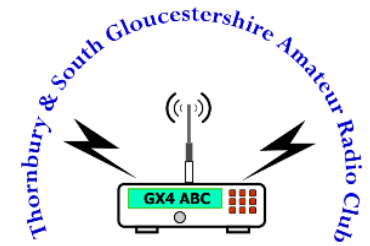


Arduino Beginners Course

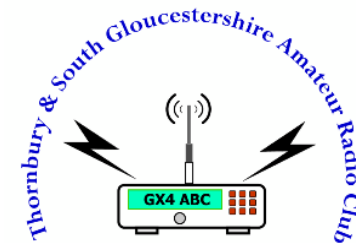
21-Feb-2018

MOZMB

Agenda

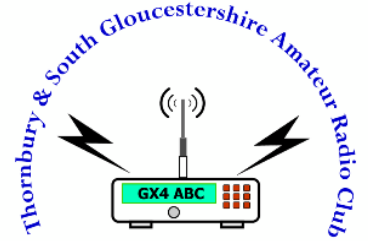


- Arduino Software Setup
- Arduino Software Familiarisation
- Adding the NodeMCU Board
- Connecting UP
- Writing and uploading your first Sketch
- Modify Sketches
- Adding Libraries
- Running up the WiFi



Arduino Software Setup

Arduino Software Setup 1/3



Double-click the Arduino installer

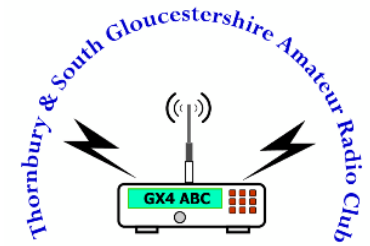


arduino-1.8.5-windows.exe
Type: Application

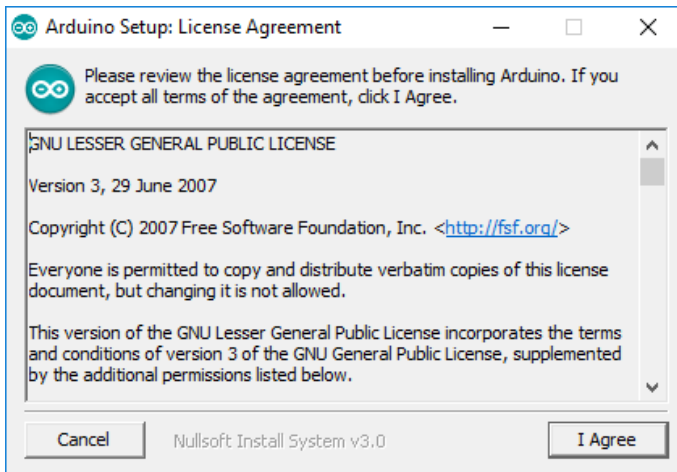
Date modified: 29/12/2017 17:01
Size: 90.3 MB

Accept any software warning

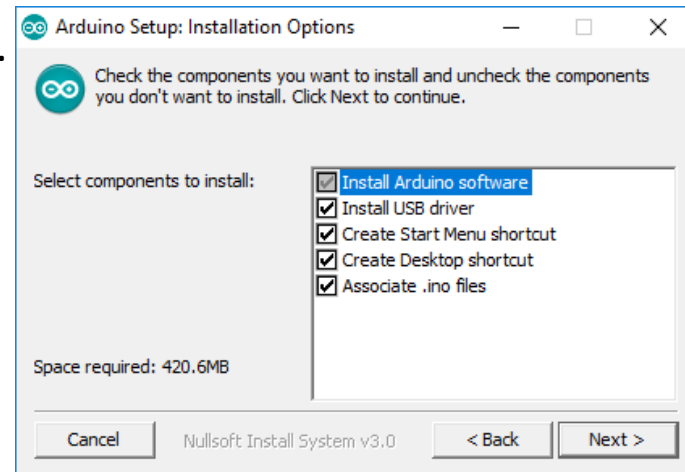
Arduino Software Setup 2/3



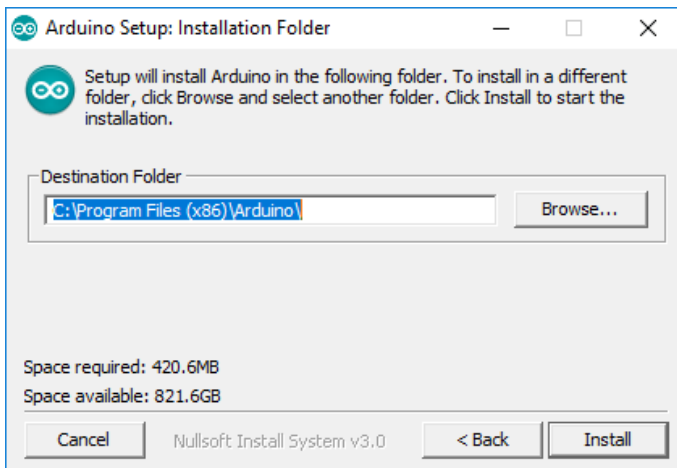
1.



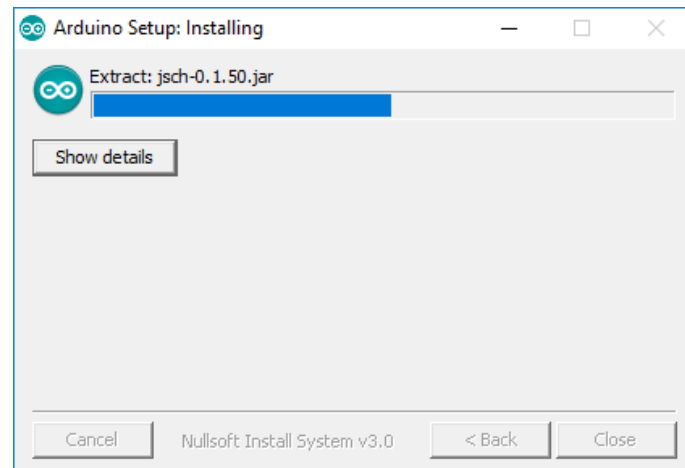
2.



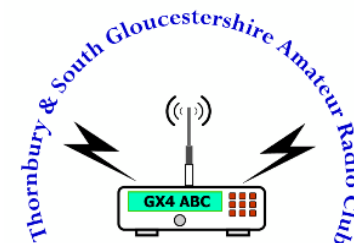
3.



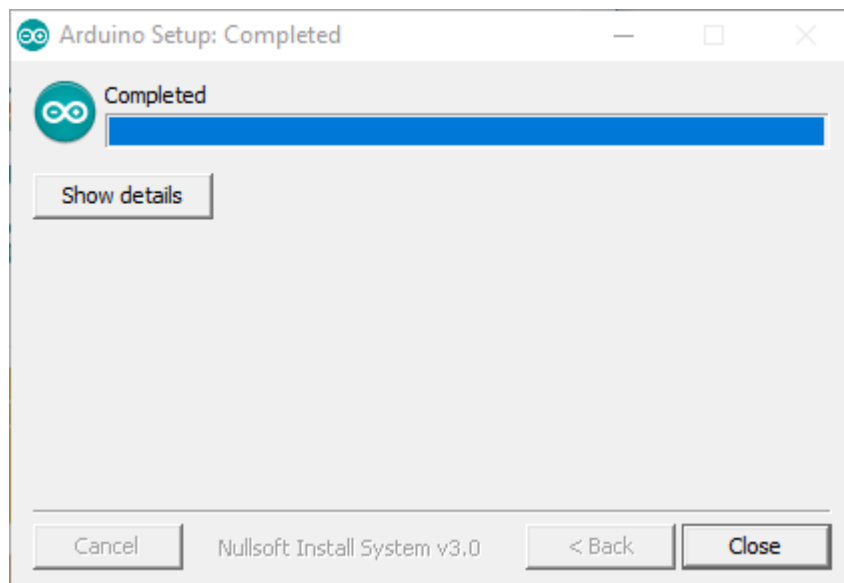
4.



Arduino software setup 3/3

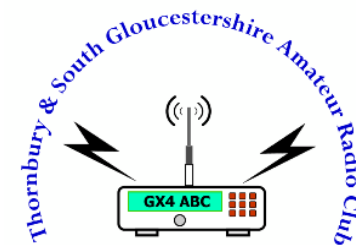


5.



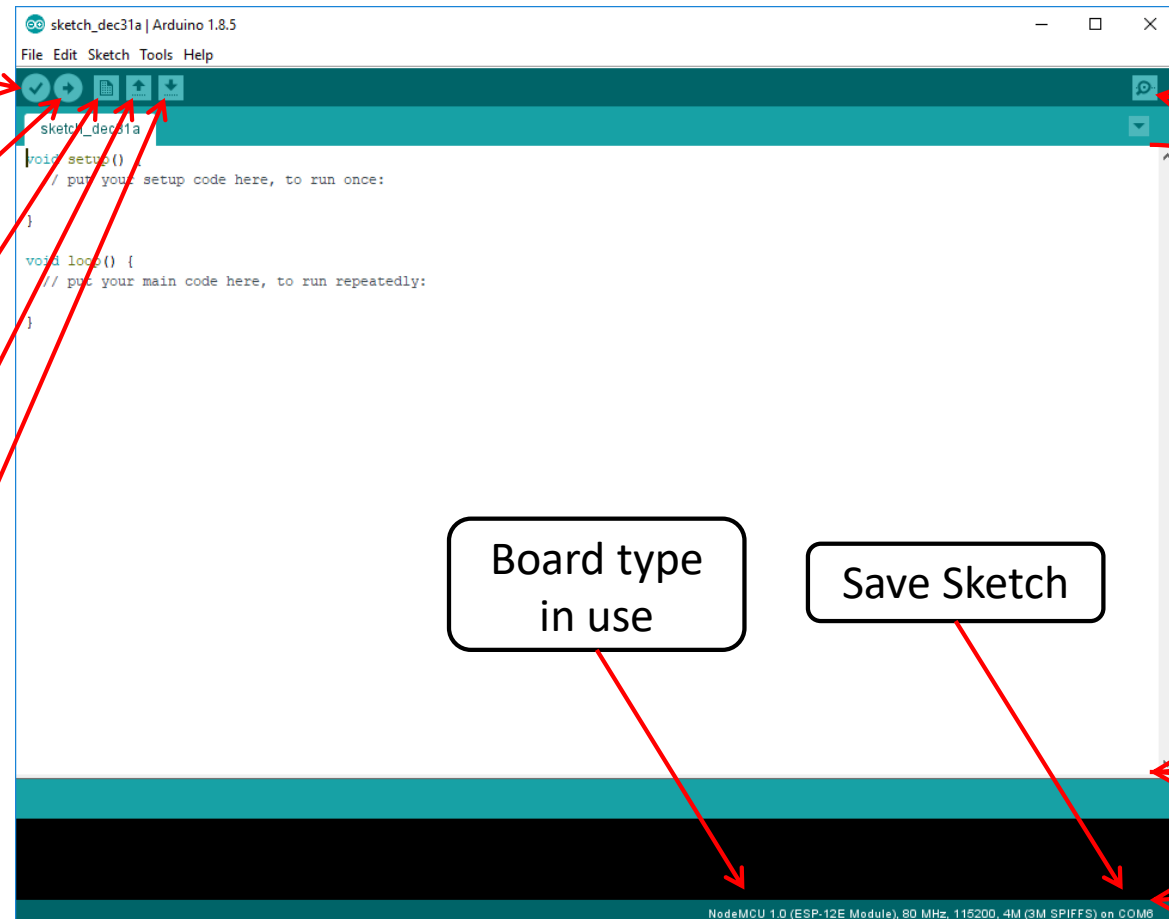
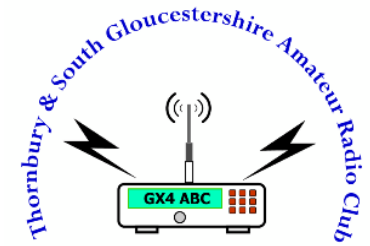
New Shortcut

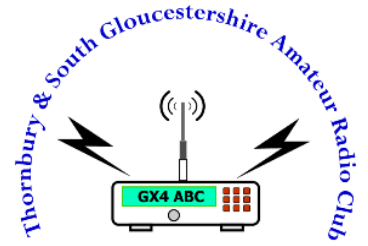
Double Click to run



Arduino Software Familiarisation

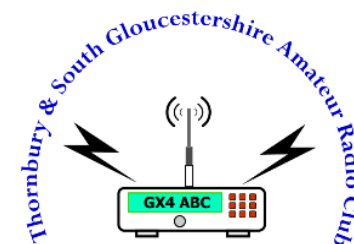
Arduino Software Familiarisation



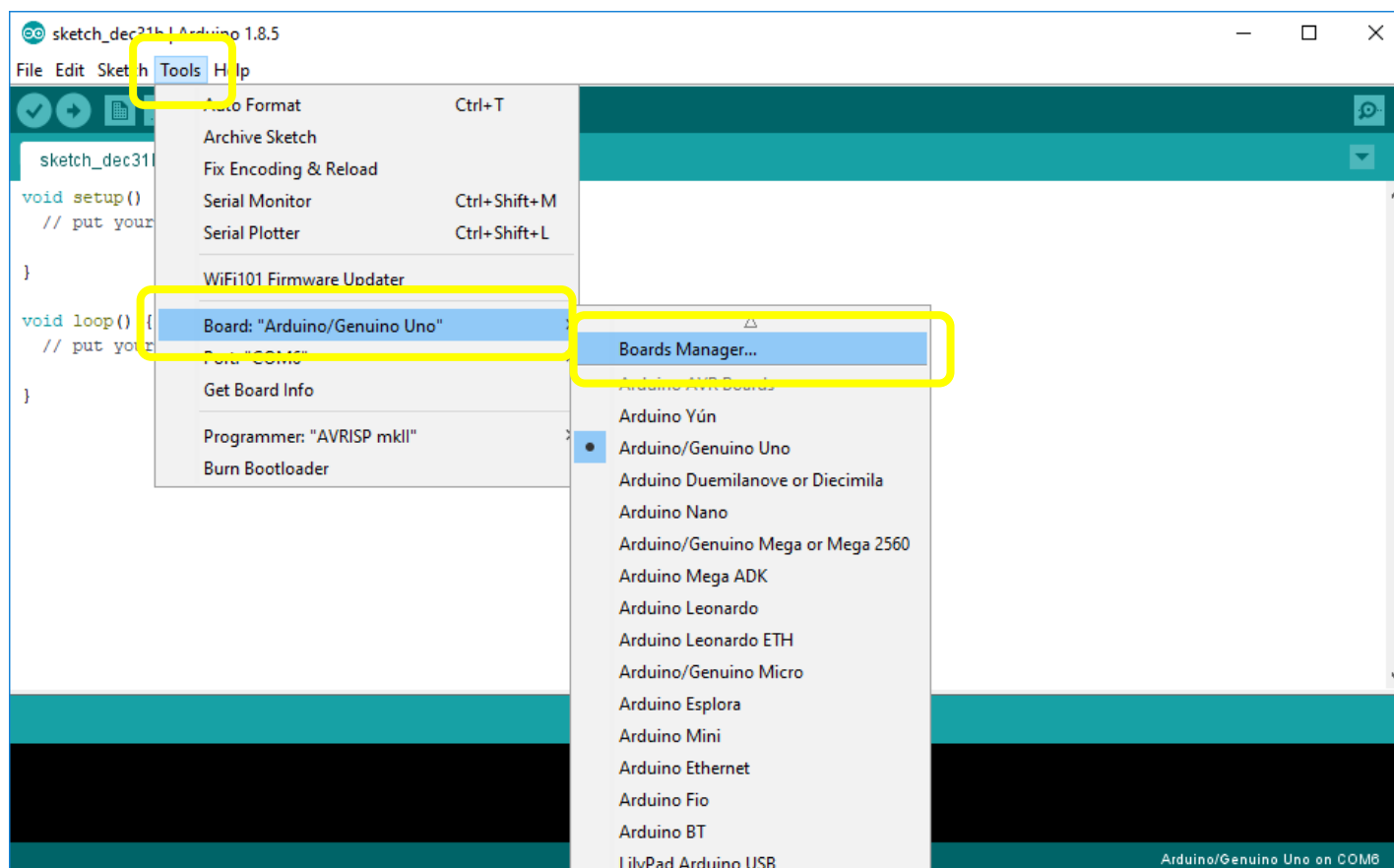


Adding Boards

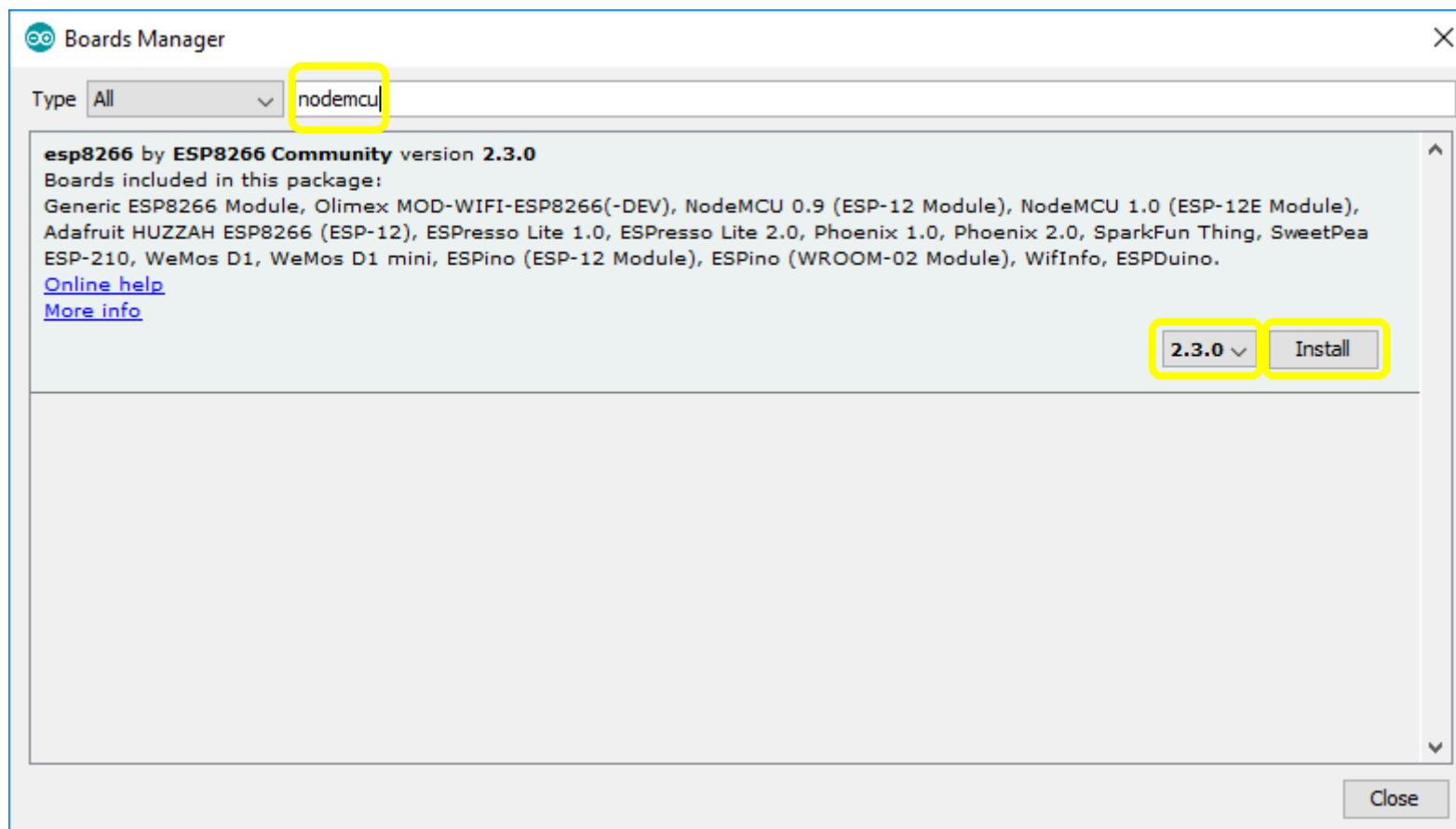
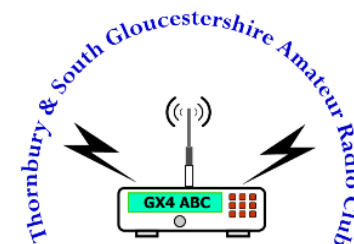
Adding Boards 1/3



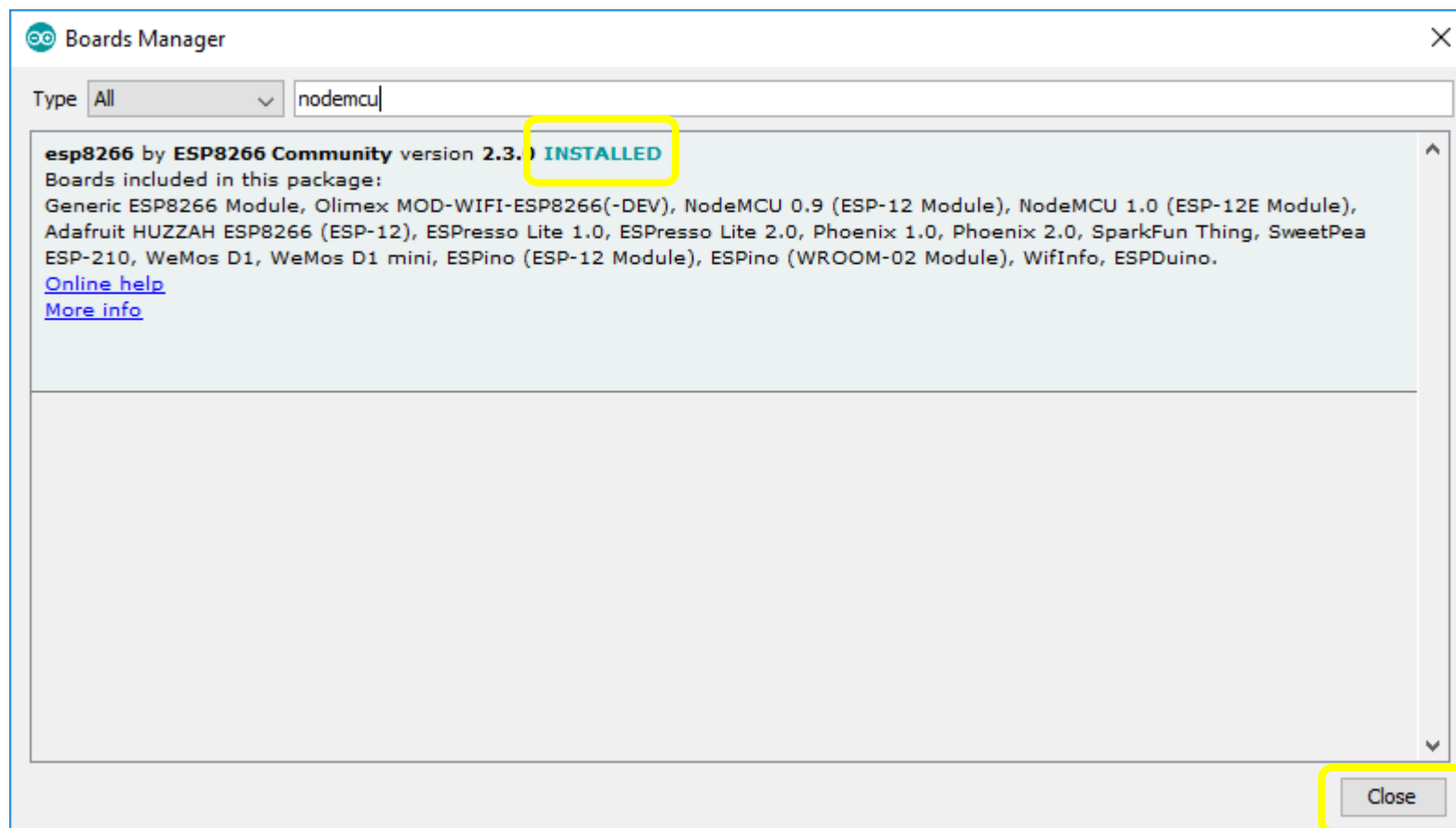
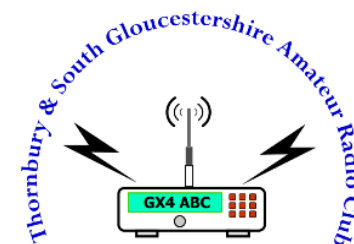
Menu: Tools/Board.../Boards Manager...

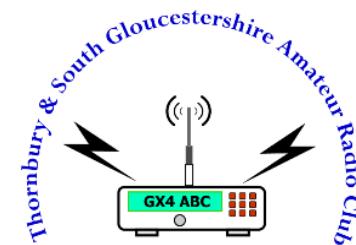


Adding Boards 2/3



Adding Boards 3/3

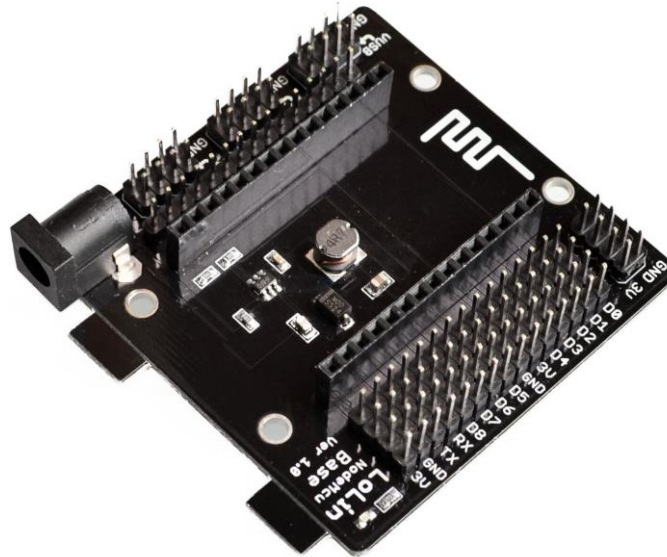
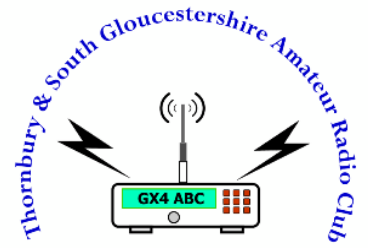




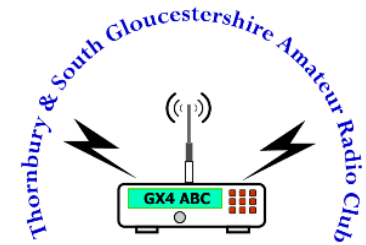
Connecting Up

Connecting Up 1/4

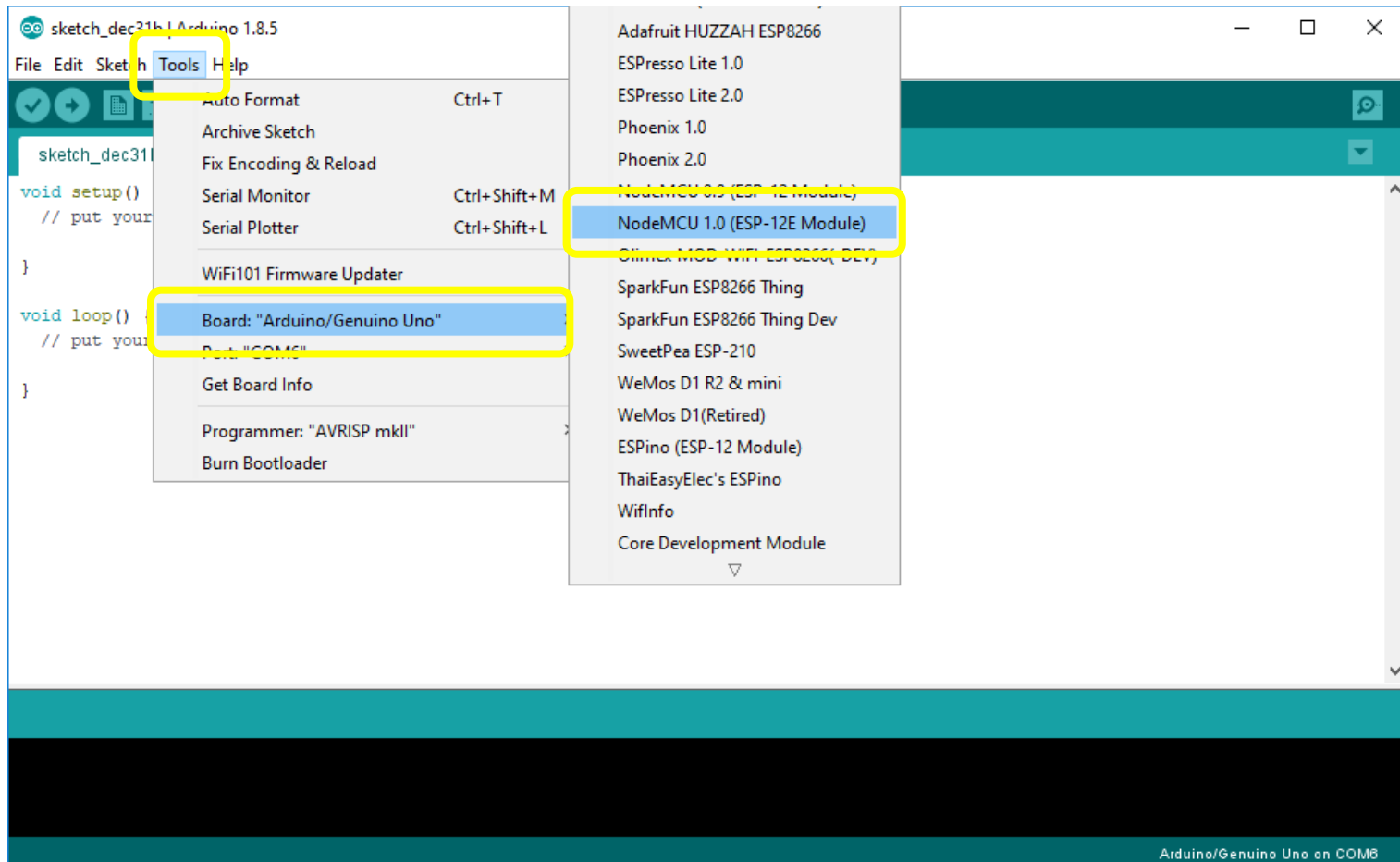
- Plug your NodeMCU into the base and then a spare USB port on your Laptop/PC.



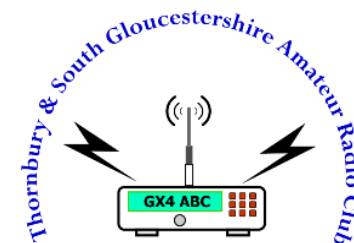
Connecting Up 2/4



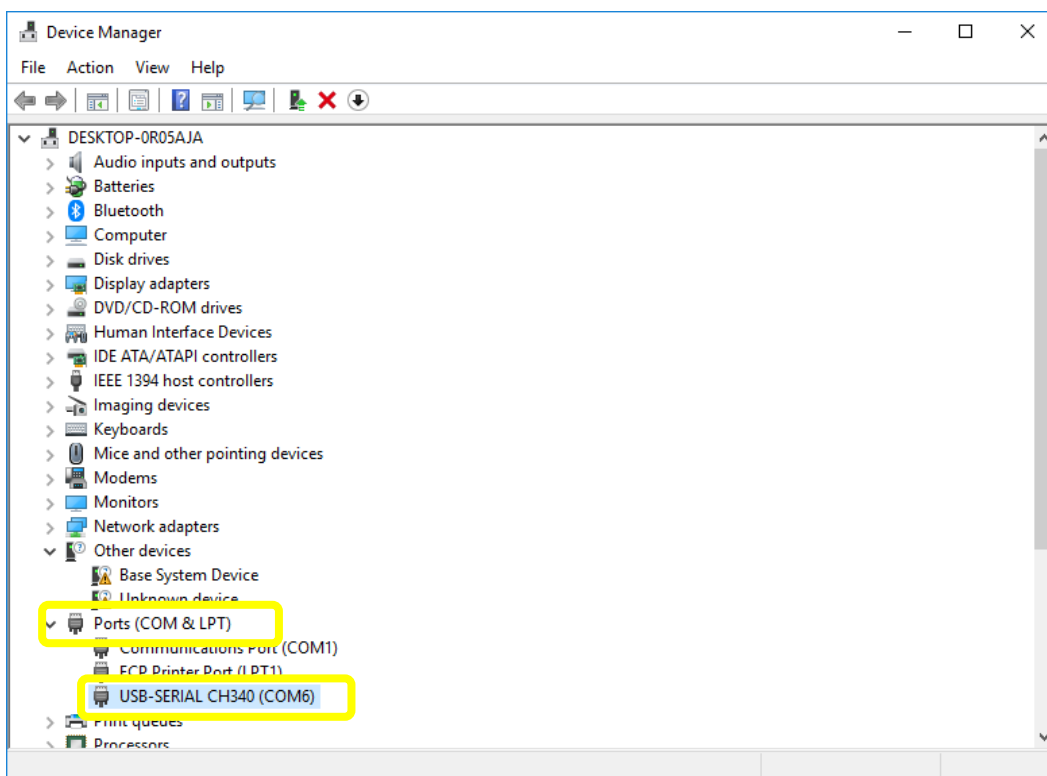
Menu: Tools/Board.../NodeMCU 1.0 (ESP-12E Module)



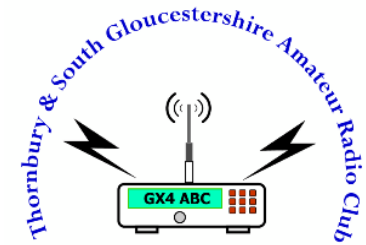
Connecting Up 3/4



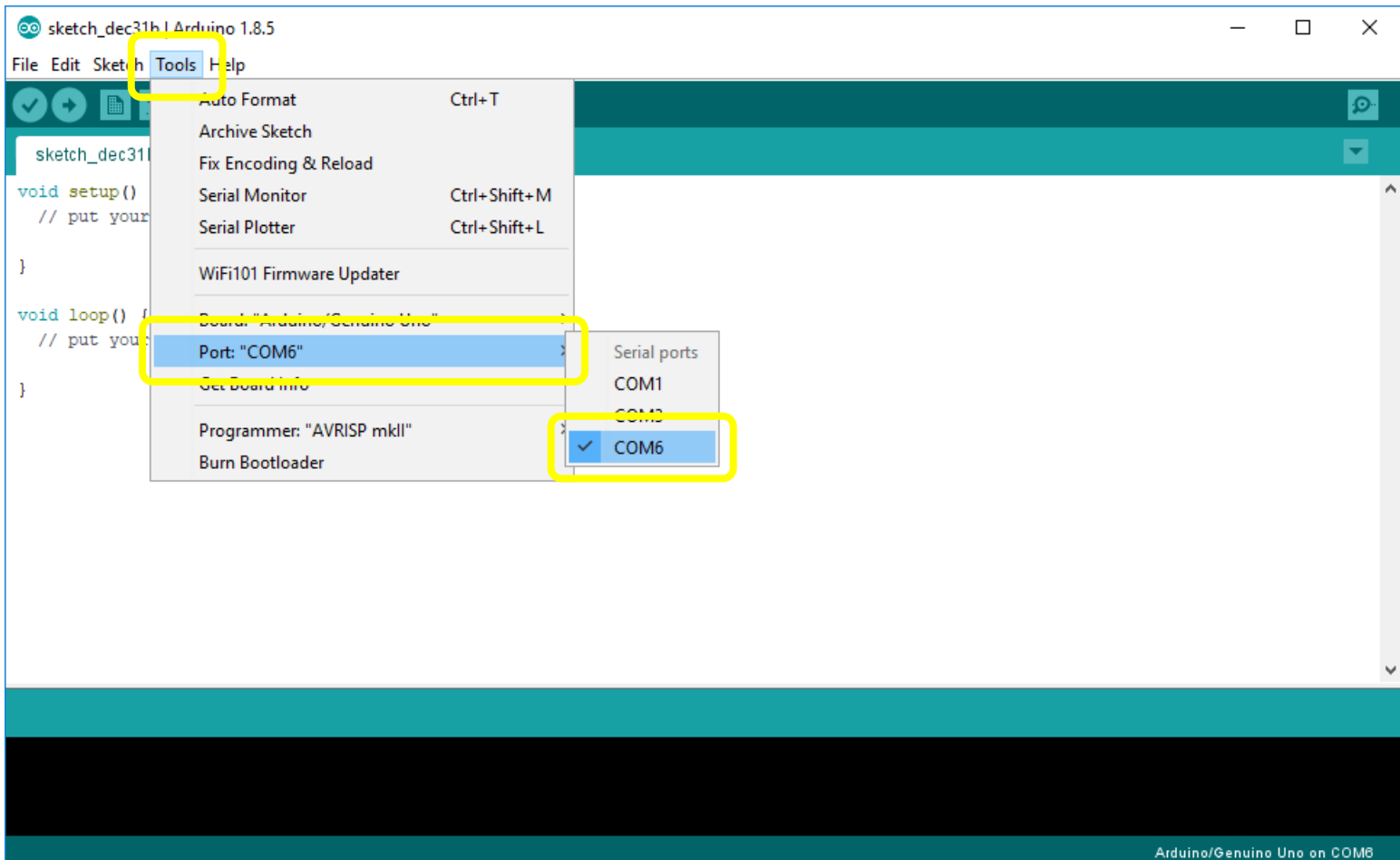
- Open Device Manager (Windows Key + X or via Control Panel)
- Expand Ports (COM & LPT)
- Note the serial port for the USB-SERIAL CH340 interface

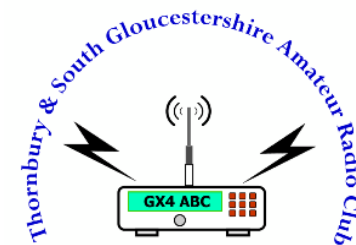


Connecting Up 4/4



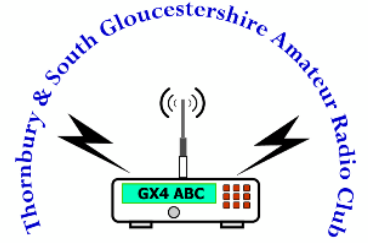
Menu: Tools/Port.../COMx (select you NodeMCU serial port)





Writing and uploading your first Sketch

Writing and uploading your first Sketch 1/4



1. Setup Output pin
2. Turn our LED On
3. Delay for 1 second
4. Turn our LED off
5. Delay for 2 seconds

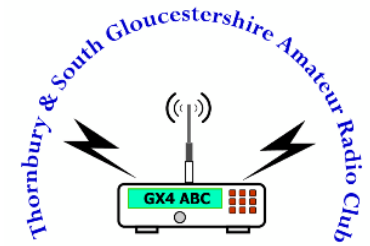


sketch_dec31b \$

```
/*  
ESP8266 Blink by Simon Peter Modified by Paul Smart MOZMB  
Blink the blue LED on the ESP-12E module  
  
The blue LED on the ESP-12E module is connected to GPIO2 labelled D4  
  
*/  
  
int ESP12E_LED = 2;  
  
void setup() {  
  // put your setup code here, to run once:  
  pinMode(ESP12E_LED, OUTPUT);    // Initialize the LED_BUILTIN pin as an output  
}  
  
void loop() {  
  // put your main code here, to run repeatedly:  
  digitalWrite(ESP12E_LED, LOW);    // Turn the Builtin LED on (Note that LOW is the voltage level  
                                     // but actually the LED is on; this is because  
                                     // it is active low on the ESP-12-E)  
  delay(1000);                      // Wait for a second  
  
  digitalWrite(ESP12E_LED, HIGH);   // Turn the LED off by making the voltage LOW  
  delay(2000);                      // Wait for two seconds  
}
```

When ready select Verify or Upload if you are brave

Writing and uploading your first Sketch 4/4



```
Blink | Arduino 1.8.5
File Edit Sketch Tools Help

Blink

/*
 ESP8266 Blink by Simon Peter Modified by Paul Smart M0ZMB
 Blink the blue LED on the ESP-12E module

 The blue LED on the ESP-12E module is connected to GPIO2 labelled D4
 */

int ESP12E_LED = 2          // Create and set the Integer variable to 2

void setup() {
  // put your setup code here, to run once:
  pinMode(ESP12E_LED, OUTPUT); // Initialize the pin as an output
}

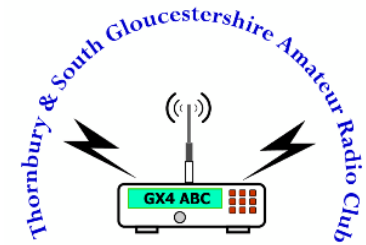
void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(ESP12E_LED, LOW); // Turn the Builtin LED on (Note that LOW is the voltage level
                                // but actually the LED is on; this is because
                                // it is active low on the ESP-12-E)
  delay(1000);                  // Wait for a second

  digitalWrite(ESP12E_LED, HIGH); // Turn the Builtin LED off by making the voltage LOW
  delay(2000);                  // Wait for two seconds
}

expected ',' or ';' before 'void'
Blink:11: error: expected ',', or ';' before 'void'

void setup() {
^
exit status 1
expected ',', or ';' before 'void'
11
NodeMCU 1.0 (ESP-12E Module), 80 MHz, 115200, 4M (3M SPIFFS) on COM8
```

Writing and uploading your first Sketch 4/4



```
Blink | Arduino 1.8.5
File Edit Sketch Tools Help

Blink

/*
  ESP8266 Blink by Simon Peter Modified by Paul Smart M0ZMB
  Blink the blue LED on the ESP-12E module

  The blue LED on the ESP-12E module is connected to GPIO2 labelled D4
*/

int ESP12E_LED = 2;           // Create and set the Integer variable to 2

void setup() {
  // put your setup code here, to run once:
  pinMode(ESP12E_LED, OUTPUT); // Initialize the pin as an output
}

void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(ESP12E_LED, LOW); // Turn the Builtin LED on (Note that LOW is the voltage level
                                // but actually the LED is on; this is because
                                // it is active low on the ESP-12-E)
  delay(1000);                  // Wait for a second

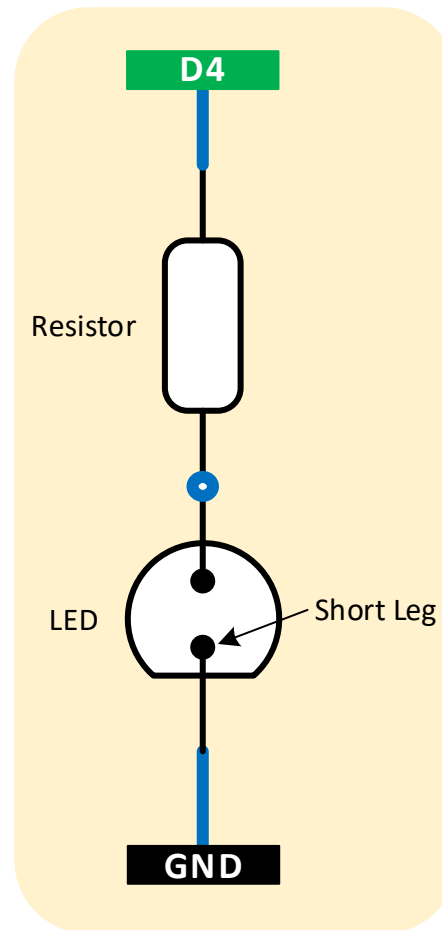
  digitalWrite(ESP12E_LED, HIGH); // Turn the Builtin LED off by making the voltage LOW
  delay(2000);                  // Wait for two seconds
}

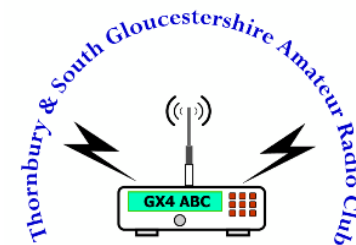
Uploading...

Sketch uses 222237 bytes (21%) of program storage space. Maximum is 1044464 bytes.
Global variables use 31580 bytes (38%) of dynamic memory, leaving 50340 bytes for local variables. Maximum is 81920 bytes.
Uploading 226384 bytes from C:\Users\Paul\AppData\Local\Temp\arduino_build_996904/Blink.ino.bin to flash at 0x00000000
..... [ 36% ]
..... [ 72% ]
.....

14 NodeMCU 1.0 (ESP-12E Module), 80 MHz, 115200, 4M (3M SPIFFS) on COM6
```

Connecting an LED

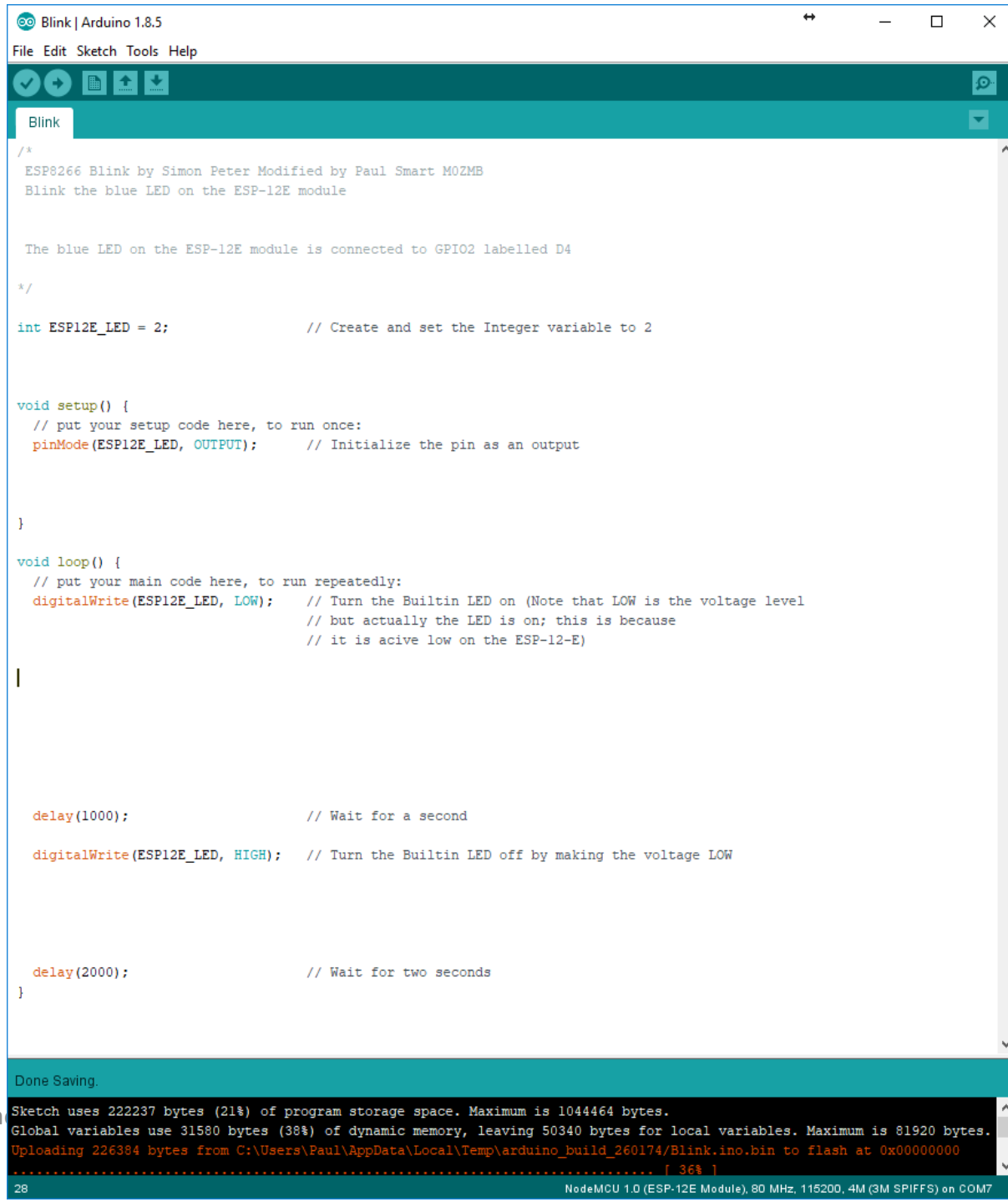




Modify

Modify

1/3



```
Blink
/*
  ESP8266 Blink by Simon Peter Modified by Paul Smart MOZMB
  Blink the blue LED on the ESP-12E module

  The blue LED on the ESP-12E module is connected to GPIO2 labelled D4
*/

int ESP12E_LED = 2;           // Create and set the Integer variable to 2

void setup() {
  // put your setup code here, to run once:
  pinMode(ESP12E_LED, OUTPUT); // Initialize the pin as an output
}

void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(ESP12E_LED, LOW); // Turn the Builtin LED on (Note that LOW is the voltage level
                                  // but actually the LED is on; this is because
                                  // it is active low on the ESP-12-E)

  delay(1000);                  // Wait for a second

  digitalWrite(ESP12E_LED, HIGH); // Turn the Builtin LED off by making the voltage LOW

  delay(2000);                  // Wait for two seconds
}
```

Done Saving.

Sketch uses 222237 bytes (21%) of program storage space. Maximum is 1044464 bytes.
Global variables use 31580 bytes (38%) of dynamic memory, leaving 50340 bytes for local variables. Maximum is 81920 bytes.
Uploading 226384 bytes from C:\Users\Paul\AppData\Local\Temp\arduino_build_260174/Blink.ino.bin to flash at 0x00000000
..... [36%]

28 NodeMCU 1.0 (ESP-12E Module), 80 MHz, 115200, 4M (3M SPIFFS) on COM7

Modify 2/3

```
int Speaker = 14;
```

```
pinMode(Speaker, OUTPUT);
```

```
tone(Speaker, 1500, 1000);
```

```
tone(Speaker, 1200, 2000);
```

```
Tone | Arduino 1.8.5
File Edit Sketch Tools Help

/*
  ESP8266 Blink by Simon Peter Modified by Paul Smart M0ZMB
  Blink the blue LED on the ESP-12E module
  and play a two tone

  The blue LED on the ESP-12E module is connected to GPIO2 labelled D4
*/

int ESP12E_LED = 2;           // Create and set the Integer variable to 2 or pin D4
int Speaker = 14;             // Create and set the Integer variable to 14 or pin D5

void setup() {
  // put your setup code here, to run once:
  pinMode(ESP12E_LED, OUTPUT); // Initialize the pin as an output
  pinMode(Speaker, OUTPUT);    // Initialize the pin as an output
}

void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(ESP12E_LED, LOW); // Turn the Built-in LED on (Note that LOW is the voltage level
                                  // but actually the LED is on; this is because
                                  // it is active low on the ESP-12-E)

  tone(Speaker, 1500, 1000);      // Play a tone for 1 second

  delay(1000);                   // Wait for a second

  digitalWrite(ESP12E_LED, HIGH); // Turn the Built-in LED off by making the voltage LOW

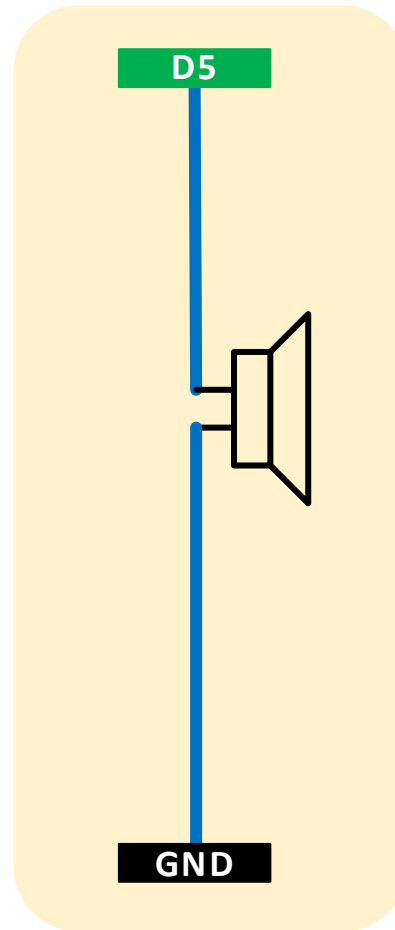
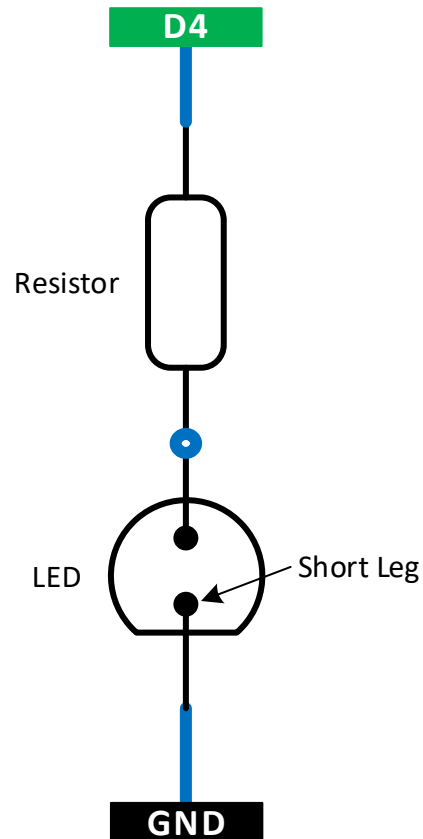
  tone(Speaker, 1200, 2000);      // Play a tone for 2 seconds

  delay(2000);                   // Wait for two seconds
}

Done Saving.
..... [ 36% ]
..... [ 72% ]
..... [ 100% ]

11 NodeMCU 1.0 (ESP-12E Module), 80 MHz, 115200, 4M (3M SPIFFS) on COM7
```

Connecting a Speaker



Modify 3/3

```
int Switch = 16;
```

```
pinMode(Switch, INPUT);
```

```
if(digitalRead(Switch) == HIGH){
```

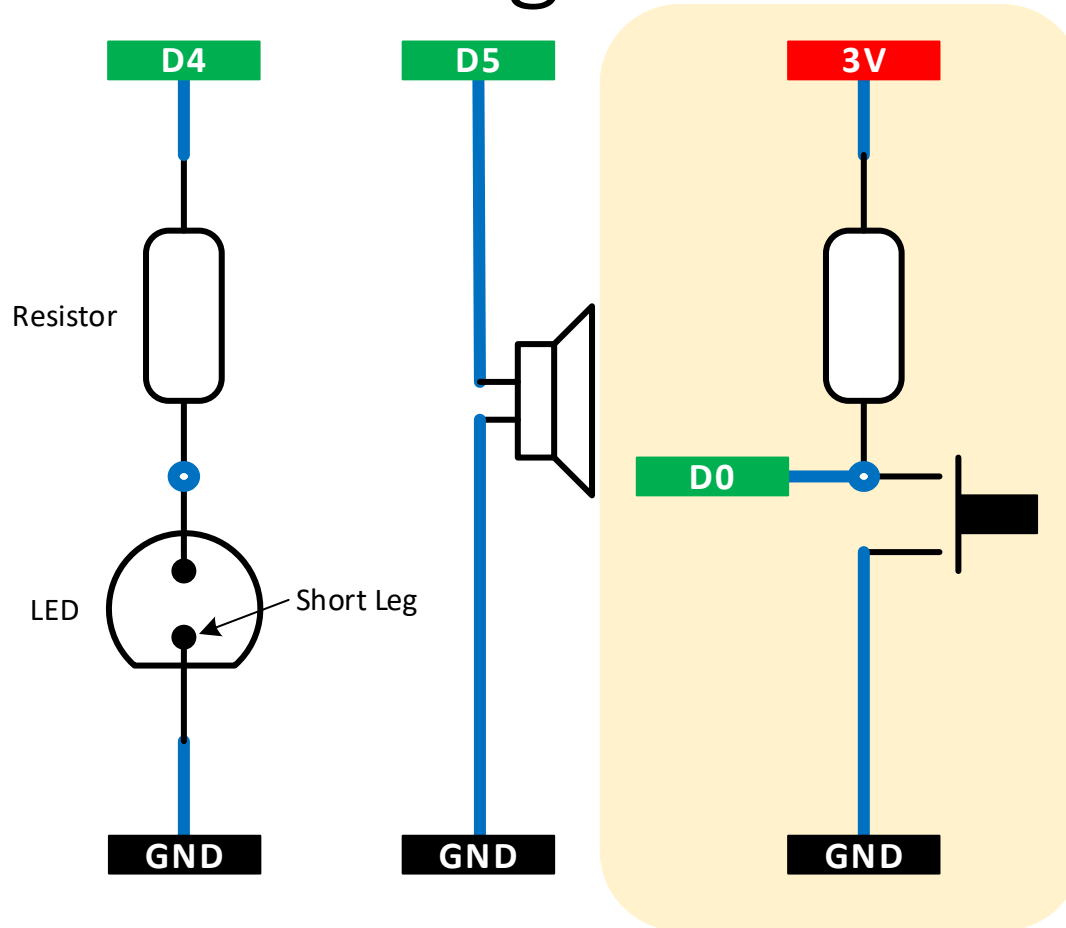
```
}  
else {  
  noTone(Speaker);  
}
```

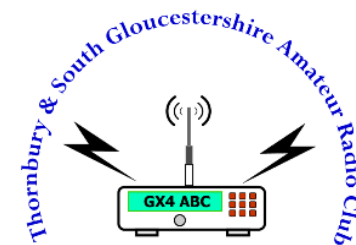
```
if(digitalRead(Switch) == HIGH){
```

```
}
```

```
Switch | Arduino 1.8.5  
File Edit Sketch Tools Help  
✓ ↻ 📄 ⬆ ⬇  
Switch  
/*  
  ESP8266 Blink by Simon Peter Modified by Paul Smart MOZMB  
  Blink the blue LED on the ESP-12E module  
  and play a two tone controlled by a switch.  
  
  The blue LED on the ESP-12E module is connected to GPIO2 labelled D4  
  
  */  
  
int ESP12E_LED = 2;           // Create and set the Integer variable to 2 or pin D4  
int Speaker = 14;             // Create and set the Integer variable to 14 or pin D5  
int Switch = 16;              // Create and set the Integer variable to 16 or pin D0  
  
void setup() {  
  // put your setup code here, to run once:  
  pinMode(ESP12E_LED, OUTPUT); // Initialize the pin as an output  
  pinMode(Speaker, OUTPUT);    // Initialize the pin as an output  
  pinMode(Switch, INPUT);      // Initialise the pin as an input  
}  
  
void loop() {  
  // put your main code here, to run repeatedly:  
  digitalWrite(ESP12E_LED, LOW); // Turn the Built-in LED on (Note that LOW is the voltage level  
                                  // but actually the LED is on; this is because  
                                  // it is active low on the ESP-12-E)  
  
  if(digitalRead(Switch) == HIGH){ // If the switch is not pushed play the tone  
    tone(Speaker, 1500, 1000);      // Play a tone for 1 second  
  }  
  else {  
    noTone(Speaker);               // Turn all tones off  
  }  
  
  delay(1000);                     // Wait for a second  
  
  digitalWrite(ESP12E_LED, HIGH); // Turn the Built-in LED off by making the voltage LOW  
  
  if(digitalRead(Switch) == HIGH){  
    tone(Speaker, 1200, 2000);      // Play a tone for 2 seconds  
  }  
  
  delay(2000);                     // Wait for two seconds  
}  
  
Done uploading.  
..... [ 36% ]  
..... [ 72% ]  
..... [ 100% ]  
16 NodeMCU 1.0 (ESP-12E Module), 80 MHz, 115200, 4M (3M SPIFFS) on COM7
```

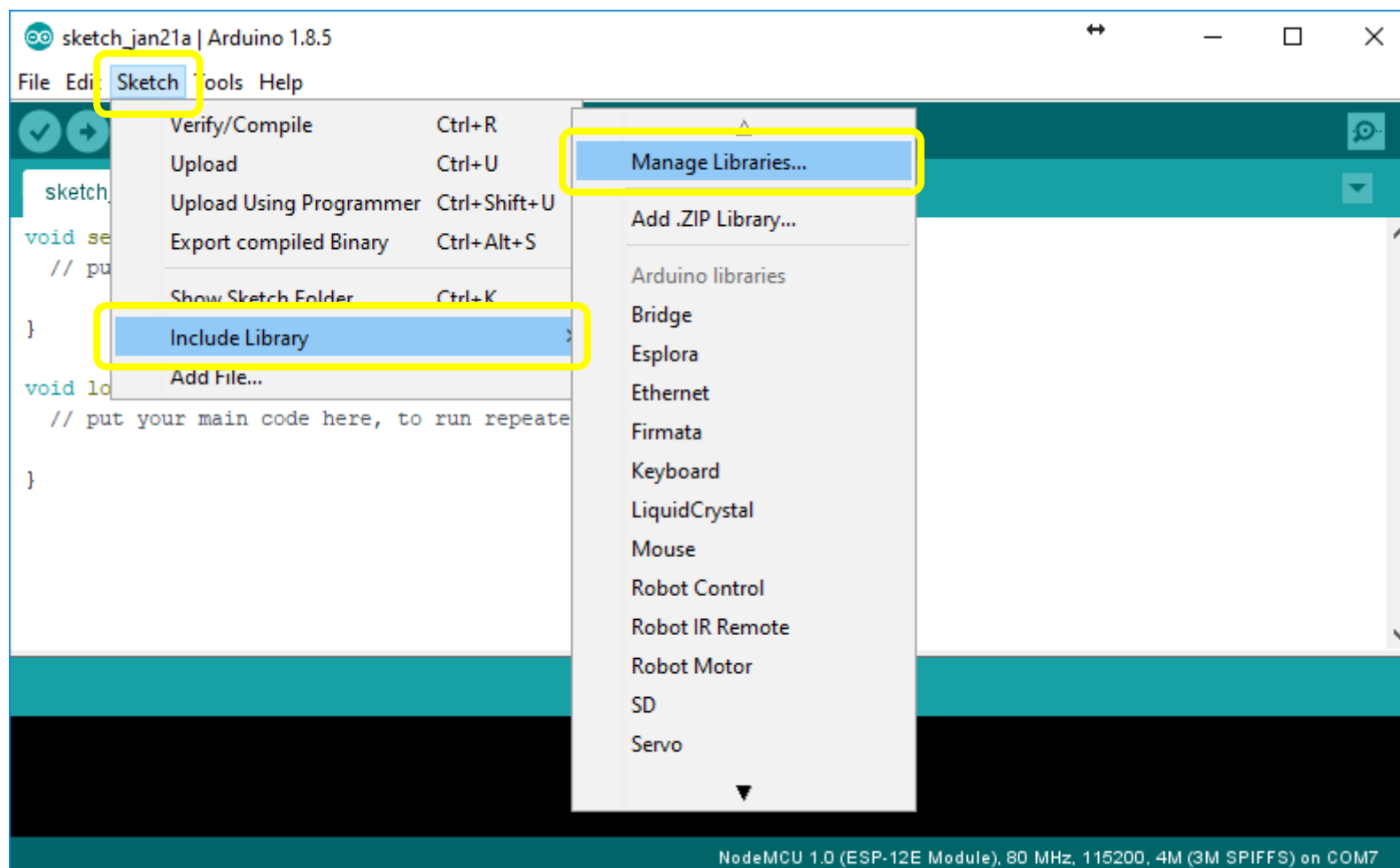
Connecting a Switch



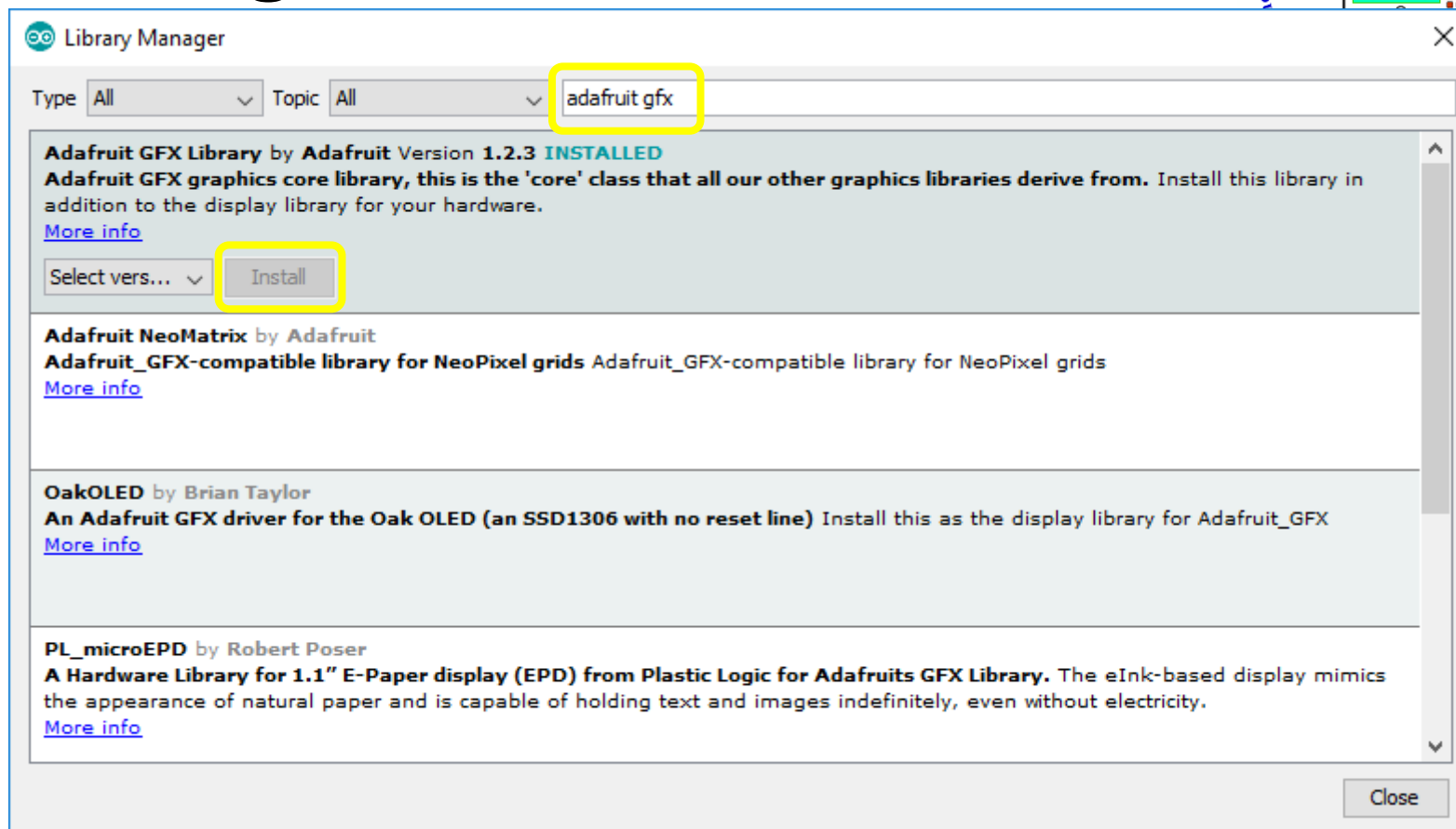


Adding Libraries

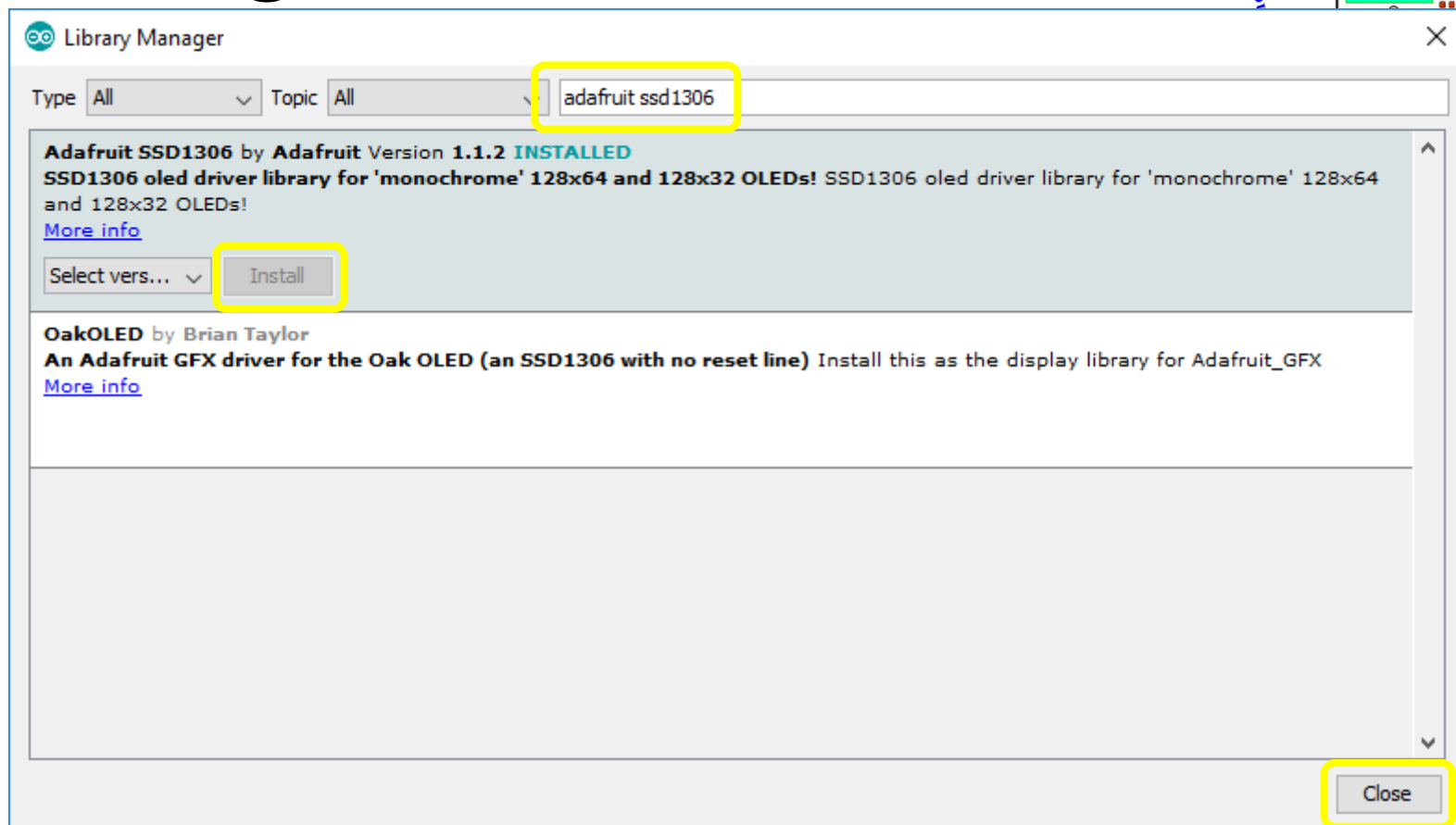
Adding Libraries 1/3

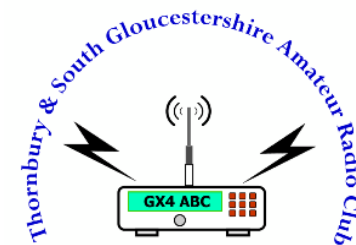


Adding Libraries 2/3



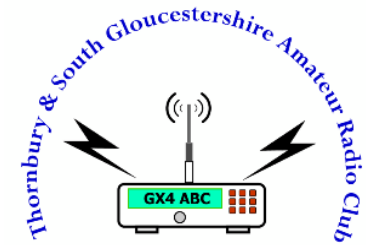
Adding Libraries 3/3





Running up the WiFi

Running up the WiFi



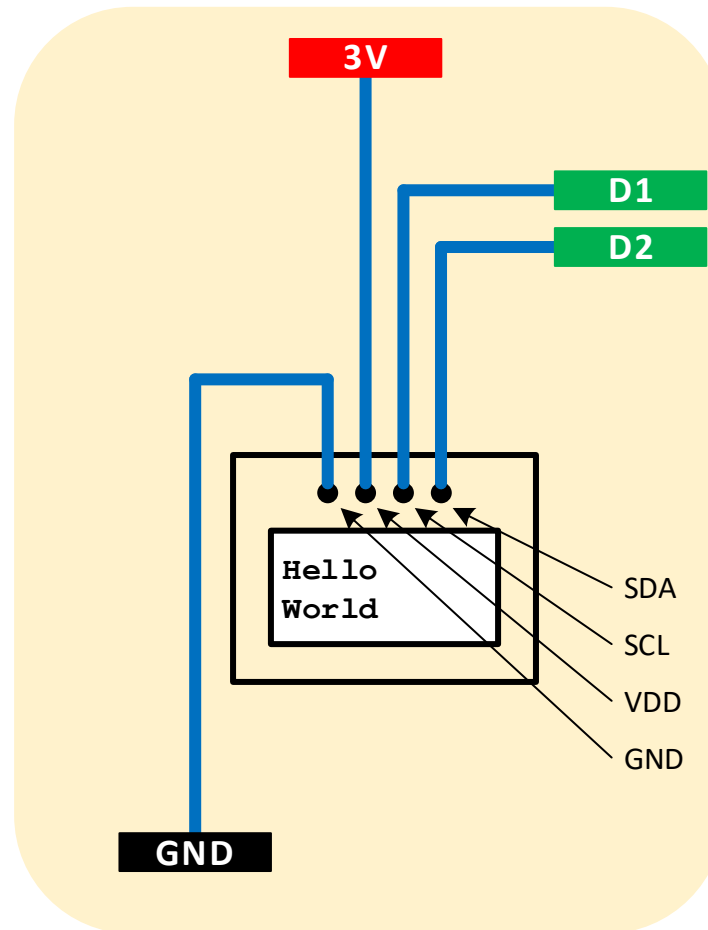
```
/*
 * This sketch demonstrates how to scan WiFi networks.
 * The API is almost the same as with the WiFi Shield library,
 * the most obvious difference being the different file you need to include:
 *
 * Modified by Paul Smart M0ZMB to show encryption types
 * and show results on an OLED display.
 */

#include "ESP8266WiFi.h"           // Include the WiFi library

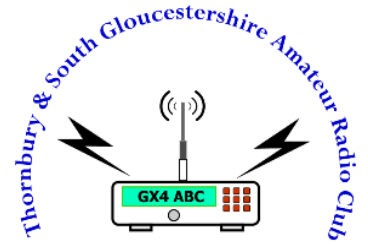
// #include <SPI.h>                 // Include the libraries for the display
#include <Wire.h>
#include <Adafruit_GFX.h>
#include <Adafruit_SSD1306.h>
#define OLED_RESET 0
```

At the bottom, a status bar shows: 'Updates available for some of your [boards](#) and [libraries](#)'. The bottom right corner of the window displays hardware specifications: 'ule), 80 MHz, 115200, 4M (3M SPIFFS) on COM7'.

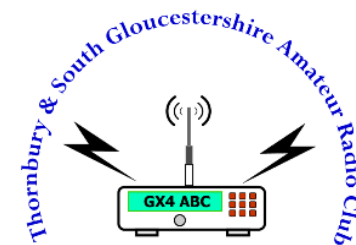
Running up the WiFi



References & Links



[ARDU] - Arduino : <https://www.arduino.cc/>



The End

Thank you