TH244A001
UserManual

Version: 0.32

This document contains information on a new product under development by Megawin.
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2024/08 version 0.32

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Revision

20230712 Initial release

20240430 p26: JSON Document URL updated

20240702 Modify all TH244A001 in file to TH244A001001

20240830 Modify formats

1 Knowing Arduino and megawin TH244A001

1.1 A Brief introduction to Arduino

Arduino is an open source electronic design platform that is convenient, flexible and easy to use. It contains hardware (various models of Arduino official boards, third-party supported development boards and various accessories) and software (Arduino IDE 2.2.1, which has been updated to version 2.2.1 in September 2023). It was developed by a European development team in 2005. Its members include Massimo Banzi, David Cuartielles, Tom Igoe, Gianluca Martino, David Mellis and Nicholas Zambetti, etc.

Arduino is an open source software and hardware platform, built on the open source simple I/O interface edition, and has a Processing/Wiring development environment using coding language similar to Java and C. Arduino contains two parts: the hardware part is the Arduino circuit board that can be used to make circuit connections; the other is the PC program development environment - Arduino IDE. Write the programming code in the IDE, upload the program to the Arduino board, the Arduino board will respond relative to the program design.

Arduino can sense the environment through a variety of sensors, and control lights, motors, and other devices to feedback and influence the environment. The MCU on the development board can be downloaded binary file through Arduino. The programming of Arduino is realized by Arduino programming language (based on Wiring) and Arduino development environment (based on Processing). An Arduino project, can only contain Arduino, can also contain Arduino and some other software running on the PC, they communicate with each other (such as Flash, Processing, MaxMSP).

Arduino development IDE interface is based on open source code, which allows you to download and use for free to develop more amazing interactive works.

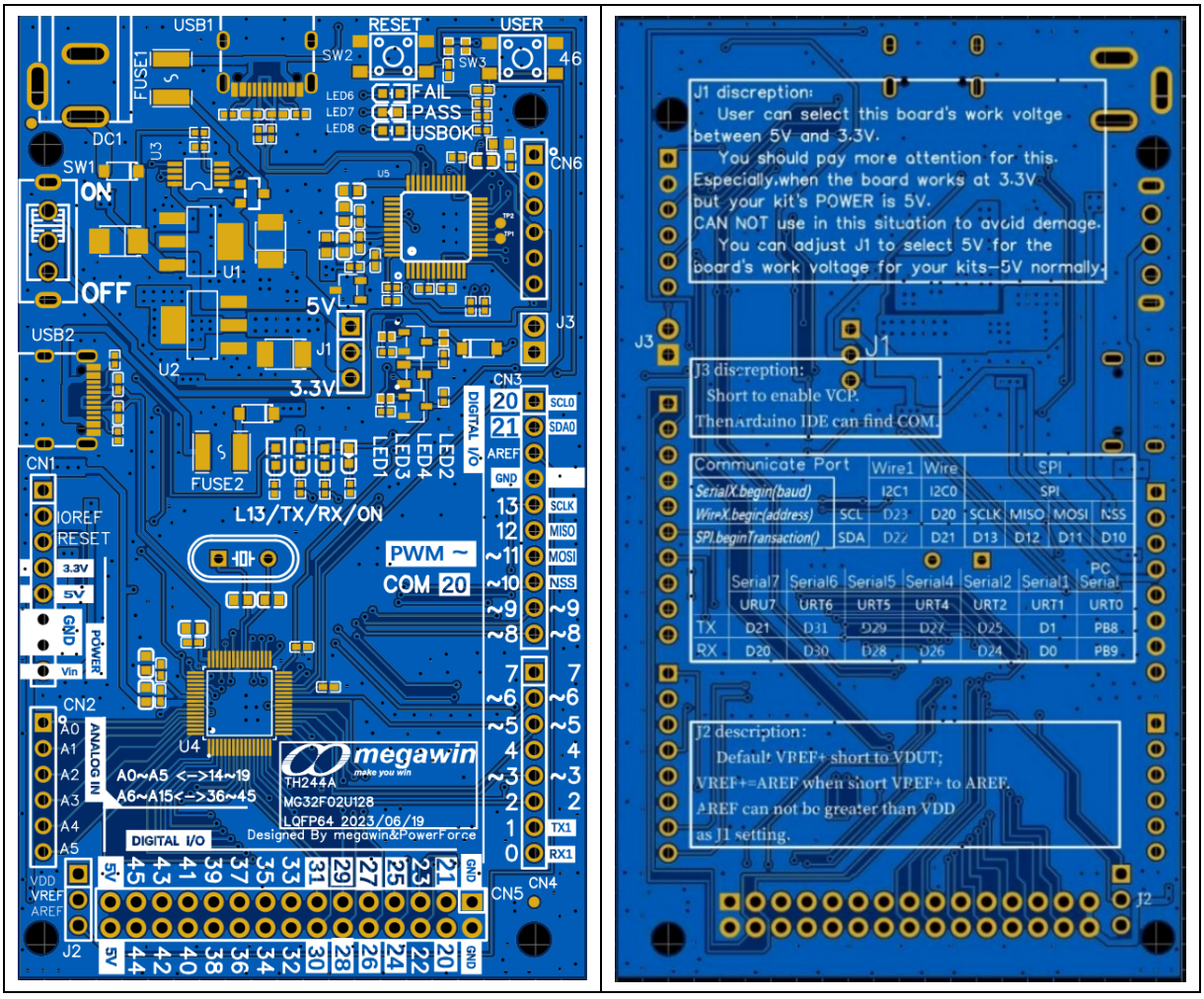
1.2 Introduction to TH244A001

TH244A001 is based on megawin 32-bit ARM-M0 MCU MG32F02U128AD64 design, compatible with Arduino UNO R3 interface development board. Compared with UNO R3, TH244A001 has up to 46 GPIOs that can be connected externally. There are 7 UART, 2 I2C, 1 SPI, 16 analog inputs, 1 12bit DAC output, and 7 PWM outputs. TH244A001 also contains MG84FG516(MLink), which based on megawin high performance 8bit 8051 USB MCU, allows SWD debug and ISP program download. User do not need to match other debug tools.

After megawin_TH244A001_for_Arduino_vx.x.x.zip is unzipped, the four files (folders) are: **x.x.x** is the current released version number
• TH244A001_UserManual is the user manual, **which is this file**. Introduce how to build development environment and the basic setting of the development board; • TH244A001_UserGuide is the guidelines for the user. Introduce the basic functions of the development board and the use of basic functions; • MG32x02z is the core development package file, and the internal folder **x.x.x** is the current version number released. Users need to place the package to the specified path as required; See 3.4.1 for details • MLink VCP Driver. Install the development board driver, See 2.2 for details

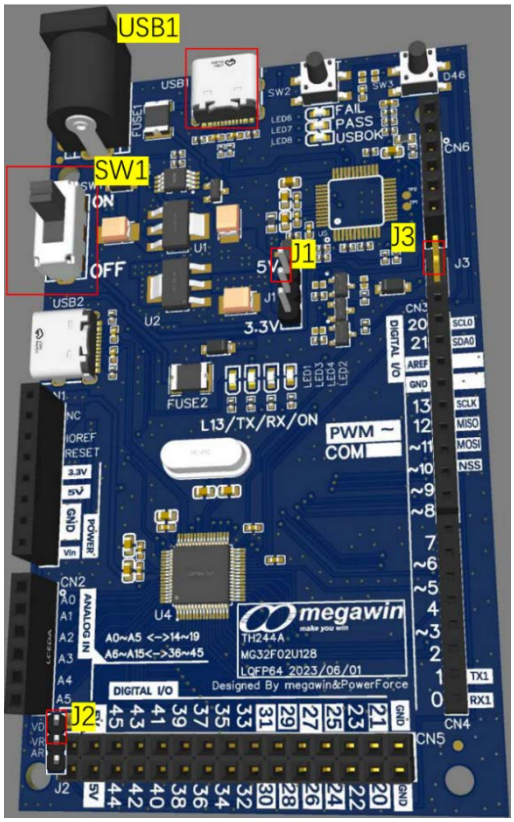
Please refer to TH244A001_UserGuide for TH244A001 details.

Development board TH244A001 preview:



2 TH244A001 SETUP & Driver Installtion

2.1 Development board TH244A001 2.54mm 2pin Jumper (Jumper) setting

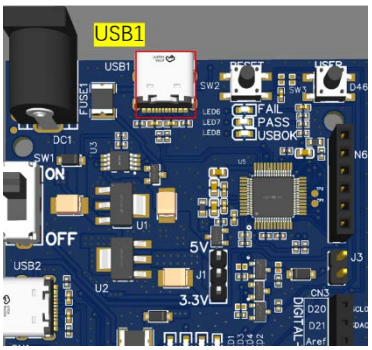
J1: Set the working voltage of the development board, the default is 5V power supply Tip: when set to 3.3 V, attention should be paid that the external module voltage cannot be more than 3.3 V, to avoid burning chip. **J2**: Set ADC external reference voltage VREF+ = VDD(MG32 power), which is the operation voltage of TH244A001 set by J1 Tip: The ADC reference voltage of TH244A001 can be set as internal 2.4V reference source or external reference source with a special function. The default setting is external reference source, and it is set as the operation voltage of the development board through J2. Please refer to the ADC section of TH244A001 manual for details. **J3**: the default setting is short circuit, means enable MLink MG84FG516 VCP, used for PC and TH244A001	

communication	

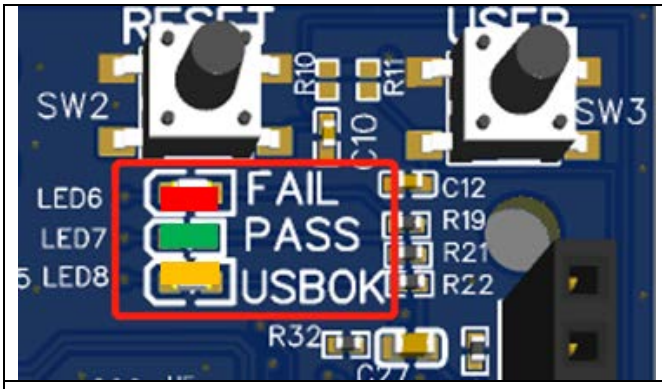
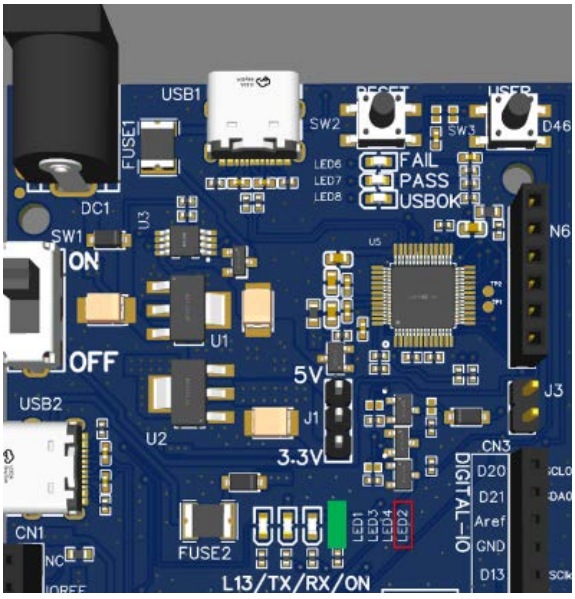
2.2 Install the MLink VCP Driver

1. Connect PC and Device

Connect the TH244A001 USB1 via USB 2.0 A TO C cable, or USB 3.1 C TO C cable, and PC will not recognize the development board device when the other end is connected to PC. Place the VCP driver file SHA-1/SHA-2 to the PC for installation of the driver.

USB 2.0 A TO C cable; **Must contain USB2.0 signal lines**	USB 3.1 C TO C cable You won't actually use USB3.1 signal. **At least the USB2.0 signal cable must be included**	USB1 interface for download programs
		

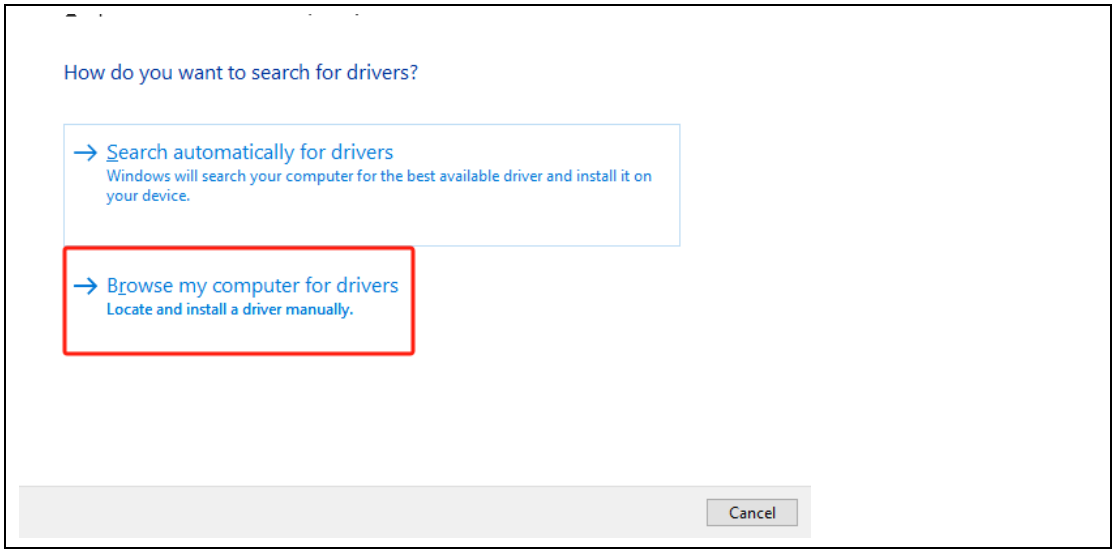
After connecting the USB1 to the PC, the green power indicator LED2 of the TH244A001 board turn on, means power on; LED7/8 turn on, indicating that the MLink VCP is normal.

	USB1 normal connection status Green LED7/Orange LED8 are both turn on, If the communication is bad, the red LED6 will be turn on
	Make sure the power is on properly, as shown in LED2, and the green LED keeps on at all times

2. PC opens the Computer Management, the PC prompts the discovery of a new device, there will be a yellow exclamation mark prompt

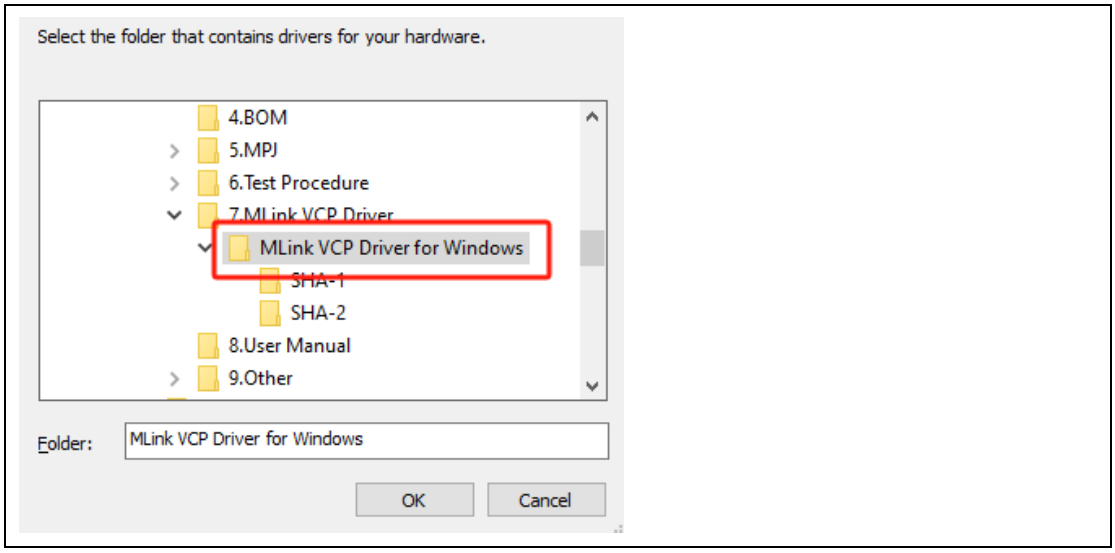
3. Right click on the M-Link Virtual Com Port and click "Update driver" in the pop-up menu

4. Select **Browse my computer for drivers**



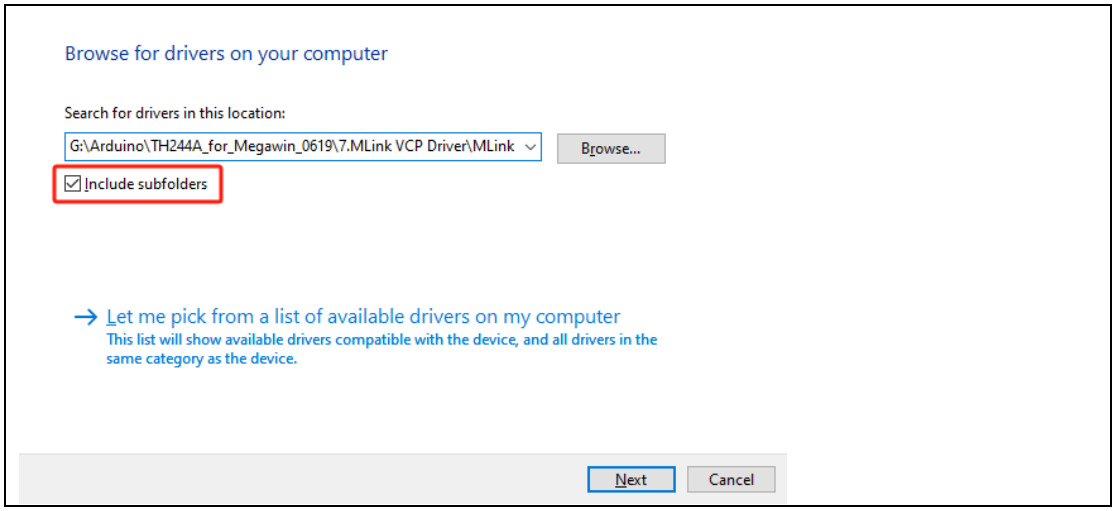
5. Go to the folder where the VCP driver is located and click OK again

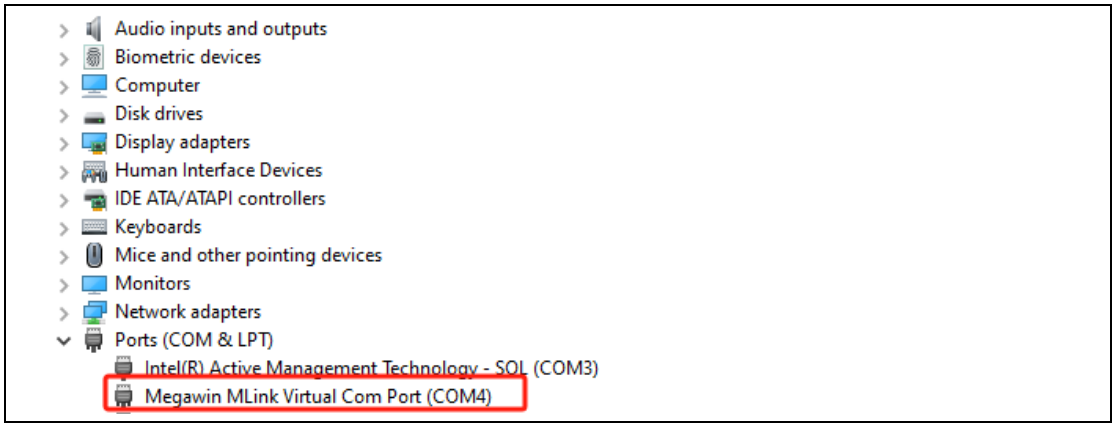
   Windows will automatically select SHA-1 or SHA-2



6. Include subfolders, tick the box; After clicking next, the serial port number will be displayed for successful installation, such as COM4 in the picture below

Note: When connecting different USB ports of PC, the COM number is not the same, please choose according to the actual situation;



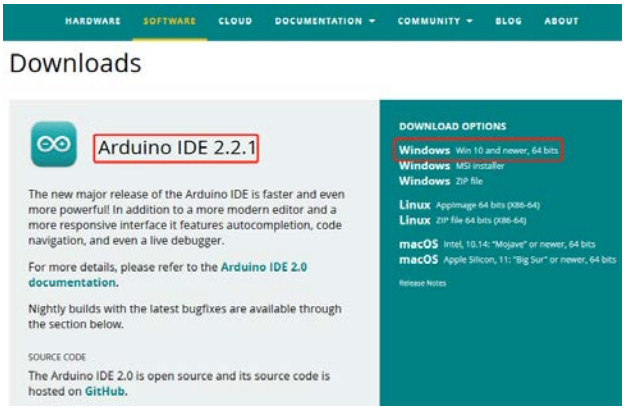
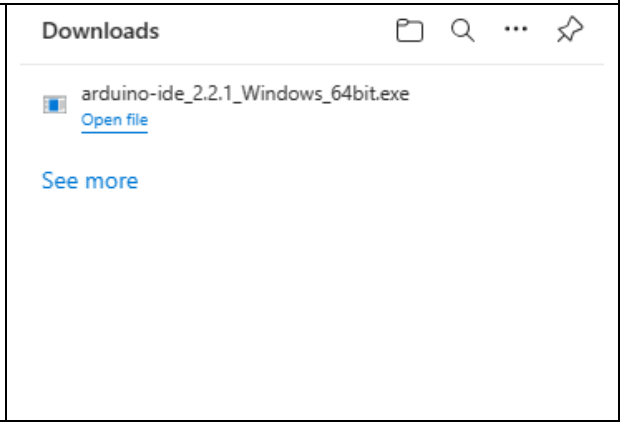


3 Development environment Preparation

3.1 Download the Arduino IDE

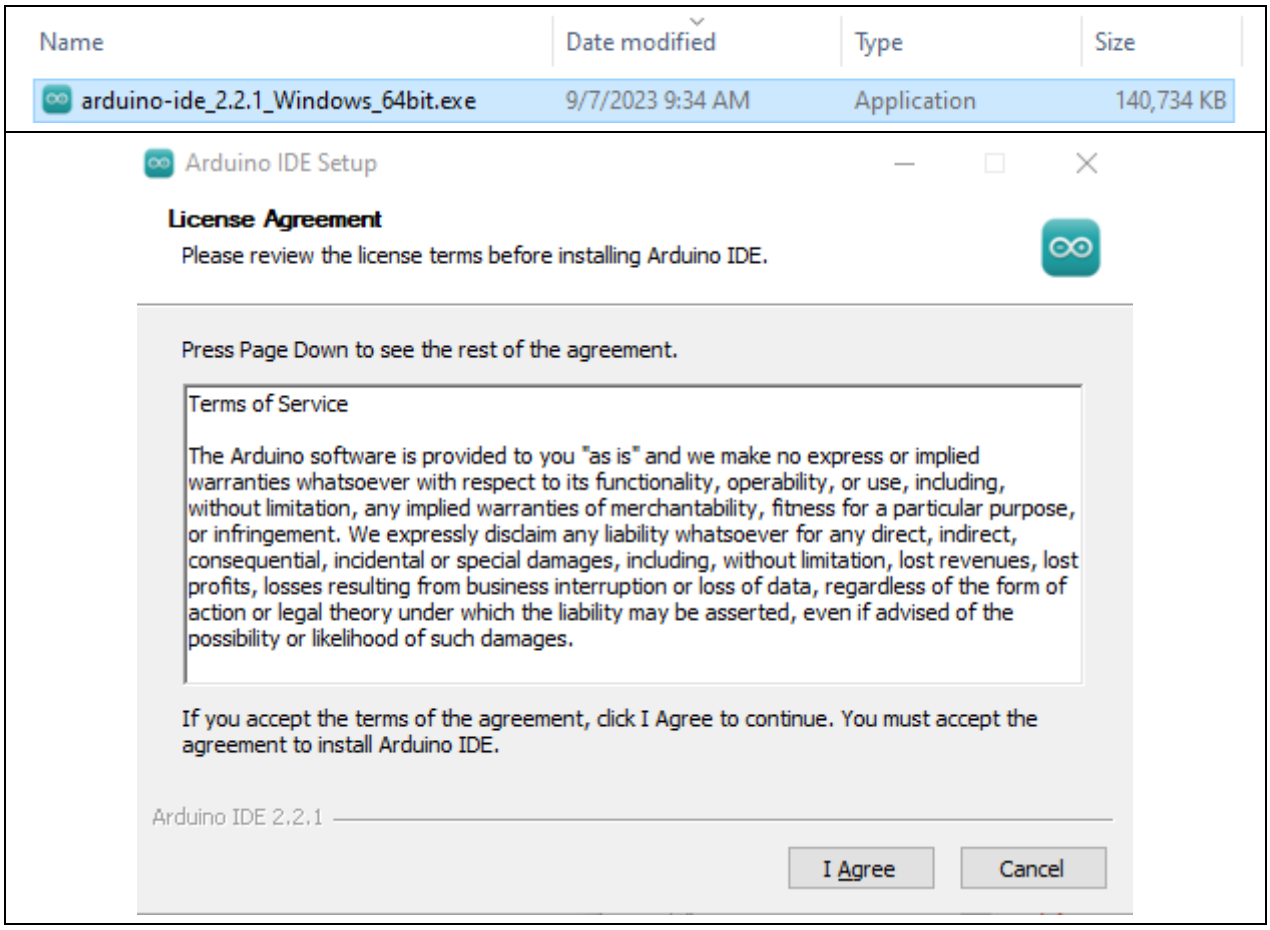
As of September 2023 Arduino have released the Arduino IDE version 2.2.1. Users can download the latest version. (As of July 2024, the latest version of the IDE is version 2.3.3, downloaded in the same way as 2.1.0)

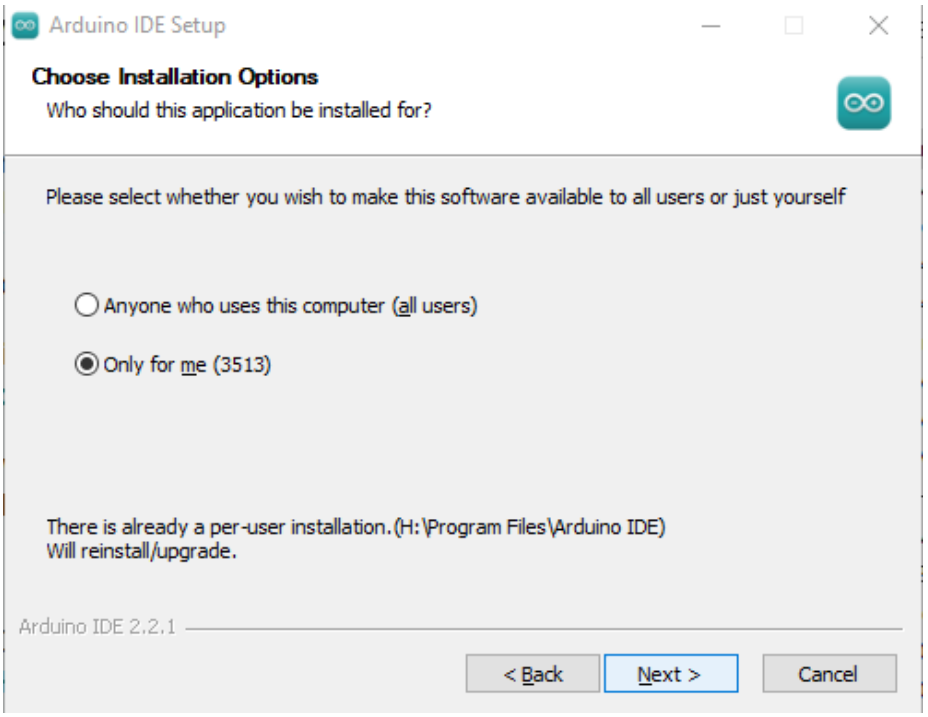
For Windows users, click Download Windows, for Mac and Linux users, select the appropriate file to download.

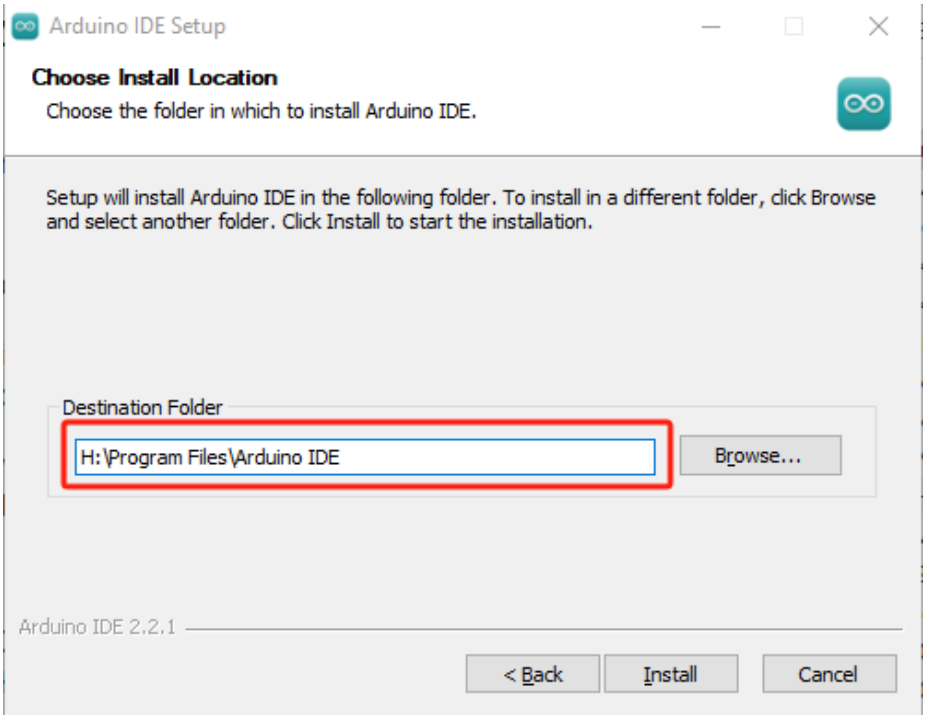
To the Arduino's official website to download https://www.arduino.cc/en/software	
	

3.2 Arduino IDE installation

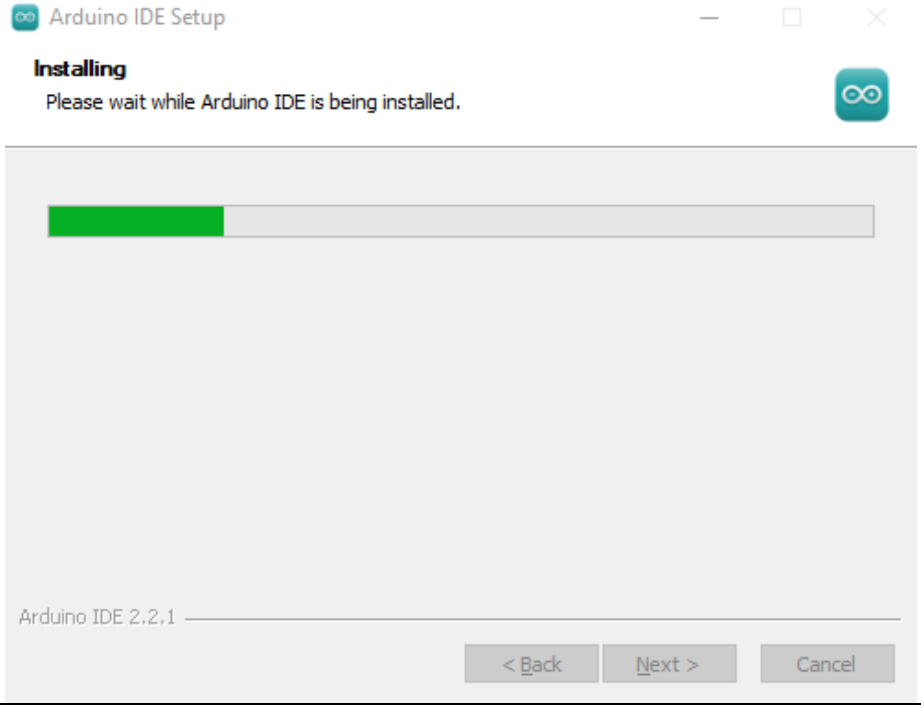
Double click on the.exe file below. Press the default to complete the installation process.

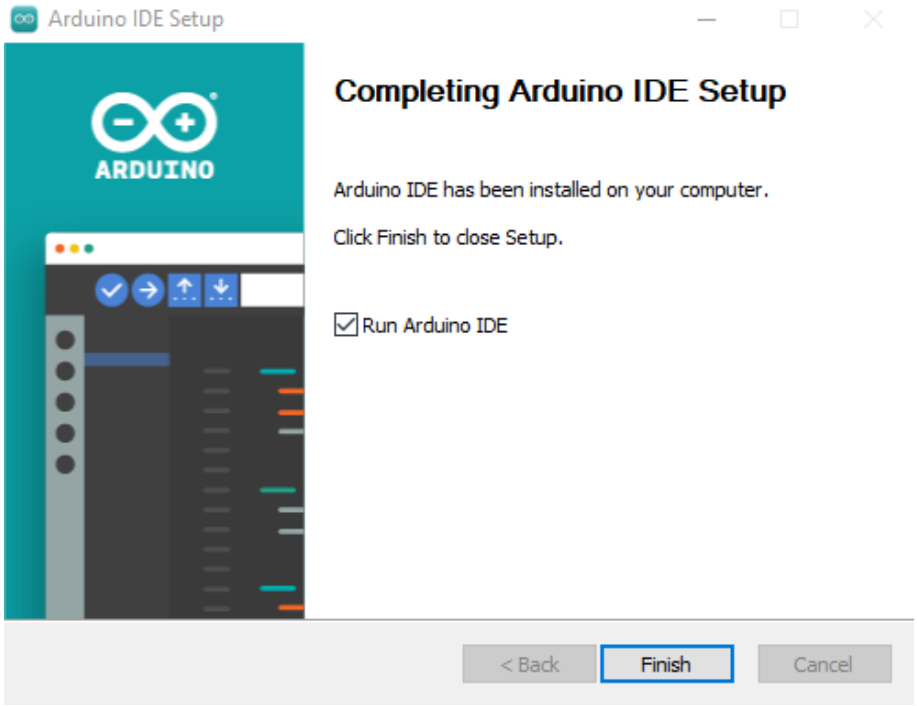


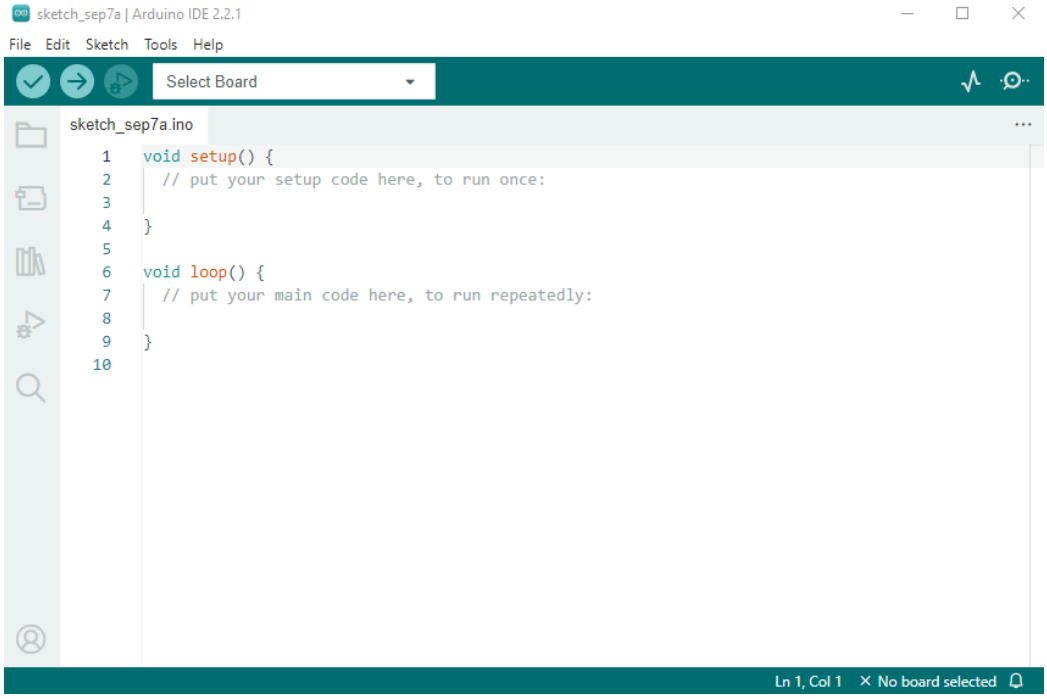




Use this to modify this installation path


Arduino IDE Setup
Installing
Please wait while Arduino IDE is being installed.
Arduino IDE 2.2.1
< Back
Next >
Cancel


Arduino IDE Setup
ARDUINO
Completing Arduino IDE Setup
Arduino IDE has been installed on your computer.
Click Finish to close Setup.
Run Arduino IDE
< Back
Finish
Cancel



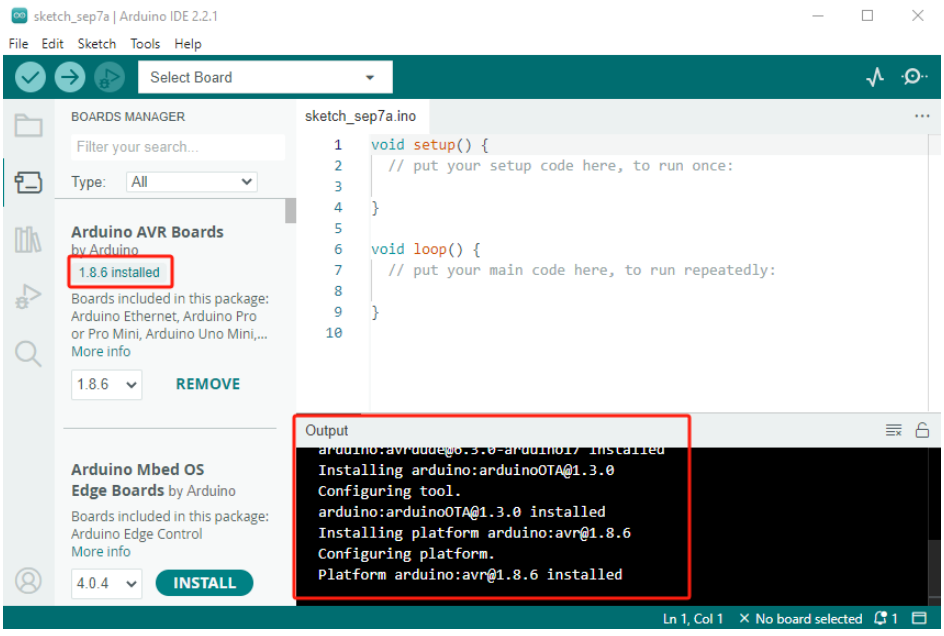
Arduino IDE version 2.2.1, after the installation is complete, default is not include any development kit.

First of all, users need to download the official AVR development kit, see 3.3 for details.

3.3 Official AVR development Kit installation

Install the development kit for the official Arduino development board. Install the Arduino AVR Boards in the BOARDS MANAGER as follows

After successful installation, below, shows that 1.8.6 is installed

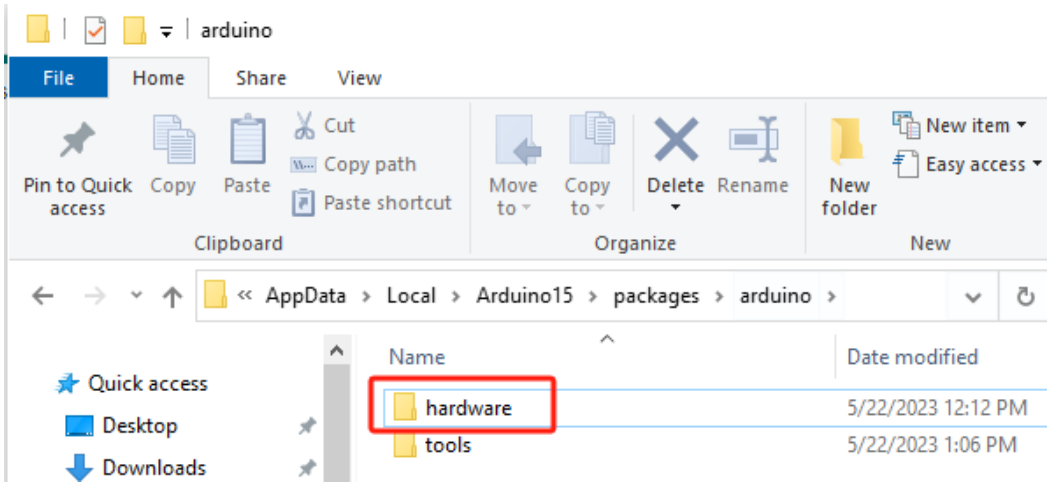


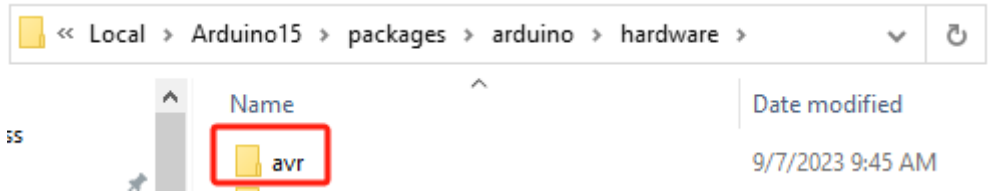
After the Arduino official development kit is installed, (note: the path of

C:\Users\3513 is modified according to the user's PC)

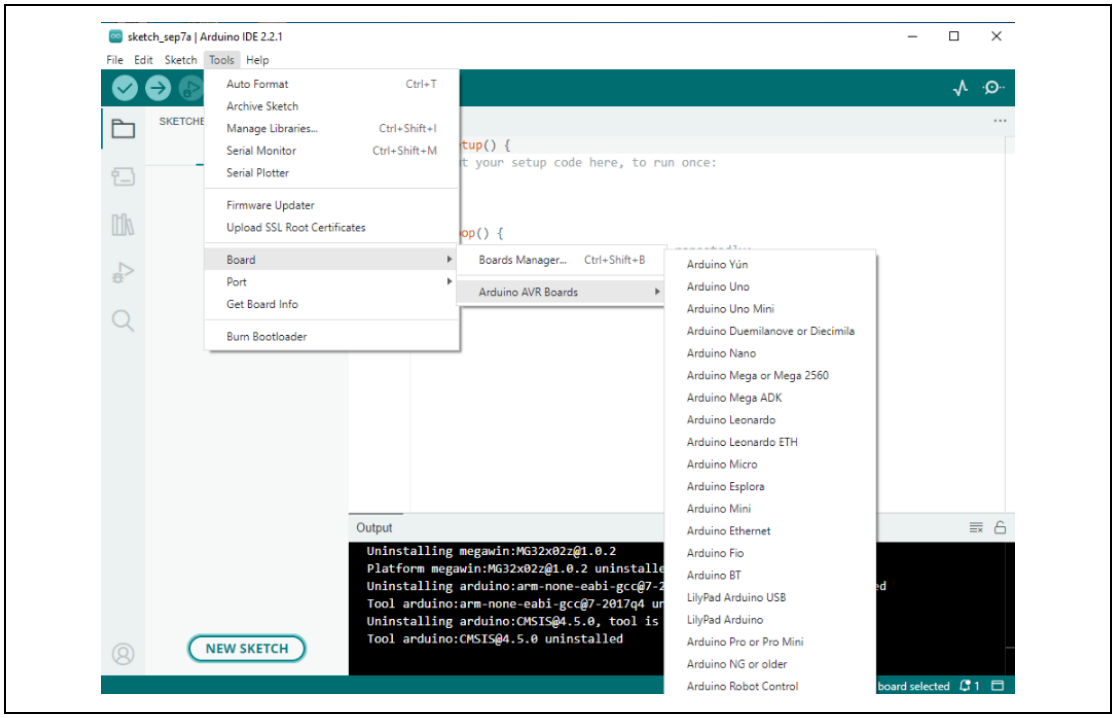
Automatically create a new **hardware** folder in the path

C:\Users\3513**AppData\Local\Arduino15\packages\arduino**. At this time, only the official AVR series development board data is inside the hardware folder.





At this time,in the Arduino IDE BOARDS MANAGER, users can see the AVR series development board. Now, users can use all the official development boards.



3.4 third-party development boards Installation and update

Commonly used Arduino AVR development boards, such as UNO, MEGA, NANO and other official development boards, have automatically downloaded and installed the official development kit when installing ARDUINO IDE. Development boards connect to PC via USB cable can be identified model directly by Arduino IDE. However, third-party development boards, such as Bluno m3, ESP32, teensy, STM Necleo, Nu_edu_Arduino, Megawin TH244A001 and other third-party development boards, cannot be directly identified by IDE, and special development kits need to be installed. Here is a brief introduction to the process of adding development board information. Unofficial development boards are called third-party contributed development boards, requiring manual setup and installation of development kits. **It is recommended to use the method two: Arduino IDE automatic download.**

This section contains how to update a new version of the development kit when a new version is released.

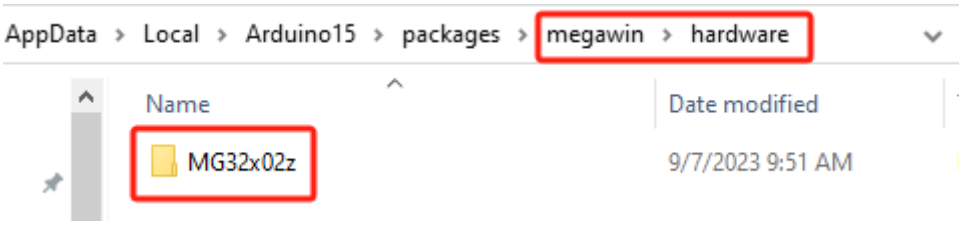
There are two ways to download and update the kit:

- The **method 1** is to manually place the development kit file, compiler file and ARM standard interface file CMSIS;
- The **method 2** is to download and install through BOARDS MANAGER in the Arduino IDE.

3.4.1 Method 1: manually place development kit , compiler files and ARM standard interface files for the first time

1. Place the development kit file
2. Place the compiler file
3. Place the ARM standard interface file CMSIS

1. Place the development kit file
Unzip and copy the file megawin_TH244A001_for_arduino_vx.x.zip download from megawin official website and place the development kit file (**MG32x02z**) into the following path: C:\Users\3513\AppData\Local**Arduino15\packages\megawin\hardware** <C:\Users\3513 depending on PC, according to the actual path Settings > If the \megawin\hardware\ path is not available, user need to create megawin folder and hardware folder, and place MG32x02z in the hardware folder **Please note that the folder name MG32x02z cannot be changed;**



Special attention to the development kit files path as follows:

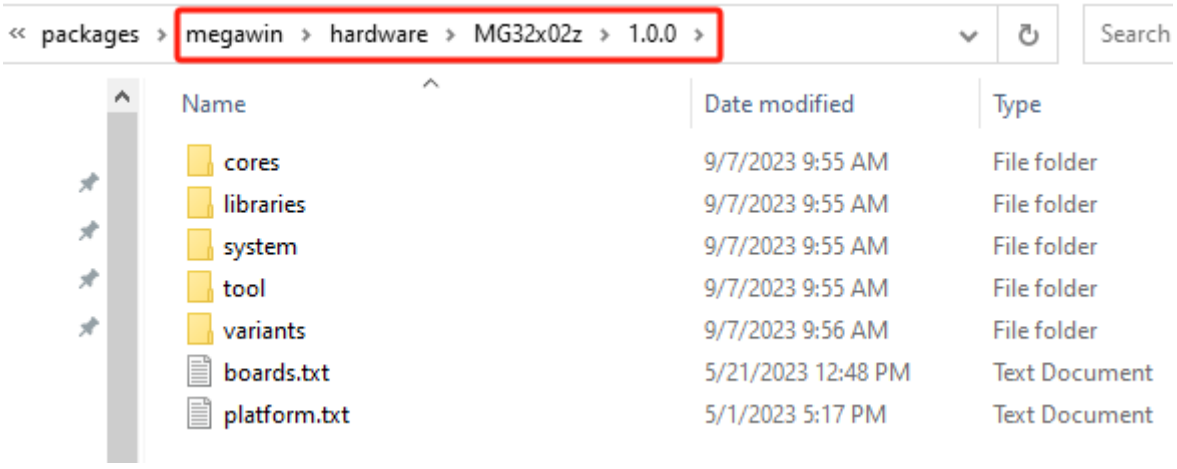
C:\Users\3513\AppData\Local**Arduino15\packages\megawin\hardware\ MG32x02z\x.x.x**

<C:\Users\3513 according to different computers, according to the actual path set > other path, may cause the Arduino IDE can not identify the development board.

The following is the full path reference of the development kit ->**Arduino15\packages\megawin\hardware\MG32x02z\x.x.x**

Where x.x.x is the version number. <C:\Users\3513 Set by actual path according to different computers >

For example, the following is the placement path for version 1.0.0.

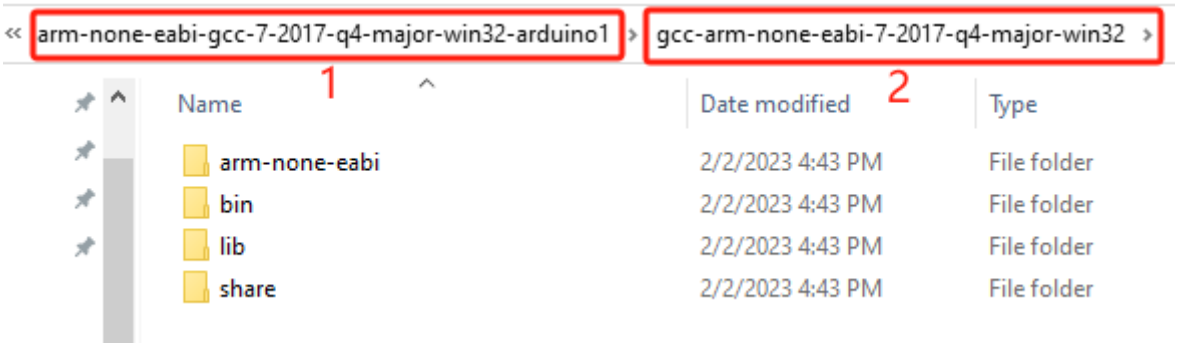


2. Place the compiler file

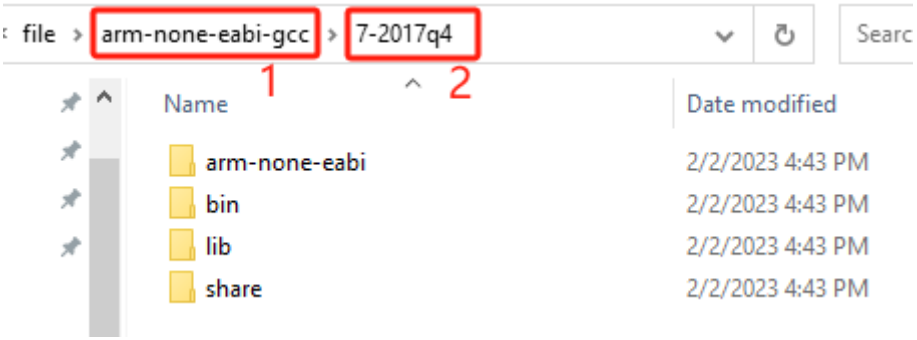
Go to the official arduino website and download the gcc compiler.

http://downloads.arduino.cc/tools/gcc-arm-none-eabi-7-2017-q4-major-win32-arduino1.zip

Download and unzip the file structure is as follows:



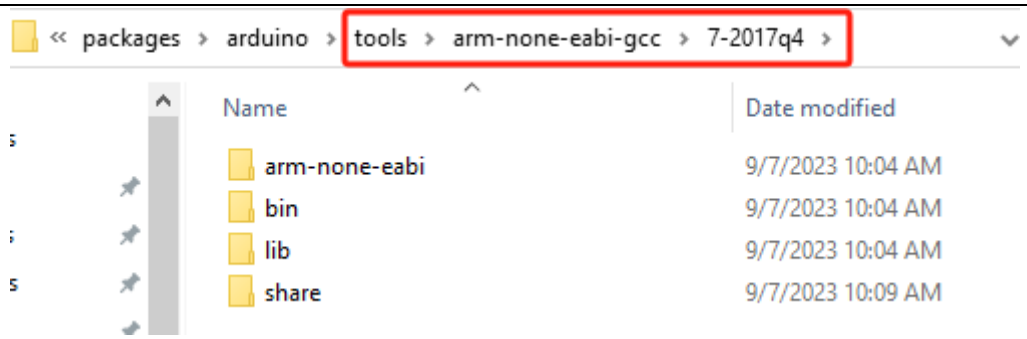
Change the folder names at places 1 and 2 to **arm-none-ebi-gcc** and **7-2017q4**, as follows:



Place the folder **arm-none-ebi-gcc** as a whole at the following paths:

C:\Users\3513\AppData\Local**Arduino15\packages\arduino\tools**

<C:\Users\3513 Set according to the actual path according to different computers > , as shown in the following screenshot:

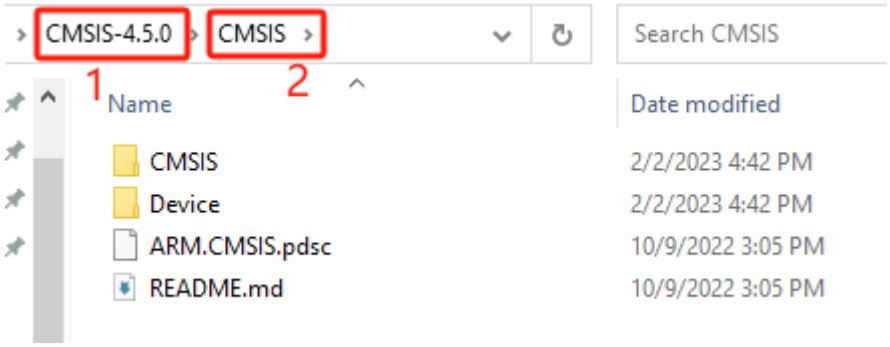


3. Place the ARM standard interface file CMSIS

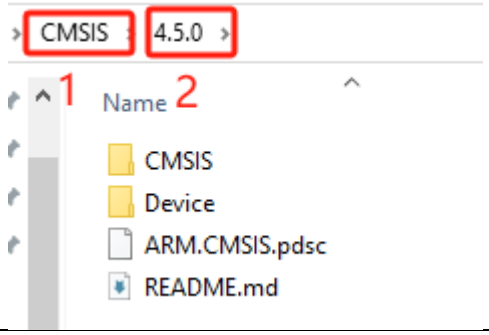
Download the CMSIS file from the official Arduino website

http://downloads.arduino.cc/CMSIS-4.5.0.tar.bz2

Download and unzip the file structure is as follows:



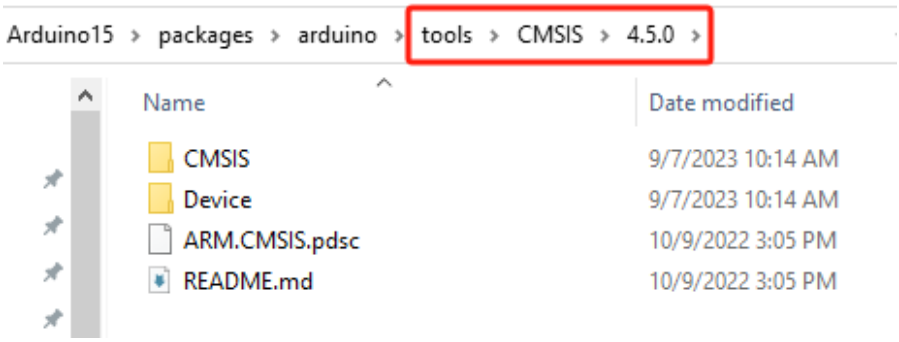
Change the folder names at places 1 and 2 to CMSIS and 4.5.0



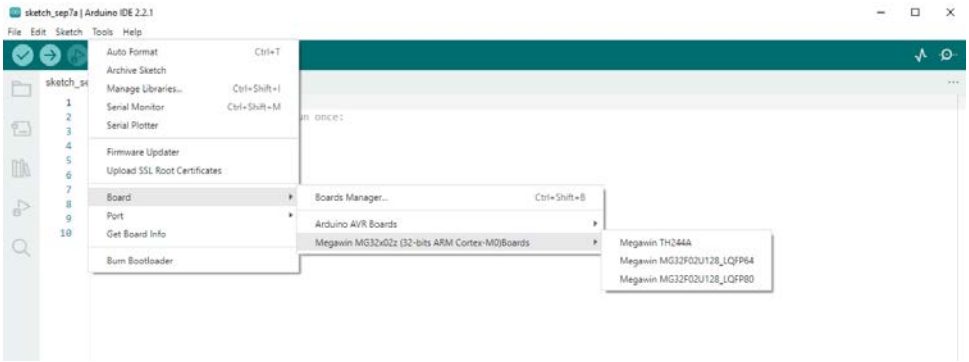
Place the folder **CMSIS** folder at the following paths:

C:\Users\3513\AppData\Local**Arduino15\packages\arduino\tools**

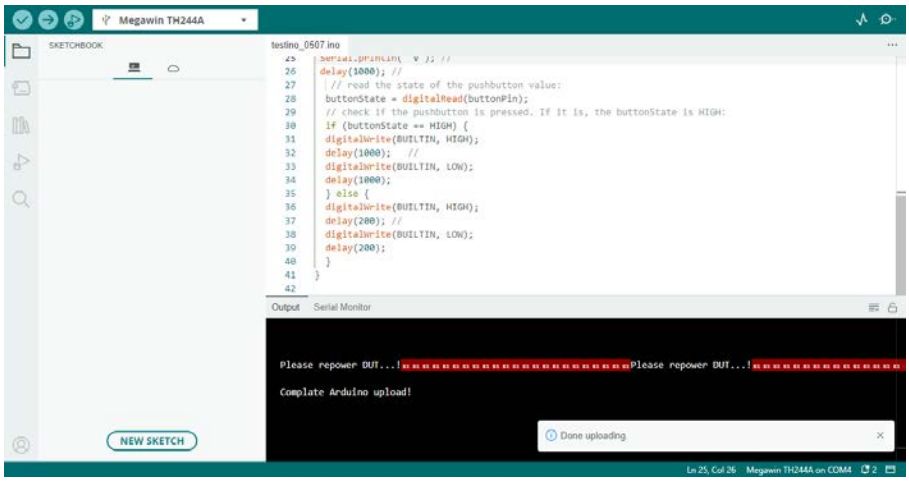
<C:\Users\3513 Set according to the actual path according to different computers>, as shown in the following screenshot:



After restarting Arduino IDE, you can see the newly added Megawin TH244A001 development board in the Arduino IDE BOARDS MANAGER. If you do not see the list of third-party development boards, it is recommended to restart the IDE again).



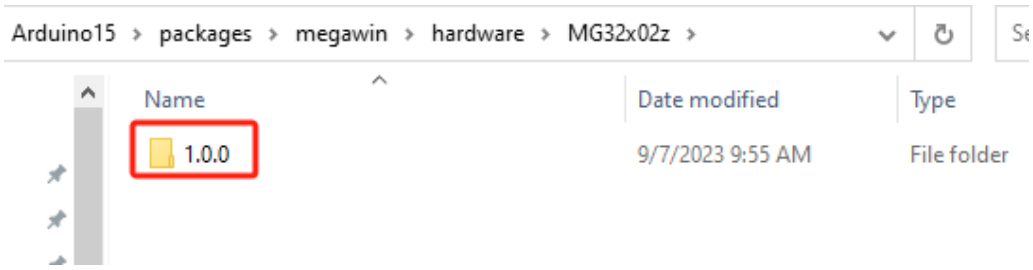
New Arduino project test, can be compiled and uploaded normally



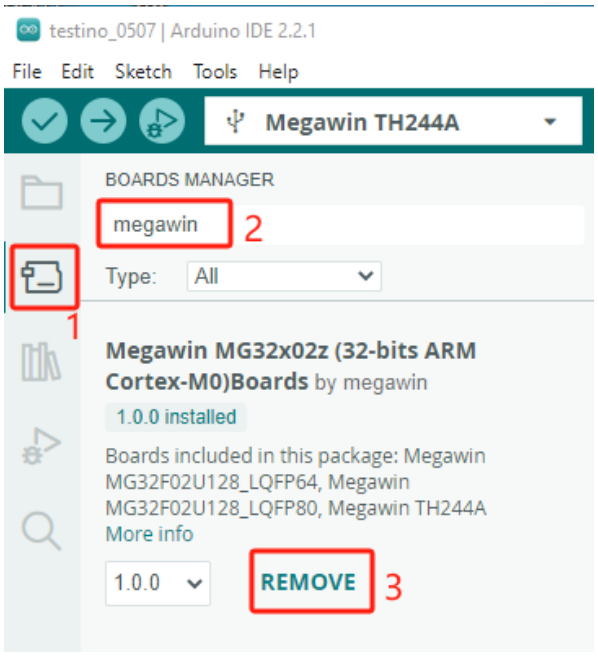
3.4.2 Method 1: Manually update the new version of the development kit

When a new version is released:

Example: current version 0.0.8 is installed. If a new version 1.0.0 is available, the user can place the new development kit in the **MG32x02z folder**. When the new version 1.0.0 development kit folder is placed in the MG32x02z folder, after restarting the Arduino IDE, the Arduino IDE development board manager will automatically identify the new version 1.0.0 version with the higher version number and use it.



When using the BOARDS MANAGER to **remove** the development kit function, it will directly uninstall the installed version. After the uninstallation is completed, the folder of the corresponding version under the **MG32x02z** folder will be deleted. You can also delete the old version folder directly in the **MG32x02z** folder.



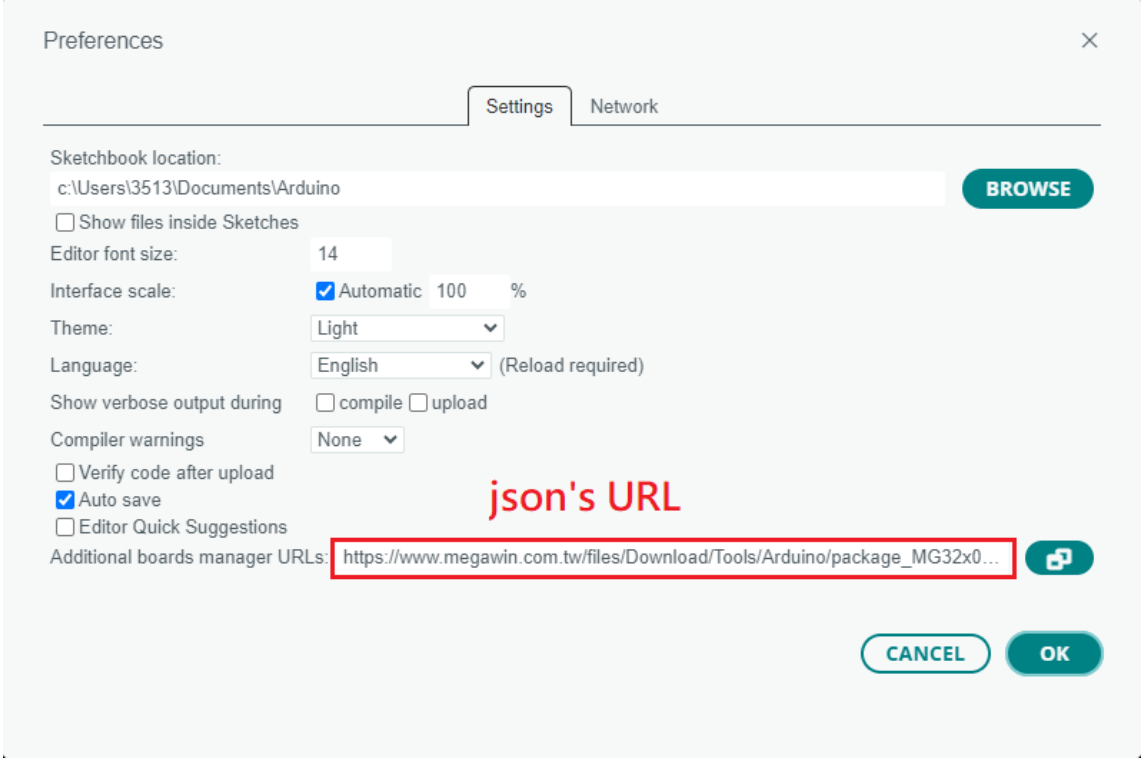
3.4.3 Method two: Download and install via the Arduino IDE Board Manager automatically for the first time

Through the Arduino IDE navigation bar **file - > preferences - > other development board manager addresses**, add the absolute path to the JSON file automatically download and install. Arduino IDE automatically manages the third-party development board to automatically download and install the development kit, compiler program and ARM standard interface files from the path defined by the JSON file. The whole process takes about 2 to 3 minutes.

Fill in the following JSON file address, click OK, Arduino IDE will immediately start to retrieve the JSON file corresponding to the specified address, and download it;

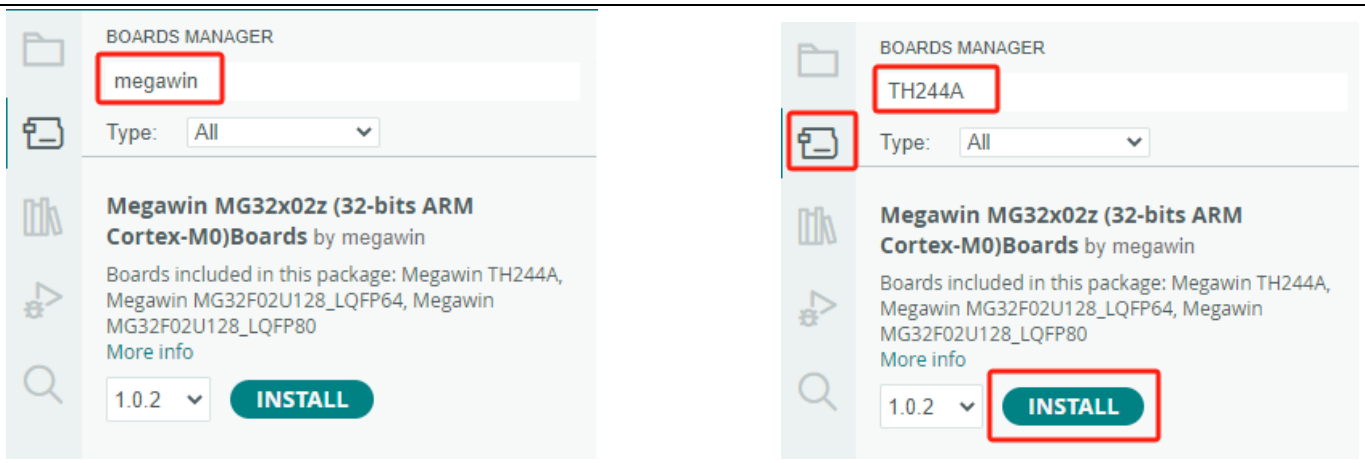
https://www.megawin.com.tw/files/Download/Tools/Arduino/package_MG32x02z_index.json

This path is only need to filled in one time, every time after starting the Arduino IDE automatically retrieves the path of the JSON file new versions development kit.

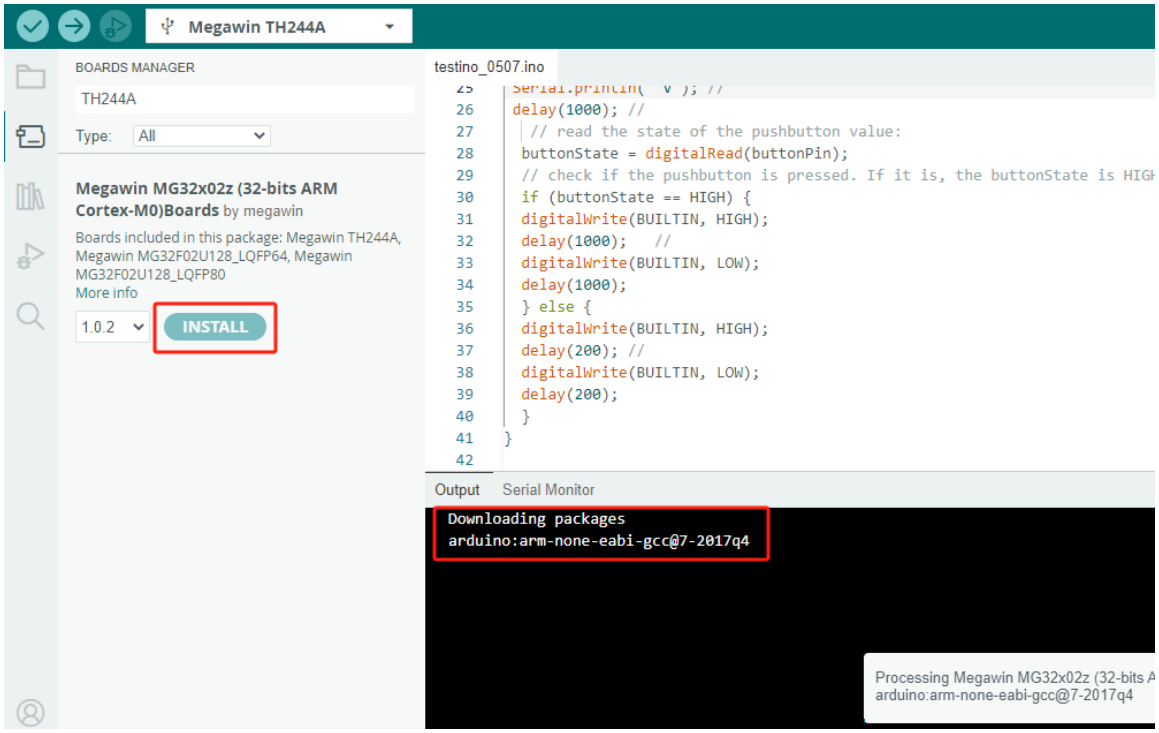


After the search is completed, open the BOARDS MANAGER, and all the development packages included in the index will be listed. User can **search megawin or TH244A001** to find development kit, the following screenshot show all the development kit searching from JSON. Select Install to start the installation.

For example ,there is a new version 1.0.2, please install the latest version.

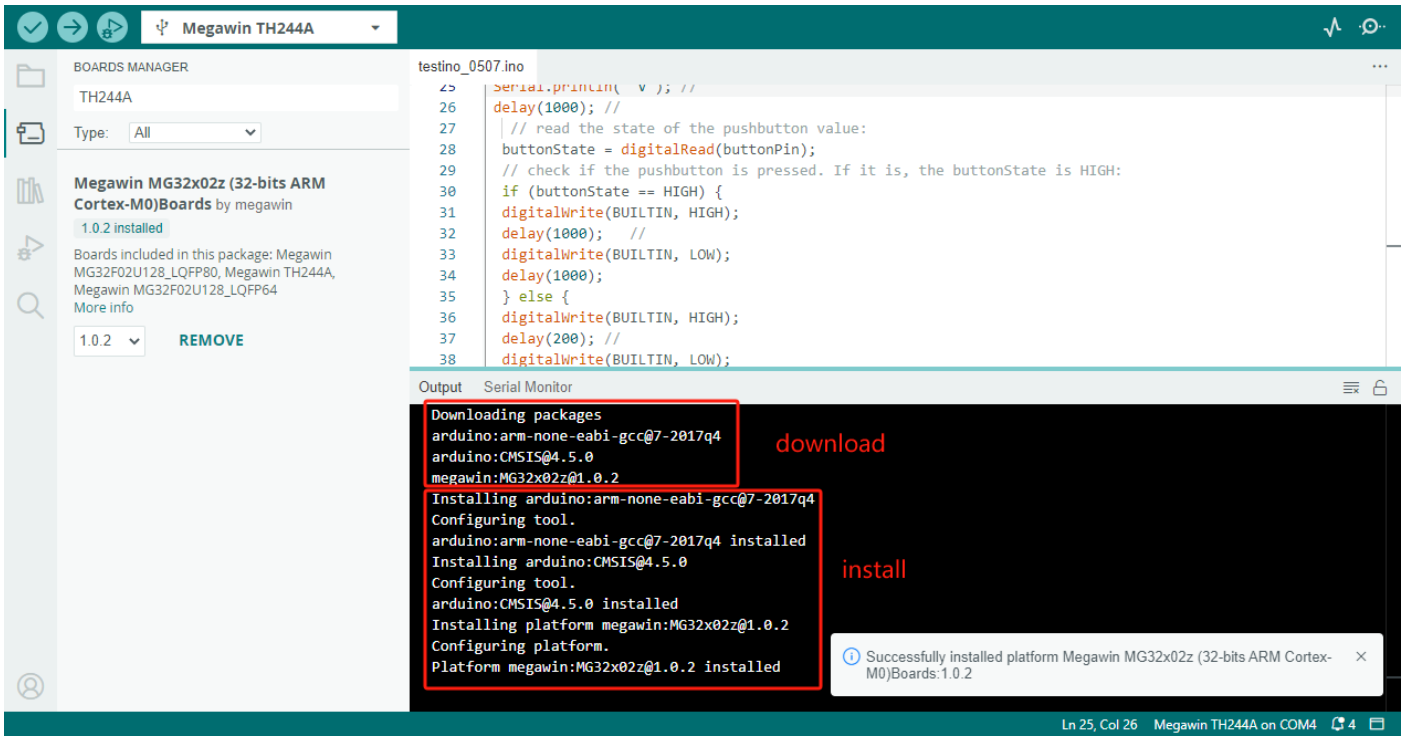


Click **Install** to download the arm-none-ebi-gcc compiler, CMSIS4.5.0 tool file, and magawin platform development kit file.

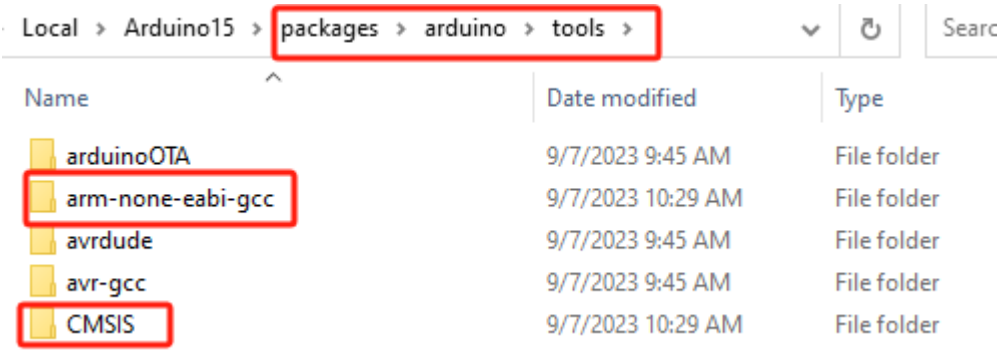


After files are downloaded finish, it will be installed automatically.

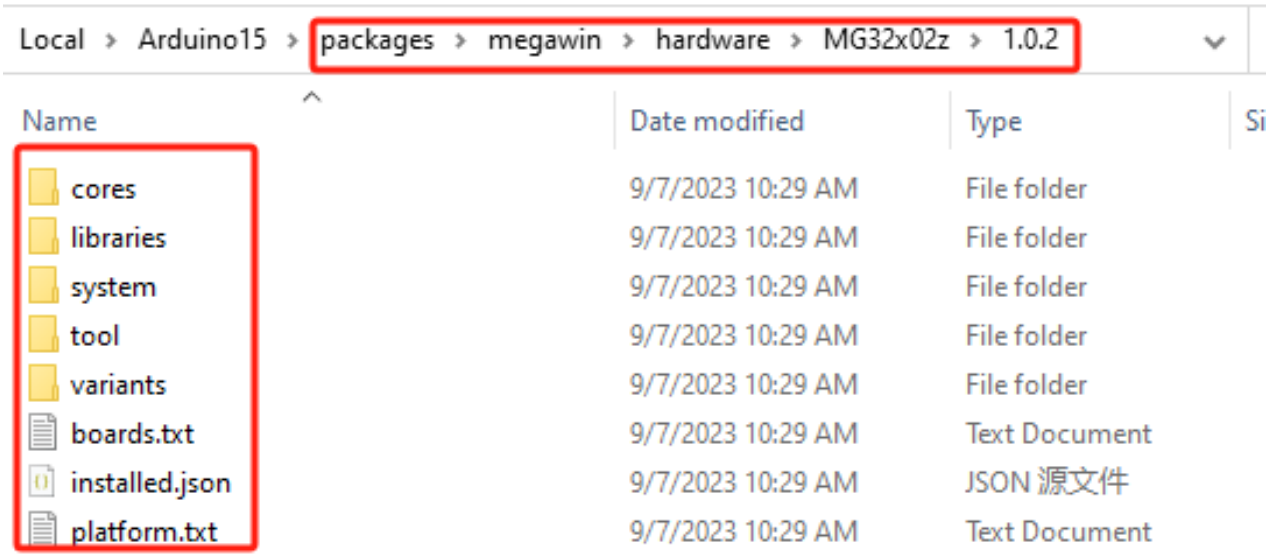
The following screenshot shows that **1.0.2 has been installed**.



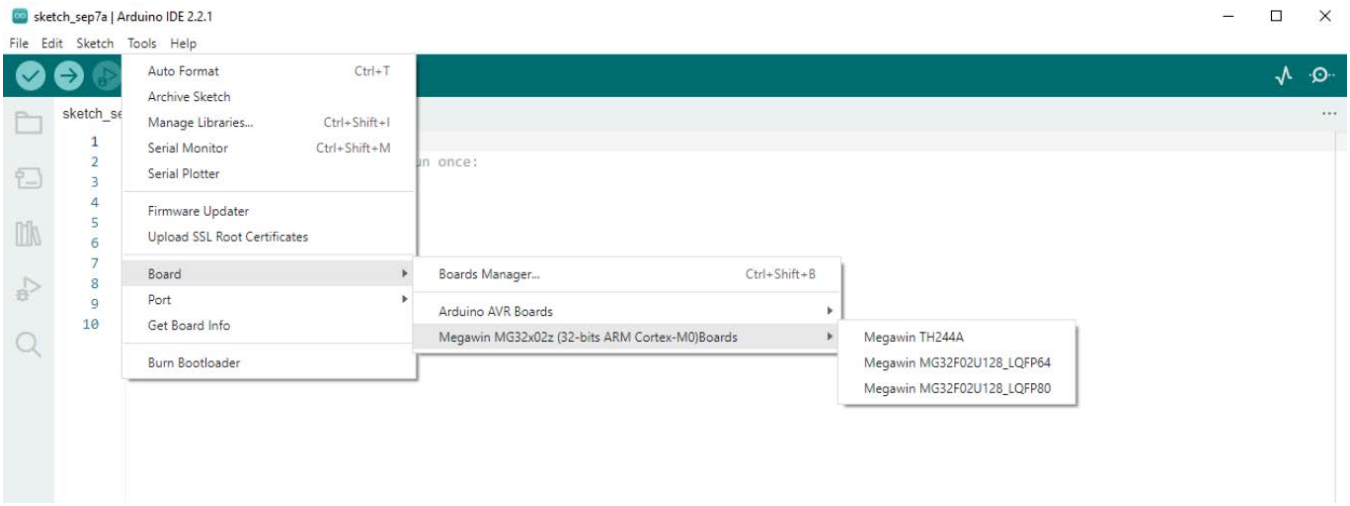
After installation is complete, the Arduino IDE will place gcc compiler and SMSIS to the following path automatically.



The development kit is automatically installed to the following path:



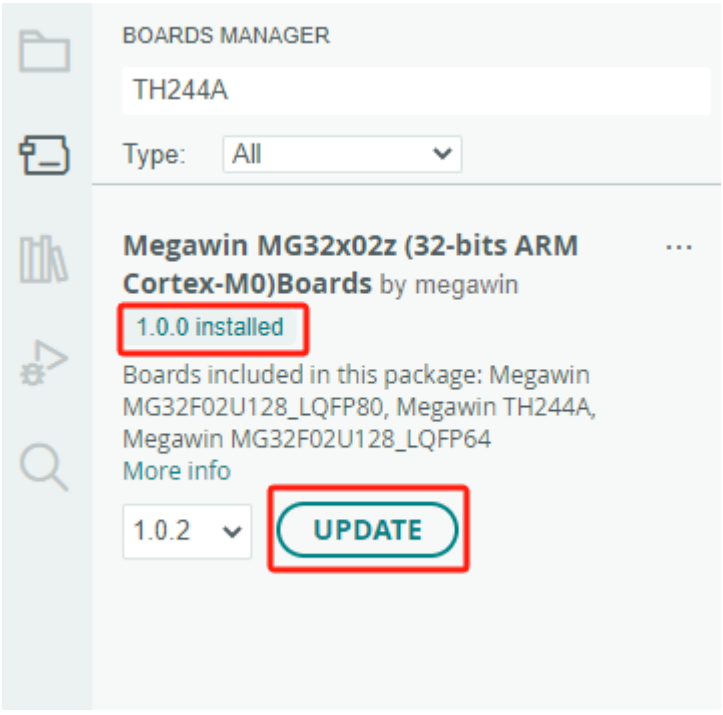
After installation is complete, it is recommended a restart of Arduino IDE. Users can see the newly added a third party development board in the BOARDS MANAGER. Users can select Megawin TH244A001 as the current development board in the development board selection.



3.4.4 Method two: Arduino IDE development board manager automatically updates the new version of the development kit

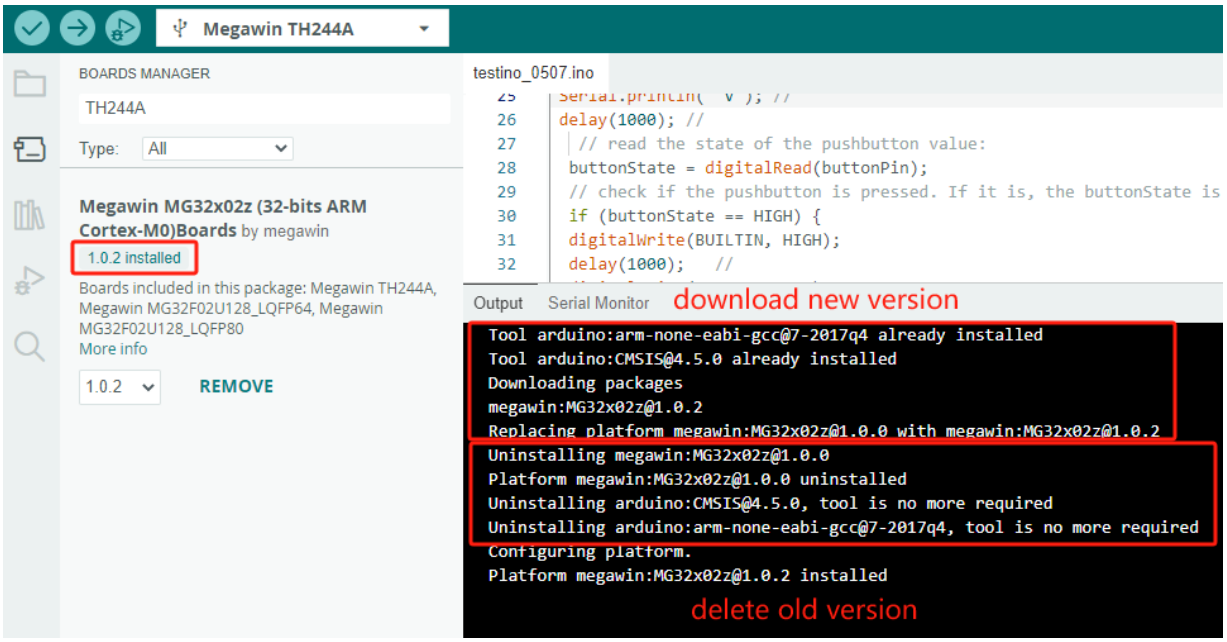
When Arduino IDE finds a new version by retrieving the JSON file:

For example: when the current version installed on the development board is 1.0.0, and the newly released JSON file defines the new version 1.0.2, the Arduino IDE BOARDS MANAGER will prompt to update the 1.0.2 version. When users click update, the Arduino IDE will download the new version related documents, and uninstall the old version, is as follows:



User click **Update** to download and install the latest 1.0.2 version of the development kit. Arduino IDE will install the new version 1.0.2 and 1.0.0 uninstall the old version.

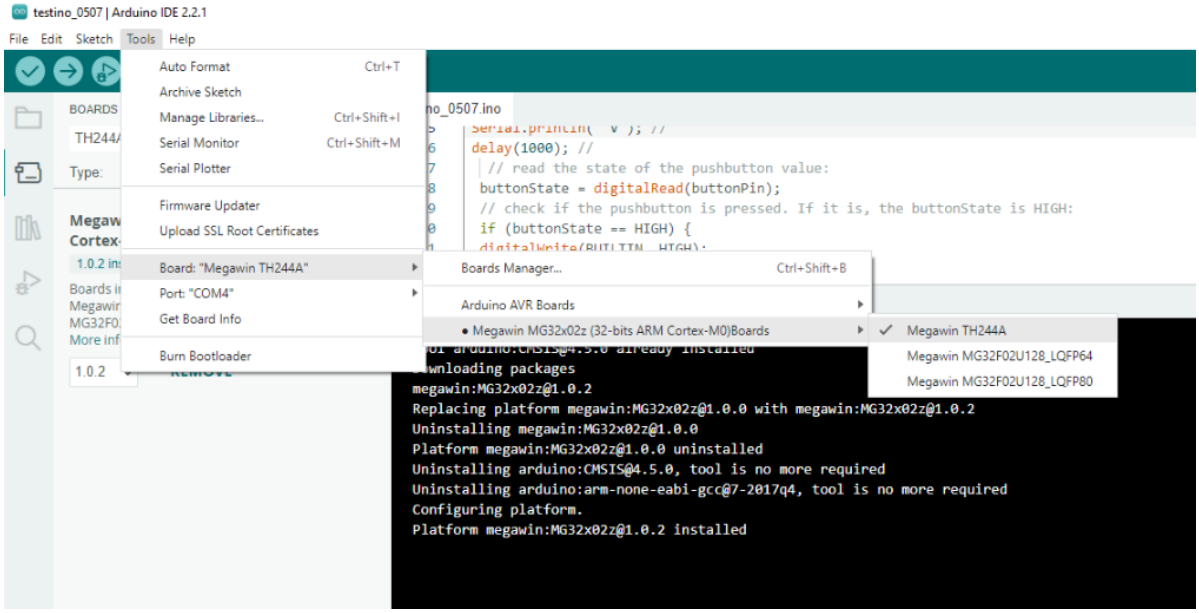
Only one development package will be actived for the same platform at the same time.



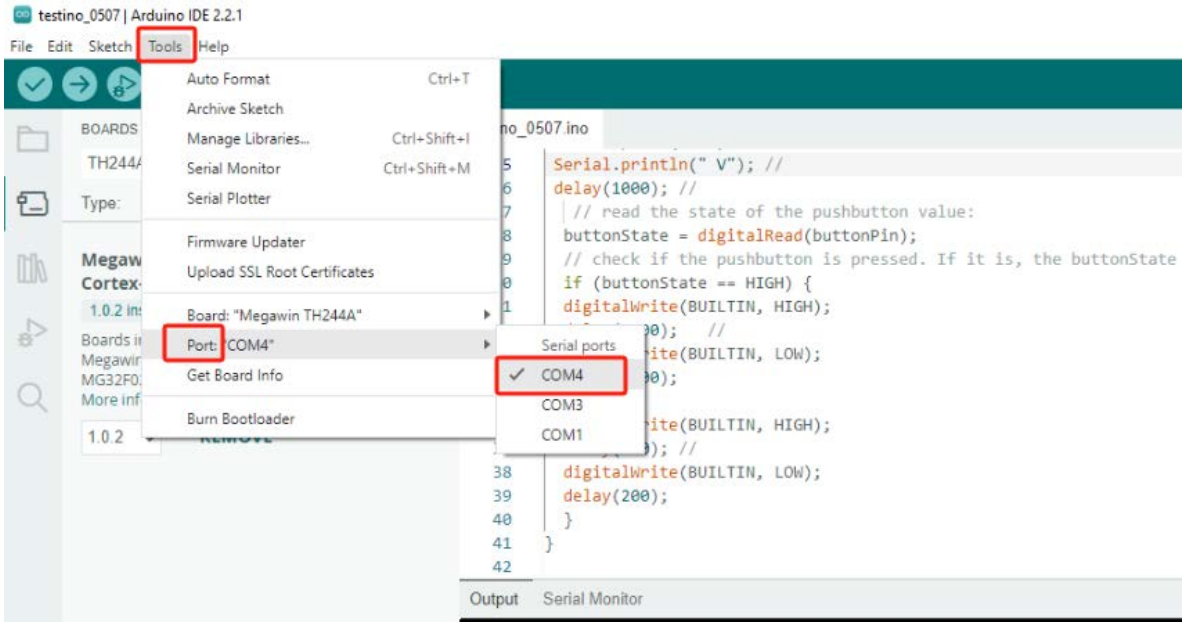
3.5 Program compilation and upload

Compile and upload the program through Arduino IDE

1 Select TH244A001 as the current development board through the following figure, and the system will automatically load the relevant data of this development board;

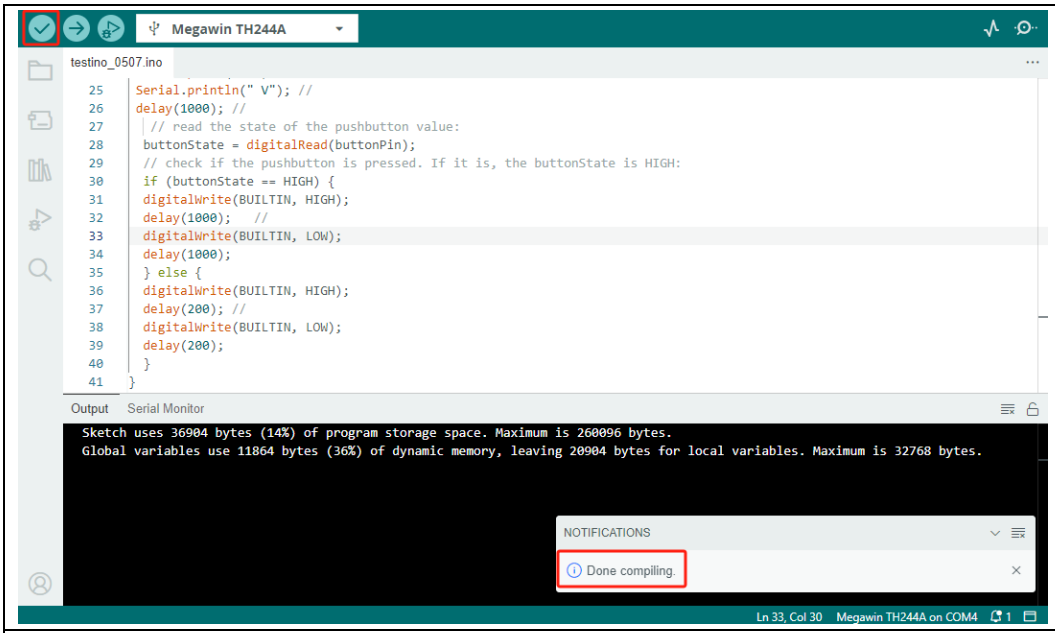


2 Select the serial port number for upload program

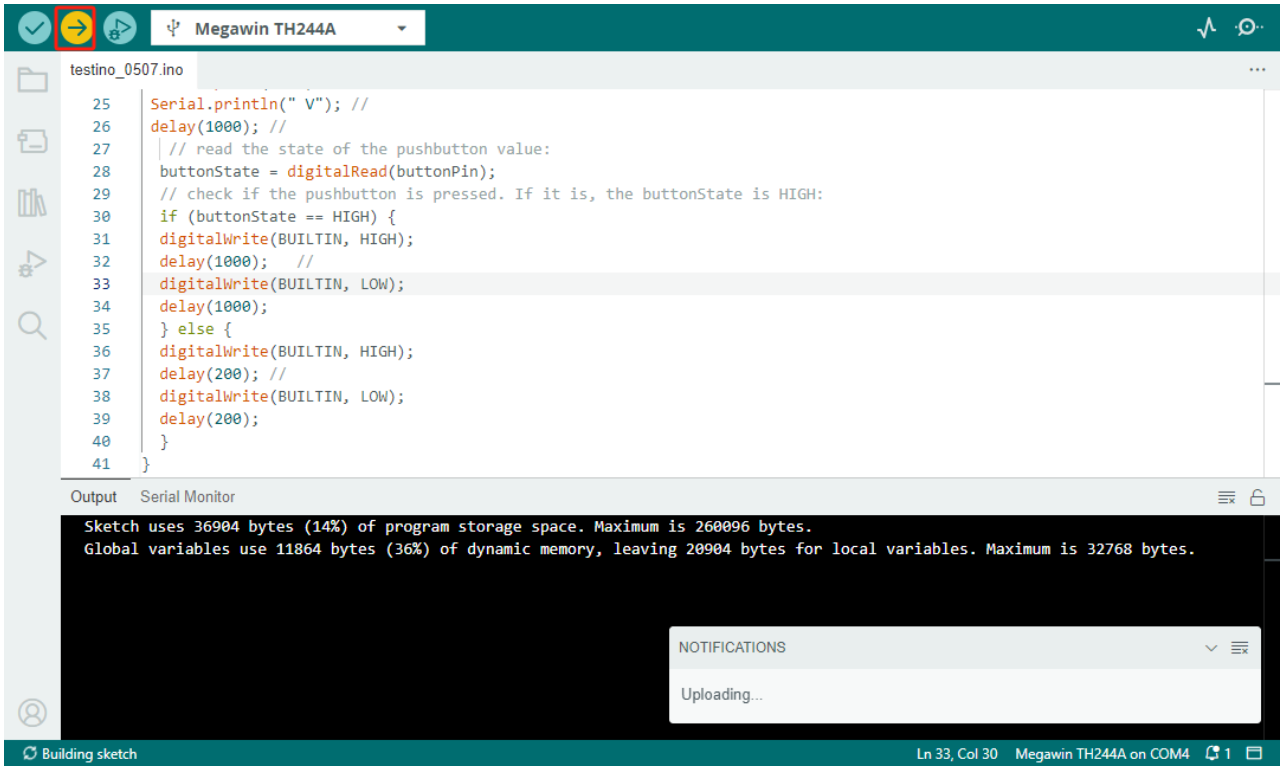


3 Compile the Arduino program

✔ **Compilation verification, only do compilation action, can test whether the program can be compiled successfully;**

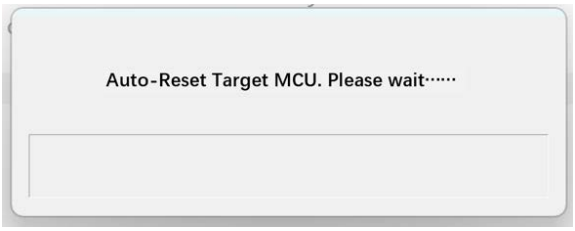


means compilation verification and upload, after the execution of compilation, if the compilation passes, IDE will upload the program to the development board TH244A001.



4 When compilation is completed, Arduino IDE will show

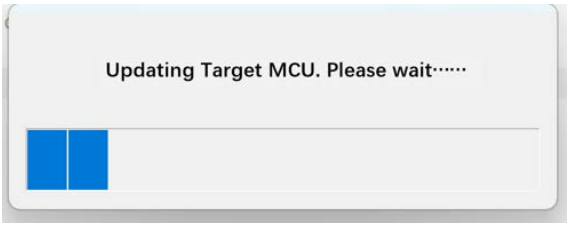
Auto-Reset Target MCU. Please wait…… The development board will automatically perform the RESET action.

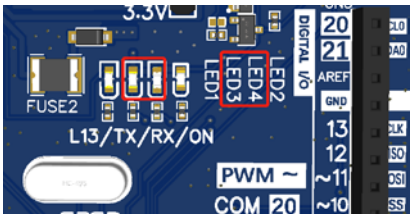


5 After the development board is RESET, it will show

Updating Target MCU. Please wait…… ， and show the upload progress bar;

The TX/RX LED LED3/4 will keep flashing during the upload process.

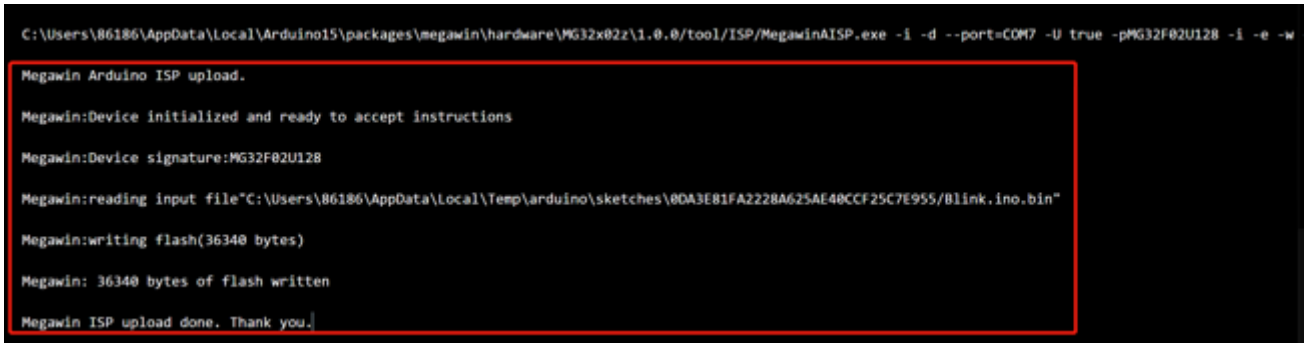




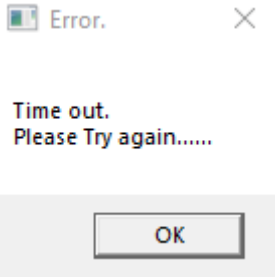
6 When the upload is completed, the TX/RX LED will stop blinking.

The upload is completed as follows, showing the current device model MG32F02U128;

The current bin file path (hex is in the same path); Take the information such as the usage of the Flash.



7 Upload timeout event occurrence, such as loose wire, or Arduino IDE abnormal, Will prompt Time out. Please Try again... Click OK



8 Check the USB connection, confirm that the development board is selected, the serial port is set correctly, and try to upload program again.