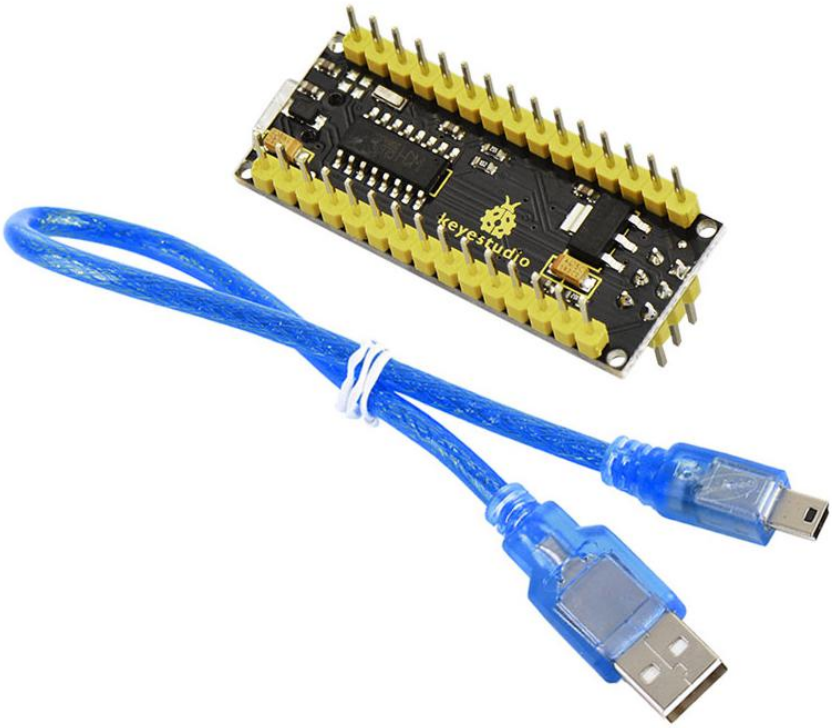
Keyestudio NANO CH340



Content

1. Description

The processor core of Keyestudio Nano CH340 is atmega328p-au. It is as same as the official Arduino Nano in addition to driver file and USB to serial chip (CH340G).

It also has a 14 digital input / output interfaces (6 of which can be used as PWM output), 8 analog input interfaces, 1 16MHz crystal oscillator, 1 mini USB port, 1 ICSP interface, and a reset button.

The ICSP interface is used to burn firmware to Atmega328P-Au. Since this chip we burn firmly in front of the factory, it is generally not available. When using the Mini USB cable, we can use the VIN GND (DC 7-12V) to power.

What's more, you can burn the firmware for Atmega328P-Au 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: ATMEGA328P-AU

Operating Voltage: 5V

Input Voltage (recommended):DC 7-12V

Digital I/O Pins: 14 (D0-D13)

PWM Digital I/O Pins：6 (D3 D5 D6 D9 D10 D11)

Analog Input Pins: 8(A0-A7)

DC Current per I/O Pin: 40 mA

Flash Memory: 32 KB of which 2 KB used by bootloader

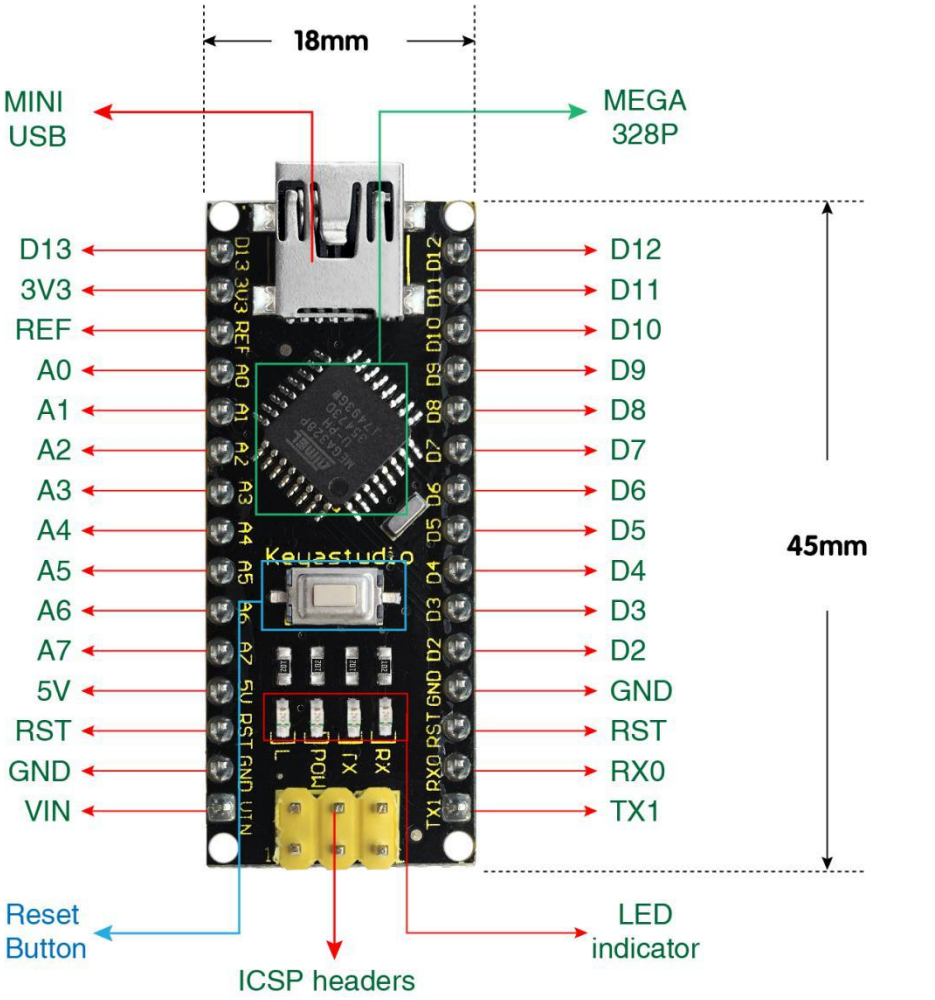
SRAM:2 KB

EEPROM:1 KB

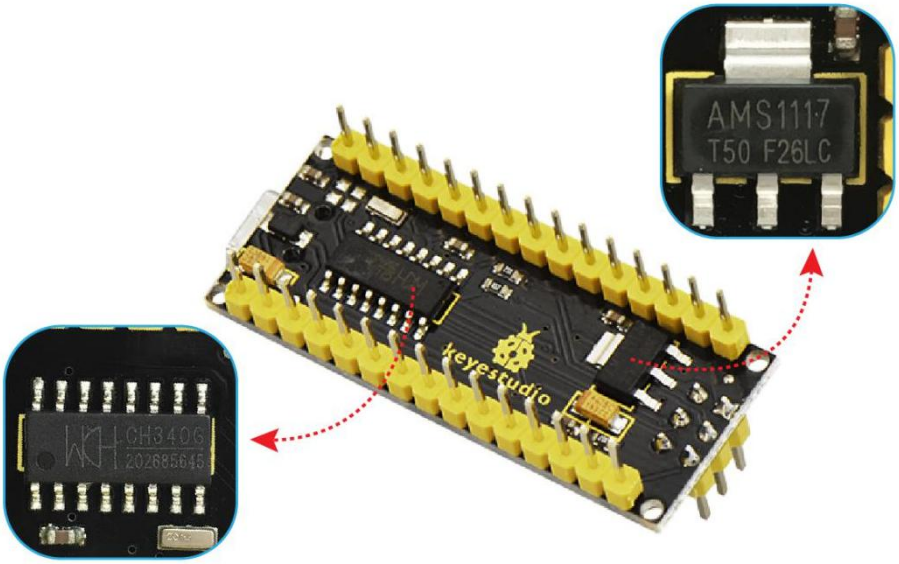
Clock Speed:16 MHz

LED_BUILTIN:D13

3. Pins


18mm
MINI
USB
MEGA
328P
D13
3V3
REF
A0
A1
A2
A3
A4
A5
A6
A7
5V
RST
GND
VIN
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
GND
RST
RX0
TX1
45mm
Keyestudio
Reset
Button
ICSP headers
LED
indicator

H:18mm


AMS1117
T50 F26LC
CH340G
keyestudio

1	**ICSP Header**	**ICSP (In-Circuit Serial Programming) Header** ICSP is the AVR, an 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 output. In fact, slave the output devices under the SPI bus host. When connecting to PC, program the firmware to ATMEGA328P-AU.
2	**LED indicator（RX）**	Onboard you can find the label: RX(receive) When control board communicates via serial port, receive the message, RX led flashes.
3	**LED indicator（TX）**	Onboard you can find the label: TX (transmit) When control board communicates via serial port, send the message, TX led flashes.
4	**LED indicator（POW）**	Power up the control board, LED on, otherwise LED off.
5	**LED indicator（L）**	There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

6	**RX0（D0） TX1（D1） D2-D13**	It has 14 digital input/output pins D0-D13 (of which 6 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.
7	**RST**	Reset pin: connect external button. The function is the same as RESET button.
8	**MEGA 328P**	Each board has its own microcontroller. You can regard it as the brain of your board. Microcontrollers are usually from ATMEL. Before you load a new program on the Arduino IDE, you must know what IC is on your board. This information can be checked at the top surface of IC. The board's microcontroller is ATMEGA328P-AU. More info. see the datasheet
9	**MINI USB**	The board can be powered via Mini-B USB connection. Also upload the program to the board via USB port.
10	**3V3 pin**	Provides 3.3V voltage output
11	**REF**	Reference external voltage (0-5 volts) for the analog input pins. Used with analogReference().
12	**A0-A7**	The Nano has 8 Analog Pins, labeled A0 through A7.

13	**5V pin**	Provides 5V voltage output
14	**GND**	Ground pin
15	**VIN**	Input an external voltage DC7-12V to power the board.
16	**Reset Button**	Used to reset the control board
17	**CH340G**	USB-to-serial port chip, converting the USB signal into Serial port signal.
18	**AMS1117**	Convert the external voltage input DC7-12V into DC5V, then transfer it to the processor and other elements.

3. Specialized Functions of Some Pins:

- **Serial communication:** 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data.
- **PWM (Pulse-Width Modulation):** D3, D5, D6, D9, D10, D11
- **External Interrupts:** D2 (interrupt 0) and D3 (interrupt 1). These pins can

be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the attachInterrupt() function for details.

- **SPI communication:** D10 (SS), D11 (MOSI), D12 (MISO), D13 (SCK).
- **IIC communication:** A4 (SDA); A5(SCL)

4. Windows System

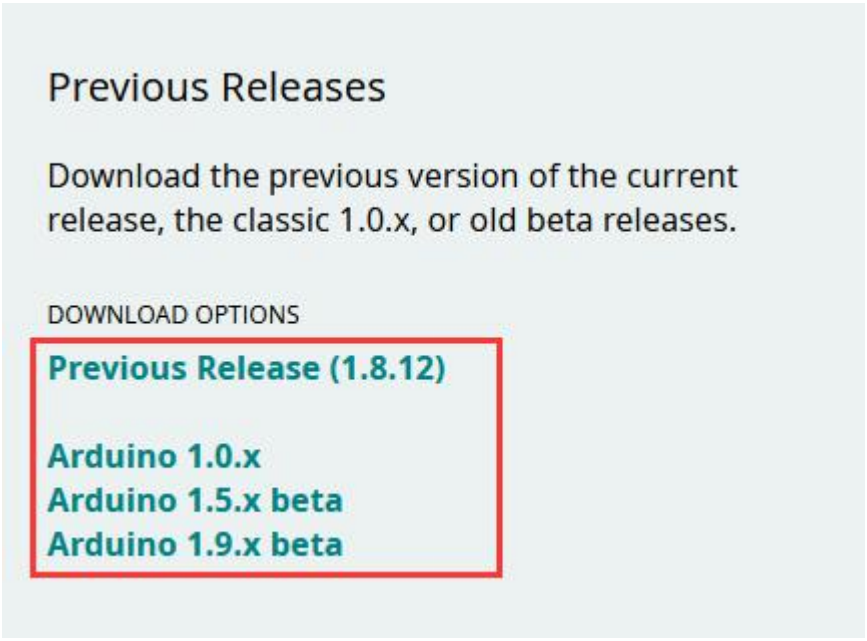
4.1 Download the Arduino IDE

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.

Previous IDE Releases

ARDUINO 1.8.12

Arduino IDE that can be used with any Arduino board, including the Arduino Yún and Arduino DUE. Refer to the Getting Started page for Installation instructions.
See the release notes.

Windows Installer
Windows ZIP file for non admin install

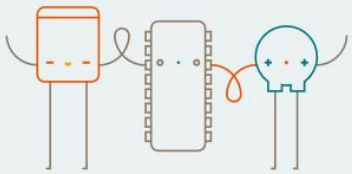
Mac OS X 10.8 Mountain Lion or newer

Linux 32 bits
Linux 64 bits
Linux ARM 32
Linux ARM 64

Source

Contribute to the Arduino Software

Consider supporting the Arduino Software by contributing to its development. (US tax payers, please note this contribution is not tax deductible). Learn more on how your contribution will be used.



SINCE MARCH 2015, THE ARDUINO IDE HAS BEEN DOWNLOADED 45,290,706 TIMES. (IMPRESSIVE!) NO LONGER JUST FOR ARDUINO AND GENUINO BOARDS, HUNDREDS OF COMPANIES AROUND THE WORLD ARE USING THE IDE TO PROGRAM THEIR DEVICES, INCLUDING COMPATIBLES, CLONES, AND EVEN COUNTERFEITS. HELP ACCELERATE ITS DEVELOPMENT WITH A SMALL CONTRIBUTION! REMEMBER: OPEN SOURCE IS LOVE!

$3 $5 $10 $25 $50 OTHER

JUST DOWNLOAD CONTRIBUTE & DOWNLOAD

Click icon 

to download Arduino IDE.

4.2 Download Driver of CH340

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

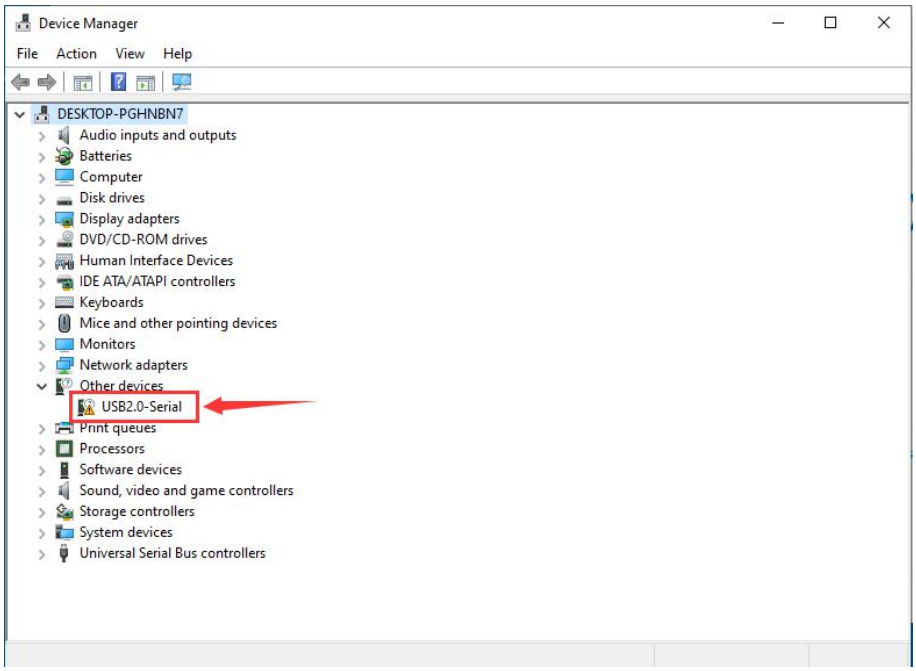
4.3 Install the Driver

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

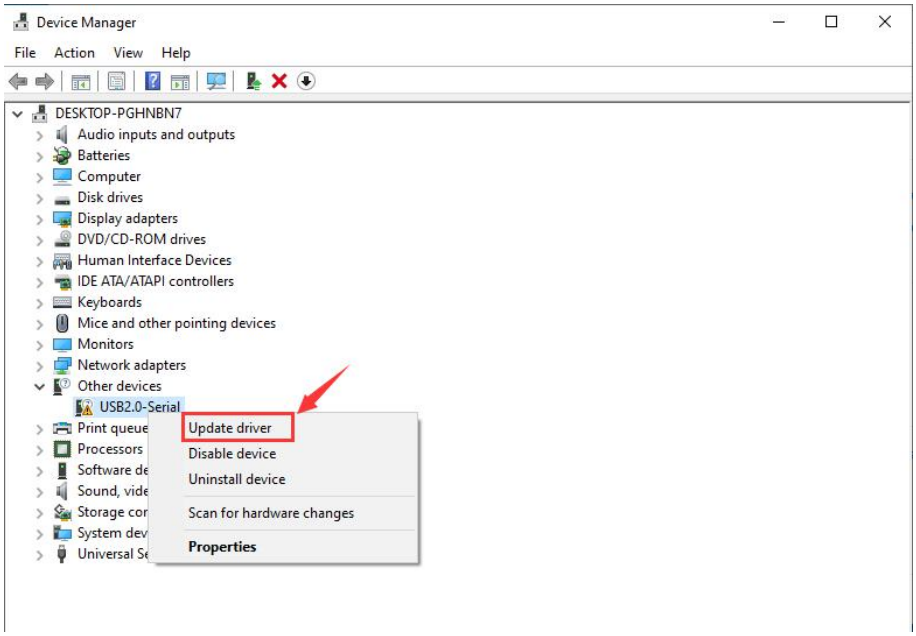
First, let’ s attach USB cable to computer. The driver can be installed automatically if the PC system is Windows 10, however, you need to install the driver manually if the PC system is other version.

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

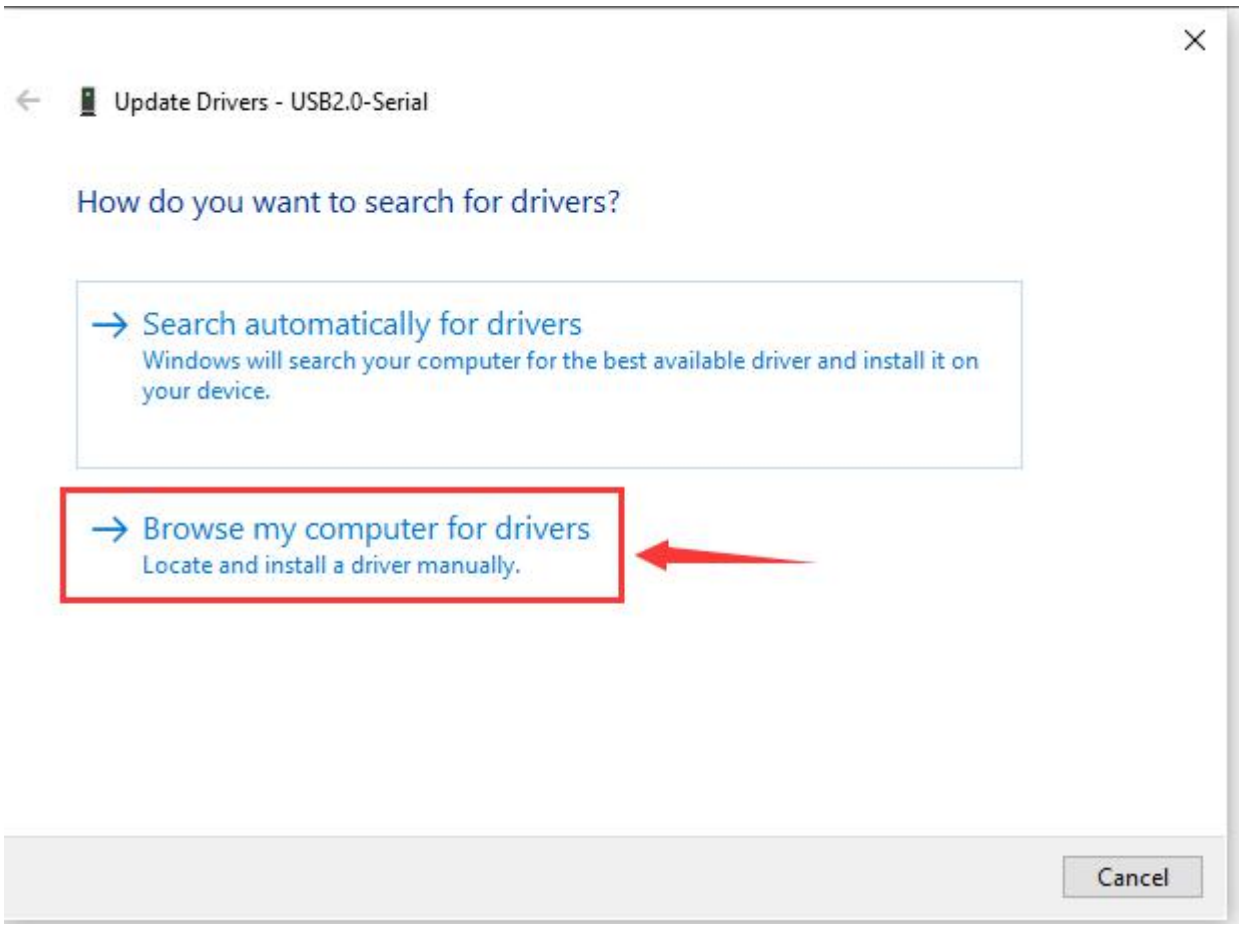
Click Computer----- Properties----- Device Manager, as shown below:



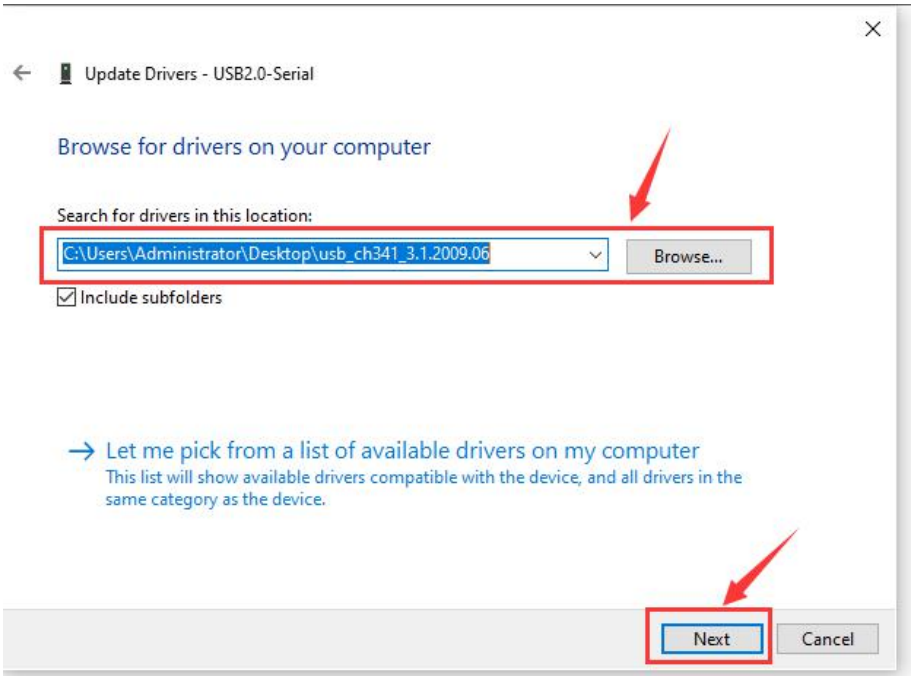
Click USB Serial and "Update Driver Program"



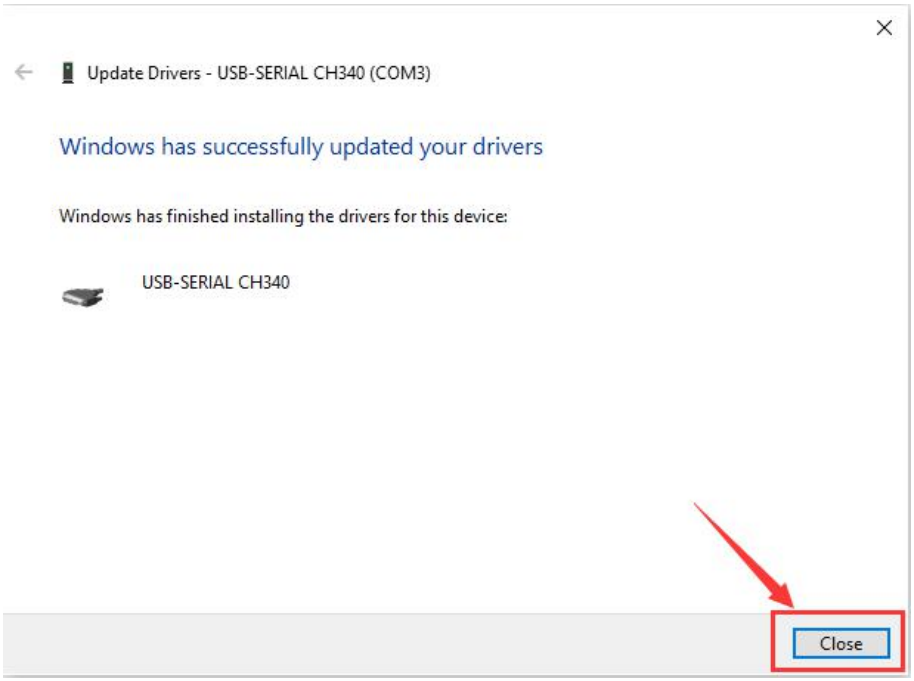
Jump into the following page and select "Browse my computer for driver software".



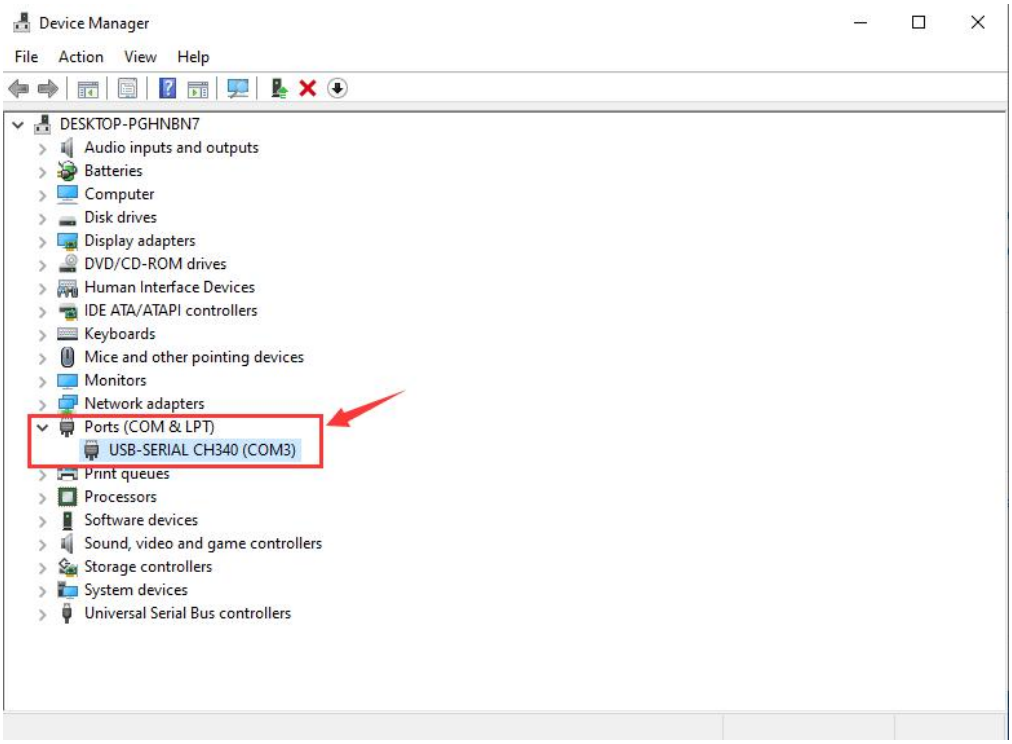
Search the **usb_ch341_3.1.2009.06 folder**



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



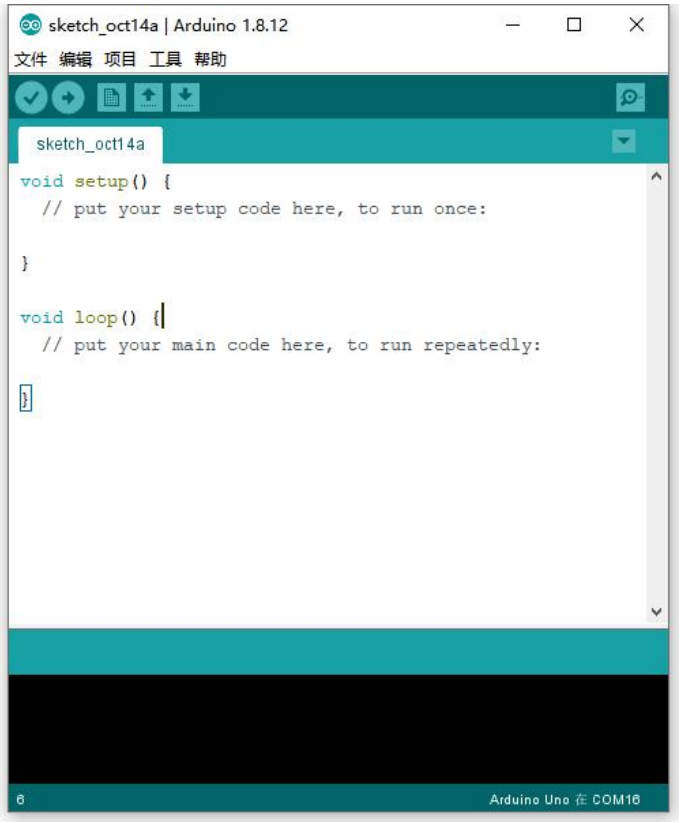
Click Computer----- Properties----- Device Manager, as shown below.



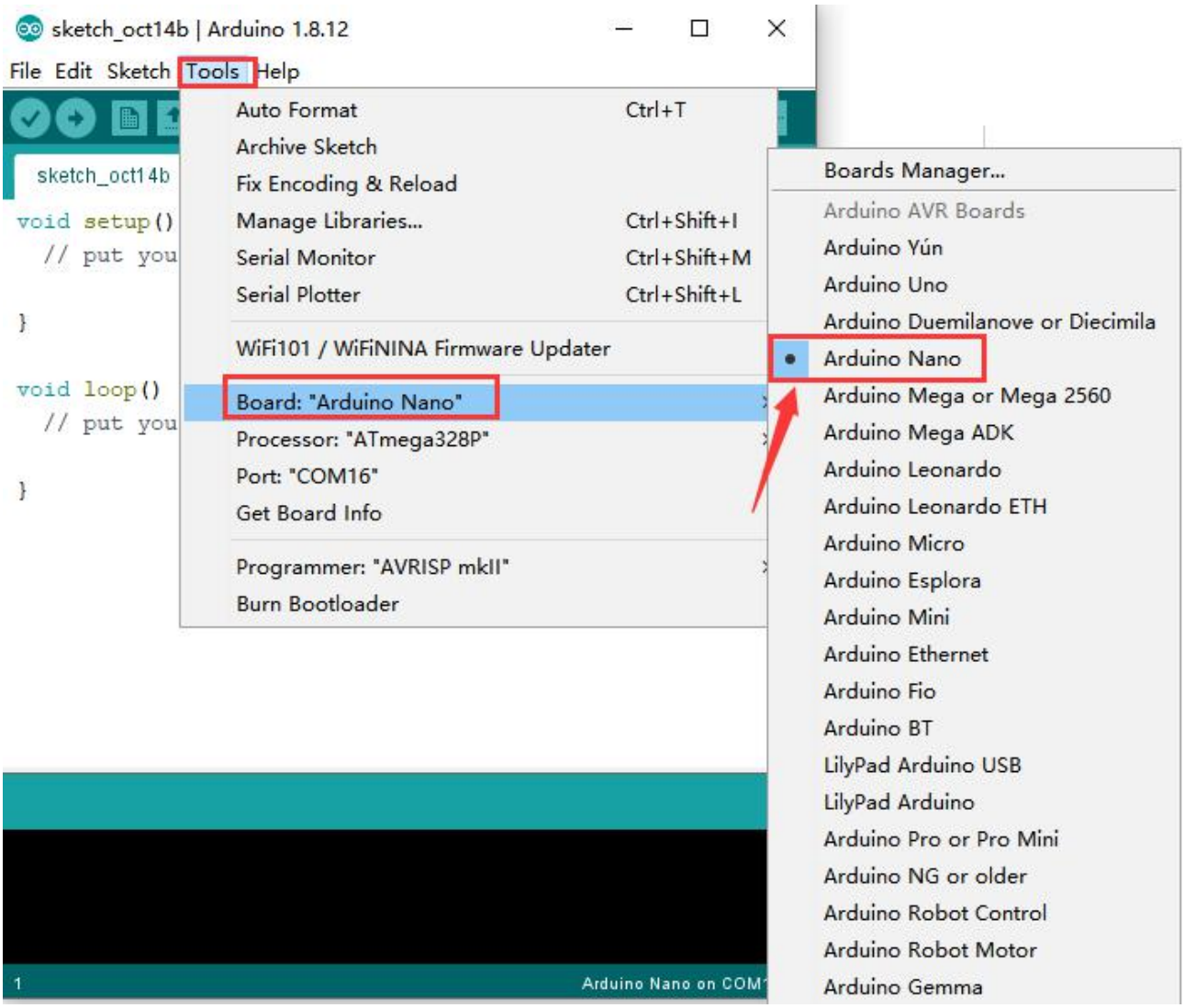
4.4 Arduino IDE Setting

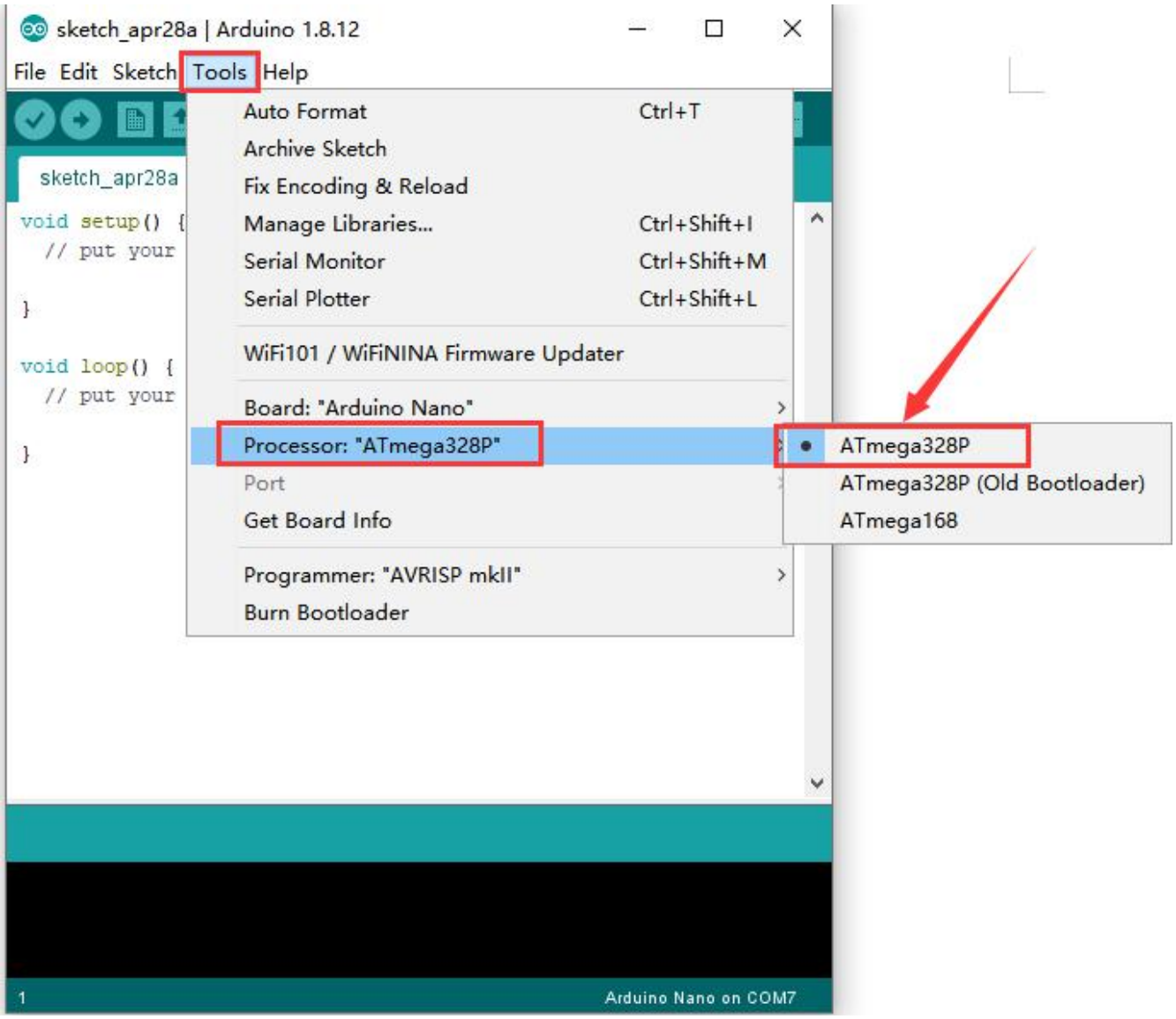
Click 

icon to pen Arduino IDE.

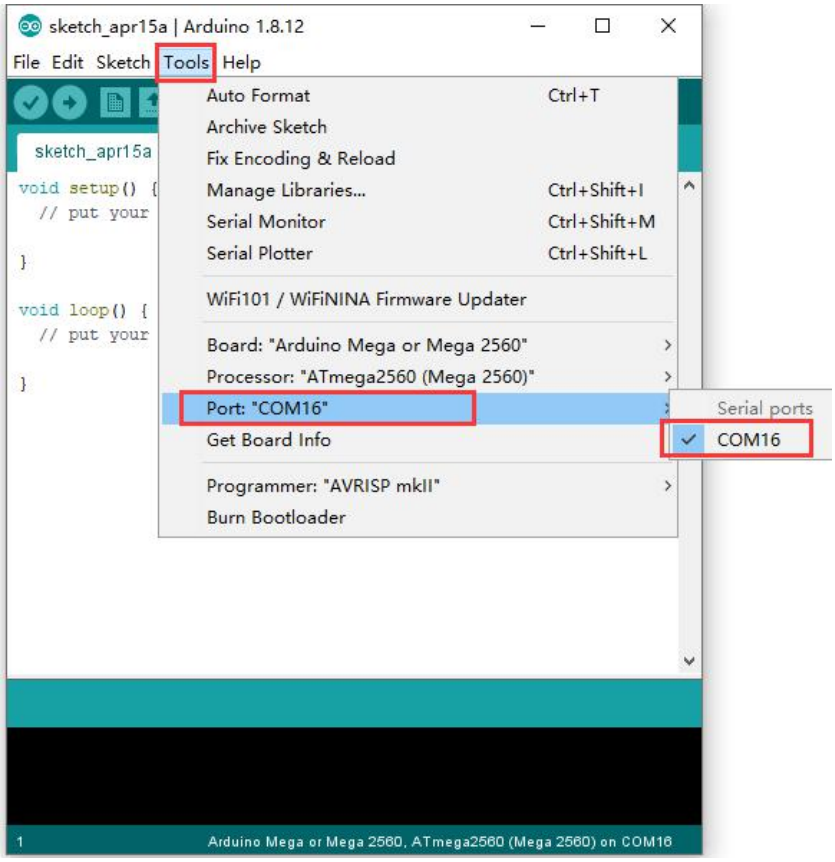


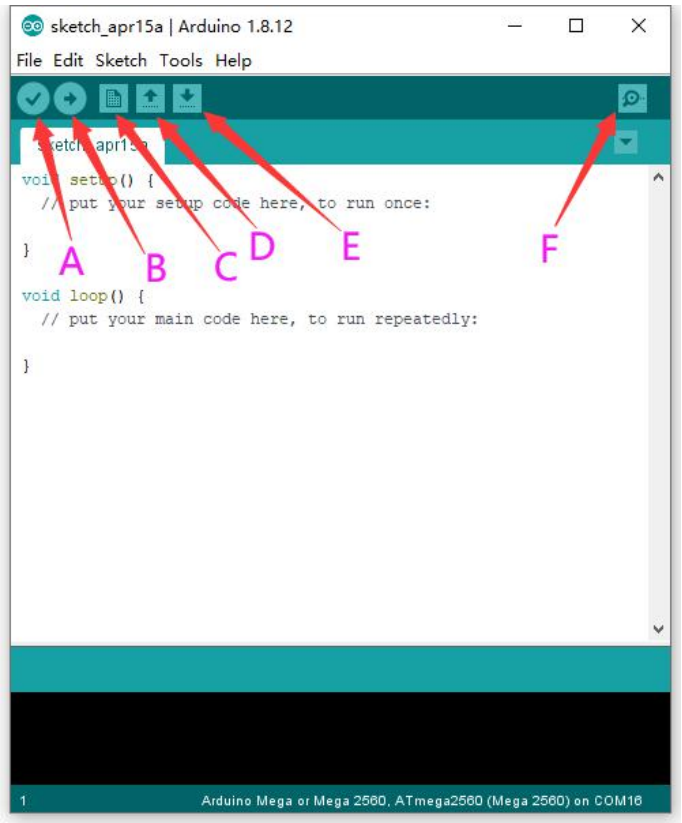
When downloading the sketch to the board, you must select the correct name of Arduino board that matches the board connected to your computer. As shown below;


sketch_oct14b | Arduino 1.8.12
File Edit Sketch Tools Help
sketch_oct14b
void setup()
// put you
}
void loop()
// put you
}
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 Nano"
Processor: "ATmega328P"
Port: "COM16"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Boards Manager...
Arduino AVR Boards
Arduino Yún
Arduino Uno
Arduino Duemilanove or Diecimila
Arduino Nano
Arduino Mega or Mega 2560
Arduino Mega ADK
Arduino Leonardo
Arduino Leonardo ETH
Arduino Micro
Arduino Esplora
Arduino Mini
Arduino Ethernet
Arduino Fio
Arduino BT
LilyPad Arduino USB
LilyPad Arduino
Arduino Pro or Pro Mini
Arduino NG or older
Arduino Robot Control
Arduino Robot Motor
Arduino Gemma
1
Arduino Nano on COM



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


sketch_apr15a | Arduino 1.8.12
File Edit Sketch Tools Help
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
sketch_apr15a
void setup() {
// put your
}
void loop() {
// put your
}
1
Arduino Mega or Mega 2560, ATmega2560 (Mega 2560) on COM16


sketch_apr15a | Arduino 1.8.12
File Edit Sketch Tools Help
void setup() {
// put your setup code here, to run once:
}
void loop() {
// put your main code here, to run repeatedly:
}
A
B
C
D
E
F
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.

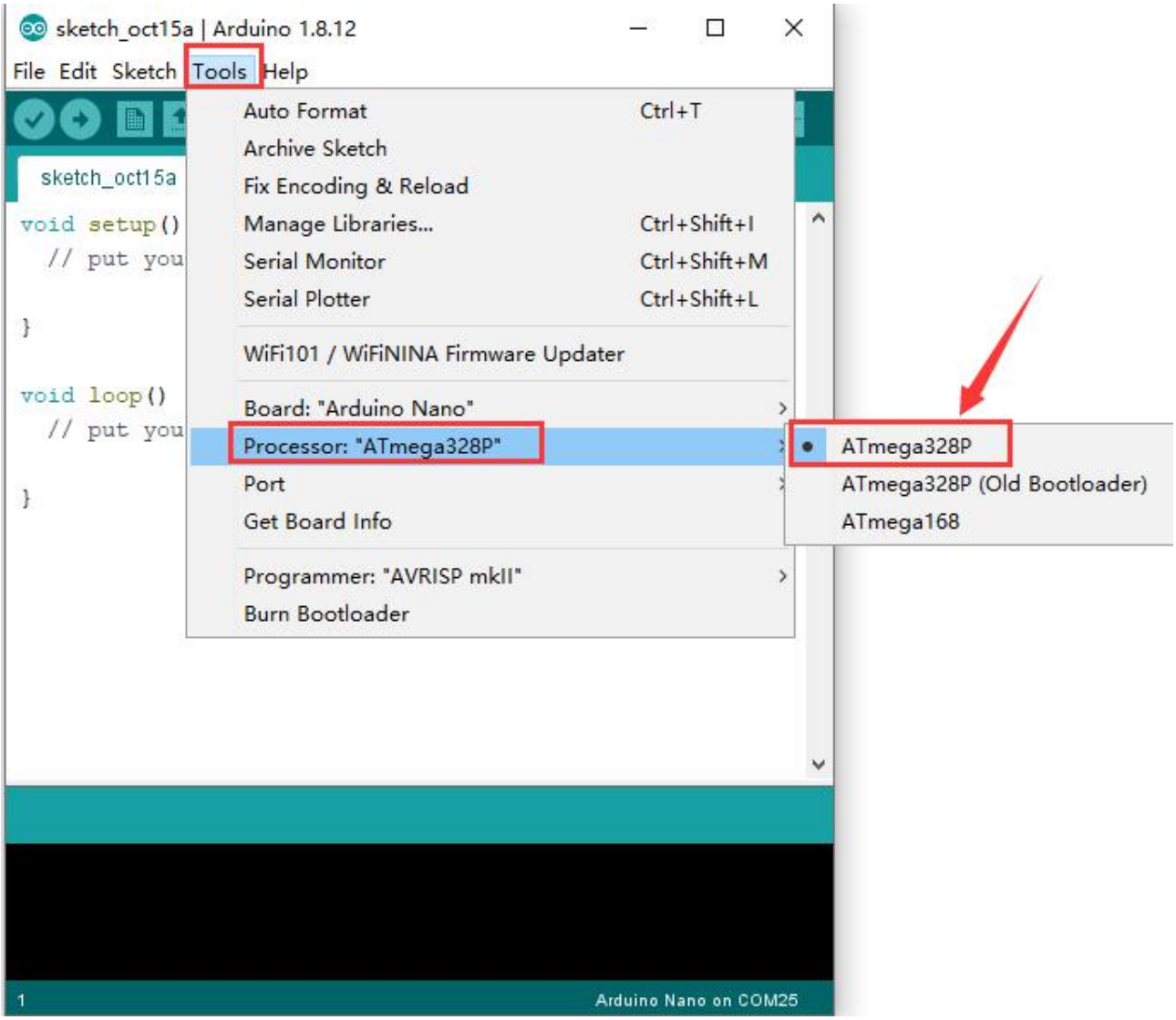
D- Used to directly open an example sketch.

E- Used to save the sketch.

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

4.5 Setting IDE for New Bootloader

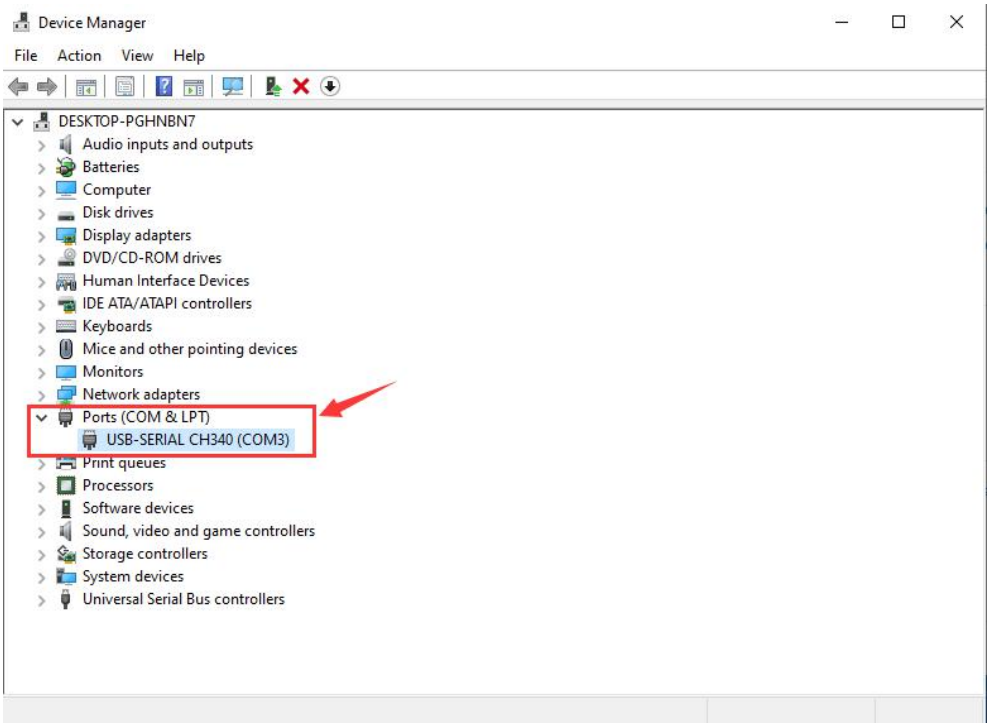
Arduino Nano board could burn new and old bootloader. New bootloader is only compatible with 1.8.9 IDE and above. Yet the old one is compatible with all versions.

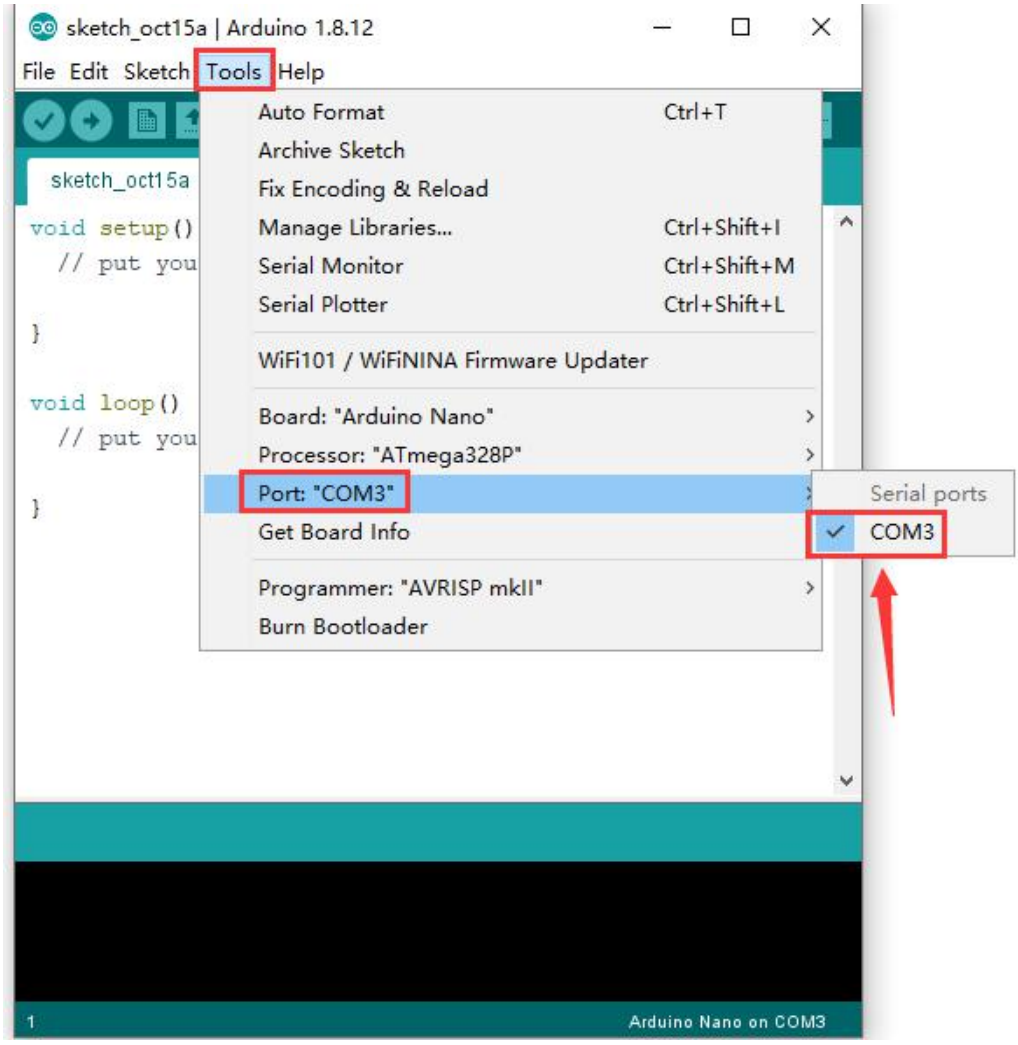


4.6 Select Your Serial Port

Select the serial device of the Arduino board from the **Tools | Serial Port menu**.

Note: to avoid errors, the COM Port should keep the same as the Ports shown on Device Manager.

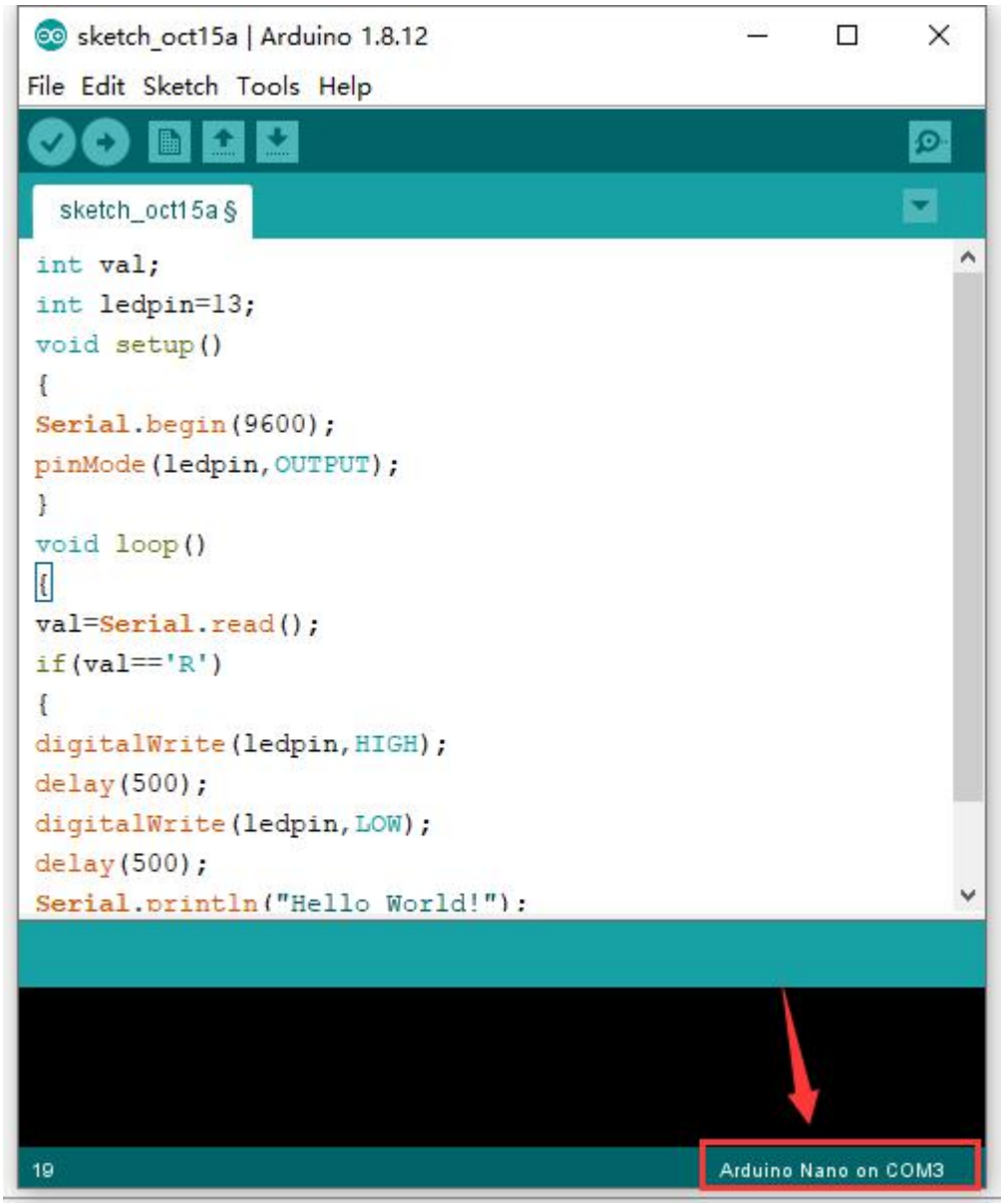

Device Manager
File Action View Help
DESKTOP-PGHNBN7
Audio inputs and outputs
Batteries
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Ports (COM & LPT)
USB-SERIAL CH340 (COM3)
Print queues
Processors
Software devices
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers

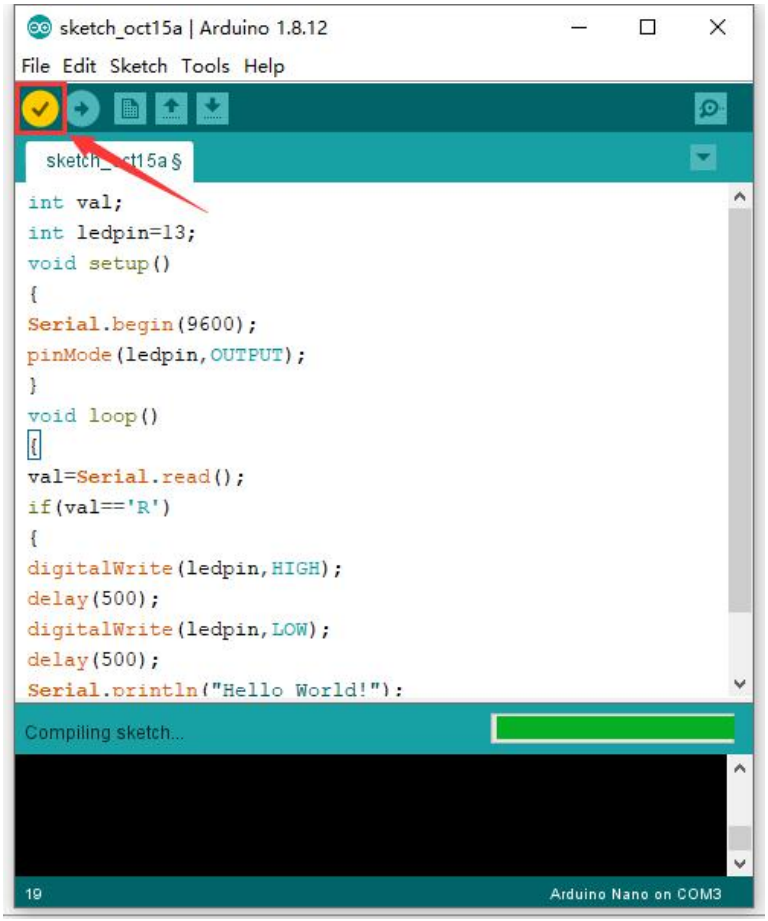

sketch_oct15a | Arduino 1.8.12
File Edit Sketch Tools Help
sketch_oct15a
void setup()
// put you
}
void loop()
// put you
}
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino Nano"
Processor: "ATmega328P"
Port: "COM3"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Serial ports
COM3
1
Arduino Nano on COM3

4.7 Hello World!

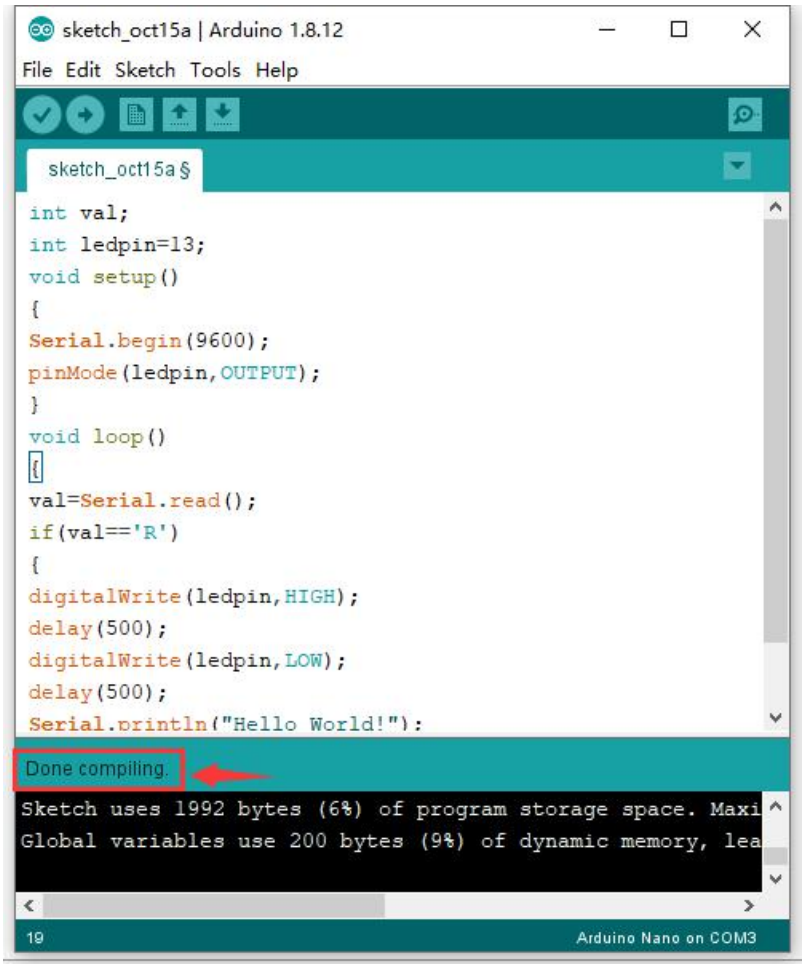
Copy the following code in the Arduino IDE.

```
int val;
int ledpin=13;
void setup()
{
Serial.begin(9600);
pinMode(ledpin,OUTPUT);
}
void loop()
{
val=Serial.read();
if(val=='R')
{
digitalWrite(ledpin,HIGH);
delay(500);
digitalWrite(ledpin,LOW);
delay(500);
Serial.println("Hello World!");
}
}
```

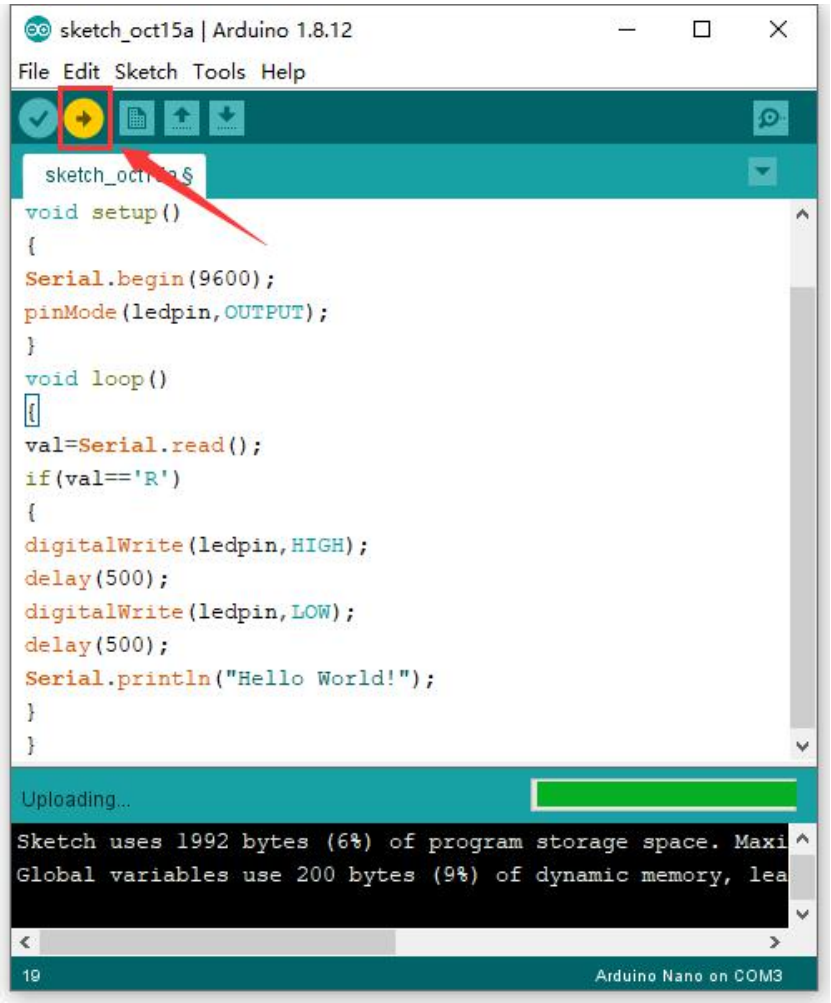

sketch_oct15a | Arduino 1.8.12
File Edit Sketch Tools Help
sketch_oct15a §
int val;
int ledpin=13;
void setup()
{
Serial.begin(9600);
pinMode(ledpin,OUTPUT);
}
void loop()
{
val=Serial.read();
if(val=='R')
{
digitalWrite(ledpin,HIGH);
delay(500);
digitalWrite(ledpin,LOW);
delay(500);
Serial.println("Hello World!");
19
Arduino Nano on COM3

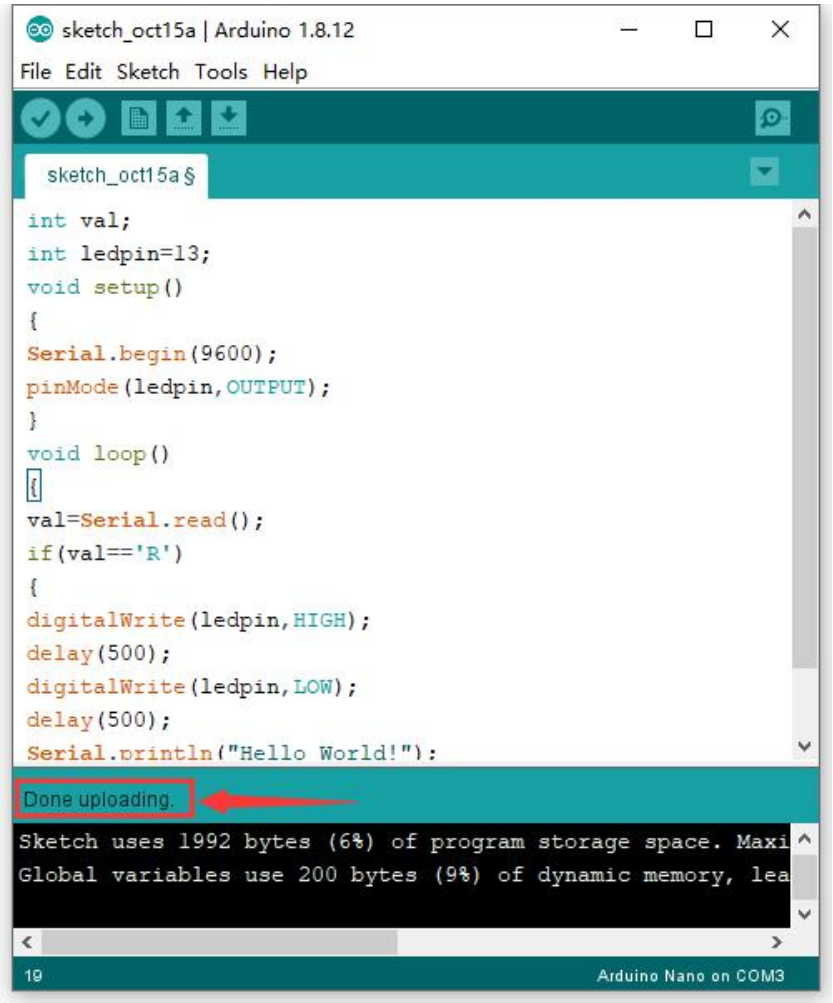


Then click verify button to check the errors. If compiling successfully, the message "Done compiling." will appear in the status bar.

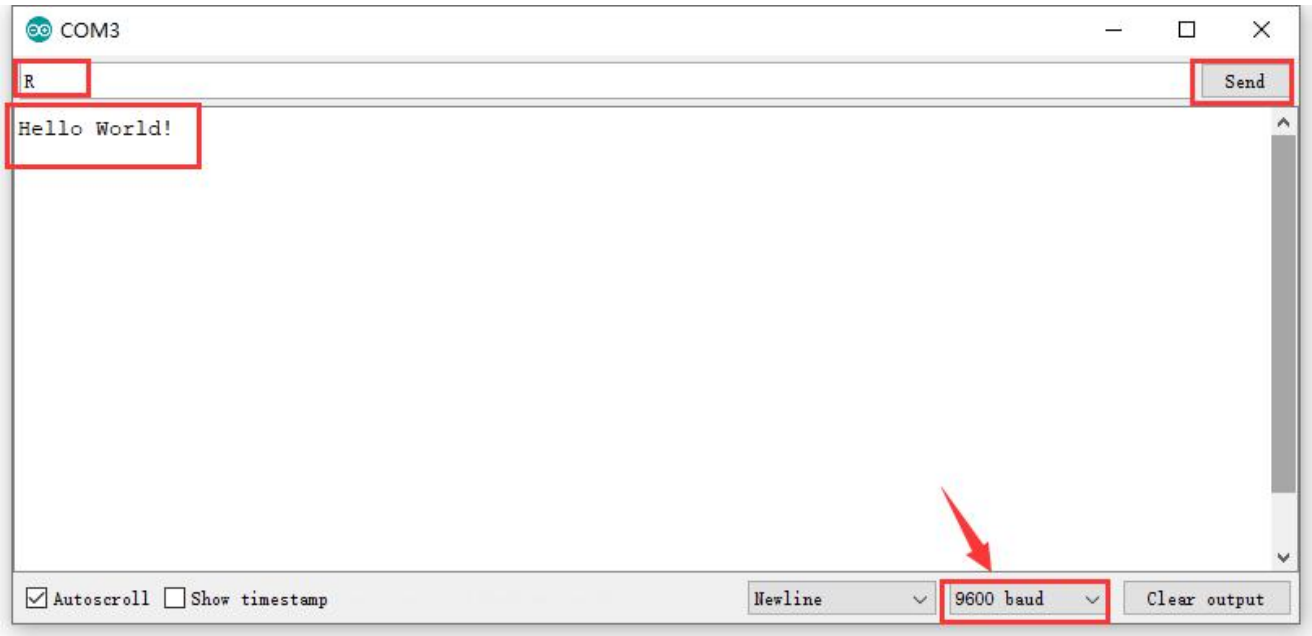


After that, click the "Upload" button to upload the code. If the upload is successful, the message "Done uploading." will appear in the status bar.


sketch_oct15a | Arduino 1.8.12
File Edit Sketch Tools Help
void setup()
{
Serial.begin(9600);
pinMode(ledpin,OUTPUT);
}
void loop()
{
val=Serial.read();
if(val=='R')
{
digitalWrite(ledpin,HIGH);
delay(500);
digitalWrite(ledpin,LOW);
delay(500);
Serial.println("Hello World!");
}
}
Uploading...
Sketch uses 1992 bytes (6%) of program storage space. Maxi
Global variables use 200 bytes (9%) of dynamic memory, lea
19
Arduino Nano on COM3



Then click  to open serial monitor and set the baud rate to 9600, enter an "R" and click Send, that is, the computer will send the character R. When NANO board receives it, you should see the RX led on the board flash once, and then D13 led flash once; when keyestudio NANO board sends "Hello World!" to the computer, finally you should see the "Hello World!" is showed on the monitor, and TX led on the board flash once.



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 Driver of CH340

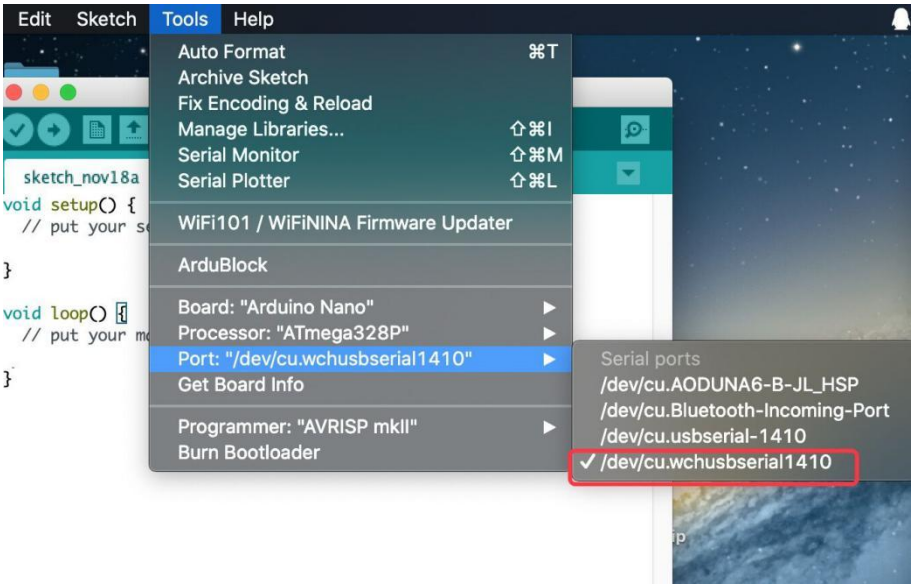
https://fs.keyestudio.com/CH340-MAC

5.3 How to Install Driver of CH340

Please refer to the following link:
https://wiki.keyestudio.com/Download_CH340_Driver_on_MAC_System

5.4 Setting Arduino IDE

The setting method is as same as the chapter 4.4 except from COM port, as shown below:



6. Shipping List

Keyestudio NANO ch340*1pcs

30cm Blue mini USB*1pcs

Resource:

https://fs.keyestudio.com/KS0173