RK1808 EVB
User Guide

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Preface

Overview

This document introduces basic functions, hardware features, multi-function hardware configurations, and software debugging operations of RK1808 EVB board. aiming at helping developers use RK1808 EVB more easily and more correctly, and get familiar with RK1808 chip solution.

Product version

The product version described in this document are as follows:

Product Name	Product Version
RK1808 EVB	rk_evb_rk1808_lp3d178p132sd6_v11_20181107

Applicable to object

This document is mainly suitable for the following engineers:

- Hardware development engineers
- Field application engineers
- Embedded software development engineers
- Test engineers

Revision History

Revision history recorded description of each version, and any updates of previous versions are included in the latest one.

Revision Date	Version No	Author	Revision Description
2018-12-26	V1.0	RZF	Initial Release

Acronyms

Acronyms include abbreviations of commonly used phrases in this document.

DDR	Double Data Rate	双倍速率同步动态随机存储器
eMMC	Embedded Multi Media Card	内嵌式多媒体存储卡
I^2C	Inter-Integrated Circuit	内部整合电路(两线式串行通讯总线)
JTAG	Joint Test Action Group	联合测试行为组织定义的一种国际标准测试协议（IEEE 1149.1兼容）
LDO	Low Drop Out Linear Regulator	低压差线性稳压器
LVDS	Low-Voltage Differential Signaling	低电压差分信号
MIPI	Mobile Industry Processor Interface	移动产业处理器接口
PMIC	Power Management IC	电源管理芯片
PMU	Power Management Unit	电源管理单元
RK	Rockchip Electronics Co.,Ltd.	瑞芯微电子股份有限公司
SD Card	Secure Digital Memory Card	安全数码卡
SDIO	Secure Digital Input and Output	安全数字输入输出接口
SDMMC	Secure DigitalMulti Media Card	安全数字多媒体存储卡
TF Card	Micro SDCard(Trans-flash Card)	外置记忆卡
USB	Universal Serial Bus	通用串行总线

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Chapter 1. Overview

1.1 EVB brief introduction

RK1808 EVB is a development board which is designed for Rockchip RK1808 multimedia processing chip (RK1808),integrating reference design, chip debugging, testing and verification. It is used to show customers powerful multimedia interfaces and rich peripheral interfaces of RK1808 chip, and provide customers with hardware reference design based on RK1808 chip, so that customers can finish product design without modifying or simply modifying module circuits of reference design. In consideration of different using environments and full-function verification of the chip, all kinds of interfaces are complete and design is relatively complex.

RK1808 EVB can be connected to PC via a USB cable to form a basic development system or a more complete development system or a demo environment. Connect the following devices or components at the same time.

- Power
- LCM MIPI screen
- TF Card
- Earphones or speakers
- Camera module

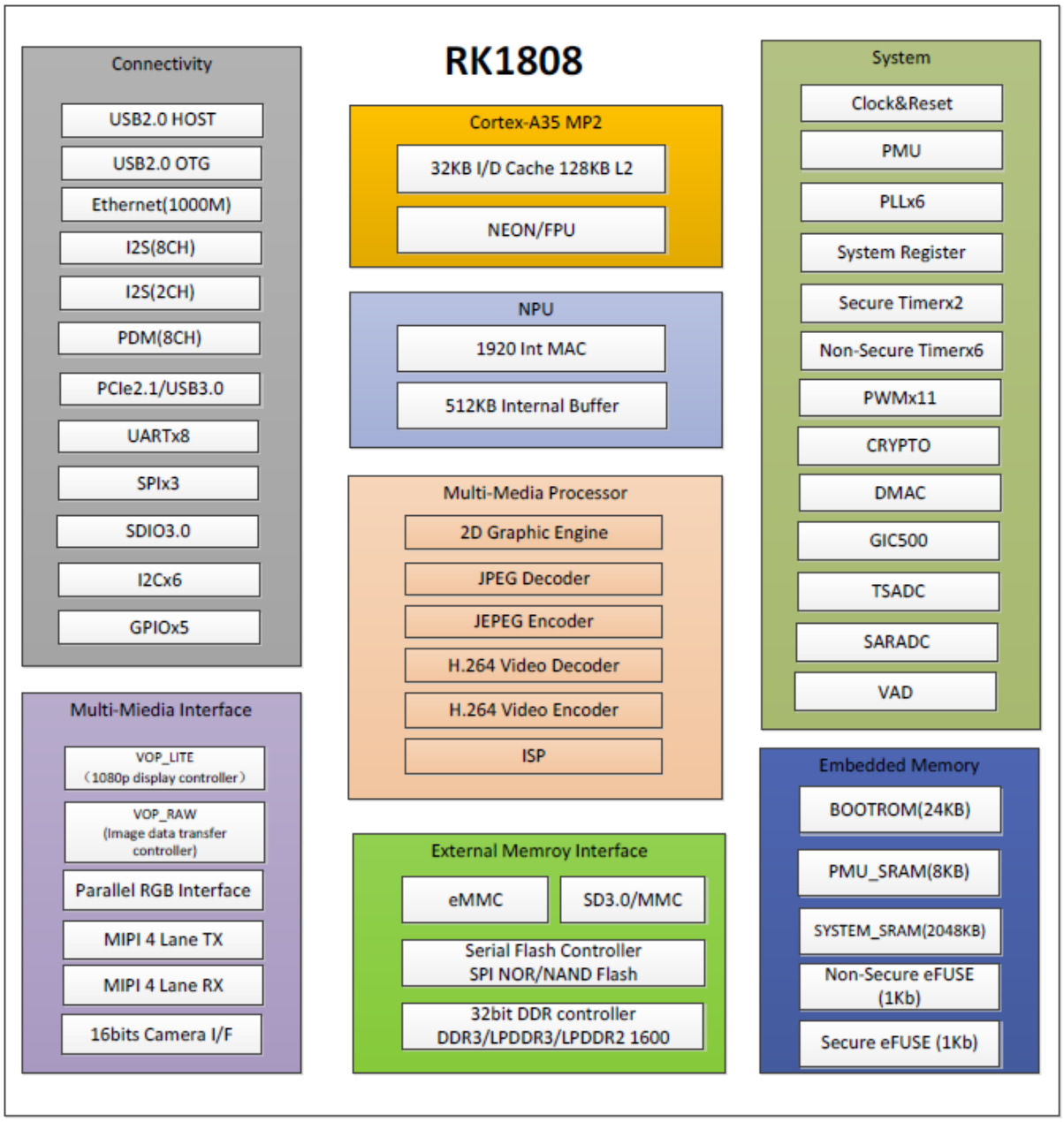

Figure 1-1 RK1808 chip architecture

1.2 EVB system block diagram

System block diagram provides developers an intuitive view of architecture and principles of the whole system which is powered by a power adapter or battery and debugged by UART serial port and JTAG interface to verify each function module. The EVB has most interfaces, including Camera input, WIFI+BT module, USB OTG, TF card, audio interfaces and video interfaces, which meet needs of different application requirements in most cases, and is helpful for in-depth development and rapid production of the chip solution.

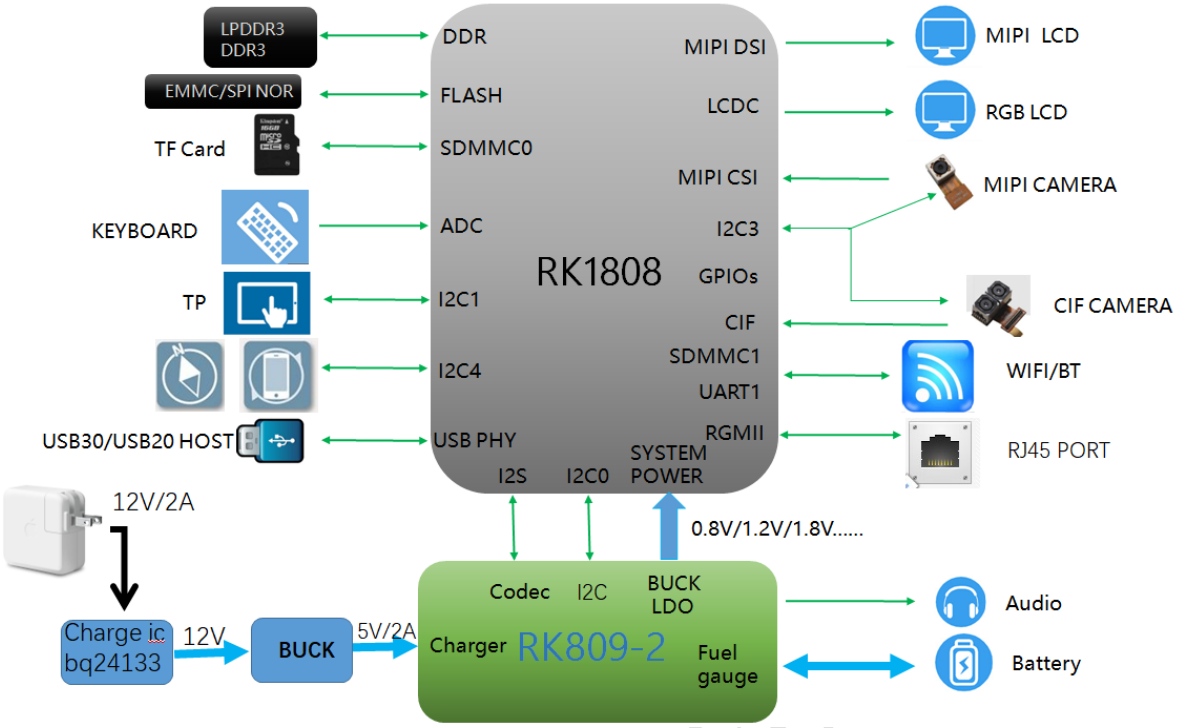

Figure 1-2 EVB system block diagram

1.3 Functions instruction

RK1808 EVB contains the following functions:

- RK809-2 charging and CODEC audio management functions
- 32bit LPDDR3, total capacity is 2G Byte
- 8bit eMMC, total capacity is 16G Byte
- TF Card: support external extended storage capacity
- USB OTG: used to upgrade system, support Host/Device switching
- System buttons: Power, Menu, VOL+, VOL-, Maskrom
- SDIO Wifi (AP6212): support wireless Internet access
- Audio out: support headphones, speakers
- Audio in: support recording
- Uart Debug: used to debug the EVB
- Sensor: G-sensor MMA7660FC, Compass AK8963C
- CIF Camera: IMX323/AR0230,200W pixels
- MIPI Camera: OV5695, 500W pixels
- Expansion interfaces: JTAG, SPI FLASHE, LCDC, RGMII, CIF, MIC-ARRAY
- TYPEC internal debugging port (need to be equipped with a small board, currently only used inside RK)

Functions modules layout is as follows:

TOP Layer：

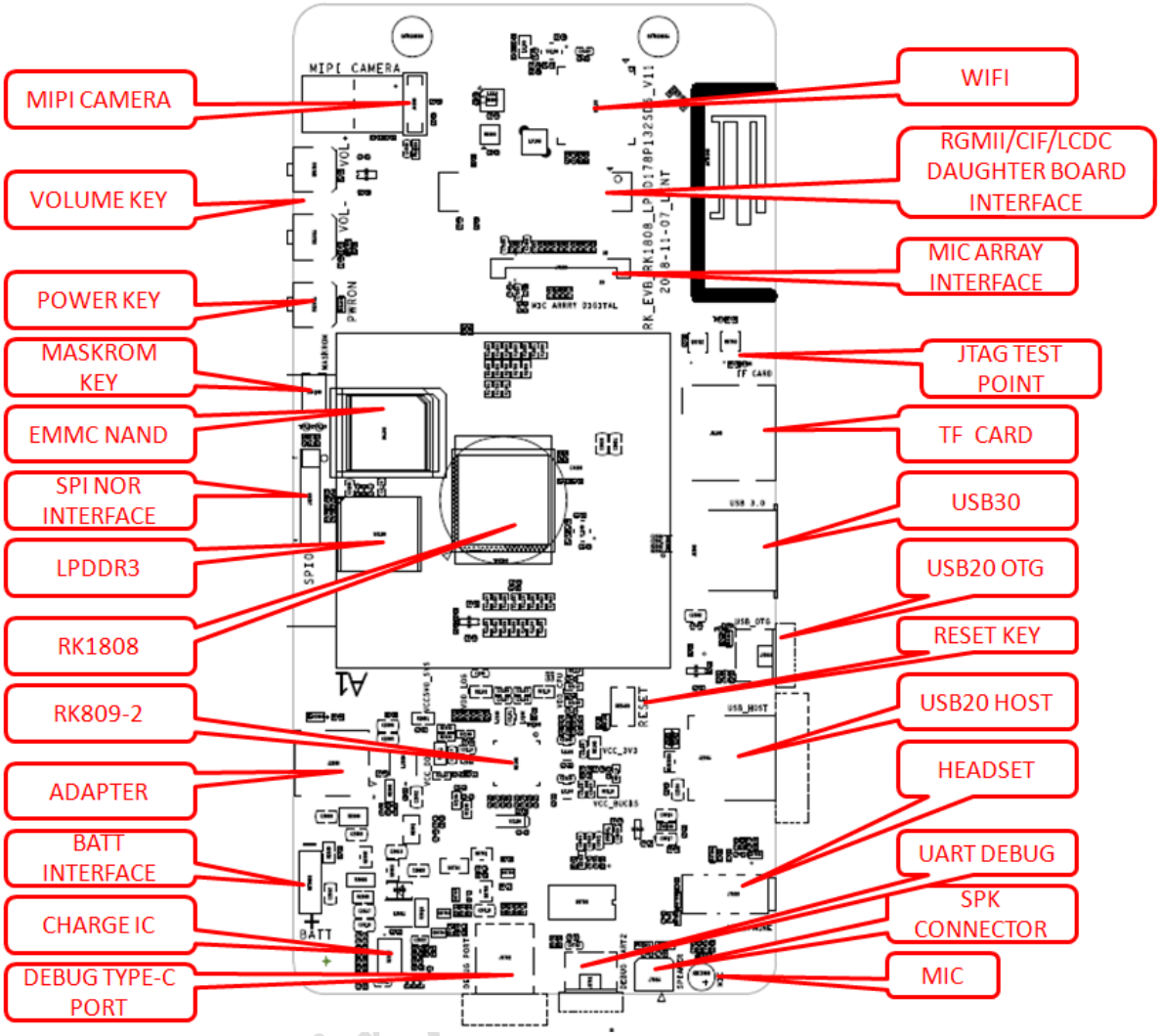

Figure 1-3 Modules layout of RK1808 EVB 1.1 PCB TOP Layer

Bottom Layer：

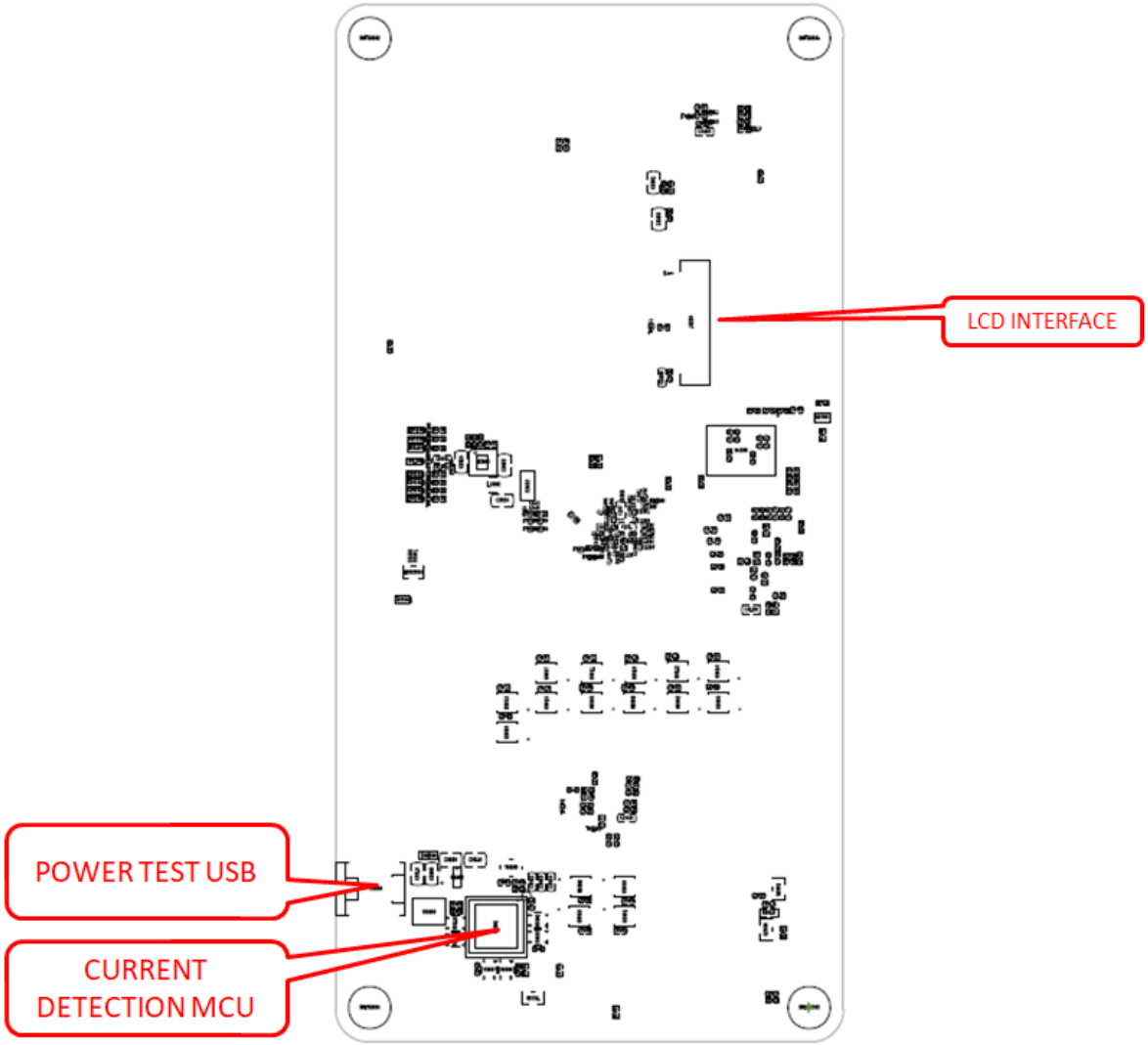

Figure 1-4 Modules layout of RK1808 EVB 1.1 PCB bottom Layer

1.4 EVB default downloading functions

The EVB has been downloaded firmware which covers functions as shown in the following table by default:

Table 1-1 RK1808 EVB functions menu

No.	EVB functions	Requirements
1	PMIC RK809-2	CODEC, GAS GAUGE detect functions
2	DDR LPDDR3	Should identify the total capacity of 2GByte, running 800M frequency
3	eMMC/SPI NOR	Should correctly identify the capacity of 16GByte, 256M
4	Serial port FT232RL	Input and output normally
5	USB OTG	ADB device should be identified, firmware can be downloaded
6	TF Card	Identify TF Card normally
7	Audio codec	Headphones and speakers play and switch normally
8	G-Sensor	MMA7660FC function is normal
9	KEY BAORD	All buttons functions are normally

10	WIFI/BT	AP6212 module, WIFI/BT function is normal
11	MIPI/CIF Camera	Camera function is normal, MIPI camera input by default
12	RTC	RTC timing function is normal
13	RGMII	Normal Communication of 1000M Ethernet Interface
14	LCDC	RGB screen display normally
15	MIC ARRAY	MIC array function can be used normally
16	Secondary suspend and resume	Suspend and resume system is normal

1.5 EVB components

RK1808 EVB mainly includes the following materials:

- RK1808 EVB board
- Power adapter, specifications: input 100V AC~240V AC, 50Hz; output 12V DC, 2A
- Display, specification: MIPI; size: 5.5 inches; resolution: 1280x720

The EVB has the following expansion components, optional:

- Extended RGB: Specifications: 7", RGB 24bit, resolution: 1024x600
- RGMII small board: optional

Chapter 2. EVB Hardware Introduction

2.1 Overall effect diagrams.

External view of the EVB:

Figure 2-1 Top view of the EVB

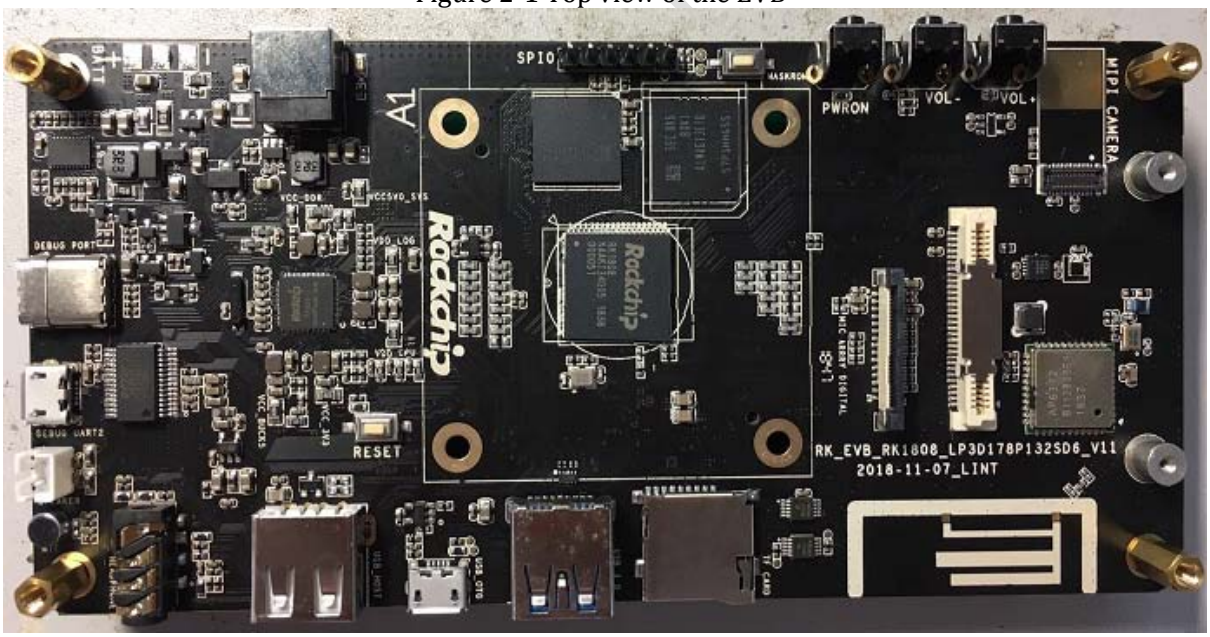

Figure 2-2 Bottom view of the EVB

2.2 Structure and interface diagrams

Hardware design of RK1808 EVB are as follows:

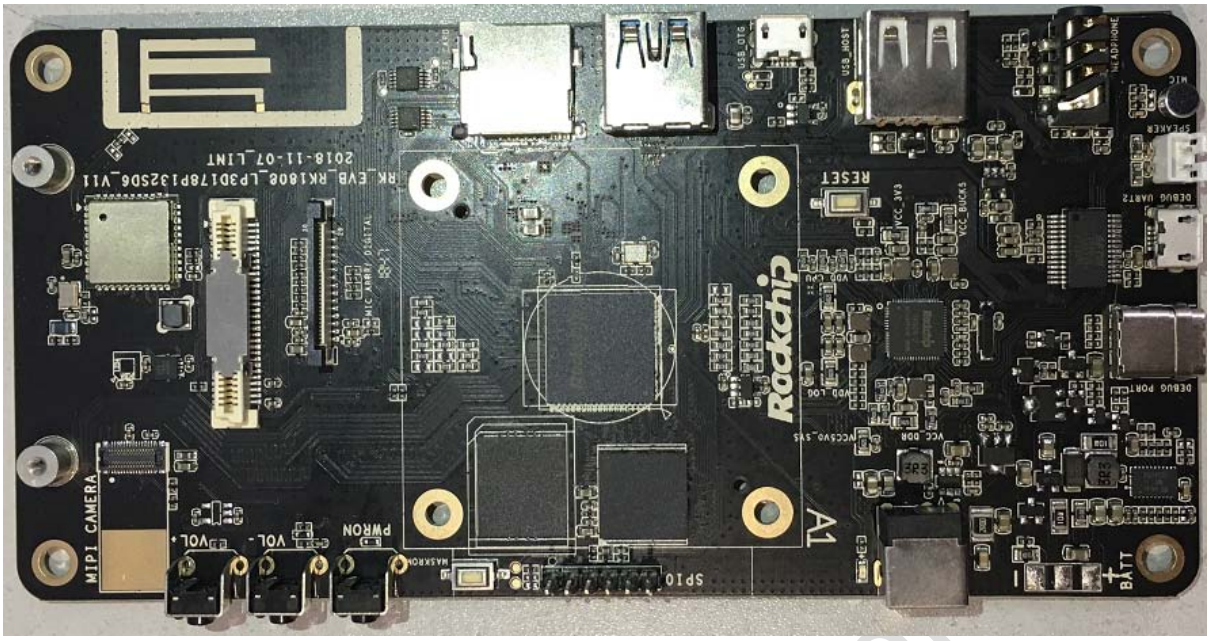

Figure 2-3 Top layer of EVB hardware design

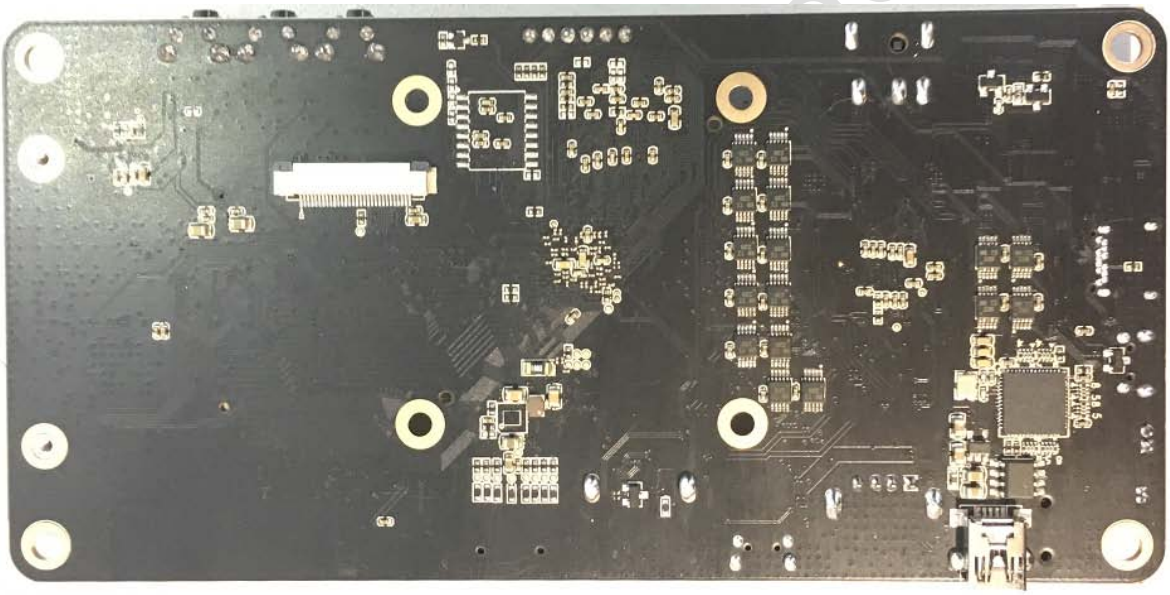

Figure 2-4 Bottom layer of EVB hardware design

2.3 Power block diagram

RK1808 EVB PMIC power supply is RK809-2, power block diagram is shown below.

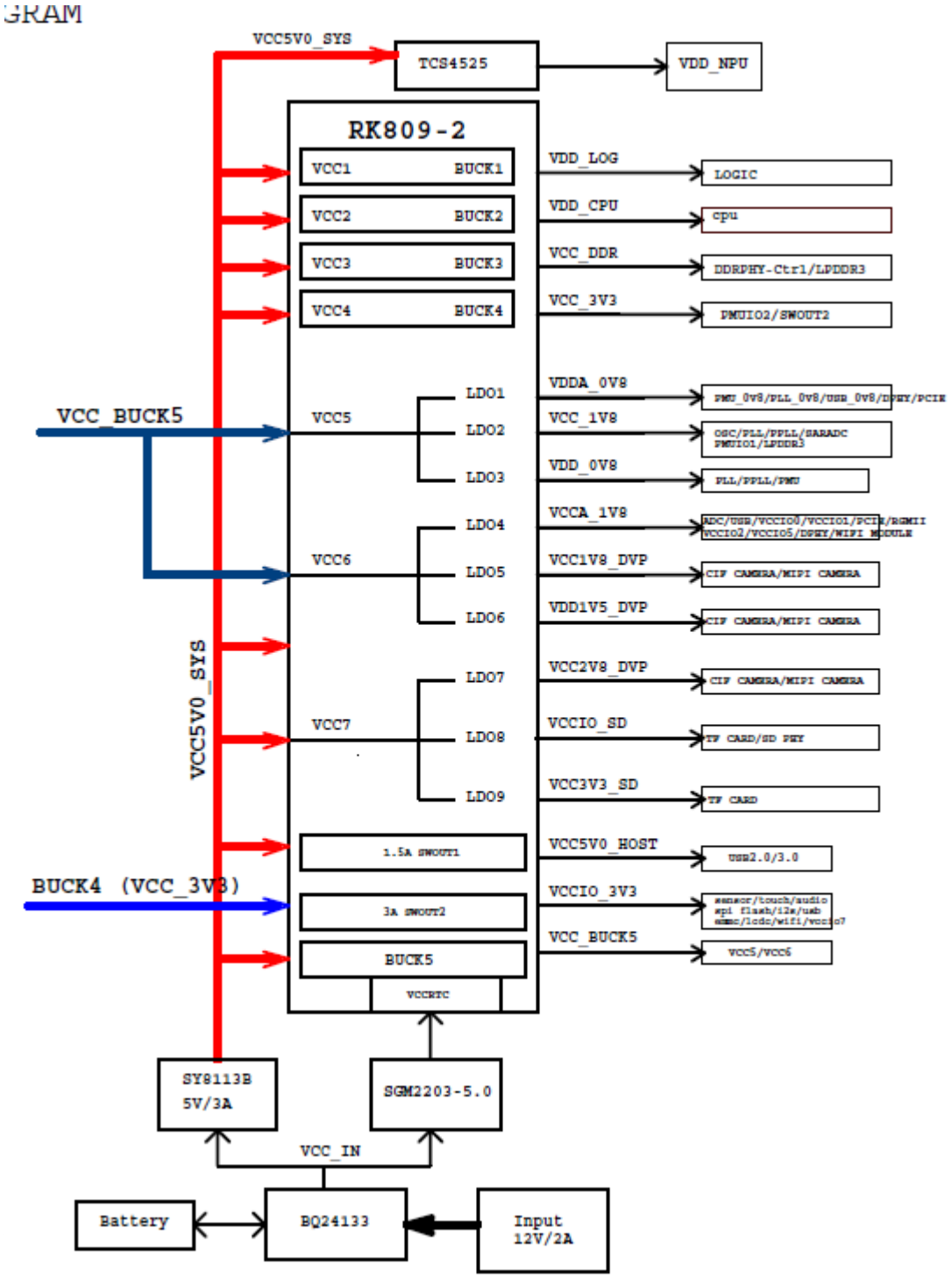

Figure 2-5 EVB power block diagram

2.4 I²C address

I2C (7bit) address configuration of EVB peripheral device see as follows:

Table 2-1 Address of EVB peripheral device

	Device	Address
I²C0	RK809-2	0x20

	TCS4525	0X1C
I²C1	GT1680	0X14
I²C3	OV5695	0X36
	GC2145	0X3C
I²C4	MMA7660FCT	0X4C
	AK8963C	0X0D

Note: When using an expansion board, make sure that I2C address on the board does not conflict with I2C address on the development board.

2.5 EVB board reference design

The reference design of RK1808 EVB see as follows. Please obtain from our FAE when needed.

"RK_EVB_1808_LP3D178P132SD6_V11_20181107.dsn"

"rk_evb_rk1808_lp3d178p132sd6_v11_20181107_final_lint.brd"

Chapter 3. Brief Description of EVB Main Board Modules

3.1 Power input

Use a power adapter providing 12V/2A power supply or use batteries and press power button to power-on. SY8113 BUCK chip on the board provides input to PMIC after 12V step-down to 5V, the other groups of voltages output by PMIC are provided for EVB board.

Figure 3-1 EVB power input

3.2 Memory

3.2.1 eMMC

1. The memory on the EVB board is 16 Bit eMMC FLASH by default, and SPI Flash location is reserved, which can support 4bit SPI Flash.

2. Maskrom (update) upgrade button next to eMMC Flash is convenient to upgrade firmware. Connect USB, press and hold SW4100 button and power on or reset, system will enter MaskRom firmware upgrade mode.

Figure 3-2 EVB Memory eMMC

3.2.2 DDR

RK1808 supports single channel 32bit DDR, single 32bit LPDDR3 is used on the EVB, total capacity is 2GByte by default.

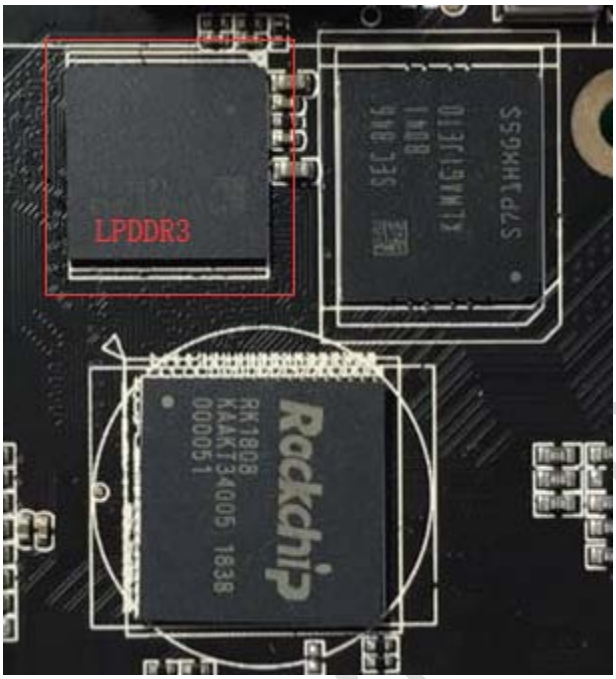

Figure 3-3 LPDDR3 location and hardware design

3.3 Button input

1. EVB provides buttons combination application, using RK1808 ADC_IN2 as a detection port, supporting 10-bit resolution rate.

2. ADC supply voltage is provided by VCC_1V8, and the corresponding button value can be calculated according to resistances parameters of Figure 3-5.

3. Several commonly used buttons are defined on the EVB: PWRON/VOL+/VOL-.

4. Connect USB, press and hold VOL+/Recovery button to power on (or reset), will enter Rockusb downloading mode

Figure 3-4 EVB buttons

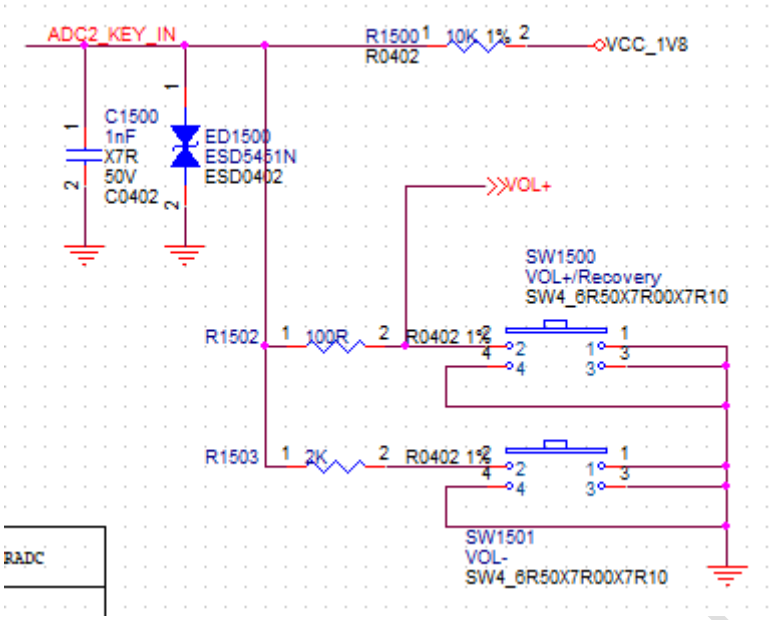

Figure 3-5 EVB buttons combination schematic

3.4 G-Sensor output

The gravity acceleration sensor MMA7660FC used on the EVB is an accelerometer of ±1.5g three-axis digital output I2C, ultra-low power, compact capacitive micro-motor, as shown below.

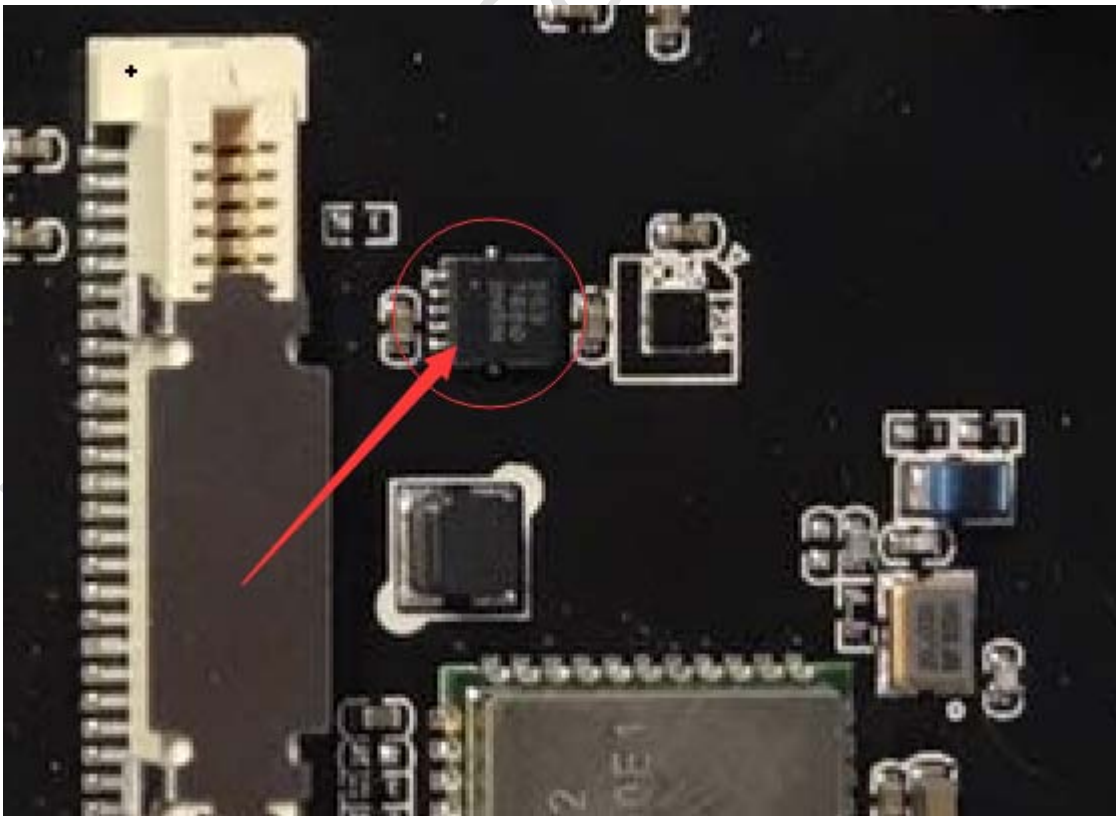

Figure 3-6 EVB gravity acceleration sensor

3.5 Compass output

The compass used in the EVB is AK8963C which communicates with main controller in I2C mode. Its location is reserved by default, if necessary, please add it by yourself. The location is shown below.

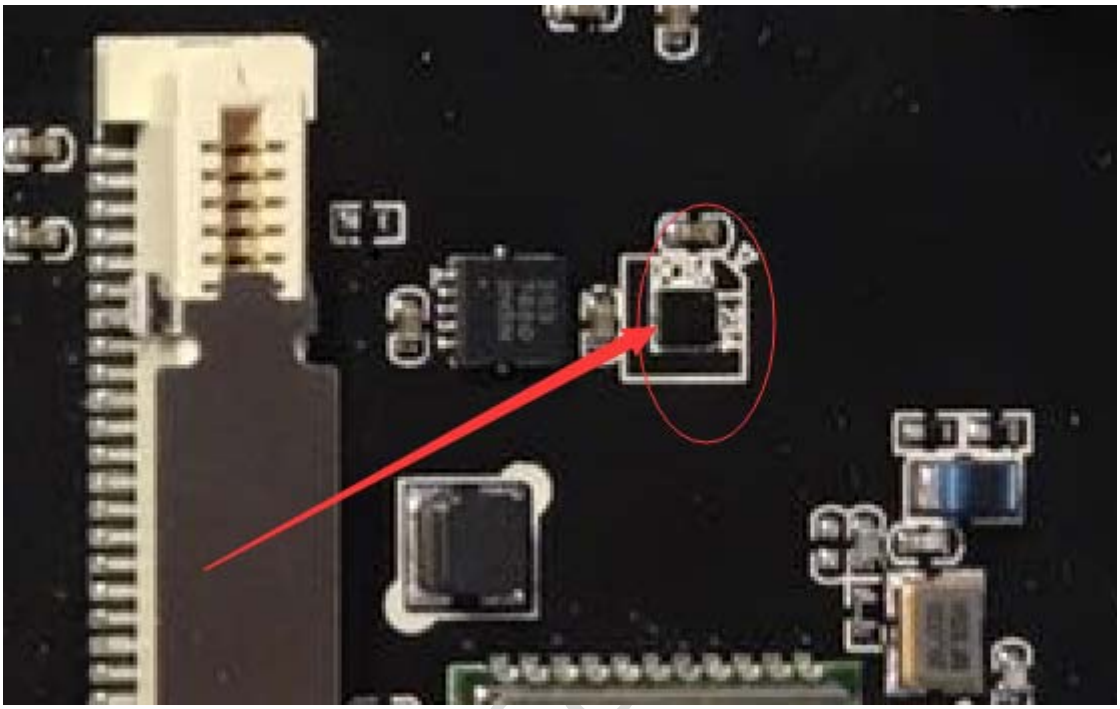

Figure 3-7 EVB compass

3.6 Audio input and output

The EVB Audio use RK809-2 Chip Built-in Codec. Its features are as follows:

- Built-in Charge Pump, support for stereo headphones without capacitive coupling output
- Built-in Class-D power amplifier for driving 1.3W/8ohm speaker output with overcurrent protection.
- Microphones support single-end or differential input.

Figure 3-8 EVB audio input and output

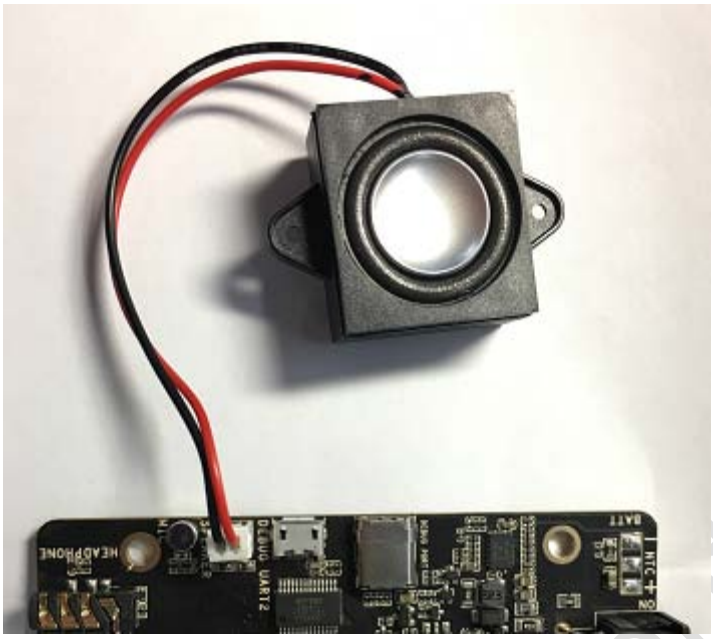

Figure 3-9 EVB speaker output

3.7 USB OTG socket

There is a USB OTG interface on the EVB, as shown below, J2503 is USB OTG Micro-B type socket, compatible with USB 2.0/1.1 specification. Can be configured as an independent USB HOST or USB DEVICE by detecting VBUS and USB ID signal input. In upgrade mode, J2503 is used as a firmware upgrade input.

Figure 3-10 EVB USB OTG socket

3.8 TFCard socket

There is a TF card socket on EVB, as shown below, support SDMMC 2.0/3.0, data bus width is 4bits

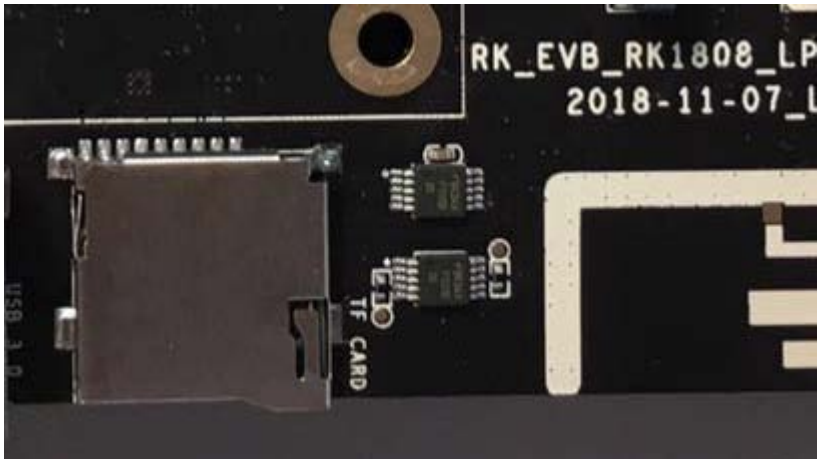

Figure 3-11 EVB TF socket

3.9 Camera socket

The EVB camera socket supports MIPI CSI and CIF two camera modules, is shown in Figure 3-12. CIF Camera is on expansion board and requires additional application, it is not a standard component.

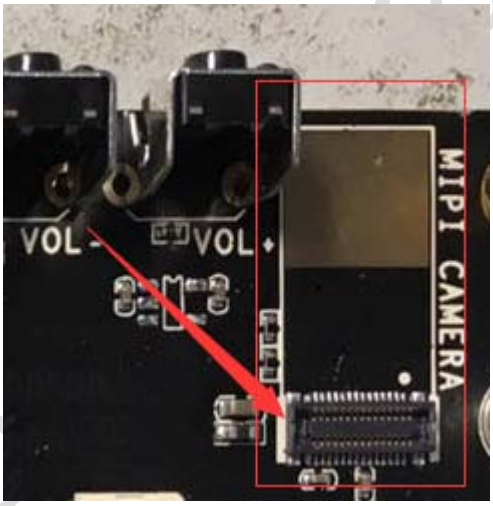

Figure 3-12 EVB camera interface

Figure 3-13 CIF Camera interface

Table 3-1 MIPI camera network and corresponding controller pin

MIPI Camera socket pin number	CIF Camera socket pins network	CIF Camera corresponding controller pins
1	GND	GND
2	MIPI_CSI_D0P	MIPI_CSI_D0P
3	MIPI_CSI_DON	MIPI_CSI_DON
4	GND	GND
5	MIPI_CSI_D2P	MIPI_CSI_D2P
6	MIPI_CSI_D2N	MIPI_CSI_D2N
7	GND	GND
8	MIPI_CSI_D3P	MIPI_CSI_D3P
9	MIPI_CSI_D3N	MIPI_CSI_D3N
10	GND	GND
11	MIPI_MCLK	CIF_CLKOUT/RGMII_CLK/ GPIO2_B7_d
12	MIPI_RST	N/A
13	GND	GND
14	CAM_PDN	UART3_RTS/GPIO0_C7
15	GND	GND
16	GND	GND
17	VCC2V8_DVP	N/A
18	VCC2V8_AF	N/A
19	GND	GND
20	I2C2_SCL_CAM	I2C3_SCL/UART2_TX_M1/ GPIO2_D0_u
21	I2C2_SDA_CAM	I2C3_SDA/UART2_RX_M1/ GPIO2_D1_u
22	DVDD_MIPI	N/A

23	GND	GND
24	VCC1V8_DVP	N/A
25	GND	GND
26	MIPI_CSI_D1N	MIPI_CSI_D1N
27	MIPI_CSI_D1P	MIPI_CSI_D1P
28	GND	GND
29	MIPI_CSI_CLKP	MIPI_CSI_CLKP
30	MIPI_CSI_CLKN	MIPI_CSI_CLKN
31	GND	GND
32	GND	GND
33	GND	GND
34	GND	GND

Table 3-2 CIF Camera network and corresponding controller pin

CIF Camera socket pin number	CIF Camera socket pin network	CIF Camera corresponding controller pin
1	CIF_D11	GPIO2_C3/CIF_D11/LCDC_D3
2	GND	GND
3	I2C3_SDA_CIFCAM	I2C3_SDA/UART2_RX_M1/ GPIO2_D1_u
4	VCC2V8_DVP	N/A
5	I2C3_SCL_CIFCAM	I2C3_SCL/UART2_TX_M1/ GPIO2_D0_u
6	MIPI_CSI_PWDN/CIF_RST	GPIO2_C5/LCDC_D5
7	CIF_VSYNC	CIF_VSYNC/RGMII_TXD2/ GPIO2_B4_d
8	PWDN	LCDC_D4/ GPIO2_C4_d
9	CIF_HREF	CIF_HREF/RGMII_RXD2/ GPIO2_B5_d
10	VDD1V5_DVP	N/A
11	VCC1V8_DVP	N/A
12	CIF_D9	CIF_CLKOUT/RGMII_CLK/ GPIO2_B7_d
13	CIF_CLKOUT	CIF_CLKOUT/RGMII_CLK/ GPIO2_B7
14	CIF_D8	CIF_D8/RGMII_MDC/LCDC_HSYNC/ GPIO2_B2_d
15	GND	GND
16	CIF_D7	CIF_D7/RGMII_COL/ GPIO2_B1_d
17	CIF_CLKIN	CIF_CLKIN/RGMII_RXD3/ GPIO2_B6_d
18	CIF_D6	CIF_D6/RGMII_MDIO/ GPIO2_B0_d
19	CIF_D2	CIF_D2/RGMII_RXD0/SPI2_MISO_M1/ GPIO2_A4_d
20	CIF_D5	CIF_D5/RGMII_RXDV/SPI2_CSN_M1/ GPIO2_A7_d
21	CIF_D3	CIF_D3/RGMII_RXD1/SPI2_CLK_M1/ GPIO2_A5_d
22	CIF_D4	CIF_D4/RGMII_RXER/SPI2_MOSI_M1/ GPIO2_A6_d

23	CIF_D1	CIF_D1/RGMII_TXCLK/ GPIO2_C1_d
24	CIF_D0	CIF_D0/CLKOUT_ETHERNET/ GPIO2_C0_d
25	CIF_D10	CIF_D10/RGMII_RXCLK/LCDC _D2/ GPIO2_C2_d
26-30	GND	GND

3.10 WIFI+BT module

The WIFI+BT module on EVB adopts Taiwan AMPAK AP6212 module, as shown in Figure 3-14. Its characteristics are as follows:

- Support WIFI (802.11 b/g/n), BT4.1, FM functions.
- BT data uses UART communication mode.
- BT audio is transmitted through PCM interface.
- WIFI data supports 4bits SDIO 3.0 data bus.

Figure 3-14 EVB WIFI+BT module

3.11 LCM MIPI interface

The EVB display uses 5.5” MIPI screen by default, as shown in the figure below.

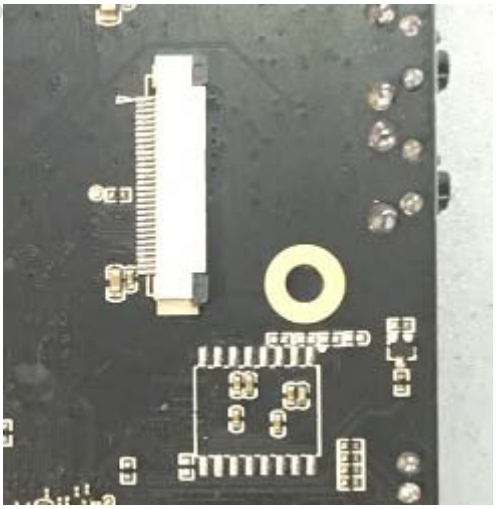

Figure 3-15 EVB LCM MIPI interface

Table 3-3 LCM MIPI interface pins network and corresponding controller pins

LCM MIPI interface pin number	LCM MIPI interface pins network	LCM MIPI interface corresponding controller pins
1	GND	GND
2	MIPI_DSI_D0N	DPHY_TX_D0N
3	MIPI_DSI_D0P	DPHY_TX_D0P
4	GND	GND
5	MIPI_DSI_D1N	DPHY_TX_D1N
6	MIPI_DSI_D1P	DPHY_TX_D1P
7	GND	GND
8	MIPI_DSI_CLKN	DPHY_TX_CLKN
9	MIPI_DSI_CLKP	DPHY_TX_CLKP
10	GND	GND
11	MIPI_DSI_D2N	DPHY_TX_D2N
12	MIPI_DSI_D2P	DPHY_TX_D2P
13	GND	GND
14	MIPI_DSI_D3N	DPHY_TX_D3N
15	MIPI_DSI_D3P	DPHY_TX_D3P
16	GND	GND
17	PWM1_LCD_BL	PMW1/UART3_TX/GPIO0_C3_d
18	NC	N/A
19	LCD_VCCIO	N/A
20	NC	N/A
21	ADC0_HW_ID	ADC_IN0
22	DFTJTAG_TDO/LCD_PWREN_H	PMW3/UART3_RX/GPIO0_C4_d
23	I2C1_SCL_TP	I2C1_SCL/GPIO0_C0_d
24	I2C1_SDA_TP	I2C1_SDA/GPIO0_C1_d
25	TP_INT_L	UART0_RTS/TEST_CLK1/GPIO0_B5_u
26	TP_RST_L	UART0_CTS/GPIO0_B4_u
27	GND	GND
28	VCC_SYS	N/A
29	VCC_SYS	N/A
30	VCC_SYS	N/A
31	GND	GND
32	GND	GND

3.12 RGMII/LCDC/CIF extension socket

The RGMII/LCDC/CIF expansion socket (U8500) is reserved on the EVB, as shown in Figure 3-16. If you need to use RGMII/LCDC/CIF (BT1120) functions, you need to select small boards accordingly. These three small board EVB kits are not standard components. Customers need to apply separately if necessary. As shown in the following figure 3-17

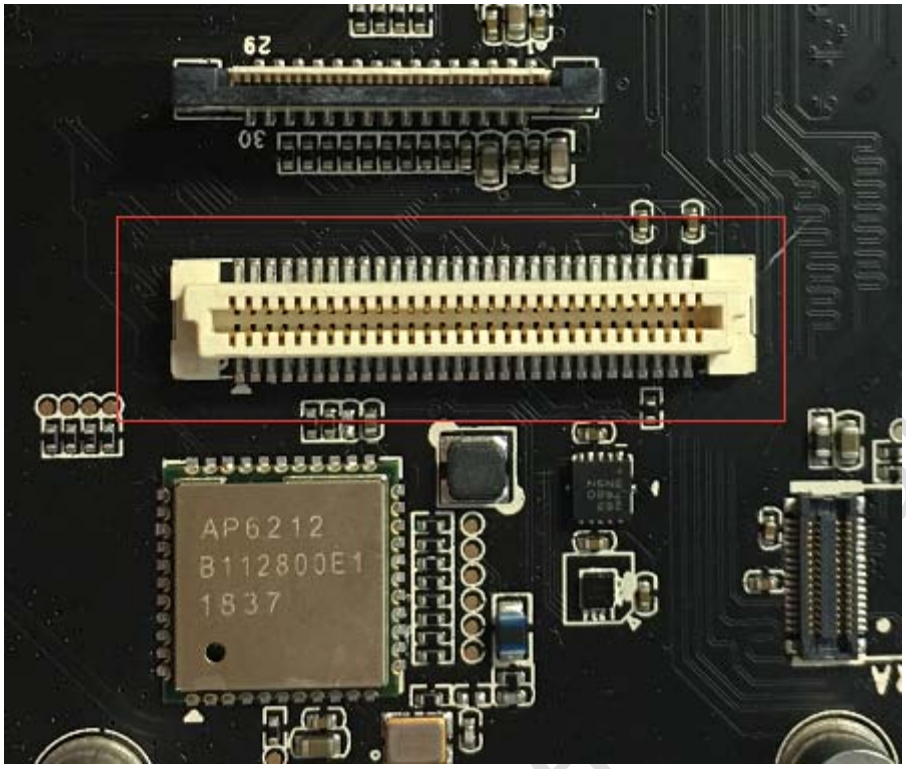

Figure 3-16 EVB RGMII/LCDC/CIF extension socket

Figure 3-17 RGMII/LCDC/CIF extended small board

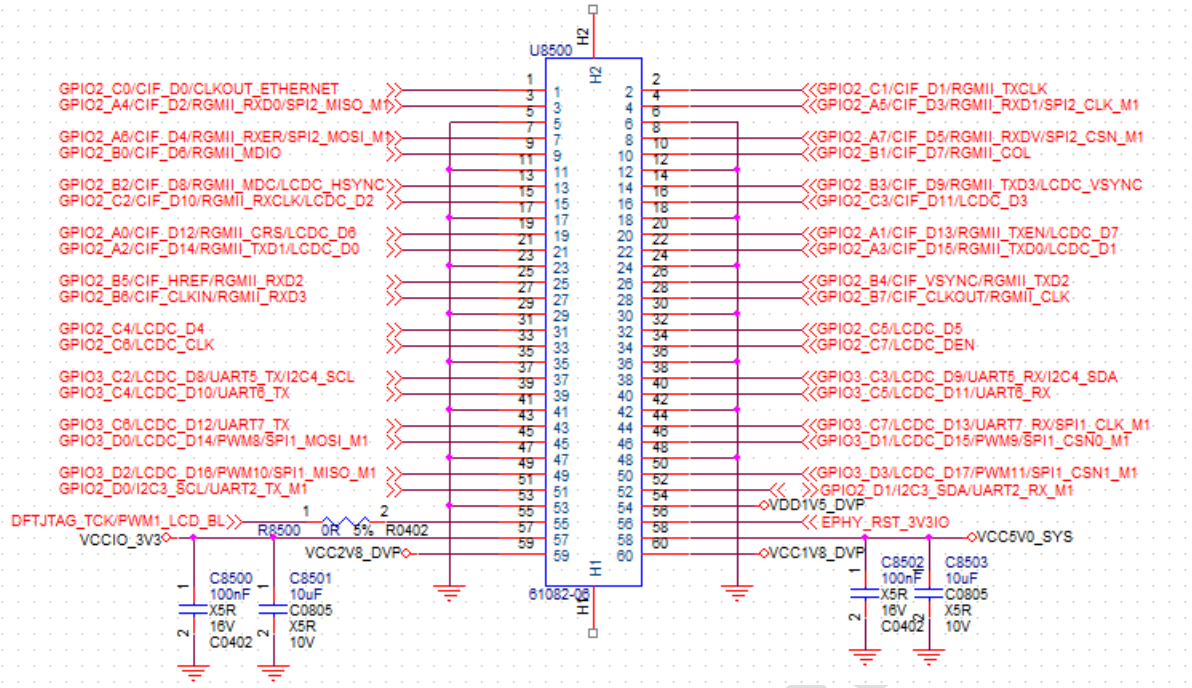

Figure 3-18 U8500 network name

Table 3-4 RGMII/LCDC/CIF interface pins network and corresponding controller pins

J9301 interface pin number	J9301 interface pins network	J9301 interface corresponding controller pins
1	GPIO2_C0/CIF_D0/CLKOUT_ETHERNET	CIF_D0/CLKOUT_ETHERNET/ GPIO2_C0_d
2	GPIO2_C1/CIF_D1/RGMII_TXCLK	CIF_D1/RGMII_TXCLK/ GPIO2_C1_d
3	GPIO2_A4/CIF_D2/RGMII_RXD0/SPI2_MISO_M1	CIF_D2/RGMII_RXD0/SPI2_MISO_M1/ GPIO2_A4_d
4	GPIO2_A5/CIF_D3/RGMII_RXD1/SPI2_CLK_M1	CIF_D3/RGMII_RXD1/SPI2_CLK_M1/ GPIO2_A5_d
5	GND	GND
6	GND	GND
7	GPIO2_A6/CIF_D4/RGMII_RXER/SPI2_MOSI_M1	CIF_D4/RGMII_RXER/SPI2_MOSI_M1/ GPIO2_A6_d
8	GPIO2_A7/CIF_D5/RGMII_RXDV/SPI2_CSN_M1	CIF_D5/RGMII_RXDV/SPI2_CSN_M1/ GPIO2_A7_d
9	GPIO2_B0/CIF_D6/RGMII_MDIO	CIF_D6/RGMII_MDIO/ GPIO2_B0_d
10	GPIO2_B1/CIF_D7/RGMII_COL	CIF_D7/RGMII_COL/ GPIO2_B1_d
11	GND	GND
12	GND	GND
13	GPIO2_B2/CIF_D8/RGMII_MDC/LCDC_HSYNC	CIF_D8/RGMII_MDC/LCDC_HSYNC/ GPIO2_B2_d
14	GPIO2_B3/CIF_D9/RGMII_TXD3/LCDC_VSYNC	CIF_D9/RGMII_TXD3/LCDC_VSYNC/ GPIO2_B3_d
15	GPIO2_C2/CIF_D10/RGMII_RXCLK/LCDC_D2	CIF_D10/RGMII_RXCLK/LCDC_D2/ GPIO2_C2_d
16	GPIO2_C3/CIF_D11/LCDC_D3	CIF_D11/LCDC_D3/ GPIO2_C3_d

17	GND	GND
18	GND	GND
19	GPIO2_A0/CIF_D12/RGMII_CRS/LCDC_D6	CIF_D12/RGMII_CRS/LCDC_D6/ GPIO2_A0_d
20	GPIO2_A1/CIF_D13/RGMII_TXEN/LCDC_D7	CIF_D13/RGMII_TXEN/LCDC_D7/ GPIO2_A1_d
21	GPIO2_A2/CIF_D14/RGMII_TXD1/LCDC_D0	CIF_D14/RGMII_TXD1/LCDC_D0/ GPIO2_A2_d
22	GPIO2_A3/CIF_D15/RGMII_TXD0/LCDC_D1	CIF_D15/RGMII_TXD0/LCDC_D1/ GPIO2_A3_d
23	GND	GND
24	GND	GND
25	GPIO2_B5/CIF_HREF/RGMII_RXD2	CIF_HREF/RGMII_RXD2/ GPIO2_B5_d
26	GPIO2_B4/CIF_VSYNC/RGMII_TXD2	CIF_VSYNC/RGMII_TXD2/ GPIO2_B4_d
27	GPIO2_B6/CIF_CLKIN/RGMII_RXD3	CIF_CLKIN/RGMII_RXD3/ GPIO2_B6_d
28	GPIO2_B7/CIF_CLKOUT/ RGMII_CLK	CIF_CLKOUT/RGMII_CLK/ GPIO2_B7_d
29	GND	GND
30	GND	GND
31	GPIO2_C4/LCDC_D4	LCDC_D4/ GPIO2_C4
32	GPIO2_C5/LCDC_D5	LCDC_D5/ GPIO2_C5
33	GPIO2_C6/LCDC_CLK	LCDC_CLK/ GPIO2_C6
34	GPIO2_C7/LCDC_DEN	LCDC_DEN/ GPIO2_C7
35	GND	GND
36	GND	GND
37	GPIO3_C2/LCDC_D8/UART5_TX/I2C4_SCL	LCDC_D8/UART5_TX/I2C4_SCL/ GPIO3_C2
38	GPIO3_C3/LCDC_D9/UART5_RX/I2C4_SDA	LCDC_D9/UART5_RX/I2C4_SDA/ GPIO3_C3
39	GPIO3_C4/LCDC_D10/UART6_TX	LCDC_D10/UART6_TX/ GPIO3_C4
40	GPIO3_C5/LCDC_D11/UART6_RX	LCDC_D11/UART6_RX/ GPIO3_C5
41	GND	GND
42	GND	GND
43	GPIO3_C6/LCDC_D12/UART7_TX	LCDC_D12/UART7_TX/ GPIO3_C6
44	GPIO3_C7/LCDC_D13/UART7_RX/SPI1_CLK_M1	LCDC_D13/UART7_RX/SPI1_CLK_M1/ GPIO3_C7
45	GPIO3_D0/LCDC_D14/PWM8/SPI1_MOSI_M1	LCDC_D14/PWM8/SPI1_MOSI_M1/ GPIO3_D0
46	GPIO3_D1/LCDC_D15/PWM9/SPI1_CSN0_M1	LCDC_D15/PWM9/SPI1_CSN0_M1/ GPIO3_D1
47	GND	GND
48	GND	GND
49	GPIO3_D2/LCDC_D16/PWM10/SPI1_MISO_M1	LCDC_D16/PWM10/SPI1_MISO_M1/ GPIO3_D2
50	GPIO3_D3/LCDC_D17/PWM11/SPI1_CSN1_M1	LCDC_D17/PWM11/SPI1_CSN1_M1/ GPIO3_D3
51	GPIO2_D0/I2C3_SCL/UA	I2C3_SCL/UART2_TX_M1/ GPIO2_D0

	RT2_TX_M1	
52	GPIO2_D1/I2C3_SDA/UART2_RX_M1	I2C3_SDA/UART2_RX_M1/ GPIO2_D1
53	GND	GND
54	VDD1V5_DVP	*NC*
55	DFTJTAG_TCK/PWM1_LCD_BL	PWM1/URAT3_TX/GPIO0_C3_d
56	EPHY_RST_3V3IO	UART0_TX/GPIO0_B2_d
57	*VCCIO_3V3*	*NC*
58	*VCC5V0_SYS*	*NC*
59	*VCC2V8_DVP*	*NC*
60	*VCC1V8_DVP*	*NC*

3.13 UART debug socket

The EVB provides a serial port for development and debugging, as shown in the following figure. The EVB uses PL-2303HX highly integrated FT232-USB interface conversion chip.

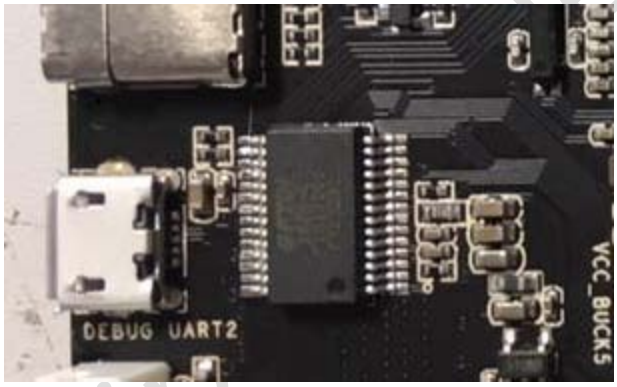

Figure 3-19 EVB UART Debug socket (Mini USB)

3.14 JTAG debug socket

In order to make the EVB small, JTAG interface is externalized through type-C (J9702) interface, and only test points of SWD JTAG are reserved on EVB. Switching by a switch because JTAG signal is shared with SDMMC0, when inserting SD card, JTAG signal is cut to SDMMC bus without SD card. It is SWD JTAG function by default.

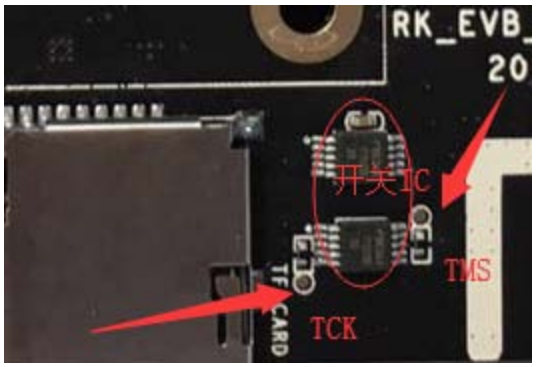

Figure 3-20 EVB JTAG Debug socket

Chapter 4. EVB board instruction

4.1 EVB power on/off and standby

Introduction to the EVB boot up and shutdown methods is as below.

1, Boot up method:

(1) Use DC 12V for power supply and it will boot up when plugging in.

(2) Use two-cell battery to supply power and it will boot up when short press the Power button for more than 0.5s.

2, Abnormal shutdown method

(1) Use single-cell battery for power supply, in abnormal cases, you can long press Power button for 8s to forcedly shutdown, or click Reset button to reset.

(2) Use DC 12V for power supply, in abnormal cases, in addition to the above method, you can also directly unplug the power cable to shut down power supply of the development board.

3, Standby method

In the desktop or application scenario, press Power button, system will enter standby mode. In the case that USB is not connected, if no operation is performed, the system will enter deep-sleep mode after a period of time.

4.2 USB driver installation

The EVB needs to install USB driver before image downloading, driver upgrading and ADB connection. The driver tool is in the directory of SDK\RKTools\windows\Release_DriverAssitant4.7. Open "DriverInstall.exe", click "Driver Installation" and wait for prompting "Install Driver Successfully". If the old driver is already installed, click "Drive Uninstall" and reinstall the driver.

Driver files currently support xp, win7_32, win7_64, win8_32, win8_64, win10_32 and win10_64 operating system.

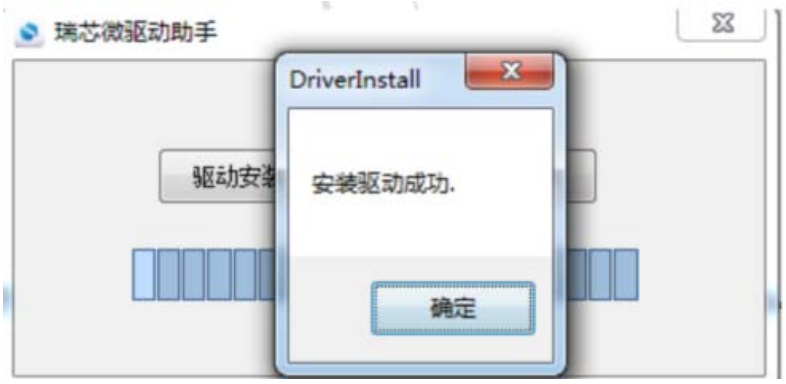

Figure 4-1 Driver installation successfully

4.3 EVB image downloading

RK1808 EVB has two image downloading methods:

4.3.1 Maskrom downloading mode

The basic principle is to short FLASH_D0 to ground before system is powered on, so that Flash boot fails and then enters Maskrom state. It is applicable for the case that system cannot boot up normally caused by downloading wrong BOOTLOADER file.

The detailed steps are as below:

1.Connect USB to PC, press and hold Maskrom button on the development board.

2.Supply EVB with 12V. If it is already powered on, please press reset button.

3.Waiting for a while, the development tool will display "Discover a Maskrom device". Need to notice that in Maskrom state, you need to select the corresponding Loader at the same time to upgrade.

4.Use the development tool to select the corresponding image files.

5.Click Execute to enter upgrade state. There is a progress display bar on the right side of the tool showing the download and verification status.

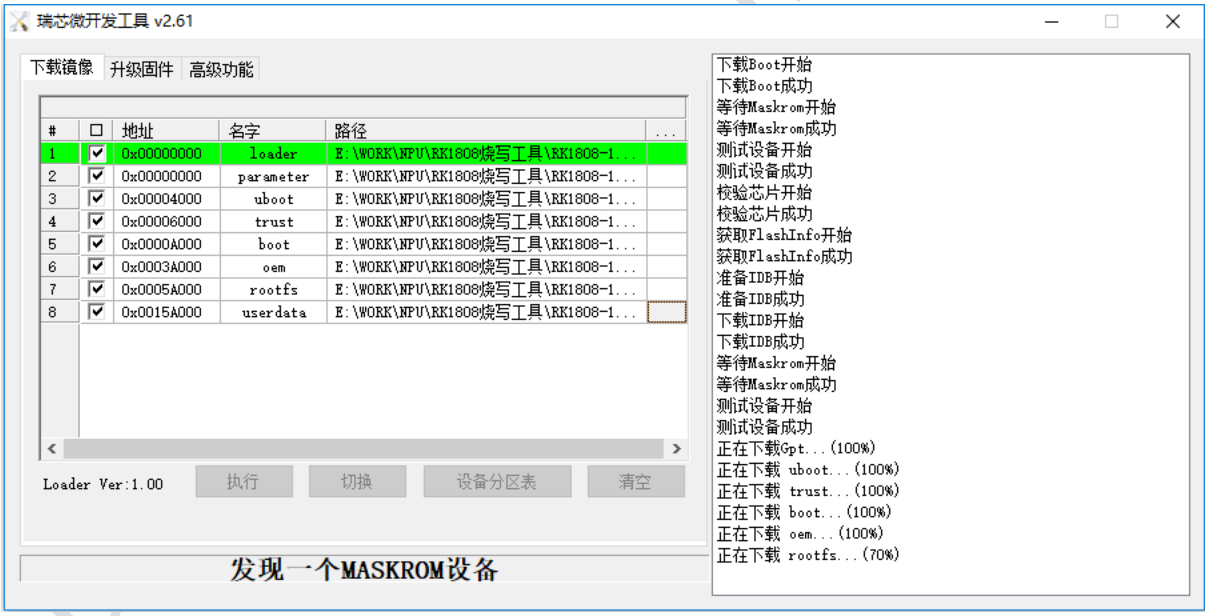

Figure 4-2 Maskrom downloading mode

4.3.2 Loader downloading mode

The basic principle is to ensure that ADC2_KEY_IN is low before the system is powered on or restarted, and the system will enter Loader state after power-on or restart. It is applicable to upgrade part or full image in normal cases.

The detailed steps are as below:

1, Press and hold Vol+/RECOVER button on the development board and connect USB to PC.

2, Supply EVB with 12V. If it is already powered on, please press reset button.

3, Waiting for a while, the development tool will display "Discover a Loader device". Need to notice that you can only select the updated image file instead of downloading the full image in Loader mode.

4, Use the development tool to select the corresponding image files.

5, Click Execute to enter upgrade state. There is a progress display bar on the right side of the tool showing the download and verification status.

In addition to the above methods, when the power is connected, you can also input reboot loader in log to enter loader state.

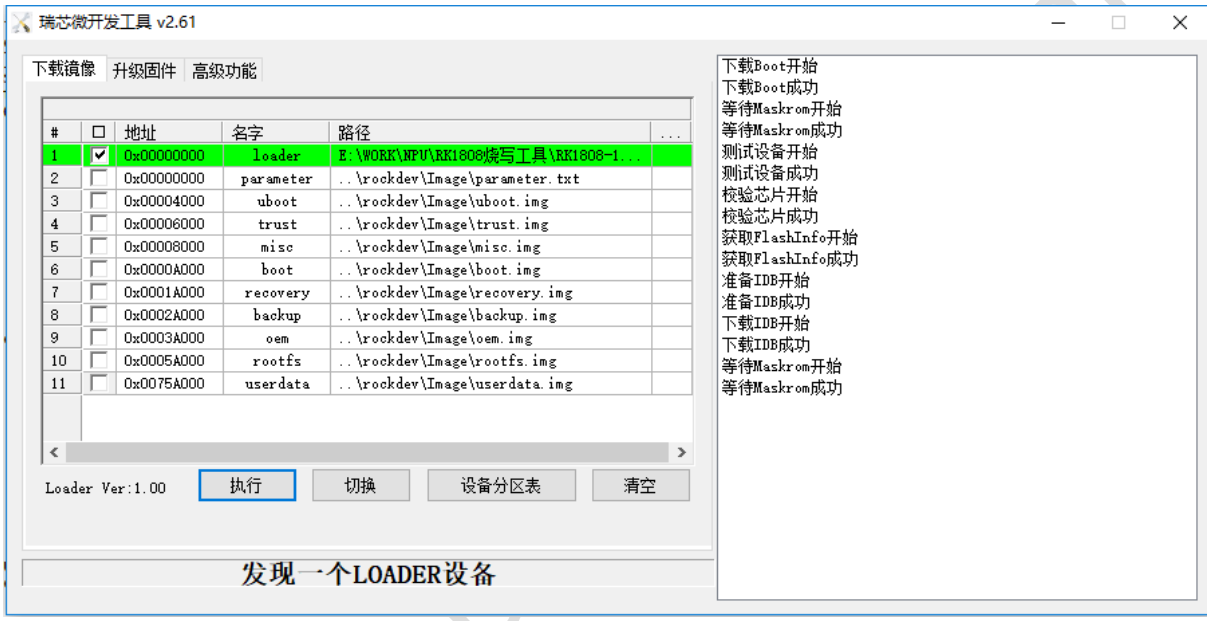

Figure 4-3 Loader downloading mode

4.4 Serial port debug

4.4.1 Serial port connection

Connect USB Debug of EVB to PC, and get COM number of current port in PC device manager.

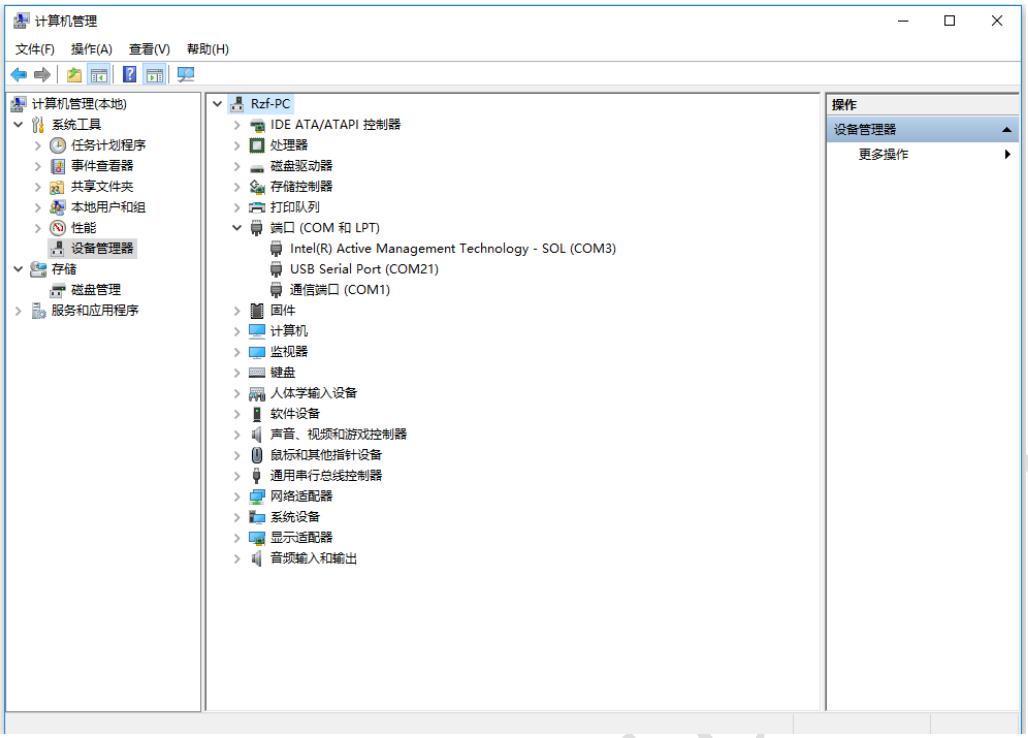

Figure 4-4 Acquire the current port COM number

Open the serial port tool "SecureCRT" and click "Quick Connect" button.

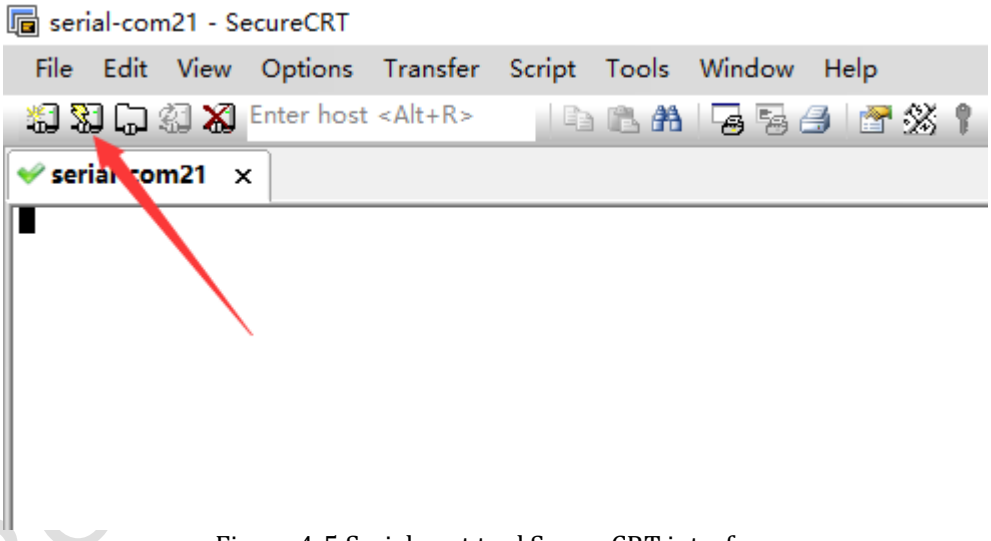

Figure 4-5 Serial port tool SecureCRT interface

Configure the serial port, as shown in below figure select the port number which will be connected with the development board, and set baud rate as 1.5M. No need to select the flow control RTS/CTS, otherwise it cannot be input.

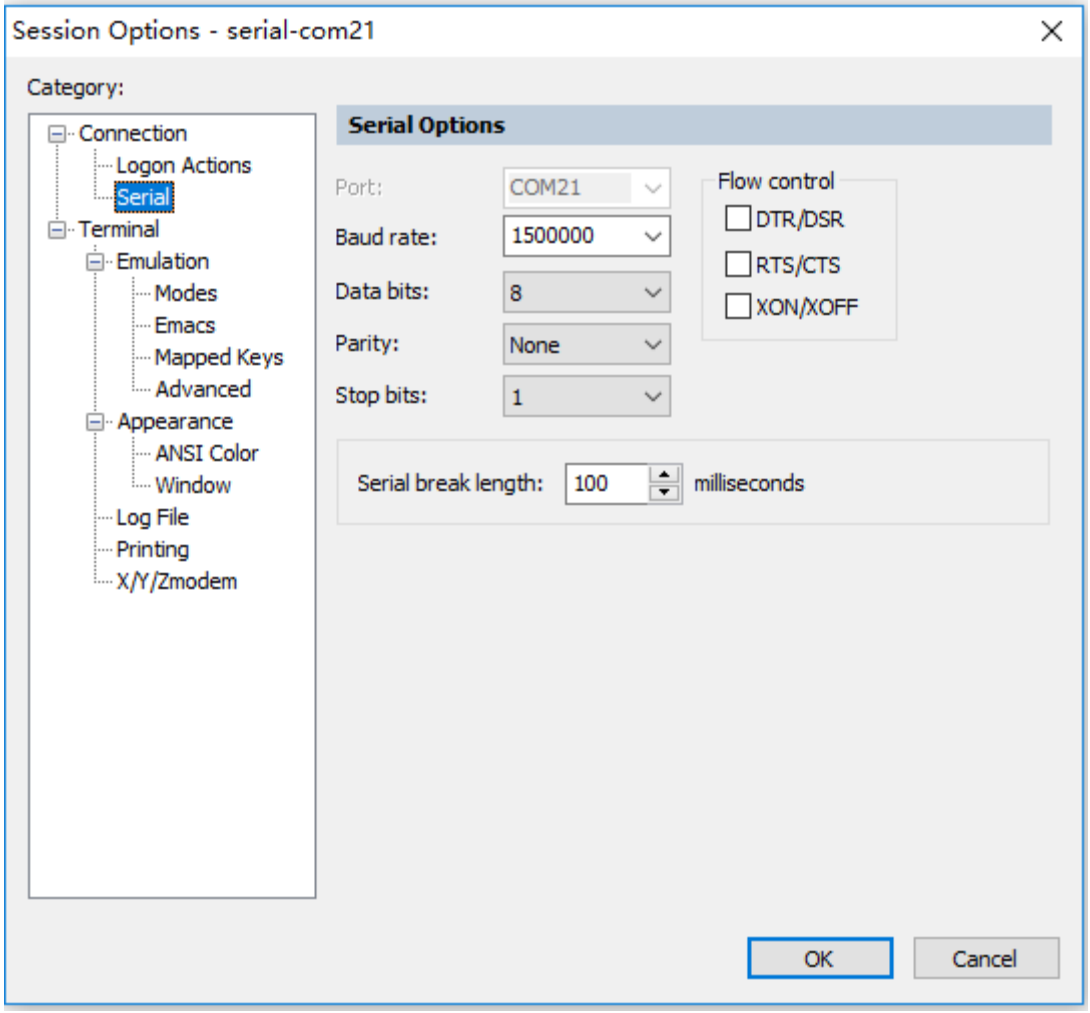

Figure 4-6 Configure the serial port information

Click Connect to connect device normally. Configure session options to make debugging more convenient, click "Session Options" in toolbar, and then increase the value of rollback buffer, it can save more log information.

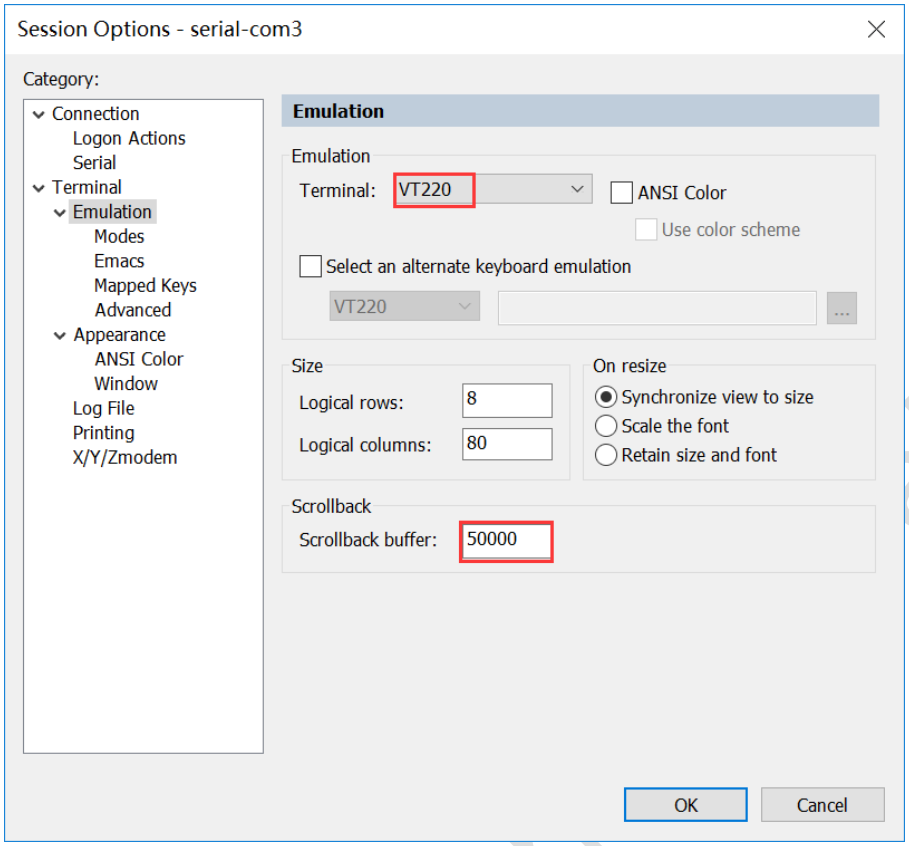

Figure 4-7 Configure the serial port tool option

4.4.2 ADB debug

1. Make sure driver is installed successfully, and a PC connects to USB OTG port of the development board.

2. On the PC side, click “Start---Run”, input cmd, enter the directory where the adb.exe tool is located, and input “adb devices”, if the connected device can be queried, it means connection is normal.

3. Input "adb shell" to enter ADB debugging.

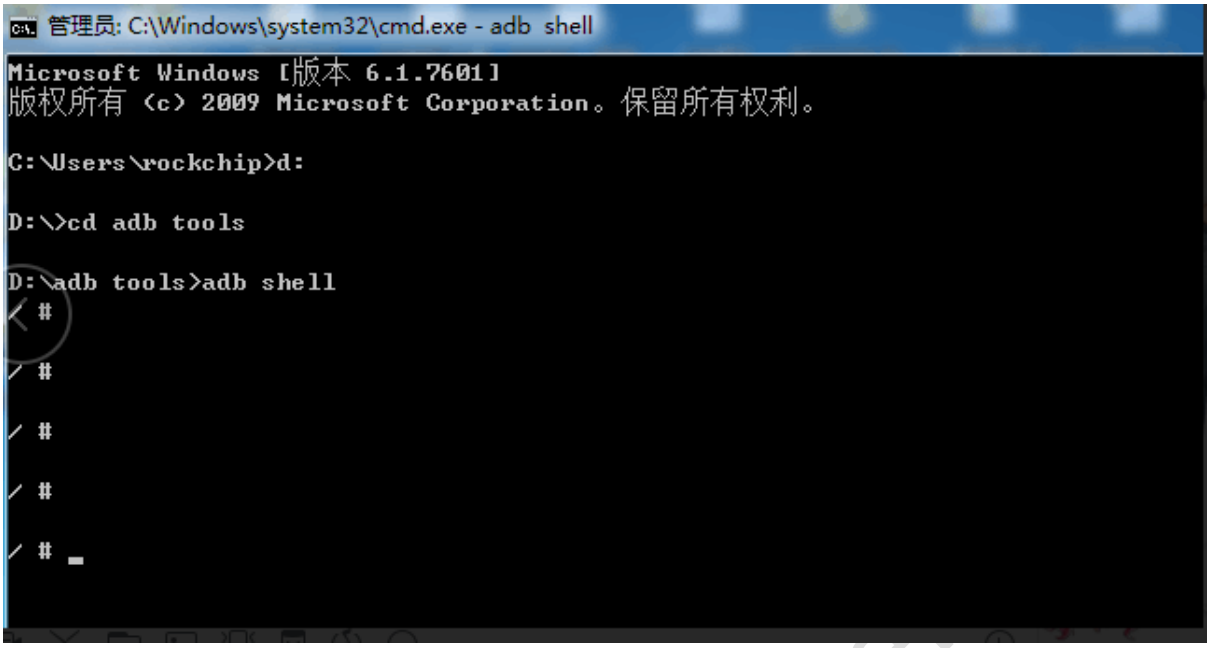

Figure 4-8 ADB connect normally

Chapter 5. Notice

5.1 Notice

RK1808 EVB is applicable to use in a laboratory or engineering development environment. Please read the following notices before starting operation:

- Never hot-swap the panel interface and extension board of the development board.
- Before unpacking EVB and assembling, in order to avoid damage to the development board hardware caused by electrostatic discharge (ESD), please take necessary anti-static measures.
- When holding the development board, please hold the edge of the development board. Do not touch the exposed metal part of the development board to avoid damage to the components of the development board caused by electrostatic discharge (ESD).
- Please place RK1808 development boards on a dry flat surface to keep them away from heat sources, electromagnetic interference sources and radiation sources, and electromagnetic radiation sensitive devices (such as medical equipment).