



國產IC開發套件

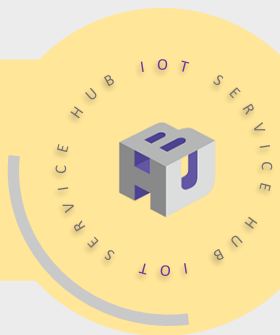
DSI 2598+

介紹與使用說明



物聯網智造基地

I O T S E R V I C E H U B

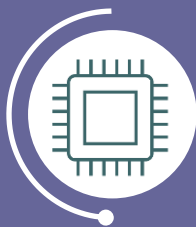


國產IC開發套件 DSI 2598+

大綱/CONTENTS



DSI2598+介紹



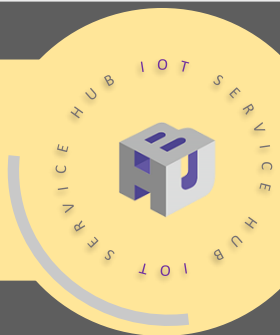
軟體教學



Sim及APN



範例介紹



DSI5168介紹

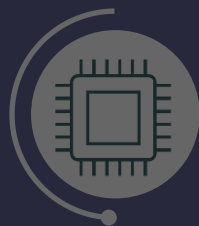


DSI2598+介紹

開發板簡介

DSI2598+腳位圖

核心功能



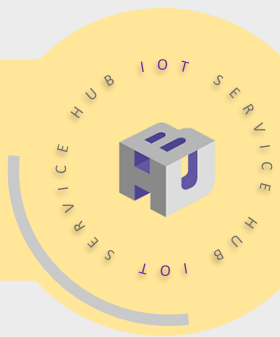
軟體教學



Sim及APN

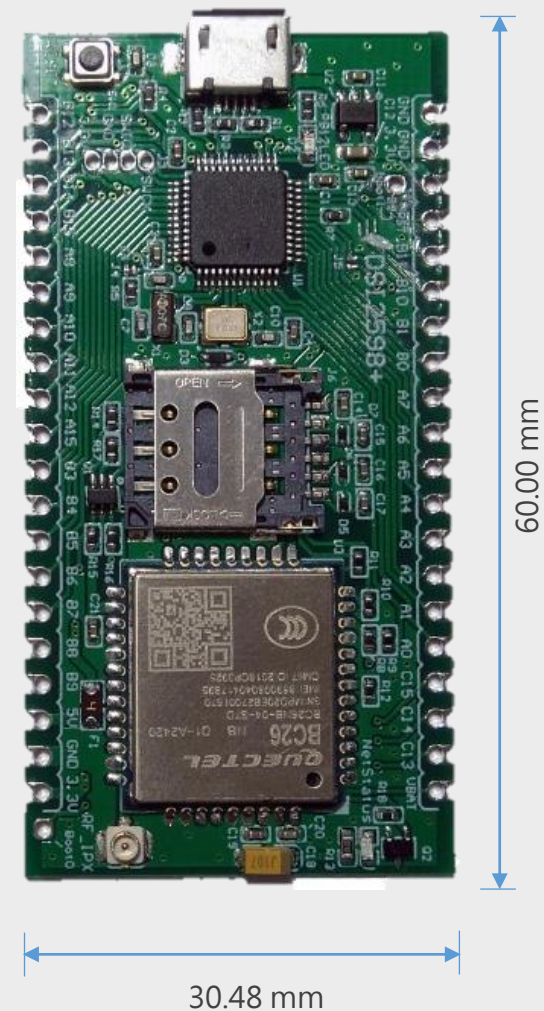


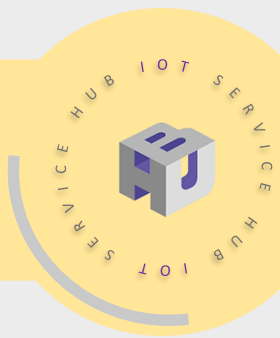
範例介紹



開發板簡介

- NB-IoT使用MTK MT2625晶片
- STM32 F103 32 bit核心
- 相容Arduino IDE開發環境
- Keil C / STM32Cube 開發環境
- 多種韌體燒錄方式
- 更多功能腳位，12 bit ADC解析度
- 郵票式電路板設計

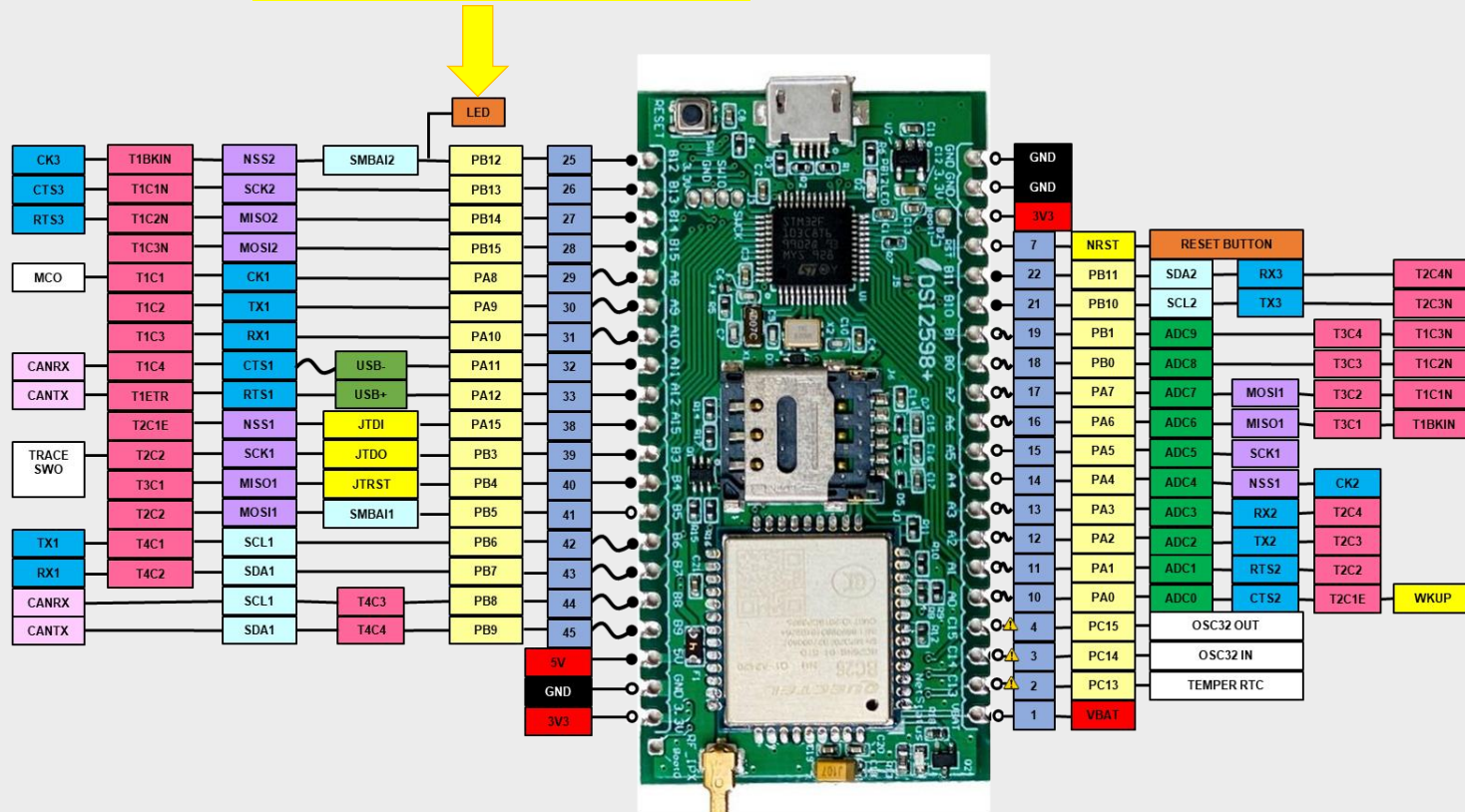




DSI2598+ 腳位圖

LEGEND	
	POWER
	GROUND
	PHYSICAL PIN
	PIN NAME
	CONTROL
	ANALOG
	TIMER & CHANNEL
	USART
	SPI
	I2C
	CAN BUS
	USB
	MISC
BOARD HARDWARE	
	5V tolerant
	Not 5V tolerant
	PWM pin
	Alternate function
	PC13,PC14,PC15: Sink max 3mA, Source 0mA, Max 2mHz, Max 30pF
	Absolute MAX 150mA total source/sink for entire CPU
	Max ±20mA per pin, ±8mA recommend

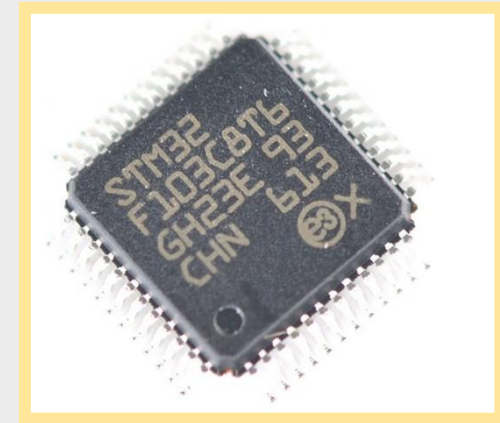
內置LED腳位為PB12

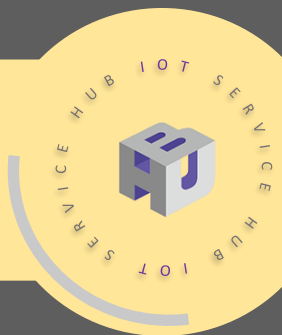




核心功能

- STM32F103C8T6 ARM Cortex M3
- 72 MHz maximum frequency
- 64 Kbytes of Flash memory
- 20 Kbytes of SRAM
- 8 MHz system crystal
- 32.768 KHz RTC crystal
- 2x SPI, 3x USART, 2x I2C, 1x CAN
- USART1 for NB-IoT & firmware upload (with boot0 = 1, JP4 connect to 3.3V)

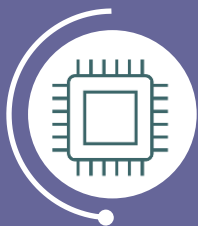




軟體教學



DSI2598+介紹



軟體教學

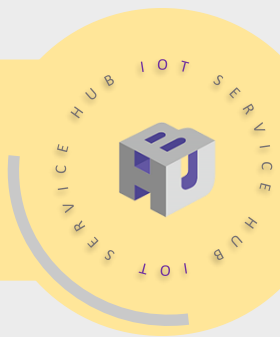


Sim及APN



範例介紹

- 驅動程式安裝
- 安裝Arduino IDE
- Arduino IDE 設定
- 燒錄方法

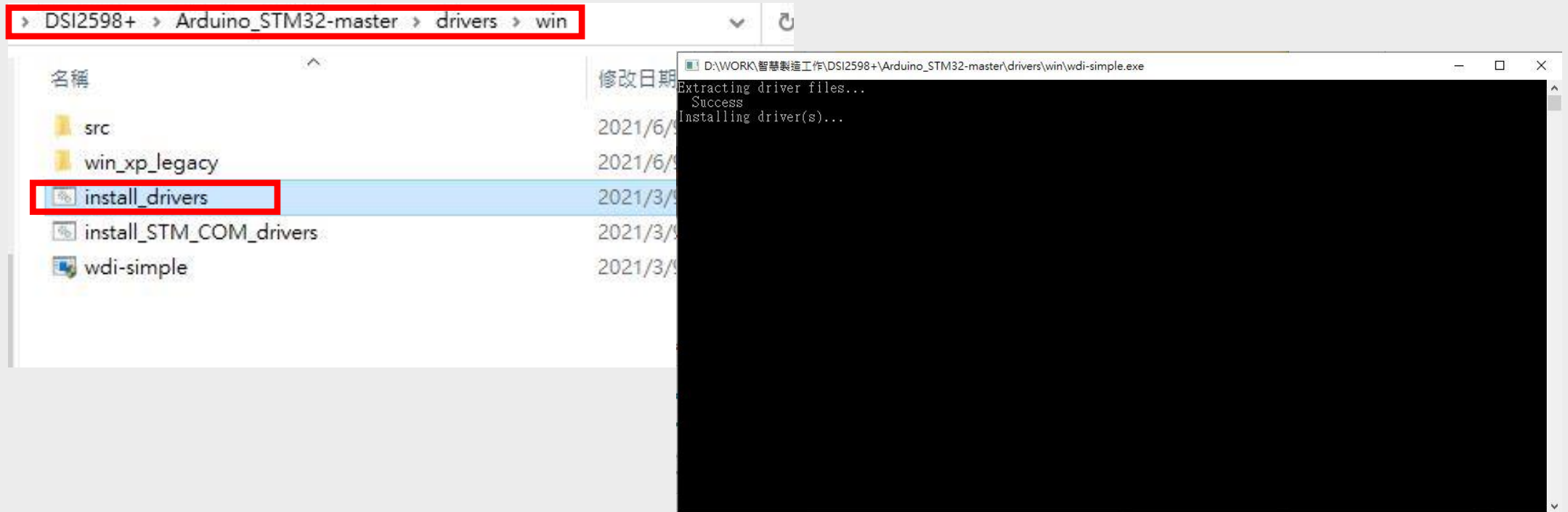


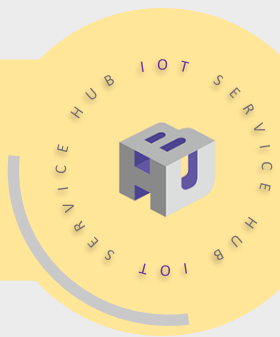
驅動程式安裝

- 安裝Driver

下載以下網址：https://github.com/rogerclarkmelbourne/Arduino_STM32

將DSI512598+接上 Windows的電腦，執行install_drivers.bat驅動程式，看到以下系統視窗，表示已安裝完成。





安裝 Arduino IDE

HARDWARE SOFTWARE CLOUD DOCUMENTATION COMMUNITY BLOG ABOUT

Downloads



Arduino IDE 1.8.13


The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

Refer to the [Getting Started](#) page for Installation instructions.

SOURCE CODE

Active development of the Arduino software is **hosted by GitHub**. See the instructions for **building the code**. Latest release source code archives are available [here](#). The archives are PGP-signed so they can be verified using [this](#) gpg key.

DOWNLOAD OPTIONS

- Windows** Win 7 and newer
- Windows** ZIP file
- Windows app** Win 8.1 or 10 
- Linux** 32 bits
- Linux** 64 bits
- Linux** ARM 32 bits
- Linux** ARM 64 bits
- Mac OS X** 10.10 or newer

[Release Notes](#) [Checksums \(sha512\)](#)

至以下網址下載Arduino IDE:
<https://www.arduino.cc/en/software>
並選擇符合您電腦的版本

HARDWARE SOFTWARE CLOUD DOCUMENTATION COMMUNITY BLOG ABOUT

Support the Arduino IDE

Since the release 1.x release in March 2015, the Arduino IDE has been downloaded **50,614,238** times — impressive! Help its development with a donation.

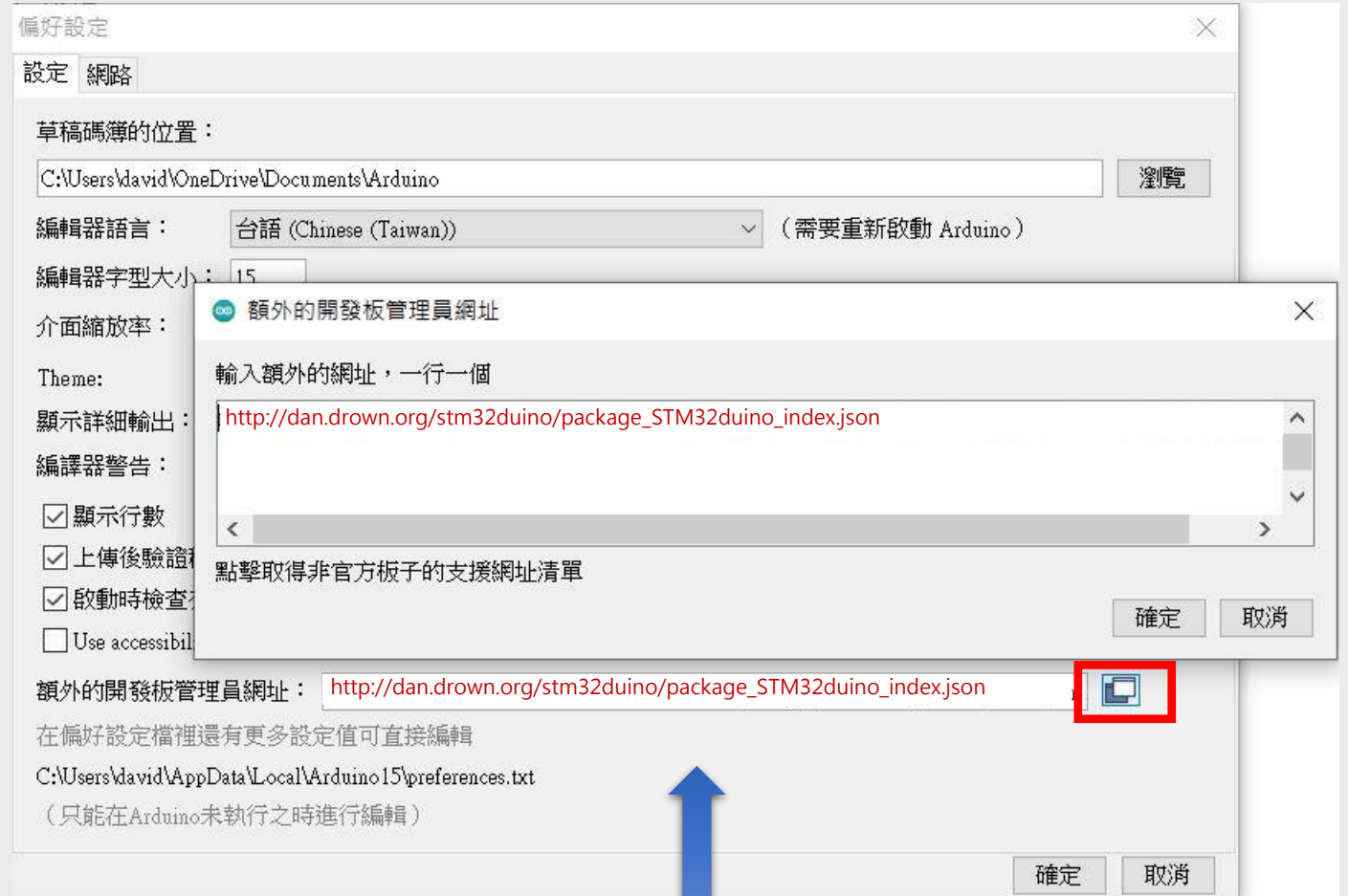
\$3 \$5 \$10 \$25 \$50 Other

JUST DOWNLOAD **CONTRIBUTE & DOWNLOAD**



可自行選擇是否贊助Arduino，若暫且不贊助，點選JUST DOWNLOAD即可

Arduino IDE 設定 (1)



在額外的開發板管理員網址中輸入以下網址：

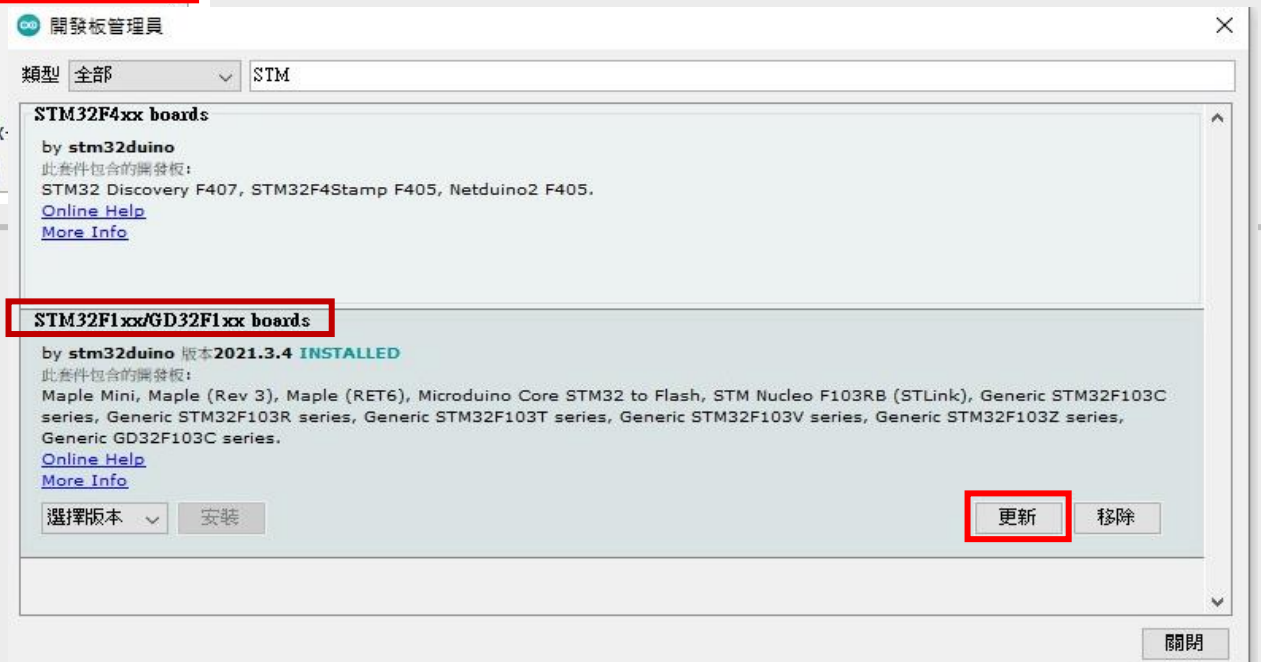
http://dan.drown.org/stm32duino/package_STM32duino_index.json

Arduino IDE 設定 (2)

工具 說明

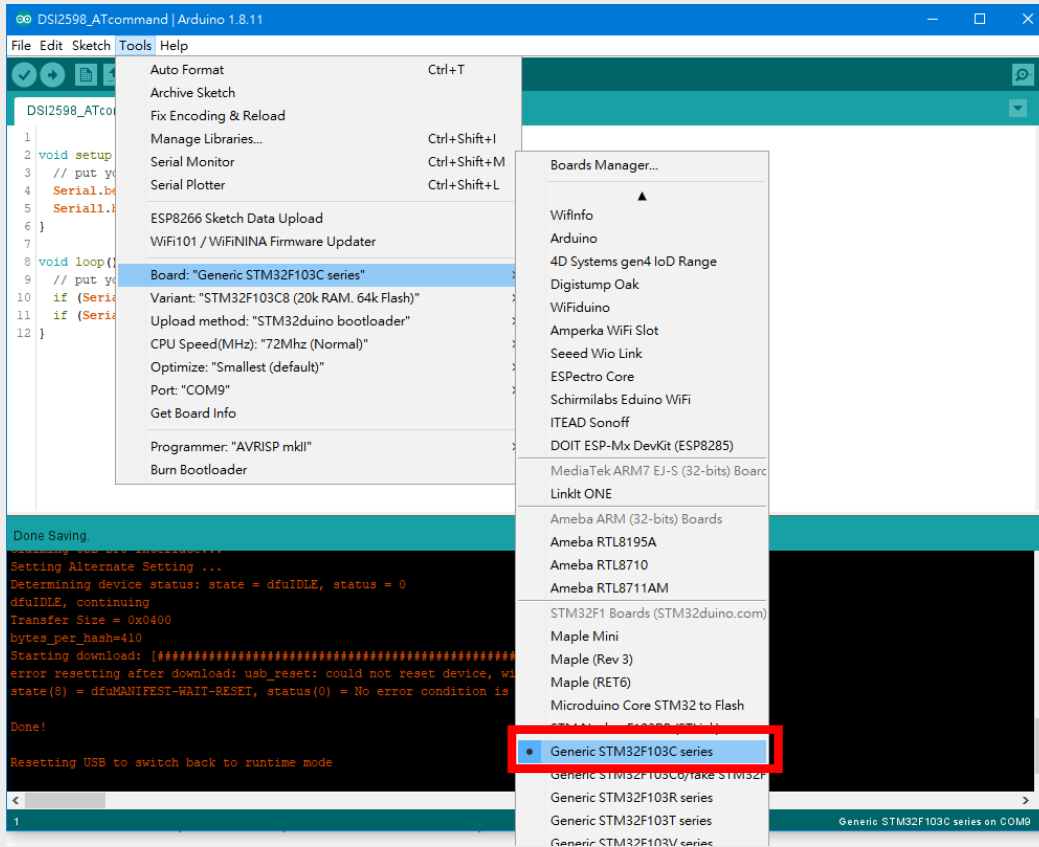
自動格式化	Ctrl+T	
封存草稿碼		
修正編碼並重新載入		
管理程式庫...	Ctrl+Shift+I	
序列埠監控視窗	Ctrl+Shift+M	
序列繪圖家	Ctrl+Shift+L	
WiFi101 / WiFinINA Firmware Updater		
開發板: "Ameba RTL8195A"		開發板管理員...
序列埠		Ameba ARM (32-bits) Boards
取得開發板資訊		Arduino ARM (32-bits) Boards
		Arduino AVR Boards
		Arduino SAMD (32-bits ARM Cortex-
		STM32F1 Boards (Arduino_STM32)
燒錄器		
燒錄Bootloader		

在Arduino IDE 功能列的“工具”中選擇“開發板管理員”



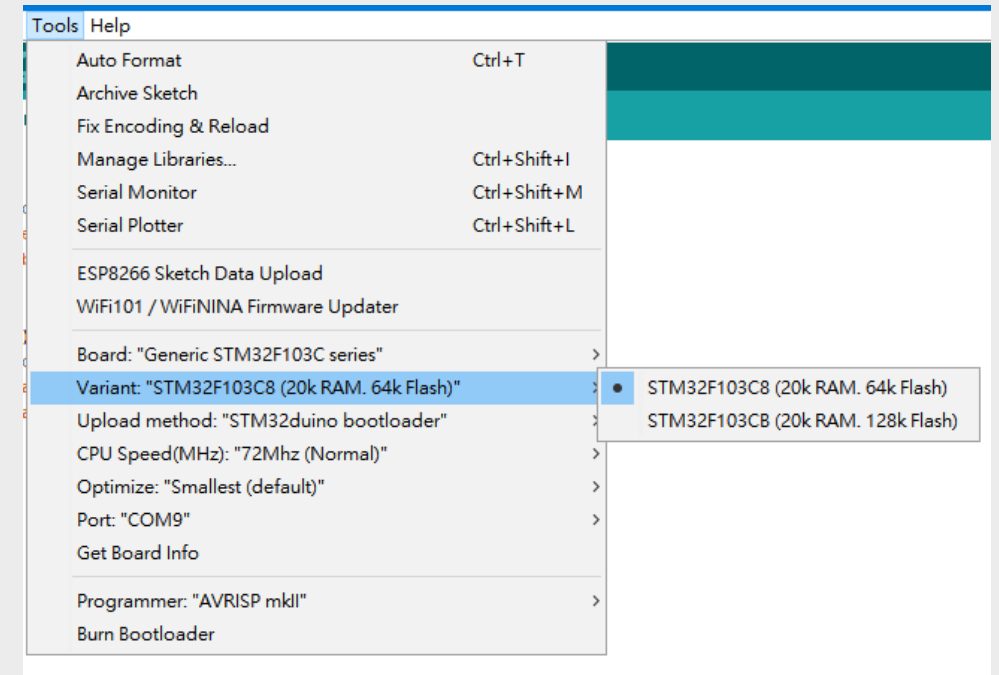
連網狀態下安裝 "STM32F1xx/GD32F1xx boards"
確認開發板 "STM32F1xx" 並且按下更新

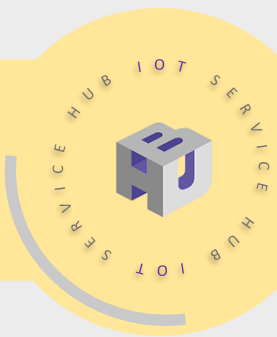
Arduino IDE 設定 (3)



選擇開發板: "Generic STM32F103C series".

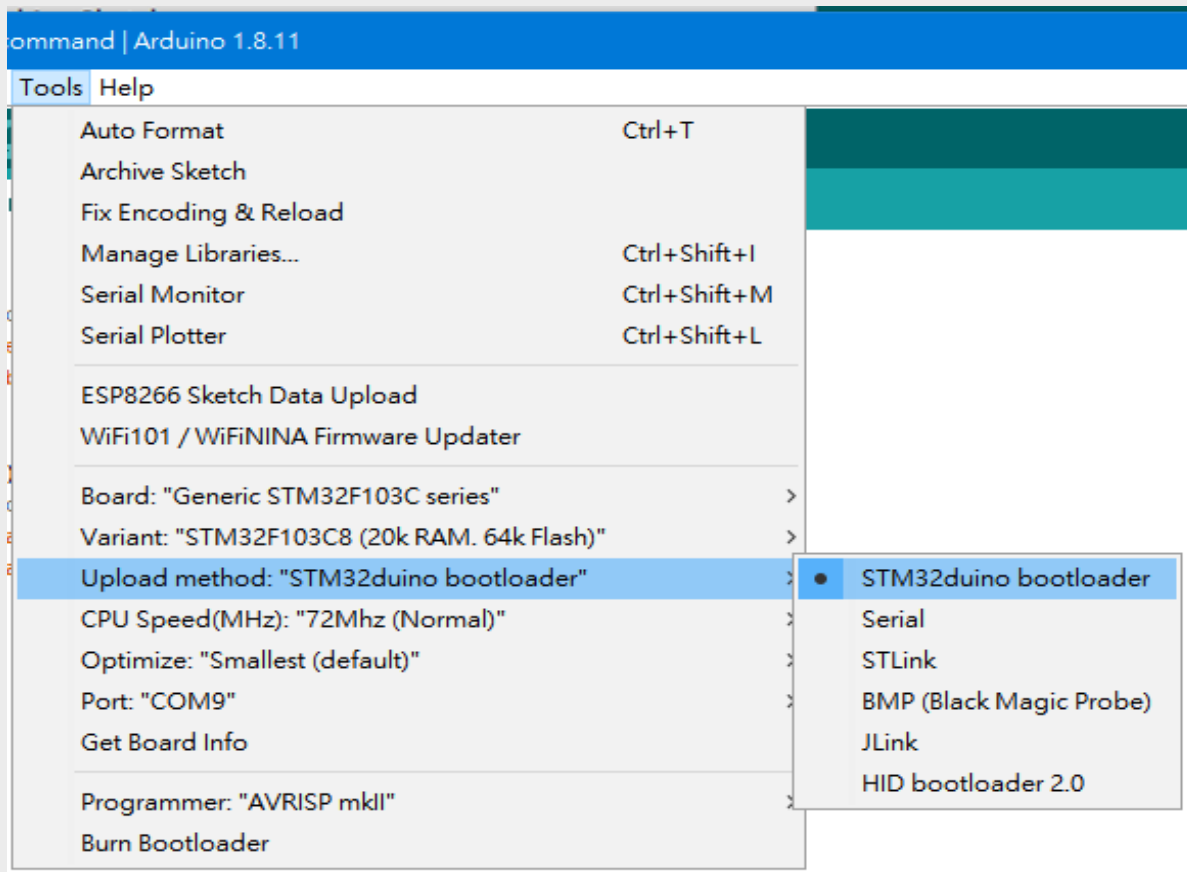
選擇64k 的Flash 版本





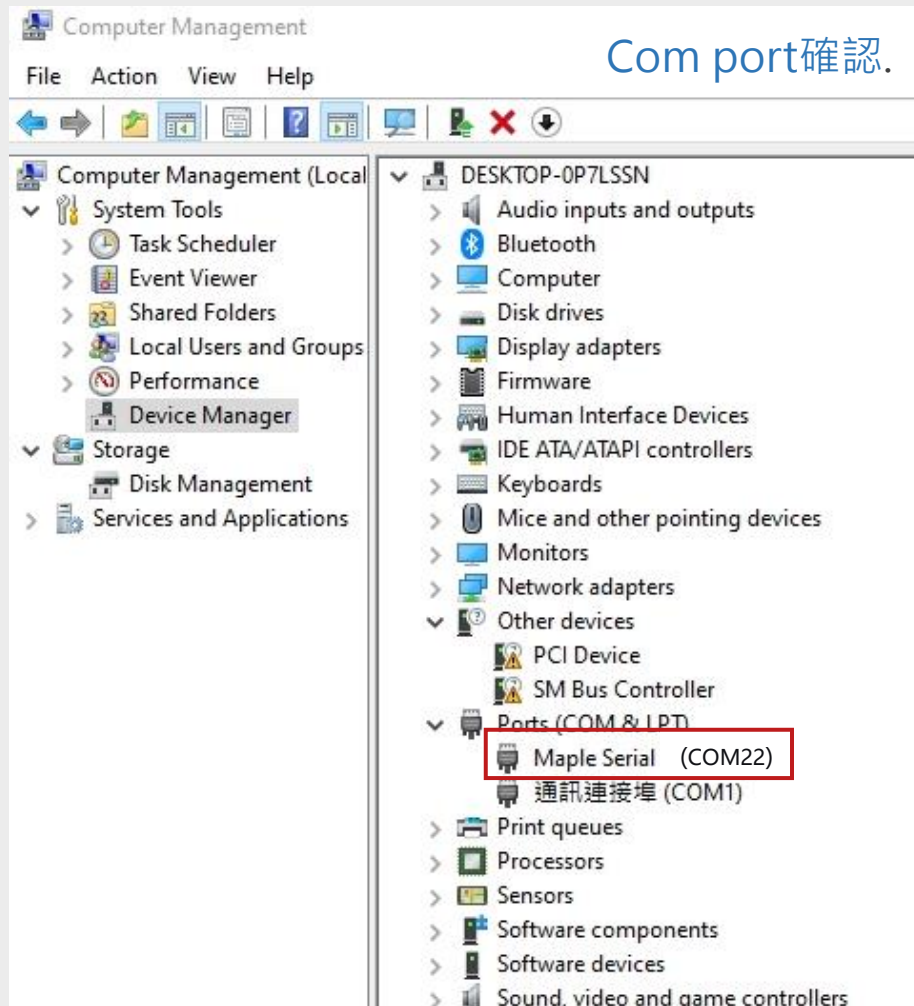
Arduino IDE 設定 (4)

選擇上傳方式 “STM32duino bootloader” 。

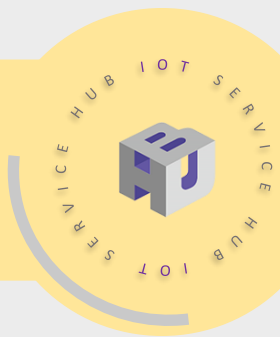


- 預設使用DSI 2598+上的USB，配合已經先預載的bootloader來燒錄。
- 你也可以利用Serial 及 STLink進行上傳，(後面的投影片將會介紹)

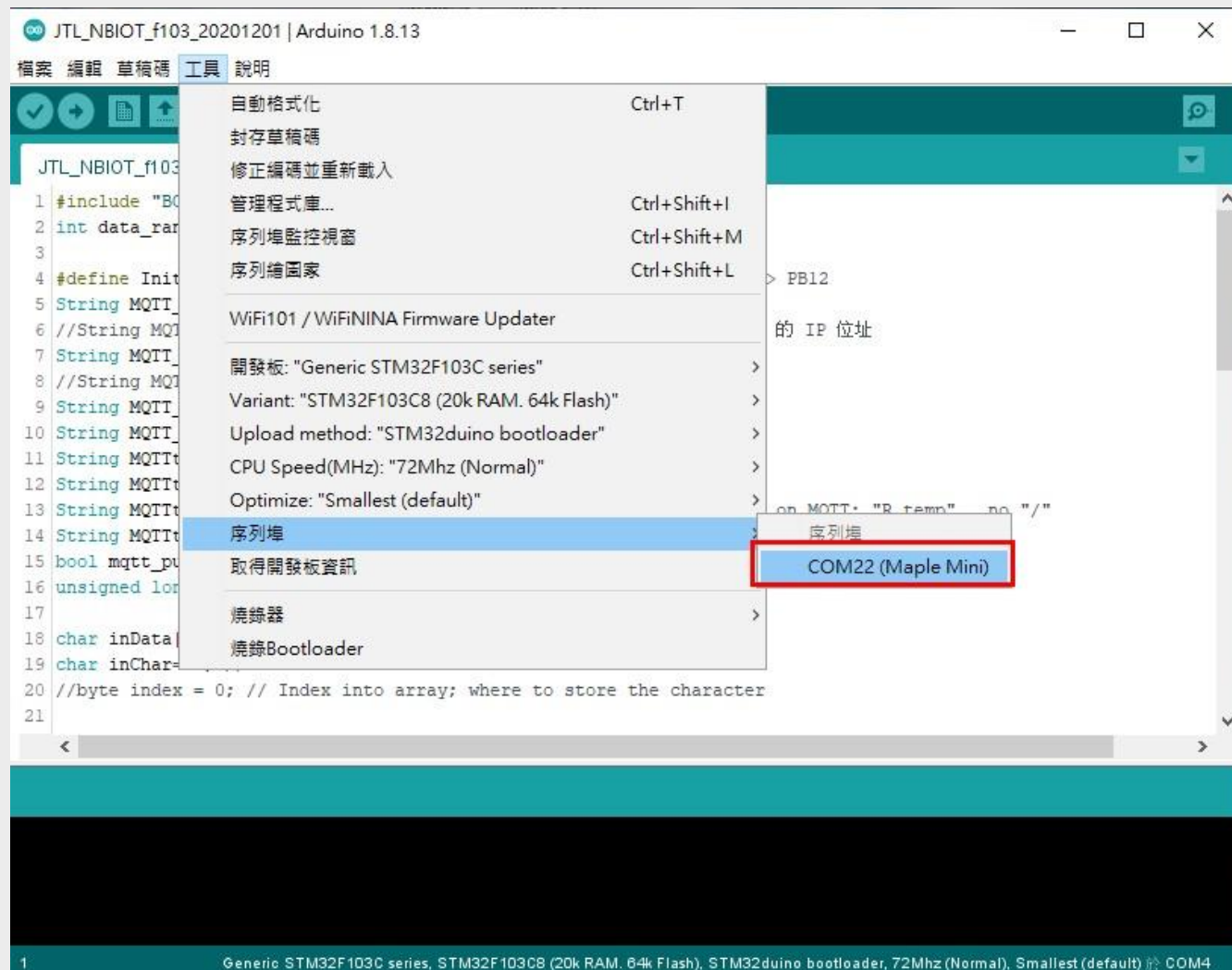
Arduino IDE 設定 (5)



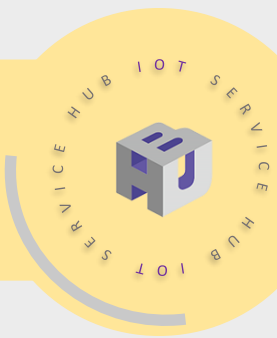
- 一般來說第一次插上USB，Windows電腦即可找到2598+開發板，並且會有com port出現
- 若沒有出現com port號碼，僅有maple字樣的設備出現，則需重新燒錄bootloader



Arduino IDE 設定 (6)



在IDE上顯示的COM則會有Maple Mini字樣

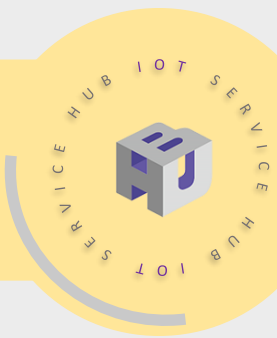


燒錄方法(1)

The screenshot shows the Arduino IDE interface for a project named 'AnalogInput' using 'Arduino 1.8.13'. The menu bar includes '檔案', '編輯', '草稿碼', '工具', and '說明'. The toolbar contains several icons, with the upload icon (a right-pointing arrow) highlighted by a red box. Below the toolbar, the code editor displays the following code:

```
1 /*  
2  Analog Input  
3  
4  Demonstrates analog input by reading an analog sensor on analog pin  
5  0 and turning on and off the Maple's built-in light emitting diode  
6  (LED). The amount of time the LED will be on and off depends on the  
7  value obtained by analogRead().  
8  
9  Created by David Cuartielles  
10 Modified 16 Jun 2009  
11 By Tom Igoe  
12  
13 http://leaflabs.com/docs/adc.html  
14  
15 Ported to Maple 27 May 2010  
16 by Bryan Newbold  
17 */  
18  
19 int sensorPin = 0; // Select the input pin for the potentiometer  
20 int sensorValue = 0; // Variable to store the value coming from the sensor  
21
```

點選紅框內的按鈕，即可將撰寫的程式碼上傳到開發板中，完成燒錄的動作



燒錄方法(2)

本開發板設計，可提供多種程式燒錄方式，一般出廠設定為方便使用，免去外接燒錄設備，採用bootloader燒錄方式，如此一來只需接上開發板的USB即可透過Arduino IDE選擇STM32duino bootloader選項，直接燒錄。

另有使用FTDI工具的Serial燒錄方式與STLink工具的STLink燒錄方式

三種上傳方法

STM32duino
bootloader

Serial

STLink

USB直接燒錄

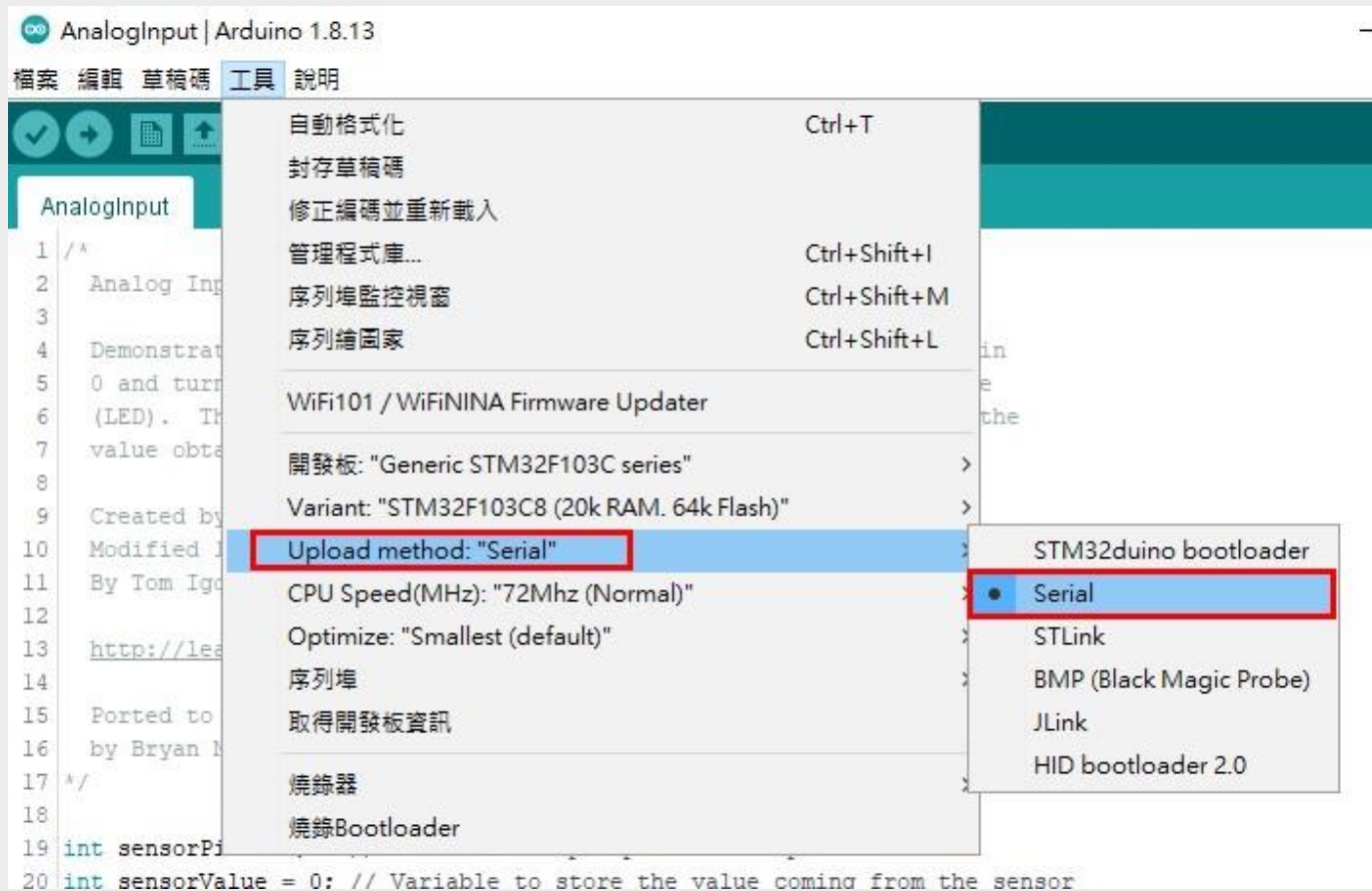
FTDI工具

STLink工具

燒錄方法(3)

Serial燒錄方式

參考影片：<https://www.youtube.com/watch?v=zUk0lN1oEwQ>

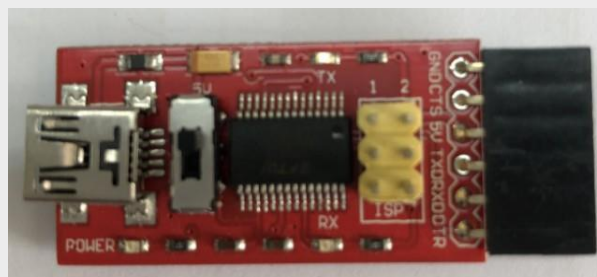


Upload method要選擇Serial

燒錄方法(4)

Serial-連接設定

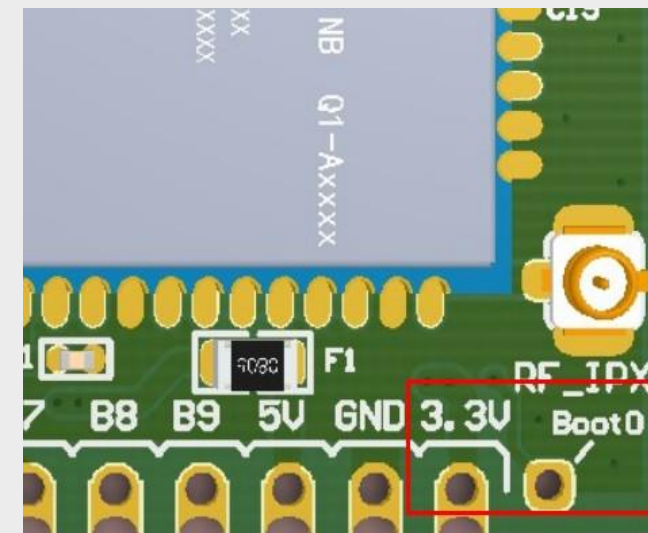
1. 準備FTDI工具，將RX連接到PA9 (TX)，TX接到PA10 (RX)，並接上5V與GND到2598+板上，再來選擇跳線，設定Boot0 = 1
2. 將天線座旁的Boot0腳位與3.3V使用跳帽短路，達成Boot0 = 1的條件，按下USB旁Reset鍵
3. IDE按下上傳鈕開始燒錄程式
4. 燒錄完成後，解開Boot0為開路
5. 按下Reset，程式開始運作



FTDI

RX	PA9
TX	PA10
5V	5V
GND	GND

PA9, PA10即為UART1腳位

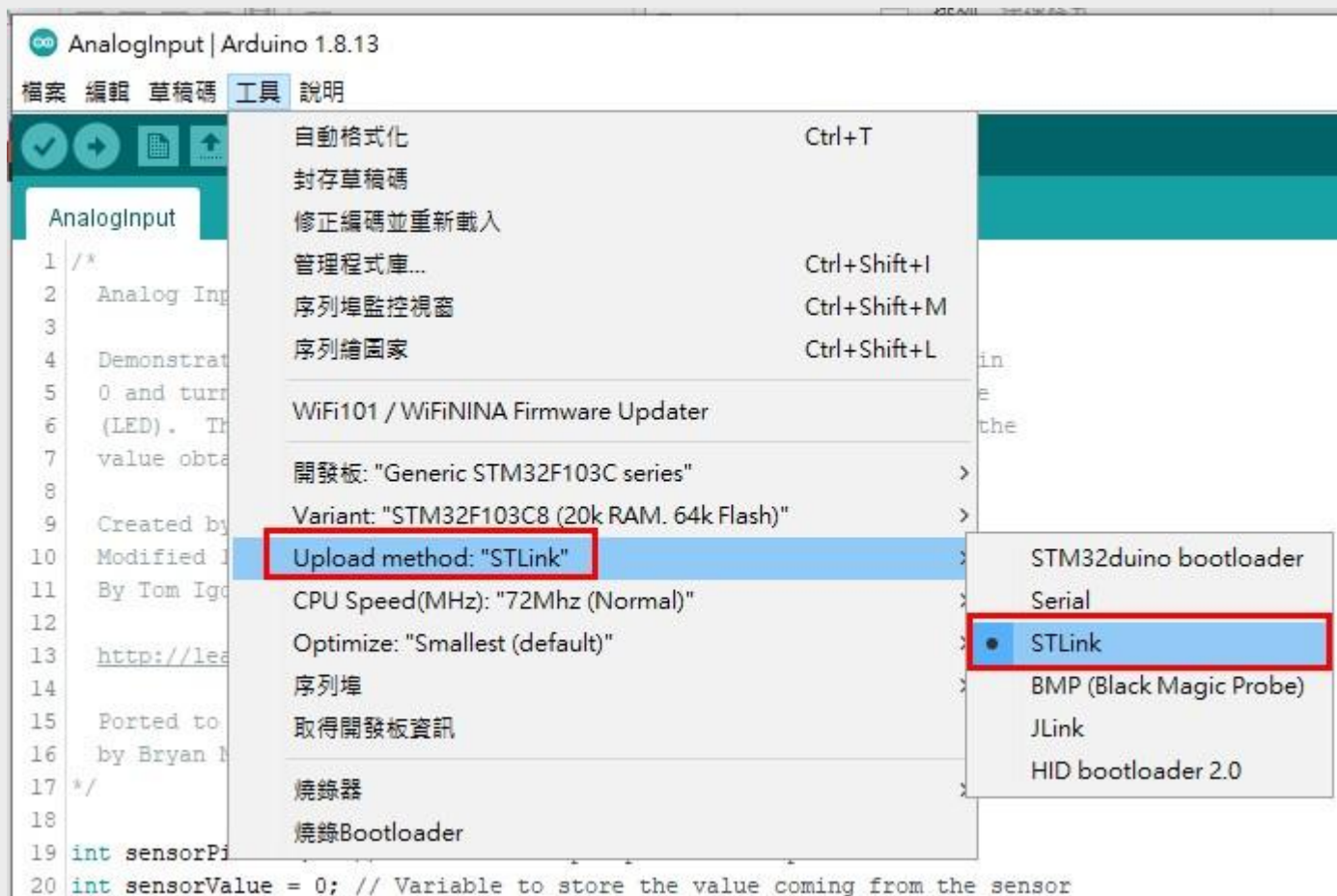


將紅框內3.3V與Boot0短路進入燒錄模式

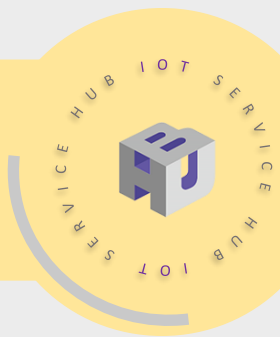
燒錄方法(5)

STLink燒熱方式

參考影片：<https://www.youtube.com/watch?v=zUk0IN1oEwQ>



Upload method要選擇STLink



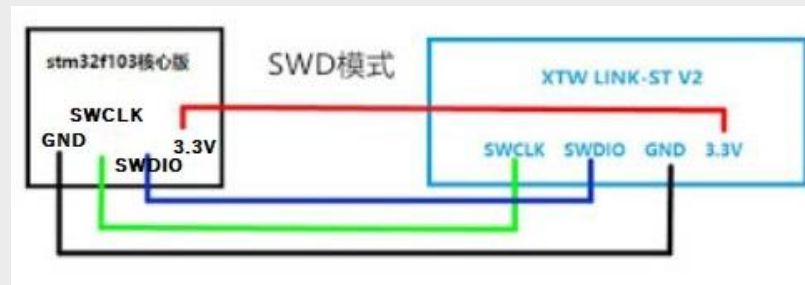
燒錄方法(6)

STLink-連接設定

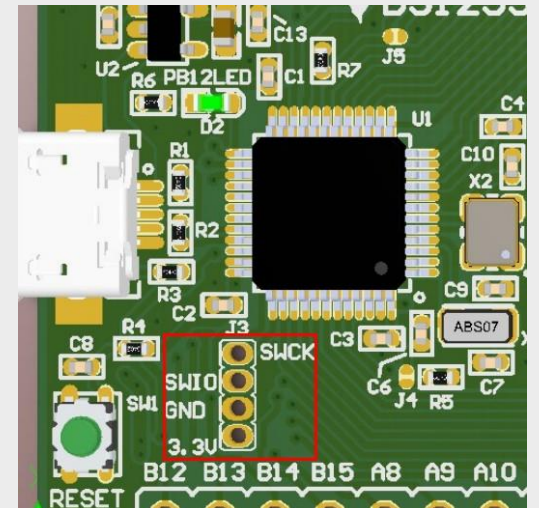
1. 準備STLink工具，如下圖將線路接到到2598+板上，不用設定Boot0
2. IDE按下上傳鈕開始燒錄程式
3. 按下Reset，程式開始運作



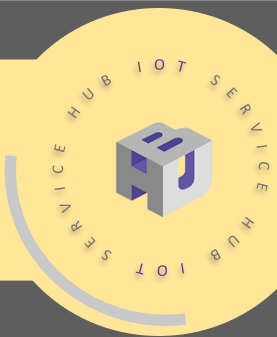
請自行準備適合的
ST-Link燒錄器



2598+與STLink燒錄器接線



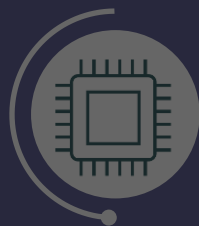
STLink腳位間距較小，需自行焊上接頭



Sim卡及APN



DSI2598+介紹



軟體教學



Sim及APN



範例介紹

Sim卡設定

APN設定

數據平台

Sim卡設定

ATcommand設定

NB-IoT的Sim卡第一次使用前需要設定，請先將DSI 2598+燒錄以下code，進入指令模式設定Sim卡

```
void setup() {
  // put your setup code here, to run once:
  Serial.begin(115200);
  Serial1.begin(115200);
}

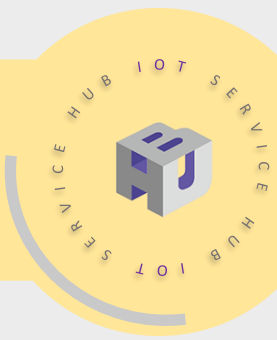
void loop() {
  // put your main code here, to run repeatedly:
  if (Serial.available()) Serial1.write(Serial.read());
  if (Serial1.available()) Serial.write(Serial1.read());
}
```

燒錄完成後，打開IDE的Serial monitor

注意

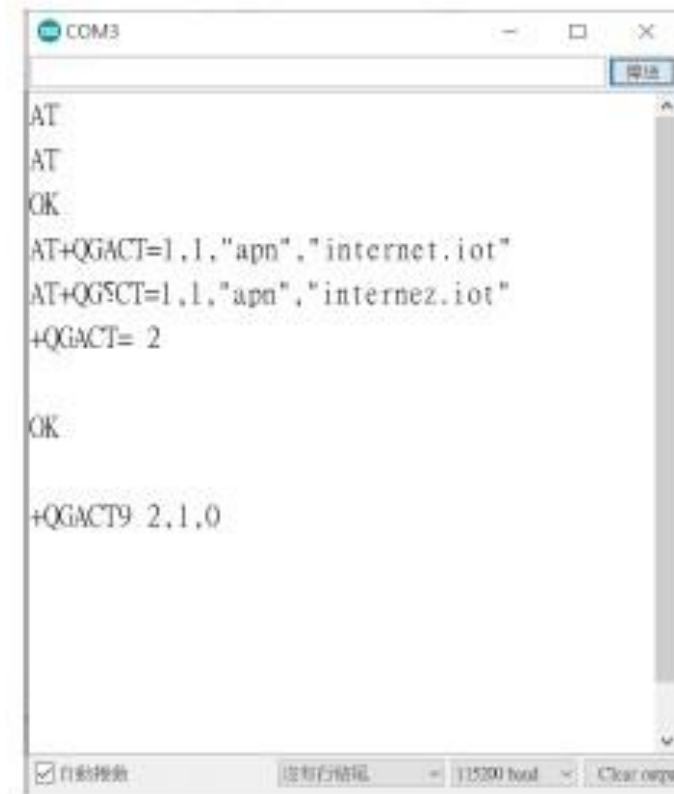
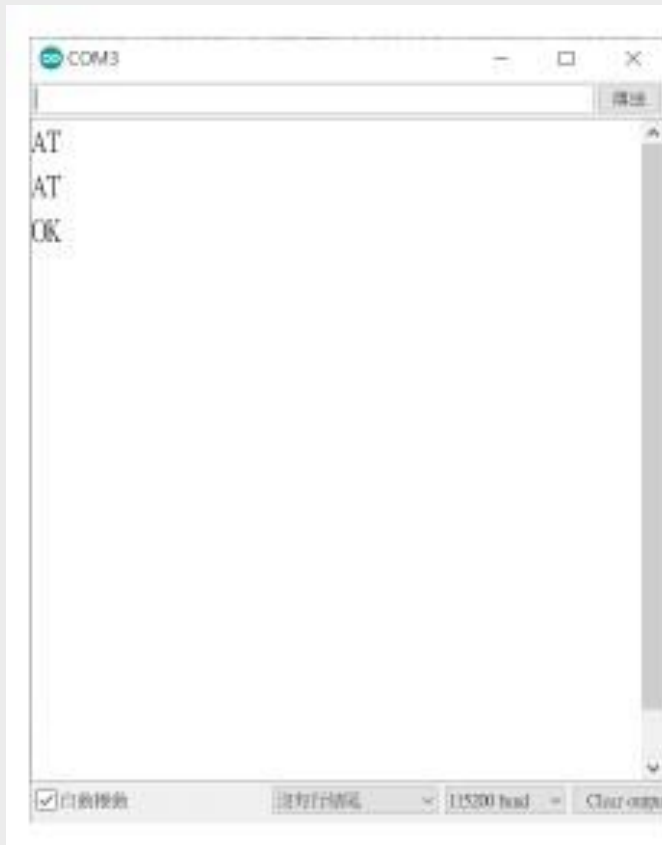
開啟Serial monitor後，若按下2598+的Reset鍵，可能需要再重開Serial monitor才能正常顯示





APN設定(1)

1. 打開 Serial monitor ，在上方輸入欄中輸入AT指令，可先輸入「 AT 」，查看模組是否有回覆「 OK 」。
2. 啟用 APN：`AT+QGACT=1,1,"apn","internet.iot"`



APN設定(2)

3. 註冊 APN : `AT+QCGDEFCONT="IP", "internet.iot"`
4. 頻寬設定 : `AT+QBAND=1,8`
5. 重新啟動模組 : `AT+QRST=1`
6. 重啟後應能得到一組IP位址，代表sim卡與基地台連線

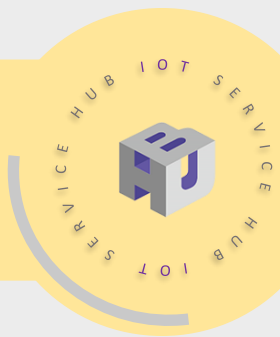
!!

- 2598+支援頻段(band)為：
B1, B3, B5, B8, B20
- 中華電信使用B8 (900MHz)
經測試可相容2598+

```

COM3
AT
AT
OK
AT+QGACT=1,1,"apn","internet.iot"
AT+QGSCT=1,1,"apn","internet.iot"
+QGACT= 2
OK
+QGACT9 2,1,0
AT+QCGDEFCONT="IP","internet.iot"
AT+QCGDB5CONT="IP",!internet.iot"
OK
COM3
OK
AT+QGACT=1,1,"apn","internet.iot"
AT+QGSCT=1,1,"apn","internet.iot"
+QGACT= 2
OK
+QGACT9 2,1,0
AT+QCGDEFCONT="IP","internet.iot"
AT+QCGDB5CONT="IP",!internet.iot"
OK
AT+QBAND=1,8
AT+QAAND=1,8
OK
COM3
AT+QCGDEFCONT="IP","internet.iot"
AT+QCGDB5CONT="IP",!internet.iot"
OK
AT+QBAND=1,8
AT+QAAND=1,8
OK
AT+QRST=1
AT+QRSR=1
F1: 0000 0000
V09 0000 0000 [0001]
00: 0006 000C
01: 0000
F0: 0000 0000
B
  
```

需注意各家電信商APN設定不同，band亦不同，申請前需確認是否相容2598+支援之頻段



APN設定(2)

連線確認

- IP查詢：**AT+CGPADDR=1**
- 回覆：OK：尚未找到IP
- 回覆：**+CGPADDR: 1,IP(四位)**：表示已有IP
- 說明：若設定期間連上網路會自動回傳IP位址
- **+IP**：IP位址

Reset後應自動得到IP



```
COM5
AT+QCRST=L5
F1: 0000 0000
V0: 0000 0000 [0001]
00: 0006 000C
01: 0000
G1: 0000 0080
4
AT+CPIN?
AT+CPIN?
+CPIN: RE00Y
OK
+IP: 10.176.174.247
```

```
COM5
AT+A$PADDR=1
+CGPADDR9 1,10.175.1 $I??j
OK
AT+CGPADDR=1
AT+CGPAFDR=1
+A$PADDR: 1,Lr???r???r???j
OK
AT+CGPADDR=1
AT+CG$ADDR=1
+CGPADDR: 1,10.175.176.247
OK
```

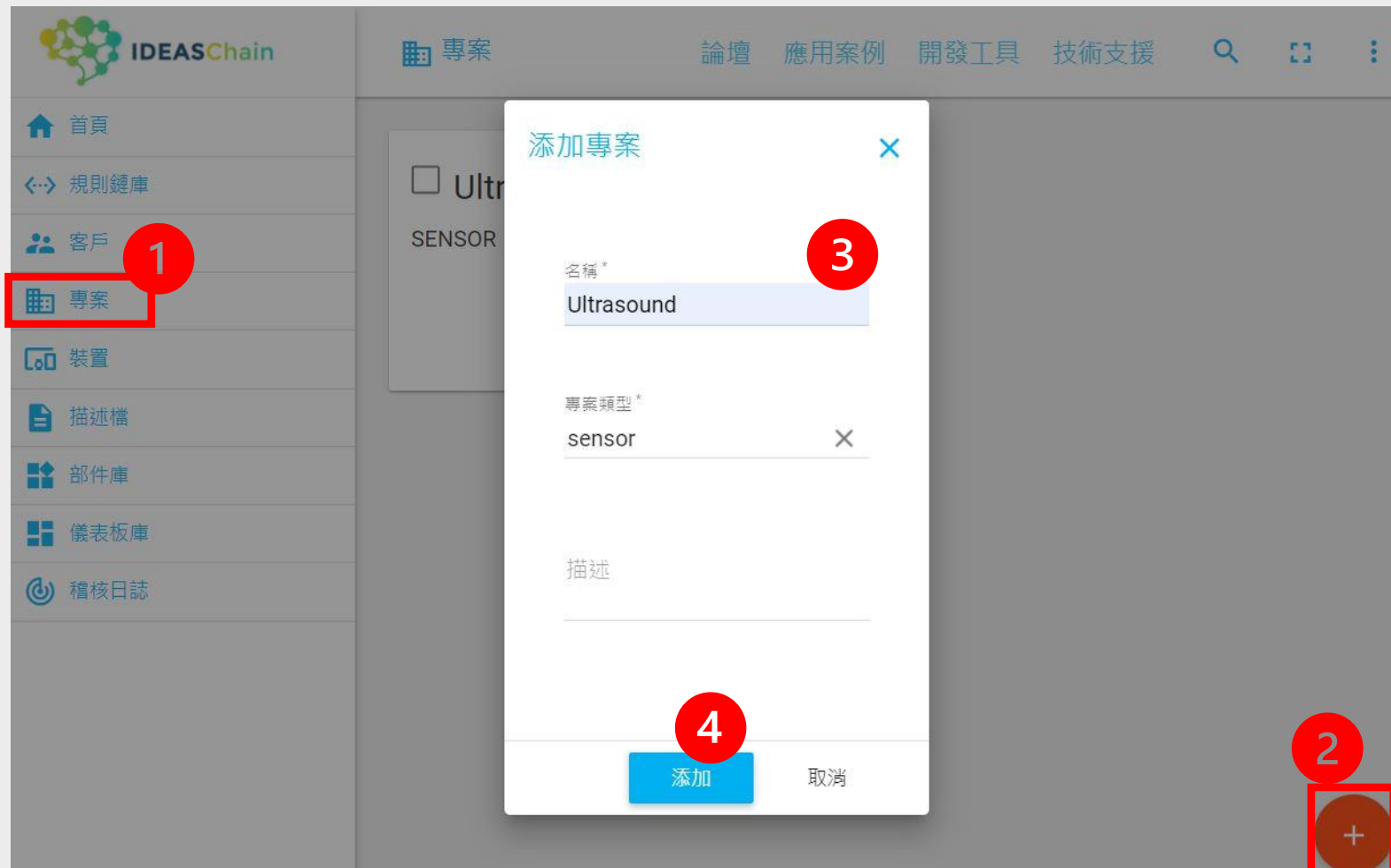
數據平台

Step1. 至IDEAS Chain並點選數據平台: <https://iiot.ideaschain.com.tw/home> (請先建立帳號)
在此平台建立專屬專案，並連接儀表板

The screenshot displays the IDEASChain data platform interface. At the top left is the IDEASChain logo. The top right navigation bar includes links for '論壇', '應用案例', '開發工具', and '技術支援', along with a user profile icon labeled '租戶管理員'. The left sidebar menu lists various navigation options: '首頁', '規則鏈庫', '客戶', '專案', '裝置', '描述檔', '郵件庫', '儀表板庫', and '稽核日誌'. The main dashboard area is organized into four primary management sections, each with a blue icon and a label: '規則集管理' (containing '規則鏈庫'), '客戶管理' (containing '客戶'), '專案管理' (containing '專案'), and '裝置管理' (containing '裝置' and '描述檔').

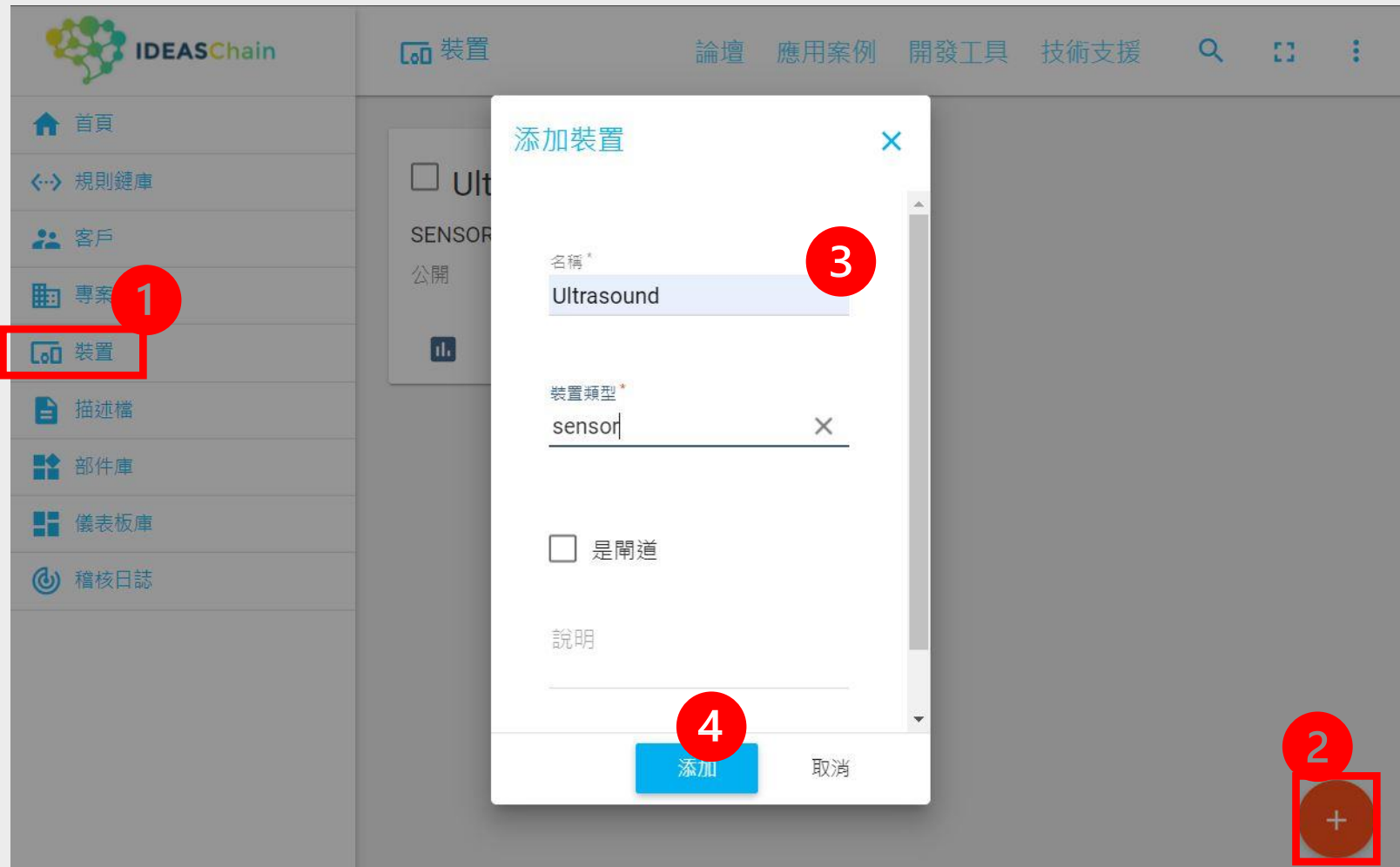
數據平台

Step2. 點選左側:<專案>，再點選右下角的+，添加專案，填寫名稱類型後，點選添加



數據平台

Step3. 點選左側:<裝置>，再點選右下角的+，添加專案，填寫名稱類型後，點選添加



數據平台

Step4. 點選左側:<裝置>，再點選剛才新增的裝置，並複製存取權杖，貼上於程式碼中(或MQTTBox)

The screenshot displays the IDEASChain data platform interface. On the left, a navigation menu includes '首頁', '規則鏈庫', '客戶', '專案', '裝置', '描述檔', '部件庫', '儀表板庫', and '稽核日誌'. The '裝置' (Devices) menu item is highlighted with a red box and a red circle containing the number '1'. The main content area shows a list of devices, with 'Ultrasound' selected. A red box and a red circle with the number '2' highlight the 'Ultrasound' device name. Below the device name, there are several icons for device management. On the right, the 'ULTRASOUND' device details page is shown. The '複製存取權杖' (Copy Access Token) button is highlighted with a red box and a red circle with the number '3'. Other buttons like '私人', '管理認證', and '刪除裝置' are also visible. The device details include fields for '名稱' (Name) and '裝置類型' (Device Type).

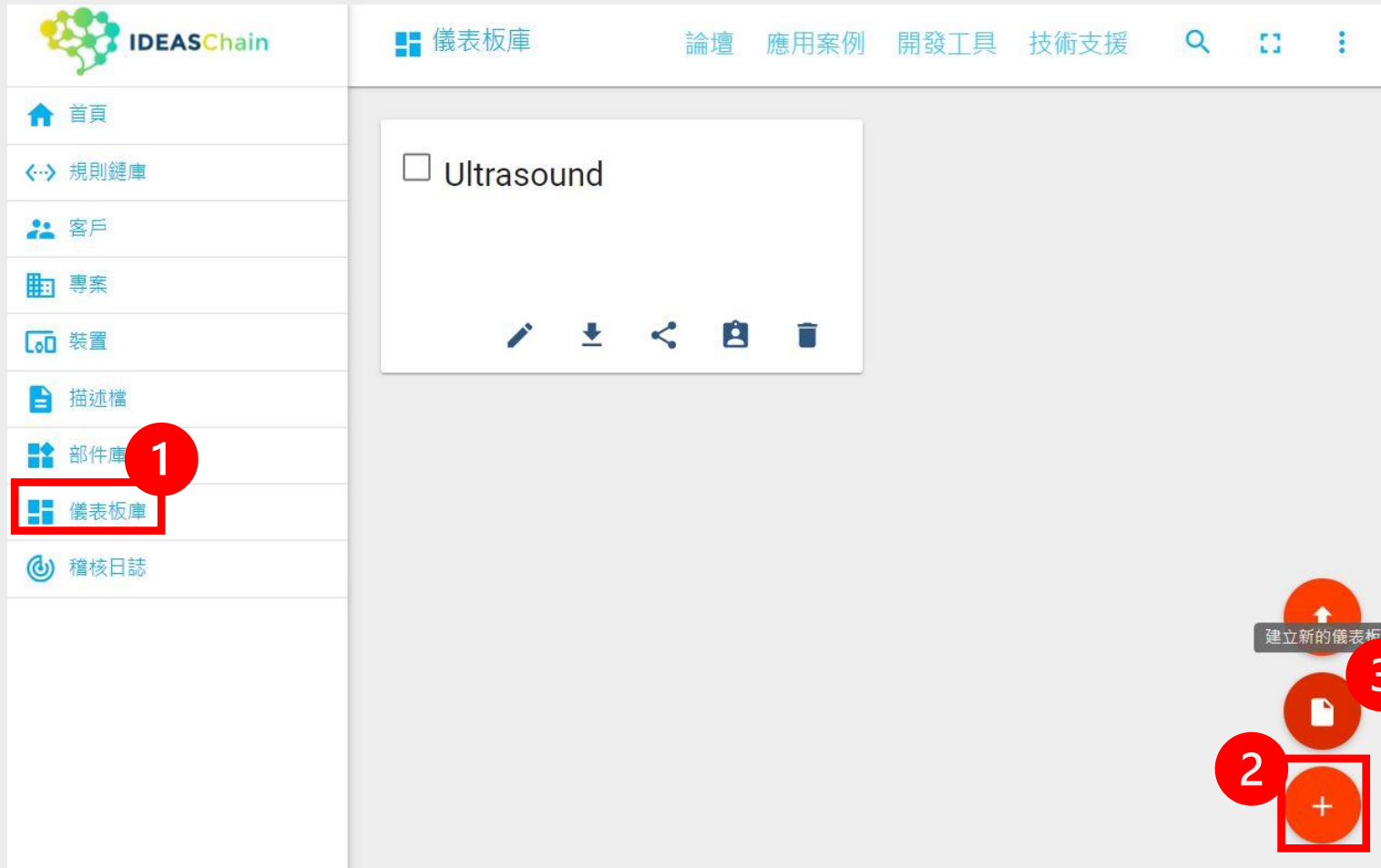
數據平台

Step5. 點選左側:<裝置>，再點選剛才新增的裝置，接著點選關聯，關聯類型填寫“Contains”後，類型點選<裝置>，並填寫剛才加入的裝置名稱，最後點選<添加>。

The screenshot displays the IDEASChain web application interface. On the left, a navigation sidebar contains menu items: 首頁, 規則鏈庫, 客戶, 專案, 裝置 (highlighted with a red circle 1), 描述檔, 部件庫, 儀表板庫, and 稽核日誌. The main content area shows a '裝置' (Device) management page for 'Ultrasound' (highlighted with a red circle 2). A modal dialog titled '添加關聯' (Add Relationship) is open in the center. Inside the dialog, the '關聯類型' (Relationship Type) field is set to 'Contains' (highlighted with a red circle 3). The '到實體' (To Entity) section shows a dropdown menu with '裝置' (Device) selected and 'Ultrasound' entered in the text field (highlighted with a red circle 4). At the bottom of the dialog, there are '添加' (Add) and '取消' (Cancel) buttons. The background interface shows a table with columns for '事件' (Event), '關聯' (Relationship), and '稽核日誌' (Audit Log), with the '關聯' column highlighted by a red circle 3.

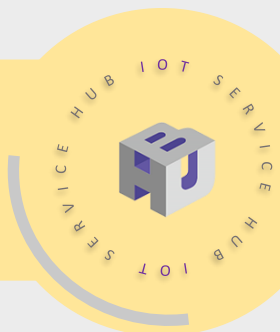
數據平台

Step6. 點選左側:<儀表板庫>，再點選右下角的+，建立新的儀表板



Step7. 添加儀表板並新增標題





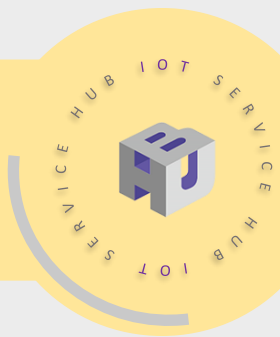
數據平台

Step8. 點選左側:<儀表板庫>，再點選剛才新增的儀表板，建立新的儀表板點選添加



Step9. 點選添加新的部件



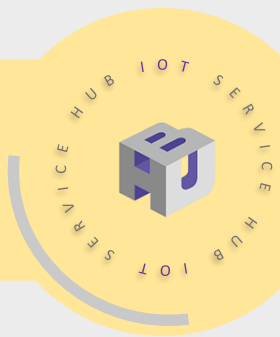


數據平台

Step10. 點選當前包，在選擇合適的圖表，在這裡使用“Charts”，並在圖表處點一下新增

The screenshot shows the IDEASChain dashboard interface. On the left is a navigation menu with options like '首頁', '規則鏈庫', '客戶', '專案', '裝置', '描述檔', '部件庫', '儀表板庫', and '稽核日誌'. The main area displays a dashboard titled 'Ultrasour' with a '選擇部' (Select Department) dropdown. A context menu is open, listing various chart types: 'Analogue gauges', 'Cards', 'Charts', 'Control widgets', and 'Date'. The 'Charts' option is highlighted with a red box and a red circle labeled '2'. Below the menu, a 'Timeseries E' chart is visible, showing a bar chart with two data series: 'First' (blue) and 'Second' (yellow). The chart area is also highlighted with a red box and a red circle labeled '3'. A red circle labeled '1' is positioned over the '當前包' (Current Package) option in the '選擇部' dropdown.

Series	平均值
First	161.23
Second	42.64



數據平台

Step11. 類型:點選實體，參數:輸入sensorDist

添加部件

數據 設定 進階 動作

使用儀表板的時間窗口 時間窗口 即時 - 最後分

資料來源

1	類型	參數	時間序列
1.	實體	sensorDist	時間序列

沒有找到'sensorDist' 別名 建立新別名

實體別名必填。 需要裝置時間序列。

+ 添加

5 添加 取消

Step12. 類型:點選實體，參數:輸入sensorDist

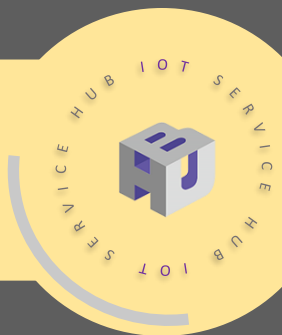
添加別名

別名* sensorDist

過濾類型* 單個實體

類型 裝置* Ultrasound

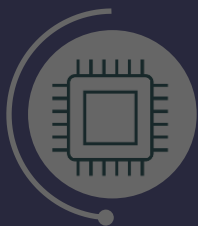
4 添加



範例介紹



DSI2598+介紹



軟體教學



數據平台



範例介紹

IDEASChain應用案例

範例介紹

Bootloader設定

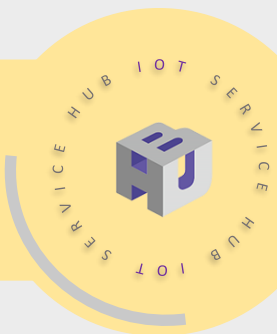
實作案例:長照中心老人離床
監測

IDEASChain 應用案例

點選以下網址 <https://iforum.ideaschain.com.tw/iforum/techmatch/tagsearch.do>
進入IDEASChain 應用案例，可以參考相關的使用方式及其他硬體搭配

The screenshot displays the IDEASChain forum interface. At the top, the navigation menu includes '首頁', '數據平台', '論壇', '應用案例' (highlighted with a red box), '開發工具', '技術支援', '管理後台', and '登出'. The main header area features the IDEASChain logo and the title '應用案例' next to an illustration of people assembling puzzle pieces. Below the header, there is a breadcrumb trail '首頁 > 應用案例' and a filter for '全部時間' and '最新發文'. A search bar with the placeholder '搜尋...' and a dropdown menu for '選擇應用類型' are present. The main content area shows a post titled 'DSI5168工廠材料分裝' with a description of its use in factory material sorting. The post includes a small image, a list of tags (DSI 5168, 新版數據平台, 智慧立方), and the author 'hikari' with a timestamp. To the right of the post, there are icons for views (30), likes (0), and comments (0). A '上傳方案' button is also visible. At the bottom right, a '常用標籤' section lists tags like DSI 2598+, DSI 5188, DSI 2599, 藍芽/BLE, and WiFi.

...
n.tw/iforum/techmatch/list.do



範例介紹

- ◆ 安裝STM32duino後會有許多F103核心的範例，可參考使用
- ◆ 原舊版MEGA328P核心範例與Arduino相關感測器library，基本上都可沿用，但涉及ADC腳位使用之library則需自行修改ADC初始設定

2598+較第一代2598有較強的核心與較多的功能腳位，並有多種燒錄方式，其使用的靈活度也較高，並且有設計硬體reset NB-IoT模組的方式，各種使用範例，可參考ideaschain官網的**應用案例**：

<https://iforum.ideaschain.com.tw/iforum/techmatch/list.do>

使用ideaschain平台以MQTT發布與訂閱：

<https://iforum.ideaschain.com.tw/iforum/techmatch/solution.do?solution=32>

使用2598+以http方式上傳資料：

<https://iforum.ideaschain.com.tw/iforum/techmatch/solution.do?solution=33>

使用2598+搭配休眠模式運作：

<https://iforum.ideaschain.com.tw/iforum/techmatch/solution.do?solution=34>

使用2598搭配自架MQTT與手機APP互動：

<https://iforum.ideaschain.com.tw/iforum/techmatch/solution.do?solution=19>

```
digitalWrite(PB12, LOW);
```

可使板上LED燈亮起

(設計者：楊俊益)

Bootloader設定

環境準備

注意

當開發板USB發生異常插拔，造成開發板內bootloader失效，或者安裝驅動程式無效，或是code撰寫有異常造成bootloader失效，電腦無法辨識開發板，無法選擇直接以Arduino IDE透過USB上傳code，則必須重新燒錄bootloader

燒錄步驟參考網頁：

<https://www.electronicshub.org/how-to-upload-stm32f103c8t6-usb-bootloader/>

官網下載STM32CubeProg：

<https://www.st.com/en/development-tools/st-link-v2.html#tools-software>

(免費下載，需填e-mail等資料，由mail連結開啟)

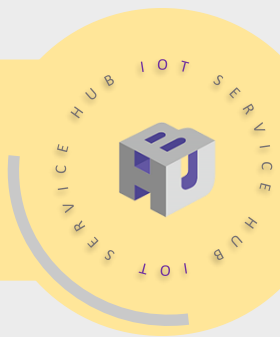
STM32Cube
Programmer

安裝可能還需要加裝Java Runtime Environment

All tools & software

Software Development Tools

Part number	Status	Description	Type	Supplier
ST-LINK-SERVER	ACTIVE	ST-LINK server software module	STM32 Performance and Debuggers	ST
STM32CubeProg	ACTIVE	STM32CubeProgrammer software for all STM32	STM32 Programmers	ST
STSW-LINK004	ACTIVE	STM32 ST-LINK utility	STM32 Programmers	ST



Bootloader設定

Bin檔準備

STM32Cube準備好之後，需要STM32duino bootloader的bin檔燒錄進去，請至以下網址下載整包code：

STM32duino-bootloader：

<https://github.com/rogerclarkmelbourne/STM32duino-bootloader>

rogerclarkmelbourne / STM32duino-bootloader

<> Code Issues 5 Pull requests 1 Actions Projects Security Insights

master 2 branches 0 tags

Go to file

Code

Clone

HTTPS GitHub CLI

https://github.com/rogerclarkmelbourne

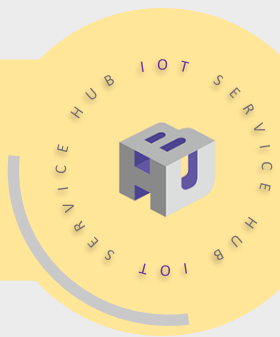
Use Git or checkout with SVN using the web URL.

Open with GitHub Desktop

Download ZIP

3 years ago

File Name	Commit Message
binaries	Updated 'Congratulations' sketch in the combined bootloa
bootloader_only_binaries	Updated bat files to include or handle r
flash	Remove trailing whitespaces
sketch_combiner	Updated 'Congratulations' sketch in the
stm32_lib	cleanup
updater_gd32f1	Remove trailing whitespaces



Bootloader設定

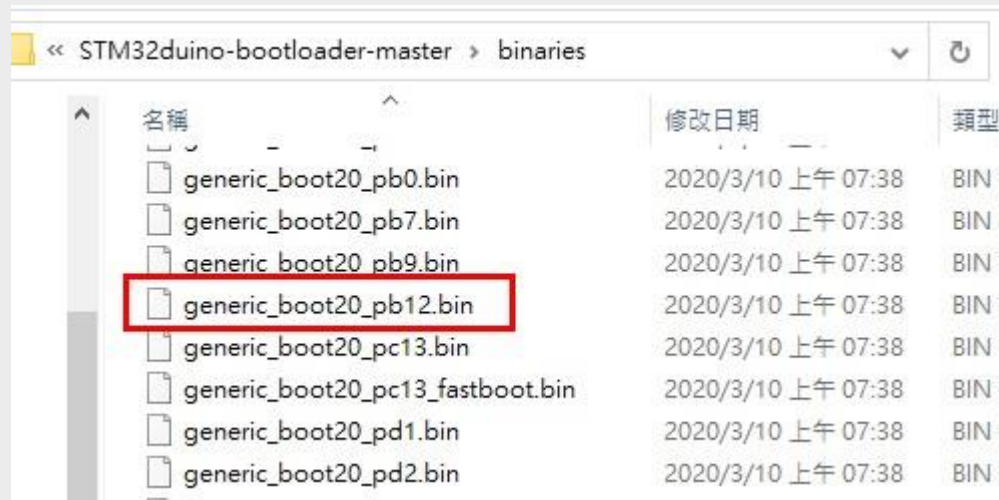
Bootloader Bin 檔燒錄

STM32Cube燒錄步驟請參考以下網址說明：

參考網頁：

<https://www.electronicshub.org/how-to-upload-stm32f103c8t6-usb-bootloader/>

燒錄方式一樣有使用FTDI的UART與STLink兩種，選擇一種進行



DSI 2598+使用的是LED在PB12的版本