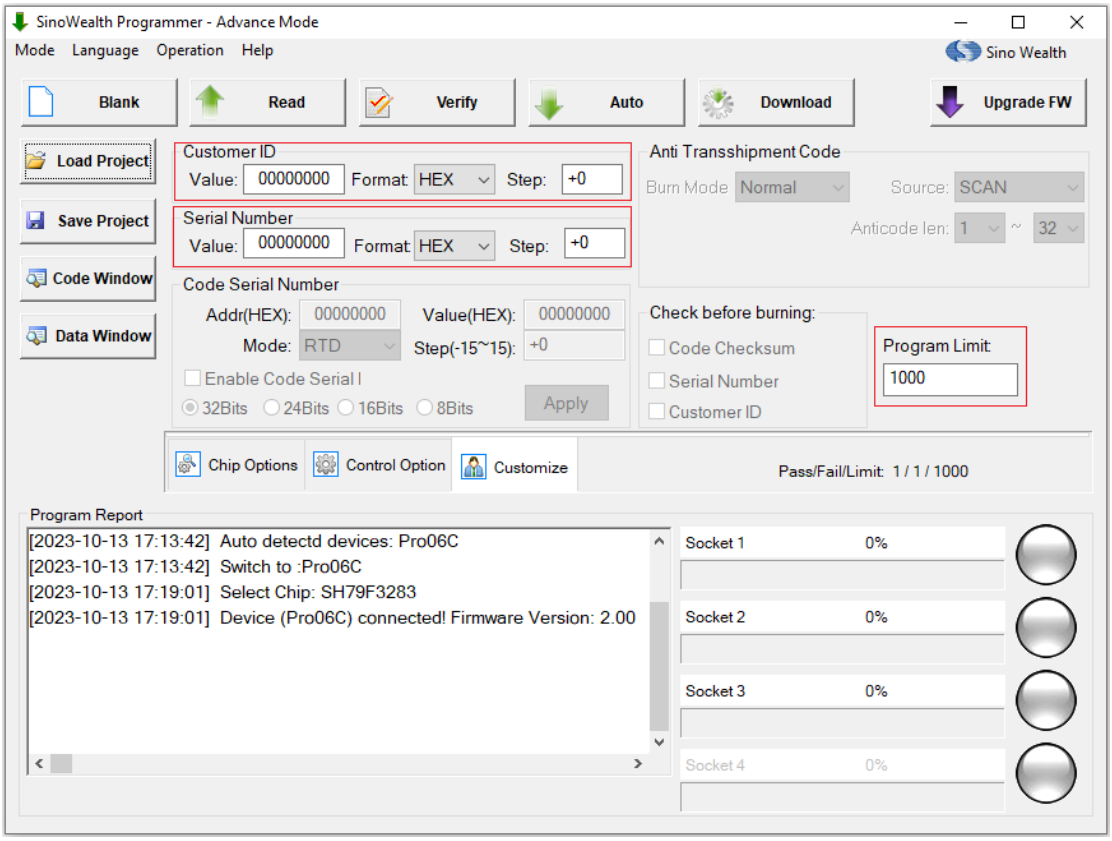

Figure 5.2.8.a Configure customer information

5.2.9 Loading Code and Loading Data

Optional configuration items. Set customer identification code (CID), serial number (SN), and programming limit information.

Loading through 'Load Project'

It can support loading hex or bin files. For 32-bit ARM core MCU, the hex file loaded here can support multiple blocks, such as a hex file that includes both Main block, Customer block, and E2PROM block codes.

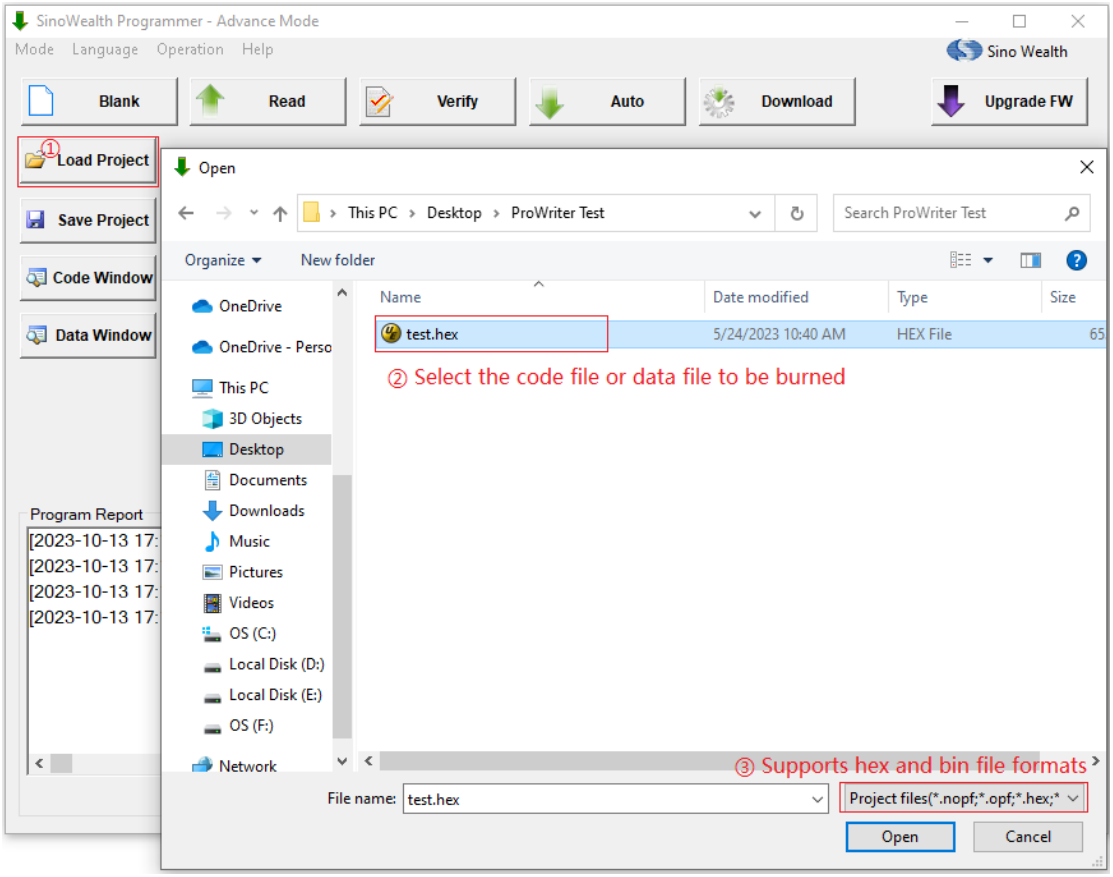

Figure 5.2.9.a Loading through 'Load Project'

Loading through 'Load Code' or 'Load Data' Directly

Load the code or data to be programmed. Please refer to Chapter 4.4 of this article for details.

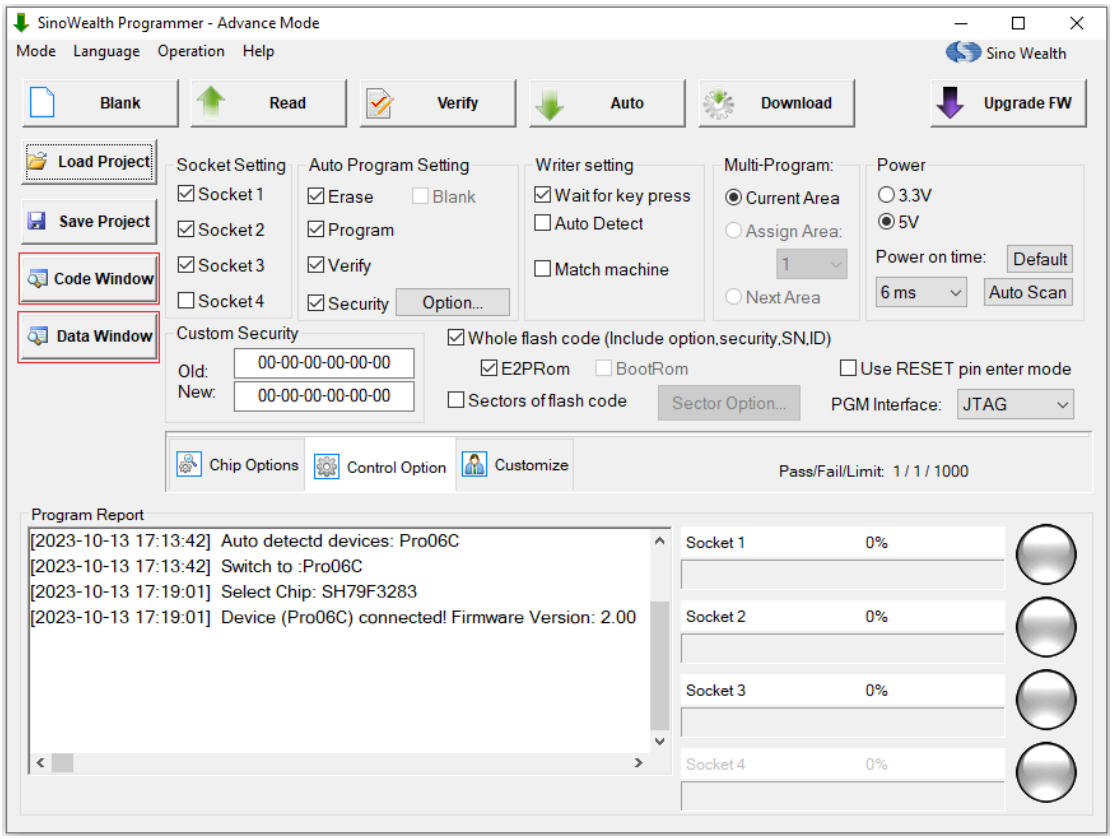

Figure 5.2.9.b Programming examples_ 'Load Code' & 'Load Data'

5.2.10 Automatic programming settings

Configure specific operations during the programming process (such as 'erase', 'program', 'verify', and 'security'). Please refer to Chapter 4.2.4 of this article for details.

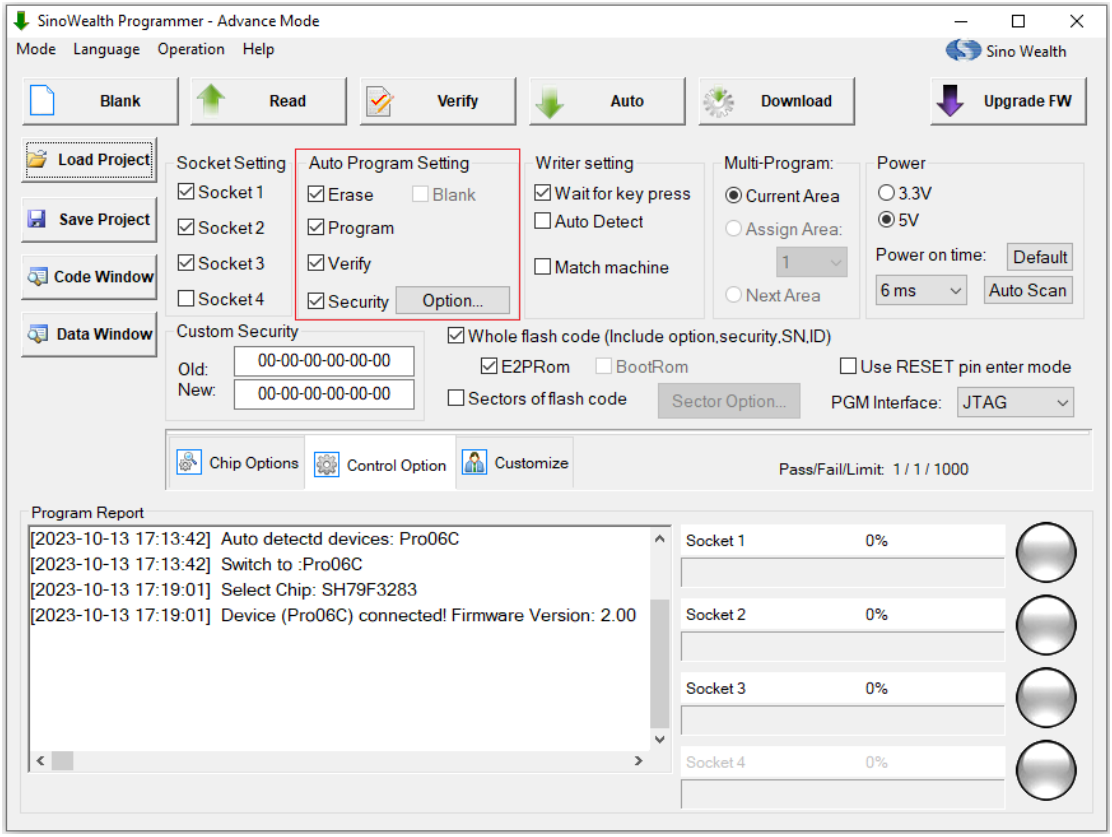

Figure 5.2.10.a Configuration of programming steps and code encryption

5.2.11 Download parameters

Download the programming configuration parameter information to the programmer. Please refer to Chapter 4.2.5 of this article for details.

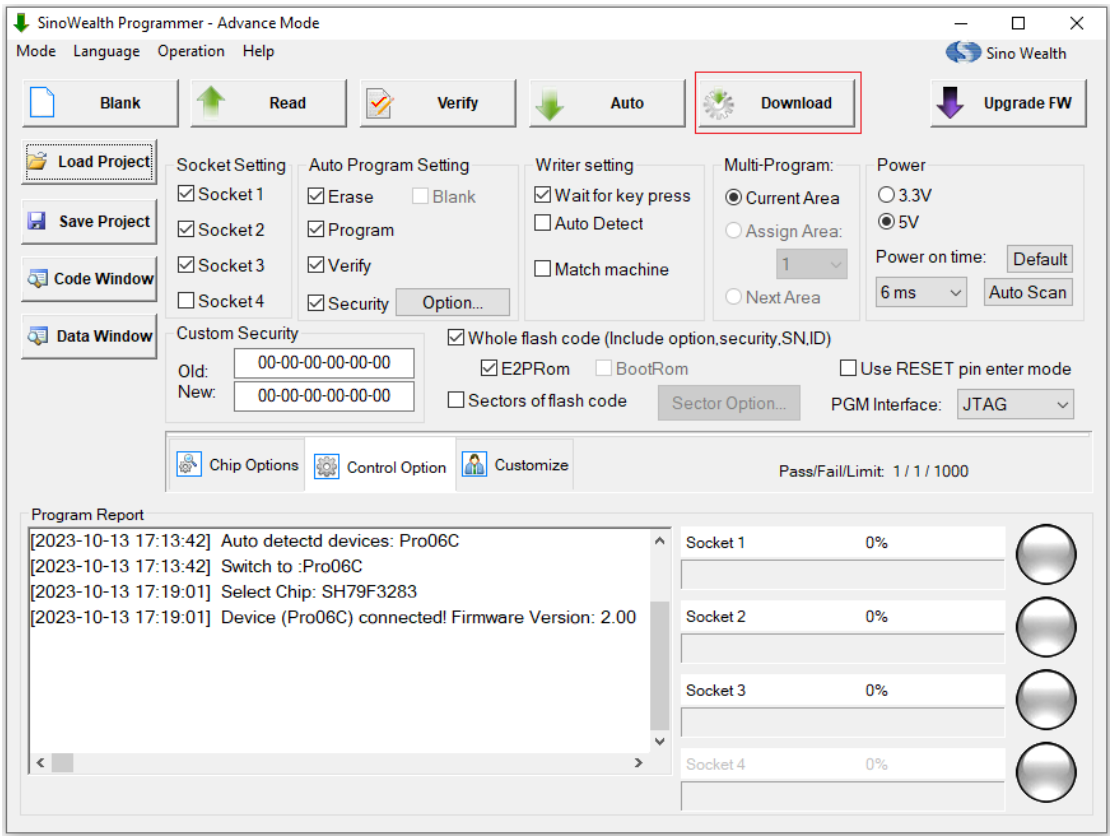

Figure 5.2.11.a Download parameters

5.2.12 Execute programming

The programming methods can be divided into two types: 'online programming' and 'offline programming'.

Online programming

Online mode refers to the burner being connected to the upper computer through USB. When in online mode, the ProWriter UI will display information related to the programmer.

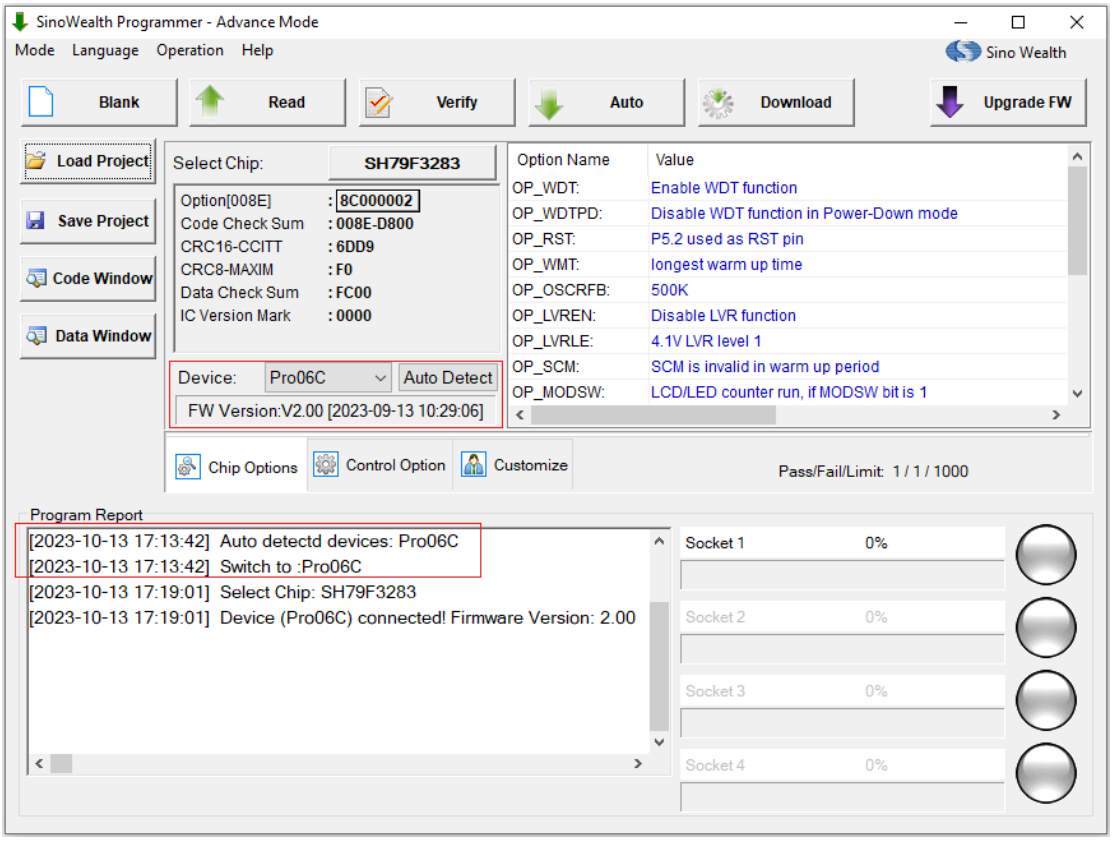

Figure 5.2.12.a Programmer Device info display

In online mode, after connecting the programmer to the chip to be programmed, click 'Auto' to achieve 'online programming'.

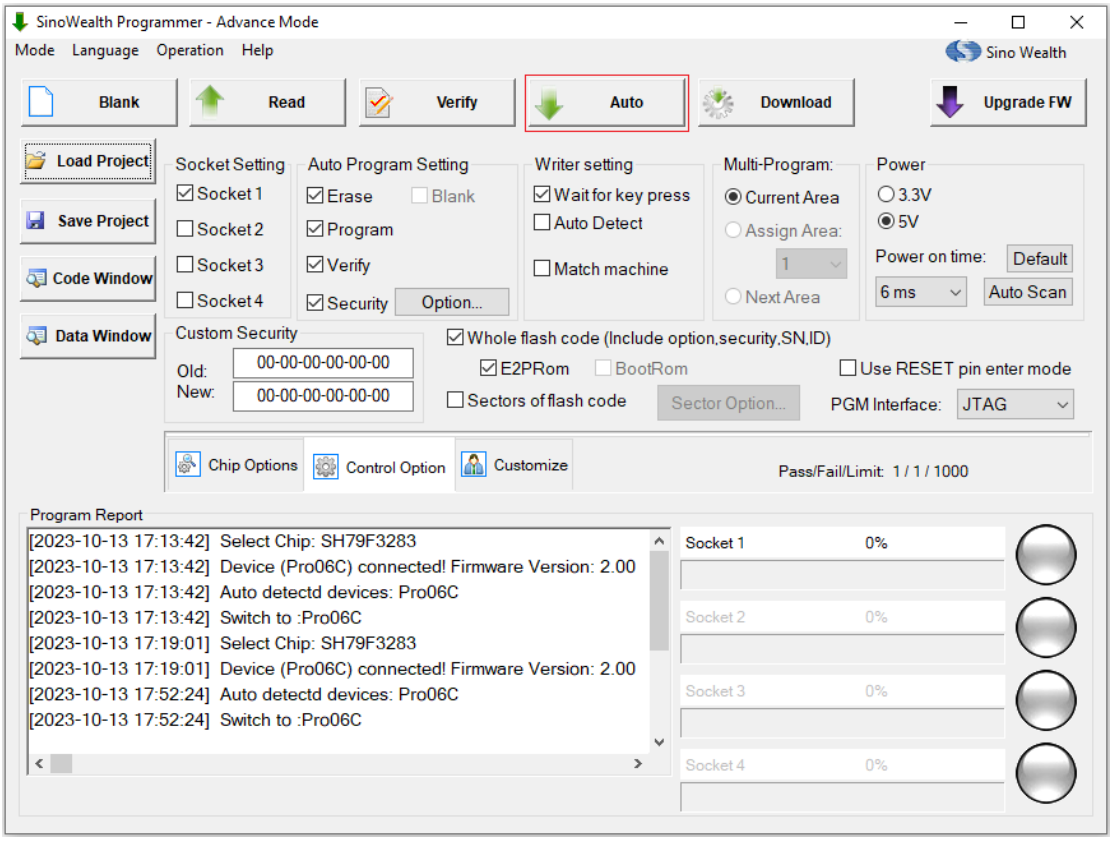

Figure 5.2.12.b Programming in online mode

offline programming

Disconnect the USB, power on the programmer again, and the programmer automatically enters the 'offline programming' mode.

At this time, according to the different configurations of the 'Writer Setting' option during the 'Download', there will be two situations:

- Checked 'Auto Detect': Once the programmer detects that a new chip has been connected, it will automatically start programming.
- Checked 'Wait for key press': When the programmer detects that a new chip has been connected, it will not directly start programming. It will only start programming when the "Start Key" is pressed.

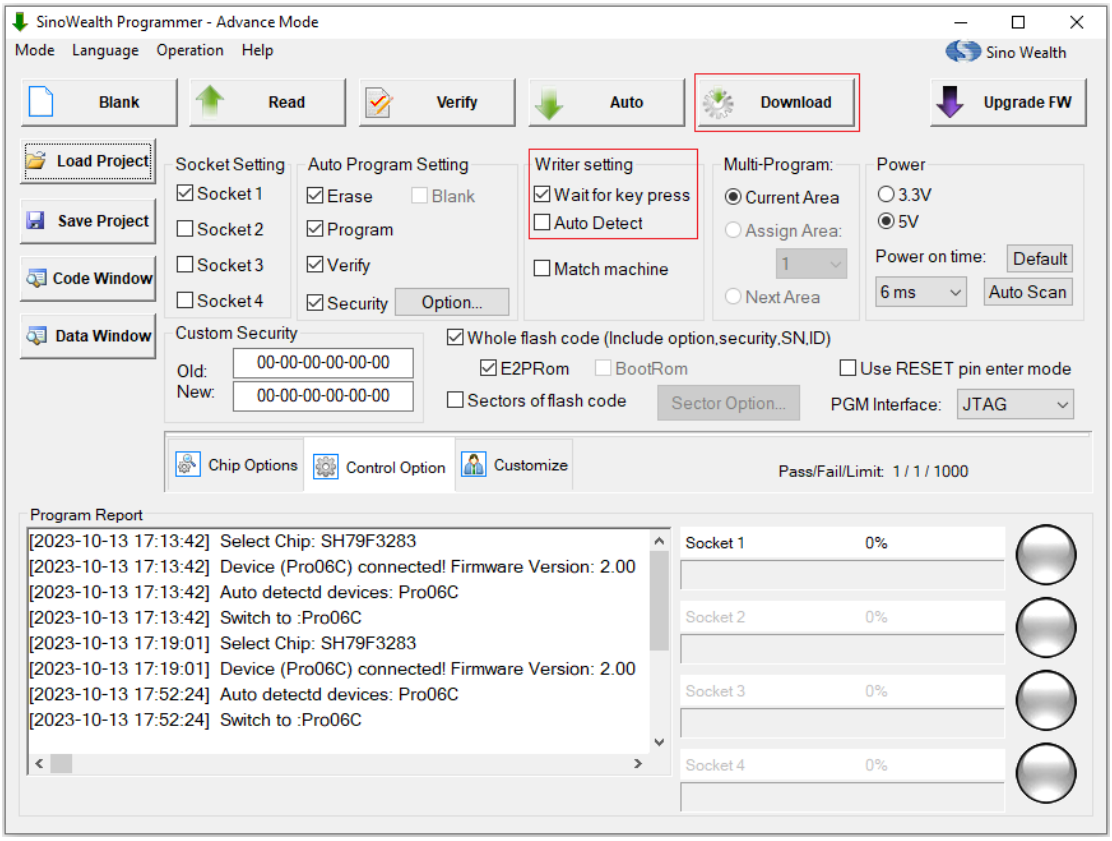

Figure 5.2.12.c Programming in offline mode

Chapter 6 Example of creating a nopf file

6.1 Configure parameters

6.1.1 Chip Name Configuration

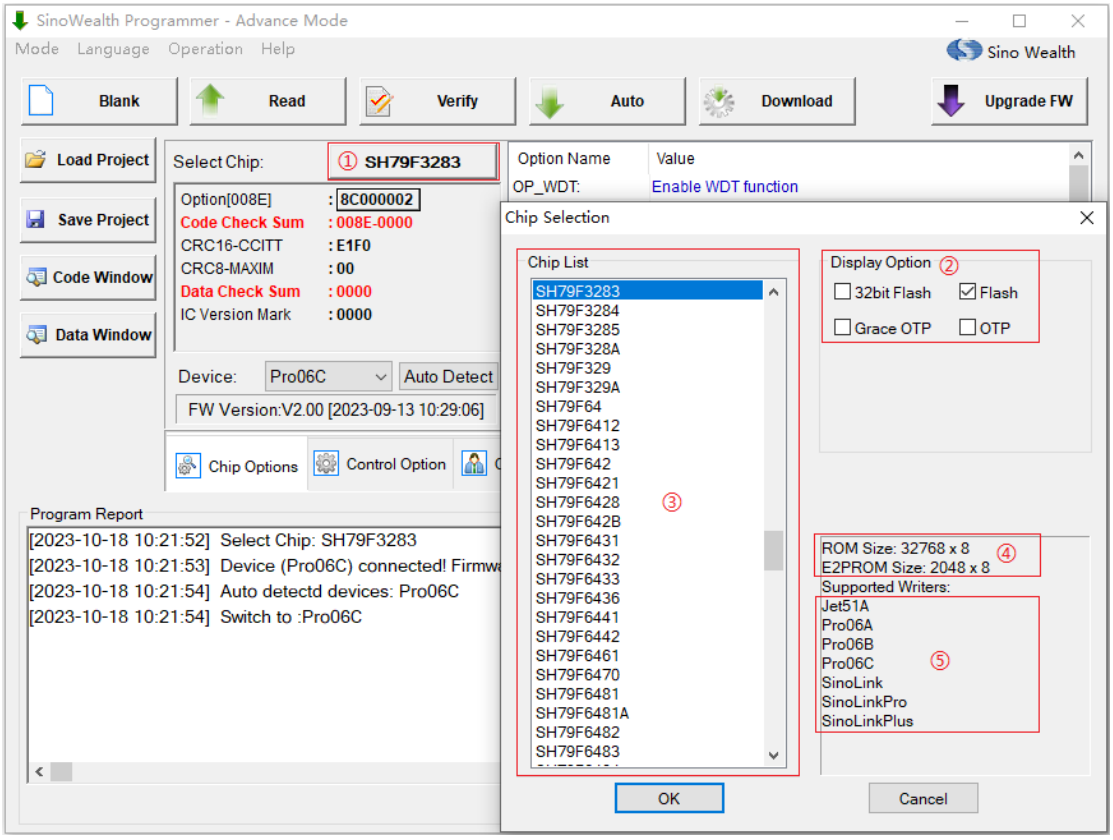

Figure 6.1.1.a Chip Name Configuration

- ② Area is the flash type selection area.
- ③Area displays all currently supported MCU types. If there are no required types, please update to the latest version of ProWriter software.
- ④ Area displays the ROM and E2PROM sizes of the currently selected MCU.
- ⑤ Area displays all programmer that support the current chip.

6.1.2 Channel (socket) setting

Pro06C supports up to 4 programming channels at the same time, and users can check it according to actual needs.

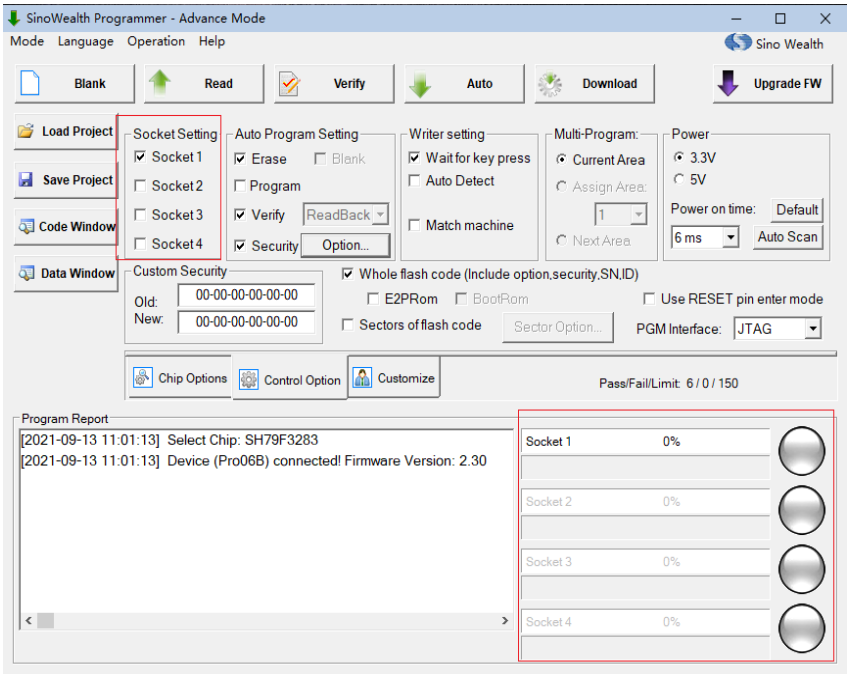

Figure 6.1.2.a Socket setting and display

6.1.3 Configure 'Power' and 'Power on time'

Configure the power supply for the MCU to be programmed during the programming process. The default value for 'Power on time' is 6ms.

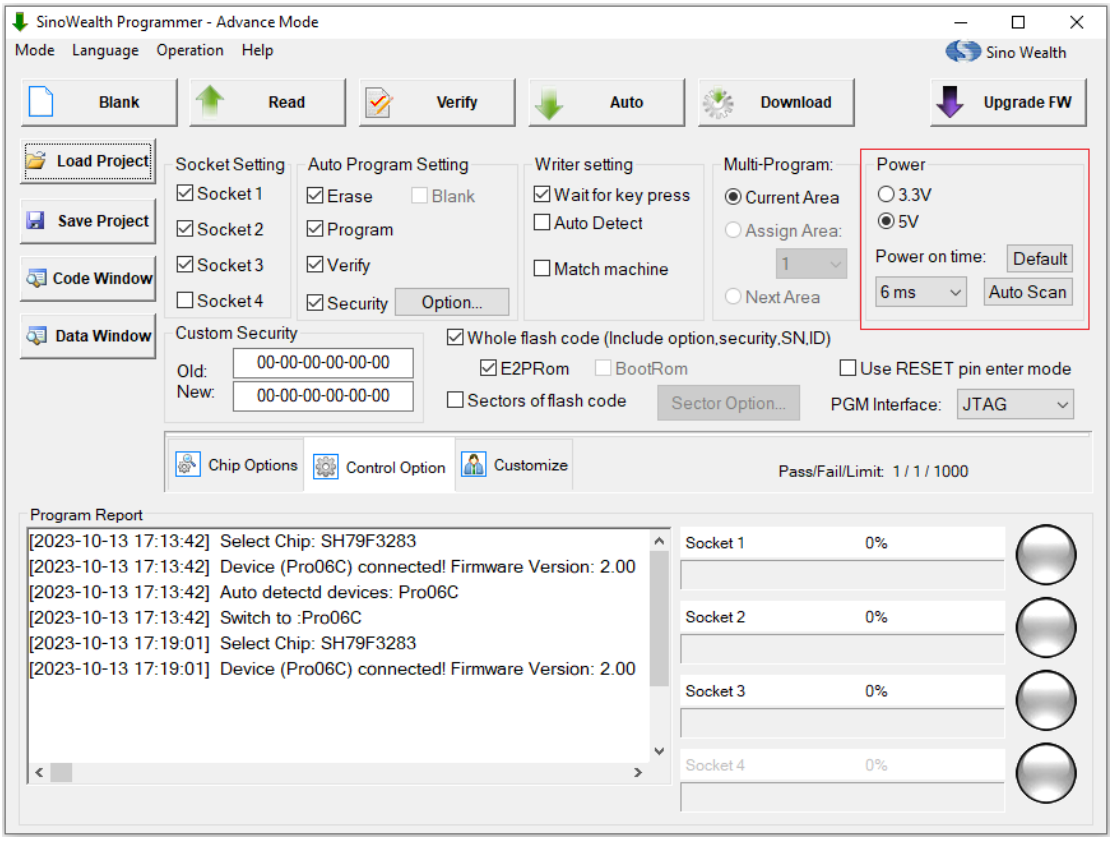

Figure 6.1.3.a 'Power' setting

6.1.4 Configure programming interface

The programming interfaces supported by different MCU models vary, and users can configure them according to their actual needs. Some chips only support one interface, so there is no need to configure it.

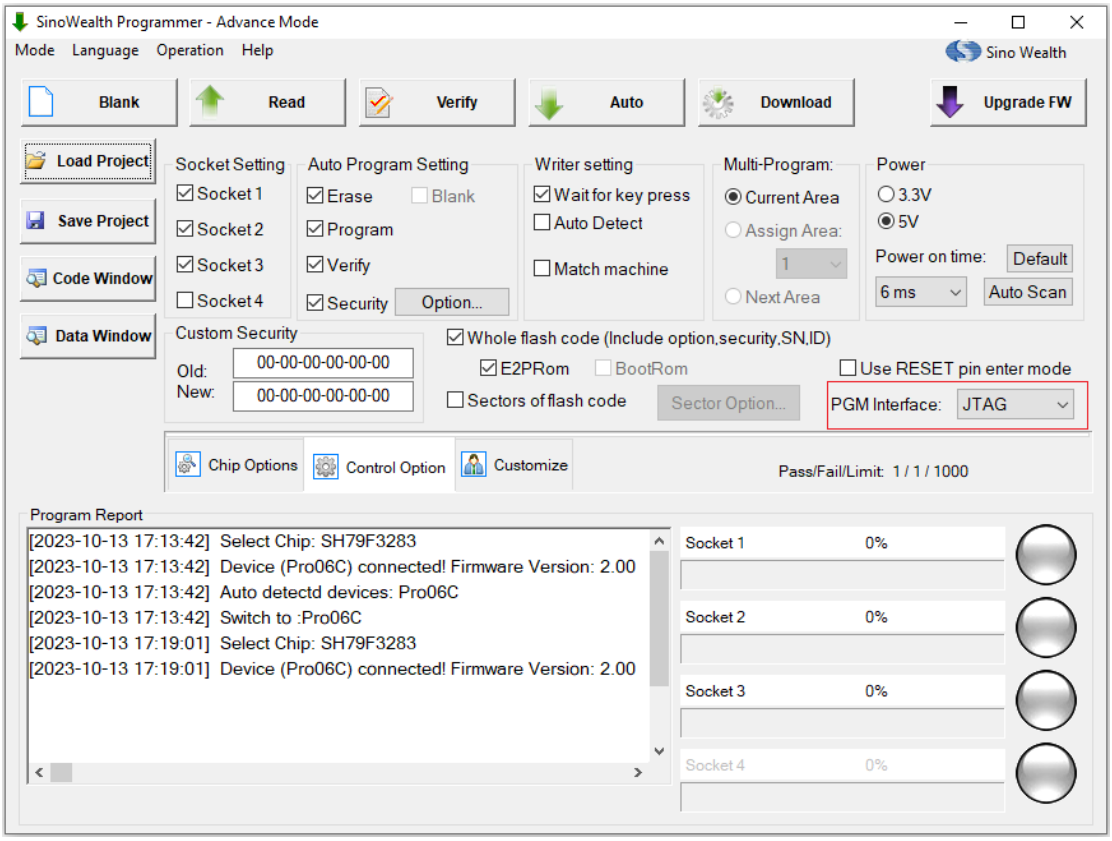

Figure 6.1.4.a 'PGM Interface' setting

6.1.5 Configure 'Use RESET pin enter mode'

If the user needs to use the RESET pin to enter the programming mode, they can check "Use RESET pin enter mode".

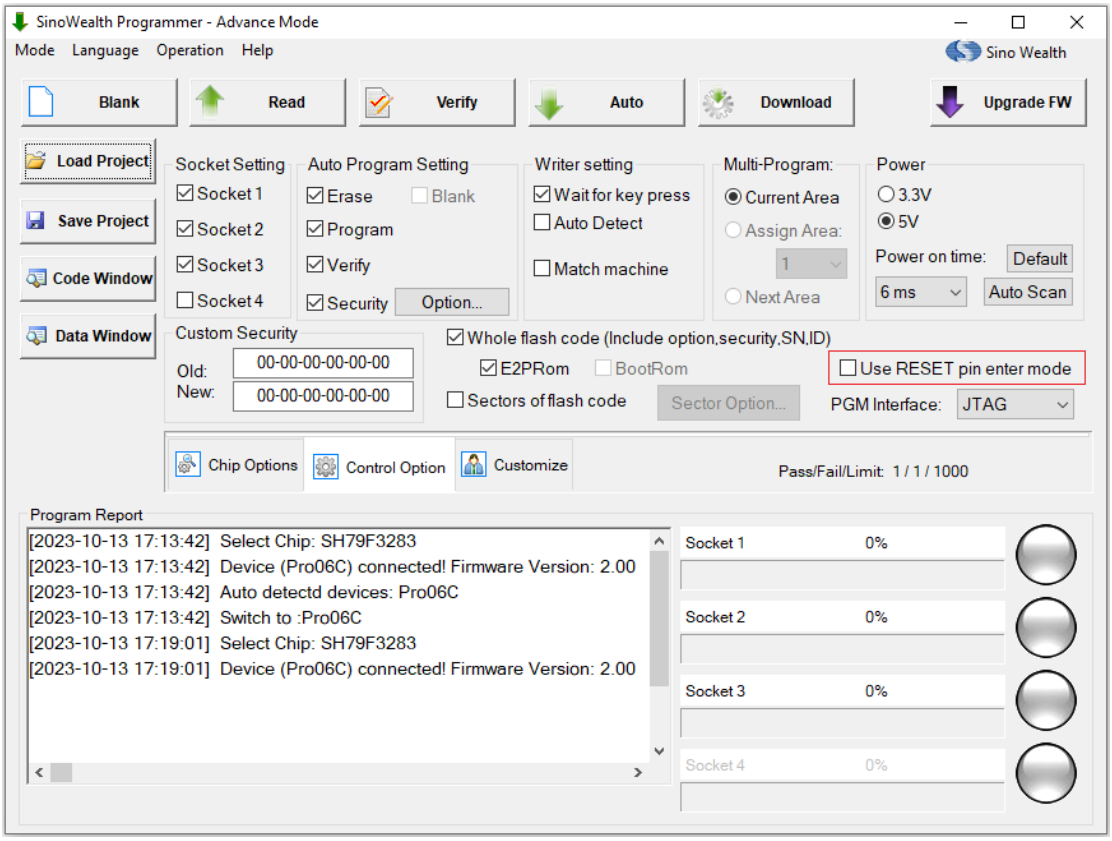

Figure 6.1.5.a 'Use RESET pin enter mode' setting

6.1.6 Configure the flash block to be programmed

The area to be programmed corresponds to the block in the target MCU flash. Users should check and configure according to their actual needs.

Usually, users need to check 'Whole flash code(Include option.security.SN.ID)'. If it involves programming 'user data', please also check 'E2PROM'.

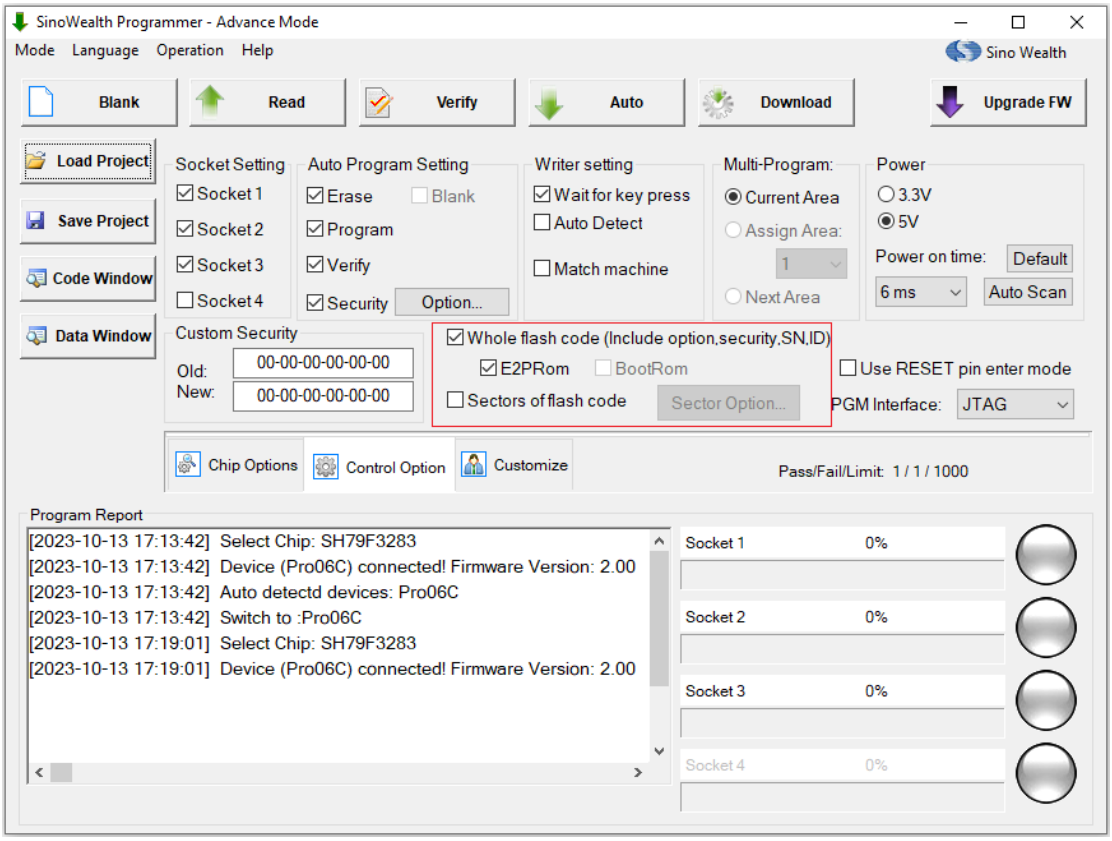

Figure 6.1.6.a Configure the flash area to be programmed

6.1.7 Custom Security

Optional configuration items. Please note that you can only set the 'Custom Security' after checking the 'Security' option under the 'Auto Program Setting' column.

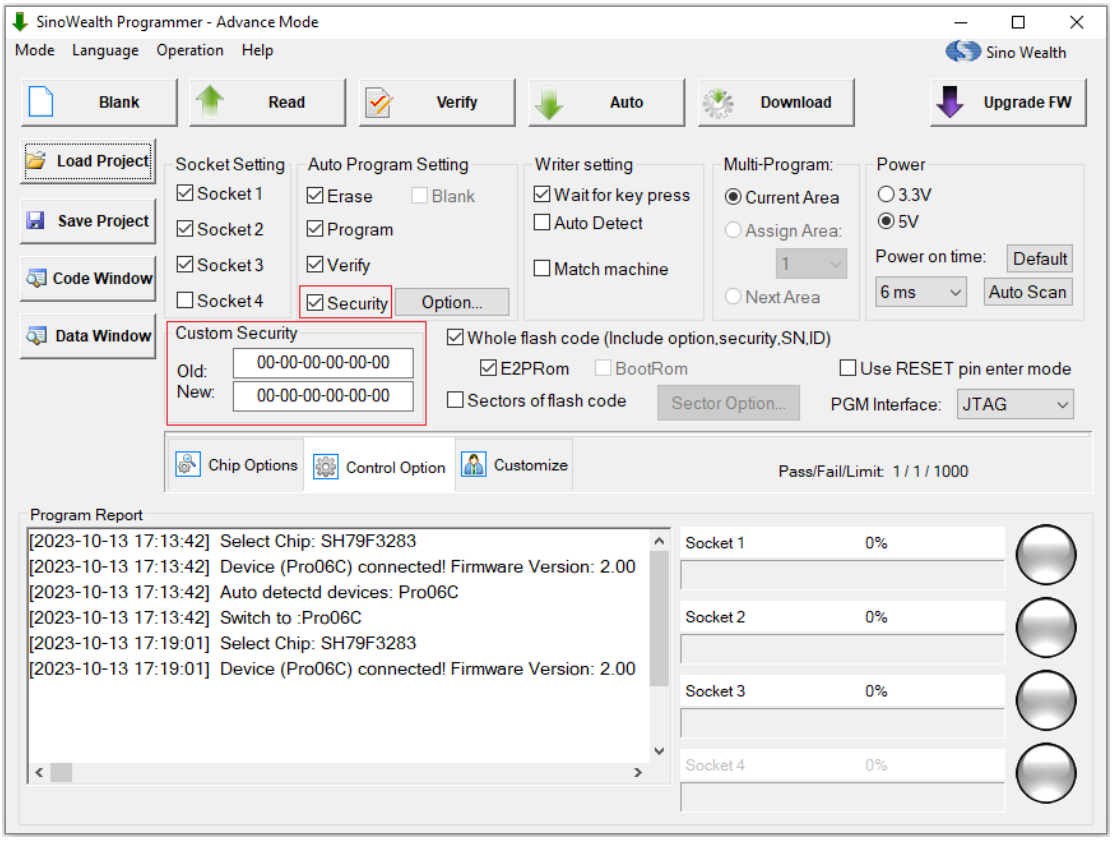

Figure 6.1.7.a Configure 'Custom Security'

6.1.8 Configure customer information

Optional configuration items. Set customer identification code (CID), serial number (SN), and programming limit information.

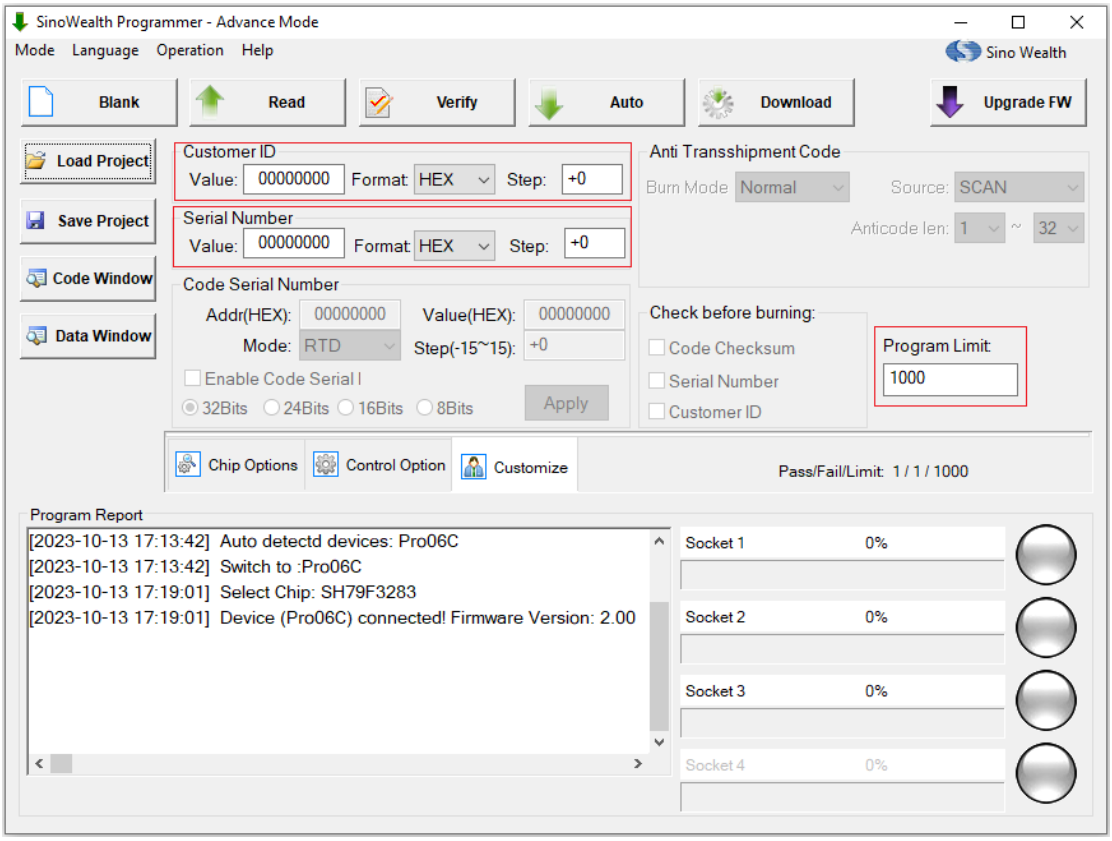

Figure 6.1.8.a Configure customer information

6.1.9 Loading Code and Loading Data

Optional configuration items. Set customer identification code (CID), serial number (SN), and programming limit information.

Loading through 'Load Project'

It can support loading hex or bin files. For 32-bit ARM core MCU, the hex file loaded here can support multiple blocks, such as a hex file that includes both Main block, Customer block, and E2PROM block codes.

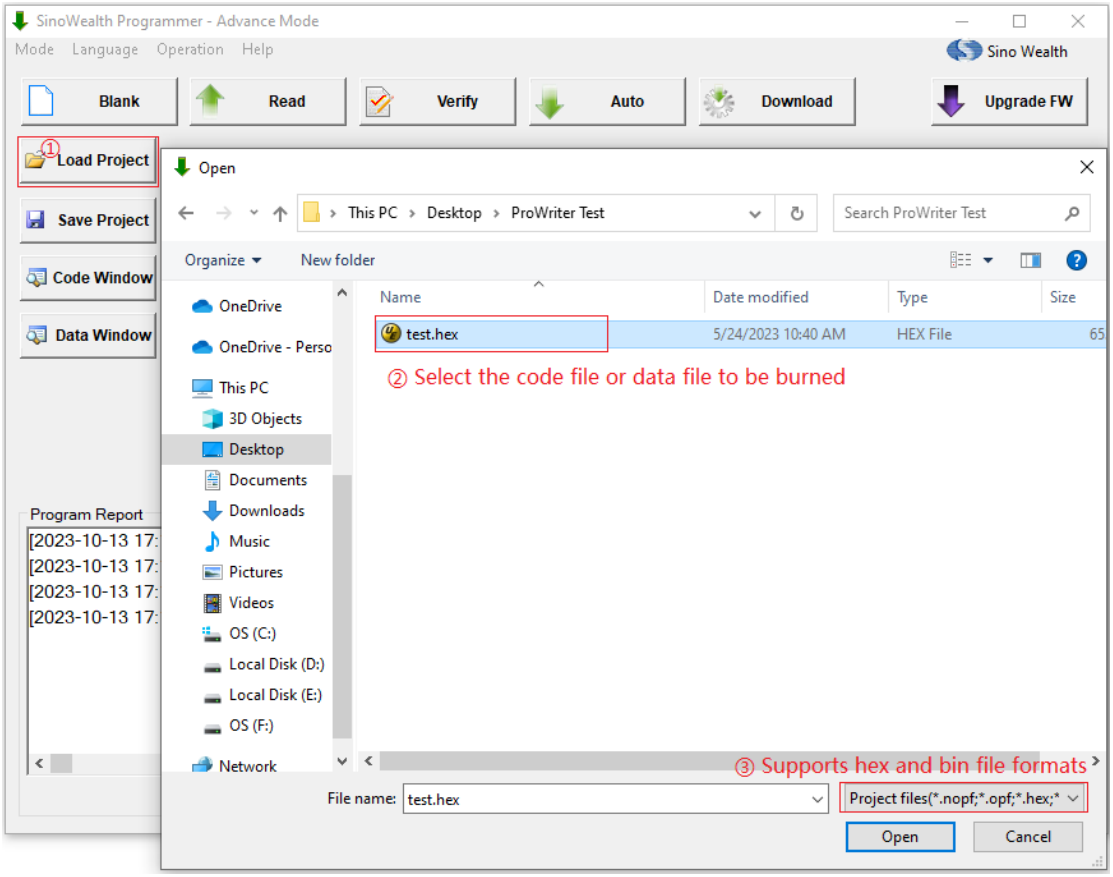

Figure 6.1.9.a Loading through 'Load Project'

Loading through 'Load Code' or 'Load Data' Directly

Load the code or data to be programmed. Please refer to Chapter 4.4 of this article for details.

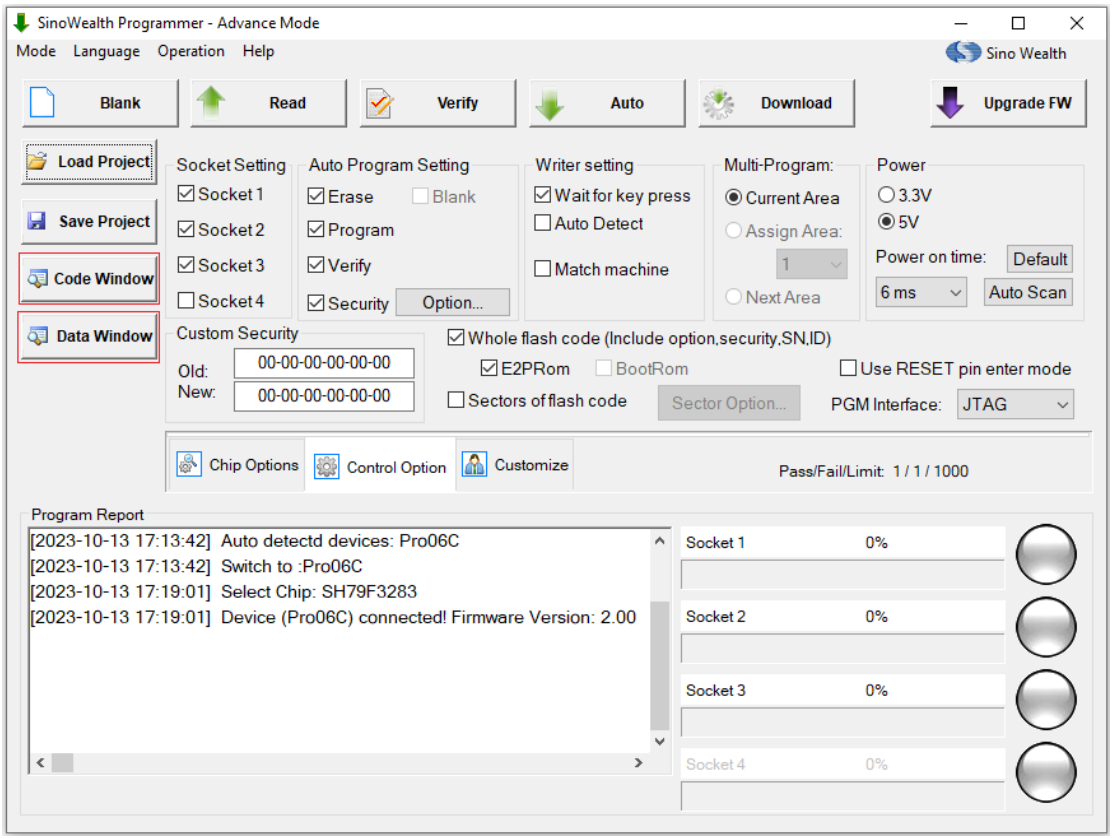

Figure 6.1.9.b Programming examples_ 'Load Code' & 'Load Data'

6.1.10 Automatic programming settings

Configure specific operations during the programming process (such as 'erase', 'program', 'verify', and 'security'). Please refer to Chapter 4.2.4 of this article for details.

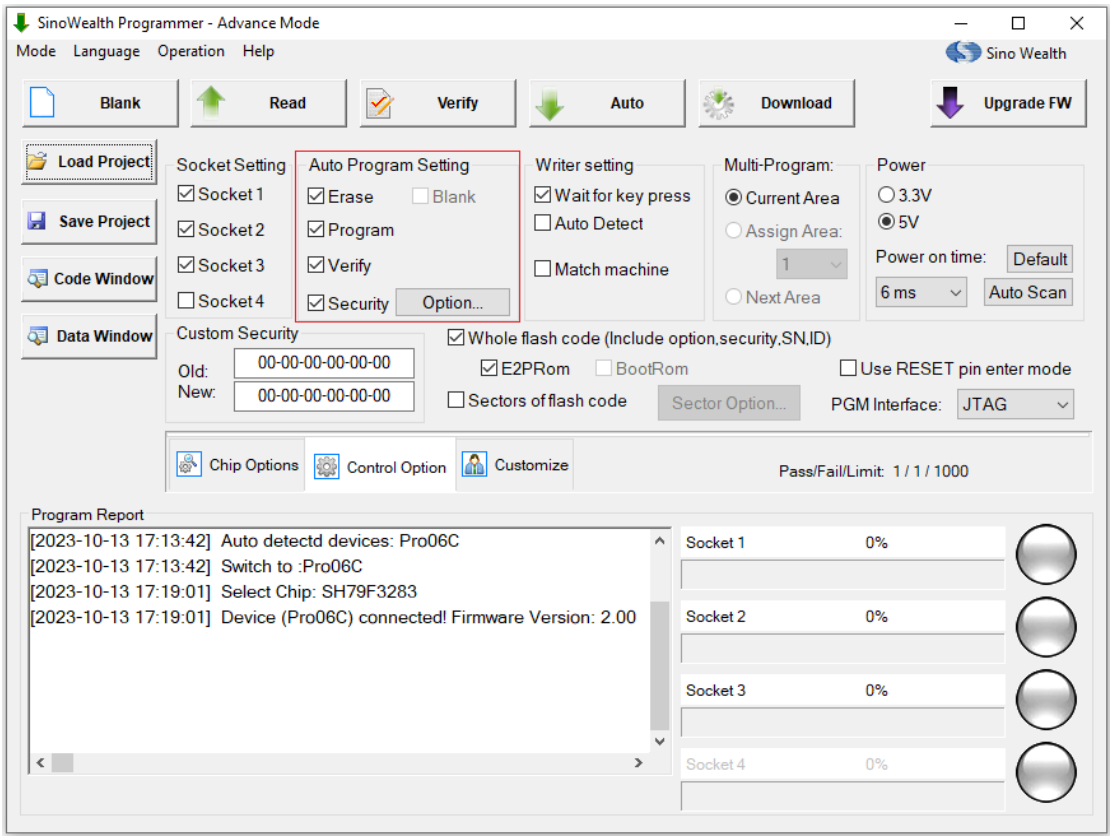

Figure 6.1.10.a Configuration of programming steps and code encryption

6.2 Save the project as a nopf file

Save the project to generate a nopf file. It can be divided into long-term valid version nopf files and limited time valid version nopf files. This article explains the generation of a 'long-term version nopf file'.

6.2.1 Generate long-term valid version nopf file

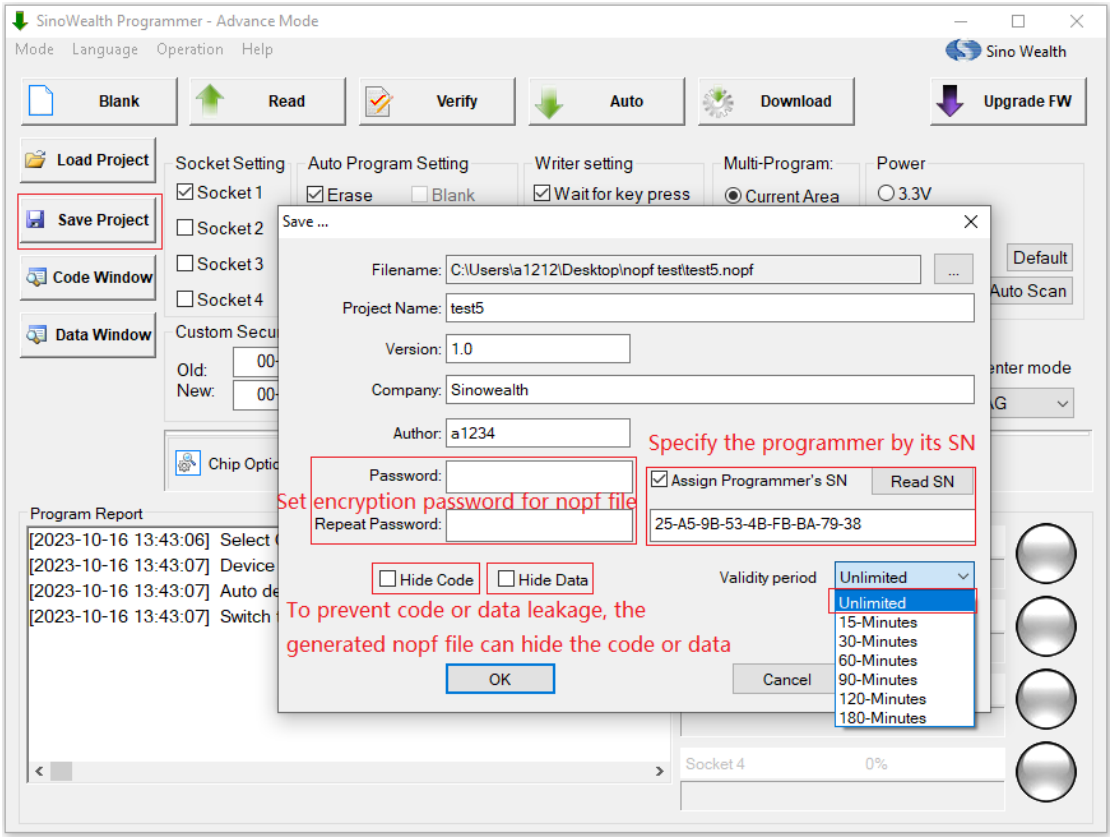

Figure 6.2.1.a Generate long-term valid version nopf file

- **Password**

Customers can decide whether to set a 'password' based on their actual needs.

- **Specify the SN of the programmer**

Check 'Assign Programmer's SN' and fill in the serial number of the programmer that needs to be specified in the format.

- **Hide Code**

Users should choose whether to check 'Hide Code' according to their actual

needs.

- **Hide Data**

Users should choose whether to check 'Hide Data' according to their actual needs.

Save the project to generate a long-term valid version of nopf

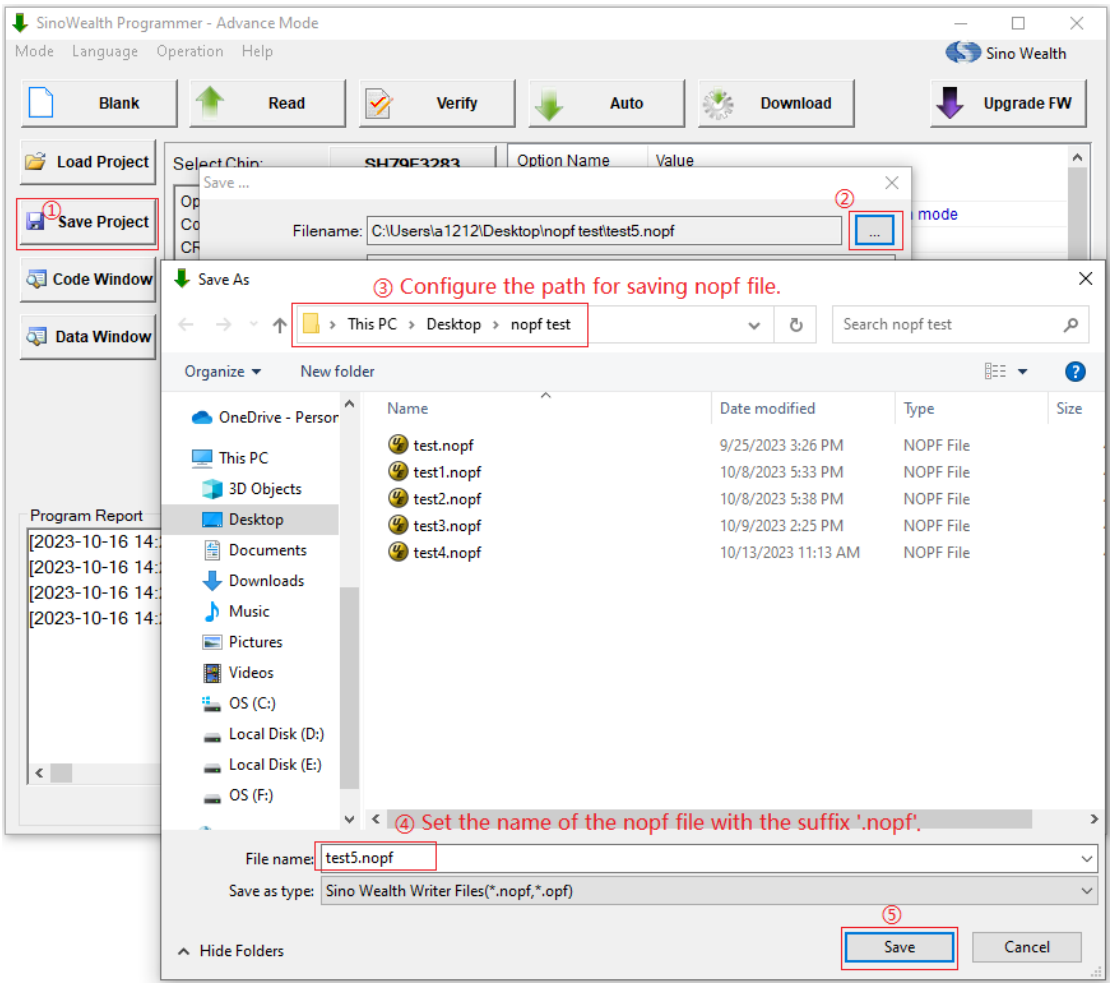

Figure 6.2.1.b Save the project to generate long-term valid version nopf file

Note:

1. If the user needs the nopf file to have the "Program Limit" function, please create a limited time valid version of the nopf file.

Chapter 7 Common Problems and Corresponding Solutions

1. Pro06C/Pro06B has been powered on and connected to the upper computer through a USB cable, but the ProWriter UI displays "No Writer":

1) Check if the USB cable connection is normal.

2) Click on "Auto Detect", and if successful, the device name and firmware version information will be displayed.

3) Check if the hardware device driver is functioning properly.

2. Program fail:

1) Check if the "Socket Setting", "PGM Interface", programming area, etc. are selected correctly.

2) Update ProWriter to the latest software version.

3) Check if the firmware of the programmer and the library files of the chip have been updated to the latest version.

4) Check if the "Power on time" parameter settings are appropriate. You can use the "Auto Scan" method to check. If the external capacitance of the VDD is large, it is recommended to manually modify the "Power on time" parameter for an attempt. After each attempt, it is necessary to manually short-circuit the VDD and GND to discharge.

5) Check if there is an external circuit on the IC programming pin. For resistors connected in series on the programming pin, pull-up resistors on the programming pin, or pull-down resistors on the programming pin, it is recommended to follow the maximum value in the "Application Reference" table. For other application circuits, it is recommended to disconnect the circuit before programming. If it cannot be disconnected, it is recommended to programming the chip first before welding.

Parameter		Symbol	MIN.	TYP.	MAX.	Unit	Condition
Resistor connected in series	SWE	R_S	-	-	47	Ω	
	JTAG		-	-	100	Ω	
	SWD		-	-	100	Ω	
Pull-up resistor	SWE	R_{PH}	3.3	-	-	kΩ	
	JTAG		1	-	-	kΩ	
	SWD		1	-	-	kΩ	
Pull-down resistor	SWE	R_{PL}	33	-	-	kΩ	
	JTAG		4.7	-	-	kΩ	
	SWD		4.7	-	-	kΩ	
VDD Capacitor		C_{VDD}	-	-	1000	uF	
The duration of pressing Key		T_{KEY}	200	-	-	mS	
The level of the Key		V_{KEY}	GND	-	GND+0.6	V	Active at low level

Figure 7.2.a Application reference table

6) Check if there are high-power modules or other modules that may pull lower the VDD level on the board. If so, it is recommended to disconnect them before programming them.

7) If there is an external power supply on the board, the RST pin must be used for programming, and the "Use RESET pin enter mode" option on the software UI needs to be checked. For Pro06C/Pro06B, VDDx cannot be connected, otherwise it may damage the programmer. At this time, the detection connection function needs to be disabled (check "Turn off the chip connection detection function" in "Operation" → "Setting").

3. Pro06C/Pro06B detection connection failure:

1) If there is an external power supply on the board, the RST pin must be used for programming, and the "Use RESET pin enter mode" option on the software UI needs to be checked. For Pro06C/Pro06B, VDDx cannot be connected, otherwise it may damage the programmer. At this time, the detection connection function needs to be disabled (check "Turn off the chip connection detection function" in "Operation" → "Setting").

2) Check if there is an external circuit on the IC programming pin, disconnect the external circuit, or shield the detection connection function.

3) If the "Auto Detect" method is checked for programming, when the probability of error is high, it is necessary to first check the wiring/thimble and other connectors, as shaking during contact can affect the programming. Therefore, it is usually recommended to check the "Wait for key press" method.

4. Automatic programming machine matching problem:

1) It is recommended to check the "Wait for key press" method for programming. Please refer to the "Application Reference" table for key signal requirements, as shown in Figure 7.2.a.

2) For multi-channel programming, it is recommended to connect all the selected channels before providing a unified start signal. Otherwise, when some channels program, the "key press" detection function will temporarily fail, and other channels cannot start programming.

3) Ensure that the START, BUSY, and OK signals are connected correctly, and check "Match machine" on the software UI.

5. Although there is a prompt of "successful programming ", the Main area Code obtained from reading is actually inconsistent with the original programming value:

1) Is "Program" and "Verify" not checked.

2) Is the code area not checked (both "Whole flash code" and "Sectors of flash code" are not checked).

3) Is' Sectors of flash code 'checked, but the sectors to be programmed are not checked in "Sector Option…".

4) Is it encrypted? Such as sector encryption("B0/B1"), "Ultra Security", "Custom Security", "The low/high level of read protect", etc.

6. If the "Code Option", "Customer ID", and "Serial Number" cannot be programmed in, the following operations can be attempted:

1) Check if "Whole flash code (Include option.security.SN.ID)" is checked.

2) The operation options such as "Erase" and "Program" in the "Auto Program Setting" option bar must be checked.

3) Code option, Customer ID, serial number, etc. are not zero.

7. Error related to chip name selection:

1) Check whether the chip name selected on the software UI is consistent with the IC name to be operated on.

2) Check if the chip is encrypted.

3) Check if the wiring is correct.

8. Software usage related issues:

1) If the required chip name cannot be found, please update the software to the latest version.

2) If you are unable to load code or data about flash blocks such as data, OTP, Boot, etc., please check if the corresponding flash block is checked.

3) After loading opf/nopf, if you need to update E2/Code content, you can check "Allow changes to

EEPROM content operating options" or "Allow changes FLASH operation options" in "Operation" → "Setting".

4) For chips with a code option length of 8 bytes, ProWriter V3.0 and above must be used.

5) The software UI displays 4 digits of "code checksum", with the low two bytes of "0000-0000" indicating the code checksum and the high two bytes indicating the code option checksum.

9. Check the ProWriter software version and programmer firmware version:

1) View ProWriter software version information in the "Help" → "About..." window.

2) View firmware version related information in the "Chip Options" sub UI of the software main UI.

3) For more information, please open "Help" → "Help" for query.