



Flash and Authorize CB Modules

Version: 20240614

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After embedded firmware development, you need to flash the firmware to the module and authorize the module to connect to the cloud.

This topic describes three options to flash the firmware and authorize the module.

- Custom development: applies to the product release step in the custom development solution.
- Sandwich development board: flashes firmware to and authorizes the Sandwich development board.
- Flashing tool from the chip vendor: applies to the development step. You can flash firmware to the module **unlimited times with authorizing the module once**.

:::important

In this topic, a credential, a license, and a token mean the same thing.

:::

1 Applicability

This topic applies to [CBX series modules](#) with the BK7231N built in.

- [CBU](#)
- [CBU-IPEX](#)
- [CBLC5](#)
- [CBLC9](#)
- [CB1S](#)
- [CB3S](#)
- [CB3L](#)
- [CB2S](#)
- [CB8P](#)
- [CB2L](#)
- [CB3SE](#)
- [CBU-NL](#)
- [CB3S-NL](#)

2 Preparation

Before you flash the firmware and authorize the module, you need to have the following items ready:

- An account of the Smart PMS
- **Production Toolkit** software installed on your computer
- [Beken Writer](#) from the chip vendor installed on your computer
- A USB to UART converter

2.1 Register with the PMS

Open [Smart PMS](#) and sign up. Select **Personal developer** in **Type** and enter the registration information. Then, you will receive an email after registration.

1 Fill in basic information

2 account password

3 Apply for review

* area

☒ China Mainland ☐ Hong Kong, Macao and Taiwan and International

* Type

☐ the company ☒ Personal developer

* mailbox

* Mobile number (account)

+ 86

* Verification code

get verification code

* applicant

* the reason

0 / 100

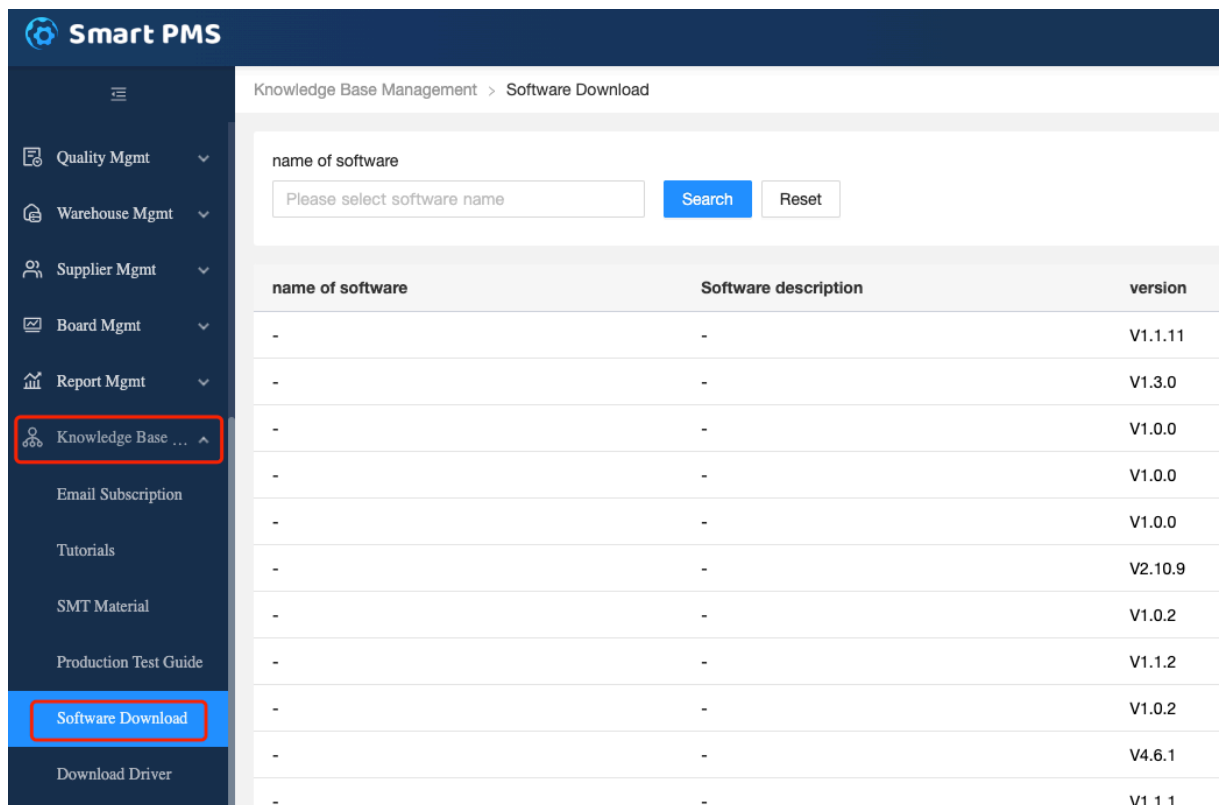
☐ Read and agree [《Terms of Service》](#) [《Legal Notices》](#) [《Privacy Policy》](#)

Next step

2.2 Download and install Production Toolkit

2.2.1 Download Production Toolkit

1. Log in to the [Smart PMS](#).
2. Choose **Knowledge Base Management > Software Download**. Find **Production Toolkit** and download it.



Smart PMS

Knowledge Base Management > Software Download

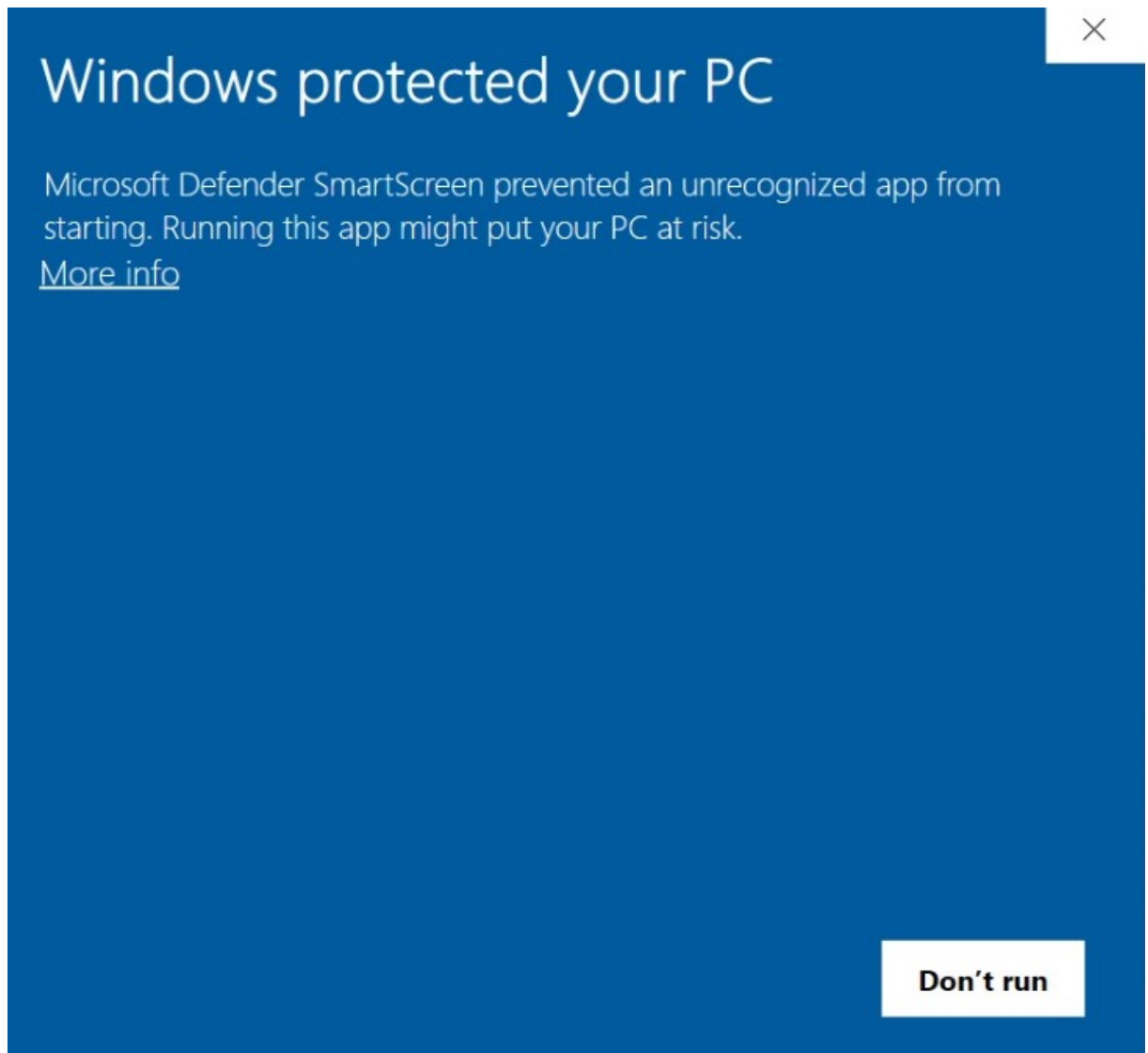
name of software

Please select software name

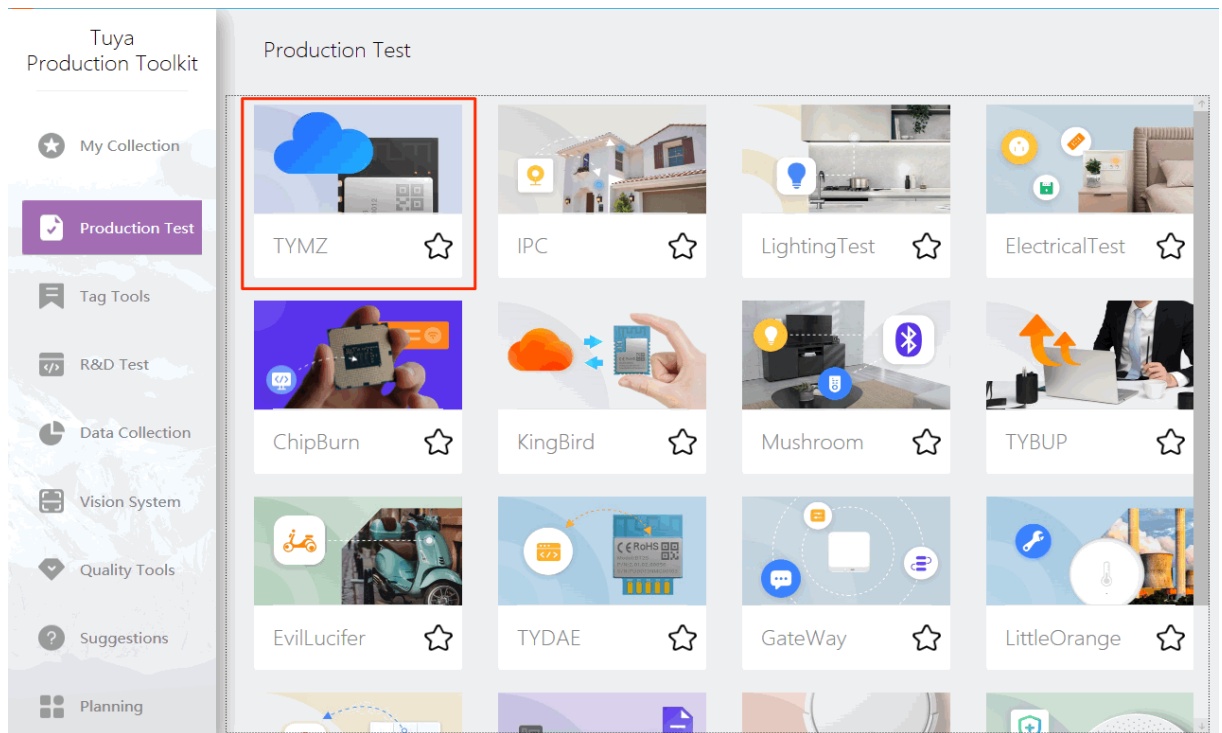
name of software	Software description	version
-	-	V1.1.11
-	-	V1.3.0
-	-	V1.0.0
-	-	V1.0.0
-	-	V1.0.0
-	-	V2.10.9
-	-	V1.0.2
-	-	V1.1.2
-	-	V1.0.2
-	-	V4.6.1
-	-	V1.1.1

2.2.2 Install Production Toolkit

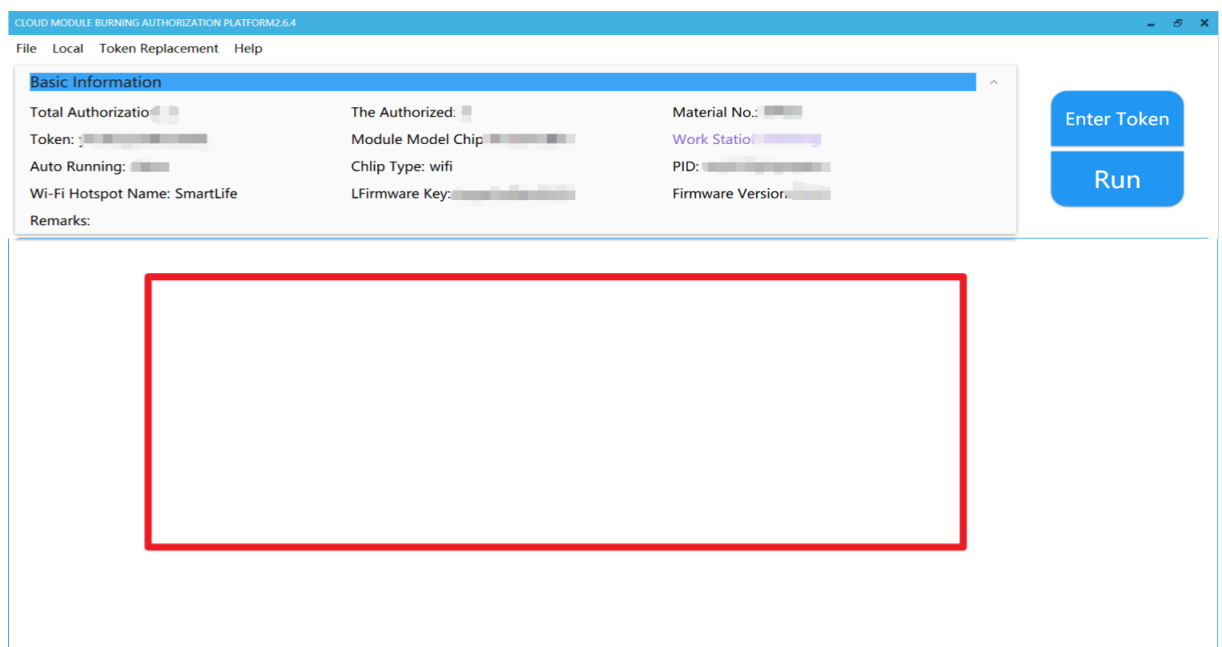
1. Open the installer. When you are prompted with the following window, click **More info**.



2. Click **Run anyway**.
3. Follow the onscreen instructions to begin installing. You can specify an installation directory as needed.
4. After installation, open the software and log in with your **Smart PMS** account and password.
5. Click **TYMZ**.



6. Check the installation result.



- If you have a yellow screen, it means the installation is successful. You can

then download the **Beken Writer**.

- If you have a white blank screen, you need to set the software to make it run correctly.

1. Choose **File > Set Up**.

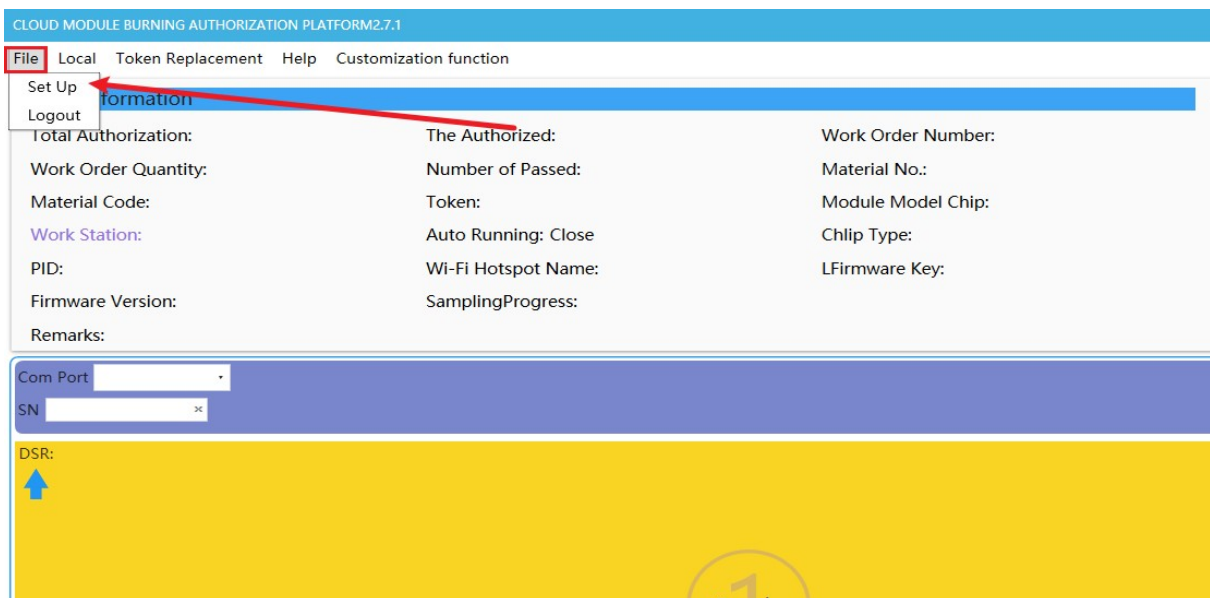


Figure 1: img

2. In **Basic Setting**, change **1*1** for **Multi Selection** to **1*2** and click **OK**. You will have two yellow screen sections.

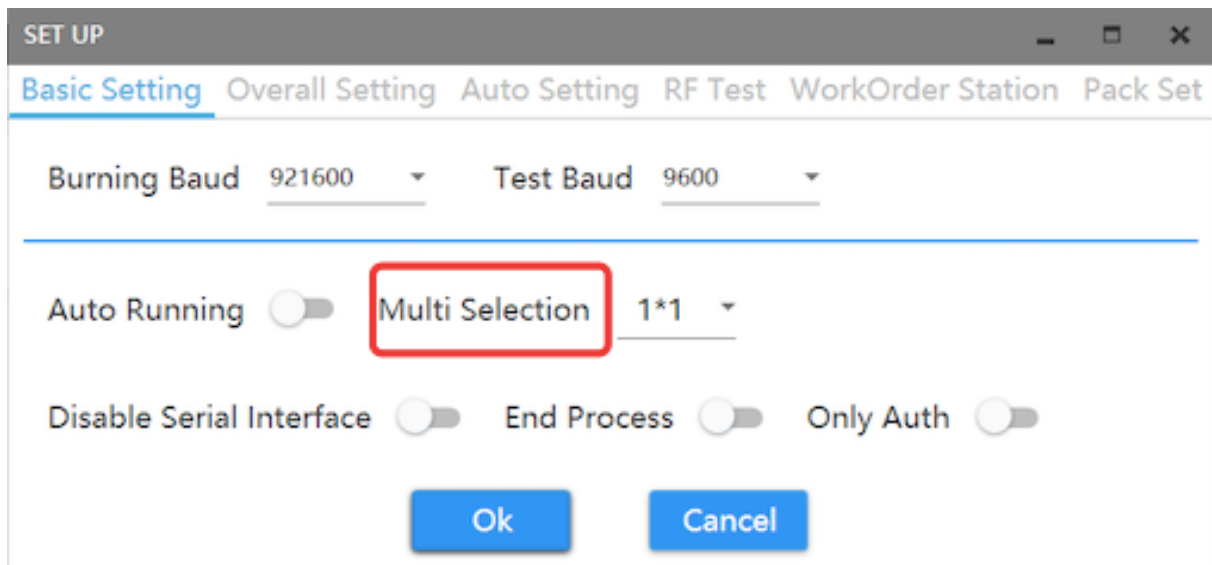


Figure 2: img

3. Then, change **1*2** back to **1*1**. This software will work fine.

2.3 Download Beken Writer

Click [bk_writer_gui_V1.6.3](#) to download the Beken Writer flashing tool.

3 Flash firmware

The flashing process varies, depending on different development boards or modules. If you develop with the Sandwich development board, we recommend that you use the **Cloud Module Burning Authorization Platform** software to flash the firmware.

3.1 Custom development

This method applies to the product **release step** in the custom development solution. Specifically, upload the compiled firmware to the Tuya Developer Platform, get the token, and then use the **Cloud Module Burning Authorization Platform** software to flash the firmware and authorize the module.

Only the authorized module can be connected to the Tuya Developer Platform. You can use the **Beken Writer** to flash existing or updated firmware to an authorized module.

3.1.1 Upload firmware

1. Log in to the [Tuya Developer Platform](#), click the target product, and then go to the **Hardware Development** step.
2. Click **Add custom firmware** and complete the required information.

Parameter name	Description
Firmware identifier	The Firmware Identifier must be identical to the name of the project folder under the <code>apps</code> directory. Assume that the firmware identifier is <code>wifi_one_light</code> . You should upload the production file of the project <code>wifi_one_light</code> under the <code>apps</code> directory.
Flash Size	The Flash Size is 16 Mbit, equal to 2 MB. See the datasheet for the flash size of the network module you use.

Parameter name	Description
	Note: 1 byte = 8 bits. 16 Mbit ÷ 8 = 2 MB.
Parameters not framed in red	Use the default settings.

The screenshot shows the 'Add Firmware' dialog in the Tuya IoT Platform. The 'Basic Information' tab is active, and a red box highlights the input fields for firmware details. A red arrow points to the 'Add Custom Firmware' button in the background interface. A red circle with the number 3 is next to the 'Generate Firmware Key' button at the bottom right.

1. Click **Upload Firmware** to upload the firmware in the next step. Set the following parameters and click **Save**.

Parameter name	Description
Firmware version	The Firmware Version must be identical to the one used for compilation.
Firmware for production	Upload the binary file with the suffix <code>.QIO</code> .

Parameter name	Description
User area firmware	Upload the binary file with the suffix UA .
Firmware updates	Upload the binary file with the suffix UG .
Operation mode	Select the QIO option.

Add Firmware
X

1

2

Enter firmware information
Upload Firmware

Basic Information

Firmware Identifier: bk7231n_light1_io_xx

Firmware Name (in Chinese): Cool white light

Firmware Name (in English): Cool white light

* Firmware Version ⓘ: 1.0.0

* Critical Version ⓘ: ☐ Yes ☒ No

* Production Firmware ⓘ:

🔗 [k7231n_light1_io_xx_QIO_1.0.0.bin](#)

* User Area Firmware ⓘ:

🔗 [bk7231n_light1_io_xx_UA_1.0.0.bin](#)

Firmware Updates ⓘ:

File to Build Incremental Package ⓘ:

🔗 [bk7231n_light1_io_xx_UG_1.0.0.bin](#)

Flash Size: 16Mbit

1. Click **Enable Firmware**.



Firmware Added

This firmware version must be enabled before you can deploy OTA updates and release the product. Enable now?

Enable Later

Enable Firmware

2. Choose **General availability** for deployment scope and click **Save and Enable**.

General availability is selected to facilitate product management for you as an individual developer. If your product is built for mass production, proceed with caution when choosing the development scope.

Enable Firmware Version



i Enable Firmware mainly used to control whether the current firmware version can be used for product replication, OEM and firmware upgrade

Firmware Information

Firmware Name (in Chinese): Cool white light

Firmware Name (in English): Cool white light

Firmware Version: 1.0.0

Firmware Key: .

Release Notes: -

Select Firmware

☐ Firmware Updates: **i** Upload the firmware updates before you enable this firmware version.

☒ Production Firmware: k7231n_light1_io_xx_QIO_1.0.0.bin

Deployment Scope

☒ General availability

☐ Limited scope

Cancel

Save and Enable

3.1.2 Get production credentials

After the firmware is uploaded to and enabled on the Tuya Developer Platform, you can get free licenses. They are required when you flash the firmware and autho-

size the module by using the **Cloud Module Burning Authorization Platform** software.

1. Click **Get 2 Free Licenses**.

Function Definition Device Interaction **Hardware Development** Product Configuration Device Debugging Testing Service [Development Guide](#)

① Modify firmware and configuration during product development, production data will not be modified, necessary to reconfirm production data

Different access modes for different categories, Self-develop SDK and Tuya Standard Module SDK merge into TuyaOS Access [How to develop hardware?](#)

① SelectedCloud AccessMode

MCU SDK **TuyaOS** Link SDK

② SelectedCloud Access hardware

Hardware Name	Firmware Type	Firmware Name/Firmware Key	Current Version	Operation
CBU Wi-Fi & Bluetooth Module chip: BK7231N Hardware details>>	Module Firmware	Cool white light Edit Firmware More	Enabled 1.0.0 Replace/Edit	Change Hardware ¥17.00 Buy now Get 2 Free License

2. For **Delivery Mode**, choose **Credential** and click **Submit**.

- **Credential:** The flashing and authorization software writes a unique credential to a device. It can read the specified numbers of credentials and write them to devices in bulk. To use credentials, make sure you have uploaded the production firmware to the Tuya Developer Platform.
- **License List:** A list provides license information in plain text, which must be written to devices manually one by one.
- **Credential (Authorization Only):** The flashing and authorization software writes a unique credential to a device for the purpose of authorization only without the need for firmware.

Get Free License

① You can get 2 free licenses (worth ¥20.00) for debugging purposes. Click Confirm and get them.

Generic License

Purchase Purpose: Debugging

Select Product:

Delivery Mode: Please select

Unit Price: Credential

Quantity: License List

Credential (Authorization Only)

Confirm


Figure 3: get_token_2

- Find your product by PID and click **Download Credential**.

Order List

Production Order License Pickup List Debugging & Sample Order

Order Status Please enter keywords to search Search Reset

Item Info	Unit Price	Number	Subtotal	Status	Operation
2021-06-17 20:16 Item Type: License					
Order No.:YL21061710201025 Debugging					
 Generic License	¥0.00	10	¥0.00	Completed	Download Credential
Product ID: 				Details	
Total: ¥0.00 Paid: ¥0.00 To Be Paid: ¥0.00					

Total 1 item(s) < 1 >

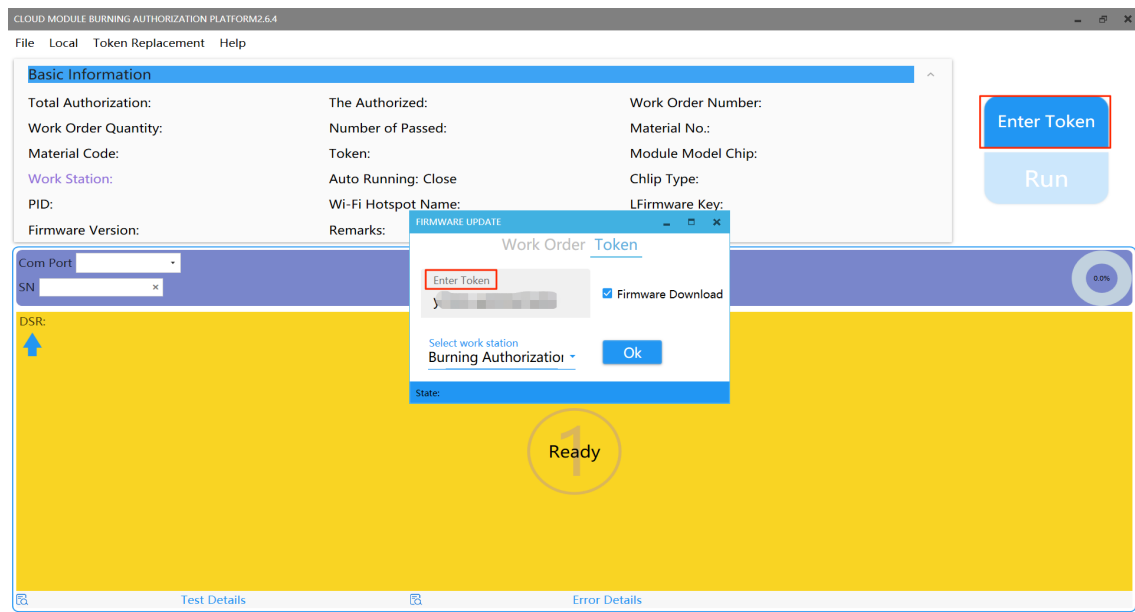
- Extract the downloaded file and open the `Token_information.txt` file. Copy the credential.
- Open the **Cloud Module Burning Authorization Platform** software, enter your credential in the token input box, and select **Burning Authorization** for the work station.

If you get an error message saying `Failed to get token, no permissions for actions`, follow the instructions in the [FAQs section](#) to troubleshoot the problem.

The screenshot shows a window titled 'FIRMWARE UPDATE' with standard Windows window controls. The main heading is 'Work Order Token'. Below this, there is a text input field with the placeholder 'Enter Token' highlighted by a red rectangle. To the right of the input field is a checked checkbox labeled 'Firmware Download'. Below the input field, there is a dropdown menu with the text 'Select work station' and 'Burning Authorization' selected, followed by a blue 'Ok' button. At the bottom of the window, there is a blue bar with the text 'State:'.

3.1.3 Flashing and Authorization

1. Open the **Cloud Module Burning Authorization Platform** software, click **Enter Token**, enter your credential, select **Burning Authorization** for the work station, and click **OK**.



2. Connect your board to your computer by using a USB to UART converter. The pin connection table is as below:

USB to UART converter pins	Sandwich SoC board pins
VCC	VCC
GND	GND
TX	RX
RX	TX

3. Select the correct **COM Port** and click **Run**. Immediately power off the board and power on it again. Alternatively, you can directly press the reset button to restart the board.

:::important

- To restart the board, do not directly disconnect the USB to UART converter from your computer. Otherwise, flashing will fail. You should disconnect the VCC and GND jumper wires between the board and the USB to UART converter and connect them again.
- The CBU board comes with a USB to serial CH340 chip. After you click **Run** on the software, press the reset button on the board to restart it.

⋮

```
1 ![sandwich_board_download_4](https://images.tuyacn.com/content-pla
2 tform/hestia/1651155468bab4469e94.png)
```

1. (Optional) If you failed to enter the production test, it might be because the board has been connected to the network for more than 15 minutes and the testing channel has been shut down. For more information about this issue, see [Failed to enter production test](#).

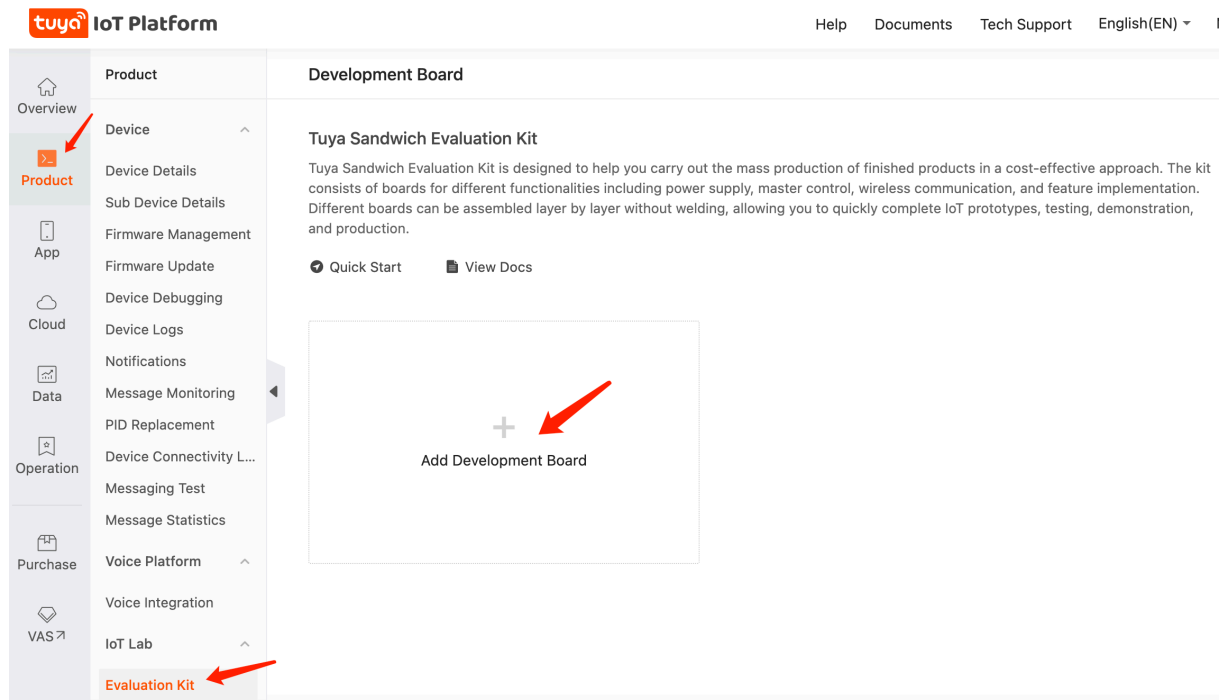
3.2 Sandwich Development Board

This method applies only when you flash the firmware to and authorize the Sandwich development board.

For the products created based on the no-code development solution on the Tuya Developer Platform, they must be bound with the Sandwich SoC microcontroller board. This way, you can request licenses as the credentials (tokens) from the Tuya Sandwich Evaluation Kit. Otherwise, if your account is not bound with a Sandwich SoC microcontroller board, the network module cannot be granted a token for the product in the no-code development solution. Thus, flashing and authorization cannot be implemented for the module.

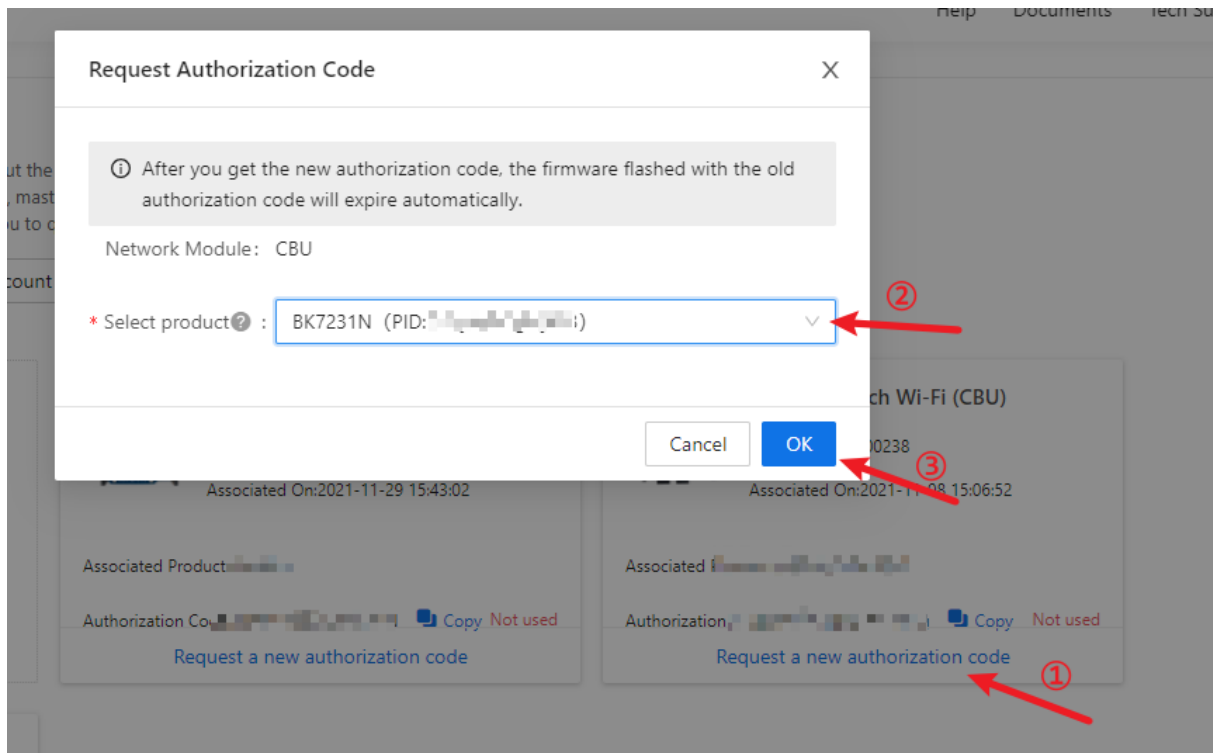
3.2.1 Sandwich development board

Go to [Tuya Developer Platform](#) > **Product** > **IoT Lab** > **Evaluation Kit**, and click **Add Development Board**. In the dialog box that appears, enter the ID and password of the board.



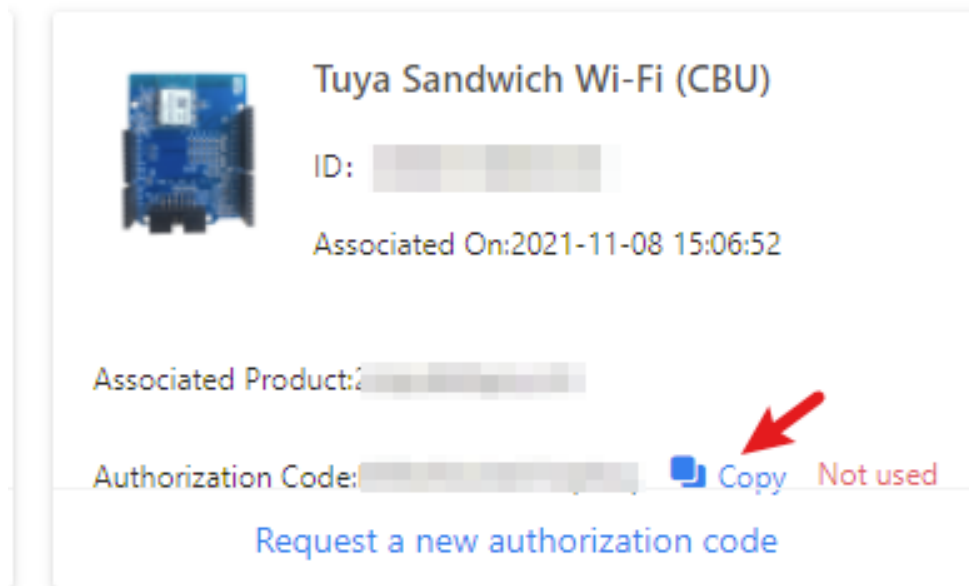
3.2.2 Get the token

After the board is bound, click **Request a new authorization code for the board**, and in the dialog box that appears, select the target product to get the token.



3.2.3 Flashing and Authorization

1. Copy the token from the Tuya Developer Platform and open the **Cloud Module Burning Authorization Platform** software.



2. For more information, see [Flash firmware and authorize module](#).

3.3 Beken Writer

This method applies to the development step. You can flash firmware to the module **unlimited times with authorizing the module once**. The module must be authorized before flashing. Select the correct flash partition to ensure writing to the right section. Otherwise, the program cannot run as expected.

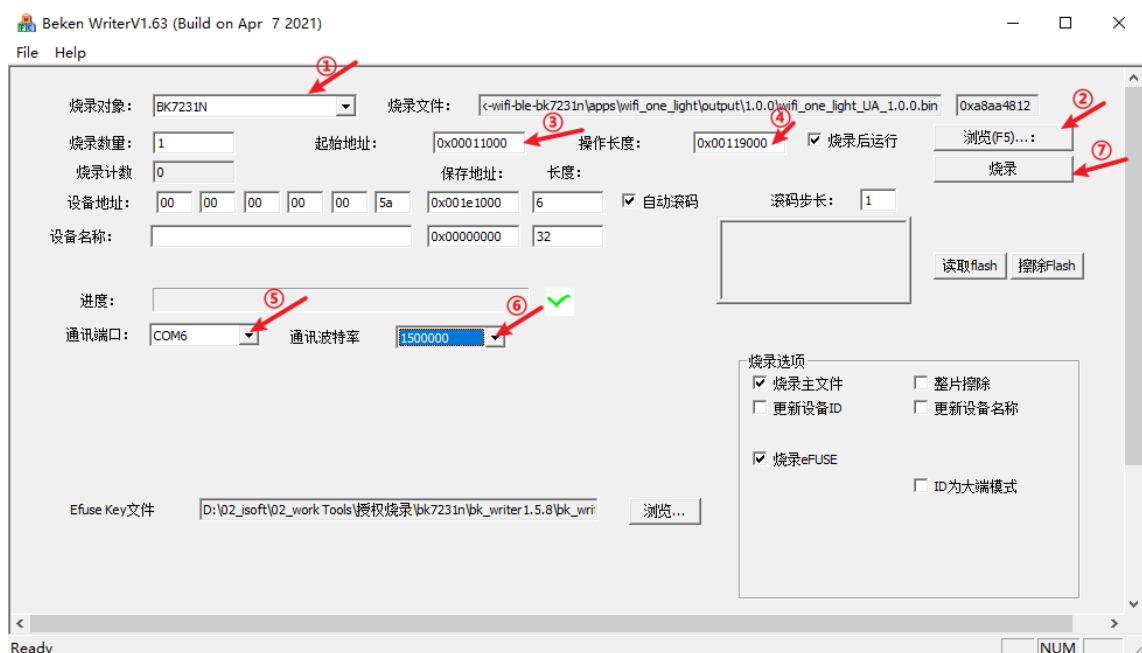
During development, flashing and authorization is always required each time the **Cloud Module Burning Authorization Platform** software is used. To improve efficiency, you can use the flashing tool from the chip vendor to **flash firmware to an authorized module unlimited times**.

3.3.1 Beken Writer

The Beken Writer tool is used only to flash the firmware to the application zone and is unable to authorize the module. You can use this tool to flash an authorized module. Therefore, you do not need to upload firmware to the Tuya Developer Platform for

flashing and authorization with the **Cloud Module Burning Authorization Platform** software each time the firmware is updated.

1. Select the chip model of the target module from the **Flashing Object** drop-down list. For more information, see [Datasheets of Network Modules](#).
2. Click **Browse** and select the binary file with the suffix **UA**.
3. Set **Start Address** to **0x00011000** and set **Operation Length** to **0x00119000**.
4. Select the correct serial port from **COM Port** and set **Baud Rate** to the maximum value to accelerate the flashing speed.
5. Click **Run**. Immediately power off the board and power on it again to start flashing. The updated firmware will be flashed to the module. There is no need to authorize the module with the **Cloud Module Burning Authorization Platform** software again.



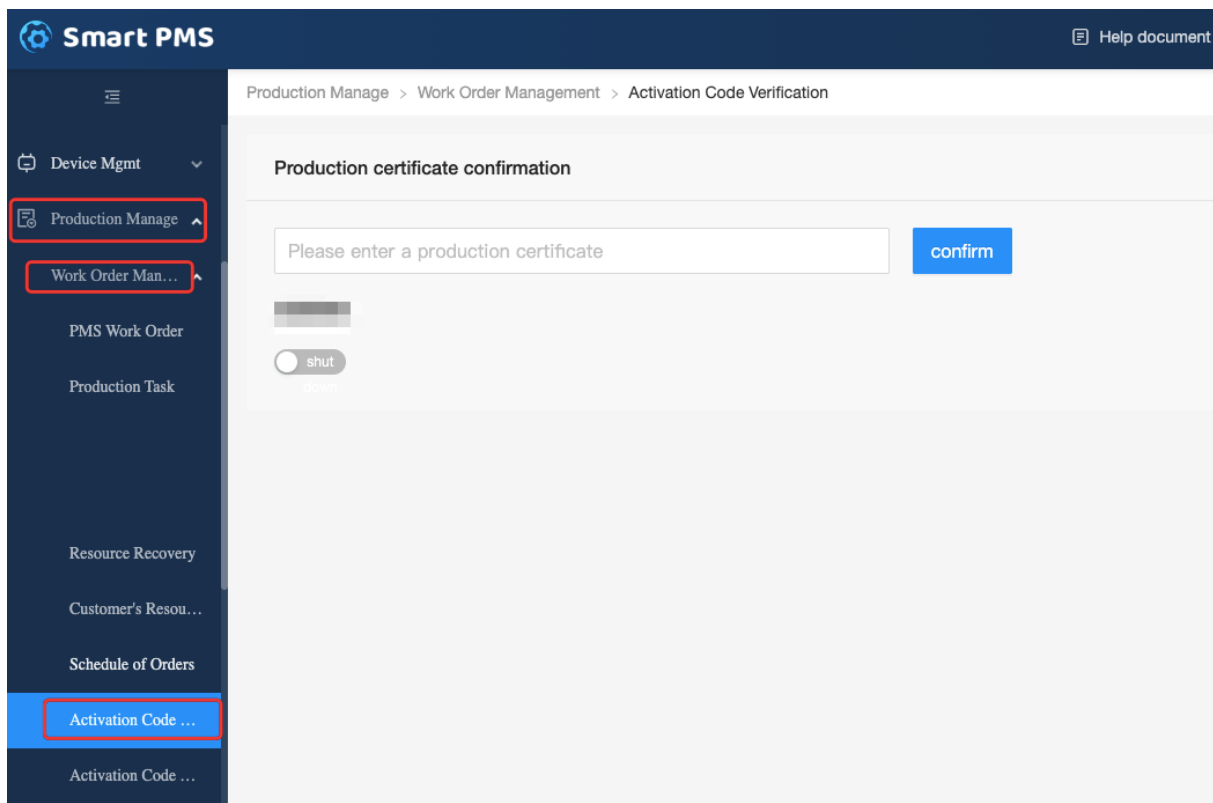
4 FAQs

4.1 Failed to get token, no permissions for actions

When you enter the credential, an error message saying `Failed to get token, no permissions for actions` is returned.

Troubleshooting

Log in to the [Smart PMS](#). Choose **Production Manage > Work Order Management > Activation Code Verification**. Enter your credential with issue and click **OK**. Go back to the software. Enter your credential again and you should be good to go.



4.2 Bus contention error

This error occurs possibly because other software occupies the required serial port for flashing.

Troubleshooting

Close all flashing tools, or plug off the USB to TTL converter and plug it into the computer.

4.3 Fail to get firmware fingerprint

In the authorization-only scenario, **the failure to get the firmware fingerprint** might occur. The possible cause is that the flashed firmware name or version number does not match the authorized firmware name or version number.

Troubleshooting

1. Enter the token that matches the firmware fingerprint and then run authorization.
2. Try flashing and authorization again. This method does not apply to the production certificate of **Authorization Only**.


4.4 Fail to enter production test

If the module has been connected to the network for more than 15 minutes, the testing channel will be shut down. During flashing and authorization, if the **failure of entering the production test** occurs and a message saying `have activated over 15 min, not enter mf_init` is logged, this means the device has disabled the production test mode.

Troubleshooting

You need to erase the flashing data before the authorization is successful.

```
[ble_appm_set_scan_rsp_data]
end_adv_state:3
[PLATFORM DEBUG]UNKNOWN EVENT:16
[gapm_cmp_evt_handler] conidx:0,operation:0xaa,status:0x0
[appm_adv_fsm_next] cur_adv_state:3
[appm_start_advertising_cmd]
adv_state:6
[ble_appm_start_advertising]
end_adv_state:6
[PLATFORM DEBUG]UNKNOWN EVENT:16
[gapm_cmp_evt_handler] conidx:0,operation:0xa4,status:0x0
[appm_adv_fsm_next] cur_adv_state:6
adv_state:7
end_adv_state:7
[PLATFORM DEBUG]UNKNOWN EVENT:16
[01-01 18:12:15 TUYA Notice][lr:0x9a37b] have activated over 15 min, not enter mf_init
[01-01 18:12:15 TUYA Notice][lr:0x57e65] mf_init succ
[PLATFORM NOTICE]bk_rst:0 tuyu_rst:0
[01-01 18:12:15 TUYA Notice][lr:0x9927f] Last reset reason: 0
[01-01 18:12:15 TUYA Notice][lr:0x993ed] serial_no:105a1709bdf6
[PLATFORM ERROR]set country err!
bk_wlan cca closed
[01-01 18:12:15 TUYA Notice][lr:0x99425] gw_cntl.gw_wsm.stat:2
[01-01 18:12:15 TUYA Notice][lr:0x994b3] gw_cntl.gw_wsm.nc_tp:9
[01-01 18:12:15 TUYA Notice][lr:0x994bb] gw_cntl.gw_wsm.md:0
[01-01 18:12:15 TUYA Notice][lr:0x996a3] gw_cntl.gw_if.abi:0 input:0
```



4.4.1 Modify code (generic method)

If the failure of entering the production test occurs, you can call the function `mf_test_ignore_close_flag()`; in the function `pre_device_init()` of the file `tuya_device.c` to ignore the flag that disables the production test. This avoids the authorization failure caused by the disabled production test.

```
/**
 * @brief device initialization prep work
 *
 * @return none
 */
VOID_T pre_device_init(VOID_T)
{
    ..../* reset key init */
    ....wifi_key_init();

    ....PR_DEBUG("%s", tuya_iot_get_sdk_info()); /* print SDK information */
    ....PR_DEBUG("%s:%s", APP_BIN_NAME, DEV_SW_VERSION); /* print the firmware name and version */
    ....PR_NOTICE("firmware compiled at %s %s", __DATE__, __TIME__); /* print firmware compilation time */
    ....PR_NOTICE("system reset reason:[%s]", tuya_hal_system_get_rst_info()); /* print system reboot causes */

    ....SetLogManageAttr(TY_LOG_LEVEL_NOTICE); /* set the log level */

    ....mf_test_ignore_close_flag();
    ....return;
}
```

4.4.2 Erase data with chip manufacturer's tool for Beken series

Open the `bk_writer` tool provided by the chip vendor and change **Flashing Object** to the required chip. For more information, see [Datasheets of Network Modules](#).

Settings for development boards with Beken chips:

- WB3S: Select **BK7231** from the **Flashing Object** drop-down list.
- CBU: Select **BK7231N** from the **Flashing Object** drop-down list.
- Enter `0x001EE000` in **start address** and `0x00012000` in **operation length**.

Select the COM port, click **Erase Flash**, and then restart the module to start erasing the memory data.

