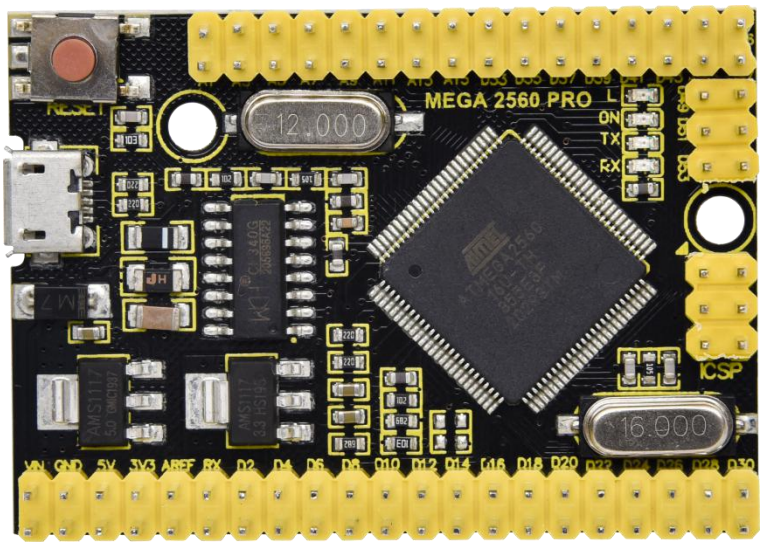
Keyestudio MEGA 2560 PRO Development Board

(Black and Eco-friendly)



Contents

1. Introduction

The mega 2560 control board, among the series of MCUs , is the most popular since it has numerous pins.
However, a substantial number of pins don’ t meet the space demand of DIY design. To tackle this issue, we roll out the Keyestudio MEGA 2560 PRO development board. In fact, its use method is as same as the official mega board, in addition to the different volume.

Its processor core is ATMEGA2560-16AU. In the meantime, it has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 channel serial communication ports, a USB connection, 1 ICSP header, and a reset button. And all ports are extended by pins with the interval of 2.54mm.
What’s more, you can burn the firmware for ATMEGA2560-16AU through the built-in ICSP port. The firmware of this chip is burnt well before delivery, therefore, you don’t need to burn the firmware.

The power can be supplied through USB cable, port 5V , GND（DC 5V）, as well as Vin GND (DC 7-12V).

2. Specification

Microcontroller: ATMEGA2560-16AU

USB to serial chip：CH340G

Operating Voltage:　5V

Input Voltage (recommended):DC 7-12V

Digital I/O Pins: 54 (D0-D53)

PWM Digital I/O Pins：15(D2-D13 D44-D46)

Analog Input Pins: 16(A0-A15)

DC Current per I/O Pin: 20 mA

DC Current for 3.3V Pin: 50 mA

Flash Memory: 256 KB of which 8 KB used by bootloader

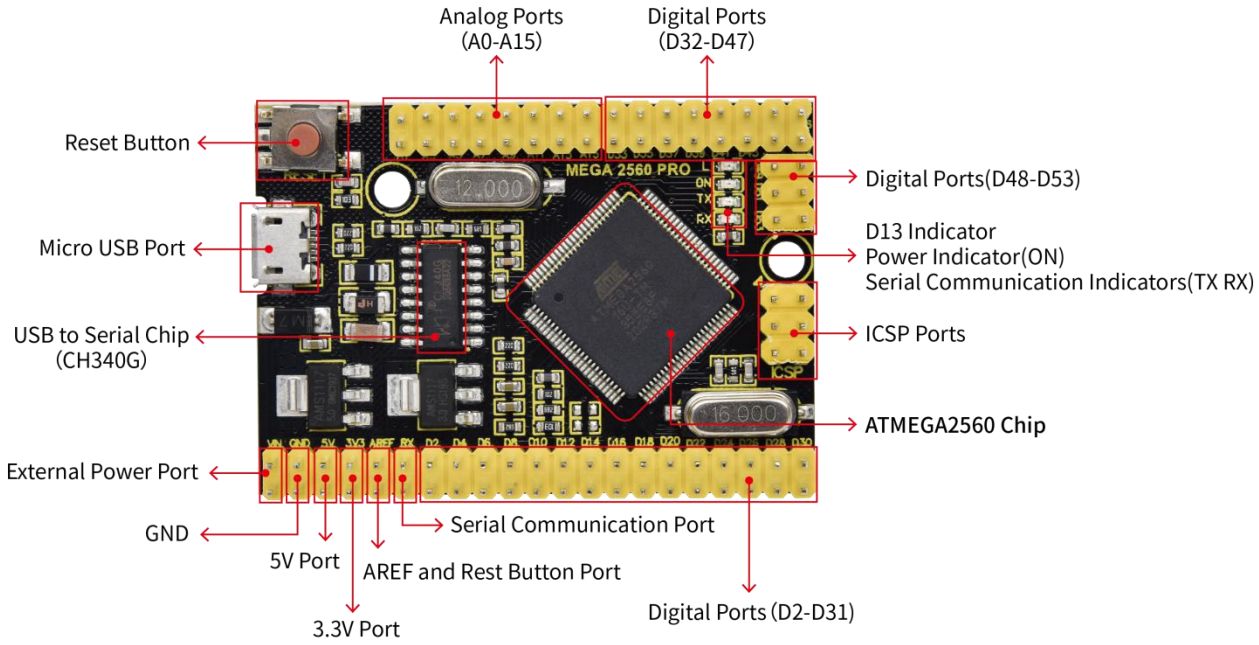
SRAM: 8 KB

EEPROM: 4 KB

Clock Speed: 16 MHz

LED_BUILTIN:D13

3. **Pin Interfaces:**



1	External Power Ports	External input: DC 7-12V
2	Ground	GND
3	5V	DC 5V input/output voltage (supply power for control board when inputting 5V)

4	3.3V	Provide DC 3.3V output voltage
5	AREF	Analog reference. Used to set the external reference voltage(0-5V)
6	Reset Button Port	Can be connected to press button, as same as reset button
7	Serial communication port	The default serial communication port， RX responds to D0（digital port), TX responds to D1 （digital port)
8	Digital Ports	Have 54 digital input/output pins (of which 15 can be used as PWM outputs). These pins can be configured as digital input pin to read the logic value (0 or 1). Or used as digital output pin to drive different modules like LED, relay, etc.
9	Analog Ports	16 analog pins (A0-A15)
10	ATMEGA 2560 (Microc	Each board has its own microcontroller,. The MCU of this board is ATMEGA2560-16AU.

	ontroller)	
11	ICSP Pin	the AVR, an Arduino micro-program header consisting of MOSI, MISO, SCK, RESET, VCC, and GND. It is often called the SPI (serial peripheral interface) and can be considered an "extension" of the output. In fact, slave the output devices to the SPI bus host. When connecting to PC, program the firmware to ATMEGA2560-16AU.
12	L Indicator	When D13 is high level, LED will be on; when it is low level, LED will be off
13	ON Indicator	LED is on when control board is plugged in power, otherwise, it will be off
14	TX Indicator	When Arduino board communicates via serial port and sends the message, TX led will flash
15	RX Indicator	When Arduino board communicates via serial port and receive the message, RX led will flash.
16	Reset Button	Reset your control board
17	Micro USB	Supply power for control board and upload code
18	USB to	CH340G, transform USB signals of computer to

	serial chip	serial signals

3. Specialized Functions of Some Pins:

Serial Communication Port(4-channel)：Serial（D0 corresponds to RX0, D1 is equivalent to TX0）, Serial1（D19 corresponds RX1, D18 is equivalent to TX1), Serial2 (D17 corresponds to RX2, D16 stands for TX2) and Serial3（D15 stands for RX3, D14 corresponds to TX3）.

RX（D0）and TX（D1）are connected to the USB to serial chip of CH340G

- **Serial Communication:** D0 (RX0) and D1 (TX1); Serial 1: D19 (RX1) and D18 (TX1); Serial 2: D17 (RX2) and D16 (TX2); Serial 3: D15 (RX3) and D14 (TX3).
- **PWM Pins (Pulse-Width Modulation):** D2 to D13, and D44 to D46.
- **External Interrupts:** D2 (interrupt 0), D3 (interrupt 1), D18 (interrupt 5), D19 (interrupt 4), D20 (interrupt 3), and D21 (interrupt 2).
- **SPI communication:** D53 (SS), D52 (SCK), D51 (MOSI), D50 (MISO).
- **IIC communication:** D20 (SDA); D21 (SCL).

4. Windows System

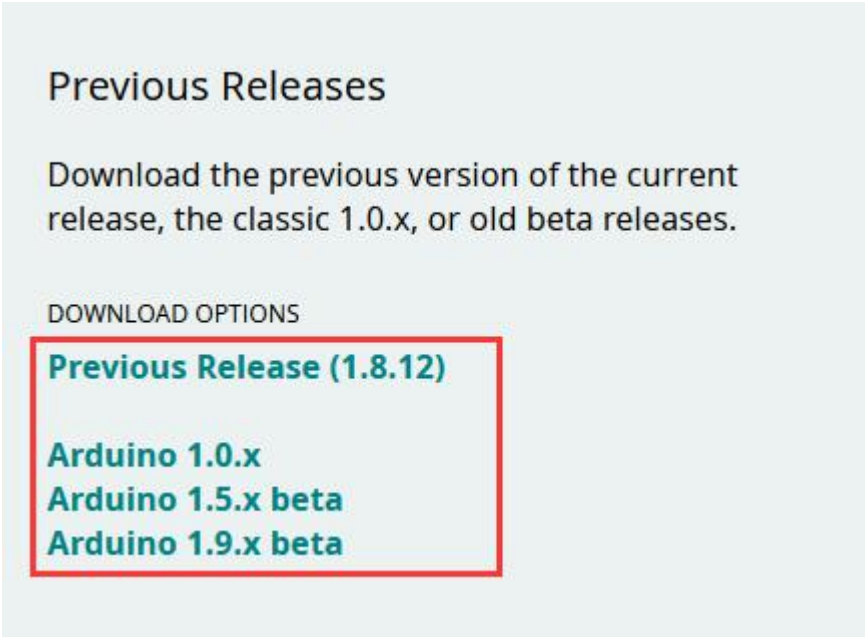
4.1 Download Arduino IDE

When getting this control board, we need to install Arduino IDE

Enter the website https://www.arduino.cc/, and click SOFTWARE > DOWNLOADS

You can select the latest version-----1.8.13. Alternatively, the previous release is your another choice.

In this project, we use 1.8.12 version.



Click **Previous Release (1.8.12)** to enter the new page. As shown below;

The **Windows installer** needs installing manually. Yet , the **Windows zip file for non admin install**， a zip file of Arduino 1.8.12 version, can be directly downloaded and installed.

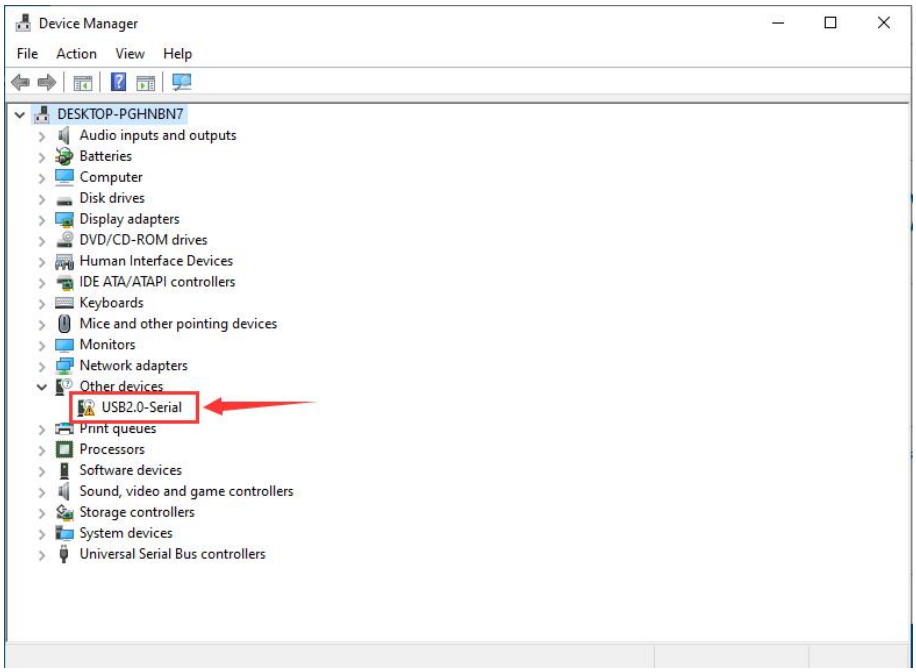
4.2 Installing Driver

For this part, we need to install the driver of Arduino IDE

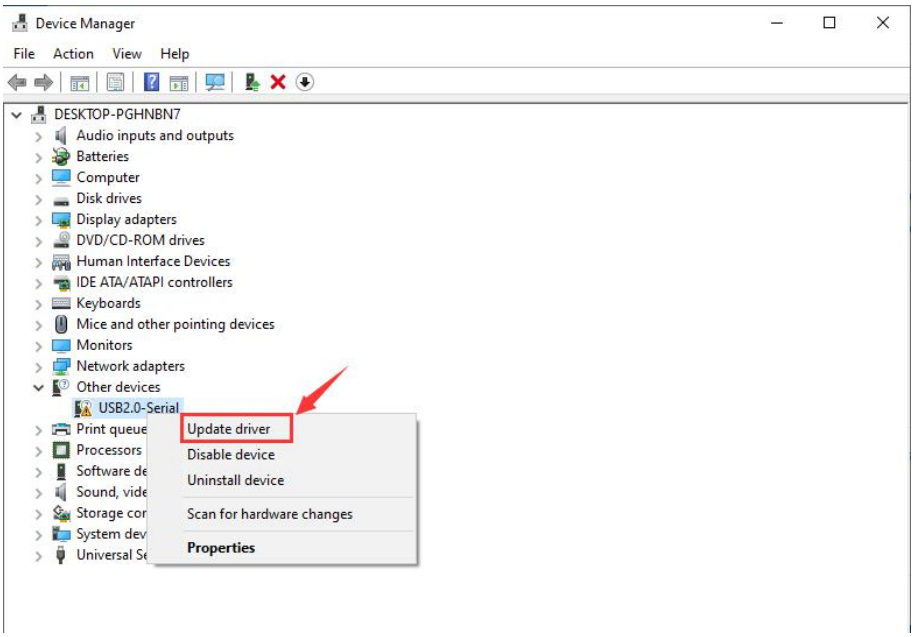
First, let' s attach USB cable to computer. The driver can be installed automatically if the PC system is Windows 10, however, you need to install the driver manually if the PC system is other version.

The USB to serial chip of control board is CH340G, therefore, we will install its driver(usb_ch341_3.1.2009.06).

Click Computer----- Properties----- Device Manager, as shown below:

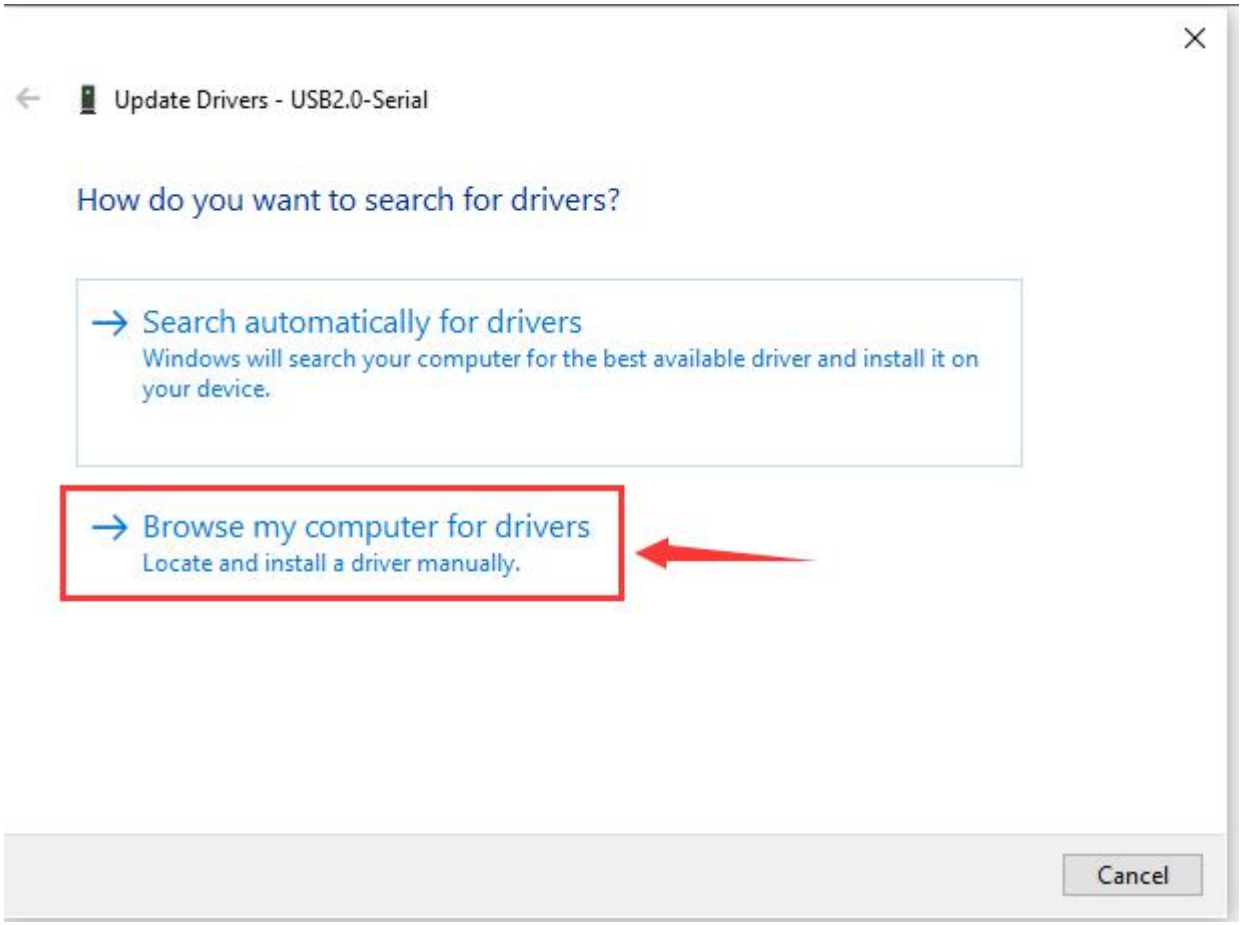


Click USB Serial and "Update Driver Program"

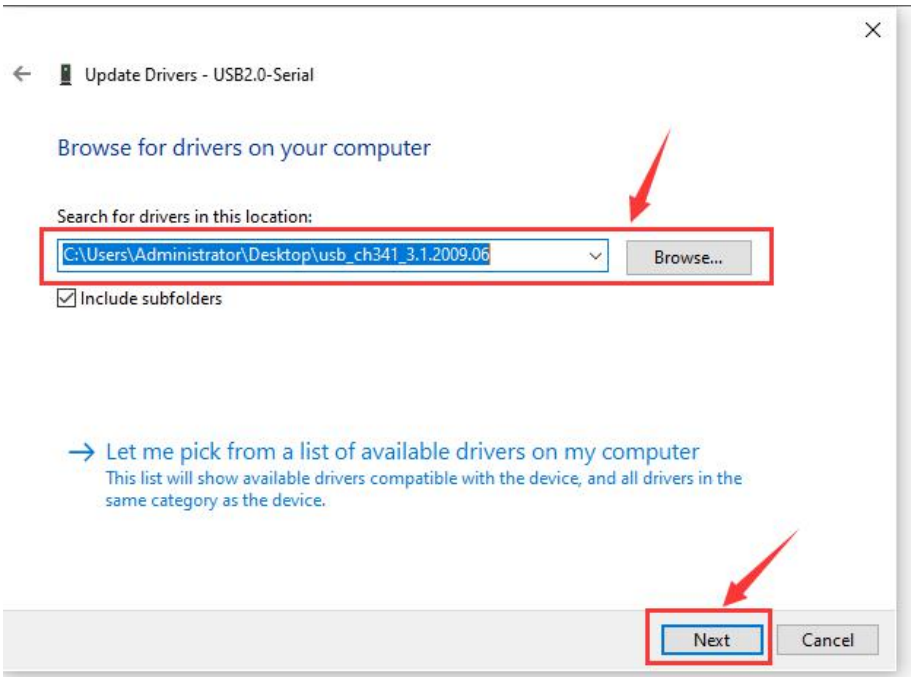


Jump into the following page and select "Browse my computer for driver

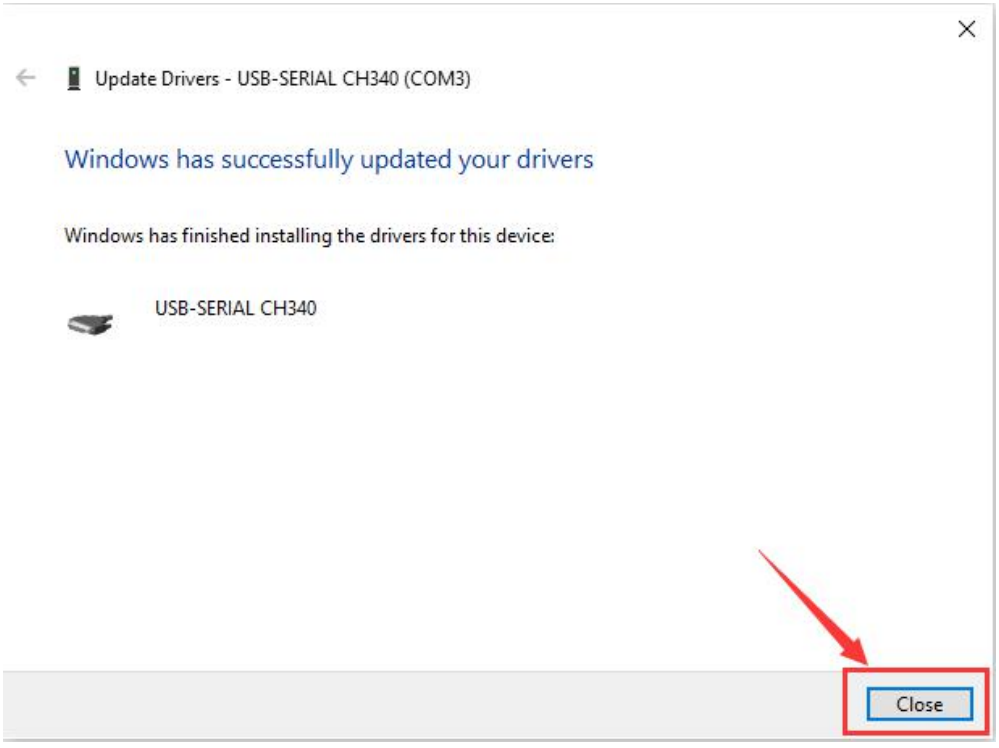
software”.



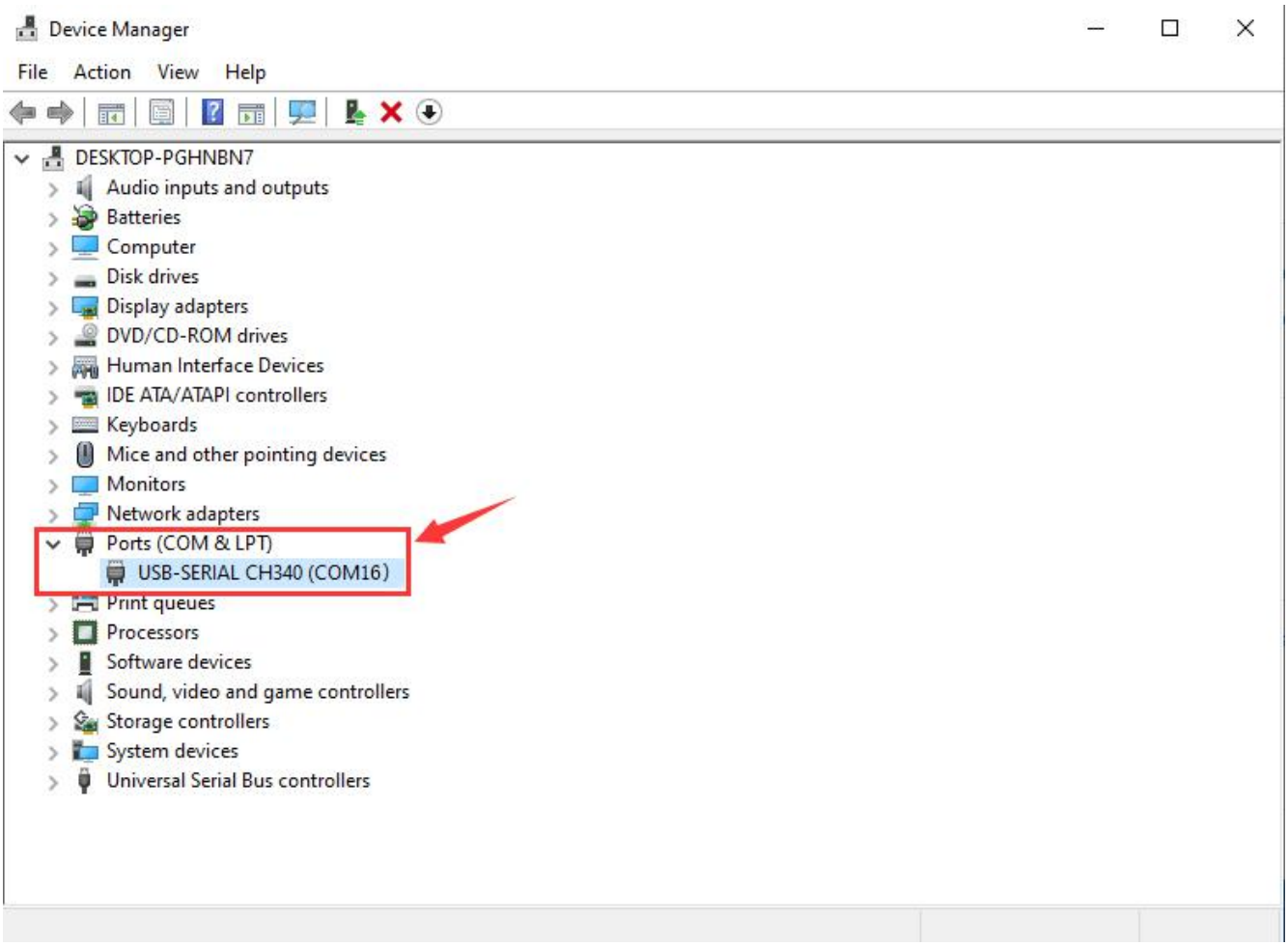
Search the **usb_ch341_3.1.2009.06 folder**



After the driver is installed, you need to click **Close.**



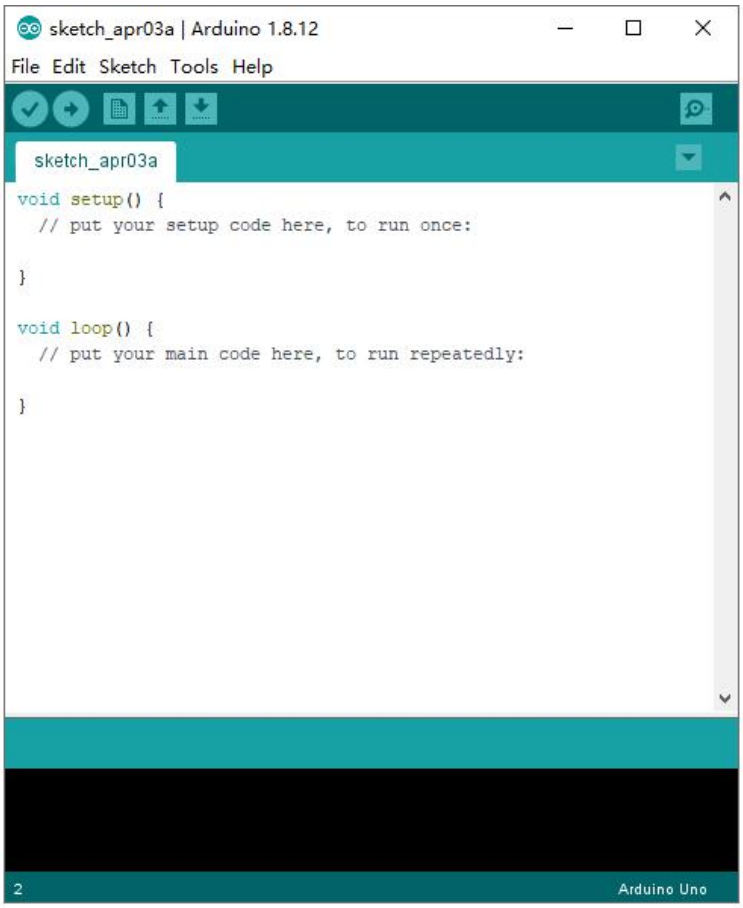
Click Computer----- Properties----- Device Manager, as shown below



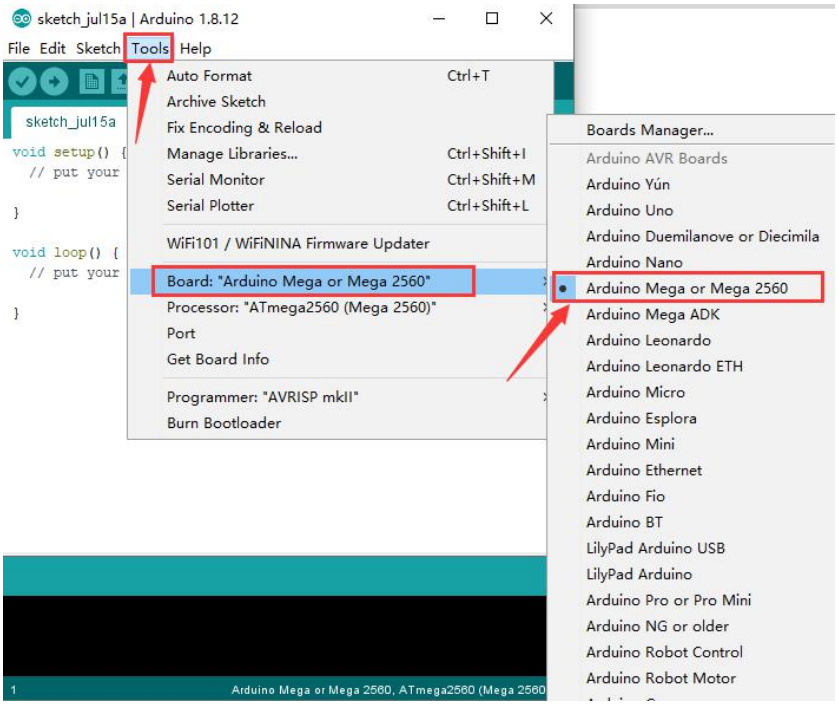
4.3 Arduino IDE Setting

Click 

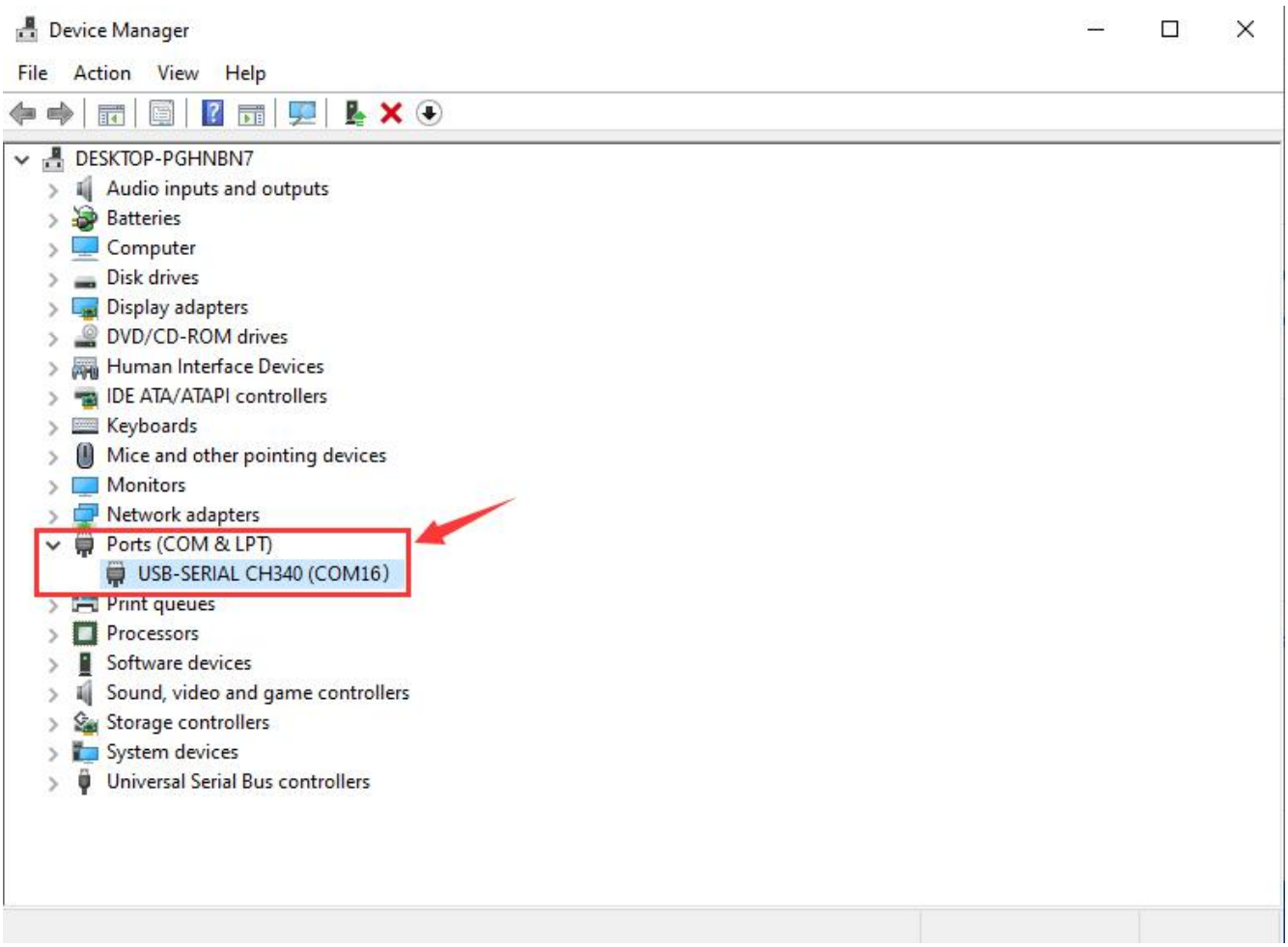
icon to pen Arduino IDE.

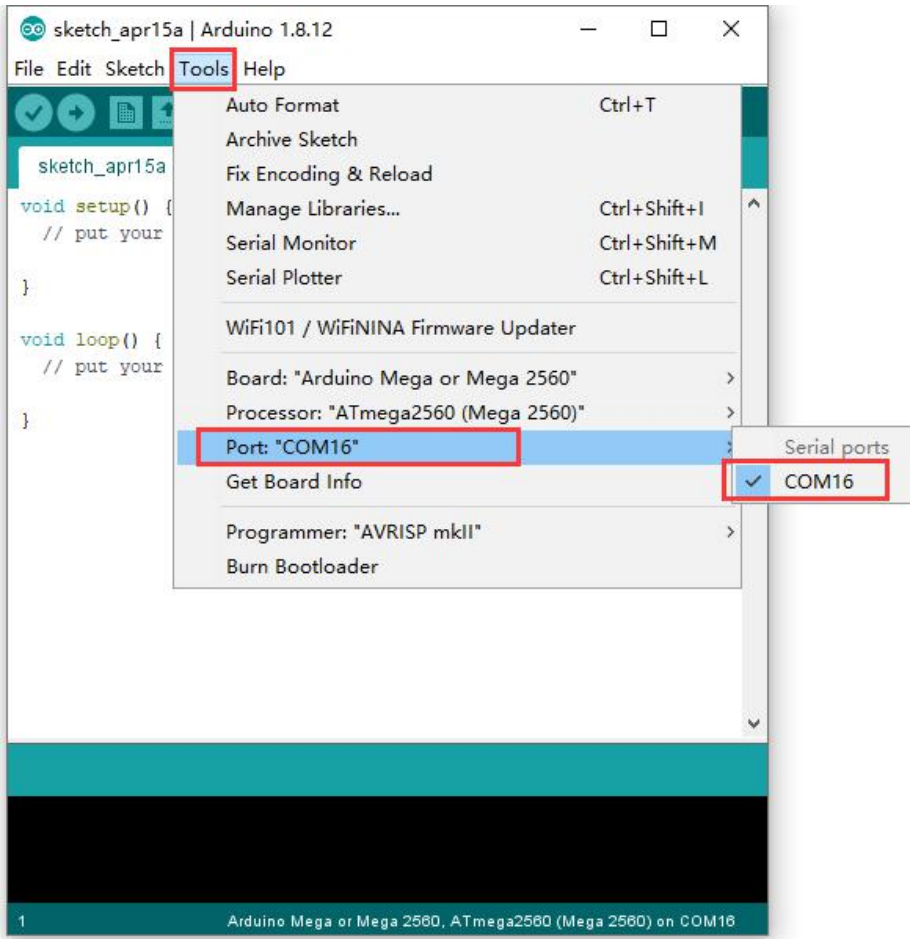


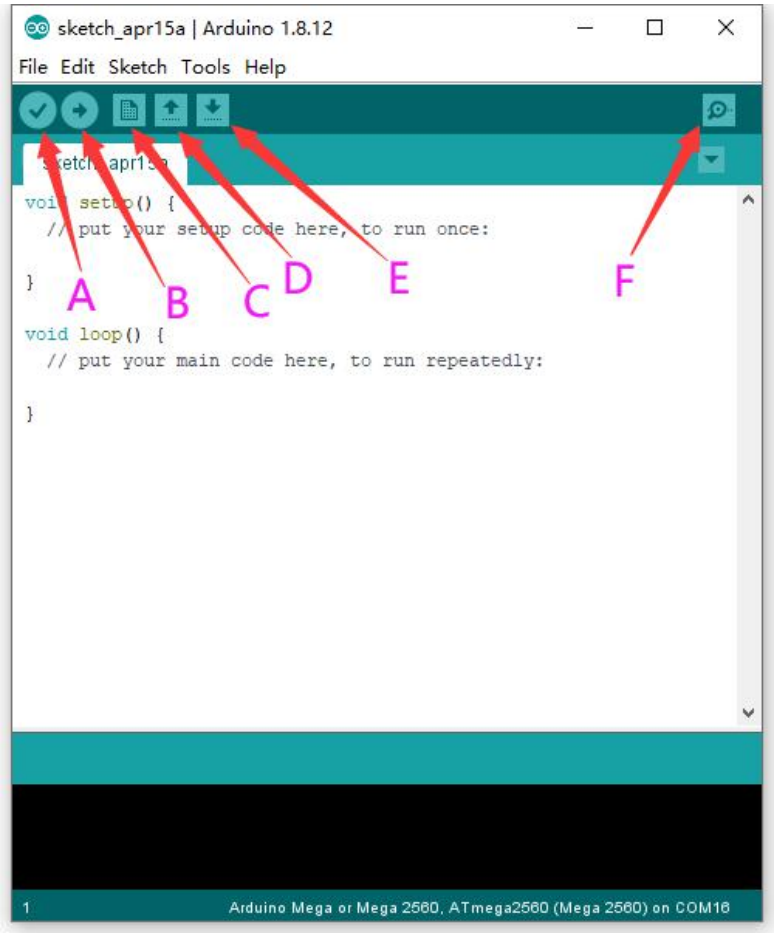
When downloading the sketch to the board, you must select the correct name of Arduino board that matches the board connected to your computer. As shown below;



Then select the correct COM port (you can see the corresponding COM port after the driver is successfully installed).


Device Manager
File Action View Help
DESKTOP-PGHNBN7
Audio inputs and outputs
Batteries
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Ports (COM & LPT)
USB-SERIAL CH340 (COM16)
Print queues
Processors
Software devices
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers


sketch_apr15a | Arduino 1.8.12
File Edit Sketch Tools Help
sketch_apr15a
void setup() {
// put your
}
void loop() {
// put your
}
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino Mega or Mega 2560"
Processor: "ATmega2560 (Mega 2560)"
Port: "COM16"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Serial ports
COM16
1
Arduino Mega or Mega 2560, ATmega2560 (Mega 2560) on COM16



A- Used to verify whether there is any compiling mistakes or not.

B- Used to upload the sketch to your Arduino board.

C- Used to create shortcut window of a new sketch.

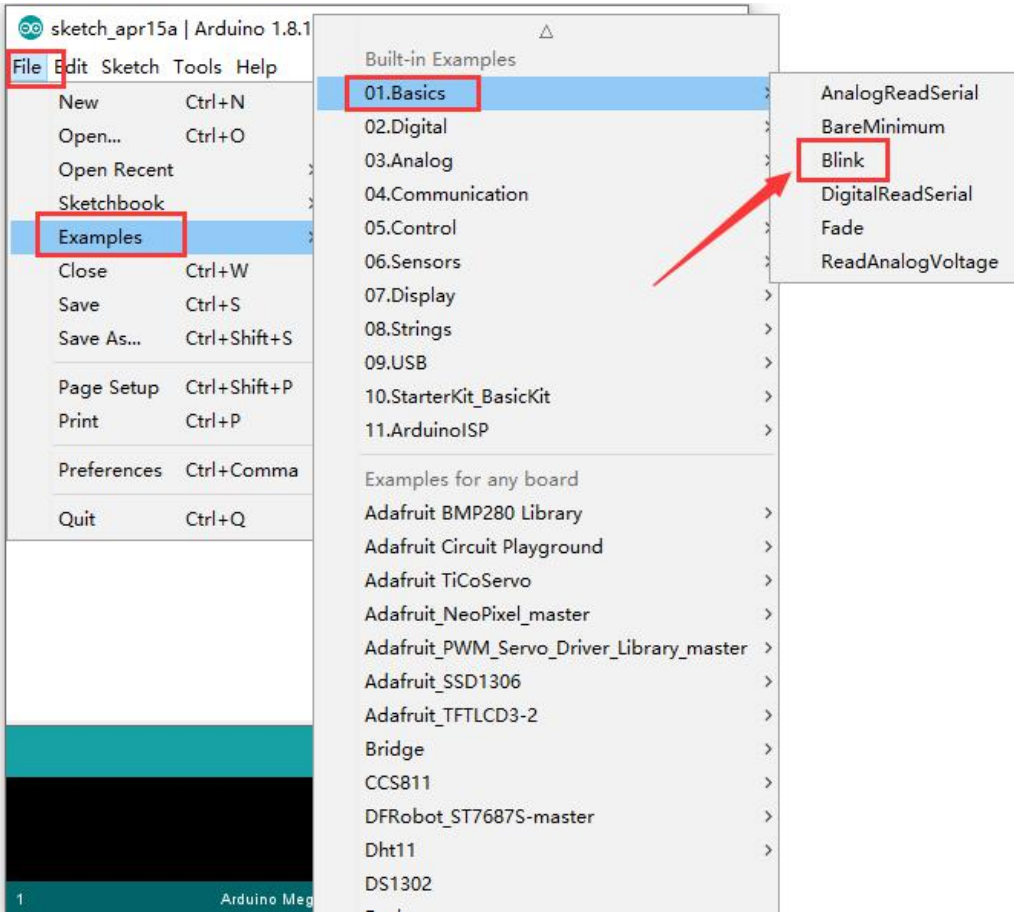
D- Used to directly open an example sketch.

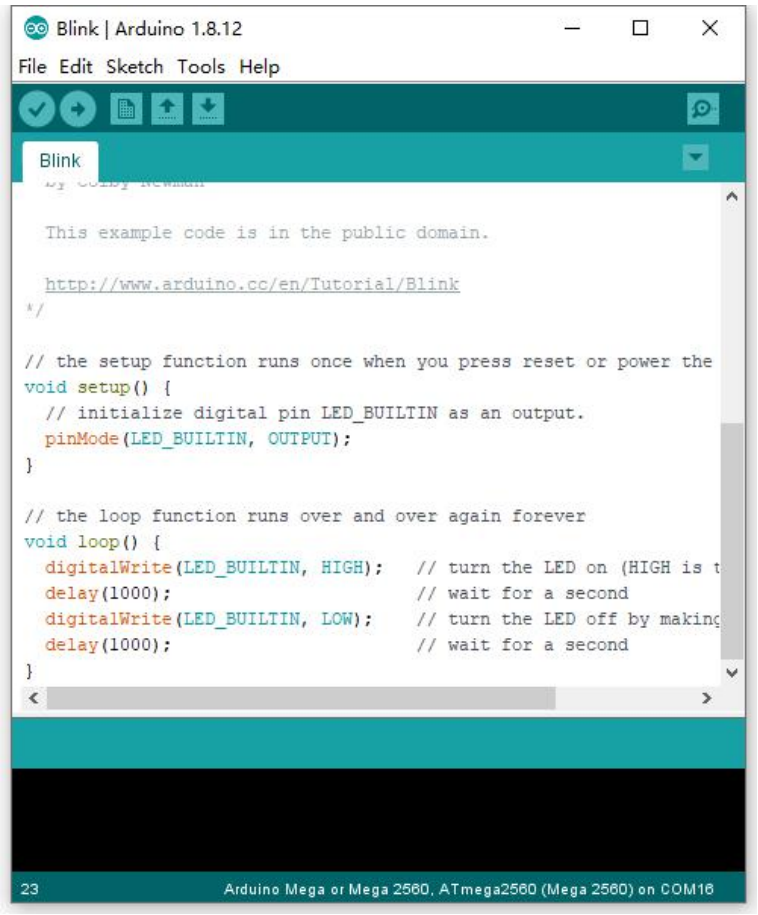
E- Used to save the sketch.

F- Used to send the serial data received from board to the serial monitor.

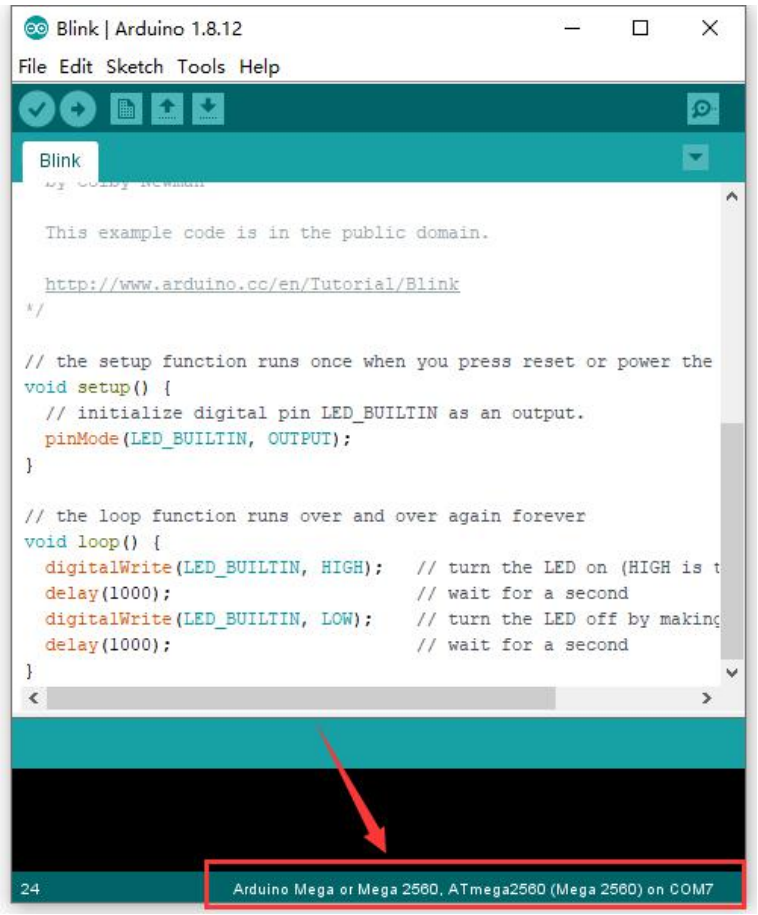
5.4 Start A Program

Open the file to select **Example**, and click **BASIC**>**BLINK**, as shown below:

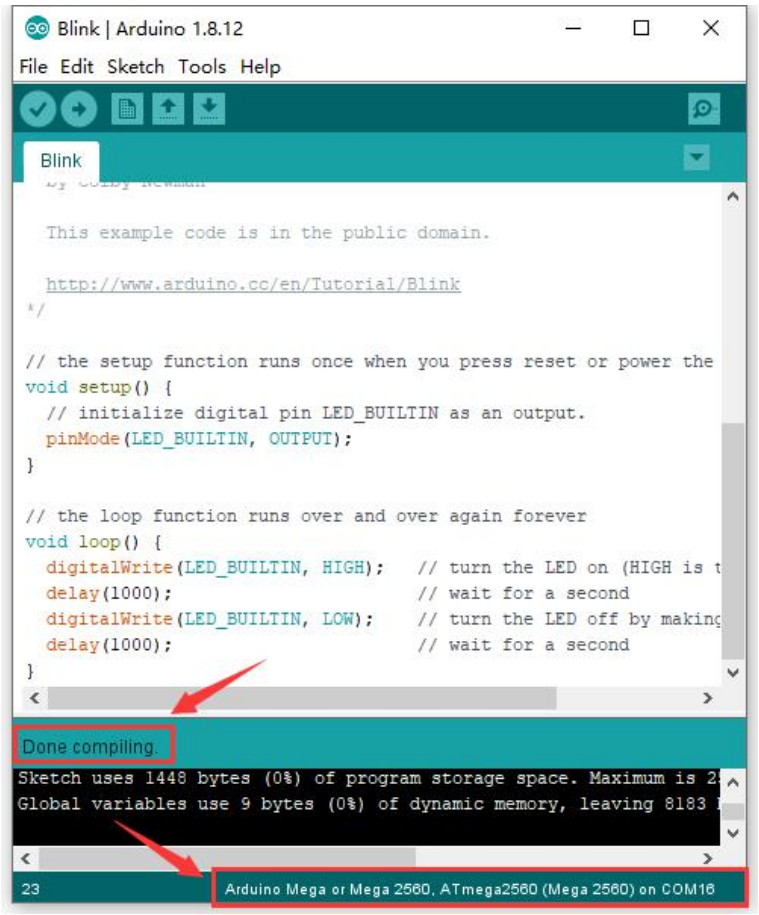




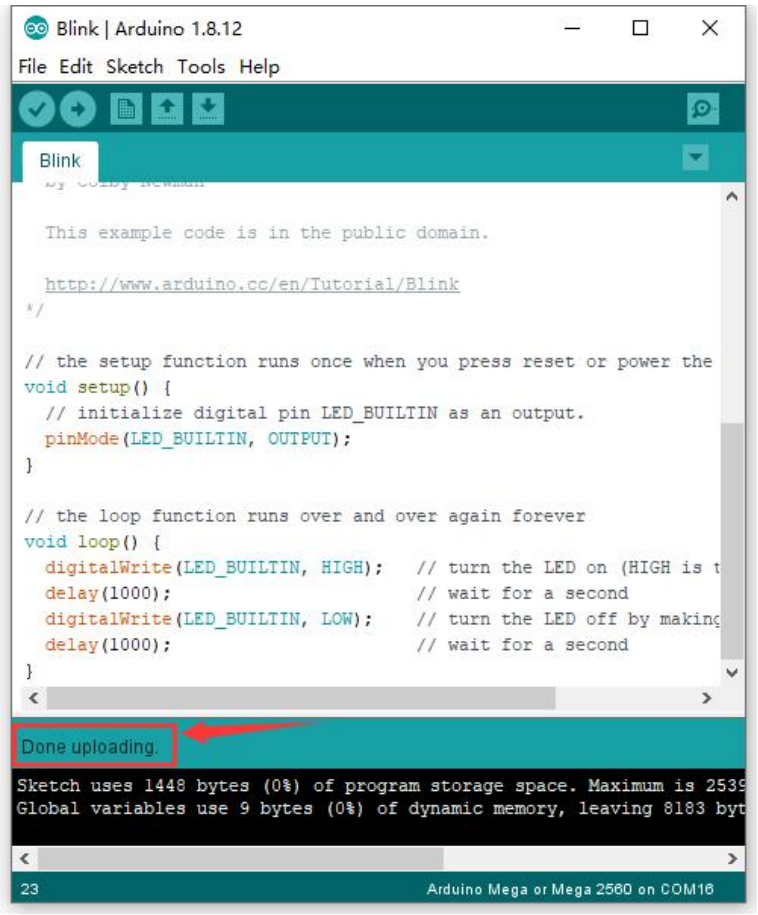
Set the correct **COM port,** and the corresponding board and COM port are shown on the lower right of IDE.



Click to start compiling the program, and check errors.



Click to upload the program



After the program is uploaded successfully, the onboard LED blinks.

Congratulation, you finish the first program.

5. MAC System

5.1 Install Arduino IDE on MAC System

The installation instruction is as same as the chapter 4.1, as shown below:

5.2 Download the Driver of CH340

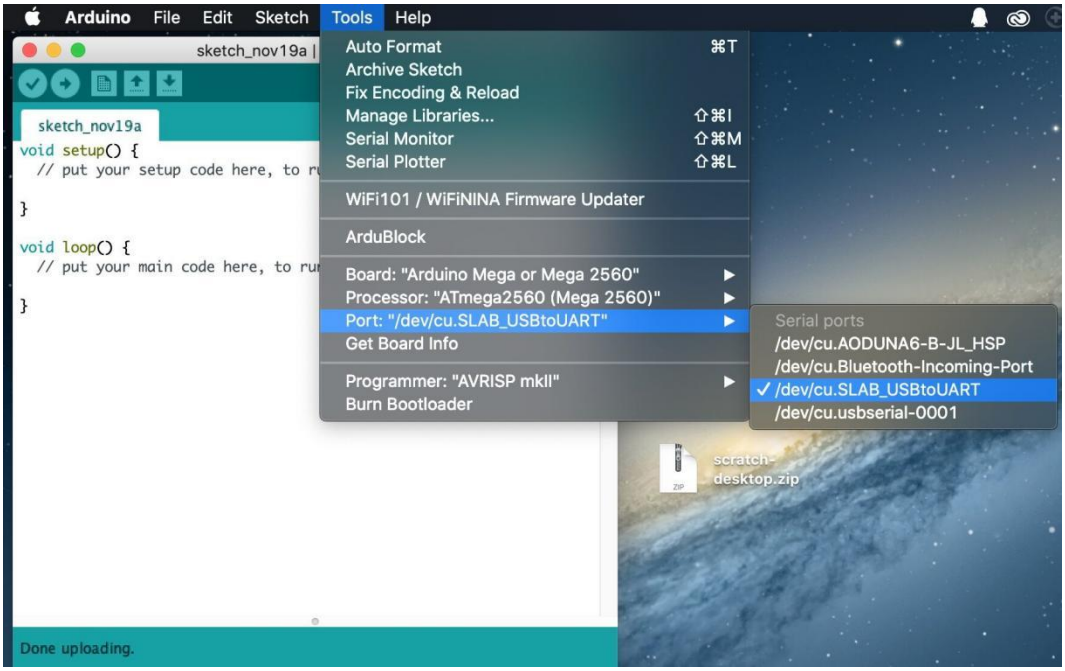
https://fs.keyestudio.com/CH340-MAC

5.3 How to Install the Driver of CH340

https://wiki.keyestudio.com/Download_CH340_Driver_on_MAC_System

5.4 Arduino IDE Setting

The setting method is as same as the chapter 4.3 except from COM port, as shown below.


Arduino File Edit Sketch Tools Help
sketch_nov19a |
sketch_nov19a
void setup() {
// put your setup code here, to r
}
void loop() {
// put your main code here, to ru
}
Done uploading.
Auto Format ⌘T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... ⇧⌘I
Serial Monitor ⇧⌘M
Serial Plotter ⇧⌘L
WiFi101 / WiFiNINA Firmware Updater
ArduBlock
Board: "Arduino Mega or Mega 2560"
Processor: "ATmega2560 (Mega 2560)"
Port: "/dev/cu.SLAB_USBtoUART"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Serial ports
/dev/cu.AODUNA6-B-JL_HSP
/dev/cu.Bluetooth-Incoming-Port
/dev/cu.SLAB_USBtoUART
/dev/cu.usbserial-0001
scratch-desktop.zip