

SWD-M4
1-to-4 Programmer
User Guide

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1 Introduction

The SWD-M4 Programmer sends the programmed HEX data from the PC to the SWD-M4 motherboard through the USB-HID protocol, and at the same time uses the SWD interface to programming the ARM series ICs, or you can download the HEX or BIN files to the EEPROM of the SWD-M4 motherboard for off-line programming. It also supports 4 pieces of IC on-line or off-line programming and it is suitable for mass production.

2 Installing Procedures

Please download the software from the official website <http://www.weltrend.com.tw/en-global/support/detail/69/125/93>

Item	Content	Description	Doc	SW
WA007	WLINK-SWUT-M4 Burner	WLINK-SWUT-M4 is USB to SWUT 1-to-4 way Programmer and it supports ISP tool for Weltrend WT56Fxxx, WT51Fxxx series MCU.	Doc26	SW28
ArmM4S	1 to 4 ARM MCU Gang Programmer	WT32L064/032 SWD-M4 1-to-4 Programmer for Mass Production	Arm_DOC 6 Arm_DOC 9	ArmM4S

Copy the execution software SWD_M4S_xxx to your PC without installing it and click to open it directly, as shown below.



3 Programmer & Driver

The SWD-M4 programmer adopts a Human Interface Device (HID) and the software can be used directly without installing a driver. After connecting the SWD-M4 to the USB port of PC, check the installed devices under the Windows Device Manager. The “**USB Human Interface Device**” will appear, and it indicates that the SWD-M4 programmer has been successfully connected to the PC.

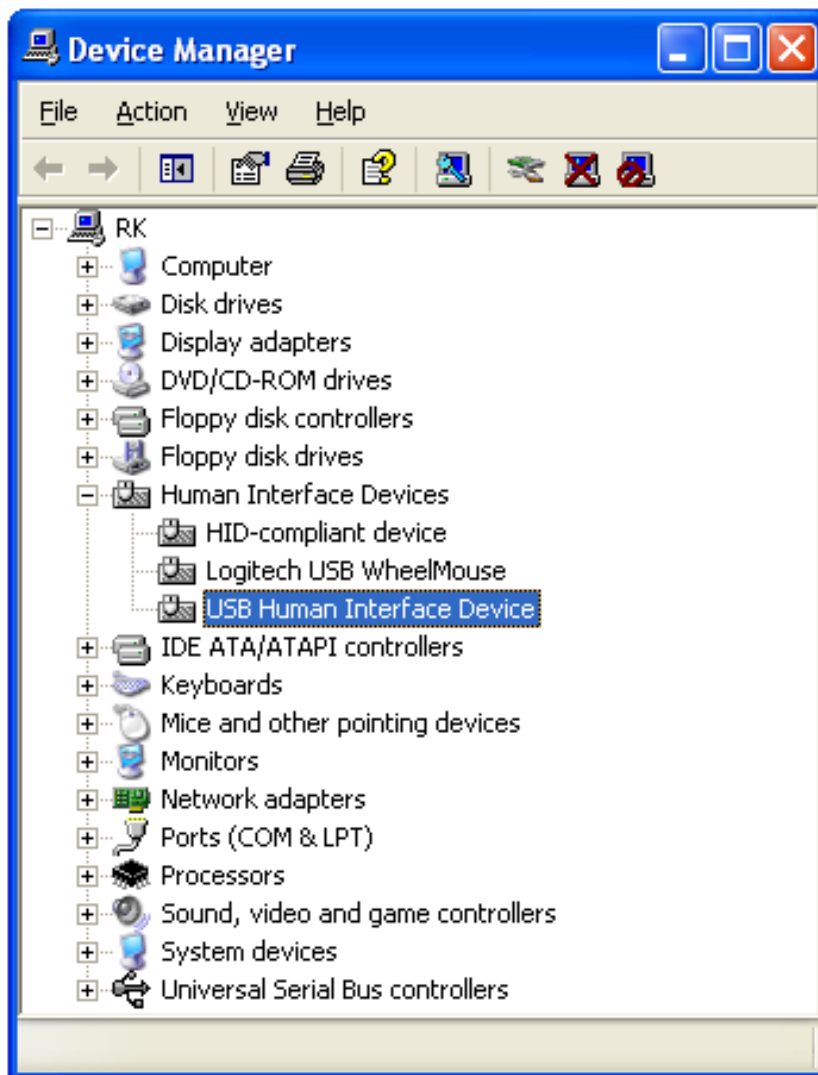


Figure 3-1 Device lists

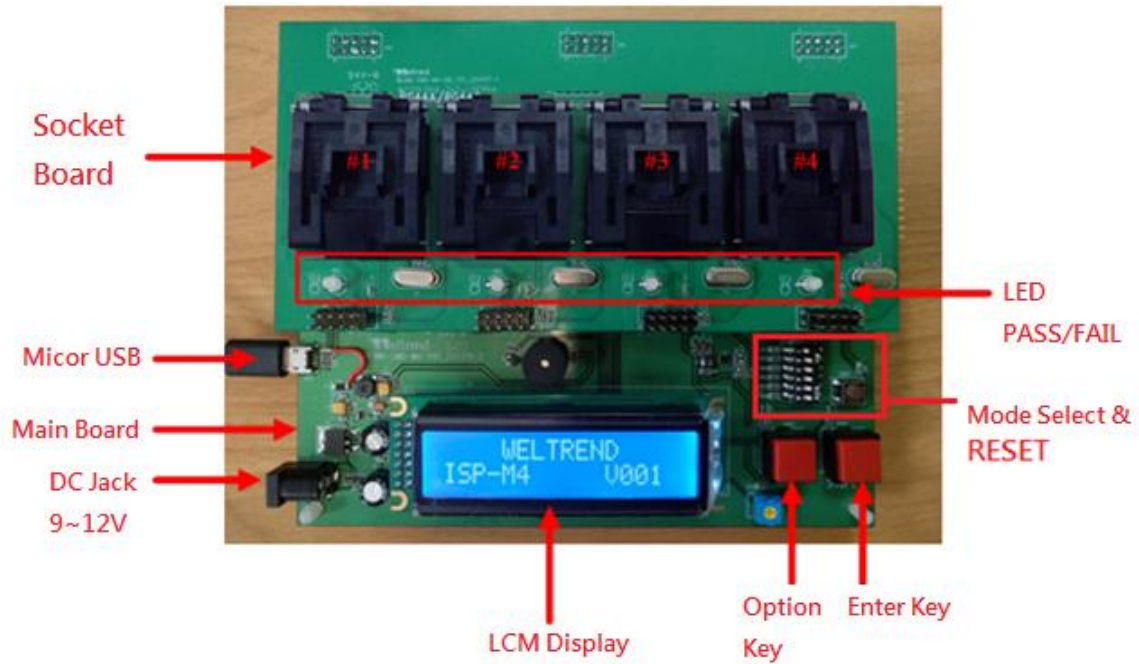


Figure 3-2 SWD-M4 Fixture Hardware Overview

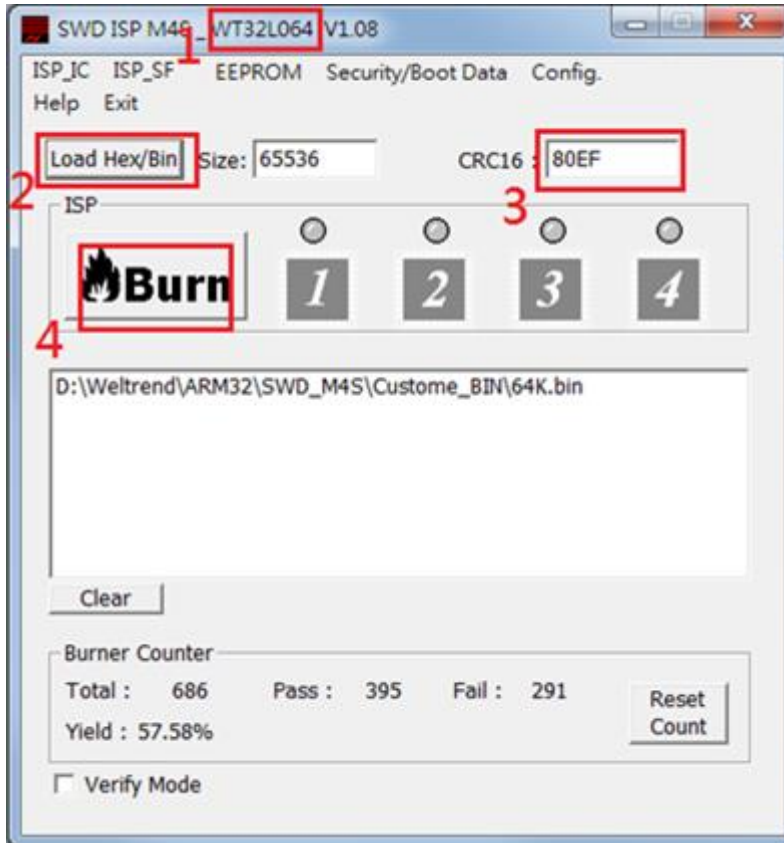
- SWD-M4 Fixture is consisted of Main Board and Daughter Board, the Main board provides programming control, while the daughter board fixes MCU IC holders and LEDs to display programming results. Different IC packages provide different daughter boards.
- LCD Display: It displays the contents of system version, checksum, successful/failed programming counts, and the programming limited quantity.
- Mode Setting: The Default settings of NO.1~6 are ON (rightward) for the standard programming mode, and other modes are set as follows.

NO	OFF (Leftward)	ON (Rightward)
1	USB OFF	USB ON
2	Reader mode	Standard Programming mode
3	1 to 1	1 to 4
4	Erase mode	Standard Programming mode
5	Keep INF and Data area	Standard Programming mode
6	Factory Debug/Handler mode	Standard Programming mode

Table 3-3 DIP mode setting table

Remarks: If the SWD-M4 firmware version is lower than V005, DIP No.1 should be set to left (OFF) for USB on and right (ON) for off-line programming, or please update the firmware to the latest version. Please refer to chapter 7 SWD_M4 Host Firmware Update Instruction.

4 SWD-M4 Program Interface



Menu functions:

- ◆ ISP_IC: Programming User Interface.
- ◆ ISP_SF: Programming Flash Interface.
- ◆ EEPROM: IC Internal 512 Bytes Memory.
- ◆ Security/Boot: Program Protection Level and Startup Configurations.
- ◆ Config.: Programming IC selection and rolling code setting.
- ◆ Help: Version information and Technical Contact Window.
- ◆ Exit: Exit this program.

Figure 4-1 SWD-M4S Programming AP window

- **Basic procedures:** 1. Confirm IC Model → 2. Open Programming HEX file → 3. Make Sure CRC is correct → 4. Execute Programming

Note: If the PC is not connected to the SWD-M4 fixture, a warning message will appear as below:



Figure 4-2 Device not found

5 Operation Procedures

5.1 Basic Parameter Setting

- Software menu → Config, Select the Programming target IC model before programming

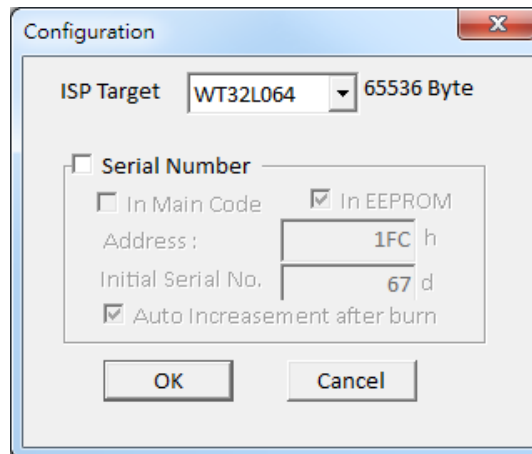


Figure 5-1 Config.

- Select the Programming target IC model.

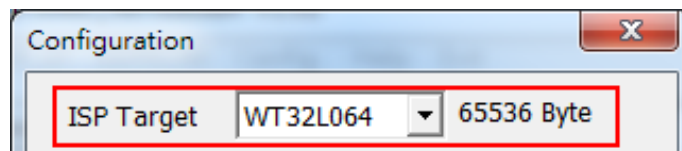


Figure 5-2 Config. IC

- Select whether to enable the Rolling-SN function and set the initial value and storage address of Rolling-SN. The SN initial address can be selected from the Main Flash (64KB) or INF1 (512B) area.

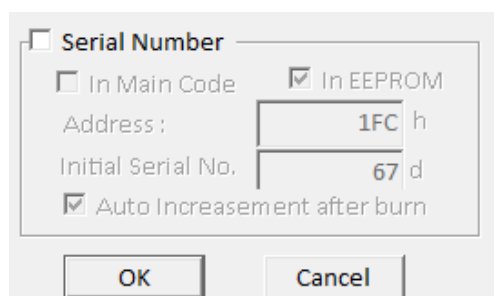


Figure 5-1 Serial Number

5.2 Advanced Parameter Setting

5.2.1 Security/Boot Data

- Security/Boot Data can read the program settings and protection level of the current IC. If users want to modify it, they need to compile it through FW and then programming it into the IC. Please refer to wt321064_flashext.h & wt321064_flashext.lib of CMSIS for more details.

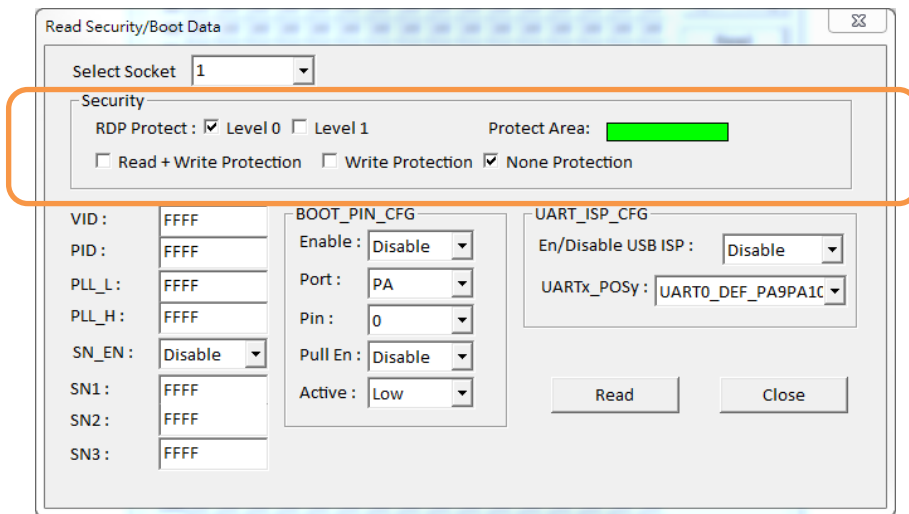



Figure 5-2 Security

- Click  to set protect range, unit 1KB. Please refer to WT32L064/32 Datasheet for more detailed information.

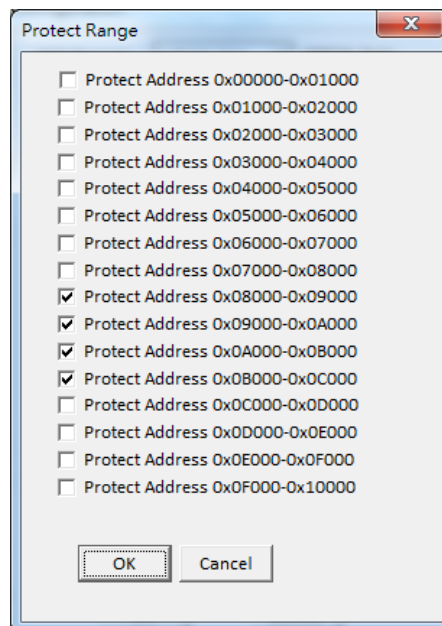


Figure 5-3 Security Range

- In the lower half of the window, set the factory BOOTLOAD & USB program startup condition according to the parameter, if it is FFFF, the default value is used instead of the parameter.
- If IC is inserted, press “Read” to read the current settings of the IC model, program protection level, and program start-up in Serial Flash.

Figure 5-4 Boot Data

BOOT DATA Parameters:

VID/PID: The original Bootloader uses the USB PID/VID, default 0x32 0x64

PLL_L/H: Initial working frequency uses the multiplier of PLL, turn off PLL_L=0xFFFF, PLL_H=0xFFFF, and then IRC uses HSI.

SN_EN: Enable serial number function

SN1~3: USER serial number content, fixed address (0x1FF00054~0x1FF0005C), where the serial number cannot be incremented.

BOOT_PIN_CFG

Enable: Enable HW RESET PIN function

Port: RESET PORT used

Pin: RESET PIN used

Pull En: RESET PIN used pull up or down setting

Active: RESET PIN used trigger condition

UART_ISP_CFG

EN/Disable USB ISP: Enable the original BOOT/UART ISP function

UARTx/POSy: Select the GPIO used by UART ISP

5.2.2 Simulation EEPROM Usage

In addition to the 64KB Main Flash, the WT32L064/32 has an additional 512B memory (Simulation EEPROM) for users to record non-programmed data, fixed addressed as 0x1FF0600~0x1FF07FF.

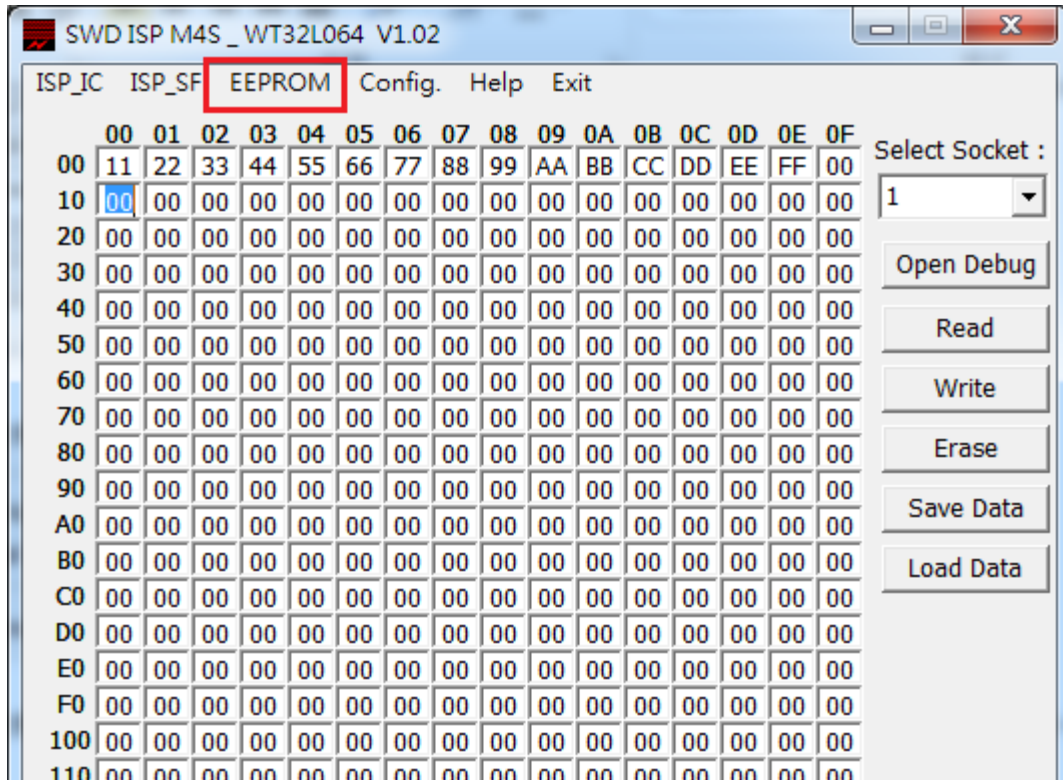


Figure 5-5 Simulation EEPROM

- Select Socket Number, press “Open Debug” button to use the “Read/Write” button to read and write the parameter contents in time or press the “Erase” button to delete all the parameter contents
- Click on the checkbox to edit the content, after the editing is finished, you can click on the “Save Data” button to save the parameter content into a file for use in the Config. Dialog, or use the “Load Data” button to load the parameter content back into the Config. Dialog.

5.3 On-line Programming Software Operation

- Check if the IC model, Program Protection Level, and Program Startup Configuration are correct before programming.
- Press the **“Load Hex/Bin”** button to select the Hex/Bin format files to be programmed.

Remarks: Files in Hex format will be converted into files in Bin format.

After selecting the file from the **“Load Hex/Bin”** button, the file size, CRC16 and the file location will be displayed in the main interface.

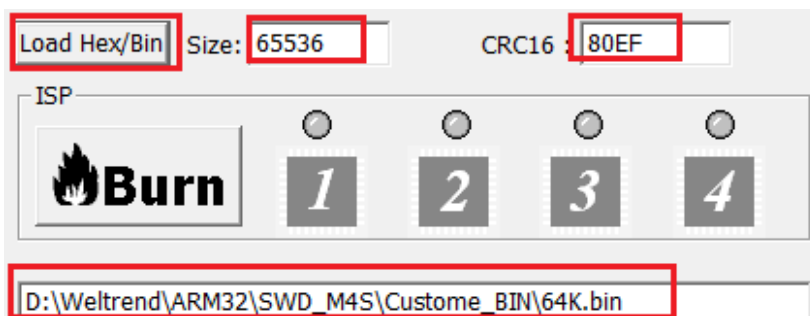


Figure 5-8 ISP Load File

“Burn” button: The selected Hex/Bin file will be programmed into the IC. The orange light will be displayed during the programming process, and the time taken will be displayed when it is finished. The green light will be displayed if the programming is successful, and the red light will be displayed if the programming fails. The total counts of successful/failed programming and yield rate will also be displayed as below.

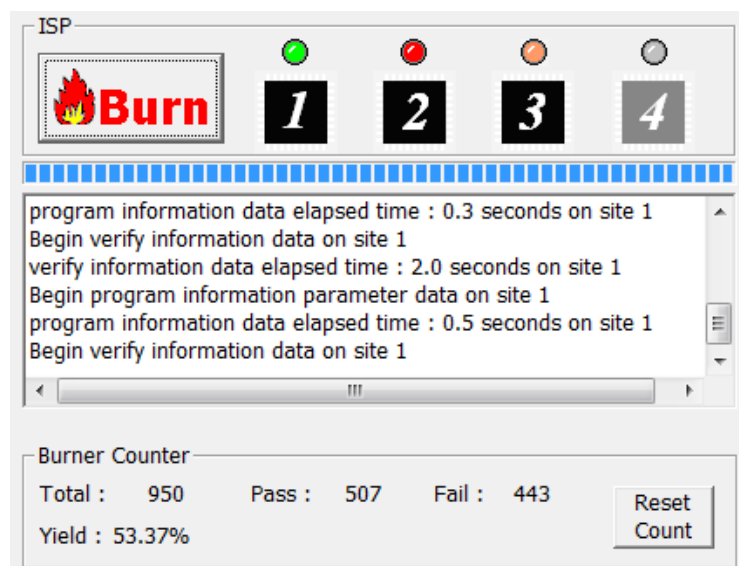


Figure 5-9 ISP Burn

- “CMP” button: Check the “Verify Mode” button; press the “CMP” button to compare the programmed code inside the IC. Compare the selected file (*.Bin) with the program coded inside the IC to determine if the selected file is consistent with the program inside the IC (Please press the “Load Hex/Bin” button to load the file you want to compare first). After the comparison is finished, the time taken will be displayed; the green light is displayed if the comparison is successful, and the red light is displayed if the comparison fails.

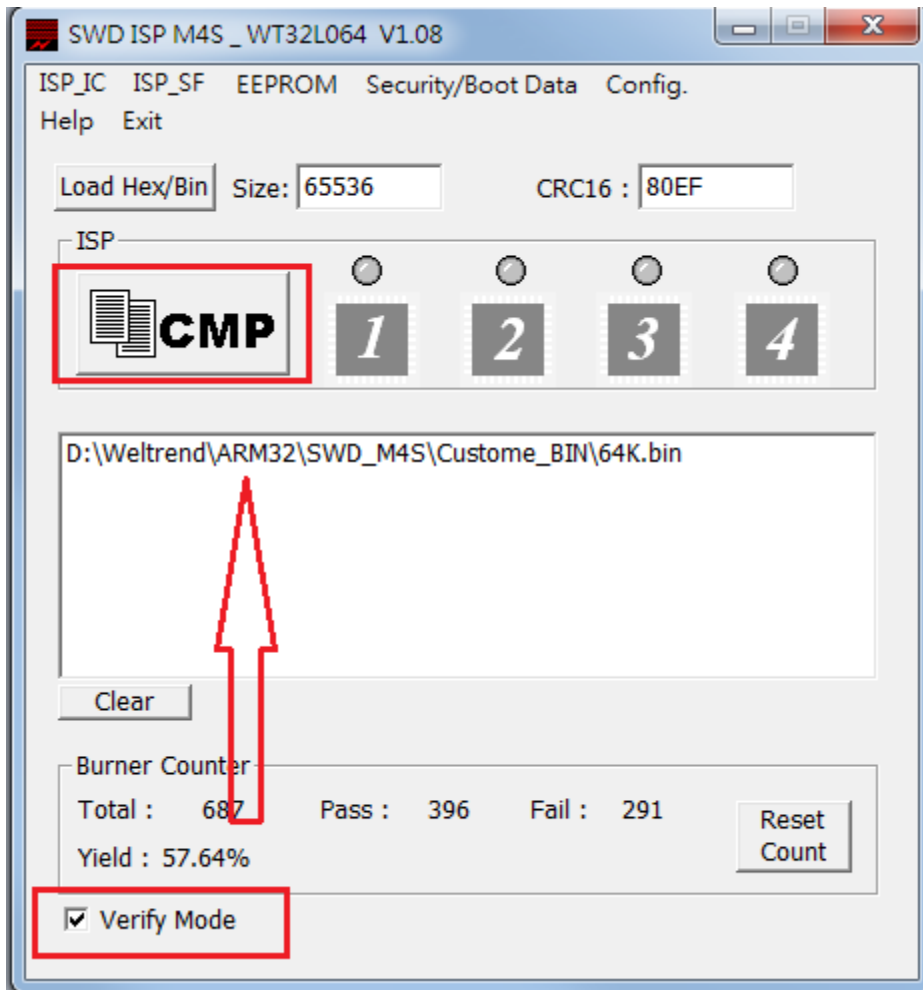


Figure 5-10 ISP Verify

5.4 Off-Line Programmer Software Operation

This function is to upload the programmed data to the Serial Flash on the SWD-M4 host for off-line programming.

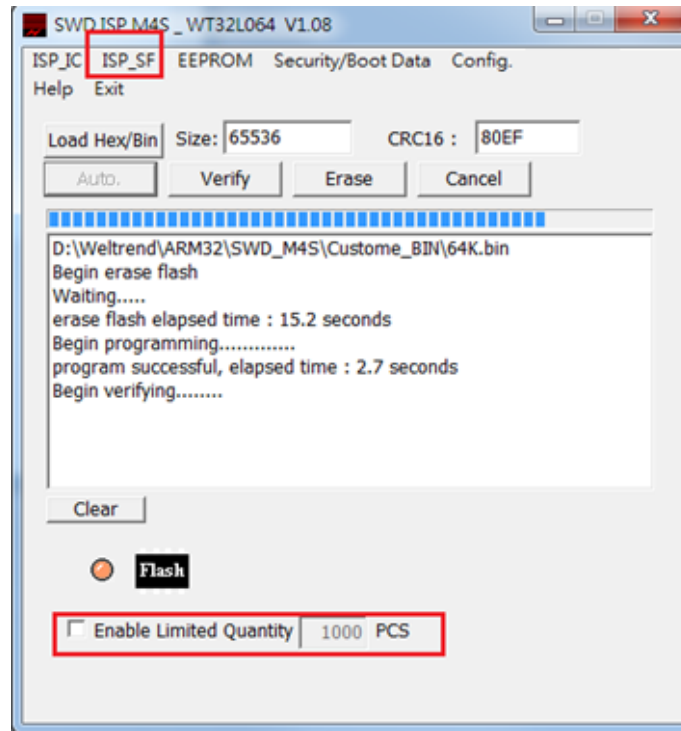


Figure 5-11 ISP Serial Flash

- Check if the IC model, Program protection level, and other parameter settings are correct.
- Check or uncheck the box to decide whether to limit the number of SWD-M4 off-line programming ICs and the number of input limits.
- Press the “Load Hex/Bin” button to select the Hex/Bin format files to be programmed.

The function of this “Auto” button is to integrate the above mentioned functions of “Program” & “Verify”. When this button is pressed, the specified file will be programmed into Serial Flash, and when the programming is completed, the internal program will be read out to compare with the specified programmed destination file. If any errors occurred during the comparison process, an error message will pop up in the window and the operation will be interrupted.

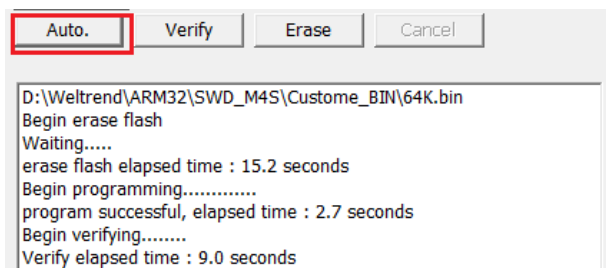


Figure 5-12 ISP Auto

6 System Structure

SWD-M4 fixture provides three different functions when used off-line:

- Programming and verify the target IC: Copy the data stored on the fixture to the target IC and confirm the writing result
- Verify the target IC: Confirm whether the target IC matches the data of the fixture and compare it with the CRC16 check code

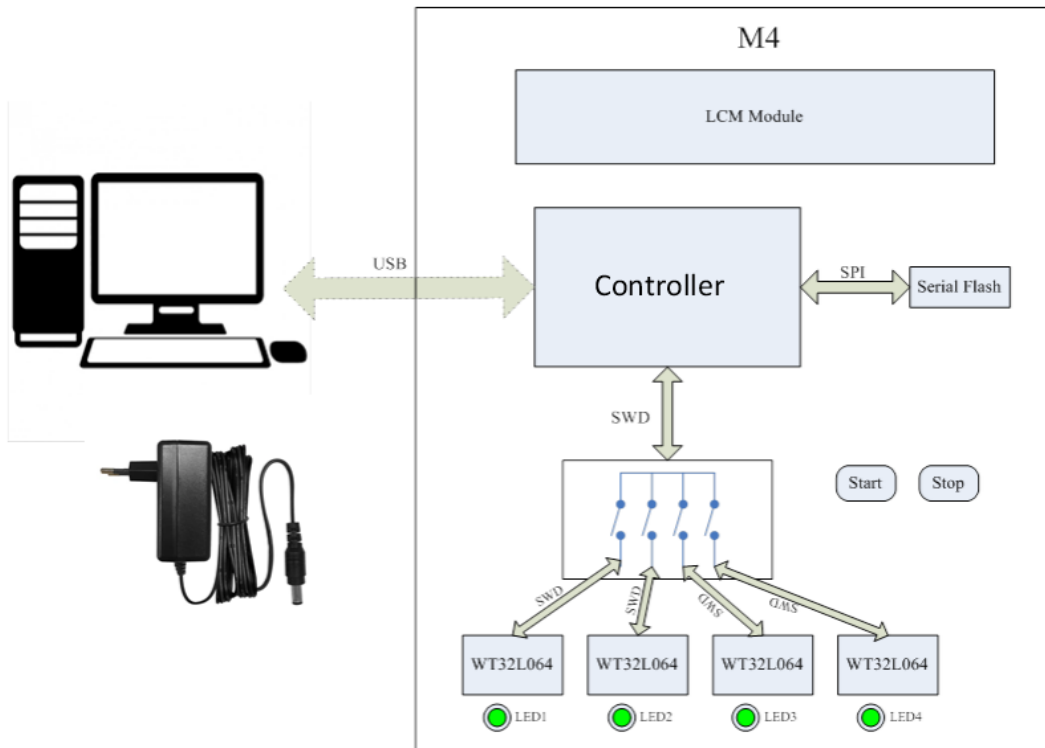


Figure 6-1 Overview

Please refer to Table 3-3 for DIP mode setting. The DIP-SW and RESET buttons are at the upper part of the figure below, the right button at the bottom is for function activation, the left button is for display page switching, and the yellow knob can adjust the LCM brightness.



Figure 6-2 Overview

6.1 Off-line

In this section, we will introduce the complete off-line function of the fixture, and list the three main modes. 1. Standard Programming Mode 2. Reader Verification Mode 3. Clear Mode, the following list is the function and description.









Select Key	Page No.	LCD Display	Description
Standard Programming Mode	1		First clear the FLASH inside the IC, start programming and check the FLASH content, when finished, the LED will light up green to indicate successful programming, if it is red, the programming fails.
	2		
	3		
Reader Verification Mode	1		Check whether the code of the IC is the same as the host file in the flash. If the code is the same, it lights up in green; If it is different, it lights up in red.
	2		Calculate the CRC16 code stored in the IC and compare it with the CRC16 data in the FLASH. If both are the same, the LED lights green; if it is different, the LED lights red.
	3		Read back the CRC16 value of 64KB directly from the IC.
	4		Read back the CRC16 value of 32KB directly from the IC.
Clear Mode	1		Execute the FLASH erasing

Table 6-2 SWD-M4S Off-line Function Definition table

6.2 Off-line Programming Process

In this section, we will briefly explain how users can use the programming and verification functions. As shown in Figure 6-3, it illustrates the process from the feeding to the completion of programming and observing whether the programming is successful by the light signal. At the end of the process, the fixture will issue a warning tone to alert the user.

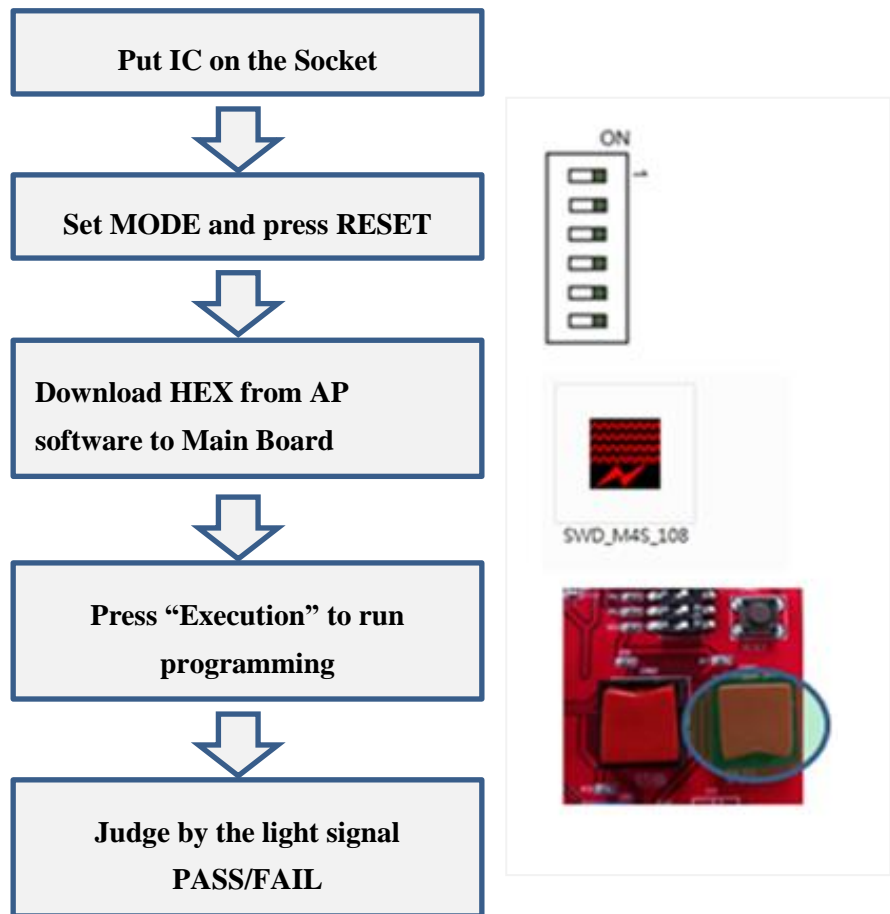


Figure 6-3 Off-line Programmer Operation Flow

7 SWD_M4 Host Firmware Update

If there is a new version of SWD_M4 firmware to be updated, please turn the DIP-SW position 2 on the following SWD_M4 mother board to the left (OFF) as shown in Figure 7-1, then connect SWD_M4 to the USB port of PC and start the DfuDemo software on your PC as shown in Figure 7-1-1 as below.

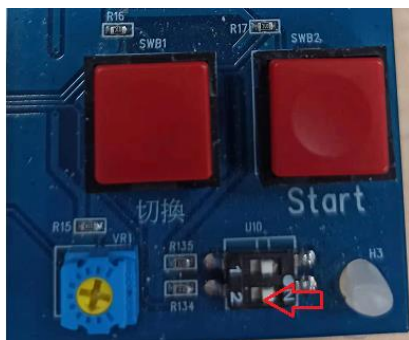
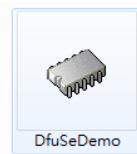


Figure 7-1 DFU switch



**Figure 7-1-1
DFU software**

The software operation procedures are as below:

1. Confirm the device connection.
2. Open the target DFU file.
3. Perform Upgrade and confirm the successful result as below, after the successful result, please resume the above DIP-SW position 2 (NO) and reconnect the USB.

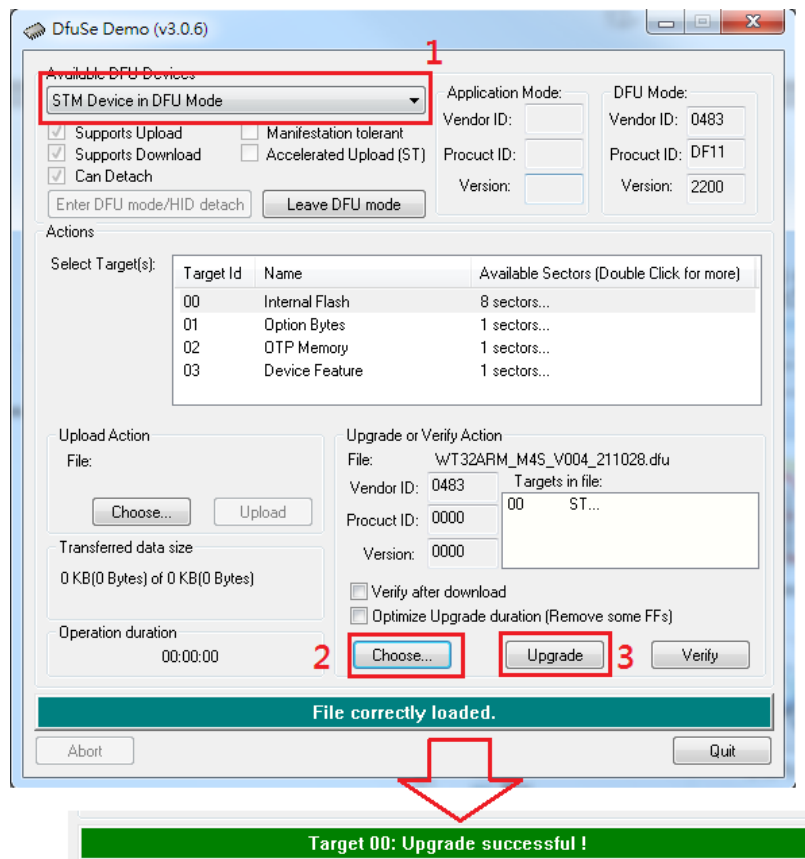


Figure 7-2 DFU Software Update Target Device

8 Revision History

Version	History	Date
1.0	Initial issue	January 2022
1.1	1. Add Page Erase, when DIP No. 5 = OFF 2. Add Handler, when DIP No. 6 = OFF	April 2022