

# **HJ RF Module**

**SPEC**

**V1.0**

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# 1. Summary

## 1.1 Functions

Frequency band: 2405 ~ 2480MHz.

FSK or GFSK modulation

Low current consumption: RX 16mA, TX 20mA (at 0dBm output power).

Low sleep current (1.5 uA).

On chip regulator, support input voltage 2.0 ~ 3.6 V.

Programmable data rate from 2Kbps to 500Kbps.

Programmable TX power level from – 20 dBm to 1 dBm.

Ultra High sensitivity:

-95dBm at 500Kbps on-air data rate.

-97dBm at 250Kbps on-air data rate

-104dBm at 25Kbps on-air data rate

-107dBm at 2Kbps on-air data rate

Easy to use.

Support 3-wire or 4-wire SPI.

ONE register setting for new channel frequency.

8-bits Digital RSSI for clear channel indication.

Fast exchange mode during TRX role switching.

Auto RSSI measurement.

Auto Calibrations.

Auto IF function.

Auto CRC Check.

## 1.2 Application

Wireless keyboard and mice

Remote control

Helicopter and airplane radio controller

2400 ~ 2483.5 MHz ISM system

Wireless metering and building automation

Wireless toys and game controllers

## 2. Electrical characters

Item	Description	Remark
1	EUT Name	HJRF
2	EUT Function	2.4GHz Wireless Module
3	Operation Frequency	2405MHz-2480MHz
4	Modulation Technology	FSK OR GFSK
5	Manufacturer	Richmat
6	supply voltage	2.0-3.6V
7	Current consumption	1.5uA(RC OSC OFF,typical) @Sleep mode 0.3uA(RC OSC ON,typical) @Idle mode 1.9mA( typical) @Standby mode 9mA( typical) @PLL mode 16mA( typical) @RX mode 20mA( typical) @TX mode
8	Transmit output power	0 dBm
9	Rx sensitivity	-95 dBm Data rate 500K -97 dBm Data rate 250K dBm Data rate 25K -104 Data rate 2K -107 dBm
10	Interface	6 pin 2mm header
11	Dimension	23*12.5 (mm)
12	Operating temperature	-40 ~ 85°C

### 3. Absolute Maximum Ratings

Parameter	With respect to	Rating	Unit
Supply voltage range (VDD)	GND	-0.3 ~ 3.6	V
Digital IO pins range	GND	-0.3 ~ VDD+0.3	V
Voltage on the analog pins range	GND	-0.3 ~ 2.1	V
Input RF level	5	dBm	
Storage Temperature range	-55 ~ 125	C	
ESD Rating	HBM	$\pm 2K$	V
MM	$\pm 100$	V	

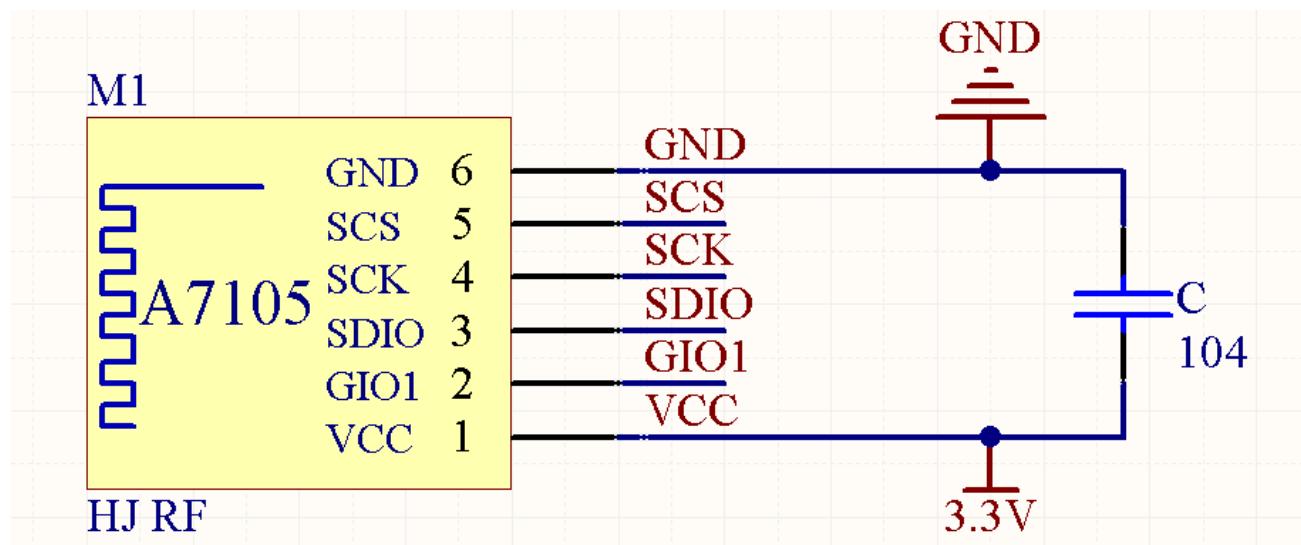
\*Stresses above those listed under “Absolute Maximum Rating” may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

\*Device is ESD sensitive. Use appropriate ESD precautions. HBM (Human Body Mode) is tested under MIL-STD-883F Method 3015.7. MM (Machine Mode) is tested under JEDEC EIA/JESD22-A115-A.

\*Device is Moisture Sensitivity Level III (MSL 3)

## 4. Pin assignment

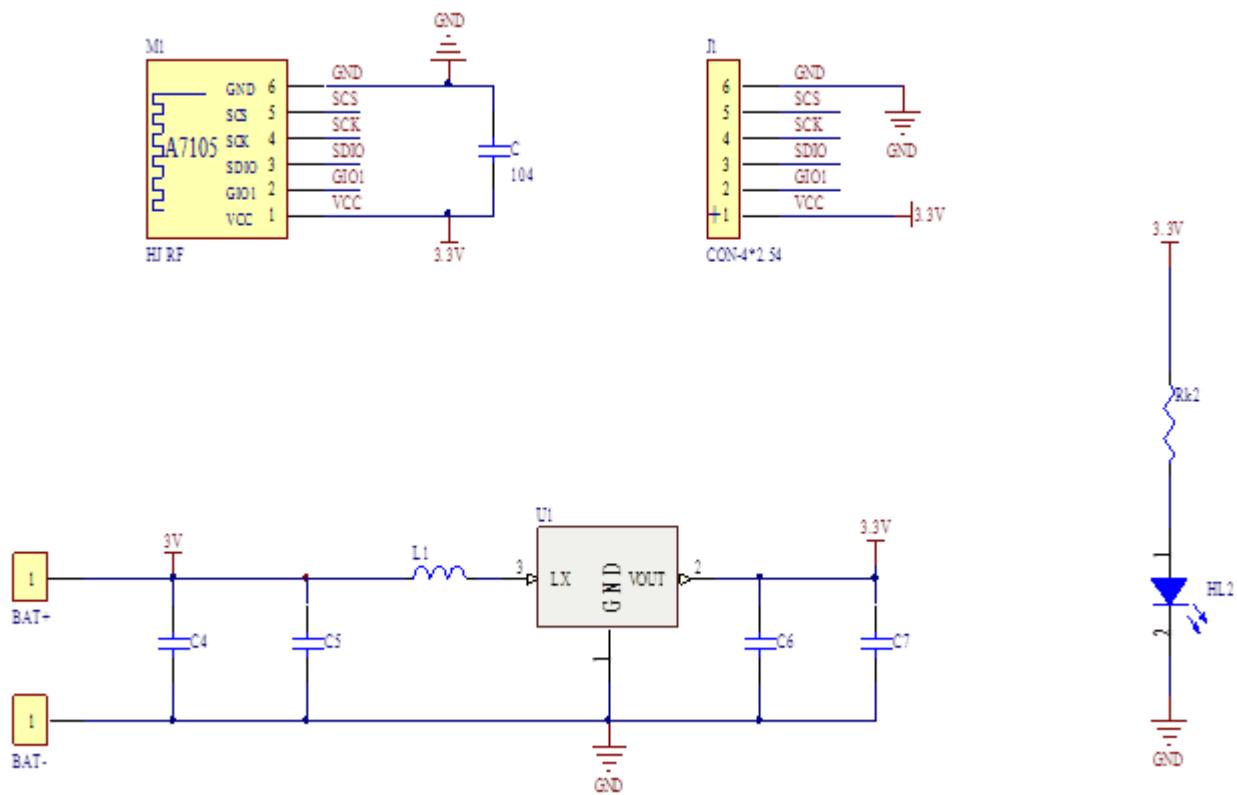
### 4.1 pin distribution



### 4.2 Pin definition

Pin No.	Symbol	Function Description
1	GND	Ground
2	SCS	3 wire SPI chip select
3	SCK	3 wire SPI clock input pin
4	SDIO	3 wire SPI read/writer data pin
5	GIO1	Multi-function GIO1/4-wire SPI data output
6	VCC	RF Module Supply voltage input

## 5. Reference schematic



## 6. Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Information for the use by the grantee in their own products

This device is intended for grantee only. Please see the full grant of equipment document for restrictions.

### **Label Information to the End User by the OEM Integrators**

If this certified module is installed inside the host device, then the outside of the host must be labeled with "Contains FCC ID: 2AJJGHJRF".

## 7. The requirement for KDB 996369 D03:

### 7.1 List of applicable FCC rules

FCC Part 15. 249.

### 7.2 Summarize the specific operational use conditions

None

### 7.3 Limited module procedures

When the limited module is installed in the host product, a C2PC is required on the module grant to register the additional host as a specific host also approved with the module. Please refer to the C2PC test plan for details.

### 7.4 Trace antenna designs

The module uses the permanent PCB antenna, so this requirement is not applicable to the product.

### 7.5 RF exposure considerations

The host device manufacturer should confirm that a separation distance of 20 cm or more should be maintained between the antenna of this host device and persons during the host device operation.

### 7.6 Antennas

PCB antenna, 0dBi

### 7.7 Label and compliance information

If this certified module is installed inside the host device, then the outside of the host must be labeled with "Contains FCC ID: 2AJJGHJRF".

### 7.8 Information on test modes and additional testing requirements

The host manufacturer can use the software to make RF transmit continuously.

### 7.9 Additional testing, Part 15 Subpart B disclaimer

The module only complies with the FCC Part 15.249. If the module is installed in the host device, the host manufacturer is responsible for the compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. For example, if the host manufacturer markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the host manufacturer shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

## C2PC test plan

The module has no RF shielding as required in 15.212(a) (1)(i) and it does not contain its own power supply regulation as required in 15.212(a) (1)(iii), as required in KDB 996369 D01 V04r02, C2PC is required for every different specific host using the module.

The following tests will be performed according to FCC Part 15.249 on the host which installed this LMA.

### **Check the operation frequency range**

Verify 2405MHz and 2480MHz channels to ensure the OFR falls within 2400-2483.5MHz.

### **Radiated Emissions (band edge)**

Verify 2405MHz and 2480MHz channels to that the host also meets band edge requirements.

### **Radiated Spurious Emissions**

Verify 2405MHz and 2480MHz channels to ensure that the host also meets Radiated Spurious Emissions requirements.

### **Power Line Conducted Emissions (FCC Part 15.207)**