

## NUC240 SPI接口驅動ENC28J60

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 NUC240 驅動 ENC28J60，實現 uIP 功能
BSP 版本	NUC230_240_Series_BSP_CMSIS_V3.01.001
開發平臺	NuTiny-SDK-NUC240V

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## 1 功能介紹

### 1.1 簡介

本範例代碼使用NUC240系列芯片，通過SPI2接口驅動ENC28J60以太網控制器，從而實現uIP功能。當ENC28J60模塊通過網線連接網絡後，用戶可以在同一網關下使用電腦工具串口及網絡助手手工工具查看執行結果。

### 1.2 執行結果

The screenshot displays the TPCOM software interface, titled "TCPCOM [网络+串口] 二合一调试助手 V2.0.1". It is divided into several sections:

- 串口设置 (Serial Settings):** Includes fields for 串口号 (COM10 #P), 波特率 (115200), 校验位 (NONE), 数据位 (8 bit), and 停止位 (1 bit). A "关闭" (Close) button is present.
- 接收区设置 (Receive Area Settings):** Contains checkboxes for "接收转向文件...", "显示日志时间", "自动换行显示", "十六进制显示", and "暂停接收显示". It also has "保存数据" (Save Data) and "清除显示" (Clear Display) buttons.
- 发送区设置 (Send Area Settings):** Contains checkboxes for "启用文件数据源...", "自动发送附加位", "发送完自动清空", "按十六进制发送", and "循环发送 1000 ms". It also has "文件载入" (Load File) and "清除输入" (Clear Input) buttons.
- 串口数据接收 (Serial Data Reception):** A text area showing memory addresses (MAADDR5 to MAADDR0) and connection logs: "TCP Server Disconnected", "TCP Client Disconnected", "uIP log:tcp\_server connected!", "TCP Server Connected", "uIP log:tcp\_server acked!", "TCP Server Connected", and "TCP Server RX:Hello Nuvoton". Below this is a "Hello Nuvoton" text field and a "发送" (Send) button.
- 网络数据接收 (Network Data Reception):** A text area showing "[Receive from 192.168.3.16 : 1200]#" and "Connect to NUVOTON Board Successfully!". Below this is a "Hello Nuvoton" text field and a "发送" (Send) button.
- 网络设置 (Network Settings):** Includes a dropdown for "协议类型" (TCP Client), fields for "服务器IP地址" (192.168.3.16) and "服务器端口号" (1200), and a "断开" (Disconnect) button.
- 接收区设置 (Network Receive Area Settings):** Similar to the serial receive area settings, with checkboxes and "保存数据" / "清除显示" buttons.
- 发送区设置 (Network Send Area Settings):** Similar to the serial send area settings, with checkboxes and "文件载入" / "清除输入" buttons.
- 本地主机 (Local Host):** Fields for "本地主机" (192.168.3.7) and "端口" (58724).
- 底部状态栏 (Bottom Status Bar):** Shows "就绪!" (Ready!) on both sides, and statistics for "发送" (Send) and "接收" (Receive) counts, along with "复位计数" (Reset Count) buttons.

## 2 代碼介紹

初始化 ENC28J60 接口：

```
uint32_t ENC28J60_Init(uint8_t *macaddr)
{
    uint32_t retry = 0;
    ENC28J60_Reset();
    ENC28J60_Write_Op(ENC28J60_SOFT_RESET, 0, ENC28J60_SOFT_RESET);
    while (!(ENC28J60_Read(ESTAT)&ESTAT_CLKRDY) && retry < 500)
    {
        retry++;
        CLK_SysTickDelay(1000);
    }
    if (retry >= 500)
    {
        return 1;
    }
    .....
}
```

uIP 初始化及 IP 地址設置：

```
while(tapdev_init()) // Init ENC28J60
{
    printf("ENC28J60 Init Error!");
    CLK_SysTickDelay(200000);
}
uip_init();
uip_arp_init();
uip_ipaddr(ipaddr, 192, 168, 3, 16);
uip_sethostaddr(ipaddr);
uip_ipaddr(ipaddr, 192, 168, 3, 1);
uip_setdraddr(ipaddr);
uip_ipaddr(ipaddr, 255, 255, 255, 0);
uip_setnetmask(ipaddr);
uip_listen(HTONS(1200));
tcp_client_reconnect();
```

### 3 軟件與硬件環境

- 軟件環境

- BSP 版本

- ◆ NUC230\_240\_Series\_BSP\_CMSIS\_V3.01

- IDE 版本

- ◆ Keil uVersion 5.26

- 硬件環境

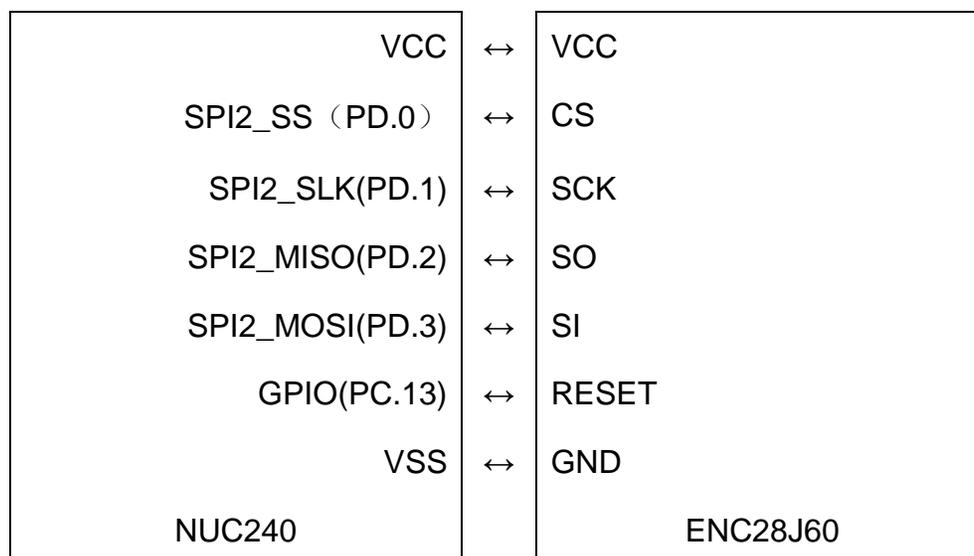
- 電路組件

- ◆ NuTiny-SDK-NUC240V

- ◆ ENC28J60 模組

- 示意圖

硬件連接採用 NuTiny-SDK-NUC240V 與 ENC28J60 模組連接。



## 4 目錄信息

### 📁 EC\_NUC240\_SPI\_ENC28J60\_uIP\_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
📁 NuEdu	Library for NuEdu-SDK-xxxx board
📁 StdDriver	All peripheral driver header and source files
📁 SampleCode	
📁 ExampleCode	Source file of example code
📁 ThirdParty	
📁 uIP-1.0	uIP is a very small implementation of the TCP/IP stack that is written by Adam Dunkels <adam@sics.se>. More information can be obtained from the uIP homepage at <a href="https://github.com/adamdunkels/uip">https://github.com/adamdunkels/uip</a>

## 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 NUC240\_SPI\_ENC28J60.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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