

Intelligent Dipstick (IDS)

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Parts Needed

- 1 ESP32 Dev Kit C v4
- 1 Screw Terminal Block Breakout Board for ES32 Dev Kit C
- 2 green LED lights
- 2 red LED lights
- 4 220-ohm resistors
- 1 MAX 6675 + K-Type Thermocouple

Refer to [Capstone Gateway Diagram.pdf](#) and [Capstone Sensor Diagram.pdf](#) as an assembly guide.

Setting Up Arduino IDE 1.8.19 for IDS Sensors and Gateway

Arduino's IDE needs to be configured to compile its sketches appropriately for the ESP32.

**** Disable any antivirus software temporarily for the next steps! ****

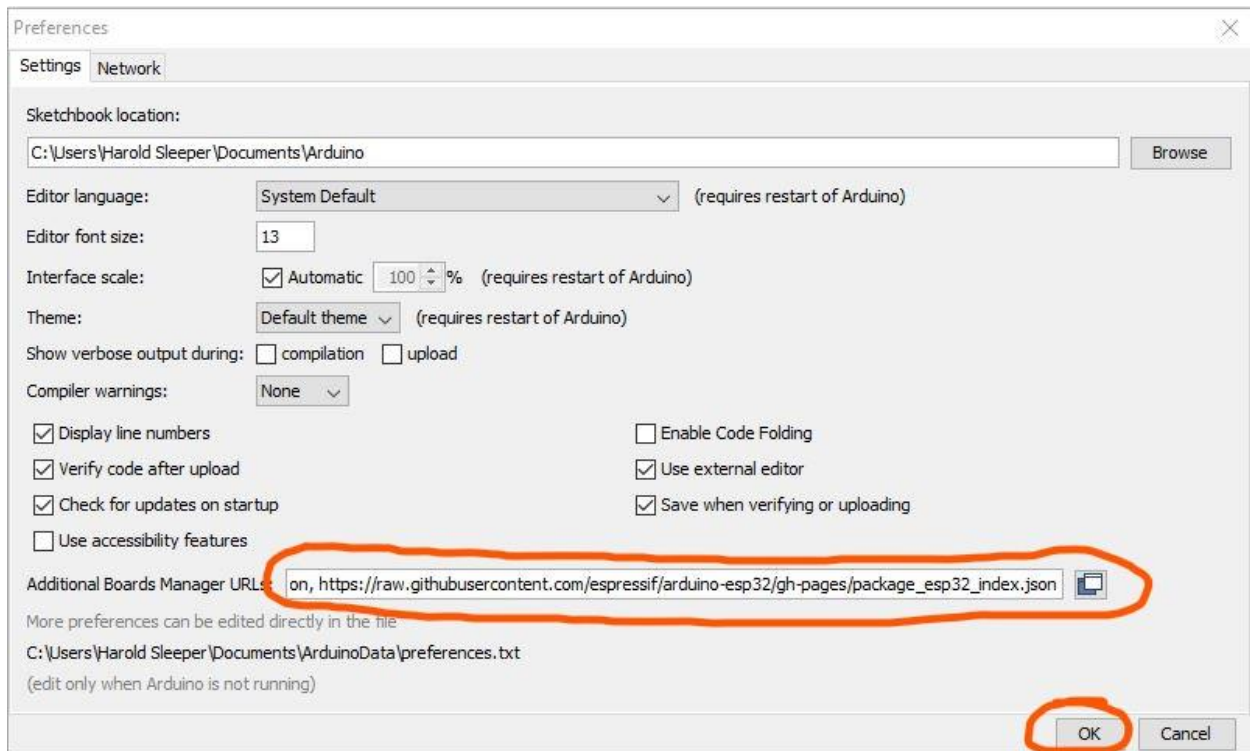
1. First in the Arduino IDE, go to the *File* menu and choose *Preferences*

This should open a *Preferences* window. Within the *Preferences* window near the bottom, should be a text field labeled *Additional Boards Manager URLs*.

Copy the next two lines into the text field and press *OK*.

https://dl.espressif.com/dl/package_esp32_index.json,

https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json



The two separate URLs should be separated by a comma as shown and as it appears in this text.

2. Next in the Arduino IDE, go to the *Tools* menu, choose *Board*, then go to *Boards Manager*...

This should open the *Boards Manager* window.

Search for ESP32 and press install button for the ESP32 by Espressif Systems.

3. Go to [CP210x USB to UART Bridge VCP Drivers - Silicon Labs \(silabs.com\)](https://www.silabs.com/CP210x-USB-to-UART-Bridge-VCP-Drivers)

Near the top of the webpage should be a hyperlink labeled *Downloads*. Click it!

Choose *CP210x Universal Windows Driver* from the options.

Software Downloads

Software (11)

Software • 11

CP210x Universal Windows Driver	v10.1.10 1/13/2021
CP210x VCP Mac OSX Driver	v6.0.1 3/31/2021
CP210x VCP Windows	v6.7 9/3/2020
CP210x Windows Drivers	v6.7.6 9/3/2020
CP210x Windows Drivers with Serial Enumerator	v6.7.6 9/3/2020

Extract the downloaded zip file into a location of your choosing and within that folder open

CP210xVCPIInstaller_x64.exe (this assumes you are using a 64-bit computer, otherwise

choose the ..._x86 option)

Follow the on-screen installation instructions

Prepare Blues Wireless Notecard

- Please follow the instructions found [here](#) on the Blues Wireless Developer site for directions on installing the Blues Wireless Notecard onto the Blues Wireless Notecarrier-AF.
- Once the Notecarrier is assembled use the instructions found [here](#) to create a Notehub Project and obtain a ProductUID.
- Save the ProductUID for use later in this project.

Installing Arduino Libraries

- a) Go to the Arduino IDE *Tools* menu, then choose *Manage Libraries*
- b) Search for "Blues" in the input box and click the *Install* button next to the "Blues Wireless Notecard" result.
- c) Search for MAX6675 and install the library by Yurri Salimov
- d) Search for NimBLE and install the library by h2zero

Uploading Arduino Programs onto the ESP32 Dev Kit C v1 and Adafruit Feather

To install Capstone_Sensors.ino onto the ESP32 Dev Kit C:

1. Connect the Dev Kit C to a USB port via micro-USB connector
2. Open Capstone_Sensors.ino in Arduino IDE
3. Navigate to the *Tools* menu in Arduino IDE, then choose *Port* and select the appropriate serial port associated with the newly connected Dev Kit C
4. Within the *Tools* menu, choose *Board* menu, select *ESP Arduino*, and from that menu choose “ESP32 Dev Module”
5. Navigate to the *Sketch* menu in Arduino IDE and select the *Upload* option (alternatively press Ctrl+U). The program will compile and upload onto the ESP32 board. [*](#)

To install Capstone_Gateway.ino onto the Adafruit Feather:

1. Connect the Adafruit to a USB port via micro-USB connector (Pro Tip: disconnect other ESP32s from the same computer to avoid confusion as to which serial port to use)
2. Open Capstone_Gateway.ino in Arduino IDE
3. Go to line 8 in the code and use your own ProjectUID to replace the Product UID placeholder within the quotes. As seen below:


```
#define productUID "com.your-company.your-name:you_project"
```
4. Navigate to the *Tools* menu in Arduino IDE, then choose *Port* and select the appropriate serial port associated with the newly connected Adafruit

5. Within the *Tools* menu, choose *Board* menu, select *ESP Arduino*, and from that menu choose “Adafruit ESP32 Feather”
6. Navigate to the *Sketch* menu in Arduino IDE and select the *Upload* option (alternatively press Ctrl+U). The program will compile and upload onto the ESP32 board.

*Depending on the manufacturer, the Dev Kit C might require the user to press and hold the Boot button on the ESP32 board while Arduino IDE tries to connect to it. Release boot button when uploading proceeds.

