

M480 WiFi MQTT 用戶端

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 MQTT 用戶端功能
BSP 版本	M480 Series BSP CMSIS V3.04.000
開發平台	NuMaker-IoT-M487 v1.3

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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，實現MQTT用戶端功能。當ESP8266模組連接上無線存取點後，開始建立與MQTT代理人的連線，並且每10秒發佈NuMaker-IoT-M487板子上SW2(GPIO F11)和SW3(GPIO G5)按鍵狀態的訊息。

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。

MQTT是一種基於“發佈(Publisher)/訂閱(Subscriber)”機制的訊息傳輸協定。一個MQTT系統由服務器和通信的用戶端所組成，而服務器通常稱為“代理人(Broker)”。用戶端可以是訊息的發佈者，也可以是訂閱者。

在範例程式裡，展示的是用戶端訊息的發佈者，固定會發佈主題為“M480_MQTT_GPIO”的訊息到代理人端。代理人端使用的是“test.mosquitto.org”服務器。最後在Android手機上使用MQTT Dashboard 或者在 iOS 裝置上使用 MQTTTool 在做為訂閱者，來接收主題為“M480_MQTT_GPIO”的訊息。

1.3 執行結果



```
Tera Term - [disconnected] VT
File Edit Setup Control Window KanjiCode Help
Device reset sequence finished!
ESP-AT Lib initialized!
Scanning access points...
Access points listed!
AP found: NT_ZY, CH: 11, RSSI: -52
AP found: ZY_PX, CH: 3, RSSI: -56
AP found: LupinAmway, CH: 1, RSSI: -59
AP found: NT_ZY_BUFFALO, CH: 6, RSSI: -59
AP found: WECWLAN_11n, CH: 11, RSSI: -64
AP found: NTCWLAN-N, CH: 11, RSSI: -65
AP found: DLink-AC30, CH: 2, RSSI: -67
AP found: WECWLAN_11n, CH: 1, RSSI: -70
AP found: , CH: 1, RSSI: -70
AP found: NTCWLAN-N, CH: 1, RSSI: -71
AP found: NTCWLAN, CH: 1, RSSI: -74
AP found: efuji-17, CH: 1, RSSI: -78
AP found: lianxin-1, CH: 3, RSSI: -78
AP found: 88job, CH: 1, RSSI: -80
AP found: Lianxin, CH: 1, RSSI: -85
AP found: asuswifi, CH: 1, RSSI: -91
Connecting to "NT_ZY" network...
Wifi connected!
Wifi got IP!
Connected to NT_ZY network!
Station IP address: 192.168.2.143; Is DHCP: 1
MQTT Client ID: B4E6203C2428
MQTT accepted!
Successfully subscribed to M480_MQTT_GPIO topic
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
Published message was: [PortF:Pin11]: 1, [PortG:Pin5]: 1
Publishing message ...
```

2 代碼介紹

設置連接無線存取點的 SSID 和 Key：

```
#ifndef __NETWORKIF_ESP8266_H__
#define __NETWORKIF_ESP8266_H__

//Preferred access point
#define DEF_JOIN_AP_SSID    "NT_ZY"
#define DEF_JOIN_AP_KEY    "12345678"

//ESP8266 network interface task
void NetworkIF_ESP8266_Task(void *pvParameter);

#endif
```

連接到 MQTT 代理人:

```
/** Make a connection to MQTT server in non-blocking mode */
static void example_do_connect(esp_mqtt_client_p client)
{
    if (client == NULL)
    {
        return;
    }

    /*
     * Start a simple connection to open source
     * MQTT server on mosquitto.org
     */
    retries++;
    esp_timeout_remove(mqtt_timeout_cb);
    esp_mqtt_client_connect(mqtt_client, "test.mosquitto.org", 1883, mqtt_cb,
    &mqtt_client_info);
}
```

發佈訊息:

```
/**
 * \brief          Timeout callback for MQTT events
 * \param[in]      arg: User argument
 */
```

```

void mqtt_timeout_cb(void *arg)
{
    esp_mqtt_client_p client = arg;
    espr_t res;

    char szPin0Name[20];
    char szPin1Name[20];
    static char tx_data[60];

    GenPinNameStr(szPin0Name, 20, READ_PIN0_PORT, READ_PIN0_PIN);
    GenPinNameStr(szPin1Name, 20, READ_PIN1_PORT, READ_PIN1_PIN);

    if (esp_mqtt_client_is_connected(client))
    {
        sprintf(tx_data, "[%s]: %u, [%s]: %u", szPin0Name, READ_PIN0, szPin1Name,
READ_PIN1);

        if ((res = esp_mqtt_client_publish(client, DEF_TOPIC_STR, tx_data,
ESP_U16(strlen(tx_data)), ESP_MQTT_QOS_EXACTLY_ONCE, 0, tx_data)) == espOK)
        {
            printf("Publishing message ...\r\n");
        }
        else
        {
            printf("Cannot publish...: %d\r\n", (int)res);
        }
    }

    esp_timeout_add(10000, mqtt_timeout_cb, client);
}

```

3 軟體與硬體環境

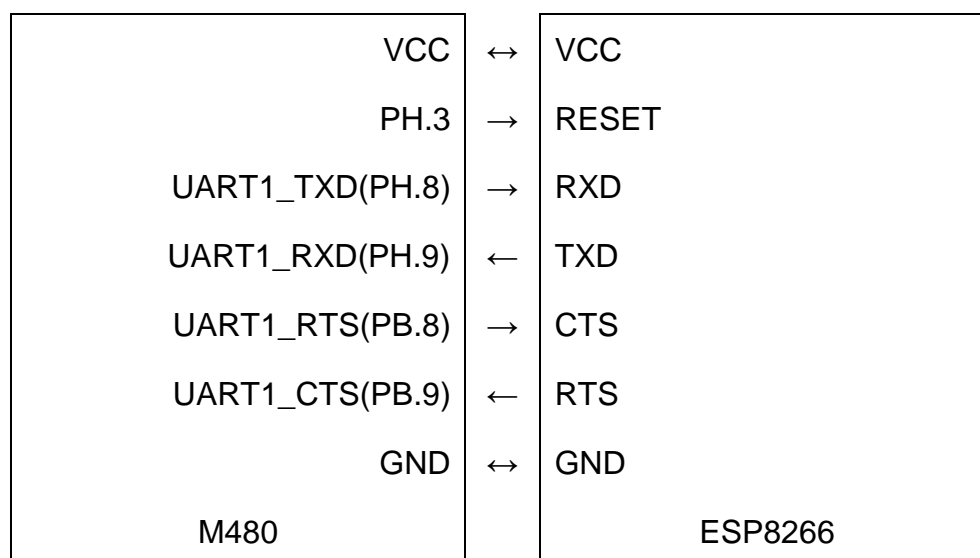
● 軟體環境

- 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。



4 目錄資訊

EC_M480_WiFi_MQTTClient_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/>

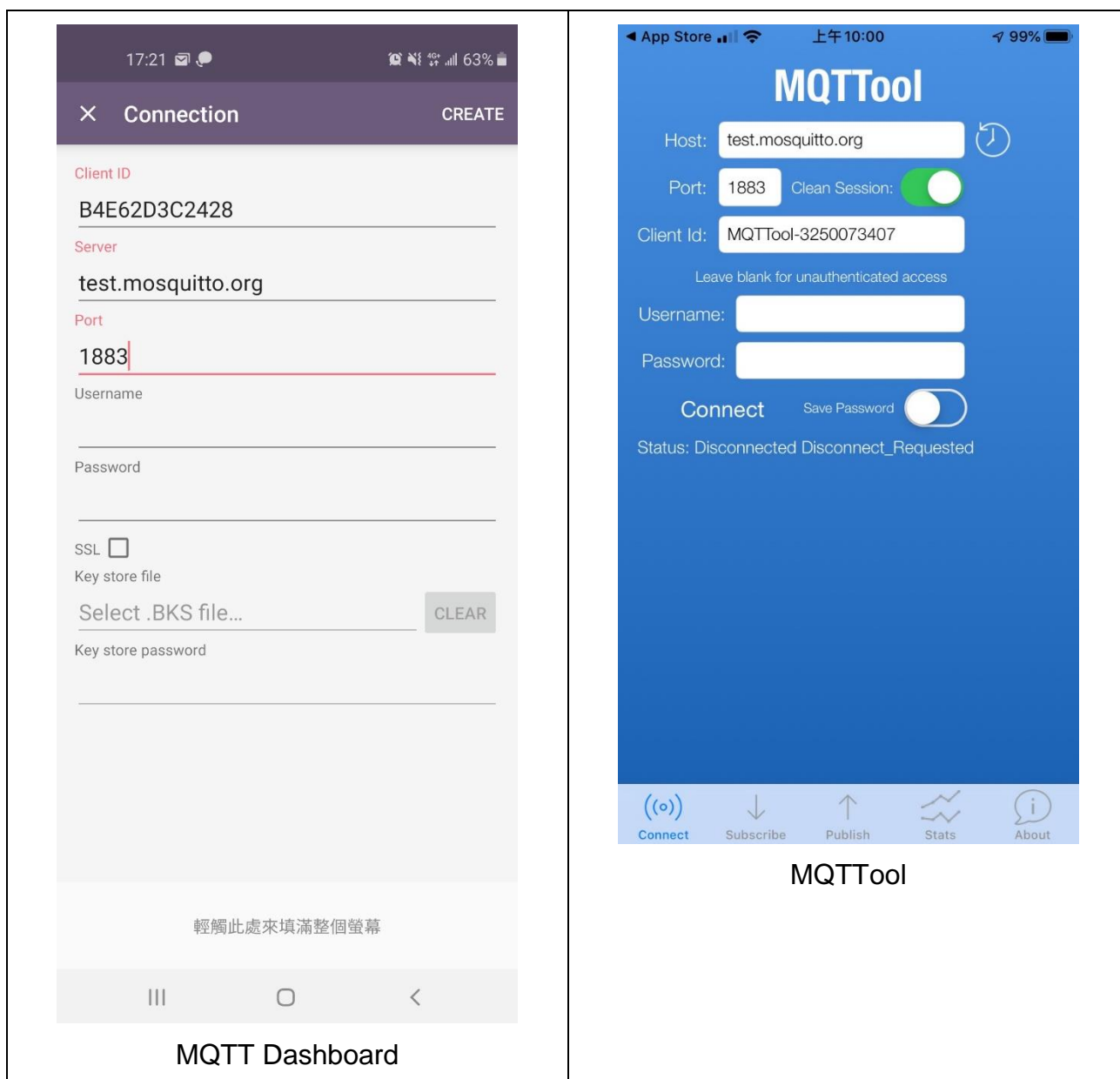
ESP_AT_Lib

ESP_AT Library commands parser is generic, platform independent, library for communication with ESP8266 WiFi module using AT commands. Its official website is https://mayerle.eu/documentation/esp_at/html/index.html

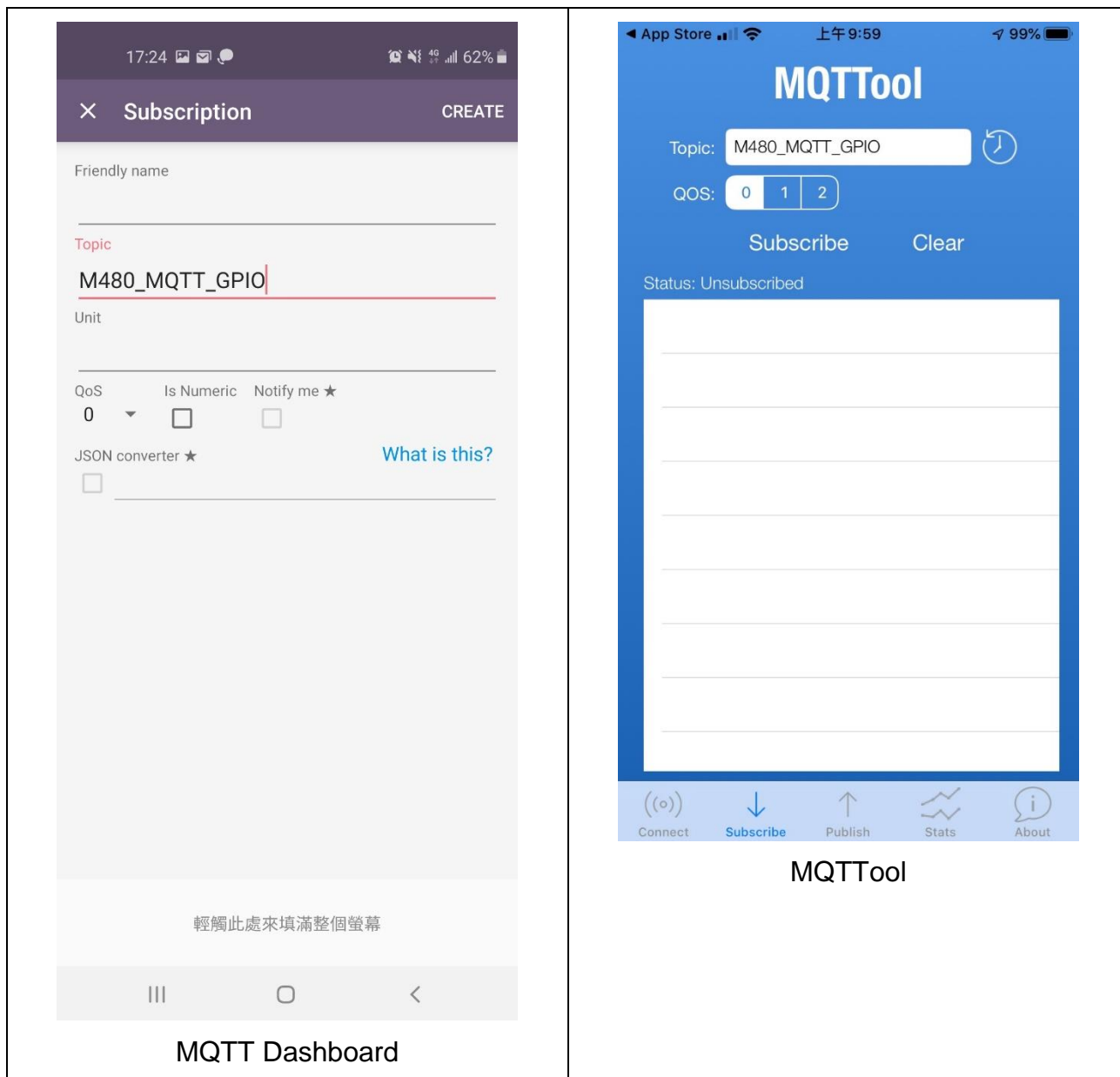
5 如何執行範例程式

1. 根據目錄資訊章節進入 ExampleCode 路徑中的 KEIL 資料夾，雙擊 M480_WiFi_MQTTClient.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. 從 Google Play 上安裝 MQTT Dashboard 或者從 App Store 安裝 MQTTTool

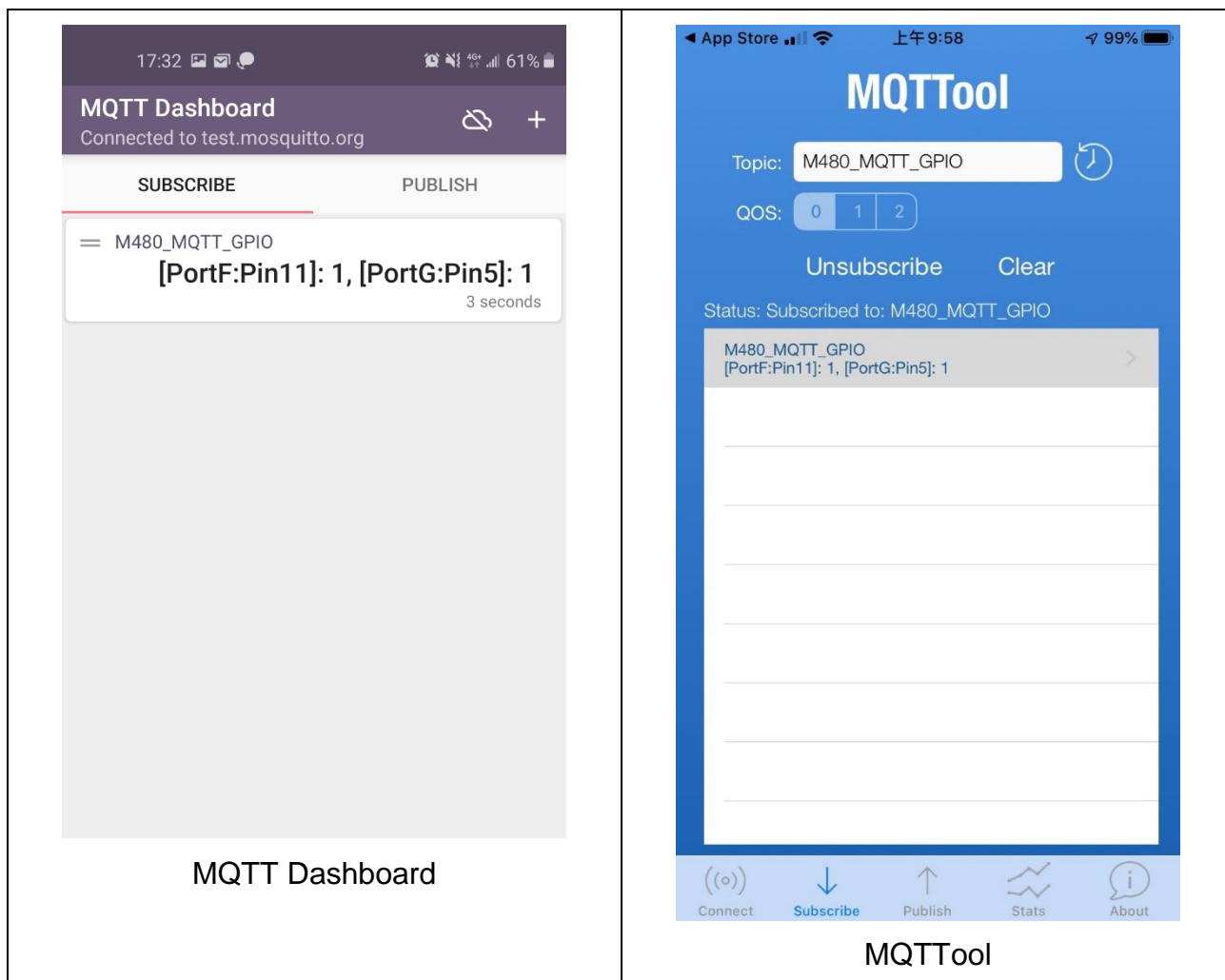
5. 使用 MQTT Dashboard 或者 MQTTTool 建立 MQTT 連線。Client ID 可以是任意的字串。



6. 訂閱主題



7. 接收訊息



6 修訂紀錄

Date	Revision	Description
Oct. 8, 2019	1.00	1. 初始發布.

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