

Low Power FSK Two-way RF Transceiver Module

SPECIFICATION

Model No.: DL-RTA7139

Version: V1.0



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	V1.0	Standardized FSK Bidirectional Module, Basic Function Edition

DL-RTA7139 was designed base on AMICCOM A7139 wireless transceiver chip from Taiwan. It is a compact and low power wireless transceiver module. AMICCOM A7139 is an ISM band wireless transceiver chip, mainly set to 315/433/470/868/915/MHz ISM/SRD frequency bands, with very low power consumption (e.g.: under 434MHz band, power consumption in RX mode is just 3.8mA).

It is ideal for battery-powered long-distance wireless transmission, and provides a very good link budget, with high class E power output up to 20dBm, and a maximum transmission rate of 250Kbps. Users can easily develop wireless products with stable performance and high reliability by this module, without having a deep understanding of RF circuit design.

1. Features:

- Compact size, SMD stamp edge half-hole encapsulation;
- Operating frequency: 433.92 Mhz (other frequencies, 315M ~ 915MHz, can be customized);
- Transmission distance: open air around 1.2 km (indoor test: 10-layer stable transmission);
- Supports FSK, GFSK modulation and programmable control;
- The communication rate ranges from 2 Kbps to 250 Kbps, which is programmable;
- The maximum output power is 20dBm;
- High reception sensitivity: -119dBm@2kbps;
- Low power consumption, receiving current <4mA (AGC Off);
- Low power mode with power consumption <0.3uA, ideal for battery-powered wireless transmission in long distance
- Independent 64BYTE transmit/receive data buffer
- Switching time between standby and receive state can be set (WOR function), to reduce the power consumption
- Supports RSSI signal strength detection, and battery low-voltage detection
- Power supply: DC1.9~3.6V

2. Applications:

- | | |
|-------------------------------|---------------------------------|
| • ISM band data communication | • Intelligent Building |
| • Intelligent Home Security | • AMR (Automatic Mobile Robot) |
| • Wireless remote control | • Architectural Automation |
| • Wireless Sensor Network | • Energy Control and Management |

- RKE (Remote Keyless Entry) measurement

- Heat energy collection, meter

3. Technical Parameter

No	Characteristics	Parameter	Remark
1	Working voltage	1.9~3.6V DC	
2	Frequency range	433.92MHz	Other frequencies can be customized
3	Transmit power	-30~20dBm	Programmable
4	Receive sensitivity	-107dBm@100Kbps; -119dBm@2Kbps	FSK/433.92Mhz
5	Modulation	FSK/GFSK	Programmable
6	Transmission rate	2K~250Kbps	
7	Receiving current	<4mA	AGC Off
8	Transmission current	31mA@12.5dBm, 82mA@20dBm	
9	Standby current	<0.3uA	Please refer the chip working mode
10	Communication distance	1200m	In an open air
11	Working temperature	-20~85℃	

Remarks:

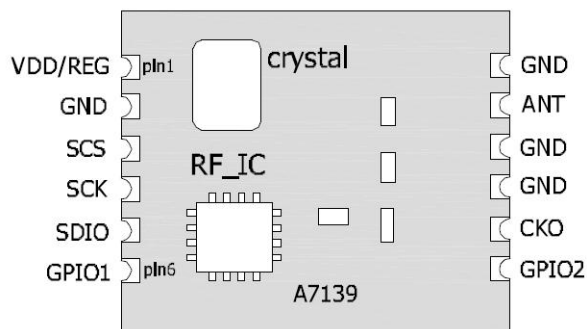
DL-RTA7139 has two prominent performance:

1. Full Receive state power consumption is only 3.8mA;
2. Support wide communication rate ranges from 2 Kbps to 250 Kbps.

FSK transceiver chips from Ti-chipcon, Silicon Labs, Semtech and other international brands which are currently used in ISM band applications, usually consume about 10 mA of receiving power. Most systems for industrial control and data acquisition are powered by batteries, and require a period of 3-5 years, while the average power consumption of the transceiver chips from above brands is relatively high.

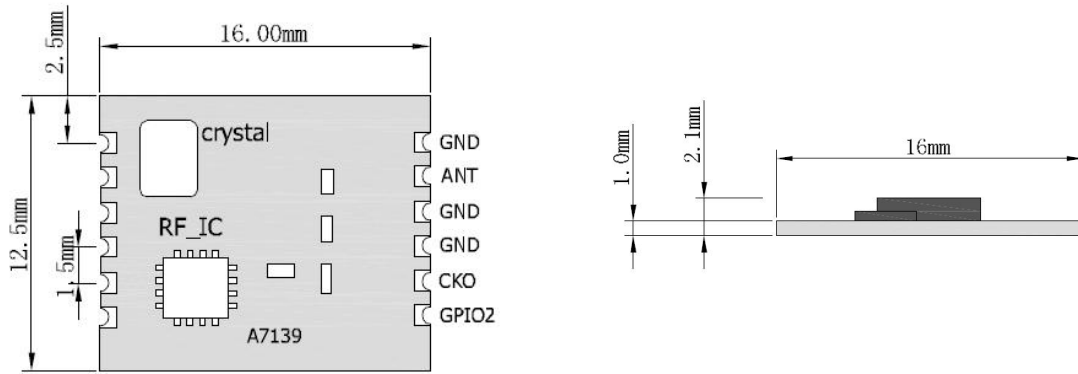
But this A7139 chip combines ultra-low power MCU and optimizes its software algorithms, which can achieve an optimal power planning.

4. Pins Definition:



No	Name	Description	Remark
PIN1	VDD/REG	Power supply	
PIN2	GND	Grounding, common ground with the system	
PIN3	SCS	CS input of SPI	DI
PIN4	SCK	Clock input of SPI	DI
PIN5	SDIO	SPI data interface	DI/O
PIN6	GPIO1	Digital signal IO/1 , SPI data output	DI/O
PIN7	GPIO2	Digital signal IO/2 , SPI data output	DI/O
PIN8	CKO	Digital signal SCLK output, SPI data output	DO
PIN9	GND	Grounding, common ground with the system	
PIN10	GND	Grounding, signal ground	The antenna shield is well grounded
PIN11	ANT	RF output, Antenna interface	
PIN12	GND	Grounding, signal ground	

5. 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.

In the process of the on-board application, please add a piece of microstrip line from the ANT output interface, with a width of more than 0.5mm, pave both sides with holes, add 1.5mm diameter and 0.9mm diameter pad at the end of the microstrip line to facilitate the welding of external high frequency adapter line, or spring antenna, single-core copper wire, etc.

Please request module packaging from our technical support: SMT patch packaging, DIP direct insert packaging (reference diagram)

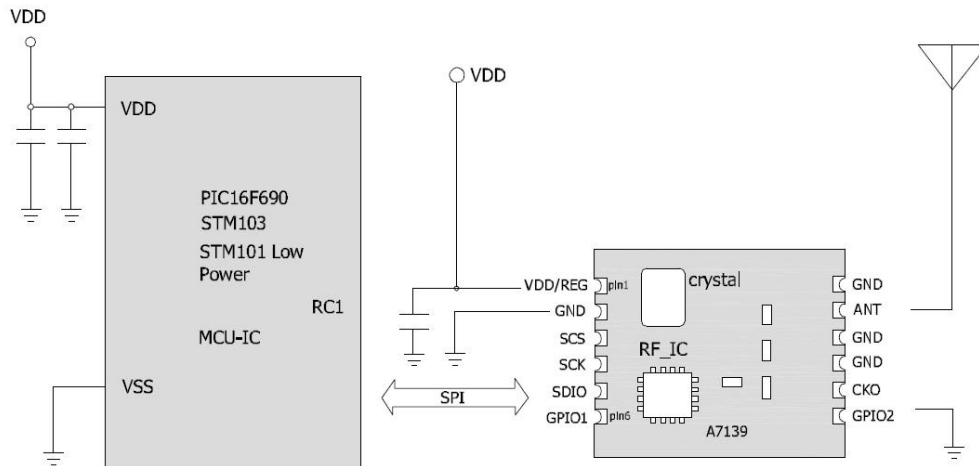
Package file format description:

*.ASC format imported with Protel99se; *.DXF format imported with CAD; *.PCB format opened with PADS software;



Module packaging: SMT mounting (steel mesh thickness < 1.2mm)

6. Connection between module and terminal equipment (TTL electrical level)



System Application Diagram

7. 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.

8. Contact us

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★ Data collection, Smart home, Internet of Things applications, Wireless remote-control technology, Remote

active RFID, Antennas ★

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