Industrial Grade Wireless Remote Transmission Module

SPECIFICATION

Model No.: **DL-RTA5043**

Version: V1.1

Before using this module, please read this document carefully, and pay attention to the following important matters:

This module is an electrostatic sensitive product. Please operate it on an anti-static workbench during installation and testing.

The module uses an external antenna by default. The antenna can be a wire antenna or a standard UHF antenna. You can choose a specific antenna according to the actual situation. If the terminal product uses a metal shell, be sure to install the antenna outside the metal shell. Otherwise, the RF signal will be seriously attenuated, which will affect the effective distance.

Metal objects and wires should be kept away from the antenna as much as possible.

When installing the module, nearby objects should be kept at a sufficient safety distance from the module to prevent short circuit damage.

This module should be used in a dry environment. Please do not make any liquid substance come into this module.

Please use an independent voltage regulator circuit to supply power to this module, and avoid sharing with other circuits. The tolerance of the power supply should not be less than 5%.

Limitations:

This module is intended to be embedded in the customer's terminal product application, and does not provide a casing itself. It is not recommended that the customer directly resell this module as a final product without permission.

This series of modules are in accordance with commonly used international standards. If there is any special certification needed, we can adjust certain indicators according to your needs.

This module cannot be applied to life rescue, life-support systems, or any occasion where personal injury or life threatening may cause by equipment failure. Any organization or individual carrying out the above-mentioned applications shall bear all risks at their own.

We will not be responsible for any direct or indirect damage, injury or loss of profits caused by products that use this module.

File Version Update Management

Date	File Version	Remark
2016-8-5	SPI Version V1.0	Standard Version, ISM frequency bands only
2016-9-30	Standard Version V1.1	Standardized data transmission module with additional metal shielding cover

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DL-RTA5043 is a 50mW narrowband (centralized power) wireless data transmission module based on AX5043 RF chip from Swiss AXSEM. It works in 433.92MHz ISM band and uses SPI port for data transmission, which reduces the cost budget for wireless applications.

Narrow-band transmission has the advantages of concentrated power density, long transmission distance and strong anti-jamming ability, and greatly increases transmission distance compared with other similar products at the same power. The module can configure FEC forward error correction algorithm, which has high encoding efficiency and strong error correction ability. It can actively correct the jammed packets in case of sudden interference, greatly improving the reliability and transmission distance.

The module has data encryption and compression capabilities. The transmit data in the air is random but with rigorous encryption and decryption, which makes data interception meaningless. The data compression function has the probability to reduce the transmission time, reduce the probability of interference, and improve the reliability and transmission efficiency.

The module can operate in the low voltage range of 1.8-3.6V to meet the needs of battery power supply. The module communicates with MCU via SPI port, can simulate SPI interface through standard SPI interface or I/O interface of MCU, consumes only tens of microamperes of current in power saving mode, and is very suitable for ultra-low power system and sensor application.

1. Features:

● Transmission distance: 2100m

● Multiple baud rates can be configured at will

● Receiving Sensitivity: -126dBm

● Low Receive Power Consumption (Minimum 30uA)

● Control the output power through MCU

● Sleeping current only 1.7uA

● Wake on radio function

● 256 channels frequency: 433.92M, 470M, etc.

● Double 512Bytes Ring Buffer

● Multiple power levels (maximum 50mW)

● Encryption algorithm + FEC error correction function

● Configurable 65536 address (easy to group)

● Supports voltage reading

2. Applications:

- Wireless meter reading
- Intelligent Home
- Intelligent Building
- Environmental Monitoring
- Small weather stations
- Consumer Electronics
- Other wireless transmission applications

- Wireless Sensing
- Industrial Remote Control, Telemetry
- High Tension Line Monitoring
- Highway
- Automatic Data Acquisition
- Street light control

3. Basic Usage

The simplest usage: One-to-One Data Transfer. (e.g.: MCU-SPI interfaces are used to drive RF data transmission at both ends of communication)

Flexible usage: Many-to-One polling mode networking, One-to-Many broadcast mode networking, etc.

Detailed description please see this manual and related Application Note

4. Technical Parameter

No	Name	Parameter values
1	Module size	16 * 19.8mm (Antenna excluded)
2	Place of origin	All imported components, origin from Japan, USA, Germany
3	Production process	SMT, wireless products must adopt SMT to ensure batch consistency and reliability
4	Interface type	1*11*1.27mm , Universal board and DuPont wire can be used (1.27mm standard pin, pay attention to welding short circuit)
5	Frequency range	425 - 510MHz (433.92MHz is recommended)
6	Power Supply	1.8 – 3.6VDC
7	Communication level	Max. 3.6V, it is suggested that the difference between supply voltage should be less than 0.3V to reduce power consumption
8	Measured distance	about 2100m (Test conditions: clear, open, maximum power, antenna gain 5dBi, height greater than 2m, 1.2k AIUR)
9	Transmit power	Max. 17dBm (about 50mW) , -10dBm~18dBm adjustable , 0.5dB Stepping , the output is 17dbm as default
10	Air Interface User Rate	1.2、2.4、4.8、9.6、19.2、38.4、50、70Kbps can be configured arbitrarily , better RF performance above 50kbps
11	Sleep current	50nA Deep sleep current , 500nA Power-down current
12	Transmission current	55mA@50mW

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| 13	Receiving current	RX 9.5mA@868MHz; RX 6.5mA@169MHz
14	Communication port	SPI port, baud rate is configurable from 1200 - 115200 arbitrarily
15	Driving Mode	SPI interface
16	Module address	65536 addresses can be configured (convenient for networking, supporting broadcast and fixed-point transmission)
17	RSSI support	Built in intelligent processing
18	Receive sensitivity	-126dbm@1.2Kbps (receiving sensitivity has nothing to do with serial baud rate and delay time)
19	Antenna	SMA Antenna / Spring Antenna
20	Working temperature	-40 ~ +85℃
21	Working humidity	10% ~ 90% relative humidity, non-condensing
22	Storage temperature	-40 ~ +125℃

5. Pins Definition:
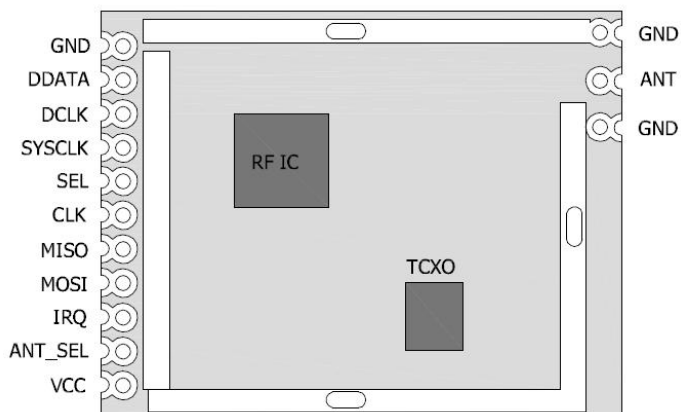
No	Name	I/O	Description
1	GND	P	Grounding, common ground with the system
2	DDATA	I/O	Standard data input and output interface, can be configured as standard IO port
3	DCLK	I/O	Wireless mode: clock output, can be configured as standard IO port for use
4	SYSCLK	I/O	Default reference frequency output, can be configured as standard IO, internal 56K Ω pull-up resistance
5	SEL	Input	Serial peripheral interface select pin
6	MISO	Output	Serial peripheral interface data output
7	MOSI	Input	Serial peripheral interface data input
8	IRQ	I/O	Default to transmit and receive external interrupt, configurable standard IO, internal 65K Ω pull-up resistor
9	ANT_SEL	I/O	Diversity antenna output selection, can be configured as standard IO, internal 65K Ω pull-up resistance
10	VCC	P	System power supply, 1.8-3.6v standard voltage, front-end filter processing

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11	GND	P	High frequency signal grounding
12	ANT	P	RF signal output, external antenna or adapter
13	GND	P	High frequency signal grounding

6. Package Outline
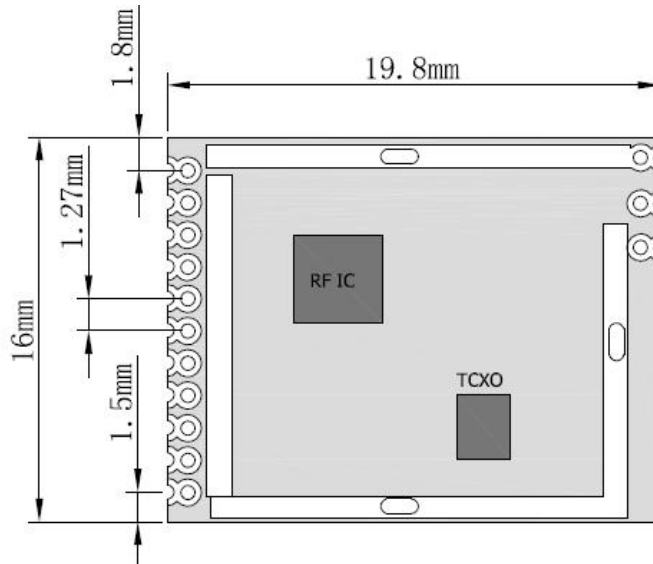
Remark: Gold plating PCB with half hole stamp edge and surface mounting technology (SMT) as defaulted. To avoid the resistance damage of high-power iron during mass production, please do not weld the antenna directly to the module.

For industrial control applications, it is necessary to increase the mechanical strength and isolate the space from the application motherboard through standard 1.27mm header. While 11pin and 3pin headers are used for welding.

The antenna output port is ① IPEX adapter and IPEX to SMA adapter cable; ② SMA female is used to connect standard rubber rod antenna or sucker antenna. You can design the interface according to your own product

Please request module packaging from our technical support: SMT patch packaging, DIP direct insert packaging (reference diagram)
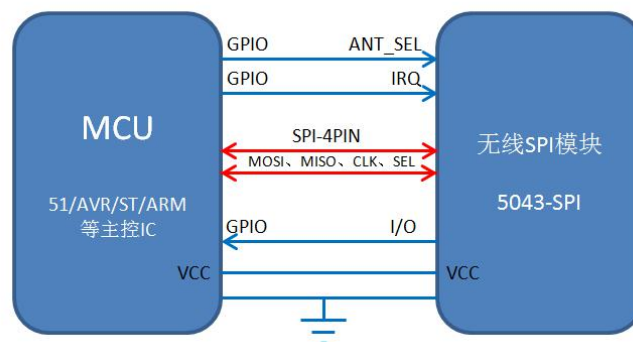
Package file format description:
*.ASC format imported with Protel99se;   *.DXF format imported with CAD;   *.PCB format opened with PADS software;
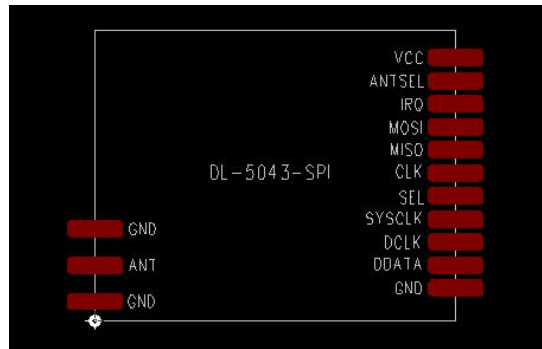
Module packaging: SMT mounting (DIP-1.27 need special application)

7. Connection between module and MCU

System Application Diagram

Note: the RF module adopts TTL level, please connect with MCU of TTL level, pay attention to the voltage is DC1.8-3.6V.

If you are using 5V MCU, it is necessary to convert SPI interface level or reduce MCU system voltage to 3.3V.

8. Module testing (measurement) reference:

Distance: 2100m transceiver stable, 2200m single direction reception

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9. Problems in module application

Considering the complexity of data transmission over the air, the radio frequency modulation method of the data, and some inherent characteristics of electromagnetic waves, the following issues should be considered during the application process.

1. The electromagnetic interference of the application environment will affect the actual distance of the remote control. Electromagnetic wave interference is divided into mainboard power supply interference, TFT screen data cable interference, Flash data exchange interference; and airborne carrier frequency interference, noise interference, high-power signal source interference, etc.

2. Factors such as product size, internal space, and coating of the shell will cause the attenuation of the wireless signal, which will affect the remote-control distance. Usually the narrow internal space of the product is not conducive to the extension of the antenna. The outer shell should avoid metal or metal plating as much as possible.

3. To choose a proper antenna is very important. The antenna is an important part of the communication system, and its performance directly affects the indicators of the communication system. We must pay attention to its performance (antenna type, antenna electrical performance) when selecting the antenna. Please feel free to contact us for consultation or recommendation, if you need.

10. Contact us

Shenzhen DreamLnk Technology Co., Ltd
★ Data collection, Smart home, Internet of Things applications, Wireless remote-control technology, Remote active RFID, Antennas ★

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