

Technical Document

Version 1.0

January, 2017

PM Designer Function Guide

TN027S

如何使用 MQTT 功能

How to using the MQTT function.



Designed to be Outstanding

© Revision Record

Revision	Date	Content	Owner

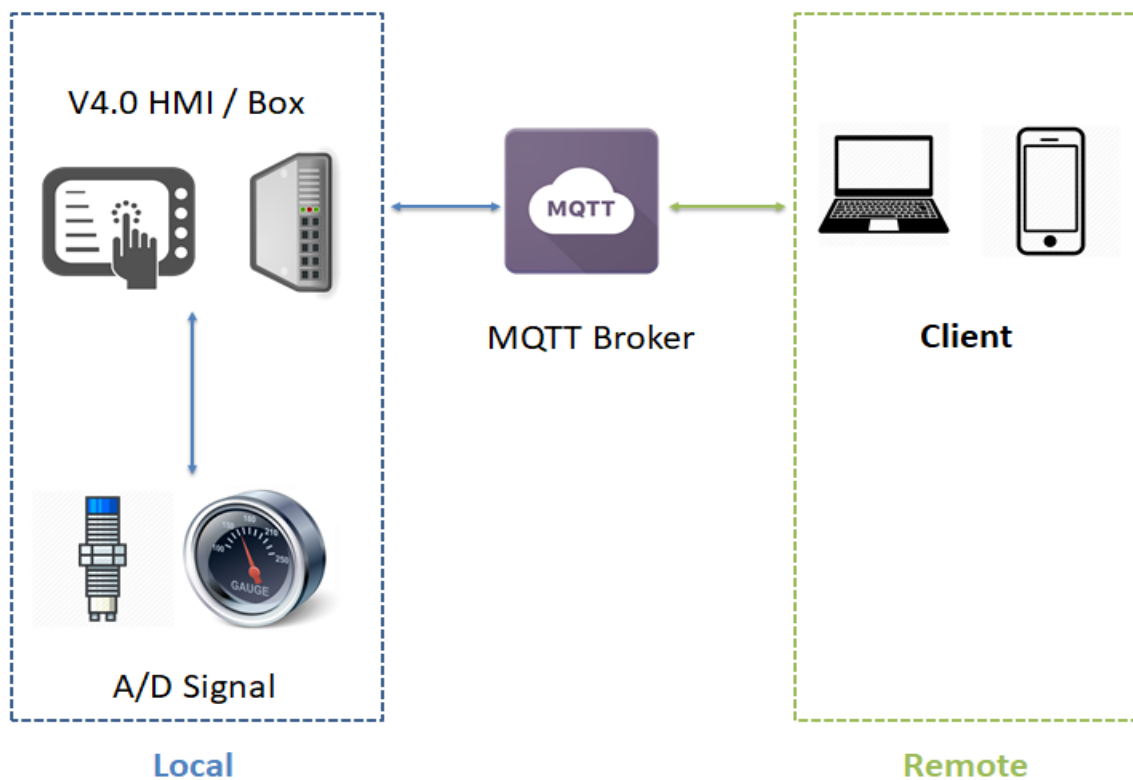
前言 (Preface)

此技術文件是說明如何設定 MQTT，令用戶端可經由 **Mosquitto Server** 訂閱訊息。

This tech note explicated how to make the MQTT setting , publish and subscribe by Cermate HMI .

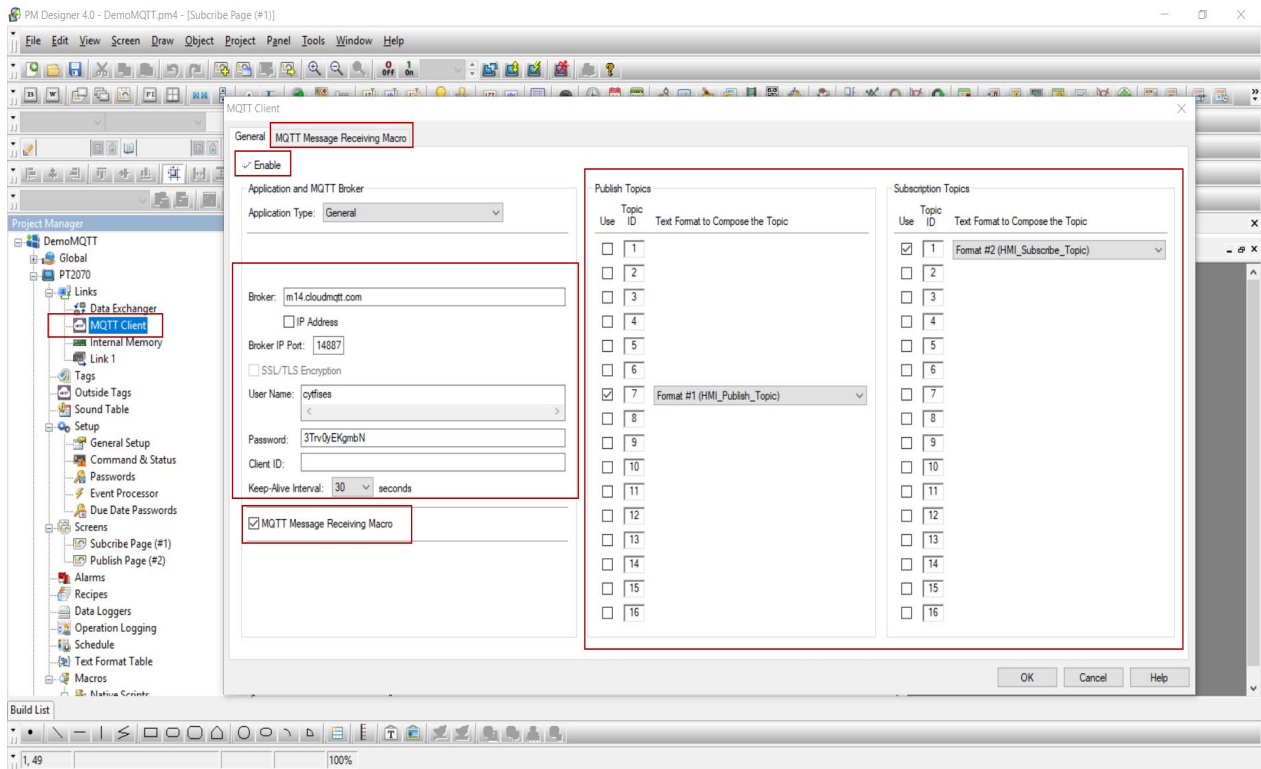
本文使用 **PT2070** 與 **PM Designer Ver. 4.0.2.02** 測試說明

This tech note do test by using **PM Designer Ver. 4.0.2.02** and **PT2070** .



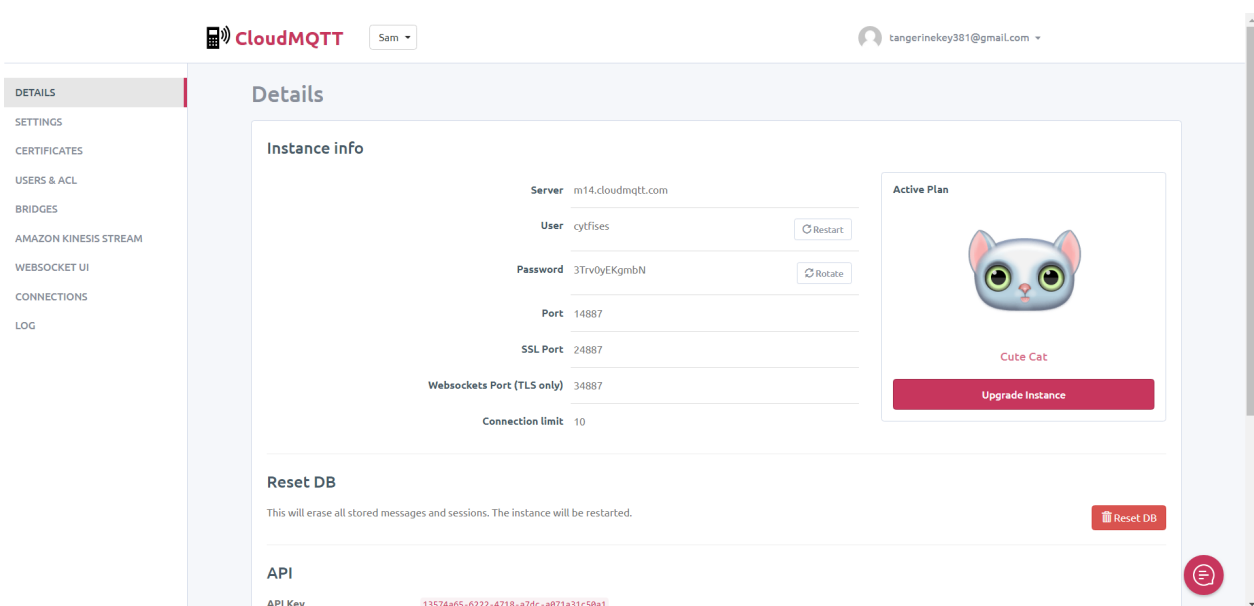
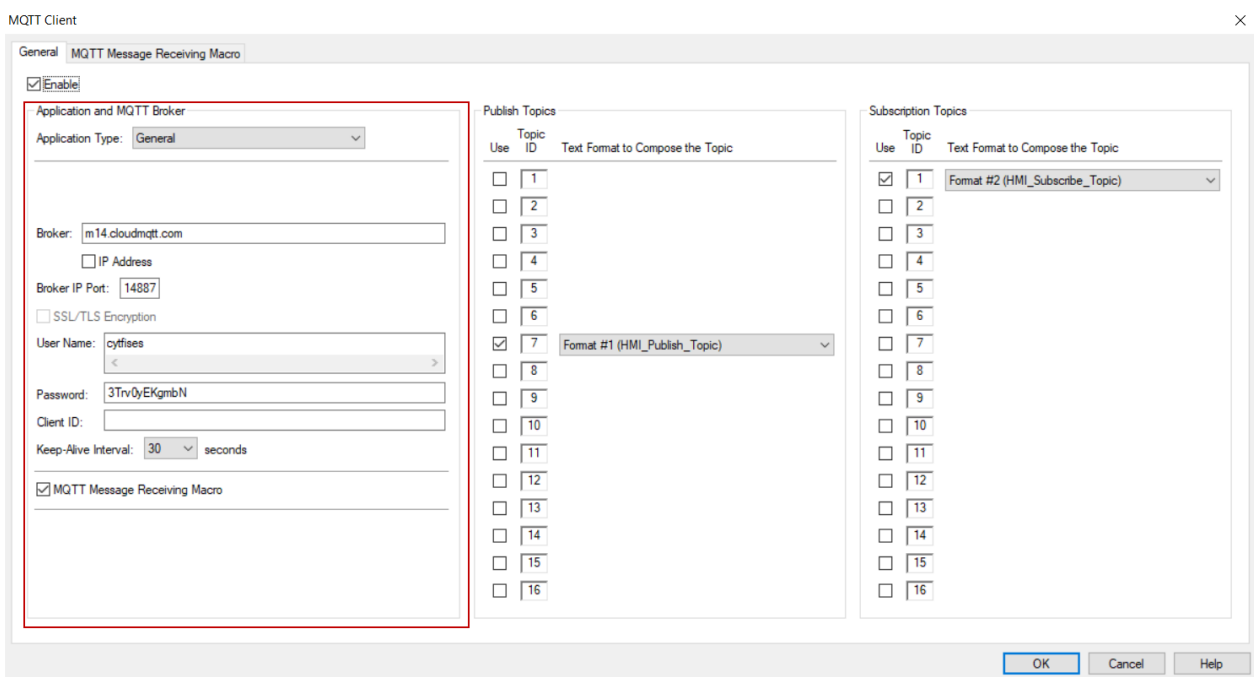
步驟 1 : 點開 **MQTT Client** , 這邊有許多區塊 , 別擔心 , 我們會依序設定 .

Step 1 : Click **MQTT Client** , there are many blocks , do not worry , we will make the setting step by step .



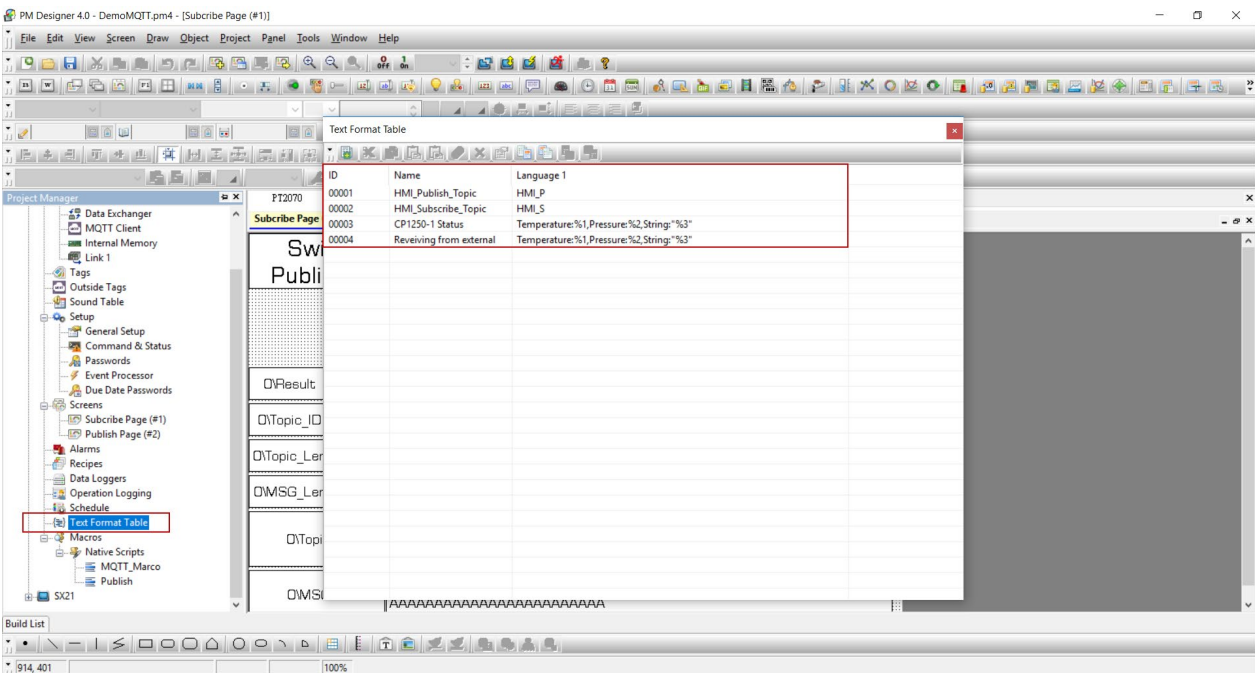
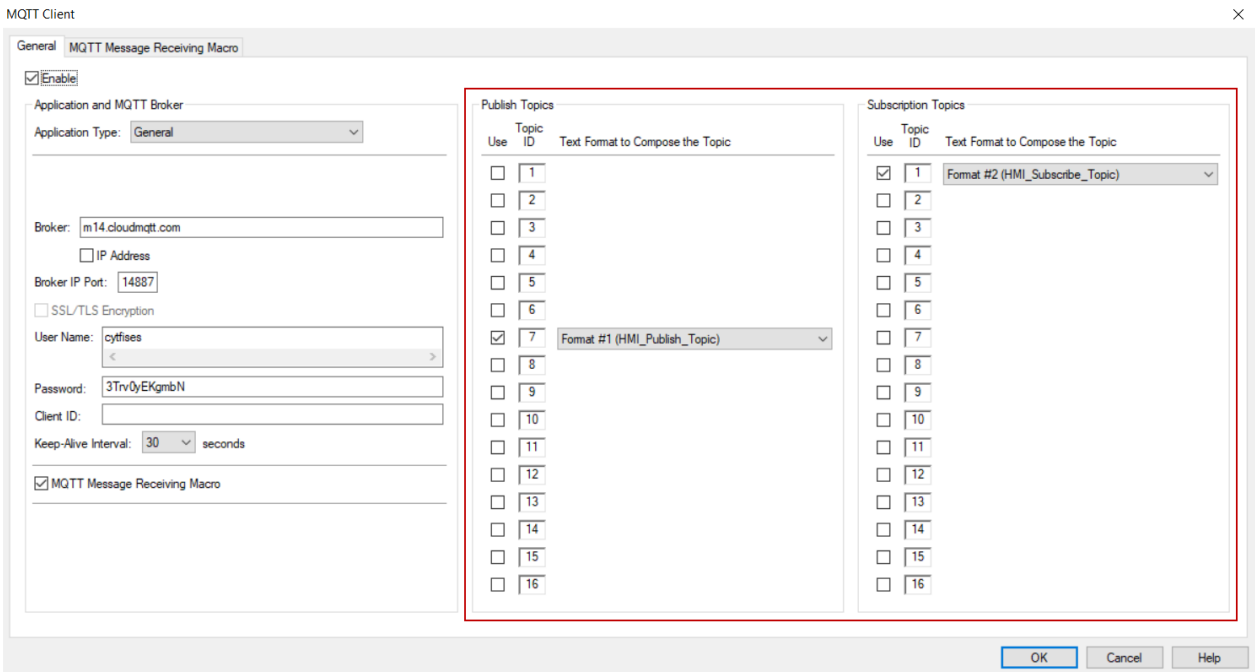
步驟 2：先將 **Enable** 打勾，然後設定 **MQTT Broker** 的資訊，你也可以在自己的電腦架設 **MQTT Broker**，這次我們使用免費的 **CloudMQTT** 進行測試。

Step 2：Check the **Enable** first, then make the **MQTT Broker** setting, you also can established the **MQTT Broker** on your own PC, we do the test base on **CloudMQTT** for free.



步驟 3 : 為了建立 *Publish Topic* 與 *Subscription Topic* , 我們必須先到 *Text Format Table* 先設定好選項 .

Step 3 : For established *Publish Topic* and *Subscription Topic* , we have to make some setting on *Text Format Table* first .

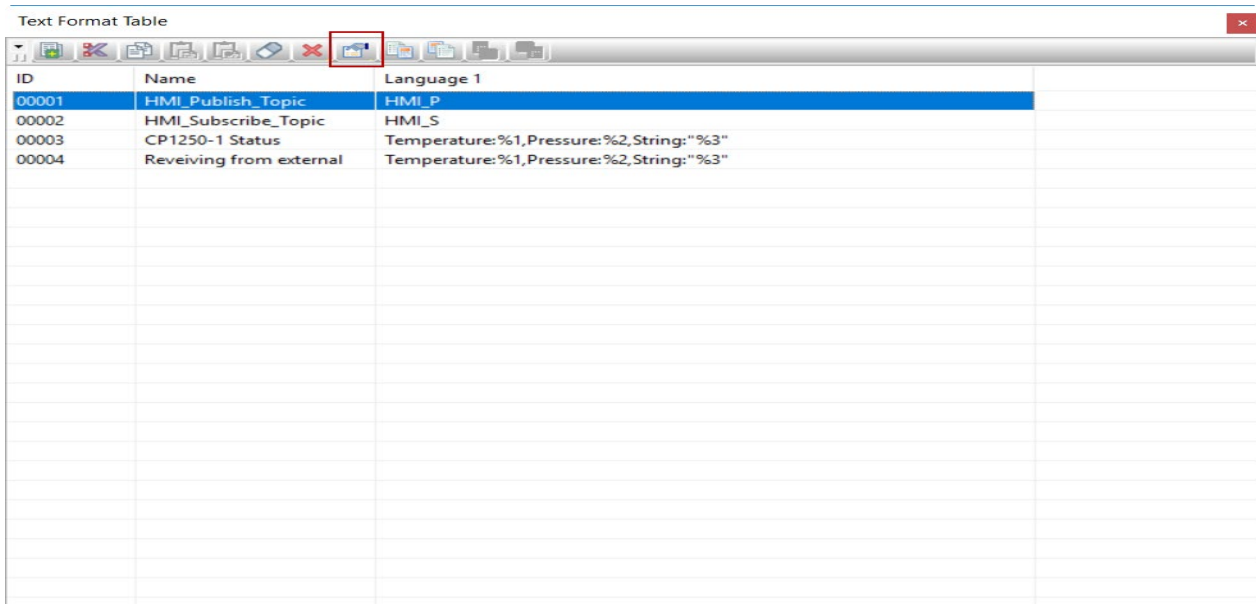


步驟 4 : 選擇 *HMI_Publish_Topic* , 再點選 *Property* , 可以看到我們勾選

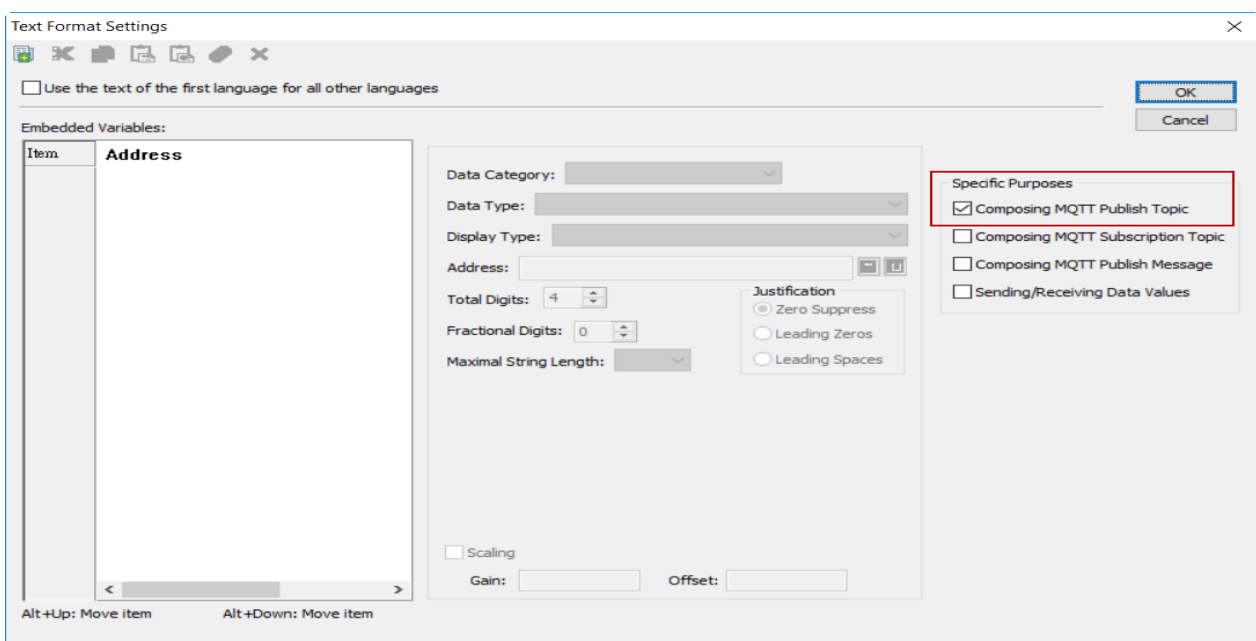
Composing MQTT Publish Topic , 代表 *ID:00001* 這個選項我們只拿來當作 *MQTT*

Publish 的主題 , 當然你也可以合併使用 , 將 *Subscribe* 與 *Publish* 都勾選 .

Step 4 : Choose the *HMI_Publish_Topic* , then click *Property* , you can see we only check the *Composing MQTT Publish Topic* , that's meaning we use the *ID:00001* for *MQTT Publish* only , of course you can check *Subscribe* and *Publish* both in the same *ID* .



ID	Name	Language 1
00001	HMI_Publish_Topic	HMI_P
00002	HMI_Subscribe_Topic	HMI_S
00003	CP1250-1 Status	Temperature:%1,Pressure:%2,String:"%3"
00004	Reveiving from external	Temperature:%1,Pressure:%2,String:"%3"



Text Format Settings

Use the text of the first language for all other languages

OK Cancel

Embedded Variables:

Item	Address
------	---------

Data Category:

Data Type:

Display Type:

Address:

Total Digits:

Fractional Digits:

Maximal String Length:

Justification

Zero Suppress

Leading Zeros

Leading Spaces

Scaling

Gain: Offset:

Specific Purposes

Composing MQTT Publish Topic

Composing MQTT Subscription Topic

Composing MQTT Publish Message

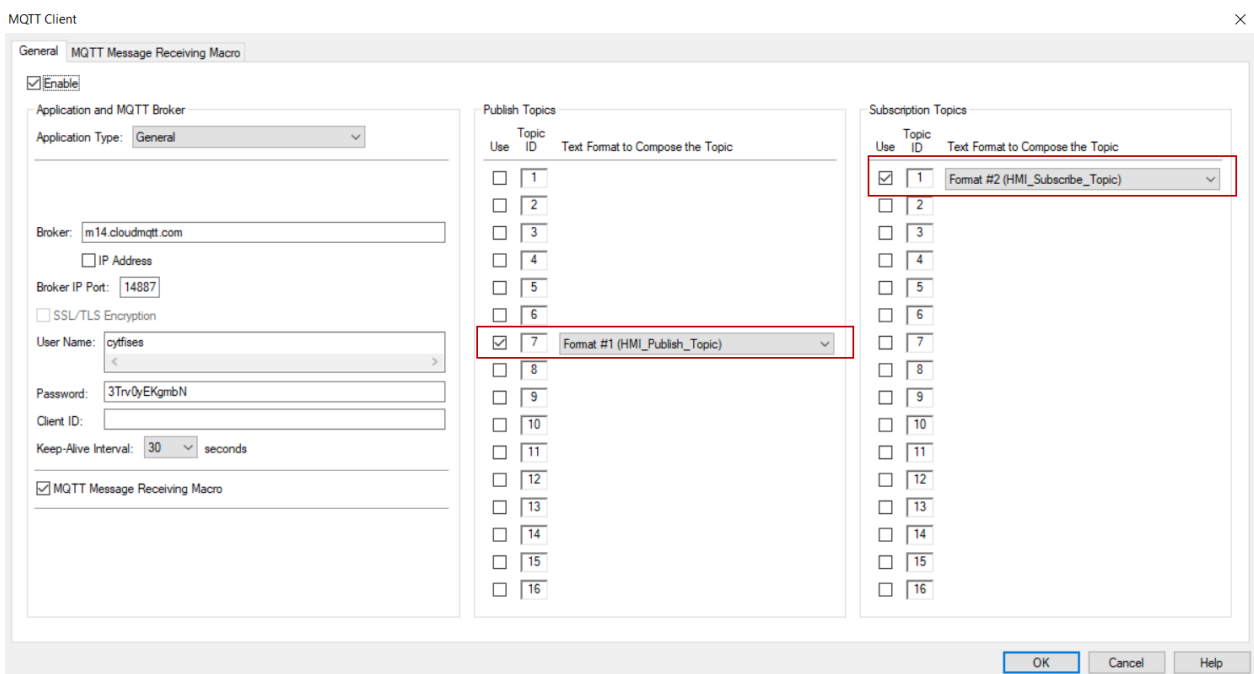
Sending/Receiving Data Values

Alt+Up: Move item Alt+Down: Move item

步驟 5 : 回到 *MQTT Client* , 現在你已經可以依照你的設定去選擇 *Publish* 或是 *Subscribe* 的 *Topic* , 如果你在上個步驟裡 , 將某個主題的 *Publish* 與 *Subscribe* 都勾選 , 那在 *MQTT Client* 你在 *Publish* 與 *Subscribe* 都可以選擇.

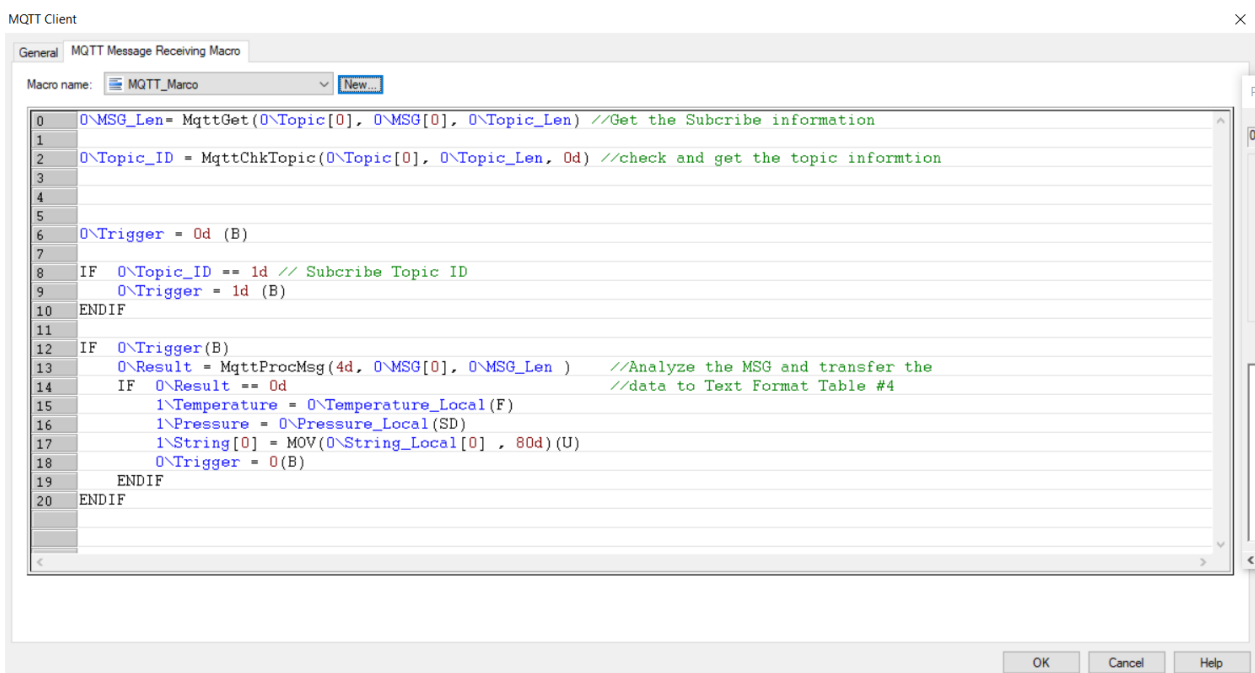
Step 5 : Back to the *MQTT Client* , you can choose the *Publish* or *Subscription Topic* that you set in last step now .

If you check *Publish* and *Subscribe* both in the same ID , now you can choose this special topic both on the *Publish* and *Subscription Topic* .



步驟 6：現在要講解 *MQTT Message Receiving Marco* 的部分，這個 Marco 主要是 HMI 在 Subscribe 時候用的，如果你的 HMI 單純只使用 Publish，可以跳過此步驟。

Step 6：Now we're going to explain how the *MQTT Message Receiving Marco* working, this Marco would be used when HMI Subscribe the other. If you only want to use the Publish function, you can skip this step.



```
0 \MSG_Len= MqttGet(0\Topic[0], 0\MSG[0], 0\Topic_Len) //Get the Subscribe information
1
2 0\Topic_ID = MqttChkTopic(0\Topic[0], 0\Topic_Len, 0d) //check and get the topic informtion
3
4
5
6 0\Trigger = 0d (B)
7
8 IF 0\Topic_ID == 1d // Subscribe Topic ID
9 0\Trigger = 1d (B)
10 ENDIF
11
12 IF 0\Trigger(B)
13 0\Result = MqttProcMsg(4d, 0\MSG[0], 0\MSG_Len ) //Analyze the MSG and transfer the
14 IF 0\Result == 0d //data to Text Format Table #4
15 1\Temperature = 0\Temperature_Local(F)
16 1\Pressure = 0\Pressure_Local(SD)
17 1\String[0] = MOV(0\String_Local[0] , 80d)(U)
18 0\Trigger = 0(B)
19 ENDIF
20 ENDIF
```

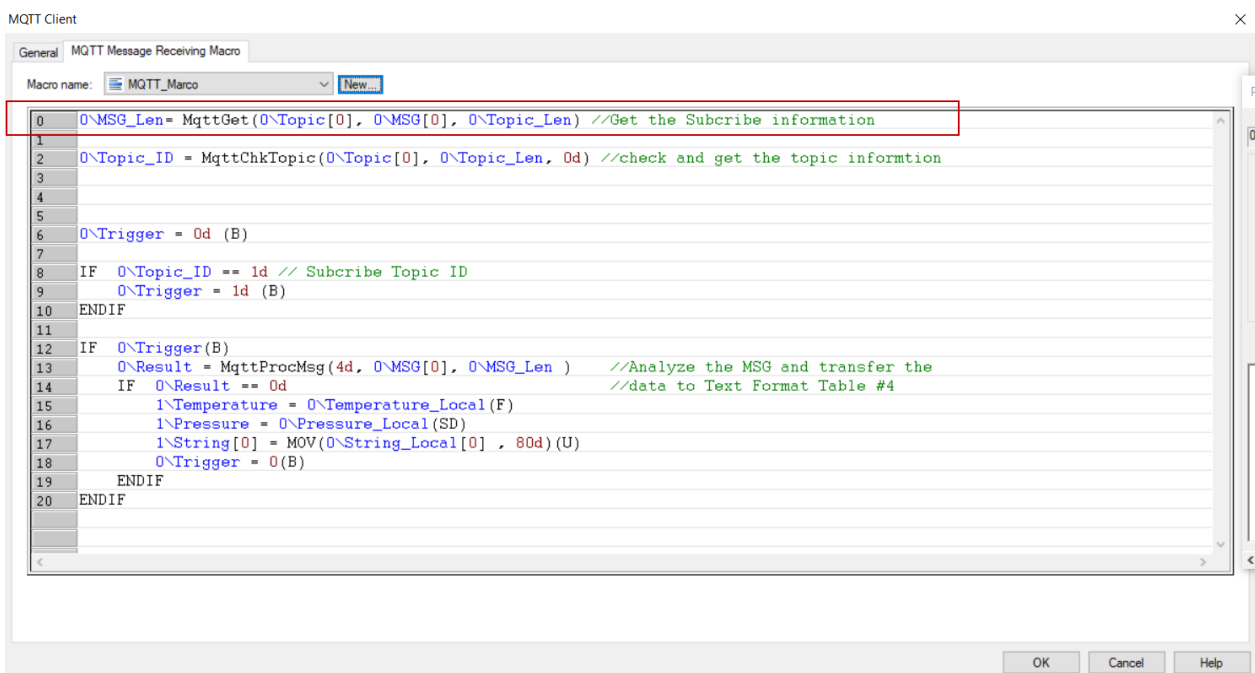

步驟 7 : *MQTT Message Receiving Marco* 第 0 行的功能:

當有任何訊息被 *Publish* 時 , HMI 會用這個命令去獲取 *Topic* 與 *Message* 的長度跟內容 , 然後將資料儲存到你所設定的變數內 , 在 AP 內 , 我們分別使用 *0\MSG_Len , 0\Topic[0] , 0\MSG[0] , 0\Topic_Len* , 來儲存 Message 長度 , Topic 內容 , Message 內容 , Topic 長度 .

Step 7 : The line 0 in the *MQTT Message Receiving Marco* :

HMI will use this command to capture the *Length* and *Content* of Topic and Message when some information being Published , then save them to the variable you set in the command .

In this AP , we use the *0\MSG_Len , 0\Topic[0] , 0\MSG[0] , 0\Topic_Len* to saving Length of Message , Content of Topic , Content of Message , Length of Topic .



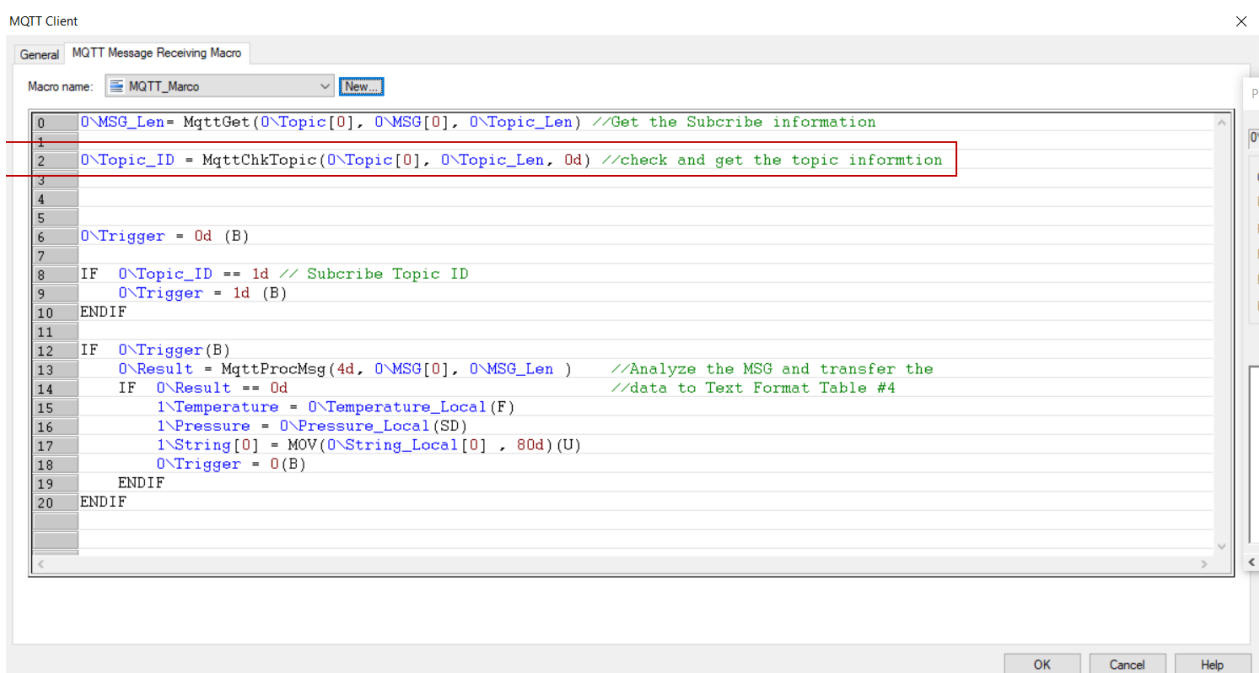
```
MQTT Client
General MQTT Message Receiving Macro
Macro name: MQTT_Marco
0 0\MSG_Len= MqttGet(0\Topic[0], 0\MSG[0], 0\Topic_Len) //Get the Subscribe information
1
2 0\Topic_ID = MqttChkTopic(0\Topic[0], 0\Topic_Len, 0d) //check and get the topic informtion
3
4
5
6 0\Trigger = 0d (B)
7
8 IF 0\Topic_ID == 1d // Subscribe Topic ID
9   0\Trigger = 1d (B)
10 ENDIF
11
12 IF 0\Trigger(B)
13   0\Result = MqttProcMsg(4d, 0\MSG[0], 0\MSG_Len ) //Analyze the MSG and transfer the
14   IF 0\Result == 0d //data to Text Format Table #4
15     1\Temperature = 0\Temperature_Local(F)
16     1\Pressure = 0\Pressure_Local(SD)
17     1\String[0] = MOV(0\String_Local[0] , 80d)(U)
18     0\Trigger = 0(B)
19   ENDIF
20 ENDIF
```

步驟 8 : *MQTT Message Receiving Marco* 第 2 行的功能:

將上一步驟所取得的 Topic 長度與內容與 HMI 內所設定的 *Subscription Topic* 比對 , 如果有相同的 Topic , 則獲得 *0\Topic_ID* .

Step 8 : The line 2 in the *MQTT Message Receiving Marco* :

This command will compare the Length and Content of Topic with Subscription Topic we set before in the HMI , if both of them the same , get the *0\Topic_ID* .



```
MQTT Client
General MQTT Message Receiving Macro
Macro name: MQTT_Marco
0 0\MSG_Len= MqttGet(0\Topic[0], 0\MSG[0], 0\Topic_Len) //Get the Subscribe information
1
2 0\Topic_ID = MqttChkTopic(0\Topic[0], 0\Topic_Len, 0d) //check and get the topic information
3
4
5
6 0\Trigger = 0d (B)
7
8 IF 0\Topic_ID == 1d // Subscribe Topic ID
9 0\Trigger = 1d (B)
10 ENDIF
11
12 IF 0\Trigger(B)
13 0\Result = MqttProcMsg(4d, 0\MSG[0], 0\MSG_Len ) //Analyze the MSG and transfer the
14 IF 0\Result == 0d //data to Text Format Table #4
15 1\Temperature = 0\Temperature_Local(F)
16 1\Pressure = 0\Pressure_Local(SD)
17 1\String[0] = MOV(0\String_Local[0] , 80d)(U)
18 0\Trigger = 0(B)
19 ENDIF
20 ENDIF
```

步驟 9 : *MQTT Message Receiving Marco* 第 8-10 行的功能:

若是 *0\Topic_ID* 為 1 則觸發 *0\Trigger* 這個 bit , 讓他可以觸發下面的 Marco .

Step 9 : The line 8-10 in the *MQTT Message Receiving Marco* :

If the value of *0\Topic_ID* equal to 1 , the *0\Trigger* will be ON to triggered the Marco line 12-20 below .

```

0 0\MSG_Len= MqttGet(0\Topic[0], 0\MSG[0], 0\Topic_Len) //Get the Subscribe information
1
2 0\Topic_ID = MqttChkTopic(0\Topic[0], 0\Topic_Len, 0d) //check and get the topic informtion
3
4
5
6 0\Trigger = 0d (B)
7
8 IF 0\Topic_ID == 1d // Subscribe Topic ID
9   0\Trigger = 1d (B)
10 ENDIF
11
12 IF 0\Trigger(B)
13   0\Result = MqttProcMsg(4d, 0\MSG[0], 0\MSG_Len ) //Analyze the MSG and transfer the
14   IF 0\Result == 0d //data to Text Format Table #4
15     1\Temperature = 0\Temperature_Local(F)
16     1\Pressure = 0\Pressure_Local(SD)
17     1\String[0] = MOV(0\String_Local[0] , 80d)(U)
18     0\Trigger = 0(B)
19   ENDIF
20 ENDIF
    
```

MQTT Client

General MQTT Message Receiving Macro

Enable

Application and MQTT Broker

Application Type: General

Broker: m14.cloudmqtt.com

IP Address

Broker IP Port: 14887

SSL/TLS Encryption

User Name: cyfises

Password: 3Trv0yEKgmbN

Client ID:

Keep-Alive Interval: 30 seconds

MQTT Message Receiving Macro

Publish Topics

Use	Topic ID	Text Format to Compose the Topic
<input type="checkbox"/>	1	
<input type="checkbox"/>	2	
<input type="checkbox"/>	3	
<input type="checkbox"/>	4	
<input type="checkbox"/>	5	
<input type="checkbox"/>	6	
<input checked="" type="checkbox"/>	7	Format #1 (HMI_Publish_Topic)
<input type="checkbox"/>	8	
<input type="checkbox"/>	9	
<input type="checkbox"/>	10	
<input type="checkbox"/>	11	
<input type="checkbox"/>	12	
<input type="checkbox"/>	13	
<input type="checkbox"/>	14	
<input type="checkbox"/>	15	
<input type="checkbox"/>	16	

Subscription Topics

Use	Topic ID	Text Format to Compose the Topic
<input checked="" type="checkbox"/>	1	Format #2 (HMI_Subscribe_Topic)
<input type="checkbox"/>	2	
<input type="checkbox"/>	3	
<input type="checkbox"/>	4	
<input type="checkbox"/>	5	
<input type="checkbox"/>	6	
<input type="checkbox"/>	7	
<input type="checkbox"/>	8	
<input type="checkbox"/>	9	
<input type="checkbox"/>	10	
<input type="checkbox"/>	11	
<input type="checkbox"/>	12	
<input type="checkbox"/>	13	
<input type="checkbox"/>	14	
<input type="checkbox"/>	15	
<input type="checkbox"/>	16	

舉例來說，如果你從 MQTT Broker 收到了一個 Message，內容是 `:Temperature:234.56,Pressure:-6789,String:"ASCII",MqttProcMsg` 這個指令會將收到的訊息，與 *Text Format Table* 的 *ID0004* 比對，如果長度與內容都 **完全** 相同，`0\Result` 將會等於 0，並且將 234.56 存到 `0\Temperature_Local`，-6789 存到 `0\Pressure_Local`，ASCII 存到 `0\String_Local[0]`

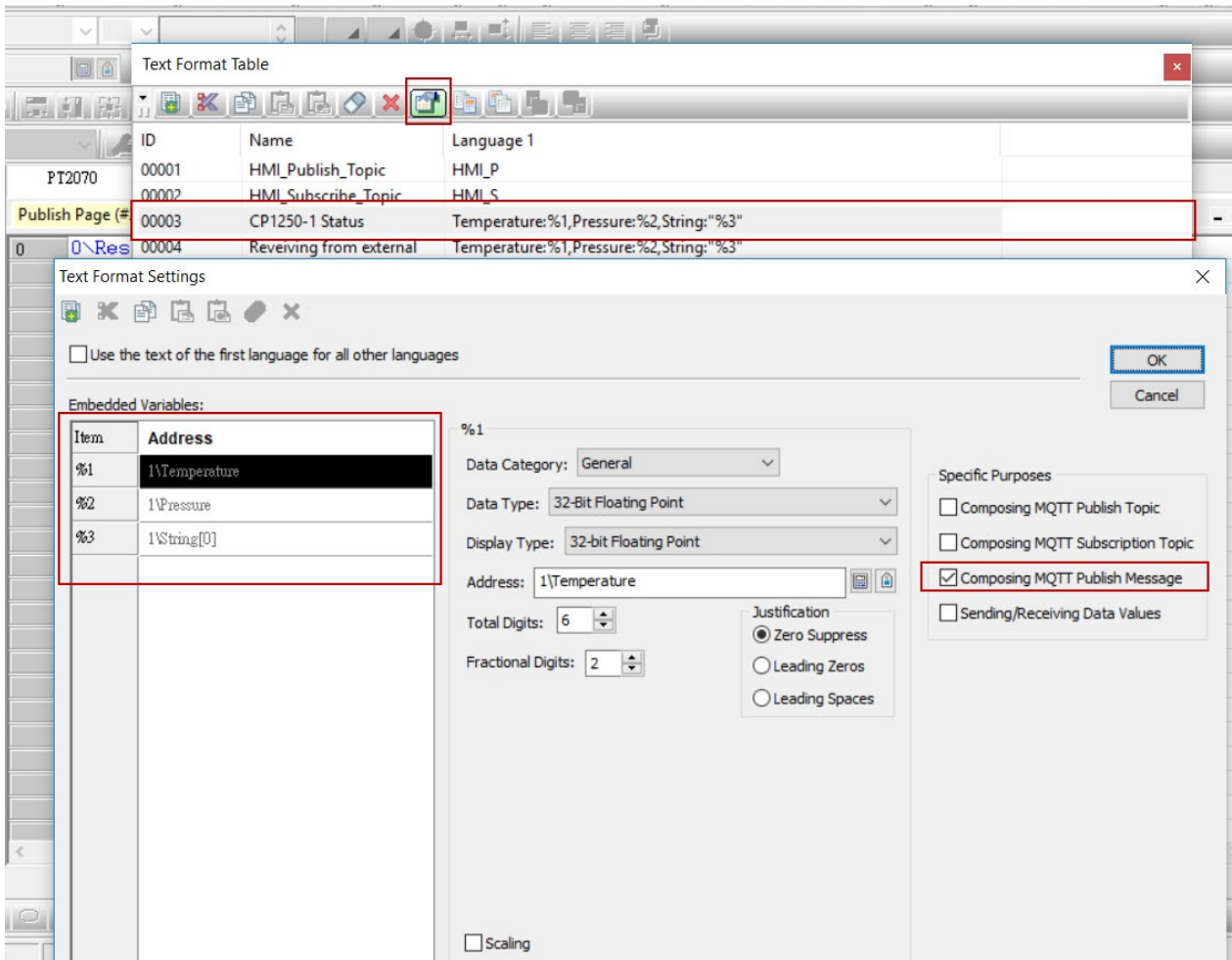
For example, if you receive a Message from MQTT Broker, the content is : `Temperature:234.56,Pressure:-6789,String:"ASCII"`, this command *MqttProcMsg* will compare the Message with the Content of ID0004 in the *Text Format Table*. If the length and content is **Totally** the same, `0\Result` will be 0, and save 234.56 to `0\Temperature_Local`, -6789 to `0\Pressure_Local`, ASCII to `0\String_Local[0]`

步驟 11: Publish 功能說明:

打開 **Text Format Table**, 設定要發送的 Message 內容與數據 .

Step 11: Publish Function Description:

Open **Text Format Table**, set the detail of Message .



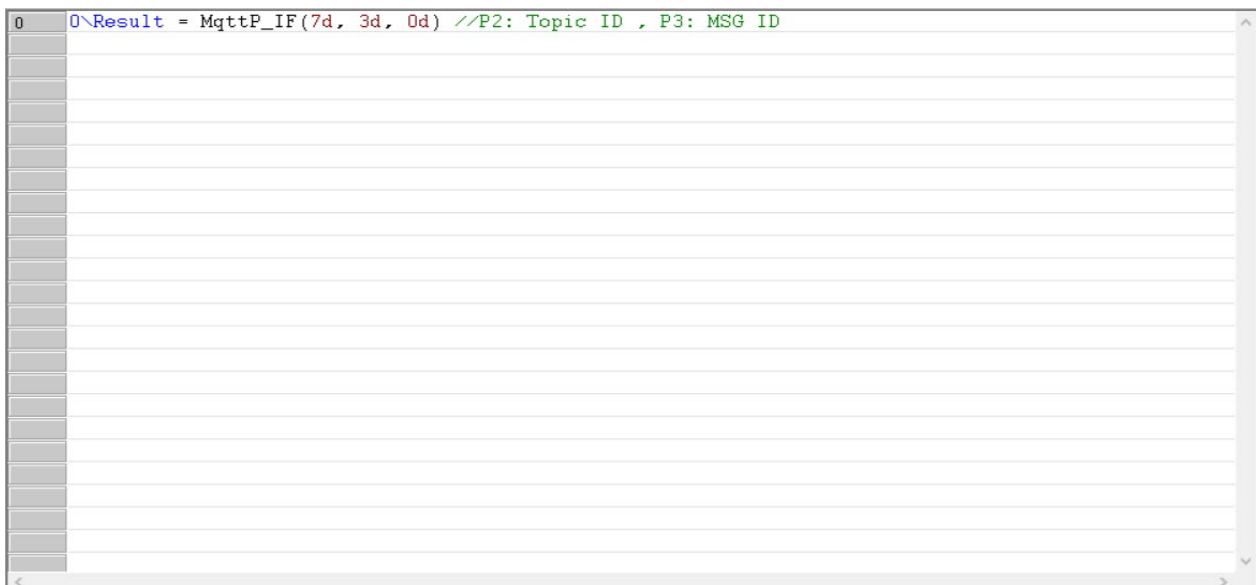
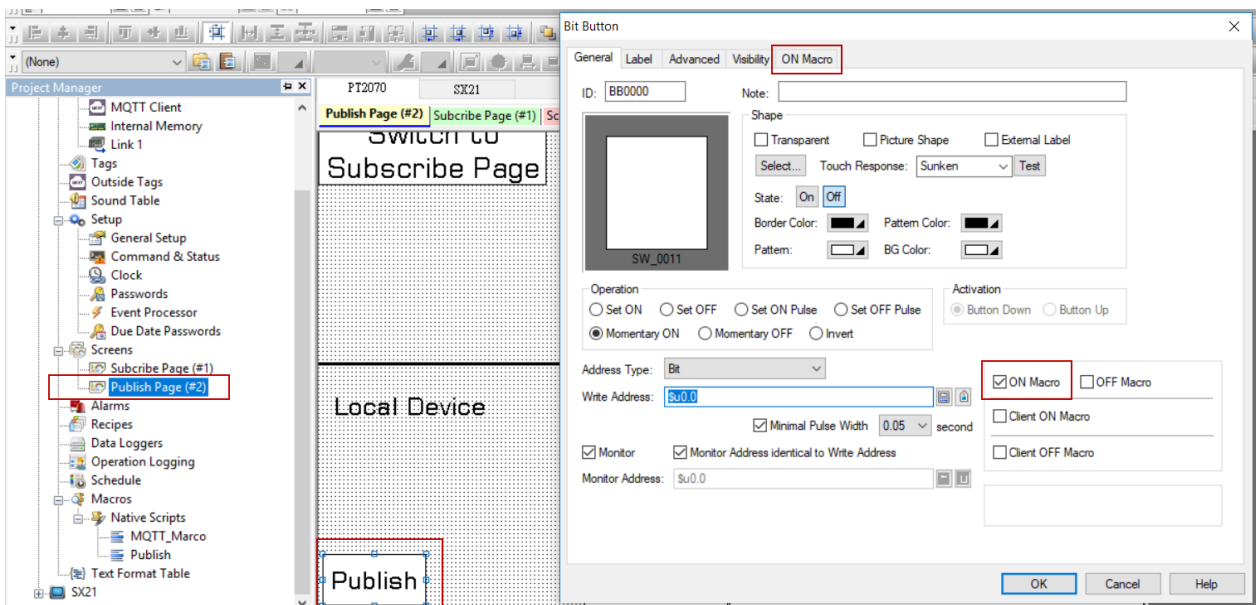
步驟 12: 開啟 *Publish Page* , 看到 *ON Marco* 的部分 .

MqttP_IF , 這個指令是將 *Topic ID* 為 7 的 Topic 與 *Message ID* 為 3 的 Message Publish , 若指令成功執行 , 則 *0\Result* 為 0 .

Step 12: Open the *Publish Page* , we can see the *ON Marco* .

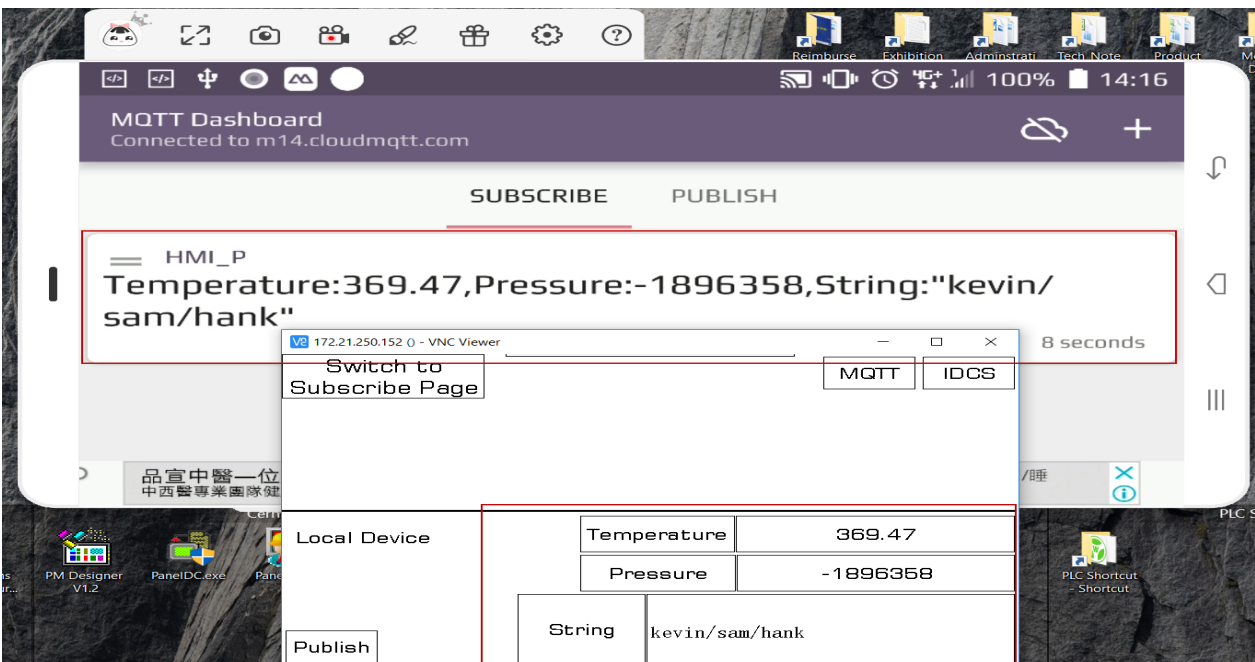
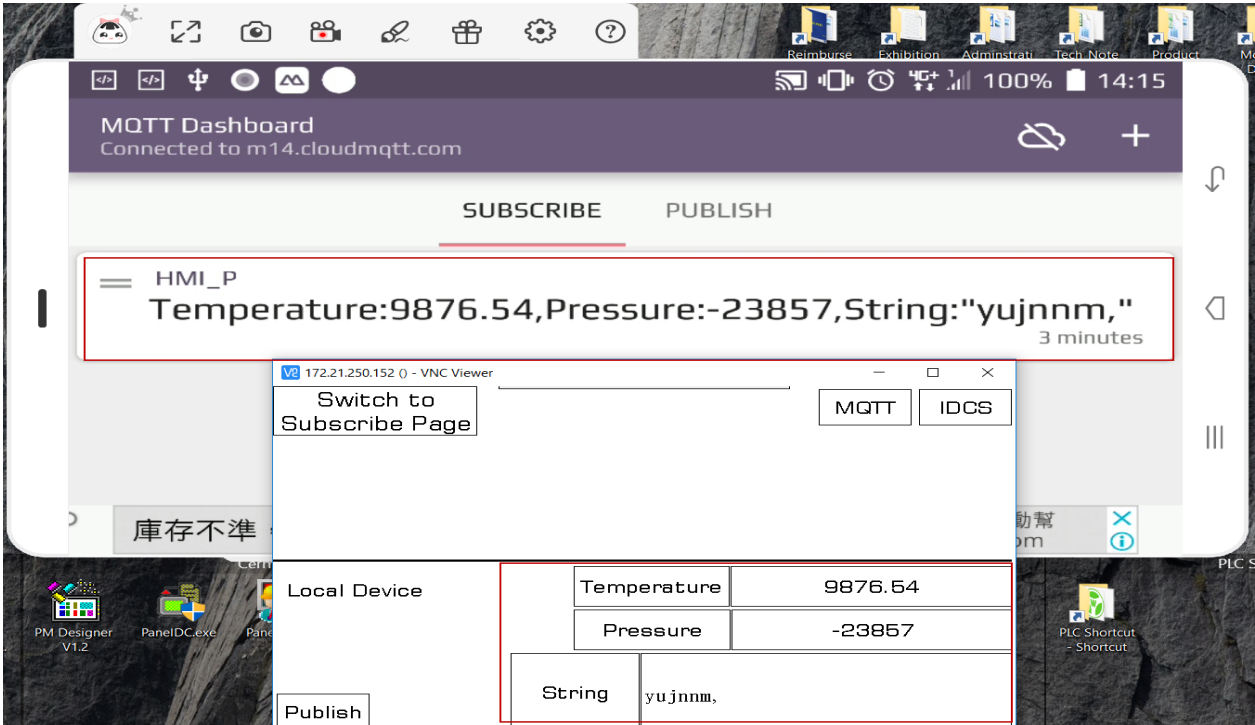
This command *MqttP_IF* will Publish the Topic and Message which *Topic ID* is 7 and *Message ID* is 3 .

If this command execute successfully , *0\Result* will be 0 .



步驟 13: 最後，你可以使用 Android 的 Application 來收發這些訊息與監控數據。

Step 13: Finally, you can use the Android Application to Publish / Subscribe these Message.



MQTT Dashboard
Connected to m14.cloudmqtt.com

SUBSCRIBE PUBLISH

HMI_S Temperature:3249.56,Pressure:-124578,String:"I'm in Taipei now"

Temperature:3249.56,Pressure:-124578,String:"I'm in Taipei now" PUBLISH

172.21.250.152 () - VNC Viewer

Switch to Publish Page

Temperature	3249.56
Pressure	-124578
String	I'm in Taipei now
OPublish_Trigger	OFF
OResult	0
OITopic_ID	1
OITopic_Len	10
OIMSG_Len	128
OITopic()	HMI_S
OIMSG()	Temperature:3249.56,Pressure:-124578,String:"I'm in Taipei now"

Technical Support Information

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