Arduino Nesso N1 LoRa 通信

Arduino Nesso N1 LoRa 通信相关 API 与案例程序。

> **注意**
>
> Arduino Nesso N1 使用 SX1262 LoRa 通信芯片，开发时请注意选择相应的类。

案例程序

编译要求

- M5Stack 板管理版本 >= 3.2.5
- 开发板选项 = ArduinoNessoN1
- M5GFX 库版本 >= 0.2.17
- M5Unified 库版本 >= 0.2.11
- RadioLib 库版本 >= 7.3.0

发送端

cpp

```cpp
#include "M5Unified.h"
#include <RadioLib.h>

#define LORA_MOSI_PIN 21
#define LORA_MISO_PIN 22
#define LORA_SCK_PIN 20
#define LORA_IRQ_PIN 15
#define LORA_CS_PIN 23
#define LORA_BUSY_PIN 19

// SX1262: NSS, DIO1, NRST, BUSY
SX1262 radio = new Module(LORA_CS_PIN, LORA_IRQ_PIN, RADIOLIB_NC, LORA_BUSY_PIN);

// save transmission state between loops
int transmissionState = RADIOLIB_ERR_NONE;

// flag to indicate that a packet was sent
volatile bool transmittedFlag = false;

// this function is called when a complete packet is transmitted by the module
// IMPORTANT: this function MUST be 'void' type and MUST NOT have any arguments!
#if defined(ESP8266) || defined(ESP32)
ICACHE_RAM_ATTR
#endif

void setFlag(void) {
  // we sent a packet, set the flag
  transmittedFlag = true;
}

M5Canvas canvas(&M5.Display);

void setup() {
  M5.begin();
  Serial.begin(115200);
  M5.Display.setRotation(1);

  // LED_BUILTIN at E1.P7
  auto& ioe = M5.getIOExpander(0);

  //LORA_RESET
  ioe.digitalWrite(7, false);
  delay(100);
  ioe.digitalWrite(7, true);
  delay(100);

  ioe.digitalWrite(5, true);  //LORA_LNA_ENABLE
  ioe.digitalWrite(6, true);  //LORA_ANTENNA_SWITCH

  canvas.createSprite(M5.Display.width(), M5.Display.height());
```

```
  canvas.setTextColor(GREEN);
  canvas.setTextScroll(true);
  // initialize SX1262
  Serial.print(F("[SX1262] Initializing ... "));
  canvas.println("[SX1262] Initializing ... ");
  canvas.pushSprite(0, 0);

  // frequency, bandwidth, spreading factor, coding rate, sync word, power, preamble length, TCXO r
  // useRegulatorLDO
  int state = radio.begin(868.0, 125.0f, 12, 5, 0x34, 22, 20, 3.0, true);
  if (state == RADIOLIB_ERR_NONE) {
    Serial.println(F("success!"));
  } else {
    Serial.print(F("failed, code "));
    Serial.println(state);
    while (true) {
      delay(10);
    }
  }

  // set the function that will be called when packet transmission is finished
  radio.setPacketSentAction(setFlag);

  // start transmitting the first packet
  Serial.print(F("[SX1262] Sending first packet ... "));

  // you can transmit C-string or Arduino string up to 256 characters long
  transmissionState = radio.startTransmit("Hello world from M5Stack!");
}

// counter to keep track of transmitted packets
int count = 0;

void loop() {
  // check if the previous transmission finished
  if (transmittedFlag) {
    // reset flag
    transmittedFlag = false;

    if (transmissionState == RADIOLIB_ERR_NONE) {
      // packet was successfully sent
      Serial.println(F("transmission finished!"));
      canvas.println("OK!");
      canvas.pushSprite(0, 0);
      // NOTE: when using interrupt-driven transmit method, it is not possible to automatically mea
      // transmission data rate using getDataRate()

    } else {
      Serial.print(F("failed, code "));
      Serial.println(transmissionState);
    }

    // clean up after transmission is finished. This will ensure transmitter is disabled, RF switch
```

```
    // etc.
    radio.finishTransmit();

    // wait a second before transmitting again
    delay(1000);

    // send another one
    Serial.print(F("[SX1262] Sending another packet ... "));

    // you can transmit C-string or Arduino string up to 256 characters long
    String str = "Hello Arduino Nesso N1 #" + String(count++);
    transmissionState = radio.startTransmit(str);
    canvas.println("Send:" + str);
    canvas.pushSprite(0, 0);
  }
  delay(100);
}
```

接收端

cpp

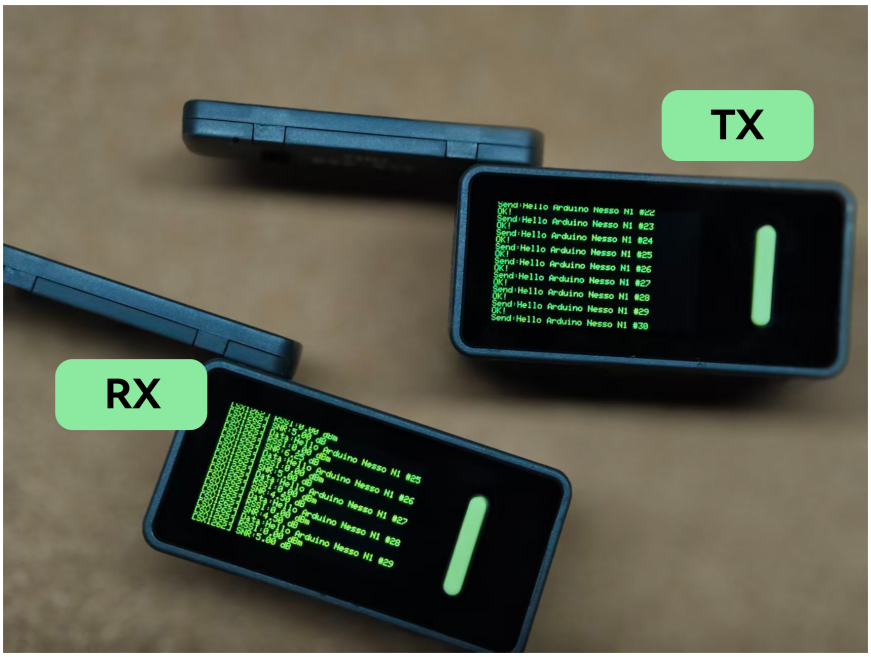
```cpp
#include "M5Unified.h"
#include <RadioLib.h>

#define LORA_MOSI_PIN 21
#define LORA_MISO_PIN 22
#define LORA_SCK_PIN 20
#define LORA_IRQ_PIN 15
#define LORA_CS_PIN 23
#define LORA_BUSY_PIN 19

// SX1262: NSS, DIO1, NRST, BUSY
SX1262 radio = new Module(LORA_CS_PIN, LORA_IRQ_PIN, RADIOLIB_NC, LORA_BUSY_PIN);

// flag to indicate that a packet was received
volatile bool receivedFlag = false;

// this function is called when a complete packet is received by the module
// IMPORTANT: this function MUST be 'void' type and MUST NOT have any arguments!
#if defined(ESP8266) || defined(ESP32)
ICACHE_RAM_ATTR
#endif

void setFlag(void) {
  // we got a packet, set the flag
  receivedFlag = true;
}

M5Canvas canvas(&M5.Display);

void setup() {
  M5.begin();
  Serial.begin(115200);
  M5.Display.setRotation(1);

  // LED_BUILTIN at E1.P7
  auto& ioe = M5.getIOExpander(0);

  //LORA_RESET
  ioe.digitalWrite(7, false);
  delay(100);
  ioe.digitalWrite(7, true);
  delay(100);

  ioe.digitalWrite(5, true);  //LORA_LNA_ENABLE
  ioe.digitalWrite(6, true);  //LORA_ANTENNA_SWITCH

  canvas.createSprite(M5.Display.width(), M5.Display.height());
  canvas.setTextColor(GREEN);
  canvas.setTextScroll(true);
  // initialize SX1262
```

```
  Serial.print(F("[SX1262] Initializing ... "));
  canvas.println("[SX1262] Initializing ... ");
  canvas.pushSprite(0, 0);

  // frequency, bandwidth, spreading factor, coding rate, sync word, power, preamble length, TCXO r
  int state = radio.begin(868.0, 125.0f, 12, 5, 0x34, 22, 20, 3.0, true);
  if (state == RADIOLIB_ERR_NONE) {
    Serial.println(F("success!"));
  } else {
    Serial.print(F("failed, code "));
    Serial.println(state);
    while (true) { delay(10); }
  }

  // set the function that will be called when new packet is received
  radio.setPacketReceivedAction(setFlag);

  // start listening for LoRa packets
  Serial.print(F("[SX1262] Starting to listen ... "));
  state = radio.startReceive();
  if (state == RADIOLIB_ERR_NONE) {
    Serial.println(F("success!"));
  } else {
    Serial.print(F("failed, code "));
    Serial.println(state);
    while (true) { delay(10); }
  }
}

void loop() {
  // check if the flag is set
  if (receivedFlag) {
    // reset flag
    receivedFlag = false;

    // you can read received data as an Arduino String
    String str;
    int state = radio.readData(str);

    if (state == RADIOLIB_ERR_NONE) {
      // packet was successfully received
      Serial.println(F("[SX1262] Received packet!"));

      // print data of the packet
      Serial.print(F("[SX1262] Data:\t\t"));
      Serial.println(str);

      canvas.print(F("[SX1262] Data:\t\t"));
      canvas.println(str);

      // print RSSI (Received Signal Strength Indicator)
      Serial.print(F("[SX1262] RSSI:\t\t"));
      Serial.print(radio.getRSSI());
```

```
      Serial.println(F(" dBm"));

      canvas.print(F("[SX1262] RSSI:\t\t"));
      canvas.print(radio.getRSSI());
      canvas.println(F(" dBm"));

      // print SNR (Signal-to-Noise Ratio)
      Serial.print(F("[SX1262] SNR:\t\t"));
      Serial.print(radio.getSNR());
      Serial.println(F(" dB"));

      canvas.print(F("[SX1262] SNR:\t\t"));
      canvas.print(radio.getSNR());
      canvas.println(F(" dB"));

      canvas.pushSprite(0, 0);

      // print frequency error
      Serial.print(F("[SX1262] Frequency error:\t"));
      Serial.print(radio.getFrequencyError());
      Serial.println(F(" Hz"));



    } else if (state == RADIOLIB_ERR_CRC_MISMATCH) {
      // packet was received, but is malformed
      Serial.println(F("CRC error!"));

    } else {
      // some other error occurred
      Serial.print(F("failed, code "));
      Serial.println(state);
    }
  }
}
```

运行结果

将以上两段代码分别编译上传至两个 Arduino Nesso N1，发送端和接收端将分别显示发送和接收状态。



API

Arduino Nesso N1 LoRa 通信部分使用了**RadioLib**库作为驱动，更多相关的 API 可以参考下方文档：

- RadioLib Library - GitHub
- RadioLib Wiki - GitHub
- RadioLib Docs
- RadioLib SX1262 Docs