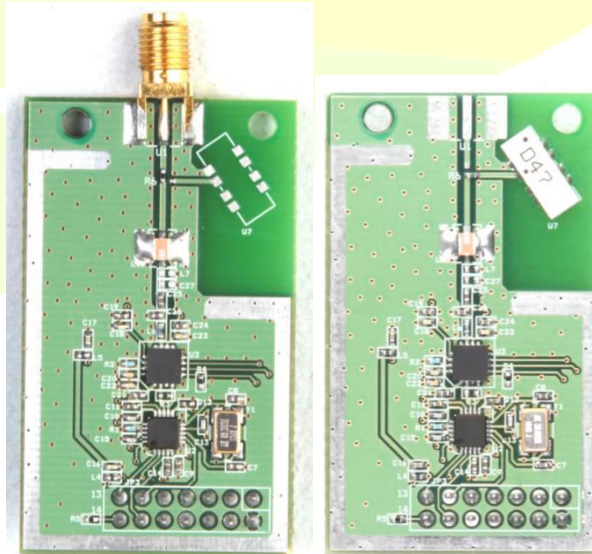


Technical Datasheet for RDM-T24FZ-LR

Long Range RF Transceiver Module in 2.4 GHz



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Document Revision History

| Version No. | Release Date | Description of Changes |
|-------------|-------------------|------------------------|
| 1.0 | February 26, 2011 | Initial Release |



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1. Overview

The RF transceiver module RDM-T24FZ-LR is a long range device designed for very low-power wireless applications. The circuit is mainly intended for the 2400 to 2483.5 MHz ISM (Industrial, Scientific and Medical) and SRD (Short Range Device) frequency band. The RF transceiver is integrated with a highly configurable baseband modem. The modem supports various modulation formats and has a configurable data rate up to 500 kbps. The module provides extensive hardware support for packet handling, data buffering, burst transmissions, clear channel assessment, link quality indication, and wake-on-radio. The main operating parameters and the 64-byte transmit/receive FIFOs of the module can be controlled via an SPI interface. A 4-wire SPI serial interface is used for configuration and data buffer access.

There are two variants to the RF module. The variant RDM-T24FZ-LR-SMA comes with an edge mount female SMA connector. A 2.4 GHz whip antenna with a male SMA connector can be used along with this module. The variant RDM-T24FZ-LR-CA comes with an on-board chip antenna.

2. Key Features

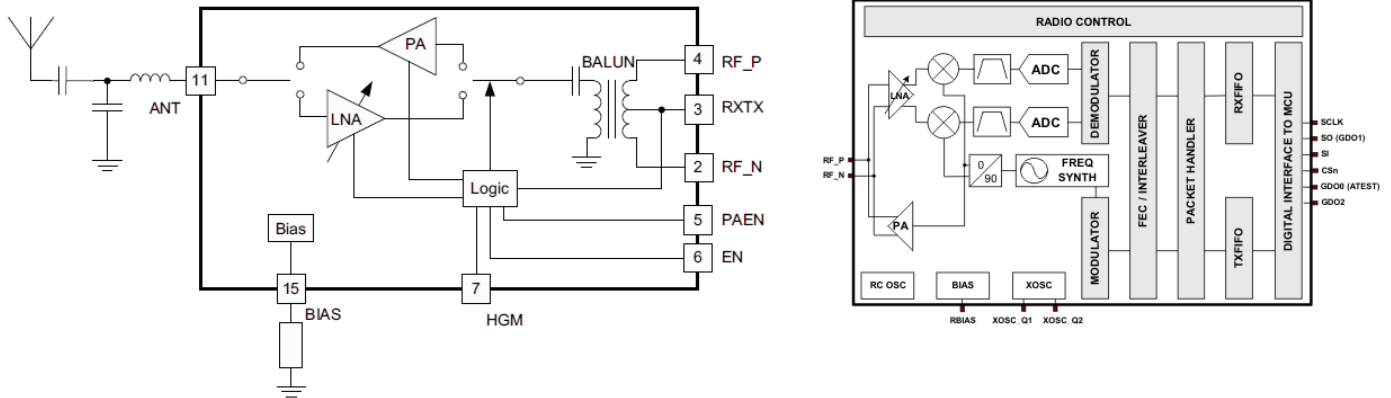
- High sensitivity (-104 dBm at 2.4 kBaud, 1% packet error rate)
- Programmable output power up to +20 dBm.
- Excellent receiver selectivity and blocking performance
- Programmable data rate from 1.2 to 500kBaud
- Frequency band: 2400-2483.5 MHz
- 2-FSK, GFSK, and MSK supported as well as OOK
- Integrated analog temperature sensor
- Digital RSSI output
- Programmable Carrier Sense (CS) indicator
- Optional automatic whitening and de-whitening of data
- Wake-on-radio functionality for automatic low-power RX polling
- Separate 64-byte RX and TX data FIFOs (enables burst mode data transmission)

3. Application Areas

- Industrial monitoring and control
- Home and building automation
- Automatic Meter Reading
- Wireless sensor networks
- Remote controls
- Consumer electronics
- Wireless medical applications

- Security systems
- Automotive systems
- Active RFID solutions

4. Functional Block Diagram



5. Pin Configuration and Function Description



| Pin No. | Pin Name | Description |
|---------|----------|---|
| 1 | Vcc | Positive Power Supply (3.6V DC) |
| 2 | Gnd | Power Supply Ground |
| 3 | NC | NC |
| 4 | NC | NC |
| 5 | HGM | Digital control pin. HGM=1 → Device in High Gain Mode HGM=0 → Device in Low Gain Mode (RX only) |
| 6 | NC | NC |
| 7 | PAEN | Amplifier Enable |
| 8 | GDO0 | Digital output pin for general use: <ul style="list-style-type: none"> • Test signals • FIFO status signals • Clear Channel Indicator • Serial output RX data • Serial input TX data |
| 9 | SI | Serial configuration interface, data input |
| 10 | SO | Serial configuration interface, data output |
| 11 | CSN | Serial configuration interface, chip select |
| 12 | GDO2 | Digital output pin for general use: <ul style="list-style-type: none"> • FIFO status signals • Clear Channel Indicator • Clock output, down-divided from XOSC • Serial output RX data |
| 13 | SCLK | Serial configuration interface, clock input |
| 14 | EN | LNA enable |

6. Device Specifications

6.1. General Specifications

| Parameter | Min | Typ | Max | Unit |
|-----------------------|-----|---------------|-----|-------|
| Dimensions | | 52.28 x 31.37 | | Mm |
| Weight | | 20 | | grams |
| Operating Temperature | -40 | | +85 | °C |
| Humidity | 20 | | 85 | %RH |
| Supply Voltage | 1.8 | | 3.6 | V |

6.2. Transmitter Specifications

| Parameter | Min | Typ | Max | Unit |
|------------------------------|------|-------|---------|------|
| Frequency Range | 2400 | | 2483.50 | MHz |
| Data Rate | 1 | | 500 | Kbps |
| Maximum Power | | +20 | | dBm |
| Minimum Power | | -5 | | dBm |
| Harmonics | | | | |
| Second Harmonic | | -41.1 | | dBc |
| Third Harmonic | | -37.3 | | dBc |
| Transmit Current Consumption | | | | |
| 0 dBm | | 42 | | mA |
| 20 dBm | | 60 | | mA |
| Sleep Current Consumption | | <1 | | μA |

6.3. Receiver Specifications

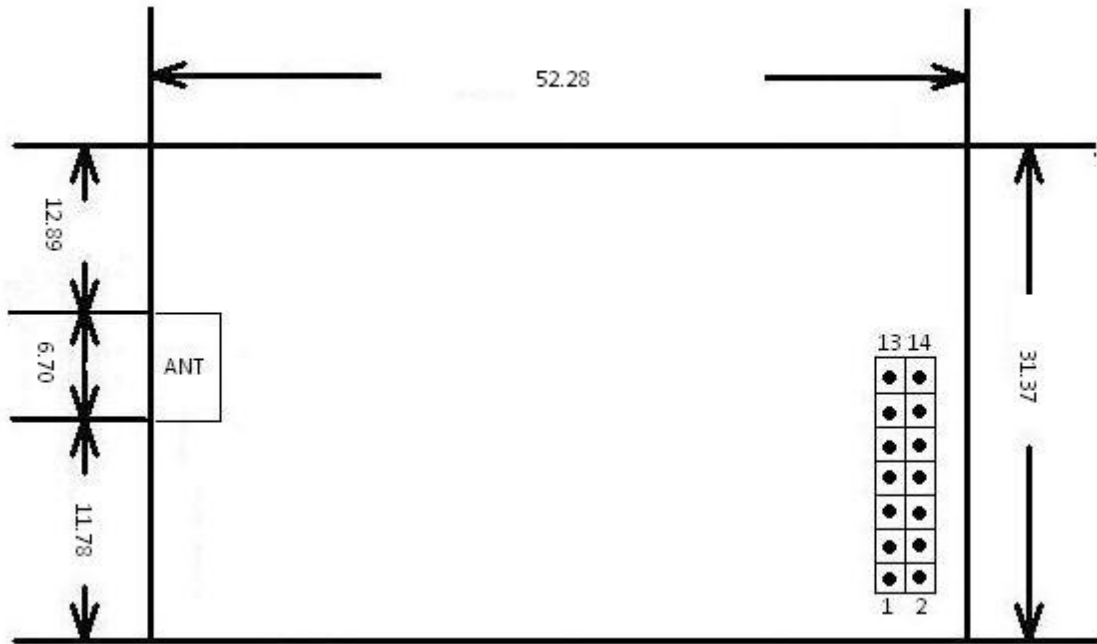
| Parameter | Min | Typ | Max | Unit |
|------------------------------|-----|------|-----|------|
| Receiver Current Consumption | | 20 | | mA |
| Sensitivity | | | | |
| 2.4 kbps | | -104 | | dBm |
| 10 kbps | | -99 | | dBm |
| 250 kbps | | -89 | | dBm |
| Adjacent Channel Rejection | | | | |
| 250kHz channel spacing | | 23 | | dB |

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



7. Mechanical Drawings



8. Example Circuit

The example circuit shown below explains how to connect the RDM-T24FZ-LR-SMA/CA module to a microcontroller (R8C27). This sample schematic can be used to develop an experimental board for testing the module.

9. Custom Applications

For cost-sensitive and custom applications, such as wireless sensors and AMR, Reindeer Technologies can embed the application software directly into a microcontroller built into the module. For more information on this service, please contact Reindeer Technologies.

10. Reference

For detailed information about programming the RDM-T24FZ-LR-SMA/CA module, please consult the current CC2500 and CC2591/90 datasheet which can be found at <http://www.ti.com>.

11. Ordering Information

| Ordering Part Number | Description |
|----------------------|--|
| RDM-T24FZ-LR-SMA | RF Transceiver Module in 2400 to 2500 MHz with External Antenna |
| RDM-T24FZ-LR-CA | RF Transceiver Module in 2400 to 2500 MHz with Internal Chip Antenna |

12. Contact Us

12.1 Technical Support

Reindeer Technologies Pvt. Ltd. has built a solid technical support infrastructure so that you can get answers to your questions when you need them. Our technical support engineers are available Mon-Fri between 9:00 am and 6:30 pm Indian standard time.

The best way to reach a technical support engineer is to send an email to support@reindeersystems.com. E-mail support requests are given priority because we can handle them more efficiently than phone support requests.

12.2 Sales Support

Our sales department can be reached via e-mail at sales@reindeersystems.com or by phone at +91-44-45022335. Our sales department is available Mon-Fri between 9:00 am and 6:30 pm.



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