

ECSiNG 131-BS

ECSiNG CC1101 Wireless RF Transceiver Module User Manual

Model: 131-BS

1. INTRODUCTION

This manual provides comprehensive instructions for the ECSiNG CC1101 Wireless RF Transceiver Module. This module is designed for low-power wireless applications, offering reliable data transmission and reception across multiple frequency bands. It is compatible with Arduino platforms, making it suitable for various DIY and embedded projects requiring wireless communication.

2. PRODUCT FEATURES

- **Frequency Compatibility:** Supports 315 MHz, 433 MHz, 868 MHz, and 915 MHz bands.
- **Modulation Support:** Compatible with 2-FSK, GFSK, and MSK modulation schemes.
- **High Reception Sensitivity:** Achieves -110 dBm at 1200 baud.
- **Flexible Data Rate:** Operates from a minimum of 1.2 kbps to a maximum of 500 kbps.
- **Independent FIFO Buffers:** Features 64-byte independent RX and TX data FIFO buffers.
- **Reliable Data Transmission:** Integrated CRC error detection ensures data integrity.
- **Signal Monitoring:** Supports RSSI (Received Signal Strength Indication) and carrier sense functions.
- **Low Power Consumption:** Designed for energy-efficient operation.
- **Programmable Communication Address:** 256 communication addresses programmable via SPI.
- **Adjustable Output Power:** Programmable output power up to +10 dBm across all supported frequencies.
- **WOR Functionality:** Wake-On-Radio function for reduced power consumption during idle states.
- **Fast Frequency Synthesizer:** Enables quick frequency hopping.

3. COMPONENTS INCLUDED

The package typically includes the following items:

- ECSiNG CC1101 Wireless RF Transceiver Module
- SMA Antenna Rod

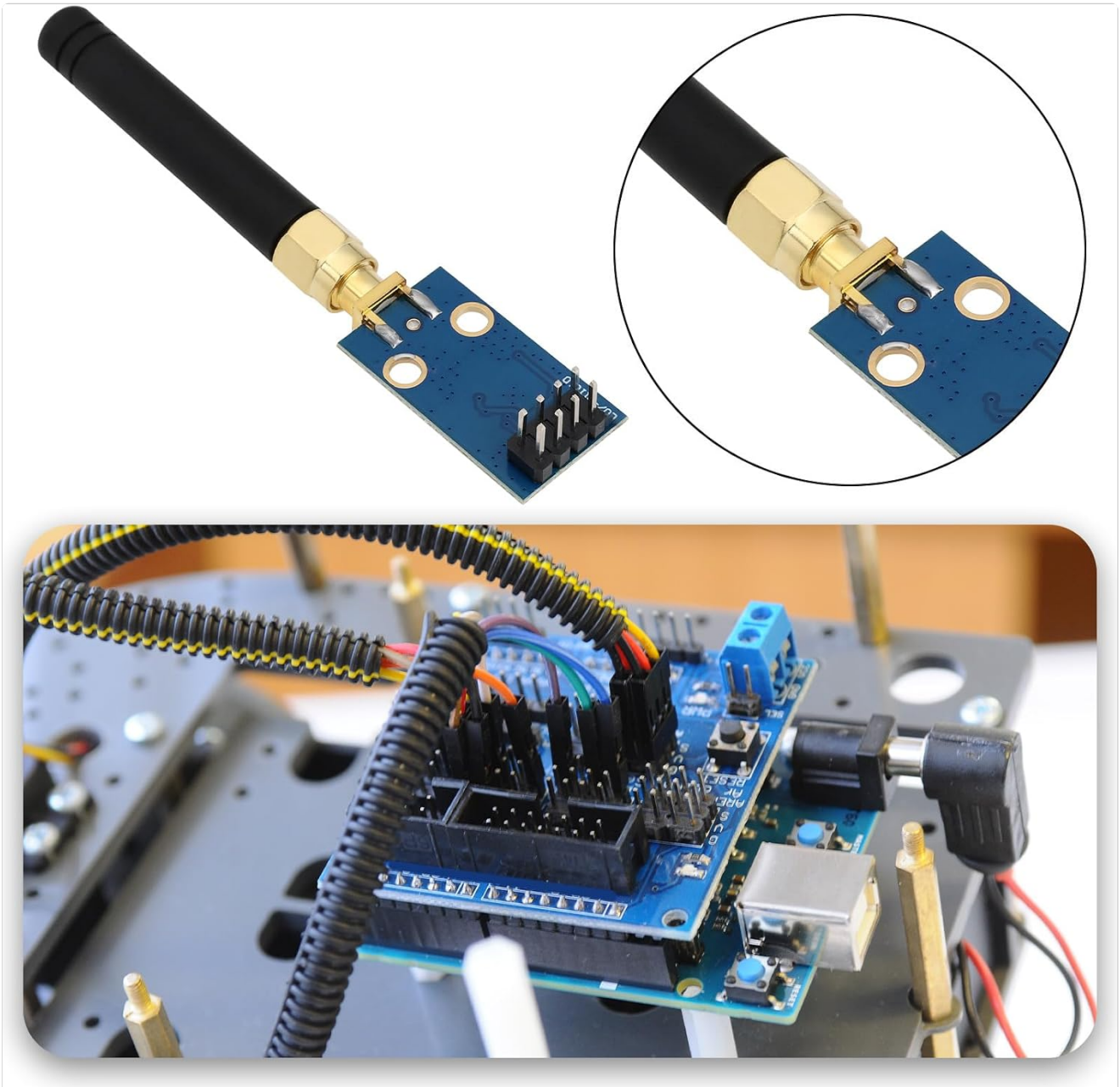


Image 3.1: The ECSiNG CC1101 module with its attached SMA antenna rod, showing the compact design and the antenna connector.

4. PINOUT DIAGRAM

Understanding the pinout is crucial for correct connection to your microcontroller. The module typically features an 8-pin header.



Image 4.1: Bottom view of the CC1101 module, illustrating the 8-pin header for connection to a microcontroller. Pin labels are typically printed on the PCB.

Common pin assignments (refer to module's specific markings for confirmation):

- **VCC:** Power supply (typically 3.3V)
- **GND:** Ground
- **CSN (Chip Select Not):** SPI Chip Select pin
- **SCK (Serial Clock):** SPI Clock pin
- **MOSI (Master Out Slave In):** SPI Data Out pin
- **MISO (Master In Slave Out):** SPI Data In pin
- **GDO0 (General Purpose Data Output 0):** Configurable interrupt/status output
- **GDO2 (General Purpose Data Output 2):** Configurable interrupt/status output

5. SETUP AND CONNECTION

To integrate the CC1101 module with an Arduino, follow these general steps:

1. **Attach Antenna:** Securely screw the SMA antenna rod onto the module's SMA connector.
2. **Power Connection:** Connect the VCC pin of the CC1101 module to the 3.3V output of your Arduino. Connect the GND pin to the Arduino's GND.
3. **SPI Connection:** Connect the SPI pins (CSN, SCK, MOSI, MISO) of the CC1101 module to the corresponding SPI pins on your Arduino. These are typically digital pins 10-13 on most Arduino boards, but may vary (e.g., ICSP header).
4. **GDO Pins:** Connect GDO0 and GDO2 to digital input pins on your Arduino. These pins can be configured to signal various events, such as packet reception or transmission completion.
5. **Software Setup:** Install a compatible CC1101 library for Arduino IDE. Examples and documentation for the chosen library will guide you through initialization and communication.

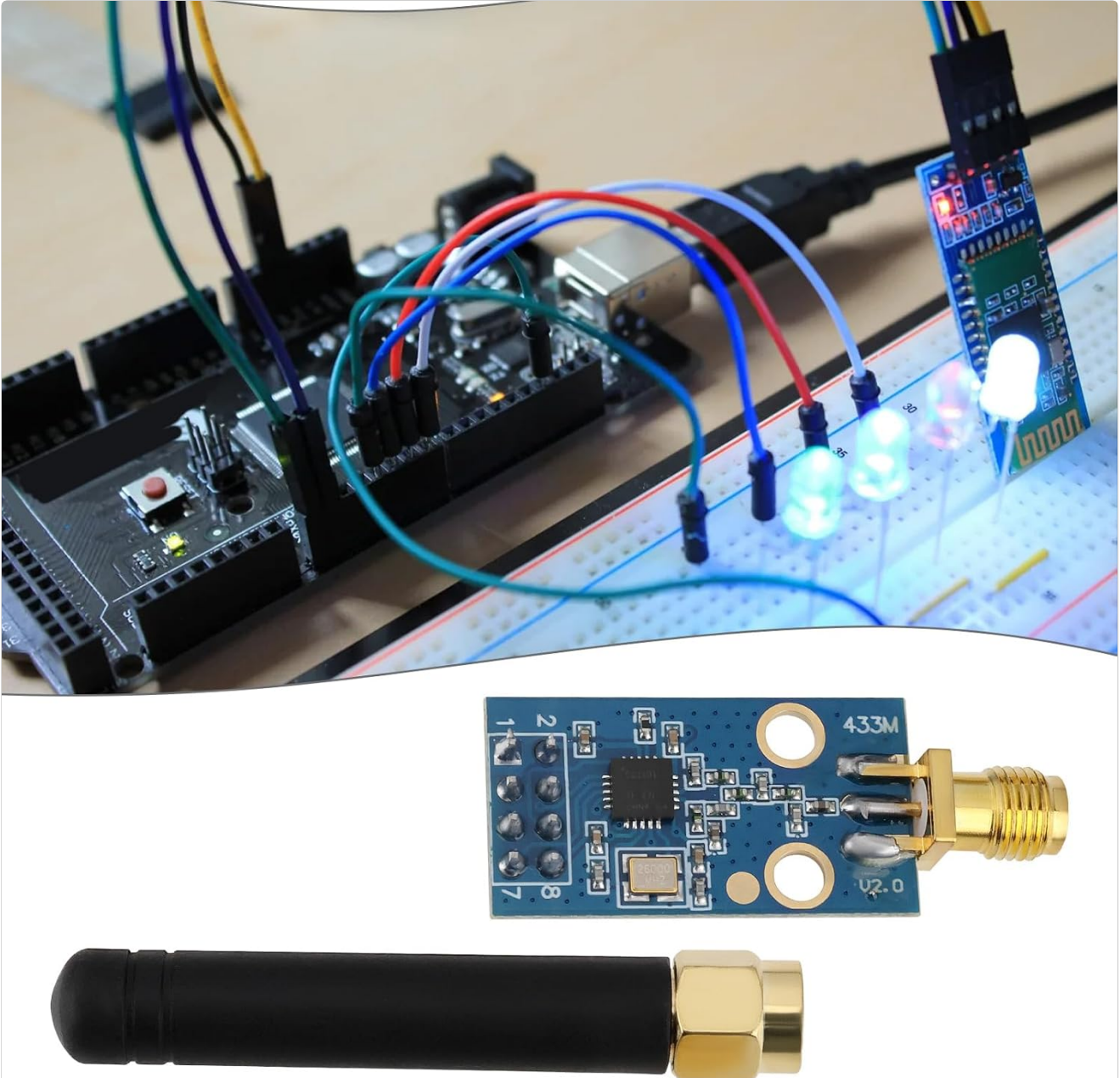


Image 5.1: An example setup showing the CC1101 module connected to an Arduino board and a breadboard with additional components, demonstrating a typical wiring configuration.

6. OPERATING PRINCIPLES

The CC1101 module operates as a half-duplex transceiver, meaning it can either transmit or receive data at any given time, but not simultaneously. Communication is managed via the SPI interface, where the microcontroller sends commands and data to the CC1101 and reads its status and received data.

6.1. Data Transmission

To transmit data, the microcontroller writes the data into the CC1101's TX FIFO buffer via SPI. Once the data is loaded, a command is issued to put the CC1101 into transmit mode. The module then modulates the data onto the selected RF carrier frequency and sends it through the antenna. The GDO pins can be configured to signal when transmission is complete.

6.2. Data Reception

For reception, the microcontroller commands the CC1101 to enter receive mode. The module continuously listens for incoming RF signals on the configured frequency. When a signal is detected and a valid packet (with correct synchronization and CRC) is received, the data is stored in the RX FIFO buffer. The GDO pins can be configured to generate an interrupt, notifying the microcontroller that new data is available to be read from the RX FIFO via SPI.

6.3. Power Management (WOR)

The Wake-On-Radio (WOR) function allows the module to periodically enter a low-power sleep state and wake up to check for incoming signals. This significantly reduces overall power consumption, making it ideal for battery-powered applications. The wake-up interval is programmable, balancing power saving with responsiveness.

7. TECHNICAL SPECIFICATIONS

Feature	Specification
Brand	ECSiNG
Model Number	131-BS
Supported Frequencies	315 MHz, 433 MHz, 868 MHz, 915 MHz
Modulation Types	2-FSK, GFSK, MSK
Reception Sensitivity	-110 dBm (at 1.2 kbps baud rate)
Data Rate	1.2 kbps to 500 kbps
FIFO Buffers	64-byte independent RX and TX
Error Detection	Integrated CRC
Signal Features	RSSI, Carrier Sense
Communication Interface	SPI
Programmable Addresses	256
Output Power	Up to +10 dBm
Power Saving	Wake-On-Radio (WOR) function
Origin	China

8. TROUBLESHOOTING

• No Communication:

- Verify all wiring connections, especially for VCC, GND, and SPI pins.
- Ensure the module is receiving 3.3V power.
- Check that the correct SPI pins are used on the Arduino and in your code.

- Confirm the CC1101 library is correctly installed and initialized.
- **Poor Range/Interference:**
 - Ensure the SMA antenna is securely attached.
 - Check for physical obstructions between transceivers.
 - Verify that both modules are configured to the same frequency band and modulation settings.
 - Avoid placing the module near other RF-emitting devices or strong electromagnetic fields.
- **Data Corruption:**
 - Confirm that CRC error detection is enabled and functioning.
 - Ensure data rates and packet structures are consistent between sender and receiver.
 - Check for potential power supply noise affecting the module.

9. MAINTENANCE

The ECSiNG CC1101 module is a low-maintenance device. To ensure optimal performance and longevity:

- **Keep Clean:** Avoid dust and debris accumulation on the module's PCB. Use a soft, dry brush if cleaning is necessary.
- **Handle with Care:** Electronic components are sensitive to electrostatic discharge (ESD). Handle the module by its edges and use appropriate ESD precautions.
- **Environmental Conditions:** Operate and store the module within recommended temperature and humidity ranges to prevent damage.
- **Antenna Connection:** Ensure the antenna is always securely connected during operation to prevent damage to the RF output stage.

10. WARRANTY AND SUPPORT

Information regarding specific warranty terms and conditions for the ECSiNG CC1101 Wireless RF Transceiver Module is not available in the provided product details. For warranty claims or technical support, please contact your retailer or the manufacturer directly.

Please refer to the original purchase documentation or the ECSiNG official website for the most current support information.