Uses M051 SPI to Drive NRF24L01P Module

Example Code Introduction for 32-bit NuMicro® Family

Information

Application	This sample code uses M051 SPI to drive NRF24L01P 2.4GHz RF Module.
BSP Version	M051SeriesBSP_CMSIS_Rev3.01.001
Hardware	NuTiny-SDK-M051L

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1 Function Description

1.1 Introduction

This example code uses M051 series of chips to drive two sets of NRF24L01P 2.4GHz RF modules through SPI interface to realize automatic frequency hopping and communication functions.
One NRF24L01P 2.4GHz module driven by M051 sends data, and the other NRF24L01P 2.4GHz module driven by M051 receives and prints communication information through UART port.

1.2 Demo Result

Receiving part：

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 Code Description

Send project :

```
        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();
        }
```

Receive project :

```
    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 Software and Hardware Environment

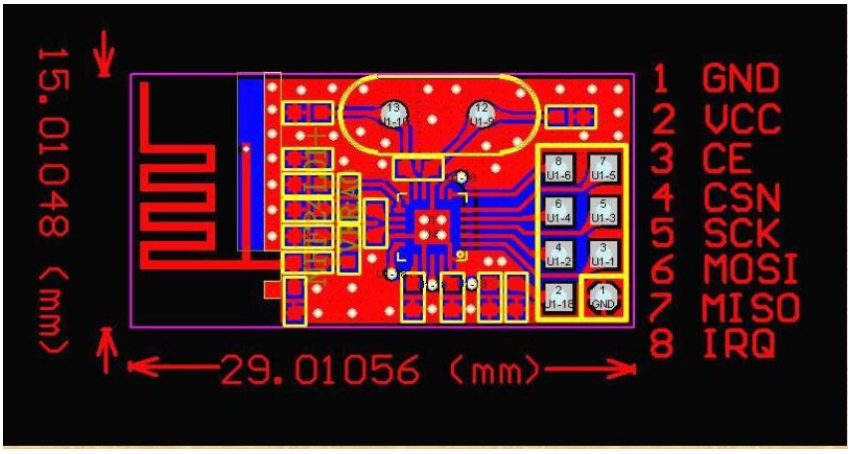
Software Environment

- BSP version
  - M051SeriesBSP_CMSIS_Rev3.01.001
- IDE version
  - Keil uVersion 5.26

Hardware Environment

- Circuit components
  - NuTiny-SDK-M051L
  - NRF24L01P 2.4GHz RF Module
- Diagram

NRF24L01P 2.4GHz RF Module PCB Layout diagram:



The hardware connection to connect with NRF24L01P 2.4GHz RF module.

M051		NRF24L01P
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)

4 Directory Information

- 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 How to Execute Example Code

1. Browsing into sample code folder by Directory Information (section 4) and double click M051_SPI_NRF24L01P_Rev.uvproj and M051_SPI_NRF24L01P_Sent.uvproj
2. Enter Keil compile mode
   a. Build
   b. Download
   c. Start/Stop debug session
3. Enter debug mode
   a. Run

6 Revision History

Date	Revision	Description
Sept. 17, 2019	1.00	1. Initially issued.

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