No-Code IoT Pool Monitor

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https://learn.adafruit.com/iot-pool

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You can build your own IoT Pool Monitor using Adafruit IO and WipperSnapper.

This can help you keep track of water temperatures by logging and plotting data to a dashboard!

All of the electronics are housed in a clear sealed enclosure that is also water resistant.
This project is powered by the Feather ESP32-S2 running WipperSnapper, Adafruit’s no-code solution to IoT Projects.

Just stick the DS18B20 wire in the pool to monitor how warm it is and log that data in a custom dashboard.

With WipperSnapper you can create a beautiful dashboard with gauges and charts so you can visually monitor the warmth of your pool!

Parts

Adafuit ESP32-S2 Feather - 4 MB Flash + 2 MB PSRAM

What's Feather-shaped and has an ESP32-S2 WiFi module? What has a STEMMA QT connector for I2C devices? What has your favorite Espressif WiFi microcontroller and lots of Flash and...

https://www.adafruit.com/product/5000
Waterproof 1-Wire DS18B20 Digital temperature sensor
This is a pre-wired and waterproofed (with heat shrink) version of a 1 Wire DS18B20 sensor. Handy for when you need to measure something far away, or in wet conditions. While the...
https://www.adafruit.com/product/381

Small Plastic Project Enclosure - Weatherproof with Clear Top
Store your project safe and sound in this nice weatherproof box with a clear top. We picked up this box because we like the machinable ABS plastic body and tough clear polycarbonate...
https://www.adafruit.com/product/903

Lithium Ion Battery Pack - 3.7V 4400mAh
Need a big battery for your project? This lithium-ion pack is made of 2 balanced 2200mAh cells for a total of 4400mAh capacity! The cells are connected in parallel and spot-welded to a...
https://www.adafruit.com/product/354

Adafruit IO+ Subscription Card
These are for freebies only! If you like to purchase one for yourself, here’s the store version! https://www.adafruit.com/product/3980
https://www.adafruit.com/product/4443
USB Type A to Type C Cable - approx 1 meter / 3 ft long
As technology changes and adapts, so does Adafruit. This USB Type A to Type C cable will help you with the transition to USB C, even if you’re still...
https://www.adafruit.com/product/4474

Circuit Diagram

The wiring diagram below provides a visual reference for connecting the components. It is not true to scale, it is just meant to be used as reference. This diagrams was created using the Fritzing software package.

Take a moment to review the components in the circuit diagram. This illustration is meant for referencing wired connections - the length of wire, position and size of components are not exact.

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.
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, a web platform designed (by Adafruit!) 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.

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.

Install USB Driver

Install CP2104 / CP2102N USB Driver

Many ESP32 boards have a USB-to-Serial converter that talks to the chip itself, and will need a driver on your computer's operating system. The driver is available for Mac, Windows, and Linux.

Click here to download the CP2104/CP2102N driver

Install CH9102 / CH34X USB Driver

Newer ESP32 boards have a different USB-to-serial converter that talks to the chip itself, and will need a driver on your computer's operating system. The driver is available for Mac and Windows. It is already built into Linux.
If you would like more detail, check out the guide on installing these drivers.

Click here to download the Windows driver

Click here to download the Mac driver

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 QT Py ESP32 Pico. 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".
You have successfully connected a new qtpy-esp32 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 Name**

Adafruit QT Py ESP32 Pico

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.

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!"

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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.

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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.

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"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.

![Arduino IDE Setup](#)

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 Adafruit QT Py ESP32 Pico](#)
WipperSnapper Overview

Ok - you've connected your board to WipperSnapper. Now what?

This page will give you a quick tour of Adafruit IO WipperSnapper and its core features.

WipperSnapper Device List

The Device List page provides a list of the devices you've connected to Adafruit IO WipperSnapper along with their connection status.

Think of it as a virtual inventory for your boards!

You can visit this page at any time by navigating to https://io.adafruit.com/wippersnapper.
Clicking on a device from the Devices List page will bring you to its device page. This page is an interface to configure and interact with anything physically connected to your device.

You may think of it as the state of your device at any given time.

When you register a device for the first time, this page will be empty, it's a clean slate!
WipperSnapper Components

A "component" in WipperSnapper denotes anything which is physically connected to your hardware.

This can include sensors, buttons, LEDs, NeoPixels, displays, and more!

When you click New Component, your hardware will automatically connect to and configure the component using the settings you specified. No coding required!

Additionally, a component also sets up a unique Adafruit IO feed to store the component's data stream on the web.
Do I need to set up my components every time I use WipperSnapper?

Nope! WipperSnapper remembers each component's configuration for each of your boards. The "state" of your board's configuration is saved to its device page.

When you re-connect a board to WipperSnapper, it will automatically re-configure every component listed on the Device Page. The most recent value stored on each component's feed will be sent to the device.

I do not see my the component I want to use listed in the component picker pop-up

We're actively working towards adding more components and component types to Adafruit Wippersnapper.

We also gladly take community contributions to Adafruit IO - You can add your own component by following this guide. ()
3D Printing

Parts List
STL files for 3D printing are oriented to print "as-is" on FDM style machines. Parts are designed to 3D print without any support material. Original design source may be downloaded using the links below.

Edit Design
Pool_Box.zip

Slice with settings for PLA material

The parts were sliced using CURA using the slice settings below.

- PLA filament 220c extruder
- 0.2 layer height
- 10% gyroid infill
- 60mm/s print speed
- 60c heated bed

Supports
- Support Extrusion Width: .2
- Support Density: 4%
- Support Overhang Angle: 50
- Support Z Height: .21
- Interface: On
- Support Roof: On
- Support Pattern: Zig Zag

Build Plate Adhesion
- Type: brim
- Line Count: 6
Assemble

Solder Resister

Gently bend the ends of the resistor to fit between the 3v and 12 pins. Position on the back side of the board (flat side of the Feather board). Follow the diagram to solder the wires to each pin.

Thread wire

Pass sensor through the printed Feather mount.

Press fit Feather

Align the stand-offs on the mount to the screw holes on the Feather and press fit the board into place.
Prep Case

The DS18B20 fits through a 1/4" drill hole. The clear plastic case has markings to make a hole in the center.

Thread wire

Pass the sensor through the hole and align the printed mount to the two screw holes.
Mount Feather

Use the included screws to fasten the printed mount to the case.

Place the lipo battery next the feather and connect to the JST port.

Attach Lid

Place the lid over the case and fasten with the included screws.

Hot glue is not truly waterproof and can fail when exposed to UV or water. Marine 2-part epoxy is a better choice for a long-term sealed connection.
Seal wire

Carefully apply hot glue over the hole to seal the case.

Place Case

Place the case at a corner of the pool and submerge the DS18B20 wire into the pool to start capturing data!