M051 SPI接口驱动NRF24L01P模块

NuMicro® 32 位系列微控制器范例代码介绍

文件信息

代码简述	本范例代码使用 M051 驱动 NRF24L01P 2.4GHz RF 模块，实现通信功能。
BSP 版本	M051SeriesBSP_CMSIS_Rev3.01.001
开发平台	NuTiny-SDK-M051L

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1 功能介绍

1.1 简介

本范例代码使用M051系列芯片，通过SPI0接口驱动两组NRF24L01P 2.4GHz无线模块，实现自动跳频，通信功能。

一个M051驱动的NRF24L01P 2.4GHz模块发送数据，另一个M051驱动的NRF24L01P 2.4GHz模块接收并通过UART端口打印通信信息。

1.2 执行结果

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 代码介绍

发送端：

```
        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();
        }
```

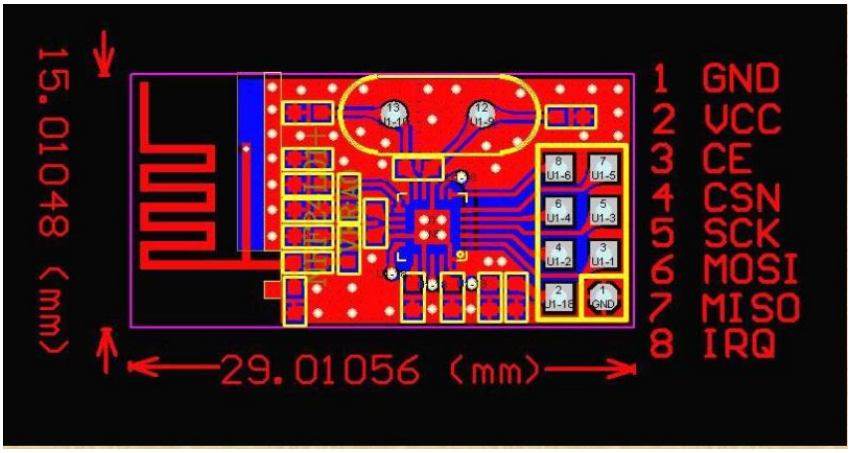
接收端：

```
    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 软件与硬件环境

- 软件环境
  - BSP 版本
    - M051SeriesBSP_CMSIS_Rev3.01.001
  - IDE 版本
    - Keil uVersion 5.26
- 硬件环境
  - 电路组件
    - NuTiny-SDK-M051L
    - NRF24L01P 2.4GHz RF 模块
  - 示意图

NRF24L01P 2.4GHz RF 模块 PCB 示意图：



硬件连接采用 NuTiny-SDK-M051L SPI0 与 NRF24L01P 2.4GHz RF 模块连接。

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 目录信息

- 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 如何执行范例程序

1. 根据目录信息章节进入 ExampleCode 路径中的 KEIL 文件夹，双击 M051_SPI_NRF24L01P_Rev.uvproj 和 M051_SPI_NRF24L01P_Sent.uvproj。
2. 进入编译模式接口
   a. 编译
   b. 下载代码至内存
   c. 进入 / 离开除错模式
3. 进入除错模式接口
   a. 执行代码

6 修订纪录

Date	Revision	Description
Sept. 17, 2019	1.00	1. 初始发布.

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