



聯發科

Filogic 130A (MT7933)

Arduino開發板教學

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大綱

- 開發板Filologic130A 介紹
- 開發環境：Arduino SDK安裝與韌體上傳
- 周邊介面與範例說明：
 - 溫溼度感測模組 DHT11
 - 板上RGB LED
 - MQTT 訂閱/發佈

開發板Filologic130A 介紹:開發板硬體外觀及I/O功能

LEGEND

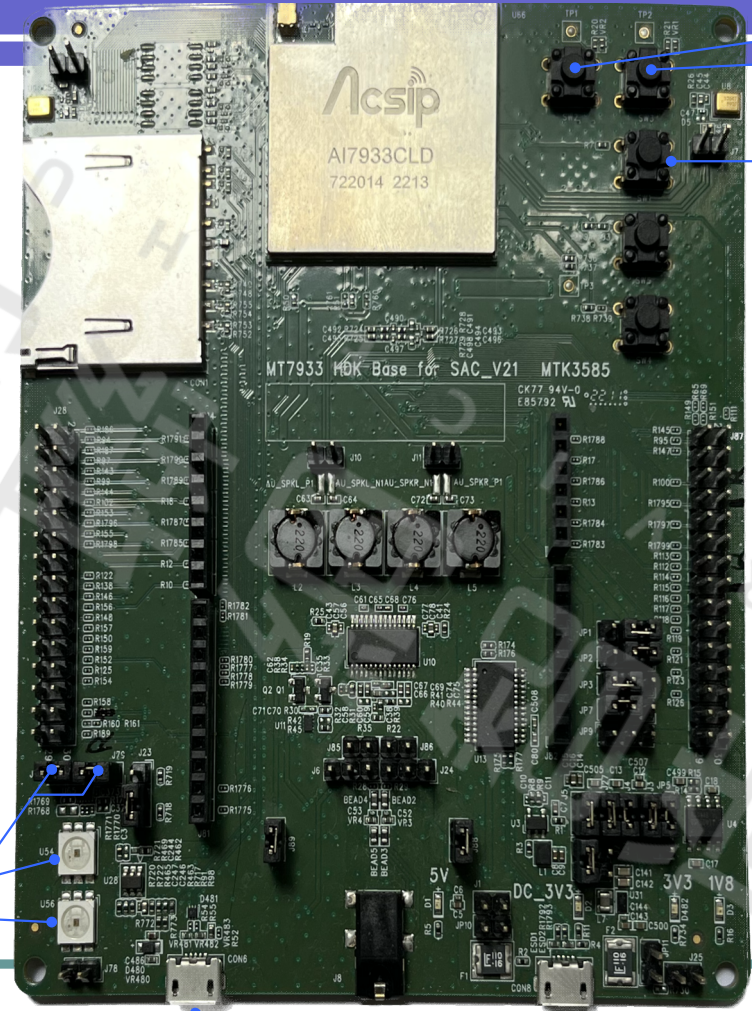
POWER
GROUND
PIN NAME
Analog/ADC
SPI
I2C
UART
D I/O
SDIO
BOARD HARDWARE

J28						J84					
1	2	6	SPI0_CLK	SDIO_CLK	UART0_RX	42	8				
3	4	7	SPI0_CS	SDIO_DAT0	UART0_TX	44	7				
5	6	8	SPI0_MISO	SDIO_DAT1	23	6					
7	8	9	SPI0_MOSI	SDIO_CMD	38	5					
9	10	10		SDIO_DAT2	15	4					
11	12	11		SDIO_DAT3	37	3					
13	14	GND			36	2					
15	16	12			35	1					
17	18										
19	20			SDIO_DAT3	11	10					
21	22			SDIO_DAT2	10	9					
23	24			SDIO_CMD	SPI0_CS	7	8				
25	26	GND		SDIO_DAT1	SPI0_MOSI	9	7				
27	28	44	UART0_TX	SDIO_DAT0	SPI0_MISO	8	6				
29	30	42	UART0_RX	SDIO_CLK	SPI0_CLK	6	5				
					GND		4				
					GND		3				
					I2C_SDA	19	2				
					I2C_SCL	20	1				

J80 & J79 shorted for SPI0_LED*

SPI0_LED1

SPI0_LED2



SW2 47

SW3 49

RST

J83				J82			
6	20	I2C_SCL	8				
5	19	I2C_SDA	7				
4	22	GND	6				
3	21	GND	5				
2	18	GND	4				
1	17	GND	3				
			2				
			1				
			GND				
			GND				
			5V				
			3.3V				
			RST				
			IORLI				

J87					
RST	1	2			
GND	3	4			
12	5	6		48	
13	7	8		50	
14	9	10		GND	
15	11	12		24	
16	13	14			
17	15	16			
18	17	18			
I2C_SDA	19	20			
I2C_SCL	21	22			
GND	23	24		VCCIO	
GND	25	26		GND	
GND	27	28		3.3V	
1.8V	29	30		GND	
				5V	

USB_OTG

Download monitor USB serial

開發板Filologic130A 介紹: Arduino目前可以使用I/O及硬體資源

- UART X 1
 - I2C X 1
 - SPI / SDIO/SD卡
 - ADC X 4 (輸入範圍0~1.8V)
 - PWM X 12
 - USB DISK
- MCU**

- Wi-Fi 6.0(2.4/5GHz) 無線連網
- BT 5.0

- Stereo speaker / line out 音訊
- Microphone X 2

開發環境 Filogic Arduino 1.8.18 安裝(1)

- 下載Arduino 1.8.18

<https://www.arduino.cc/en/software/OldSoftwareReleases>

arduino.cc/en/software/OldSoftwareReleases

汽車修理 國小數學 Agilent amoBBS arduino cc2540 DIY EDA EETOP ESP8266 MPU-9150 netDRV NXT

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Arduino Web Editor

Start coding online and save your sketches in the cloud. The most up-to-date version of the IDE includes all libraries and also supports new Arduino boards.

CODE ONLINE GETTING STARTED

SOFTWARE

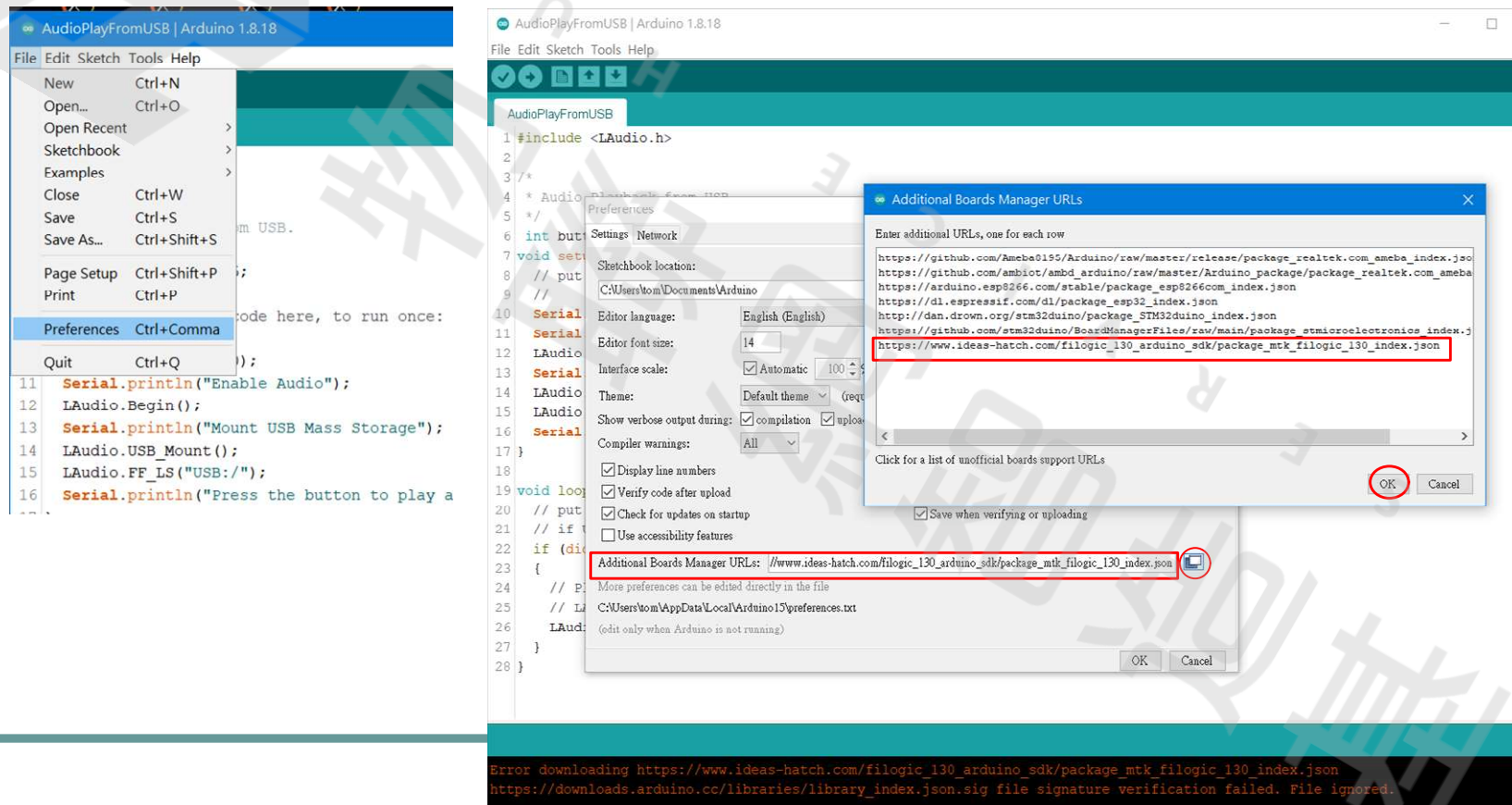
ARDUINO 1.8.18

Arduino IDE that can be used with any Arduino board, including the Arduino Yún and Arduino DUE. Refer to the [Getting Started](#) page for Installation instructions. [See the release notes](#).

Windows	MAC	Linux	Source
Windows Installer Windows ZIP file for non admin install	MAC OS 10.8 Mountain Lion or newer	Linux 32 bits Linux 64 bits Linux ARM 32	Source

開發環境 Filologic Arduino 1.8.18 安裝(2)

- 在開發板管理網址設定: https://www.ideas-hatch.com/filologic_130_arduino_sdk/package_mtk_filologic_130_index.json



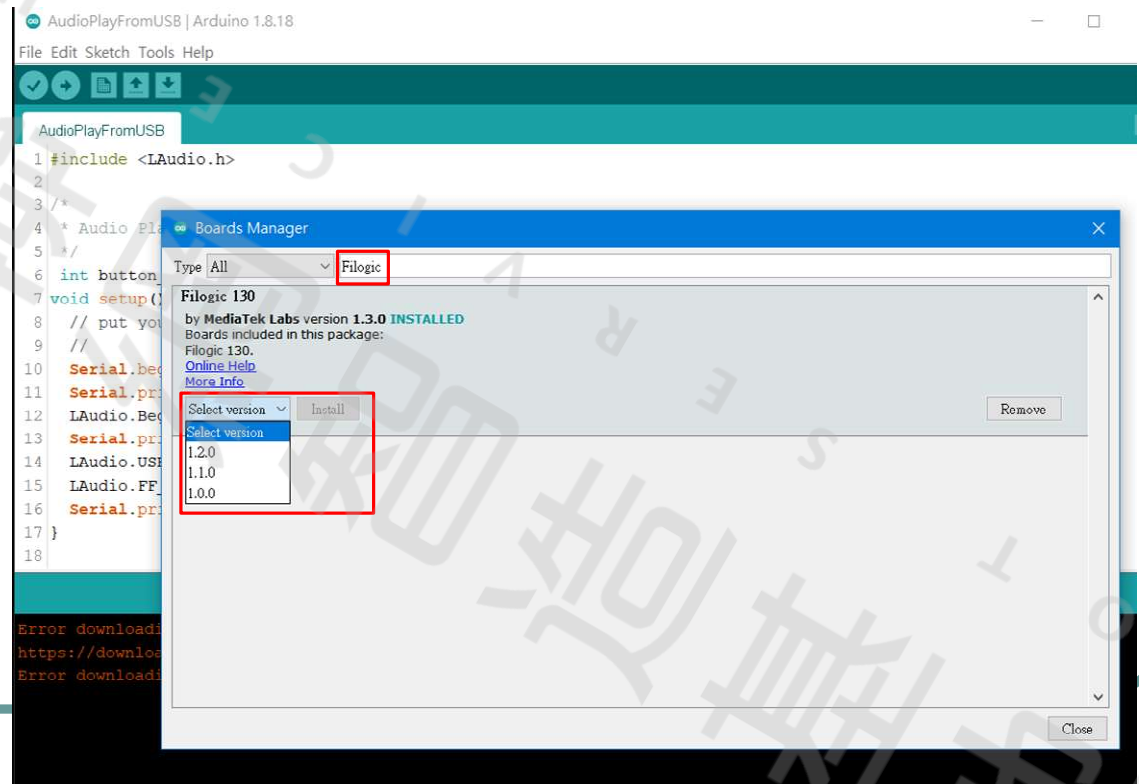
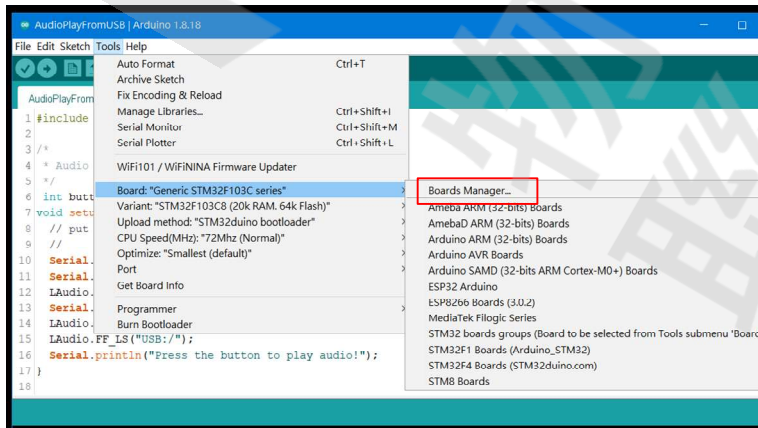
The screenshot displays the Arduino IDE environment. On the left, the 'File' menu is open, with 'Preferences' selected. The main workspace shows a sketch with the following code:

```
1 #include <LAudio.h>
2
3 /*
4 * Audio playback example
5 */
6 int buttonPin = 2; // the pin of the pushbutton
7 void setup() {
8   // put your setup code here, to run once:
9   pinMode(buttonPin, INPUT);
10  Serial.begin(9600);
11  LAudio.Begin();
12  Serial.println("Mount USB Mass Storage");
13  LAudio.USB_Mount();
14  LAudio_FF_LS("USB:/");
15  Serial.println("Press the button to play a");
16
17
18
19 void loop() {
20   // put your main code here, to run repeatedly:
21   // if the pushbutton pressed, there is a low on the pin:
22   if (digitalRead(buttonPin) == LOW) {
23     // Play the file
24     // Play the file
25     // L
26     LAudio
27   }
28 }
```

The 'Additional Boards Manager URLs' dialog box is open, showing a list of URLs. The URL https://www.ideas-hatch.com/filologic_130_arduino_sdk/package_mtk_filologic_130_index.json is highlighted in red. The 'Preferences' window is also open, showing the 'Additional Boards Manager URLs' field with the same URL pasted in. A console window at the bottom shows an error message: 'Error downloading https://www.ideas-hatch.com/filologic_130_arduino_sdk/package_mtk_filologic_130_index.json https://downloads.arduino.cc/libraries/library_index.json.sig file signature verification failed. File ignored.'

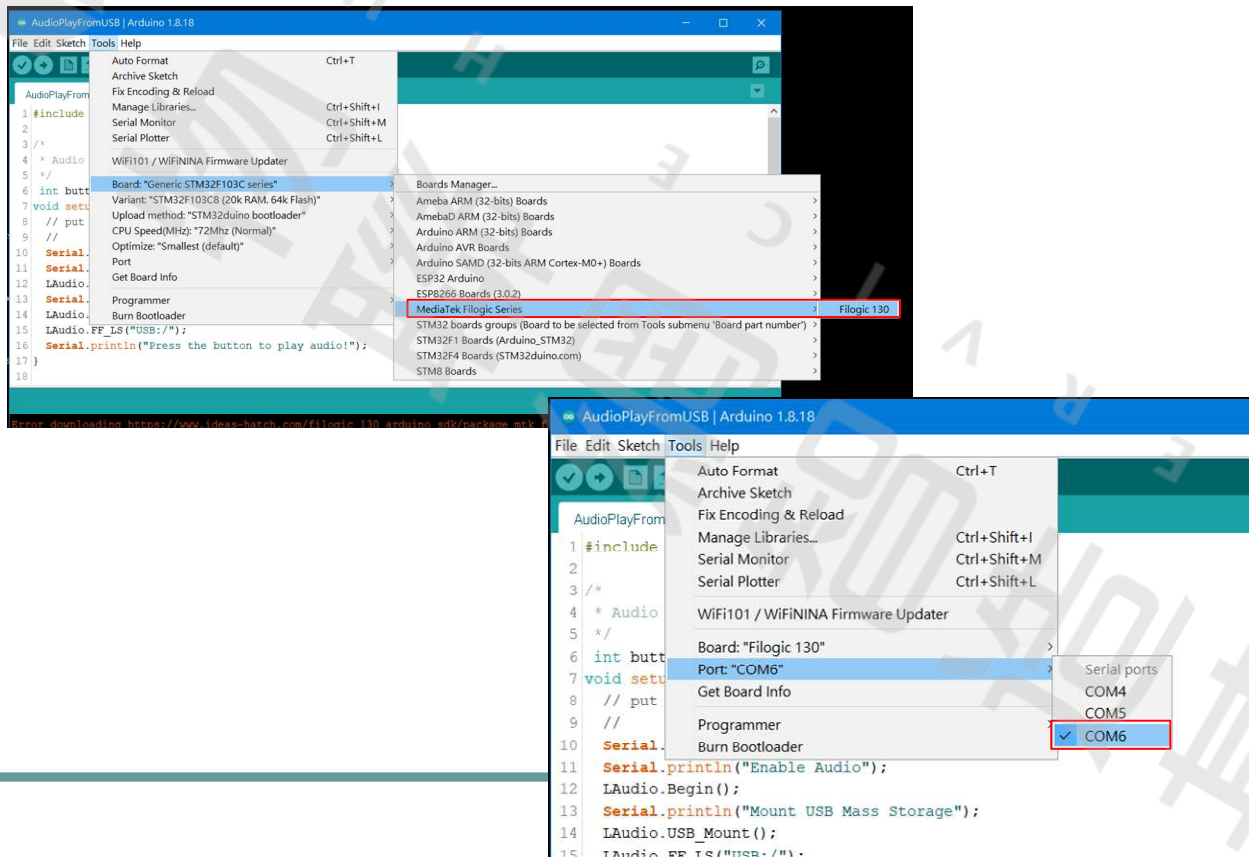
開發環境 Filogic Arduino 1.8.18 安裝(3)

- 按裝開發板 Filogic 1.0.0 逐版安裝到 1.3.0



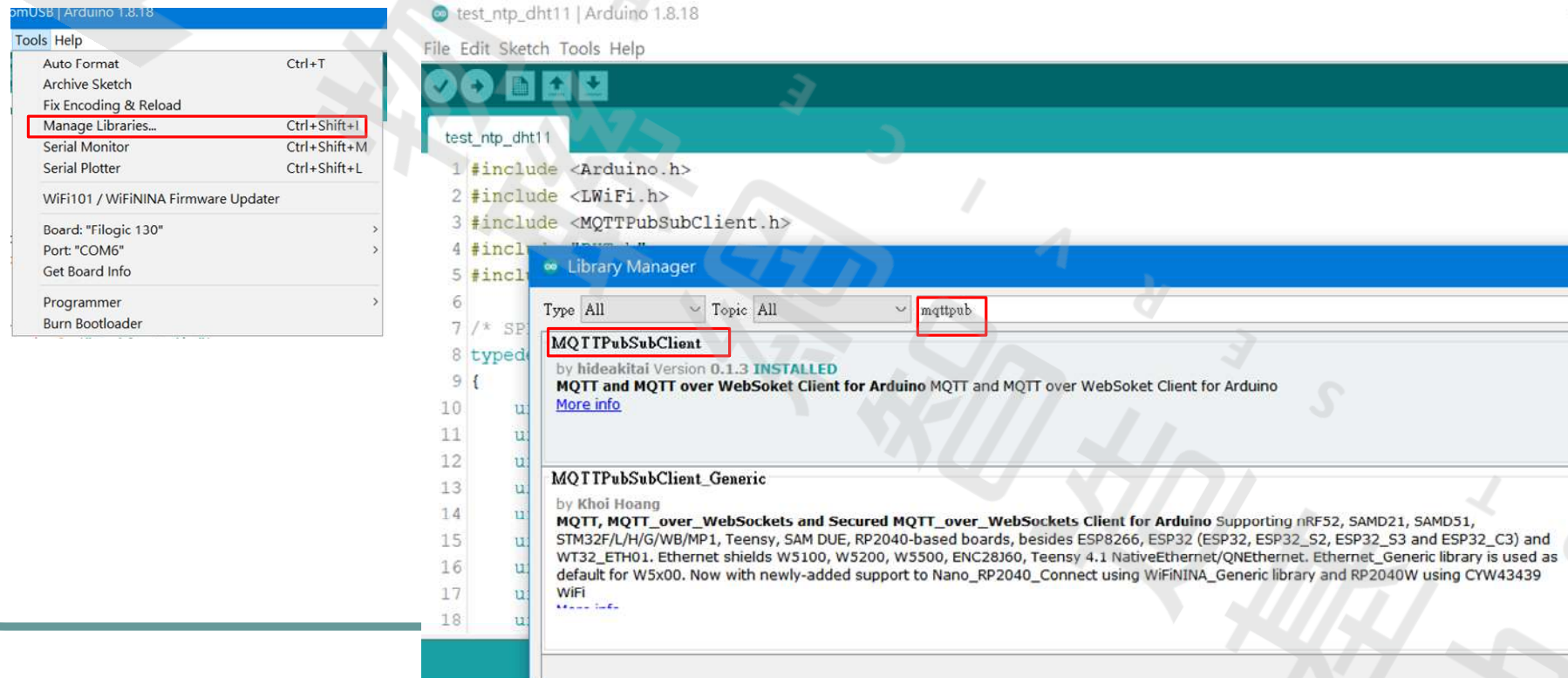
開發環境 Filogic Arduino 1.8.18 安裝(4)

- 選擇Filogic開發版及serial com port



開發環境 Filogic Arduino 1.8.18 安裝(5)

- 安裝 MQTTPubSubClient library



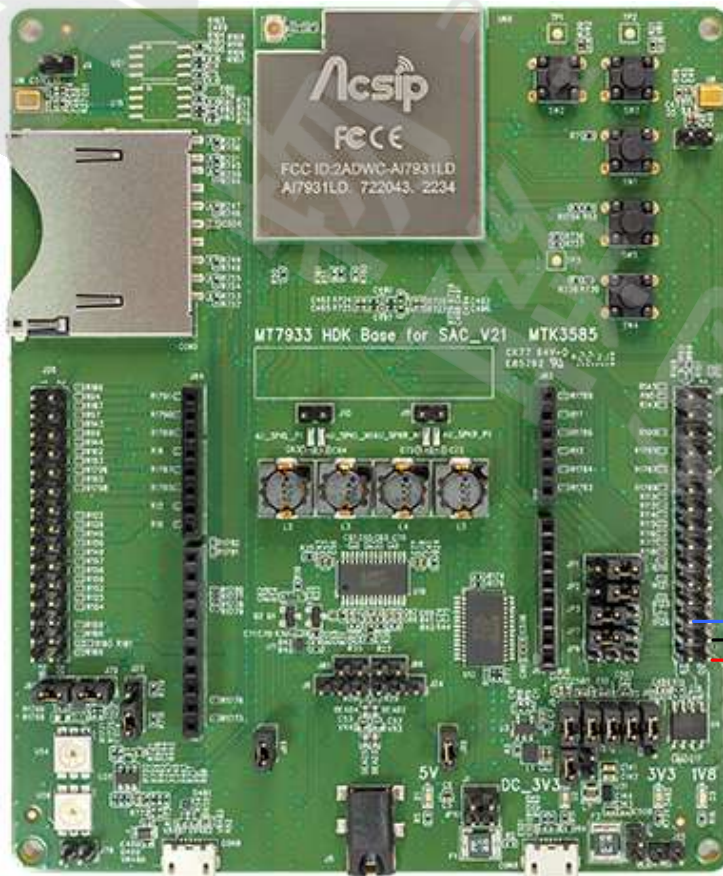
周邊介面與範例說明：溫溼度感測模組 DHT11(1)

- DHT11是一個結合濕度計和測溫元件量測週遭空氣環境，並與一個高性能八位元單晶片相連接，將所量測到的溫、濕度資料拆解成為數位訊號，再由感測器接腳將資料送出。使用上很簡單，但是抓取資料時必須要特別注意時間的掌控，而且每筆資料的抓取時間間隔要 2 秒鐘以上，不能太快。
- DHT11 的規格如下：
 - 濕度測量範圍：20~90%;
 - 濕度測量精度：±5%;
 - 溫度測量範圍：0~50°C
 - 溫度測量精度：±2°C
 - 電源供應範圍：3~5V
 - 頻率不可超過：0.5Hz (每2秒一次)



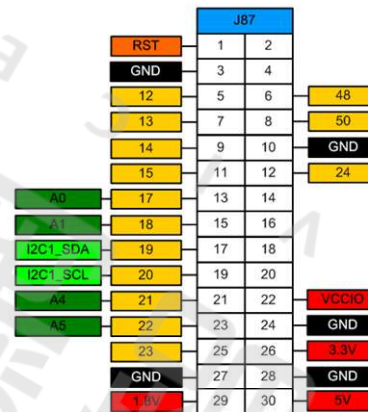
周邊介面與範例說明：溫溼度感測模組 DHT11(2)

電路連接圖



PIN :

- J87 – 25 Arduino 23(左側倒數第三個)
- J87 – 30 5V (右側倒數第一個)
- J87 – 28 GND (右側倒數第二個)



周邊介面與範例說明：溫溼度感測模組 DHT11(3)

- test_dht11
- 安裝 DHT sensor library
- 修改DHTPIN 為23

```
test_dht11 | Arduino 1.8.18
File Edit Sketch Tools Help

test_dht11
1
2 #include "DHT.h"
3
4 #define DHTPIN 23 // 設定DHT11訊號pin
5 #define DHTTYPE DHT11 // DHT 11
6 DHT dht(DHTPIN, DHTTYPE);
7
8 void setup() {
9   Serial.begin(115200); // 設定USB Serial 115200 bps, 為了Serial Monitor
10  dht.begin(); // 做始 DHT (溫溼度sensor)
11 }
12
13 void loop() {
14   float h = dht.readHumidity(); // 讀出濕度
15   float t = dht.readTemperature(); // 讀出攝氏溫度
16   if (!isnan(h) || !isnan(t)) { // 檢查是否正確的讀出
17     Serial.println(F("Failed to read from DHT sensor!"));
18   }
19   return;
20
21   Serial.print(F("Humidity: "));
22   Serial.print(h);
23   Serial.print(F(" % Temperature: "));
24   Serial.print(t);
25   Serial.println(F("°C "));
26
27   delay(2000); // 隔2秒,再讀
28 }

FlashWrite mode: 0
Sending file: C:\Users\com\AppData\Local\Arduino15\packages\Fillogic\tools/flash_tool
Sending file:size= 0x48b10
Sended: 32K
Sended: 64K
Sended: 96K
Sended: 128K
Sended: 160K
Sended: 192K
Sended: 224K
Sended: 256K
Sended: 288K
Sended: 320K
Session be burned:ROM_FROGS, Completed:= 1/1
checksum0/1= 0x187e 0x187e
Burn_time0: 10.09
Finished!
```

```
COM6
hal_psram_init

Psram type : 2
UHS PSRAM K Pass
[SPM] INFRA IRQ regist success
[SPM] INFRA IRQ start success
[SPM] CM33 IRQ regist success
[SPM] CM33 IRQ start success
Sleep handle name: GPT0, index 22
Sleep manager init done
ffffffffffvfnbf5ffffvffz N5fNfvvvvVfHfipc notify thread
AMRO DRIVER INTF
[mt7933_codec_dac_depop_setup]:804: msg: vosel_val = 4
[afe_probe]:7773: msg: MT7933 AFE driver initialized.
[adsp_probe]:1531: msg: [adsp_probe]

[mt7933_adsp_probe]:680: msg: mt7933_adsp_probe
[mt7933_adsp_probe]:712: msg: mt7933_adsp_probe dsp boot run = 0

[snr_ctl_dev_register]:75: msg: ctl_name:control, device_id: 22

[audio init]:2963: msg: done
Humidity: 32.00% Temperature: 27.00°C
Humidity: 32.00% Temperature: 27.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
Humidity: 33.00% Temperature: 26.00°C
```

Library Manager

Type All Topic All **DHT11**

[More info](#)

DHT sensor library
by Adafruit Version 1.4.2 **INSTALLED**
Arduino library for DHT11, DHT22, etc Temp & Humidity Sensors Arduino library for DHT11, DHT22, etc Temp & Humidity Sensors
[More info](#)

DHT sensor library for ESPx
by beegee_tokyo
Arduino ESP library for DHT11, DHT22, etc Temp & Humidity Sensors Optimized libray to match ESP32 requirements. Last changes: Fix negative temperature problem (credits @helijunky)
[More info](#)

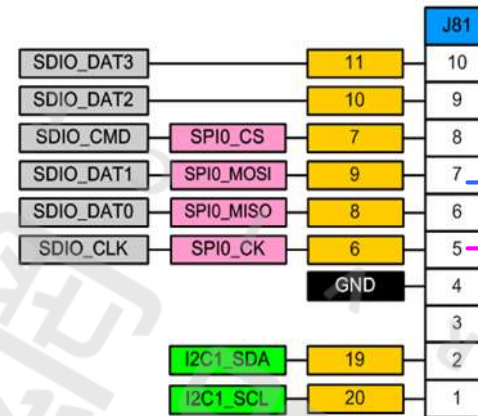
DHT Sensors Non-Blocking

周邊介面與範例說明：板上RGB LED (1)

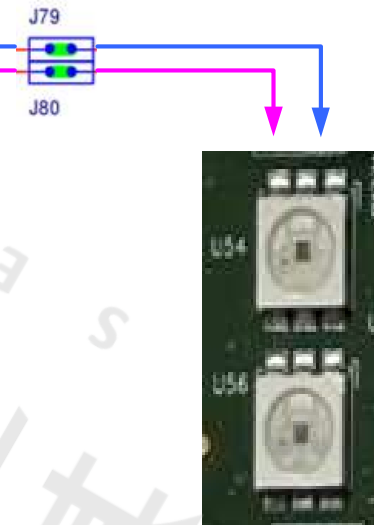
- 板上的2顆3色LED透過SPI調整明滅顏色
- 資料格式如下：

```
/* SPI LED0 & LED1 控制的資料格式 */  
typedef struct led_cmd  
{  
    uint32_t    start;  
    uint8_t     led1_global;  
    uint8_t     led1_b;  
    uint8_t     led1_g;  
    uint8_t     led1_r;  
    uint8_t     led2_global;  
    uint8_t     led2_b;  
    uint8_t     led2_g;  
    uint8_t     led2_r;  
    uint32_t    end;  
} led_cmd_t;
```

0x00000000
0xf0
LED1_Blue
LED1_Green
LED1_Red
0xf0
LED2_Blue
LED2_Green
LED2_Red
0xffffffff



電路連接示意圖



周邊介面與範例說明：板上RGB LED (2)

程式說明

```
test_obRGBLED | Arduino 1.8.18
File Edit Sketch Tools Help
test_obRGBLED
1 #include <FSPI.h> 引入SPI程式庫
2
3 /* SPI LED0 & LED1 控制的資料格式 */
4 typedef struct led_cmd
5 {
6     uint32_t    start;
7     uint8_t     led1_global;
8     uint8_t     led1_b;
9     uint8_t     led1_g;
10    uint8_t     led1_r;
11    uint8_t     led2_global;
12    uint8_t     led2_b;
13    uint8_t     led2_g;
14    uint8_t     led2_r;
15    uint32_t    end;
16 } led_cmd_t;
17
18 led_cmd_t led_cmd; // 控制LED暫存區
19
20 void ledOff(){ // 將LED off, 並設定傳送的格式
21     led_cmd.start = 0x00000000;
22     led_cmd.led1_global = 0xF0;
23     led_cmd.led1_b = 0x00;
24     led_cmd.led1_g = 0x00;
25     led_cmd.led1_r = 0x00;
26     led_cmd.led2_global = 0xF0;
27     led_cmd.led2_b = 0x00;
28     led_cmd.led2_g = 0x00;
29     led_cmd.led2_r = 0x00;
30     led_cmd.end = 0xFFFFFFFF;
31     FSPI.transfer(&led_cmd, sizeof(led_cmd));
32 }
33 }
```

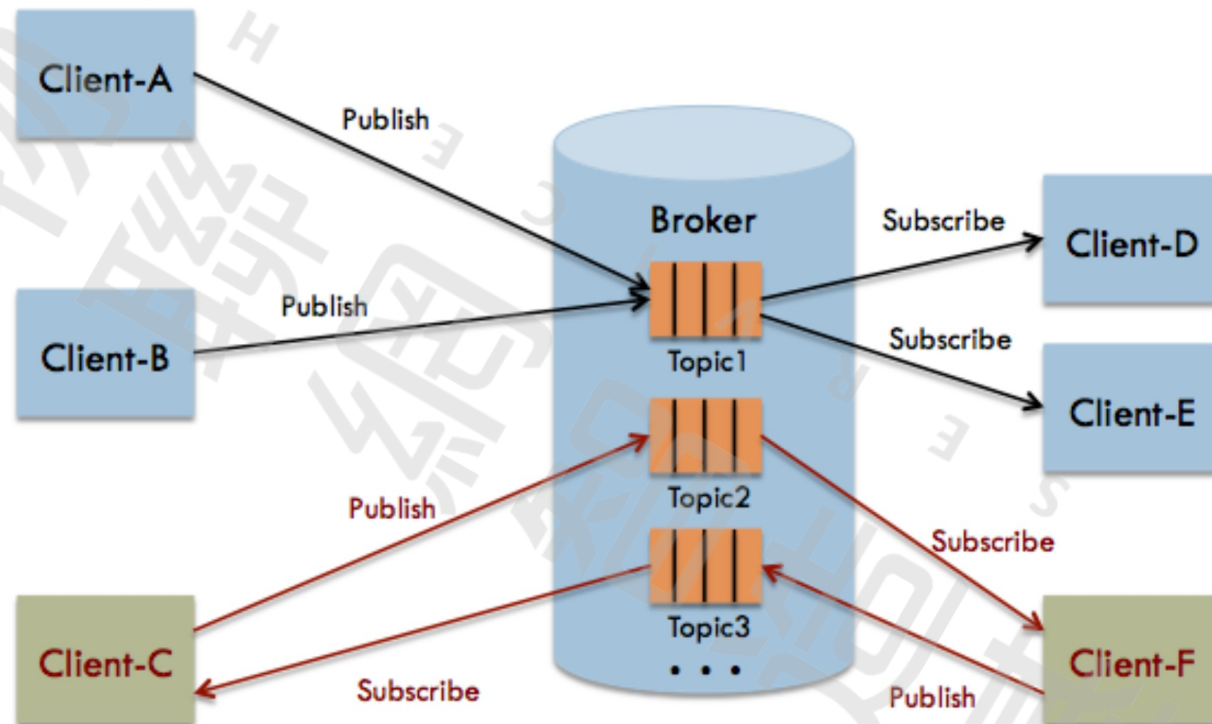
```
34 void setLedColor(uint8_t r1,uint8_t g1,uint8_t b1,uint8_t r2,uint8_t g2,uint8_t b2){
35     led_cmd.led1_b = b1;
36     led_cmd.led1_g = g1;
37     led_cmd.led1_r = r1;
38     led_cmd.led2_b = b2;
39     led_cmd.led2_g = g2;
40     led_cmd.led2_r = r2;
41     FSPI.transfer(&led_cmd, sizeof(led_cmd));
42 }
43
44 int colorI;
45 int tcolor;
46
47 void setup() {
48     FSPI.begin();
49     Serial.begin(115200);
50     ledOff();
51     colorI=0;
52 }
53
54 void loop() {
55     if (colorI>=1536) colorI=0;
56     if (colorI<256){
57         tcolor =colorI;
58         setLedColor(tcolor,0,0,tcolor,tcolor,0);
59     }else if (colorI< 512){
60         tcolor=0xff & (255-(colorI & 0xff));
61         setLedColor(tcolor,0,0,tcolor,tcolor,0);
62     }else if (colorI< 768){
63         tcolor = colorI & 0xff;
64         setLedColor(0,tcolor,0,0,tcolor,tcolor);
65     }else if (colorI< 1024){
66         tcolor = 0xff & (255-(colorI & 0xff));
67         setLedColor(0,tcolor,0,0,tcolor,tcolor);
68     }else if (colorI< 1280){
69         tcolor = colorI & 0xff;
70         setLedColor(0,0,tcolor,tcolor,0,tcolor);
71     }else{
72         tcolor = 0xff & (255-(colorI & 0xff));
73         setLedColor(0,0,tcolor,tcolor,0,tcolor);
74     }
75     colorI++;
76     delay(50);
77 }
```

設定LED顏色並透過SPI傳送設定資訊

設定SPI、Serial及LED

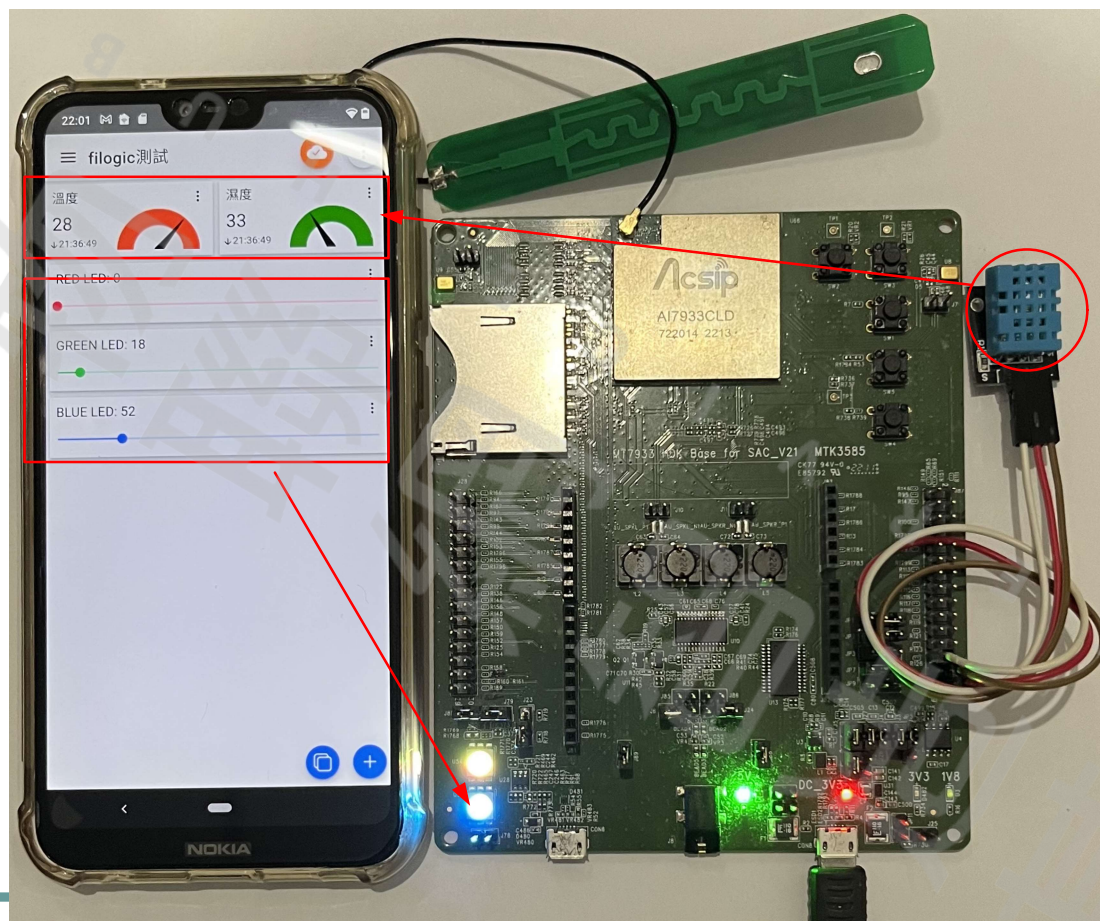
周邊介面與範例說明：MQTT 訂閱/發佈(1)

● MQTT 介紹



周邊介面與範例說明：MQTT 訂閱/發佈(2)

- 硬體連線
- MQTT 操作



周邊介面與範例說明：MQTT 訂閱/發佈(3)

- 程式說明1

```
test_mqtt | Arduino 1.8.18
File Edit Sketch Tools Help
test_mqtt
1
2 #include <LWiFi.h>
3 #include <MQTTPubSubClient.h>
4 #include "DHT.h"
5 #include <FSPI.h>
6
7 /* SPI LED0 & LED1 控制的資料格式 */
8 typedef struct led_cmd
9 {
10     uint32_t    start;
11     uint8_t     led1_global;
12     uint8_t     led1_b;
13     uint8_t     led1_g;
14     uint8_t     led1_r;
15     uint8_t     led2_global;
16     uint8_t     led2_b;
17     uint8_t     led2_g;
18     uint8_t     led2_r;
19     uint32_t    end;
20 } led_cmd_t;
21
22 led_cmd_t led_cmd; // 控制LED暫存區
23
24 #define DHTPIN 23 // 設定DHT11訊號pin
25 #define DHTTYPE DHT11 // DHT 11
26 DHT dht(DHTPIN, DHTTYPE);
27
28 char ssid[] = "XXXXXX"; // WIFI ID
29 char pass[] = "XXXXXX"; // WIFI 密碼
30
31 const char* mqttServer = "XXX.com.tw"; // MQTT伺服器位址
32 const char* mqttUserName = "XXX"; // 使用者名稱
33 const char* mqttPwd = "XXXX"; // MQTT密碼
34 const char* deviceID = "filogic00"; // 用戶端ID, 隨意設定。
35
36 WiFiClient client;
37 MQTTPubSubClient mqtt;
38
39 void ledOff(){ // 將LED off, 並設定傳送的格式
40     led_cmd.start = 0x00000000;
41     led_cmd.led1_global = 0xF0;
42     led_cmd.led1_b = 0x00;
43     led_cmd.led1_g = 0x00;
44     led_cmd.led1_r = 0x00;
45     led_cmd.led2_global = 0xF0;
46     led_cmd.led2_b = 0x00;
47     led_cmd.led2_g = 0x00;
48     led_cmd.led2_r = 0x00;
49     led_cmd.end = 0xFFFFFFFF;
50     FSPI.transfer(&led_cmd, sizeof(led_cmd));
51 }
52
53 void setLedColor(uint8_t r, uint8_t g, uint8_t b, int led=0){
54     if (led==0) {
55         led_cmd.led1_b = b;
56         led_cmd.led1_g = g;
57         led_cmd.led1_r = r;
58     } else {
59         led_cmd.led2_b = b;
60         led_cmd.led2_g = g;
61         led_cmd.led2_r = r;
62     }
63     FSPI.transfer(&led_cmd, sizeof(led_cmd));
64 }
```

周邊介面與範例說明：MQTT 訂閱/發佈(4)

● 程式說明2

```
65
66 uint8_t redLed, greenLed, blueLed;
67 void setup() {
68     FSPI.begin();
69     Serial.begin(115200);
70     ledOff();
71
72     Serial.println("WIFI 連接中");
73     WiFi.begin(ssid, pass);
74
75     while (WiFi.status() != WL_CONNECTED) {
76         delay(500);
77         setLedColor(0x0, 0x50, 0x0);
78         Serial.print(".");
79         delay(300);
80         setLedColor(0x0, 0x0, 0x50);
81     }
82     Serial.println("WIFI 連接上了, 連接MQTT仲介伺服器中");
83     setLedColor(0x0, 0x10, 0x0);
84     dht.begin();
85     while (!client.connect(mqttServer, 1883)){
86         Serial.print("連接 ");
87         Serial.print(mqttServer);
88         Serial.println(" MQTT仲介伺服器.....");
89         delay(500);
90     }
91     Serial.println("Login MQTT仲介伺服器");
92     setLedColor(0x0, 0x10, 0x10);
93     mqtt.begin(client);
94     while (!mqtt.connect(deviceID, mqttUserName, mqttPwd)){
95         Serial.print("Login ");
96         Serial.print(mqttServer);
97         Serial.println(" MQTT仲介伺服器.....");
98         delay(500);
99     }
100    Serial.println("MQTT仲介伺服器 login ok");
```

```
101    setLedColor(0x0, 0x10, 0x0);
102    redLed=0;
103    greenLed=0;
104    blueLed=0;
105    String topic;
106    topic=(String)deviceID+"/rLed";
107    mqtt.subscribe(topic, [](const String& payload, const size_t size) {
108        Serial.print("RED LED: ");
109        Serial.println(payload);
110        redLed = 0xff & payload.toInt();
111        setLedColor(redLed, greenLed, blueLed, 1);
112    });
113    topic=(String)deviceID+"/gLed";
114    mqtt.subscribe(topic, [](const String& payload, const size_t size) {
115        Serial.print("GREEN LED: ");
116        Serial.println(payload);
117        greenLed = 0xff & payload.toInt();
118        setLedColor(redLed, greenLed, blueLed, 1);
119    });
120    topic=(String)deviceID+"/bLed";
121    mqtt.subscribe(topic, [](const String& payload, const size_t size) {
122        Serial.print("BLUE LED: ");
123        Serial.println(payload);
124        blueLed = 0xff & payload.toInt();
125        setLedColor(redLed, greenLed, blueLed, 1);
126    });
127    delay(1500);
128 }
129 }
```

周邊介面與範例說明：MQTT 訂閱/發佈(5)

- 程式說明3

APIs

```
void begin(ClientType& client);
bool connect(const String& client_id, const String& user = "", const String& pass = "");
bool disconnect();
bool update();

bool publish(const String& topic, const String& payload, const bool retained = false, int qos = 0);
bool publish(const String& topic, uint8_t* payload, const size_t length, const bool retained = false, const u

void subscribe(const global_callback_t& cb);
bool subscribe(const String& topic, const topic_callback_t& cb);
bool subscribe(const String& topic, const uint8_t qos, const topic_callback_t& cb);
bool unsubscribe(const String& topic);
```

周邊介面與範例說明：MQTT 訂閱/發佈(6)

- 程式說明4

```
129
130 void loop() {
131     mqtt.update();
132     float h = dht.readHumidity(); //讀出溫濕度
133     float t = dht.readTemperature();
134     if (isnan(h) || isnan(t)) { //檢查讀出溫濕度是否有效
135         Serial.println(F("Failed to read from DHT sensor!"));
136         return;
137     }
138
139     Serial.print(F("濕度: "));
140     Serial.print(h);
141     Serial.print(F("% 溫度: "));
142     Serial.print(t);
143     Serial.println(F("°C "));
144
145     String top,msg; // 發佈溫濕度
146     top=(String)deviceID+"/Humidity";
147     msg=String(round(h));
148     mqtt.publish(top.c_str(), msg.c_str());
149     top=(String)deviceID+"/Temperature";
150     msg=String(round(t));
151     mqtt.publish(top.c_str(), msg.c_str());
152
153     delay(500);
154     setLedColor(0x20,0x0,0x20);
155     delay(500);
156     setLedColor(0x20,0x20,0x5);
157     delay(500);
158     setLedColor(0x0,0x0,0x0);
159     delay(1000);
160 }
```

周邊介面與範例說明：MQTT 訂閱/發佈(7)

● Android APP

IoT MQTT Panel

Rahul Kundu
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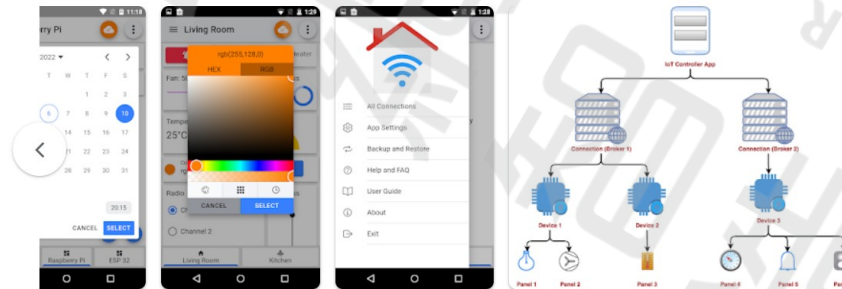
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周邊介面與範例說明：MQTT 訂閱/發佈(8)

- Apple Iphone APP ?

