

FIBOCOM EVK-SC800 User Guide

Version: V1.0.3

Date: 2020-04-29



Applicability Type

No.	Model	Note
1	EVK-SC800-CN-00	NA

Copyright

Copyright©2020 Fibocom Wireless Inc. All rights reserved.

Without the prior written permission of the copyright holder, any company or individual is prohibited to excerpt, copy any part of or the entire document, or distribute the document in any form.

Notice

The document is subject to update from time to time owing to the product version upgrade or other reasons. Unless otherwise specified, the document only serves as the user guide. All the statements, information and suggestions contained in the document do not constitute any explicit or implicit guarantee.

Trademark



The trademark is registered and owned by Fibocom Wireless Inc.

Change History

Version	Author	Reviewer	Approver	Update at	Description
V1.0.3	Wang Peng	Tu Min	Chen Guojiang	2020-04-29	Added contents
V1.0.2	Gao Ying	Tu Min	Chen Guojiang	2019-12-28	Modified power key description
V1.0.1					Add ADP install method
V1.0.0					Initial version

Content

1	Foreword	6
2	Product Overview	7
2.1	Product Introduction	7
2.2	Product Specifications	7
2.3	Product Appearance	9
2.4	EVK Parts List	10
2.5	ADP Support List	11
3	Interface Specifications	12
3.1	Power Interfaces	12
3.1.1	DC Interface	12
3.1.2	Battery Interface	13
3.2	Battery	14
3.3	Key	14
3.4	Screen	15
3.5	TP	16
3.6	Camera	18
3.7	Audio	19
3.7.1	Speaker and Receiver	19
3.7.2	Headphone Jack	20
3.7.3	Microphones	22
3.8	USB Interfaces	22
3.9	UART	25
3.10	SPI Interface	26
3.11	SD Interface	27
3.12	SIM Interface	28
3.13	GPIO Interface	29
3.14	Sensors	32
3.15	ADP Interface	32
3.16	Antenna Interfaces	33
4	Directions for Use	34
4.1	Power On	34
4.2	Power Off	34
4.3	Using the Debugging Serial Port	35
4.4	Using the Download USB Port	36
5	FAQs	39

5.1	No Response After Pressing the Power Button.....	39
5.2	No Output on Screen.....	39
5.3	DC Power Overcurrent Protection Is Caused by the High Current at the Startup.....	39

1 Foreword

This document describes the product introduction and instructions of the development suite EVK-SC800. With assistance of this document, application developers can quickly become familiar with and use EVK-SC800.

2 Product Overview

2.1 Product Introduction

Fibocom EVK-SC800 development board integrates a rich set of external interfaces. Cooperate with Fibocom SC80X, SQ808X, SU80X series of intelligent modules ([see the ADP support list for details](#)), it can provide a complete development and debugging platform for application developers to develop, verify, and demonstrate products quickly.

2.2 Product Specifications

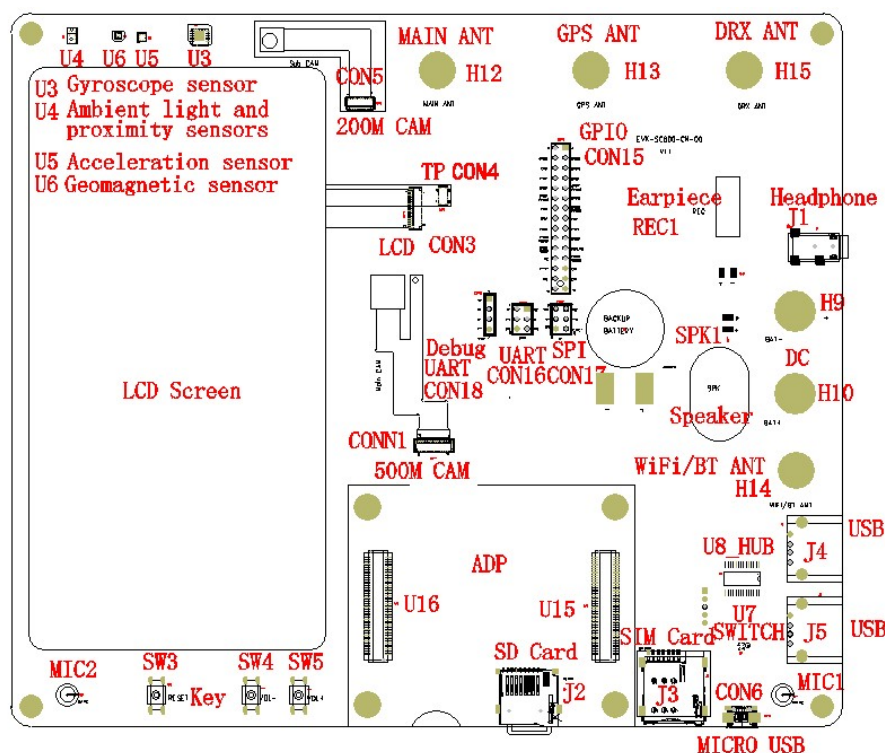


Figure 2-1 Board interfaces

Table 2-1 Product specifications

Product Specification		
Power supply features	Voltage range: 3.5-4.2V (The voltage range refers to the values specified in the installed ADP manual)	
	Recommended value: 3.8V	
	Maximum Power Current: 3A	
Interface	Power supply	Power terminal: BAT+(negative pole) BAT-(negative pole)

Product Specification		
features		Battery interface: 3.7V lithium battery interface 4400mAh built-in 10K NTC resistance
	Camera	Rear camera 5M 2lane MIPI CSI interface (with flash)
		Front camera 2M 1lane MIPI CSI interface
	Screen	5.5 inch 720P resolution 4 MIPI DSI interface LCD screen
	TP	Capacitive touch screen interface
	Audio	Audio input: MIC1 (main MIC) MIC2
		Audio output: receiver, speaker (8Ω 1.2W), and headphone jack (MIC is supported)
	USB	2 USB2.0 TYPE_A_HOST interface
		1 USB2.0 MICRO USB DEVICE interface (download and charging)
	UART	Debugging serial port Port voltage: 3.3V
		Four-wire serial port with flow control Port voltage: 3.3V
	SPI	Standard SPI interface Interface voltage: 3.3V
	USIM	1 SIM card interface, compatible with 3.0 or 1.8V level, support hot plug
	SD Card	1 SDIO3.0 interface, support hot plug
	Sensor	Ambient light and proximity sensors Geomagnetic sensor Gyroscope sensor
	Key	Reset key Volume+ key Volume- key
	Antenna	MAIN Antenna
		DRX Antenna
		GNSS Antenna
		WIFI/BT antenna
Environmental characteristics	Operating temperature	-25℃ to 75℃ (Non-battery power)

Product Specification		
	Storage temperature	-45℃ to 90℃ (Non-battery power)
Structural characteristics	Dimension	180mm×210mm

2.3 Product Appearance

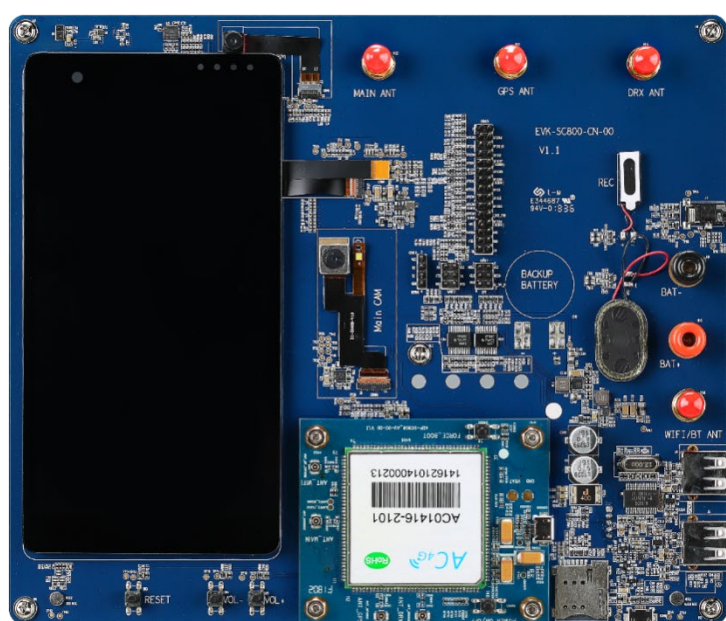


Figure 2-2 Front view

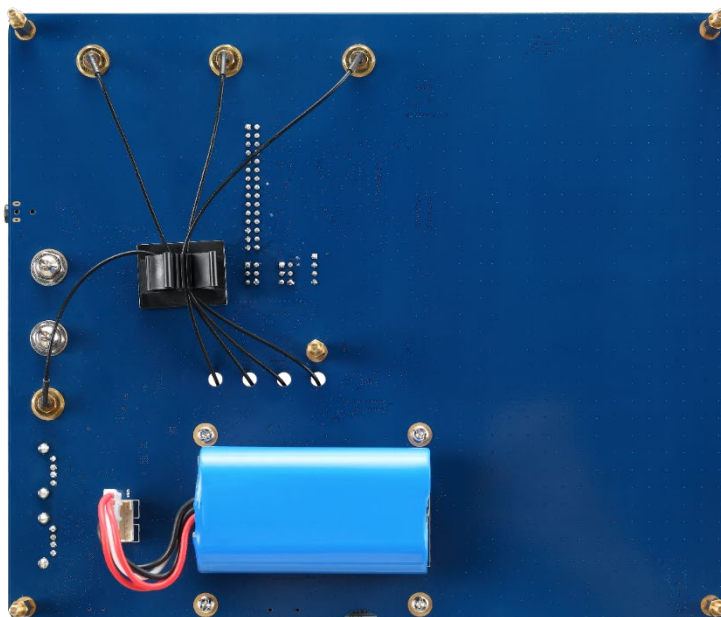


Figure 2-3 Rear view

2.4 EVK Parts List

Table 2-2 Parts list

Name	Specification	Quantity
Battery	3.7V lithium battery interface 4400mAh built-in 10K NTC resistance	1
USB cable	Micro USB cable	1
Antenna	MAIN antenna	1
	DRX antenna	1
	GNSS antenna	1
	WIFI/BT antenna	1

2.5 ADP Support List

Table 2-3 ADP support list

Platform	Model	Note
MSM8909	ADP-SC800 series	NA
	ADP-SC802 series	NA
	ADP-SC806 series	NA
	ADP-SC808 series	NA
QCM2150	ADP-SQ806 series	NA
	ADP-SQ808 series	NA
SL8541E	ADP-SU806 series	NA
	ADP-SU808 series	NA

3 Interface Specifications

3.1 Power Interfaces

EVK-SC800 supports two power supply modes: power supply interface (H10, H9) and battery supply interface (CON14).

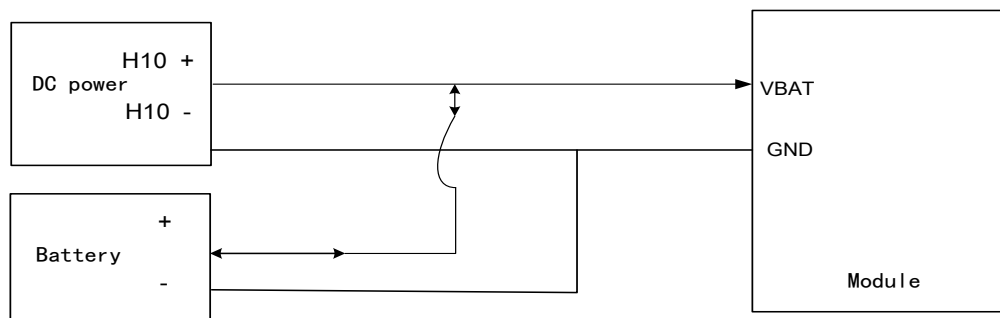


Figure 3-1 Power supply mode

3.1.1 DC Interface

When EVK-SC800 is powered by DC power supply, the positive terminal of the power supply is connected to BAT+ (H10), while the negative terminal of the power supply is connected to BAT- (H9). Power supply voltage ranges from 3.5V to 4.2V (refer to the standard value in the manual of installed ADP). 3.8V is recommended.



Note:

The current output capacity of the DC power supply should be greater than 3A. Disconnect the battery when using the DC power supply to prevent damage to the battery.



Figure 3-2 DC interface

3.1.2 Battery Interface

When EVK-SC800 is powered by battery, the battery should be inserted into the battery connector (CON14). The battery interface is shown as follows:

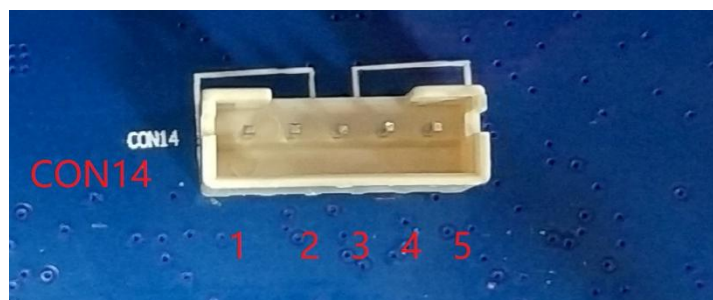


Figure 3-2 Battery interface

Table 3-1 Battery interface (CON14)

Pin	Description	Note
1	VBAT	VBAT
2	VBAT	VBAT
3	VBAT_CON_TEMP	Battery temperature detection pin
4	GND	GND
5	GND	GND

3.2 Battery

EVK-SC800 is equipped with a 4400 mAh (The actual capacity is subject to the actual goods received) lithium battery with built-in 10 K NTC resistance, which is composed of two 3.7 to 4.2V lithium batteries in parallel. The double-sided adhesive is stuck on the back of the development board near the battery interface. Please disconnect the DC power supply when using it, and then insert the battery into the battery connector (CON14). After the battery is used up, it should be charged in time. If the installed module supports the charging function, you can use the Micro USB cable to connect the CON6 on the development board to charge when it is started or shut down (If you are not sure whether the module installed supports the charging function, you can query the module manual.)



Figure 3-3 Battery

Table 3-2 Battery specifications

Item	Specification	Note
Capacity	4400mAh	The actual capacity is subject to the actual goods received
Charge current	MAX 1.4A	
Discharge current	MAX 5A	
Charge cut-off voltage	4.2V	
Charge temperature range	0°C - 45°C	
Discharge temperature range	0°C - 60°C	

3.3 Key

EVK-SC800 provides three buttons (SW3, SW4, SW5), the ON/OFF button and the mandatory download button are located on ADP.



Note:

Reproduction forbidden without Fibocom Wireless Inc. written authorization - All Rights Reserved.

The duration of each ADP button and the function of each ADP button shall be determined by consulting the specific module manual.

- ON/OFF button: the product can be started, shut down, slept and waked up by this button.
 - Press 2 seconds under shutdown state to boot the module.
 - Press 0.1 to 0.5 seconds to wake up the module after starting the sleep state.
 - After the module is started and waked up, press 0.1 to 0.5 seconds, and the module will enter sleep mode.
 - After the module is started and waked up, press 0.6 to 2 seconds, the option box will be displayed, please follow the prompt.
 - After the module is started and waked up, press 10 to 12 seconds to shut down or restart it forcibly according to software settings.
- Mandatory download button: when downloading programs, you need to press this button and then the power button to display the download port.
- Reset button (SW3): reset the module.
- Volume reduction button (SW4): turn down the volume.
- Volume button (SW5): increase the volume.

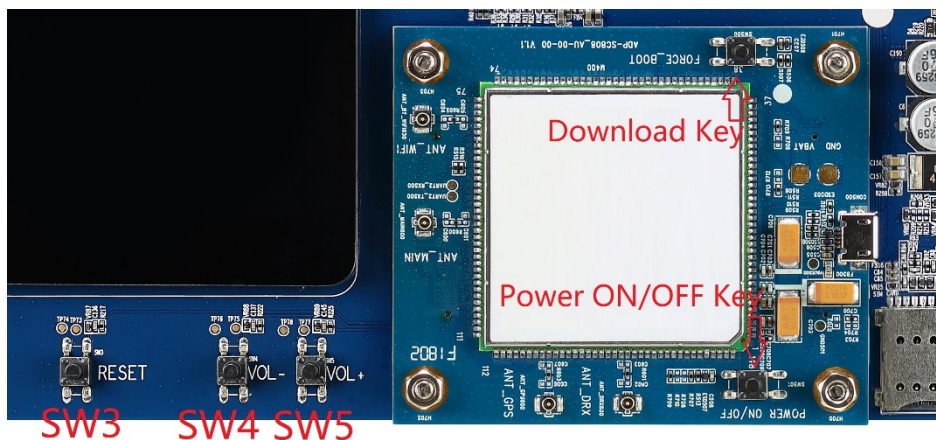


Figure 3-4 Buttons

3.4 Screen

EVK-SC800 is equipped with a 5.5-inch LCD screen. It supports 4 groups of high-speed differential data transmission. The screen resolution ratio is 720×(RGB) 1280, and the display color is 16.7 M. The specific reference circuit is as follows:

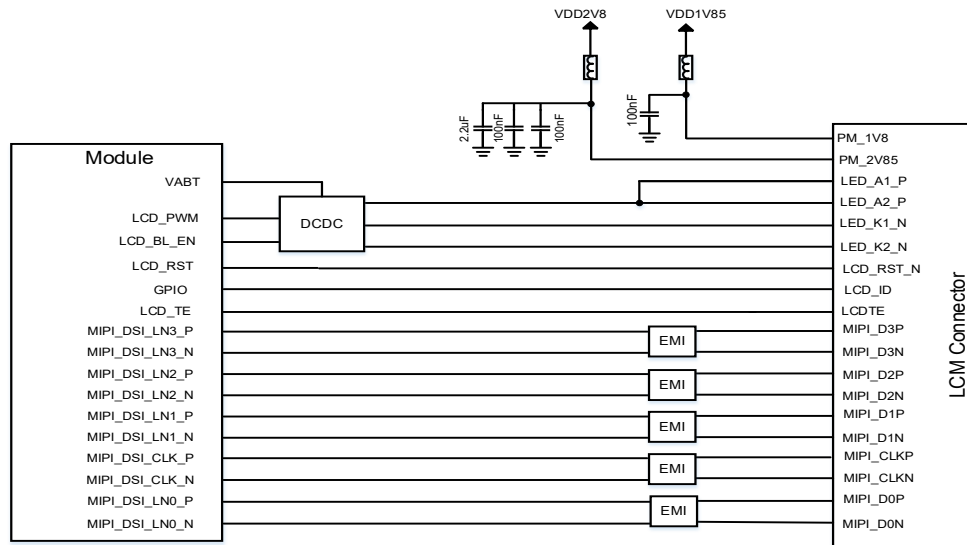


Figure 3-5 LCD reference circuit

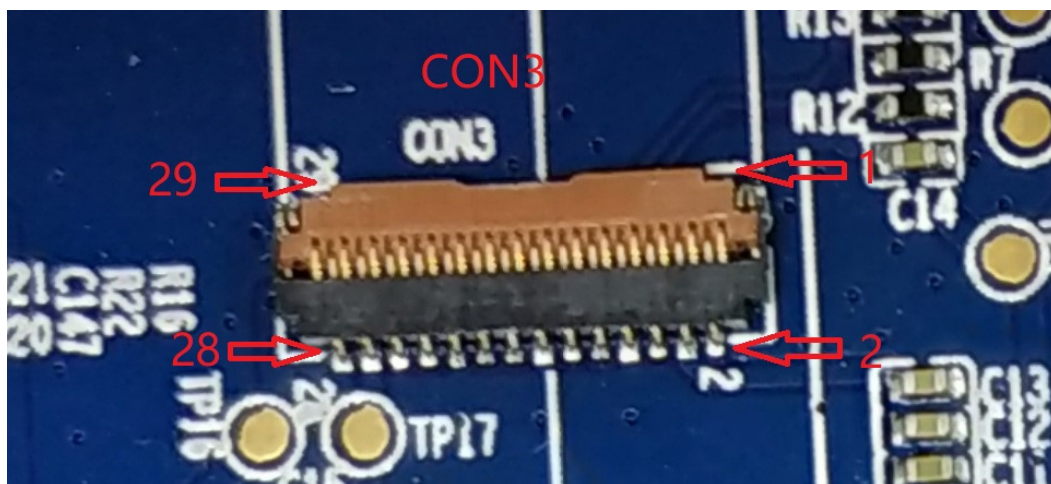


Figure 3-6 Screen interfaces



Note:

Please refer to the schematic diagram of the development board for the specific definition of PIN.

3.5 TP

The touch screen (TP) of EVK-SC800 is a multi-touch capacitive screen with I2C interface.

The specific reference circuit is as follows:

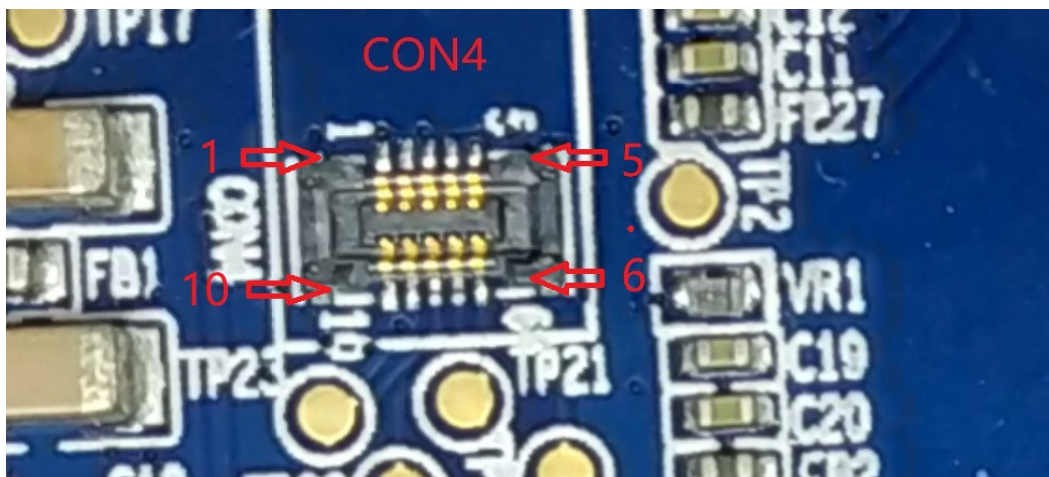


Figure 3-7 TP Interfaces

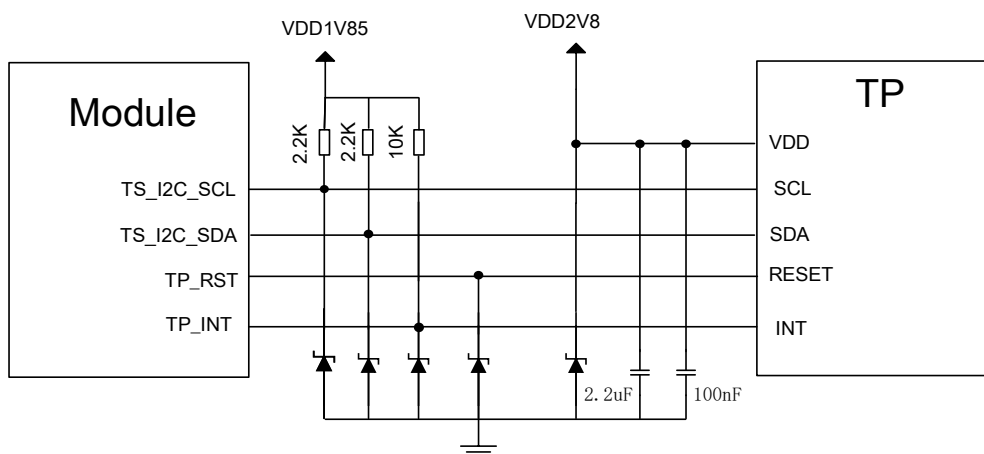


Figure 3-8 TP Reference circuit

Table 3-3 TP interfaces (CON4)

Pin	Description	Note
1	GND	GND
2	GND	GND
3	GND	GND
4	VDD_2V85_L17	TP power 2.85V
5	TP_RST_N	TP reset
6	I2C_SCL_TP	TP I2C clock
7	I2C_SDA_TP	TP I2C data
8	TP_INT	TP interrupt
9	GND	GND
10	GND	GND

3.6 Camera

The EVK-SC800 uses a dual camera based on the MIPI_CSI standard. The main camera is a 5 mega-pixel CMOS camera with 2 sets of MIPI_CSI high-speed differential data lines. The main camera supports flash function. The secondary camera is a 2 mega-pixel CMOS camera using a set of MIPI_CSI high-speed differential data lines. The specific reference circuit is as follows:

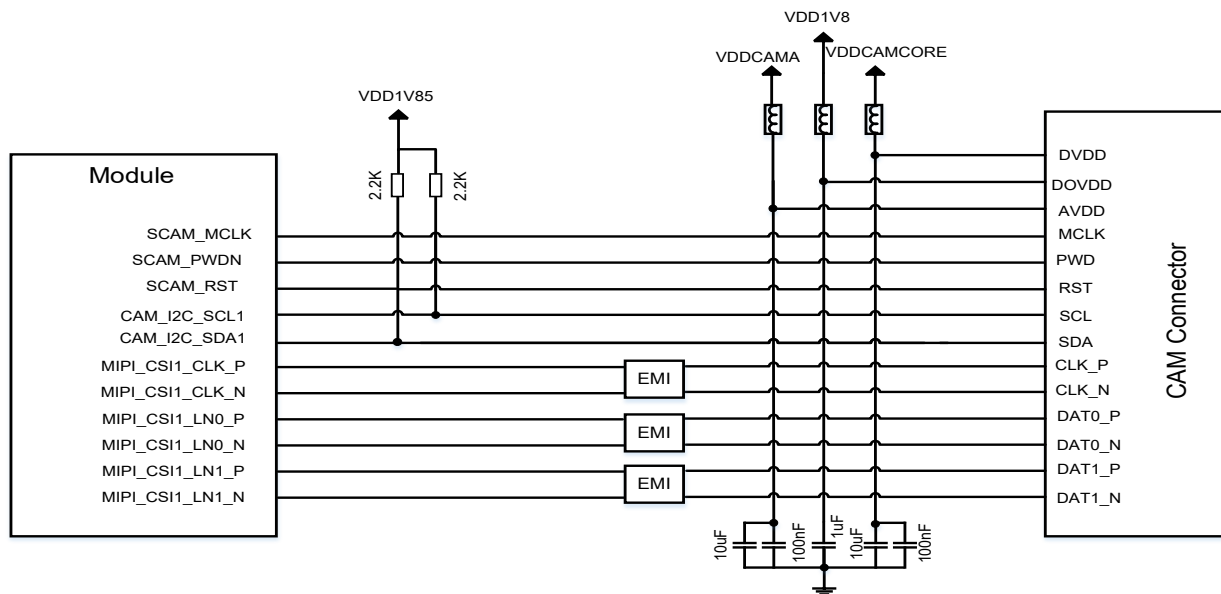


Figure 3-9 5 mega-pixel camera reference circuit

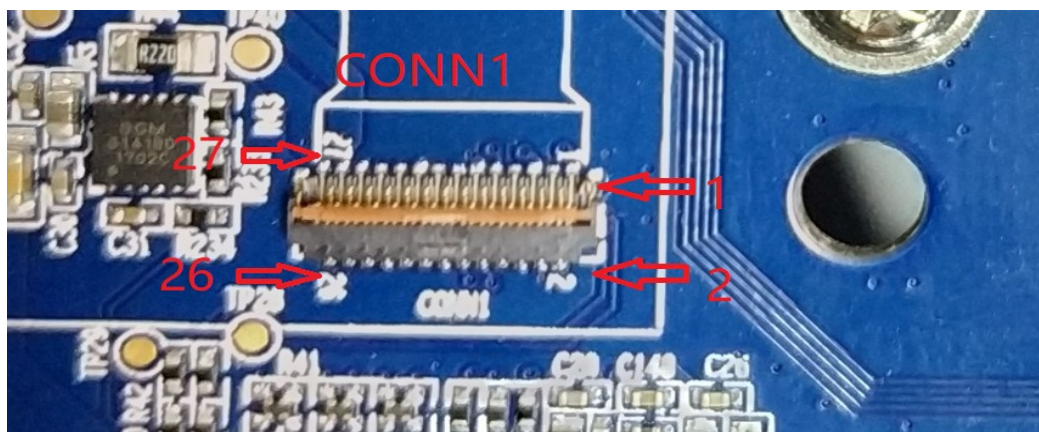


Figure 3-10 5 mega-pixel camera interfaces



Note:

Please refer to the schematic diagram of the development board for the specific definition of the PIN.

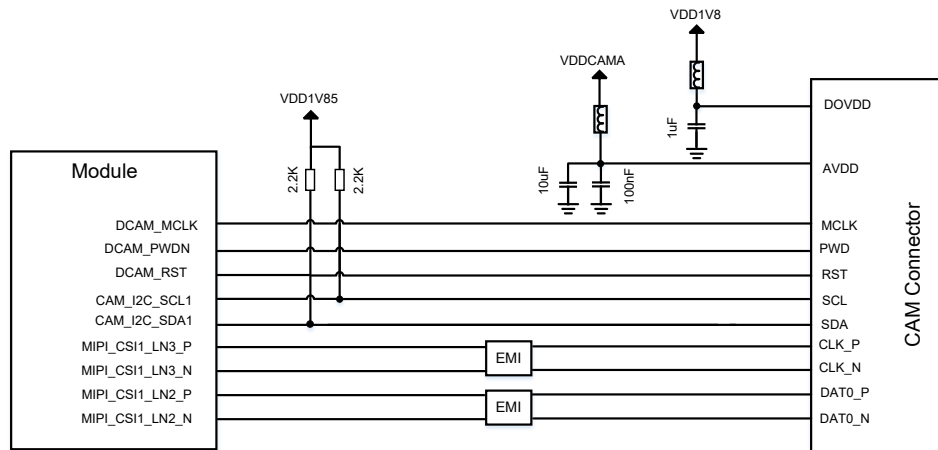


Figure 3-11 2 mega-pixel camera reference circuit

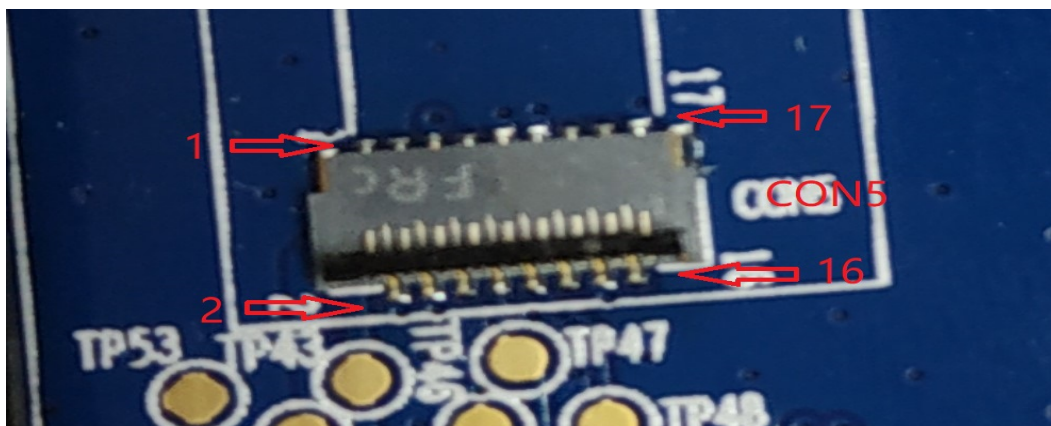


Figure 3-12 2 mega-pixel camera interfaces



Note:

Please refer to the schematic diagram of the development board for the specific definition of the PIN.

3.7 Audio

EVK-SC800 provides rich audio input and output interface, speaker interface SPK1, receiver interface REC1, headphone interface J1, and microphone interface MIC1 and MIC2.

3.7.1 Speaker and Receiver

The 8Ω 1.2w speaker that matched with the development board has been welded to the speaker interface (SPK1).

The receiver that matched with the development board has been welded on the receiver interface (REC1).

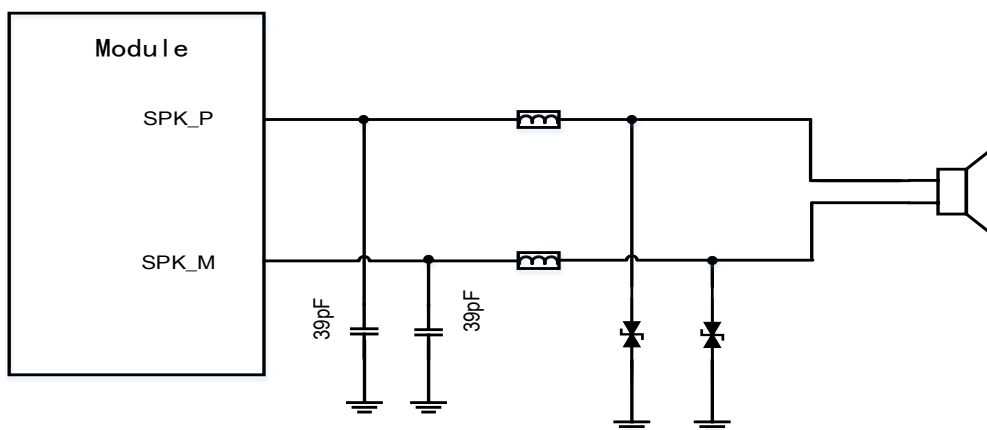


Figure 3-13 Speaker reference circuit

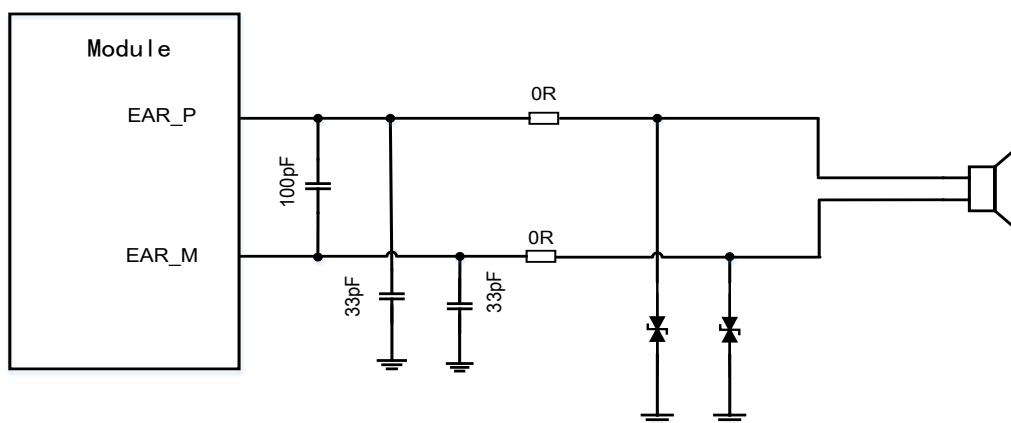


Figure 3-14 Receiver reference circuit

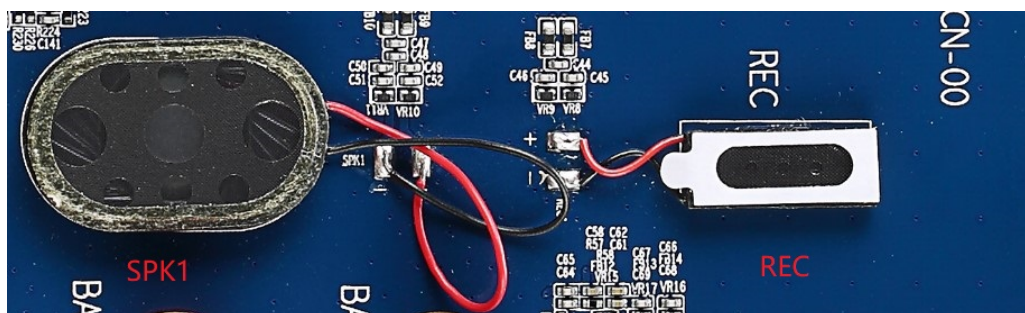


Figure 3-15 Speaker and receiver interface

3.7.2 Headphone Jack

The reference circuit of the headphone jack (J1) is as follows:

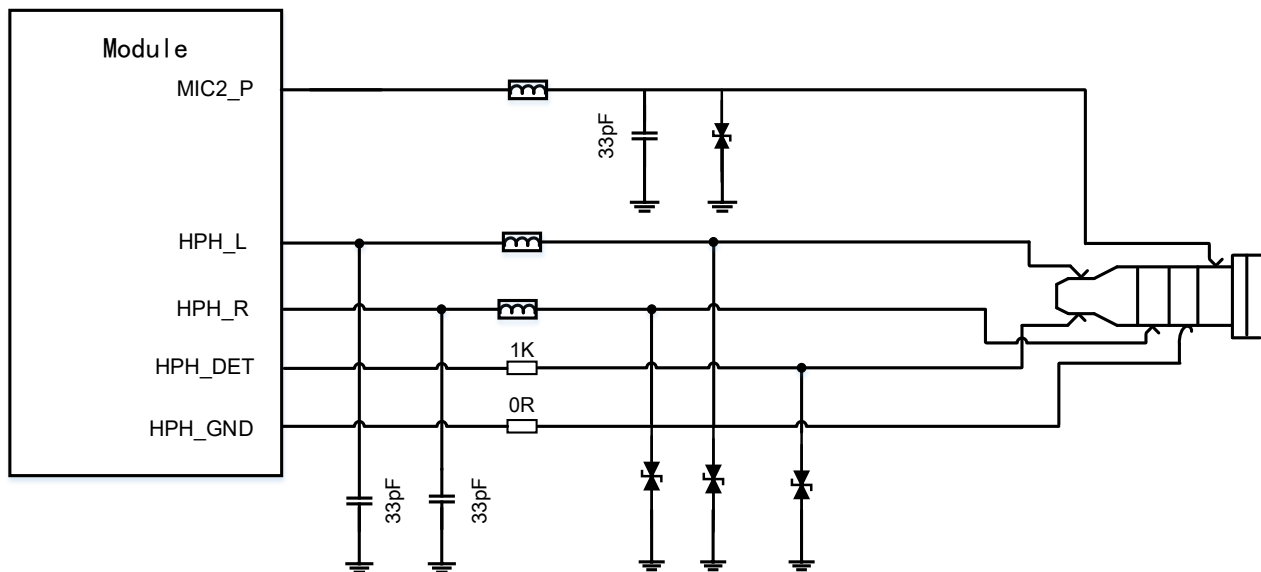


Figure 3-16 Headphone reference circuit

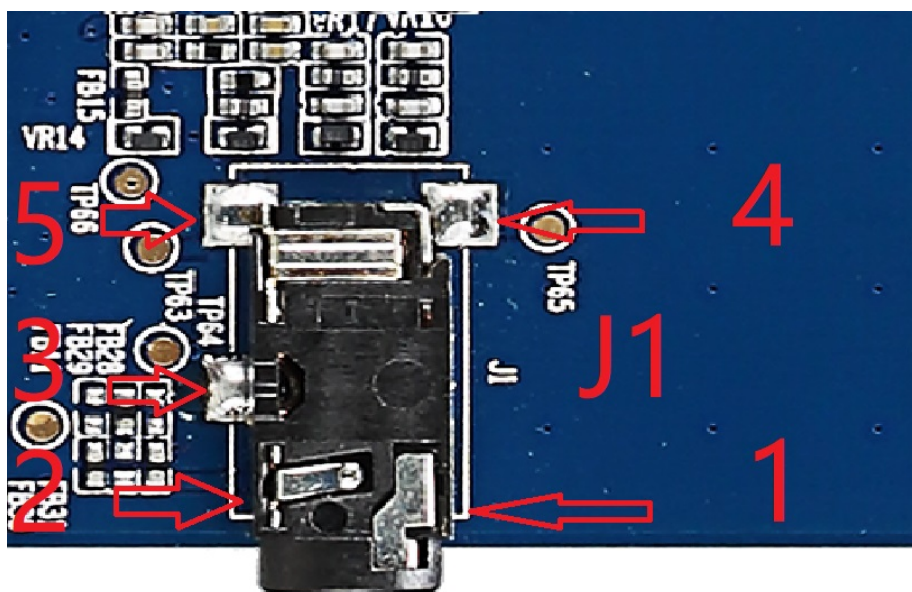


Figure 3-17 Headphone jack

Table 3-4 Headphone jack (J1)

Pin	Description	Note
1	MIC2_P	MIC single-terminal input for headset
2	GND	GND
3	HPH_R	Earphone right channel output
4	HPH_L	Earphone left channel output
5	HPH_DET	The headset detects signal input

3.7.3 Microphones

The EVK-SC800 development board provides two already welded microphones. The main MIC (MIC1) and the secondary MIC (MIC2).

The specific reference circuit is as follows:

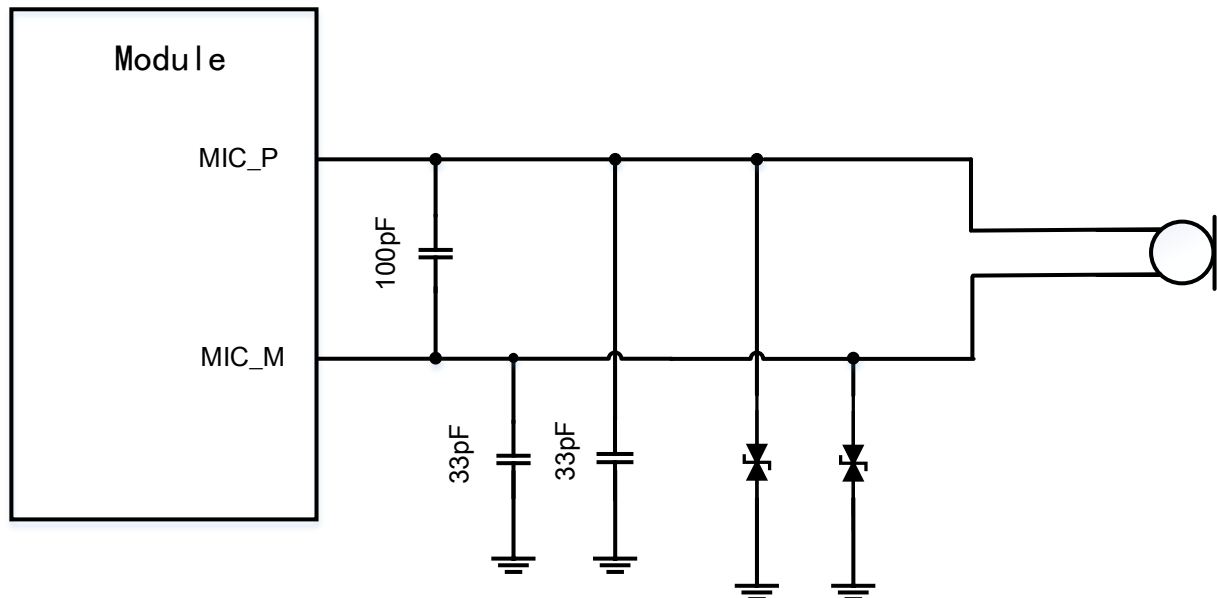


Figure 3-18 MIC reference circuit



Figure 3-19 MICs

3.8 USB Interfaces

EVK-SC800 provides three USB 2.0 interfaces, one Micro USB 2.0 interface (CON6), and two Type A USB 2.0 interfaces (J4 and J5). The CON6 as the default interface to download, and the J4 and J5 interfaces can only work in HOST mode. The J4 and J5 interfaces are extended by the USB HUB. The USB HUB and CON6 share the unique USB channel through the USB switch IC. By default, the J4 and J5 interfaces are enabled, and CON6 is not available. When CON6 is connected to PC with micro USB cable, the USB switch IC will switch the USB channel to CON6 through detection. In this way, CON6 is available, J4 and

Reproduction forbidden without Fibocom Wireless Inc. written authorization - All Rights Reserved.

J5 are not available.



Note:

Once the ADP is connected to the EVK, the USB interface on the ADP cannot be used, only the USB interface on the EVK can be used.

The switch relationship is shown as follows:

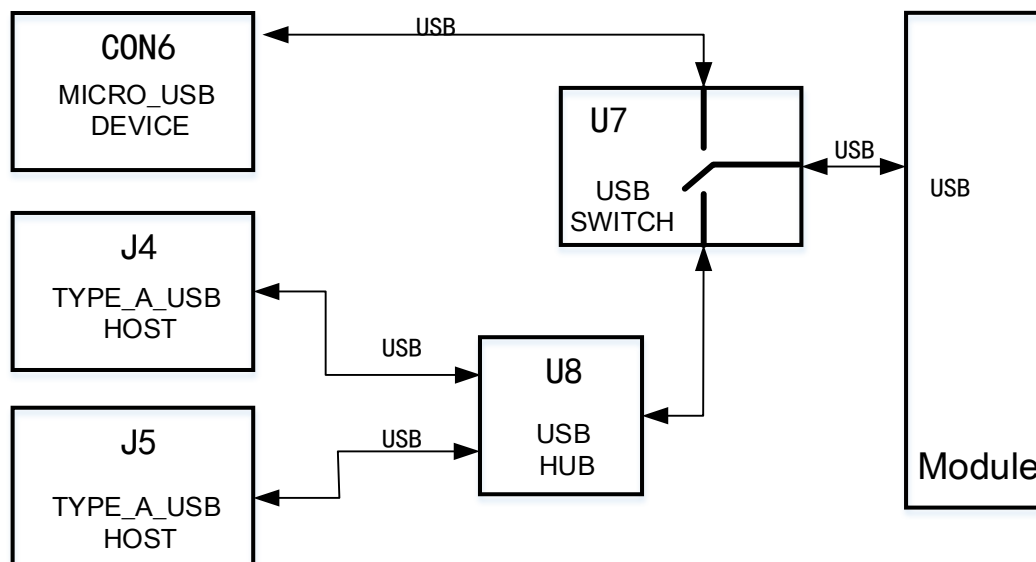


Figure 3-20 USB switch relationship

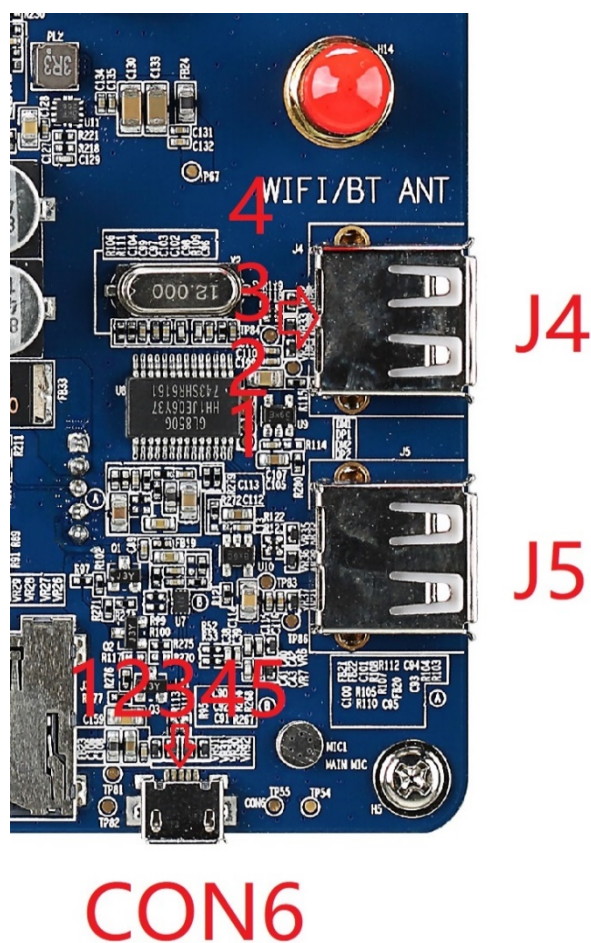


Figure 3-21 USB interfaces

Table 3-5 Micro USB interface (CON6)

Pin	Description	Note
1	USB_VBUS	5V input, module USB_VBUS power supply, USB device insertion detection
2	USB_DM	USB DM
3	USB_DP	USB DP
4	USB_ID	NC
5	GND	USB GND

Table 3-6 USB interface (J4 and J5)

Pin	Description	Note
1	USB_VBUS	5V output
2	USB_DM	USB DM
3	USB_DP	USB DP
4	GND	USB GND

3.9 UART

EVK-SC800 provides 2 UART serial ports, CON18 is a debug serial port, which can output LOG information for debugging, and CON16 is a serial port with flow control function, which can be used to connect external devices. There is a 3.3V or 1.8V level conversion chip between the two serial ports and the module, and the serial port level is 3.3V.

The following figure shows the schematic diagram of level conversion:

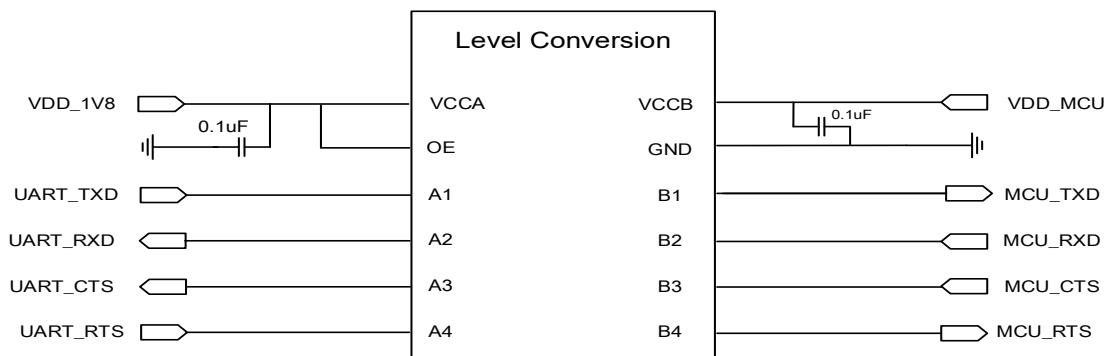


Figure 3-23 UART level conversion

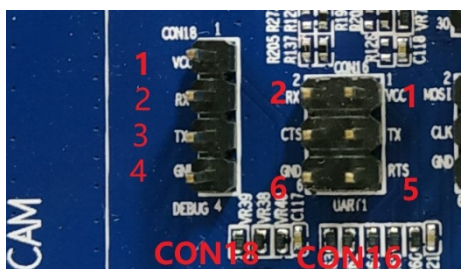


Figure 3-22 UART interfaces

Table 3-7 Debug UART (CON18)

Pin	Description	Note
1	3.3V power	3.3V power output
2	RX	Data reception
3	TX	Data sending
4	GND	GND

Table 3-8 With flow control UART (CON16)

Pin	Description	Note
1	3.3V power	3.3V power output
2	RX	Data reception
3	TX	Data sending
4	CTS	Clear to send
5	RTS	Request to send
6	GND	GND

3.10 SPI Interface

EVK-SC800 provides an SPI interface (CON17) with a 3.3V or 1.8V level conversion chip between the serial port and the module. The interface level is 3.3V.

The following figure shows the schematic diagram of level conversion:

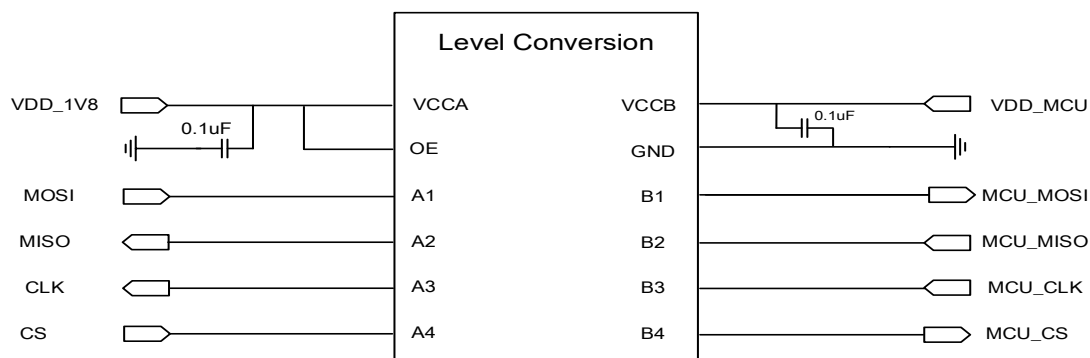


Figure 3-24 SPI level conversion

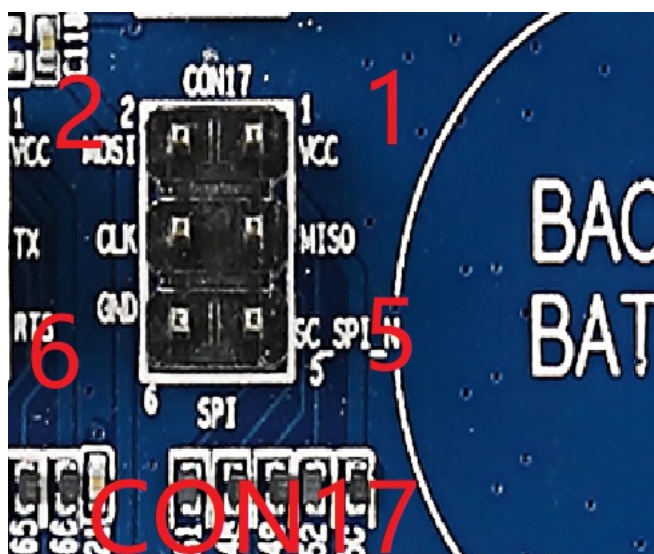


Figure 3-25 SPI interface

Table 3-9 SPI interface (CON17)

Pin	Description	Note
1	3.3V power	3.3V power output
2	MOSI	SPI MOSI
3	MISO	SPI MISO
4	CLK	SPI CLOCK
5	CS	SPI chip selection
6	GND	GND

3.11 SD Interface

EVK-SC800 provides an SD card interface (J2), which support 32GB capacity and hot plugging function.

The circuit diagram is as follows:

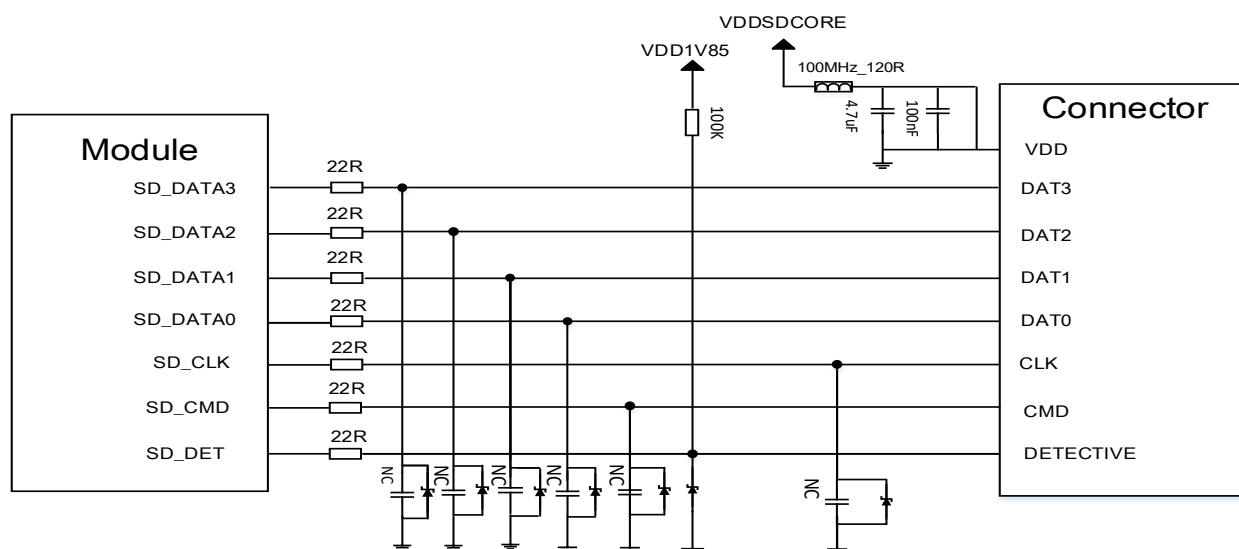


Figure 3-26 SD card reference circuit

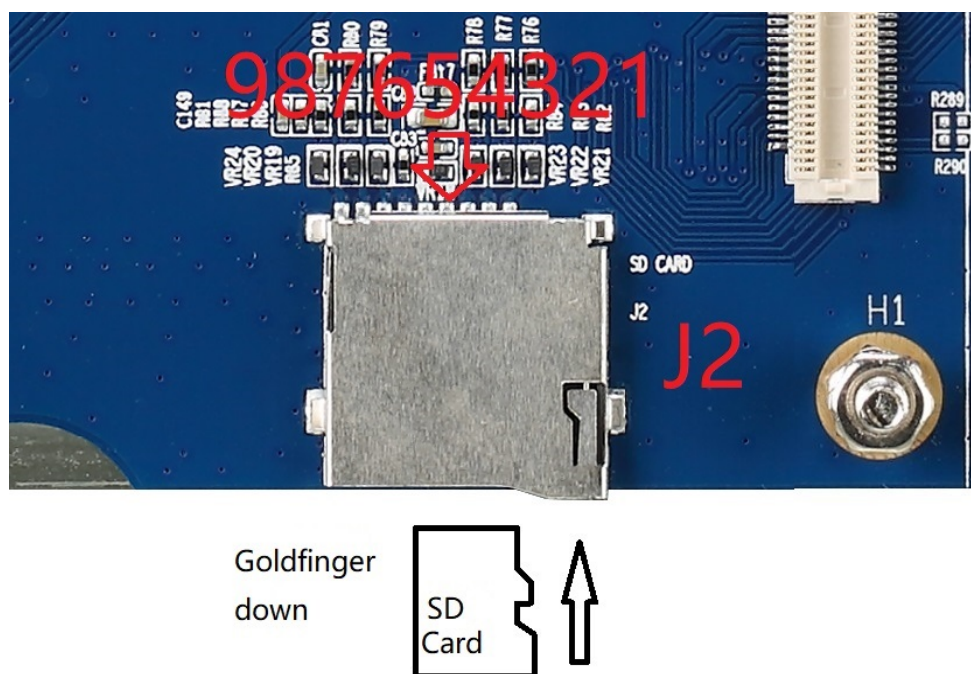


Figure 3-27 SD card interface

Table 3-10 SD Card interface (J2)

Pin	Description	Note
1	SD_D2	SD data
2	SD_D3	SD data
3	SD_CMD	SD command
4	VDD_SD_L11	SD power
5	SD_CLK	SD clock
6	GND	GND
7	SD_D0	SD data
8	SD_D1	SD data
9	SD_DET	SD detection

3.12 SIM Interface

The EVK-SC800 development board provides a micro SIM card interface (J3), which is SIM card 2 by default and supports 1.8V or 3V SIM card. (Temporarily, this function is disabled, supporting software is required). The another micro SIM card is the SIM card 1 by default, which located on the ADP board and is enabled by default.

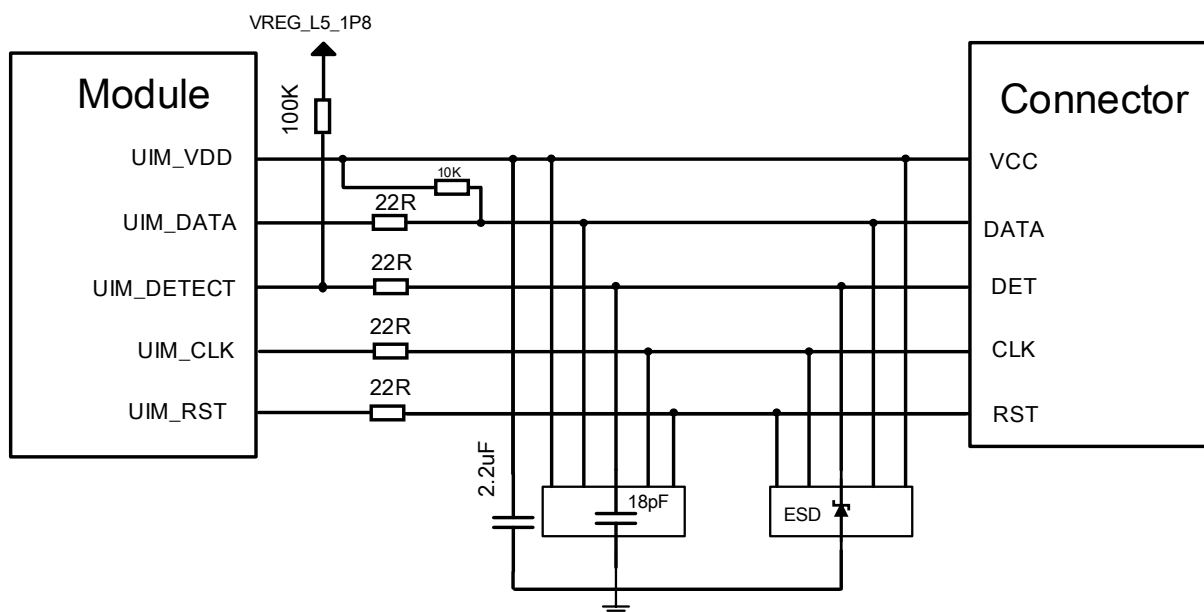


Figure 3-28 SIM reference circuit

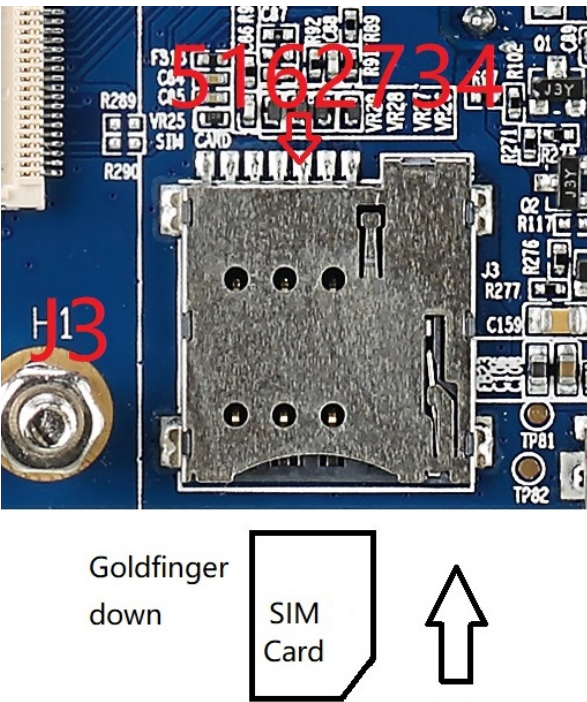


Figure 3-29 SIM card interface

Table 3-21 SIM card interface (J3)

Pin	Description	Note
1	VDD_ USIM2_L15	USIM2 Power, 1.8V or 2.95V
2	USIM2_RST	USIM2 reset
3	USIM2_CLK	USIM2 clock
4	USIM2_DET	USIM2 detection
5	GND	GND
6	NC	NC
7	USIM2_DIO	USIM2 data

3.13 GPIO Interface

The EVK-SC800 development board provides multichannel GPIOs for users. Please note that the voltage of all GPIOs is 1.8V.



Note:

For details about GPIO corresponding module pin and pin function, refer to the ADP schematic and module manual.

The physical drawing is as follows:

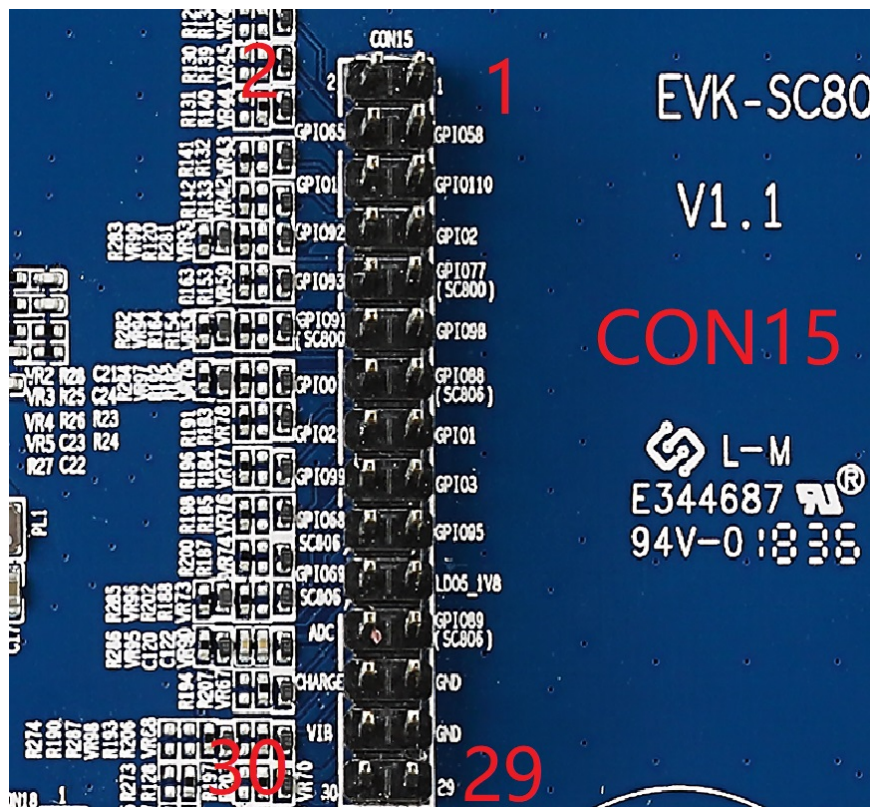


Figure 3-30 GPIO interface

Table 3-3 GPIO interface (CON15)

Pin	Description	Note
1	GND	GND
2	NC	NC
3	RESERVED	RESERVED
4	RESERVED	RESERVED
5	RESERVED	RESERVED
6	PMU_GPIO1	GPIO, power domain 1.2/1.8V adjustable
7	PMU_GPIO2	GPIO, power domain 1.2/1.8V adjustable
8	GPIO_92	GPIO, power domain 1.8V support interrupt
9	NC	NC
10	GPIO_93	GPIO, power domain 1.8V
11	GPIO_98	GPIO, power domain 1.8V support interrupt
12	NC	NC
13	NC	NC
14	GPIO_0	GPIO, power domain 1.8V
15	GPIO_1	GPIO, power domain 1.8V
16	GPIO_2	GPIO, power domain 1.8V
17	GPIO_3	GPIO, power domain 1.8V
18	GPIO_99	GPIO, power domain 1.8V
19	GPIO_95	GPIO, power domain 1.8V support interrupt
20	GPIO_68	GPIO, power domain 1.8V
21	NC	NC
22	GPIO_69	GPIO, power domain 1.8V
23	GPIO_89	GPIO, power domain 1.8V
24	ADC	The input voltage range is 0.1 to 4.5V
25	GND	GND
26	LED_CHARGE_N	Charging status indicator pin, connect the negative pole of the indicator light
27	GND	GND
28	VIB_DRV_N	The driving pin of the motor, connected to the negative pole of the motor
29	GND	GND
30	NC	NC

3.14 Sensors

The EVK-SC800 development board integrates a variety of sensors, using I2C interface.

- Ambient light and proximity sensors (U4)
- Geomagnetic sensor (U6)
- Gyroscope sensor (U3)
- Acceleration sensor (U5) no patch.

The following figure shows the sensors:

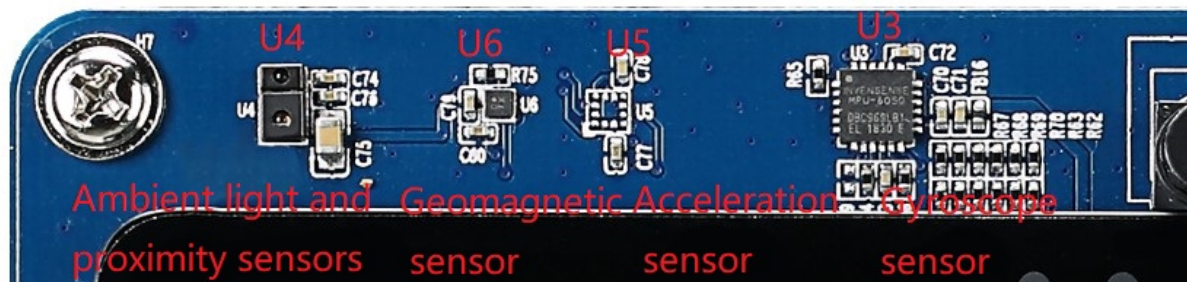


Figure 3-31 Onboard sensors

3.15 ADP Interface

EVK-SC800 and ADP are connected by two 100 pin board-to-board connectors. Pay special attention to the white error-proof mark on ADP when connecting ADP, align the ADP screw hole with the development board screw column, and then press the ADP to the board-to board connector of the development board to ensure that the U15 and U16 are in good contact.

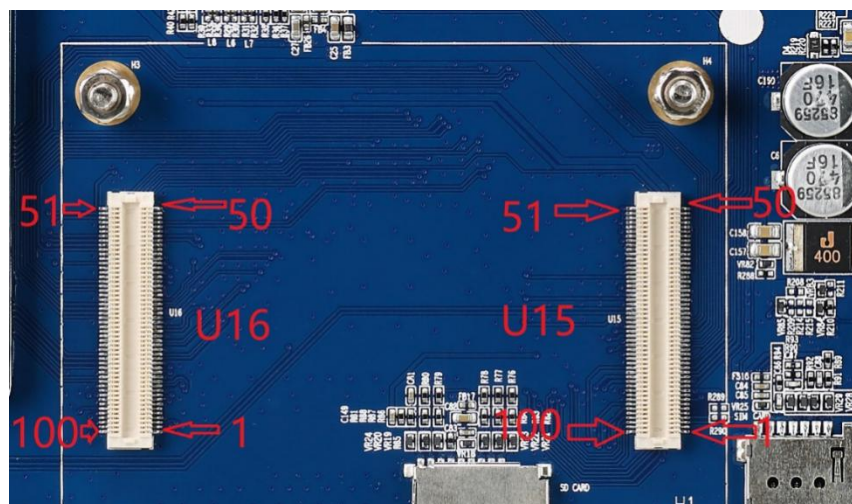


Figure 3-32 ADP interface



Note:

Please refer to the development board schematic for the specific PIN definition.

3.16 Antenna Interfaces

EVK-SC800 provides four antenna interfaces:

- MAIN Antenna: MAIN_ANT(H12)
- DRX Antenna: DRX_ANT (H15)
- WIFI/BT Antenna: WIFI/BT_ANT(H14)
- GNSS Antenna: GPS_ANT(H13)

The following figure shows the physical drawing:

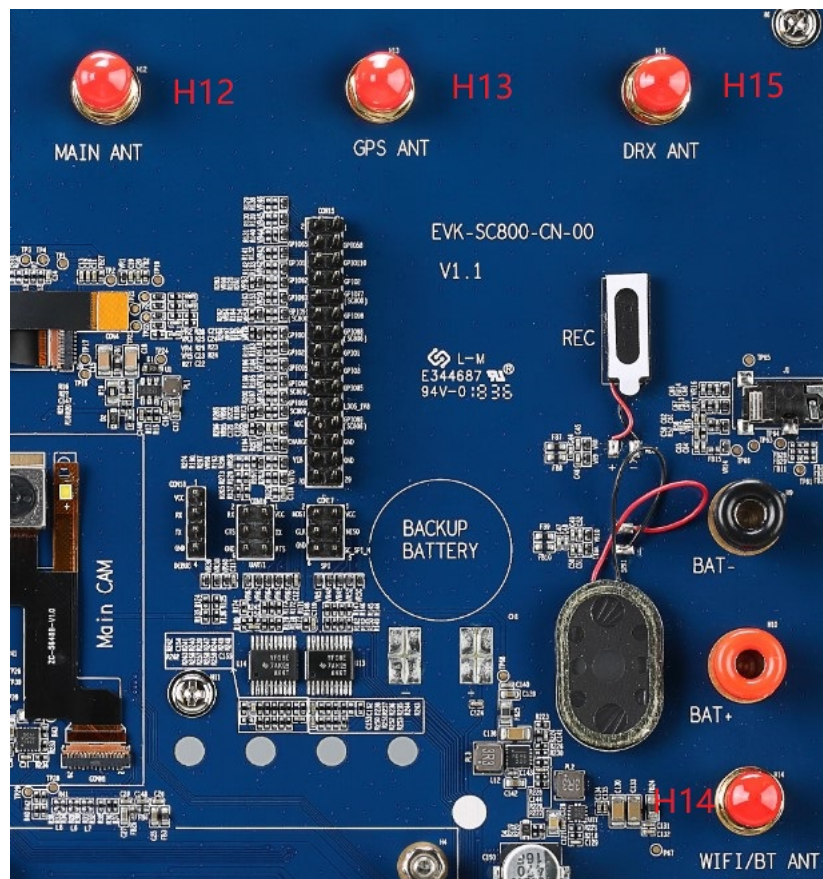


Figure 3-33 Antenna interfaces

4 Directions for Use

EVK-SC800 basic operations include: boot, shutdown, debugging serial port use, download USB port use, and firmware update operations. The following will explain in details.

4.1 Power On

1. Install the ADP on the EVK-SC800 development board in a correct direction and keep the board-to-board connector in good contact.
2. Connect the battery (voltage greater than 3.5V) or the DC power supply (3.8V and 3A) to the specified power supply interface of the development board
3. In the shutdown state, long press the switch button on the ADP for 2s.
4. Wait for the module to boot, and observe whether the boot screen appears. The correct starting screen is as follows:

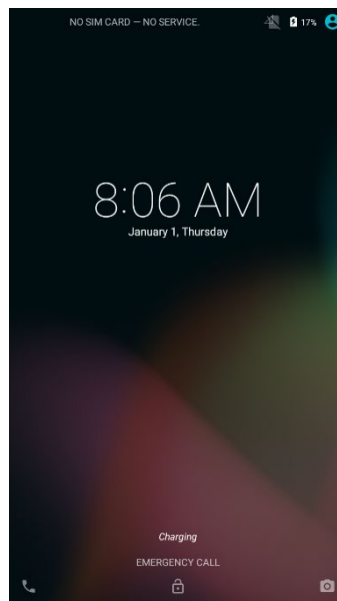


Figure 4-1 Splash screen

4.2 Power Off

EVK-SC800 supports two shutdown modes: software shutdown and hardware shutdown.

The software shutdown procedure is as follows:

1. Long press the ON/OFF button for more than 500 ms, and a dialog box as shown in the following figure is displayed:

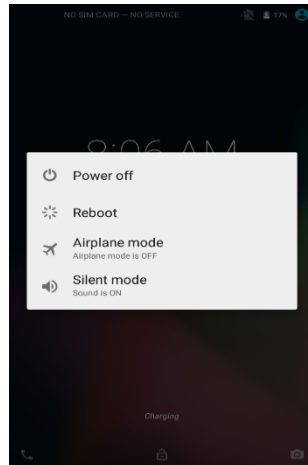


Figure 4-2 Shutdown screen

2. Choose **Power off**.

The module performs a shutdown operation and then shuts down.

Hardware shutdown

Long press the ON/OFF button for 10s, and the module is forced to shut down (Forced shutdown is only used when the module is not responding).

4.3 Using the Debugging Serial Port

1. Connect the serial ports of PC and the development board with USB serial port cable (provided by yourself). RX, TX and GND of the USB serial port need to be connected to TX, RX and GND of the development board respectively.



Note:

The serial port power supply of the development board is output, and the USB serial port power supply connection is not required.

2. Press the power button to start the module.
3. Observe whether there are new serial port devices in the PC device manager: ports (COM and LPT), as shown in the following figure:

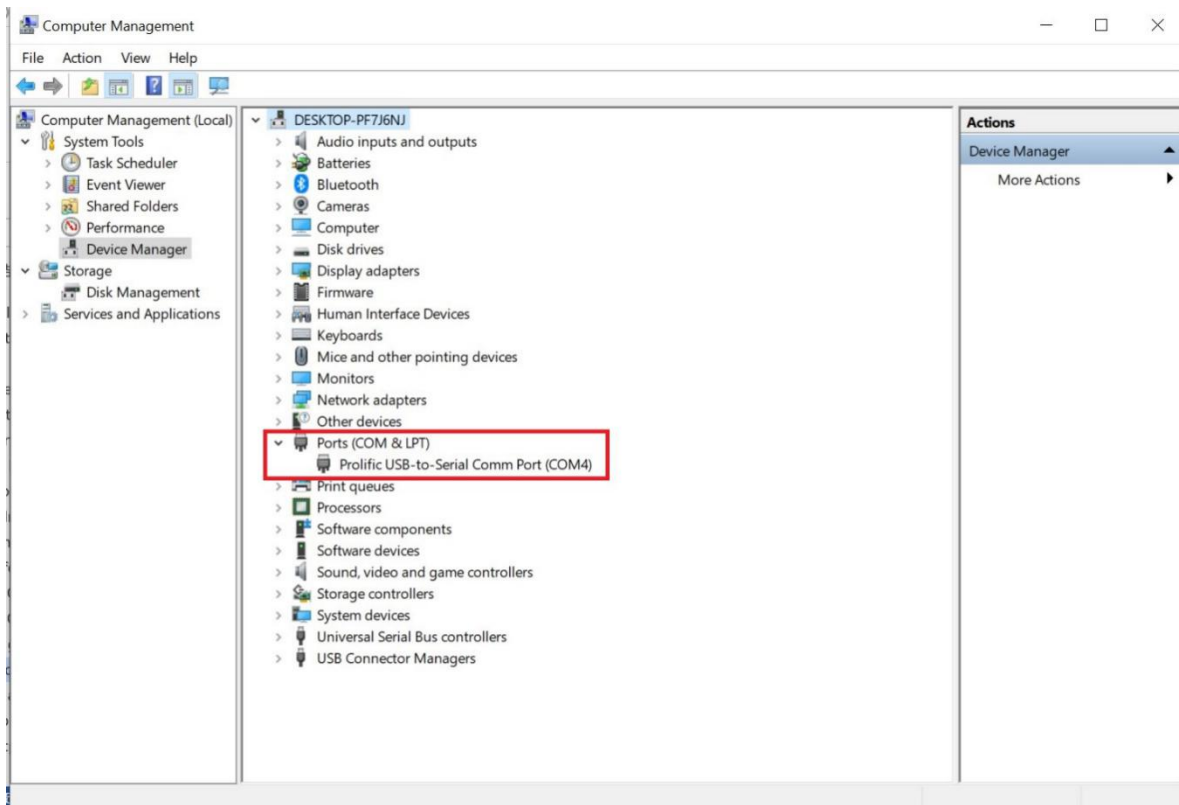


Figure 4-3 Schematic diagram of serial port device

4. Open the serial port debugging tool and select the corresponding new serial port device in the PC device manager, and set the correct serial port baud rate, as shown in the following figure:

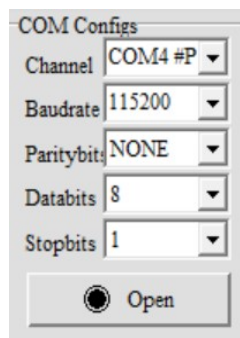


Figure 4-4 Schematic diagram for serial port parameter setting

4.4 Using the Download USB Port

1. Connect the Micro USB interfaces of PC and the development board using the Micro USB cable that included with the development board.
2. Press the power button to start the module.
3. Observe whether there are new devices in the PC device manager: ports (COM and LPT) and modems,

as shown in the following figure:

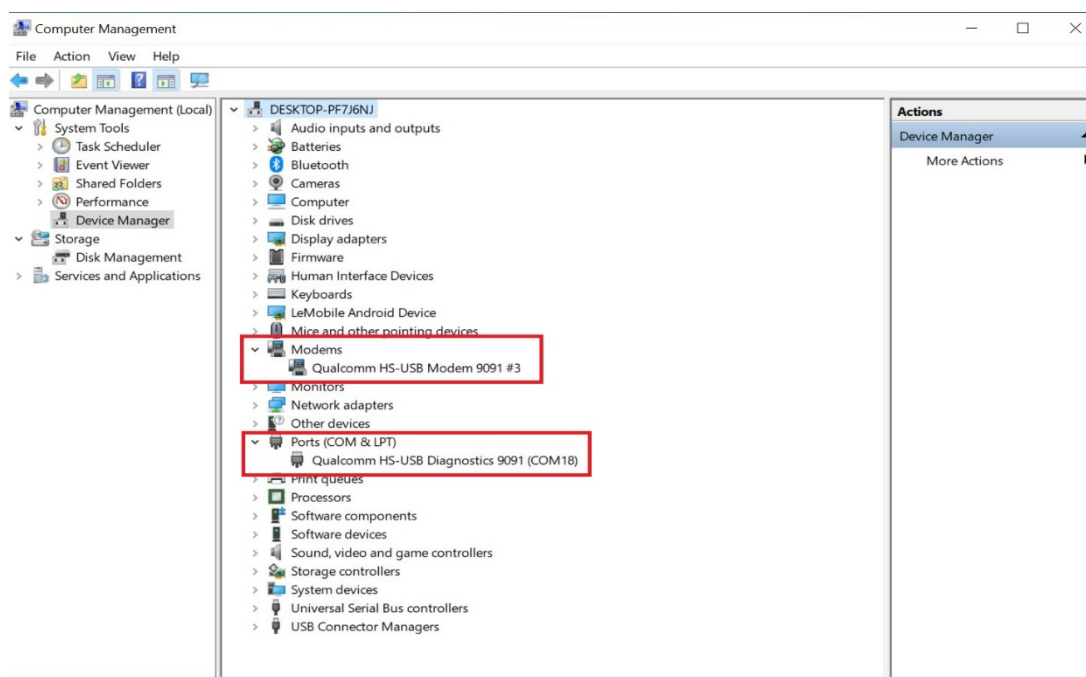


Figure 4-5 Schematic diagram of serial port devices

4. Open the QFIL software and perform steps 1 to 5 to complete the program update, as shown in the following figure:

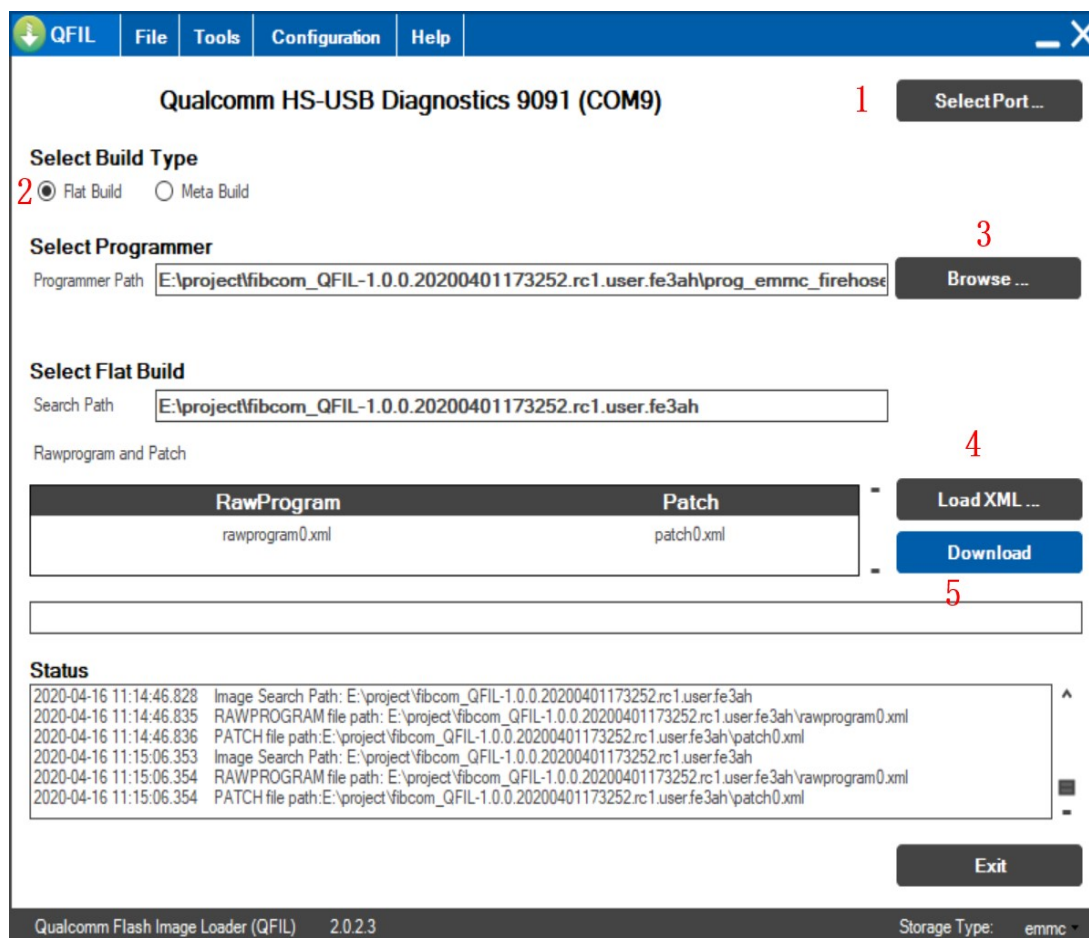


Figure 4-6 Download software schematic diagram



Note:

The instructions of the download USB port are only applicable to Qualcomm platform.

5 FAQs

5.1 No Response After Pressing the Power Button

1. If battery is used, check whether the battery voltage is too low.
2. If the DC power supply is used, check whether the connection between the power supply and the development board is intact, the output voltage of the power supply is correct, and the point source overcurrent protection has been adjusted above 3A.
3. Check whether the ADP module is installed in place and whether the split-plate connector is in good contact.

5.2 No Output on Screen

1. Observe that the DC power supply has output current, which proves that it has been turned on.
2. Check whether the screen cable is loose and not connected.

5.3 DC Power Overcurrent Protection Is Caused by the High Current at the Startup

1. Check whether the DC power overcurrent protection is set below 3A.
2. Check whether the DC power supply is used, but the battery is also connected to the battery interface. If yes, please remove the battery and restart.
3. Check whether the battery voltage is too low or has been over discharge. If yes, charge the battery.