How to use the GSS

Version 1.0

# Overview

This readme file goes over how to setup the GSS in the incarnation that was used for the Expo presentation.

This involves the GSU and sensing vehicles, sending the status over LoRa to the GSG (Dragino) then sending over the internet to the MQTT server and then updating the simulation software with the status of the parking spot. The simulation can then be viewed on a webpage by going to the web server ip address.

The readme assumes basic knowledge of using Arduino, Arduino IDE and networking.

# Adafruit Feather M0

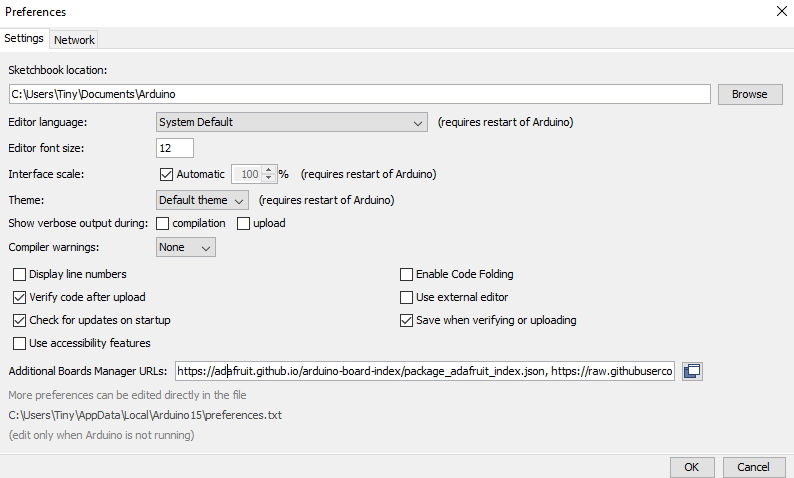
The Feather M0 is programmed using the Arduino IDE located at <https://www.arduino.cc/en/Main/Software>

The Feather board will need to be added via the board manager by doing the following:

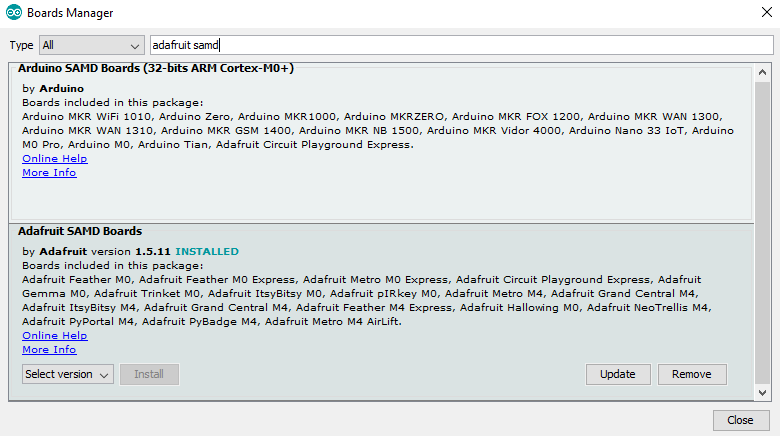
In the Arduino IDE, go to File -> Preferences

Add the following link to Additional Board Manager URLs:

<https://adafruit.github.io/arduino-board-index/package_adafruit_index.json>



Then, go to Tools -> Boards –> Board Manager, search for Adafruit SAMD and install the Adafruit SAMD Boards package.



Sketches will now be able to be compiled and uploaded to the Feather M0.

# The GSU

Zane created an enclosure which houses GSU ID 2. It contains the Adafruit Feather M0, DS3231 RTC, Antenna, LED, Ultrasonic sensor and PIR sensor. The Antenna, Ultrasonic, PIR sensors and LED can be seen on the outside.

The GSU is ceiling mounted 8-10 ft above ground with the sensors facing down. There is a micro USB port on the outside of the GSU which will need to be attached to mains power, powerbank, computer or other means of providing power.

The GSU is running the sketch called Park\_-\_it\_-\_Cda.ino

The GSU sensing can be tested mounted or unmounted. If there is no obstruction within 100 cm (3.28 ft), the LED will be green. Placing a hand or driving a vehicle under the sensors will cause the sensor readings to change. If the obstruction is within 100 cm, the GSS considers the parking spot occupied.

# Networking - GSU, GSG - Dragino

The GSG is a Dragino LG02. Both the GSG and GSU are configured to listen on the 900 MHz frequency using the default modem configuration settings.

Bandwidth = 125 kHz, Coding rate = 4/5, Spreading factor = 128chips/symbol

The Dragino connects to a WiFi network and has been successfully connected to Tyrel's, Nikolai's and Zane's home networks. To connect to a new network will require connecting a computer to the LAN port using a network cable.

Open a web browser and go to 10.130.1.1. The default login is root/dragino. Go to network -> wireless -> scan. Search for the network to join and enter its credentials. Click on save and apply and the Dragino will connect to the new network. The full user manual is located in the Manuals and Datasheets folder.

The Dragino can be checked to see if it is receiving messages by going to Service -> Logread -> RxTxJson

Messages received over LoRa appear here and the sequence being looked for begins with 3C313E which is <1> in ascii hexadecimal encoding. These are first 3 bytes of the message being sent from the GSU to the GSG and let it know to forward it onto the MQTT server.

# MQTT Server and Simulation