M480 WiFi TCP服務器

NuMicro® 32 位系列微控制器範例代碼介紹

文件資訊

代碼簡述	本範例使用 M480 UART 驅動 ESP8266，實現 TCP 服務器功能
BSP 版本	M480 Series BSP CMSIS V3.04.000
開發平台	NuMaker-IoT-M487 v1.3

1 功能介紹

1.1 簡介

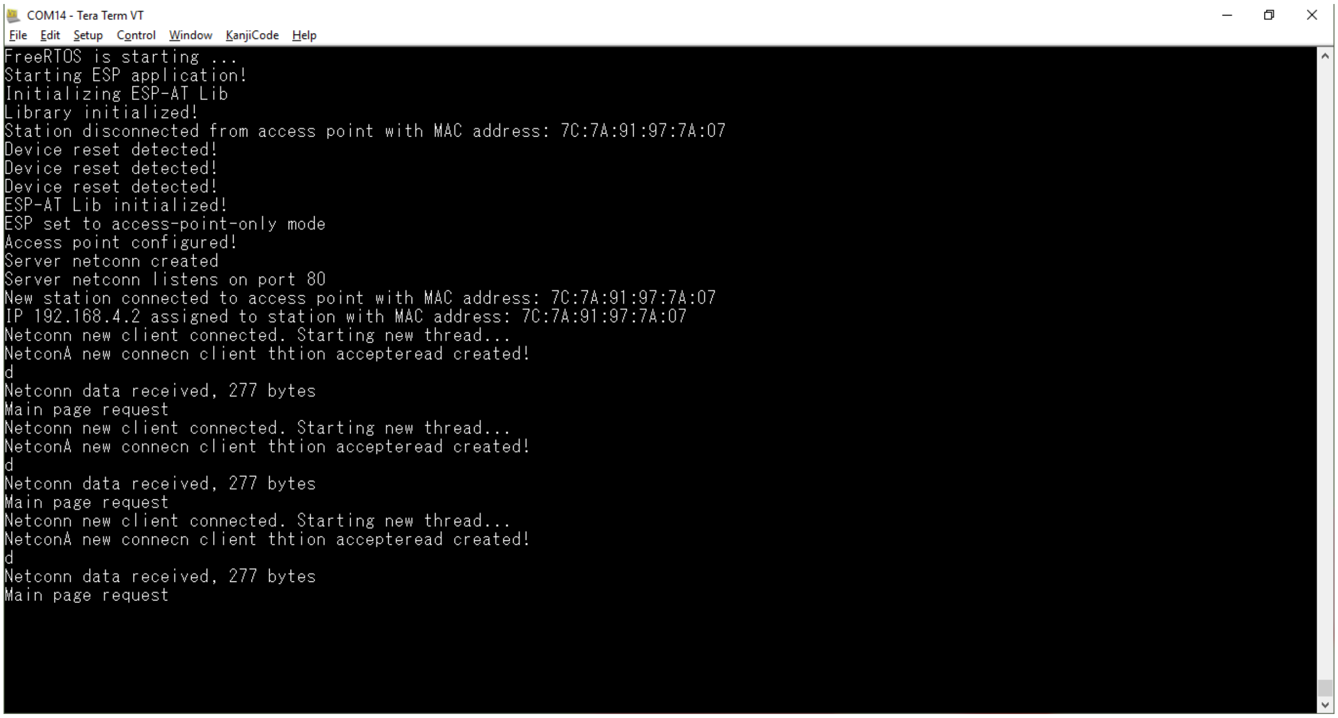
本範例程式碼使用M480系列晶片，通過UART1驅動ESP8266 WiFi模組，建立無線存取點，並提供TCP服務器功能。當電腦透過WiFi連接到ESP8266無線存取點後，可以開啟瀏覽器觀察NuMaker-IoT-M487 SW2(GPIO F11) 和 SW3(GPIO G5) 按鍵的狀態。

1.2 原理

範例程式核心使用了ESP-AT Lib函式庫。ESP-AT Lib是一個AT命令解析器，用於使用AT命令與ESP8266 WiFi模組通信。ESP-AT Lib提供了Station和Access point無線網路管理API，並提供了BSD socket相似的API，方便應用程式建立主從式架構的網路應用。

程式裡一開始讓ESP8266模組進入Access point模式，接著開啟HTTP 80埠，等待網路連接。此時可以讓電腦接入SSID為”ESP_AccessPoint”且Key為”12345678”的無線存取點，並自動取得IP。最後打開瀏覽器，連接80埠，取得目前NuMaker-IoT-M487 SW2和SW3按鍵的狀態。

1.3 執行結果



```
FreeRTOS is starting ...
Starting ESP application!
Initializing ESP-AT Lib
Library initialized!
Station disconnected from access point with MAC address: 7C:7A:91:97:7A:07
Device reset detected!
Device reset detected!
Device reset detected!
ESP-AT Lib initialized!
ESP set to access-point-only mode
Access point configured!
Server netconn created
Server netconn listens on port 80
New station connected to access point with MAC address: 7C:7A:91:97:7A:07
IP 192.168.4.2 assigned to station with MAC address: 7C:7A:91:97:7A:07
Netconn new client connected. Starting new thread...
NetconA new connecn client thtion accepteread created!
d
Netconn data received, 277 bytes
Main page request
Netconn new client connected. Starting new thread...
NetconA new connecn client thtion accepteread created!
d
Netconn data received, 277 bytes
Main page request
Netconn new client connected. Starting new thread...
NetconA new connecn client thtion accepteread created!
d
Netconn data received, 277 bytes
Main page request
```

2 代碼介紹

設置 ESP8266 模組為 Access point 模式：

```
    /* Enable access point only mode */
    if ((res = esp_set_wifi_mode(ESP_MODE_AP, 1, NULL, NULL, 1)) == espOK)
    {
        printf("ESP set to access-point-only mode\r\n");
    }
    else
    {
        printf("Problems setting ESP to access-point-only mode: %d\r\n", (int)res);
    }

    /* Configure access point */
    res = esp_ap_configure("ESP_AccessPoint", "12345678", 10, ESP_ECN_WPA2_PSK, 5, 0, 0,
NULL, NULL, 1);

    if (res == espOK)
    {
        printf("Access point configured!\r\n");
    }
```

開啟 80 埠服務：

```
    /*
     * First create a new instance of netconn
     * connection and initialize system message boxes
     * to accept clients and packet buffers
     */
    server = esp_netconn_new(ESP_NETCONN_TYPE_TCP);

    if (server != NULL)
    {
        printf("Server netconn created\r\n");

        /* Bind network connection to port 80 */
        res = esp_netconn_bind(server, 80);
        if (res == espOK)
        {
            printf("Server netconn listens on port 80\r\n");
            /*
             * Start listening for incoming connections
             * on previously binded port
             */
            res = esp_netconn_listen(server);

            while (1)
            {
                /*
                 * Wait and accept new client connection
                 *
                 * Function will block thread until
                 * new client is connected to server
                 */
                res = esp_netconn_accept(server, &client);

                if (res == espOK)
                {
                    printf("Netconn new client connected. Starting new thread...\r\n");

                    /*
                     * Start new thread for this request.
                     *
                     * Read and write back data to user in separated thread
                     * to allow processing of multiple requests at the same time
                     */
                    if (esp_sys_thread_create(NULL, "client",
(esp_sys_thread_fn)netconn_server_processing_thread, client, 512, ESP_SYS_THREAD_PRIO))
                    {
                        printf("Netconn client thread created\r\n");
                    }
                    else
                    {
                        printf("Netconn client thread creation failed!\r\n");

                        /* Force close & delete */
                        esp_netconn_close(client);
                        esp_netconn_delete(client);
                    }
                }
                else
                {
                    printf("Netconn connection accept error!\r\n");
                    break;
                }
            }
        }
        else
        {
            printf("Netconn server cannot bind to port\r\n");
        }
    }
    else
    {
        printf("Cannot create server netconn\r\n");
    }
```

3 軟體與硬體環境

- **軟體環境**
    - BSP 版本
        - M480 Series BSP CMSIS V3.04.000
    - IDE 版本
        - Keil uVersion 5.26
- **硬體環境**
    - 電路元件
        - NuMaker-IoT-M487
        - ESP8266 模組
    - 示意圖

M480 通過 UART1 接口與 ESP8266 模組連接。

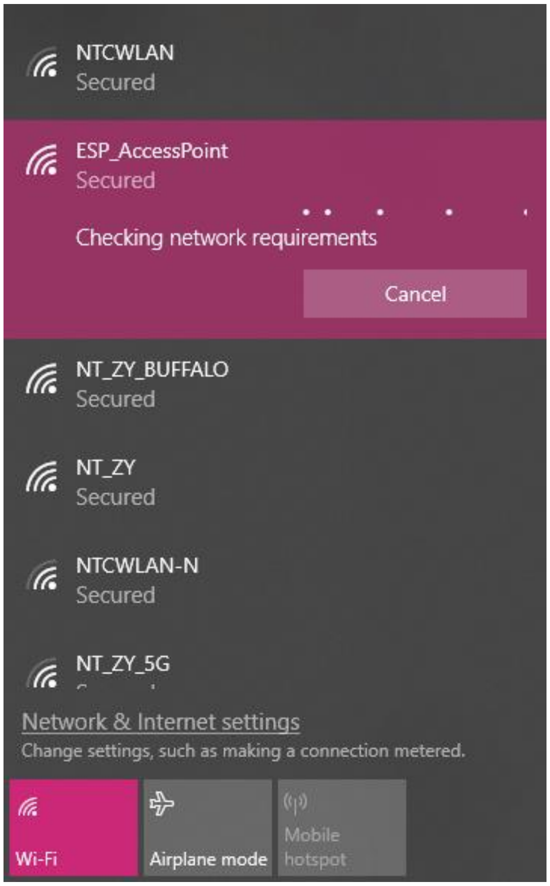
VCC	↔	VCC
PH.3	→	RESET
UART1_TXD(PH.8)	→	RXD
UART1_RXD(PH.9)	←	TXD
UART1_RTS(PB.8)	→	CTS
UART1_CTS(PB.9)	←	RTS
GND	↔	GND
M480		ESP8266

4 目錄資訊

🗁 EC_M480_WiFi_TCPServer_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
🗁 ThirdParty	
🗁 FreeRTOS	A real time operating system available for free download. Its official website is: http://www.freertos.org/
🗁 ESP_AT_Lib	ESP_AT Library commands parser is generic, platform independent, library for communication with ESP8266 WiFi module using AT commands. Its official website is https://majerle.eu/documentation/esp_at/html/index.html

5 如何執行範例程式

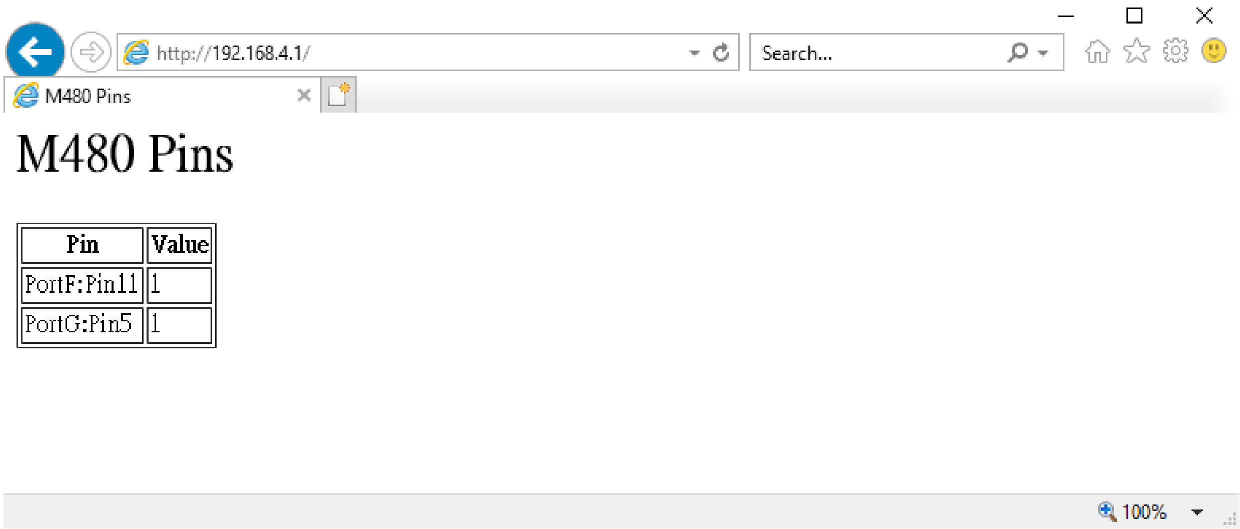
1. 根據目錄資訊章節進入 ExampleCode 路徑中的 KEIL 資料夾，雙擊 M480_WiFi_TCPServer.uvproj。
2. 進入編譯模式介面
    a. 編譯
    b. 下載代碼至記憶體
    c. 進入 / 離開除錯模式
3. 進入除錯模式介面
    a. 執行代碼
4. 電腦連接“ESP_AccessPoint”無線存取點 (key:12345678)



Checking network requirements

Change settings, such as making a connection metered.

5. 打開瀏覽器，並輸入 http://192.168.4.1/



M480 Pins

Pin	Value
PortF:Pin11	1
PortG:Pin5	1

6 修訂紀錄

Date	Revision	Description
Oct. 7, 2019	1.00	1. 初始發布.

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