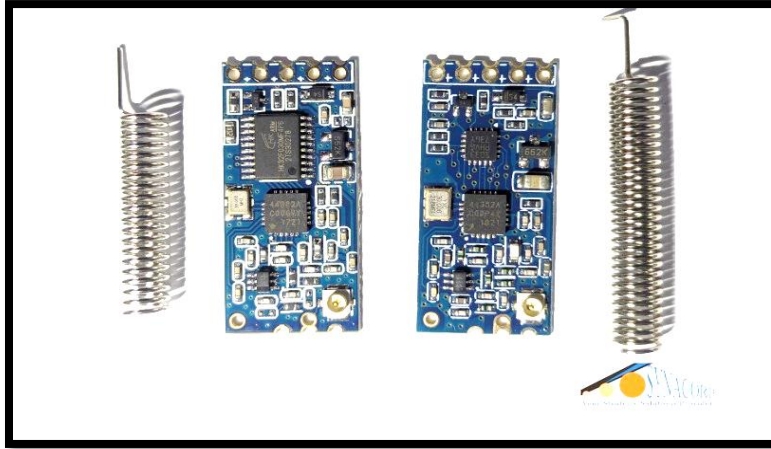


## HC-12 433MHz RF (UART) Transceiver Module 1km

### Introduction:



The HC-12 is a versatile 433MHz RF (Radio Frequency) transceiver module designed for UART (Universal Asynchronous Receiver-Transmitter) communication. It serves as a wireless bridge for data transmission between electronic devices, commonly used with microcontrollers. With an advertised range of up to 1km in open space, the HC-12 is ideal for applications requiring reliable and long-distance wireless connectivity. Its compact design and ease of integration make it a popular choice for hobbyists, engineers, and developers working on diverse projects such as remote monitoring, telemetry, and home automation.

### Features:

- Long-distance wireless transmission (1,000m in open space/ baud rate 5,000bps in the air)
- Working frequency range (433.4-473.0MHz, up to 100 communication channels)
- Maximum 100mW (20dBm) transmitting power (8 gears of power can be set)
- Three working modes, adapting to different application situations
- Built-in MCU, performing communication with external device through serial port
- The number of bytes transmitted unlimited to one time

### Specs:

- Working frequency: 433.4MHz to 473.0MHz
- Supply voltage: 3.2V to 5.5VDC
- Communication distance: 1,000m in the open space
- Serial baud rate: 1.2Kbps to 115.2Kbps (default 9.6Kbps)
- Receiving sensitivity: -117dBm to -100dBm
- Transmit power: -1dBm to 20dBm
- Interface protocol: **UART/TTL, Half Duplex**
- Operating temperature: -40°C to +85°C
- Dimensions: 27.8 x 14.4 x 4 mm

## Objective:

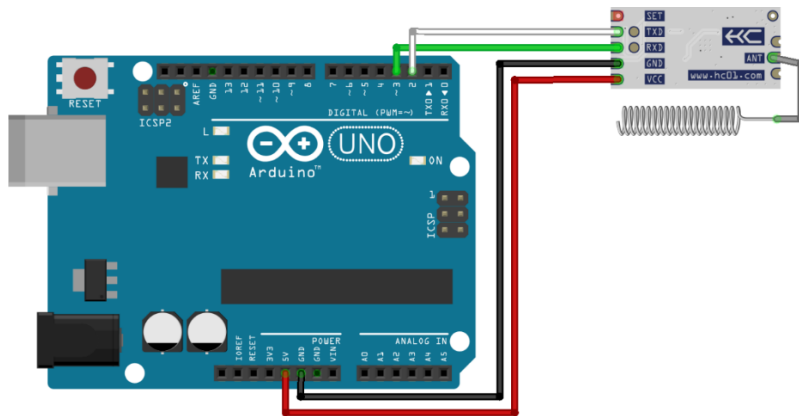
The objective of the HC-12 433MHz RF transceiver module with UART is to provide a wireless communication link between electronic devices, typically microcontrollers. Its intended use is for projects that require data transmission over a distance of up to 1km in open areas. This module enables devices to exchange information wirelessly, enhancing flexibility in various applications such as remote sensing, home automation, or other projects where wired connections are impractical.

## Components Needed:

- 2x HC-12 433MHz RF modules
- 2x Arduino boards
- Jumper wires
- USB cables for Arduino programming
- computer/laptop

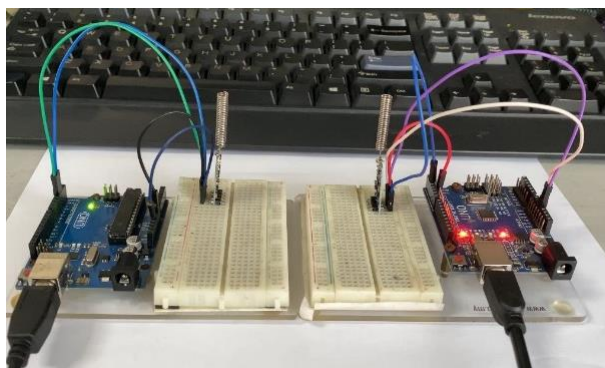
## Procedures:

**Step 1:** Connect the HC-12 modules to the Arduinos using jumper wires. A UART (or TTL) output of the Arduino will be used to interface with the HC-12 module. Here, pins 2 and 3 are used. An output of either 3.3V or 5V from the Arduino can power the module.



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**Step 2:** Ensure both Arduinos are connected to your computer for programming



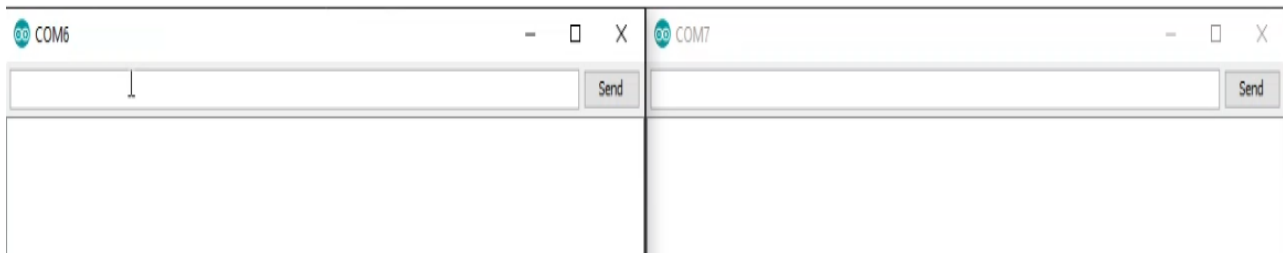
**Step 3:** Upload the code to both Arduinos.



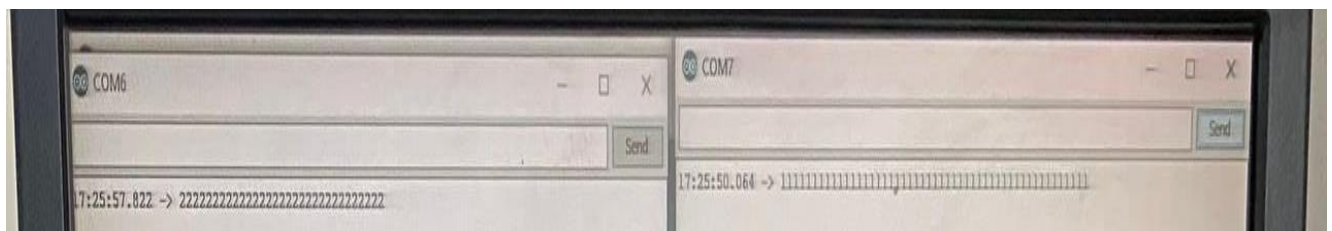
```

1 #include <SoftwareSerial.h>
2
3 SoftwareSerial HC12(2, 3); // HC-12 TX Pin, HC-12 RX Pin
4
5 void setup() {
6   Serial.begin(9600);
7   HC12.begin(9600);
8 }
9
10 void loop() {
11   while (HC12.available()) {
12     Serial.write(HC12.read());
13   }
14   while (Serial.available()) {
15     HC12.write(Serial.read());
16   }
17 }
  
```

**Step 4:** Open the Arduino Serial Monitor for both Arduinos (make sure to select the correct COM port).

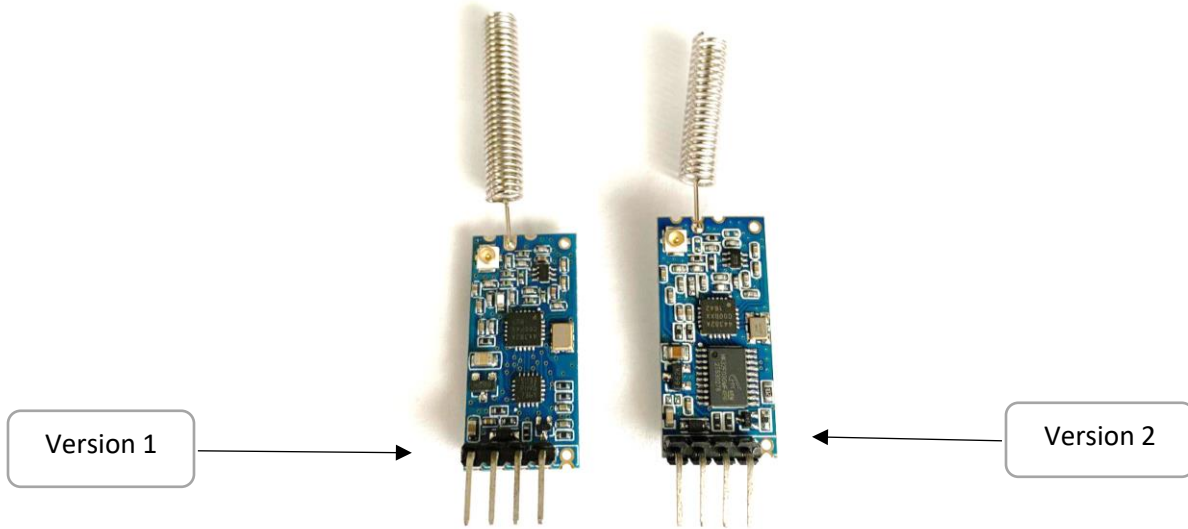


**Step 5:** Type a message in one Serial Monitor; you should see it appear in the other Serial Monitor.



**Discussion:**

Two distinct versions of this product exist, each showcasing minor disparities in their design and physical attributes. Regrettably, these two versions cannot be paired together for testing purposes. However, devices belonging to the same version are fully capable of conducting comprehensive tests and accurately detecting the connection between them.



### Conclusion:

In summary, the HC-12 433MHz RF transceiver module enables wireless communication between devices, particularly microcontrollers. With a 1km range in open spaces, it's commonly used in projects like remote sensing and home automation. When using it with Arduino, connect, write code, and monitor communication via the Serial Monitor. Its simplicity, compact design, and long-range capabilities make it popular for diverse wireless connectivity projects.