No-Code Battery Monitoring with WipperSnapper

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Overview

Low-cost Lithium Polymer batteries have revolutionized electronics - they're thin, they're light, they can be regulated down to 3.3V and they're easy to charge. On your phone, there's a little image of a battery cell that tells you the percentage of charge - so you know when you absolutely need to plug it in and when you can stay untethered.

The Adafruit LC709203F LiPoly / Lilon Fuel Gauge and Battery Monitor do the same thing. Connect it to your Lipoly or Lilon battery(1) and it will let you know the voltage of the cell, It does the annoying math of decoding the non-linear voltage to get you a good percentage as well!

This guide will explore how to read your device's battery percent, code-free, with Adafruit IO WipperSnapper. It will also explore how to send an SMS alert when the battery is fully charged.

What is WipperSnapper

WipperSnapper is a firmware designed to turn any WiFi-capable board into an Internet-of-Things device without programming a single line of code. WipperSnapper connects to Adafruit IO(2), a web platform designed (by Adafruit! (3)) to display, respond, and interact with your project's data.

Simply load the WipperSnapper firmware onto your board, add credentials, and plug it into power. Your board will automatically register itself with your Adafruit IO account.
From there, you can add components to your board such as buttons, switches, potentiometers, sensors, and more! Components are dynamically added to hardware, so you can immediately start interacting, logging, and streaming the data your projects produce without writing code.

Parts

**Adafruit ESP32 Feather V2 - 8MB Flash + 2 MB PSRAM**
One of our star Feathers is the Adafruit HUZZAH32 ESP32 Feather - with the fabulous ESP32 WROOM module on there, it makes quick work...
https://www.adafruit.com/product/5400

**Adafruit LC709203F LiPoly / Lilon Fuel Gauge and Battery Monitor**
Low cost Lithium Polymer batteries have revolutionized electronics - they're thin, they're light, they can be regulated down to 3.3V and they're easy to charge. On your...
https://www.adafruit.com/product/4712

**Lithium Ion Polymer Battery Ideal For Feathers - 3.7V 400mAh**
Lithium-ion polymer (also known as 'lipo' or 'lipoly') batteries are thin, light, and powerful. The output ranges from 4.2V when completely charged to 3.7V. This...
https://www.adafruit.com/product/3898
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Wiring

Some boards, such as the Feather ESP32-S2, have an LC709230F built in. For those boards, you may omit this step.

First, wire up an LC709203F to your board exactly as follows. Here is an example of the LC709203F wired to an Adafruit ESP32 Feather V2 using I2C with a STEMMA QT cable (no soldering required). You can use a breadboard and wire if you wish, but a STEMMA QT cable makes it much easier.
Board 3V to sensor VIN (red wire on STEMMA QT)
Board GND to sensor GND (black wire on STEMMA QT)
Board SCL to sensor SCL (yellow wire on STEMMA QT)
Board SDA to sensor SDA (blue wire on STEMMA QT)

WipperSnapper Setup

The WipperSnapper firmware and ecosystem are in BETA and are actively being developed to add functionality, more boards, more sensors, and fix bugs. We encourage you to try out WipperSnapper with the understanding that it is not final release software and is still in development.

If you encounter any bugs, glitches, or difficulties during the beta period, or with this guide, please contact us via http://io.adafruit.com/support

What is WipperSnapper

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Sign up for Adafruit.io

You will need an Adafruit IO account to use WipperSnapper on your board. If you do not already have one, head over to io.adafruit.com to create a free account.

Add a New Device to Adafruit IO

Log into your Adafruit IO account. Click the New Device button at the top of the page.

After clicking New Device, you should be on the board selector page. This page displays every board that is compatible with the WipperSnapper firmware.

In the board selector page's search bar, search for the Feather ESP32 V2. Once you've located the board you'd like to install WipperSnapper on, click the Choose Board button to bring you to the self-guided installation wizard.
Follow the step-by-step instructions on the page to install Wippersnapper on your device and connect it to Adafruit IO.

If the installation was successful, a popover should appear displaying that your board has successfully been detected by Adafruit IO.

Give your board a name and click "Continue to Device Page".
New Device Detected!

You have successfully connected a new **feather-esp32-v2** device to Adafruit IO. It is already set up and submitting data. You can name the device here, and set up components on the device page.

![Device Image]

**Device Name**
Adafruit Feather ESP32 V2

**Firmware Version:** 🌐 v1.0.0-beta.38

[Continue to Device Page]

You should be brought to your board's device page.

Next, Visit this guide's WipperSnapper Essentials pages to learn how to interact with your board using Adafruit IO.

![Device Page]

Feedback

Adafruit.io WipperSnapper is in beta and you can help improve it!

If you have suggestions or general feedback about the installation process - visit [http://io.adafruit.com/support](http://io.adafruit.com/support), click "Contact Adafruit IO Support" and select "I have feedback or suggestions for the WipperSnapper Beta".
Troubleshooting

If you encountered an issue during installation, please try the steps below first.

If you’re still unable to resolve the issue, or if your issue is not listed below, get in touch with us directly at https://io.adafruit.com/support(). Make sure to click "Contact Adafruit IO Support" and select "There is an issue with WipperSnapper. Something is broken!"

I don't see my board on Adafruit IO, it is stuck connecting to WiFi

First, make sure that you selected the correct board on the board selector.

Next, please make sure that you entered your WiFi credentials properly, there are no spaces/special characters in either your network name (SSID) or password, and that you are connected to a 2.4GHz wireless network.

If you're still unable to connect your board to WiFi, please make a new post on the WipperSnapper technical support forum with the error you're experiencing, the LED colors which are blinking, and the board you're using. ()

I don't see my board on Adafruit IO, it is stuck "Registering with Adafruit IO"

Try hard-resetting your board by unplugging it from USB power and plugging it back in.

If the error is still occurring, please make a new post on the WipperSnapper technical support forum with information about what you're experiencing, the LED colors which are blinking (if applicable), and the board you're using. ()

"Uninstalling" WipperSnapper

WipperSnapper firmware is an application that is loaded onto your board. There is nothing to "uninstall". However, you may want to "move" your board from running WipperSnapper to running Arduino or CircuitPython. You also may need to restore your board to the state it was shipped to you from the Adafruit factory.
Moving from WipperSnapper to CircuitPython

Follow the steps on the [Installing CircuitPython page](#) to install CircuitPython on your board running WipperSnapper.

- If you are unable to double-tap the RST button to enter the UF2 bootloader, follow the "Factory Resetting a WipperSnapper Board" instructions below.

Uploading this sketch will overwrite WipperSnapper. If you want to re-install WipperSnapper, follow the instructions at the top of this page.

Moving from WipperSnapper to Arduino

If you want to use your board with Arduino, you will use the Arduino IDE to load any sketch onto your board.

First, follow the page below to set up your Arduino IDE environment for use with your board.

[Setup Arduino IDE](#)

Then, follow the page below to upload the "Arduino Blink" sketch to your board.

[Upload Arduino "Blink" Sketch](#)

Uploading this sketch will overwrite WipperSnapper. If you want to re-install WipperSnapper, follow the instructions at the top of this page.

Factory Resetting a WipperSnapper Board

Sometimes, hardware gets into a state that requires it to be "restored" to the original state it shipped in. If you’d like to get your board back to its original factory state, follow the guide below.

[Factory Reset your Adafruit Feather HUZZAH ESP32-V2](#)
Usage

Assuming you have already gone through the WipperSnapper Setup page and connected your board to WipperSnapper, navigate to the WipperSnapper board list.

On this page, select the WipperSnapper board you just connected.

- If you do not see your board listed - go back to the WipperSnapper Setup Page and make sure it registers with Adafrut.io

On the device page, quickly check that your device is online and is running the latest version of the WipperSnapper firmware.

The device tile on the left indicates the version number of the firmware running on the connected board.

If the firmware version is green with a checkmark - continue with this guide.
If the firmware version is red with an "X" - update to the latest WipperSnapper firmware on your board before continuing.

Click the New Component button or the + button to bring up the component picker.
Under I2C Components, select the LC709203F.
On the component configuration page, the LC709203F's sensor address should be listed along with the sensor's settings.

The Send Every option is specific to each measurement. This option will tell the Feather how often it should read from each of the LC709203F's two measurements and send the data to Adafruit IO. Measurements can range from every 30 seconds to every 24 hours.

For this example, set the Send Every interval for each sensor to every 30 seconds.
Your device interface should now show the sensor components you created. After the interval you configured elapses, WipperSnapper will automatically read values from the sensor(s) and send them to Adafruit IO.

To view the data that has been logged from the sensor, click on the graph next to the sensor name.
Here you can see the feed history and edit things about the feed such as the name, privacy, webhooks associated with the feed and more. If you want to learn more about how feeds work, check out this page.

The LC709203F has two measurements that each have their own feeds. In this picture, we’re looking at the battery cell percent reading, but if you click on the graph icon for the other measurement you’ll see its feed history.
Battery Level SMS Alert with Adafruit IO Actions

IO-PLUS ONLY: Adafruit IO's SMS Action requires your Adafruit IO account to have an active subscription to Adafruit IO PLUS. Adafruit IO PLUS ("IO+") is our PAID Adafruit IO plan. Visit https://io.adafruit.com/plus for more info.

First head over to your Adafruit account page (). Enter your phone number in the box and click continue and verify.

You should now receive a verification code at the mobile number you entered. Enter this code into the box labeled verification code. Press submit.

You should see a blue box that says Successfully validated phone number and your phone number in the box under mobile number.
If this is all correct you can continue to the next part of the guide.
From any page in Adafruit IO, click the link labeled Actions, then click New Action and select the Reactive Action option.

Fill out the options for this action. Make sure to choose the right feed and set the Limit Every option to a reasonable number so you aren’t getting texts every 30 seconds.

We also changed the body so that it would tell us that the battery was fully charged instead of only the percentage.
When the battery is fully charged, you should receive a text message from Adafruit IO!