# HJ  RF Module

## SPEC

## V1.0

# Index

# 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<br>0.3uA(RC OSC ON,typical) @Idle mode<br>1.9mA( typical) @Standby mode<br>9mA( typical) @PLL mode<br>16mA( typical) @RX mode<br>20mA( typical) @TX mode |
| 8 | Transmit output power | 0 dBm |
| 9 | Rx sensitivity | -95 dBm  Data rate 500K<br>-97 dBm  Data rate 250K  -104 dBm  Data rate 25K  -107 dBm  Data rate 2K |
| 10 | Interface | 6 pin 2mm header |
| 11 | Dimension | 23*12.5 (mm) |
| 12 | Operating temperature | -40 ~ 85℃ |

# 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 | ± 2K | V |
| MM | ± 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.

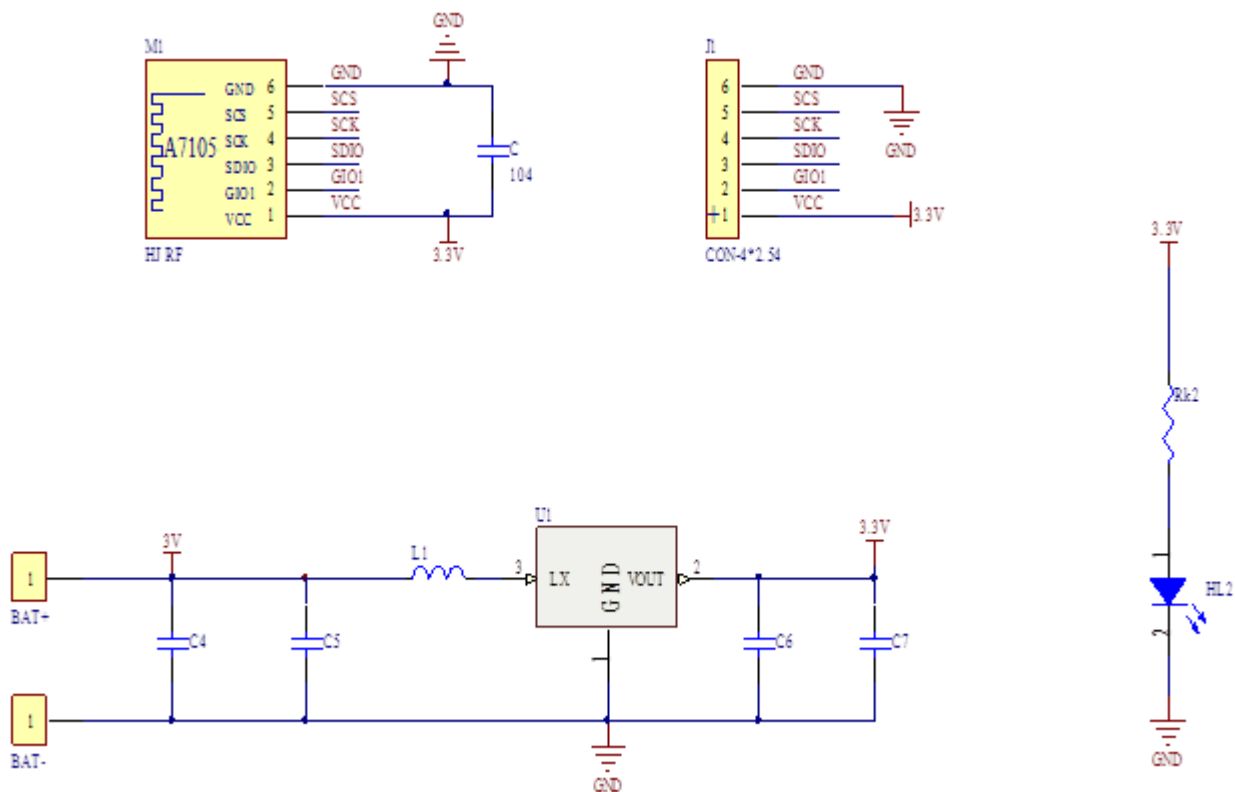*Device is Moisture Sensitivity Level III (MSL 3)

# 4. Pin assignment

## 4.1pin distribution
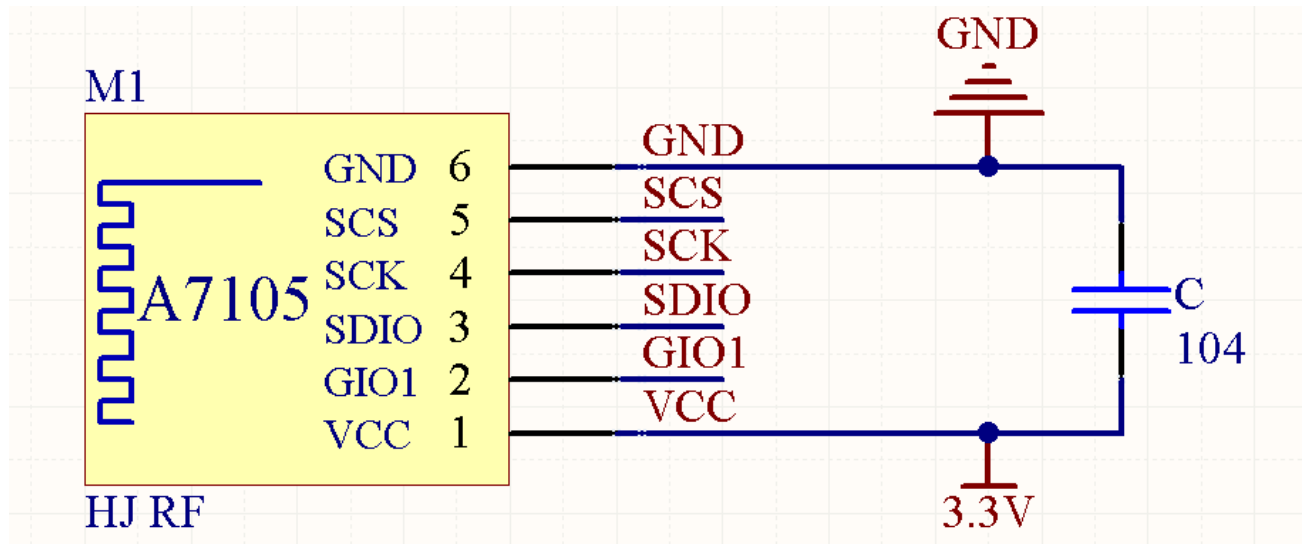


## 4.2Pin definition

| 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 OEM Integrators**
This device is intended for OEM integrators 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
The Module is limited to manufacturer's host devices only.

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 circuity), 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.