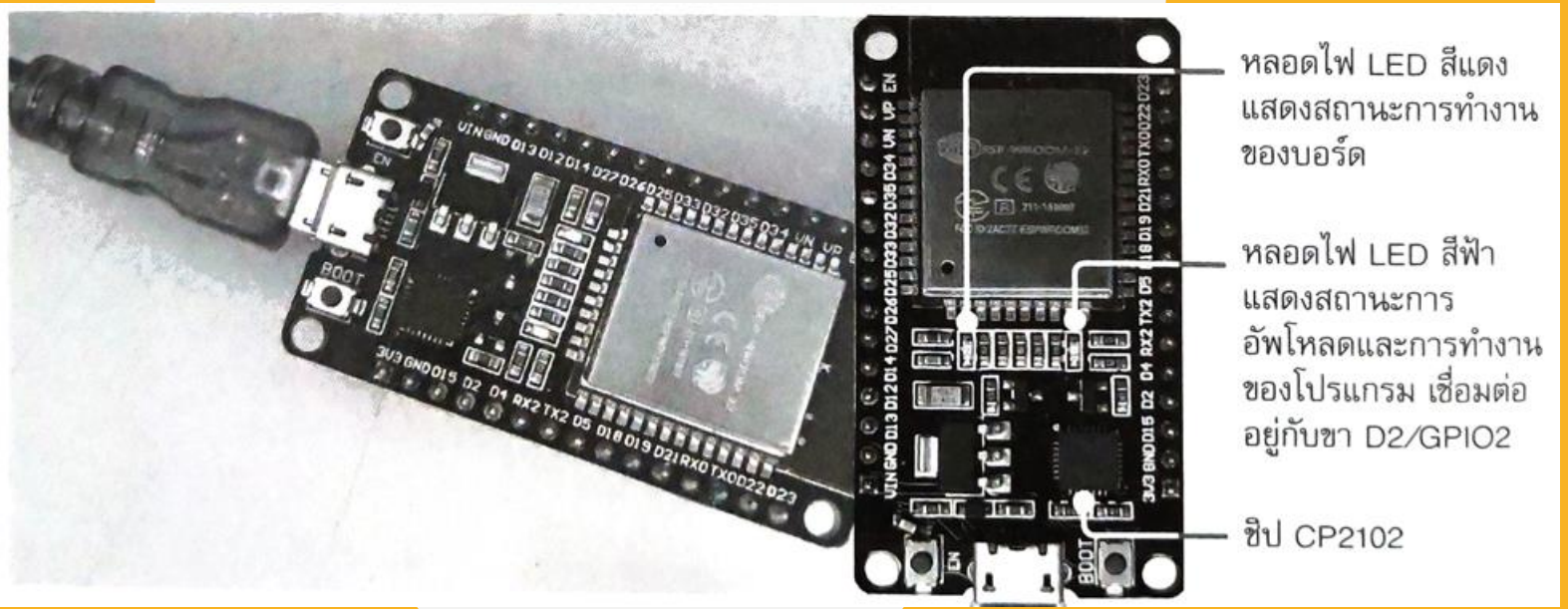
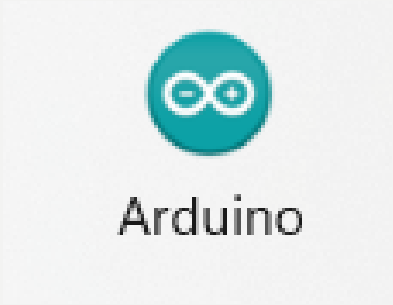
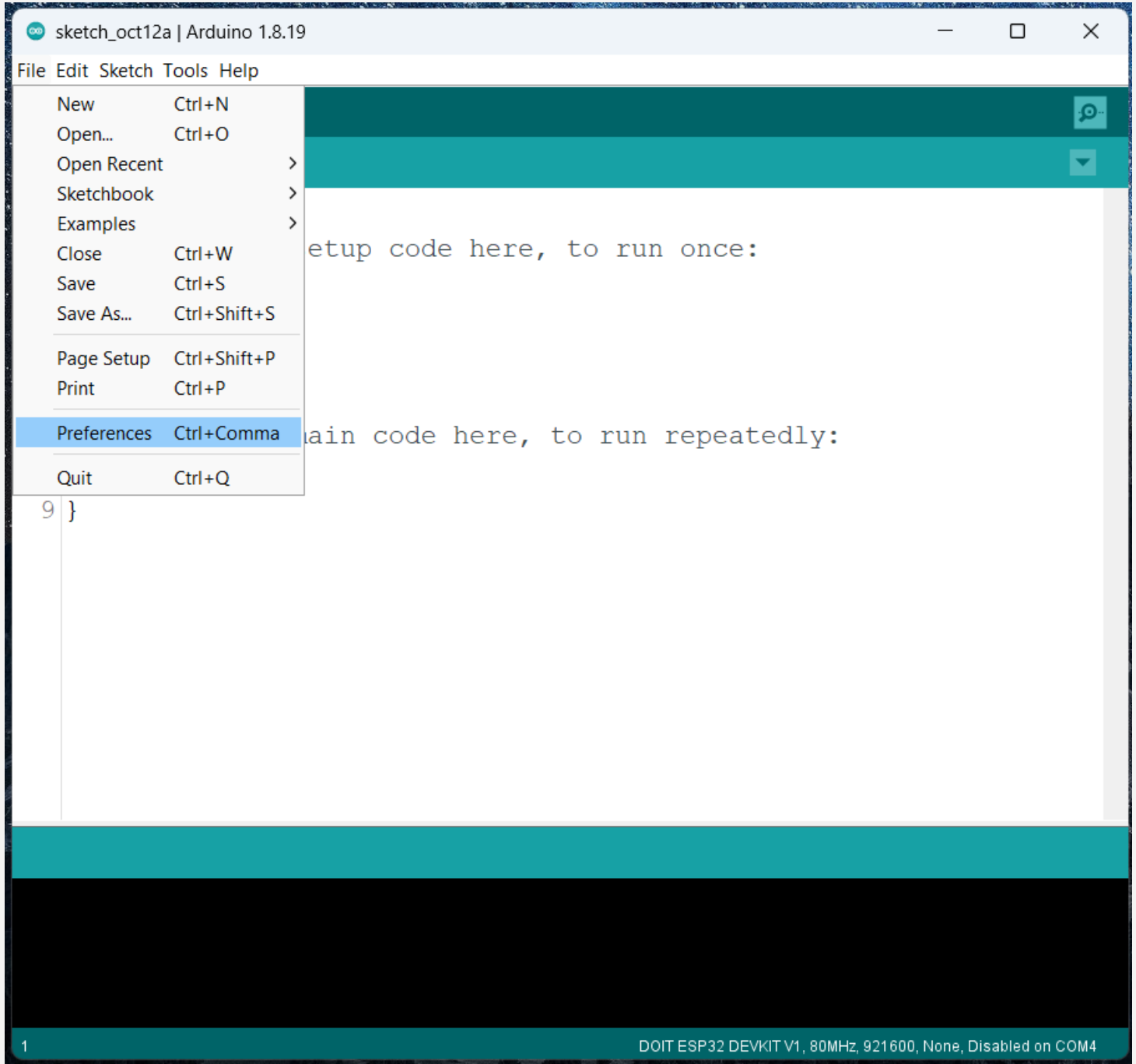
การทดสอบและอัพโหลดโปรแกรม



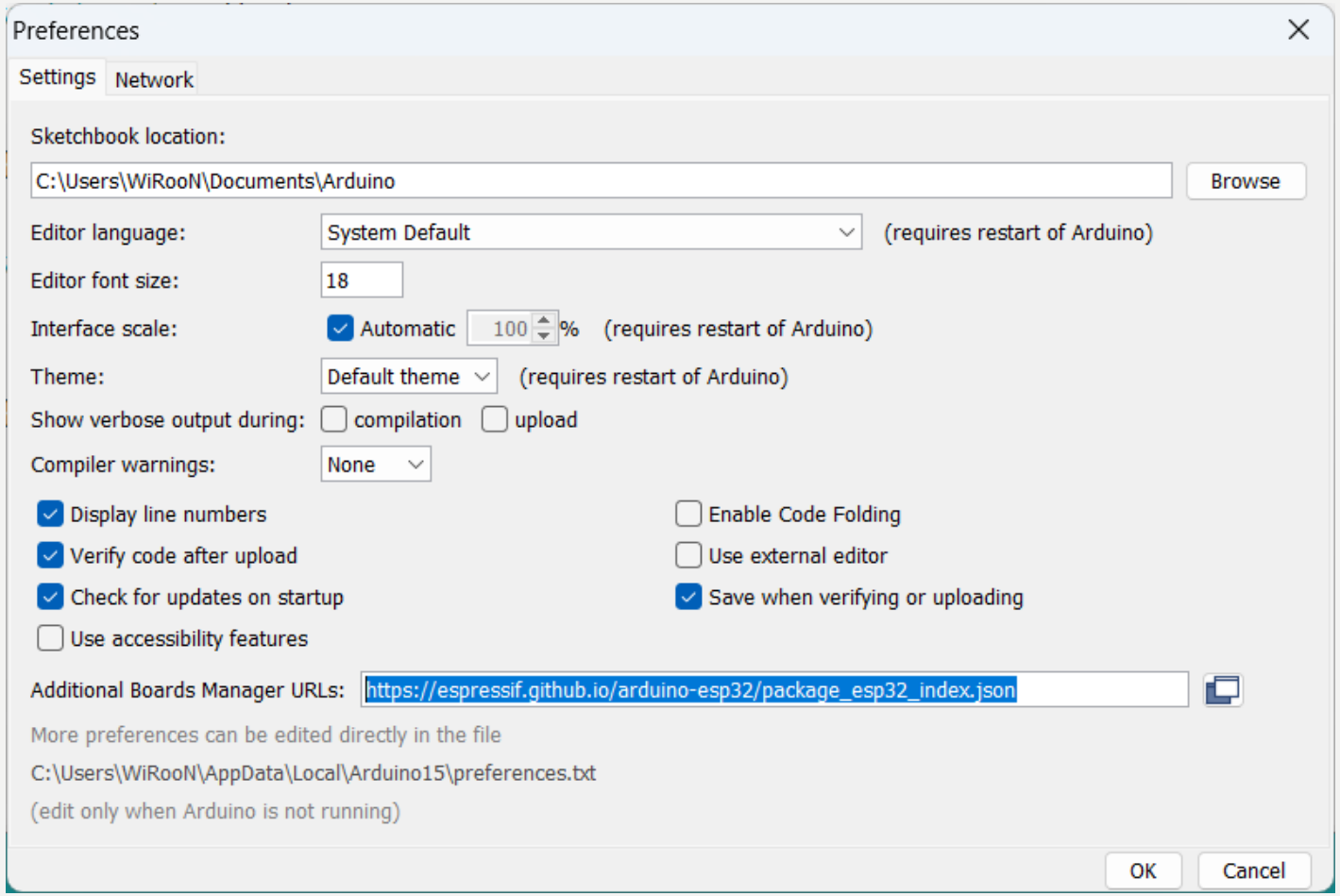
บอร์ด NodeMCU ESP32

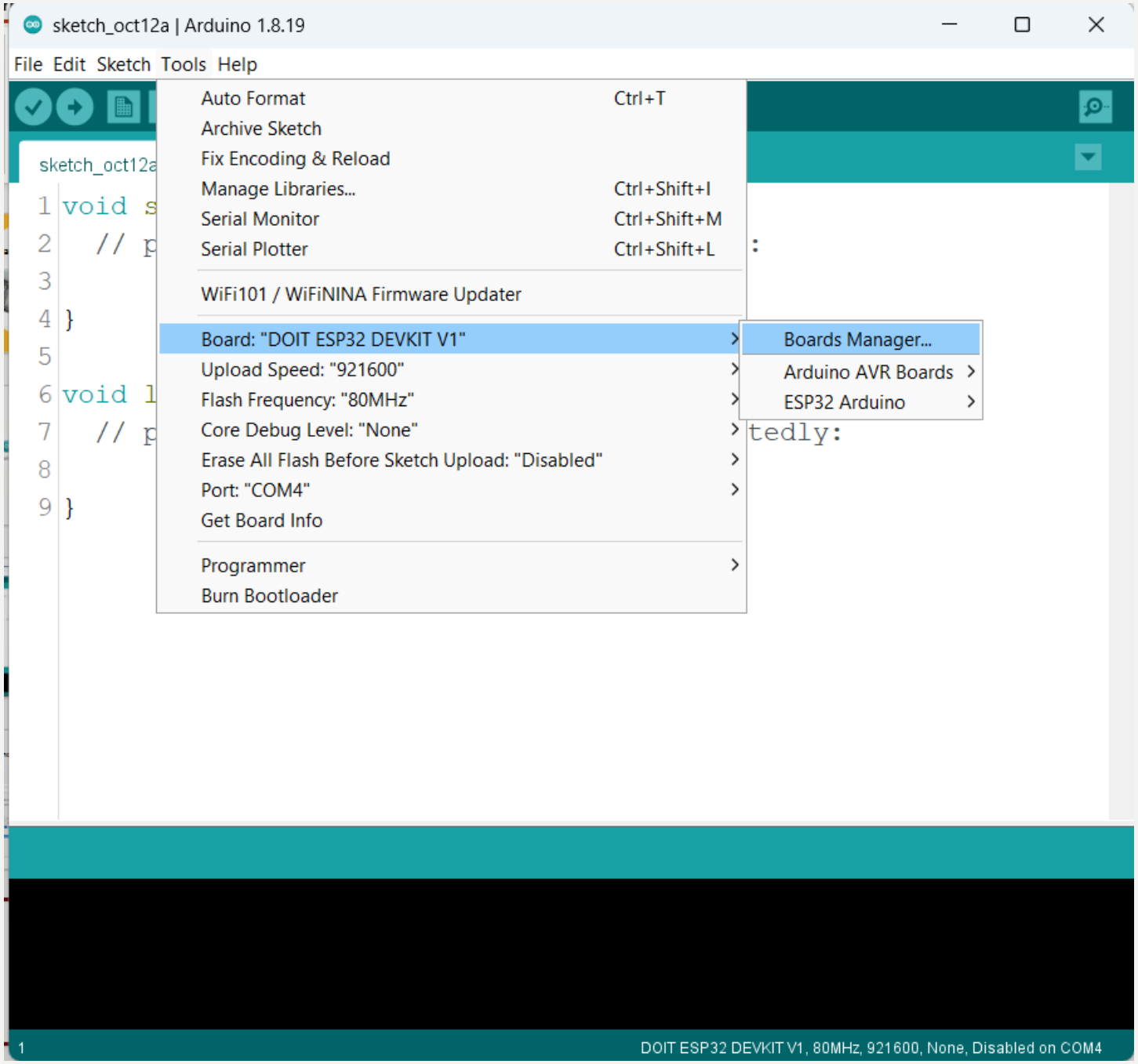
การอัพโหลด (Upload)

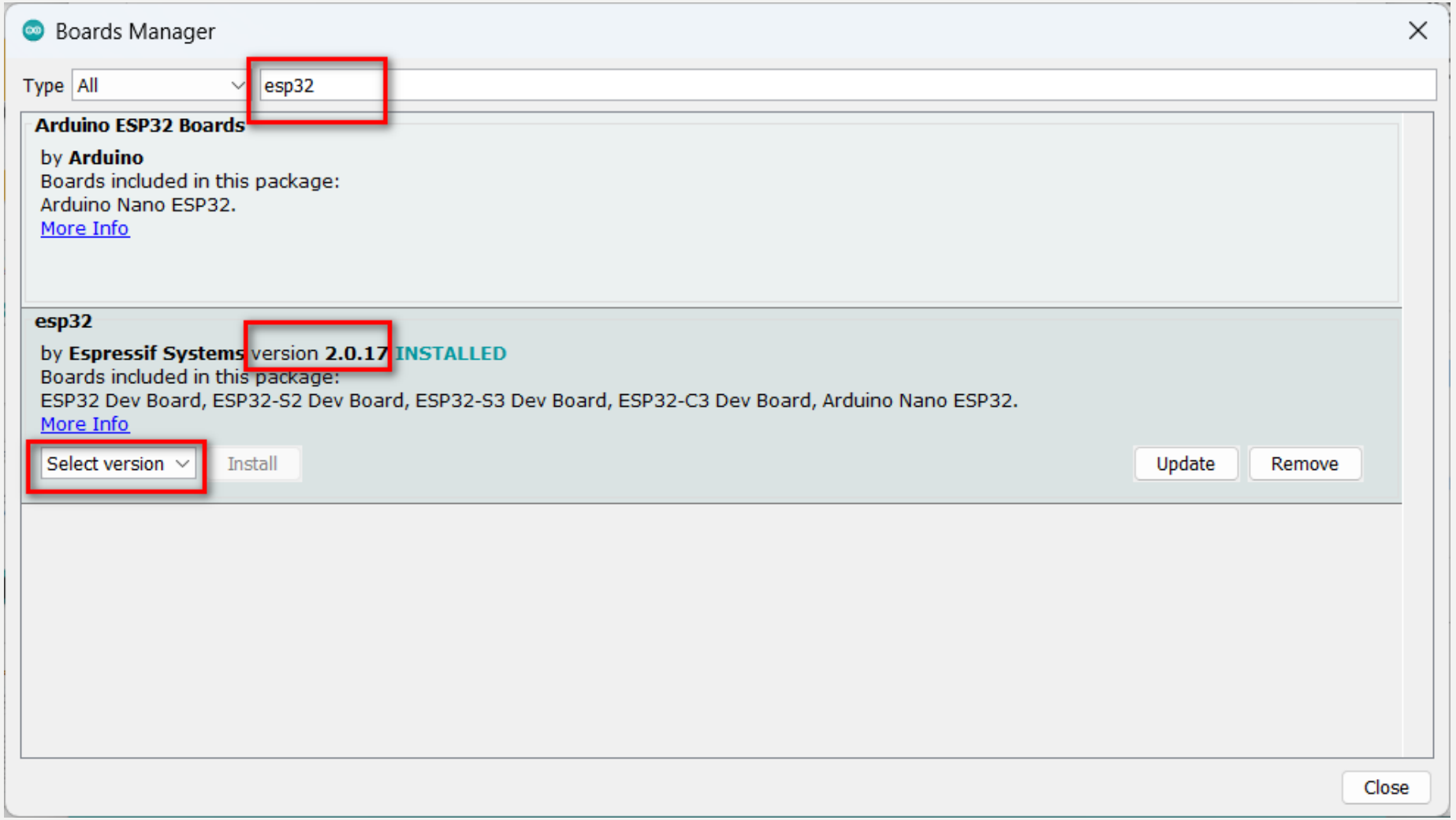


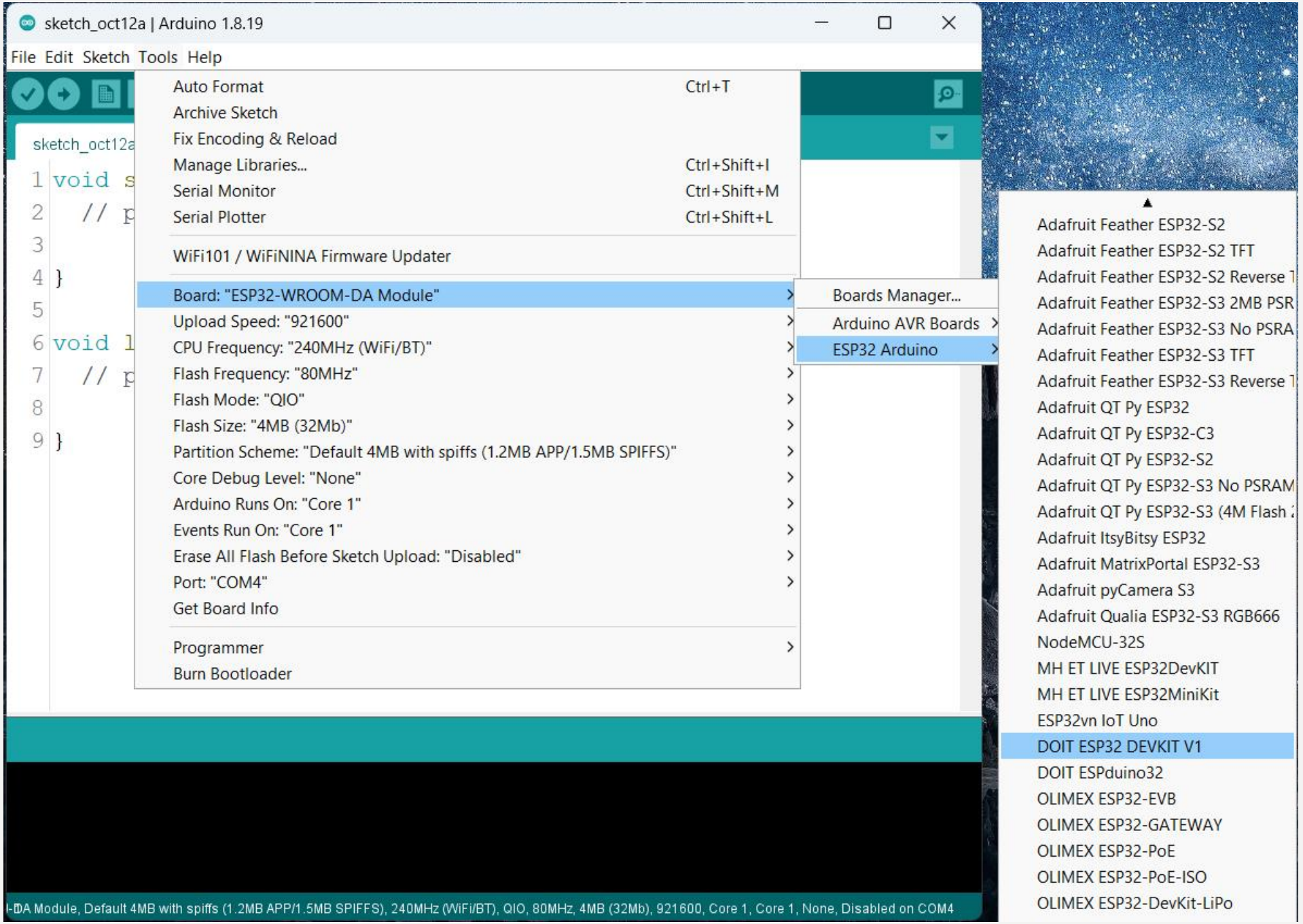

sketch_oct12a | Arduino 1.8.19
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Open Recent
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
etup code here, to run once:
ain code here, to run repeatedly:
9 }
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4

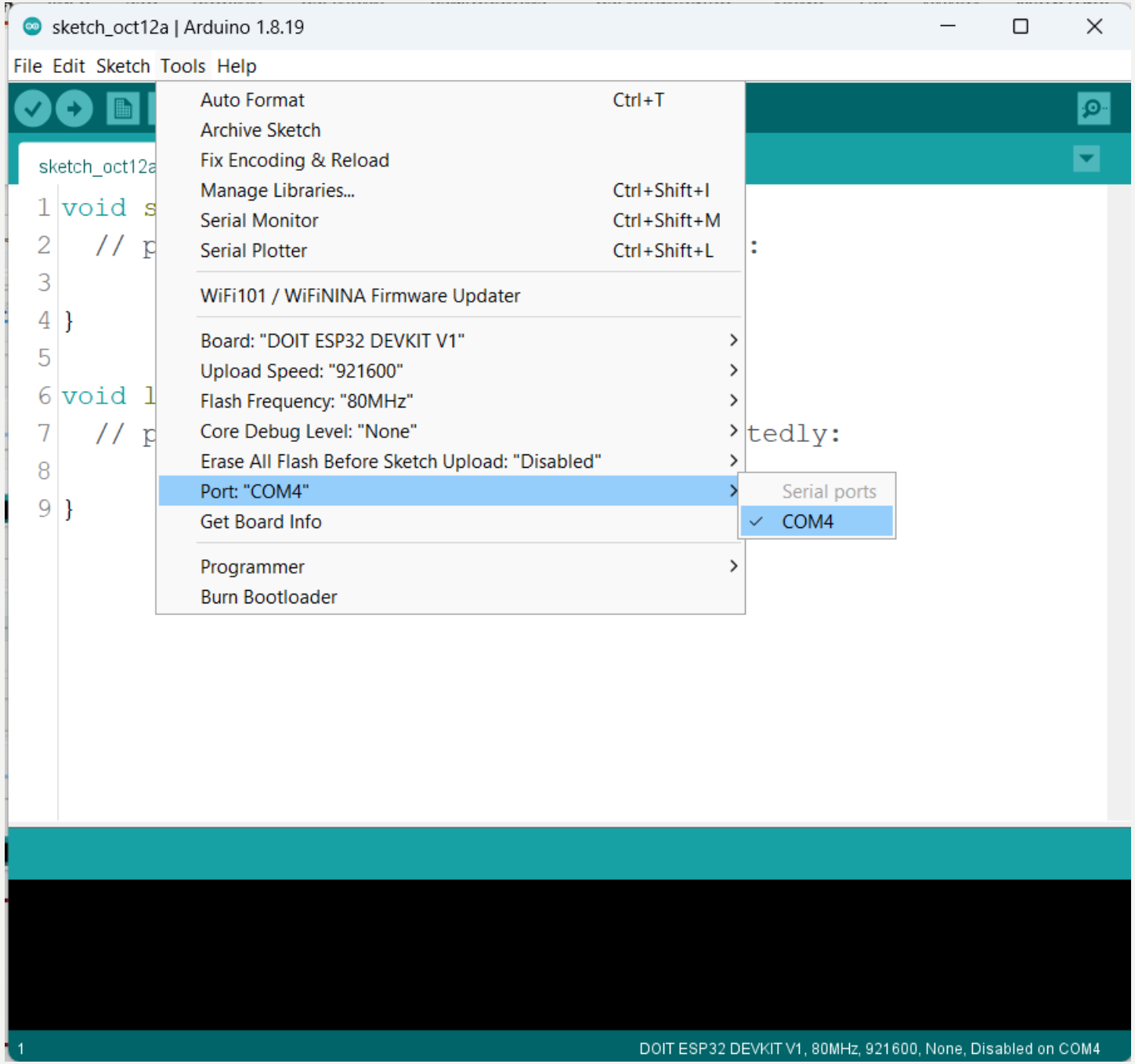
https://espressif.github.io/arduino-esp32/package_esp32_index.json



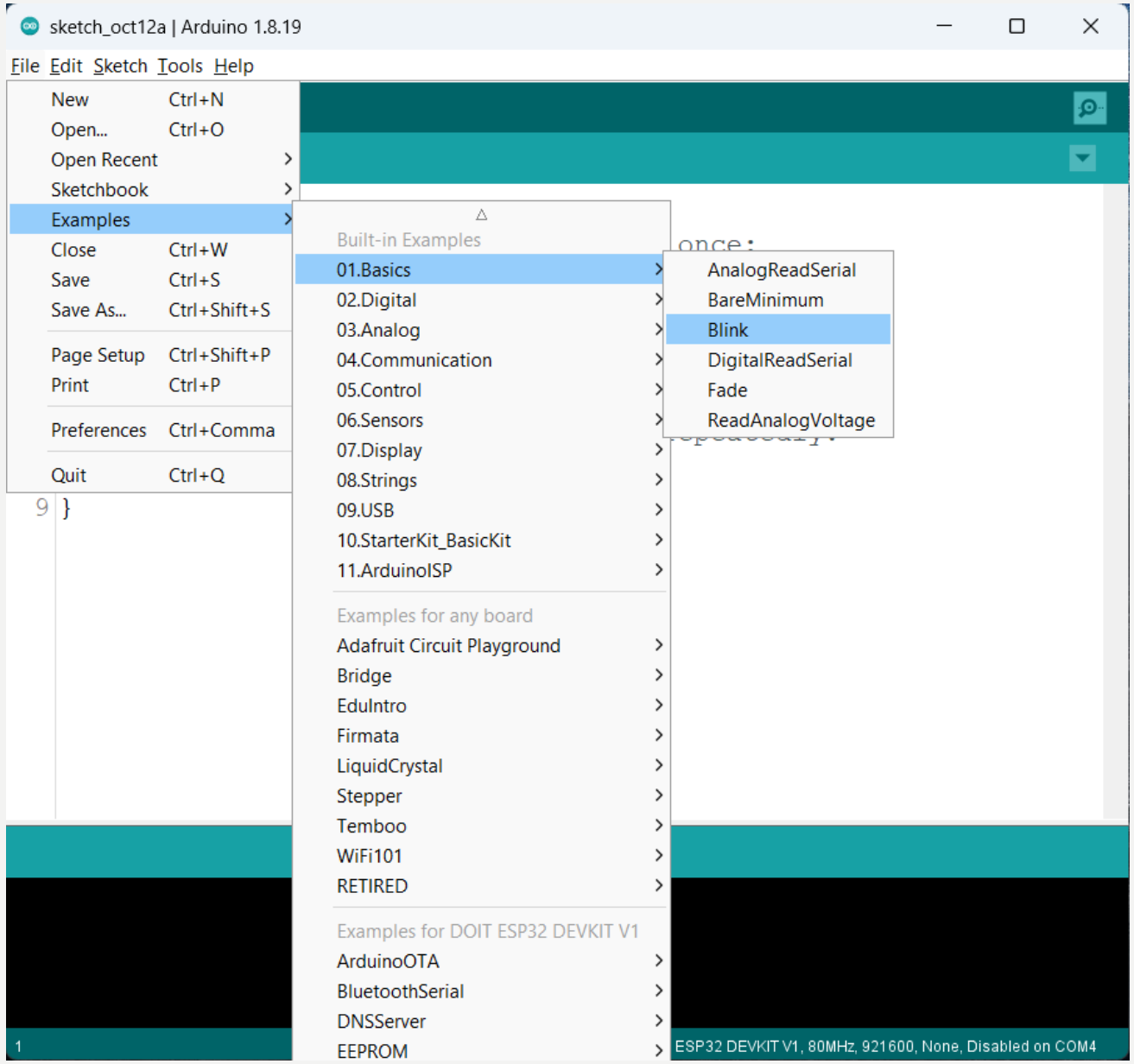

sketch_oct12a | Arduino 1.8.19
File Edit Sketch Tools Help
sketch_oct12a
1 void s
2 // p
3
4 }
5
6 void l
7 // p
8
9 }
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "DOIT ESP32 DEVKIT V1"
Upload Speed: "921600"
Flash Frequency: "80MHz"
Core Debug Level: "None"
Erase All Flash Before Sketch Upload: "Disabled"
Port: "COM4"
Get Board Info
Programmer
Burn Bootloader
Boards Manager...
Arduino AVR Boards
ESP32 Arduino
:
tedly:
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4

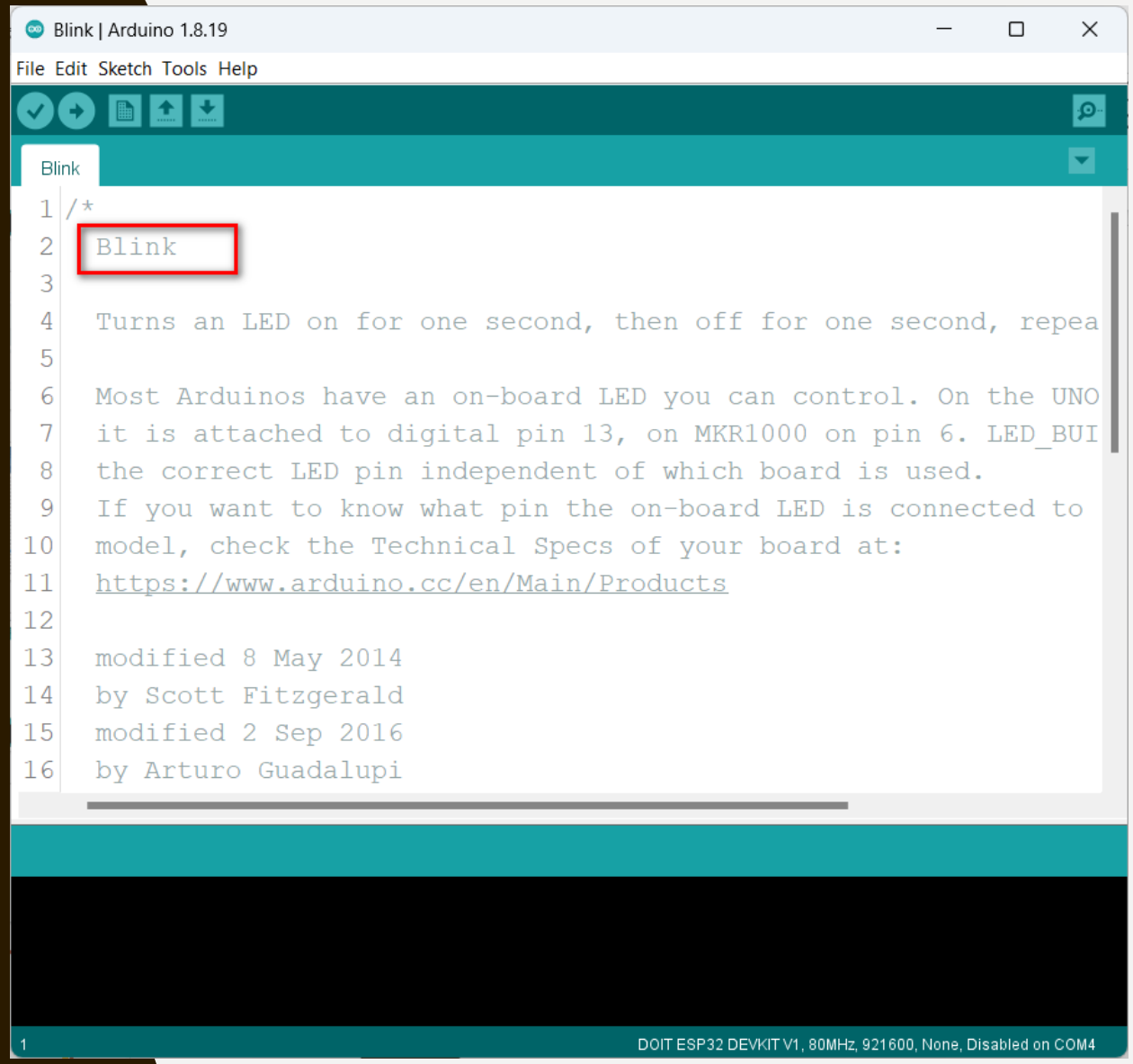

Boards Manager
Type
All
esp32
Arduino ESP32 Boards
by Arduino
Boards included in this package:
Arduino Nano ESP32.
More Info
esp32
by Espressif Systems version 2.0.17 INSTALLED
Boards included in this package:
ESP32 Dev Board, ESP32-S2 Dev Board, ESP32-S3 Dev Board, ESP32-C3 Dev Board, Arduino Nano ESP32.
More Info
Select version
Install
Update
Remove
Close

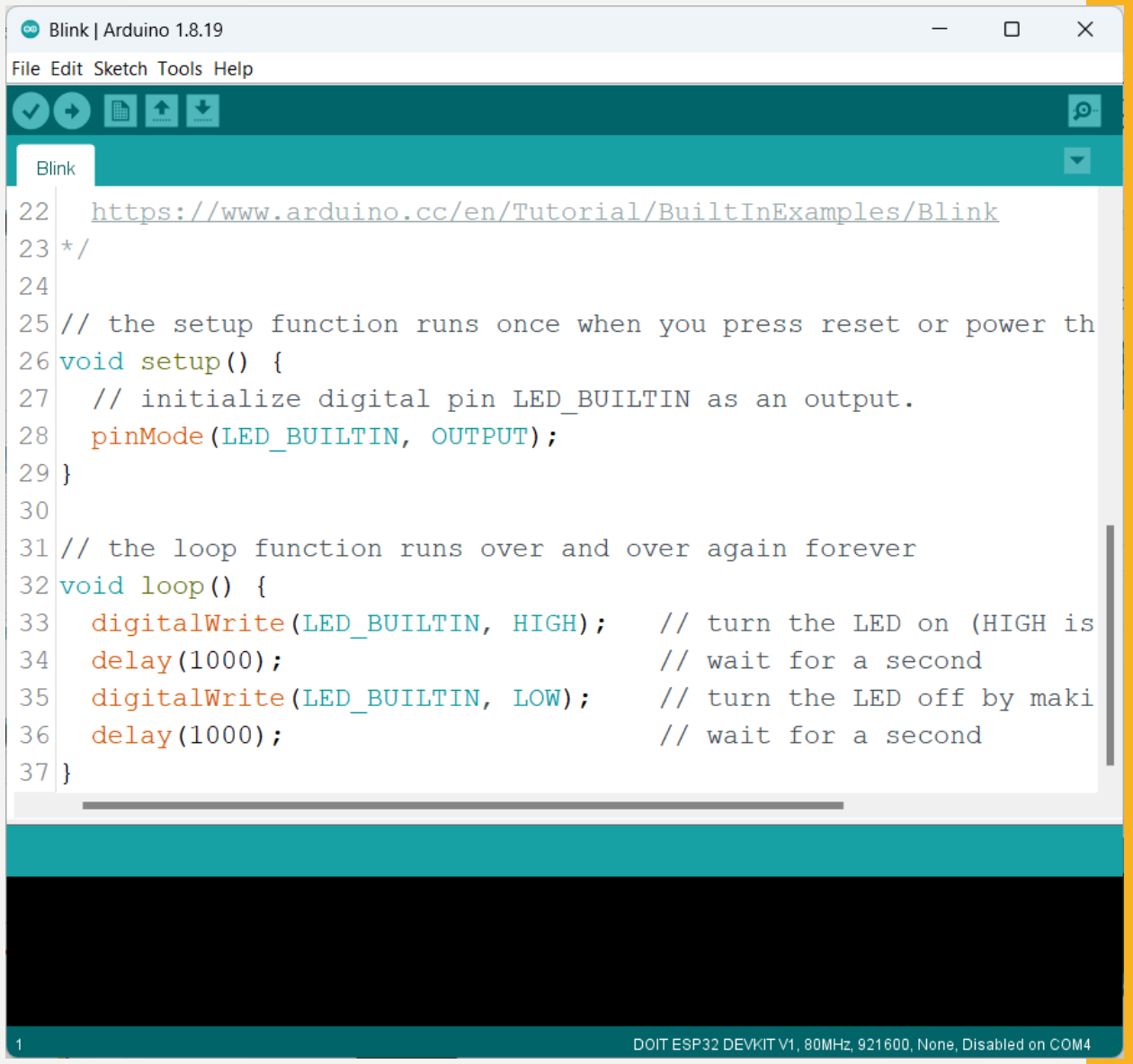

sketch_oct12a | Arduino 1.8.19
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "ESP32-WROOM-DA Module"
Upload Speed: "921600"
CPU Frequency: "240MHz (WiFi/BT)"
Flash Frequency: "80MHz"
Flash Mode: "QIO"
Flash Size: "4MB (32Mb)"
Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"
Core Debug Level: "None"
Arduino Runs On: "Core 1"
Events Run On: "Core 1"
Erase All Flash Before Sketch Upload: "Disabled"
Port: "COM4"
Get Board Info
Programmer
Burn Bootloader
Boards Manager...
Arduino AVR Boards
ESP32 Arduino
Adafruit Feather ESP32-S2
Adafruit Feather ESP32-S2 TFT
Adafruit Feather ESP32-S3 2MB PSR
Adafruit Feather ESP32-S3 No PSRA
Adafruit Feather ESP32-S3 TFT
Adafruit QT Py ESP32
Adafruit QT Py ESP32-C3
Adafruit QT Py ESP32-S2
Adafruit QT Py ESP32-S3 No PSRAM
Adafruit ItsyBitsy ESP32
Adafruit MatrixPortal ESP32-S3
Adafruit pyCamera S3
Adafruit Qualia ESP32-S3 RGB666
NodeMCU-32S
MH ET LIVE ESP32DevKIT
MH ET LIVE ESP32MiniKit
ESP32vn IoT Uno
DOIT ESP32 DEVKIT V1
DOIT ESPduino32
OLIMEX ESP32-EVB
OLIMEX ESP32-GATEWAY
OLIMEX ESP32-PoE
OLIMEX ESP32-PoE-ISO
OLIMEX ESP32-DevKit-LiPo
DA Module, Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS), 240MHz (WiFi/BT), QIO, 80MHz, 4MB (32Mb), 921600, Core 1, Core 1, None, Disabled on COM4

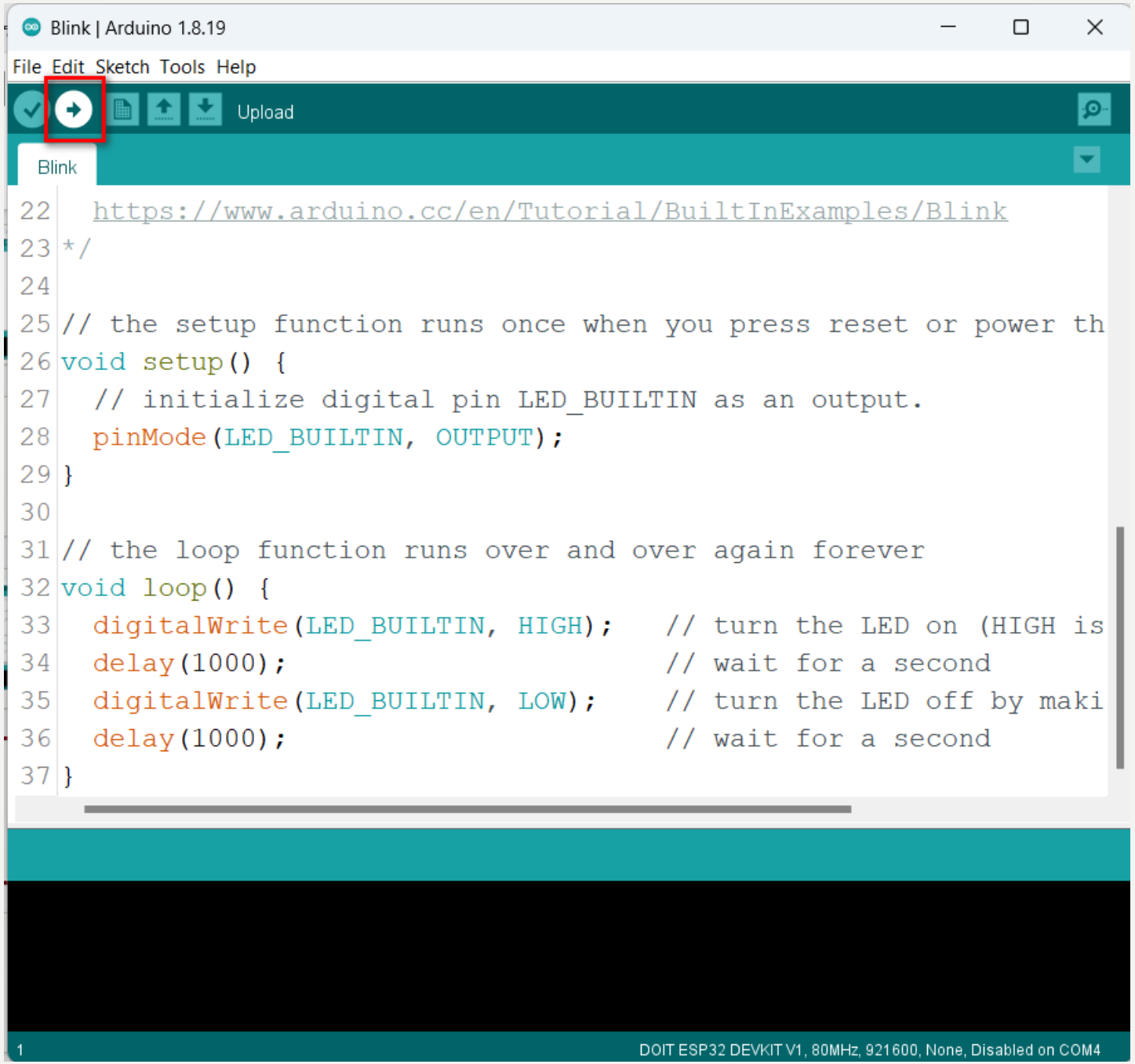

sketch_oct12a | Arduino 1.8.19
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "DOIT ESP32 DEVKIT V1"
Upload Speed: "921600"
Flash Frequency: "80MHz"
Core Debug Level: "None"
Erase All Flash Before Sketch Upload: "Disabled"
Port: "COM4"
Get Board Info
Programmer
Burn Bootloader
Serial ports
COM4
sketch_oct12a
1 void s
2 // p
3
4 }
5
6 void l
7 // p
8
9 }
tedly:
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4

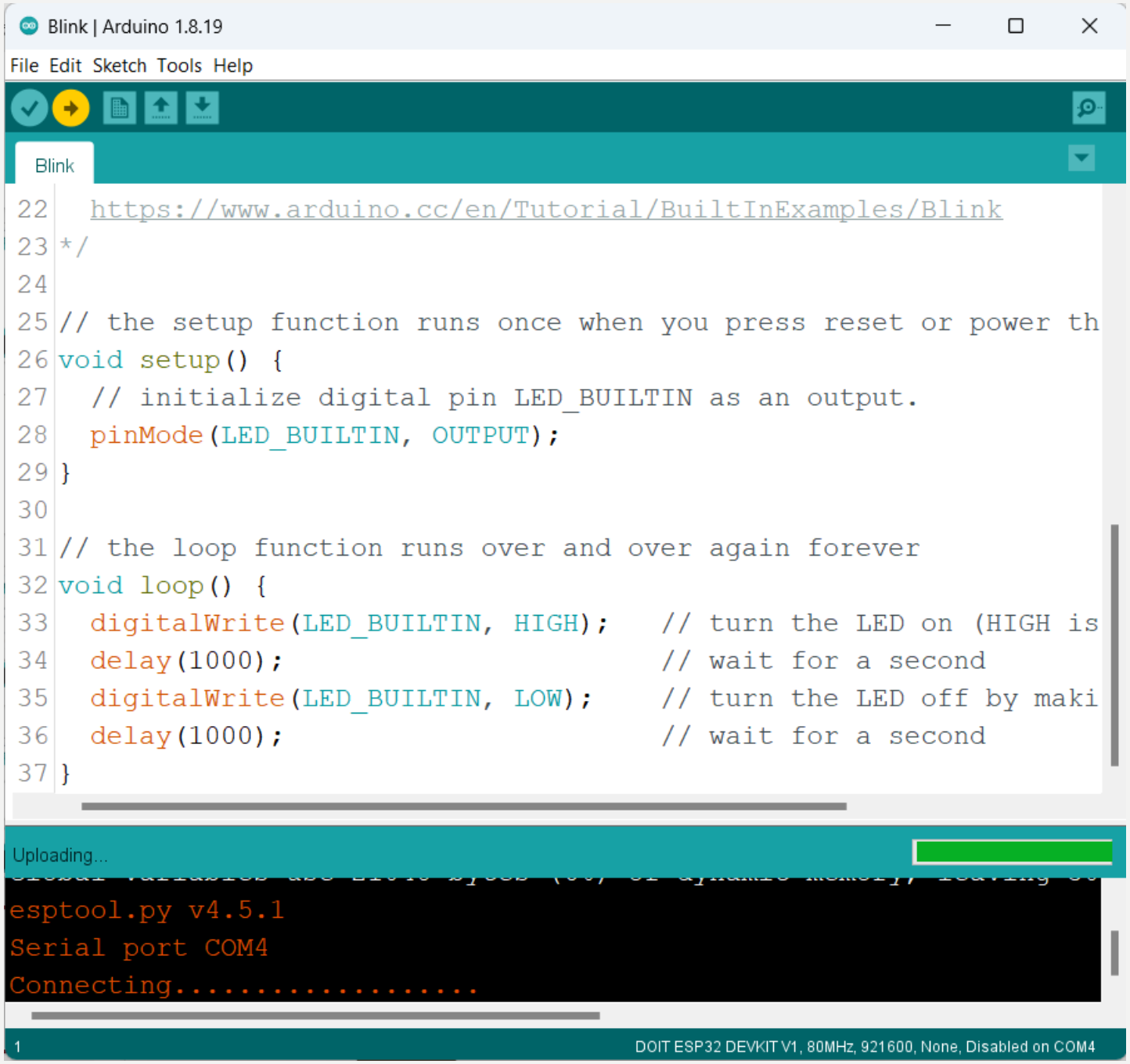
ทดสอบโปรแกรม

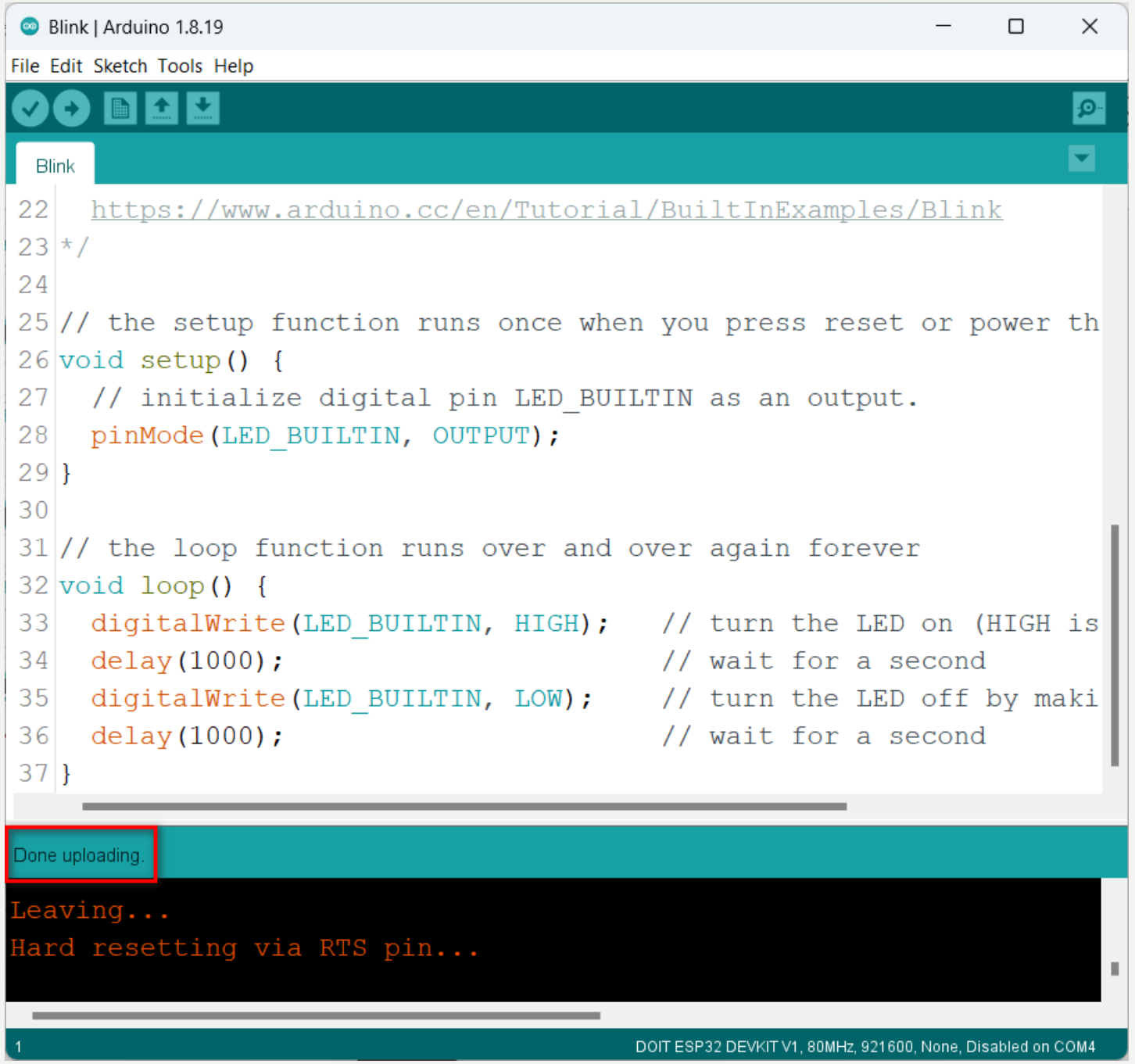


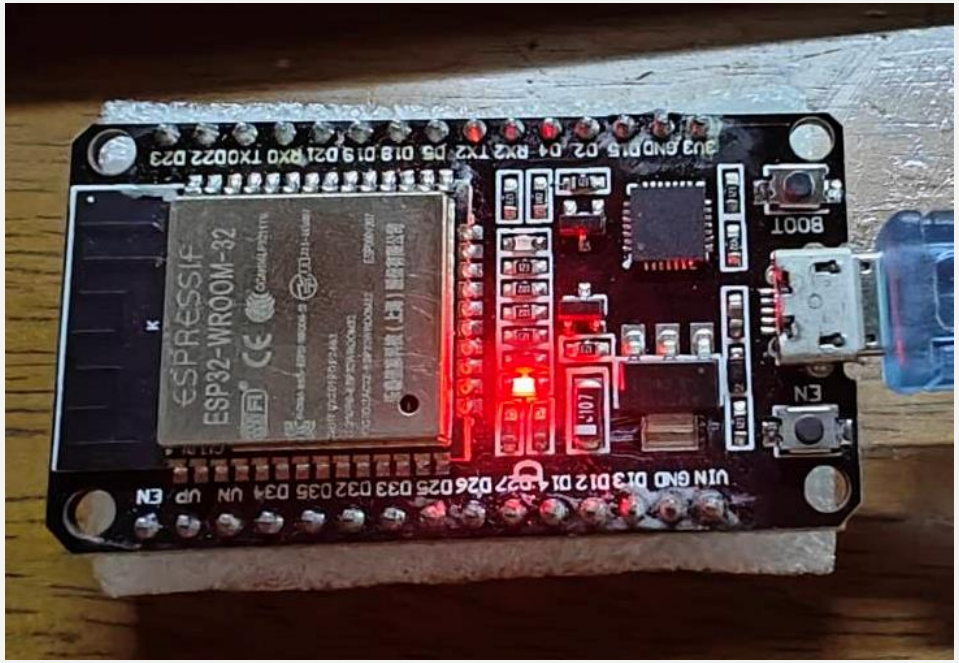

Blink | Arduino 1.8.19
File Edit Sketch Tools Help
Blink
/*
Blink
Turns an LED on for one second, then off for one second, repea
Most Arduinos have an on-board LED you can control. On the UNO
it is attached to digital pin 13, on MKR1000 on pin 6. LED_BUI
the correct LED pin independent of which board is used.
If you want to know what pin the on-board LED is connected to
model, check the Technical Specs of your board at:
https://www.arduino.cc/en/Main/Products
modified 8 May 2014
by Scott Fitzgerald
modified 2 Sep 2016
by Arturo Guadalupi
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4

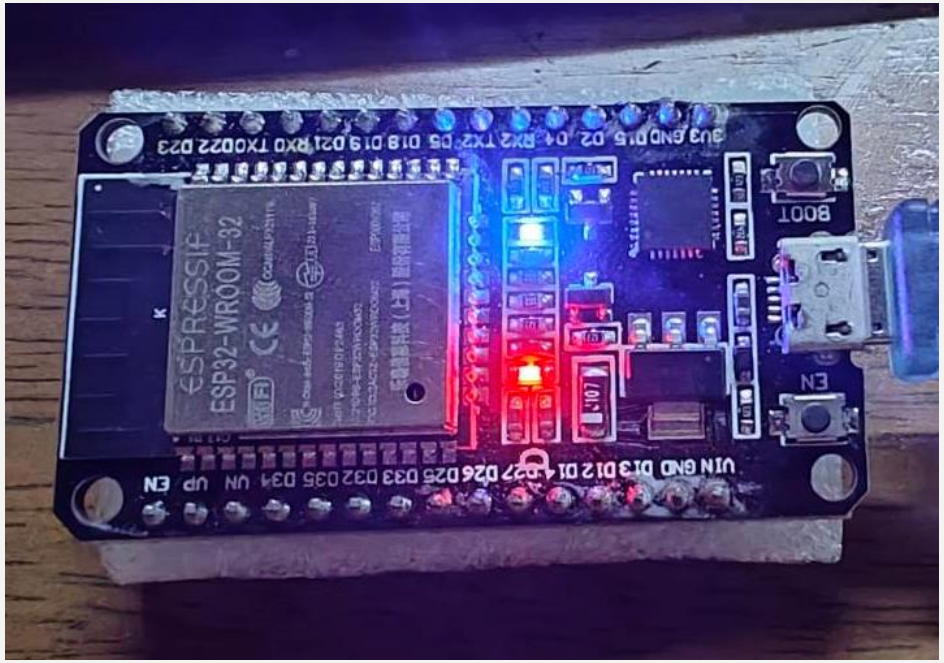

Blink | Arduino 1.8.19
File Edit Sketch Tools Help
Blink
https://www.arduino.cc/en/Tutorial/BuiltInExamples/Blink
*/
// the setup function runs once when you press reset or power th
void setup() {
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by maki
delay(1000); // wait for a second
}
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4

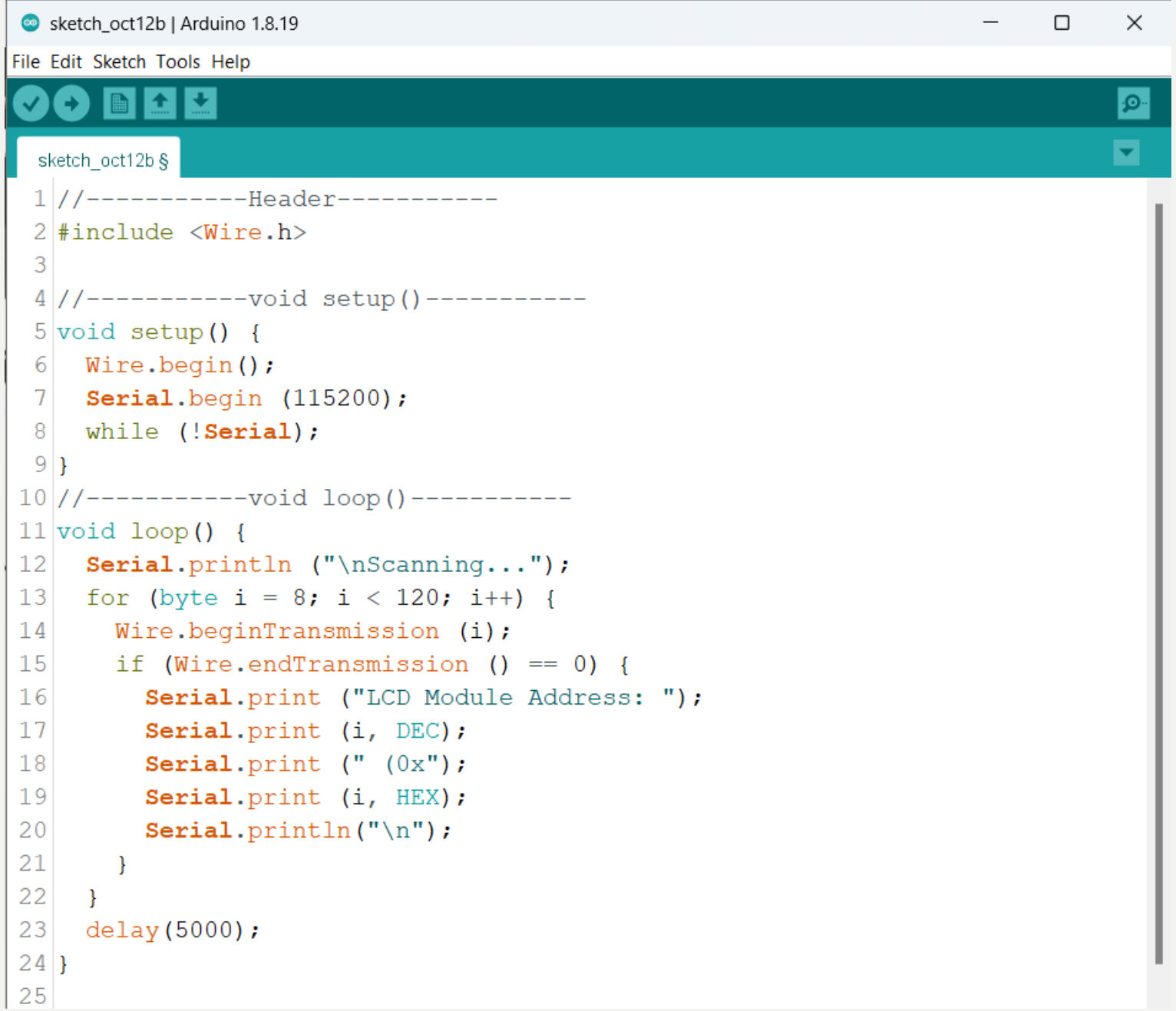

Blink | Arduino 1.8.19
File Edit Sketch Tools Help
Upload
Blink
22 https://www.arduino.cc/en/Tutorial/BuiltInExamples/Blink
23 */
24
25 // the setup function runs once when you press reset or power th
26 void setup() {
27 // initialize digital pin LED_BUILTIN as an output.
28 pinMode(LED_BUILTIN, OUTPUT);
29 }
30
31 // the loop function runs over and over again forever
32 void loop() {
33 digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is
34 delay(1000); // wait for a second
35 digitalWrite(LED_BUILTIN, LOW); // turn the LED off by maki
36 delay(1000); // wait for a second
37 }
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4


Blink | Arduino 1.8.19
File Edit Sketch Tools Help
Blink
https://www.arduino.cc/en/Tutorial/BuiltInExamples/Blink
*/
// the setup function runs once when you press reset or power th
void setup() {
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by maki
delay(1000); // wait for a second
}
Uploading...
esptool.py v4.5.1
Serial port COM4
Connecting.....
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4


Blink | Arduino 1.8.19
File Edit Sketch Tools Help
Blink
22 https://www.arduino.cc/en/Tutorial/BuiltInExamples/Blink
23 */
24
25 // the setup function runs once when you press reset or power th
26 void setup() {
27 // initialize digital pin LED_BUILTIN as an output.
28 pinMode(LED_BUILTIN, OUTPUT);
29 }
30
31 // the loop function runs over and over again forever
32 void loop() {
33 digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is
34 delay(1000); // wait for a second
35 digitalWrite(LED_BUILTIN, LOW); // turn the LED off by maki
36 delay(1000); // wait for a second
37 }
Done uploading.
Leaving...
Hard resetting via RTS pin...
1
DOIT ESP32 DEVKIT V1, 80MHz, 921600, None, Disabled on COM4

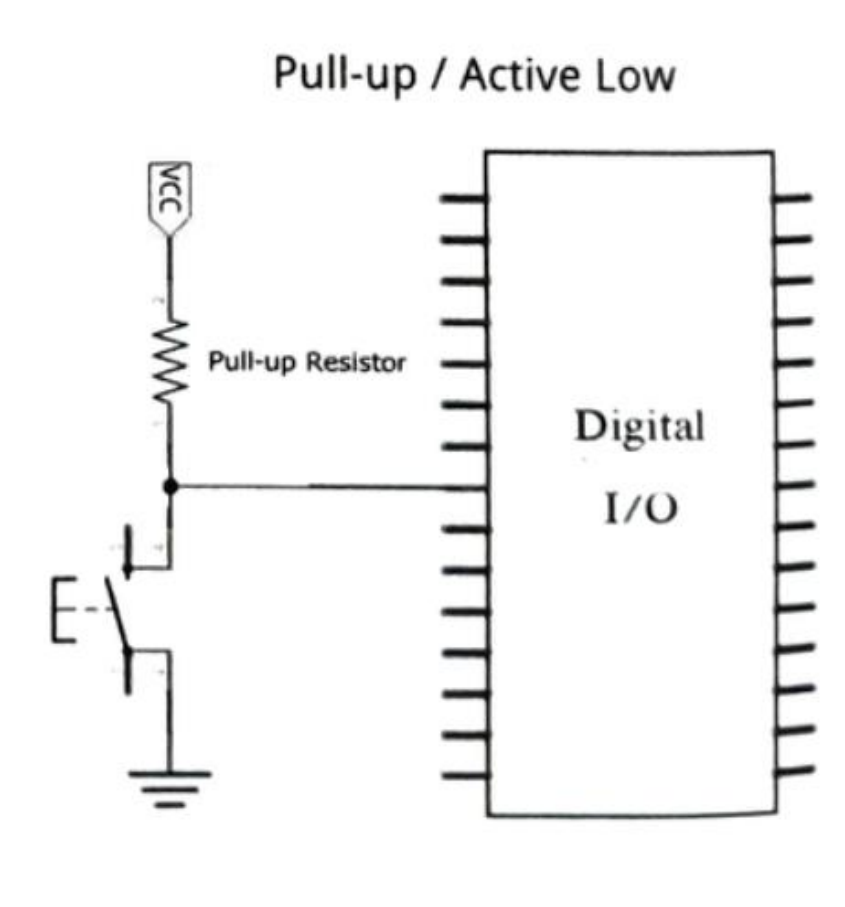

ESPRESSIF
ESP32-WROOM-32
BOOT
EN


ESPRESSIF
ESP32-WROOM-32
BOOT
EN

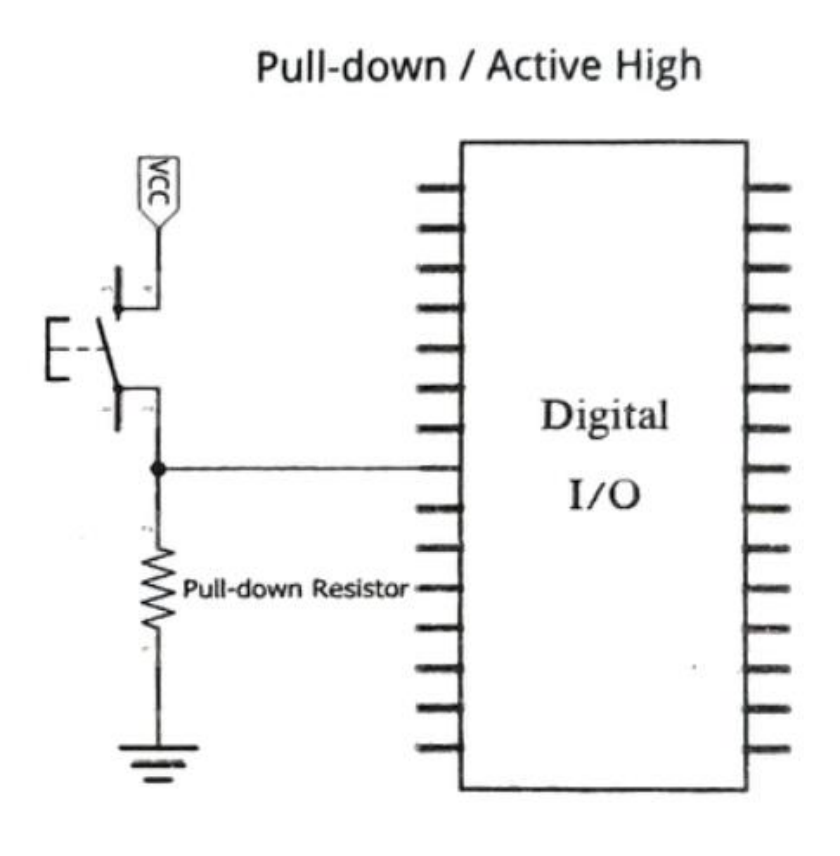

sketch_oct12b | Arduino 1.8.19
File Edit Sketch Tools Help
sketch_oct12b §
//----------Header----------
#include <Wire.h>
//----------void setup()----------
void setup() {
Wire.begin();
Serial.begin (115200);
while (!Serial);
}
//----------void loop()----------
void loop() {
Serial.println ("\nScanning...");
for (byte i = 8; i < 120; i++) {
Wire.beginTransmission (i);
if (Wire.endTransmission () == 0) {
Serial.print ("LCD Module Address: ");
Serial.print (i, DEC);
Serial.print (" (0x");
Serial.print (i, HEX);
Serial.println("\n");
}
}
delay(5000);
}

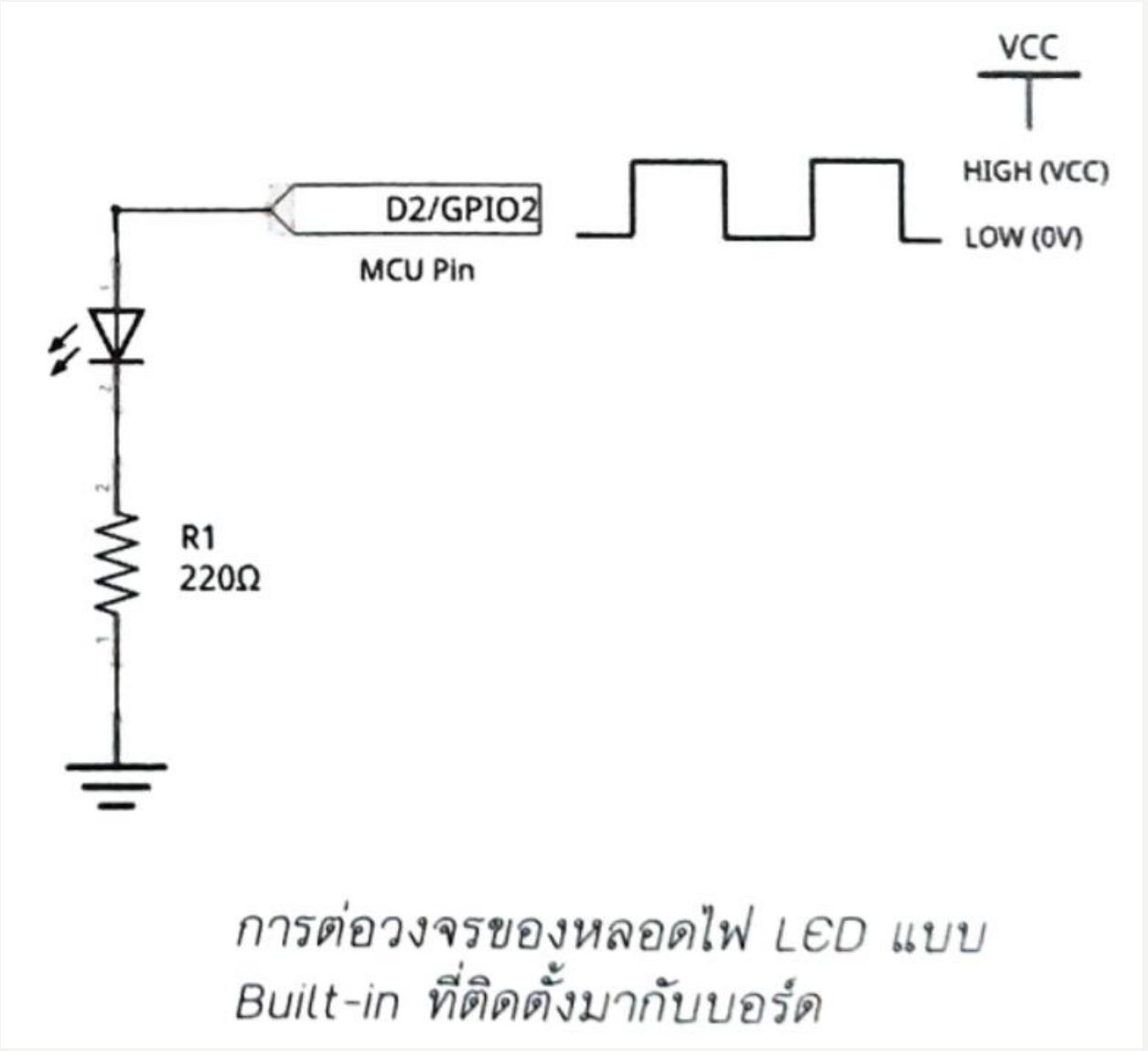
การต่อวงจรให้อุปกรณ์ทำงานในแบบ Active Low/Active High

Active Low หรือ Pull-Up



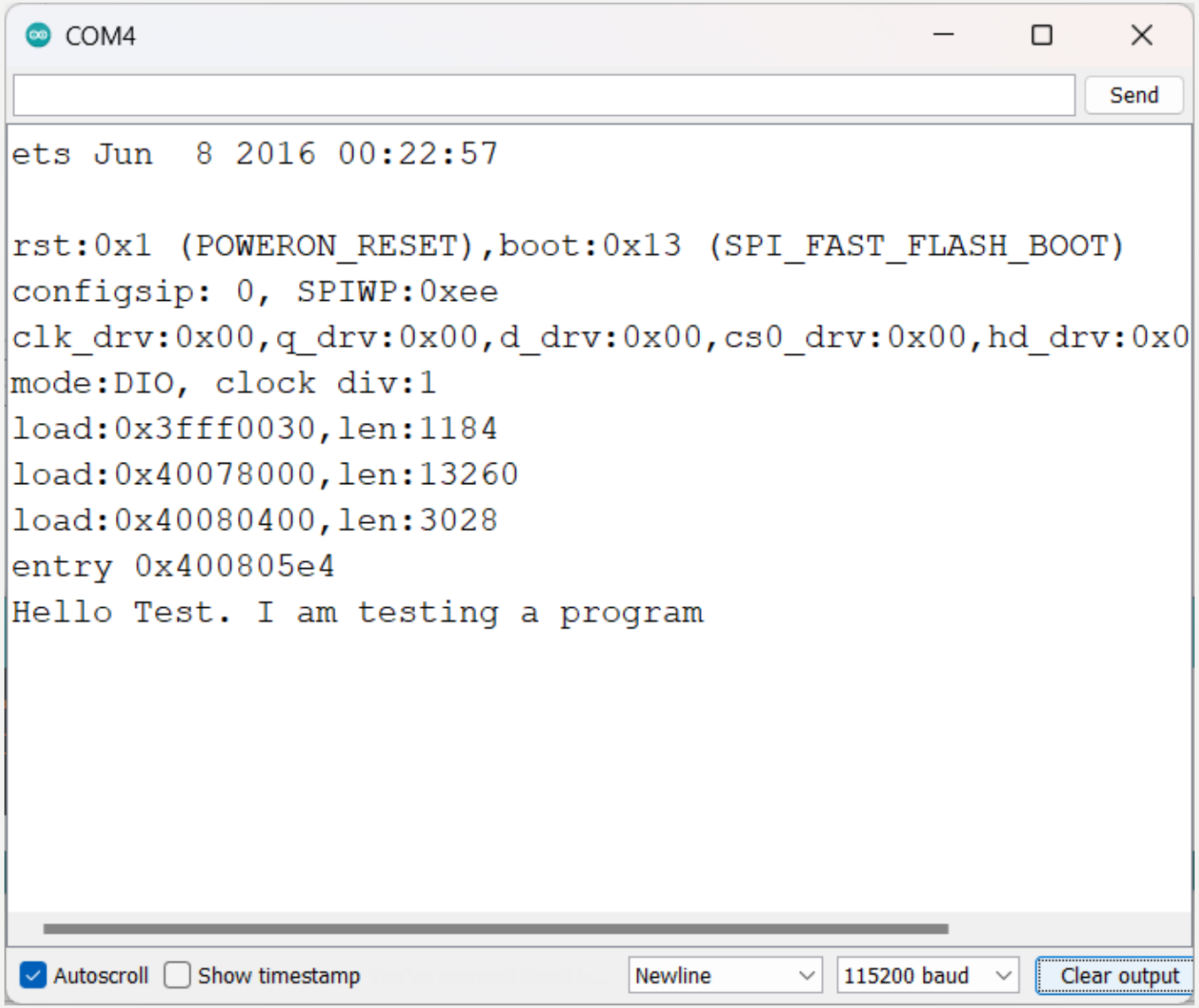
Active High หรือ Pull-Down



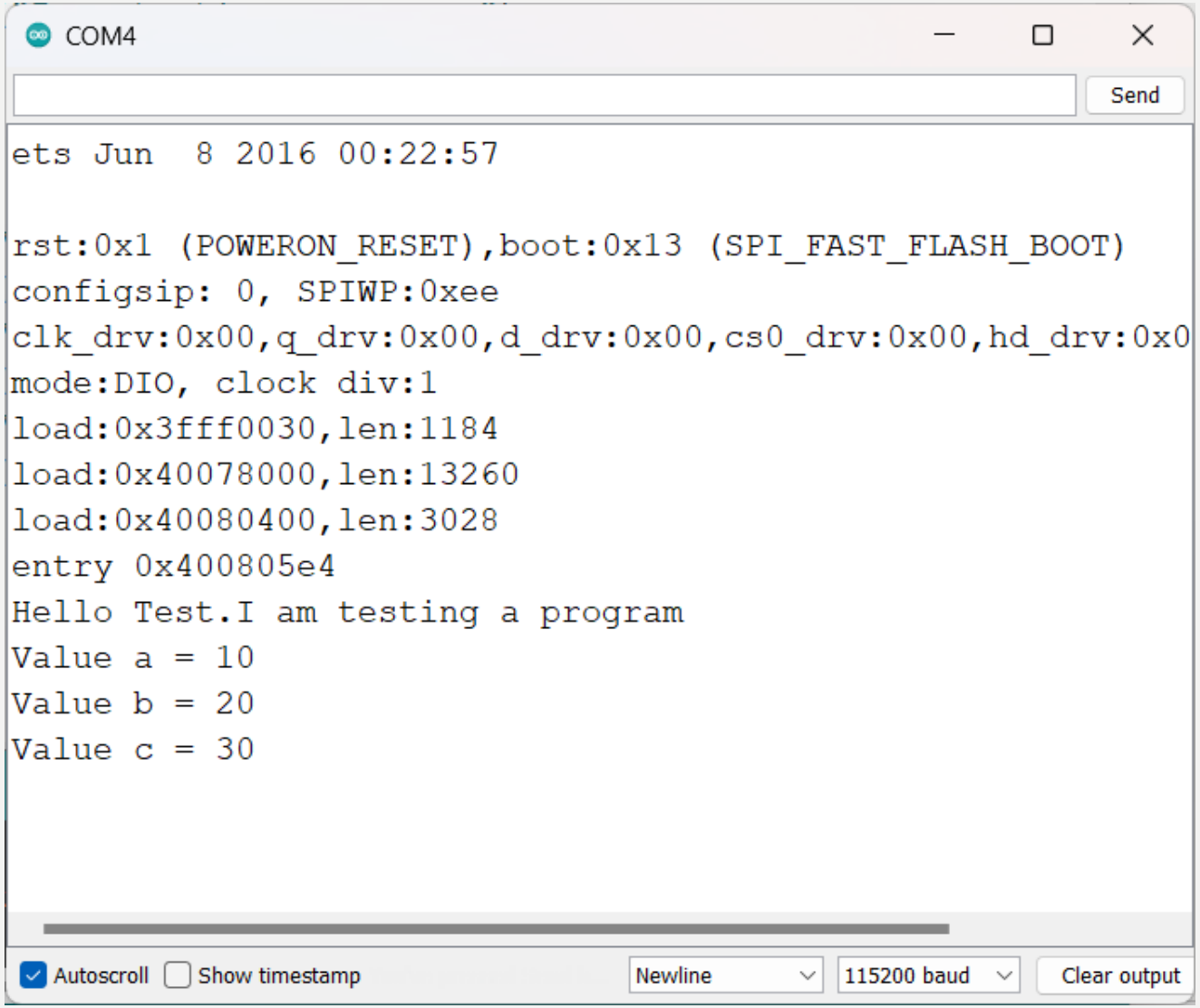


การต่อวงจรของหลอดไฟ LED แบบ Built-in ที่ติดตั้งมากับบอร์ด

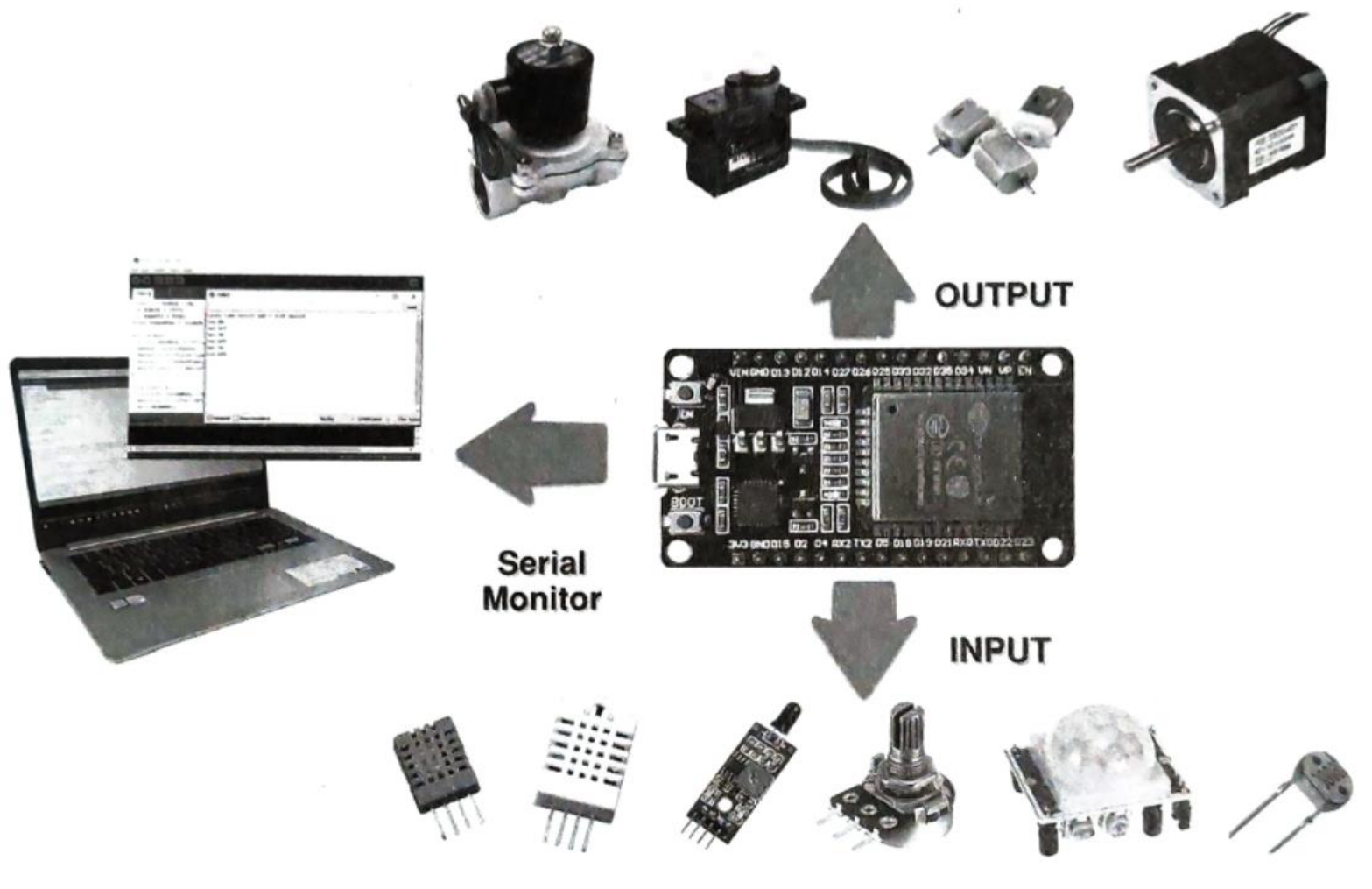
การใช้ Serial Monitor

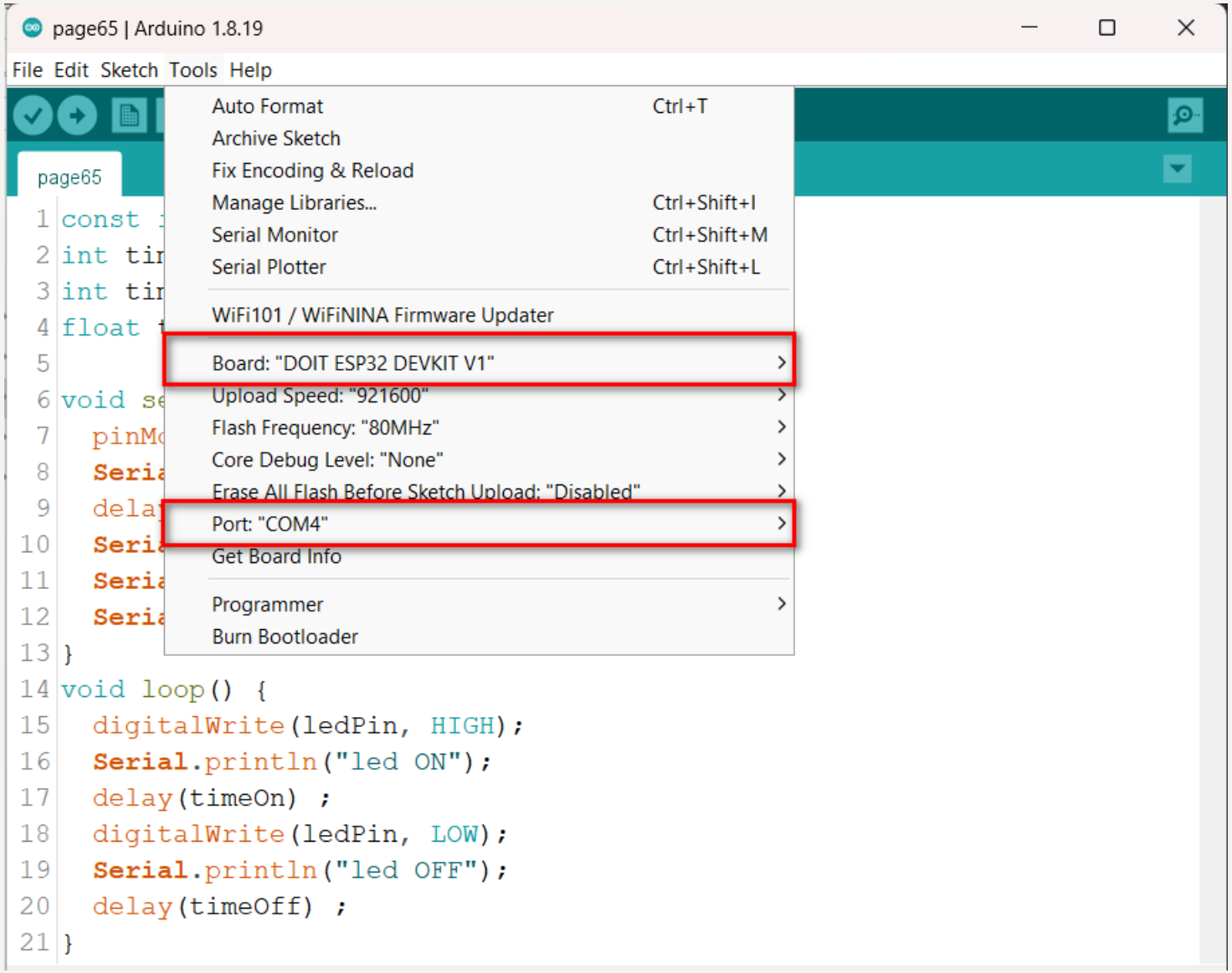

COM4
Send
ets Jun 8 2016 00:22:57
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x0
mode:DIO, clock div:1
load:0x3fff0030,len:1184
load:0x40078000,len:13260
load:0x40080400,len:3028
entry 0x400805e4
Hello Test. I am testing a program
Autoscroll
Show timestamp
Newline
115200 baud
Clear output


page63 | Arduino 1.8.19
File Edit Sketch Tools Help
page63
1 void setup() {
2 Serial.begin(115200);
3 delay(100);
4 Serial.print("Hello Test.");
5 Serial.println("I am testing a program");
6 int a, b, c;
7 a = 10;
8 b = 20;
9 c = a + b;
10 Serial.print("Value a = ");
11 Serial.println(a);
12 Serial.print("Value b = ");
13 Serial.println(b);
14 Serial.print("Value c = ");
15 Serial.println(c);
16 }
17
18 void loop() {
19
20 }

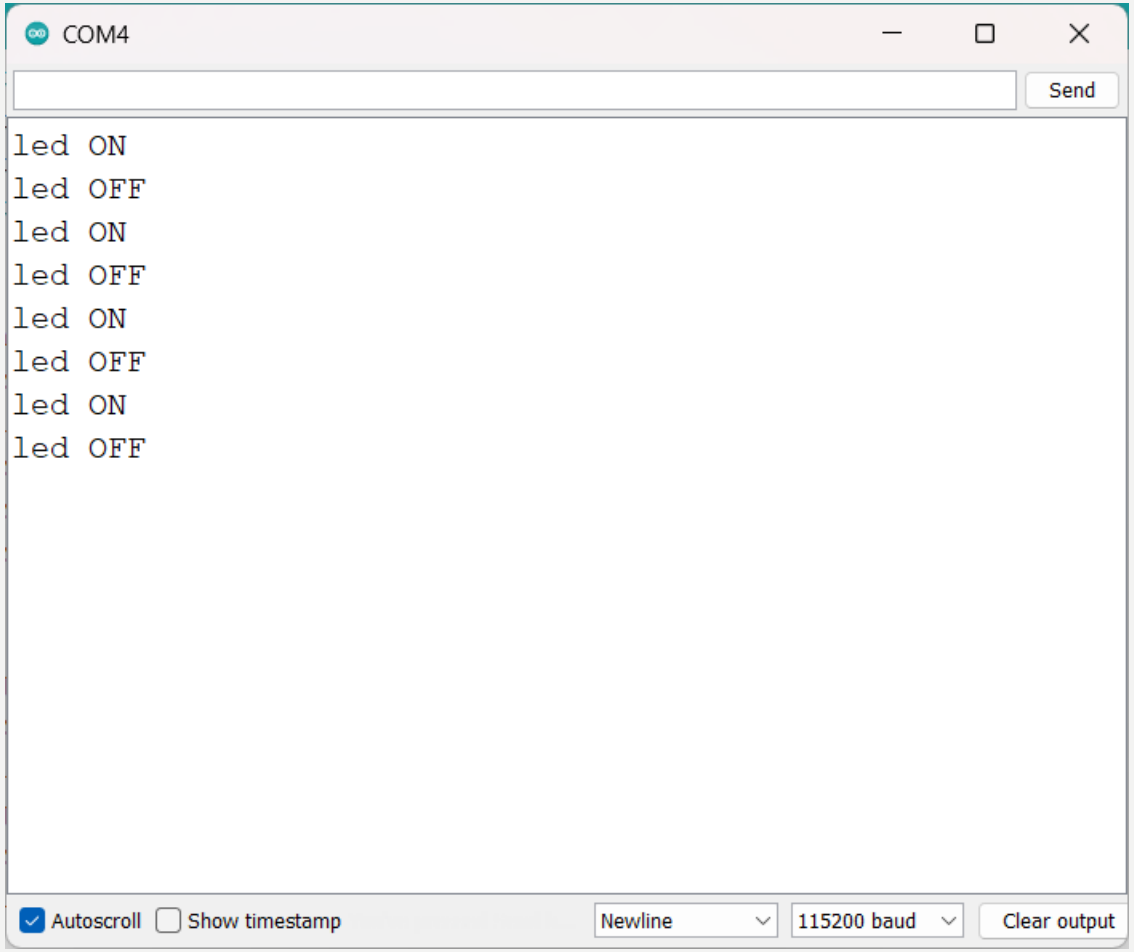

COM4
Send
ets Jun 8 2016 00:22:57
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x0
mode:DIO, clock div:1
load:0x3fff0030,len:1184
load:0x40078000,len:13260
load:0x40080400,len:3028
entry 0x400805e4
Hello Test.I am testing a program
Value a = 10
Value b = 20
Value c = 30
Autoscroll
Show timestamp
Newline
115200 baud
Clear output

การใช้ Serial Monitor ดูข้อมูลที่ส่งออกจากบอร์ด

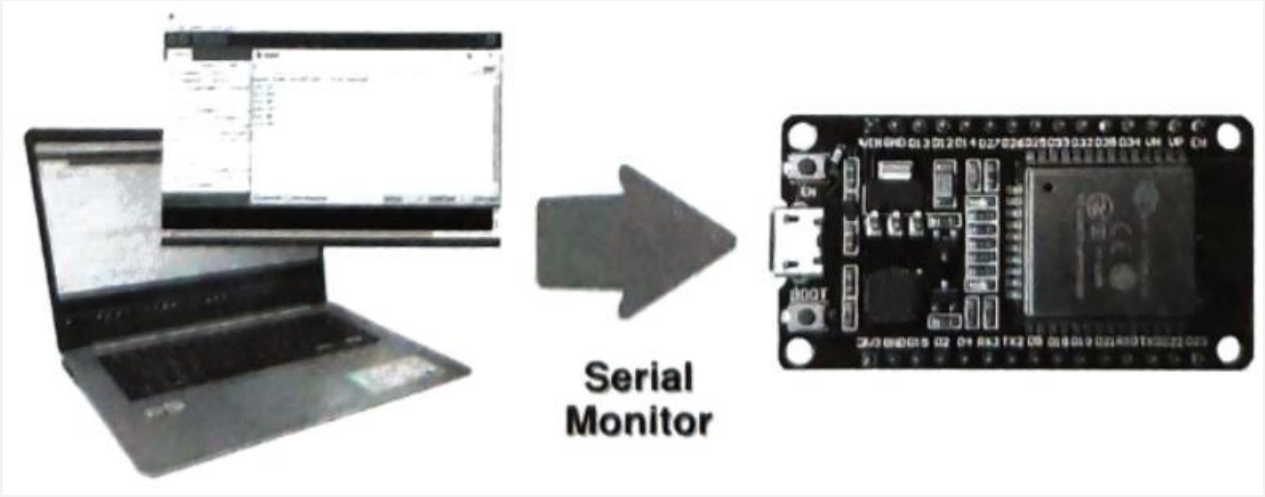



page65 | Arduino 1.8.19
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "DOIT ESP32 DEVKIT V1"
Upload Speed: "921600"
Flash Frequency: "80MHz"
Core Debug Level: "None"
Erase All Flash Before Sketch Upload: "Disabled"
Port: "COM4"
Get Board Info
Programmer
Burn Bootloader
page65
void loop() {
digitalWrite(ledPin, HIGH);
Serial.println("led ON");
delay(timeOn) ;
digitalWrite(ledPin, LOW);
Serial.println("led OFF");
delay(timeOff) ;
}

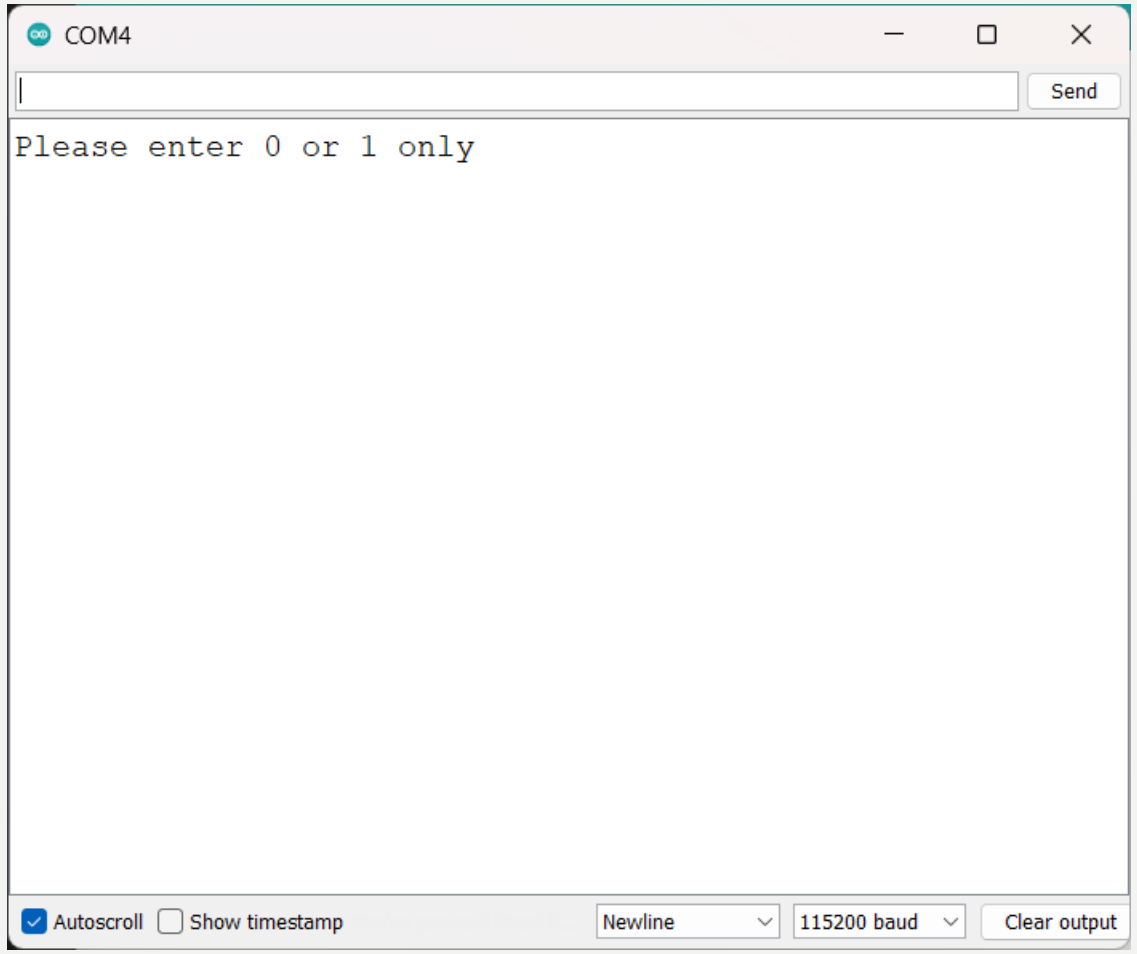

page65 | Arduino 1.8.19
File Edit Sketch Tools Help
page65 §
1 const int ledPin = 2;
2 int timeOn = 1500;
3 int timeOff = 2000;
4 float totalTime = (timeOn + timeOff) / 1000;
5
6 void setup() {
7 pinMode(ledPin, OUTPUT);
8 Serial.begin(115200);
9 delay(100);
10 Serial.print("Cycle time on/off LED = ");
11 Serial.print(totalTime);
12 Serial.println(" second");
13 }
14 void loop() {
15 digitalWrite(ledPin, HIGH);
16 Serial.println("led ON");
17 delay(timeOn) ;
18 digitalWrite(ledPin, LOW);
19 Serial.println("led OFF");
20 delay(timeOff) ;
21 }


COM4
Send
led ON
led OFF
led ON
led OFF
led ON
led OFF
led ON
led OFF
Autoscroll
Show timestamp
Newline
115200 baud
Clear output

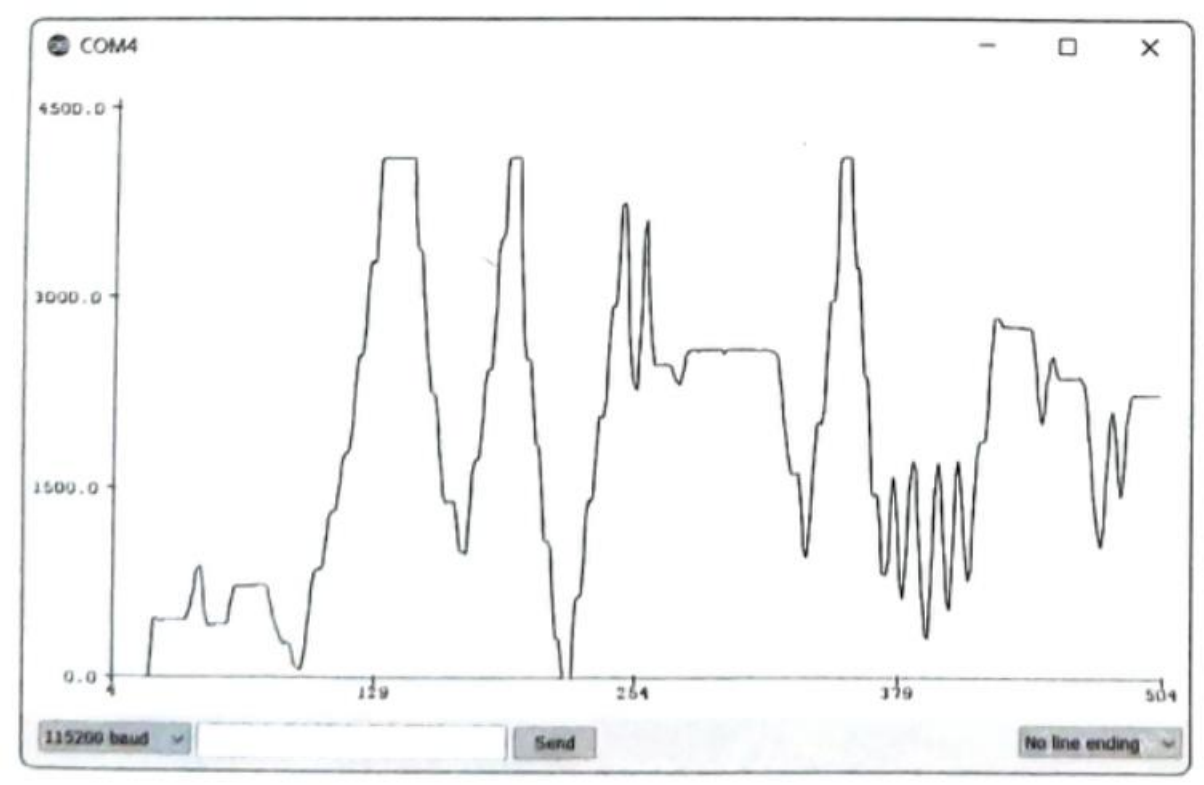
การใช้ Serial Monitor ส่งข้อมูลจากแป้นพิมพ์ไปยังบอร์ด




page67 | Arduino 1.8.19
File Edit Sketch Tools Help
page67
1 const int ledPin = 2;
2
3 void setup() {
4 pinMode(ledPin, OUTPUT) ;
5 Serial.begin(115200);
6 }
7
8 void loop() {
9 if (Serial.available() > 0) {
10 int inRead = Serial.read();
11 if (inRead == '1') {
12 digitalWrite(ledPin, HIGH) ;
13 } else if (inRead == '0') {
14 digitalWrite(ledPin, LOW) ;
15 } else if (inRead > '1') {
16 Serial.println("Please enter 0 or 1 only");
17 }
18 delay(100);
19 }
20 }

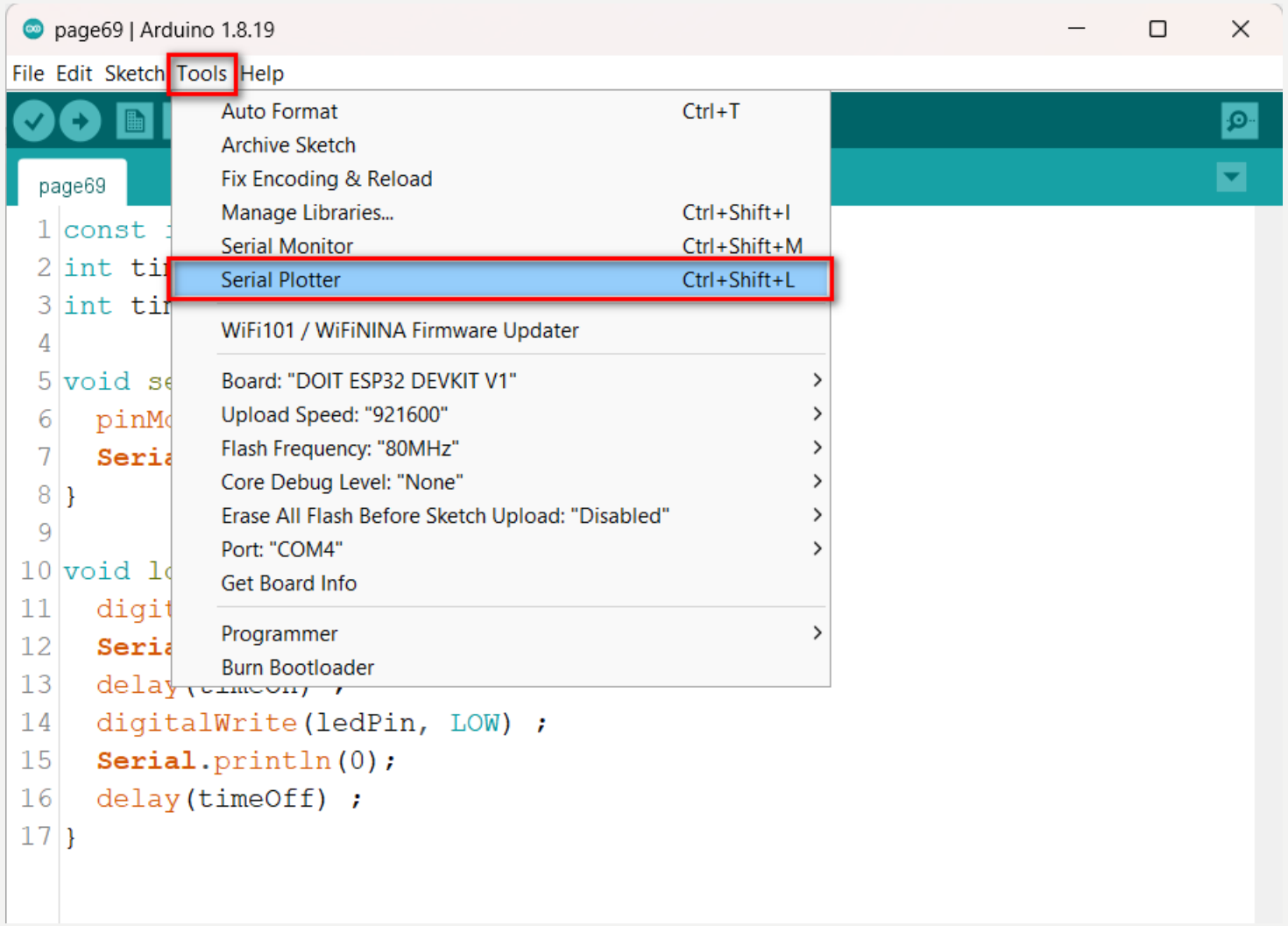

COM4
Send
Please enter 0 or 1 only
Autoscroll
Show timestamp
Newline
115200 baud
Clear output

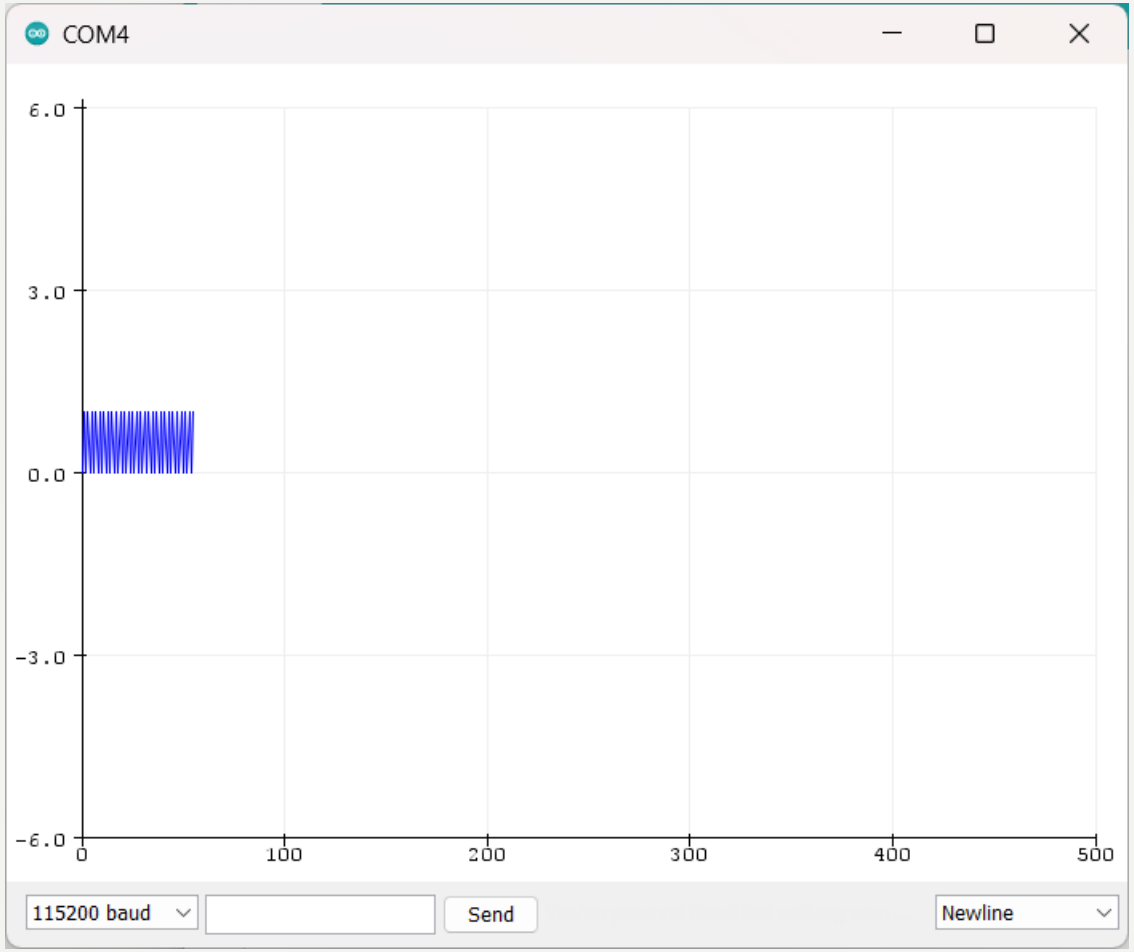
การพล็อตกราฟด้วย Serial Plotter



การใช้งาน Serial Plotter


```
1  const int ledPin = 2;
2  int timeOn = 1000;
3  int timeOff = 2000;
4
5  void setup() {
6    pinMode(ledPin, OUTPUT);
7    Serial.begin(115200);
8  }
9
10 void loop() {
11   digitalWrite(ledPin, HIGH);
12   Serial.println(1);
13   delay(timeOn) ;
14   digitalWrite(ledPin, LOW) ;
15   Serial.println(0);
16   delay(timeOff) ;
17 }
```


page69 | Arduino 1.8.19
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: "DOIT ESP32 DEVKIT V1"
Upload Speed: "921600"
Flash Frequency: "80MHz"
Core Debug Level: "None"
Erase All Flash Before Sketch Upload: "Disabled"
Port: "COM4"
Get Board Info
Programmer
Burn Bootloader
page69
digitalWrite(ledPin, LOW) ;
Serial.println(0);
delay(timeOff) ;


COM4
6.0
3.0
0.0
-3.0
-6.0
0
100
200
300
400
500
115200 baud
Send
Newline