T-Head Yeying1520
EVB Image Burning User Guide

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Revisions

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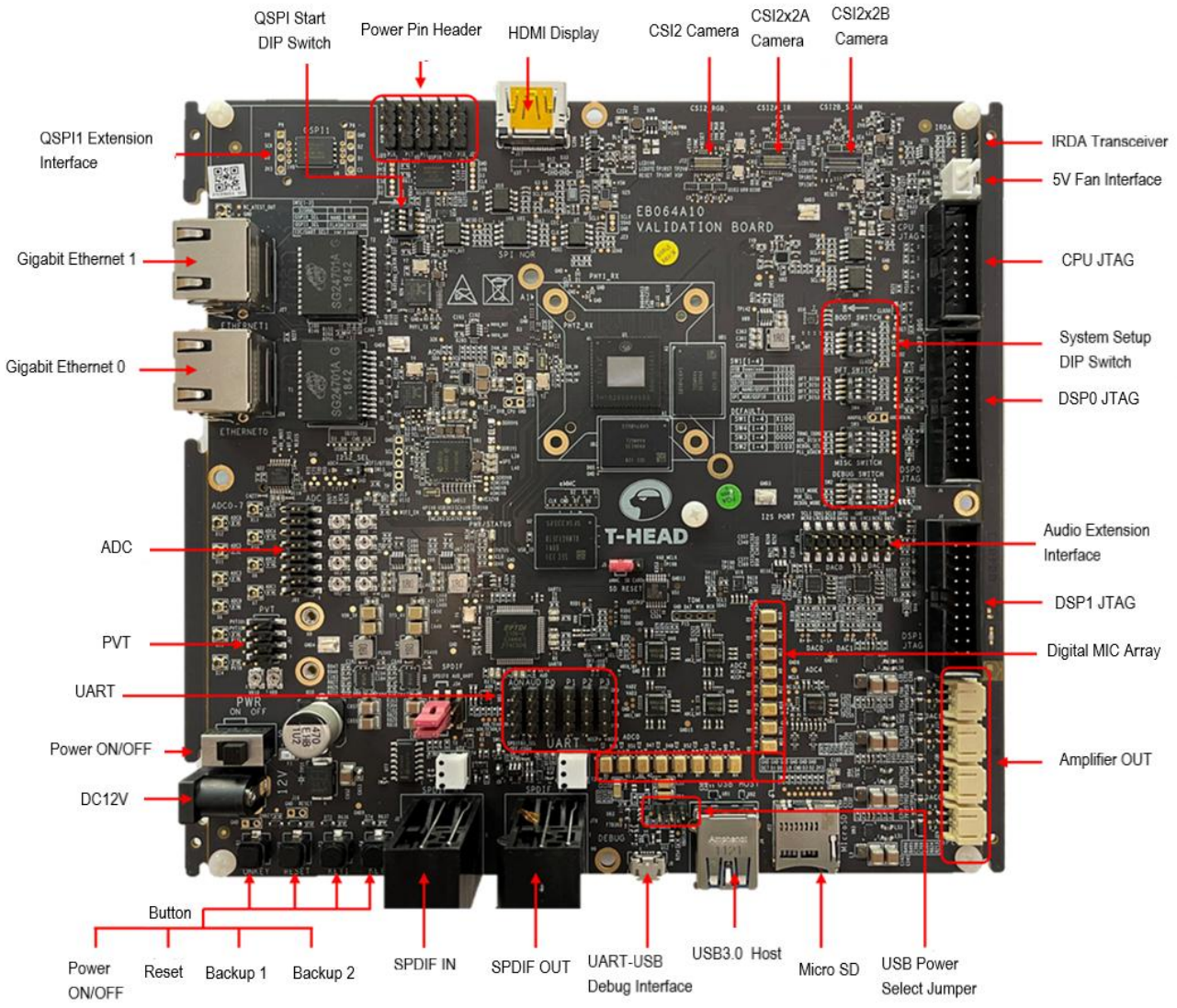
Figures & Tables

List of Abbreviations

Abbreviations	Full Spelling	Chinese Explanation

1 Overview

Yeying1520 EVB is a development board based on Yeying1520 speech-vision fusion chip, as shown in the figure below.

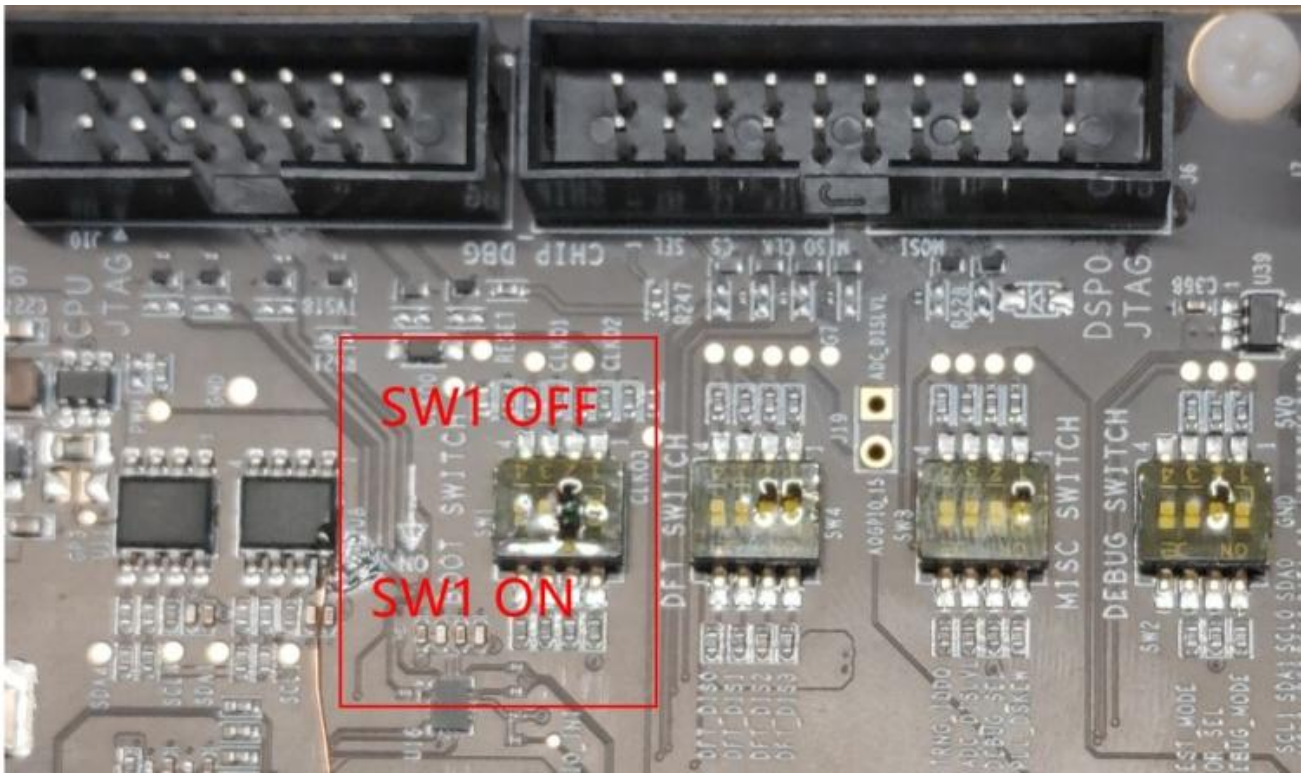


Yeying1520 EVB supports a wide range of ports and can be used to support verification and development of different MUX modes through jumpers and analog switches. For details, please refer to *Yeying1520 EVB User Guide.docx*.

Boot Mode Setting

BOOT_SEL3 SW1 [1]	BOOT_SEL2 SW1 [2]	BOOT_SEL1 SW1 [3]	BOOT_SEL0 SW1 [4]	Boot Mode Setting SW1 [1-4]
X	0	X	X	USB Download
X	***1***	***0***	***0***	***eMMC Boot***
X	1	0	1	SD Boot, SDIO0
X	1	1	0	SPI NAND boot, QSPI0, CS0
X	1	1	1	SPI NOR Boot, QSPI0, CS0

Boot jumper SW1, needs to be dialed to the OFF position, set to fastboot mode.



When you are ready, plug in the 12V DC power supply, turn on the power switch and press the power button to start.

- PWR switch SW7 jumps to the ON position
- Press the power J11 button ONKEY to power up the board

2 Install Driver

If it is a MAC computer, you only need to install the serial port tool and the android debug tool.

1. Install the serial port tool, such as minicom brew install minicom

How to use:

minicom -D /dev/<serial port number> e.g. minicom -D /dev/tty.usbserial-142202

2. Download the MAC version of android platform tools at https://developer.android.google.cn/studio/releases/platform-tools

If it is a Windows computer, you need to install the serial driver, as described below.

2.1 Serial Driver

- Serial driver:

Download the latest VCP serial driver from FTDI official website and install it. There are Windows, Linux, and Mac OS versions. The link is https://www.ftdichip.com/Drivers/VCP.htm.

		Processor Architecture							
Operating System	Release Date	X86 (32-Bit)	X64 (64-Bit)	PPC	ARM	MIPSII	MIPSIV	SH4	Comments
Windows (Desktop)*	2021-07-15	2.12.36.4	2.12.36.4	-	-	-	-	-	WHQL Certified. Includes VCP and D2XX. Available as a setup executable Please read the Release Notes and Installation Guides.
Windows (Universal)***	2021-11-12	2.12.36.4U	2.12.36.4U	-	-	-	-	-	WHQL Certified. Includes VCP and D2XX.

After the driver is installed, there should be four serial ports:

The four serial ports correspond to the following subsystems in turn:

- E902
- C906
- C910 TEE
- C910 REE

Usually we open the third serial port which is C910 TEE. After the serial port is opened, the board is reset by RESET KEY and the serial port will print the BROM message.

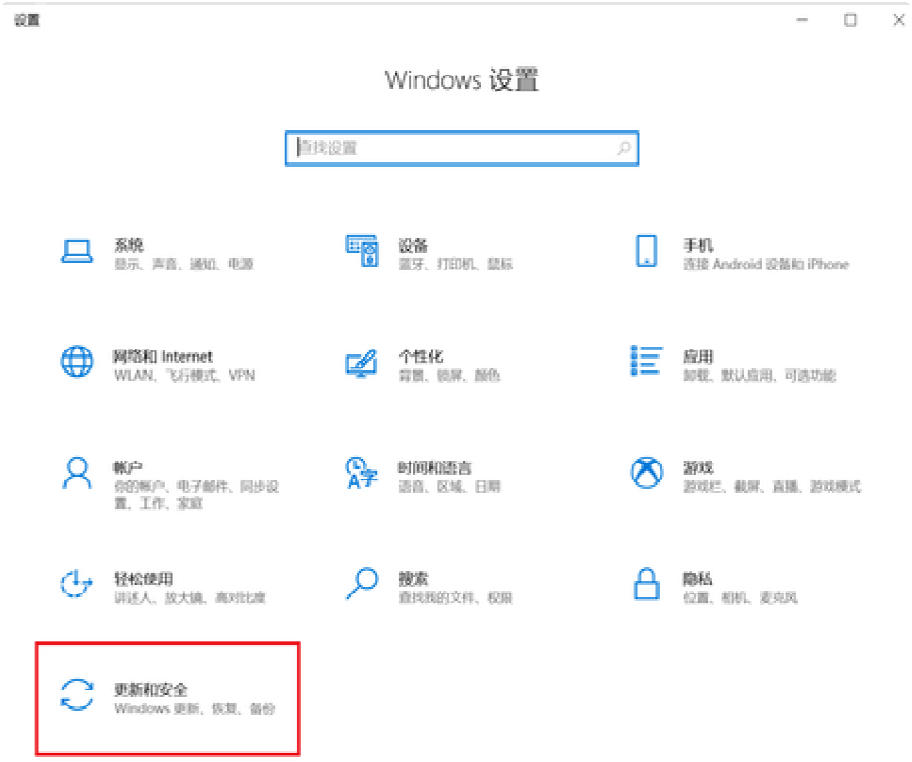
```
brom_ver 7
[APP][E] protocol_connect failed, exit.
```

If there is no BROM message, check the connection cable, jumper and power-up indicator. If there is still no such message, it is possible that the board is damaged.

2.2 Fastboot Driver

win10 needs to disable mandatory driver signature. The specific steps are as follows:

1. Find the settings of win10 and click “Settings”.



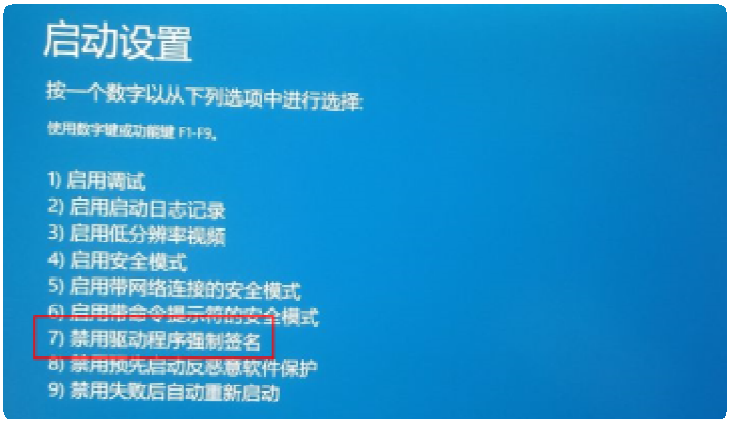
2. Click the last “Update and Security” and then click “Restore”.

3. After clicking “Restore”, click “Restart” under Advanced Setup on the right, the computer will restart at this time. If there are other programs running, please be careful.

4. Several options will appear after restarting, click the option “Troubleshooting”.

5. Click “Advanced->Start Setup->Restart”.

6. After this restart, a list will pop up with options such as Secure Mode, including “Disable Mandatory Driver Signature” that we care about here.

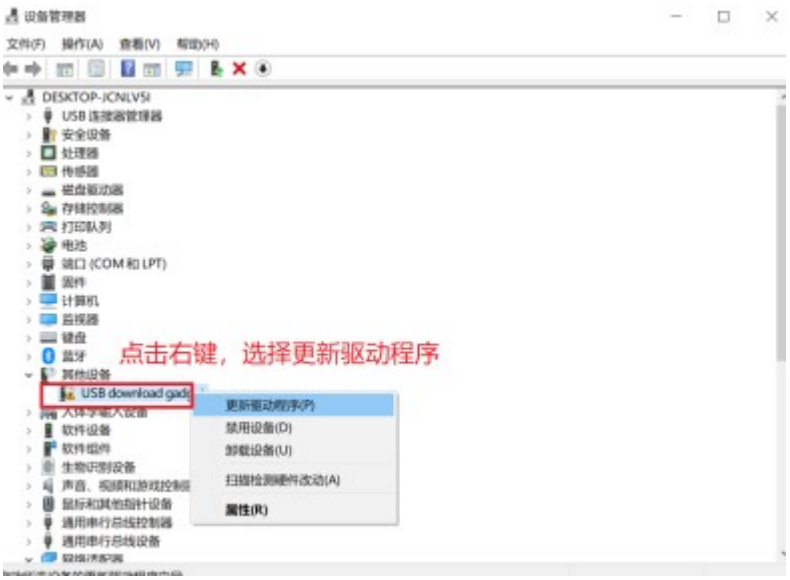


7. Select “Disable Mandatory Driver Signature”, press the corresponding number, and the computer will restart.
8. After rebooting, the driver will be successfully installed. If prompted, click to continue the installation.

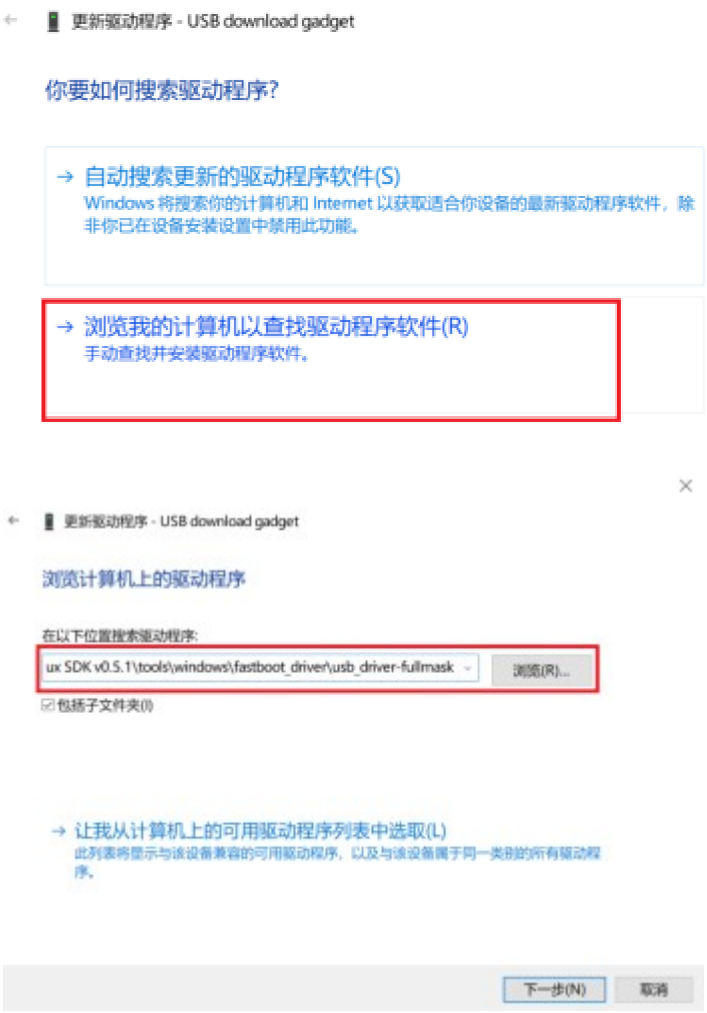
The specific steps of fastboot driver installation are as follows:

1. Connect the development board to the computer via USB.
2. Open “Device Management” and “USB download gadget” device appears.

3. Right-click to install the driver and select “Browser my computer for the driver”.

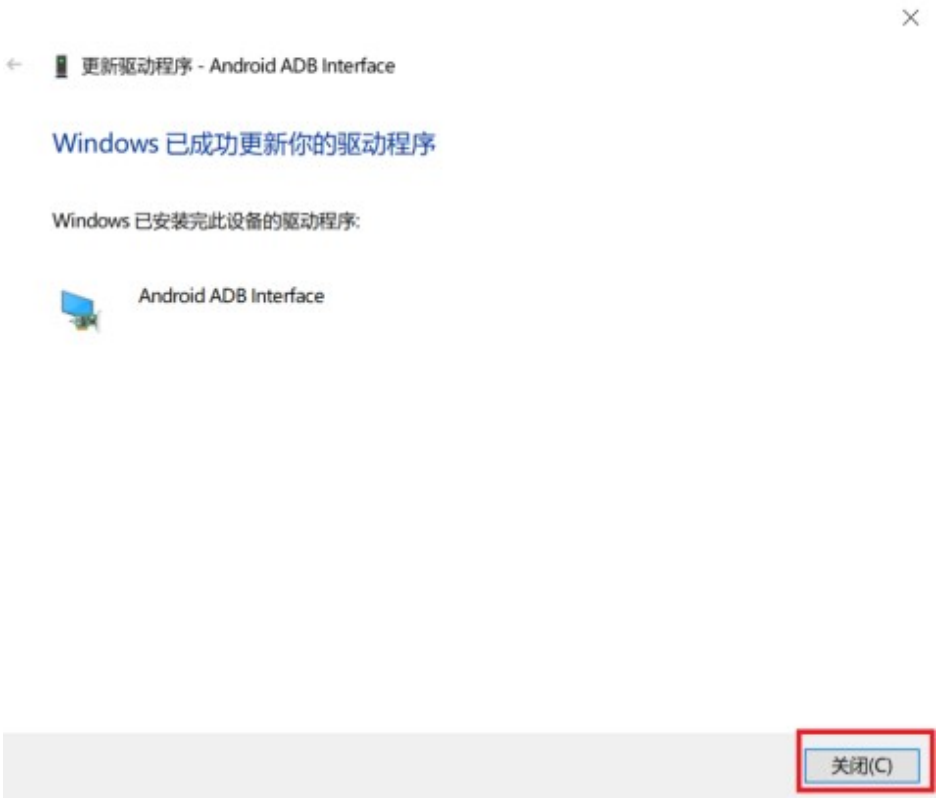


4. Select the usb_driver directory under fastboot_driver and click “Next”.



5. Select “Always install this driver software”.

6. Complete the driver installation.



2.3 Set the Default Partition

Boot to U-Boot, press any key to enter command mode during the countdown phase.

Enter the following command to complete the secure partition setup.

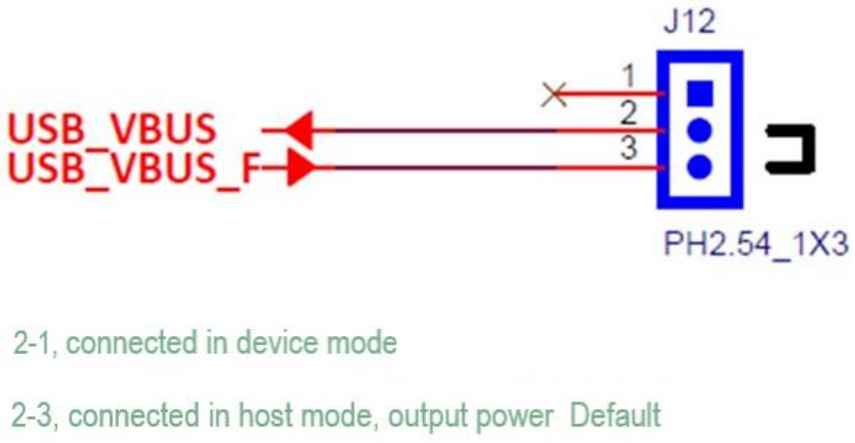
```
env default -a -f
saveenv
run gpt_partition
```

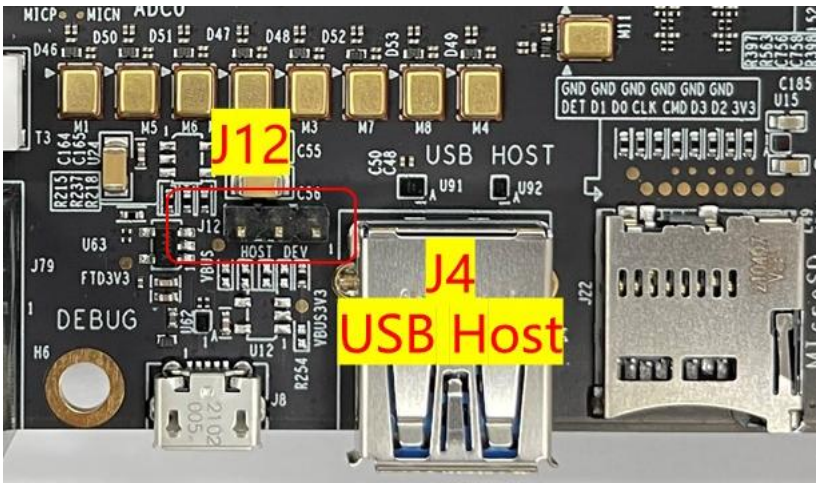
3 Power Up and Startup

3.1 Adjust Jumpers

Yeying1520 needs to be used as a device during image burning and ADB debugging. Therefore, the design of selecting the VBUS power supply through jumpers is added to the Yeying1520 EVB. In the normal host mode, the J12 jumper is connected to 2-3, and the motherboard VBUS 5V supplies the USB connector. When used as a device, the jumper is connected to 2-1, or not connected.

Note: Jumper selection for VBUS power supply is a non-standard design, so be careful when using it to avoid burning out the motherboard!

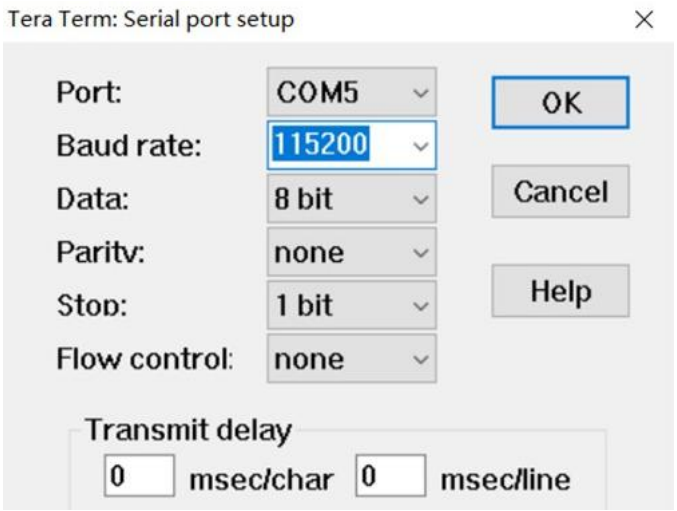




3.2 Connect the Serial Port

Plug one end of the USB MicroB cable into the computer and the other end into the verification board J8, you should see four USB serial ports on “Computer -> Computer Management->Ports”.

They are AON_UART E902 debug interface, AUD_UART C906 debug interface, UART0 C910 TEE debug interface and UART1 C910 REE interface. When burning, please select the third serial port and set the baud rate to 115200bps.



3.3 Power Up

Connect the input voltage DC12V, turn the SW7 power switch to the “ON” position, and press the ONKEY button to power up the board.

4 Image Burning

Set the DIP switch correctly, open the serial port, and then start the board. The serial port log is as follows:

```
brom_ver 7
[APP][E] protocol_connect failed, exit.
```

4.1 Windows

The burn script will be released by default in the SDK. Enter the SDK directory, switch to the fastboot burn script directory windows_script, and execute the script:

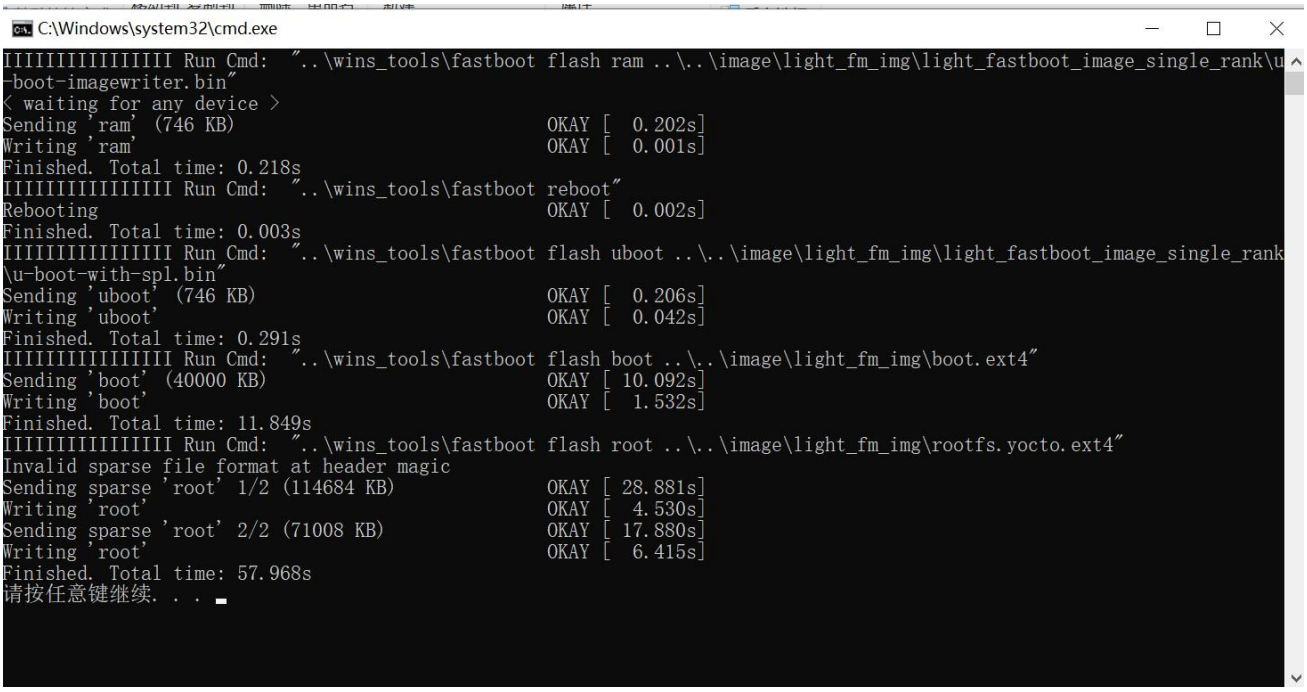
Script	Function
light_fm_ddr_fastboot.bat	Boot the system with one key without burning the eMMC
light_fm_single_rank_full_image.bat	Burn all images
light_fm_single_rank_uboot+kernel.b at	Burn U-Boot and Linux kernel
light_fm_single_rank_uboot.bat	Burn U-Boot

The script will burn the corresponding image to the eMMC, and the process takes about a few minutes to a dozen minutes, depending on the size of the image.

During the burning process, there will be log output from the serial port:

```
brom_ver 7
[APP][E] protocol_connect failed, exit.
Starting download of 764264 bytes

downloading of 764264 bytes finished

U-Boot SPL 2020.01-dirty (Jan 07 2022 - 15:13:43 +0800)
FM[1] lpddr4x singlerank freq=3733 64bit dbi_off=n sdram init
ddr initialized, jump to uboot
image has no header


U-Boot 2020.01-dirty (Jan 07 2022 - 15:13:43 +0800)

CPU:   rv64imafdcvsu
Model: T-HEAD c910 light
```

When the “Any key to continue” prompt appears, it indicates that the burning is complete:



4.2 Linux

The burn script will be released by default in the SDK. Enter the SDK directory, switch to the fastboot burn script directory linux_script, and execute the script:

```
sudo ./light_fm_single_rank_full_image.sh
```

The burning process is similar to that of Windows.

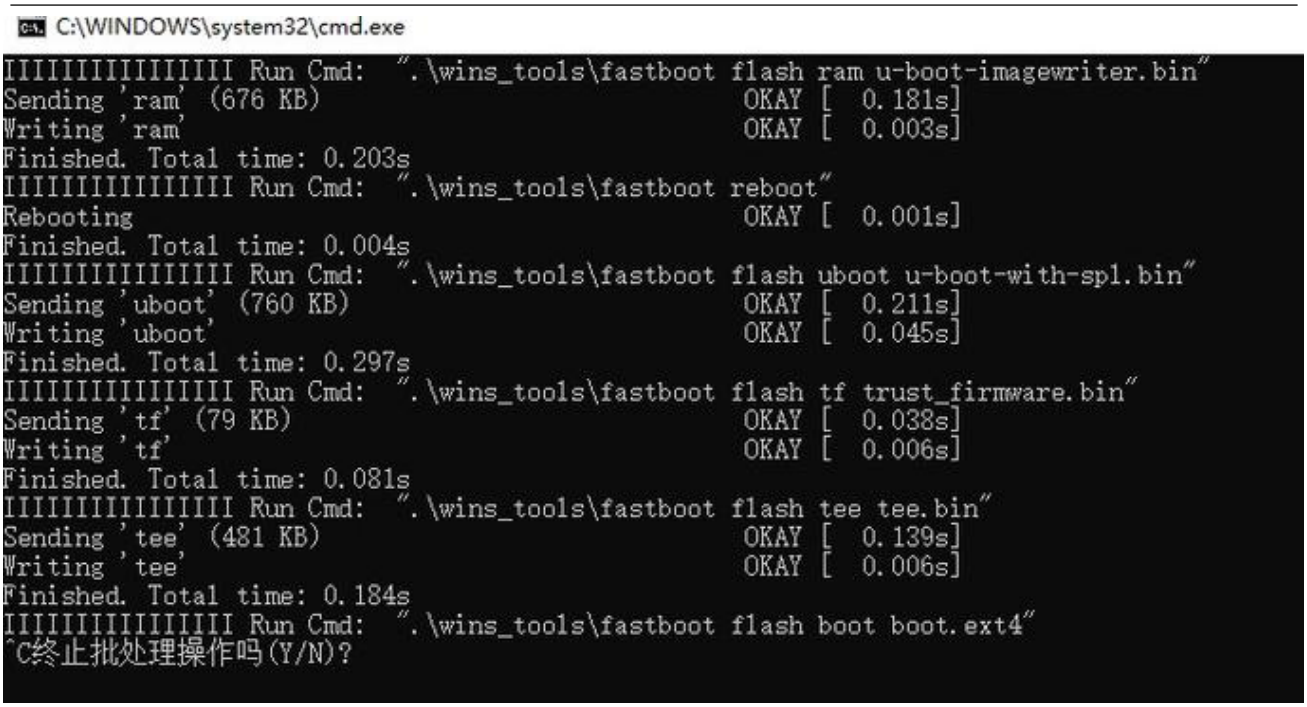
4.3 Fast Burning

The non-empty board (image has been burned) can be directly burned with the fastboot function of U-Boot without modifying the DIP switch. The specific methods are as follows:

1. Connect the USB-to-serial cable and use the serial port tool to open the third serial port on the PC for backup.
2. When the serial log shows that booting to U-Boot, press Enter on the PC to make U-Boot on the development board enter cmd mode.

```
U-Boot 2020.01-00009-gbe57a646da-dirty (Feb 22 2022 - 21:18:57 +0800)

CPU:   rv64imafdcvsu
Model: T-HEAD c910 light
DRAM:  1 GiB
C910 CPU FREQ: 1500MHz
AHB2_CPUSYS_HCLK FREQ: 250MHz
AHB3_CPUSYS_PCLK FREQ: 125MHz
PERISYS_AHB_HCLK FREQ: 250MHz
PERISYS_APB_PCLK FREQ: 62MHz
GMAC PLL POSTDIV FREQ: 1000MHZ
DPU0 PLL POSTDIV FREQ: 1188MHZ
DPU1 PLL POSTDIV FREQ: 1188MHZ
MMC:   sdhci@ffe7080000: 0, sd@ffe7090000: 1
Loading Environment from MMC... OK
In:    serial@ffe7014000
Out:   serial@ffe7014000
Err:   serial@ffe7014000
Net:
warning: ethernet@ffe7070000 (eth0) using random MAC address - 7e:21:31:52:83:41
eth0: ethernet@ffe7070000ethernet@ffe7070000:0 is connected to ethernet@ffe70700

warning: ethernet@ffe7060000 (eth1) using random MAC address - ee:94:f9:51:ab:f1
, eth1: ethernet@ffe7060000
Hit any key to stop autoboot:  0
C910 Light#
C910 Light#
```

3. Enter the “fastboot usb 0” command in the serial port and U-Boot will enter the upgrade state after execution.
4. Run the script corresponding to the image name in the Tools directory of the SDK package on the PC, and you can upgrade the uboot, rootfs and other images separately.



5. Reboot

Press the RESET button to reboot.

4.4 Secure Image Burning

The partition settings of secure images are different from those of non-secure images, as follows:

	Secure	Non-Secure	Remarks
uboot	√	√	Different images
boot	√	√	Same images
rootfs	√	√	Same images
tf	x	√	
tee	x	√	
stashtf	x	√	
stashtee	x	√	

The partition is implemented with the uboot command. When switching between secure and non-secure images, you have to reburn U-Boot and reboot it after burning to run the new U-Boot, and then burn images of other partitions.

The general steps to burn the image:

1. Power on and start up.
2. During the countdown phase of U-Boot, press any key to enter command mode.
3. Enter “fastboot usb 0” in the command line to enable the fastboot function.

The following describes the burning method on Windows. The burning method on Linux is similar to that of a non-secure image. You can find the script corresponding to the image to burn it, and will not go into details.

4.4.1 U-Boot Burning

The steps to burn U-Boot are as follows:

Run the light_fm_single_rank_uboot.bat script on the PC to burn the U-Boot image to upgrade.

Plain Text 复制代码

```
C910 Light# fastboot usb 0
request 00000000ffe7f5c0 was not queued to ep1in-bulk
request 00000000ffe7f5c0 was not queued to ep1in-bulk
request 00000000ffe7f5c0 was not queued to ep1in-bulk
Starting download of 782904 bytes
request 00000000ffe7f5c0 was not queued to ep1in-bulk
.....
downloading of 782904 bytes finished
request 00000000ffe7f5c0 was not queued to ep1in-bulk

MMC write: dev # 0, block # 0, count 1530 ... 1530 blocks written: OK
request 00000000ffe7f5c0 was not queued to ep1in-bulk

```

After burning is complete, reboot the board.

4.4.2 Set the Default Partition

Enter the following command to complete the secure partition setup.

Bash 复制代码

```
env default -a -f
saveenv
run gpt_partition
```

4.4.3 TF Image Burning

Run light_fm_single_rank_stashtf.bat on the PC to burn the TF image.

4.4.4 TEE Image Burning

Run light_fm_single_rank_stashtee.bat on the PC to burn the TEE image.

4.4.5 Full Image Burning

Run light_fm_single_rank_system.bat on the PC to burn all images.

5 Boot from eMMC

After burning is complete, jump SW1 jumper 2 to the ON position and select boot from eMMC.