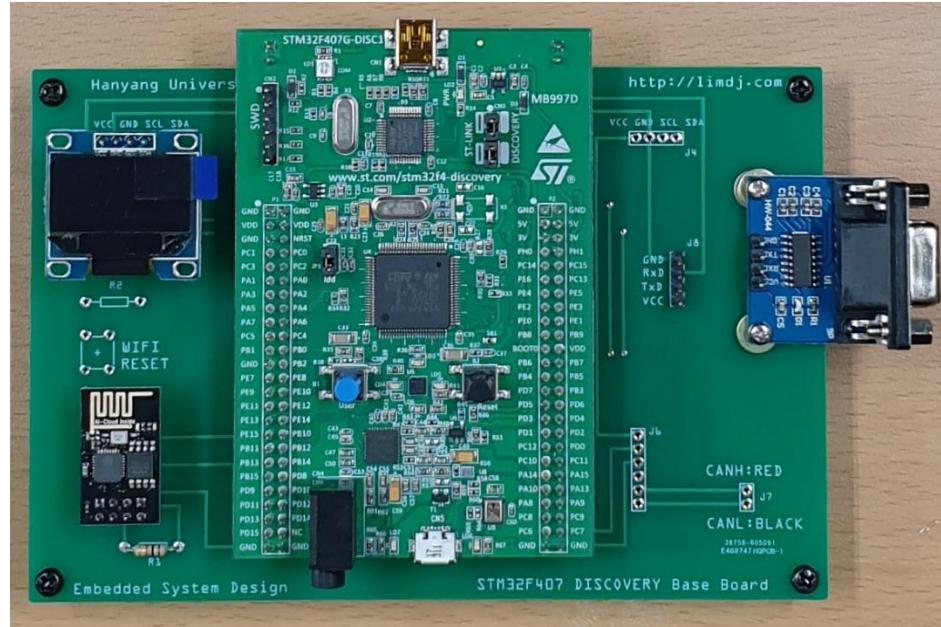


# Lab Cortex-M4: Serial WIFI

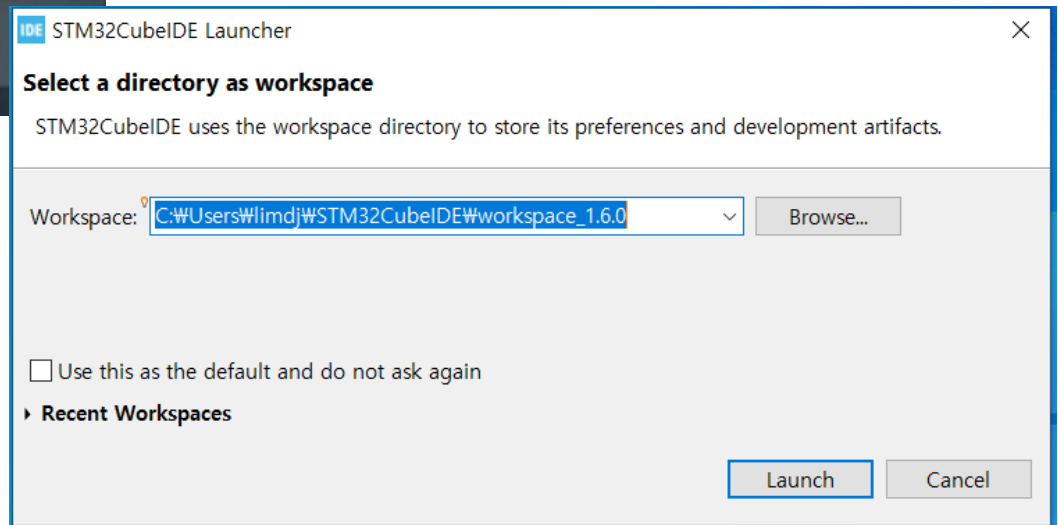
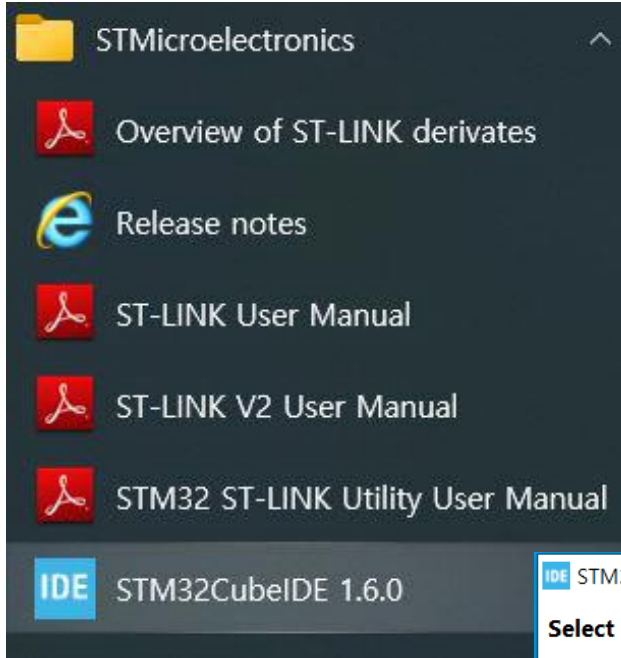


# Cortex-M4 Board

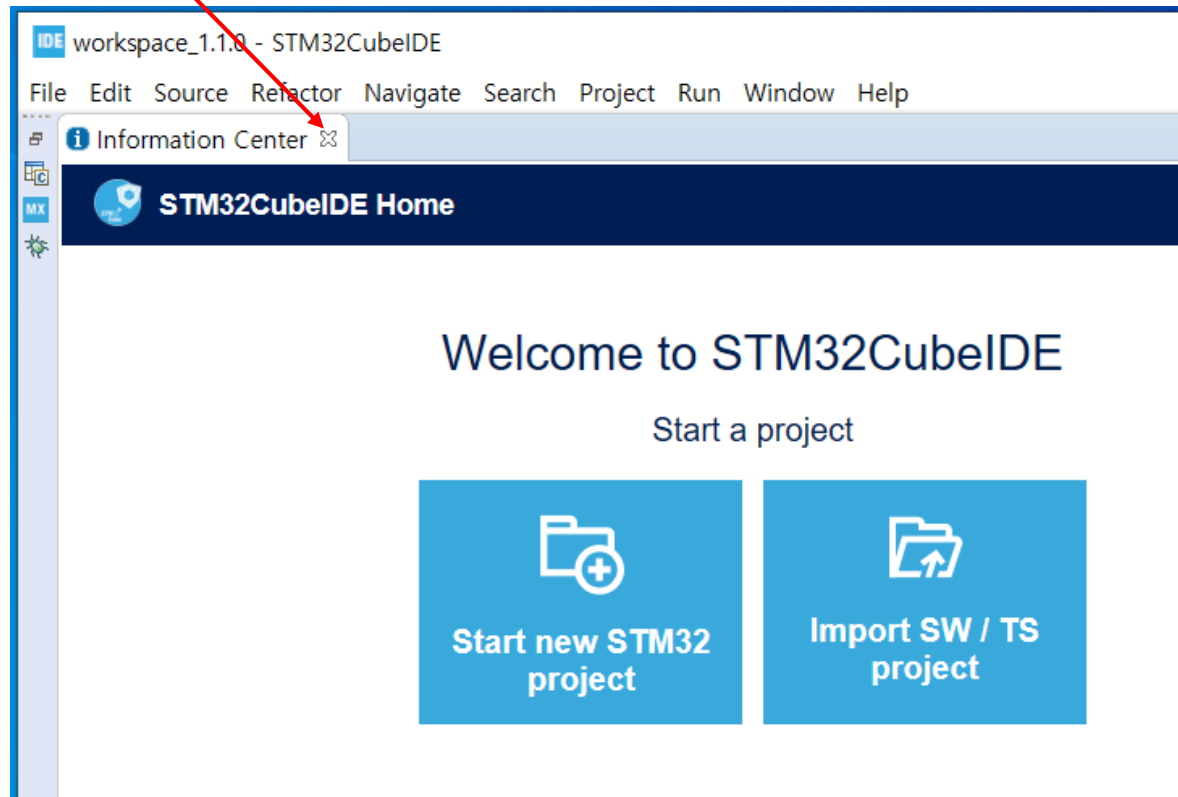
- STM32F407 Discovery Board
  - RS232C
  - Serial WIFI
  - 0.96 inch OLED graphic display
- On board ST-LINK JTAG debugging interface



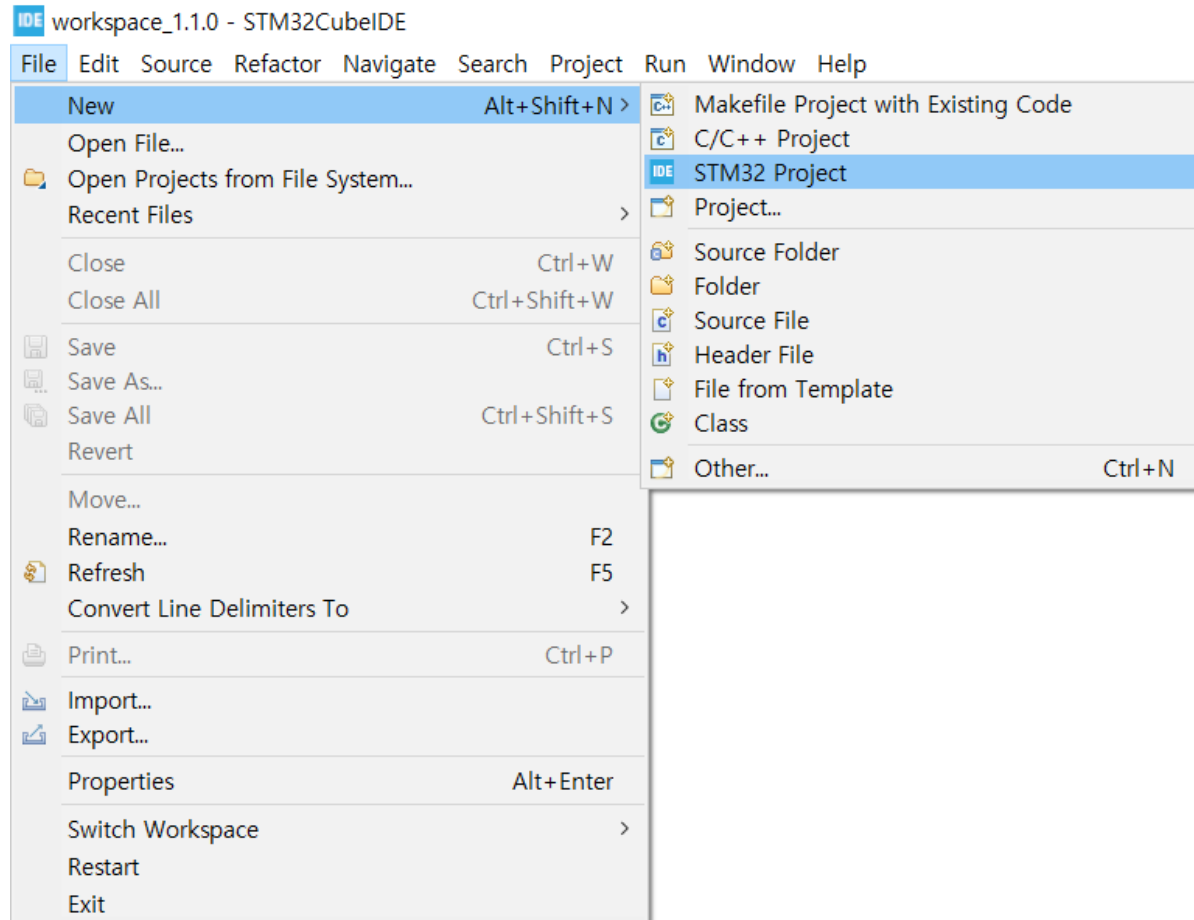
# Start STM32CubeIDE



- Click X to close



# New STM32 Project



# Select Board (Not MCU)




IDE STM32 Project

## Target Selection

Select STM32 target

MCU/MPU Selector | **Board Selector** | Cross Selector

Board Filters

★   

Part Number Search

🔍

Vendor >

Type >



Check/Uncheck All

- Discovery kit
- Evaluation Board
- Nucleo USB Dongle
- Nucleo-RF Kit
- Nucleo144
- Nucleo32
- Nucleo64

MCU/MPU Series >

Check/Uncheck All

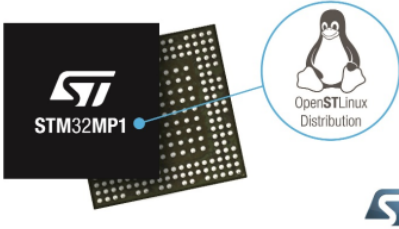
- STM32F0
- STM32F1
- STM32F2
- STM32F3
- STM32F4
- STM32F7

Features Large Picture Docs & Resources  Datasheet  Buy

★

### New multicore STM32MP1 Series


for Industrial and IoT applications






ST STM32MP1

OpenSTLinux Distribution

ST

Boards List: 7 items 

*	Overview	Part No	Type	Marketing Status	Unit Price (US\$)	Mounted Device
☆		32F469IDISCOVERY	Discovery kit	Active	59.0	<a href="#">STM32F469NHx</a>
☆		STM32F401C-DISCO	Discovery kit		0.0	<a href="#">STM32F401VCTx</a>
☆		STM32F4DISCOVERY	Discovery kit	Active	19.89	<a href="#">STM32F407VGTx</a>

# ■ Select STM32F4DISCOVERY and click Next

**Target Selection**  
Select STM32 target or STM32Cube example

MCU/MPU Selector | **Board Selector** | Example Selector | Cross Selector

Type

- Discovery Kit
- Evaluation Board
- Evaluation Kit
- Nucleo USB Dongle
- Nucleo-144
- Nucleo-32
- Nucleo-64
- Nucleo-RF Kit

MCU/MPU Series

- STM32F0
- STM32F1
- STM32F2
- STM32F3
- STM32F4

**STM32F4 Series**

**STM32F407G-DISC1** **STMicroelectronics STM32F407G Discovery Kit Board Support and Examples**

**ACTIVE** Active  
Product is in mass production

Part Number : STM32F4DISCOVERY  
Commercial Part Number : STM32F407G-DISC1

Unit Price (US\$) : **19.89**  
Mounted Device : [STM32F407VGTx](#)

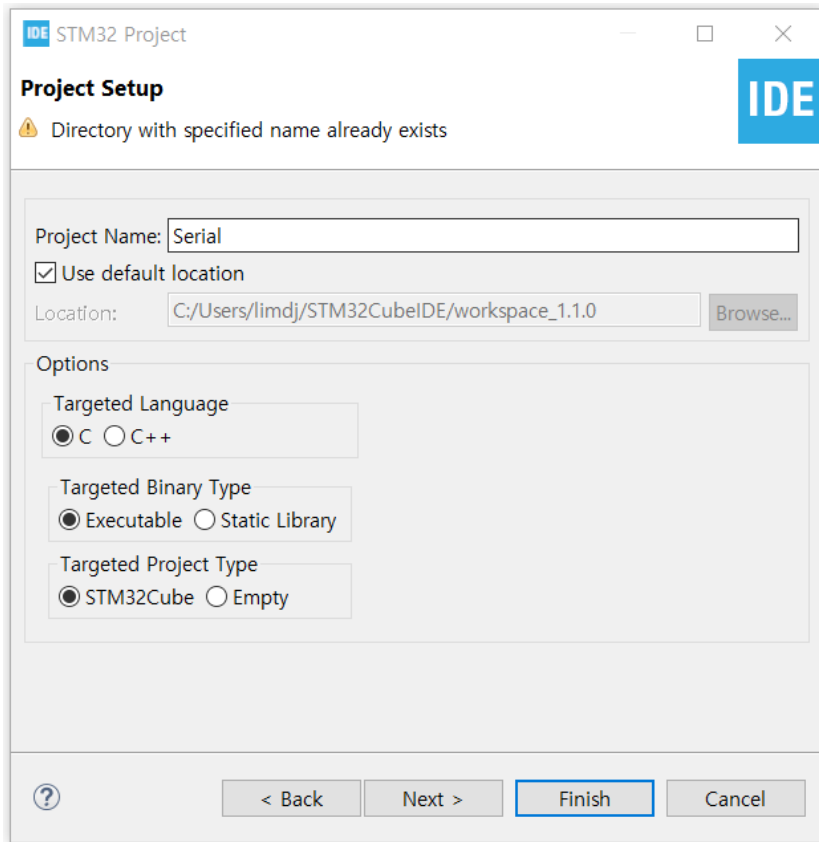
The STM32F4DISCOVERY Discovery kit leverages the capabilities of the STM32F407 high-performance microcontrollers, to allow users to develop audio applications easily. It includes an ST-LINK/V2-A embedded debug tool, one ST-MEMS digital

Boards List: 7 items [Export](#)

	Overview	Commercial Part No	Type	Marketing Sta...	Unit Price (US...	Mounted Dev...
☆		STM32F407G-DISC1	Discov...	Active	19.89	STM32F407VGTx
		STM32F407G-DISC1	Discov...	Active	19.89	STM32F407VGTx

< Back | **Next >** | Finish | Cancel

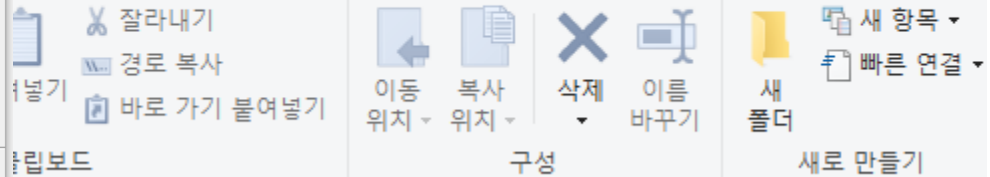
# Project Name



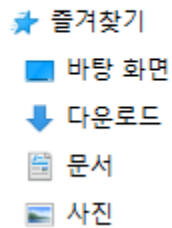
- 이 화면에서 Next를 누르면 다음 화면이 나오고, Finish를 누르면 설정이 끝남

space\_1.6.0

보기



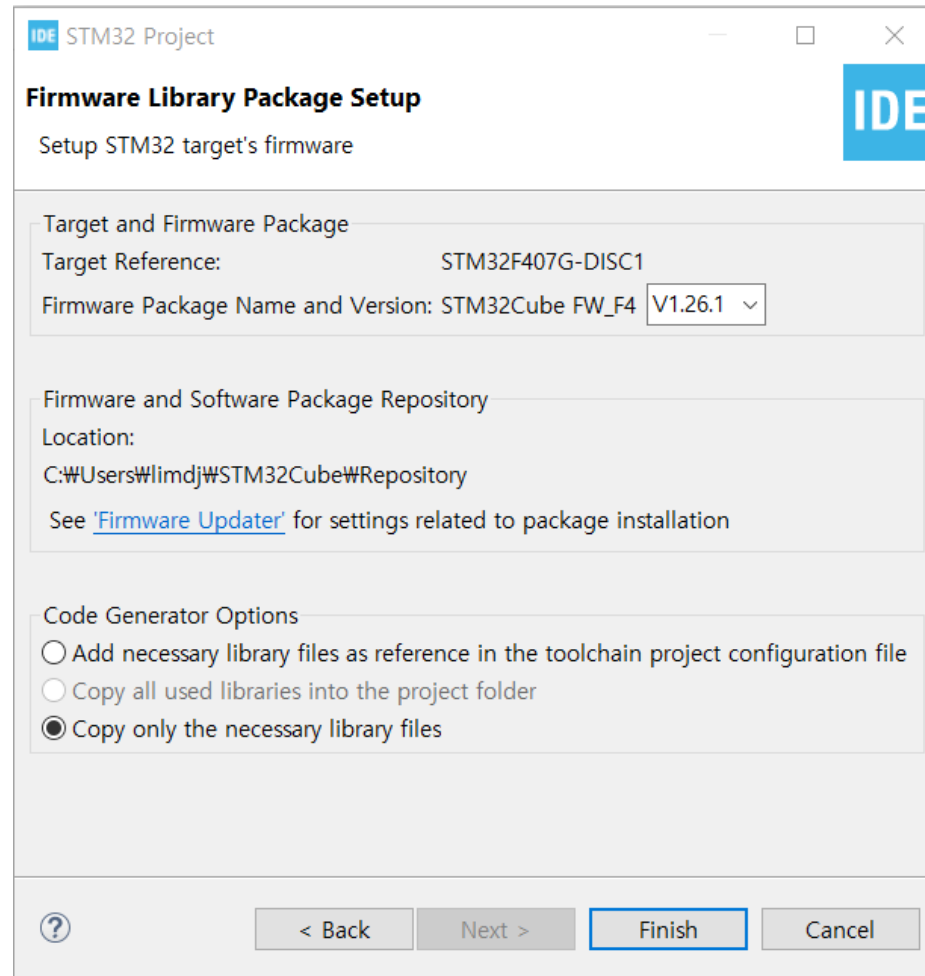
내 PC > 로컬 디스크 (C:) > 사용자 > limdj > STM32CubeIDE > workspace\_1.6.0



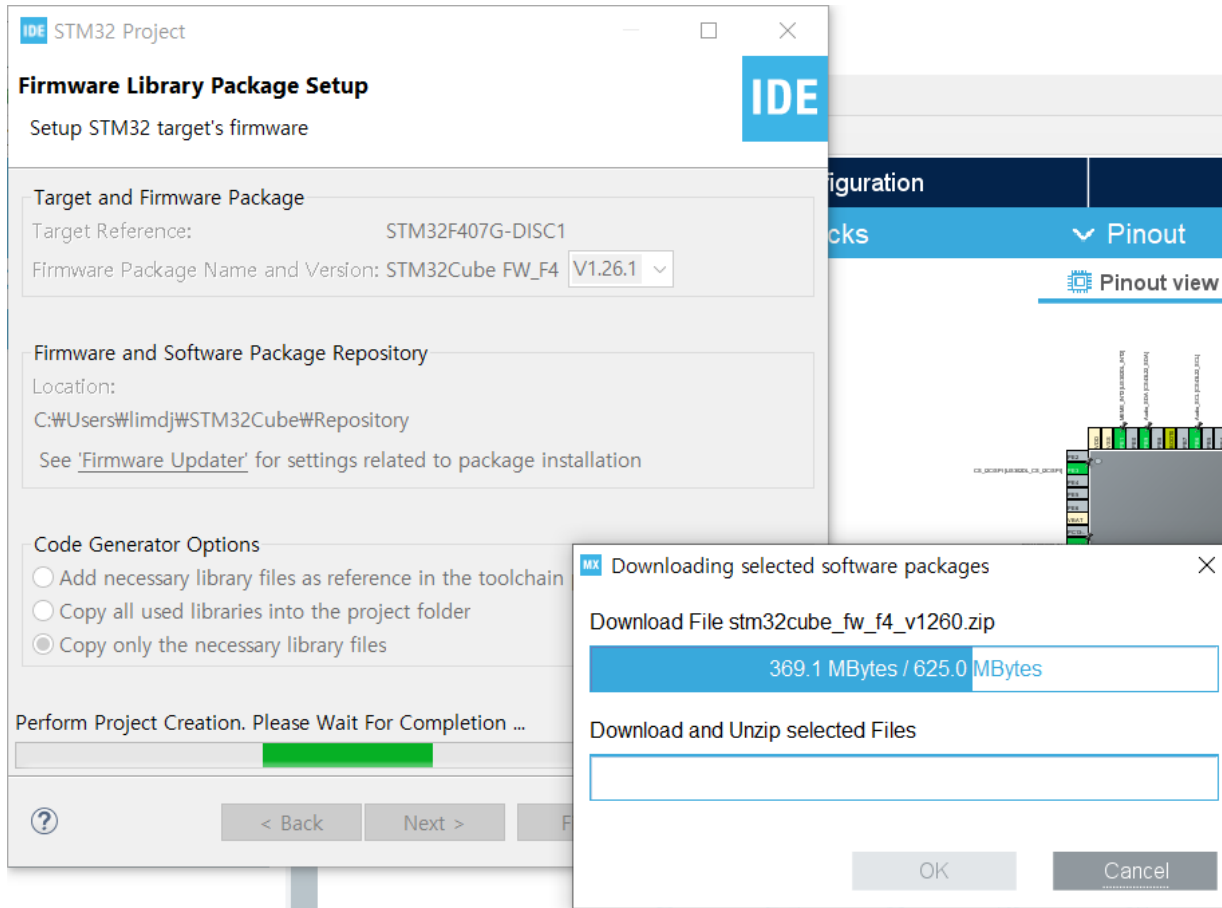
이름	수정한 날짜	유형
Serial	2021-05-01 오후 6:17	파일 폴더
nucleo	2021-03-28 오후 7:30	파일 폴더
407Can500K	2021-03-14 오후 3:15	파일 폴더
407oled	2021-03-11 오전 8:24	파일 폴더
.metadata	2021-03-05 오전 10:58	파일 폴더



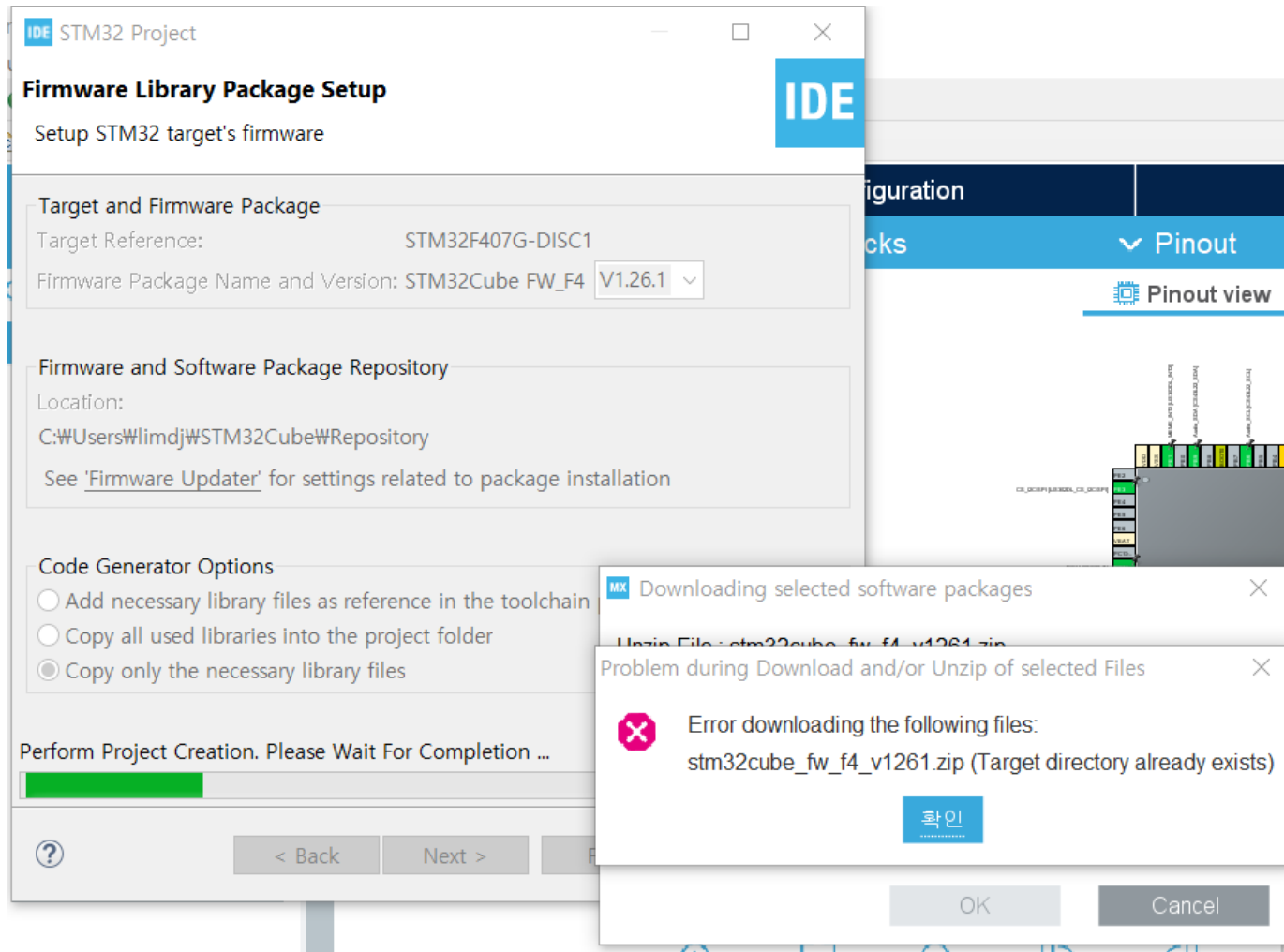
- 이전 화면에서 Next를 누르면 이 화면이 나옴
- Firmware Package Version check를 위해서 필요함



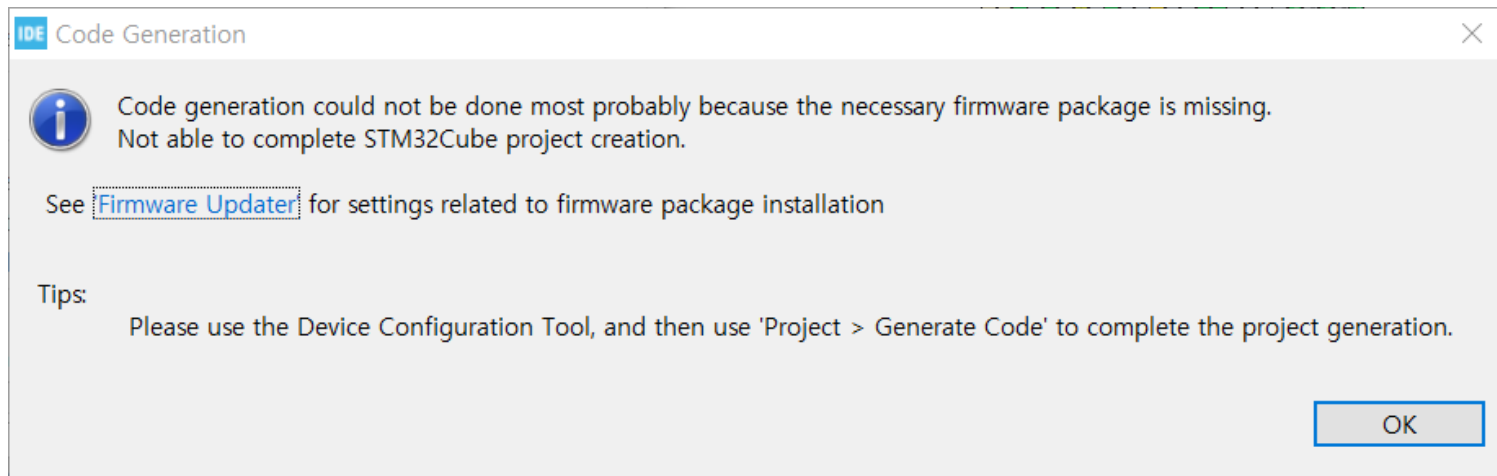
- **필수** **Firmware Package**가 없으면 다운 로드가 진행



# ■ 종종 아래와 같은 에러가 발생할 수 있음



- 앞의 화면과 같이 다운 로드에서 에러가 발생할 경우 OK를 누르고 수동으로 설치를 진행해야 함



- 아래의 디렉토리에 필요한 Firmware Package 디렉토리가 존재하는지 확인하고 없으면 압축을 풀어야 함

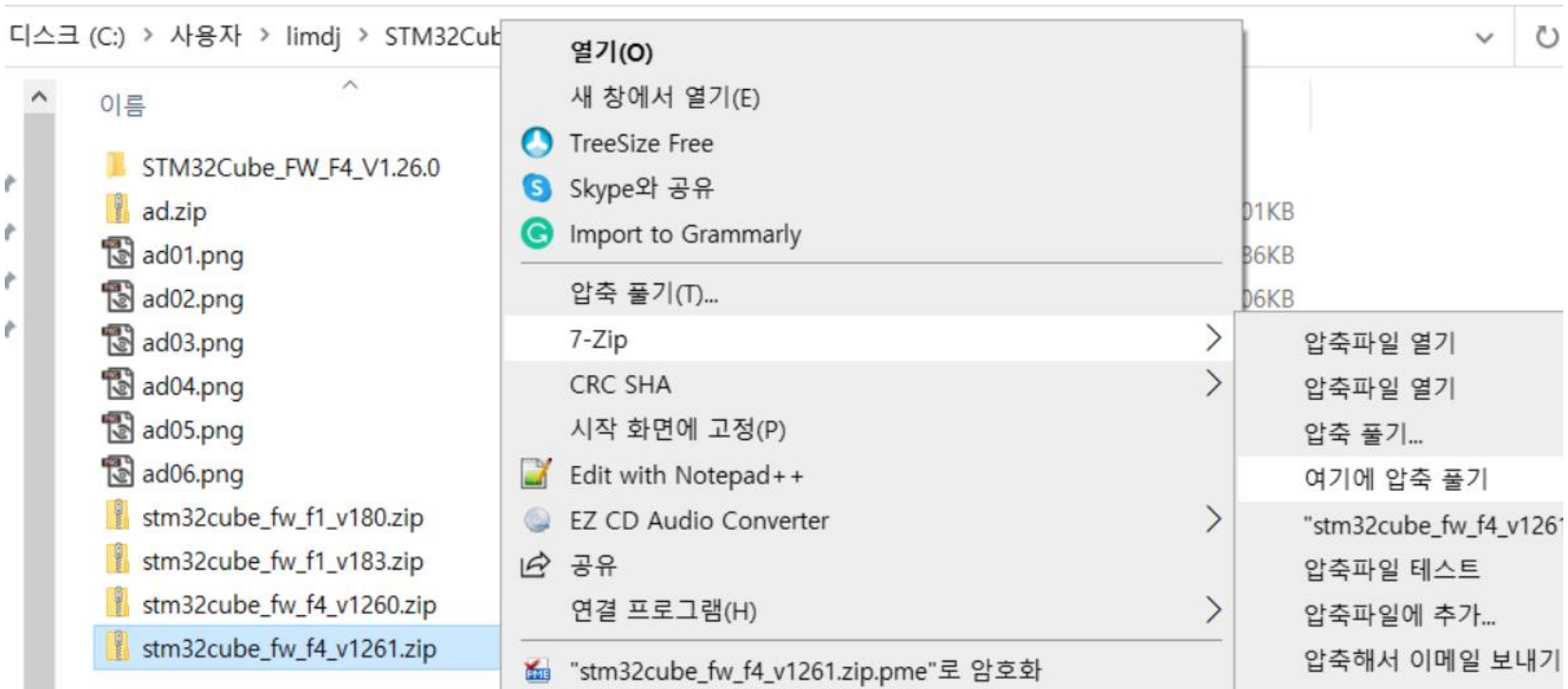
로컬 디스크 (C:) > 사용자 > limdj > STM32Cube > Repository

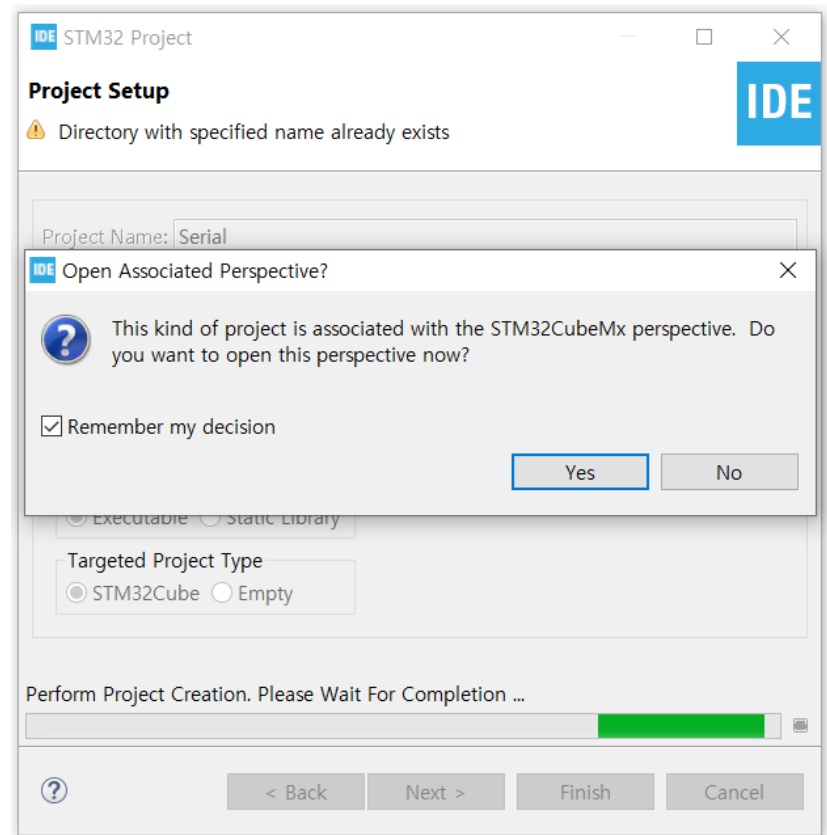
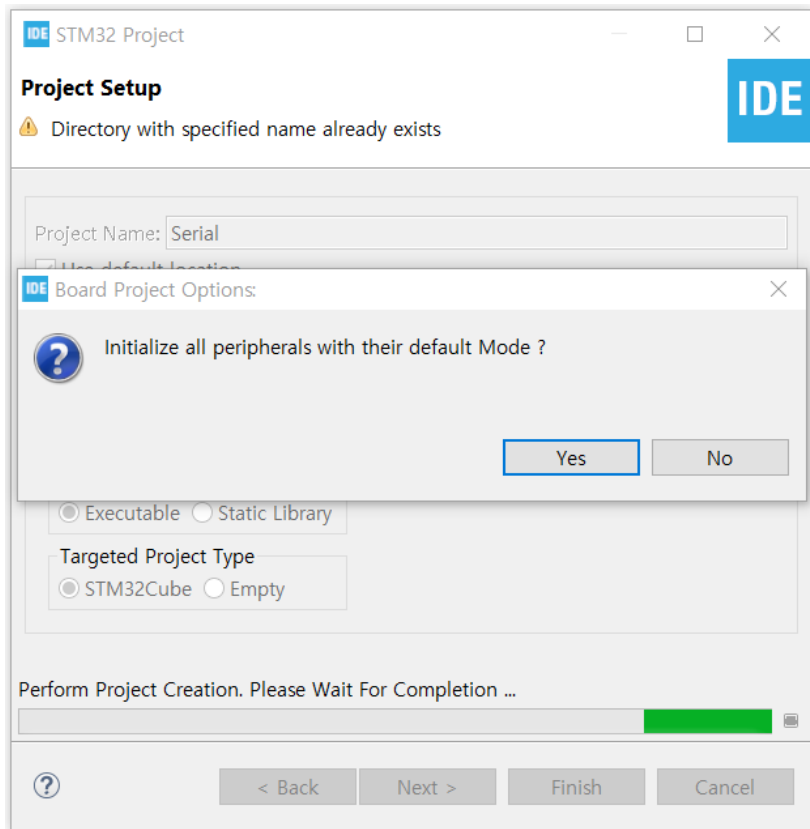
이름	수정한 날짜	유형	크기
STM32Cube_FW_F4_V1.26.0	2021-03-26 오전 2:31	파일 폴더	
ad.zip	2021-05-01 오후 6:13	압축(ZIP) 폴더	701KB
ad01.png	2021-05-01 오후 6:13	ACDSee 20 PNG I...	86KB
ad02.png	2021-05-01 오후 6:13	ACDSee 20 PNG I...	106KB
ad03.png	2021-05-01 오후 6:13	ACDSee 20 PNG I...	109KB
ad04.png	2021-05-01 오후 6:13	ACDSee 20 PNG I...	88KB
ad05.png	2021-05-01 오후 6:13	ACDSee 20 PNG I...	107KB
ad06.png	2021-05-01 오후 6:13	ACDSee 20 PNG I...	230KB
stm32cube_fw_f1_v180.zip	2021-03-28 오후 7:30	압축(ZIP) 폴더	112,452KB
stm32cube_fw_f1_v183.zip	2021-03-28 오후 7:30	압축(ZIP) 폴더	38,972KB
stm32cube_fw_f4_v1260.zip	2021-05-01 오후 7:07	압축(ZIP) 폴더	639,331KB
stm32cube_fw_f4_v1261.zip	2021-05-01 오후 7:09	압축(ZIP) 폴더	2,086KB

## ■ 여기에 압축 풀기



- 만약 마이너 버전 업데이트가 있으면 아래와 같이 업데이트 파일의 압축을 풀며, 이때 이전 설치 디렉토리에 덮어쓰게 되므로 **모두 덮어쓰기**를 선택해서 업데이트를 함







# ■ Enable USART2, USART3

The screenshot displays the STM32CubeMX interface for configuring USART2. The 'Pinout & Configuration' tab is active, showing the 'USART2 Mode and Configuration' settings. The mode is set to 'Asynchronous' and 'Hardware Flow Control (RS232)' is disabled. The 'Configuration' section is expanded to show 'Parameter Settings', with the following parameters:

Parameter	Value
Baud Rate	115200 Bits/s
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1
Data Direction	Receive and Transmit

The pinout diagram on the right shows the STM32F407VGTx LQFP100 package. The USART2\_TX pin is connected to PA2, and the USART2\_RX pin is connected to PA1. The diagram also shows other pins and their functions, such as PA13 (SWDIO), PA12 (OTG\_FS\_DP), PA11 (OTG\_FS\_DM), PA10 (OTG\_FS\_ID), PA9 (VBUS\_FS), PA8 (VREF), PA7 (I2S3\_MCK), PA6 (I2S3\_MCLK), PA5 (I2S3\_MCLK), PA4 (I2S3\_MCLK), PA3 (I2S3\_MCLK), PA2 (USART2\_TX), PA1 (USART2\_RX), PA0 (VDD), PA15 (VDD), PA14 (VDD), PA13 (VDD), PA12 (VDD), PA11 (VDD), PA10 (VDD), PA9 (VDD), PA8 (VDD), PA7 (VDD), PA6 (VDD), PA5 (VDD), PA4 (VDD), PA3 (VDD), PA2 (VDD), PA1 (VDD), PA0 (VDD).

# ■ Check if I2C1 is enabled

The screenshot displays the STM32CubeMX software interface. The top navigation bar includes 'Pinout & Configuration', 'Clock Configuration', and 'Project Manager'. The 'Pinout' tab is active, showing the 'I2C1 Mode and Configuration' window.

**I2C1 Mode and Configuration:**

- Mode:** I2C
- Configuration:**
  - Parameter Settings (Selected)
  - User Constants
  - NVIC Settings
- Configure the below parameters:**
  - Master Features:**
    - I2C Speed Mode: Standard Mode
    - I2C Clock Speed (Hz): 100000
  - Slave Features:**
    - Clock No Stretch Mode: Disabled
    - Primary Address Length: 7-bit
    - Dual Address Acknowledged: Disabled

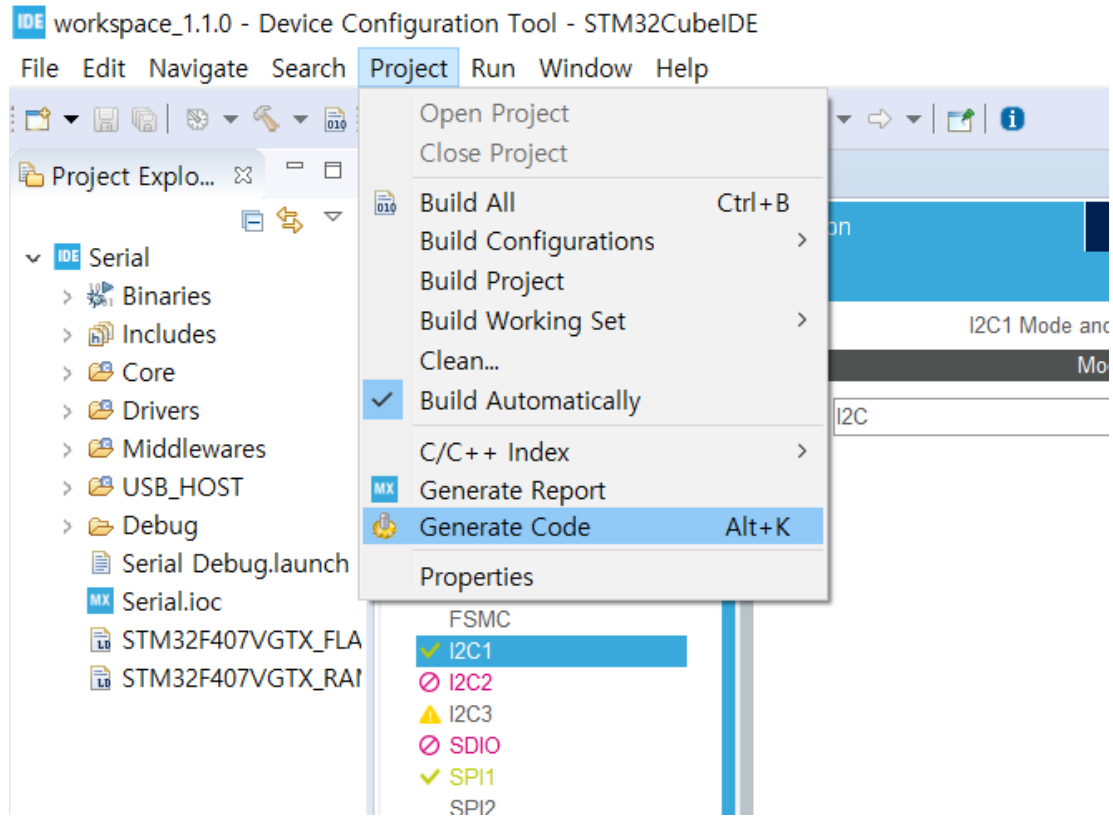
**Pinout View:**

The pinout view shows the STM32F407VGTx LQFP100 package with various pins and their functions. The I2C1 pins are highlighted in green:

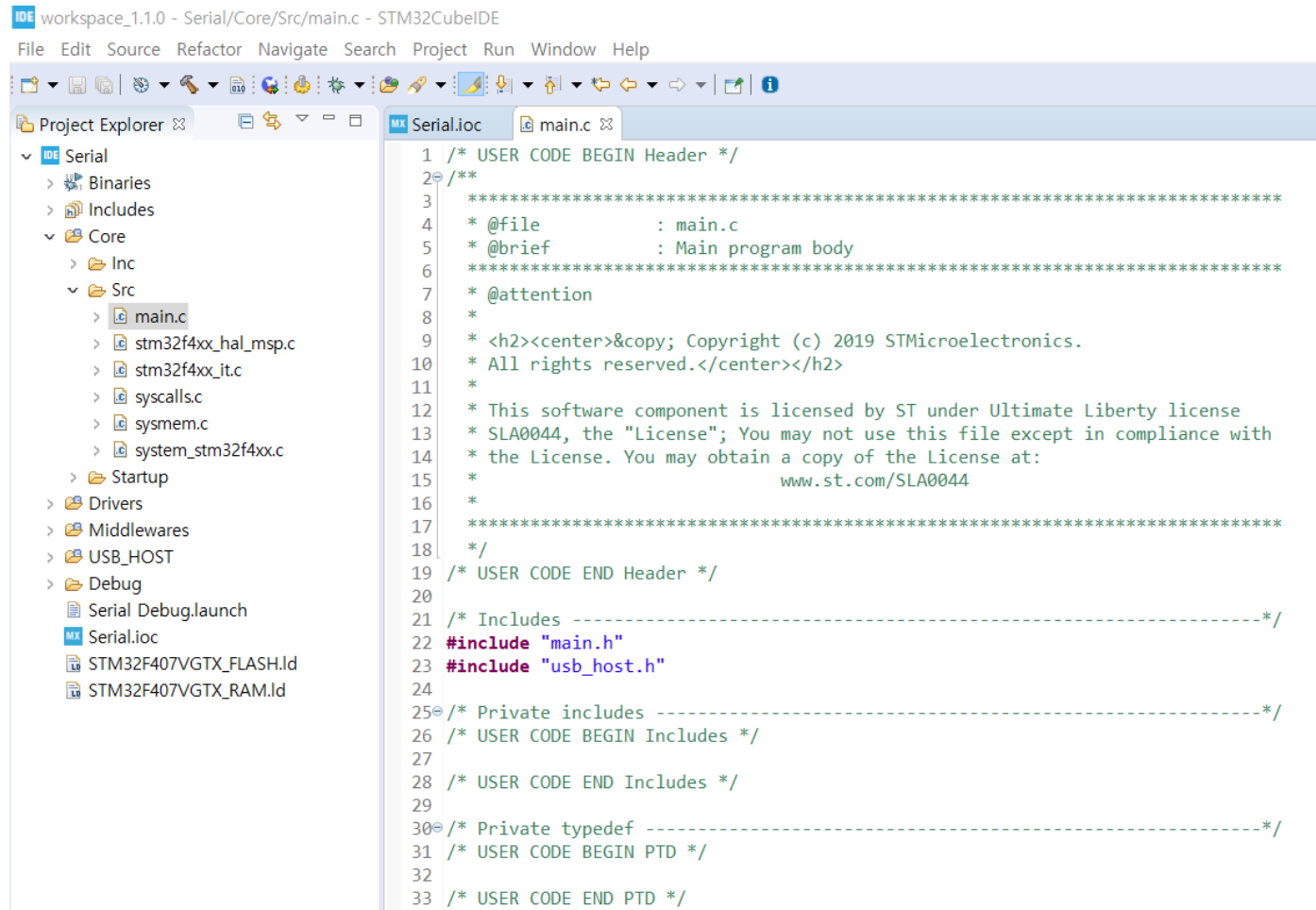
- PC14 (I2C1\_SDA)
- PC15 (I2C1\_SCL)

Other pins and functions shown include VDD, VSS, VCA, SMDIO, OTG\_FS\_DP, OTG\_FS\_DM, OTG\_FS\_ID, VBUS\_FS, VBUS, CS3\_MCK, L06, L05, L03, L04, and USART3\_TX.

# Generate Code

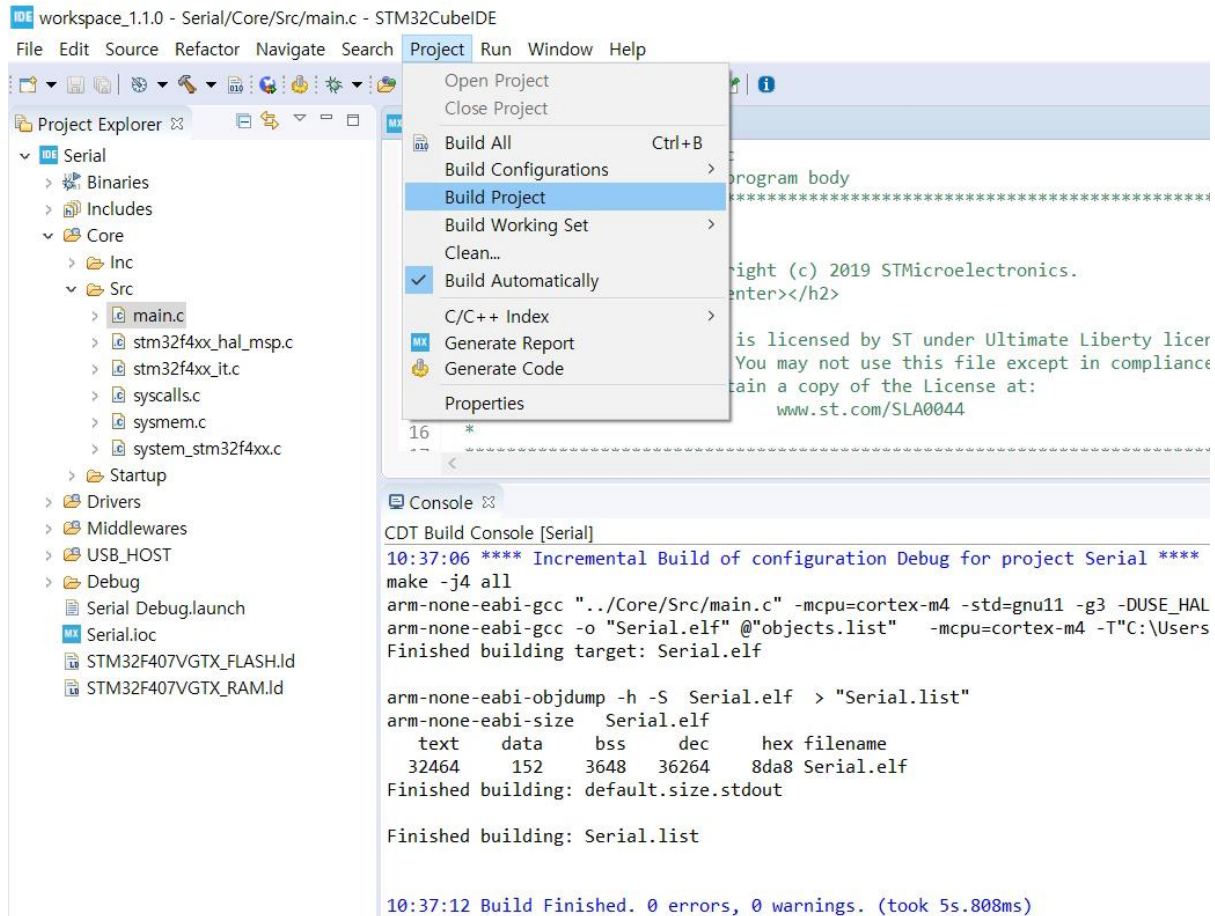


# ■ Open main.c



```
workspace_1.1.0 - Serial/Core/Src/main.c - STM32CubeIDE
File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
Serial
  Binaries
  Includes
  Core
    Inc
    Src
      main.c
      stm32f4xx_hal_msp.c
      stm32f4xx_it.c
      syscalls.c
      systemem.c
      system_stm32f4xx.c
    Startup
  Drivers
  Middlewares
  USB_HOST
  Debug
    Serial Debug.launch
    Serial.ioc
    STM32F407VGTX_FLASH.Id
    STM32F407VGTX_RAM.Id
Serial.ioc
main.c
1 /* USER CODE BEGIN Header */
2 /**
3  * *****
4  * @file      : main.c
5  * @brief     : Main program body
6  * *****
7  * @attention
8  *
9  * <h2><center>&copy; Copyright (c) 2019 STMicroelectronics.
10 * All rights reserved.</center></h2>
11 *
12 * This software component is licensed by ST under Ultimate Liberty license
13 * SLA0044, the "License"; You may not use this file except in compliance with
14 * the License. You may obtain a copy of the License at:
15 *
16 *          www.st.com/SLA0044
17 * *****
18 */
19 /* USER CODE END Header */
20
21 /* Includes -----*/
22 #include "main.h"
23 #include "usb_host.h"
24
25 /* Private includes -----*/
26 /* USER CODE BEGIN Includes */
27
28 /* USER CODE END Includes */
29
30 /* Private typedef -----*/
31 /* USER CODE BEGIN PTD */
32
33 /* USER CODE END PTD */
```

# Build Project



workspace\_1.1.0 - Serial/Core/Src/main.c - STM32CubeIDE

File Edit Source Refactor Navigate Search **Project** Run Window Help

Project Explorer

- Serial
  - Binaries
  - Includes
  - Core
    - Inc
    - Src
      - main.c**
      - stm32f4xx\_hal\_msp.c
      - stm32f4xx\_it.c
      - syscalls.c
      - systemem.c
      - system\_stm32f4xx.c
    - Startup
  - Drivers
  - Middlewares
  - USB\_HOST
  - Debug
    - Serial Debug.launch
    - Serial.ioc
    - STM32F407VGTX\_FLASH.ld
    - STM32F407VGTX\_RAM.ld

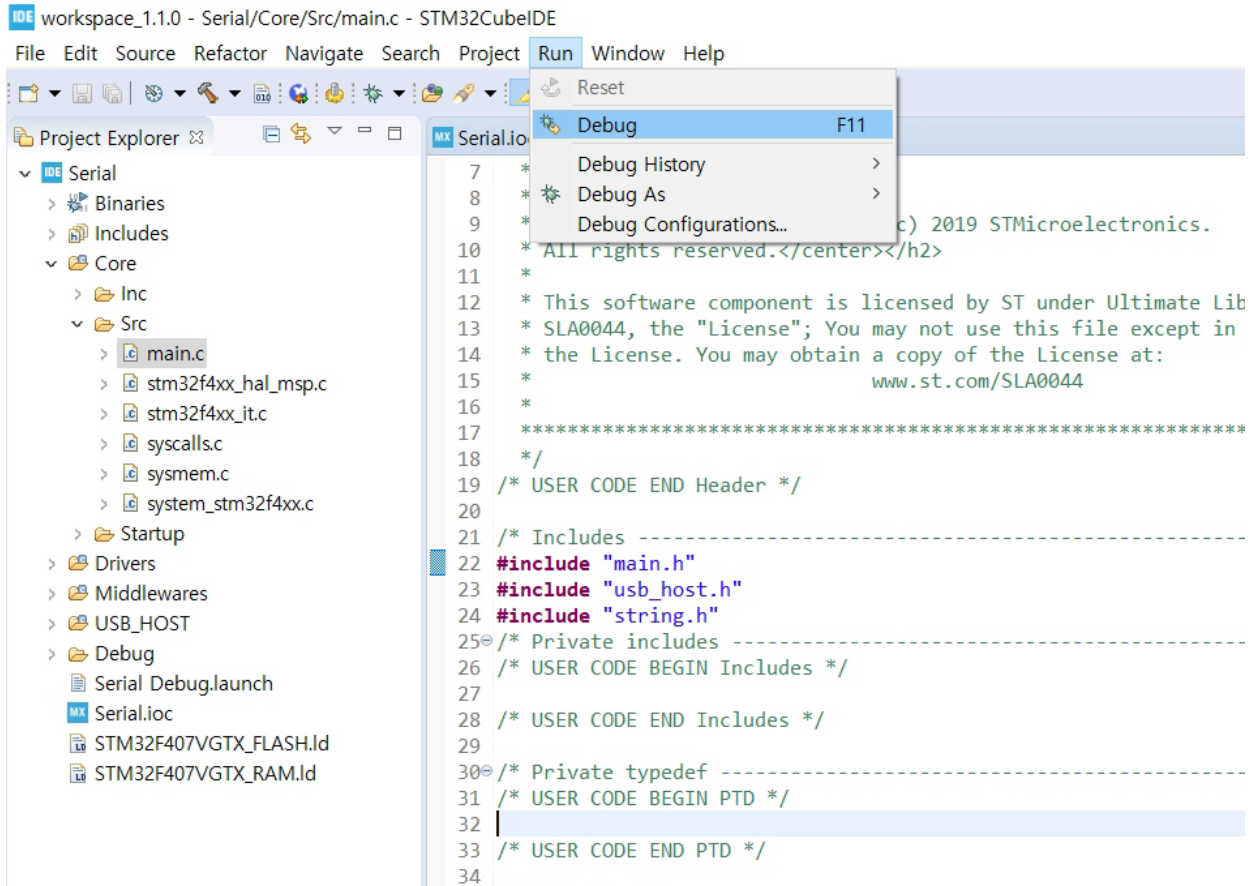
```
/* Private includes ----- */
/* USER CODE BEGIN Includes */
#include "string.h"
/* USER CODE END Includes */
```

```
/* Private user code ----- */
/* USER CODE BEGIN 0 */
void PrintString(uint8_t * string)
{
    HAL_UART_Transmit(&huart2, (uint8_t *)string, strlen((char *)string), 0xffff);
}
/* USER CODE END 0 */
```

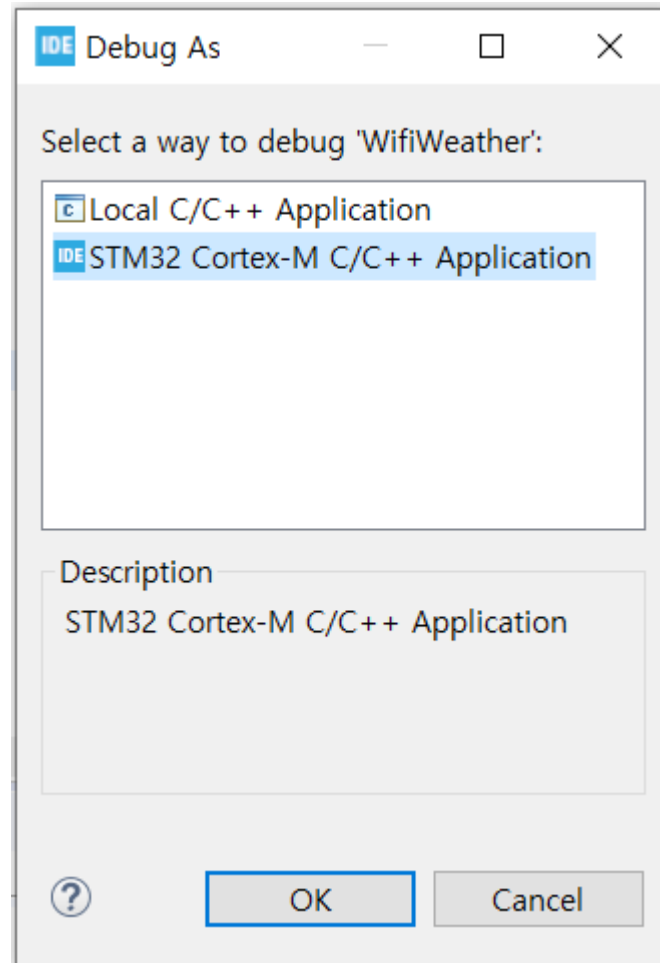
```
/* USER CODE BEGIN 2 */
    PrintString((uint8_t *)"Hello Cortex-M\n\r");
/* USER CODE END 2 */
```

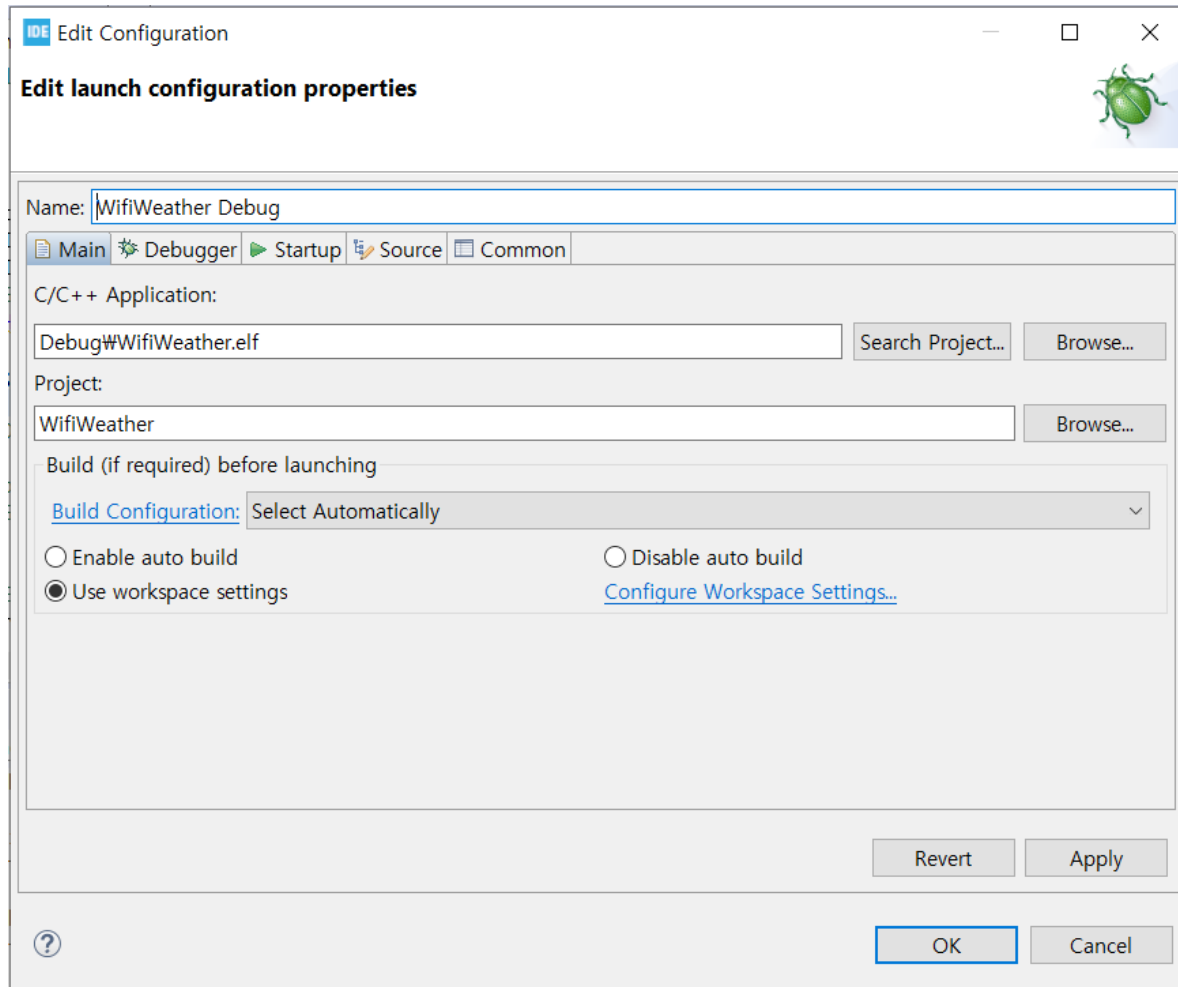
```
Serial.ioc  main.c  usbh_core.c
84 int main(void)
85 {
86     /* USER CODE BEGIN 1 */
87
88     /* USER CODE END 1 */
89
90
91     /* MCU Configuration-----*/
92
93     /* Reset of all peripherals, Initializes the Flash interface and the Systick. */
94     HAL_Init();
95
96     /* USER CODE BEGIN Init */
97
98     /* USER CODE END Init */
99
100    /* Configure the system clock */
101    SystemClock_Config();
102
103    /* USER CODE BEGIN SysInit */
104
105    /* USER CODE END SysInit */
106
107    /* Initialize all configured peripherals */
108    MX_GPIO_Init();
109    MX_I2C1_Init();
110    MX_I2S3_Init();
111    MX_SPI1_Init();
112    MX_USB_HOST_Init();
113    MX_USART2_UART_Init();
114    MX_USART3_UART_Init();
115    /* USER CODE BEGIN 2 */
116    PrintString((uint8_t *) "Hello Cortex-M\n\r");
117    /* USER CODE END 2 */
118
```

# Run Debug









workspace\_1.1.0 - Serial/Core/Src/main.c - STM32CubeIDE

File Edit Source Refactor Navigate Search Project Run Window Help

Debug Project Explorer

Serial Debug [STM32 Cortex-M C/C++ Appli  
Serial.elf [cores: 0]  
Thread #1 [main] 1 [core: 0] (Suspende  
main() at main.c:94 0x8000508  
Reset\_Handler() at startup\_stm32f407  
C:/ST/STM32CubeIDE\_1.1.0/STM32CubeID  
ST-LINK (ST-LINK GDB server)

```
84 int main(void)
85 {
86     /* USER CODE BEGIN 1 */
87
88     /* USER CODE END 1 */
89
90
91     /* MCU Configuration-----*/
92
93     /* Reset of all peripherals, Initializes the Flash interface and the Systick. */
94     HAL_Init();
95
96     /* USER CODE BEGIN Init */
97
98     /* USER CODE END Init */
99
100    /* Configure the system clock */
101    SystemClock_Config();
```

Console Problems Executables Debugger Console Memory

Serial Debug [STM32 Cortex-M C/C++ Application] ST-LINK (ST-LINK GDB server)

Erasing memory corresponding to segment 0:  
Erasing internal memory sectors [0 1]  
Download in Progress:

File download complete  
Time elapsed during download operation: 00:00:01.301

Verifying ...

Download verified successfully

# Resume

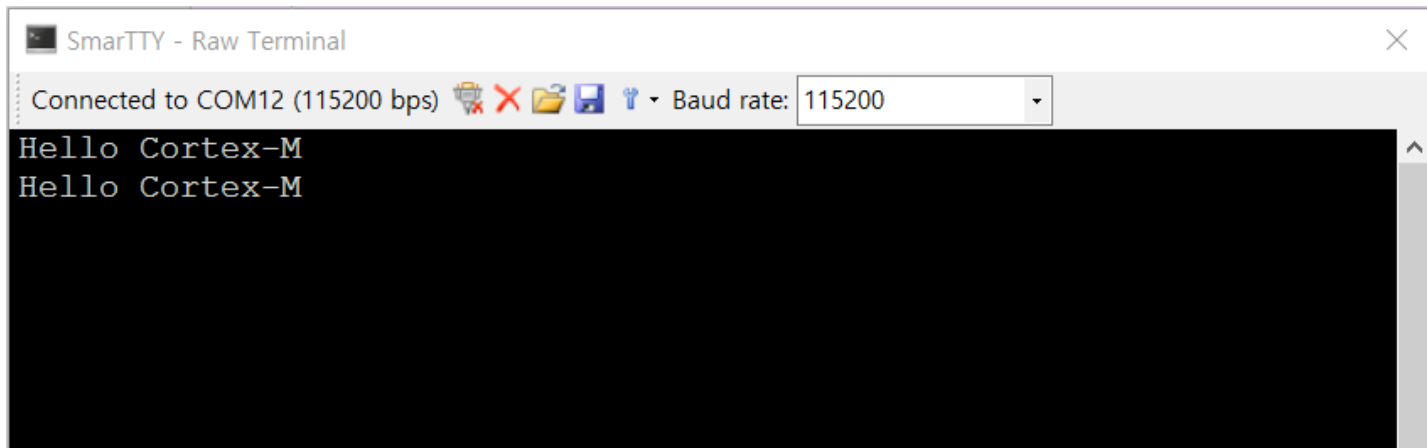
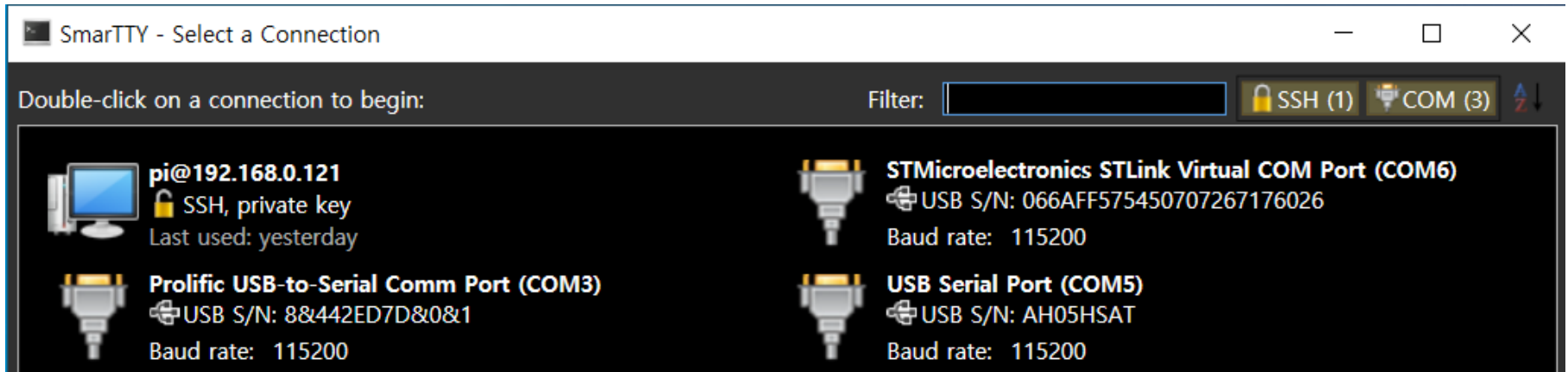
workspace\_1.1.0 - Serial/Core/Src/main.c - STM32CubeIDE

File Edit Source Refactor Navigate Search Project Run Window Help

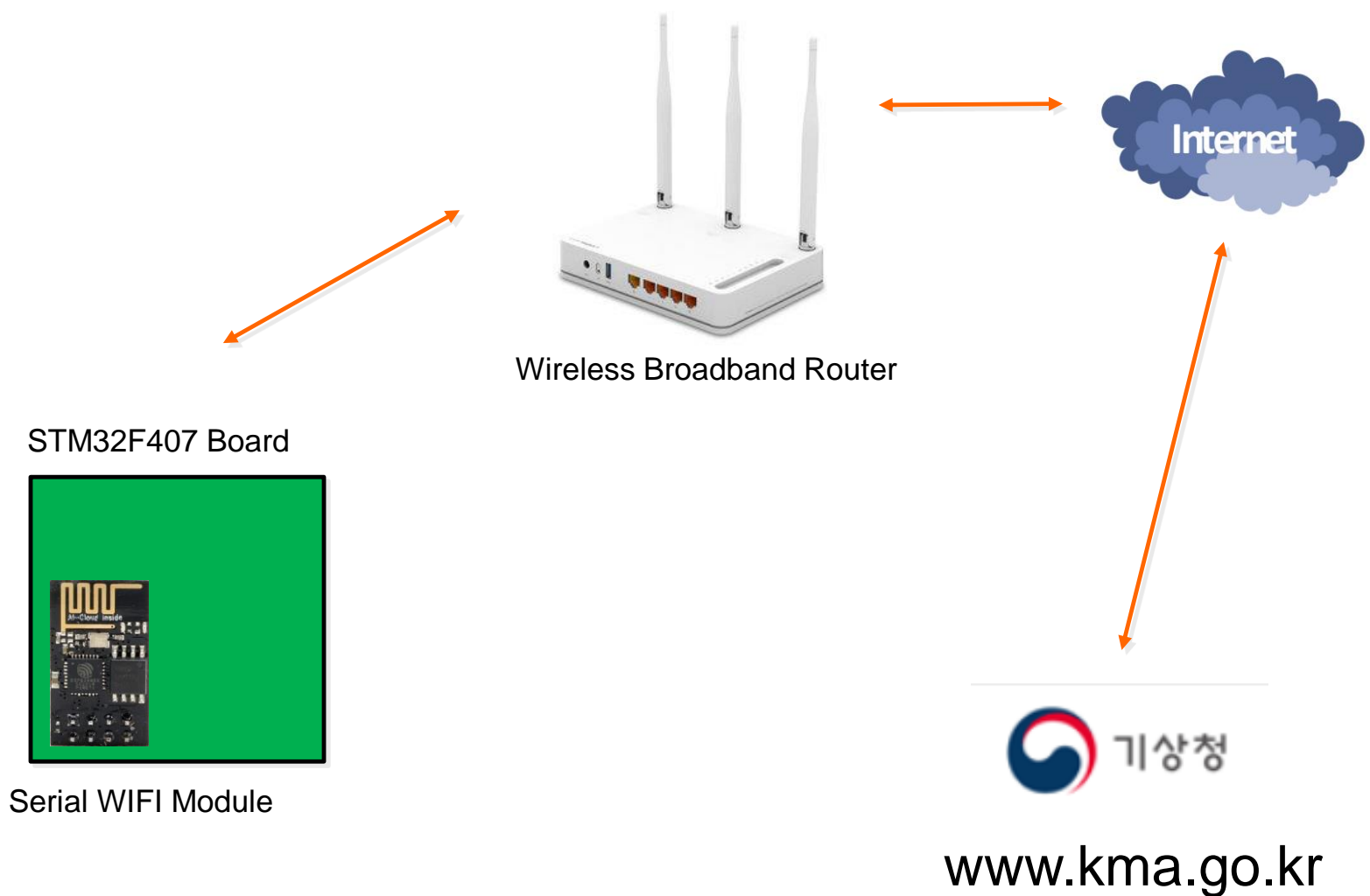
Debug Project Explorer

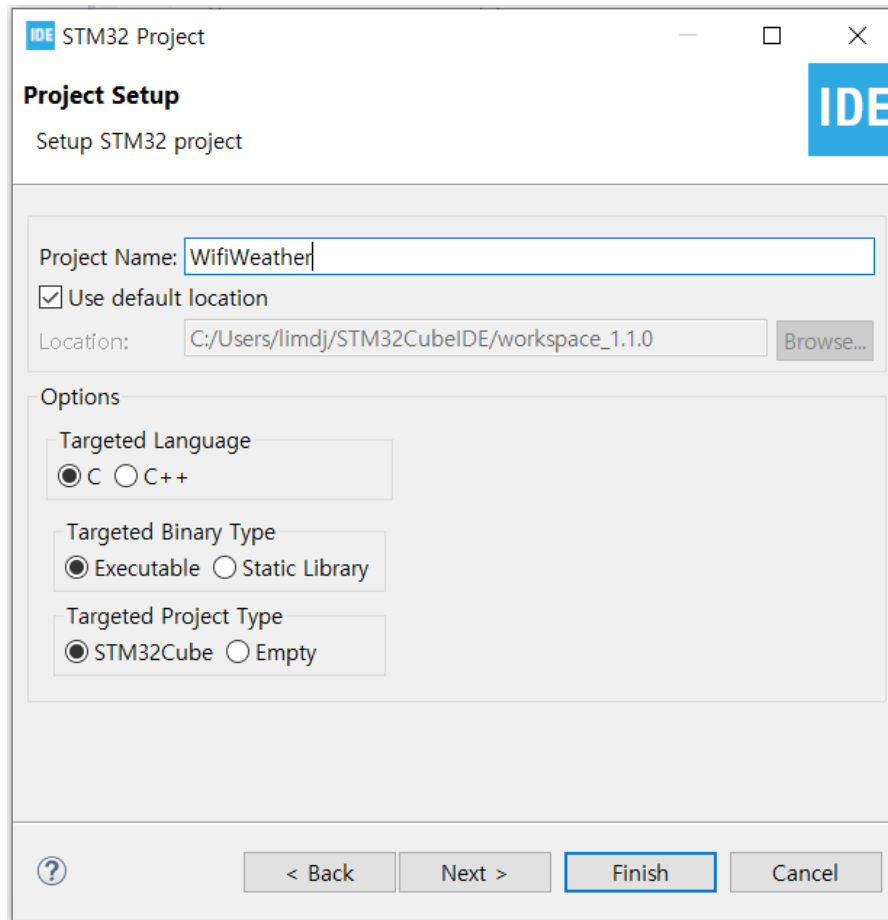
Serial Debug [STM32 Cortex-M C/C++ Appli  
Serial.elf [cores: 0]  
Thread #1 [main] 1 [core: 0] (Suspende  
main() at main.c:94 0x8000508  
Reset\_Handler() at startup\_stm32f407  
C:/ST/STM32CubeIDE\_1.1.0/STM32CubeIDI  
ST-LINK (ST-LINK GDB server)

```
84 int main(void)
85 {
86     /* USER CODE BEGIN 1 */
87
88     /* USER CODE END 1 */
89
90
91     /* MCU Configuration-----
92
93     /* Reset of all peripherals, Initializes the Flash in
94     HAL_Init();
95
96     /* USER CODE BEGIN Init */
97
98     /* USER CODE END Init */
99
100
```



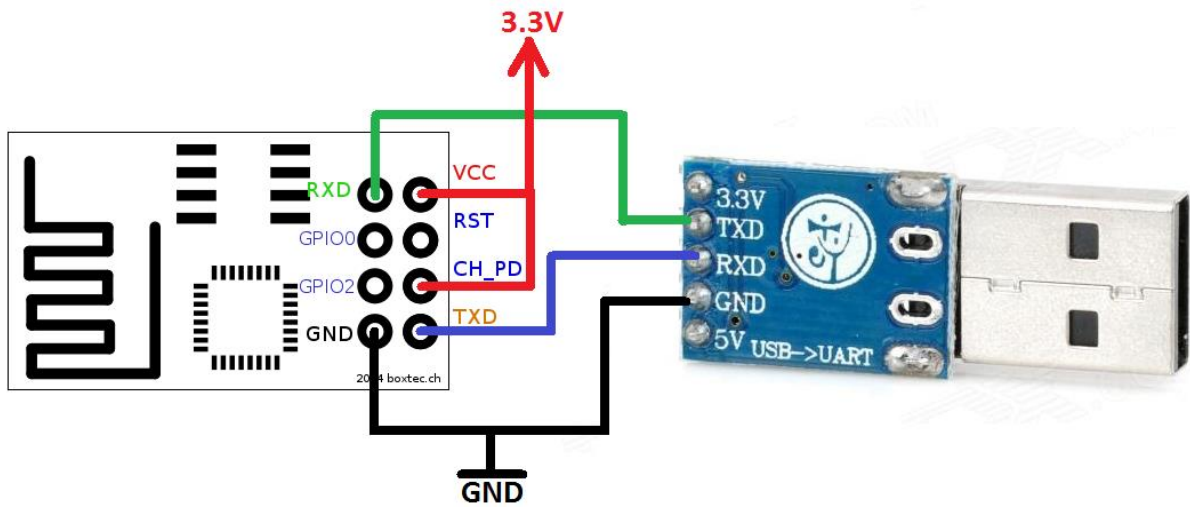
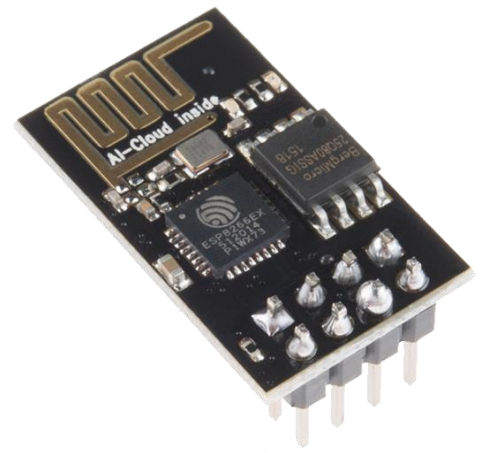
# Exercise 1: Weather Forecast using WIFI Module





# Serial WIFI Module

- ESP8266 ESP-01





# ESP8266 AT Command Set

## ESP8266 AT Command Set

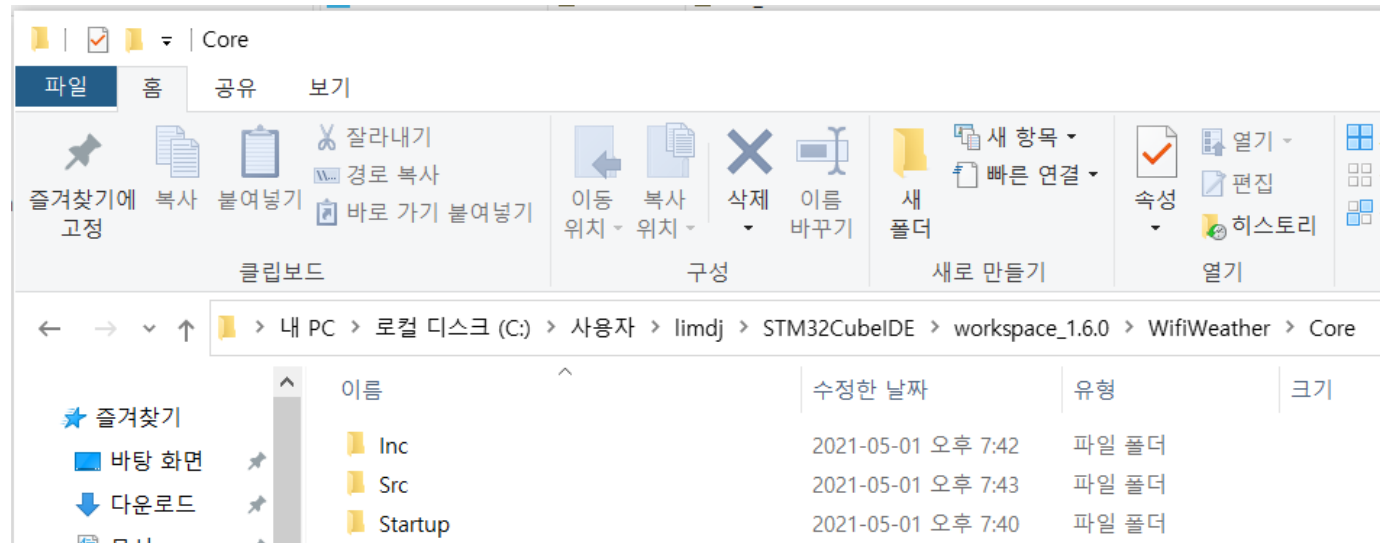
<i>Function</i>	<i>AT Command</i>	<i>Response</i>
Working	AT	OK
Restart	AT+RST	OK [System Ready, Vendor:www.ai-thinker.com]
Firmware version	AT+GMR	AT+GMR 0018000902 OK
List Access Points	AT+CWLAP	AT+CWLAP +CWLAP:(4,"RocheFortSurLac",-38,"70:62:b8:6f:6d:58",1) +CWLAP:(4,"LiliPad2.4",-83,"f8:7b:8c:1e:7c:6d",1) OK
Join Access Point	AT+CWJAP? AT+CWJAP="SSID","Password"	Query AT+CWJAP? +CWJAP:"RocheFortSurLac" OK
Quit Access Point	AT+CWQAP=? AT+CWQAP	Query OK
Get IP Address	AT+CIFSR	AT+CIFSR 192.168.0.105 OK

# ESP8266 AT Command Set

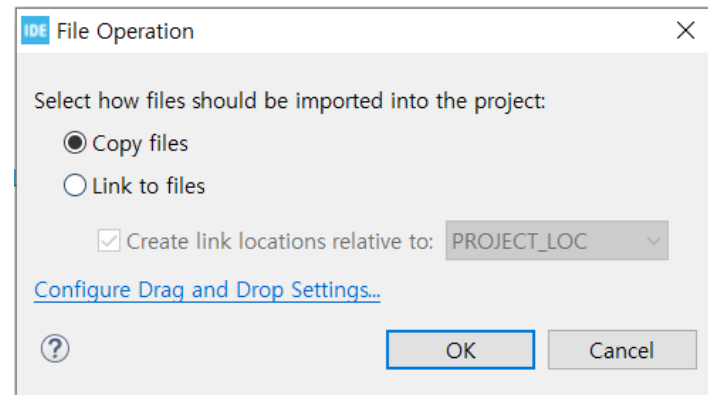
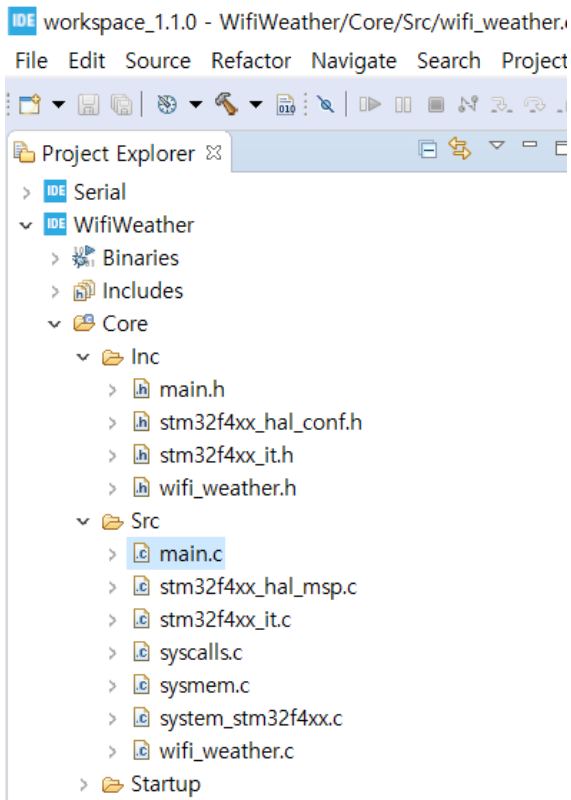
WiFi Mode	AT+CWMODE? AT+CWMODE=1 AT+CWMODE=2 AT+CWMODE=3	Query STA AP BOTH
Set up TCP or UDP connection	AT+CIPSTART=? (CIPMUX=0) AT+CIPSTART = <type>,<addr>,<port> (CIPMUX=1) AT+CIPSTART= <id><type>,<addr>,<port>	Query id = 0-4, type = TCP/UDP, addr = IP address, port= port
TCP/UDP Connections	AT+ CIPMUX? AT+ CIPMUX=0 AT+ CIPMUX=1	Query Single Multiple
Check join devices' IP	AT+CWLIF	
TCP/IP Connection Status	AT+CIPSTATUS	AT+CIPSTATUS? no this fun
Send TCP/IP data	(CIPMUX=0) AT+CIPSEND=<length>; (CIPMUX=1) AT+CIPSEND= <id>,<length>	
Close TCP / UDP connection	AT+CIPCLOSE=<id> or AT+CIPCLOSE	

# Copy Files

- Copy wifi\_weather.c file to C:\Users\UserName\STM32CubeIDE\workspace\_1.6.0\WifiWeather\Core\Src
- Copy wifi\_weather.h file to C:\Users\UserName\STM32CubeIDE\workspace\_1.6.0\WifiWeather\Core\Inc
- 이렇게 복사한 파일은 빌드를 한번 해야 Project Explorer에 나타납니다.



- 소스 파일을 프로젝트 폴더에 복사하는 것은 마우스로 소스 파일을 클릭해서 STM32CubeIDE의 Project Explorer의 디렉토리에 끌어다 놓는 것 (drag and drop)으로도 가능합니다.



- wifi\_weather.c에서 무선 공유기 이름(SSID), 비밀번호 변경

```
WifiWeather.ioc  main.c  wifi_weather.c
19 void WifiSetup(void)
20 {
21     uint8_t string[200];
22     uint8_t buffer[200];
23     int length;
24
25     for (int i = 0; i < 200; i++)buffer[i] = ' ';
26     strcpy((char *)string, "AT+CWMODE=3");
27     length = strlen((char *)string);
28     string[length] = 0x0D;
29     string[length + 1] = 0x0A;
30     string[length + 2] = 0;
31     HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
32     HAL_UART_Receive(&huart3, (uint8_t *)buffer, 100, 1000);
33     HAL_UART_Transmit(&huart2, (uint8_t *)buffer, 100, 0xFFFF);
34     string[0] = 0x0D;
35     string[1] = 0x0A;
36     HAL_UART_Transmit(&huart2, (uint8_t *)string, 2, 0xFFFF);
37
38     strcpy((char *)string, (char *)"AT+CWJAP=\"iptime_limdj\", \"password\"");
39     length = strlen((char *)string);
40     string[length] = 0x0D;
41     string[length + 1] = 0x0A;
42     string[length + 2] = 0;
```

# ESP8266 AT Instructions

## AT+CWJAP – Connects to an AP

[@deprecated] This command is deprecated. Please use AT+CWJAP\_CUR or AT+CWJAP\_DEF instead.

<b>Commands</b>	Query Command: AT+CWJAP?  Function: to query the AP to which the ESP8266 Station is already connected.	Set Command:  AT+CWJAP=<ssid>,<pwd>[,<bssid>]  Function: to set the AP to which the ESP8266 Station needs to be connected.
-----------------	---	--

# main.c 수정

```
/* USER CODE BEGIN Includes */
#include "string.h"
#include "wifi_weather.h"
/* USER CODE END Includes */

/* USER CODE BEGIN 0 */
void PrintString(uint8_t * string)
{
    HAL_UART_Transmit(&huart2, (uint8_t *)string, strlen((char *)string), 0xffff);
}
/* USER CODE END 0 */

/* USER CODE BEGIN 2 */
    PrintString((uint8_t *)"Hello Cortex-M\n\r");
    WifiSetup();
    WifiWeather();
/* USER CODE END 2 */
```

# 프로그램 실행 결과

```
SmarTTY - Raw Terminal
Connected to COM11 (115200 bps) [Icons] Baud rate: 115200
AT+CWJAP="iptime_limdj", ""
CLOSED
WIFI DISCONNECT
WIFI CONNECTED
WIFI GOT IP

AT+CIPSTART="TCP", "www.kma.go.kr", 80
busy p...

OK

AT+CIPSTART="TCP", "www.kma.go.kr", 80
CONNECT

OK

08:16:03 GMT<hour>21<temp>13.0<wfEn>Clear
08:16:05 GMT<hour>21<temp>13.0<wfEn>Clear
08:16:08 GMT<hour>21<temp>13.0<wfEn>Clear
```



# 네이버에서 기상청 동네예보 검색

주소: http://www.weather.go.kr/weather/lifenindustry/sevice\_rss.jsp

사이트명: ENGLISH JAPANESE CHINESE 글자크기 + - 검색

날씨누리 기상청 국가기상종합정보 특보 발효중 기상청 홈페이지 바로가기

특보·예보 날씨영상 바다날씨 태풍 황사 지진·화산 관측자료 기후자료 생활과산업

홈 > 생활과 산업 > 서비스 > 인터넷 > RSS

서비스 | 인터넷 인쇄

RSS 서비스에서 제공하는 기상 자료는 기상청의 기상자료 제공 정책에 따라 자료 형식 변경 혹은 중단될 수 있으며 이 경우 기상청 홈페이지를 통하여 사전 공지됩니다. (이용조건: 출처표시)  
 또한, 기존 XML 형식의 자료 제공 서비스는 국가 정보화 정책 기조에 따라 앞으로도 계속 제공될 예정입니다. (문의: webmasterkma@korea.kr)

웹 RSS 날씨위젯

**RSS란?**  
 RSS(Really Simple Syndication, Rich Site Summary)란 블로그처럼 콘텐츠 업데이트가 자주 일어나는 웹사이트에서, 업데이트된 정보를 쉽게 구독자들에게 제공하기 위해 XML을 기초로 만들어진 데이터 형식입니다. RSS서비스를 이용하면 업데이트된 정보를 찾기 위해 홈페이지에 일일이 방문하지 않아도 업데이트 될 때마다 빠르고 편리하게 확인할 수 있습니다.

**RSS 서비스 이용하기**

RSS리더기 설치 → 구독을 원하는 정보의 RSS주소 복사 → 복사된 RSS주소를 RSS리더기에 추가 → RSS리더기를 통해 실시간으로 정보를 확인

한RSS 다운받기 구글RSS 다운받기

**동네예보 > 시간별예보**

동네예보 서울특별시 검색 동작구 검색 신대방제2동 검색 RSS

바로그가서비스: 현재날씨, 지난날씨, 생활과산업, 바다날씨, 산악날씨, 지진/해일, 주말날씨, 세계날씨, 공항날씨, 날씨ON

국기태풍센터, 기후정보포털, 기상자료개방포털, 국가기상위성센터, 기상레이더센터

# 기상청 날씨누리

## ■ RSS 서비스

The screenshot shows the homepage of the Korea Meteorological Administration's weather website. The browser address bar displays 'https://www.weather.go.kr/w/in'. The page features a yellow header with the text '기상행정 홈페이지 바로가기' and a search bar. Below the header, there are navigation buttons for '날씨' (Weather) and '전국' (National). A search bar contains the text '읍면동, 주요지명으로 조회하세요'. The main content area includes a weather map with various data points and a sidebar with navigation options like '날씨', '바다', and '영상·일기도'. An orange arrow points from the 'RSS 서비스' text to the 'RSS' link in the footer.

A horizontal row of nine blue service icons with white text and symbols. From left to right: 1. '밀물·썰물 정보' (Tide information) with a wave icon. 2. '해와 달이 뜨고지는 시간' (Sun and moon rise/set times) with a sun and moon icon. 3. '기후정보포털' (Climate information portal) with a computer monitor icon. 4. '기상자료 개방포털' (Weather data open portal) with a 'DATA' icon. 5. '날씨알리미앱' (Weather alert app) with a speech bubble icon. 6. '대기질 예·경보' (Air quality forecast and warning) with the 'AirKorea' logo. 7. '날씨해설 (유튜브)' (Weather explanation on YouTube) with a video camera icon. 8. '기상청 행정홈페이지' (Weather Administration homepage) with a circular arrow icon. 9. '산불상' (Wildfire) with a flame icon.

개인정보 처리방침 | 이용약관 | 저작권보호 및 정책 | 웹접근성정책 | 홈페이지유류·건의 | 전화번호안내 | 부서·직원찾기 | 뷰어다운로드 | RSS

(07062) 서울시 동작구 여의대방로16길 61 | T. (02)2181-0900 (평일 9:00~18:00, 야간휴일은 당직실 연결)

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# RSS 서비스 페이지

RSS 서비스 안내 - Internet Explorer

https://www.weather.go.kr/w/pop/rss-guide.do

## RSS 서비스 안내

### ▪ RSS 서비스 이용하기

RSS(Really Simple Syndication, Rich Site Summary)란 블로그처럼 콘텐츠 업데이트가 자주 일어나는 웹사이트에서, 업데이트된 정보를 쉽게 구독자들에게 제공하기 위해 XML을 기초로 만들어진 데이터 형식입니다. RSS서비스를 이용하면 업데이트된 정보를 찾기 위해 홈페이지에 일일이 방문하지 않아도 업데이트 될 때마다 빠르고 편리하게 확인할 수 있습니다.

RSS리더기 설치



구독을 원하는 정보의  
RSS주소 복사



복사된 RSS주소를  
RSS리더기에 추가



RSS리더기를 통해  
실시간으로 정보를 확인

### ▪ 동네예보 > 시간별 예보

시도 강원도



선

구군

강릉시



선

읍면동

강남동




선

RSS

### 기상청 동네예보 웹서비스 - 경기도 안산시상록구 사동 도표예보

자주 업데이트되는 콘텐츠를 가진 피드를 보고 있습니다. 피드에 가입하면 일반 피드 목록에 추가됩니다. 피드의 업데이트된 정보는 자동으로 사용자의 컴퓨터로 다운로드되며 Internet Explorer 또는 다른 프로그램에서 볼 수 있습니다. [피드에 대해 자세히 알아봅니다.](#)

 [이 피드에 가입](#)

### 동네예보(도표) : 경기도 안산시상록구 사동 [X=58,Y=121]

기상청 

201805052000 6 58 121 24 0 16.0 -999.0 -999.0 4 0 흐림 Cloudy 30 0.0 0.0 2.0 4 남 S 75 0.0 0.0 3 1 15.0 18.0 14.0 4 1 비 Rain 60 0.0 0.0 1.8 4 남 S 85 5.0 0.0 6 1 14.0 18.0 14.0 4 1 비 Rain 60 0.0 0.0 2.0 4 남 S 90 5.0 0.0 9 1 15.0 18.0 14.0 4 1 비 Rain 70 0.0 0.0 2.1 2 동 E 85 8.0 0.0 12 1 16.0 18.0 14.0 4 1 비 Rain 80 0.0 0.0 2.8000000000000003 2 동 E 80 8.0 0.0 15 1 17.0 18.0 14.0 4 0 흐림 Cloudy 30 0.0 0.0 3.0 2 동 E 80 0.0 0.0 18 1 18.0 18.0 14.0 4 0 흐림 Cloudy 30 0.0 0.0 2.5 2 동 E 75 0.0 0.0 21 1 16.0 18.0 14.0 4 0 흐림 Cloudy 30 0.0 0.0 1.8 1 북동 NE 80 0.0 0.0 24 1 15.0 18.0 14.0 4 0 흐림 Cloudy 30 0.0 0.0 1.1 0 북 N 85 0.0 0.0 3 2 14.0 25.0 13.0 4 0 흐림 Cloudy 30 0.0 0.0 1.6 0 북 N 85 0.0 0.0 6 2 13.0 25.0 13.0 4 0 흐림 Cloudy 30 0.0 0.0 1.4000000000000001 0 북 N 85 0.0 0.0 9 2 18.0 25.0 13.0 3 0 구름 많음 Mostly Cloudy 20 0.0 0.0 1.0 0 북 N 55 0.0 0.0 12 2 23.0 25.0 13.0 3 0 구름 많음 Mostly Cloudy 20 0.0 0.0 2.1 0 북 N 35 0.0 0.0 15 2 25.0 25.0 13.0 3 0 구름 많음 Mostly Cloudy 20 0.0 0.0 3.5 7 북서 NW 30 0.0 0.0 18 2 21.0 25.0 13.0 2 0 구름 조금 Partly Cloudy 10 0.0 0.0 2.8000000000000003 7 북서 NW 45 0.0 0.0 21 2 17.0 25.0 13.0 1 0 맑음 Clear 0 0.0 0.0 2.6 7 북서 NW 65 0.0 0.0 24 2 14.0 25.0 13.0 1 0 맑음 Clear 0 0.0 0.0 1.8 7 북서 NW 75 0.0 0.0

# Temperature, Weather Forecast, Humidity

## ■ <temp><wfEn><reh>

```
<?xml version="1.0" encoding="UTF-8" ?>
<rss version="2.0">
<channel>
<title>기상청 동네예보 웹서비스 - 경기도 안산시상록구 사동 도표예보</title>
<link>http://www.kma.go.kr/weather/main.jsp</link>
<description>동네예보 웹서비스</description>
<language>ko</language>
<generator>동네예보</generator>
<pubDate>2018년 01월 05일 (금)요일 11:00</pubDate>
<item>
<author>기상청</author>
<category>경기도 안산시상록구 사동</category>
<title>동네예보 (도표) : 경기도 안산시상록구 사동 [X=58,Y=121]</title><link>http://www.kma.go.kr/weather/forecast/timeser
<guid>http://www.kma.go.kr/weather/forecast/timeseries.jsp?searchType=INTEREST&dongCode=4127152500</guid>
<description>
<header>
<tm>201801051100</tm>
<ts>3</ts>
<x>58</x>
<y>121</y>
</header>
<body>
<data seq="0">
<hour>15</hour>
<day>0</day>
<temp>1.0</temp>
<tmx>1.0</tmx>
<tmn>-999.0</tmn>
<sky>2</sky>
<pty>0</pty>
<wfKor>구름 조금</wfKor>
<wfEn>Partly Cloudy</wfEn>
<pop>10</pop>
<r12>0.0</r12>
<s12>0.0</s12>
<ws>3.1</ws>
<wd>6</wd>
<wdKor>서</wdKor>
<wdEn>W</wdEn>
<reh>40</reh>
<r06>0.0</r06>
<s06>0.0</s06>
</data>
```

# TCP Connection

```
strcpy((char *)string, (char *)"AT+CIPSTART=\"TCP\", \"www.kma.go.kr\", 80");
length = strlen((char *)string);
string[length] = 0x0D;
string[length + 1] = 0x0A;
string[length + 2] = 0;
HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 100, 4000);
HAL_UART_Transmit(&huart2, (uint8_t *)buffer, 100, 0xFFFF);
string[0] = 0x0D;
string[1] = 0x0A;
HAL_UART_Transmit(&huart2, (uint8_t *)string, 2, 0xFFFF);
```

AT+CIPSTART – Establishes TCP Connection, UDP Transmission or SSL Connection

## Establish TCP Connection

Set Command	Single TCP connection (AT+CIPMUX=0):	Multiple TCP Connections (AT+CIPMUX=1):
	AT+CIPSTART=<type>,<remote IP>,<remote port>[,<TCP keep alive>]	AT+CIPSTART=<link ID>,<type>,<remote IP>,<remote port>[,<TCP keep alive>]

```

sprintf((char *)query, "GET /wid/queryDFSRSS.jsp?zone=4127152500 HTTP/1.1\r\nHost: www.kma.go.kr\n");
queryLength = strlen((char *)query);

for (int i = 0; i < 50; i++)buffer[i] = ' ';
my_itoa(queryLength, queryLengthString, 3);
sprintf((char *)string, "AT+CIPSEND=%s", queryLengthString);
length = strlen((char *)string);
string[length] = 0x0D;
string[length + 1] = 0x0A;
string[length + 2] = 0;
HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 23, 4000);

for (int i = 0; i < 2000; i++)buffer[i] = ' ';
HAL_Delay(1);
HAL_UART_Transmit(&huart3, (uint8_t *)query, queryLength, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 2000, 4000);
//HAL_UART_Transmit(&huart2, (uint8_t *)buffer, 2000, 0xFFFF);
string[0] = 0x0D;
string[1] = 0x0A;
HAL_UART_Transmit(&huart2, (uint8_t *)string, 2, 0xFFFF);

```

#### AT+CIPSEND—Sends Data

##### Commands

Set Command:

1. Single connection: (+CIPMUX=0)  
AT+CIPSEND=<length>
2. Multiple connections: (+CIPMUX=1)  
AT+CIPSEND=<link ID>,<length>
3. Remote IP and ports can be set in UDP transmission:  
AT+CIPSEND=[<link ID>,<length> [<remote IP>,<remote port>]

Function: to configure the data length in normal transmission mode.

```
ret1 = (int)strstr((char *)buffer, (char *)"GMT");
HAL_UART_Transmit(&huart2, (uint8_t *) (ret1 - 9), 12, 0xFFFF);

ret1 = (int)strstr((char *)buffer, (char *)<hour>");
ret2 = (int)strstr((char *)buffer, (char *)</hour>");
HAL_UART_Transmit(&huart2, (uint8_t *) (ret1), ret2 - ret1, 0xFFFF);

ret1 = (int)strstr((char *)buffer, (char *)<temp>");
ret2 = (int)strstr((char *)buffer, (char *)</temp>");
HAL_UART_Transmit(&huart2, (uint8_t *) (ret1), ret2 - ret1, 0xFFFF);

ret1 = (int)strstr((char *)buffer, (char *)<wfEn>");
ret2 = (int)strstr((char *)buffer, (char *)</wfEn>");
HAL_UART_Transmit(&huart2, (uint8_t *) (ret1), ret2 - ret1, 0xFFFF);

string[0] = 0x0D;
string[1] = 0x0A;
HAL_UART_Transmit(&huart2, (uint8_t *)string, 2, 0xFFFF);
/* wait for a while to slow down */
HAL_Delay(2000);
```



```

sprintf((char *)string, "AT+CIPSEND=%s", queryLengthString);
length = strlen((char *)string);
string[length] = 0x0D;
string[length + 1] = 0x0A;
string[length + 2] = 0;
HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 23, 4000);

for (int i = 0; i < 2000; i++)buffer[i] = ' ';
HAL_Delay(1);
HAL_UART_Transmit(&huart3, (uint8_t *)query, queryLength, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 2000, 4000);
//HAL_UART_Transmit(&huart2, (uint8_t *)buffer, 2000, 0xFFFF);
string[0] = 0x0D;
string[1] = 0x0A;
HAL_UART_Transmit(&huart2, (uint8_t *)string,

```

```

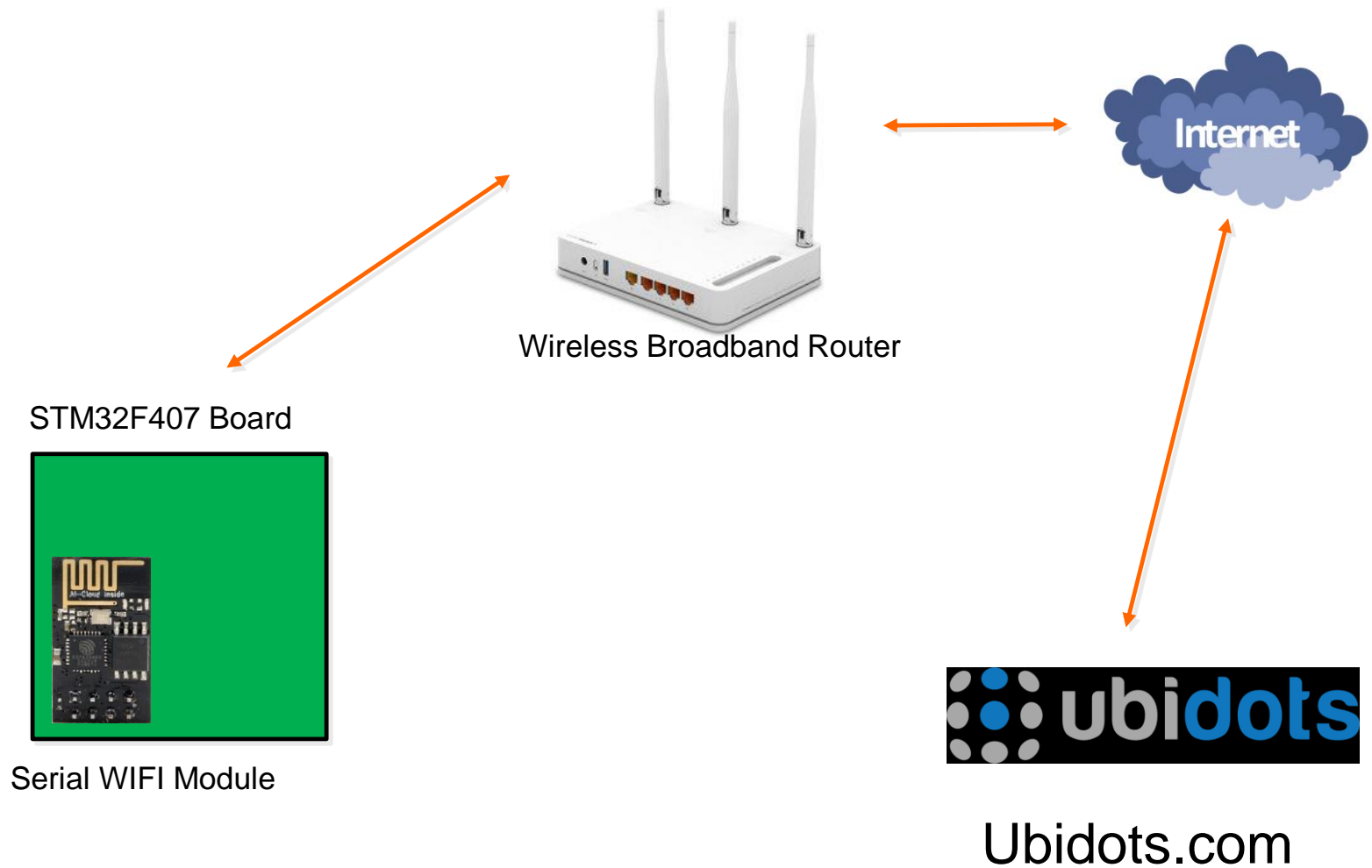
COM4 - Tera Term VT
File Edit Setup Control Window Help

+IPD,1460:HTTP/1.1 200 OK
Transfer-Encoding: chunked
Date: Mon, 07 May 2018 00:46:49 GMT
Accept-Ranges: bytes
Content-Type: text/xml; charset=UTF-8
Connection: Keep-Alive
Keep-Alive: timeout=10

1000
<?xml version="1.0" encoding="UTF-8" ?>
                                     <rss version="2.0">
                                             <channel>
<title>동네예보 웹서비스 - 경기도 안산시상록구 사동 도표예보</title>
<link>
ma.go.kr/weather/main.jsp</link>
<description>동네예보 웹서비스</desc

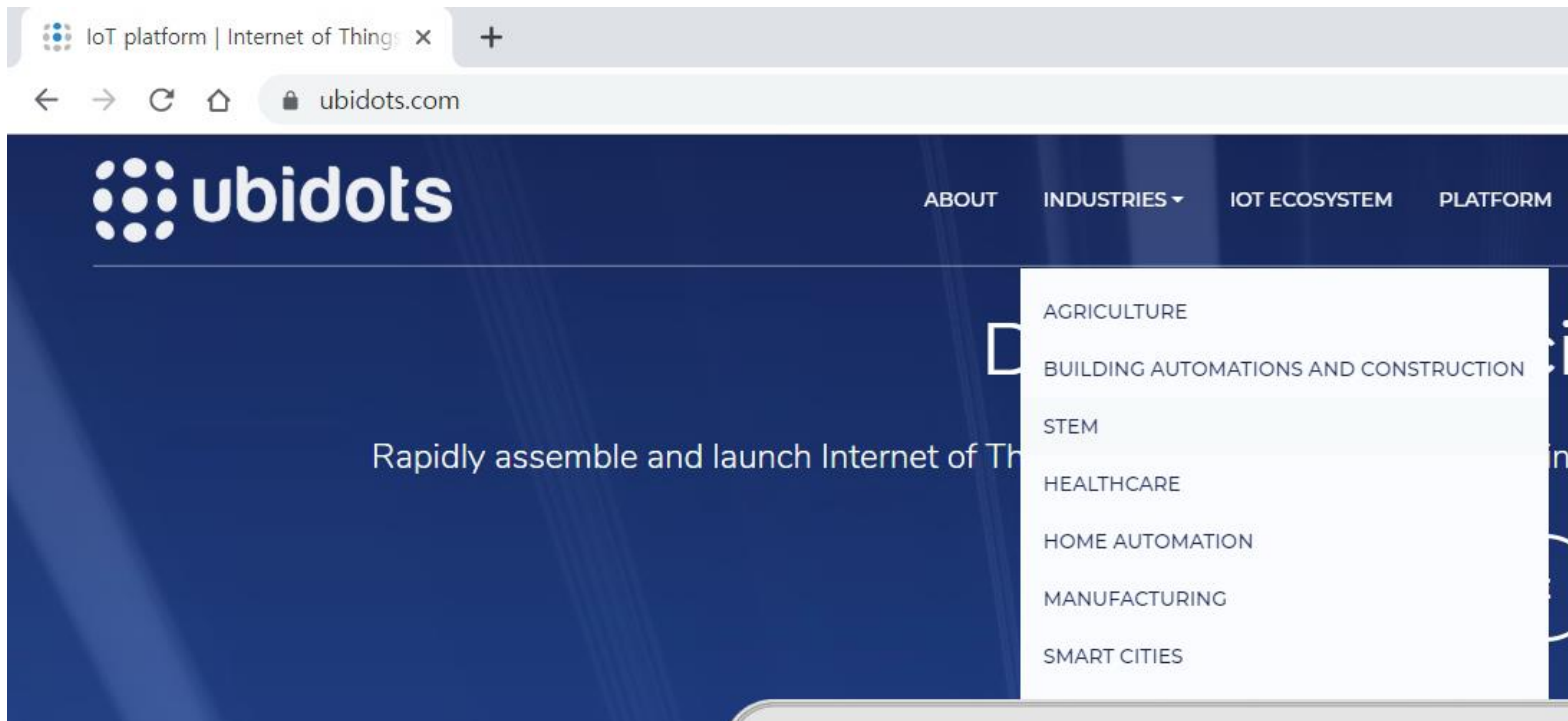
```

# Exercise 2: IoT Exercise using WIFI Module

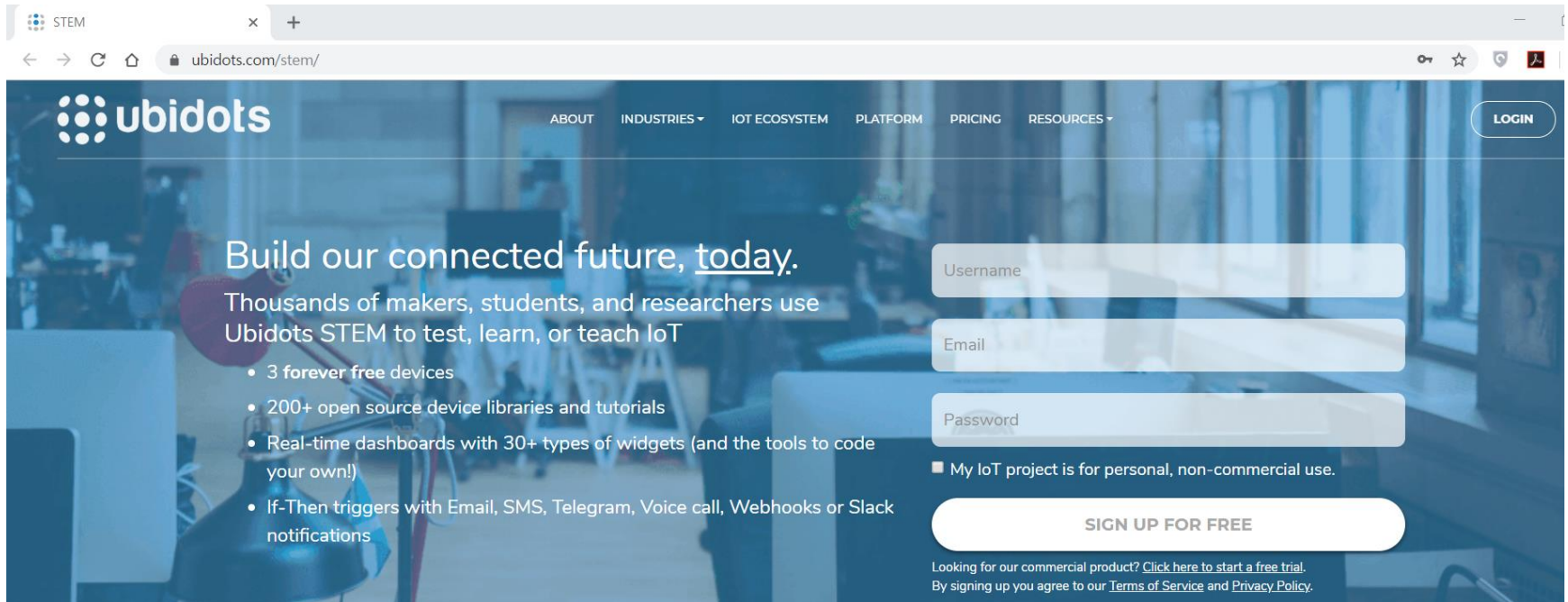


# IoT Website

- Ubidots.com
- Select STEM from INDUSTRIES menu



# ■ Sign Up or Login



The screenshot shows a web browser window with the URL `ubidots.com/stem/`. The page features the Ubidots logo and a navigation menu with links for ABOUT, INDUSTRIES, IOT ECOSYSTEM, PLATFORM, PRICING, and RESOURCES. A LOGIN button is located in the top right corner. The main content area has a blue background with the text "Build our connected future, today." and "Thousands of makers, students, and researchers use Ubidots STEM to test, learn, or teach IoT". Below this is a list of features: 3 forever free devices, 200+ open source device libraries and tutorials, Real-time dashboards with 30+ types of widgets (and the tools to code your own!), and If-Then triggers with Email, SMS, Telegram, Voice call, Webhooks or Slack notifications. To the right of the text is a sign-up form with fields for Username, Email, and Password, a checkbox for "My IoT project is for personal, non-commercial use.", and a "SIGN UP FOR FREE" button. At the bottom, there is a note: "Looking for our commercial product? Click here to start a free trial. By signing up you agree to our Terms of Service and Privacy Policy."

STEM

ubidots.com/stem/

ubidots

ABOUT INDUSTRIES IOT ECOSYSTEM PLATFORM PRICING RESOURCES

LOGIN

Build our connected future, today.

Thousands of makers, students, and researchers use Ubidots STEM to test, learn, or teach IoT

- 3 forever free devices
- 200+ open source device libraries and tutorials
- Real-time dashboards with 30+ types of widgets (and the tools to code your own!)
- If-Then triggers with Email, SMS, Telegram, Voice call, Webhooks or Slack notifications

Username

Email

Password

My IoT project is for personal, non-commercial use.

**SIGN UP FOR FREE**

Looking for our commercial product? [Click here to start a free trial.](#)  
By signing up you agree to our [Terms of Service](#) and [Privacy Policy](#).



SIGN IN

 limdj

 .....

Sign in to existing workspace

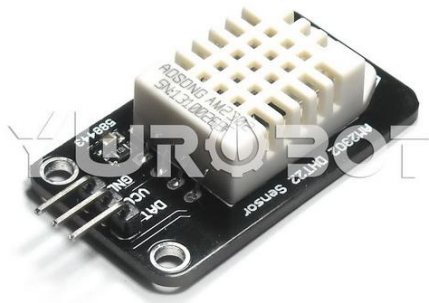
[Forgot password?](#)

SIGN IN

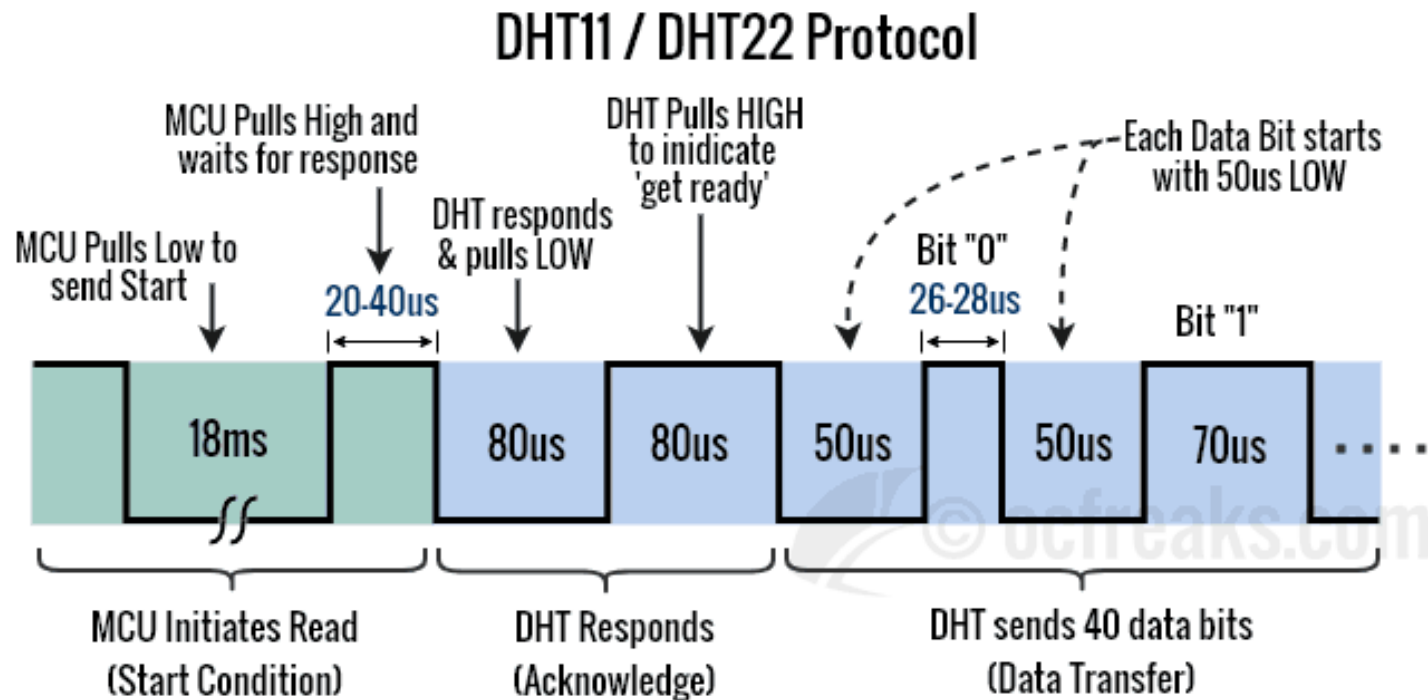
[New to Ubidots? Create an account](#)

# DHT22 온/습도 센서 연결

- VCC→3V, GND→GND, DAT→PE0

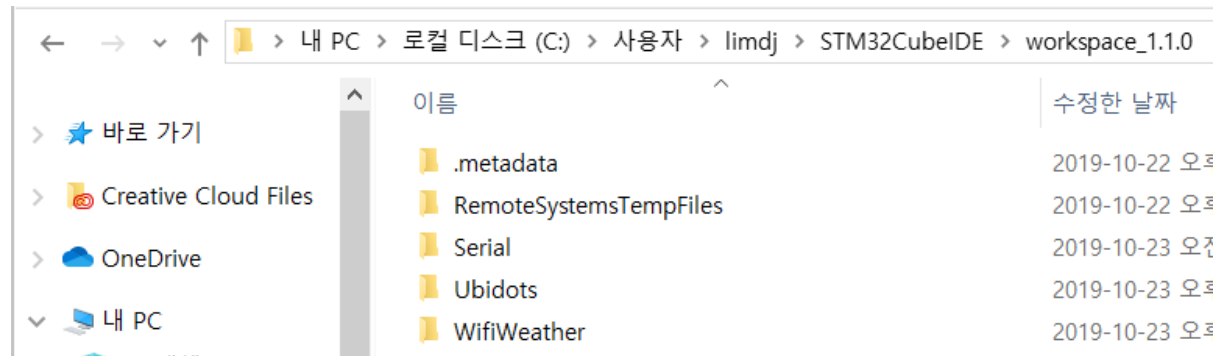
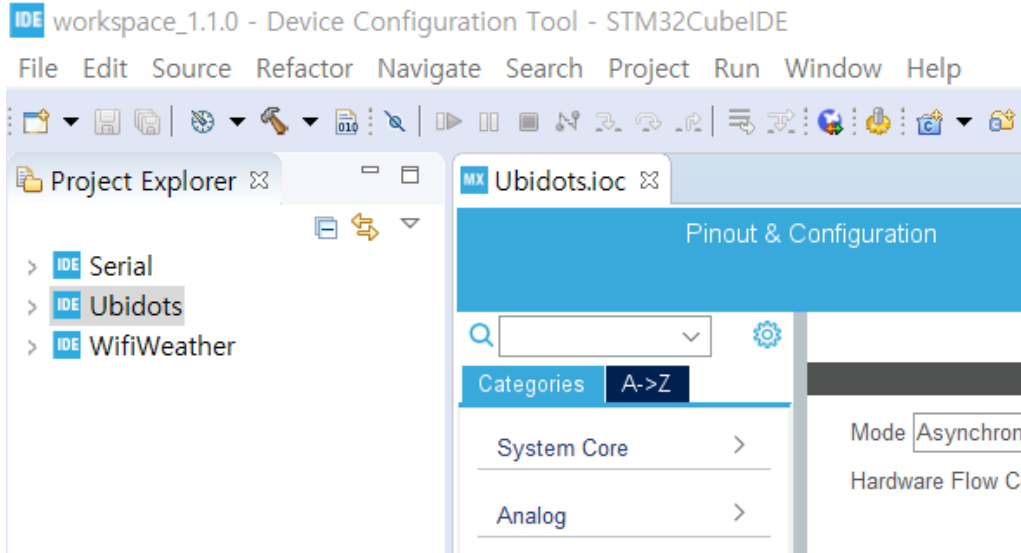


# DHT22 Protocol



# New STM32 Project

## ■ Project Name: Ubidots





# STM32CubeMX: Pinout & Configuration

- USART2: Asynchronous
- USART3: Asynchronous
- TIM9: Internal Clock,  
Prescaler: 84  
Counter Period: 0xFFFF

The screenshot displays the STM32CubeMX configuration interface. The left sidebar shows the 'Timers' category expanded, with TIM9 selected. The main panel is titled 'TIM9 Mode and Configuration' and shows the 'Mode' section with the following settings:

- Slave Mode: Disable
- Trigger Source: Disable
- Internal Clock
- Channel1: Disable
- Channel2: Disable
- Combined Channels: Disable
- One Pulse Mode

The 'Configuration' section at the bottom shows the 'Parameter Settings' tab active. The 'Counter Settings' are configured as follows:

Parameter	Value
Prescaler (PSC - 16 bits value)	84
Counter Mode	Up
Counter Period (AutoReload Register - ...)	0xFFFF
Internal Clock Division (CKD)	No Division
auto-reload preload	Disable

- 
- Copy wifi\_ubidots.c, dht22.c, main.c file to  
C:\Users\limdj\STM32CubeIDE\workspace\_1.6.0\Ubidots\Core\Src
  - Copy wifi\_ubidots.h, dht22.h file  
C:\Users\limdj\STM32CubeIDE\workspace\_1.6.0\Ubidots\Core\Inc

## ■ wifi\_ubidots.c에서 무선 공유기 이름(SSID), 비밀번호 변경

```
Ubidots.ioc  wifi_ubidots.c
61 }
62
63 void WifiSetup(void)
64 {
65     uint8_t string[200];
66     uint8_t buffer[200];
67     int length;
68
69     for (int i = 0; i < 200; i++)buffer[i] = ' ';
70     strcpy((uint8_t *)string, "AT+CWMODE=3");
71     length = strlen((uint8_t *)string);
72     string[length] = 0x0D;
73     string[length + 1] = 0x0A;
74     string[length + 2] = 0;
75     HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
76     HAL_UART_Receive(&huart3, (uint8_t *)buffer, 100, 1000);
77     HAL_UART_Transmit(&huart2, (uint8_t *)buffer, 100, 0xFFFF);
78     string[0] = 0x0D;
79     string[1] = 0x0A;
80     HAL_UART_Transmit(&huart2, (uint8_t *)string, 2, 0xFFFF);
81
82     strcpy((uint8_t *)string, (uint8_t *)"AT+CWJAP=\"iptime_limdj\", \"xxxxx\"");
83     length = strlen((uint8_t *)string);
84     string[length] = 0x0D;
85     string[length + 1] = 0x0A;
86     string[length + 2] = 0;
87     HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
```

```
DHT22_start();
check_response();
Rh_byte1 = read_data();
Rh_byte2 = read_data();
Temp_byte1 = read_data();
Temp_byte2 = read_data();
//sum = read_data();
//if (sum == (Rh_byte1+Rh_byte2+Temp_byte1+Temp_byte2))
{
    TEMP = ((Temp_byte1 << 8) | Temp_byte2);
    RH = ((Rh_byte1 << 8) | Rh_byte2);
}
temp = (float)TEMP / 10.0;
humid = (float)RH / 10.0;
FloatToString(temp_string, temp, 4, 1);
FloatToString(humid_string, humid, 4, 1);
```

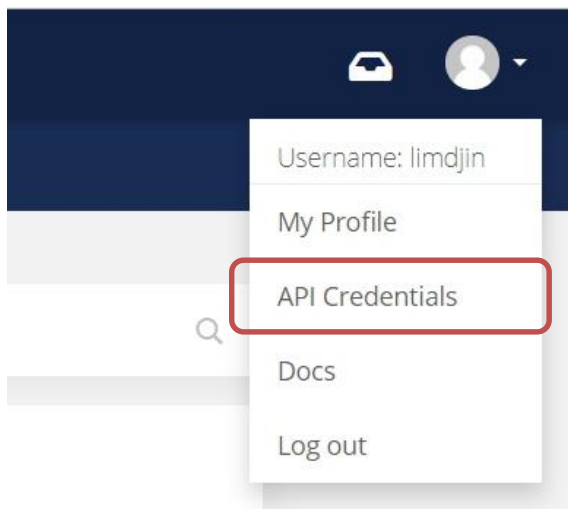
```

sprintf(message, "{\"temperature\": %s, \"humidity\": %s}", temp_string, humid_string);
HAL_UART_Transmit(&huart2, (uint8_t *)message, strlen(message), 0xFFFF);
sprintf(sendBuffer, "POST /api/v1.6/devices/%s/?token=%s HTTP/1.1\r\nHost: things.ubidots.com\r\n");
sendBufferLength = strlen((char *)sendBuffer);
for (int i = 0; i < 50; i++)buffer[i] = ' ';
my_itoa(sendBufferLength, sendBufferLengthString, 3);
sprintf((char *)string, "AT+CIPSEND=%s", sendBufferLengthString);
length = strlen((char *)string);
string[length] = 0x0D;
string[length + 1] = 0x0A;
string[length + 2] = 0;
HAL_UART_Transmit(&huart3, (uint8_t *)string, length + 2, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 24, 4000);

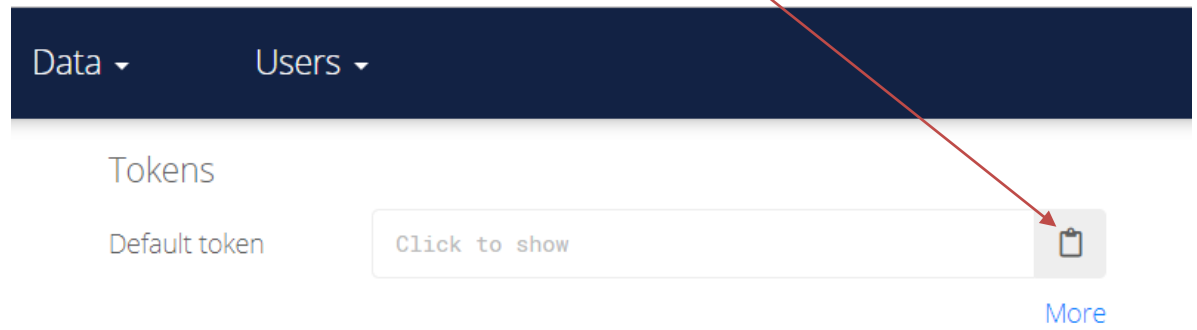
for (int i = 0; i < 2000; i++)buffer[i] = ' ';
HAL_Delay(1);
HAL_UART_Transmit(&huart3, (uint8_t *)sendBuffer, sendBufferLength, 0xFFFF);
HAL_UART_Receive(&huart3, (uint8_t *)buffer, 500, 4000);
HAL_UART_Transmit(&huart2, (uint8_t *)buffer, 500, 0xFFFF);
string[0] = 0x0D;
string[1] = 0x0A;
HAL_UART_Transmit(&huart2, (uint8_t *)string, 2, 0xFFFF);
ret = (int)strstr((char *)buffer, (char *)"ERROR");
/* wait for a while to slow down */

```

- Copy your Ubidots Token and paste in your source.

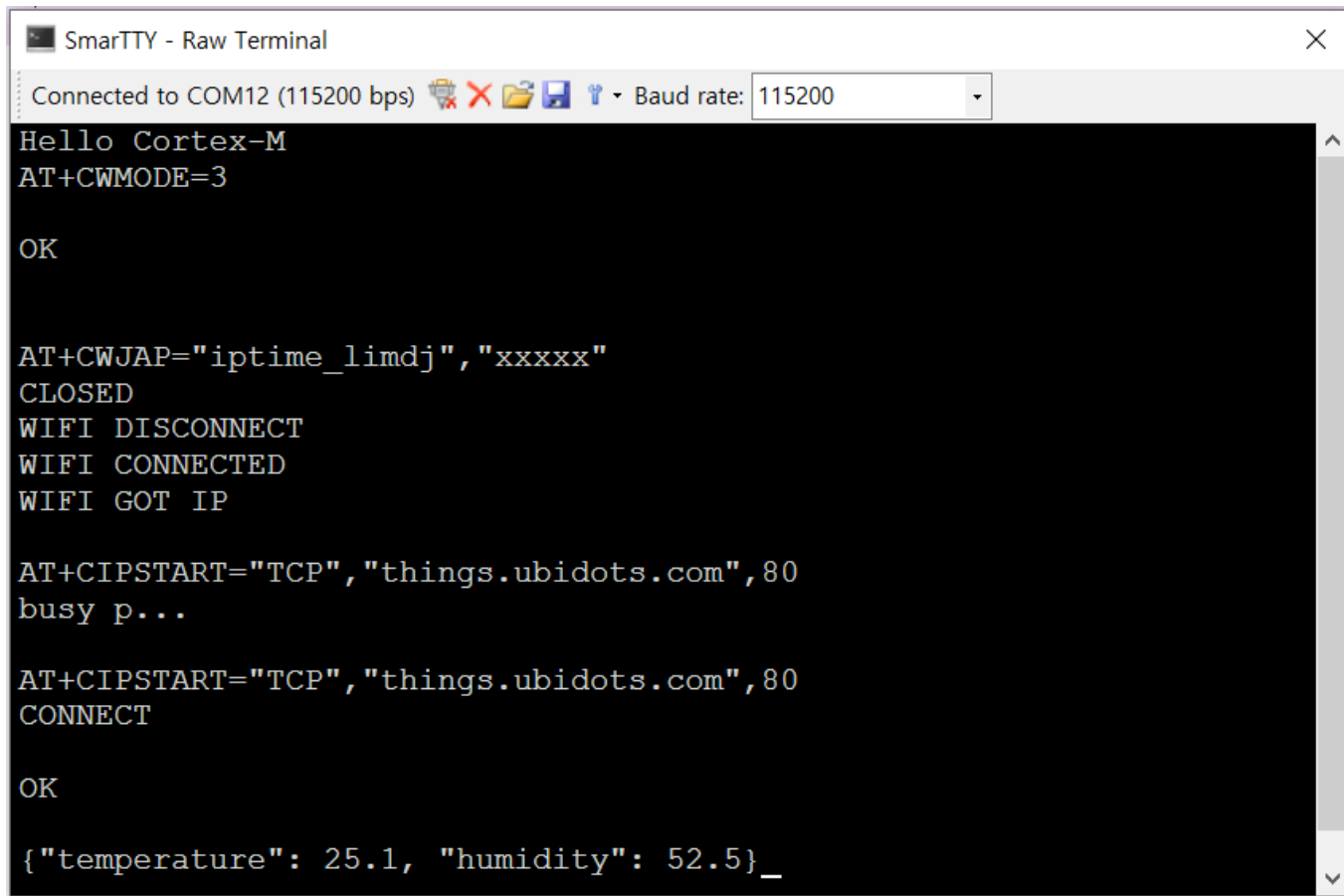


Click to copy



- Paste the token in wifi\_ubidots.c

```
Ubidots.ioc  main.c  *wifi_ubidots.c  ⌵
1 #include "stm32f4xx_hal.h"
2 #include "string.h"
3 #include "math.h"
4 #include "dht22.h"
5 extern UART_HandleTypeDef huart2;
6 extern UART_HandleTypeDef huart3;
7 #define UBIDOTS_TOKEN "BBFF-FNbbvAjk3TN96Bv2xxxxxxxxxxx"
8 #define UBIDOTS_DEVICE "STM32F407"
```



```
SmarTTY - Raw Terminal
Connected to COM12 (115200 bps) Baud rate: 115200
Hello Cortex-M
AT+CWMODE=3
OK

AT+CWJAP="iptime_limdj","xxxxx"
CLOSED
WIFI DISCONNECT
WIFI CONNECTED
WIFI GOT IP

AT+CIPSTART="TCP","things.ubidots.com",80
busy p...

AT+CIPSTART="TCP","things.ubidots.com",80
CONNECT

OK

{"temperature": 25.1, "humidity": 52.5}_
```



```
SmarTTY - Raw Terminal
Connected to COM11 (115200 bps) [Icons] Baud rate: 115200
Recv 204 bytes

SEND OK



+IPD,311:HTTP/1.1 200 OK
Server: nginx
Date: Thu, 02 May 2019 01:34:10 GMT
Content-Type: application/json
Transfer-Encoding: chunked
Connection: keep-alive
Vary: Accept-Encoding
Vary: Cookie
Allow: GET, POST, HEAD, OPTIONS

4b
{"temperature": [{"status_code": 201}], "humidity": [{"status_code": 201}]}
0
```

# Devices

- Select Devices and wait for the device to appear

The screenshot shows the Ubidots web interface. The browser address bar displays 'industrial.ubidots.com/app/devices/'. The page header includes the Ubidots logo and navigation menus for 'Devices', 'Data', and 'Users'. Below the header, there are filters for 'All organizations' and 'Sort by: Name', along with a search bar labeled 'Search Devices'. The main content area is titled 'Devices' and contains a table with the following columns: NAME, LAST ACTIVITY, CREATED AT, ORGANIZATION, DEVICE TYPE, and ACTIONS. A single device is listed in the table, with its name 'stm32f407' highlighted by a red rectangular box. The device's last activity is 'a few seconds ago' and it was created on '2019-10-23 13:59:56 +...'. The table also shows a 'ROWS PER PAGE' dropdown set to 30 and navigation arrows.

NAME	LAST ACTIVITY	CREATED AT	ORGANIZATION	DEVICE TYPE	ACTIONS
stm32f407	a few seconds ago	2019-10-23 13:59:56 +...	---	---	 

- Click humidity to change the color

The screenshot shows a configuration page for a device named 'stm32f407'. On the left is a sidebar with fields for Description, API Label, ID, and Tags. The main area displays a list of tags, each with a cloud icon, a numerical value, a label, and a 'Last activity' timestamp. The 'humidity' tag is highlighted in orange, and the 'temperature' tag is also highlighted in orange.

Tag Name	Value	Last Activity
humidity	53.00	a few seconds ago
temperature	25.20	a few seconds ago

# ■ Click brush

The screenshot displays a data monitoring interface. On the left is a sensor card for 'humidity' with a value of 52.90. The card includes sections for Description, API Label, ID, Allowed range, Unit, Tags, and Last Activity. A red arrow points to a brush icon in the top right corner of the card. To the right is a time-series chart showing humidity values from 14:00 to 14:05. Below the chart is a table with columns for DATE, VALUE, and CON. A dark blue banner at the bottom of the table reads 'New data available'.

DATE	VALUE	CON
New data available		
2019-10-23 14:16:35 +09:00	52.90	{}

- Click desired color and click ←

Oct 23 2019 - Oct 23 2019

52.90  
humidity

**Description**  
Change description

**API Label**  
humidity

**ID**  
5dafde50e694aa5108ef14ee

**Allowed range**

Color picker overlay showing a gradient from orange to black. The selected color is orange. The color picker displays the following values: Hex: FFA30D, R: 255, G: 163, B: 13.

Oct 23 2019 - Oct 23 2019

52.70  
humidity



**Description**  
Change description

**API Label**  
humidity

**ID**  
5dafde50e694aa5108ef14ee

**Allowed range**

Color picker overlay showing a gradient from blue to black. The selected color is blue. The color picker displays the following values: Hex: 2CCCE4, R: 44, G: 204, B: 228.

## stm32f407

**Description**  
Change description

---

**API Label** ⓘ  
stm32f407


---

**ID** ⓘ  
5dafde4ce694aa5108ef14e4

---


**Tags**  
Add new tag

---



52.50  
humidity

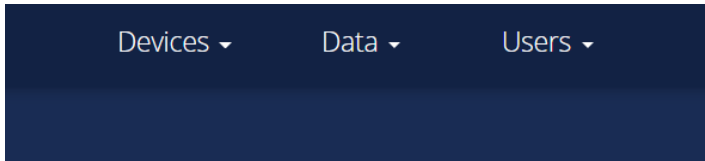
Last activity:  
a few seconds ago



25.10  
temperature

Last activity:  
a few seconds ago

- Select Dashboards from Data menu and click “Add new Dashboard”. Then click.



No Dashboards created yet

Create Dashboards to visualize your data in realtime

Add new Dashboard

A dialog box titled "Add new Dashboard" with a close button (X) in the top right corner. The dialog is divided into two sections: "General Information" and "Appearance".  
Under "General Information":

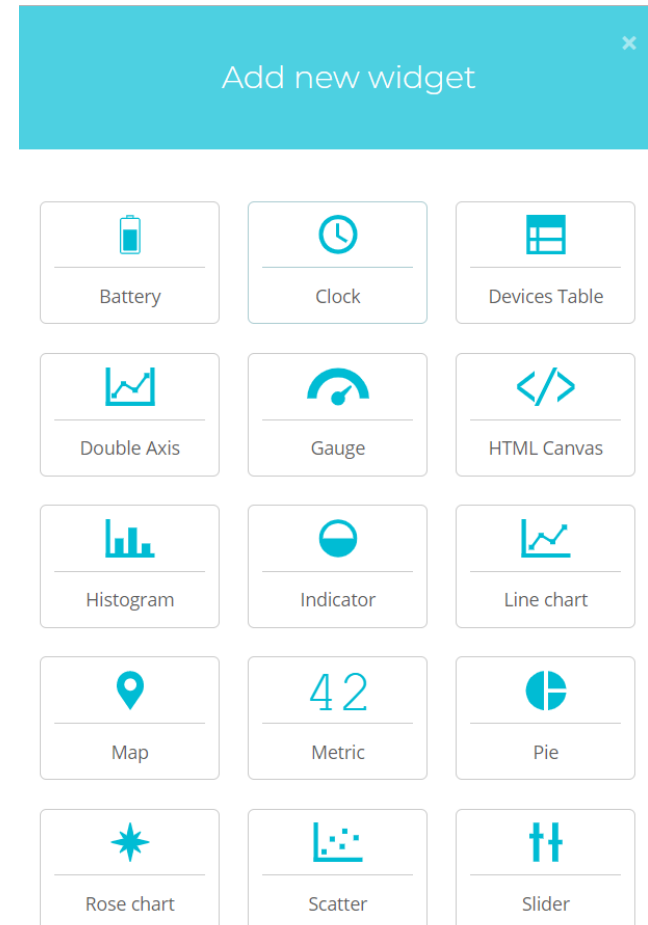
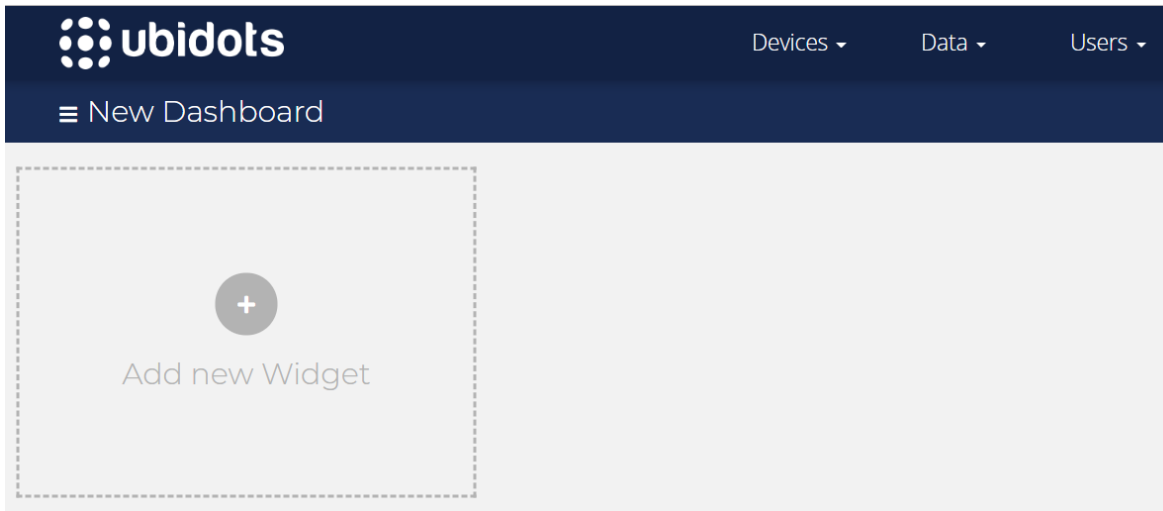
- Name: Input field with "New Dashboard" entered.
- Default time range: Dropdown menu with "Last 24 hours" selected and a blue checkmark.
- Dynamic Dashboard: Toggle switch with a blue plus icon on the left and the switch is currently off.
- Screen size: Dropdown menu with "Auto" selected and a blue checkmark.
- Date format: Dropdown menu with "10/23/2019 14:20" selected and a blue checkmark.

  
Under "Appearance":

- Floating widgets: Toggle switch, currently off.
- Widgets opacity: Input field with "100" entered.
- Custom style: Input field with "Add style" and a blue plus icon.
- Widget's horizontal spacing: Input field with "10" entered.

  
At the bottom right of the dialog is a green circular button with a white checkmark. A red arrow points from the "Add new Dashboard" button in the main interface to this green checkmark button.

# ■ Add new Widget and select Line chart





### Line chart

< BACK

Data ^

+ Add Variables

Appearance ^

Name

Decimal points

Show legend

Date format  ✓

Display X-Axis data zoom

X-Axis label


Custom style  ✓

✓

### Widget Creation

## Select Variables

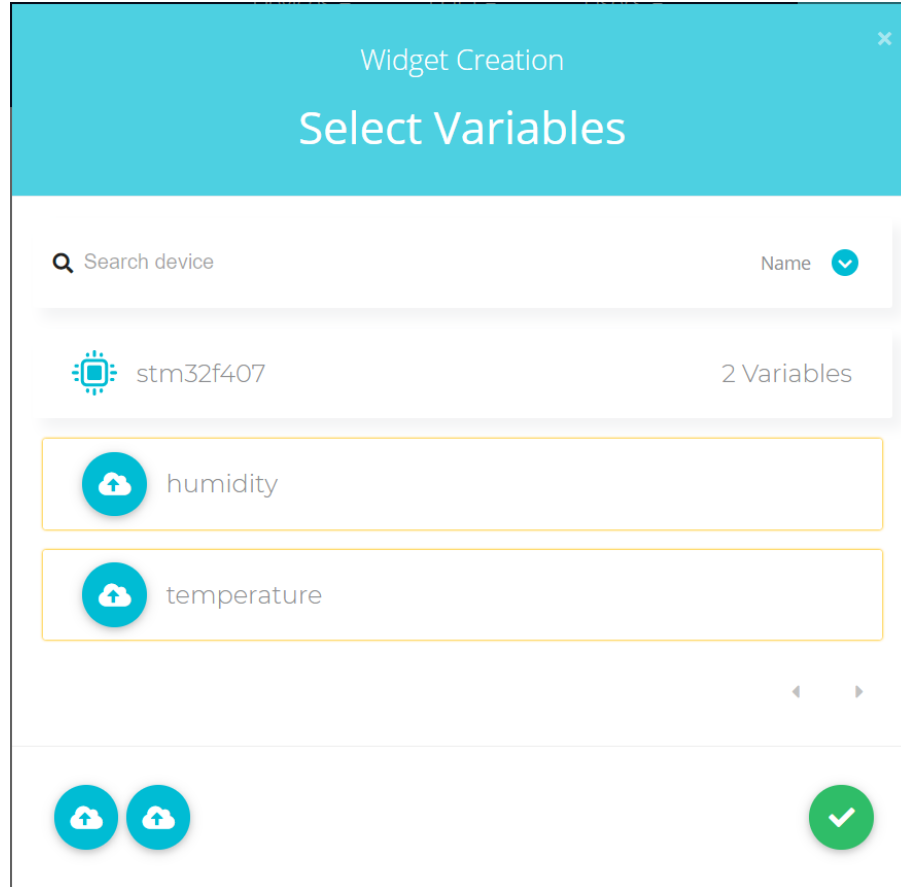
Q Search device Name ✓

 stm32f407 2 Variables

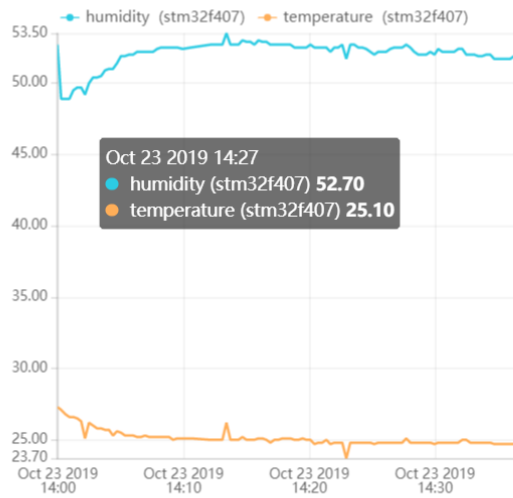
◀ ▶

✓

- Select Variables and click check mark.



## Chart

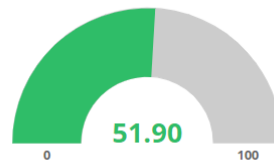


## Thermometer widget


**24.70**

Last Updated: 10/23/2019 14:36

## Gauge widget



## Values Table

DATE	HUMIDITY LAST VALUE	TEMPERATURE LAST VALUE
10/23/2019 14:36	51.90	24.70
10/23/2019 14:35	51.70	24.70
10/23/2019 14:35	51.70	24.70
10/23/2019 14:35	51.70	24.70
10/23/2019 14:35	51.70	24.70
10/23/2019 14:34	51.70	24.70
10/23/2019 14:34	52.00	24.80
10/23/2019 14:34	52.00	24.80
10/23/2019 14:33	51.90	24.80
10/23/2019 14:33	51.90	24.80

# Smartphone App

