
Richtek E-Marker Write Board User Manual

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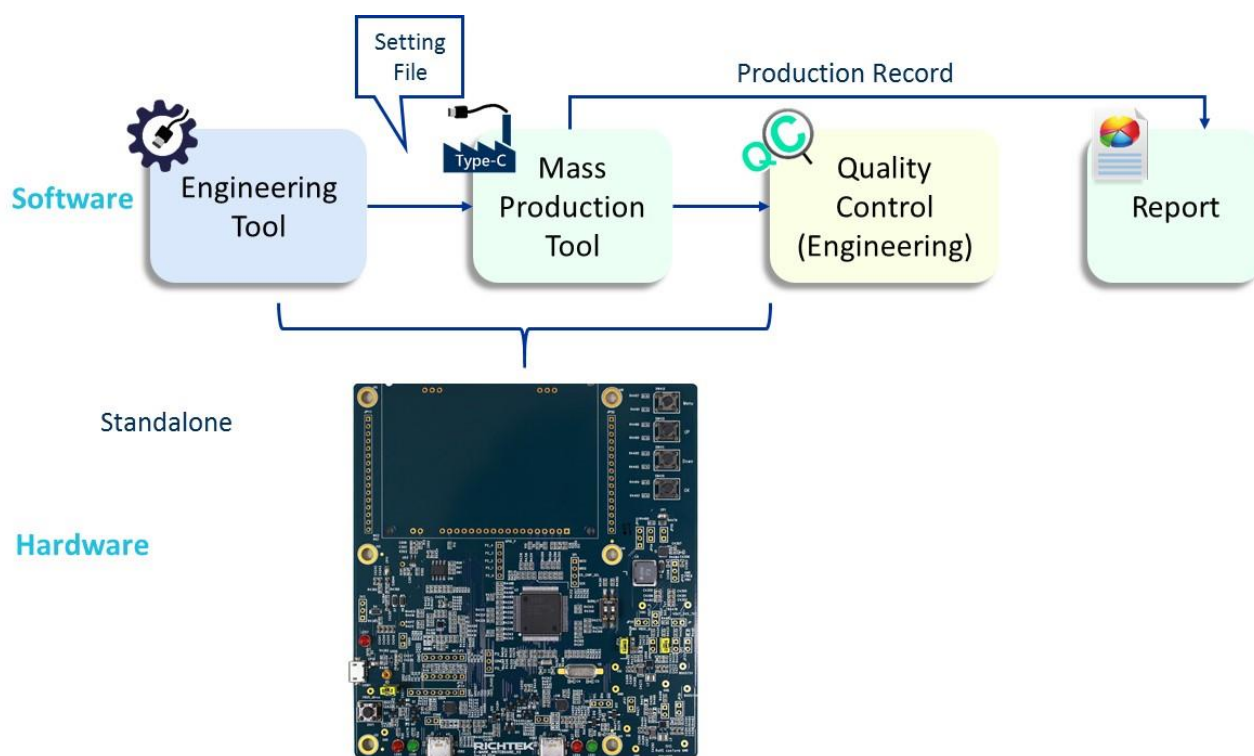
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1. Solution Overview

- E-Marker write board can program E-Marker IC along with Richtek's future products
- E-Marker write board provides LED to indicate system status
 - ▶ Please refer to the appendix for more information
- The production can be managed from cable setting to quality control with the software tools
- PD protocol version support
 - ▶ PD2 passive
 - ▶ PD2 active cable
 - ▶ PD3 passive
 - ▶ PD3 active cable (PD3 Version 1.1, where Cable VDO version = 1.2)
 - ◆ Without supporting VbusCurrent = USB Type-C Default Current



2. Engineer Tool

2.1. Overview

- Read the E-Marker IC data from cable
- Write the E-Marker IC data with
 - ▶ Cable VDM data setting
 - ▶ Writer board setting
- Save / Load all setting into / from binary file
- Save / Load setting to writer board
 - ▶ For the standalone mode
- Set vendor production information
 - ▶ Customer id (can be defined by the customer)
 - ▶ Date and time
 - ▶ Cable serial number
- Execute VDM command to check the correctness
- Save the setting to Vendor Information File (VIF file)
 - ▶ The file can be open with “USB Vendor Info File Generator” provided by USB-IF
- Set the cable VDM data and writing page in the first tab

RT1745 Engineer Setting

File / 檔案 Device / 裝置 Setting / 設定 Permission Count / 燒錄板計數

General Cable VDO 1 Cable VDO 2 SVIDs

PD Version
☒ PD2 ☐ PD3

ID Header VDO
 Product Type: Passive Cable

USB Vendor ID (Hex)
 0 0 0 0

Cert Stat VDO
 XID (Hex)
 0 0 0 0 0 0 0 0 0

Product VDO
 USB Product ID (Hex)
 0 0 0 0

Device Version by Cable Vendor (Hex)
 0 0 0 0

Over temperature Setting
 OT Detection Level: 60 °C
 OT Protection handling
☒ No OT Protection (No thermal flag assert)
☐ Send Hard Reset
☐ Thermal flag set only

Customer / Part Number 客戶名稱 / 料號
 0000 - Customer Name 1

Write setting 燒錄設定

E-Mark
☒ Single / 單一 ☐ Double / 兩個
 Single channel write/verify 單邊寫入/驗證
☒ No ☐ Yes

Production line setting 產線設置
☐ Rewritable / 可重複寫入
☐ Support stand alone / 支援燒錄板獨立運作

PD Command: Discover ID (PD2) Send PD command Discover All PD Cmd Read OTP Write OTP

- The Cable VDO1 and Cable VDO2 Setting is in the 2nd and 3rd tab

The screenshot shows the 'RT1745 Engineer Setting' window with the 'Cable VDO 1' tab selected. The interface includes a menu bar (File / 檔案, Device / 裝置, Setting / 設定, Permission Count / 燒錄板計數) and a tab bar (General, Cable VDO 1, Cable VDO 2, SVIDs). The 'Cable VDO 1' tab contains several configuration sections:

- PD Version and Product Type:** PD Version (radio buttons for PD2 and PD3), Product Type (dropdown menu set to 'Passive Cable').
- Cable VDO1 (Part 1):** Hardware Version (Hex) (input field 0), Firmware Version (Hex) (input field 0), VDO Version (dropdown menu set to 1.0), Cable Latency (dropdown menu set to < 10 ns (~1 m)), Type-C to Type-A/B/C (radio buttons for Type-A (PD2 only), Type-C, Type-B (PD2 only), and Captive), and Cable Termination Type (radio buttons for Both ends Passive, VCONN not required; Both ends Passive, VCONN required; One end Active, one end passive, VCONN required; and Both ends Active, VCONN required).
- Cable VDO1 (Part 2):** VBUS Current Handling Capability (radio buttons for VBUS not through cable, USB Type-C Default Current, 3 A, and 5 A), SuperSpeed Support (Only for PD2 Cable PD3 Passive Cable) (radio buttons for USB 2.0 Only, USB 3.2 Gen1, and USB 3.2 Gen1 and Gen2), PD3 only fields (Maximum VBUS Voltage: radio buttons for 20 V, 30 V, 40 V, and 50 V), and PD2 fields (Only for PD3) (SSTX1 DIR, SSTX2 DIR, SSRX1 DIR, and SSRX2 DIR, each with radio buttons for Fixed and Configured).
- Cable VDO1 (Part 3) (Only for Active Cable):** SOP[®] Controller Present (radio buttons for No SOP[®] controller present and SOP[®] controller present), and SBU Supported (Only for PD3 Active Cable) (radio buttons for Not Supported, Passive, and Active).

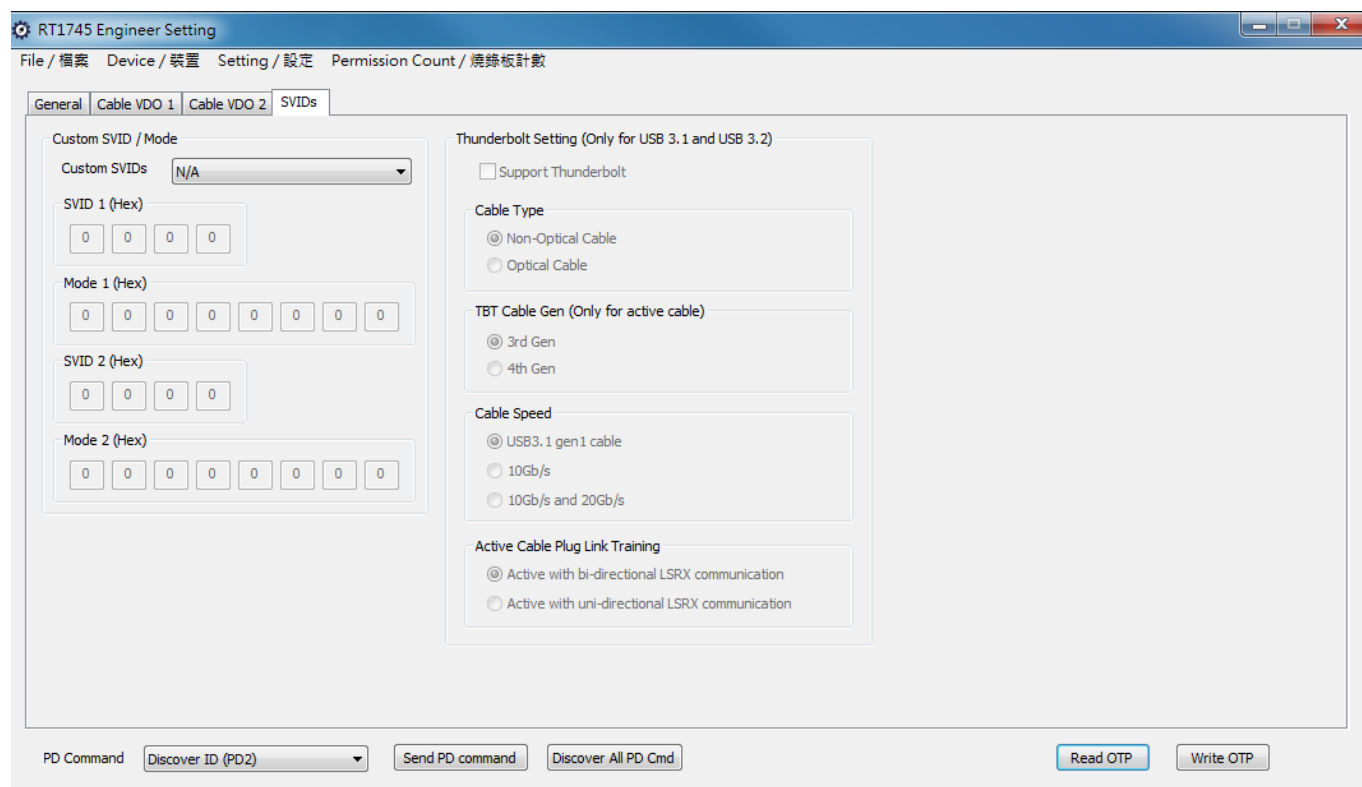
At the bottom, there is a 'PD Command' dropdown menu (set to Discover ID (PD2)), buttons for 'Send PD command' and 'Discover All PD Cmd', and buttons for 'Read OTP' and 'Write OTP'.

The screenshot shows the 'RT1745 Engineer Setting' window with the 'Cable VDO 2' tab selected. The interface includes a menu bar (File / 檔案, Device / 裝置, Setting / 設定, Permission Count / 燒錄板計數) and a tab bar (General, Cable VDO 1, Cable VDO 2, SVIDs). The 'Cable VDO 2' tab contains several configuration sections:

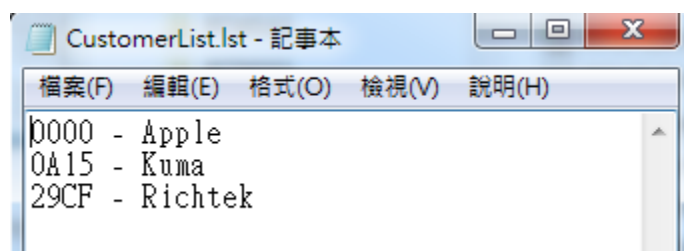
- PD Version and Product Type:** PD Version (radio buttons for PD2 and PD3), Product Type (dropdown menu set to 'Passive Cable').
- Cable VDO2 (Only for PD3 Active Cable):** (Already select 60°C in General page), Maximum Operating Temperature (Dec) (input field 0), Shutdown Temperature (Dec) (input field 0), U3 power (dropdown menu set to > 10 mW), and U3 to U0 transition mode (radio buttons for U3 to U0 direct and U3 to U0 through U3S).
- Cable VDO2 (Only for PD3 Active Cable):** USB 2.0 Support (checkbox for Support USB 2.0), USB 2.0 Hub Hops Consumed (input field 0), SuperSpeed Support (checkbox for Support SuperSpeed (USB 3.2)), SuperSpeed Lane Supported (radio buttons for One Lane and Two Lanes), and SuperSpeed Signaling (radio buttons for Gen 1 and Gen 2).

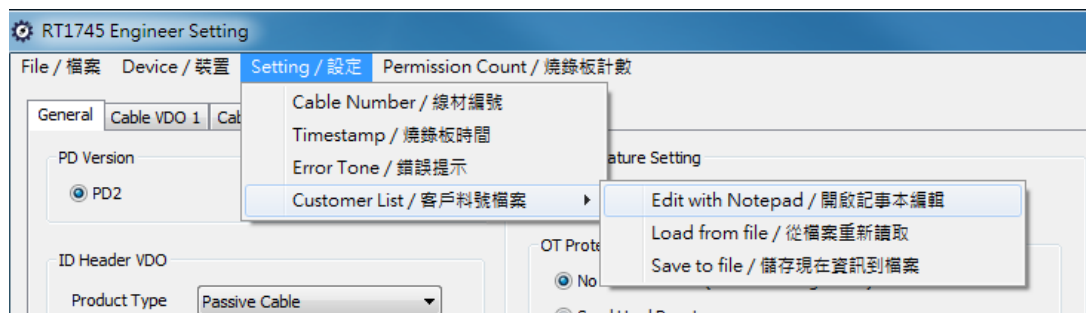
At the bottom, there is a 'PD Command' dropdown menu (set to Discover ID (PD2)), buttons for 'Send PD command' and 'Discover All PD Cmd', and buttons for 'Read OTP' and 'Write OTP'.

- The Cable VDO1 and Cable VDO2 Setting is in the 2nd and 3rd tab



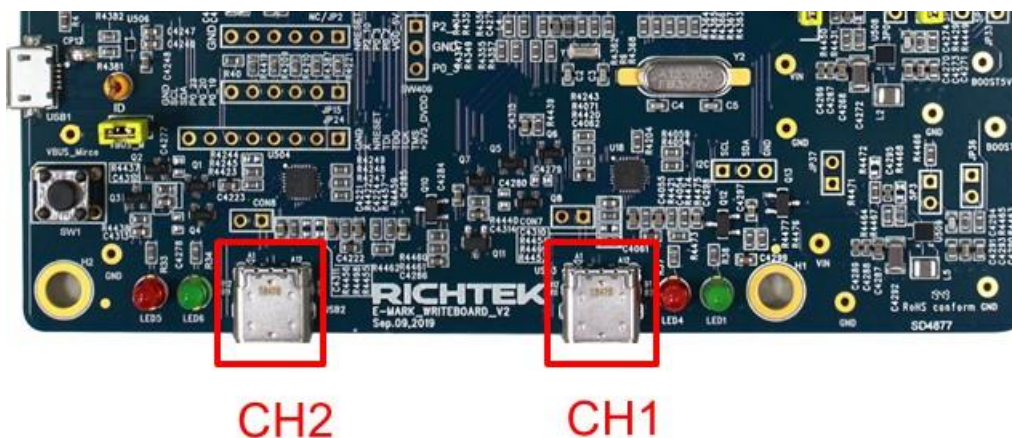
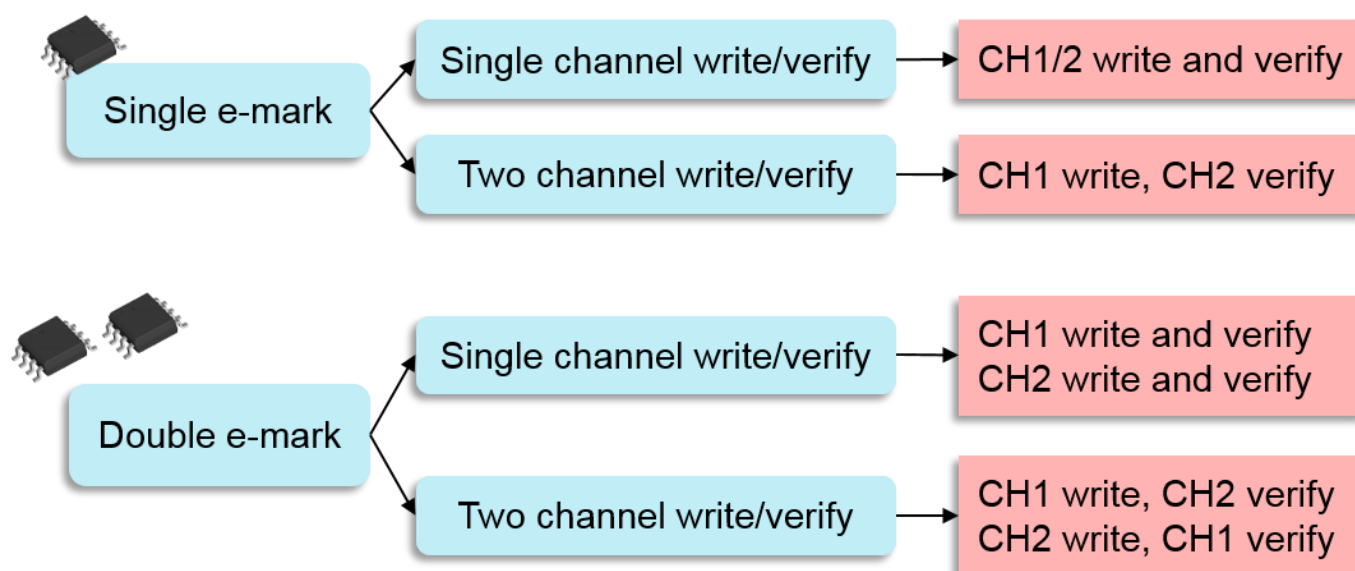
- **Open and edit the CustomerList.lst**
 - ▶ File path: "MyDocument\Richtek\E-MarkerIC\CustomerList.lst"
 - ▶ Format : Customer_ID (4 hexadecimal digits) – Customer_Name
 - ▶ It is able to open this file through the engineer tool menu
- **Customer ID will be programmed in the cable**
 - ▶ When this cable is read by quality control tool, the correspond name is shown

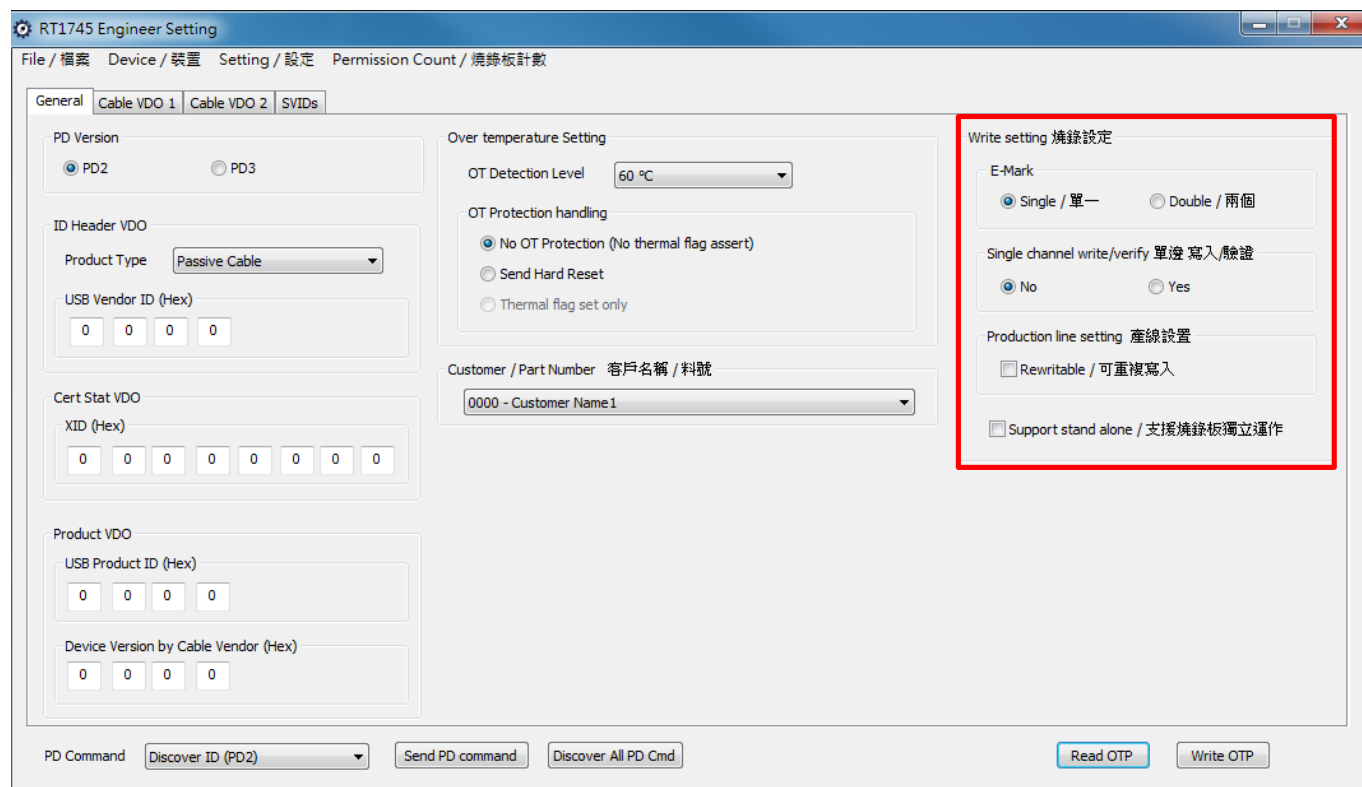




• Write operation setting

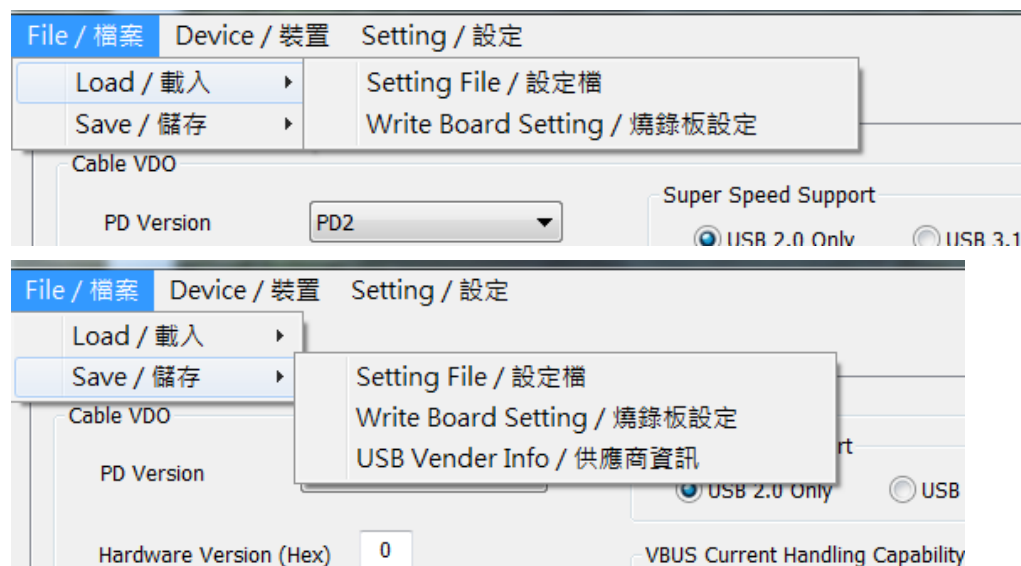
- ▶ Single / double e-mart
- ▶ Rewritable
 - ◆ Can overwrite the original data to a written cable
- ▶ Support stand alone
 - ◆ The binary file can generated can used in standalone mode
 - ◆ This option does no effect on the Mass Production Tool





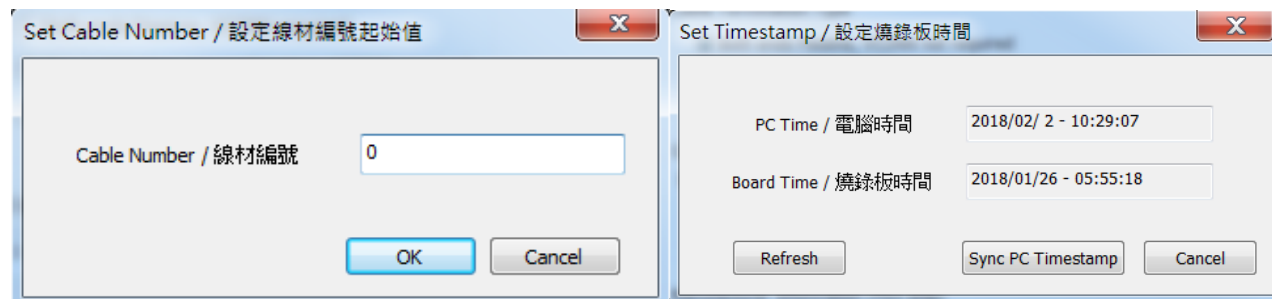
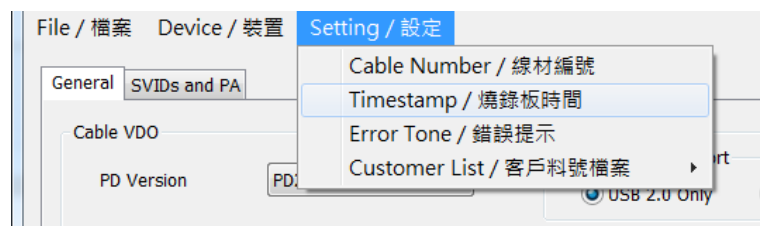
• Setting file

- ▶ Save / Load all setting into / from binary file
 - ◆ Mass production tool will load this setting file



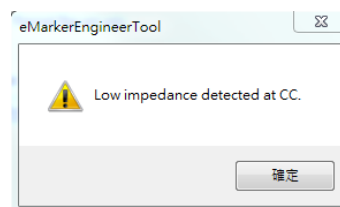
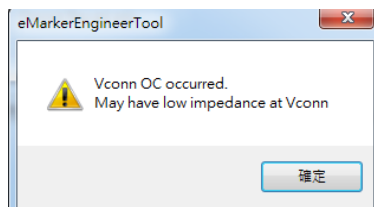
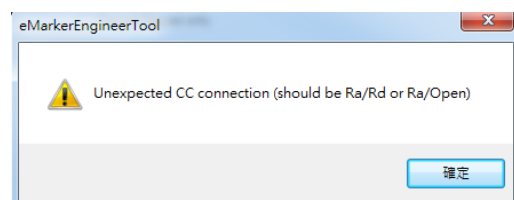
• Writer board setting

- ▶ For standalone mode
 - ◆ Program data
 - ◆ Timestamp
 - ◆ Serial number (cable number)
- ▶ Please terminate it by close button to ensure the correctness of cable number
- ▶ This number is the next serial number written to cable



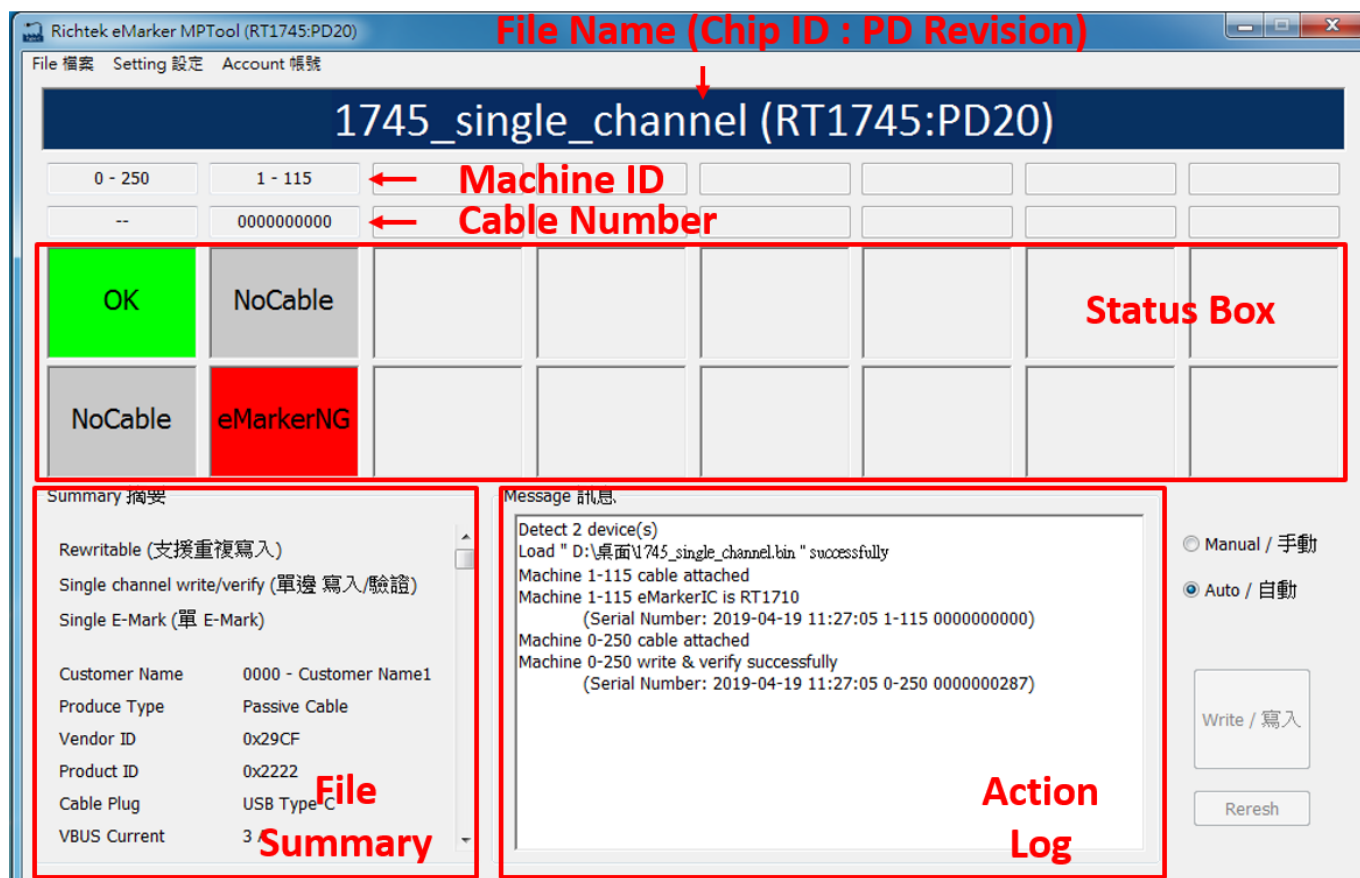
• Error message

- ▶ Unexpected CC detected
 - ◆ Maybe following condition
 - EVB CC pin short to ground
 - IC CC pin damaged
- ▶ VCONN OC occurred
 - ◆ VCONN over-current detected
 - ◆ May have low impedance at VCONN
- ▶ Low impedance detected at CC
 - ◆ Low impedance at VCONN



3. Mass Production Tool

- Load the setting file that generated by engineering tool, and start to write E-Marker cables
- When the application is turned on, it will automatically try to load the last opened setting file
- All of actions will be recorded in log file, the actions about writing will be recorded in production record
- Please terminate it by close button to ensure the correctness of cable number
- Program layout
 - ▶ Single channel write / verify



- Two channel write / verify

File Name (Chip ID : PD Revision)

1745_two_channel (RT1745:PD20)

Machine ID

Cable Number

Status Box

Summary 摘要

Rewritable (支援重複寫入)

Two channel write/verify (一邊寫入, 另一邊驗證)

Single E-Mark (單 E-Mark)

Customer Name 0000 - Customer Name1

Produce Type Passive Cable

Vendor ID 0x29CF

Product ID 0x2222

Cable Plug USB Type-C

VBUS Current 3

Message 訊息

Detect 2 device(s)

Load " D:\桌面\1745_single_channel.bin " successfully

Machine 1-115 cable attached

Machine 1-115 eMarkerIC is RT1710

(Serial Number: 2019-04-18 18:28:21 1-115 0000000000)

Machine 0-250 cable attached

Machine 0-250 No Empty Bank

(Serial Number: 2019-04-18 18:28:21 0-250 0000000286)

Machine 0-250 cable detached

Machine 1-115 cable detached

Detect 2 device(s)

Load " D:\桌面\1745_two_channel.bin " successfully

Manual / 手動

Auto / 自動

Write / 寫入

Reresh

Field Description

Machine ID

- The identification of write board

Cable Number

- The cable number will increase if the machine write successfully

Record

- Machine ID and Cable Number will be recorded in the E-Marker and local file

Load setting file

- Default password : Richtek
- Change the password in Menu : Account

Log file

- MyDocument\Richtek\E-MarkerIC\xxxxxx.log

Production record

- MyDocument\Richtek\E-MarkerIC\ProductionRecord_x_x_xxxxxx.csv

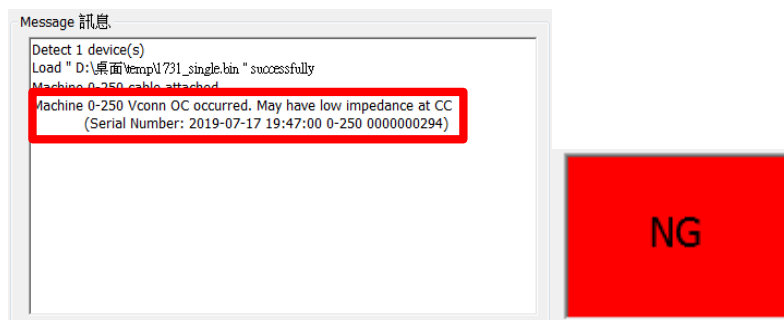
Status Box

- NO CABLE :
 - There is no cable that is ready for write
- READY
 - The machine is ready for write

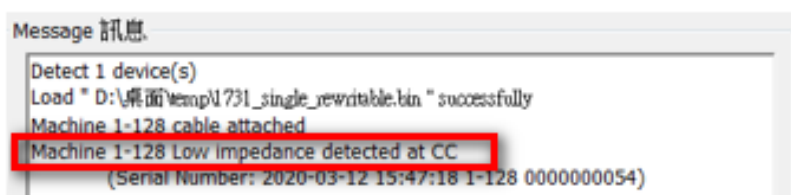
- ◆ Writing & Verifying
 - The machine is writing or verifying
- ◆ OK
 - The machine has written and verified successfully
- ◆ NG
 - The machine wrote or verified failed, or E-Marker IC had been written by another vendor
- ◆ Unavailable
 - The cable had been written and setting file does not declare rewritable
- ◆ E-MarkerNG
 - The E-Marker in the cable is different from the setting file
- ◆ Unexpected CC detected
 - Maybe following condition
 1. EVB CC pin short to ground
 2. IC CC pin damaged



- ◆ VCONN OC occurred
 - VCONN over-current detected
 - May have low impedance at VCONN



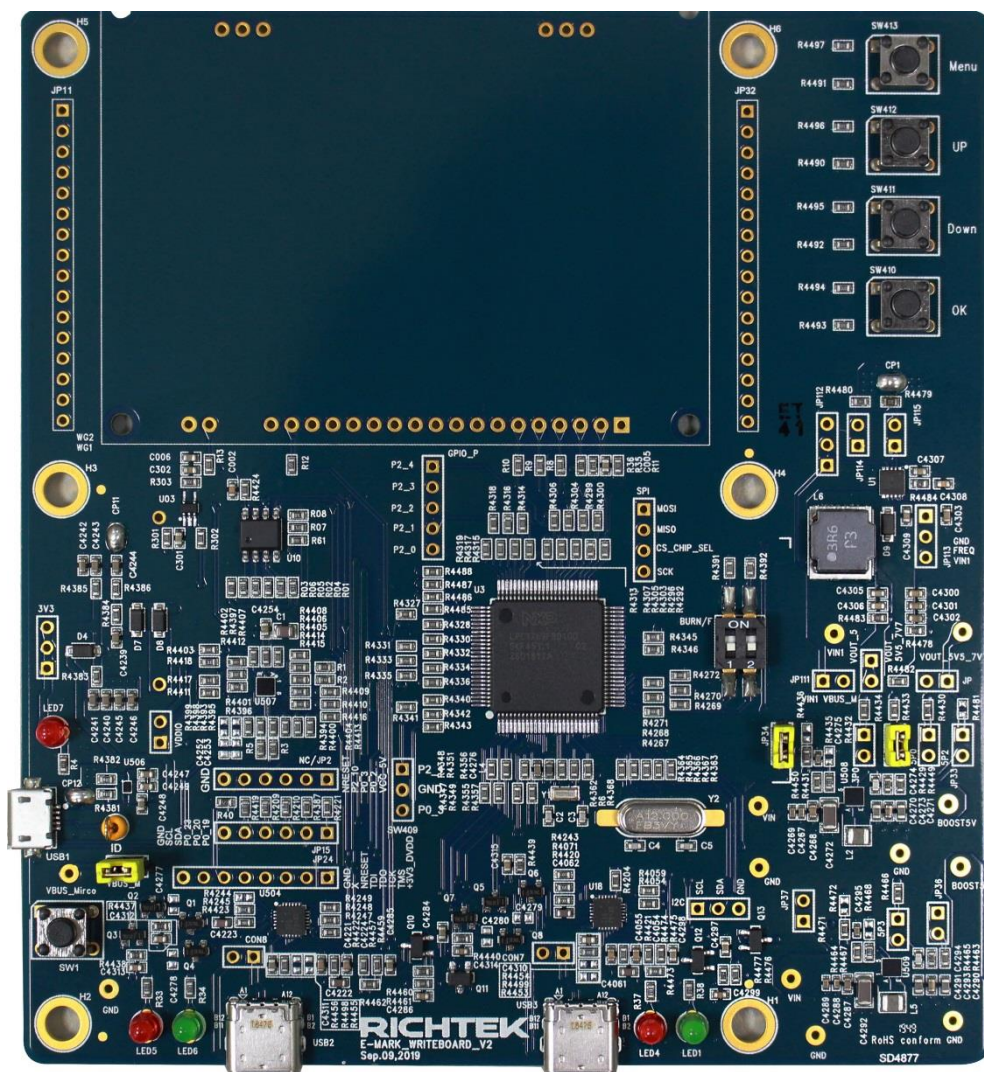
- ◆ Low impedance detected at CC
 - Low impedance at VCONN



4. Standalone Mode

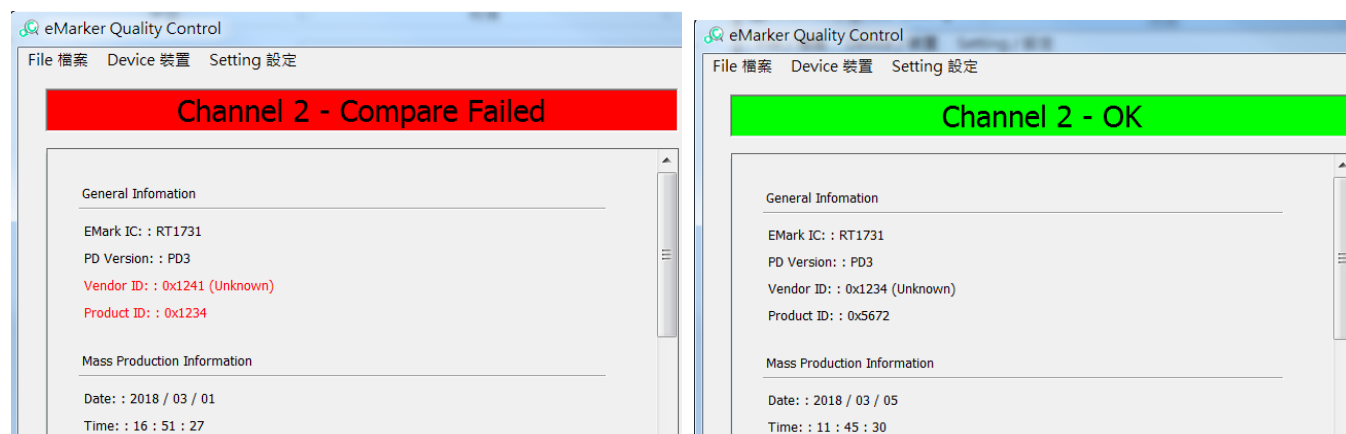
Write the cable automatically when the writer board is powered by DC.

1. Connect to Dedicated Charging Port (DCP).
 - i. This mode will not be entered when the writer board is connected to PC.
2. The data written is from the command "Save Writer Board Setting" in Engineer Tool.
3. Notice that there is no production record saved with this mode.



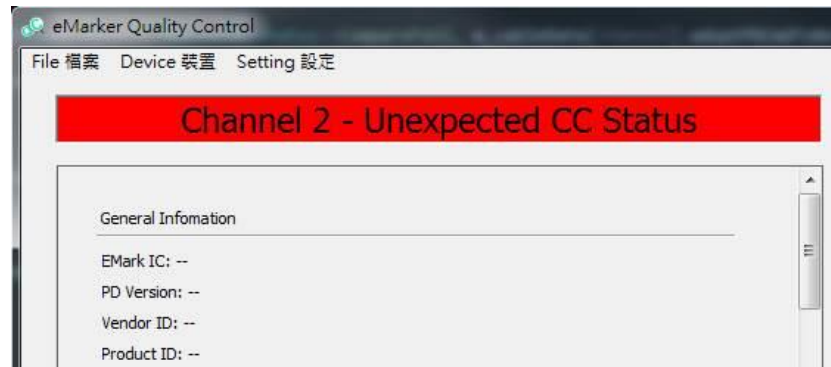
5. Quality Control Tool

- **Read the cable information**
 - ▶ Via reading OTP with engineering mode
 - ▶ Via VDM Commands (Discover ID, ...)
- **Read the data from CH1 and CH2 automatically**
 - ▶ The output data is show in the screen simultaneously
- **Compare with setting file generated by engineer tool**
 - ▶ The different fields will be shown in the color red
- **E-Marker verification**
 - ▶ Verify by OTP comparison in default
 - ▶ Check “Force using VDM discovery” to verify with VDM commands, the status bar will show “PD”
- **Comparison with binary setting**
 - ▶ Load binary by File -> Load Setting File
 - ▶ If verification is failed, the different fields are shown in red



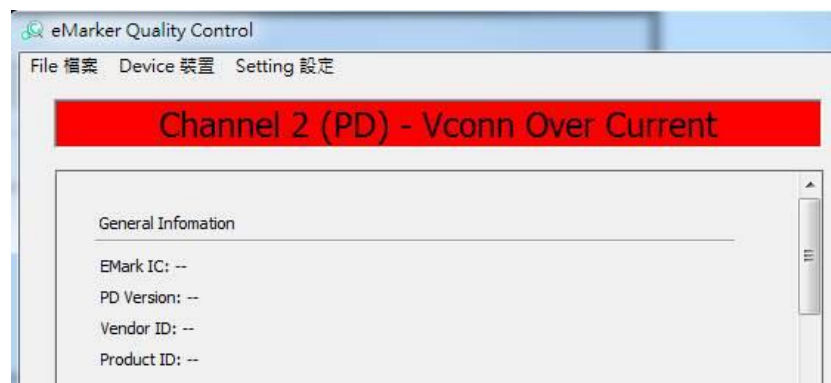
- **Unexpected CC detected**

- ▶ Maybe following condition
 1. EVB CC pin short to ground
 2. IC CC pin damaged



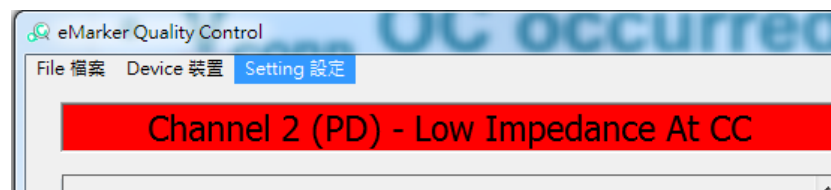
- **VCONN OC occurred**

- ▶ VCONN over-current detected
- ▶ May have low impedance at VCONN



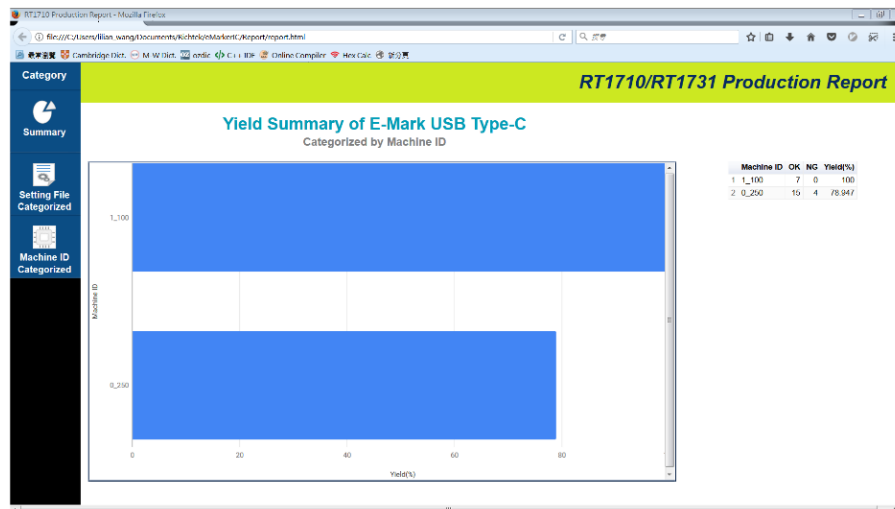
- **Low impedance detected at CC**

- ▶ Low impedance at VCONN

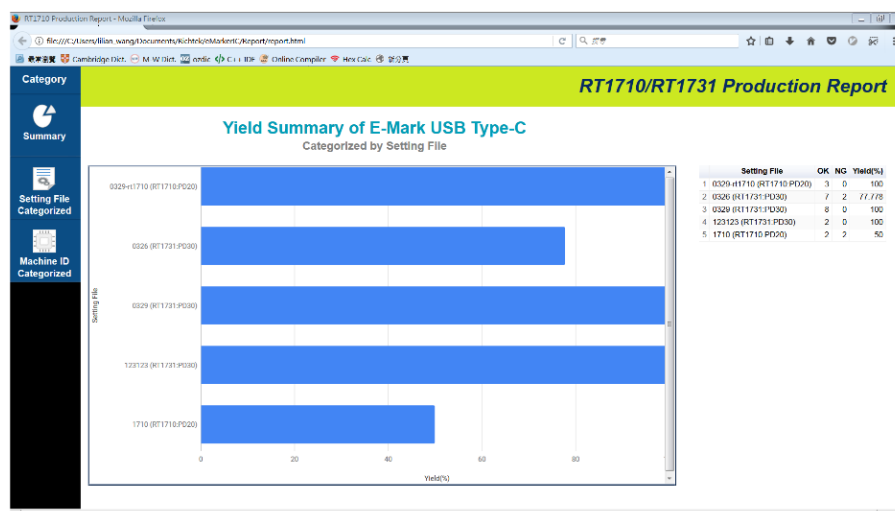


6. Report

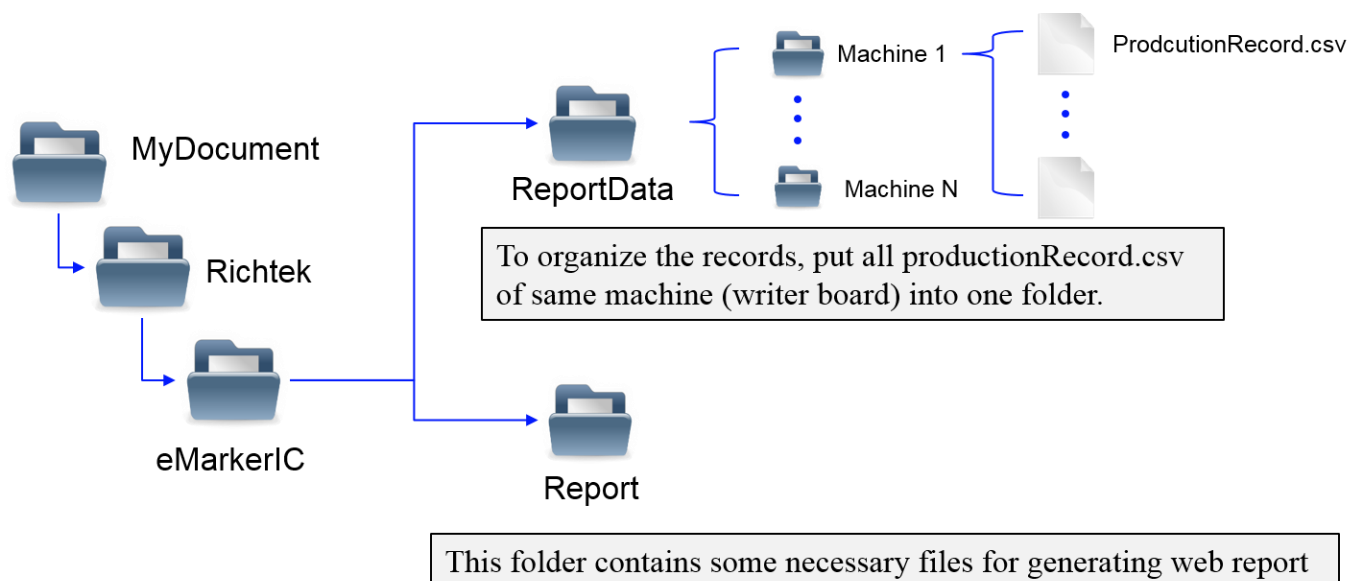
- Report can be grouped by
 - Writer board machine id



- Cable setting file



• **File structure**

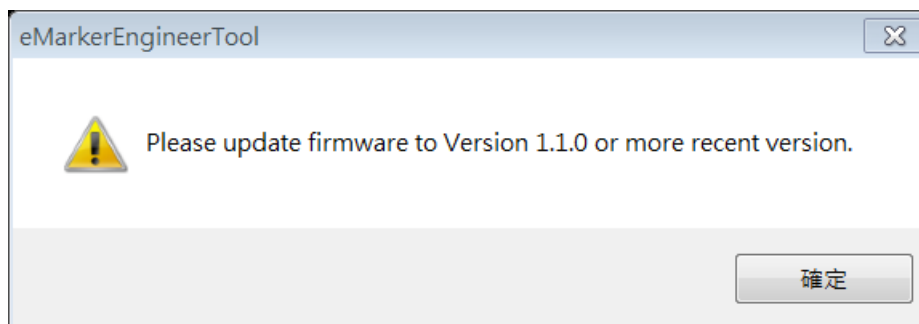


• **Instructions**

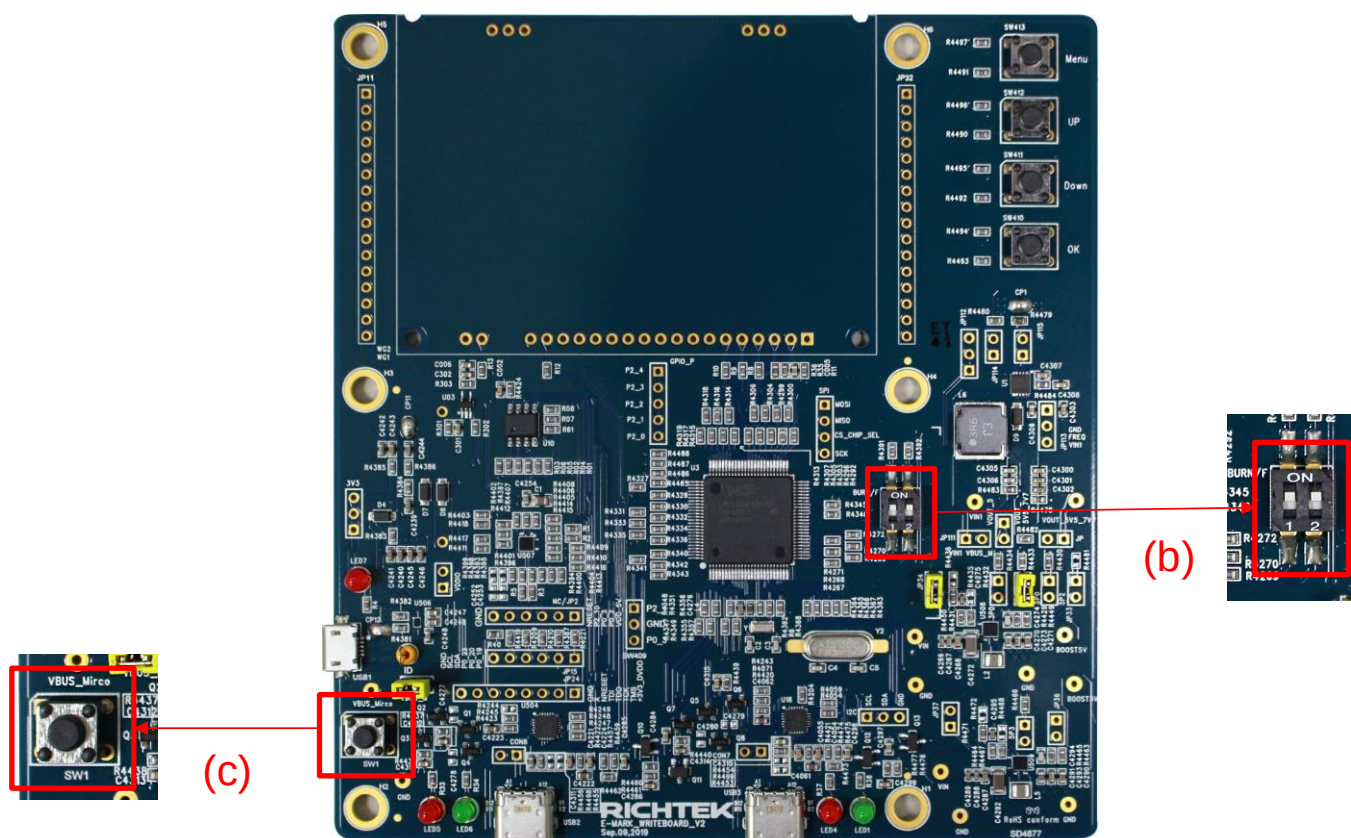
- ▶ Create the folder "ReportData" in Document/Richtek/E-MarkerIC
- ▶ Create the filter folder in E-MarkerIC, and move the production report from Document/Richtek/E-MarkerIC to the filter folder
 - ◆ For example, create the folder Machine250, and move the ProductionRecord_0_250_201803.csv into the Document/Richtek/E-MarkerIC/Machine250
- ▶ Open E-Marker Production Report and select the parsing folders and set date filters and some other filters by clicking Options
- ▶ Click Generate Report

7. FW Update Steps

- When the tools remind to update FW, please update the FW of the board by the FW binary file provided

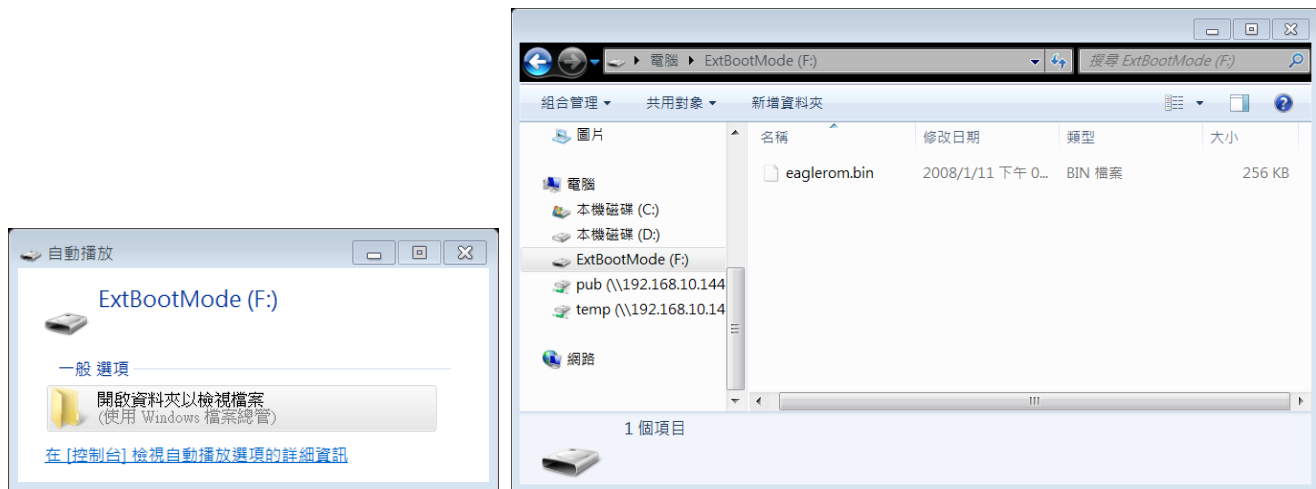


- Steps 1**
 - Connect the bridgeboard and PC
 - Pull up the switch 1 to On side
 - Press the button



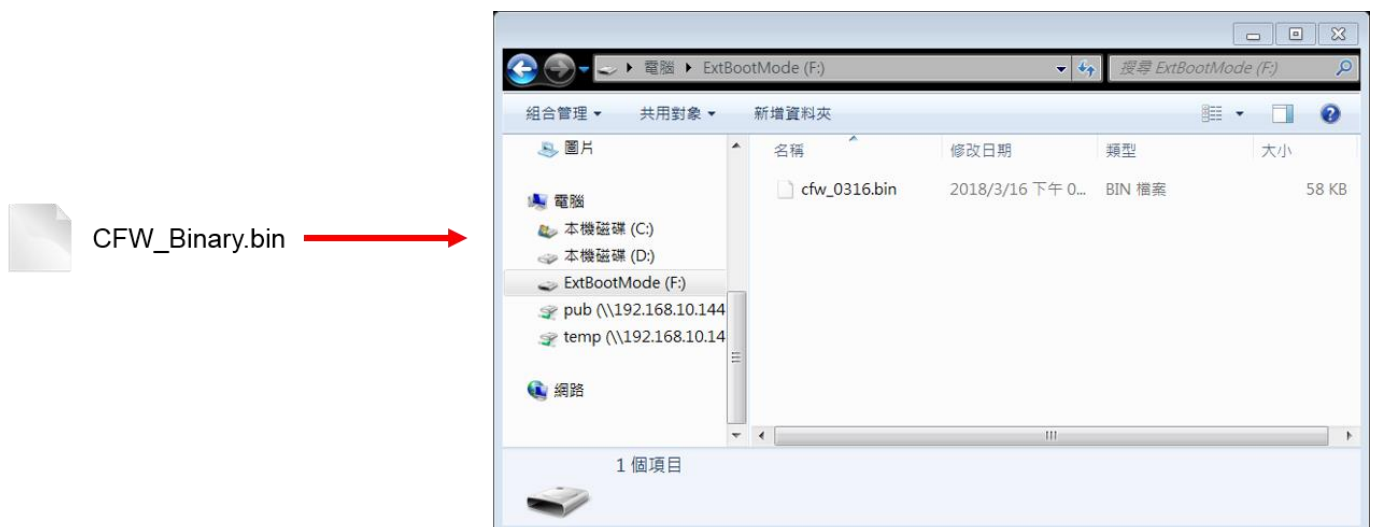
• **Steps 2**

- a. Open the Drive of bridge board
- b. Delete the file in this drive

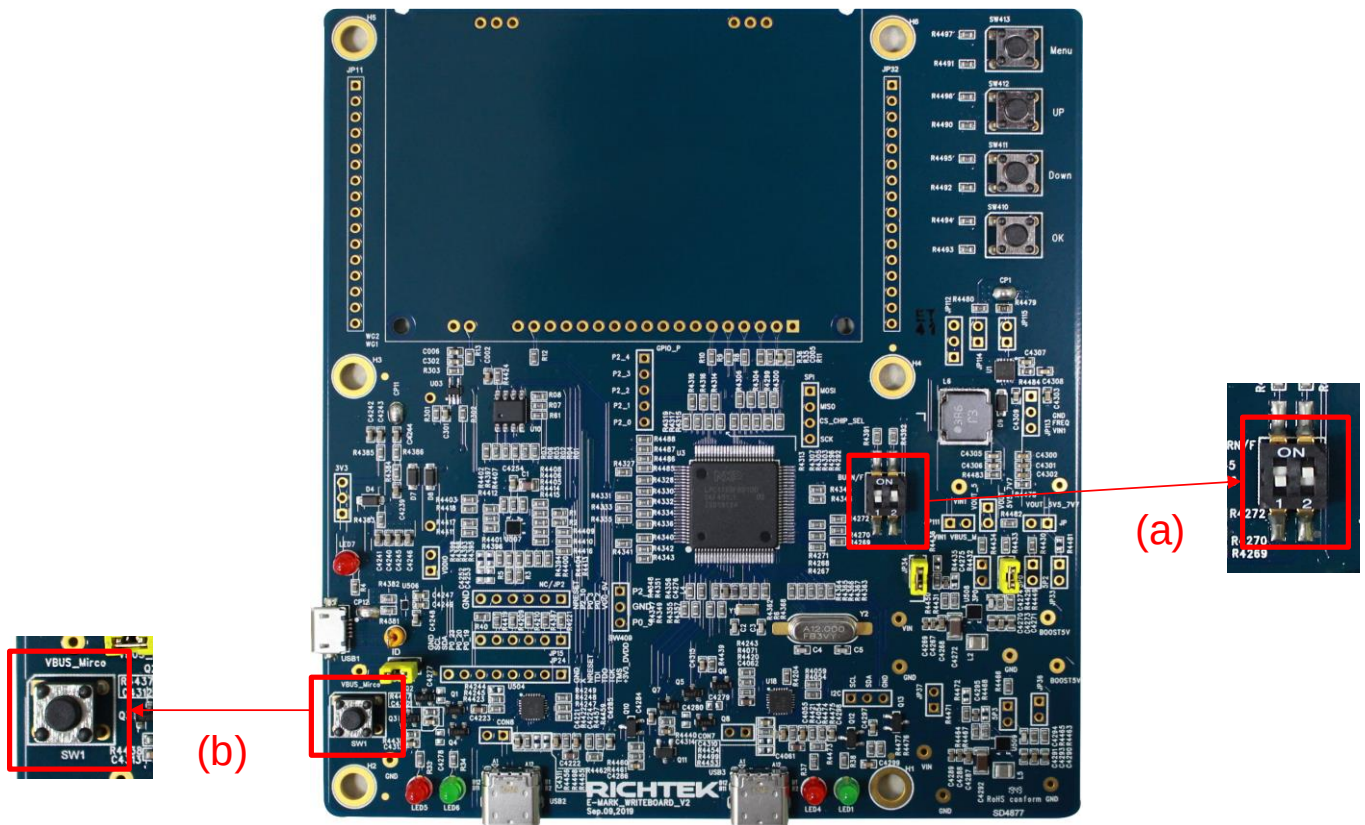


• **Steps 3**

- ▶ Copy the FW binary into this drive



- **Steps 4**
 - a. Pull down the switch 1 to number side
 - b. Press the button to restart bridgeboard



8. Appendix

• LED

Code	Meaning	LED Status	Description
Status LED : (Left / right 2 LED for left / right port)			
eLED_DETECTING	Detecting	Red and green LED flash staggered	No cable detected
eLED_DETECTED	Detected	Green LED flash	Cable detected
eLED_OK	Burn Success	Green LED keep on	Burn / read command succeed
eLED_NG	Burn Fail	Red LED keep on	Burn / read command failed
eLED_UNEXPECTED	Unexpected Device detected	Red LED flash	Unexpected device detected or cable CC pin damaged



More Information

For more information, please find the related datasheet or application notes from Richtek website <http://www.richtek.com>.

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