DB-RF001
Development Kit

User's Manual

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1. Brief Introduction

This DB-RF001 Development Kit consists of a Switch Board and a Motherboard, with two hardware SPI interfaces. The switch board adapts to the common FSK Front-end Modules and LoRa RF Modules. The motherboard integrates a Cortex-M0 32bit MCU (HC32L176KATA from HDSC), and has several common interfaces such as SPI, UART and I2C ; while the keys can be used to quickly evaluate the performance of the wireless RF front-end modules.

It was low power consumption designed and can support battery power supply, which is convenient to evaluate an RF module before project officially launched.

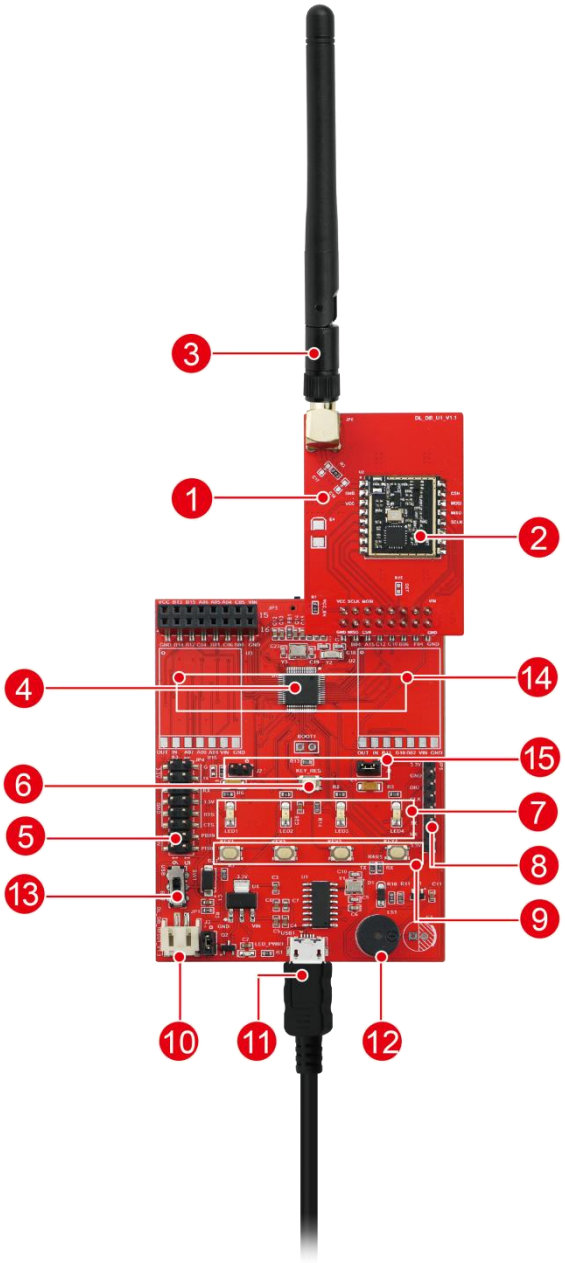
2. Product Features

- Convenient to operate, you can simply evaluate the RF module and test its communication distance;
- Supports KEIL secondary development, for a deep testing;
- Schematic Diagram, Demo Code, Data Sheet, User's Guide can be provided;
- Convenient debugging: SWD download port, UART serial port output with USB to TTL for debugging;
- Two hardware SPIs and one hardware UART, with just one RF Switch Board for multiple RF modules.
- KEY1, KEY2 keys and LED 1, LED 2 lights for user interaction.

3. Applicable RF Modules

Modulation	Model No.	Chip Solution	Frequency
Chirp-IoT	DL-PAN3031-S	PAN3031	433/470/868/915MHz
LoRa	DL-LLCC68-S	LLCC68	433/470/868/915MHz
	M-SX1278S2	SX1278	433MHz
	DL-SX1278PA	SX1278	433MHz
	DL-RFM95	SX1276	868/915MHz
FSK	DL-RTS4463	SI4463	915MHz
	DL-CC1310-B	CC1310	433/868MHz
	DL-RTM300	CMT2300	433/868/915MHz

4. Interfaces Definitions



Diagram

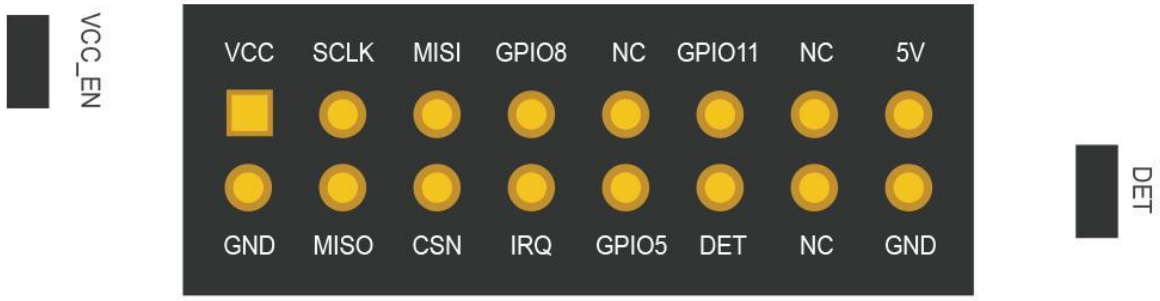
11. RF Switch Board
12. FSK/LoRa module
13. Antenna
14. MCU
15. UART/GPIO
6. Reset Key
7. LED Indicators
8. Download Port /TTL Serial Port
9. Keys
10. Battery (Power Supply)
1. USB 5V/ Serial Port
2. Buzzer
3. Power Switch
4. ADC Interfaces
5. Switch Board's VCC Enable

RF Switch Board :

Notice:

1. DET: not a pin for the RF module, but reserved to identify the Switch Board
2. VCC_EN: the resistance that supplies power to the RF module

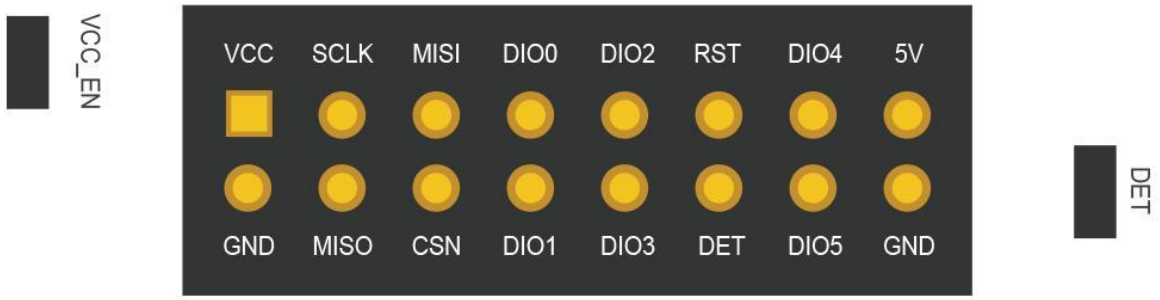
Switch Board Interface: DL-PAN3031-S



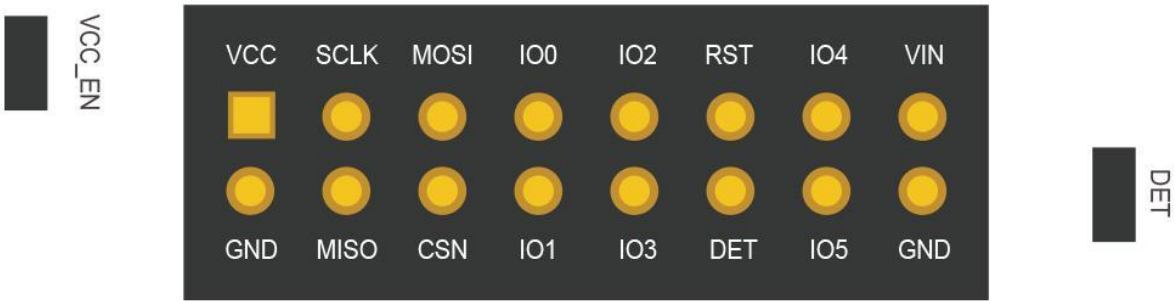
Switch Board Interface: DL-LLCC68-S

Switch Board Interface: M-SX1278S2

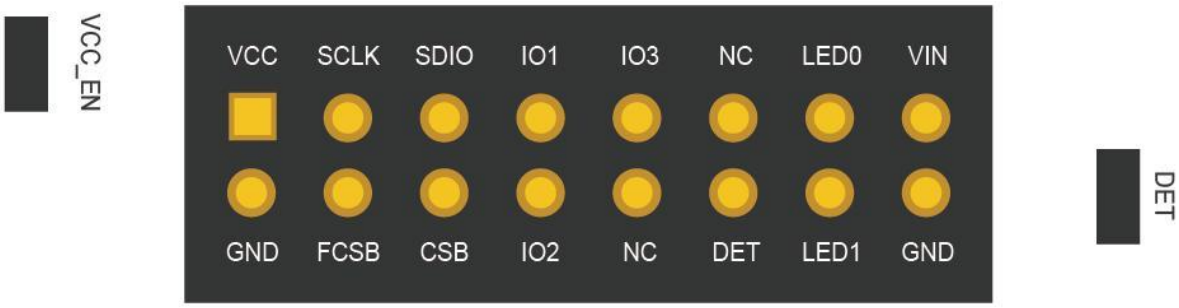
Switch Board Interface: DL-SX1278PA



Switch Board Interface: DL-RFM95

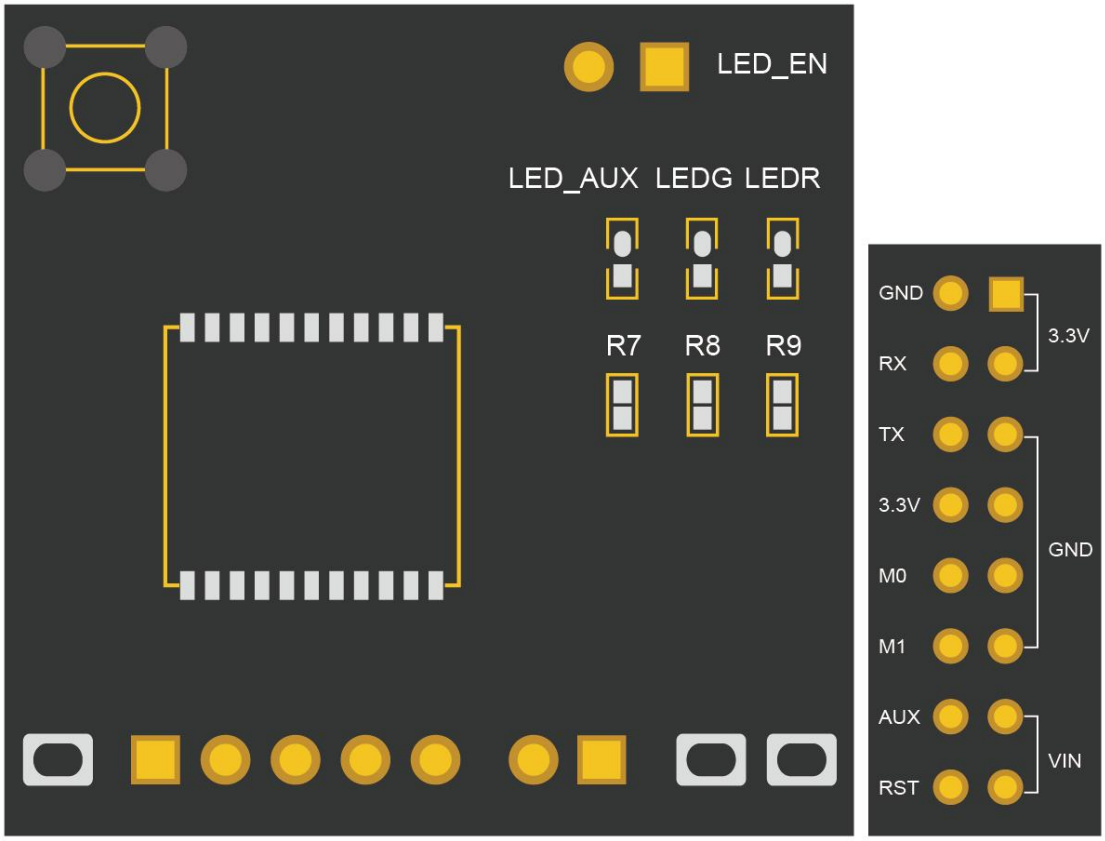


Switch Board Interface: DL-RTM300



Switch Board Interface: DL-RTS4463

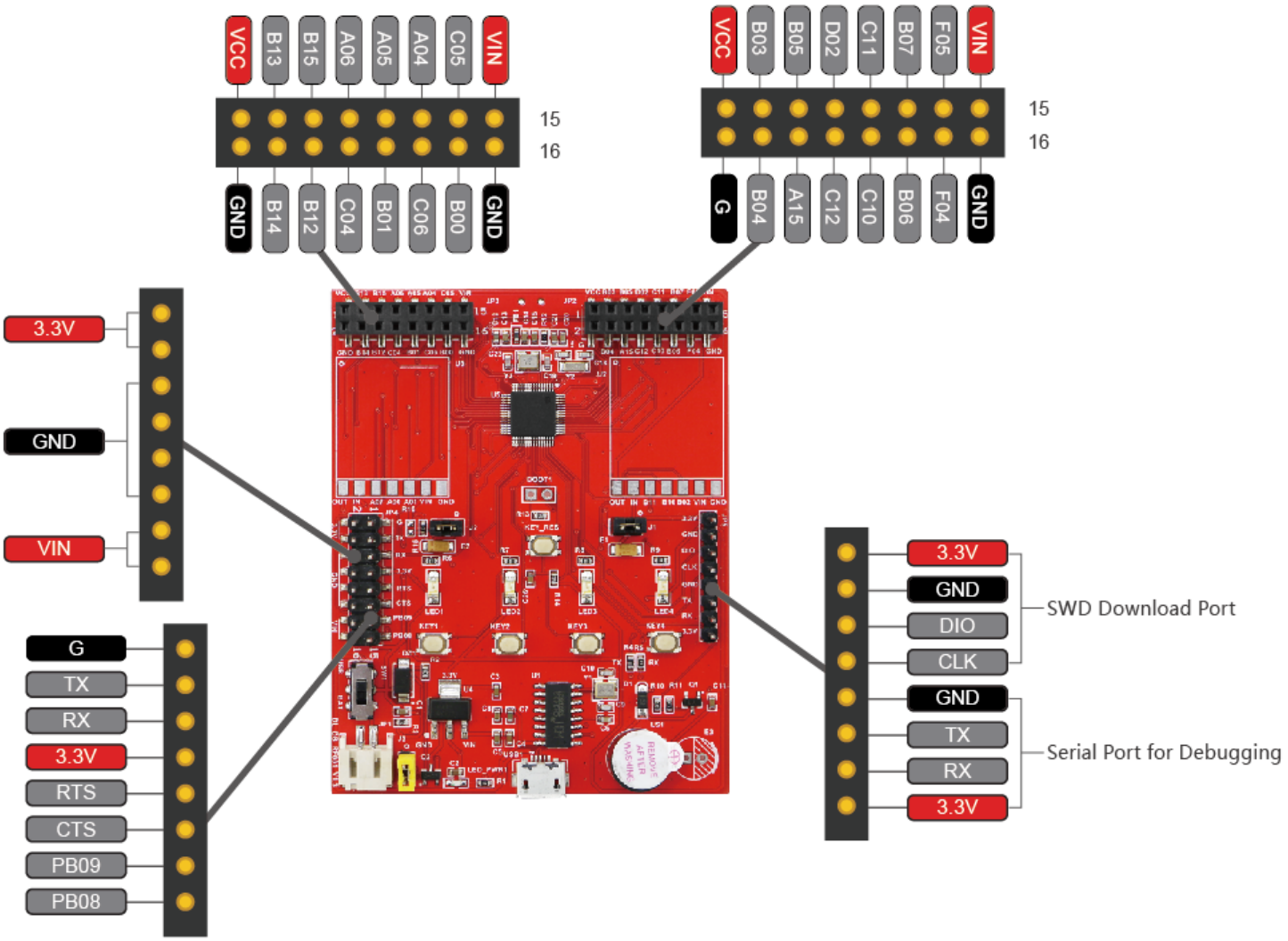
Switch Board Interface: DL-CC1310-B



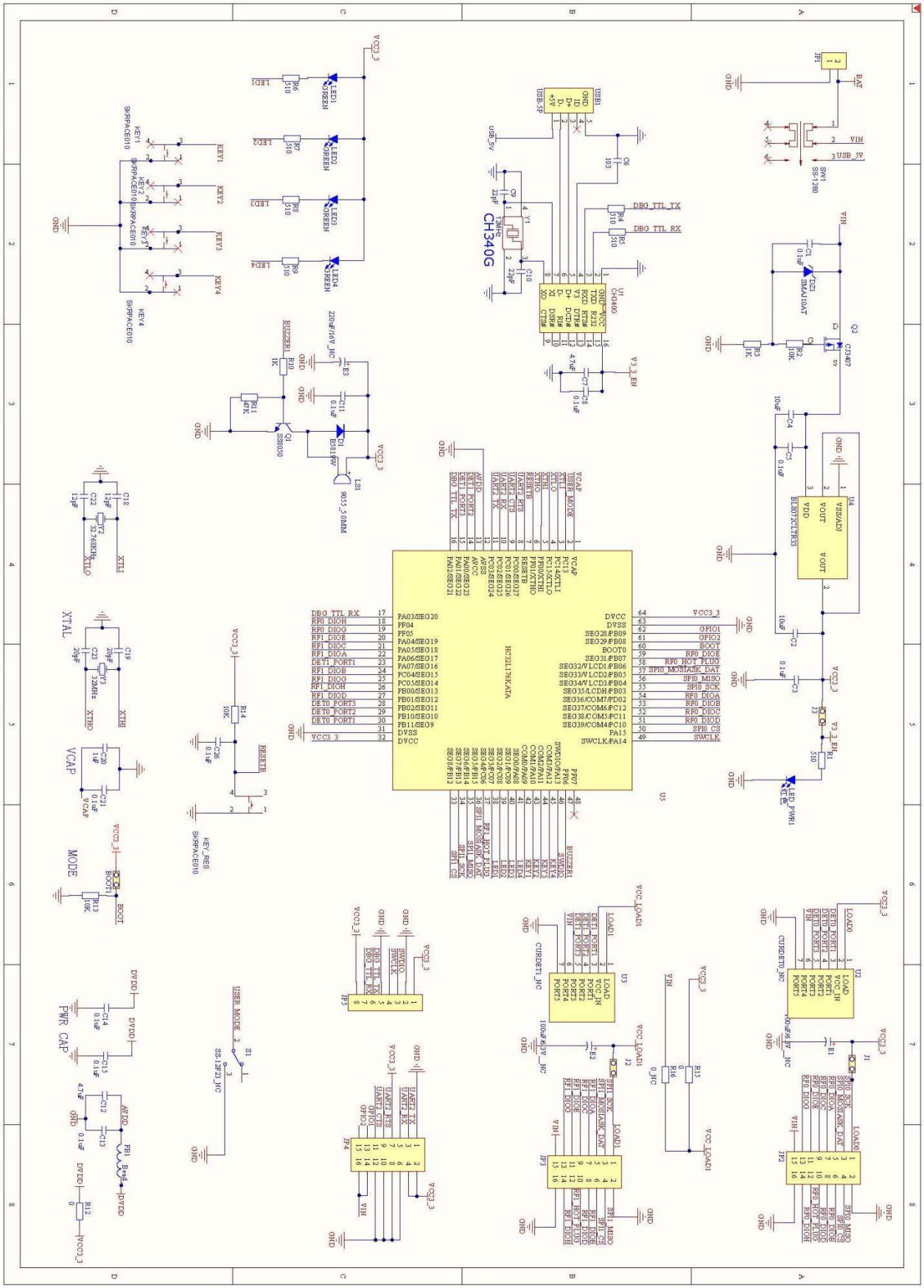
Motherboard:

Notice:

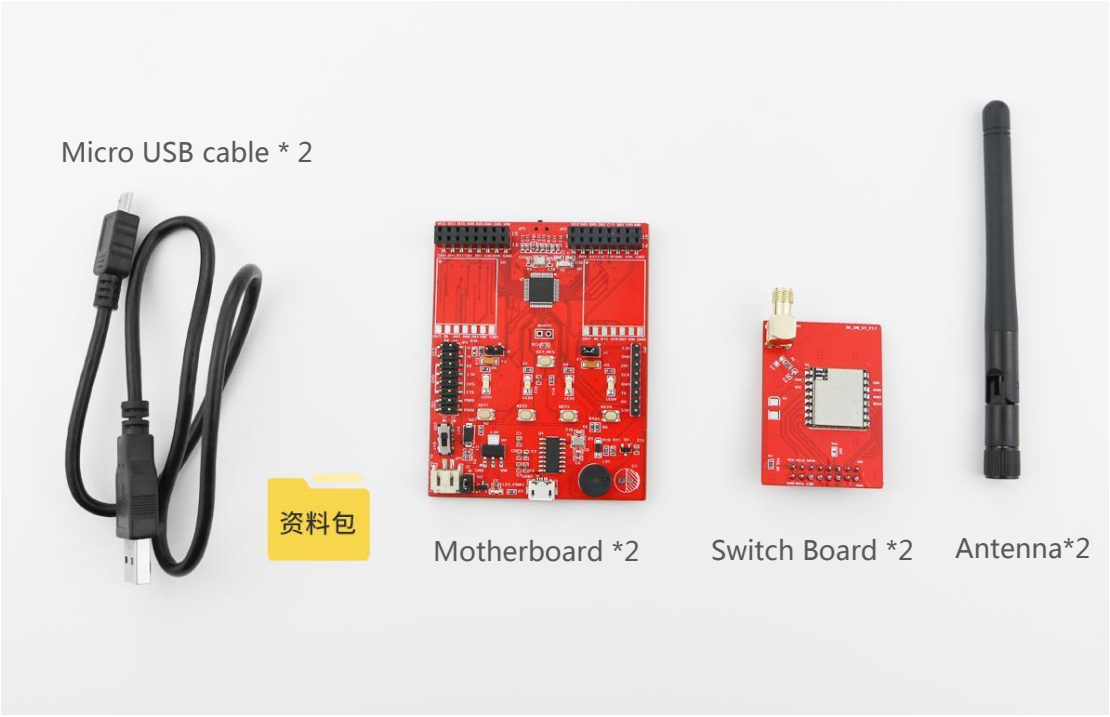
1. VCC: 3.3V after voltage stabilization;
2. VIN: USB 5V or battery power supply;
3. SWD Download Port: 3.3V-CLK; Serial Port for debugging: GND-3.3V;



5. Schematic Diagram



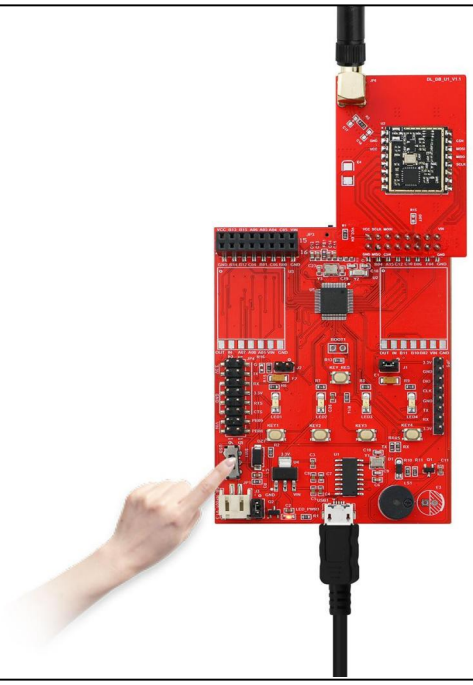
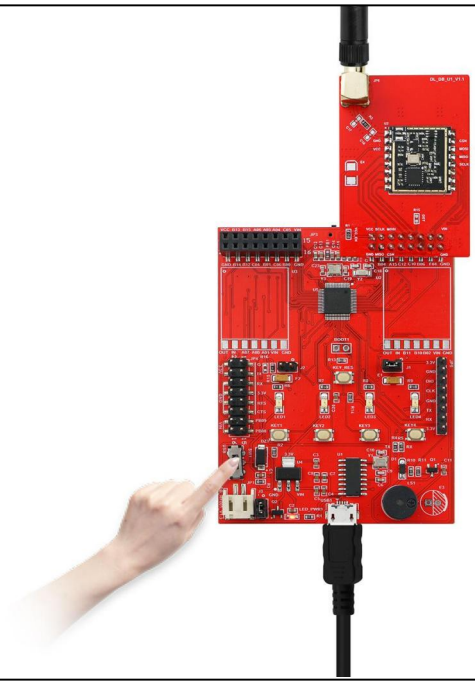
6. Packing List

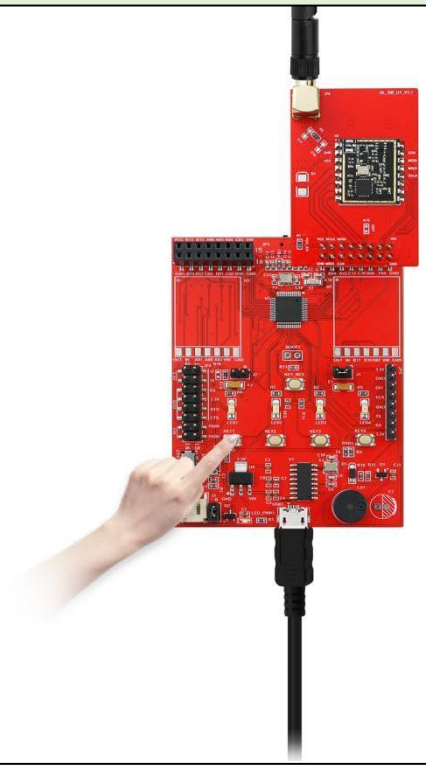
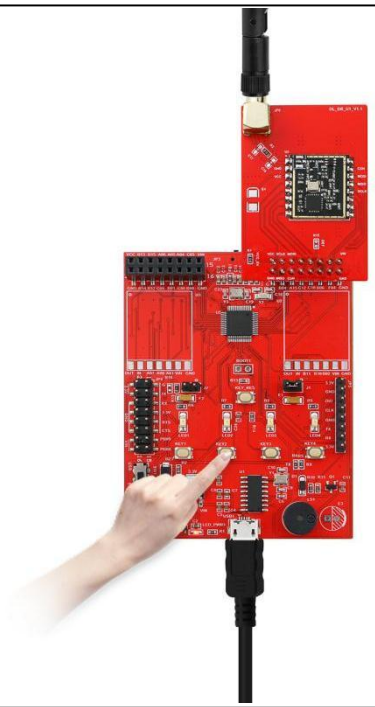
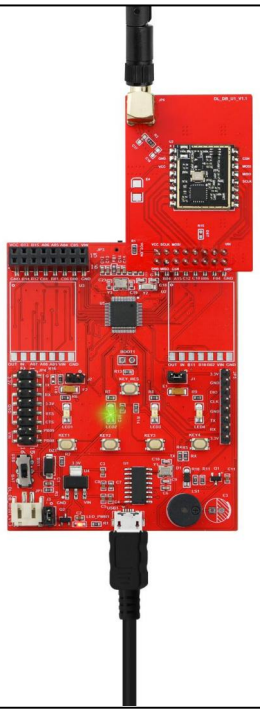


Packing List		
1	**Motherboard**	Work together with the Switch Board, to test the communication distance
2	**Switch Board**	Contains the FSK/LoRa wireless module you have ordered, with 2.54mm double row of pins
3	**Antenna**	High gain external Rubber Rod Antenna
4	**Micro USB Cable**	Power supply, USB to TTL
5	**Resources**	Resources for your secondary development use: instruction manual, demo code, etc.

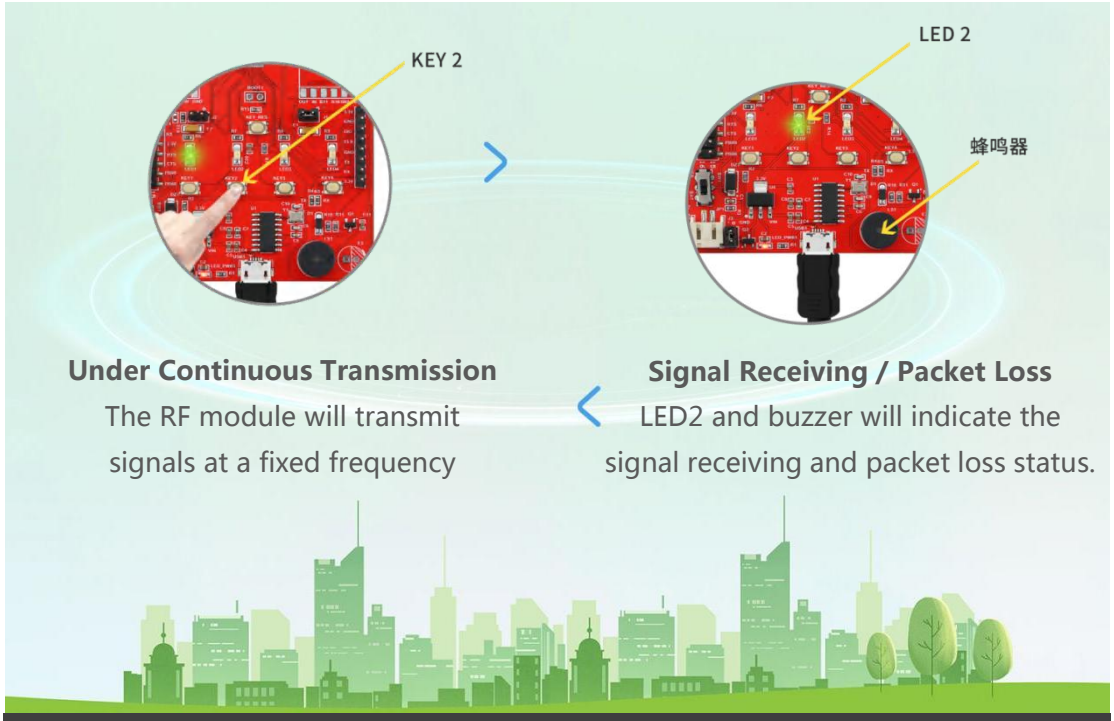
7. Operation Instructions

Any of these 2 boards can be the Transmitter or the Receiver, sharing a same program.

Instructions		
	Transmitter	Receiver
Step1		
	USB 5V Power Supply	USB 5V Power Supply
Step 2		
	Turn on the USB switch, and the red light of the power indicator is on	Turn on the USB switch, and the red light of the power indicator is on

	Transmitter	Receiver
Step 3		
	Press Key 1: send data in a single time	After receiving the data, the LED 2 indicator flashes once
Step 4		
	Press Key 2: send data continuously	When data is received, LED 2 indicator flashes continuously

8. How to Conduct Distance Test?



Several factors may affect the communication distance :

1. The higher the communication rate, the closer the communication distance;
2. Affected by antenna matching; Switch Board mismatch with antenna;
3. Impact of antenna type (e.g.: range of external rubber rod antenna > range of built-in spring antenna > range of PCB on-board-antenna)

9. F.A.Q.

Q1 Signal Transmission failed (LED 1 is off, after KEY1 is pressed)

A The initialization was unsuccessful. Possible reasons are as follows:
1. The Switch Board is not inserted in place;
2. The program is incompatible with the RF module

Q2 Signal is sent successfully (LED1 is on), but the signal reception is not successful (LED2 is not on)

A Check the power supply

Q3 Unable to recognize USB serial port

A 1. The computer is not equipped with CH340 driver;
2. J3 jumper cap is not plugged in.

Q4 There is no power supply

A 1. VCC_EN resistance on the Switch Board is not welded;
2. The J1 jumper cap on the Motherboard is not plugged in, resulting in no power supply.

Q5 Communication distance is too close

A 1. Make sure the antenna connection is normal (e.g.: ANT pad of the Switch Board, and the defaulted connection power);
2. See section 8: Several factors may affect the communication distance

10. Secondary Development Description

See details in “DB-RF001 Secondary Development Instructions”

11. Contact us

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