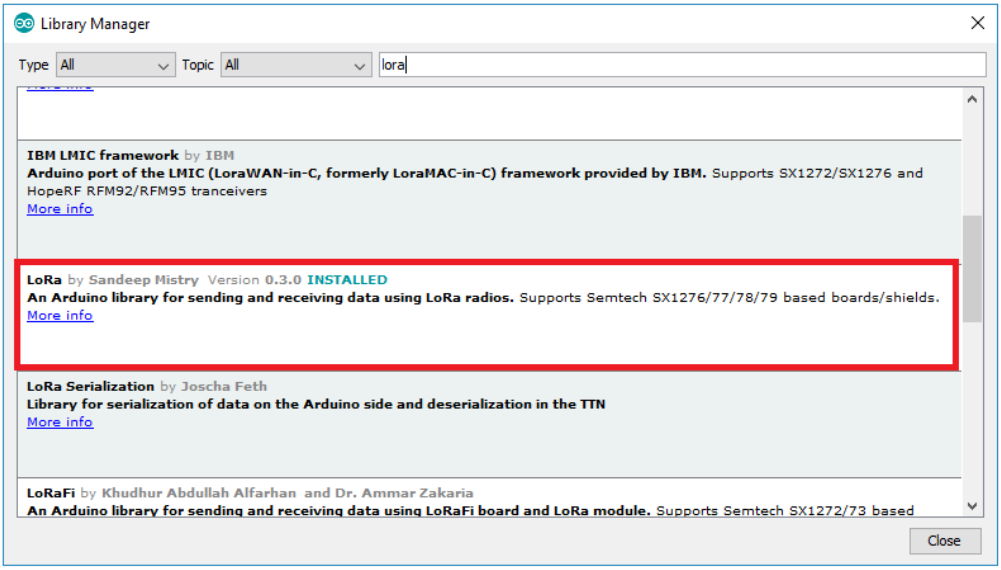
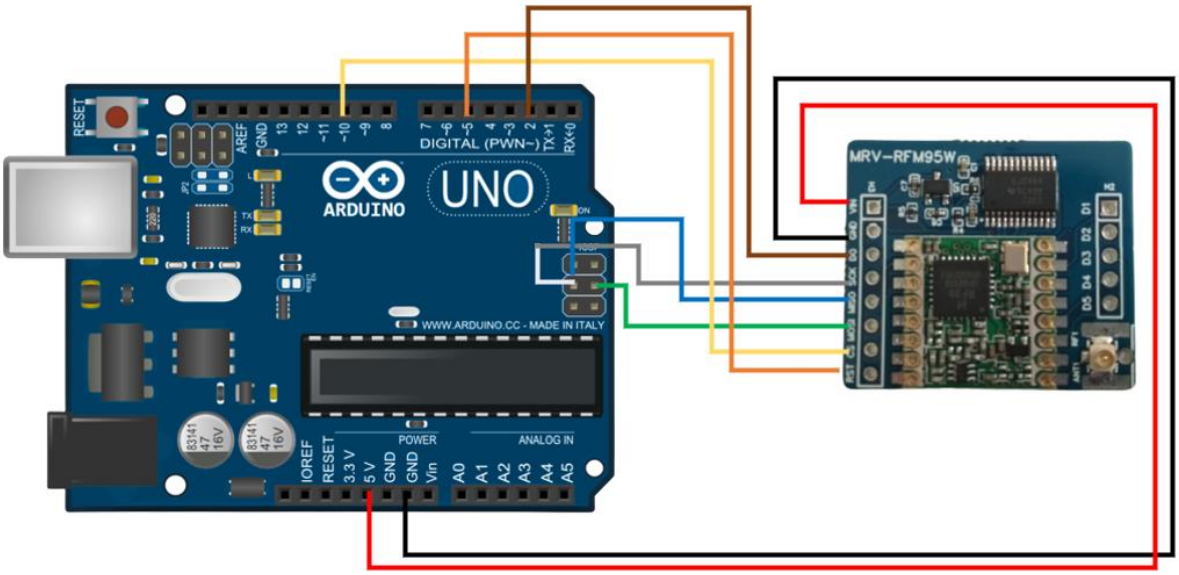
1. Menghubungkan Modul Transceiver LoRa RFM95
    1. Alat yang disiapkan :
        - Breadboard
        - ESP32/Arduino
        - Jumper
        - Modul Transceiver LoRa RFM95
        - Library LoRa

Buka Arduino IDE Anda, dan pergi ke **Sketch** > **Include Library** > **Manage Libraries** dan cari " **LoRa** ". Pilih perpustakaan LoRa yang disorot pada gambar di bawah, dan instal.



2. Modul Transceiver LoRa RFM95 dengan Arduino
    a. Gambar Rangkaian



VIN => 5V
GND => GND
D0 => 2

SCK	=>	SCK (13)
MISO	=>	MISO (12)
MOSI	=>	MOSI (11)
CS	=>	SS (10)
RST	=>	5

b. Program

Pengirim (Sender) – Arduino

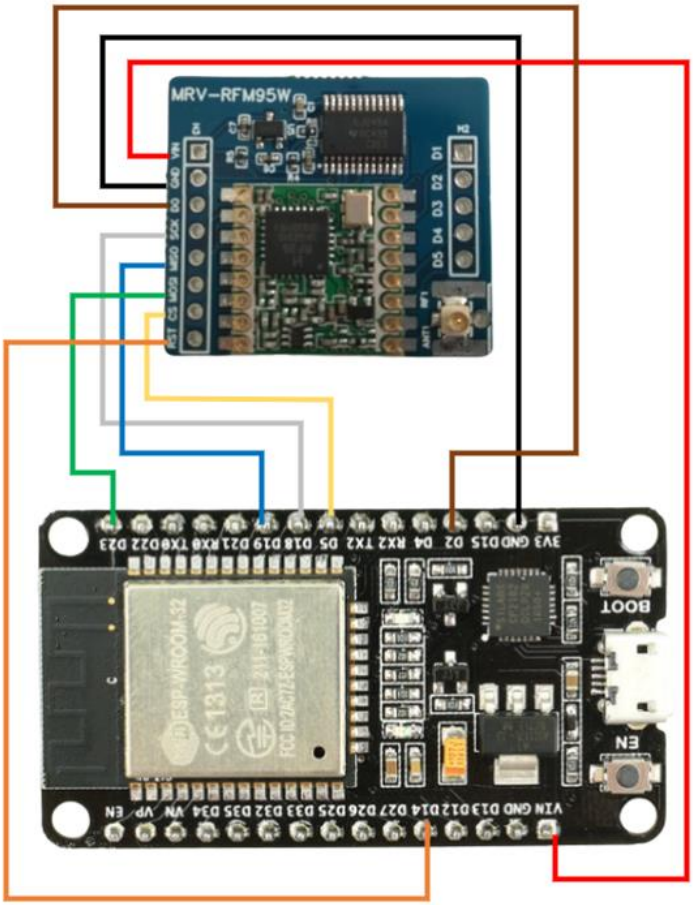
```
#include <SPI.h>
#include <LoRa.h>
#define ss 10
#define rst 5
#define dio0 2

int counter = 0;

void setup() {
 Serial.begin(115200);
 while (!Serial);
 Serial.println("LoRa Sender");
 //setup LoRa transceiver module
 LoRa.setPins(ss, rst, dio0);
 while (!LoRa.begin(915E6)) {
  Serial.println(".");
  delay(500);
 }
 LoRa.setSyncWord(0xF3);
 Serial.println("LoRa Initializing OK!");
}

void loop() {
 Serial.print("Sending packet: ");
 Serial.println(counter);
 //Send LoRa packet to receiver
 LoRa.beginPacket();
 LoRa.print("hello ");
 LoRa.print(counter);
 LoRa.endPacket();
 counter++;
 delay(10000);
}
```

Penerima (Receiver) – Arduino

```
#include <SPI.h>
#include <LoRa.h>
#define ss 10
```

```
#define rst 5
#define dio0 2

void setup() {
 //initialize Serial Monitor
 Serial.begin(115200);
 while (!Serial);
 Serial.println("LoRa Receiver");
 //setup LoRa transceiver module
 LoRa.setPins(ss, rst, dio0);
 while (!LoRa.begin(915E6)) {
  Serial.println(".");
  delay(500);
 }
 LoRa.setSyncWord(0xF3);
 Serial.println("LoRa Initializing OK!");
}

void loop() {
 // try to parse packet
 int packetSize = LoRa.parsePacket();
 if (packetSize) {
  // received a packet
  Serial.print("Received packet '");
  // read packet
  while (LoRa.available()) {
   String LoRaData = LoRa.readString();
   Serial.print(LoRaData);
  }
  // print RSSI of packet
  Serial.print("' with RSSI ");
  Serial.println(LoRa.packetRssi());
 }
}
```

3. Modul Transceiver LoRa RFM95 dengan ESP32
   a. Gambar Rangkaian



VIN	=>	VIN
GND	=>	GND
DO	=>	D2
SCK	=>	D18
MISO	=>	D19
MOSI	=>	D32
CS	=>	D5
RST	=>	D14

b. Program

Pengirim (Sender) – ESP32

```
#include <SPI.h>
#include <LoRa.h>
#define ss 5
#define rst 14
#define dio0 2

int counter = 0;

void setup() {
  Serial.begin(115200);
  while (!Serial);
  Serial.println("LoRa Sender");
```

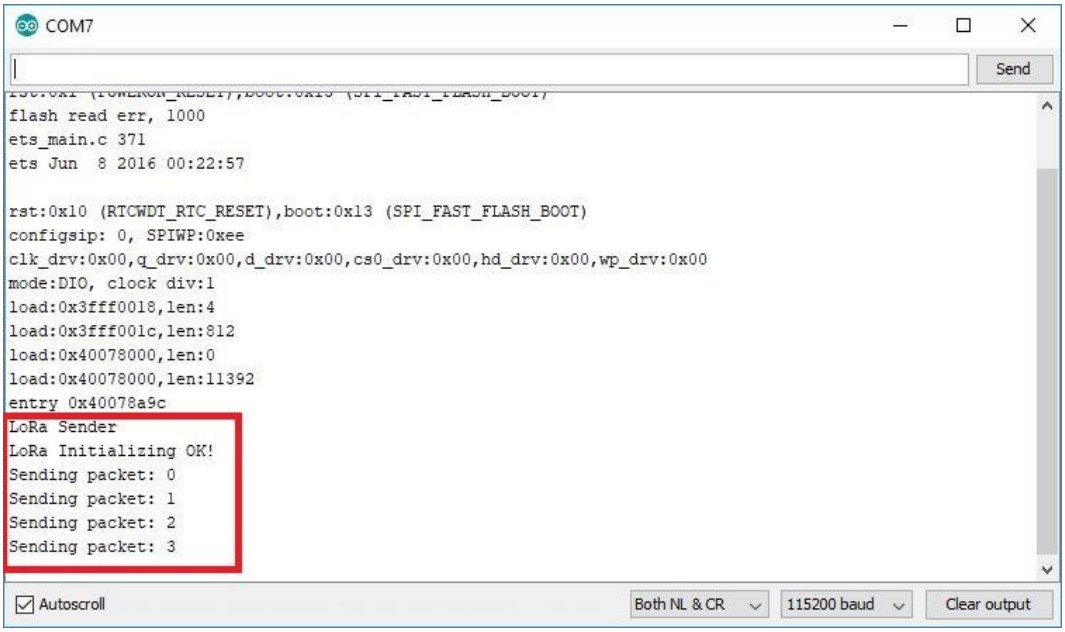
```
  //setup LoRa transceiver module
  LoRa.setPins(ss, rst, dio0);
  while (!LoRa.begin(915E6)) {
    Serial.println(".");
    delay(500);
  }
  LoRa.setSyncWord(0xF3);
  Serial.println("LoRa Initializing OK!");
}

void loop() {
  Serial.print("Sending packet: ");
  Serial.println(counter);
  //Send LoRa packet to receiver
  LoRa.beginPacket();
  LoRa.print("hello ");
  LoRa.print(counter);
  LoRa.endPacket();
  counter++;
  delay(10000);
}
```

Penerima (Receiver) – ESP32

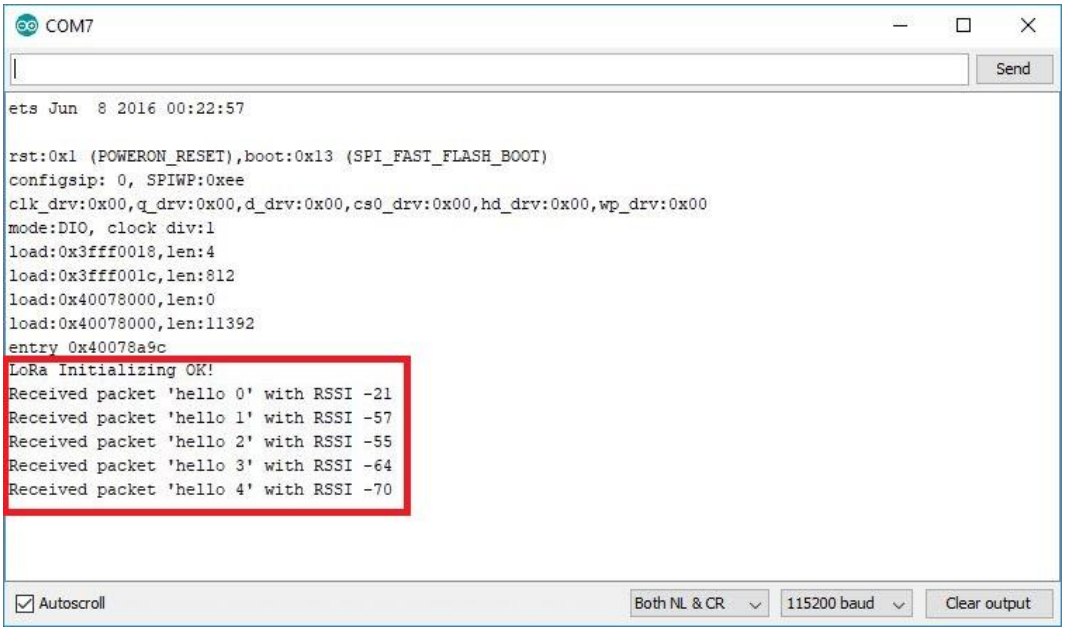
```
#include <SPI.h>
#include <LoRa.h>
#define ss 5
#define rst 14
#define dio0 2

void setup() {
  //initialize Serial Monitor
  Serial.begin(115200);
  while (!Serial);
  Serial.println("LoRa Receiver");
  LoRa.setPins(ss, rst, dio0);
  while (!LoRa.begin(915E6)) {
    Serial.println(".");
    delay(500);
  }
  LoRa.setSyncWord(0xF3);
  Serial.println("LoRa Initializing OK!");
}

void loop() {
  // try to parse packet
  int packetSize = LoRa.parsePacket();
  if (packetSize) {
```

```
    // received a packet
    Serial.print("Received packet '");
    // read packet
    while (LoRa.available()) {
      String LoRaData = LoRa.readString();
      Serial.print(LoRaData);
    }
    // print RSSI of packet
    Serial.print("' with RSSI ");
    Serial.println(LoRa.packetRssi());
  }
}
```

4. Hasil Percobaan
   a. Pengirim (Sender)



   b. Penerima (Receiver)


COM7
Send
ets Jun 8 2016 00:22:57
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0018,len:4
load:0x3fff001c,len:812
load:0x40078000,len:0
load:0x40078000,len:11392
entry 0x40078a9c
LoRa Initializing OK!
Received packet 'hello 0' with RSSI -21
Received packet 'hello 1' with RSSI -57
Received packet 'hello 2' with RSSI -55
Received packet 'hello 3' with RSSI -64
Received packet 'hello 4' with RSSI -70
Autoscroll
Both NL & CR
115200 baud
Clear output