



Keyestudio NANO CH340



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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

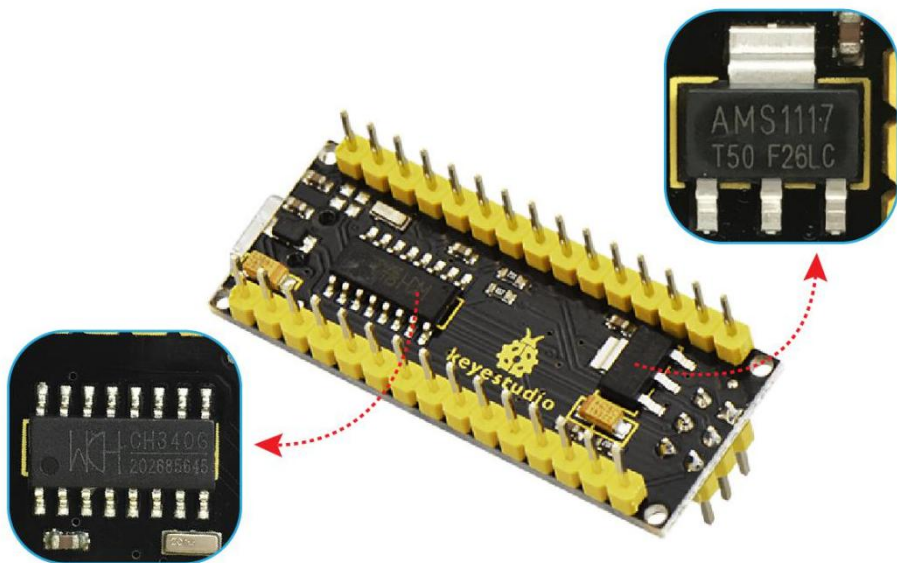
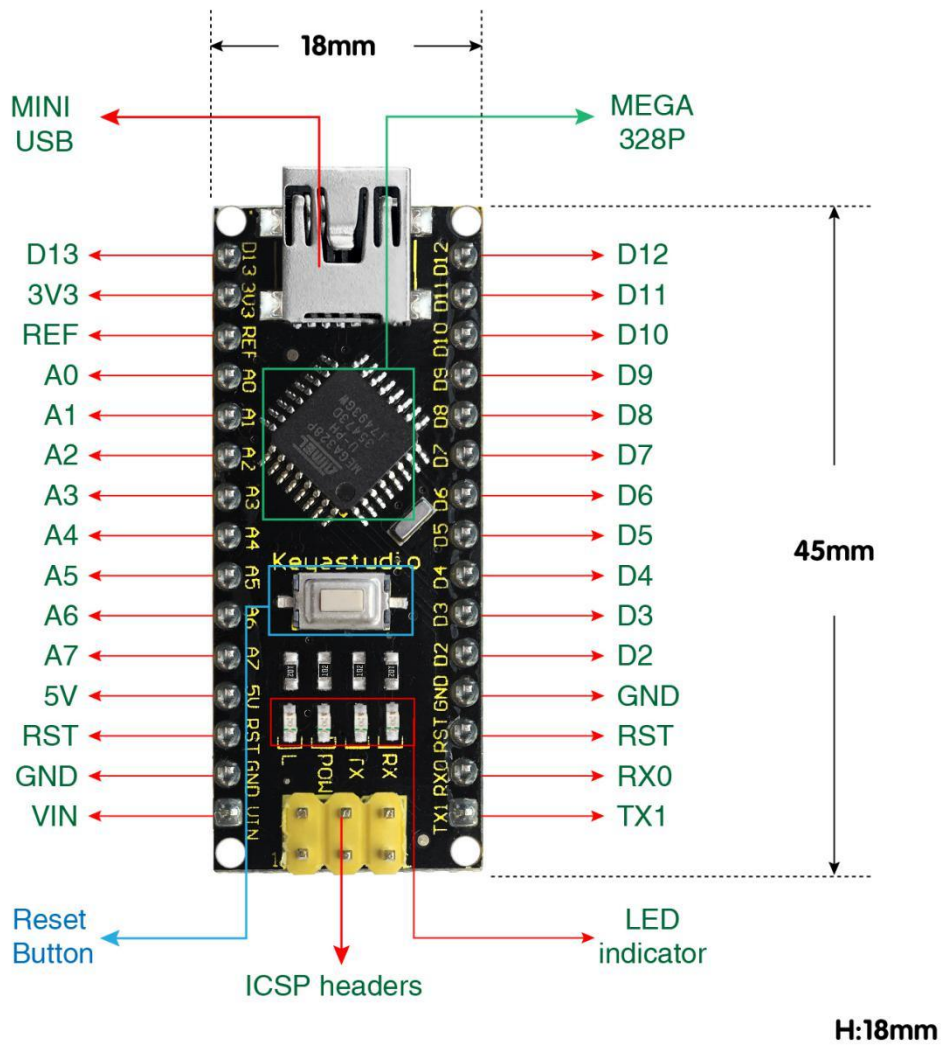
SRAM:2 KB

EEPROM: 1 KB

Clock Speed:16 MHz

LED_BUILTIN:D13

3. Pins





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



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.



Previous Releases

Download the previous version of the current release, the classic 1.0.x, or old beta releases.

DOWNLOAD OPTIONS

Previous Release (1.8.12)

Arduino 1.0.x

Arduino 1.5.x beta

Arduino 1.9.x beta

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

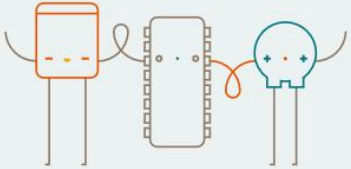
Linux ARM 32

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

JUST DOWNLOAD

CONTRIBUTE & DOWNLOAD

to download Arduino IDE.



4.2 Download Driver of CH340

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

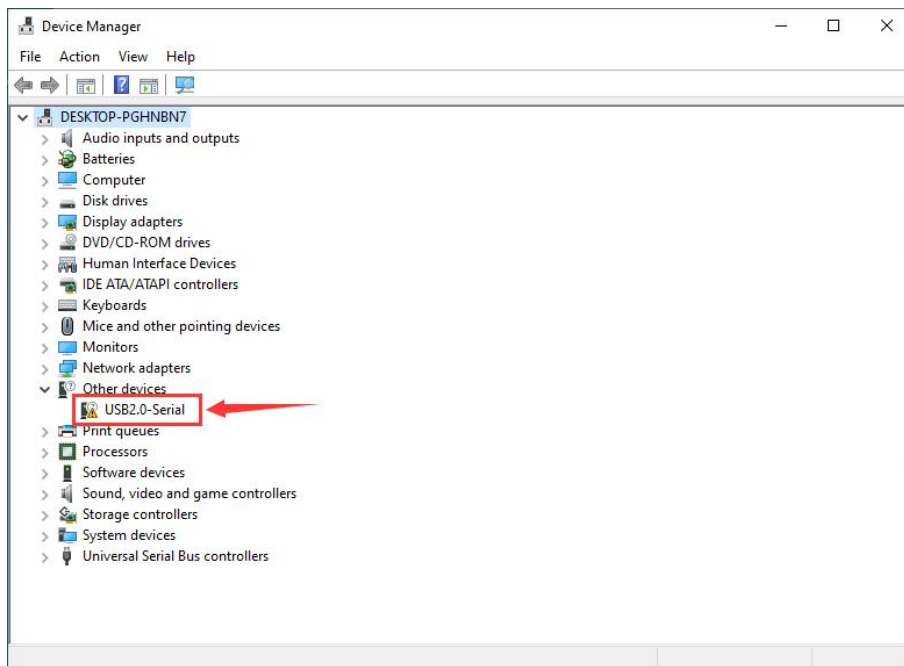
4.3 Install the Driver

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

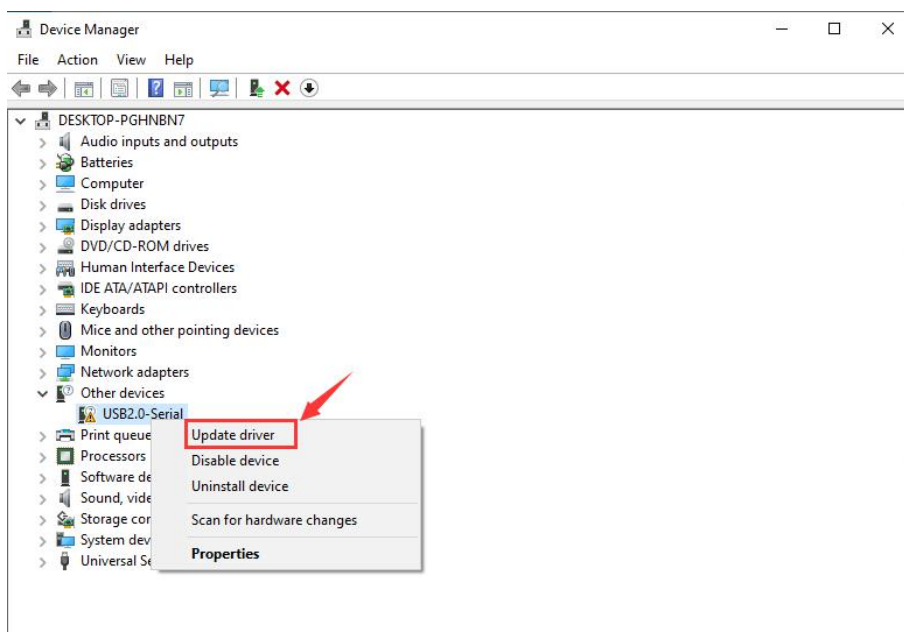
First, let' s attach USB cable to computer. The driver can be installed automatically if the PC system is Windows 10, however, you need to install the driver manually if the PC system is other version.

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

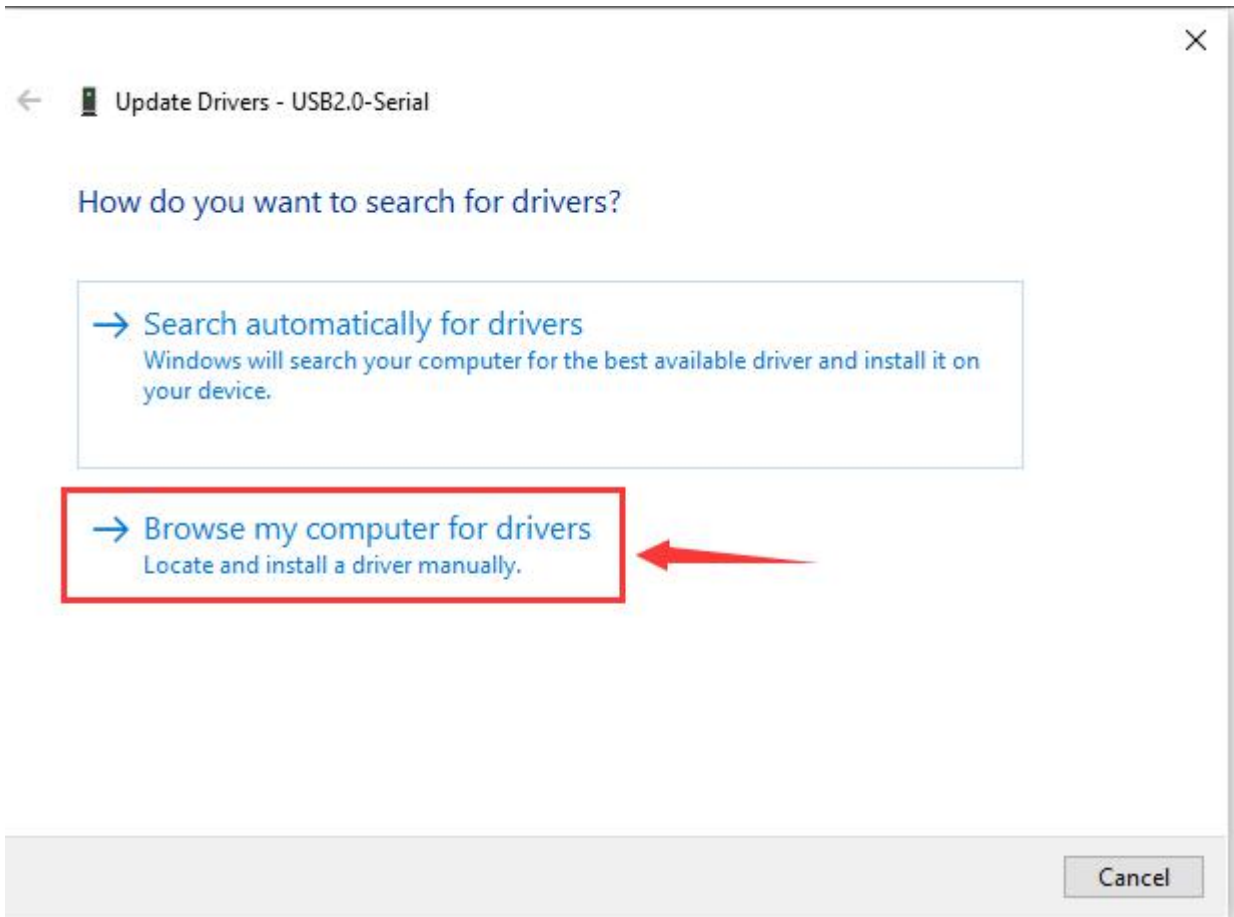
Click Computer----- Properties----- Device Manager, as shown below:



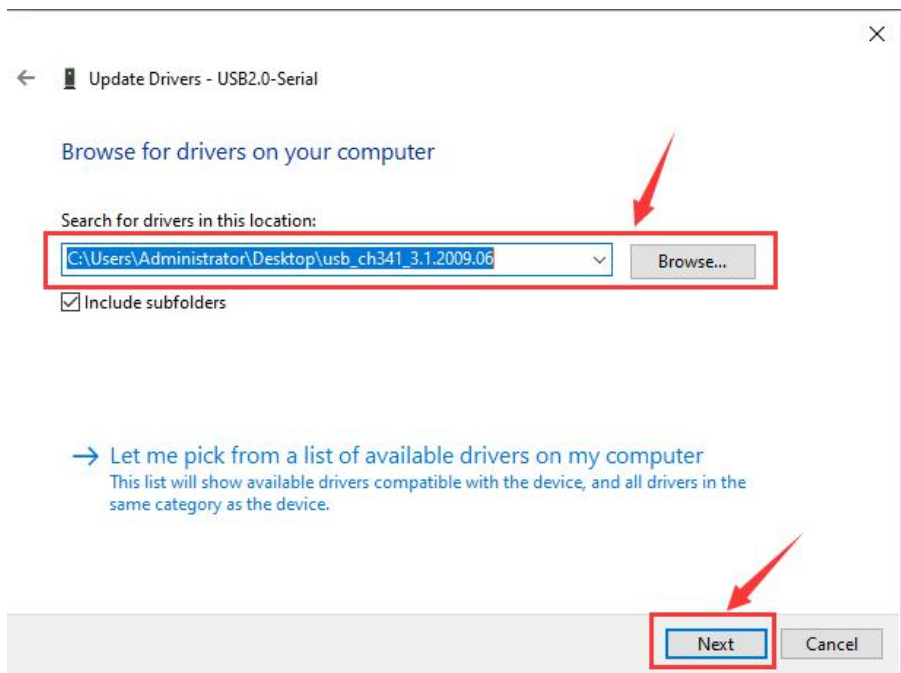
Click  USB Serial and "Update Driver Program"



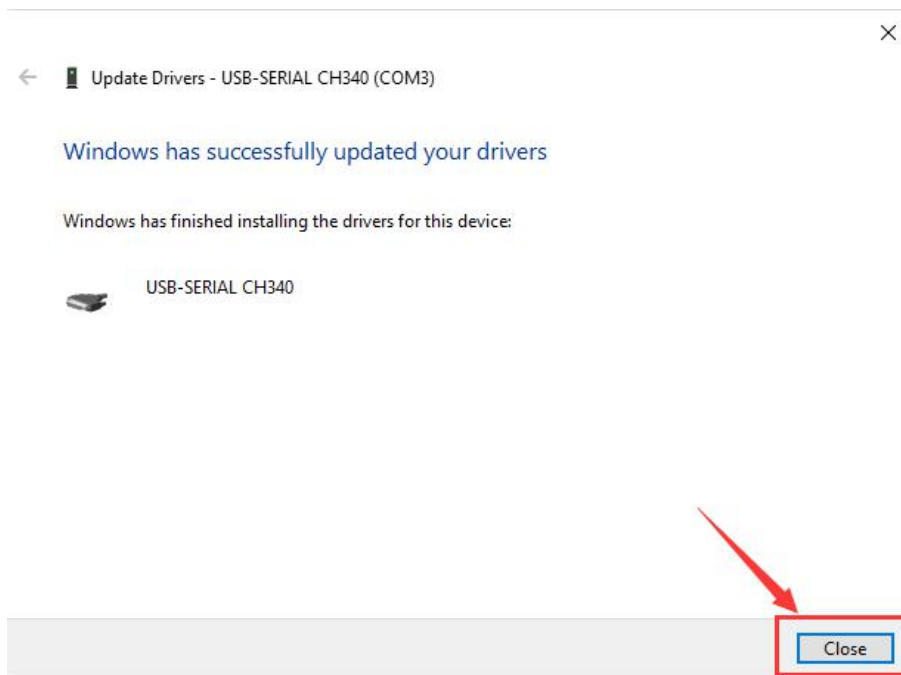
Jump into the following page and select "Browse my computer for driver software" .



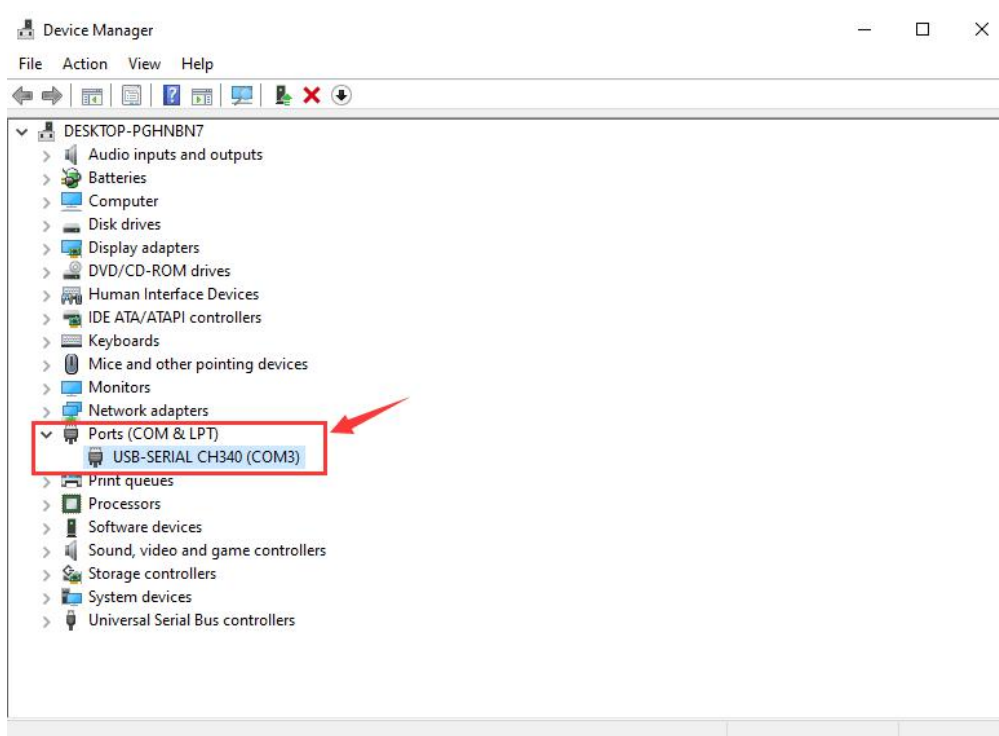
Search the **usb_ch341_3.1.2009.06** folder



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



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

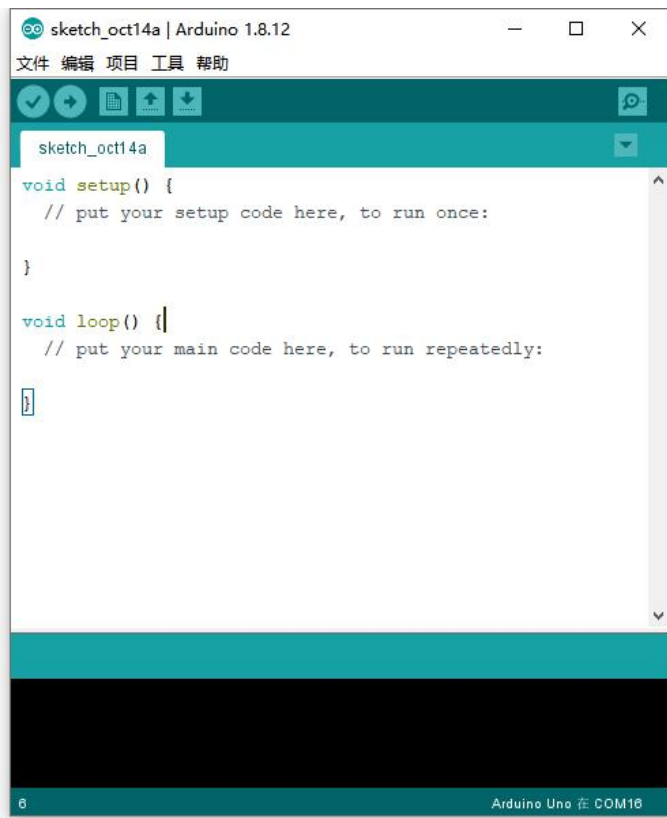




4.4 Arduino IDE Setting



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

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

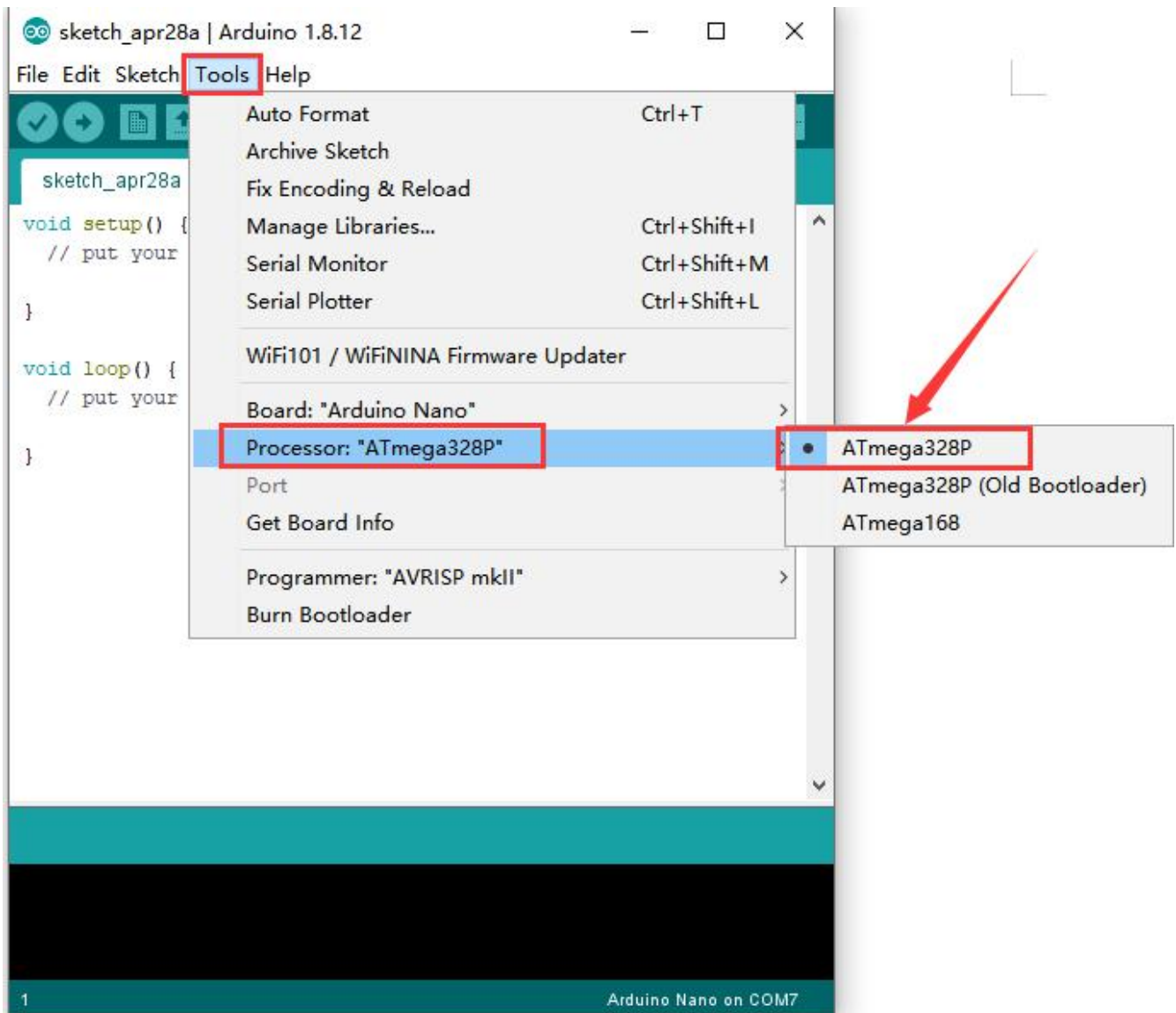
```
sketch_oct14b
void setup()
// put your code here, once:

}

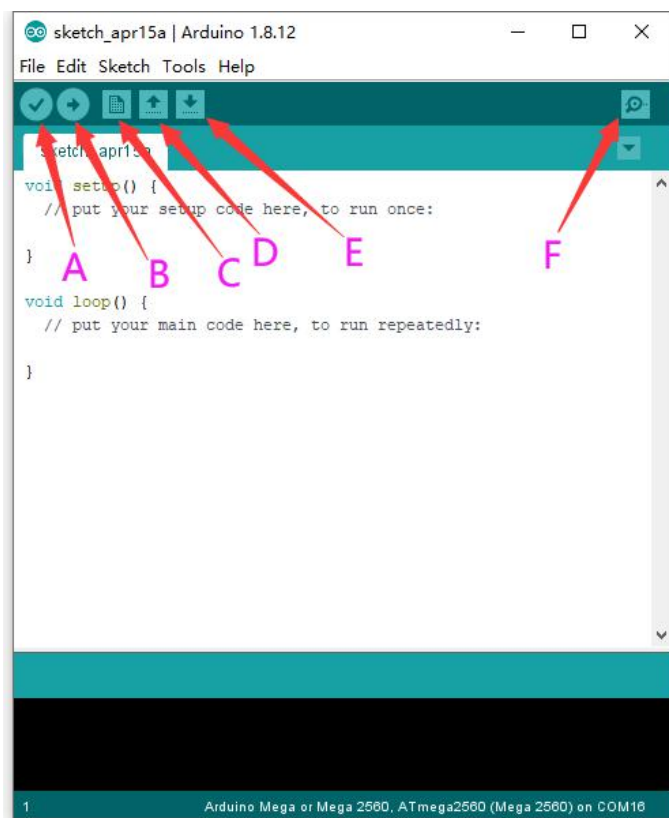
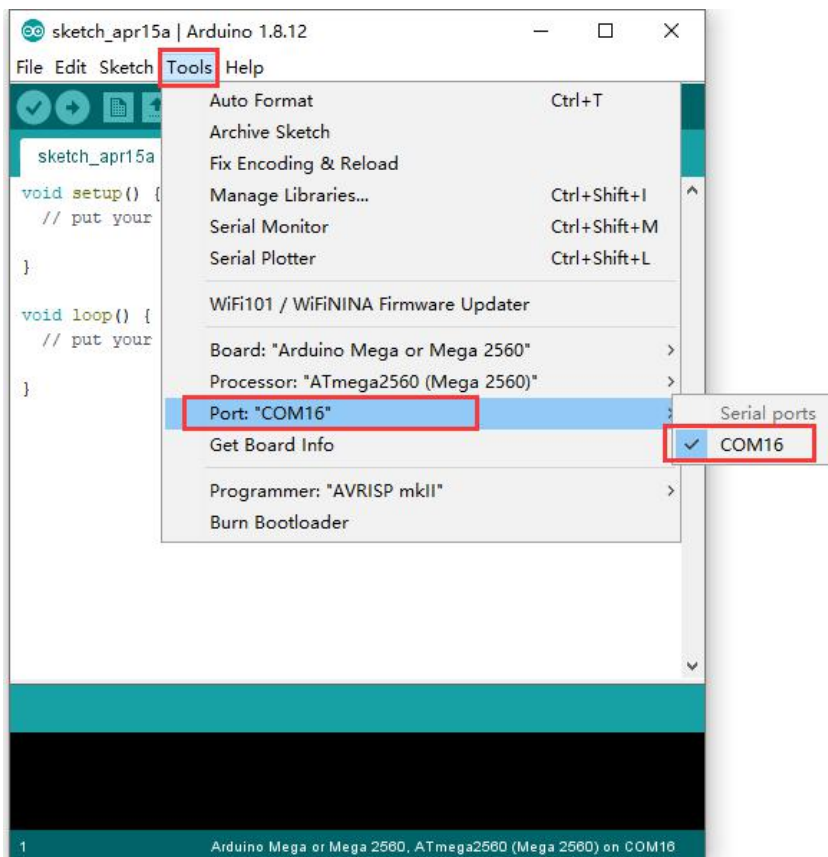
void loop()
// put your code here, over and over again:

}
```

1 Arduino Nano on COM16



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

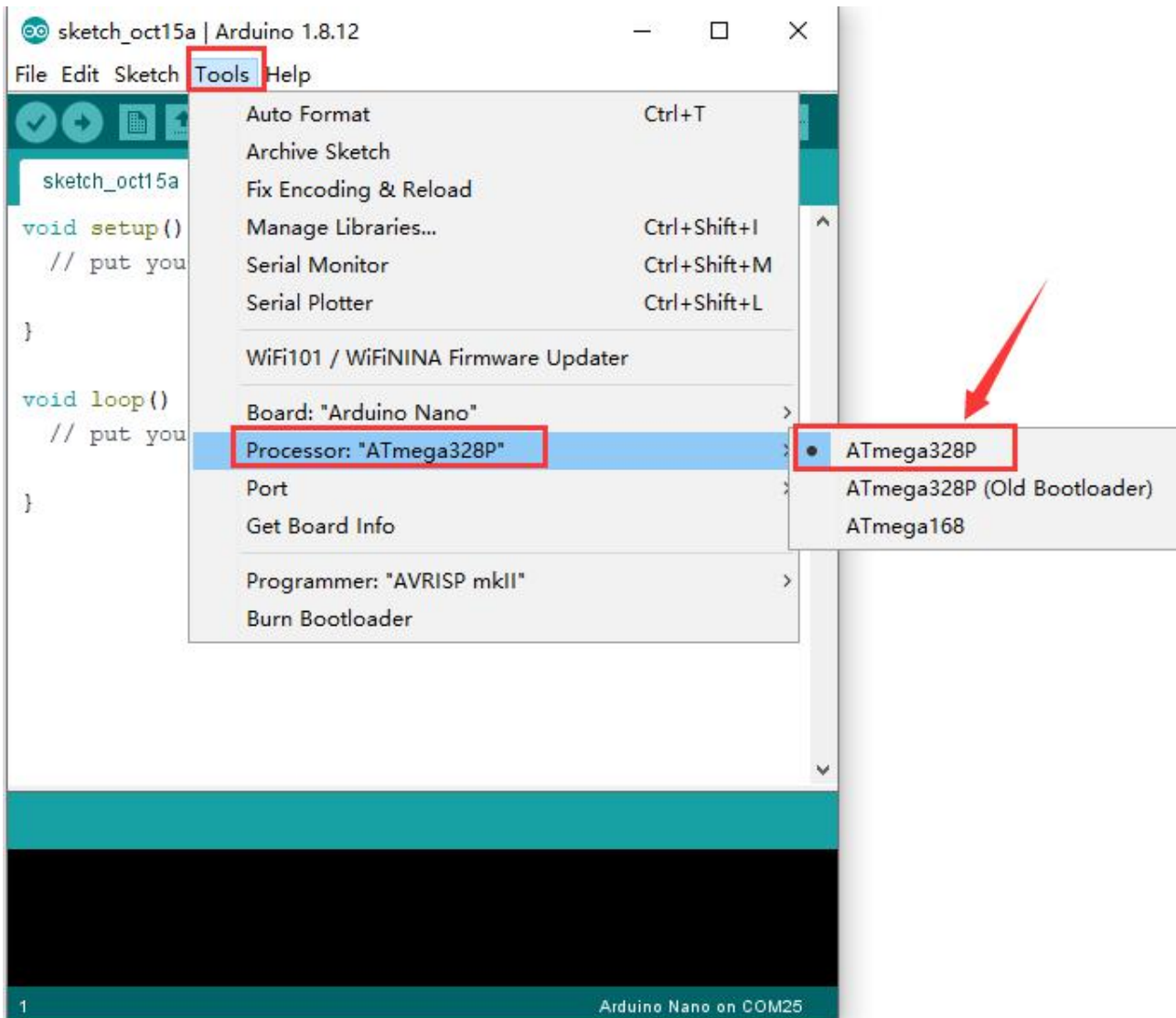




- A- Used to verify whether there is any compiling mistakes or not.
- B- Used to upload the sketch to your Arduino board.
- C- Used to create shortcut window of a new sketch.
- D- Used to directly open an example sketch.
- E- Used to save the sketch.
- F- Used to send the serial data received from board to the serial monitor.

4.5 Setting IDE for New Bootloader

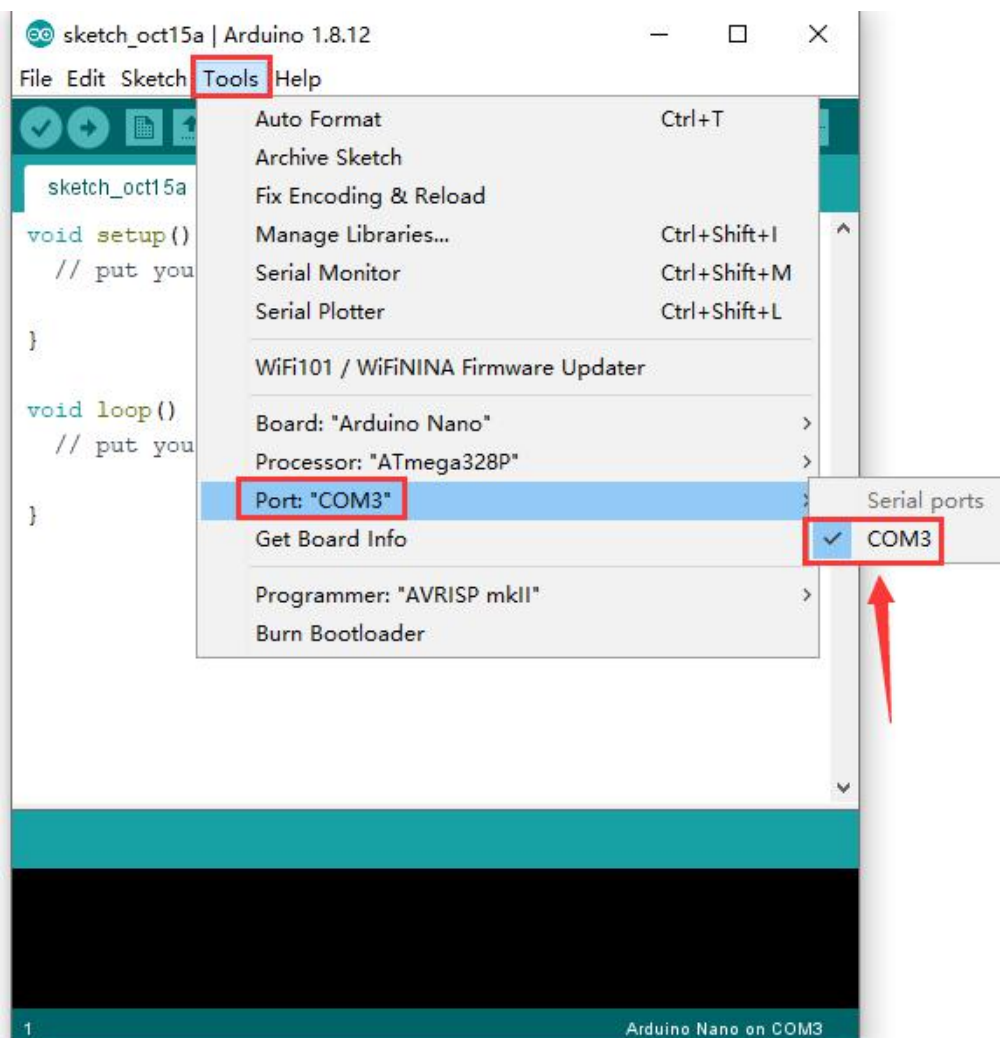
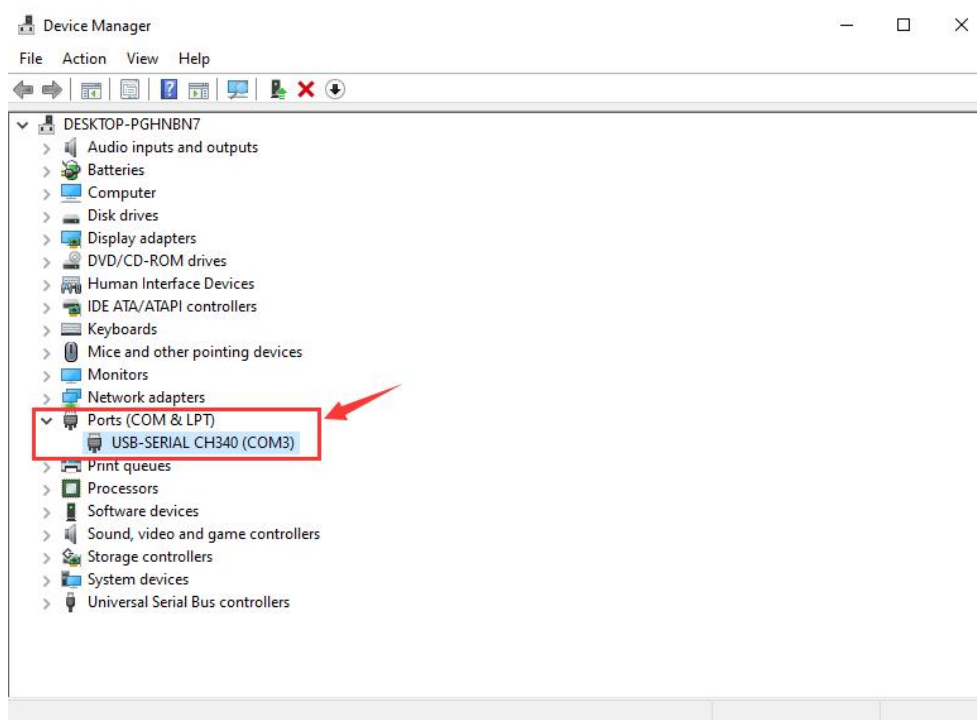
Arduino Nano board could burn new and old bootloader. New bootloader is only compatible with 1.8.9 IDE and above. Yet the old one is compatible with all versions.



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.

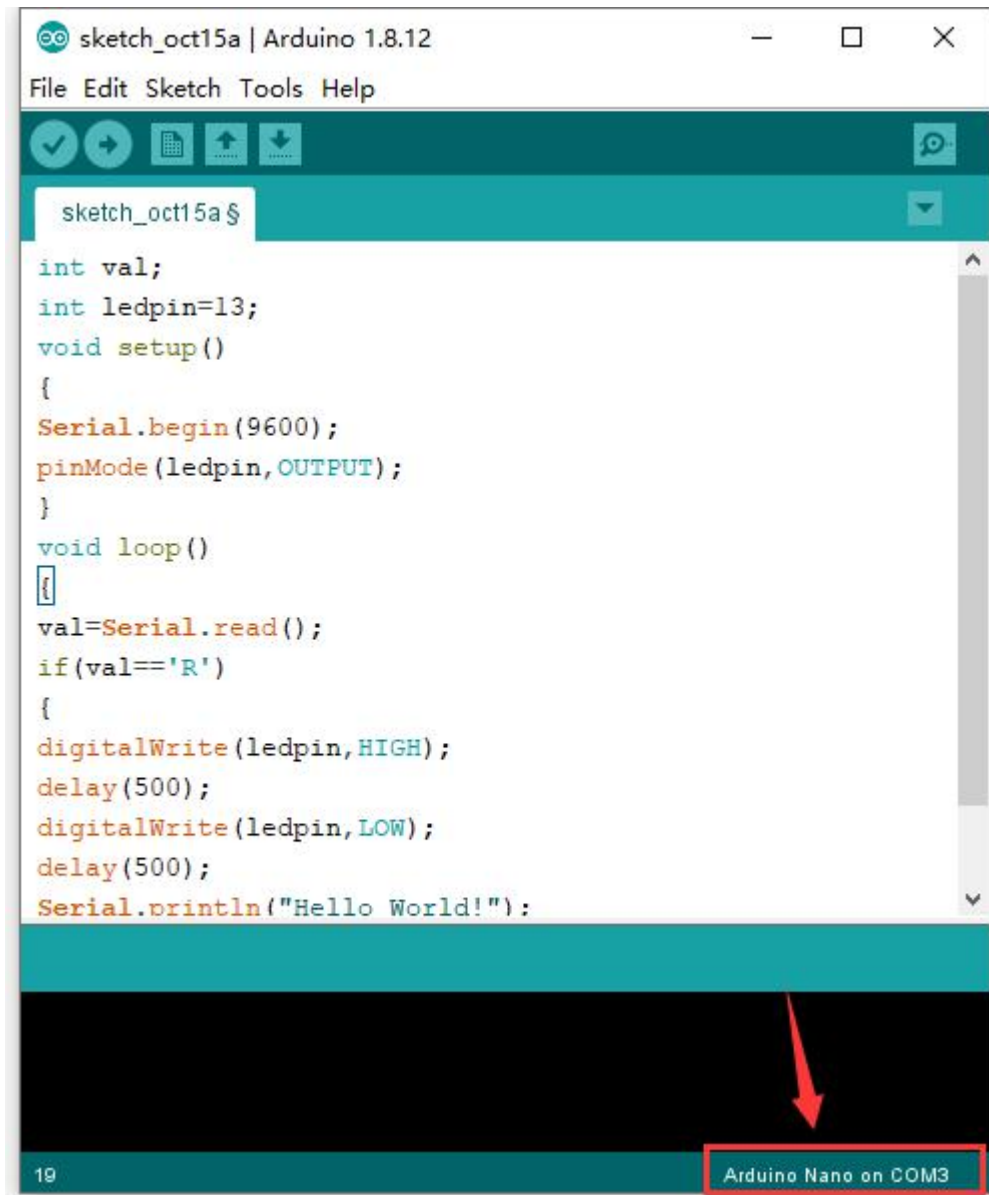


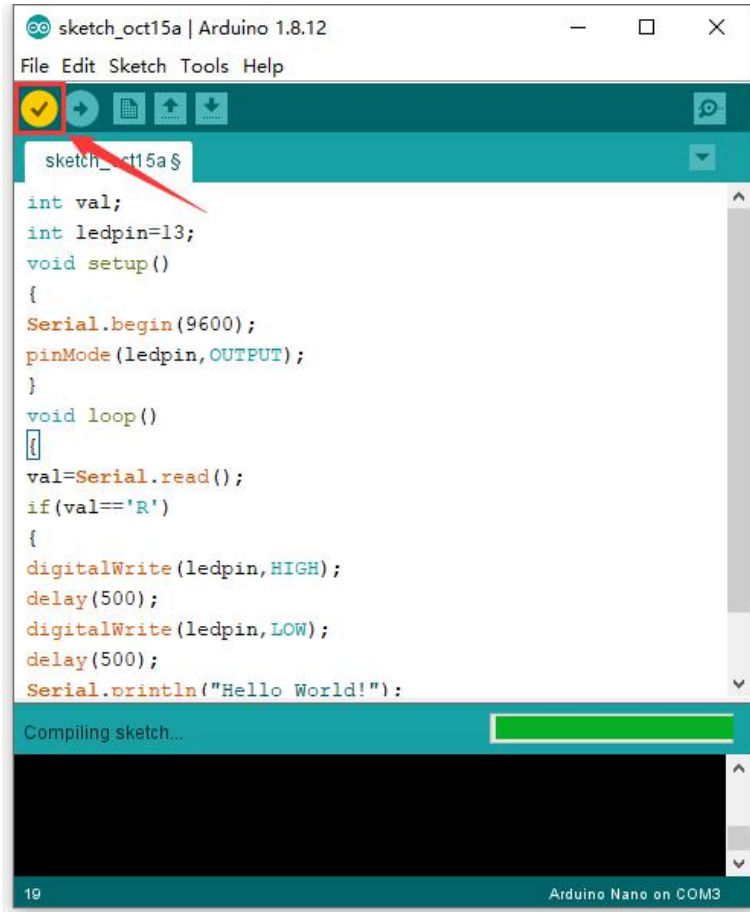


4.7 Hello World!

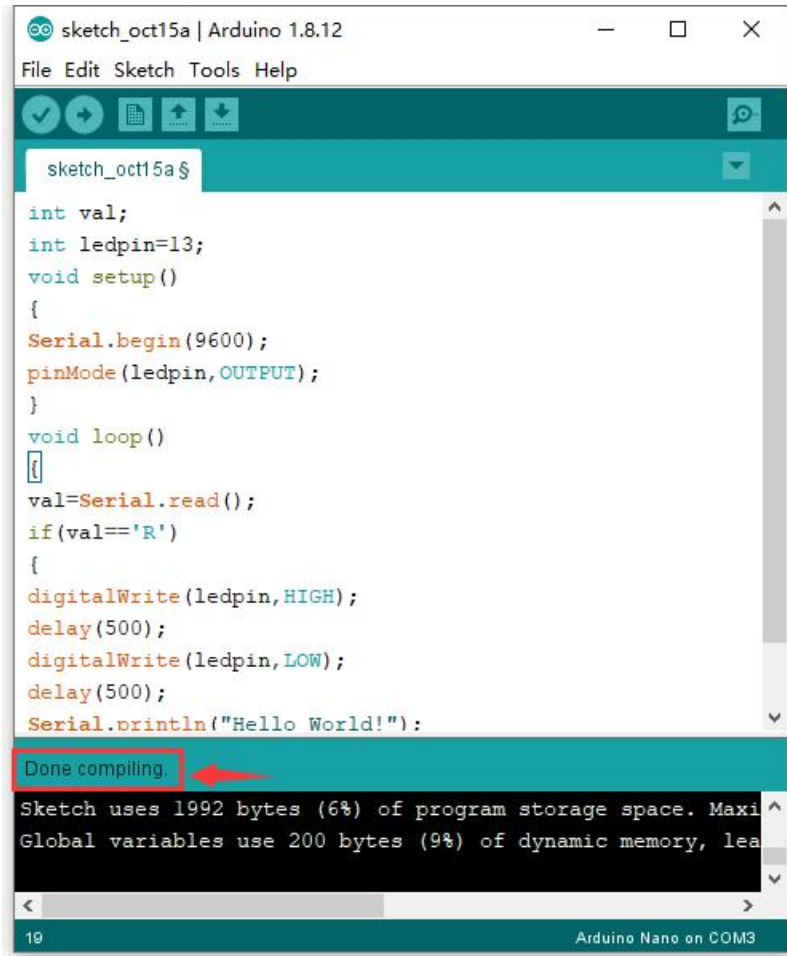
Copy the following code in the Arduino IDE.

```
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!");
  }
}
```

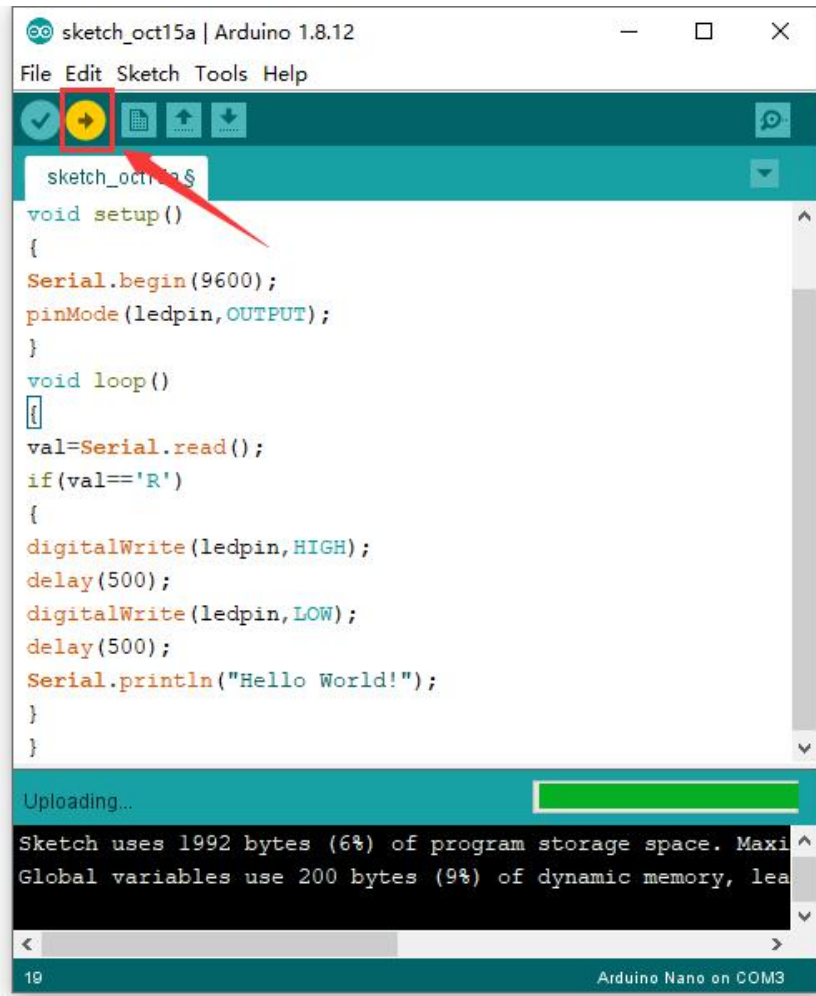


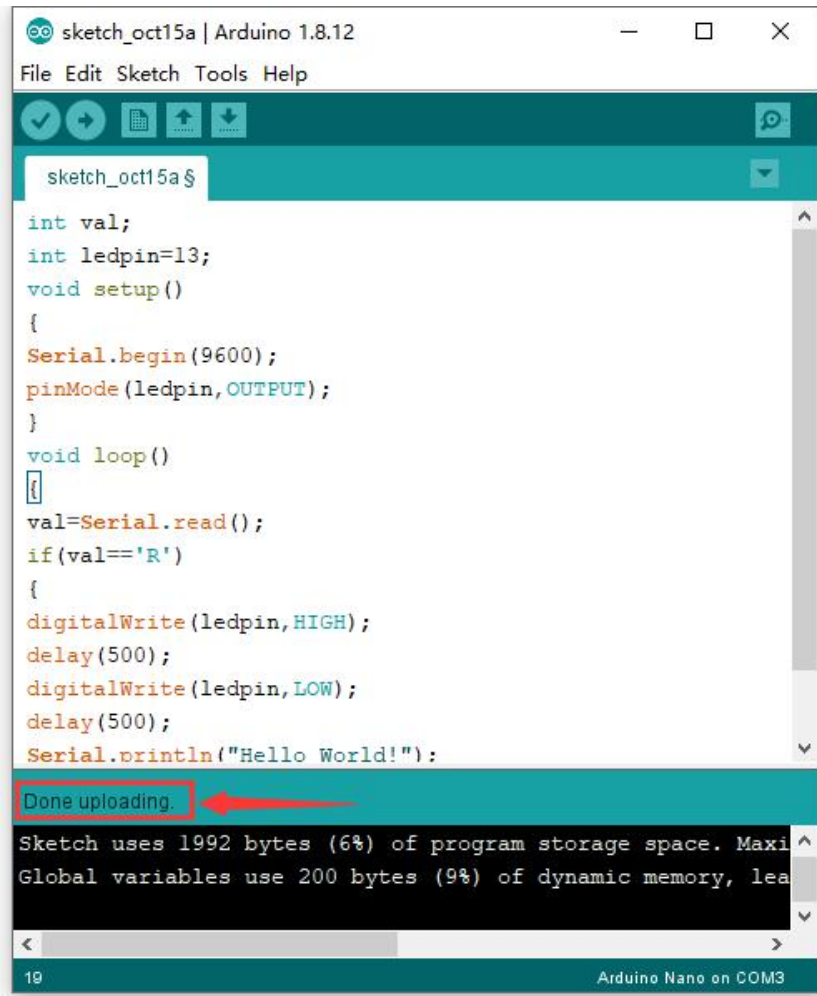


Then click verify button to check the errors. If compiling successfully, the message "Done compiling." will appear in the status bar.

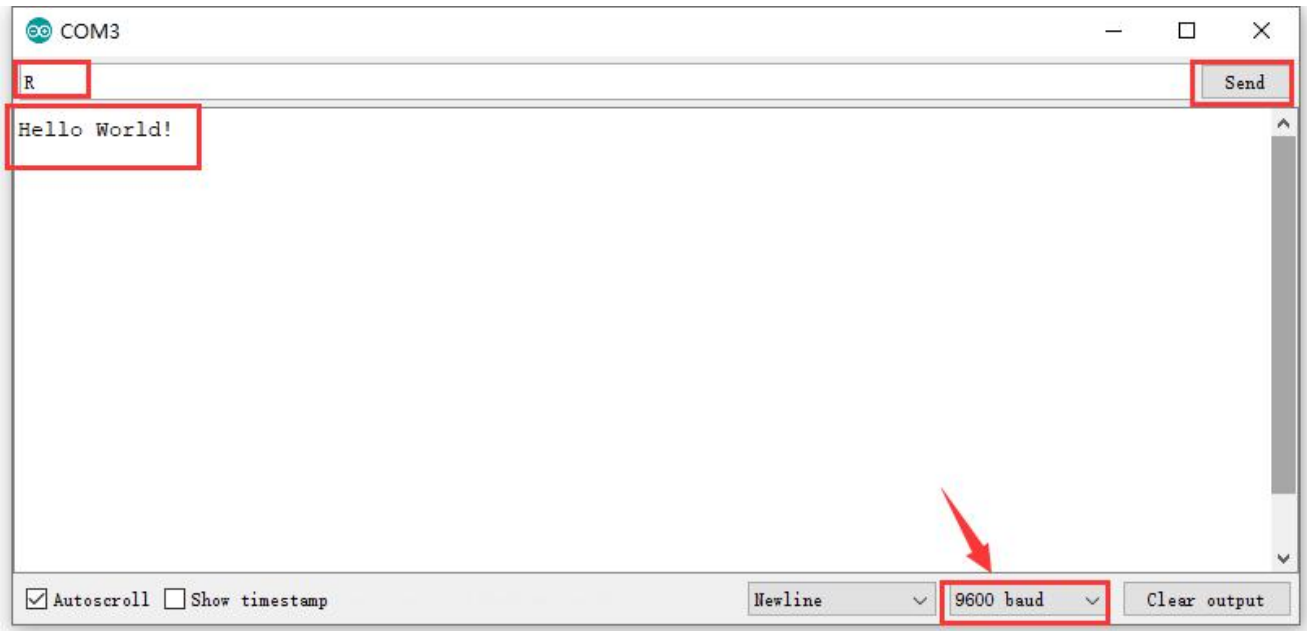


After that, click the "Upload" button to upload the code. If the upload is successful, the message "Done uploading." will appear in the status bar.





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>

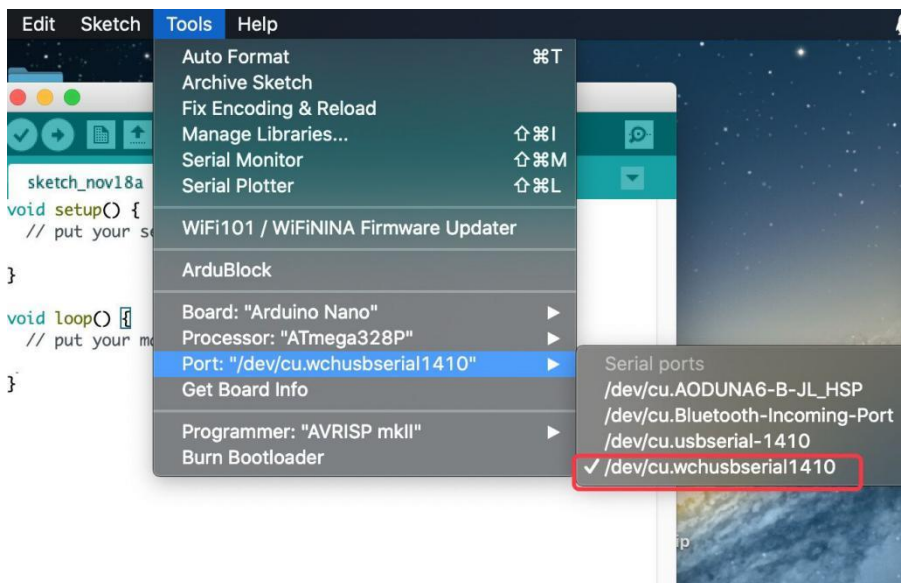
5.3 How to Install Driver of CH340

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>