



SPMC65X In-Circuit Emulator User Guide

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English Version

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Revision History

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1 SPMC65X In-Circuit Emulator

1.1 Description

Sunplus Innovation Technology Company Limited, the world famous corporation in IC design, specializes in developing high-quality integrated circuit (IC). Our vision is “Technology for Easy Living”, that is, to provide customers with satisfying products and knight service by the powerful IC design and system application capabilities. With many core technologies of multi-media, microprocessors, and digital signal processors (DSP), SunplusIT has developed a wide variety of products, such as LCDs, microcontrollers, multi-media, speech ICs, mp3/mp4, and various ASICs. Promisingly, the giant wheel of innovative design keeps rolling forward day after day.

SPMCX MCU, the industrial control MCU developed by SunplusIT, plays its significant role in the MCU field with high noise immunity, low cost high performance, and comprehensive technical-service. SPMCX MCU includes SPMC65X and SPMC75X, thereinto, The SPMC65X is suitable in general-purpose controller, Industrial equipments, computer peripheral controller, home appliance, etc. The SPMC75X is designed for inverter-fed motor driver, power electronics, home application and inverter control system, etc.

SPMC65X In-Circuit Emulator is used for SPMC65X in-circuit emulating and OTP (One-Time Programmable IC) programming. Following are the related configurations:

- One SPMC65X in-circuit emulator
- One 9V power supply
- One emulator adapter
- Two flat cables
- One USB cable
- One CD (including IDE and rich product information)
- One user guide

1.2 Structure Introduction

The In-Circuit SPMC65X In-Circuit Emulator for SPMC65x family is shown as Figure 1-1.

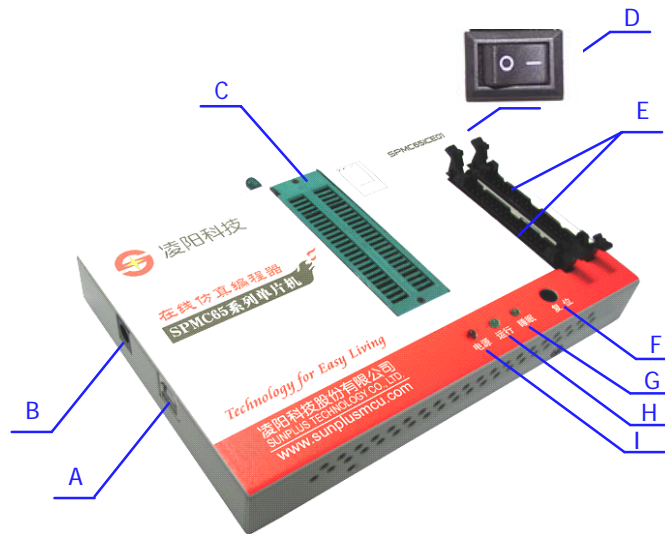


Figure 1-1 SPMC65X In-Circuit Emulator

- A: USB socket
- B: 9V power supply input
- C: In-Circuit Programming fixture for OTP type IC(upper-aligned fixed)
- D: Power switch
- E: Extended Connectors
- F: RESET
- G: SLEEP indicator, yellow
- H: RUN indicator, green
- I: POWER indicator, red

1.3 SPMC65X In-Circuit Emulator Operation

■ Connect the in-circuit SPMC65X In-Circuit Emulator with PC

Just connect a USB cable square end to the SPMC65X In-Circuit Emulator (A in Figure 1-1) and the flat end to PC USB interface.

■ Connect the in-circuit SPMC65X In-Circuit Emulator with user's target board

SPMC65X family SPMC65X In-Circuit Emulator reserves some extension connectors for connecting user self hardware board and SPMC65X family daughter board, shown in Figure 1-2. User can use the emulated daughter boards which are pin compatible with SPMC65X family microcontrollers to connect to product hardware board for system development (such as SPMC65P2408A versus SPMC65P2408A SPMC65X In-Circuit Emulator adapter). After connection via the extension connectors, debug can be

performed.



Figure 1-2 Extension Connectors to SPMC65X In-Circuit Emulator Adapter

Refer to Figure 1-3 for extension connector schematic illustration:

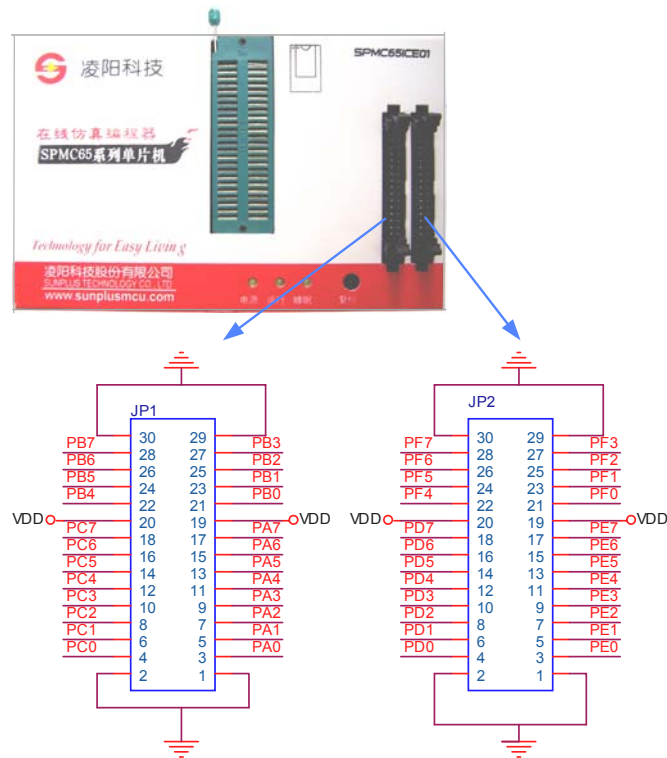


Figure 1-3 Extension Connector Schematic Illustration

■ Power Supply

There are three kinds of power supply modes for SPMC65X family SPMC65X In-Circuit Emulator.

- A switch shown as 'A' in Figure 1-1 is used to switch the supply power. While switching to "OFF" side, the supply power of SPMC65X family SPMC65X In-Circuit Emulator is independent of user's target board. The working power of SPMC65X

In-Circuit Emulator is 5Vdc converted from DC-9V adaptor input, shown as 'B' in Figure 1-1. In this operation, SPMC65X In-Circuit Emulator and user's target board have a common ground and independent power supply.

- While switching to "ON" side, shown as 'D' in Figure 1-1, SPMC65X In-Circuit Emulator and target board have the same VCC and GND. User can select the working power supplied from DC-9V adaptor ('B' in Figure 1-1) or user's target board.

Note:

The highest current that the SPMC65X In-Circuit Emulator can offer for user's target board is 500mA.

- Check the SPMC65X In-Circuit Emulator being not powered (in B of Figure 1-1), then switch the power (in D of Figure 1-1) to "ON". Supply power to the target board, and in this operation, SPMC65X In-Circuit Emulator and user's target board have a common power supply.

Note:

- Target board supplies 5V (recommend) for SPMC65X In-Circuit Emulator; once the voltage is over 6V, the over-voltage protection circuit will disable the connection.
 - The over-voltage protection circuit in SPMC65X In-Circuit Emulator is power supplied via USB port, thus first of all do connect the USB.
-

The power indicator on the SPMC65X In-Circuit Emulator (see I in Figure 1-1) is lighted when the emulator is powered on.

■ Debug

The complete emulation system let user finish all design follow from coding, debugging, emulating, to programming device. SunplusIT establishes an overall development environment which combines SPMC65X Family Emulator and FortisIDE™ to let user develop product design follow (refer to SPMC65x Programming Guide or www.SunplusITmcu.com). When indicator H is on, the system is in debug or programming cycle; when G is on, system enters SLEEP mode.

■ Programming

Connect pin 1 of the MCU to the top left of the ICP fixture and press it tightly (see Figure 1-4), then program the MCU through Q-Writer.



Figure 1-4 In-Circuit Programming fixture

2 Q-Writer

The Q-Writer is a SunplusIT new developed programming tool, which let user be able to complete all design flow in the SPMC65X family development environment. This chapter will describe how to program and usage of serial number and product information; moreover, it also introduces how to set the security via Q-writers.

You can install SPMC65 development environment Fortis IDE and Q-Writer at the same time and refer to www.SunplusITmcu.com for the last software version.

2.1 General Description

The Q-Writer is a SunplusIT new developed programming tool which is dedicated for the SPMC65X family. Q-Writer is built with a friendly operation interface (shown in Figure 2-1) and concise hardware architecture. The new generation programming tool provides many advantages like more convenient usage, high reliability and low cost etc.

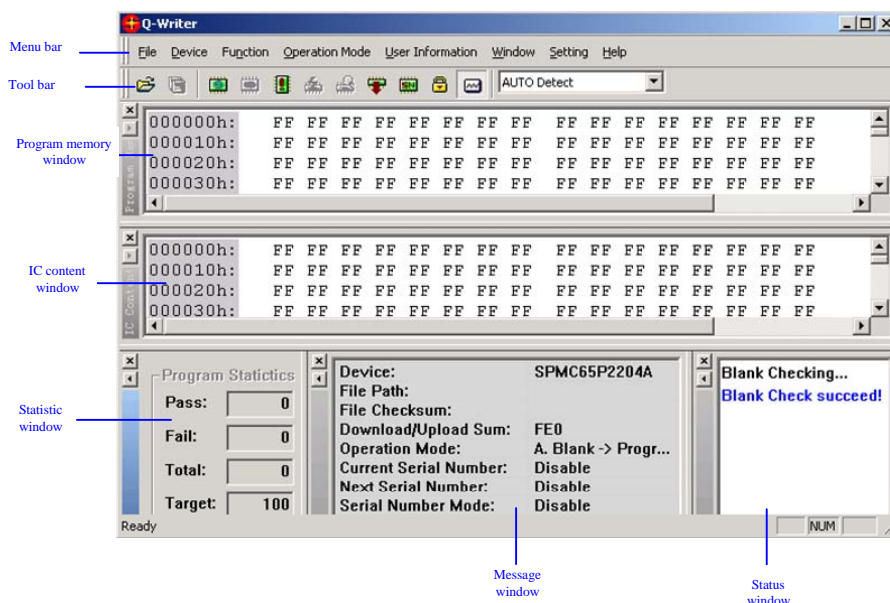


Figure 2-1 Q-Writer Interface

Program Memory Window: This window records the downloaded binary file and it is also the source for programming.

IC Content Window: This window records the content of OTP. While something error happened during operation, the window shows the error address and read back data.

Statistic Window: This window is used to manage the programmed quantity.

Message Window: To enable or disable exhibited items of this window by selecting the

checkboxes of option.

Status Window: Q-Writer shows all of the operating state in this window. User can see the whole operation procedure clearly.

2.2 Q-Writer Settings

- Select [Setting] → [Option], User can see the setting window as Figure 2-2.

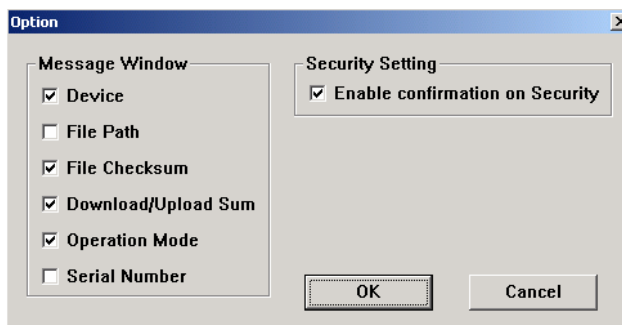


Figure 2-2 Setting Window

“Message Windows” option is to enable or disable exhibited items of this window by selecting the checkboxes of option. This window, as shown in Figure 2-3, is called by [Windows] → [Message Window].

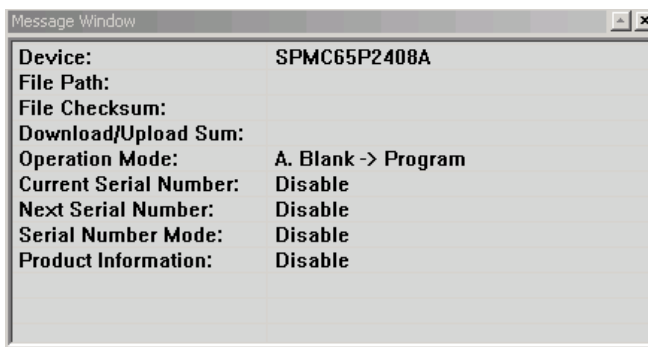


Figure 2-3 Message Window


If users uncheck the security setting selection, the system will not display a confirmation window before securing IC.

Select [Setting], user can set following functions:

- Program Statistic: The function is the same as the icon of toolbar to enable/disable statistic function.
- 16 Bytes per Row: The function controls the arrangement amount of per row. If enabling the function, per row of memory window shows 16 bytes data or else the byte is auto arranges according to the window’s size variation.

- Show ASCII Code: Show the corresponding ASCII code against the binary data of memory window.

2.3 Programming Steps via Q-Writer

- Starting Q-Writer
 - Method one: Execute Q-Writer-V1.0.0.exe directly.
 - Method two: After opening FortisIDE, user can start Q-Writer by pressing  on the toolbar or select [Tools] → [Q-Writer].

Note:

When starting Q-Writer, FortisIDE is forbidden to enter debug mode. Even if FortisIDE has gone into debug mode, it still goes back to normal state as long as starting Q-Writer.

■ Blank Check

Select [Function]→[Blank Check], check whether IC is blank or not. At the same time, Q-Writer reads out the IC data to IC content window. If this function failed at some address, the system goes to the wrong address and highlights the data with red in the IC content window.

■ Select

Select [Device]→[Select], open the device selection menu as follows. User must select a device after executing Q-Writer at the first time. The system also records the last selection device in the message window; hence the last selection device is the default setting if Q-Writer is restarted.

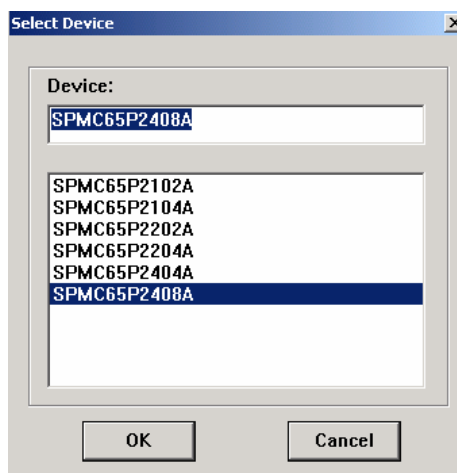


Figure 2-4 Select Device

■ File

- Select [File] → [Open] to open and download the *.bin or *.tsk file to “Program Memory Window”.
- Select [File] → [Recent Files]. Record at most 4 last opened files.

■ User Information

- Serial number

Q-Writer uses 4 bytes to be the serial number locations from 0x7FF0 to 0x7FF3, shown in Figure 2-5.

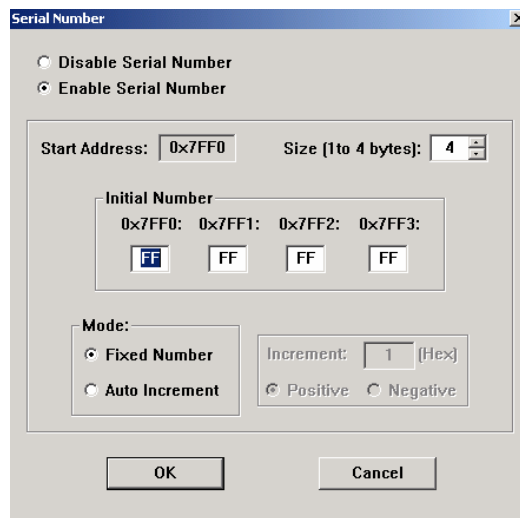


Figure 2-5 Product Serial Number

- ♣ *Start Address:* The start address of serial number is 0x7FF0. 0x7FF0 is the LSB and 0x7FF3 is the MSB.
- ♣ *Size (1 to 4 bytes):* User can decide how many bytes of serial number to be used through setting this item.
- ♣ *Initial Number:* The item is used to input the preliminary serial number. When user finishes the setting, the input data will update to program memory window. The default value of unused bytes is 0xFF.
- ♣ *Mode:* The item lets user be able to operate the serial number setting with fixed mode or auto mode. In fixed mode, the increment item becomes gray area and the serial number is fixed as initial number setting; in auto mode, user can decide the increment value and the serial number has regular variation in accordance with this value. There are two ways to change the increment value, which are positive or negative counting.

- Product Info:

0x7FF4~0x7FFF total 12 bytes are used to be the product information location. User can use free those locations to record configured product information such as

production date and factory. The default value of those bytes is 0xFF, shown in Figure 2-6.

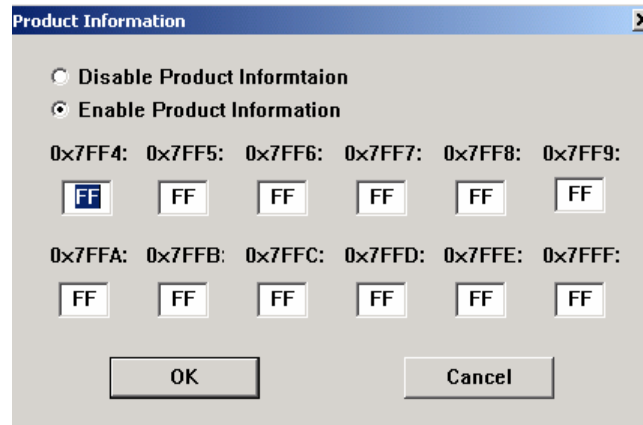


Figure 2-6 Product Information

■ Program

This command is used to program OTP device according to the content of program memory window. At the same time, Q-Writer reads out the IC data to IC content window. If this function failed at some address, the system goes to the wrong address and highlights the data with red in the IC content window. Once executing this function, Q-Writer also executes verify function to ensure the programming reliability in the meanwhile.

■ Verify

Verify function is used to check the data of source code and target OTP. While verifying IC, Q-Writer reads out the IC data to IC content window. If this function failed at some address, the system goes to the wrong address and highlights the data with red in the IC content window.

■ Secure

This command is used to enable/disable IC encryption. After setting up this function, the device will be secured and not be allowed to read. User must program and verify device before starting security operation. SPMC65X family microcontrollers just allow the IC content of some addresses to be read, which like device configuration registers, user information, and the last 16 bytes of program memory (0xFFFF0~0xFFFF). The others are shown as 0x00.

2.4 Operation Mode

This menu is used to select the continuous operation mode that suitable for mass production. Please follow the steps below.

(1) Open [Operation Mode] to select:

- A. Blank → Program: this command will auto run Blank Check and Program continuously. If any failed at some address, the system stops operating and highlights the error.
- B. Blank → Program → Verify: System will perform Blank check, Program and Verify continuously. If any failed at some address, the system stops operating and highlights the error.
- C. Blank → Program → Verify → Secure: System will perform Blank check, Program, Verify and Secure continuously. If any failed at some address, the system stops operating and highlights the error.

"A. Blank → Program" is the default mode.

- (2) Enable Statistic Window (refer to Figure 2-7) to manage the programmed quantity, shown in Figure 2-8.

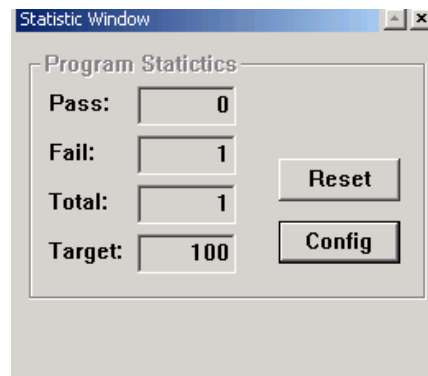


Figure 2-7 Statistic Window

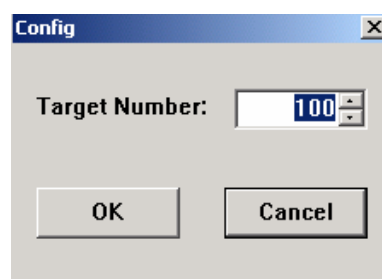















Figure 2-8 Quantity of Programmed Target

- (3) Open and download the *.bin or *.tsk file to "Program Memory Window".
- (4) Click  or select [Function] → [Auto Run] for programming automatically. Click  once and perform the selected programming mode one time. Figure 2-7 shows the programming statistic information.

✧ *Pass*: Record the quantity of programmed successfully IC.

- ◇ *Fail*: Record the quantity of programmed failure IC.
- ◇ *Total*: The sum of pass and fail IC.
- ◇ *Target*: Set the expectative programmed quantity.

2.5 Toolbar

-  Open the source file with binary format. User must download a binary code to enable all of Q-writer functions
-  Save the content of program memory as another path.
-  Select device. User has to select a correct device to operate Q-Writer.
-  Execute auto run (continuous) function.
-  Execute blank check function.
-  Execute program function.
-  Execute verify function.
-  Execute read function.
-  Enable serial number function.
-  Execute security function.
-  Enable/Disable statistic function.



Select probe. There are two kinds of items to select the suitable probe. If the probe selection item is 'Auto Detect', the system will detect plugged probe automatically.

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