M051 SPI接口驅動NRF24L01P模組

NuMicro® 32 位系列微控制器範例代碼介紹

文件信息

代碼簡述	本範例代碼使用 M051 驅動 NRF24L01P 2.4GHz RF 模組，實現通信功能。
BSP 版本	M051SeriesBSP_CMSIS_Rev3.01.001
開發平臺	NuTiny-SDK-M051L

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1 功能介紹

1.1 簡介

本範例代碼使用M051系列芯片,通過SPI0接口驅動兩組NRF24L01P 2.4GHz RF模組,實現自動跳頻，通信功能。

一個M051驅動的NRF24L01P 2.4GHz RF模組發送資料，另一個M051驅動的NRF24L01P 2.4GHz RF模組接收並通過UART埠列印通信資訊。

1.2 執行結果

接收端：

Receive READY!
u8CurCH=104,u32TestRevCount=0
u8CurCH=8,u32TestRevCount=51
u8CurCH=8,u32TestRevCount=230
u8CurCH=8,u32TestRevCount=455
u8CurCH=8,u32TestRevCount=645
u8CurCH=22,u32TestRevCount=765

2 代碼介紹

發送端：

```
        if (u8SendDataState == HAS_SENDSTATE)
        {
            u8SendDataState = NOT_SENDSTATE;
            au8tx_buf[0] = 0xAA;
            au8tx_buf[1] = u8TestData++;
            au8tx_buf[2] = u8TestData;
            if(u8TestData == 0xff)
            {
                u8TestData=0;
            }
            LED = ~LED;
            ifnnrf_tx_mode();
        }
        else if (u8SendDataState == TIMEOUT_SENDSTATE)
        {
            u8SendDataState = NOT_SENDSTATE;
            while (rf_CheckCD())
            {
                rf_ChangeCH(0);
            }
            ifnnrf_tx_mode();
        }
```

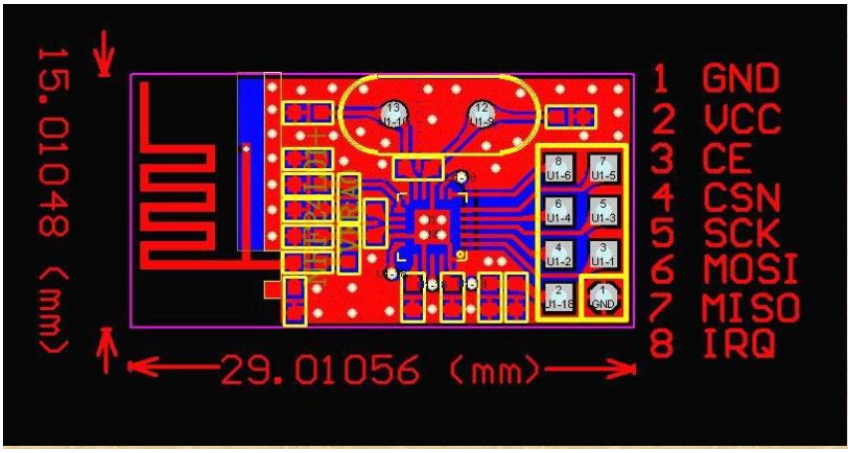
接收端：

```
    u8Status = SPI_Read(RF_STATUS);
    if (u8Status & STA_MARK_RX)
    {
        SPI_Read_Buf(RD_RX_PLOAD, au8rx_buf, TX_PLOAD_WIDTH);
        if (au8rx_buf[0] == 0xAA)
        {
            u32TestRevCount++;
            LED = ~LED;
        }
        au8rx_buf[0] = 0;
        u8RevFlag = 1;
    }
```

3 軟件與硬件環境

- 軟件環境
  - BSP 版本
    - M051SeriesBSP_CMSIS_Rev3.01.001
  - IDE 版本
    - Keil uVersion 5.26
- 硬件環境
  - 電路組件
    - NuTiny-SDK-M051L
    - NRF24L01P 2.4GHz RF 模組
  - 示意圖

NRF24L01P 2.4GHz RF 模組 PCB 示意圖：



硬件連接採用 NuTiny-SDK-M051L SPI0 與 NRF24L01P 2.4GHz RF 模組連接 。

VCC	↔	VCC（PIN2）
GPIO (P06)	↔	CE（PIN3）
SPI_SS0 (P14)	↔	CSN（PIN4）
SPI_CLK0 (P17)	→	SCK（PIN5）
SPI_MOSI_0(P15)	↔	MOSI（PIN6）
SPI_MISO_0(P16)	↔	MISO(PIN7)
INT(P32)	←	IRQ(PIN8)
GND	↔	GND(PIN1)
M051		NRF24L01P

4 目錄信息

- EC_M051_SPI_NRF24L01P_V1.00
  - Library — Sample code header and source files
    - CMSIS — Cortex® Microcontroller Software Interface Standard (CMSIS) by Arm® Corp.
    - Device — CMSIS compliant device header file
    - StdDriver — All peripheral driver header and source files
  - SampleCode
    - ExampleCode — Source file of example code

5 如何執行範例程序

1. 根據目錄信息章節進入 ExampleCode 路徑中的 KEIL 文件夾，雙擊 M051_SPI_NRF24L01P_Rev.uvproj 和 M051_SPI_NRF24L01P_Sent.uvproj。
2. 進入編譯模式接口
   a. 編譯
   b. 下載代碼至內存
   c. 進入 / 離開除錯模式
3. 進入除錯模式接口
   a. 執行代碼

6 修訂紀錄

Date	Revision	Description
Sept. 17, 2019	1.00	1. 初始發佈.

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