Rd-60-Kit Specification

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Document resume

Version	Date	Develop/revise content	Edition	Approve
V2.0.0	2025.02.08	First Edition	Jie Wei	Hong Xu

Content

1. Product Overview

Rd-60-Kit is a radar test board developed by Shenzhen Ai-Thinker Technology Co., LTD. It is compatible with two 60GHz FMCW millimeter-wave radar modules, Rd-60 and Rd-61 are designed to facilitate developers to evaluate and design solutions.

Rd-60-Kit allows developers to connect a variety of peripherals to meet the development of various application scenarios. It is especially suitable for applications such as smart home, smart appliances, smart security, and smart lighting. Its ultra-low power consumption can bring longer battery life to battery products.

Rd-60-Kit has three LED lights, three buttons, two radar sockets, a power selection switch, a function selection dip switch and two Type-C interfaces.

The main components and application connections of Rd-60-Kit are shown in the figure below:
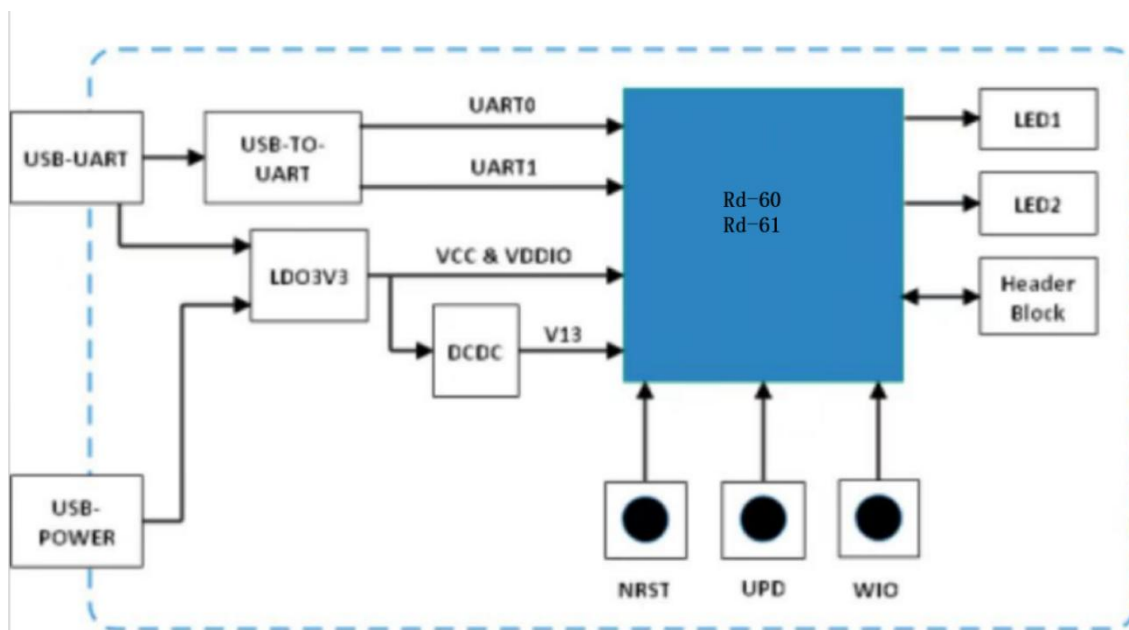
Figure 1 Schematic diagram of Rd-60-Kit hardware connection

1.1. Characteristic

■ Supports two radar modules, Rd-60 and Rd-61

■ Equipped with a host computer for point cloud data detection and parameter adjustment

■ Three status indicators, one red, one blue and one green, corresponding to the different states of Rd-60-Kit

■ Dual TTL interface, supports command sending and data output at the same time

■ Supports low power consumption test

■ Brings out all available interfaces

2. Main parameters

Table 1 main parameters

Model	Rd-60-Kit
Size	42.0*70.0(±0.2)mm
Operation temperature	-20℃~70℃
Storage environment	-40℃~ 125℃,<90%RH
Power supply	Supply voltage 1.7V ~ 5.5V, typical value 3.3V, supply current ≥500mA
Supported radar interface	Rd-60 , Rd-61
Indicator Light	3PCS（1 red, 1 blue, 1 green）

2.1. Power supply selection

Rd-60-Kit supports 2 power supply modes:

✓ Type-C port power supply (recommended)

✓ Pin header power supply

2.2. Static electricity requirements

Rd-60-Kit is an electrostatic sensitive equipment, special precautions should be taken during handling.

Figure 2 ESD anti-static diagram

2.3. Power consumption

All power consumption data below is based on an ambient temperature of 25°C, low power firmware, and 3.3V power to the board headers via a power monitor (Power Monitor BLU 939).

Table 2 Power consumption

Mode	Min.	AVG.	Max.	Unit
Rd-60-Kit base plate	-	30.74	-	μA
Equipped with Rd-60 unmanned state	-	77.82	-	μA
Equipped with Rd-60 manned state	-	1.67	-	mA
Equipped with Rd-61 unmanned state	-	56.25	-	μA
Equipped with Rd-61 manned state	-	1.67	-	mA

3. Appearance size

Front   Back

Figure 3 Appearance (rendering is for reference only, the actual product shall prevail)

Figure 4 Dimensional drawing
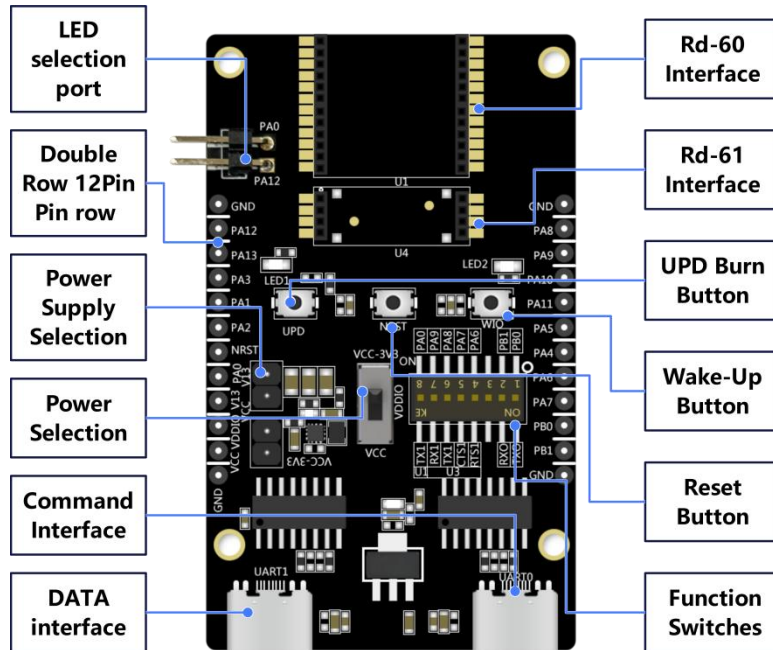
4. Interface Description

Figure 5 Rd-60-Kit interface diagram

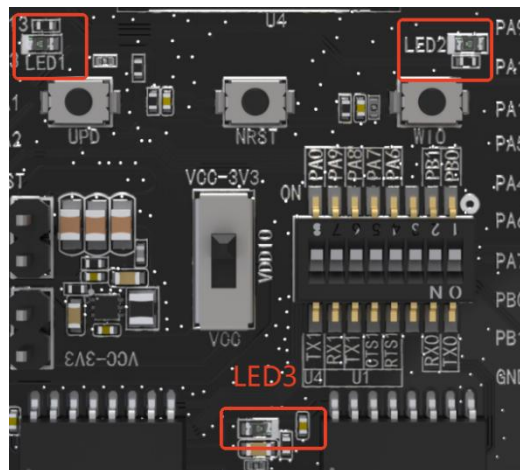## 4.1. Indicator Light Description

Figure 6 Indicator Light Diagram

■ The LED ports are not marked in the schematic diagram, so please add a note here.

✓ LED1: Connect to RD-60's PA13

✓ LED2: Connect to RD-60's PA12 and RD-61's PA0

✓ LED3: Power indicator light

■ How to use the indicator light?

✓ LED1: Reserved interface

✓ LED2: Used to indicate the presence of human body, applicable to Rd-60 and Rd-61

4.2. LED selection port description

■ Because the LED of Rd-61 uses PA0, and Rd-60 uses PA12, this LED selection port is designed to enable the LED status indicator of Rd-61.
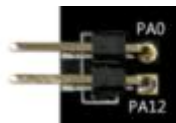

Figure 7 LED selection port diagram

■ Instructions for use

✓ When the Rd-60 module is connected, this interface can be short-circuited continuously.

✓ When connected to the Rd-61 module, this interface should be short-circuited to enable the status indicator

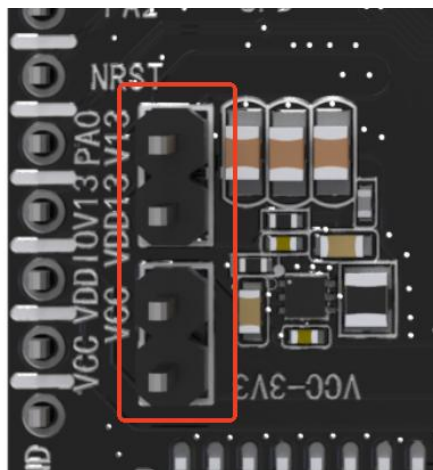## 4.3. Power Supply Selection Instructions

Figure 8 Power supply selection diagram

■ The power supply options are divided into two groups:

✓ V13 selection port: Power the module's V13 port at a voltage of 1.3V

✓ VCC selection port: external input 3.3V or 5V interface

If VCC has no external input requirements, please short-circuit VCC and VCC-3V3!

■ Instructions for use

V13 interface, when you need to supply 1.3V voltage to the V13 port of the module, it must be short-circuited.

If you need to use super low power consumption, you must short-circuit this interface, otherwise you cannot achieve the lowest power consumption.

■ VCC interface, this is the power input interface of the development board, the power supply range is 3.3V～5V. External power supply voltage can be connected through the VCC interface. This interface needs to be used with a 3V3 switch.

✓ When VCC input is 3.3V, the 3V3 switch selects the VCC terminal.

✓ When VCC inputs 5V, the 3V3 switch selects the VCC-3V3 terminal.

4.4. Power Select Switch Description

Figure 9 Schematic diagram of the power selection switch

■ This is a GPIO voltage (VDDIO) selection switch, which provides a reference level for the module's GPIO, fixed at 3.3V.

✓ VCC-3V3 ：Onboard 3.3V power supply

✓ VCC：External input power supply, voltage is 3.3V～5V

■ Instructions for use：

✓ When the VCC input of the power selection port is 5V, the switch should select VCC-3V3

✓ When the VCC input of the power selection port is 3.3V, the switch can select the VCC terminal.

4.5. Command interface description

■ The UART0 Type-C port of the development board is the command port of the module, and control commands can be sent to the module through this port.

■ Use a Type-C data cable to access this port and connect it to a PC for use.

If the port cannot be recognized, please check the driver!

4.6. Data interface description

■ The UART1 Type-C port of the development board is the radar data output port of the module, and the host computer interacts with this port for radar data.

■ Use a Type-C data cable to access this port and connect it to a PC for use.

If the port cannot be recognized, please check the driver!

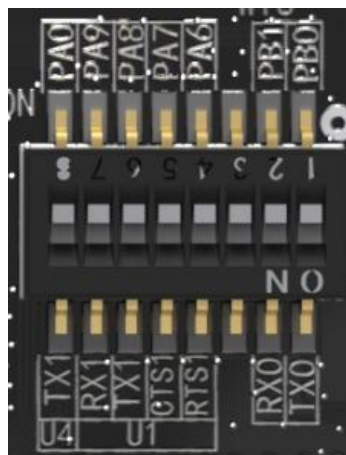## 4.7. Function selection dip switch description

Figure 10 Schematic diagram of function selection dip switch

■ This is a communication interface selection switch for UART0 and UART1. It can be used to select whether to use the Type-C interface of UART0 or UART1 for communication. The corresponding relationship is as follows:

Table 3 DIP switch function table

No.	GPIO	Functionality after enabling
1	PB0	TX0 (UART0_TXD, no distinction)
2	PB1	RX0 (UART0_RXD, no distinction)
3	NC	Dangling
4	PA6	RTS1(Rd-60 UART1_RTS)
5	PA7	CTS1(Rd-60 UART1_CTS)
6	PA8	TX1(Rd-60 UART1_TXD)
7	PA9	RX1(Rd-60 UART1_RXD)
8	PA0	TX1(Rd-61 UART1_TXD)

■ Instructions for use

✓ UART0 serial port: UART0 serial port does not distinguish between modules, Rd-60 and Rd-61 can be used, so it is enabled by default and the switch is turned to NO.

✓ UART1 serial port: Enable when you need to use UART1 to output radar data. If you are using Rd-61, just turn PA0 to NO.

4.8. Reset Button Description

■ A touch switch used to manually reset the module, effective at low level.

■ Press and release the button to reset the module.

4.9. Wake-up button description

■ When the module is in deep sleep and IO wake-up is set, it is used, and low level is effective. (Reserved interface)

■ Wake-up button access PA10,Just press the button and release it.

4.10. UPD Burn Button Description

■ Used to control the module to enter the burning mode, low level is effective.

■ After pressing the burn button, unplug and replug the Type-C data cable to enter the burn mode.

Because the module's reset function is not a hardware reset, the burn button + reset button cannot put the module into burn mode! You must power it on again!

4.11. Rd-61 Interface Description

■ The interface for installing the Rd-61 module is an 8-pin female header with a pitch of 1.27mm.

■ The Rd-61 module can be inserted according to the installation diagram.

4.12. Rd-60 Interface Description

■ The interface for installing the Rd-60 module is a 24-pin female header with a pitch of 1.27 mm.

■ The Rd-60 module can be inserted according to the installation diagram.
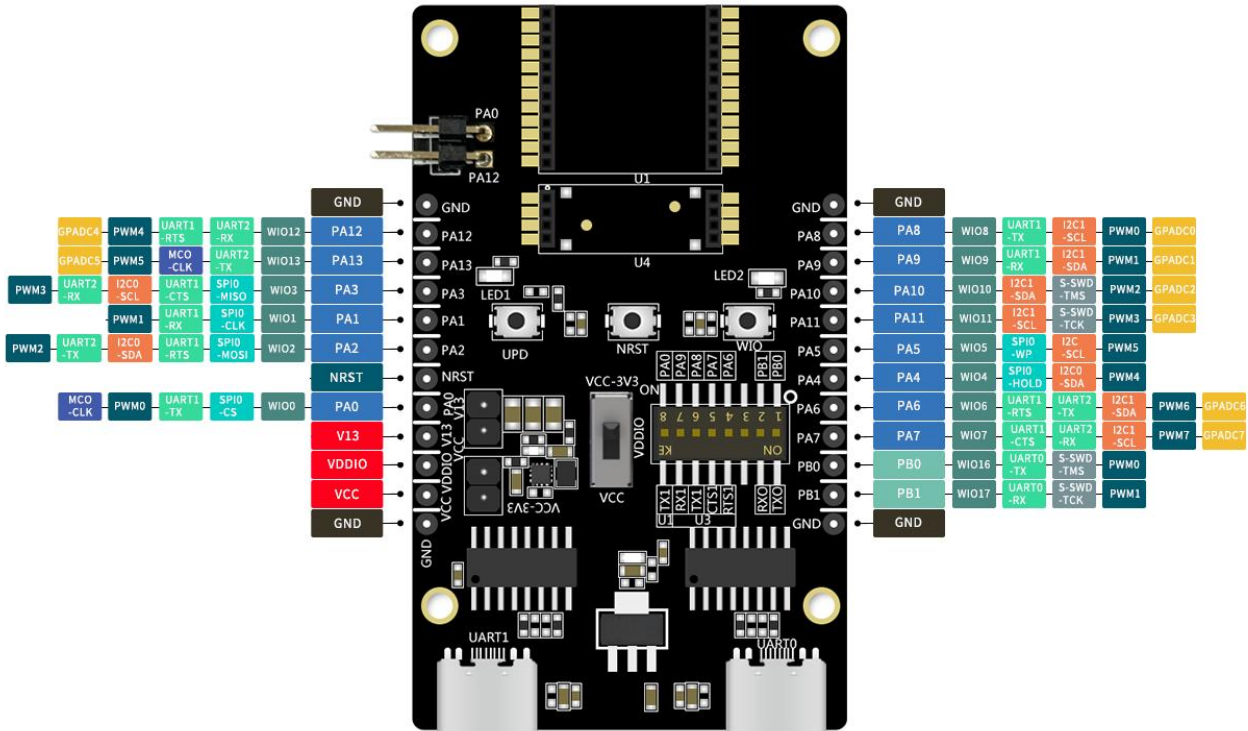
4.13．Double-row pin interface description

Figure 11 Schematic diagram of double-row pins

Table 4 Pin Definition

No.	Name	Functional Description
1	GND	(G), Ground
2	PA12	(IO/WUP),PA12,WIO12,UART2-RX,UART1-RTS,PWM4,GPADC4
3	PA13	(IO/WUP),PA13,WIO13,UART2-TX,MCO-CLK,PWM5,GPADC5
4	PA3	(IO),PA3,WIO3,SPI0-MISO,UART1-CTS,I2C0-SCL,UART2-RX,PWM3
5	PA1	(IO),PA1,WIO1,SPI0-CLK,UART1-RX,PWM1
6	PA2	(IO),PA2,WIO2,SPI0-MOSI,UART1-RTS,I2C0-SDA,UART2-TX,PWM2
7	NRST	(IO), External reset, low level is effective, default high level

8	PA0	(IO),PA0,WIO0,SPI0-CS,UART1-TX,PWM0,MCO-CLK
9	V13	(PI), Analog power input voltage 1.2V~2.5V, default 1.5V, NC
10	VDDIO	(PI), module IO power supply 1.7~3.6V, default input 3.3V
11	VCC	(PI), module power supply 1.7V~5.5V, default input 3.3V
12	GND	(G), Ground
13	GND	(G), Ground
14	PB1	(IO/WUP),PB1,WIO17,UART0-RX,S-SWD-TCK,PWM1
15	PB0	(IO/WUP),PB0,WIO16,UART0-TX,S-SWD-TMS,PWM0
16	PA7	(IO/WUP),PA7,WIO7,UART1-CTS,UART2-RX,I2C1-SCL,PWM7,GPADC7
17	PA6	(IO/WUP),PA6,WIO6,UART1-RTS,UART2-TX,I2C1-SDA,PWM6,GPADC6
18	PA4	(IO),PA4,WIO4,SPI0-HOLD,I2C0-SDA,PWM4
19	PA5	(IO),PA5,WIO5,SPI0-WP,I2C-SCL,PWM5
20	PA11	(IO/WUP),PA11,WIO11,I2C1-SCL,S-SWD-TCK,PWM3,GPADC3
21	PA10	(IO/WUP),PA10,WIO10,I2C1-SDA,S-SWD-TMS,PWM2,GPADC2
22	PA9	(IO/WUP),PA9,WIO9,UART1-RX,I2C1-SDA,PWM1,GPADC1
23	PA8	(IO/WUP),PA8,WIO8,UART1-TX,I2C1-SCL,PWM0,GPADC0
24	GND	(G), Ground

5. Installation method

Rd-60-Kit has two radar interfaces. The installation method of Rd-60 and Rd-61 is shown in the figure below.
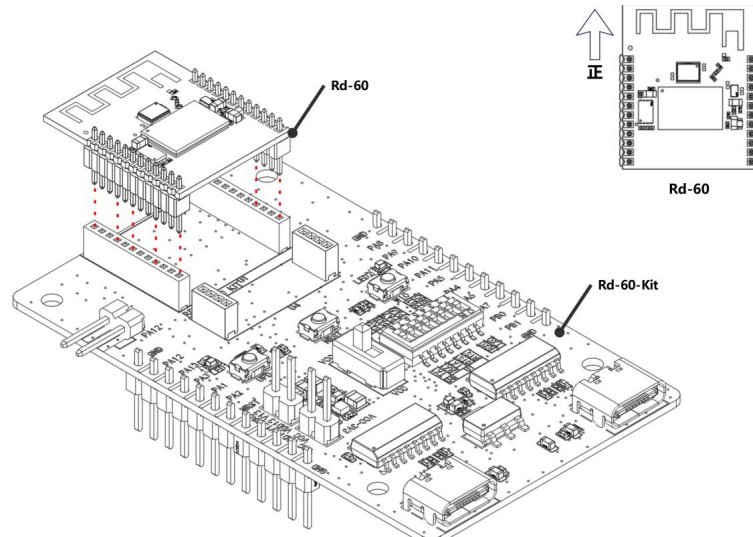

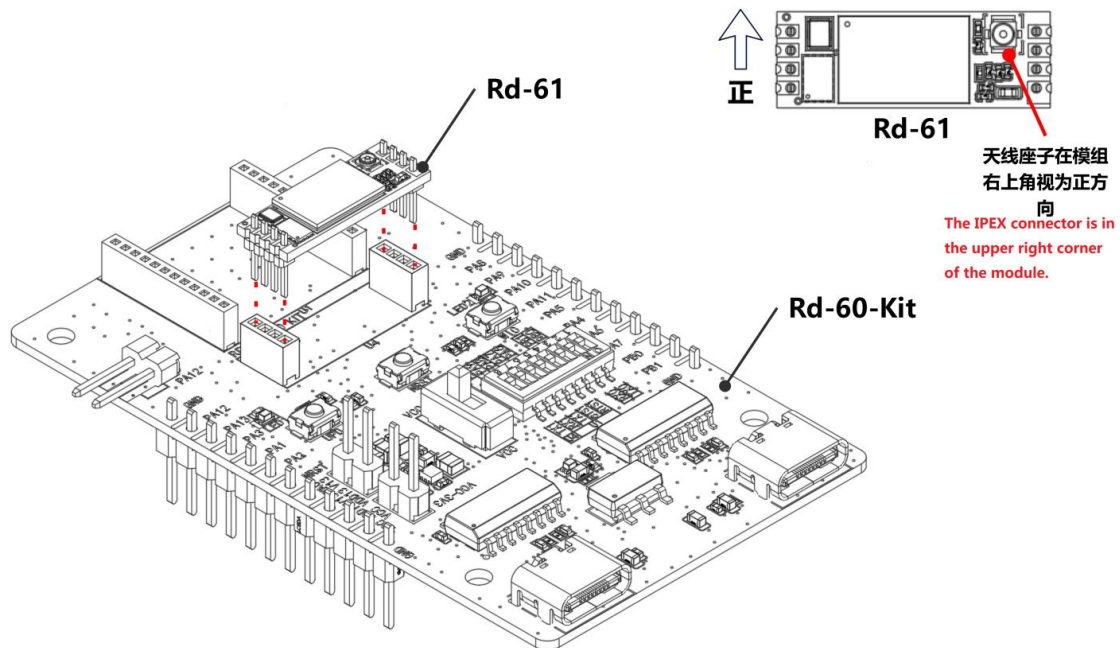**Figure 12 Rd-60 installation diagram**

Figure 13 Rd-61 installation diagram

Table 5 Radar interface parameters

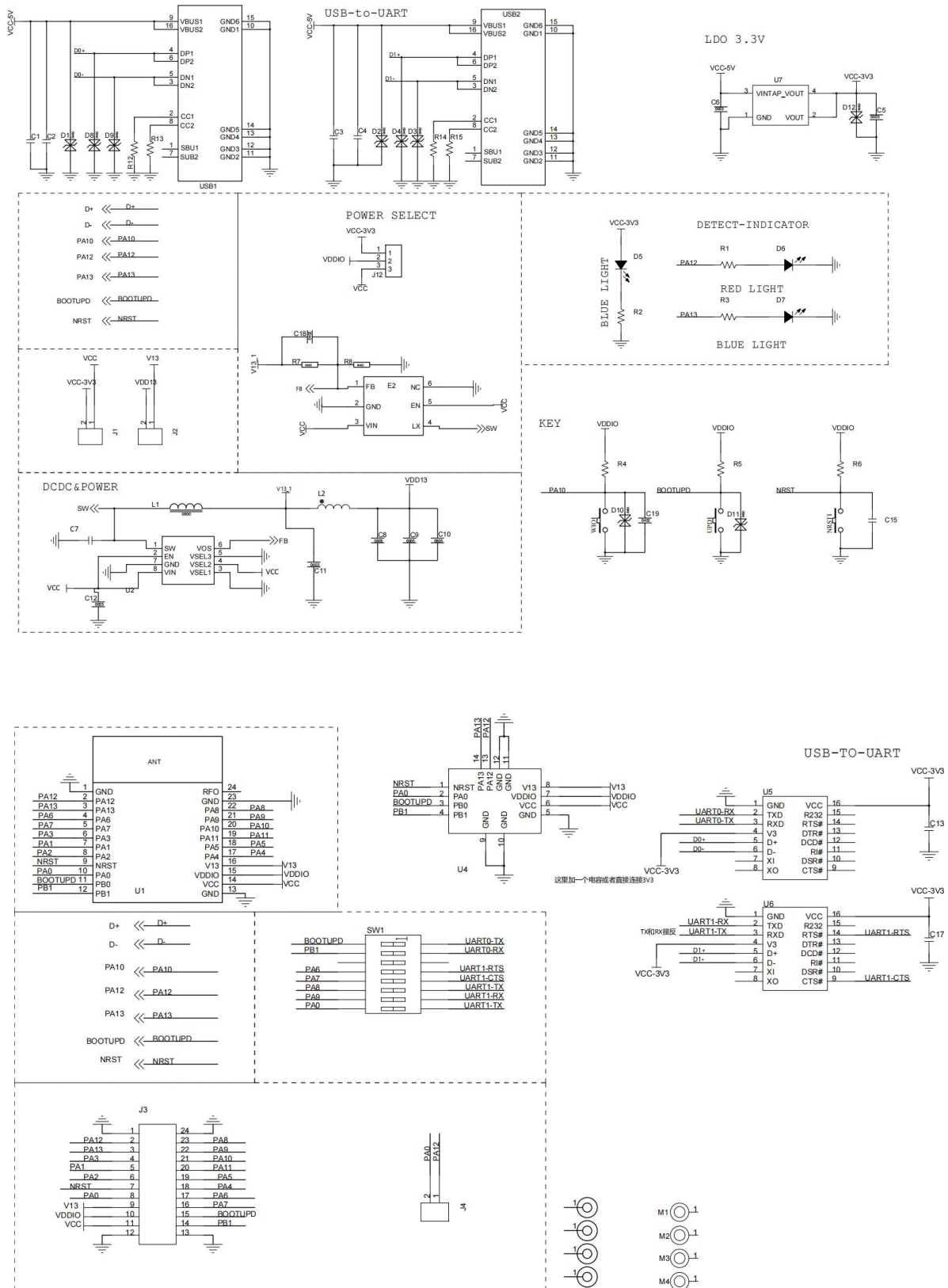| Rd-60	1.27mm pitch 24Pin female header
Rd-61	1.27mm pitch 8Pin female header

6. Schematic

Figure 14 Schematic diagram

7. Packing information

Table 6 Packaging Information

Packing list	Packing method	Quantity per package (static bag)	Quantity per pack (sealed bag)
Rd-60-Kit	Foam + anti-static bag	1pcs	20pcs

8. Contact us

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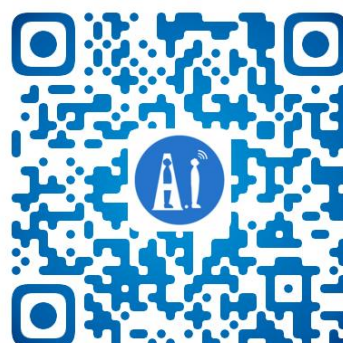
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