QCCAN 433mhz Wireless RF Transmitter and Receiver Module

QCCAN 433MHz Wireless RF Transmitter and Receiver Module DIY Kit Instruction Manual

Model: 433mhz Wireless RF Transmitter and Receiver Module

1. Introduction

This instruction manual provides detailed information for the QCCAN 433MHz Wireless RF Transmitter and Receiver Module DIY Kit. This kit is designed for various wireless control applications, including remote switches, smart home devices, and other DIY electronics projects. It utilizes ASK/OOK modulation for reliable data transmission.

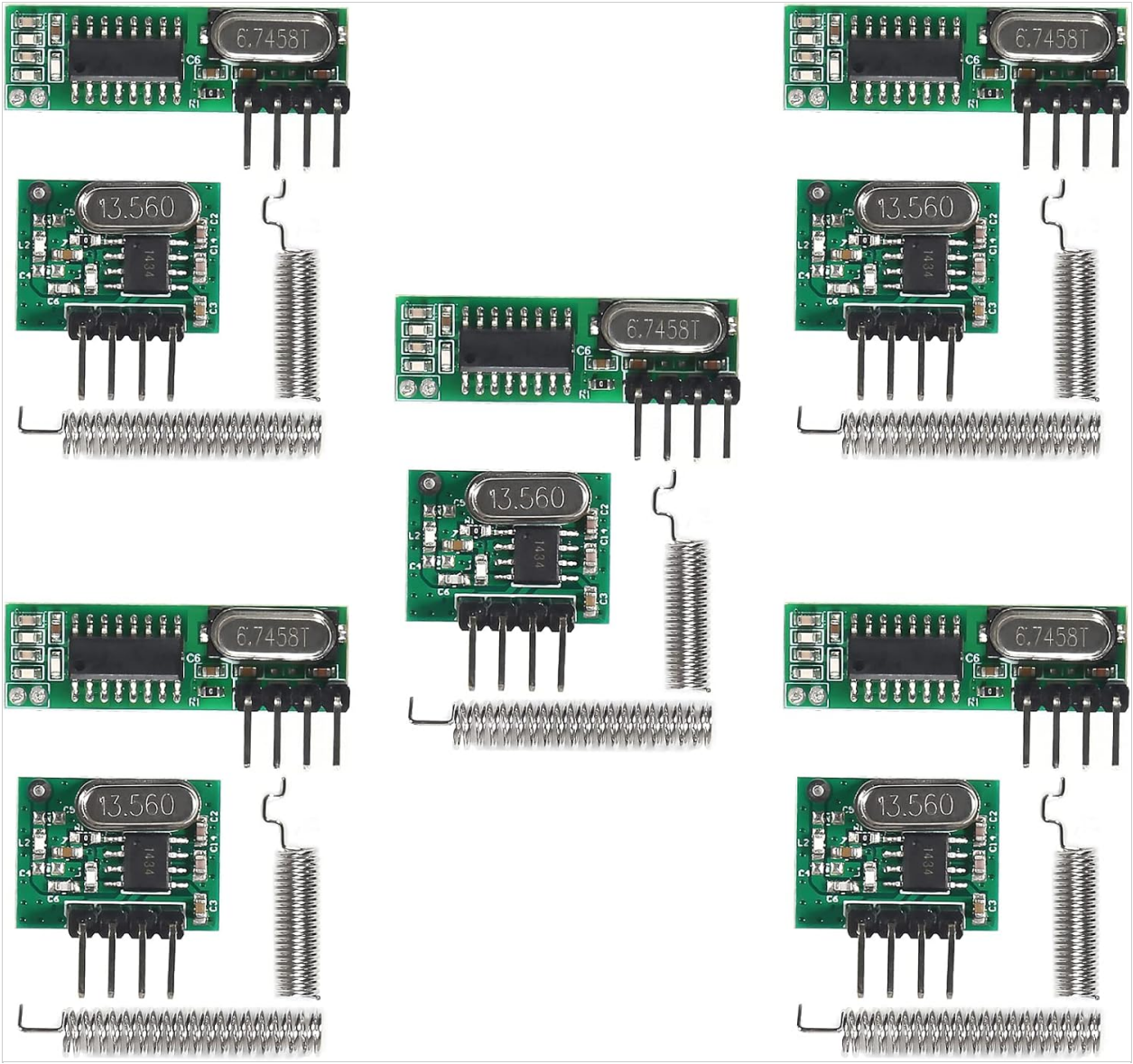

Image 1.1: Overview of the QCCAN 433MHz Wireless RF Transmitter and Receiver Module Kit, showing multiple transmitter and receiver units with their respective antennas.

2. Safety Information

[WARNINGS]

- Do not dispose of batteries in a fire.
- Do not open the device.
- Keep away from water or moisture.
- Use correct batteries.
- Avoid extreme temperatures.
- Do not use near other wireless devices that may cause interference.
- Consult this user manual for specific warnings and operational guidelines.

3. Product Overview

The QCCAN 433MHz RF Transmitter and Receiver modules are compact units designed for wireless communication in DIY projects. They support ASK (Amplitude Shift Keying) and OOK (On-Off Keying) modulation, offering a receiver sensitivity of -108dBm. The modules operate within a voltage range of 2.2V to

5V and have an operating frequency of 433.92 MHz with a bandwidth of approximately ±150KHz.
These modules feature low-power performance and a high dynamic range (greater than 60dB). Each module integrates a highly integrated chip, including a front-end low-noise amplifier, mixers, filters, and a frequency synthesizer circuit, to optimize signal reception and transmission.
Common applications include wireless power switches, remote control sockets, smart home products, remote control curtains, and remote MP3 player controls.

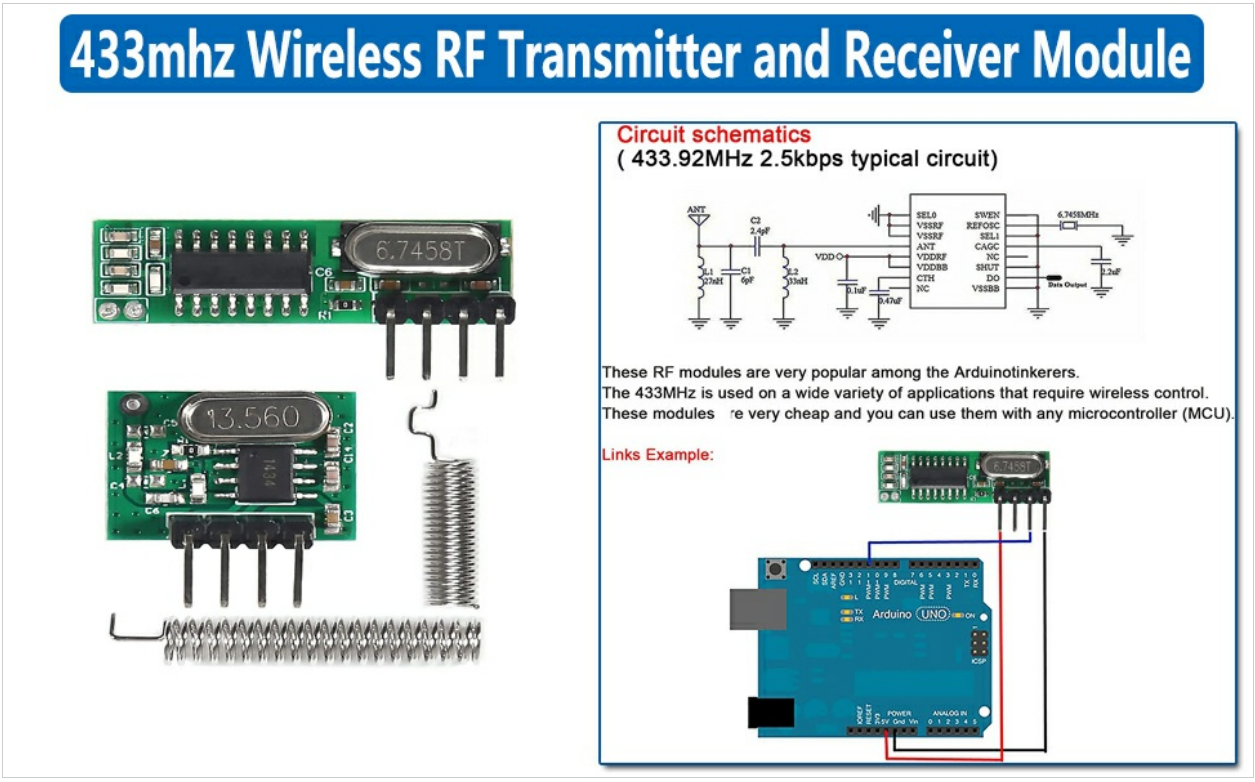

Image 3.1: Detailed view of the transmitter and receiver modules alongside a typical circuit schematic, illustrating their compact design and basic connections.

4. Specifications

Feature	Value
Operating Frequency	433.92 MHz
Modulation Type	ASK / OOK
Receiver Sensitivity	-108dBm
Input Voltage Range	2.2V - 5V
Bandwidth	±150KHz
Transmitter Power	> 11 dBm
Package Dimensions	4.37 x 2.05 x 0.55 inches (overall kit)
Item Weight	0.774 ounces (0.02 Kilograms)
Material	Metal (components)

5. Pin Definitions

Understanding the pin assignments is crucial for correct integration of these modules into your projects.

5.1 Receiver Module Pinout

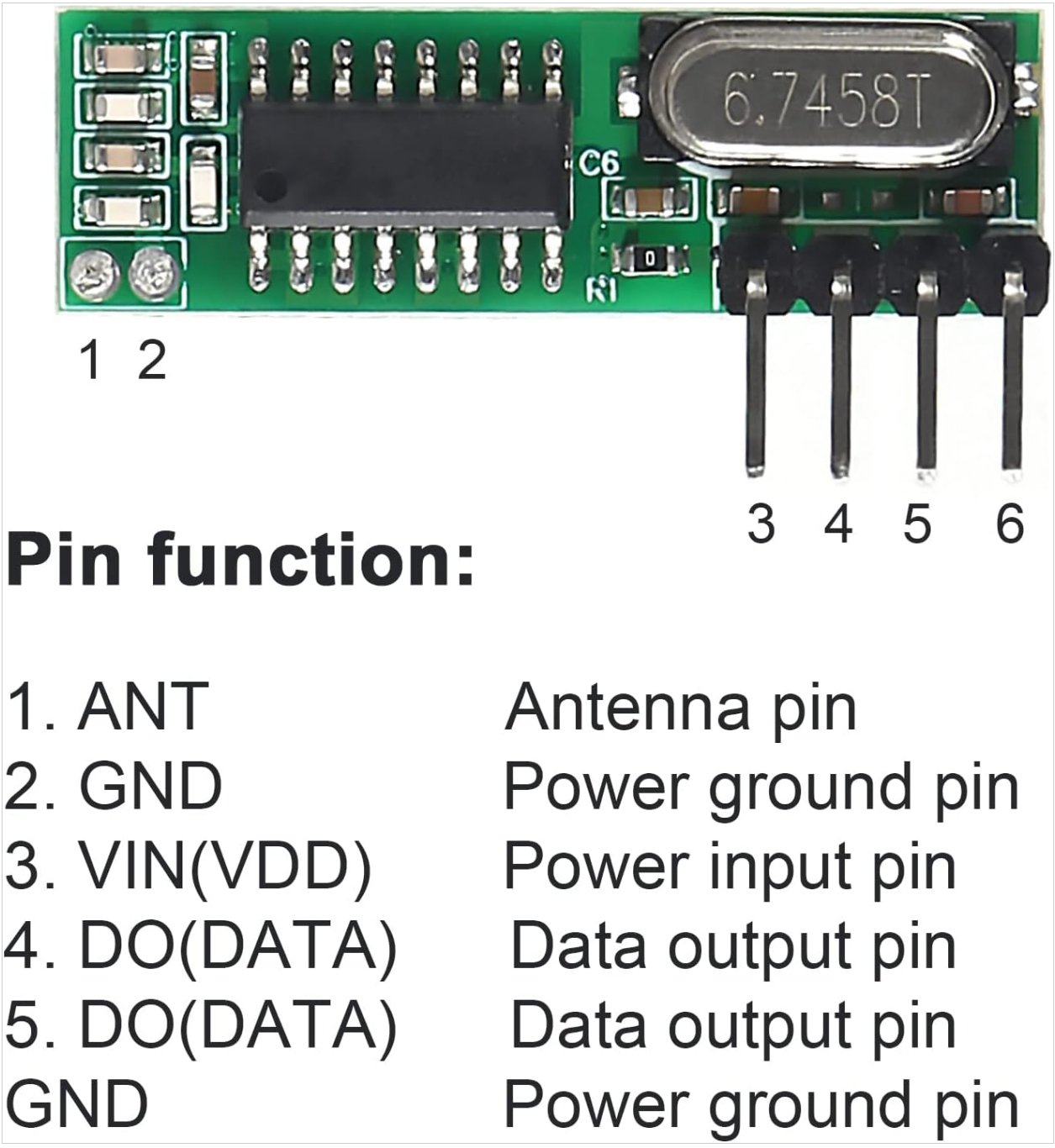

Image 5.1: Diagram showing the pin functions for the receiver module. Pins are labeled 1 through 6.

- **1. ANT:** Antenna pin. Connect the provided spring antenna here.
- **2. GND:** Power ground pin.
- **3. VIN (VDD):** Power input pin (2.2V-5V).
- **4. DO (DATA):** Data output pin.
- **5. DO (DATA):** Data output pin. (Both data output pins are typically connected internally and provide the same signal).
- **6. GND:** Power ground pin.

Note: Some modules may have two data output pins (DO) which are usually redundant. Both antenna pins should be connected to the antenna for optimal performance.

5.2 Transmitter Module Pinout

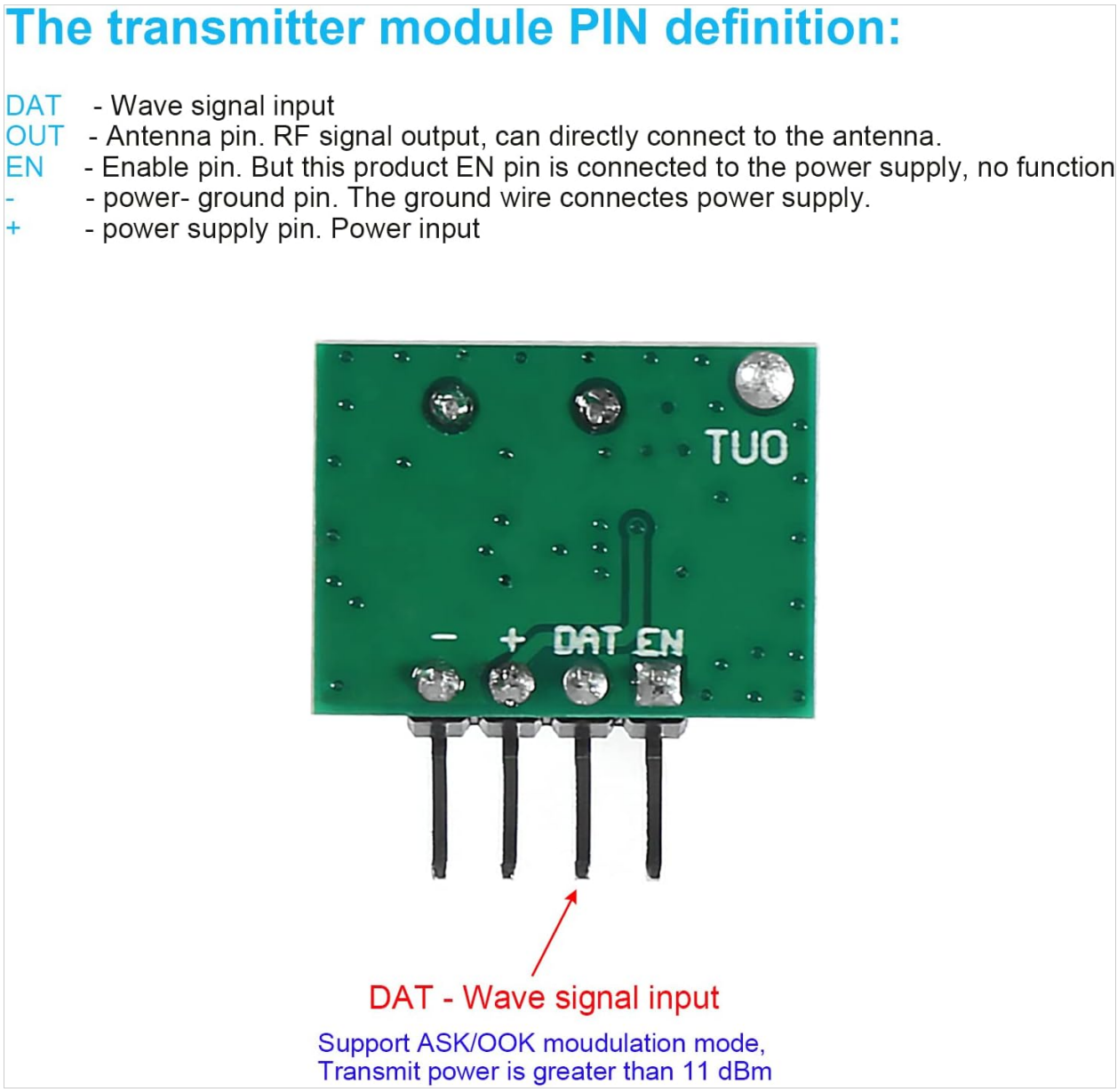

Image 5.2: Diagram showing the pin definitions for the transmitter module. Pins are labeled +, -, DAT, and EN.

- **+:** Power supply pin (2.2V-5V).
- **-:** Power ground pin.
- **DAT:** Wave signal input pin. This is where your data signal (e.g., from a microcontroller's UART TX pin) connects.
- **EN:** Enable pin. For this product, the EN pin is typically connected to the power supply (HIGH) or left disconnected as suggested by some applications, meaning it's always enabled.

Note: The EN pin is often tied high internally or can be left floating for continuous operation. If you need to control the transmitter's power, connect EN to a digital output pin on your microcontroller.

6. Setup and Connection

Proper setup involves connecting the modules to a microcontroller (such as an Arduino) and attaching the antennas.

6.1 Antenna Connection

The provided spring antennas should be soldered to the ANT pin(s) of both the transmitter and receiver modules. Ensure a secure connection for optimal range and signal quality.

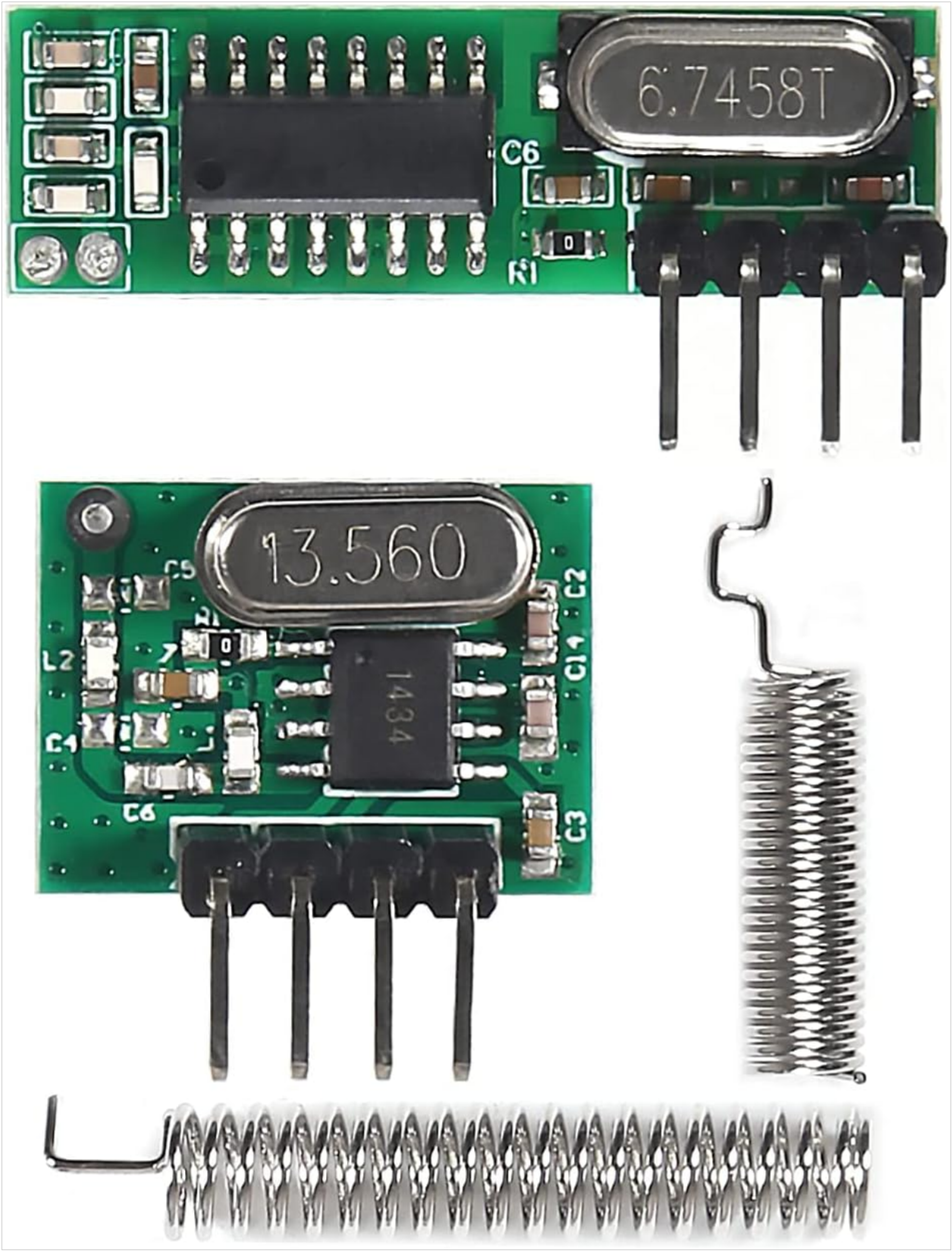

Image 6.1: Close-up view of a transmitter and receiver module, each with a spring antenna attached, demonstrating the physical connection.

6.2 Typical Circuit Connection (Arduino Example)

The modules can be easily integrated with microcontrollers. Below is a typical connection example using an Arduino board.

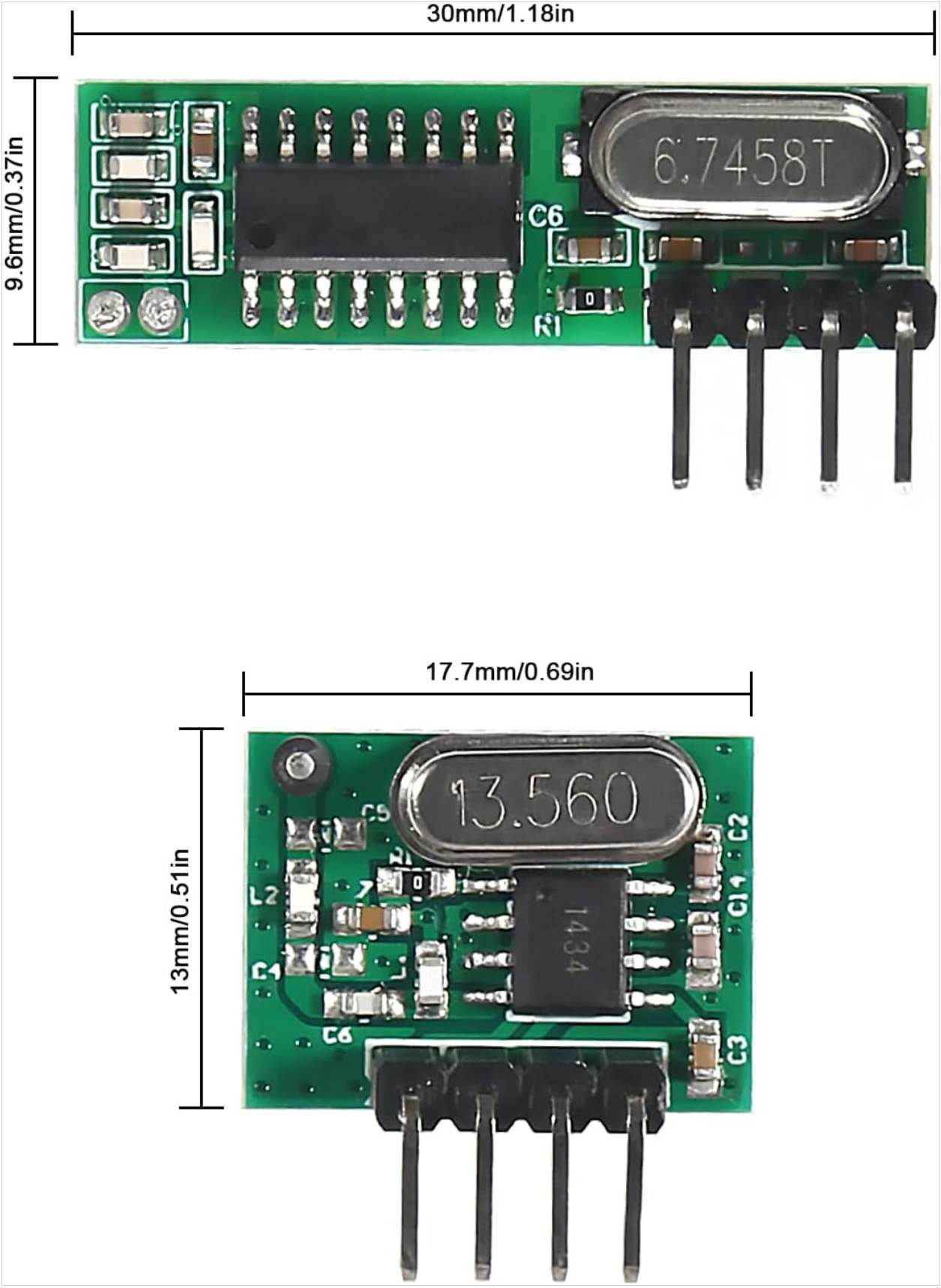

Image 6.2: Diagram illustrating how to connect the 433MHz RF transmitter and receiver modules to an Arduino Uno board for basic wireless communication.

- **Transmitter Module Connections:**
  - '+' pin to Arduino 5V.
  - '-' pin to Arduino GND.
  - 'DAT' pin to an Arduino digital output pin (e.g., Digital Pin 12 for data transmission).
  - 'EN' pin can be connected to 5V or left floating if continuous operation is desired.

- **Receiver Module Connections:**
    - 'VIN (VDD)' pin to Arduino 5V.
    - 'GND' pin to Arduino GND.
    - 'DO (DATA)' pin to an Arduino digital input pin (e.g., Digital Pin 11 for data reception).

For data communication, libraries like 'RCSwitch.h' are commonly used with Arduino to handle the ASK/OOK modulation and demodulation. Ensure your microcontroller's UART or digital I/O pins are configured correctly for the desired baud rate.

7. Operating Principles

These modules operate on the principle of Amplitude Shift Keying (ASK) or On-Off Keying (OOK) modulation. In OOK, the presence or absence of a carrier wave represents binary 1 or 0, respectively. ASK is a form of amplitude modulation that represents digital data as variations in the amplitude of a carrier wave.
The transmitter takes a digital signal (e.g., from a microcontroller's data output) and modulates it onto a 433.92 MHz carrier wave. The receiver then demodulates this signal, converting the RF signal back into a digital data stream that can be read by a microcontroller.
Effective communication requires both the transmitter and receiver to be configured for the same data protocol and baud rate. Common baud rates for these modules range from 1200 bps to 4800 bps, with 2400 bps or 3600 bps often providing a good balance between speed and reliability.

8. Troubleshooting

If you encounter issues with your QCCAN RF modules, consider the following troubleshooting steps:

- **No Signal / Poor Range:**
    - **Antenna Connection:** Ensure antennas are securely soldered to both modules. A poorly connected or missing antenna significantly reduces range.
    - **Power Supply:** Verify both modules are receiving stable power within the 2.2V-5V range. Unstable power can lead to erratic behavior.
    - **Interference:** 433MHz is a common frequency. Check for other wireless devices operating nearby that might cause interference.
    - **Obstructions:** Physical obstructions (walls, metal objects) can degrade signal quality and range. Test in an open environment first.
- **Noisy Signal / Data Corruption:**
    - **Baud Rate Mismatch:** Ensure the transmitter and receiver are configured for the exact same baud rate. Experiment with lower baud rates (e.g., 2400 bps, 3600 bps) for increased reliability.
    - **Grounding:** Ensure proper grounding for both modules and the microcontroller. Noise can be introduced by poor grounding.
    - **Power Filtering:** Add small capacitors (e.g., 0.1uF) across the VCC and GND pins of the modules to filter out power supply noise.
    - **Code Protocol:** Verify your data transmission and reception code implements a robust protocol, especially for error detection or retransmission if data integrity is critical.
- **Module Not Powering On:**
    - **Voltage Check:** Use a multimeter to confirm the correct voltage is applied to the VDD/VIN pin.
    - **Polarity:** Double-check that power and ground connections are not reversed.

- **High Quiescent Current (Transmitter):**
    - Some users report higher quiescent current than expected. If battery life is a concern, consider implementing power-saving modes or external switching for the transmitter.

9. Maintenance

These RF modules are generally low-maintenance. Follow these guidelines to ensure longevity:

- **Cleanliness:** Keep the modules free from dust and debris. Use a soft, dry brush or compressed air for cleaning if necessary.
- **Environmental Conditions:** Store and operate the modules in a dry environment, away from extreme temperatures and humidity.
- **Physical Inspection:** Periodically check soldered connections, especially for the antenna, to ensure they remain secure.
- **Power Supply:** Always use a stable and clean power supply within the specified voltage range.

10. Warranty and Support

For specific warranty information, please refer to the product's purchase documentation or contact the retailer. QCCAN provides general support for its products. For technical assistance or inquiries, please visit the official QCCAN support channels or the platform where the product was purchased.