RV1126_RV1109 EVB User Guide

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Preface

Overview

This document mainly introduces basic functions and hardware characteristics, multi-function hardware configurations and software debugging methods of RV1126_RV1109 EVB, aiming to help developers to use RV1126_RV1109 EVB more quickly and correctly, and familiar with RV1126/RV1109 chipset solution.

Product version

The corresponding product version of the document is as below:

Product name	Product version
RV1126_RV1109 EVB	RV1126_RV1109_EVB_DDR3P216SD6_V12_20200515KYY

Applicable object

This document is mainly suitable for below engineers：

- Field application engineers
- Single board hardware development engineers
- Embedded software development engineers
- Test engineers

Revision History

This 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
2020-04-27	V1.0	Xiaohf	Initial Release
2020-07-03	V1.1	Xiaohf	Update: 1. Update EVB version

Acronym

Acronym includes the abbreviations of commonly used phrases in this document.

CPU	Central processing unit	中央处理器
NPU	Neural network Processing Unit	神经网络处理器
VPU	Video Processing Unit	视频处理器
PMU	Power Management Unit	电源管理单元
PMIC	Power Management IC	电源管理芯片
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
FSPI	Flexible Serial Peripheral Interface	灵活串行外设接口
SPI	Serial Peripheral Interface	串行外设接口
SDMMC	Secure Digital Multi Media Card	安全数字多媒体存储卡
SDIO	Secure Digital Input and Output Card	安全数字输入/输出卡
SD Card	Secure Digital Memory Card	安全数码卡
TF Card	Micro SD Card(Trans-flash Card)	外置记忆卡
I2C	Inter-Integrated Circuit	内部整合电路(两线式串行通讯总线)
I2S	Inter-IC Sound	集成电路内置音频总线
ACODEC	digital audio codec	数字音频编解码器
PDM	Pulse density modulation	脉冲密度调制
USB	Universal Serial Bus	通用串行总线
UART	Universal Asynchronous Receiver/ Transmitter	通用异步收发传输器
PWM	Pulse width modulation	脉冲宽度调制
TSADC	Temperature sensing a / D converter	温度感应模数转换器
SARADC	successive approximation register Analog to digital converter	逐次逼近寄存器型模数转换器
CAN	Controller Area Network	控制器局域网络
MIPI	Mobile Industry Processor Interface	移动产业处理器接口
LVDS	Low-Voltage Differential Signaling	低电压差分信号
SubLVDS	Sub- Low-Voltage Differential Signaling	低摆幅差分信号技术
RGB	RGB color mode is a color standard in industry	RGB色彩模式，是工业界的一种颜色标准
ISP	Image Signal Processing	图像信号处理
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
Rockchip	Rockchip Electronics Co.,Ltd.	瑞芯微电子股份有限公司

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1.Overview

1.1 EVB Introduction

RV1126_RV1109 EVB is an evaluation platform for function verification of RV1126 RV1109 multimedia processing chipset (called RV11XX below). It is used to demonstrate RV11XX's powerful multimedia interfaces and rich peripheral interfaces, and also provides customers with the hardware reference design based on RV11XX, so that customers can complete the hardware development of the product without modifying or simply modifying the module circuits of the reference design.

RV11XX EVB can be used as a basic developing system by connecting with PC via an USB cable, or to implement more complete developing system or demo environment by connecting with below devices or components:

- Power supply
- MIPI panel
- TF Card memory device
- Speakers
- Camera module
- 1000M Ethernet
- WIFI
- camera drive board

The block diagram of the chip is as follows:

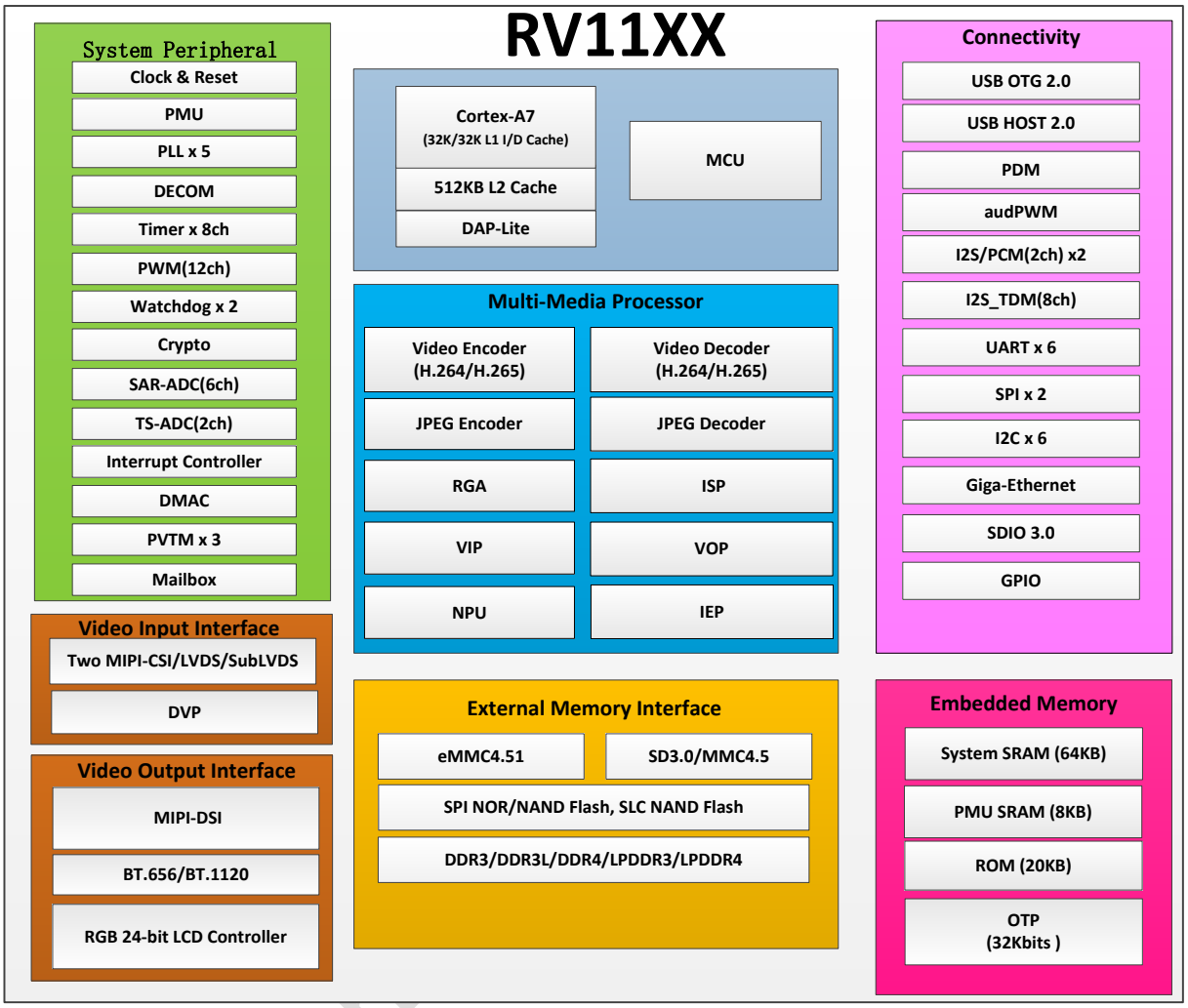


Figure 1-1 RV11XX Chip architecture

The differences between the two chips are shown in the table below:

Table 1-1 Differences between RV1126 and RV1109

RV1126/RV1109 main difference		
	RV1109	RV1126
CPU	Dual A7	Quad A7
NPU	1.2 TOPS	2.0 TOPS
ISP	5M	14M

1.2 EVB Block Diagram

The EVB block diagram helps developers understanding of the architecture and principle of the whole system visually: the whole system is powered by power adapter or battery, and debugging through UART serial port or JTAG interface to verify each function modules. The EVB has rich interfaces to meet the different applications requirements in most cases: camera, Wi-Fi/BT module, USB OTG, TF card, audio

interface, video interface, which is benefit for the deep development of the chip solution and rapid productization.

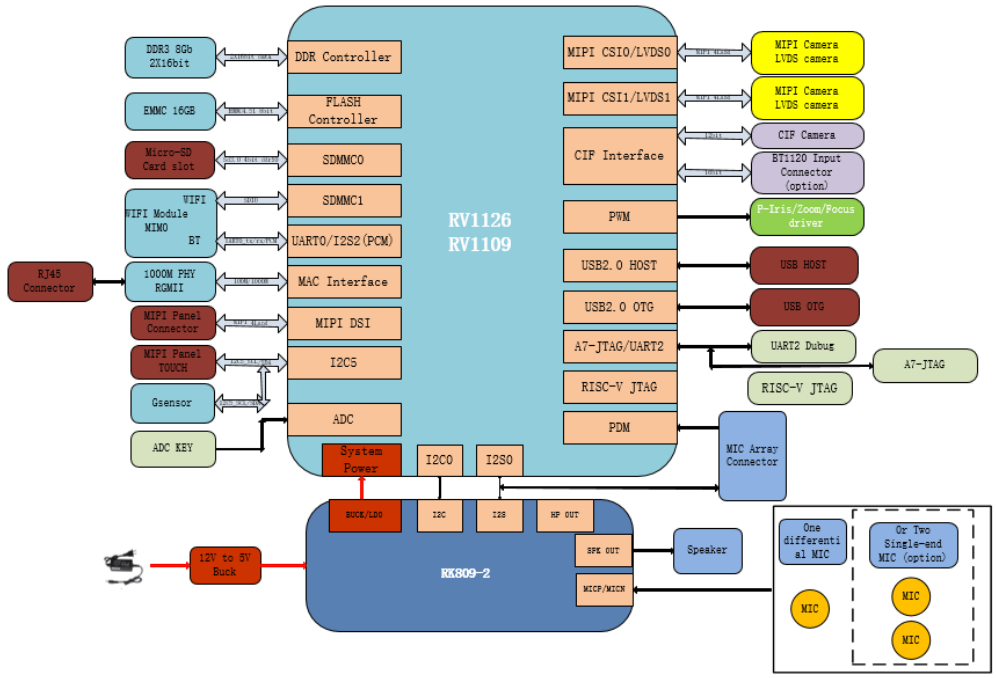


Figure 1-2 RV1126/RV1109 EVB Block Diagram

1.3 Functions Overview

RV11XX EVB includes the following features:

- BQ24171 charge controller
- RK809-2 power management IC
- DDR 2x16bit DDR3, total size 8Gbit.
- 8bit eMMC Flash, total size 16GByte
- TF Card: support external storage card
- USB HOST Type-A Port (USB2600): support USB2.0 devices
- USB Micro Port (J2500): used for image download and ADB debug
- USB HOST 2.5mm headset Port(J2601): reserve for USB camera test
- USB Micro Port: used for UART Debug
- USB Mini Port: used for power consumption test
- System buttons: Power, Reset, Menu, Esc, Left, Right, Update
- SDIO Wi-Fi/BT (AP6256): support 802.11 ac/a/b/g/n and BT5.0
- Audio out: support speaker
- Audio in: support microphone recording
- Gigabit Ethernet RTL8211F
- Sensor: G-sensor+Gyroscope MPU6500

- CIF Camera：IMX323，2M pixel
- MIPI Camera：IMX327，IMAX334,OV2718,AR0239, OS04A10
- Lens p-iris, zoom, focus IRCUT debugging control seat
- MIC Array connector
- Debug interface includes：JTAG

Function modules layout as shown below:

TOP Surface：

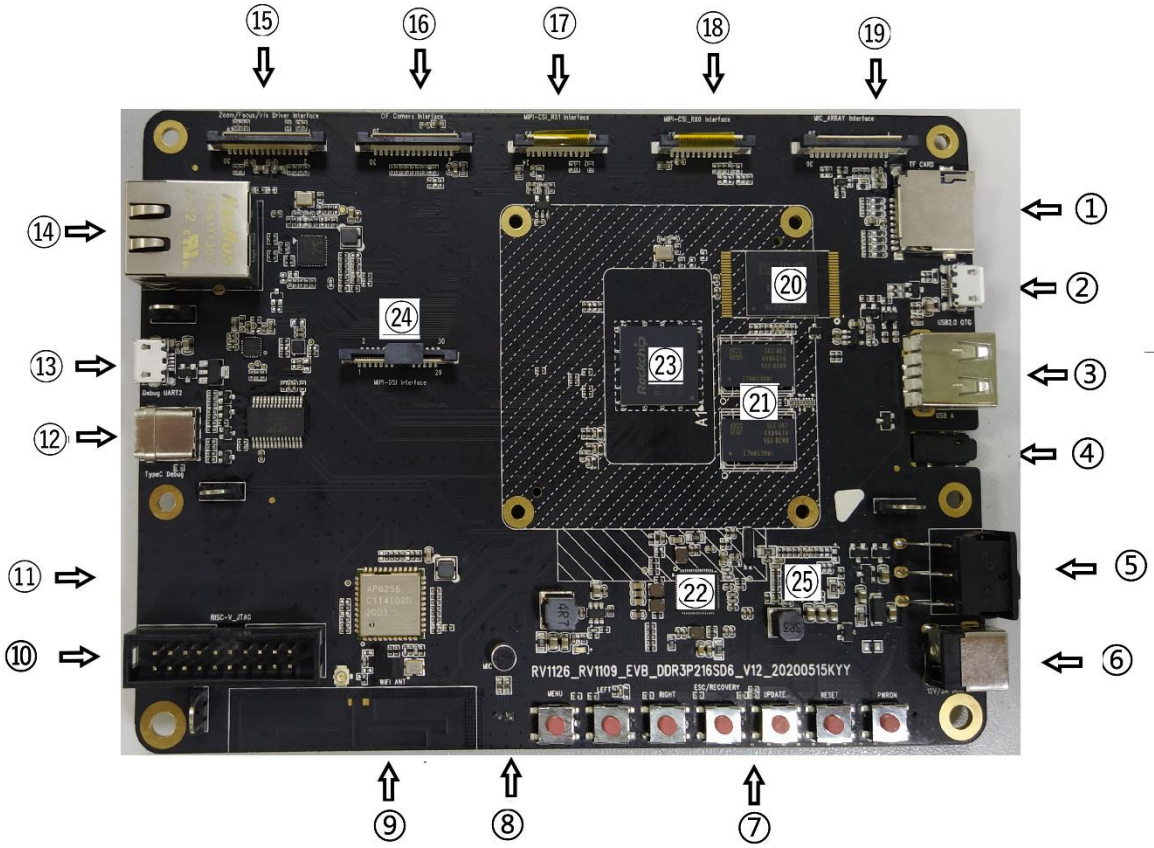


Figure 1-3 EVB TOP Surface

Bottom Surface:

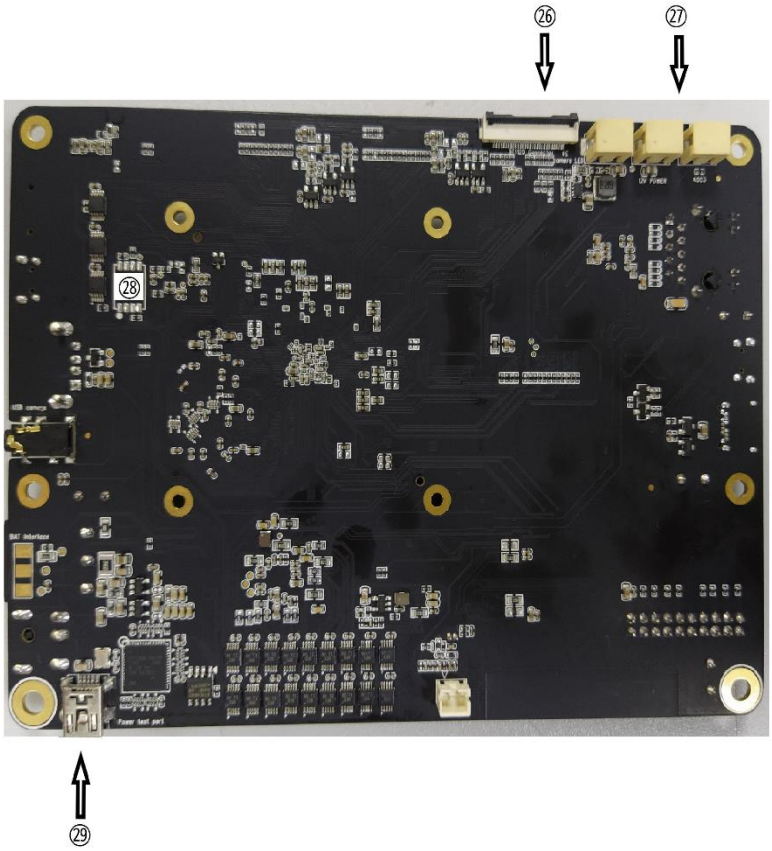


Figure 1-4 EVB Bottom Surface

1.4 EVB Default Flashing Function

The EVB has already been flashed firmware, with the following functions by default:

Table 1-2 EVB function table

Item	Function Part	Requirement
1	TF Card	Recognize TF Card normally
2	USB Micro-B Port	Can recognize ADB device and download images
3	USB Type-A Port	Can recognize device and the function is normal
4	USB camera input	Recognize USB camera normally
5	Power switch	The 12V power supply input by the DC adapter can be controlled ON/OFF by the boat switch.
6	12V power supply input	
7	KEY BAORD	All the button functions are normal
8	CLASS D output	speakers function is normal
9	Wi-Fi/BT	AP6256 module function is normal
10	RISC-V JTAG/ A7-JTAG	Chip verification and debugging, Type C is only used for chip verification
11	NC	
12	TPYEC	

13	USB Micro-B Port	Serial port input and output normally
14	Ethernet	Normal network connection
15	Zoom/ Iris Driver Interface	Zoom/Focus/Iris/IRCUT connectors are reserved on EVB for customers debugging CAMERA device more conveniently.
16	CIF camera	Camera works normally, is CIF camera input by default
17	MIPI Camera 1	Camera works normally, is MIPI camera input by default
18	MIPI Camera 2	Camera works normally, is MIPI camera input by default
19	MIC-ARRAY	MIC device input
20	eMMC Flash	Can recognize 16GByte normally
21	DDR DDR3	Can recognize 8Gbit in total
22	PMIC RK809-2	Output of each power supply are normal, accurate battery volume detection
23	CPU	RV11XX
24	MIPI panel	Screen images display normally
25	BQ24171	2-cell battery normal charging and discharging
Bottom Surface		
26	BT1120 Camera	Camera works normally, is MIPI camera input by default
27	Camera_LED Drive output	Warm up lamp drive
28	SPI flash	Verify SPI flash function
29	USB Micro-B Port	For power consumption test

1.5 EVB Components

RV11XX EVB includes the following components:

- RV11XX EVB
- DC adapter: input 100V AC~240V AC，50Hz, output DC12V/2A
- Panel: 5.5 inch MIPI panel, 720*1280 resolution

2.EVB Hardware Introduction

2.1 Physical View

The PCB physical picture of RV11XX EVB is shown as below：

Figure 2-1 EVB PCB physical front view

2.2 Power Block Diagram

RV11XX EVB uses PMIC of RK809-2. The power block diagram is as below:

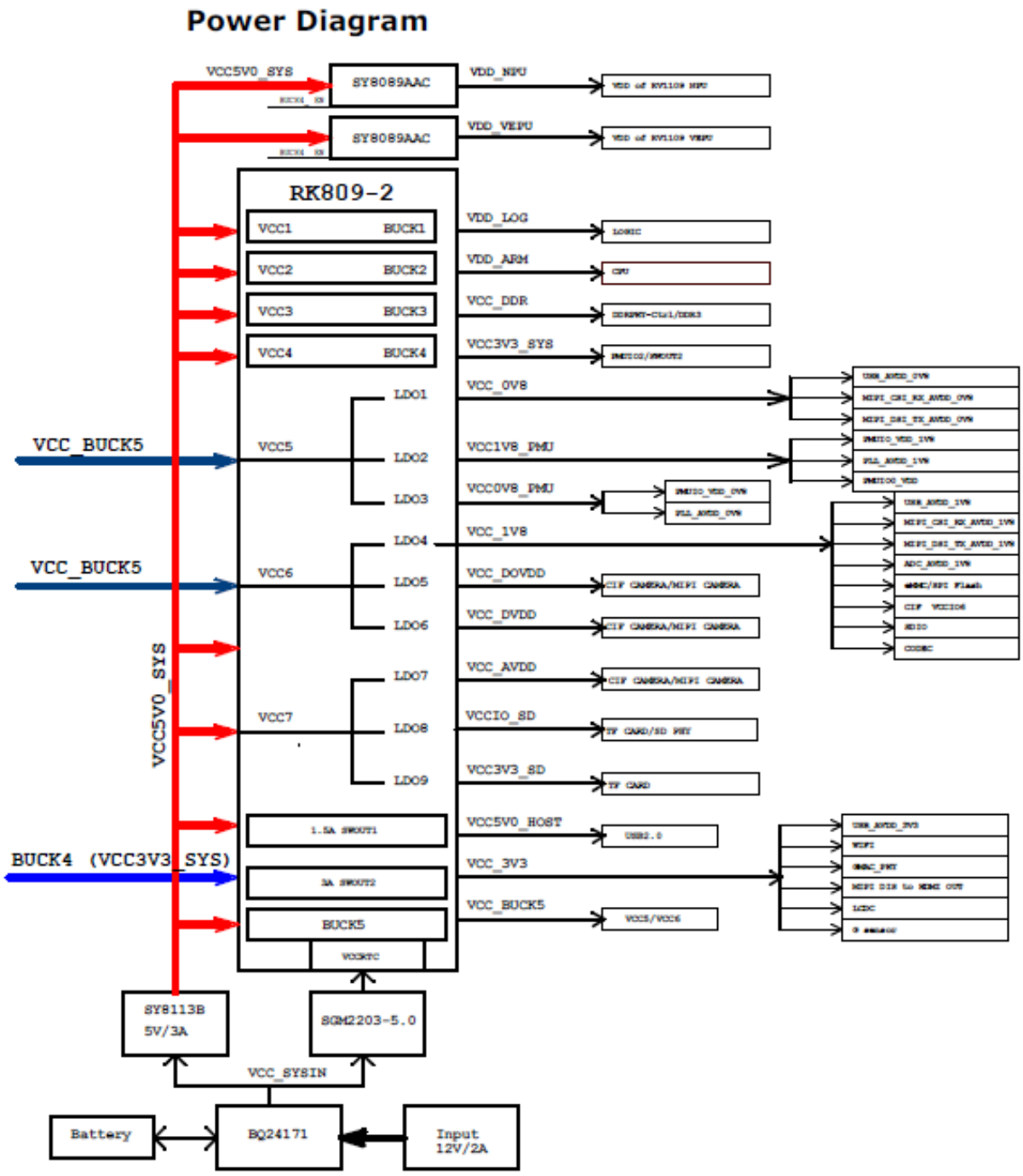


Figure 2-2 EVB power block diagram

2.3 I²C Address

I²C address (7bit) configurations of RV11XX EVB are shown as below table:

Table 2-1 EVB I2C address table

	Device	Address
I²C0	RK809-2	0x20
I²C1	IMX327	0x34
	IMX323	0x1a
I²C5	TP	0x28
	MIC Array	TAD
	MPU-6500	The address of one of the devices should be b1101000 (pin AD0 is logic low) and the address of the other should be b1101001 (pin AD0 is logic high).

Note: when using the extension board, please ensure that the I²C address not conflict with the I²C address of the EVB.

2.4 Reference Design of the EVB

Please contact with RK FAE to get the reference design of RV1126_RV1109 EVB. The latest version are as follows:

"RV1126_RV1109_EVB_DDR3P216SD6_V12_20200515.DSN"

"RV1126_RV1109_EVB_DDR3P216SD6_V12_20200515YKK.pcb"

3.EVB Modules Description

3.1 Power Input

The 12V power supply input by the DC adapter can be controlled ON/OFF by the boat switch. The power input was step-down to system power VCC_IN by charge IC. After the power supply is step-down to VCC5V0_SYS_S3 by DC-DC BUCK NB679GD, it will provide input for PMIC, and then PMIC outputs multiple power supplies for EVB.

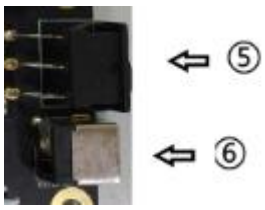


Figure 3-1 EVB power input

3.2 Memory

3.2.1 EMMC

1. The default eMMC FLASH size of the EVB is 16GByte.

2. There is Update button next to Flash, which is marked as "Update" on the main board, in order to upgrade images of the EVB conveniently. Connect USB, press and hold the button, EVB power on or reset, and then the system will enter MASKROM mode for image download.

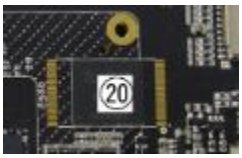


Figure 3-2 EVB eMMC Flash

3.2.2 DDR

The CPU DDR controller of RV11XX supports 32bit DDR, All use DDR3, and total size is 2GByte.

Figure 3-3 CPU DDR3

3.3 Button Input

1. The EVB provides button application, uses RV11XX ADC_IN2 as detection input, and supports 10bit resolution.

2. ADC power supply is provided by ADC_AVDD_1V8, and the corresponding key value can be calculated according to the resistance parameter in Figure 3-5.

3. The EVB defines several commonly used function buttons: MENU/ESC/RIGHT/LEFT.

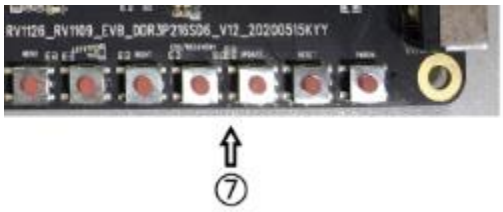
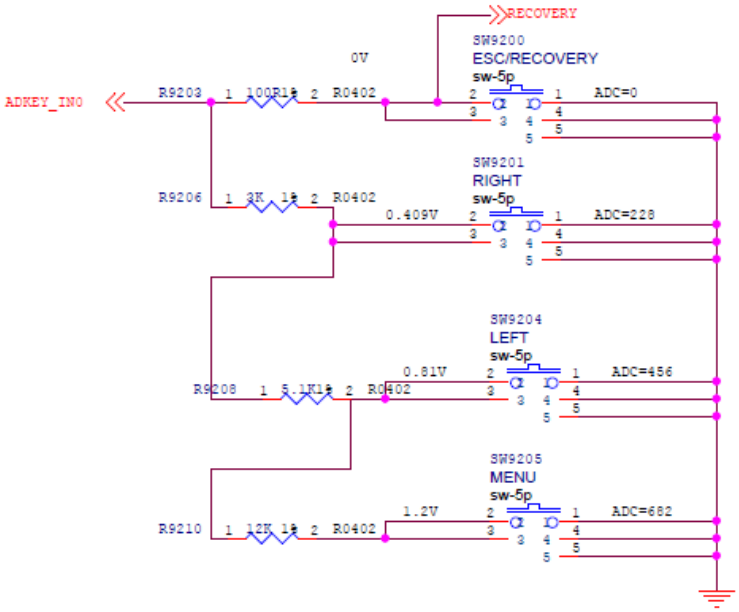


Figure 3-4 EVB buttons



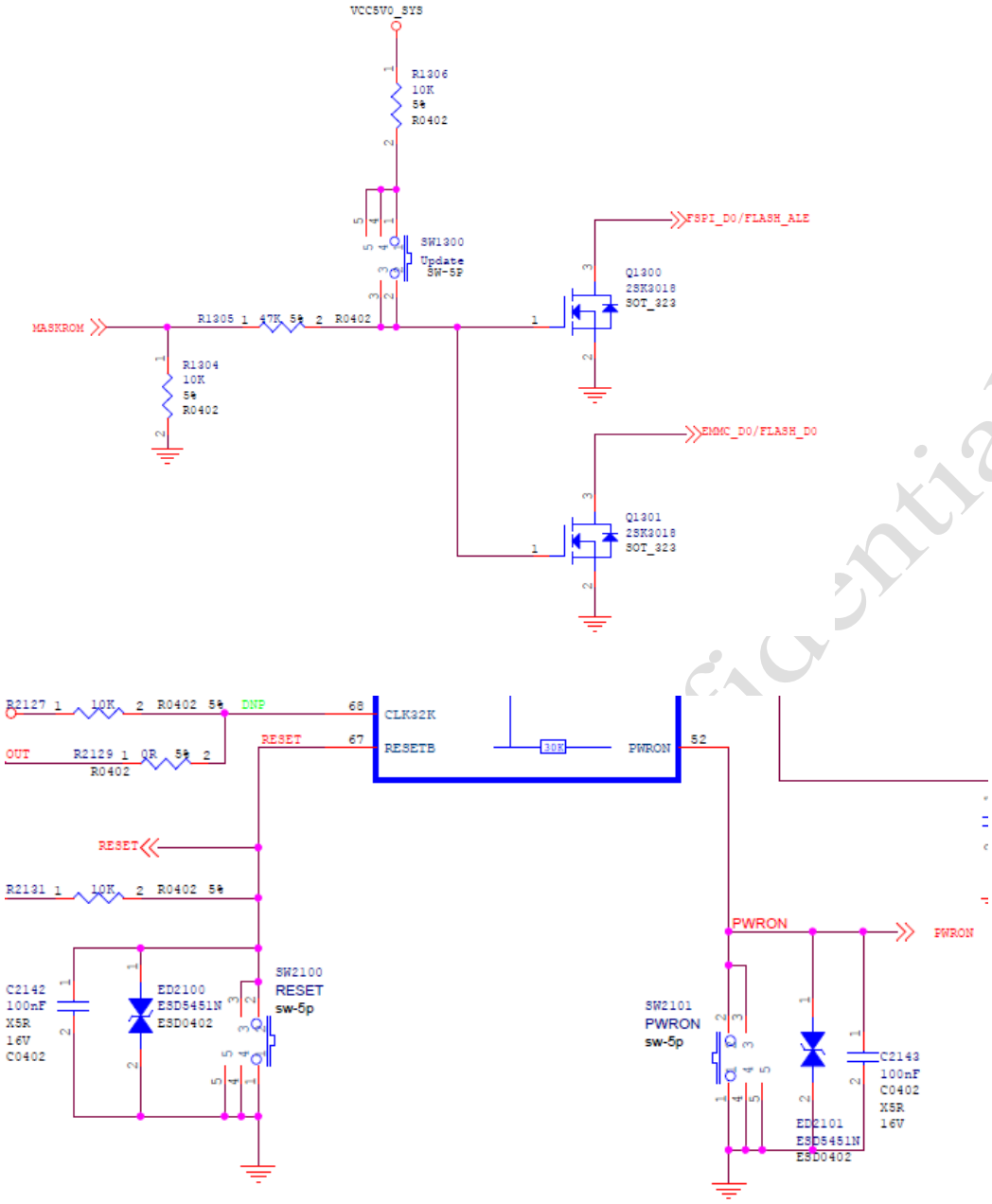


Figure 3-5 EVB button design

Table 3-1 Key menu

Key name	signaling network	Function description	Remarks
MENU	CPU / ADKEY_IN0	Main menu	
LEFT	CPU / ADKEY_IN0	Function button	
RIGHT	CPU / ADKEY_IN0	Function button	
ESC/RECOVERY	CPU / ADKEY_IN0	Enter recovery mode	
UPDATE	CPU / FSPI_D0/FLASH_ALE CPU / EMMC_D0/FLASH_D0	Program burning, cooperate with reset key to enter MASKROM mode	
RESET	RK809 / RESETB	reset	
PWRON	RK809 / PWRON	Power on/off	

3.4 G-Sensor & Gyroscope Sensor

The sensor used on the EVB is MPU6500 six-axis sensor, which supports acceleration and gyroscope detection as shown below:

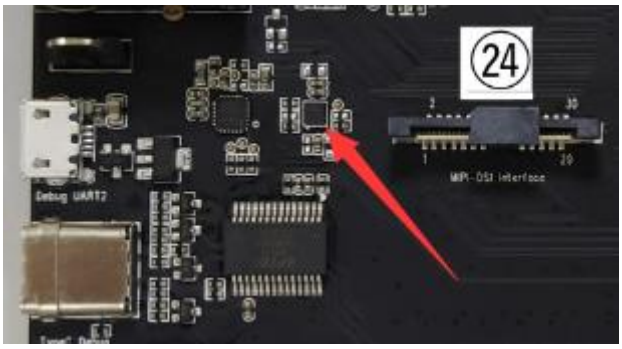


Figure 3-6 EVB sensor

3.5 The main signal list of EVB Sensor:

Table 3-2 Sensor main signal list

MPU6500 pin	Network name	CPU Network name	Function description
PIN12 INT	GSENSOR_INT_MPU	GSENSOR_INT_H/IR_PWM2_M1/ GPIO2_B1	Interrupt signal
PIN23 SCL/SCLK	I2C5_SCL_M0	I2C5_SCL_M0/ GPIO2_A5	I2C
	SPI_CLK_SENSOR	test	
PIN24 SDA/SDI	I2C5_SDA_M0	I2C5_SDA_M0/ GPIO2_B3	I2C
	SPI_TXD_SENSOR_PMU	test	

3.6 G_SENSOR

The G-sensor used on the EVB is BMA250, which is communicating with SoC via I^2C. The location is shown as below.

The function is NC by default, resistances R7400/R7402/R7406 are required to be soldered when in use.

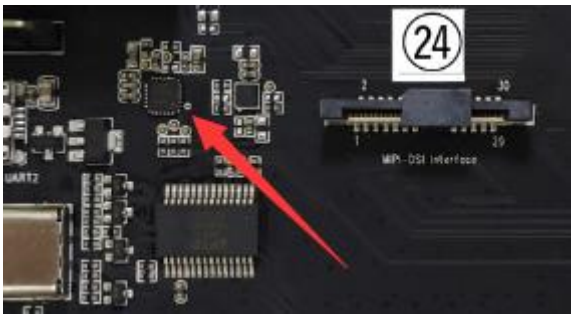


Figure 3-7 EVB G_SENSOR

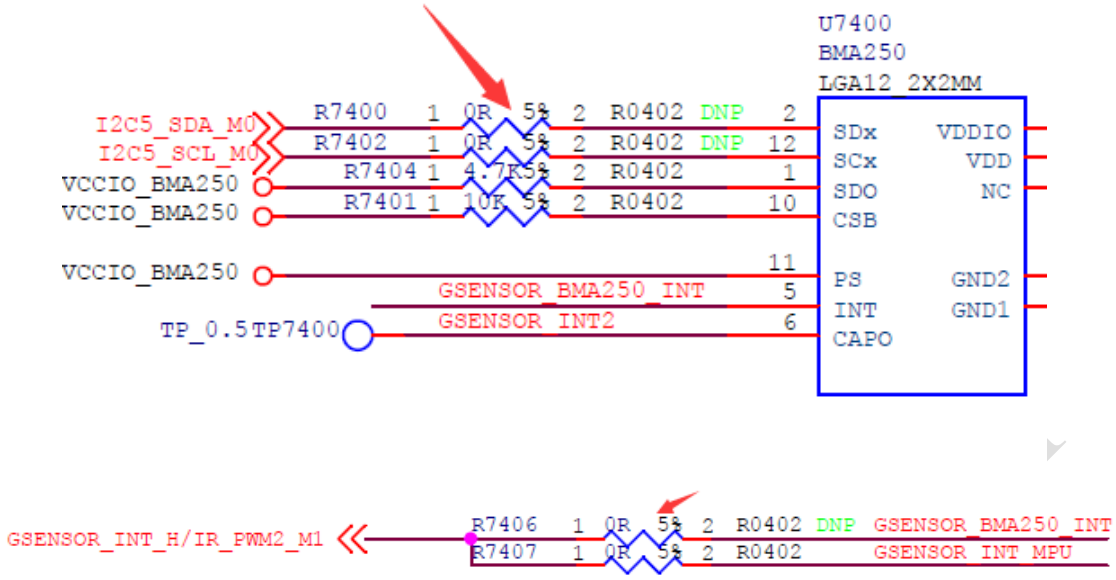


Figure 3-8 Sensor resistance jumper

G_SENSOR Main signal list:

Table 3-3 G_SENSOR main signal list

BMA250 pin	Network name	CPU Network name	Function description
PIN6 GAPO	GSENSOR_INT2	test	
PIN5 INT	GSENSOR_BMA250_INT	GSENSOR_INT_H/IR_PWM2_M1/ GPIO2_B1	Interrupt signal
PIN12 SCX	I2C5_SCL_M0	I2C5_SCL_M0/ GPIO2_A5	I2C
PIN2 SDX	I2C5_SDA_M0	I2C5_SDA_M0/ GPIO2_B3	I2C

3.7 Audio Input and Output

The EVB audio uses the embedded Codec of RK809-2, with following features:

- Embedded Charge Pump, support stereo earphone output without capacitive coupling.
- Embedded Class-D amplifier, can drive 1.3W/8ohm speaker output, and have over-current protection
- Microphone supports single-end/differential input mode.

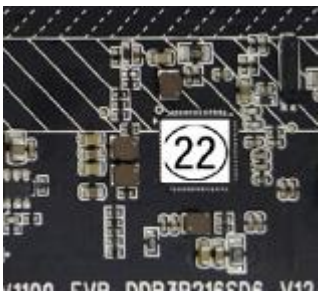


Figure 3-9 EVB audio input and output

Audio Main signal list:

Table 3-4 Audio main signal list

RK809-2 pin	Network name	CPU Network name	Function description
PIN14 LRCLK	I2S0_LRCK_TX_M0	GPIO3_D3	Frame clock LRCK (also called WS), used to switch the data of left and right channels
PIN15 BCLK	I2S0_SCLK_TX_M0	GPIO3_D0	Serial clock SCLK, also called bit clock (BCLK)
PIN16 MCLK	I2S0_MCLK_M0	GPIO3_D2	Master clock signal
PIN17 SDI	I2S0_SDO0_M0	GPIO3_D5	Serial SDATA
PIN18 SDO/PDMDATA	I2S0_SDI3_M0	GPIO3_D7	Serial SDATA

3.8 USB

The USB OTG port J2500 of the EVB is the image download port. In order to facilitate customers, the EVB also reserves USB MicroA port USB2600 for USB HOST function.

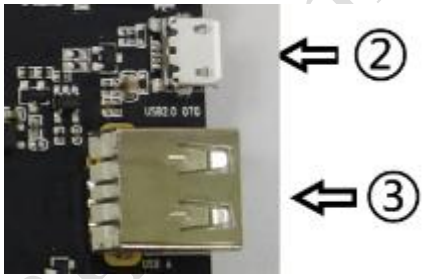


Figure 3-10 EVB USB port

USB main signal list**:**

Table 3-5 USB main signal list

USB pin	Network name	CPU Network name	Function description
USB20_micro PIN3	OTGDP	OTG_DP	Data
USB20_micro PIN2	OTGDM	OTG_DM	Data
USB20_micro PIN4	ID	OTG_ID	USB SWTICH SY6280AAC
/	OTG_DET_1V8	OTG_DET_1V8	detection signal
USBA PIN2	USB_HOST_DP	USB_HOST_DP	Data
USBA PIN3	USB_HOST_DM	USB_HOST_DM	Data

3.8 TF Card

The EVB has TF card interface as shown below. Which supports SDMMC 2.0/3.0, and the data bus width is 4bits.

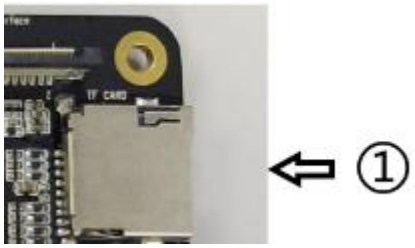


Figure 3-11 EVB TF Card connector

TF main signal list:

Table 3-6 TF main signal list

TF pin	Network name	CPU Network name	Function description
PIN1 DATA2	SDMMC0_D2	GPIO1_A6	Data
PIN2 CD/DATA3	SDMMC0_D3	GPIO1_A7	Data
PIN3 CMD	SDMMC0_CMD	GPIO1_B1	Orders and responses
PIN5 CLK	SDMMC0_CLK	GPIO1_B0	CLK
PIN7 DATA0	SDMMC0_D0	GPIO1_A4	Data
PIN8 DATA1	SDMMC0_D1	GPIO1_A5	Data
PIN9 CD	SDMMC0_DET	GPIO0_A3	Insertion detection

3.9 Camera

The camera connector of the EVB supports MIPI CSI、CIF、BT1120、USB camera modules. The connector is shown as Figure. When using camera, please pay attention to voltage matching, otherwise it will cause camera work abnormally or fail to work.

If there is any change in the voltage domain of the camera, the corresponding resistance on the EVB board needs to be changed synchronously. See the schematic diagram for details.

Bt1120 and CIF cannot be used at the same time, so the function of resistance selection is required.

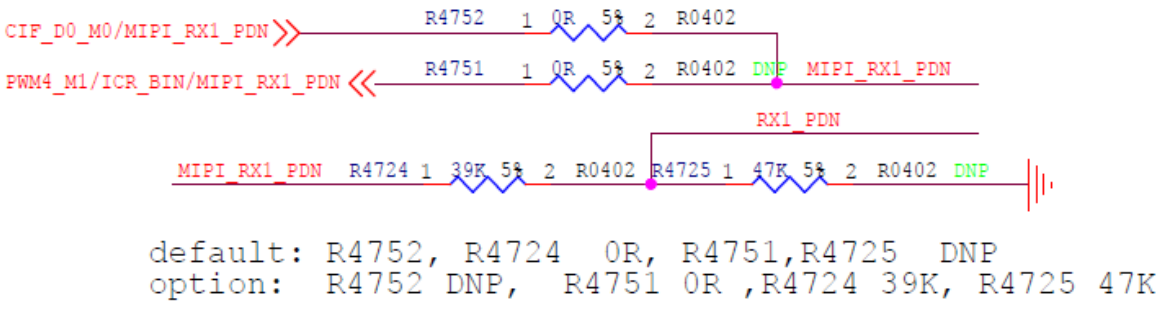
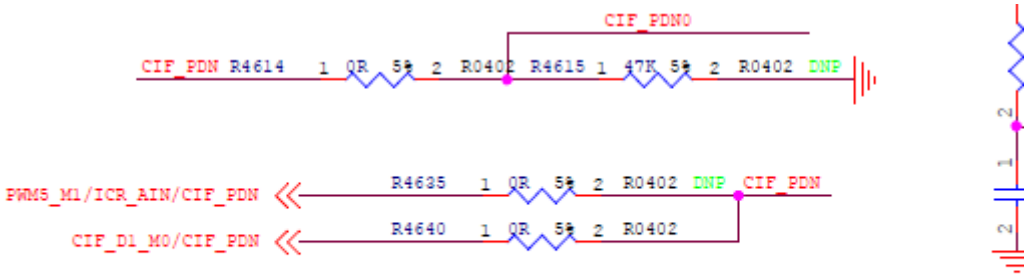


Figure 3-12 MIPI camera resistance jumper



default: R4640, R4614 0R, R4615,R4635 DNP
option: R4640 DNP, R4635 0R ,R4614 39K, R4615 47K

Figure 3-13 CIF camera resistance jumper

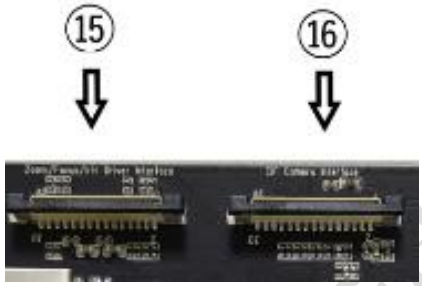


Figure 3-14 EVB CIF camera connector

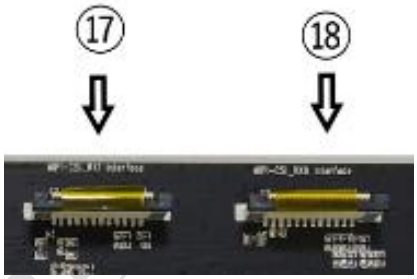


Figure 3-15 EVB MIPI camera connector

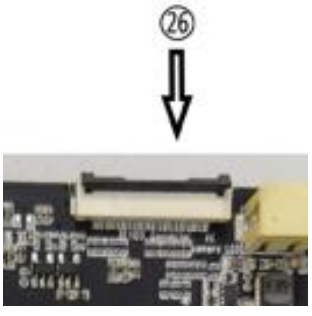


Figure 3-16 EVB BT1120 camera connector

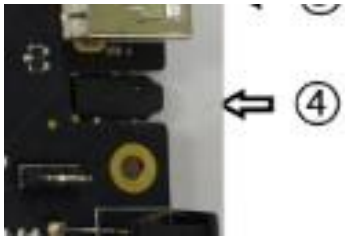


Figure 3-17 EVB USB camera connector

Cameranetwork table is as follows：

Table 3-7 MIPI Camera net name and SoC pin name

MIPI Camera connector pin No.	M MIPI Camera connector pin net name	SoC pin name
1	SPI0_MISO_M1	GPIO1_D7
2	SPI0_CS1n_M1	GPIO1_D5
3	RX1_PDN	GPIO3_A4
4	CAMERA_RST_1	NC
5	I2C1_SDA	I2C1_SDA/GPIO1_D2
6	SPI0_CLK_M1/ I2C1_SCL	I2C1_SCL/GPIO1_D3
7	GND	GND
8	GND	GND
9	MIPI_CSI_RX1_D0N	MIPI_CSI_RX1_D0N
10	MIPI_CSI_RX1_D0P	MIPI_CSI_RX1_D0P
11	MIPI_CSI_RX1_D1N	MIPI_CSI_RX1_D1N
12	MIPI_CSI_RX1_D1P	MIPI_CSI_RX1_D1P
13	MIPI_CSI_RX1_D2N	MIPI_CSI_RX1_D2N
14	MIPI_CSI_RX1_D2P	MIPI_CSI_RX1_D2P
15	MIPI_CSI_RX1_D3N	MIPI_CSI_RX1_D3N
16	MIPI_CSI_RX1_D2P	MIPI_CSI_RX1_D2P
17	GND	GND
18	MIPI_CSI_RX1_CLKN	MIPI_CSI_RX1_CLKN
19	MIPI_CSI_RX1_CLKP	MIPI_CSI_RX1_CLKP
20	GND	GND
21	MIPI_CSI_CLK1	MIPI_CSI_CLK1/GPIO2_A2
22	VCC_DOVDD_1	VCC_DOVDD_1
23	VCC_DVDD_1	VCC_DVDD_1
24	VCC_AVDD_1	VCC_AVDD_1

Table 3-8 CIF Camera net name and SoC pin name

CIF Camera connector pin No.	CIF Camera connector pin net name	SoC pin name
1	D15	CIF_D15_M0
2	GND	GND
3	SDA	I2C1_SDA /GPIO1_D2
4	VCC_AVDD_CIF	VCC_AVDD_CIF
5	SCL	I2C1_SCL /GPIO1_D3
6	RST	CIF_RST
7	VSYNC	CIF_VSYNC_M0
8	CIF_PDN0	CIF_PDN0
9	HSYNC	CIF_HSYNC_M0
10	VCC_DVDD_CIF	VCC_DVDD_CIF
11	VCC_DOVDD_CIF	VCC_DOVDD_CIF
12	D13	CIF_D13_M0
13	CLKOUT	CIF_CLKOUT_M0
14	D12	CIF_D12_M0
15	GND	GND
16	D11	CIF_D11_M0
17	CLKIN	CIF_CLKIN_M0
18	D10	CIF_D10_M0
19	D6	CIF_D6_M0
20	D9	CIF_D9_M0

21	D7	CIF_D7_M0
22	D8	CIF_D8_M0
23	D5	CIF_D5_M0
24	D4	CIF_D4_M0
25	D14	CIF_D14_M0
26	GND	GND
27	GND	GND
28	GND	GND
29	GND	GND
30	GND	GND

Table 3-9 BT1120 Camera net name and SoC pin name

BT1120 Camera connector pin No.	BT1120 Camera connector pin net name	SoC pin name
1	GND	GND
2	GND	GND
3	I2C1_SCL	I2C1_SCL/GPIO1_D3
4	I2C1_SDA	I2C1_SDA/GPIO1_D2
5	GND	GND
6	D15	CIF_D15_M0
7	D14	CIF_D14_M0
8	D13	CIF_D13_M0
9	D12	CIF_D12_M0
10	GND	GND
11	D11	CIF_D11_M0
12	D10	CIF_D10_M0
13	D9	CIF_D9_M0
14	D8	CIF_D8_M0
15	GND	GND
16	D7	CIF_D7_M0
17	D6	CIF_D6_M0
18	D5	CIF_D5_M0
19	D4	CIF_D4_M0
20	GND	GND
21	D3	CIF_D3_M0/LCD_PWREN_H
22	D2	CIF_D2_M0/CAM_EN
23	D1	CIF_D1_M0/CIF_PDN
24	D0	CIF_D0_M0/MIPI_RX1_PDN
25	GND	GND
26	VSYNC	CIF_VSYNC_M0
27	HSYNC	CIF_HSYNC_M0
28	GND	GND
29	CLKIN	CIF_CLKOUT_M0
30	GND	GND

The list of power supply for power domain and chip side is as follows:

Table 3-10 camera Power domain list

Camera type	Power supply network	Power supply mode	Default voltage	Startup timing
	VCC_DVDD_CIF	RK809 LDO5	1.8V	OFF

CIF	VCC_DOVDD_CIF	RK809 LDO4	1.8V	3
	VCC_AVDD_CIF	RK809 LDO6	1.5V	OFF
MIPI	VCC_DVDD	RK809 LDO5	1.8V	OFF
	VCC_DOVDD	RK809 LDO4	1.8V	3
	VCC_AVDD	RK809 LDO6	1.5V	OFF
BT1120	\	\	\	\
USB	VCC5V0_HOST	RK809 SWOUT1	5.0V	OFF

Table 3-11 Chip power domain list

Camera type	Power supply network	Power supply mode	Default voltage	Startup timing
CIF	VCCIO6_VDD	VCC_1V8/ RK809 LDO4(默认) VCC_3V3/ RK809 SWOUT2	1.8V	3
MIPI	MIPI_CSI_RX1_ AVDD_0V8	VCC_0V8/RK 809 LDO1	0.8V	2
	MIPI_CSI_RX1_ AVDD_1V8	VCC_1V8/ RK809 LDO3	0.8V	2
BT1120	Same CIF	Same CIF	Same CIF	Same CIF
USB	USB_AVDD_0V8	VCC_0V8/RK 809 LDO1	0.8V	2
	USB_AVDD_1V8	VCC_1V8/ RK809 LDO4	1.8V	3
	USB_AVDD_3V3	VCC_3V3/ RK809 SWOUT2	3.3V	4

3.10 Wi-Fi/BT Module

The Wi-Fi/BT module of the EVB is Taiwan AMPAK AP6398S module as shown in Figure 3-14. It has the following features:

- Support Wi-Fi (802.11 ac/a/b/g/n), BT5.0 function.
- BT data is transmitted through UART
- BT voice is transmitted through PCM
- Wi-Fi data supports 4bits SDIO 3.0

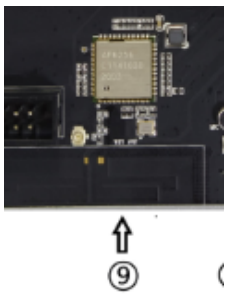


Figure 3-18 EVB Wi-Fi /BT module

List of main control signals of the Wi-Fi/BT module：

Table 3-12 List of main control signals of the Wi-Fi/BT module

WIFI/BT pin	Network name	CPU Network name	Function description
PIN6 BT_WAKE	HOST_WAKEBT	GPIO0_A4	HOST wake-up Bluetooth device
PIN7 BT_HOST_WAKE	BT_HOST_WAKE	GPIO0_A5	Bluetooth device to wake-up HOST
PIN12 WL_REG_ON	WIFI_REG_ON	GPIO0_A6	Internal regulators power enable/disable
PIN13 WL_HOST_WAKE	WIFI_WAKEHOST	GPIO0_B0	WLAN to wake-up HOST
PIN24 LPO	WIFI_BT_32KIN	GPIO0_A2	CLK IN
PIN34 BT_RST_N	BT_RST	GPIO0_A7	Low asserting reset for Bluetooth core
PIN40 TX1	WAKEUP_SOC_OPTION	\	\

There aretwo WiFi cases for WiFi/BT module power selection：

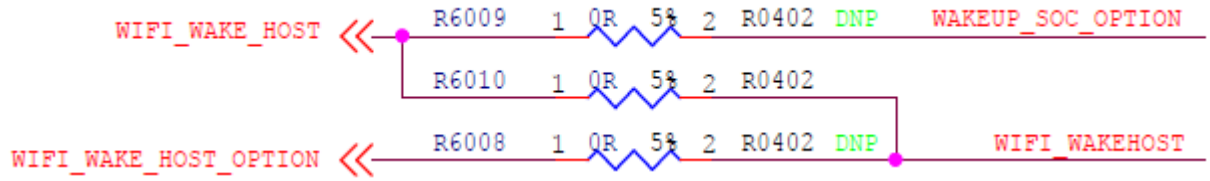
1. When WiFi is powered off in standby mode and SDIO is powered off, then VCC_1V8 and VCC_3V3 are used for power supply.

2. If WiFi is not powered off, SDIO is powered on, WiFi enters standby mode, then VCC1V8_PMU and VCC3V3_SYS are used for power supply.

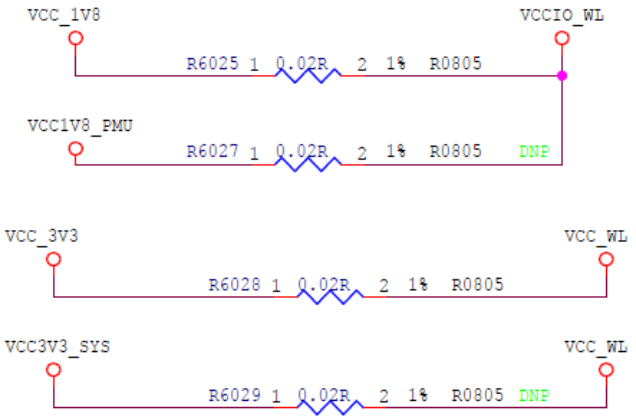
If the standby WiFi is not powered off, VCCIO3_VDD shall be changed to vcc1v8 PMU for power supply, and VCCIO_VDD_1V8 shall also be changed to VCC1V8_PMU for power supply.

When standby, SDIO of SOC is powered on continuously, r6009 and r6008 are not connected, r6010 is connected, WIFI_WAKEHOST is used to wake up SOC by default.

When standby, SDIO of SOC is powered off, r6009 and r6008 are connected, r6010 is not connected and wake up SOC by WAKEUP_SOC_OPTION.



Module Power



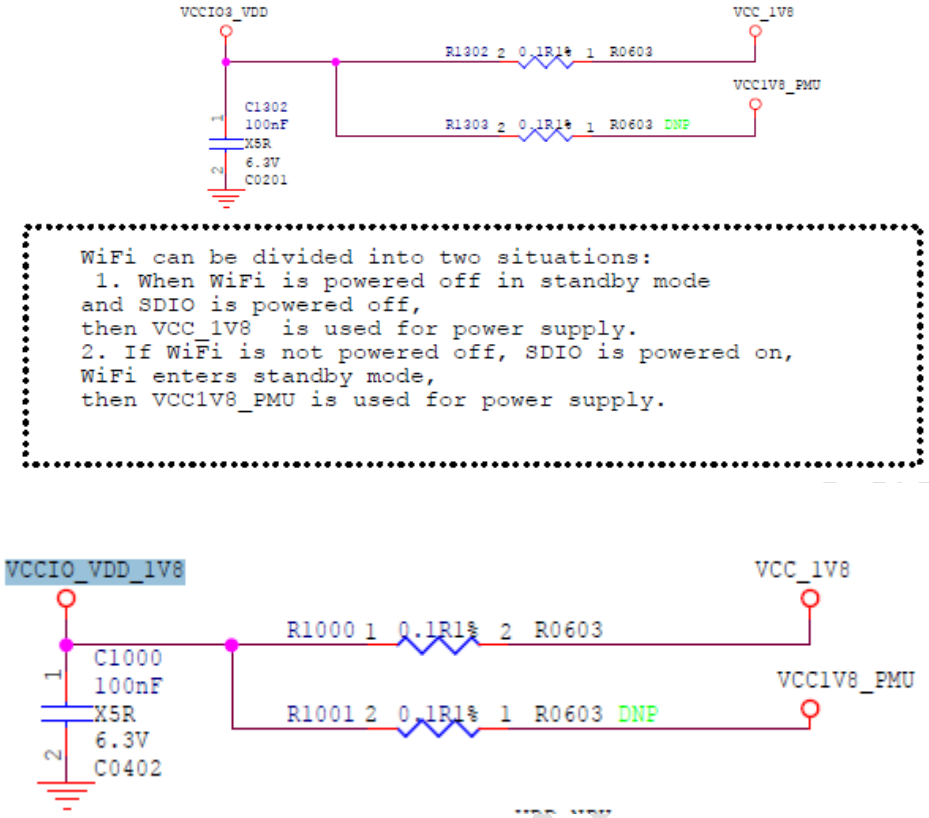


Figure 3-19 WiFi resistance jumper selection

3.11 LCM MIPI Connector

The MIPI panel output of the EVB is shown as below:

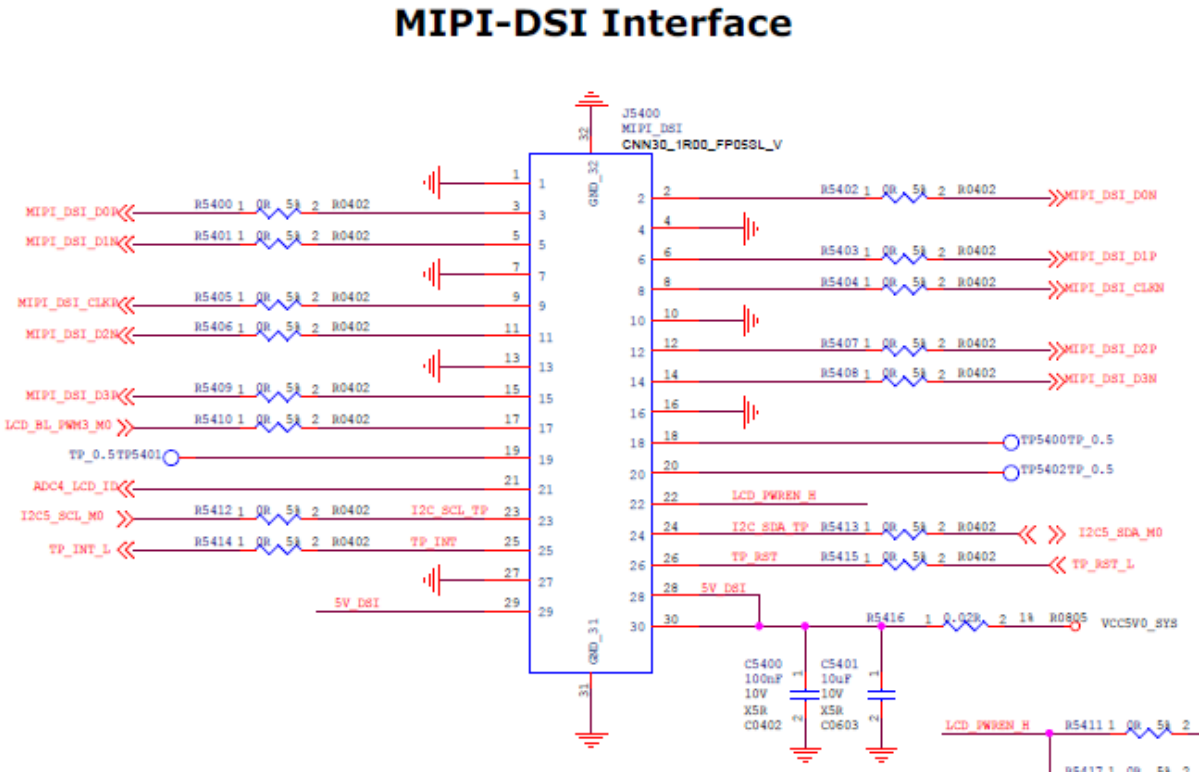


Figure 3-20 MIPI signal diagram

Figure 3-21 EVB MIPI LCM

Table 3-13 MIPI Screen network name andCPU pin name

MIPI pin	MIPI network name	CPU pin name
1	GND	GND
2	MIPI_DSI_D0N	MIPI_DSI_D0N
3	MIPI_DSI_D0P	MIPI_DSI_D0P
4	GND	GND
5	MIPI_DSI_D1N	MIPI_DSI_D1N
6	MIPI_DSI_D1P	MIPI_DSI_D1P
7	GND	GND
8	MIPI_DSI_CLKN	MIPI_DSI_CLKN
9	MIPI_DSI_CLKP	MIPI_DSI_CLKP
10	GND	GND
11	MIPI_DSI_D2N	MIPI_DSI_D2N
12	MIPI_DSI_D2P	MIPI_DSI_D2P
13	GND	GND
14	MIPI_DSI_D3N	MIPI_DSI_D3N
15	MIPI_DSI_D3P	MIPI_DSI_D3P
16	GND	GND
17	LCD_BL_PWM3_M0	GPIO0_C1
18	TP	/
19	TP	/
20	TP	/
21	ADC4_LCD_ID	ADCIN4
22	LCD_PWREN_H	GPIO3_A7
23	I2C_SCL_TP	I2C5_SCL_M0
24	I2C_SDA_TP	I2C5_SDA_M0
25	TP_INT	TP_INT_L
26	TP_RST	TP_RST_L/GPIO2_B0
27	GND	GND
28	5V_DSI	5V_DSI
29	5V_DSI	5V_DSI
30	5V_DSI	5V_DSI

3.12 GPHY

Rtl8211f-cg is used on the development board, which conforms to 10Base-T, 100base TX and 1000BASE-T IEEE802.3 standards. It can transmit network data through Cat 5 UTP cable and cat 3 UTP cable. The chip belongs to the physical layer in network communication and is used for data communication between MAC and PHY.

GPHY interface is provided on the development board as shown below.

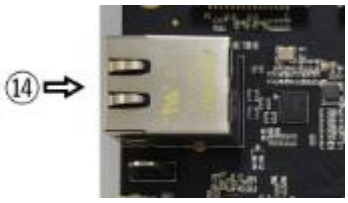


Figure 3-22 EVB GPHY

3.13 UART Debug

The EVB provides serial port for debugging. FT232RL highly integrated FT232-USB interface conversion chip is used as following.

Type C interface is for internal test.

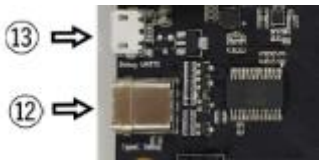


Figure 3-23 EVB UART debug port (USB Micro-B)

3.14 JTAG Debug

The EVB uses standard 20pin JTAG debug connector as shown below, which is convenient for customers to do the debugging and development through it.

No.⑪ JTAG function not available.

Figure 3-24 EVB JTAG debug connector

3.15 MIC_ARRAY Interface

The EVB reserves MIC_ARRAY connector as shown below, which is convenient for customers to debug MIC device.

The default state cannot be used. It is required to add r7252/r7209/r7210 when in used, and delete resistance r2136 on the network.

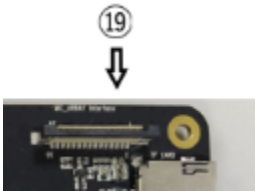


Figure 3-25 EVB MIC_ARRAY Interface

3.16 Zoom/Focus/Iris/IRCUT Driver Interface

The EVB reserves Zoom/Focus/Iris/IRCUT connector as shown below, which is convenient for customers to debug CAMERA device.

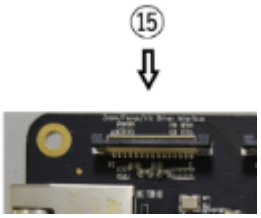


Figure 3-26 EVB Zoom/Focus/Iris/IRCUT Driver

Table 3-14 Zoom/Focus/Iris/IRCUT Driver net name and SoC pin name

Driver pin number	Driver network name	CPU pin name
1	GND	GND
2	P_IRIS/ZOOM/FOCUS_AIN1	PWM6_M1/SPI1_CS0n_M2/GPIO2_D4
3	P_IRIS/ZOOM/FOCUS_AIN2	PWM10_M1/SPI1_CLK_M2/GPIO2_D5
4	P_IRIS/ZOOM/FOCUS_BIN1	PWM9_M1/SPI1_MOSI_M2/GPIO2_D6
5	P_IRIS/ZOOM/FOCUS_BIN2	PWM8_M1/SPI1_MISO_M2/GPIO2_D7
6	TP	NC
7	GND	GND
8	P_IRIS_EN_H	P_IRIS_EN/GPIO0_C2
9	ZOOM_EN_H	ZOOM_EN/GPIO0_C0
10	FOCUS_EN_H	FOCUS_EN/GPIO0_C3
11	GND	GND
12	VCC_3V3	VCC_3V3
13	VCC_3V3	VCC_3V3
14	VCC_3V3	VCC_3V3
15	VCC_3V3	VCC_3V3
16	GND	GND
17	VCC5V0_SYS	VCC5V0_SYS
18	VCC5V0_SYS	VCC5V0_SYS
19	VCC5V0_SYS	VCC5V0_SYS
20	VCC5V0_SYS	VCC5V0_SYS
21	VCC5V0_SYS	VCC5V0_SYS
22	VCC5V0_SYS	VCC5V0_SYS
23	GND	GND
24	GND	GND
25	GSENSOR_INT_H/IR_PWM2_M1	GSENSOR_INT_H/IR_PWM2_M1/GPIO2_B1
26	PWM7_M1/PHY_INT	PWM7_M1/PHY_INT/GPIO3_A0
27	PWM11_M1/LCD_PWREN_H/LED_EN	PWM11_M1/LCD_PWREN_H/LED_EN/GPIO3_A1
28	PWM5_M1/ICR_AIN/CIF_PDN	PWM5_M1/ICR_AIN/CIF_PDN//GPIO2_A6
29	PWM4_M1/ICR_BIN/MIPI_RX1_PDN	PWM4_M1/ICR_BIN/MIPI_RX1_PDN//GPIO2_A7
30	GND	GND

4.EVB Usage

4.1 EVB Power on/off and Standby

EVB power on and power off method is described as below:

1, Power on:

If using DC 12V for power supply, turn on the power switch, and then EVB will power on.

2, Power off:

Long press Power button for over 2s, and click power off on the display panel.

3, Abnormal power off:

(1) If using 1-cell Li-battery for power supply, in abnormal case, long press Power button for over 8s can force to power off, or press Reset button to reset EVB.

(2) If use DC 12V for power supply, in abnormal case, in addition to the above method, turn off the power switch can alsopower off the EVB.

4, Standby:

In desktop or application case, press the Power button, the system will enter standby mode. If without connecting an USB and no operation, the system will enter into deep sleep after a while.

4.2 USB Driver Installation

EVB needs to install USB driver before image flashing and ADB debugging. The driver tool path is: Open "DriverInstall.exe" in the directory of SDK\RKTools\windows\Release_DriverAssitant, click "driver install", and then waiting for"install driver successfully" prompting. If there is old driver installed, please click "driver uninstall", and re-install the driver.

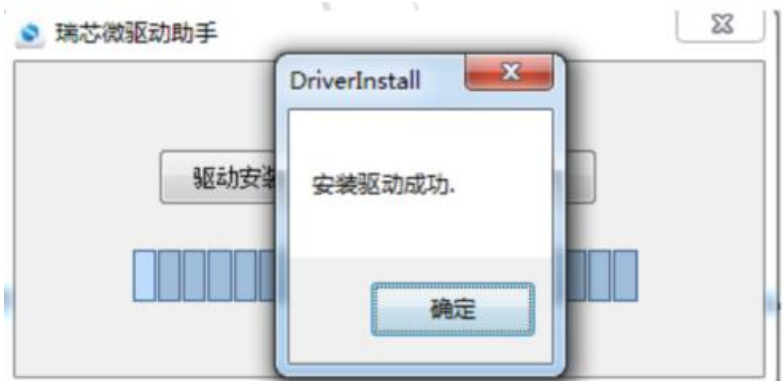


Figure 4-1 Driver install successfully

4.3 EVB Image Download

There are two ways for RV11XX EVB to download image.

4.3.1 MASKROM Download Mode

The basic principle is to short connect FLASH_D0 with GND before the system is power on, to make Flash fail to load, and then enter into MASKROM state. It is applicable for the case when download the wrong bootloader image so that the system cannot be power on normally.

The detailed steps are as below:

1、Connect USB to PC, press and hold the update button of the EVB.

2、Supply 12V for EVB, and turn on the switch. If it is already power on, please press the reset button.

3、Wait for a while, the development tool will display "find a MASKROM device".Note that in MASKROM mode the corresponding mini Loader should be selected for upgrading.

4、Select the corresponding image files.

5、Click execute to enter the upgrading state, there is the progress bar in the right box of the tool to display the download and verification status.

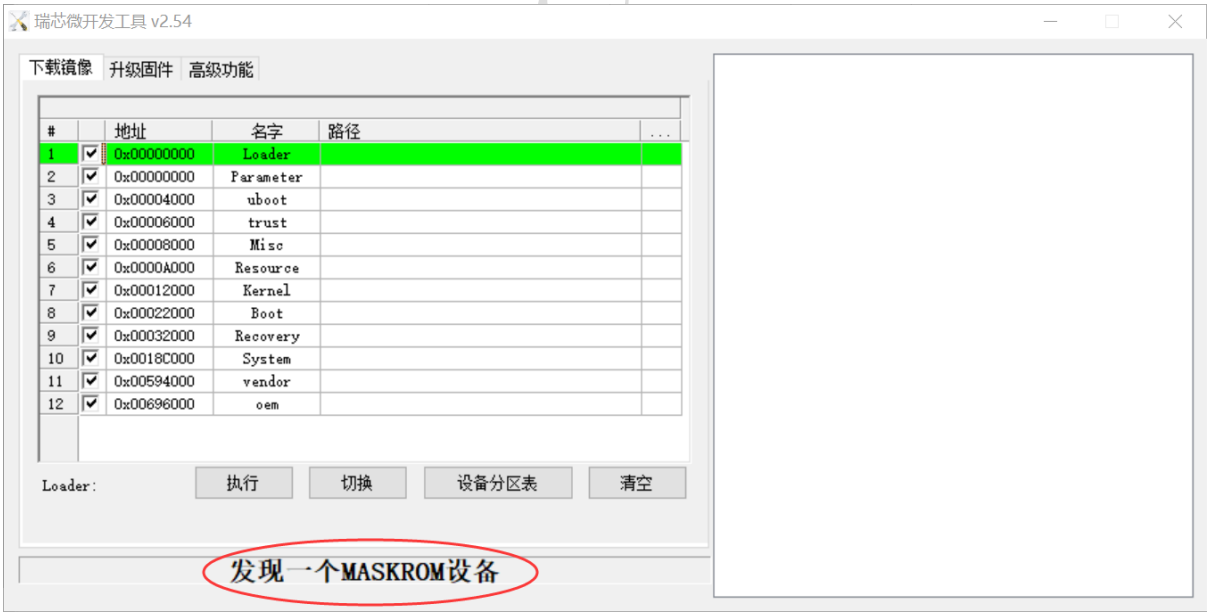


Figure 4-2 MASKROM download mode

4.3.2 Loader Download Mode

The basic principle is to ensure ADC2_KEY_IN is low level before the system is power on or reset, and the system will enter into recovery state after power on or reset. It is applicable for updating some part or the whole of the image under normal

conditions.

The detailed steps are as below:

1、Connect USB to PC, press and hold the Vol+/RECOVER button of the EVB.

2、Supply 12V for EVB, and turn on the switch. If it is already power on, please press the reset button.

3、Wait for a while, the development tool will display "find a Loader device". Note that in Loader mode there is no need to download the whole image, you can select the image file to be updated.

4、Select the corresponding image file.

5、Click execute to enter the upgrading state, there is the progress bar in the right box of the tool to display the download and verification status.

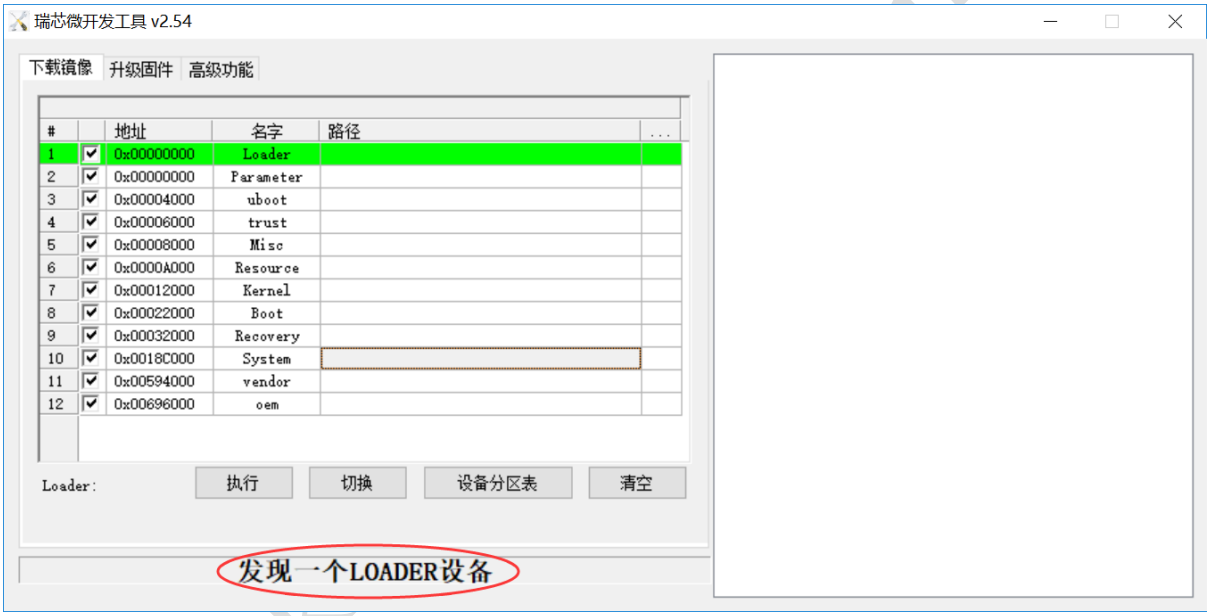


Figure 4-3 Loader download mode

4.4 Serial Port Debug

4.4.1 Connect Serial Port

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

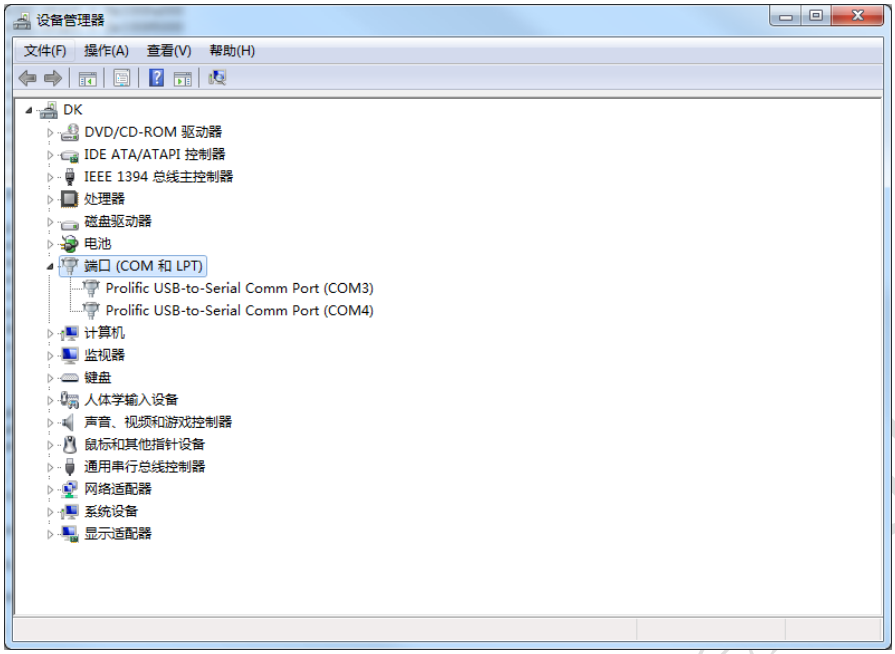


Figure 4-4 Obtain current COM port number

Open serial port tool "SecureCRT", click "quick connection" button.

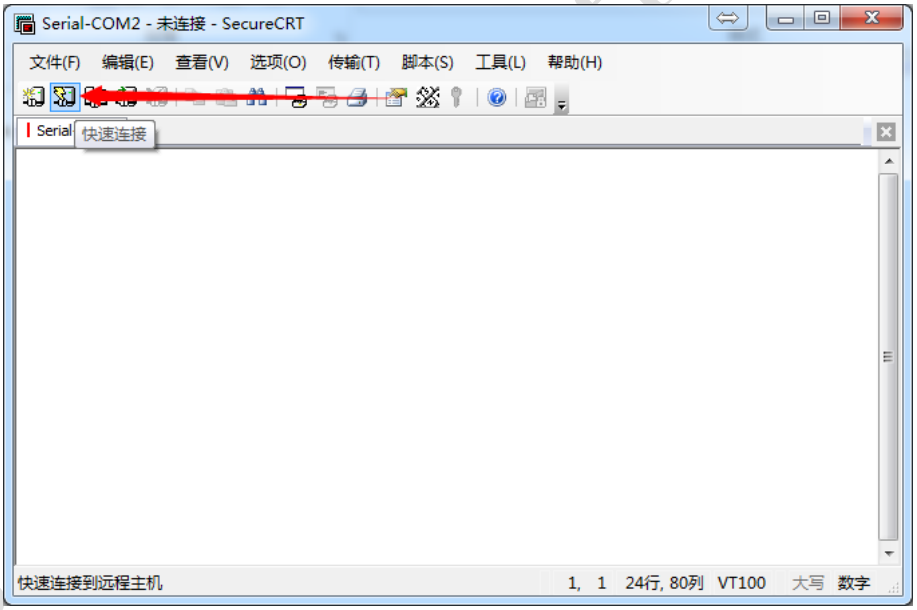


Figure 4-5 SecureCRT windows

Configure the serial port, the port selects the port number connected with the EVB, baud rate selects 1.5M, flow control RTS/CTS doesn't need to select.。

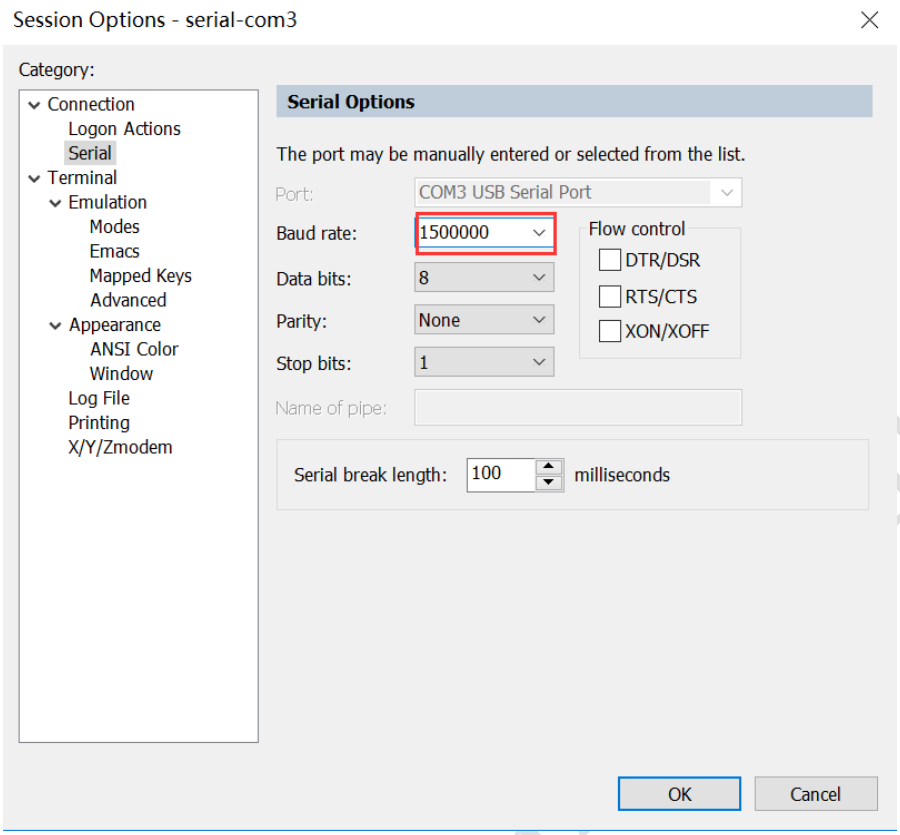


Figure 4-6 Configure serial port information

Click connection, and then it will connect the device normally. The configure session option make debug conveniently, click "Session Option" of the tool bar to save more log information if roll back buffer is set with bigger value.

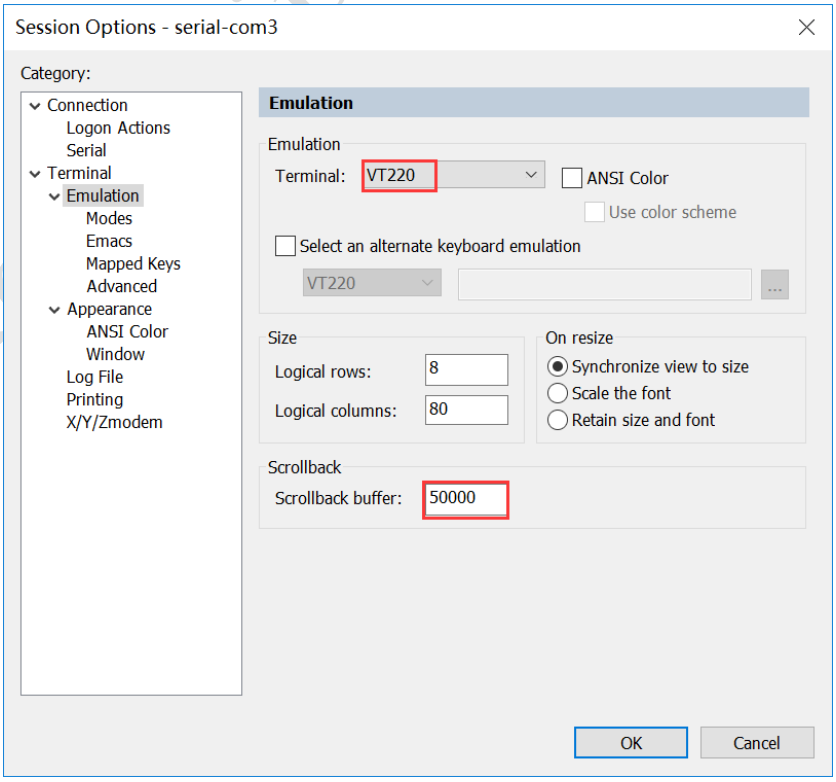


Figure 4-7 Configure serial port tool option

4.4.2 ADB Debug

1. Make sure the driver is installed successfully, and PC connects with USB port of the development board；

2. The EVB is power on, enter the system setting option, select “developer options”, and select “USB debugging”；

3. On the PC, click “start---run”, input “cmd”, enter the directory of adb.exe tool, input “adb devices”, ifyou can find the connected devices means connect normally；

4. Input “adb shell”, and enter ADB debug mode.

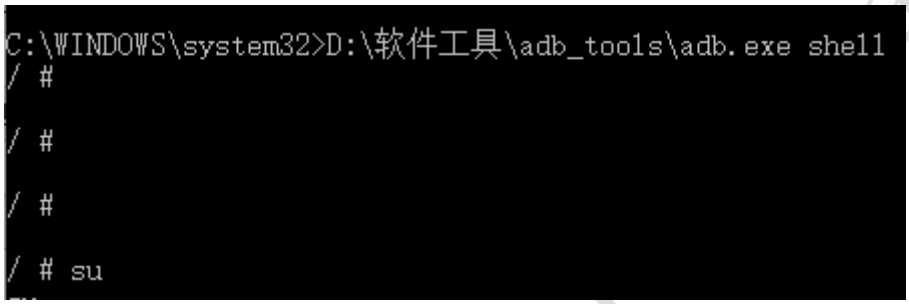


Figure 4-8 ADB connects normally

5.Notice

5.1 Notice

RV11XX EVB is suitable for lab or project development environment. Please read below notices before operation:

- It is not allow to hot-plug the screen interface and expansion board of the development board anyway.
- Before unpacking and installing the EVB board, please take the necessary anti-static measures to avoid the damage to the hardware of the EVB board caused by ESD;
- Please hold the edge of the EVB board, and do not touch the exposed metal part of the EVB board, so as to avoid the electrostatic damage to the components of the EVB board;
- Please place RV11XX EVB board on the dry layer to keep them away from heat source, electromagnetic interference source and radiation source, electromagnetic radiation sensitive equipment (such as medical equipment) and so on.