RF Transmitter and Receiver

Using an RF Transmitter and Receiver, Arduino devices can exchange messages through radio waves, enabling wireless communication between them. RF transmitters and receivers will allow communication between the rover and the operators, enabling it to be activated remotely.

Hardware

- Arduinos (2)
- RF Transmitter
- RF receiver
- Breadboards(2)
- Breadboard wires(6)

Libraries

<stdlib.h>

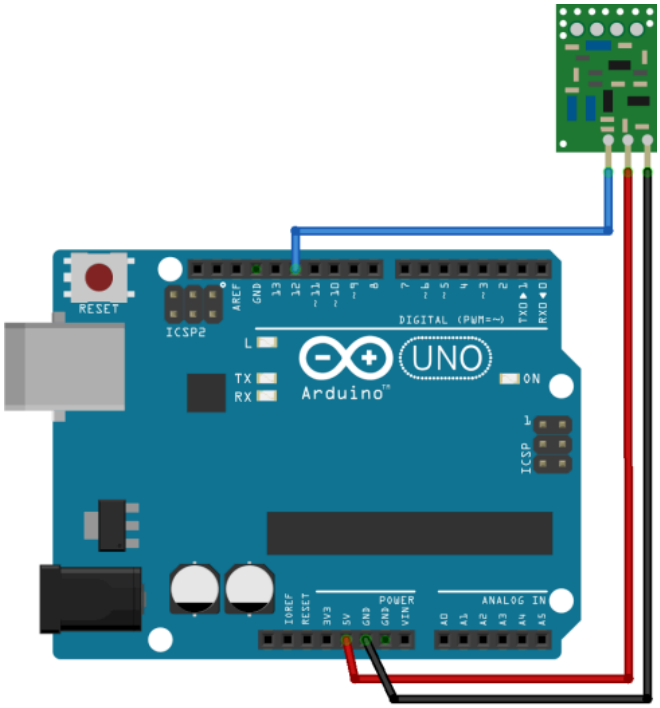
<ctype.h>

<RH_ASK.h>

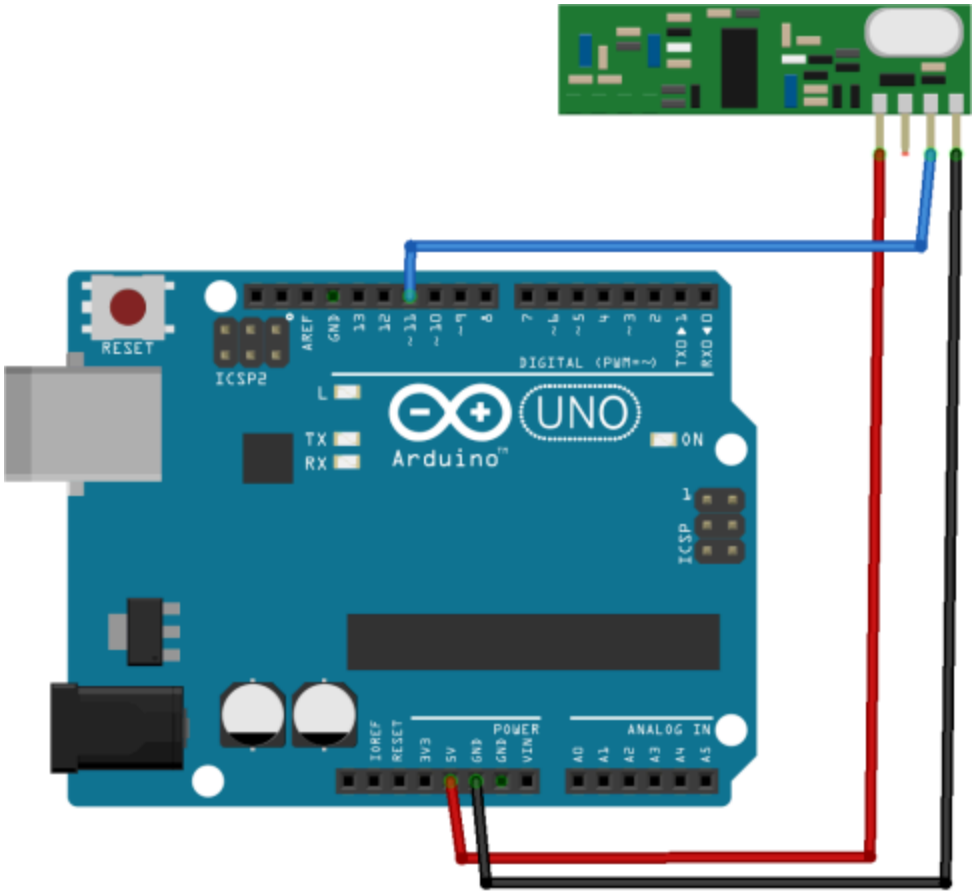
<SPI.h>

http://www.airspayce.com/mikem/arduino/RadioHead/

Wiring



Follow this diagram to wire the transmitter to your first arduino. Ground wire on the transmitter goes to ground on the arduino, VCC goes to 5v, and Data goes to digital pin 12. (https://randomnerdtutorials.com/rf-433mhz-transmitter-receiver-module-with-arduino/)



Follow this diagram to wire the receiver to your second arduino. Far right pin on the receiver goes to ground, the far left pin goes to 5v, and either middle pin goes to digital pin 11, as both center pins on the receiver are tied together. (https://randomnerdtutorials.com/rf-433mhz-transmitter-receiver-module-with-arduino/)

Transmitter code

```
// Include Required libraries
#include <RH_ASK.h>
#include <SPI.h>
RH_ASK rf_driver;

void setup() {
```

```
  Serial.begin(9600); // Initialize serial communication
  if (!rf_driver.init()) // Initialize ASK radio driver
    Serial.println("RadioHead initialization failed.");
  Serial.println("Enter string with number and press Enter:");
//Ask for the message to be sent
}

void loop() {

//wait for and input from the user
  if (Serial.available()) {
    String userInput = Serial.readStringUntil('\n'); //read the
input and save it as string
    userInput.trim(); // remove spaces

    // Convert String to char array
    char message[userInput.length() + 1];
    userInput.toCharArray(message, userInput.length() + 1);

    // Send message
    rf_driver.send((uint8_t*)message, strlen(message));
    rf_driver.waitPacketSent();

//tell the user the message sent and prompt for another input
    Serial.println("Message sent: ");
    Serial.println(message);
    Serial.println("Enter your string with number and press
Enter:");
  }
}
```

Receiver code

```
using namespace std; ////////////////////////////  necessary
libraries
#include <stdlib.h>//                                  at
http://www.airspayce.com/mikem/arduino/RadioHead/
#include <ctype.h>
#include <RH_ASK.h>
#ifdef RH_HAVE_HARDWARE_SPI//
#include <SPI.h>//
#endif
RH_ASK driver(2000, 11, 4, 5 ); //given parameters (speed,
rxPin, txPin, pttPin)


void setup()  {                //setup
#ifdef RH_HAVE_SERIAL
Serial.begin(9600);
#endif
if (!driver.init())
#ifdef RH_HAVE_SERIAL
Serial.println("init failed");
#else;
#endif
}

void loop() {
    // Define an array to store received message and its length
  uint8_t buf[RH_ASK_MAX_MESSAGE_LEN];
  uint8_t buflen = sizeof(buf);

    // Define strings to store received message and extracted
number
  String rcv;
  String number;
```

```
  int numberint; //defined integer to store number after
conversion

  //recieve message from transmitter
  if (driver.recv(buf, &buflen)){
    for (int i = 0; i < buflen; i++) {
      rcv= rcv + (char)buf[i];//converts hexadecimal to alpha
characters
    }
  }

  //Go through each charaster to determine which charactes makes
up the number
  for (int i = 0; i < buflen; i++) {
    if (isdigit(rcv[i])) {
      number = number + rcv[i];//extract number characters from
string
    }
  }
  if (number.length() > 0) {
    Serial.println(rcv);//print entire transmitted message
    numberint = number.toInt();//convert number string to
integer
    Serial.println(numberint);//print the number

    //check if number is even or odd and print result
    if (numberint % 2 == 0) {
      Serial.println("Even");
    } else {
      Serial.println("Odd");
      }
  }
}
```

Use the transmitter and receiver codes for the Arduinos, respectively. Using the Serial monitor for the transmitter, write a string of characters with a number mixed into the string somewhere. The receiver will then read off the string, read the number in the string, and determine if it is odd or even.

Code developed using

- “Complete Guide for RF 433MHz Transmitter/Receiver Module With Arduino” (https://randomnerdtutorials.com/rf-433mhz-transmitter-receiver-module-with-arduino/)
- “TUTORIAL: How to set up wireless RF (433Mhz) Transmitter Receiver Module - Arduino Quick Simple” (https://www.youtube.com/watch?v=KA_YE7AvFn0)
- Chat GPT (https://chat.openai.com/)