FieldKit Product Guide

Last Revised 2 March 2022

In this guide, we explain what a FieldKit station is and help you set up and deploy your own station with detailed step-by-step instructions.

Table of Contents

What is a FieldKit Station?

A FieldKit station is a sensing ecosystem.

If you're setting out to use FieldKit for environmental sensing, chances are you'll start by buying (or borrowing) a FieldKit station.

Stations, Modules and Sensors

A station is a home for multiple sensor modules. Modules group together sensors and their data according to distinct environmental factors, e.g. weather or pH. Sensors are physically located at various points across the hardware (via circuit boards or instruments), and the hardware itself is packaged together in products that we call Sensor Packs.

Plugging a sensor pack into your station activates the corresponding module, and data enters the station's ecosystem as part of that module.

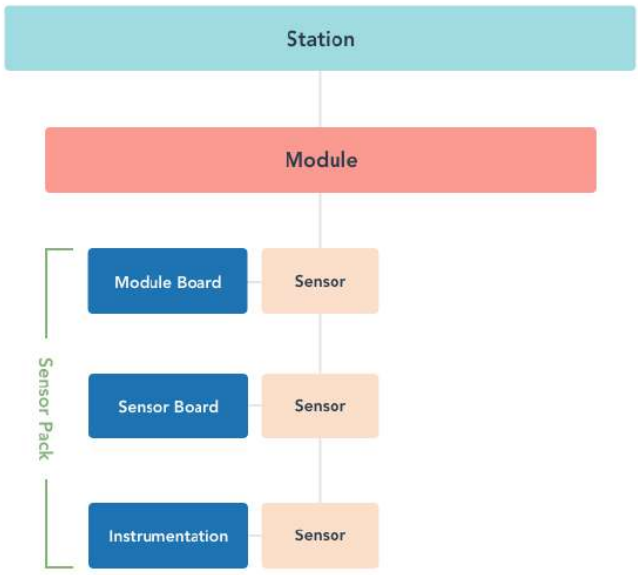
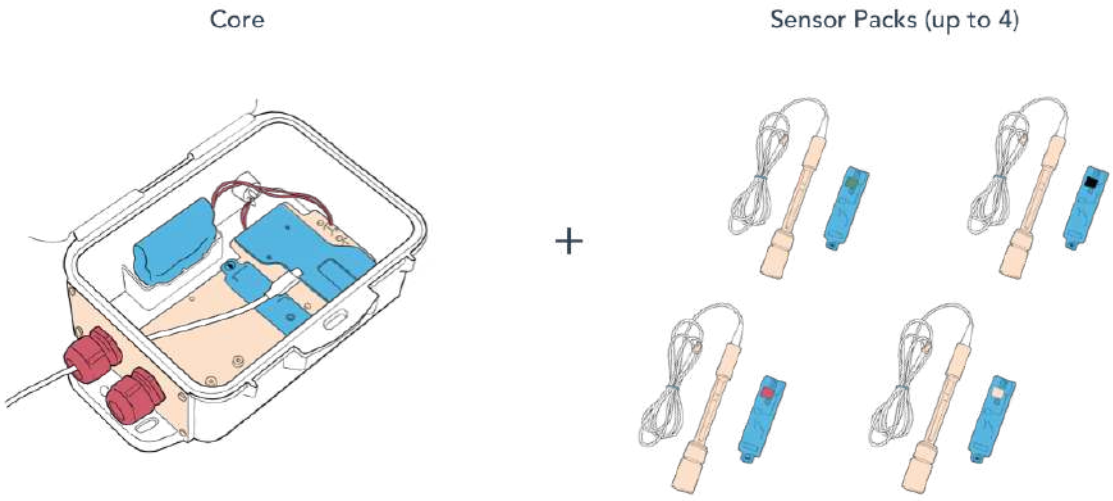


Diagram of a Station with one Module and its Sensors

While there is no limit to the number of modules that can be associated with a FieldKit Station over its lifetime, a station physically has four bays for each sensor pack to individually plug into

(by way of their module board) and the associated circuitry to handle and store the data that they collect.



A module's hardware can be changed out in case you need to replace an entire sensor pack or just one component, such as the module board.

Example: *I buy a FieldKit Weather station (which comes with a Weather Pack that includes the weather module board), but after a while I experience issues with the weather module board. FieldKit sends me a replacement module board, and from a data perspective, the same weather module just picks up where it left off and starts recording data with this new module board. On the web portal, I only see one weather module, but the system knows that two module boards were used.*

Most often, a station lives inside of a weatherproof case, which keeps everything dry. The case has holes in the cable plate on the bottom to pass through cables for external sensors. A station is powered by a battery (which lives in the case), and the battery can be charged by a solar panel (which lives outside of the case) or by using Micro-USB power.

A Flexible System

The core of a FieldKit station is the same, no matter if you are using it to measure water quality, monitor local weather conditions, or find out how clean the air is near your local school. Indeed, the biggest strength of FieldKit is that a station can be almost anything, depending on which sensor packs you plug into it at any given time. It can be a weather station, or a water station, or a weather-and-water station or a water-and-air station or an air-and-seismic station or a water-and-weather-and-seismic-and-soil-humidity station.

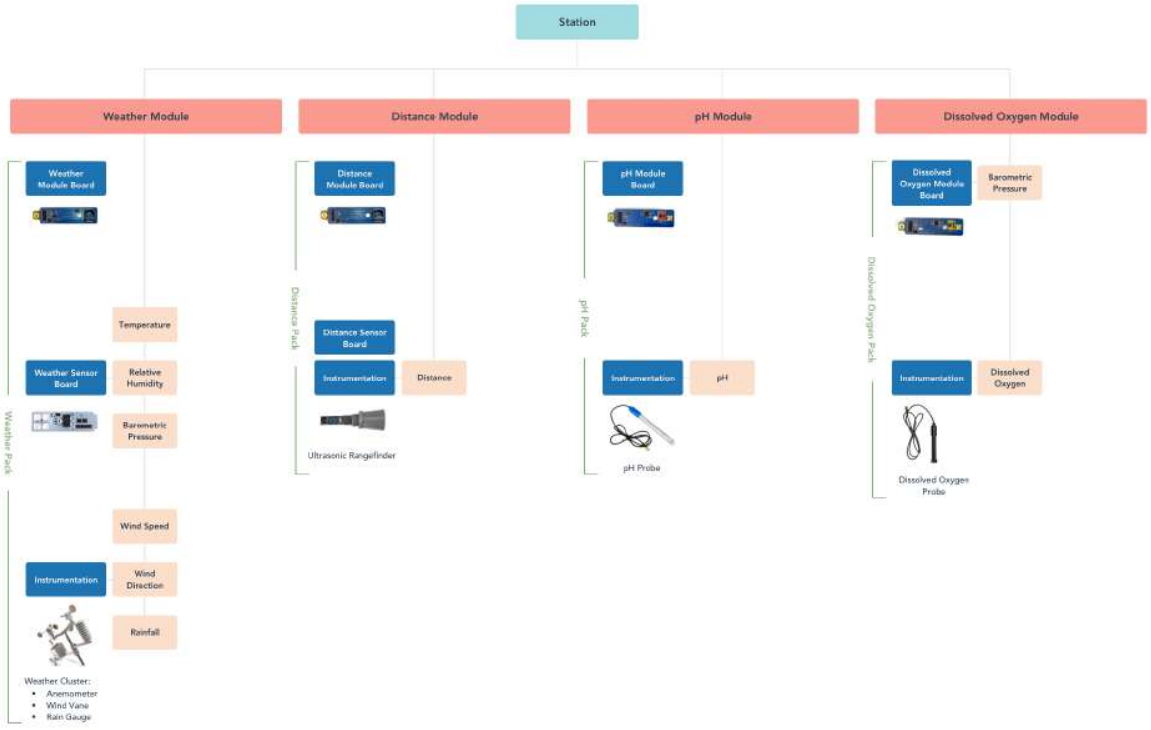


Diagram of a Station with multiple Modules and Sensors

We have launched FieldKit with six modules and are selling the associated sensor packs in our online shop, which means with the four available bays there are almost 360 possible module combinations. By the end of 2021, we hope to have ten modules available, offering 540 possible combinations. As our community grows and more developers contribute to building modules, we believe there will be hundreds of thousands of possible FieldKit configurations to be put together and put out into the world.

And remember, though there are only four bays available at any given time, that doesn't mean that you can't put your station to different uses at different times. In terms of data, stations may have more than four modules associated with them over their lifetime.

Example: *I plug in four sensor packs in January (pH, Dissolved Oxygen, Conductivity and Water Temperature), and then in August decide that I no longer want pH, and instead plug in a Distance Pack. My station now has five modules (it's just that one of them is no longer receiving data). So I can go to the web portal and review data for five modules.*

A FieldKit station knows which sensor packs are plugged into it. This means there's no extra configuration necessary to add or remove a sensor pack. Your weather station can become a

water station, just by switching sensor packs. There is little extra cost to add an extra sensor pack to a station, which means you can collect more data about a place while deploying the same amount of hardware.

Data and Power

When we talk about data, we mean two things: the data readings measured by the sensors and metadata about your sensor configuration. All data is stored on the FieldKit station. If your station is near a WiFi network, data can be uploaded automatically to the web portal on FieldKit.org. If your station is somewhere more remote, you can use our app (available on iPhone and Android) to transfer data and then upload it when connectivity permits. You can also use the app to configure the station—such as to change how often it takes measurements or to re-calibrate sensors. You can also monitor power consumption, which is particularly useful when the station is powered by a solar panel.

Technical Details

The module base allows for up to four module boards. It supplies power to them, as well as mechanically coupling them to the case. The base attaches to the lower board by way of a single connector, and the upper board connects to the lower via standard 0.1 inch (2.54 mm) headers.

All of the module boards for a FieldKit unit can technically be used on their own, if you know how to interface with them via I2C* or SPI. However, we make it much easier for you to get data from them by giving you the brain box: the Upper Board powered by an SAMD51P series 32-bit low-power microcontroller. This gives you the ability to store data locally on a microSD card or to send data back via WiFi and/or LoRa.

We have designed a weatherproof custom case for FieldKit stations which is water and impact resistant. FieldKit stations can be used in other enclosures provided there are appropriate fastening surfaces.

Even More Technical Details

BRD files for the FieldKit core and sensor modules are available in our GitHub repository:

Core: https://github.com/fieldkit/darwin-mcu

Module base: https://github.com/fieldkit/darwin-backplane-4

Example module board: https://github.com/fieldkit/darwin-weather-module

Questions? We'd love to hear from you. everyone@fieldkit.org

Parts List

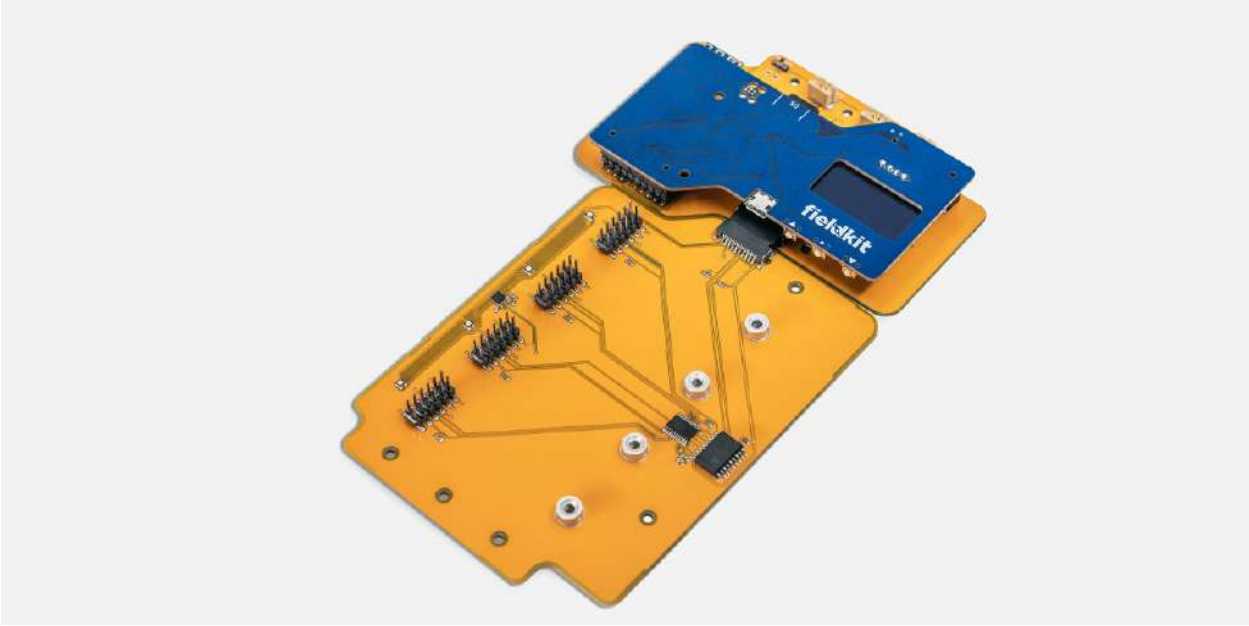
In this parts list, we will take a closer look at each component.

We've ordered the list from inside out, starting with the circuit boards and sensors, then moving onto the power sources and protective case—all of which make up a FieldKit station.

1. Core

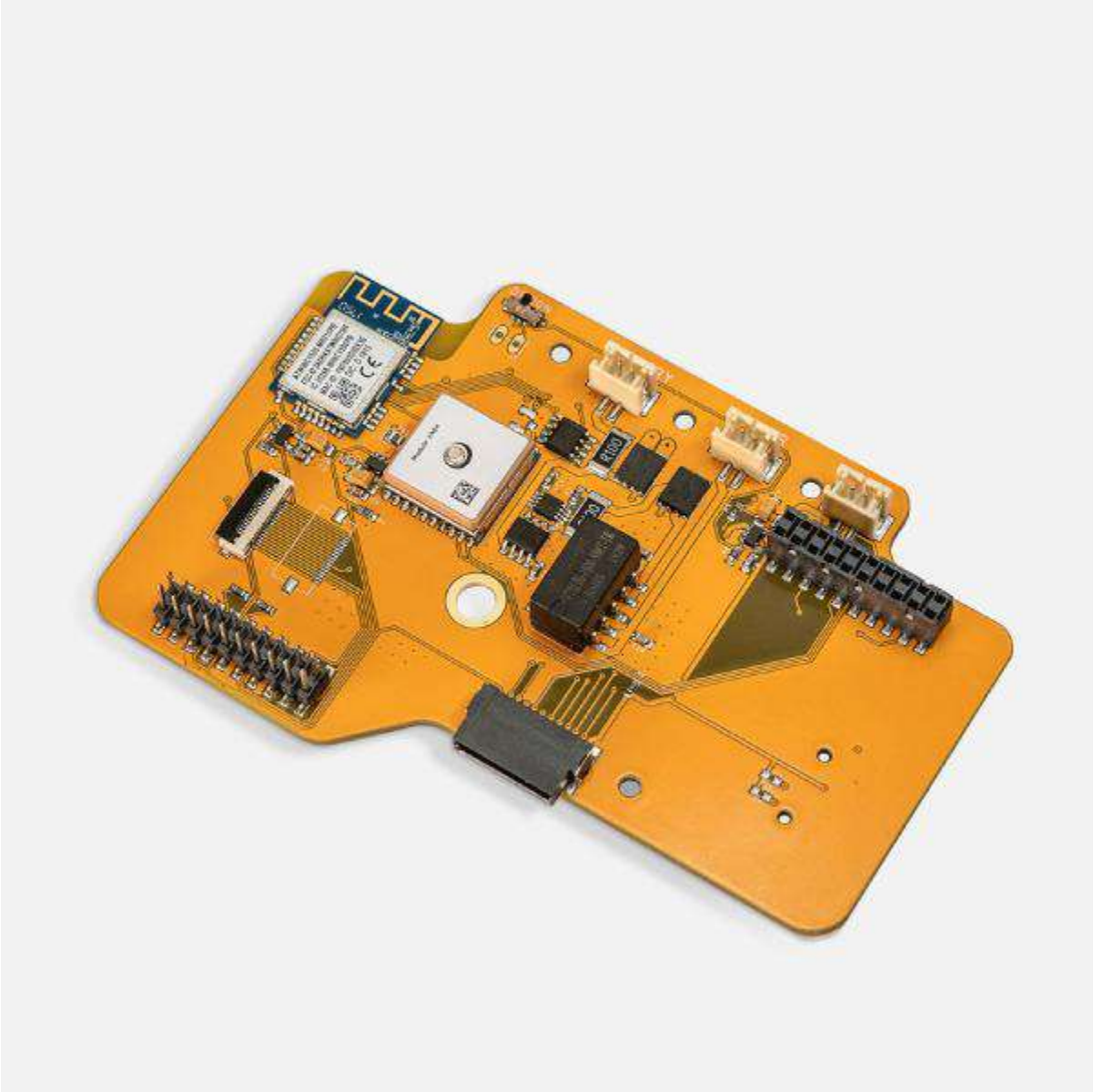
The Core is the central hub of the Station, responsible for logging and sending data from the environmental sensors to the FieldKit mobile app and web portal. It is made up of 3 boards:

- Upper Board
- Lower Board
- Module Base



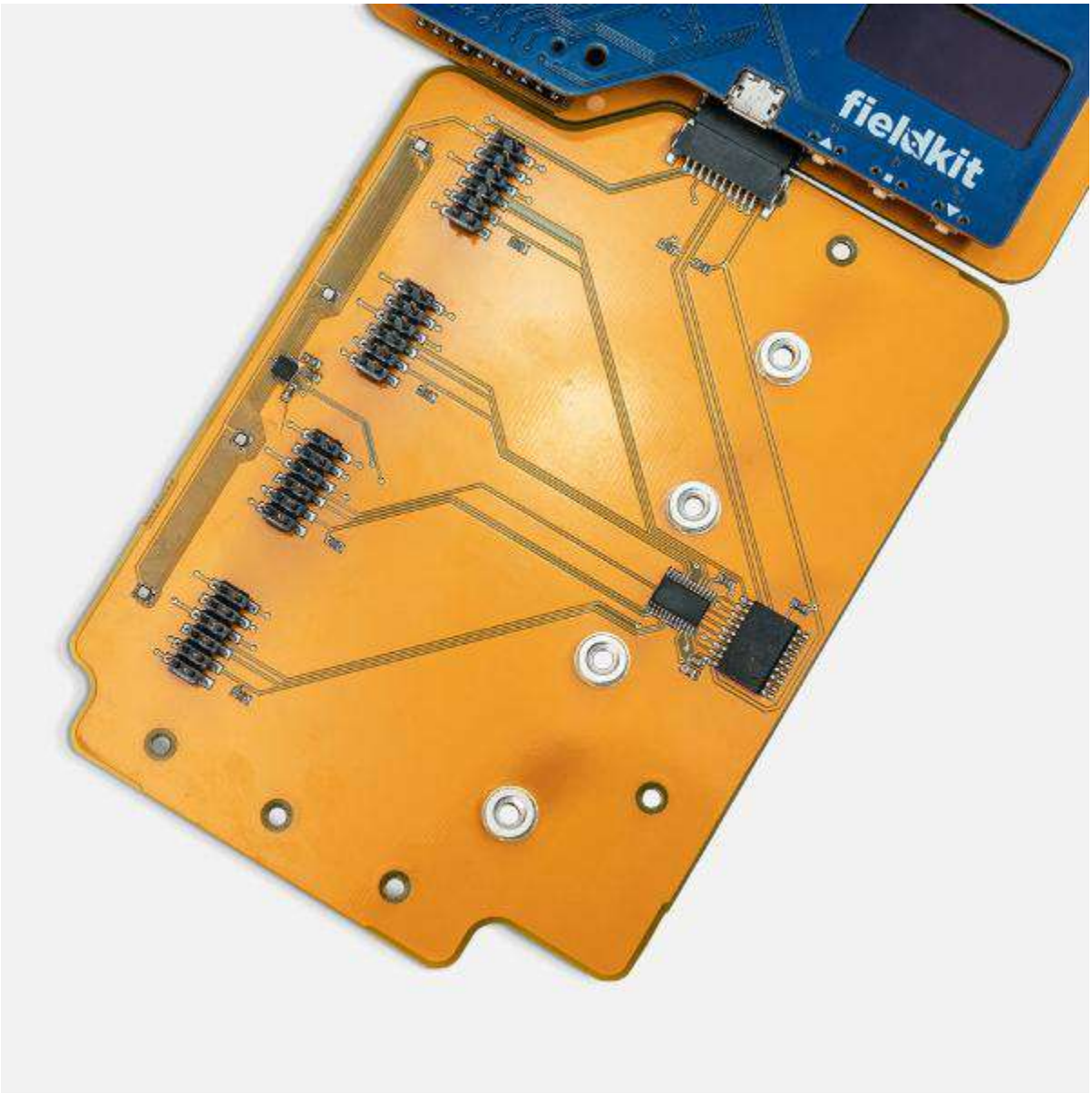
Upper Board

The Upper Board consists of a microcontroller, onboard memory, a microSD card for data backup, real-time clock (powered by an onboard super-capacitor), and an organic light emitting diode (OLED) interactive display screen. This is the brains of the station and runs the main firmware.



Lower Board

The **Lower (Radio) Board** is equipped with battery and solar connectors, a WiFi module, GPS, and a connector for optional LoRa wireless communications (using a separate LoRa Radio Pack). This is the communications center of your kit.



Module Base

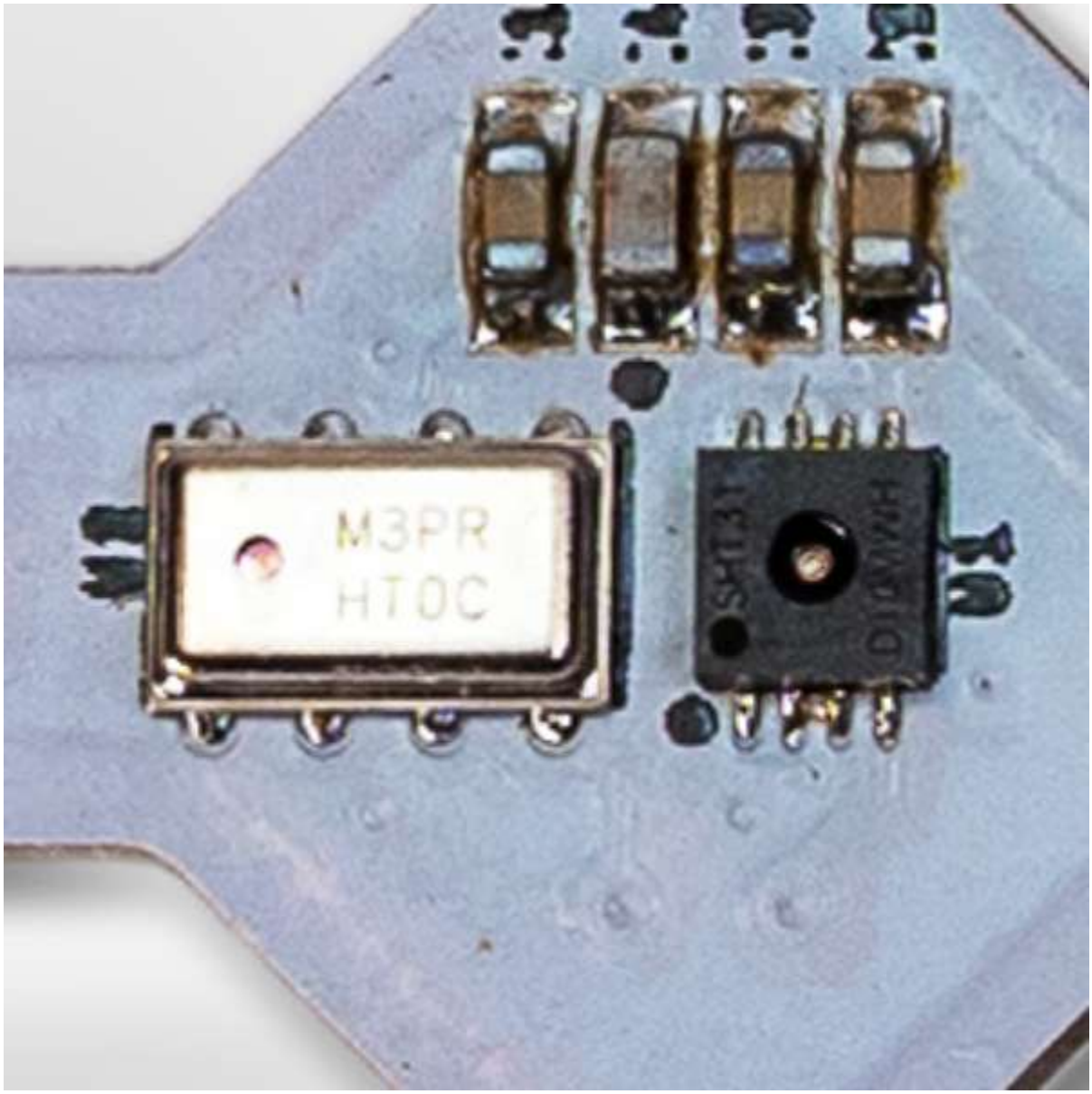
The **Module Base** attaches to the Upper and Lower Boards. It is the platform on which to attach module boards.

2. Sensors

A Sensor Pack is a set of board(s), cables and instruments that plug into the Core to gather readings on a specific environmental factor, e.g. weather or pH. A Sensor Pack might measure one or multiple parameters relevant to that factor. For instance, the Weather Pack measures temperature, relative humidity, barometric pressure, wind speed and direction, and rainfall, whereas the pH Pack measures just pH.

Weather Pack

pH Pack

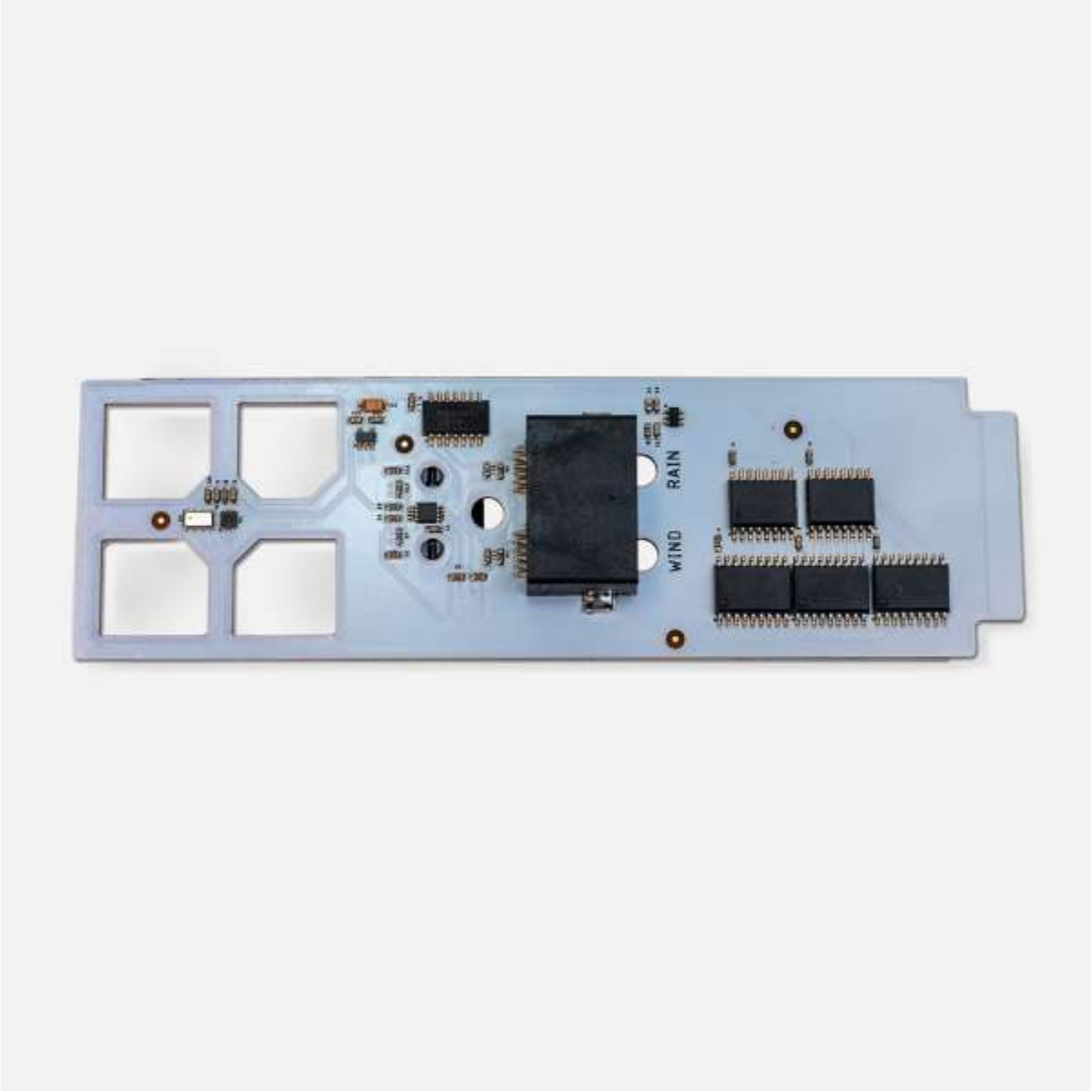


Sensor

A Sensor detects physical changes in its environment and communicates that data to the station Core. A sensor might sit directly on the Module Board, on an external Sensor Board, or within instrumentation like a Probe, Rain Gauge, Anemometer or Wind Vane. (These instruments are often themselves just called “sensors.”)

Module Board

A **Module Board** is a board that sits on the Module Base and acts as the interface to the instruments. It communicates environmental data gathered from its attached Sensors to the Core. It is possible to use between one and four Module Boards within a station at a time.



Sensor Board

A Sensor Board is a board that sits inside an external enclosure and connects to the internal Module Board. It communicates environmental data gathered from its attached Sensors to the Module Board.

Probe

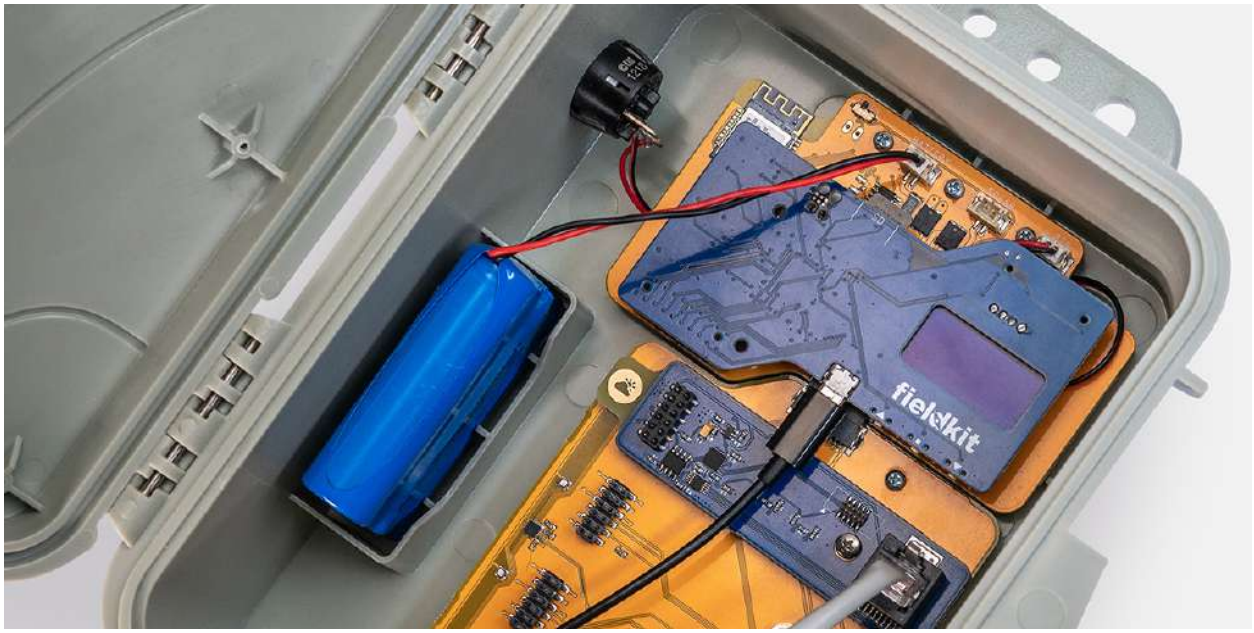
A **Probe** is an instrument (or sensor) used for measuring, testing or obtaining data. Some examples include the pH Probe, Dissolved Oxygen Probe, Conductivity Probe and Water Temperature Probe.

Cluster

A **Cluster** is a set of instruments (or sensors) that are located in the same place, such as a Weather Instrument Cluster that contains a Rain Gauge, Anemometer and Wind Vane.

3. Power

To be able to power the electronics to gather and sync data, you will need a reliable power source. A FieldKit station can be plugged into a power source like your computer or the wall using the Micro-USB Cable. For remote deployments, you can use a charged Battery, which will need to be recharged periodically. You can also use a Battery plugged into a Solar Panel for ongoing charge, as long as you have a good source of sunlight.



Micro-USB Cable

Plugging a Micro-USB Cable from a power source into the Lower Board will turn on and power your system. If a Battery is plugged into your FieldKit, it will recharge it.

Battery

The standard **Battery Pack** includes three 2000 mAh 18650 Li-polymer batteries. These batteries are rechargeable either through a USB plug-in or a supplementary solar panel.

Solar Panel

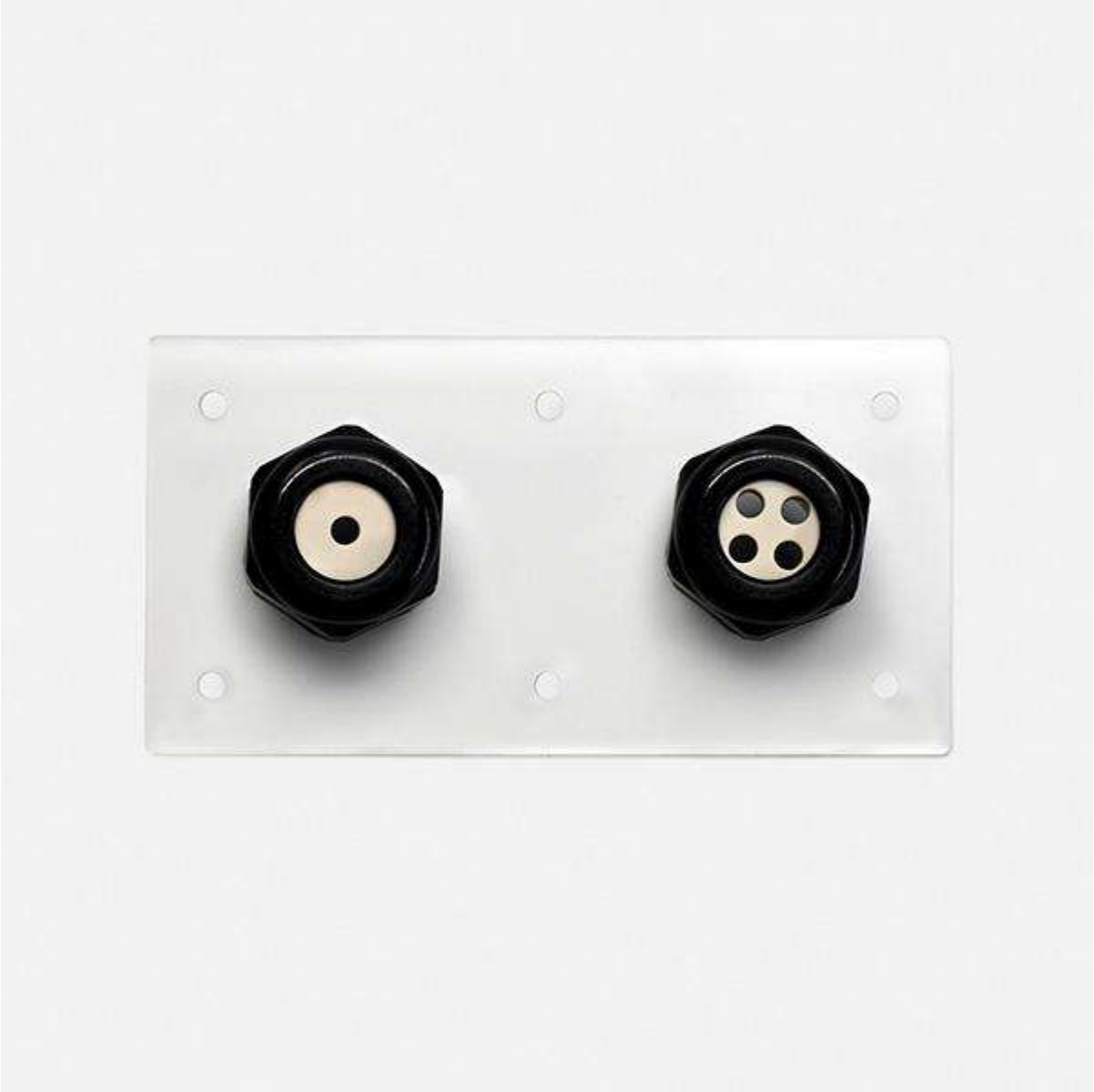
A Solar Panel absorbs sunlight and converts it into electricity to power the electronics. We use a 10 watt solar panel for our system, but if you're a pro who has the skills to mix and match, then FieldKit can work with any 12V panel as long as the cable terminates in a JST-PH and it observes the appropriate polarity. Just please note that FieldKit tech support does not cover non-FieldKit products.

4. Case

The FieldKit Case is a custom-designed case that allows for multiple mounting configurations and installation positions. It secures and protects FieldKit electronics from the elements.

Wake Button

The Wake Button on the Case wakes up the station and turns on the Station WiFi signal. This enables you to connect to the station with your phone and sync station data.



Cable Plate

A **Cable Plate** is a customizable part of the Case system with different opening configurations that allow cables to pass in and out of the case. Each case comes with a cable plate, but you might consider buying additional alternative configurations to suit different module setups. We offer blank fiberglass plates that can be drilled out and customized according to your needs. You can also opt to laser cut or 3D print your own plate. If you are interested in doing this, visit the Cable Plate page to download the .svg and .stl files.

Gland

A Gland is a portal in the case system. Each gland contains a Cable Insert with holes that allow specific cables to pass through while keeping the interior elements protected from the outside.

5. Station

When we talk about a Station, we mean the combination of the hardware and software listed above that collects and syncs data with the FieldKit mobile app and web portal.

Care of Your FieldKit

Here are some care recommendations for your FieldKit.

General FieldKit Care

Water Intrusion

We have built the FieldKit Case to be highly water-resistant.

However, to further protect your FieldKit hardware, we strongly suggest using a desiccant inside the case to reduce the potential for moisture damage. Our recommendation is a refreshable aluminum dehumidifier canister (such as those manufactured by Dry-Packs) but any desiccant that doesn't interfere with the hardware will work.

Also, make sure that the gaskets in your FieldKit Case (lid and cable plate) are sitting nice and flat, not stretched or twisted, and the lid is properly closed using the lid clasps for maximum water resistance.

Securing Your Circuit Boards

Never just leave your circuit boards in the FieldKit Case unsecured. Secure them down with screws so they don't move around and risk getting damaged. That goes for everything else in the case too, e.g. the battery, microSD cards, your lucky screwdriver—you should secure everything firmly to keep things from moving around, which could damage the boards.

Placing Your FieldKit

To protect your FieldKit, anchor it securely in place when leaving it in the field, especially if your location might experience intense winds. With the FieldKit Weather station, to ensure effective measurement, your sensor cluster should be a minimum of five meters (15 feet) off the ground to avoid boundary layer effects. If you are using a solar panel, you should ensure that it receives 6-8 hours of full sun each day, and it should be pointed in the compass heading appropriate with the location. Additionally, we recommend camouflaging your FieldKit as much as possible to prevent interference or damage by humans. The lid has a hole for a lock in case you would like to install one to minimize tampering.

Cold Temperatures

In very cold weather (i.e. -20 °C or lower), the battery for FieldKit will not work as effectively and may be damaged even by storage in these temperatures. The screen on the FieldKit's

internal hardware also may become sluggish in extreme cold. Additionally, the pH, Dissolved Oxygen and Conductivity Probes used in the FieldKit Water station could crack in freezing weather and should be protected from freezing by deep submersion into water that remains unfrozen all year. If you plan to deploy your FieldKit for a longer period of time in extreme cold, please contact us for recommendations on alternate sensors and batteries you might explore.

Hot Temperatures

The pH probe may be damaged by immersion in extremely hot temperatures (e.g. in water at or near the boiling point). If you plan to deploy your FieldKit in extremely hot water, please contact us for recommendations on alternate sensors you might explore.

Temperature Variations

If you deploy your FieldKit in an environment with extreme temperature variability (e.g. Death Valley, California), the case could possibly seal itself. If this occurs, do not attempt to open your FieldKit by prying it with a screwdriver. Instead, loosen the nuts on the cable glands slightly. A vent can also be installed in the cable plate to help mitigate this (FieldKit does not currently sell vents as part of our product range, so please source a vent separately and purchase a blank cable plate to drill in your own hole configurations).

Biofouling

If algae, plants, animals, or microorganisms accumulate on parts of your FieldKit, we recommend cleaning them with an abrasive sponge and a biodegradable cleaning product. We recommend Simple Green All-Purpose Cleaner if it is available to you.

Adding Voltage

It is possible to utilize external power sources with your FieldKit, and in extreme conditions this may even be preferable. If you choose to do this, note that plugging a 12V battery into the battery terminal will cause it to fail; it will need to be plugged into the solar terminal as that has the proper protections to accept that voltage. If you plan to use a solar panel that is not one provided by FieldKit or otherwise would like feedback on how to add voltage to the system without overloading it, please feel free to contact us for advice.

Sensor and Cable Care

Probe Breakage

Many of the sensors used with FieldKit are fragile. The pH, Conductivity and Dissolved Oxygen probes in the FieldKit Water station are prone to breakage if dropped or subjected to freezing

temperatures. Additionally, the anemometer and wind vane in the FieldKit Weather station are also prone to breakage.

Sensor Lifespan

Most of the sensors used with FieldKit will last indefinitely with proper care and regular cleaning. However, the pH and Dissolved Oxygen sensors used in the FieldKit Water station have an expected lifespan of two years. After two years, these sensors will have drifted significantly, such that their measurements might not even be correctable by calibration, and they will have lost significant sensitivity. Additionally, the Dissolved Oxygen probe requires reconditioning every 3-6 months, which is performed by rinsing out the accumulated white zinc oxide powder and refilling the probe with electrolyte solution. Do not go more than six months without reconditioning. Failure to recondition the Dissolved Oxygen probe may cause it to fail prior to the full two year lifespan.

Cable Care

Sensor cables are a key wear point. The most common issues affecting cables are UV damage and animal abrasion. If it is possible to shade your FieldKit (without shading the solar panel, if you are using one), we recommend doing so to reduce UV damage to the cables. You will know that UV damage is occurring if the cable insulation becomes brittle or discolored.

Animals will also sometimes chew on cables. To prevent this, you can choose to apply a mixture of petroleum jelly (or other grease) and cayenne pepper to the cables. This mixture is waterproof but may need to be reapplied every few weeks or months, depending on your environment. You can also purchase an armored sheath (also known as a metal wireloom) to protect your cables. We recommend using one made of aluminum, as galvanized steel sheaths eventually corrode and can be sharp on the inside, leading to cable damage.

Set Up Station

Unpack your FieldKit and check you have all the necessary parts.

Download App

Download the FieldKit mobile app before proceeding.

Download the FieldKit app from the iOS app store or Android app store onto your phone to guide your setup and view your data.

The app will help guide you through the entire setup and deployment process. While out in the field, you often won't have internet access via WiFi. Using the mobile app gives you a direct connection to your FieldKit station via the **Station WiFi** (an access point created by the station).

If you haven't done it yet, sign up for an account here at portal.fieldkit.org. That way, when you come to sync your station's data to the web portal, you'll be ready to go.

Quick Tips:

MicroSD card

We highly recommend using a microSD card in your station. This allows you to save a backup of your data and will keep all logs in case something goes wrong. You'll also need one to update your firmware. We don't sell these, but you should be able to pick one up pretty easily online or at a local retailer.

Calibration standards

Some sensors need to be calibrated to set a baseline for accurate readings. We don't sell these, but we can advise you on what you need to purchase. Check out the Set Up Modules section for more details. You may want to go ahead and purchase calibration standards before assembling your kit, so you can be ready to go when you set up your station.

Assemble Station

Carefully put together your FieldKit station.

1. Prepare to Assemble

Check that you have all necessary parts to assemble your FieldKit station. We strongly recommend going through the set-up of your station at home. This allows you to assemble your station fully, calibrate accurately, and connect to the internet for troubleshooting before you go into the field. Here's a list of parts you'll need to proceed (you can also see a list of parts with photos and helpful information at our FieldKit Parts List):

CORE

A) Upper Board

B) Lower Board

C) Module Base

SENSORS

D) Module Board(s), found in each Sensor Pack

POWER

E) Battery

F) Micro-USB cable

G) Solar Panel and Cable (optional)

CASE

H) FieldKit Case

I) Cable Plate Packs

J) Station Screw Packs

You will also need the following (not included):

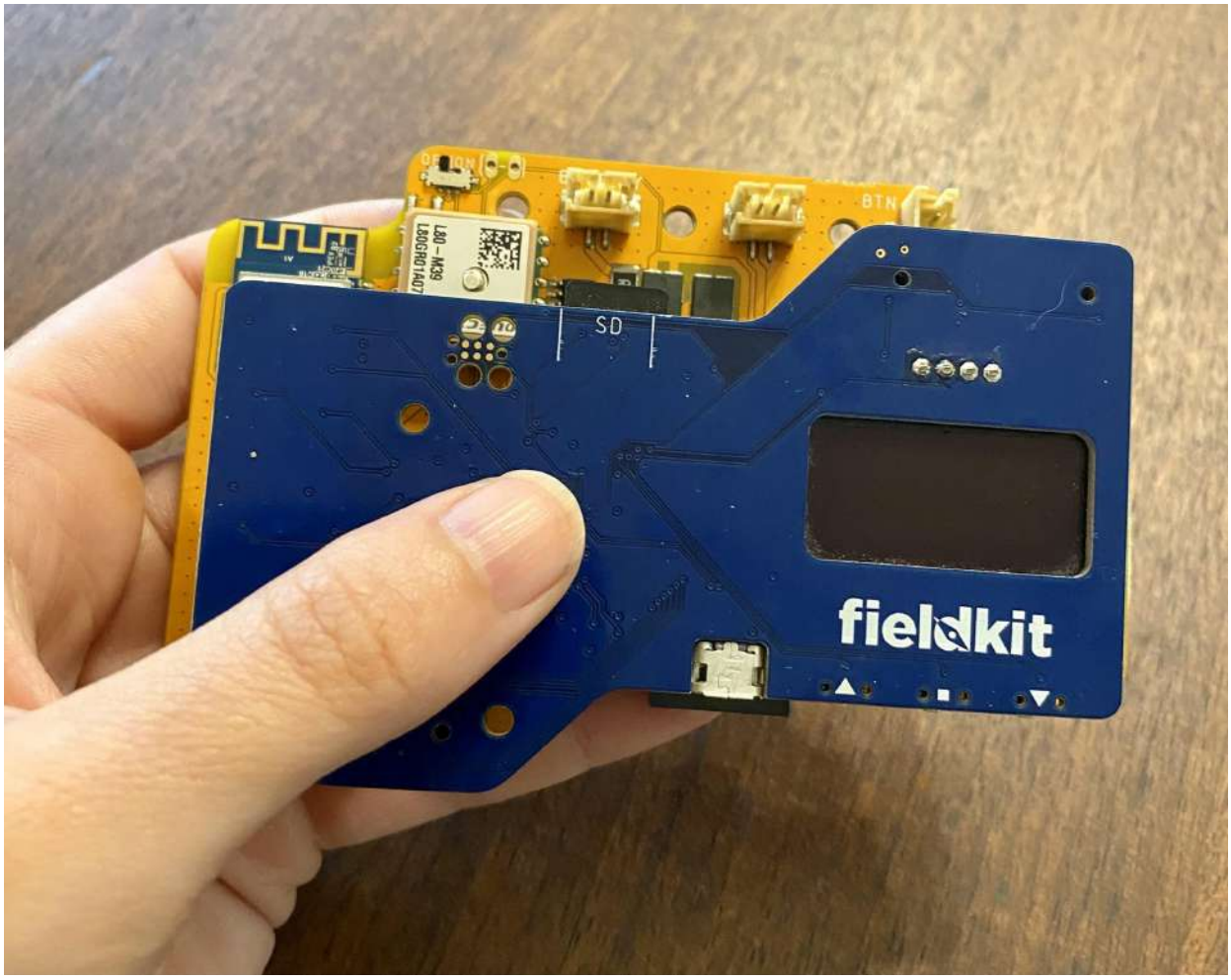
–Phillips screwdriver*

–USB wall charger

*Some people prefer to use a small jeweler's screwdriver while others are more comfortable with a regular sized screwdriver. Test out what works for you. Also, you might also like to have a small dish to hold the tiny screws.

2. Separate the Upper and Lower Boards

The Upper and Lower Boards come pre-assembled to protect the pins, so you'll need to pull them apart in order to secure the Lower Board to the case, before re-assembling them.



Take the Boards

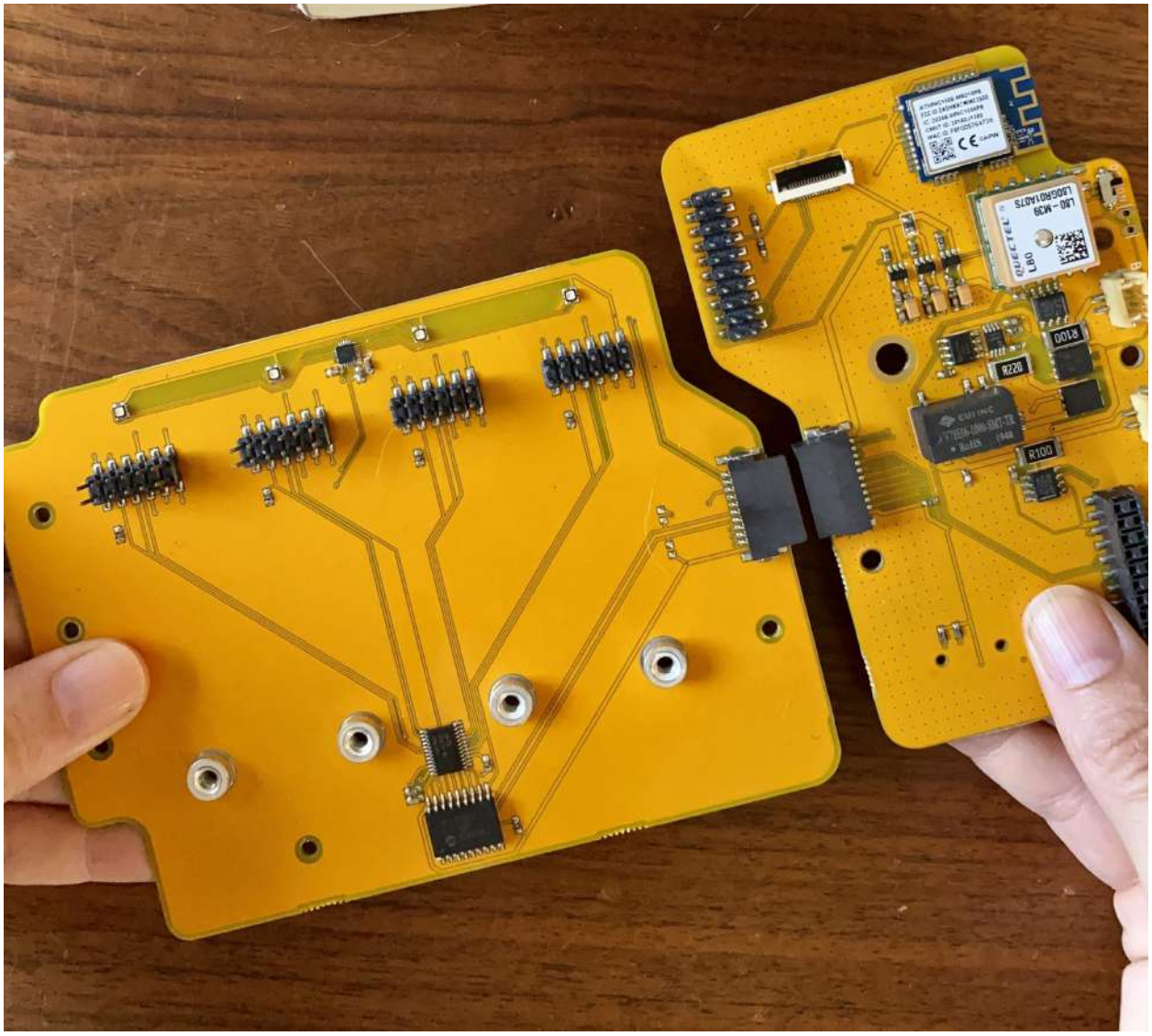
Pick up the combined Upper and Lower Boards.

Pull Boards Apart

Hold the Upper Board between your thumb and forefinger, and Lower similarly. Then, rock the boards back and forth gently on a diagonal plane to pull them apart. Set the Upper Board aside for now.

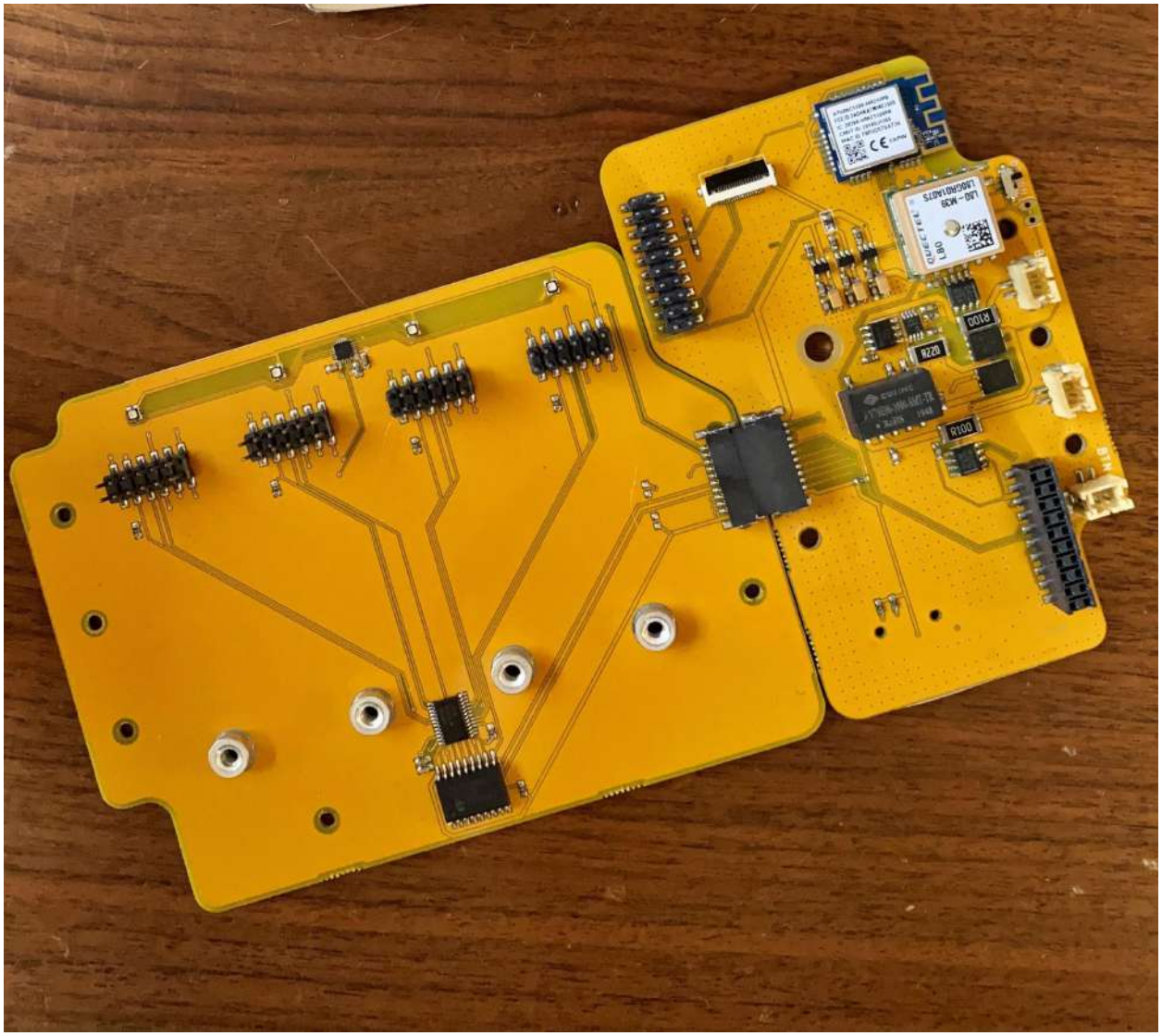
3. Attach Module Base

Attach the Lower Board to the Module Base.



Line Up

Line up the Lower Board with the Module Base.

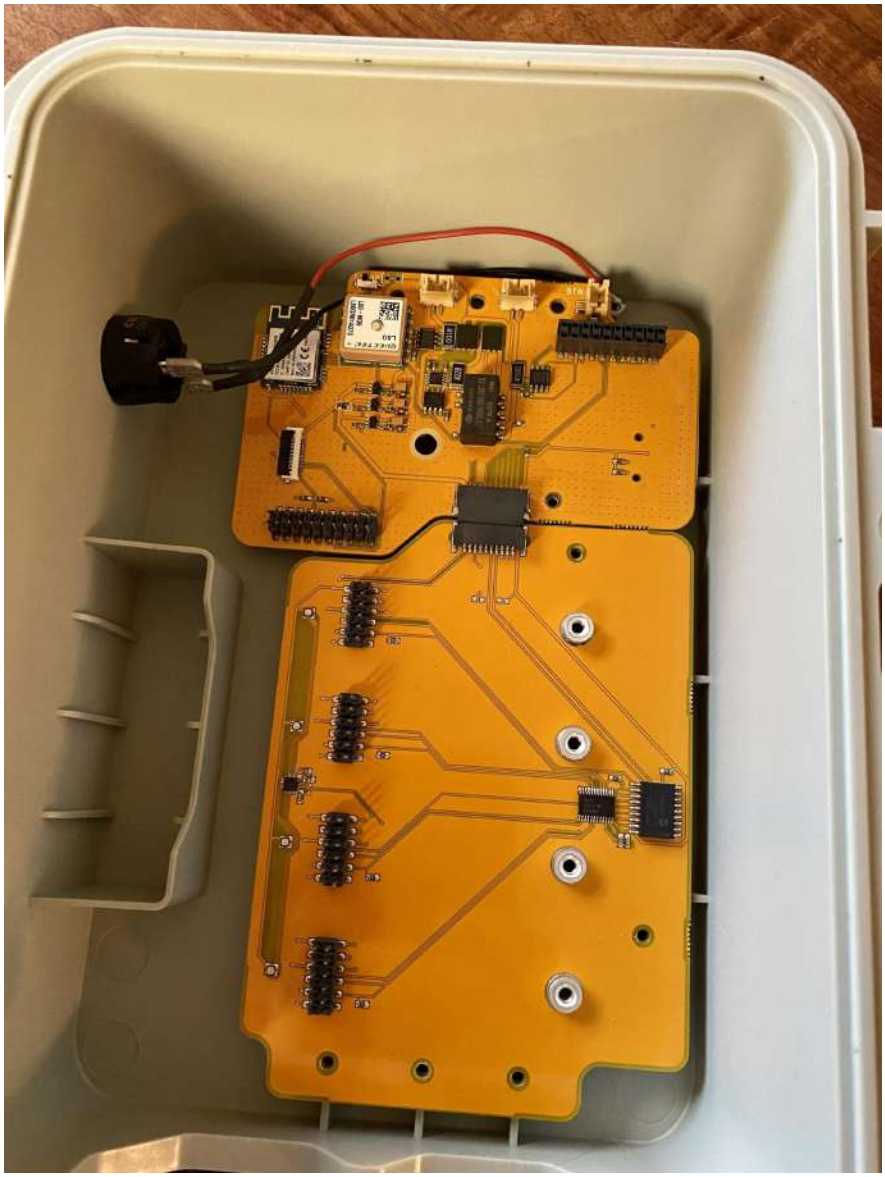


Press Together

Press together. You're now ready to start securing your boards in the case.

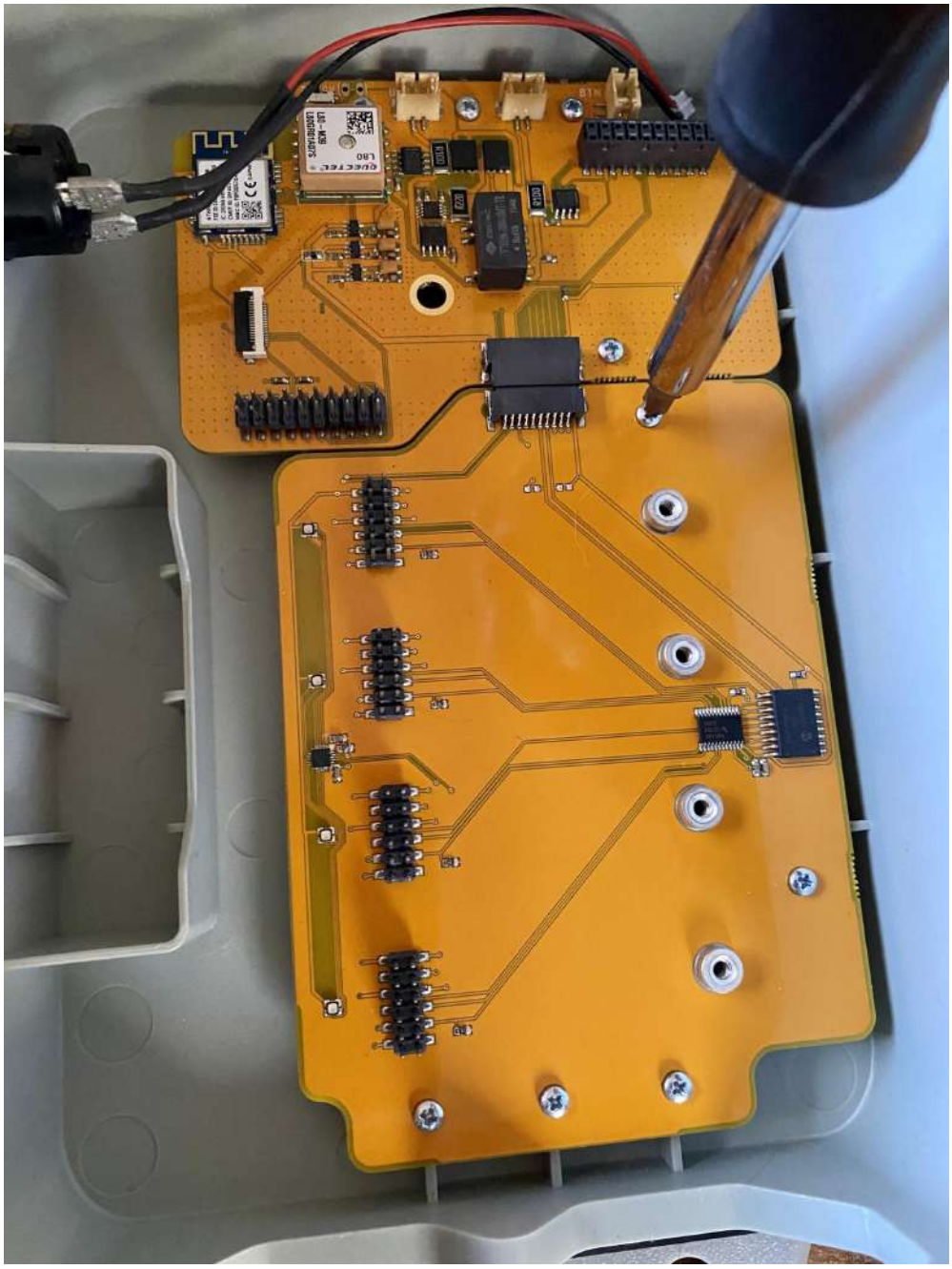
4. Secure Inside Case

Secure your circuit boards inside the Case.



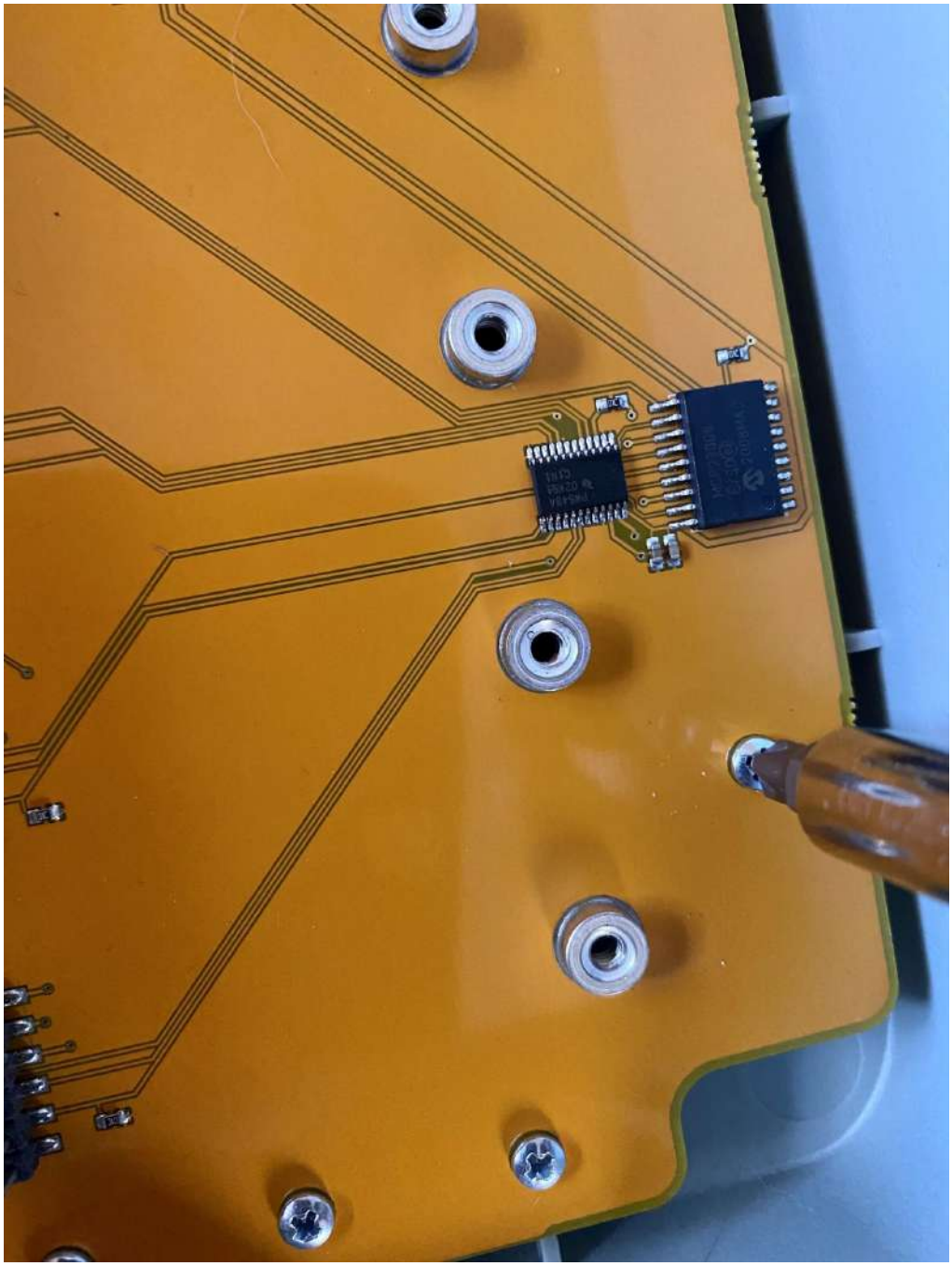
Place Components

Place your assembled components inside the Case. The wire coming out of the WiFi button on the left can be run along the boards at the top and then re-emerge on the right side, as pictured.



Screw Down the Boards

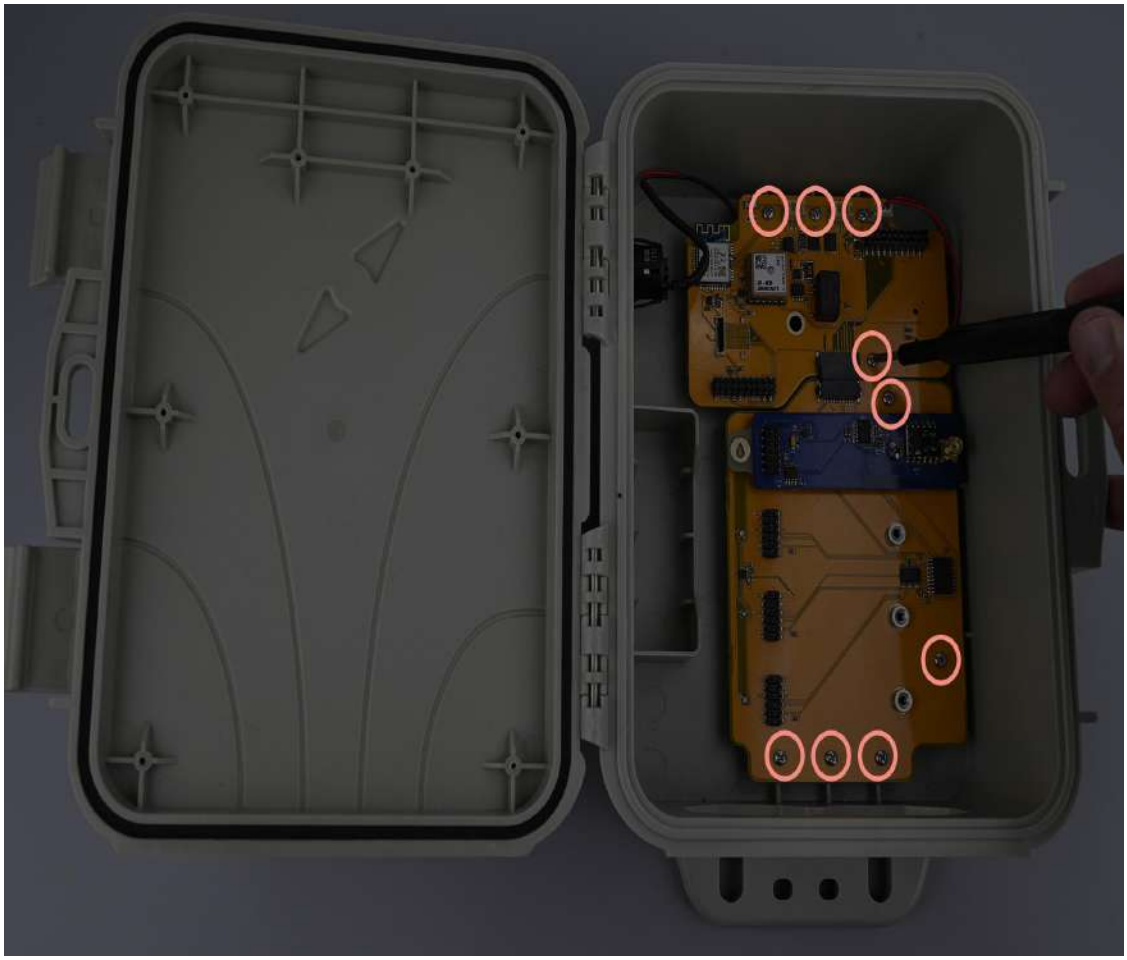
Secure everything down with the included screws (in the packet marked ‘Core to Case Screws’) so that the hardware doesn’t move around and risk damaging the boards.

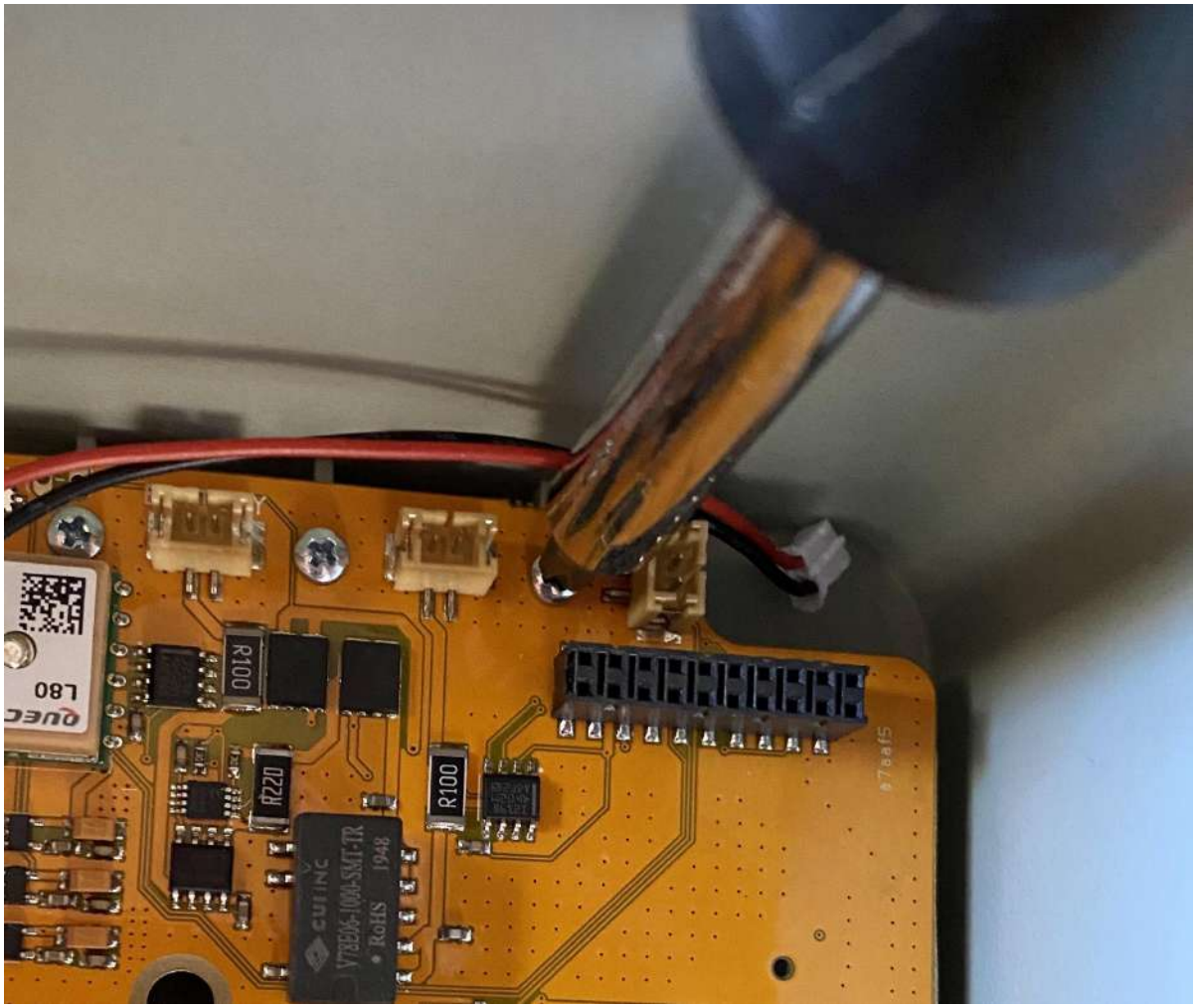


Got Them All?

Make sure you've screwed in the screws that will be covered up once you put the Upper Board and Module Boards on.

Note: We recommend screwing down all nine screws for maximum security.



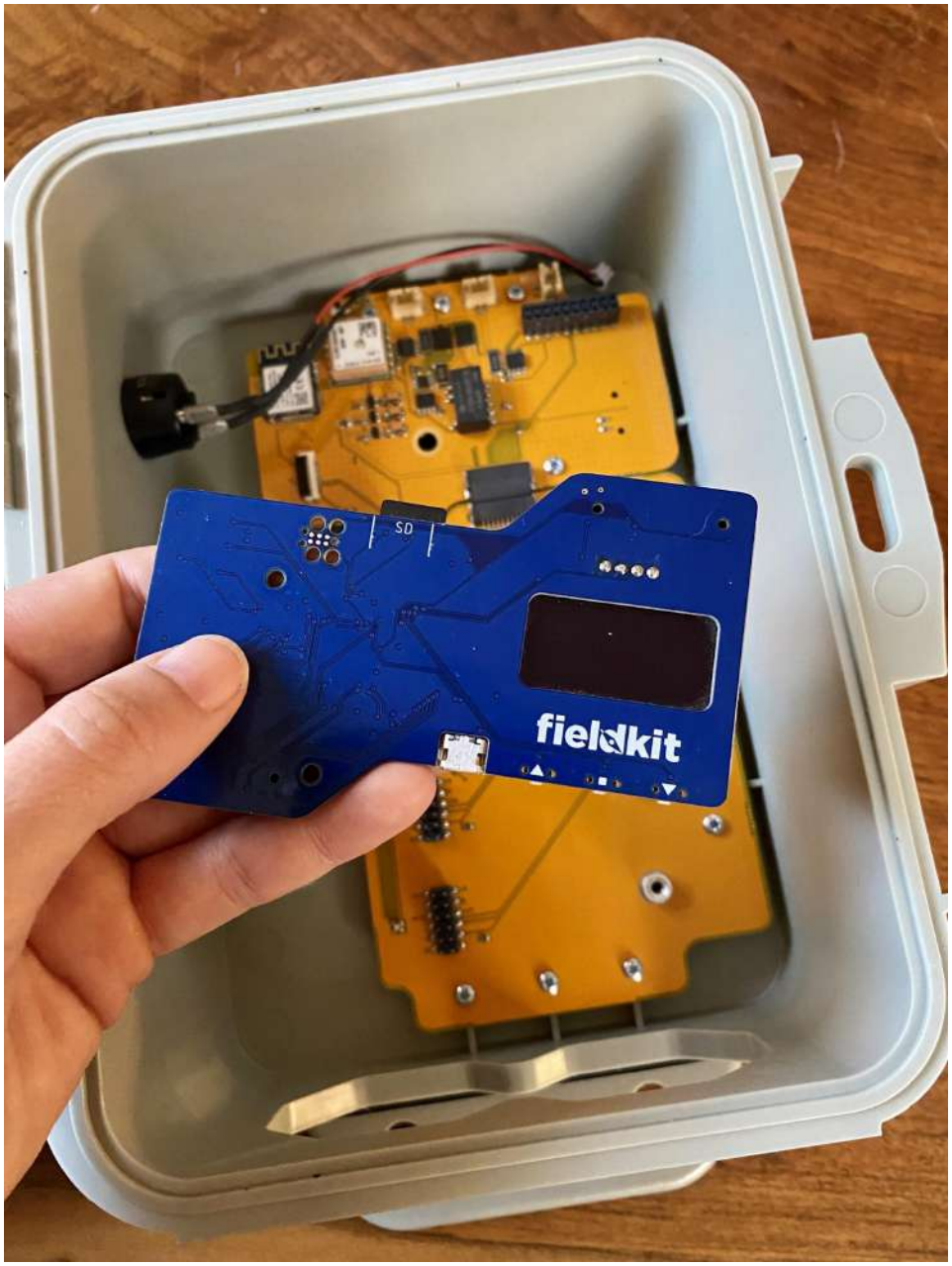


These Screws Feel Too Tight!

The screws might feel as if they're too tight as you screw them into the plastic for the first time. They are thread forming screws, so expect some resistance as you're screwing the threads into the smooth plastic.

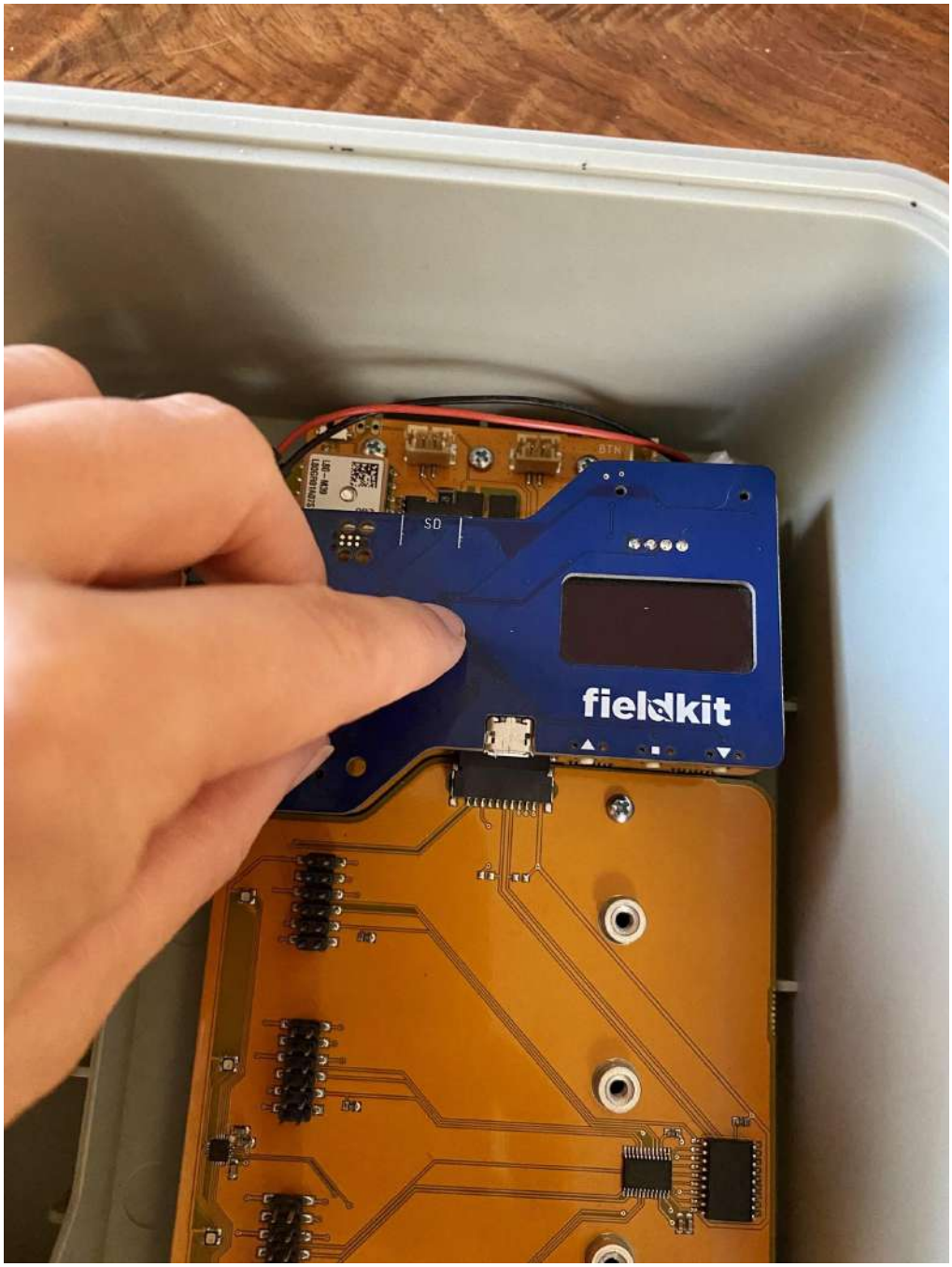
5. Place Upper Board

Now it's time to replace the Upper Board on top of the Lower Board.



Take the Upper Board

Locate the Upper Board that you previously set aside.



Line Up

Hover the Upper Board above the Lower Board that is now secure in the case. Be sure to line up the pin headers and sockets.

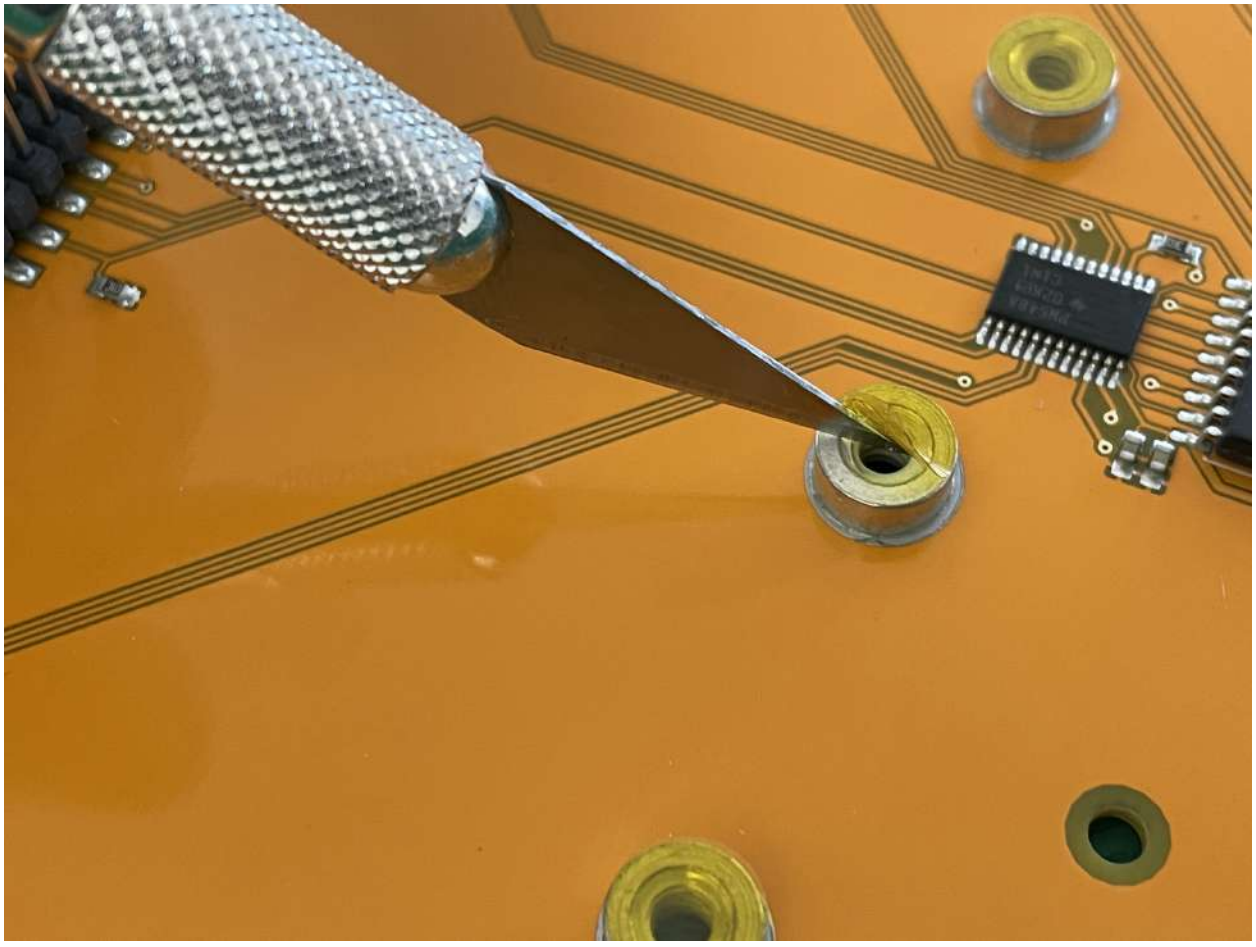
Press Together

Then press them together firmly.

Warning: Use caution to avoid bending the Lower Board and Module Base pins, and make sure the pins never touch each other, as it could damage the board.

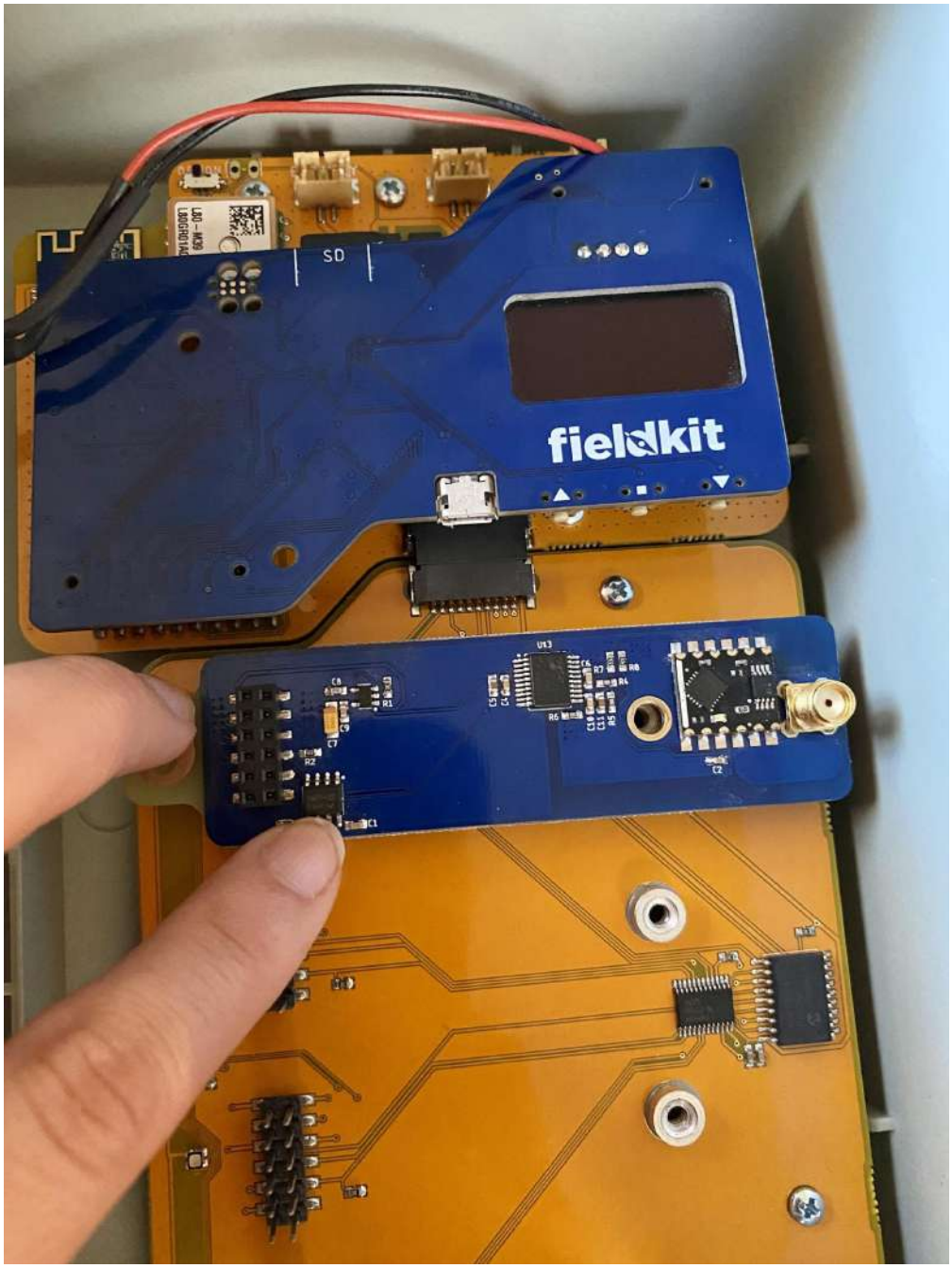
6. Attach Module Boards

Now add your Module Boards. You'll find your Module Board(s) in the Sensor Pack(s) you bought.



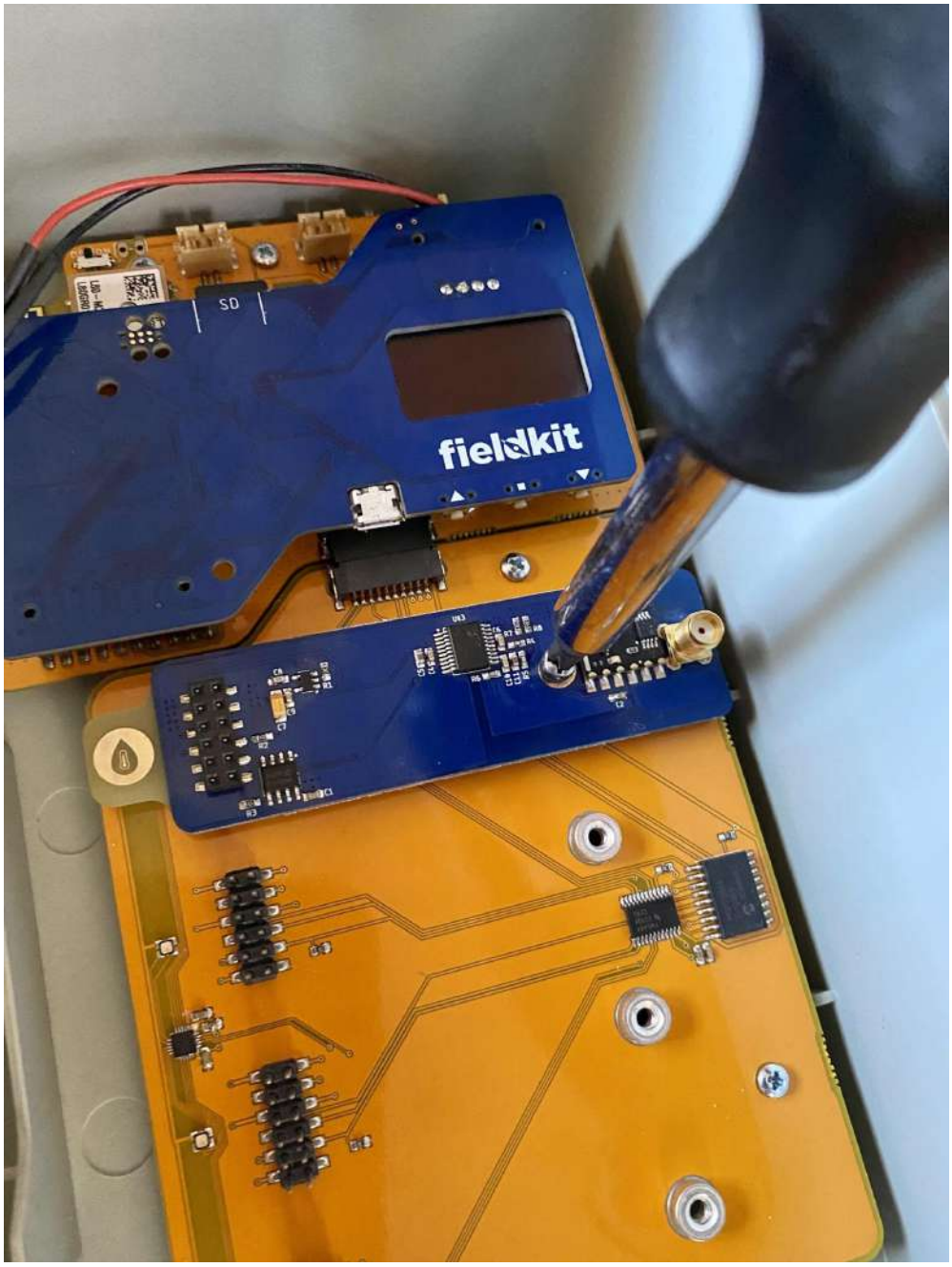
Remove Tape Circles

Remove the small transparent yellow tape circles from the standoffs where you'll attach your Module Board(s) to the Module Base.



Line Up and Press Down

Line up the Module Board with the pins on one of the bays on the Module Base. Carefully press down the Module Board into place over the pins, applying gentle, even pressure.



Screw Down the Module Board

Secure it down with the included screws (in the packet marked ‘Module Board Screws’). Repeat with all Module Boards.

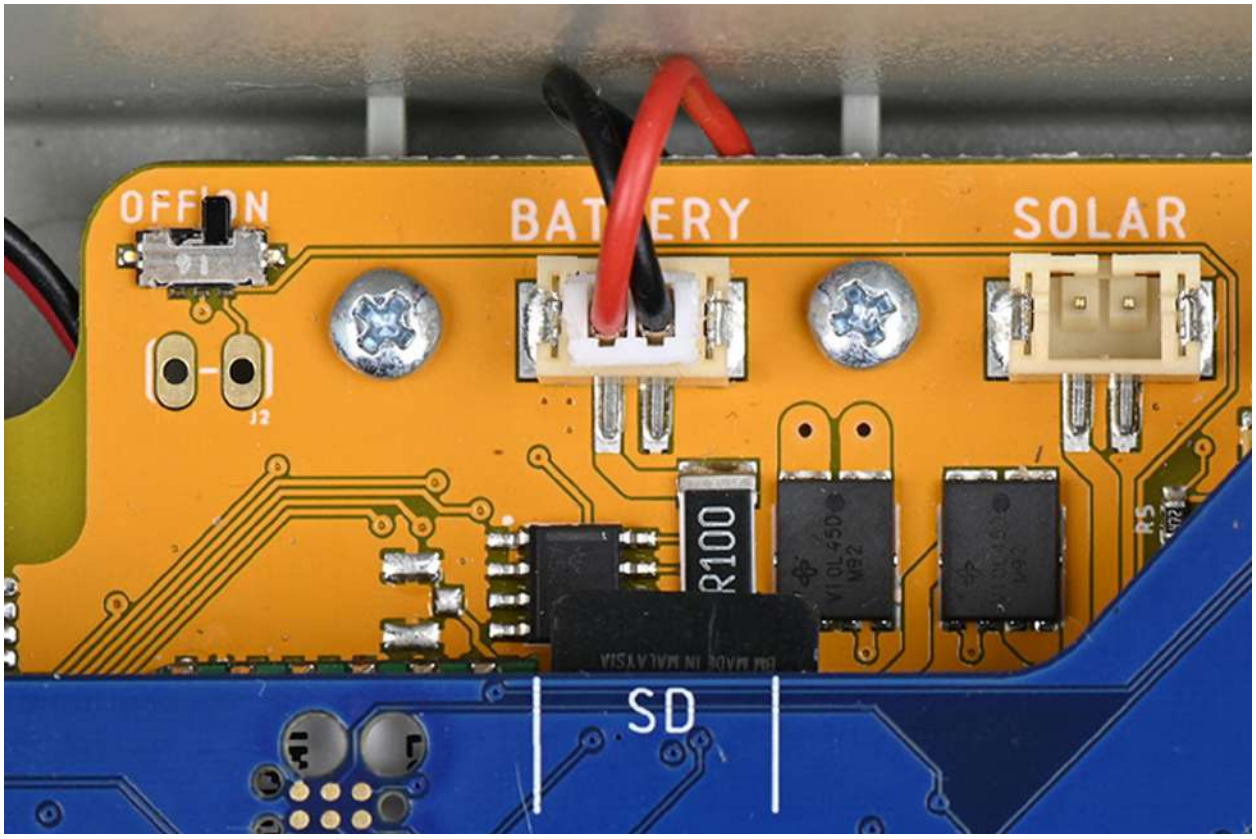
7. Attach Battery

We've designed the FieldKit Case with a battery holder to store the Battery.

Warning: Before inserting the battery, solar and button cables, double check that you are connecting them to the correct sockets (labeled "BATTERY", "SOLAR" and "BTN"). Inserting cables into the wrong sockets can permanently damage your FieldKit.

Place Battery Into Battery Holder

Place your Battery into the battery holder on the left hand side of the core.



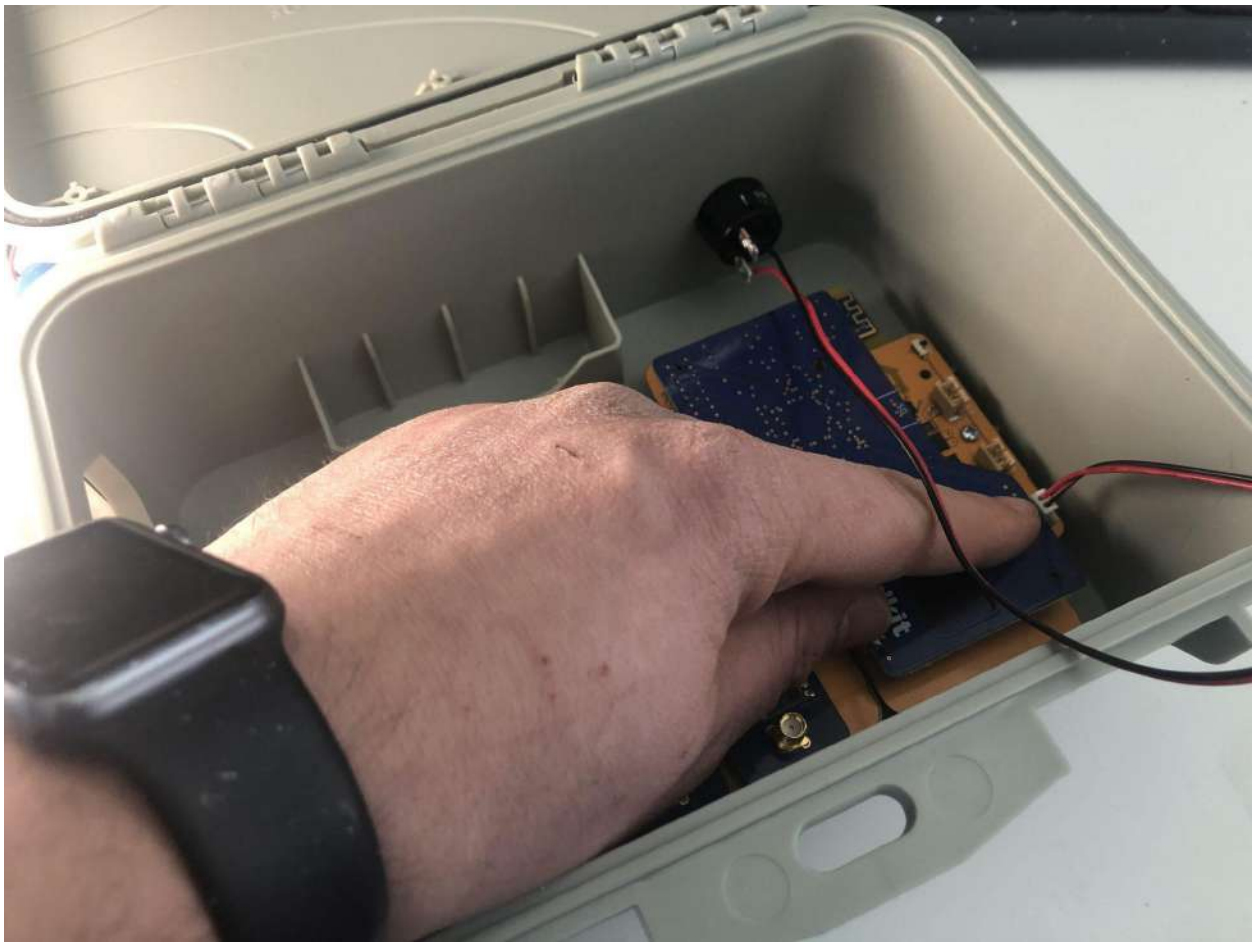
Insert Battery Cable

Insert the red and black battery cable into the socket on the top left hand side of the Upper Board where it says “BATTERY”.

8. Attach Button

Everything is better with a big button!

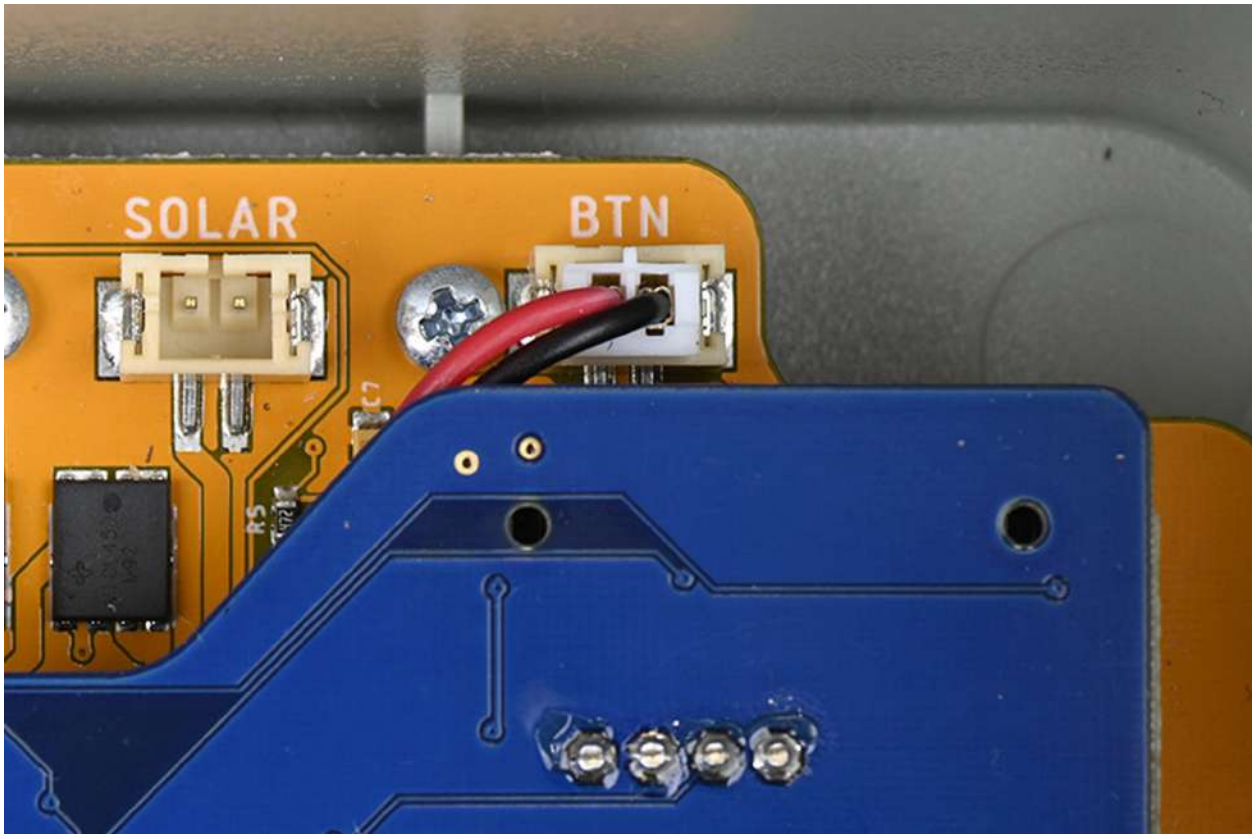
Warning: Before inserting the battery, solar and button cables, double check that you are connecting them to the correct sockets (labeled “BATTERY,” “SOLAR” and “BTN”). Inserting cables into the wrong sockets can permanently damage your FieldKit.



Locate the Button Cable

On the left hand outer wall of the Case, you’ll see a big black button. This is the Wake Button that you’ll later use to wake up the station and turn on the Station WiFi signal.

If you follow the button into the interior left hand wall of the Case, you’ll see two metal prongs with a red and black cable attached. That’s the button cable.



Insert Button Cable

Take the button cable and insert it into the socket on the top right hand side of the Upper Board where it says “BTN”.

9. Plug in Micro-USB Cable to Charge Station

Time to power up!

Locate the Micro-USB Cable

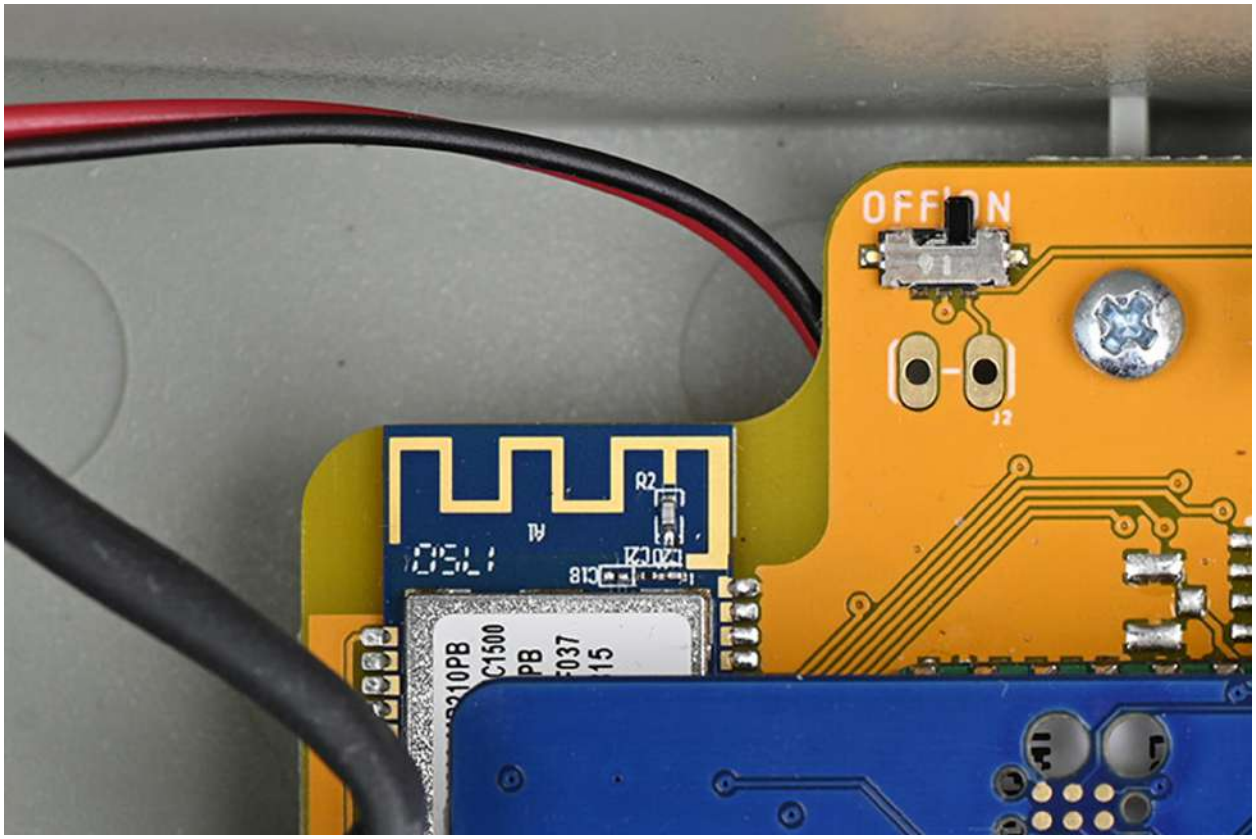
As part of your station, you'll find a black Micro-USB Cable that you will use to charge the Battery.

Plug in Cable to Charge Station

Plug in the Micro-USB cable to a power source (e.g. a USB wall charger) to start charging the Battery. Your station takes 6-12 hours to fully charge, and it should be fully charged before you deploy. It charges faster when switched off.
Important Note: If you have issues charging your station, potential culprits could be the USB charger, using a cable other than the one provided by FieldKit, or using a USB battery bank. For recommendations on what kind of charging equipment to use, please see this item in our FAQ.

10. Switch On to Connect

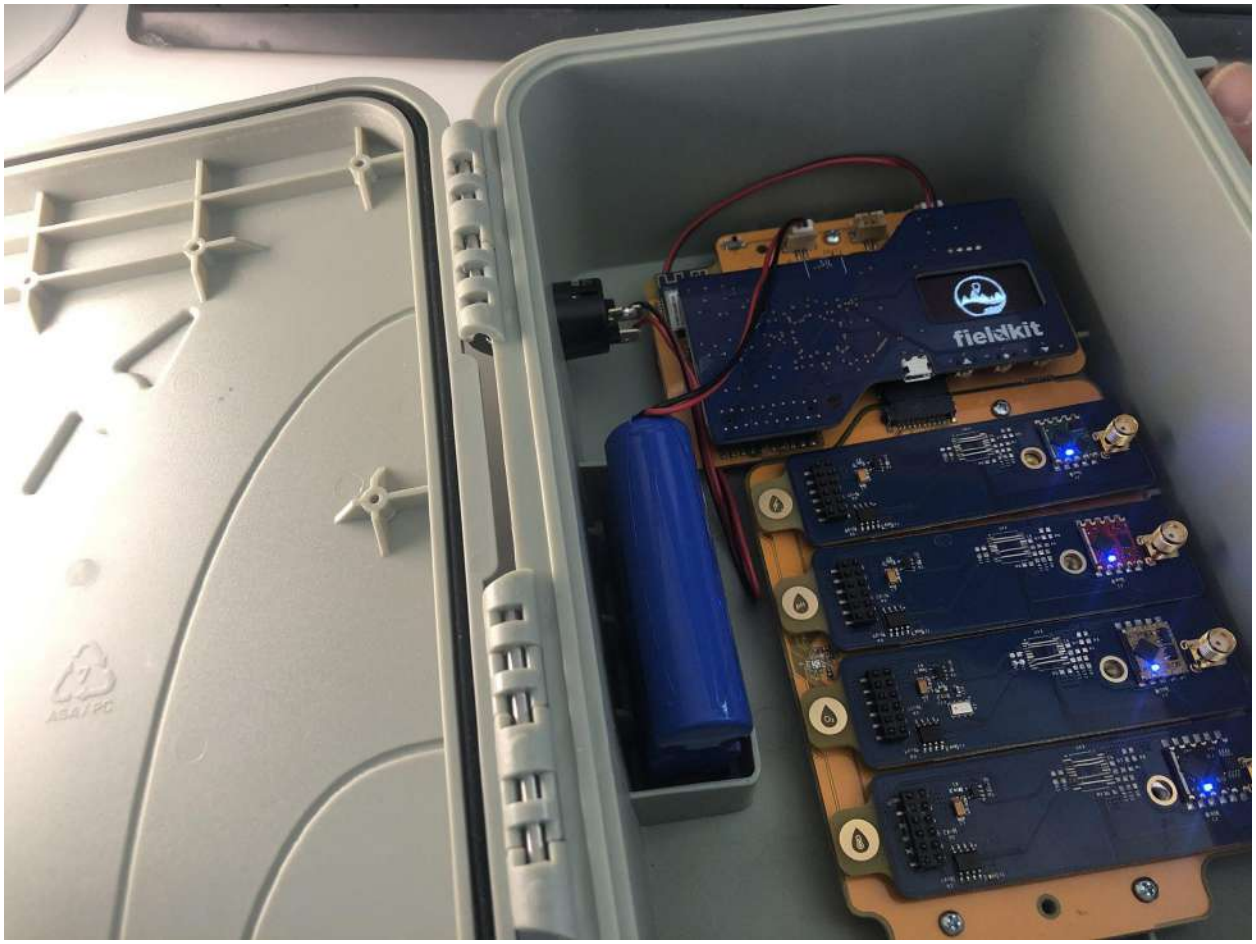
It's almost time to connect to your station!



Switch On

Flip the small switch in the top left of the Upper Board to the "ON" position, so your FieldKit station comes to life, and you're ready to connect.

You can do this with either the tip of your finger or your fingernail, or even the tip of your screwdriver.



Screen Display Turns On

Once you've turned it on, the screen display turns on and the display startup sequence begins. The Conservify logo appears briefly followed by the station name and startup diagnostics.

Once the station has successfully booted up, the display turns off. Pressing any button below the screen (or the Wake button) turns the display back on. After a period of inactivity, the display will then turn off.

Quick Tip: The system charges whether switched on or off, but having the station switched on allows you to intermittently check battery life on the station screen.

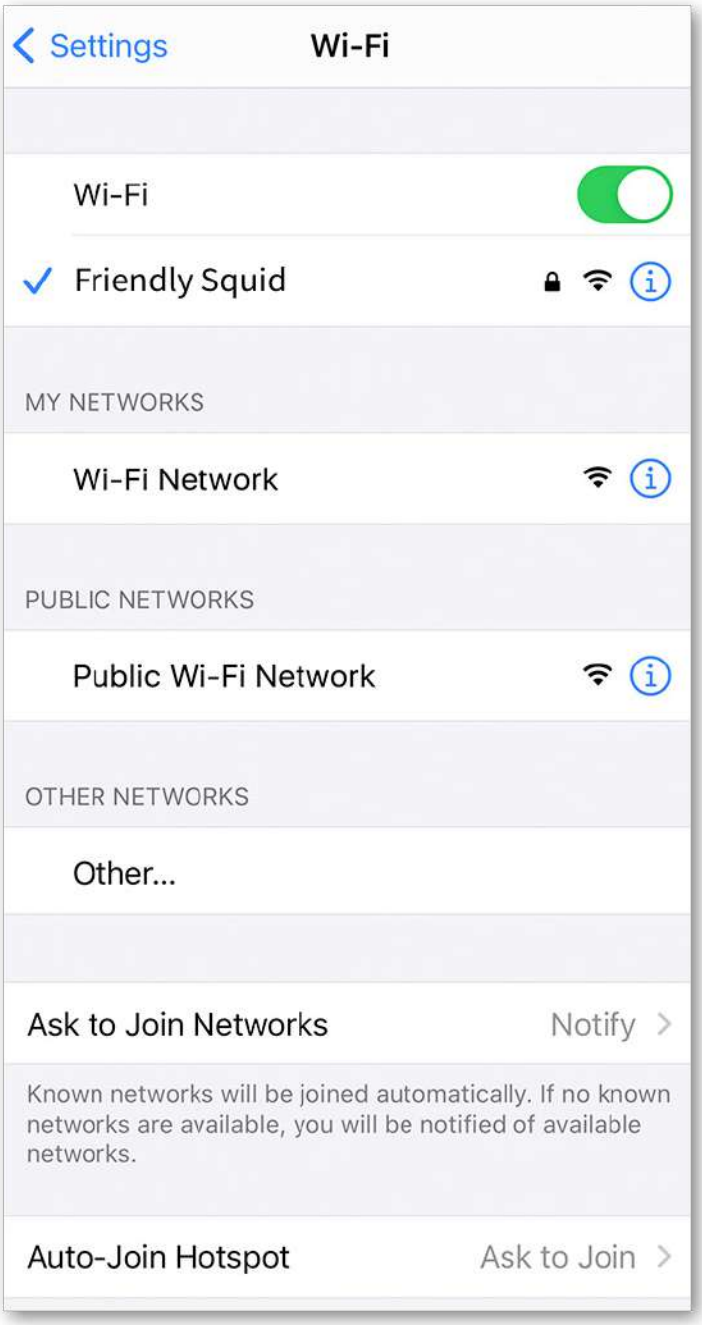
Connect Station

Connect your phone to your FieldKit station to collect and view data.

1. Turn on Station WiFi

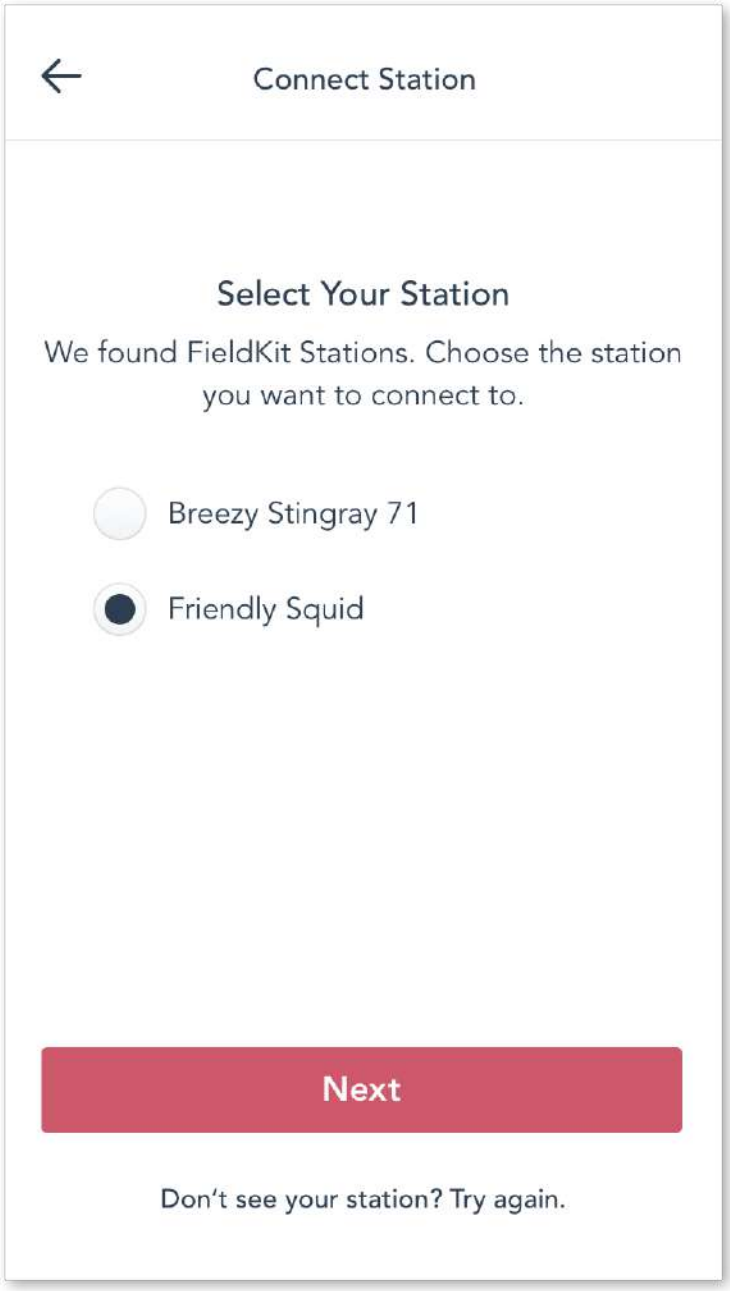
Your station has an access point with its own WiFi signal. It acts like a hotspot so you can connect to it via your mobile device and transfer data.

Press the button to enable station WiFi. WiFi can also be turned on using the menu on the Station screen. See the Station Screen Interface section for more details.



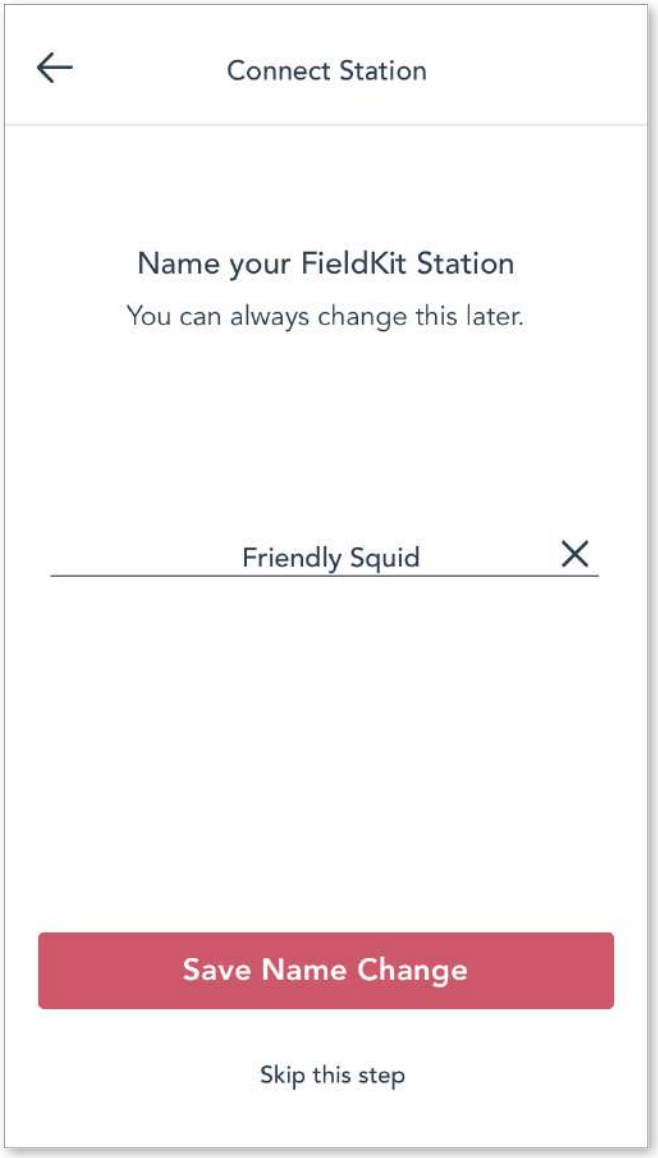
2. Connect to your Station

Go to your mobile phone WiFi settings and select the station's WiFi name displayed on the station screen. The name will default to a random combination of a descriptive adjective and a name of an animal, such as Friendly Squid or Gentle Eagle.



3. Select your Station WiFi in the App

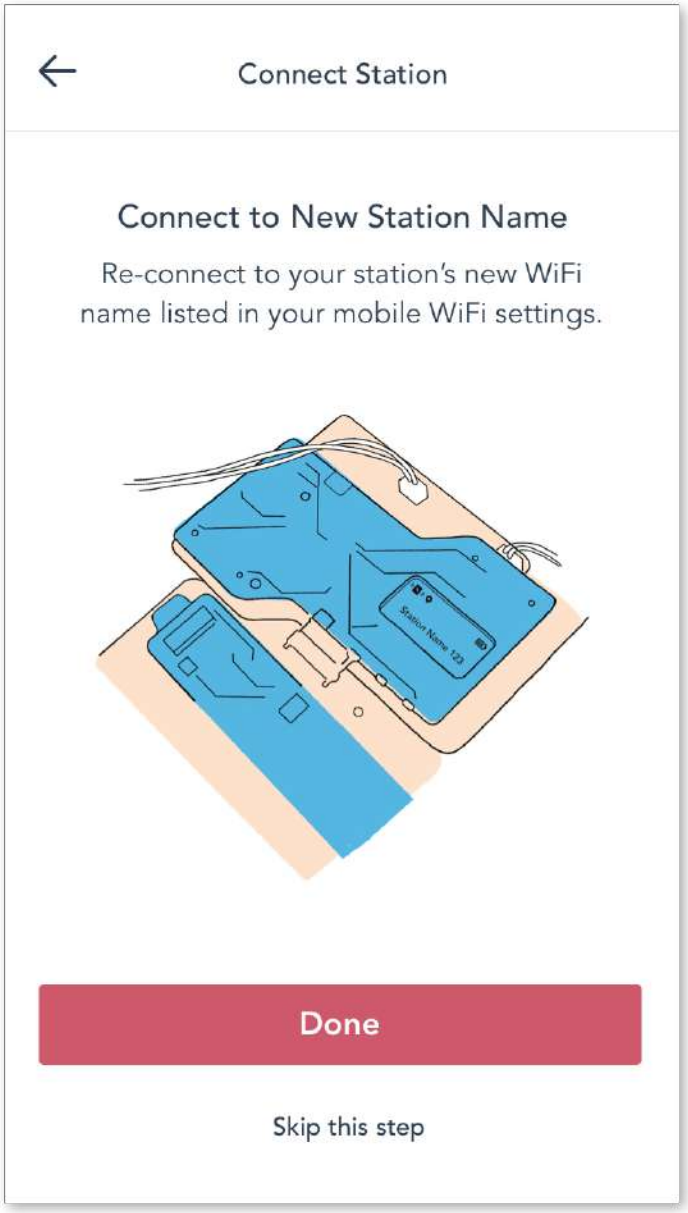
The app automatically will search for nearby FieldKit stations that have their WiFi enabled. Choose the one you are setting up (the same one as the previous step).



4. Name Station

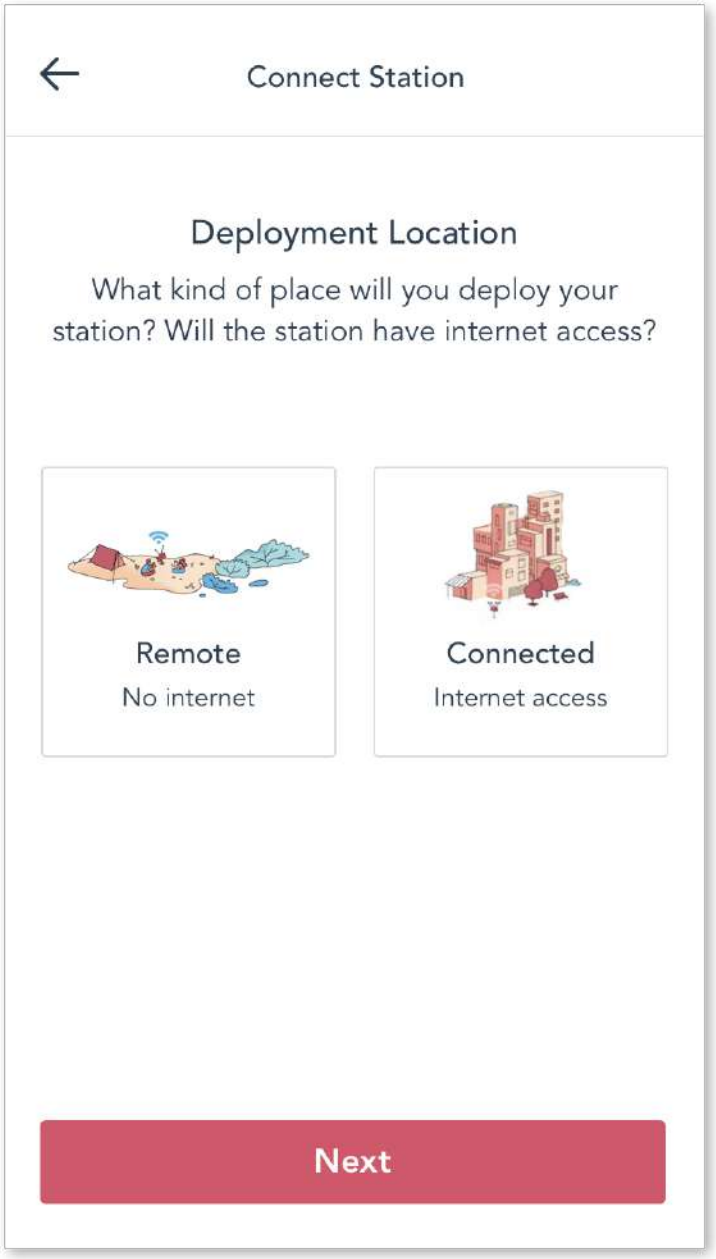
Once the app confirms that your station is connected, you can choose to name your FieldKit Station something different than the default. Providing a unique name or number for each station can help you personalize and remember each one. You can always skip this part and change your station name later.

Changing your station name will change the Station WiFi name *immediately* in your phone's WiFi settings, and *upon restart of the station and enablement of the Station WiFi* on your station screen.



5. Connect to New Station Name

If you have renamed your station, re-connect to your station's new WiFi name as listed in your phone's WiFi settings.



6. Choose WiFi Settings based on your Deployment Location

Choose how to connect and sync data based on your deployment location (you can always update this later in **Settings**). Think about where you will deploy. Will the station have internet access?

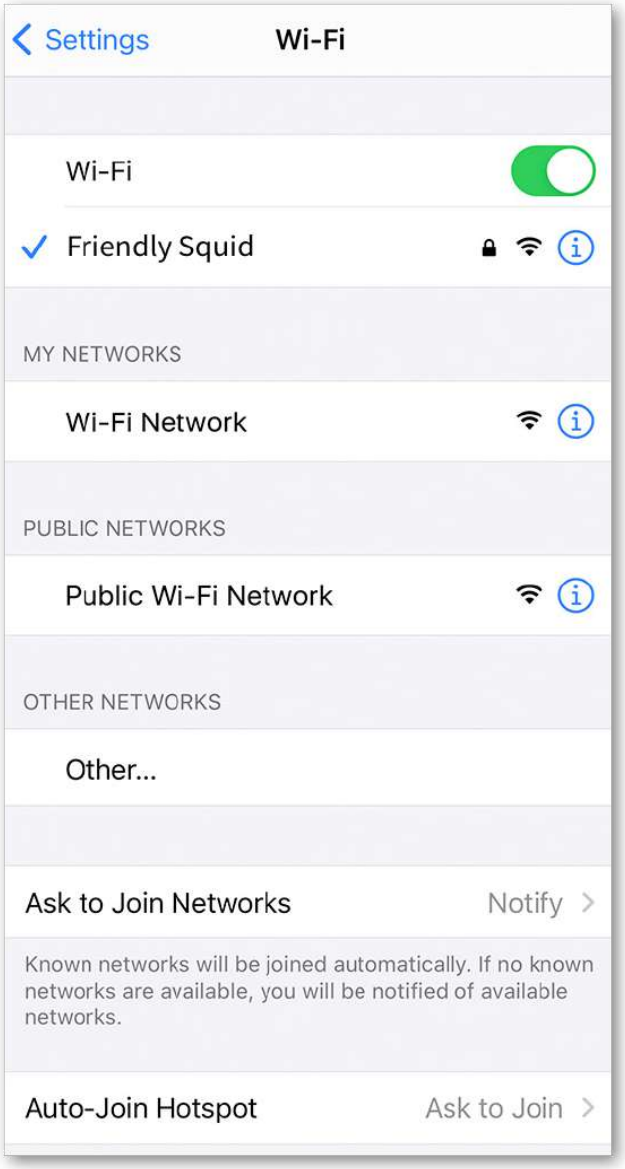
Remote Location (No Internet) → Station WiFi (Access point)

For a remote location with limited internet access, we recommend using the Station WiFi. This option syncs station data to your phone only. When you have an internet connection later, you can then use your phone to upload it to the FieldKit web portal.

Connected Location (Internet Access) → WiFi Network (Internet)

For connected locations with internet access, we recommend adding a list of preferred WiFi networks to sync station data straight to the FieldKit web portal. If the station is unable to join these networks, it will use its Station WiFi as a fallback.

Important Note: The WiFi name and password are case sensitive.



7. Connecting in the Future

If returning to a station after days, weeks or months, the FieldKit app should be able to detect the Station WiFi and connect automatically. In situations where the mobile app and station do not auto-detect one another, open up your phone's WiFi settings to reconnect. For more information on this, see the Sync Data section.

Quick Tip: In Station Settings > Networks > WiFi > Upload Schedule you can enable Station WiFi to be "Always On" by setting a data upload schedule for your station to upload data straight to the web portal (bypassing the app). Enabling "Always On" only works for stations that are plugged into an external power source, rather than using the battery alone or in conjunction with a solar panel.

Assemble Cable Plate

Cable Plate assembly depends on your sensor and power configuration.

The Cable Plate Pack is designed to fit onto the FieldKit Case, and includes a plastic Cable Plate with custom glands and cable inserts, allowing specific configurations of cables to pass into the case. The Cable Plate best suited for your needs will depend on your intended sensor and power configuration, therefore don't worry if your glands don't look exactly like the images below.

This process can be pretty involved, so you might choose to do this as part of the next step, sensor module setup, or at the very end of station setup. Either way, you can complete the steps in this section when it makes sense for you. Ensure your FieldKit Core is screwed into the case before beginning cable plate installation.

Confused about cable plate configurations? Check out this table.

Quick Tip: Note that when assembling the Cable Plate, the gland for the power cables (if used) generally goes on the left side of the plate and the gland for the sensor cables goes on the right.

1. Take your Components

Collect your gland components.

2. Remove Insert

Remove the front cap on the gland and remove the insert. For glands with a free floating insert, skip this step. Additionally, you will not need to remove nor modify the insert in the 1 CAT5 cable plate gland used with the FieldKit weather module, so you may disregard steps 3, 4, and 6 below in that case.

Important Note: If your gland came with a multi-hole insert, also look inside the gland and remove the large ring-shaped insert that comes inside. If you have issues fitting the multi-hole insert into the gland, this additional ring-shaped insert is likely the culprit.

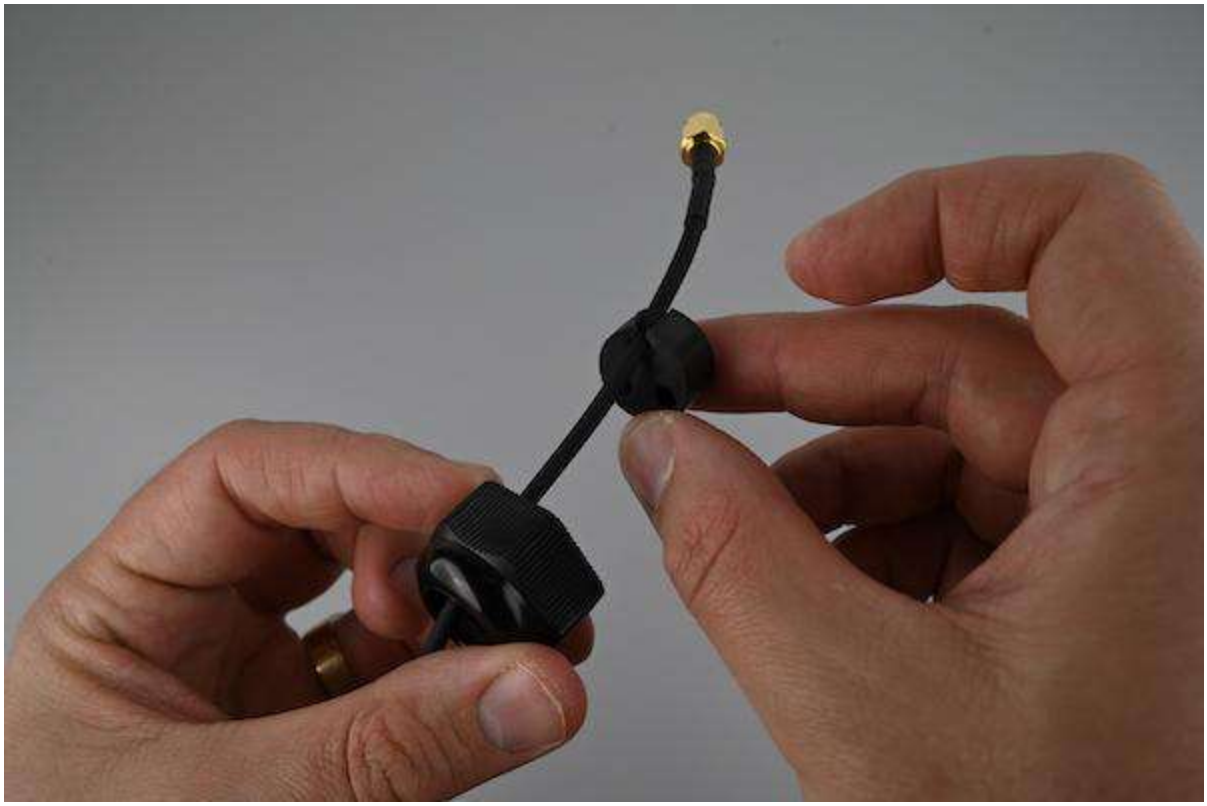
3. Cut Slit in Insert

The cable connector is too wide to thread through the diameter of the insert hole. Therefore, you'll have to cut a slit next to each insert hole to provide a way for the cable body (the thinner part) to slot in from the side.

Using scissors or a box cutter knife, carefully cut a slit that runs from the outside of the insert to the outer edge of the hole for each cable. Please take appropriate safety measures.

4. Thread Cable through Cap

Run the cable connector that plugs into the module board through the front cap (front to back).



5. Slot Cable into Insert

On the far side of the cap, slot the cable into the insert hole sideways using the slit you've just cut.

Repeat steps 3-5 as necessary for all cables going through that insert.

6. Add Insert to Gland

Now that the insert is attached to the cables, thread them into the gland body, front to back, so they exit the locking nut.

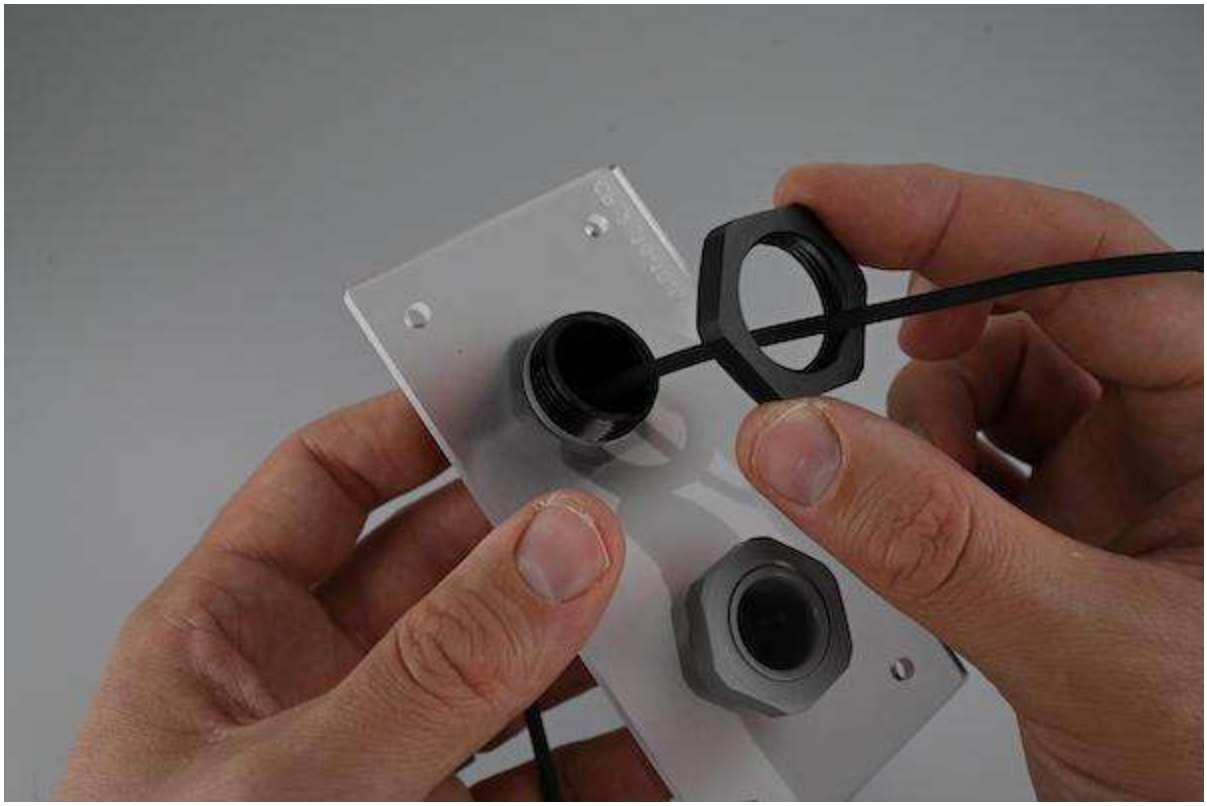
7. Secure Insert

Softly screw on the front cap to hold the insert loosely in place.

8. Set Gland into Cable Plate

Remove the locking nut from the back of the gland, insert the threaded side of the gland into the cable plate hole.

Note that when assembling the Cable Plate, the gland for the power cables (if used) generally goes on the left side of the plate and the gland for the sensor cables goes on the right.



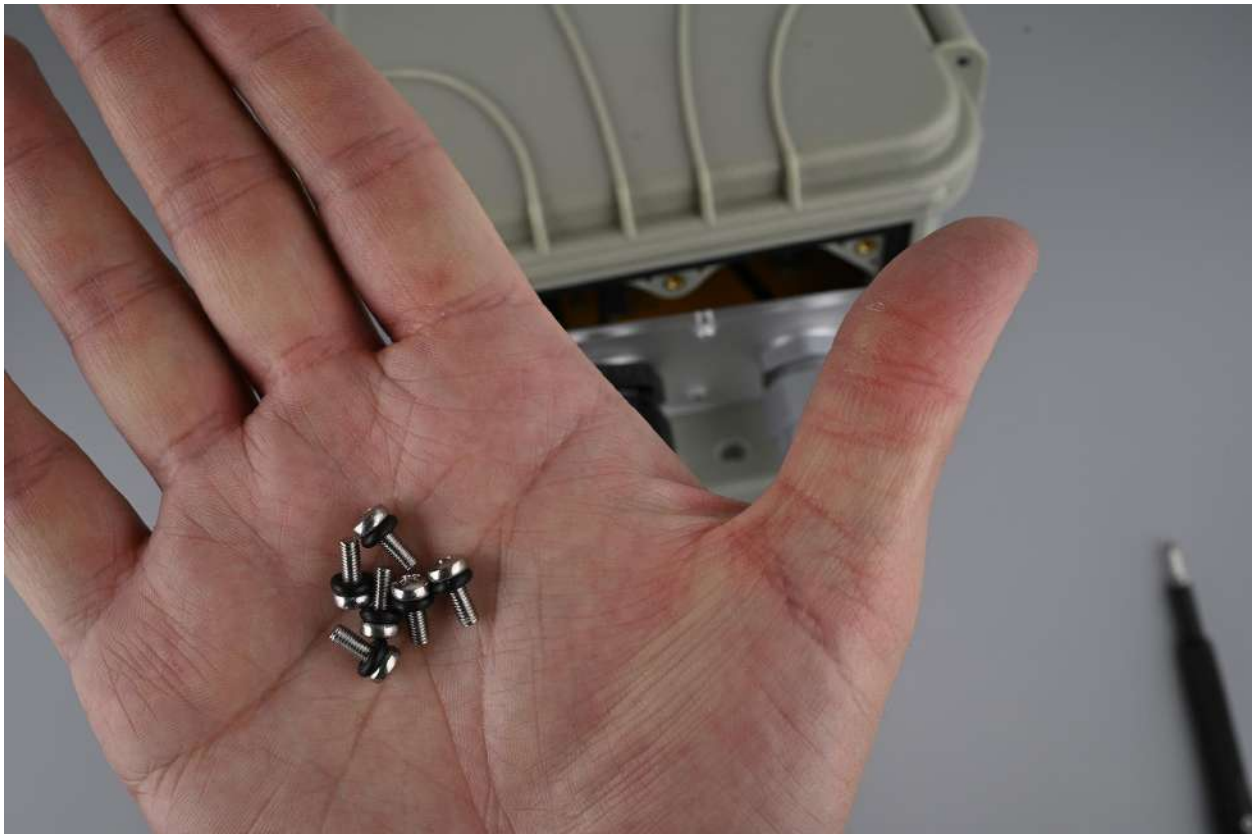
9. Lock Gland into Place

Replace the locking nut, tightening until it stops.

Repeat the above steps as necessary for all glands.

10. Position Cable Plate

Once all your cables with inserts are in their respective glands and attached to the cable plate, you're ready to screw your cable plate into place on your case by tightening the locking nut back into place.



11. Add O-Rings to Screws

Open the packet marked ‘Cable Plate Screws’, and ensure that the included o-rings are fitted onto the cable plate screws. This provides optimal weather protection.

12. Check Gasket

Next, check that the gasket is pressed into the case groove to form a snug fit.

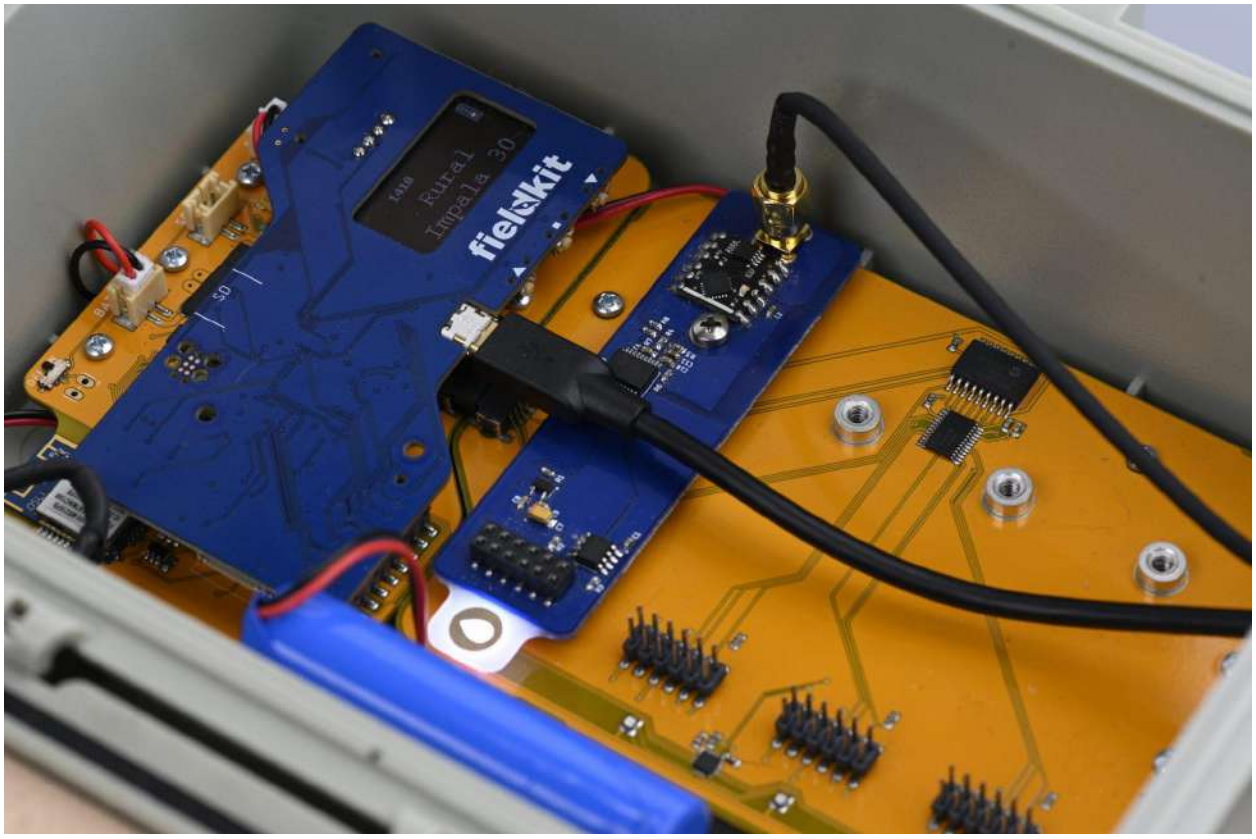
13. Screw in Cable Plate

Finally, screw your cable plate into place using the Cable Plate screws. It should be screwed in tightly, but be careful not to over-tighten the screws. The o-rings should be slightly compressed but not completely flattened.

14. Adjust Cables and Tighten Front Cap

Loosen the front cap on the gland and adjust the length of your cables so that they reach their respective connectors on the FieldKit station without too much extra slack.

Tighten the front cap on the glands until they’re snug and the cables no longer slide.



15. Double Check Cables

Regardless of assembly order (either assembling the cable plate alongside module setup, or at the very end once you're ready to deploy), be sure to follow each cable from the instrument to the module board to ensure that it is plugged into the right module board. It may be easier to run your finger along the cable to make sure you have the right one.

Optional: To improve water resistance, silicone can be used on the inserts to create a seal.

Set Up Modules

It's now time to complete the final stages of setup before deployment.

Follow the instructions in the app to assemble your Sensor Packs, plug them into your station to activate the corresponding sensor modules, and then calibrate the sensors to set a baseline for accurate readings.

You may choose to assemble your cable plate at the same time or wait until the very end of station setu

Plug in Sensor Packs to Activate Modules

FieldKit Station data is organized into sensor modules. Modules group together sensors and their data according to distinct environmental factors, e.g. weather or pH. Each module contains data from multiple sensors, which are physically located at various points across the hardware (via circuit boards or instruments). The hardware itself is packaged together and sold in the form of products called Sensor Packs.

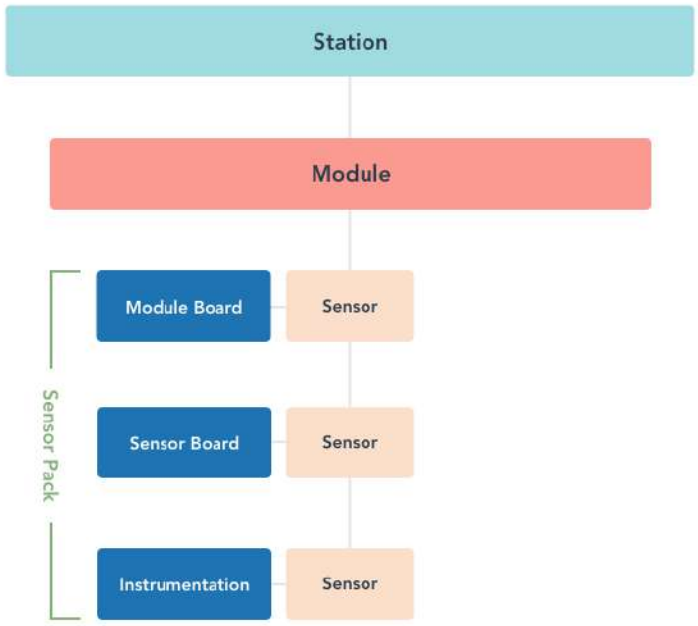


Diagram of a Station with one Module and its Sensors

After purchasing your Sensor Pack, you assemble the physical parts and plug the associated Module Board into the Core. Now the module is ready to start collecting data. At this point, that module is activated, and data enters the station's ecosystem as part of that module.

Example: *You assemble your pH Pack and look at it on your desk. It's cool but it's just a pH Pack. But then you plug it into the Core. And hey, presto! It's now a data-gathering pH Module.*

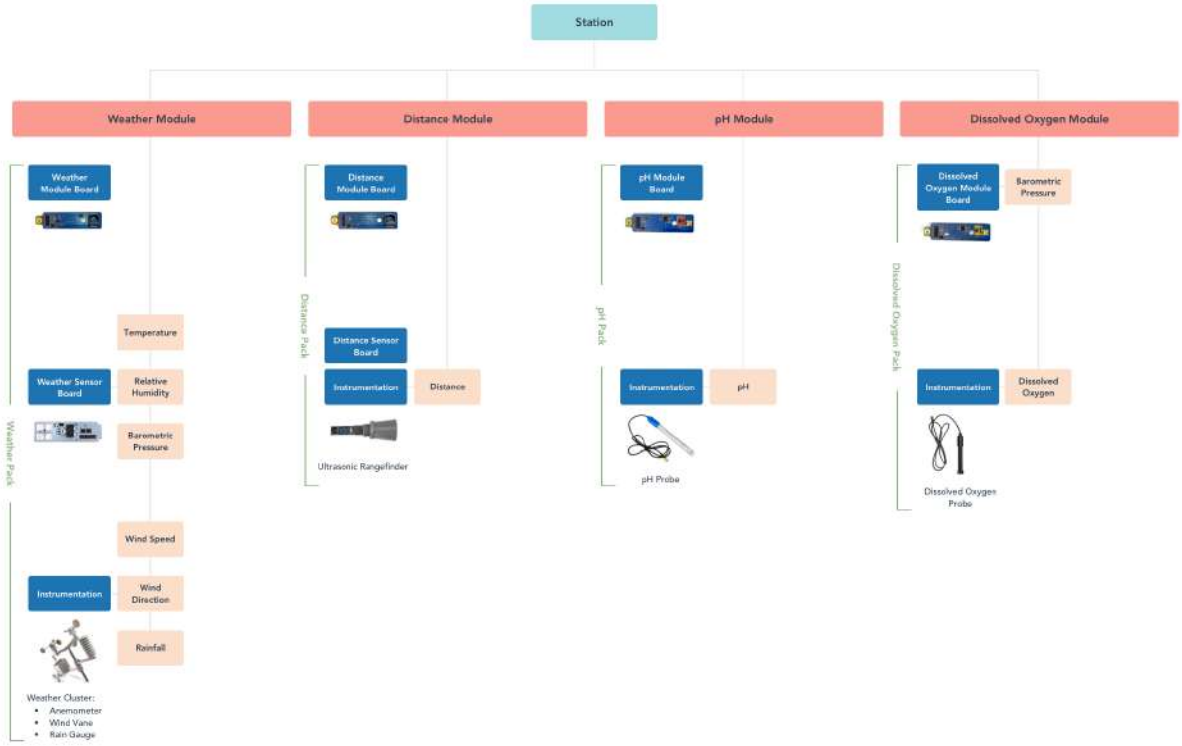


Diagram of a Station with multiple Modules and Sensors

Calibrate Sensors for Accurate Readings

What is Calibration?

Calibration is essential for accurate data readings. Modern sensors and transmitters are electronic devices, and their behaviors may drift over time due to temperature, pressure or changes in ambient conditions, resulting in inaccurate readings. Therefore, calibration is necessary to correct a sensor's baseline readings and needs to be done with all new sensors. Later on, you will likely need to recalibrate your FieldKit sensors at regular intervals to keep them accurate. Check your particular sensors for details on how often to recalibrate.

How do I do it?

For calibration, you'll need trusted calibration standards. Standards come in a few different forms (see below). In all cases, you'll use the readings that you get from your standards (the standard value) as a source of truth to correct the FieldKit sensors' baseline readings (the sensor value).

The app will guide you through the process, which follows 3 main steps:

1. Test using the following:

- FieldKit sensor
- External standard

2. Enter the standard value into the app

3. Hit "calibrate." This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

Calibration Standards

Calibration standards provide a source of truth to correct the FieldKit sensors' baseline readings and can take the form of physical quantities, standard solutions, or measurement devices. There are two main methods of calibration, each using different types of standard.

Direct Calibration

This method corrects the FieldKit sensor's baseline readings with trusted standard inputs, like solutions that have been reliably pre-mixed to a specific quantity, a calibrator that gives a known voltage, or a resistance substitution box that gives a known resistance.

Example: for pH you can use a pH 4.00 standard.

It's called a direct calibration because you take the measurement with your FieldKit sensor *directly* from the value of the reliable external standard that is also the quantity (the bottle says "pH 4.00").

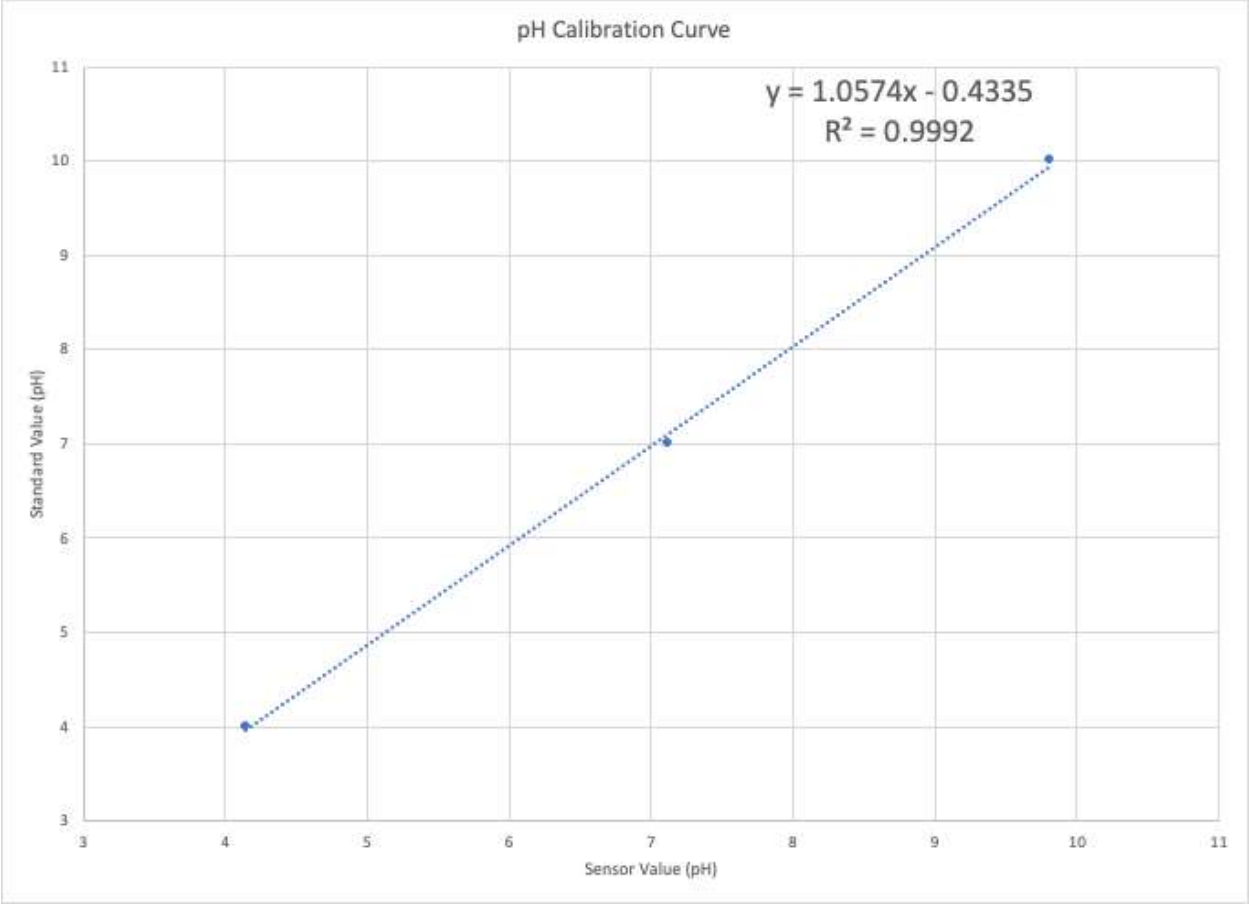
Transfer Calibration

This method corrects the FieldKit sensor's baseline readings with the readings of a separate measuring device that you already trust to be precise, known as your transfer standard. The same thing (what's known as the transfer medium) is measured by your FieldKit sensor and the external measurement device at the same time.

Example: For water temperature, you can use boiling water and a standard thermometer.

It's called a transfer calibration because the *precision* of measurement of the trusted device, or standard (e.g. the standard thermometer), is being *transferred* through simultaneous measurement of the same quantity (boiling water) to the thing being calibrated (the FieldKit sensor), which is referred to as the Device Under Test or DUT.

When doing a calibration, you're actually doing two different tasks, one after the other. The first one is known as characterization, and it's how you determine how the sensor is behaving relative to your standard. In our case, that involves taking a series of measurements, pairs of numbers we can represent like (*x, y*), where *x* is the value of the sensor, and *y* is the value of the standard. Next, we do some math to see if there's a line that will go through all of these (*x, y*) pairs, and the function that makes that line on a graph is what's known as our calibration function.



A typical calibration curve, or calibration function, in this case for pH.

Which calibration standards do I need to source?

For calibrating your FieldKit sensors, we recommend the following or equivalents. Most of these can be sourced online, while others you can find around your home or workplace:

- pH: 4.00, 7.00, and 10.00 pH standard buffer solutions
- Electrical Conductivity: 1000, 10000, and 100000 µS/cm conductivity standard solutions
- Temperature: frozen and boiling distilled water (0 and 100 °C, respectively)
- Dissolved Oxygen: Extech DO600 Dissolved Oxygen meter or equivalent, such as an aquarium DO testing kit

How often do I need to calibrate my sensors?

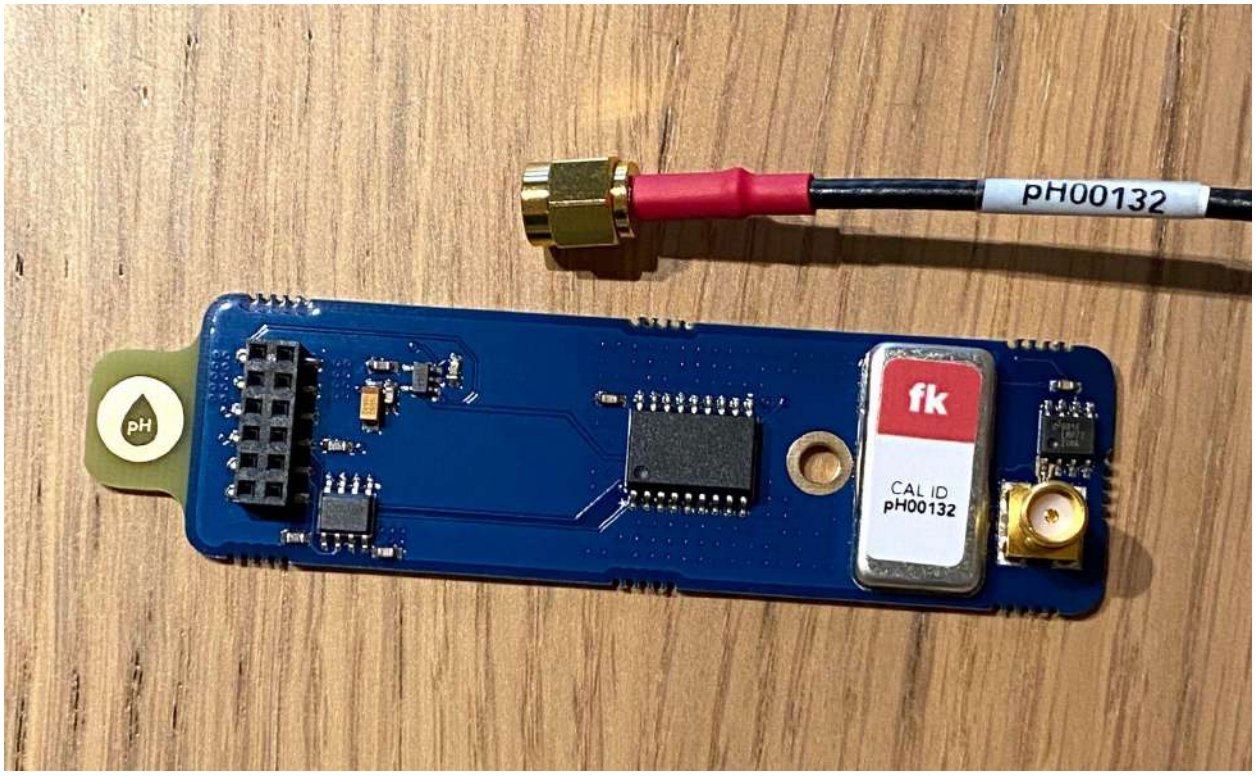
If you notice a significant, consistent drift in a certain direction, especially one that starts at an identifiable point in time (e.g. right after a big storm), that may be a sign that something has affected your sensor in the field and it's time to bring it in for recalibration. To recalibrate your sensors, you can use the same process you used for the original sensor calibration, either via the FieldKit App or the Product Guide.

pH Module Setup

Assemble pH Pack

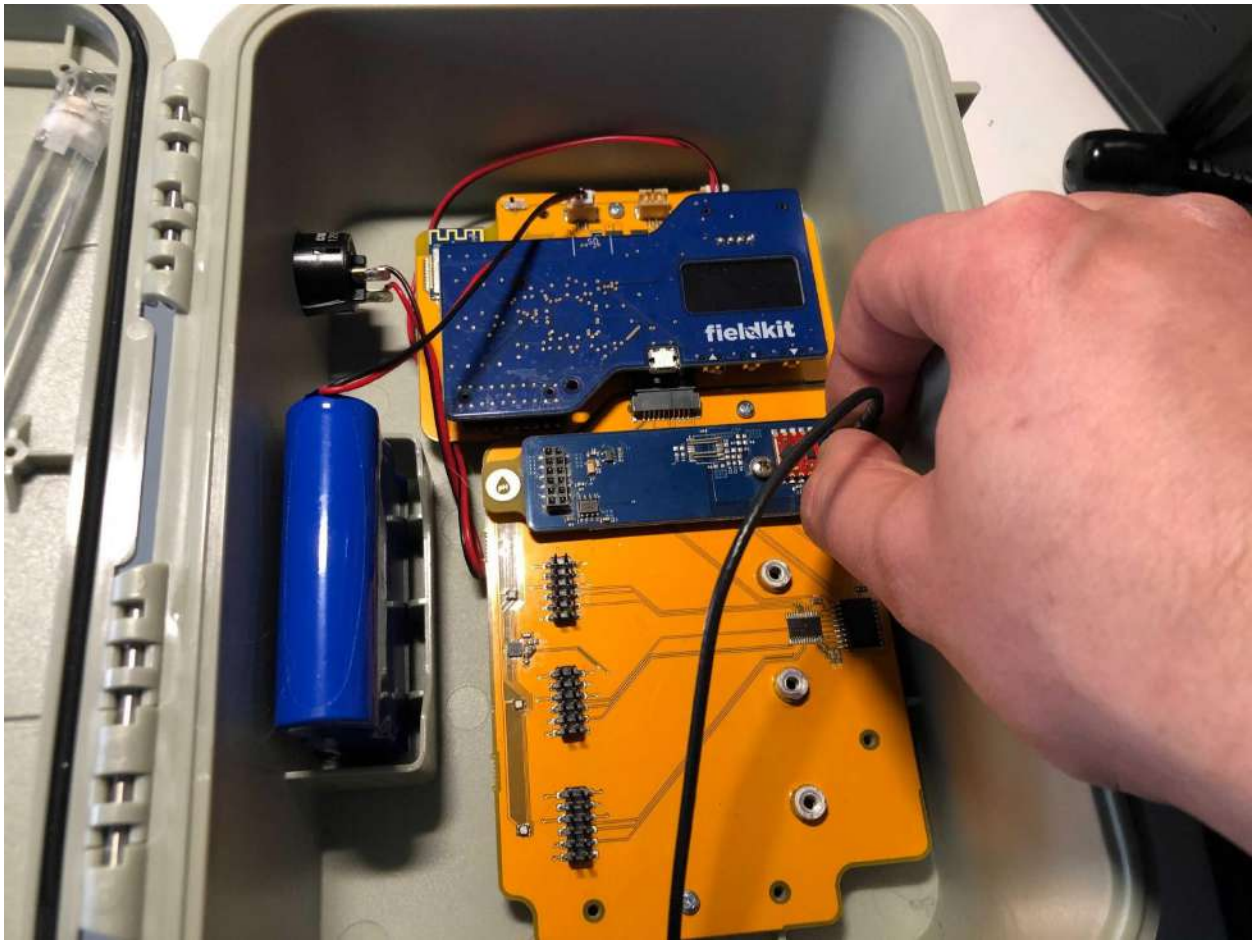
Your pH Pack consists of a pH Module Board and a pH Probe. The pH Pack components for FieldKit are color-coded red.

Important Note: Before calibration, examine your module board and probe cable for a Calibration ID (CAL ID) decal. All probe and module pairs that have the same CAL ID printed on them have been calibrated together in the lab and will not require calibration before their initial use. Additionally, if you have multiple probes of the same type, take care to match the CAL ID number on the probe cable and the module board when setting up the station (see image below). Failure to do so may result in inaccurate data and a need to recalibrate.



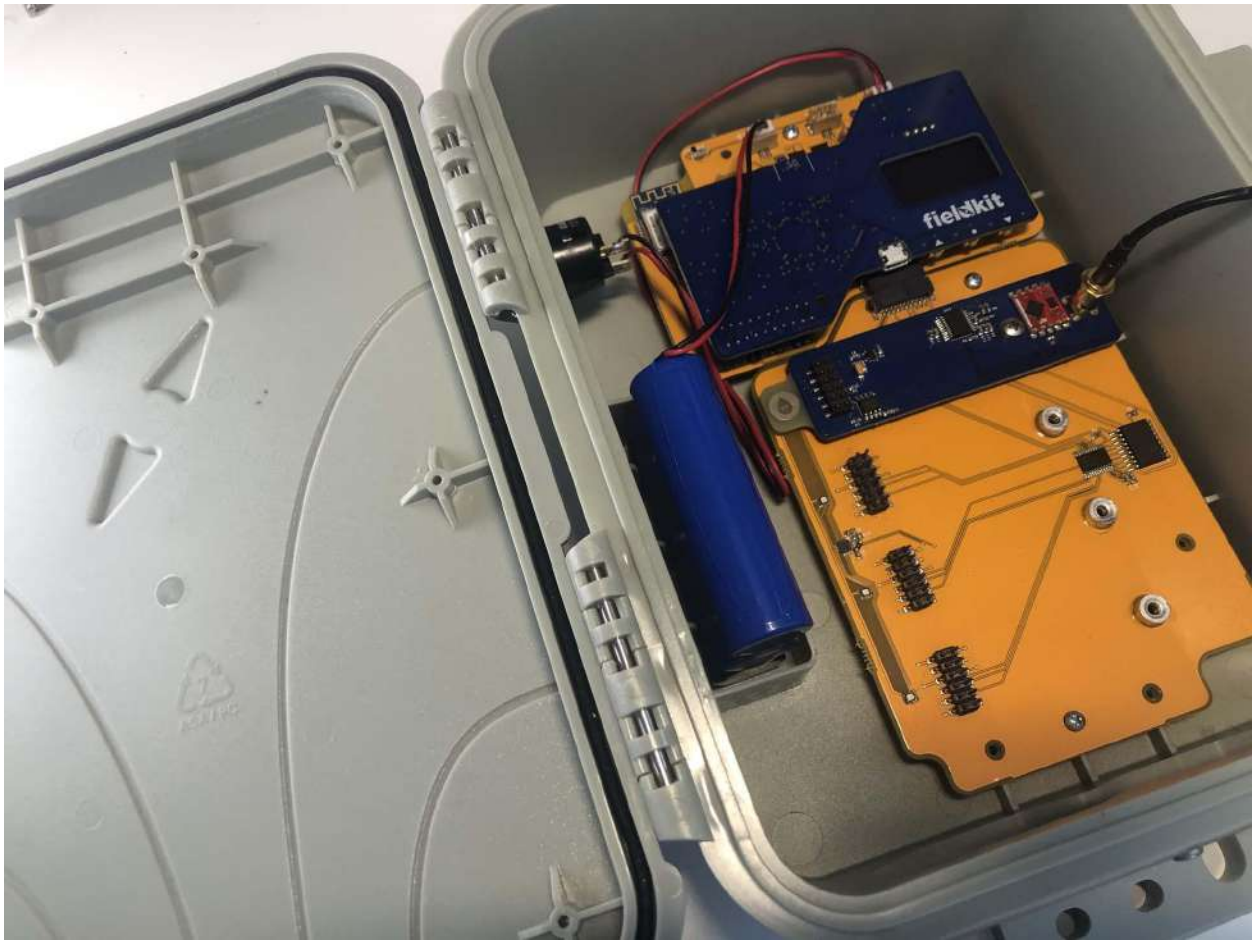
1. Do you have everything?

Collect the pH Probe. The pH Module Board should already be attached to your station.



2. Attach to Station

Screw the pH Probe cable into the pH Module Board.



3. Congratulations!

Your pH Module is now activated and ready for calibration.

Important Note: The pH Probe has an end cap containing a buffer solution that helps to maintain the life of the probe. This end cap will need to be removed when using the probe. More information on working with the pH Probe, end cap and buffer solution can be found under Water Deployments.

Calibrate pH Sensors

Calibrate the sensors on your pH module for accurate data readings.

Measuring pH

pH is a logarithmic measure of free protons (or hydrogen ions) in a given solution. Chemically, it is expressed as -log([*H*+]), which is the negative base ten logarithm of the concentration of hydrogen. This is the molar concentration, essentially what fraction of 6.02*10^23 free protons exist in one liter of solution. That means that pH is measured in -log(mol/L), but it's easier to just denote it with the leading symbol pH.

Three-point Calibration

During this calibration process, you'll enter three separate calibration points that correlate with readings from an external standard. This will take the form of three pH standard solutions in order to make certain that the probe and module board are behaving in the way that we expect them to. All three of these standard solutions are known as buffers, which means that they can be concentrated or diluted by an appreciable amount before changing their pH. This means that pH buffers can be left out for a while without having to worry about their pH changing due to evaporation. These buffers are not toxic, and can be rinsed down a drain when being disposed of.

While the order of buffers doesn't strictly matter, we normally go from low to high. Regardless, the app process will work in any order, so long as you're entering your standard values to calibrate your actual probe readings at each point.

Equipment

- pH Pack
- Cup
- 3 x pH standard solutions (we recommend pH 4.00, 7.00, and 10.00)
- De-ionized, distilled, or tap water

Important Note: If you have older pH standards, you may need to replace them. If you're not able to, or if you're reusing standards for multiple calibrations, consider using a pH meter as a standard, such as the Extech PH100 or equivalent.

1. Do you have everything?

Make sure you have 3 pH standard solutions. We recommend pH 4.00, 7.00, and 10.00.

2. Calibration Point 1

First, you'll put the probe in the first pH buffer.

a) Insert pH Probe

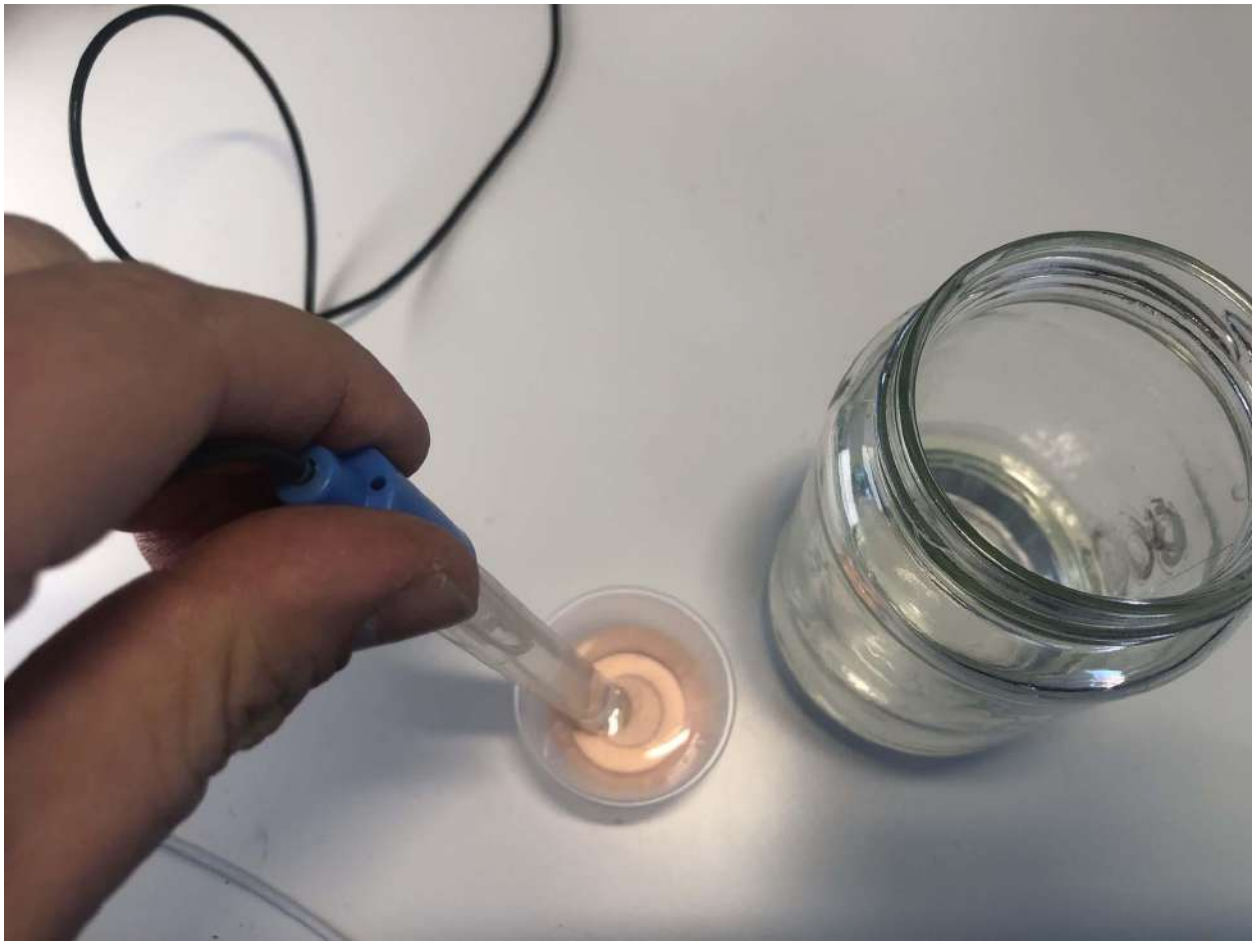
Insert the probe into a glass with at least enough pH 4.00 standard solution to completely cover the glass and electrode portion sticking out of the plastic of the pH probe.

b) Enter Standard Value as Readings Stabilize

Allow time for the reading on the pH Probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the pH standard solution into the app field. *Note: This field will be pre-populated with "pH 4.00". If yours is different, you should override it with the pH standard solution value.*

c) Success

When the timer stops, press the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.



3. Calibration Point 2

Then, you'll put the probe in the second pH buffer.

a) Rinse Off Probe

Rinse off the probe end with water. You can either use a bottle with a nozzle for this, or just dip the probe end into water.

b) Insert pH Probe

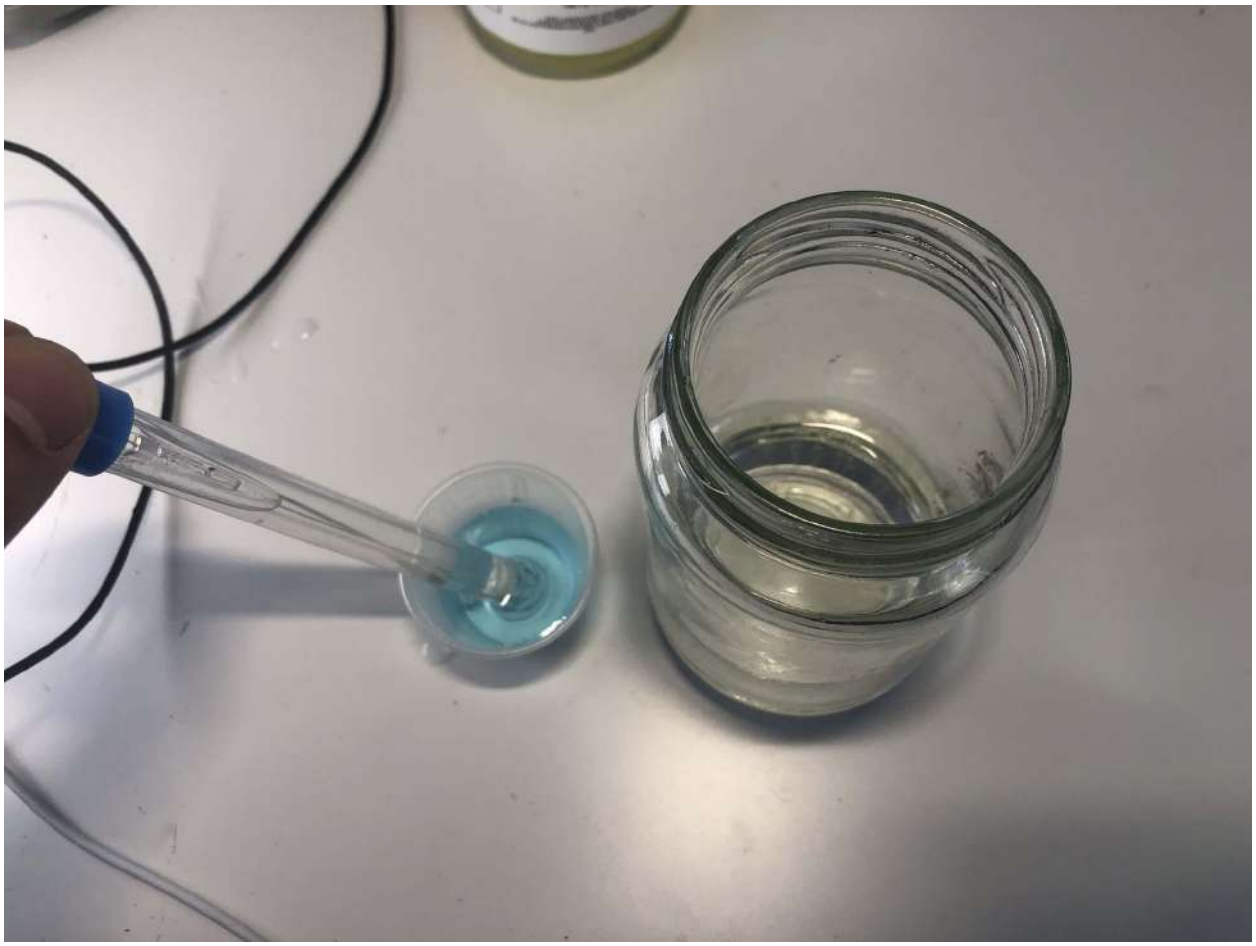
Place the pH Probe into the cup with at least enough pH 7.00 standard solution to completely cover the glass and electrode portion sticking out of the plastic of the pH probe.

c) Enter Standard Value as Readings Stabilize

Allow time for the reading on the pH Probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the pH standard solution into the app field. *Note: This field will be pre-populated with "pH 7.00". If yours is different, you should override it with the pH standard solution value.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.



4. Calibration Point 3

Finally, you'll put the probe in the third pH buffer.

a) Rinse Off Probe

Rinse off the probe end with water. You can either use a bottle with a nozzle for this, or just dip the probe end into water.

b) Insert pH Probe

Place the pH Probe into the cup with at least enough pH 10.00 standard solution to completely cover the glass and electrode portion sticking out of the plastic of the pH probe.

c) Enter Standard Value as Readings Stabilize

Allow time for the reading on the pH Probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the pH standard solution into the app field. *Note: This field will be pre-populated with "pH 10.00". If yours is different, you should override it with the pH standard solution value.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

5. Congratulations!

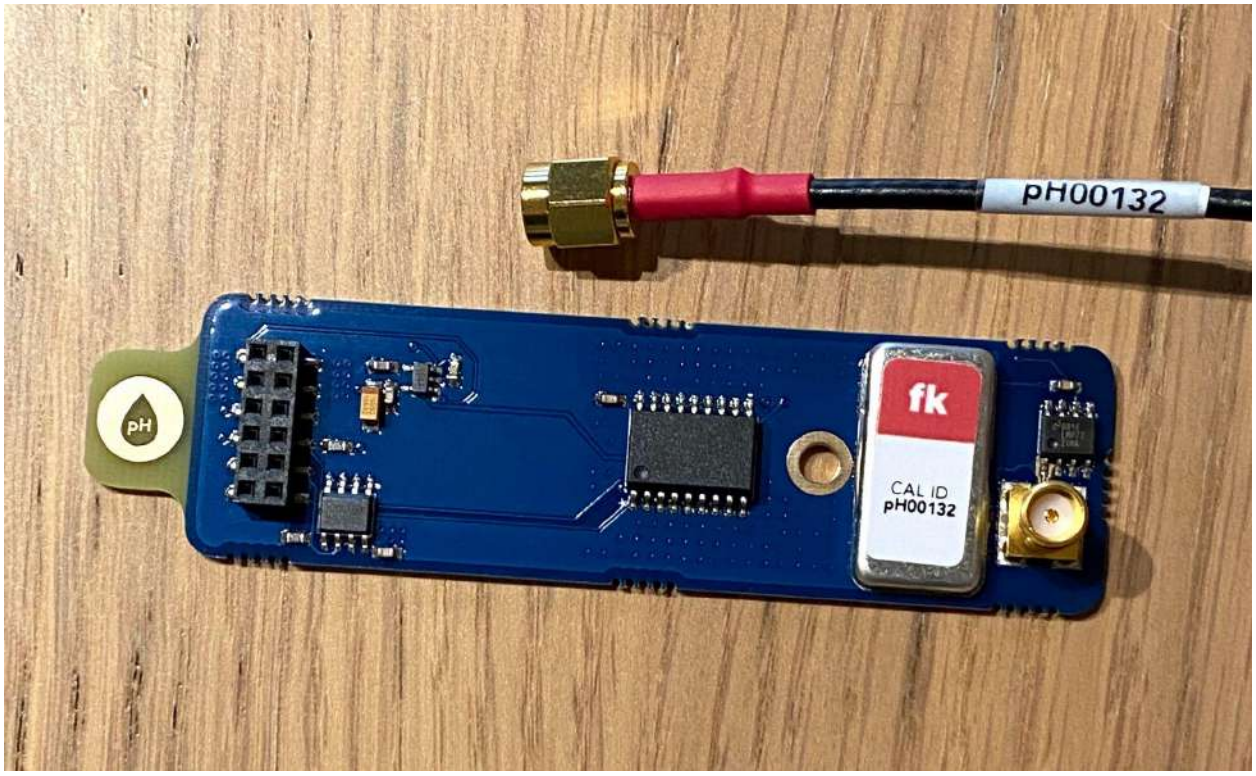
You've now completed your pH calibration.

Water Temperature Module Setup

Assemble Water Temperature Pack

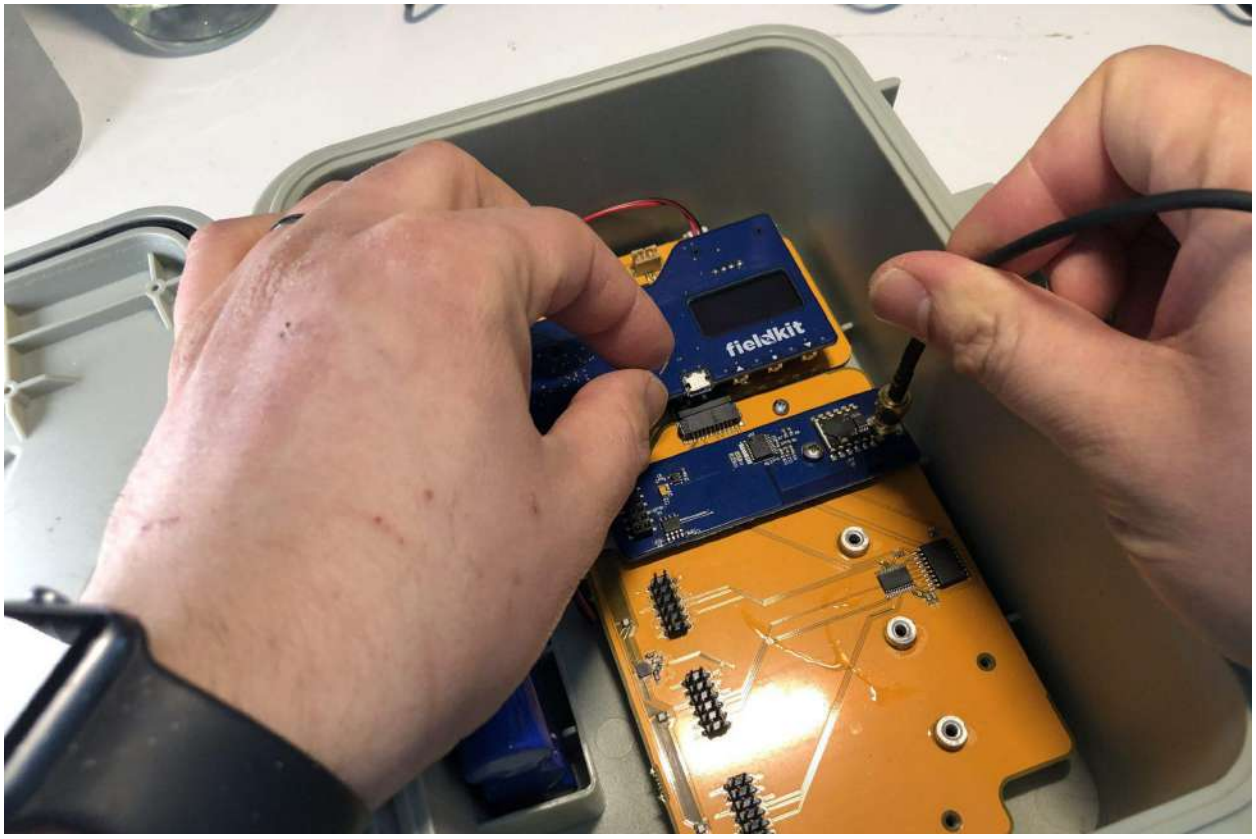
Your Water Temperature Pack consists of a Water Temperature Module Board and a Water Temperature Probe. The Water Temperature Pack components for FieldKit are color-coded black.

Important Note: Before calibration, examine your module board and probe cable for a Calibration ID (CAL ID) decal. All probe and module pairs that have the same CAL ID printed on them have been calibrated together in the lab and will not require calibration before their initial use. Additionally, if you have multiple probes of the same type, take care to match the CAL ID number on the probe cable and the module board when setting up the station (see image below). Failure to do so may result in inaccurate data and a need to recalibrate.



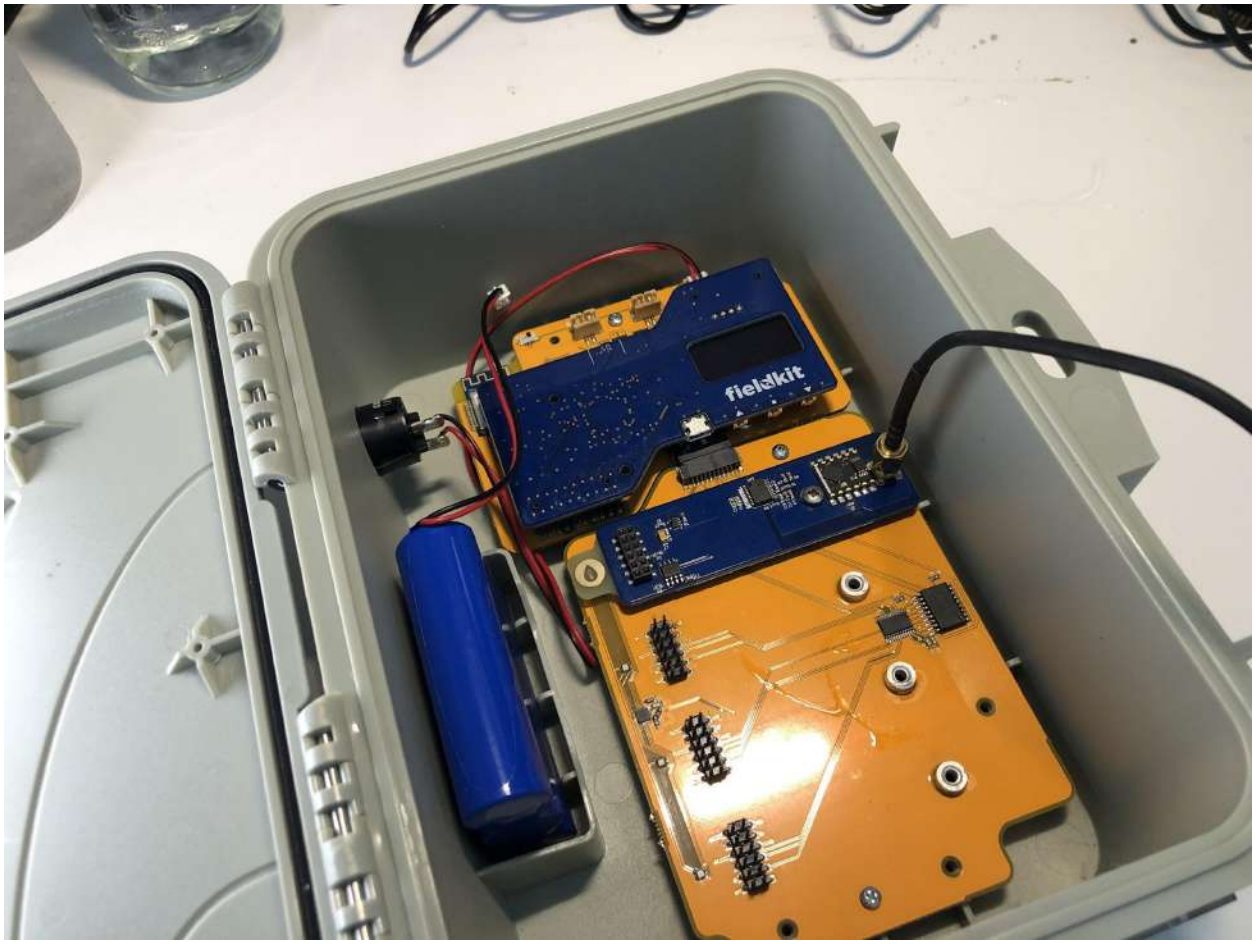
1. Do you have everything?

Collect the Water Temperature Probe. The Water Temperature Module Board should already be attached to your station.



2. Attach to Station

Screw the Water Temperature Probe cable into the Water Temperature Module Board.



3. Congratulations!

Your Water Temperature Module is now activated and ready for calibration.

Calibrate Water Temperature Sensors

Calibrate the sensors on your Water Temperature module for accurate data readings.

Measuring Temperature

Temperature is measured in degrees Celsius (°C). In this case, we're using a thermistor, which is a resistive device that changes the amount of electric current it will allow through based on the temperature at which it is operating. These have to operate in a narrow band of electric currents: too much, and you risk the thermistor self-heating and creating a measurement error; too little, and the electrical noise overwhelms our temperature signal. We calibrate to make

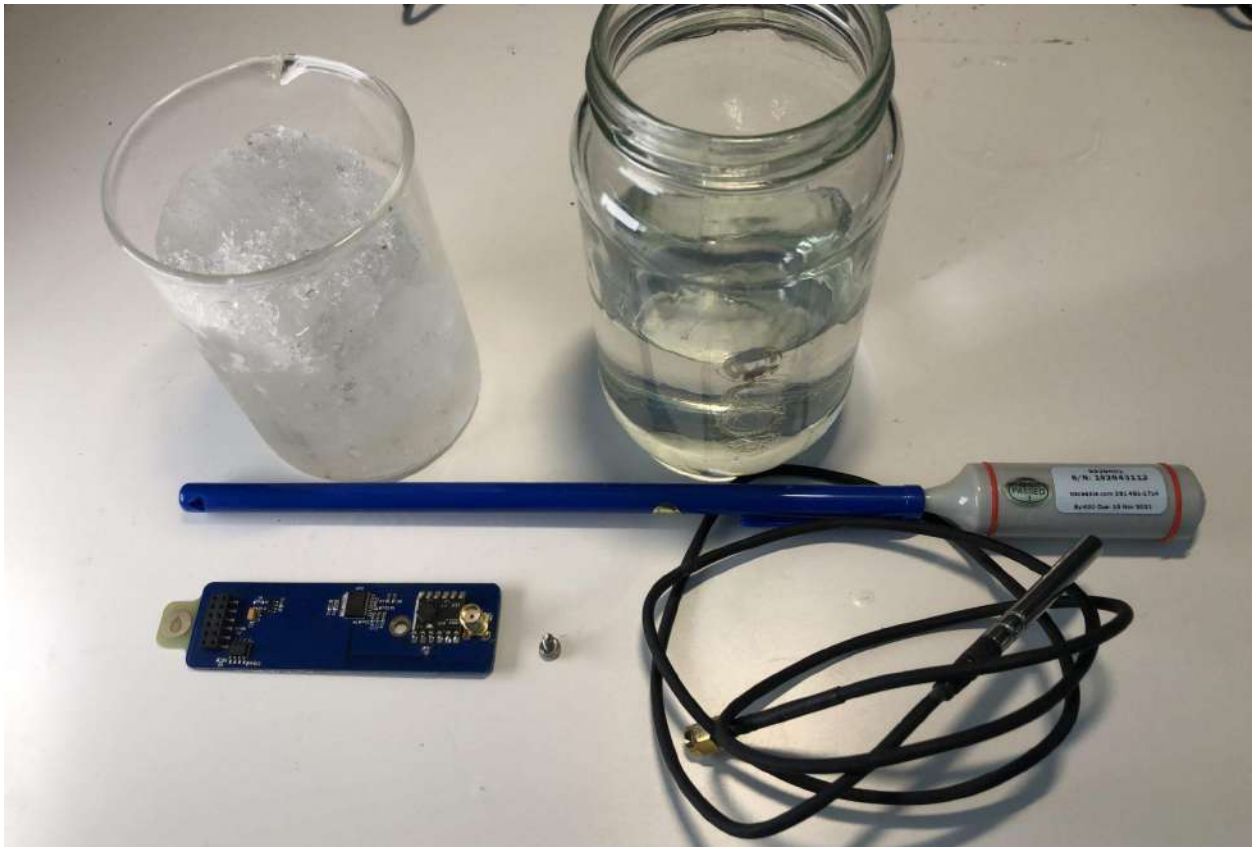
certain that the probe and module board are behaving as we expect them to in this case, and correct if they're not.

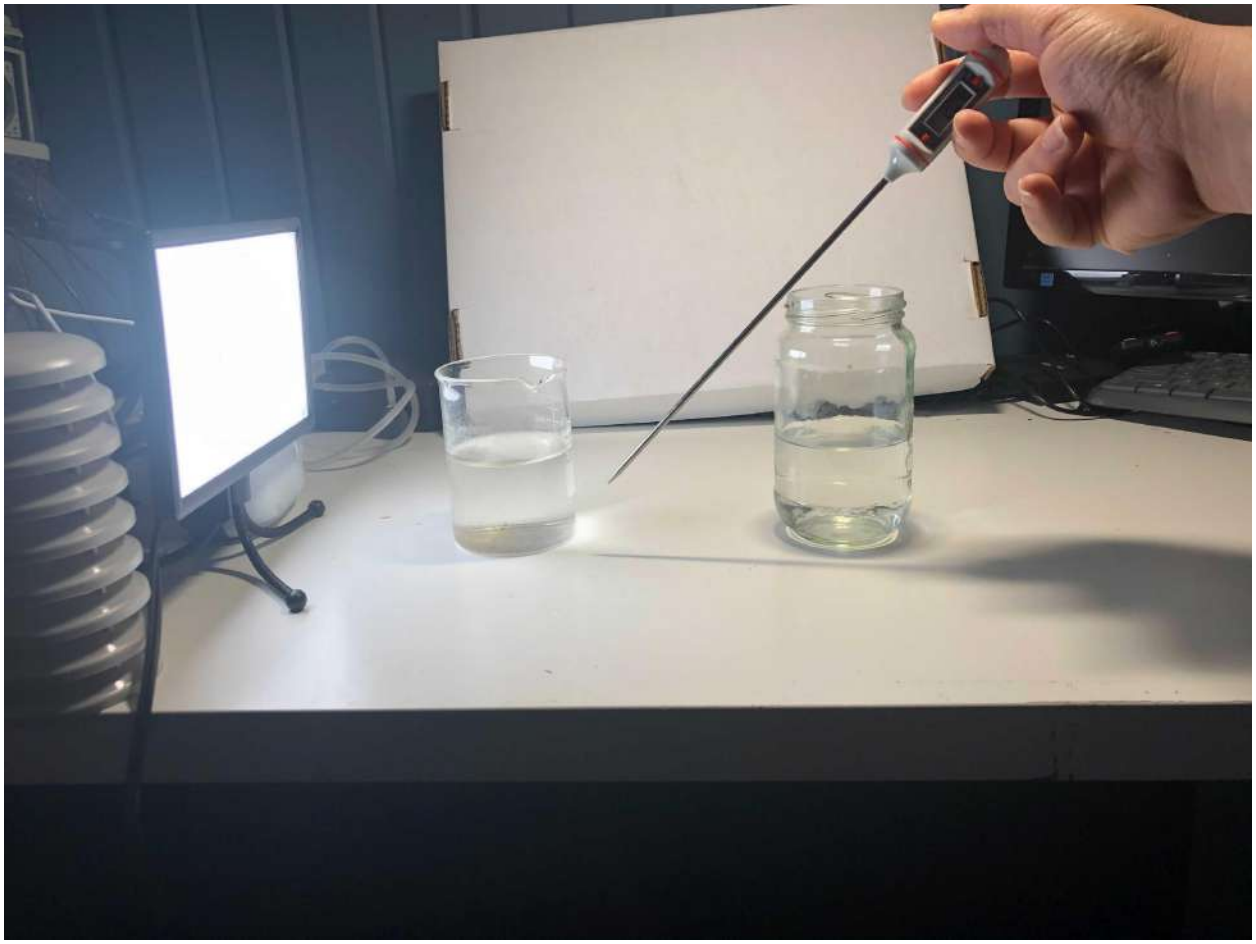
Three-Point Transfer Calibration

During this transfer calibration process, you'll enter three separate calibration points and check that they correlate with readings from an external standard. This will take the form of ice water, room temperature, and boiling water – in that order – in order to make certain that the probe and module board are behaving in the way that we expect them to.

Equipment

- Temperature Pack
- De-ionized, distilled, or tap water
- Ice
- Pot, tea kettle, or other device for boiling water
- Cup, glass or mug, capable of withstanding boiling temperatures
- Standard thermometer

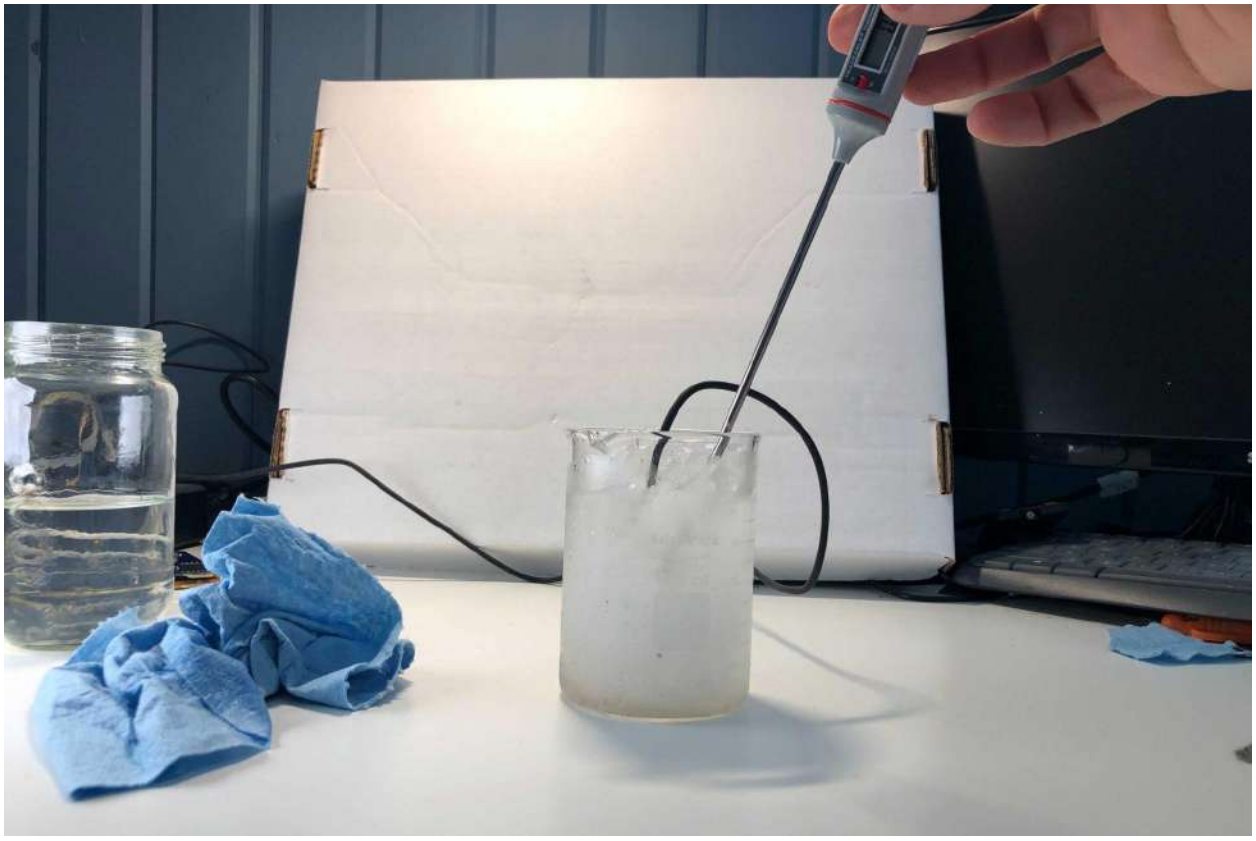




1. Do you have everything?

Make sure you have three temperature sources and a standard thermometer.

We recommend using the following sources in this order: a cup of ice water (0°C), room temperature air, and a cup of boiling water (100°C).



2. Low-Point Calibration

First, you'll measure a low temperature. Usually we'd use a physical constant. In this case it's the triple point of water, 0°C, the temperature at which water can exist as a solid, a liquid, and a gas.

a) Mix Some Ice Water

Place some ice cubes into a cup of water. Thoroughly mix it together.

b) Insert Water Temperature Probe and Standard Thermometer

Place the Water Temperature Probe and standard thermometer into the cup of ice water that's been thoroughly mixed.

c) Enter Standard Value as Readings Stabilize

Allow time for the readings on the standard thermometer to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the standard thermometer into the app field. *Note: This field will be pre-populated with "0°C". If yours is different, you should override it with the standard thermometer value.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

3. Mid-Point Calibration

Then, you'll measure an arbitrary temperature, probably between 0 and 100 °C. Usually ambient or room temperature is used for this.

a) Dry Off Probe and Standard Thermometer

Dry off the Water Temperature Probe and standard thermometer.

b) Place Water Temperature Probe and Standard Thermometer

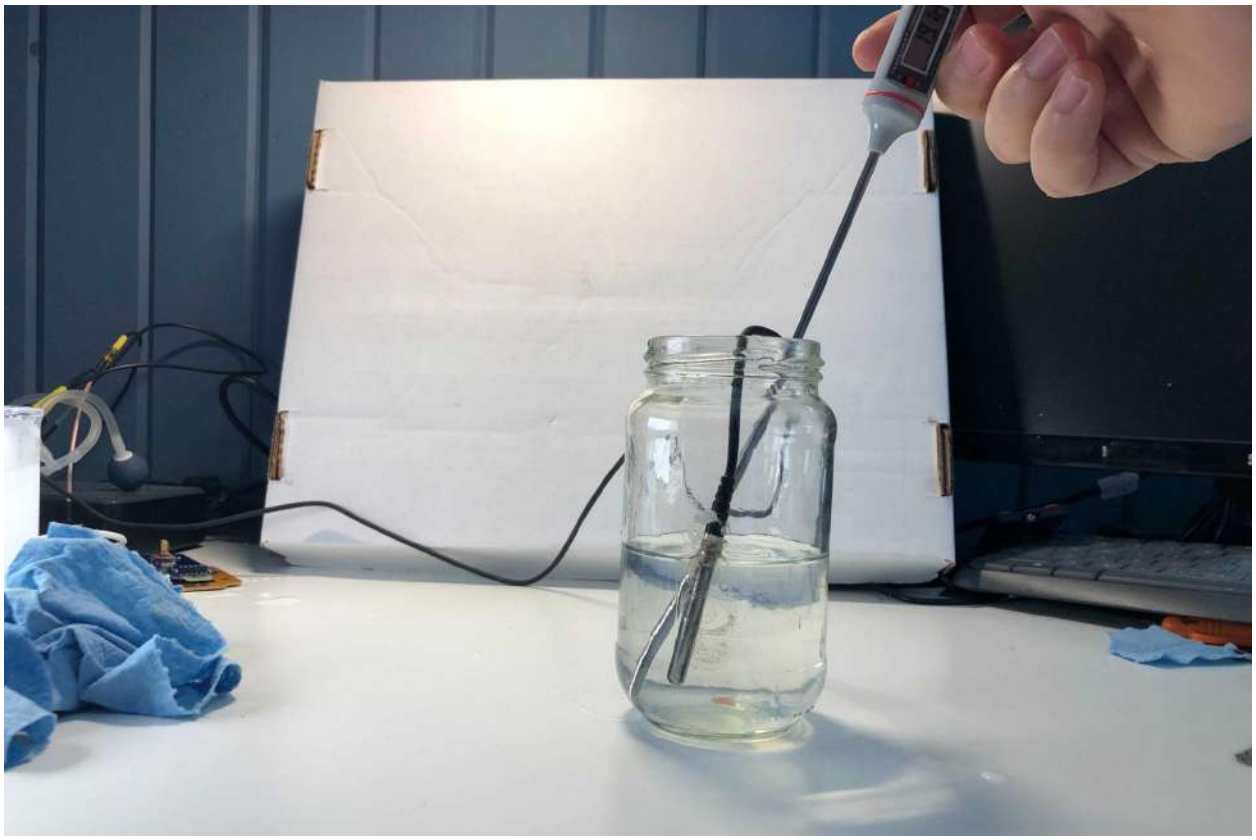
Place the standard thermometer and Water Temperature Probe in contact with one another on a dry surface. You can also put both in a container of room temperature water if this is easier.

c) Enter Standard Value as Readings Stabilize

Allow time for the readings on the standard thermometer to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the standard thermometer into the app field. *Note: This field will be pre-populated with "20°C". If yours is different, you should override it with the standard thermometer value.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.



4. High-Point Calibration

Finally, you'll use the boiling point of water as your high point for calibration. This will vary with your altitude and barometric pressure, so the 100 °C that you'd get under 100 kPa at sea level isn't necessarily what you'll see. Thus make certain to enter the temperature from your standard thermometer into the calibration temperature field in the app.

a) Boil Water

Boil some water and pour it into a cup that is capable of withstanding boiling temperatures.

b) Rinse Off Probe

Rinse off the probe end with water. You can either use a bottle with a nozzle for this, or just dip the probe end into water.

c) Insert Water Temperature Probe and Standard Thermometer

Place the Water Temperature Probe and standard thermometer into the cup of boiling water.

d) Enter Standard Value as Readings Stabilize

Allow time for the readings on the standard thermometer to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the standard thermometer into the app field. *Note: This field will be pre-populated with "100°C". If yours is different, you should override it with the standard thermometer value.*

e) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

5. Congratulations!

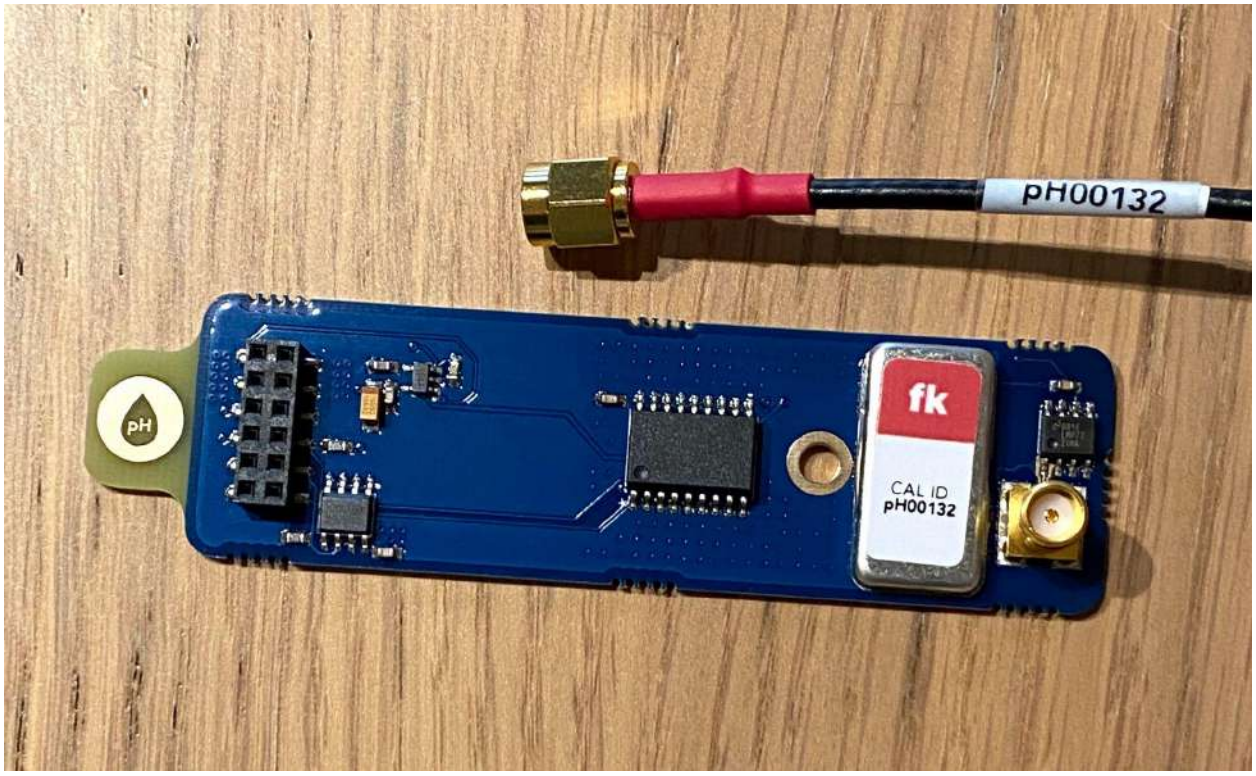
You've now completed your water temperature calibration.

Conductivity Module Setup

Assemble Conductivity Pack

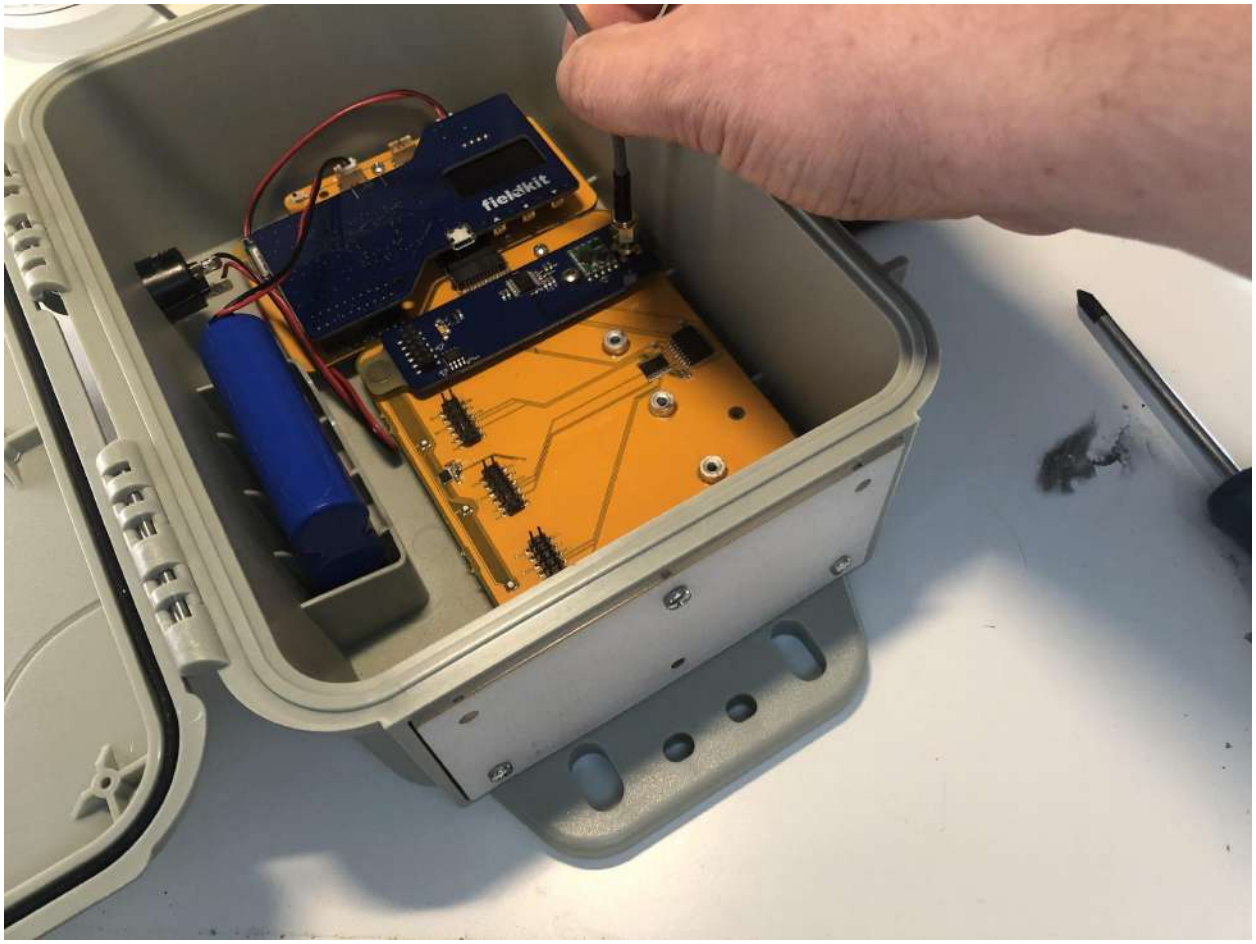
Your Conductivity Pack consists of a Conductivity Module Board and a Conductivity Probe. The Conductivity Pack components for FieldKit are color-coded green.

Important Note: Before calibration, examine your module board and probe cable for a Calibration ID (CAL ID) decal. All probe and module pairs that have the same CAL ID printed on them have been calibrated together in the lab and will not require calibration before their initial use. Additionally, if you have multiple probes of the same type, take care to match the CAL ID number on the probe cable and the module board when setting up the station (see image below). Failure to do so may result in inaccurate data and a need to recalibrate.



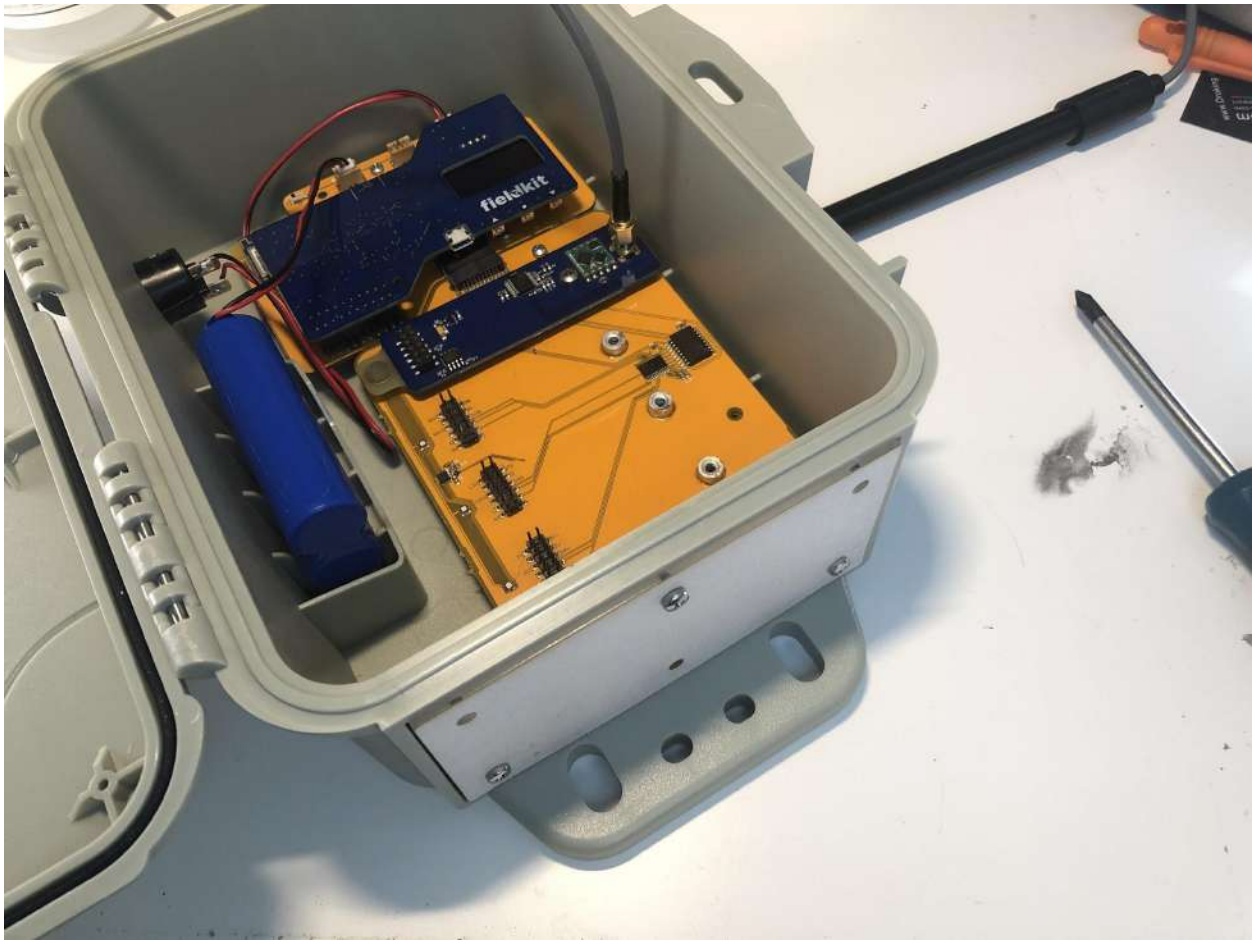
1. Do you have everything?

Collect the Conductivity Probe. The Conductivity Module Board should already be attached to your station.



2. Attach to station

Screw the Conductivity Probe cable into the Conductivity Module Board.



3. Congratulations!

Your Conductivity Module is now activated and ready for calibration.

Calibrate Conductivity Sensors

Calibrate the sensors on your Conductivity module for accurate data readings.

Measuring Conductivity

Conductivity is measured in Microsiemens Per Centimeter (µS/cm). This means measuring the amount of electrical current that flows across a gap between two graphite electrodes in the probe, along with the voltage drop across them, and dividing one by the other, and by the distance between the two electrodes. Calibration is necessary because mineral deposits can form on the electrodes and other factors can interfere with the measurement. Unlike the buffer solutions used for pH calibration, the standard solutions used in this calibration are extremely sensitive to concentration or dilution, and so need to be protected from evaporation by being

left in sealed containers when not in use. As a general practice, it is best to replace the solution in between each calibration. The solution is essentially salt water and can easily be disposed of by dumping it down the drain in the small quantities used in this calibration.

Three-Point Calibration

Make sure you have three conductivity standard solutions. We recommend 1,000, 10,000, and 100,000 µS/cm.

During this transfer calibration process, you'll enter three separate calibration points and check that they correlate with readings from an external standard. This will take the form of three Conductivity standard solutions in order to make certain that the probe and module board are behaving in the way that we expect them to.

Equipment

- Conductivity Pack
- Cup
- 3 x conductivity standard solutions (we recommend 1,000, 10,000, and 100,000 µS/cm standards)
- De-ionized, distilled, or tap water

Important Note: If you have older conductivity standards, you may need to replace them. If you're not able to, or if you're reusing standards for multiple calibrations, consider using a conductivity meter as a standard, such as the Extech EC400 or equivalent.

1. Do you have everything?

Make sure you have three conductivity standard solutions. We recommend 1,000, 10,000, and 100,000 µS/cm.

2. Calibration Point 1

First, you'll put the Conductivity Probe into the lowest conductivity solution, the one with the least salt dissolved in it, and measure what that conductivity is so you can compare it with the standard's expected value.

a) Insert Conductivity Probe

Place the Conductivity probe into the cup of water. Tap water is fine. Insert it with at least enough 1,000 µS/cm standard solution to completely cover the hole near the end of the probe.

b) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Conductivity probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the Conductivity standard solution into the app field. *Note: This field will be pre-populated with "1,000 µS/cm". If yours is different, you should override it with the Conductivity standard solution value.*

c) Success

When the timer stops, hit the “Calibrate” button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

3. Calibration Point 2

Then, you’ll clean off the probe and put it in the second solution.

a) Rinse Off Probe

Rinse off the probe end with water. You can either use a bottle with a nozzle for this, or just dip the probe end into water.

b) Insert Conductivity Probe

Place the Conductivity probe into the cup of water. Tap water is fine. Insert it with at least enough 10,000 µS/cm standard solution to completely cover the hole near the end of the probe.

c) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Conductivity probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the Conductivity standard solution into the app field. *Note: This field will be pre-populated with "10,000 µS/cm". If yours is different, you should override it with the Conductivity standard solution value.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

4. Calibration Point 3

Finally, you'll clean off the probe and put it in the highest conductivity solution.

a) Rinse Off Probe

Rinse off the probe end with water. You can either use a bottle with a nozzle for this, or just dip the probe end into water.

b) Insert Conductivity Probe

Place the Conductivity probe into the cup of water. Tap water is fine. Insert it with at least enough 100,000 µS/cm standard solution to completely cover the hole near the end of the probe.

c) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Conductivity probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the value from the Conductivity standard solution into the app field. *Note: This field will be pre-populated with "100,000 µS/cm". If yours is different, you should override it with the Conductivity standard solution value.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

5. Congratulations!

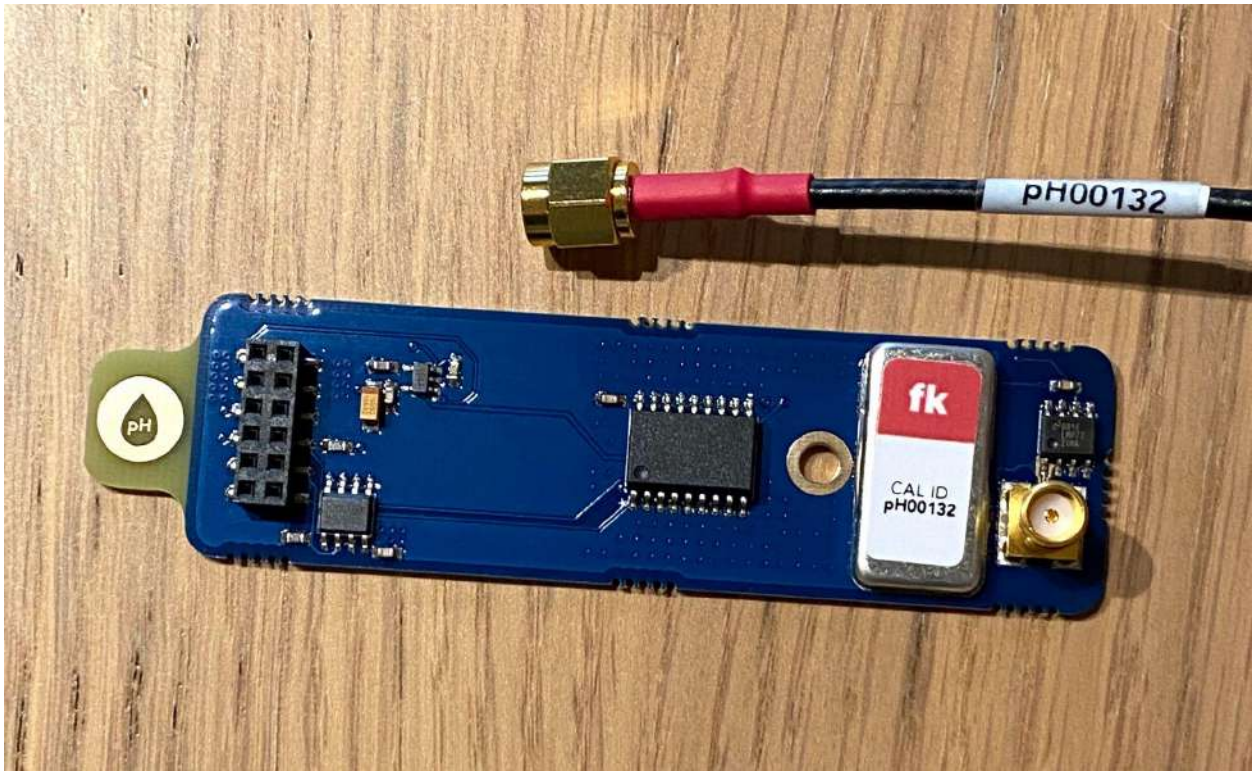
You've now completed your conductivity calibration.

Dissolved Oxygen Module Setup

Assemble Dissolved Oxygen Pack

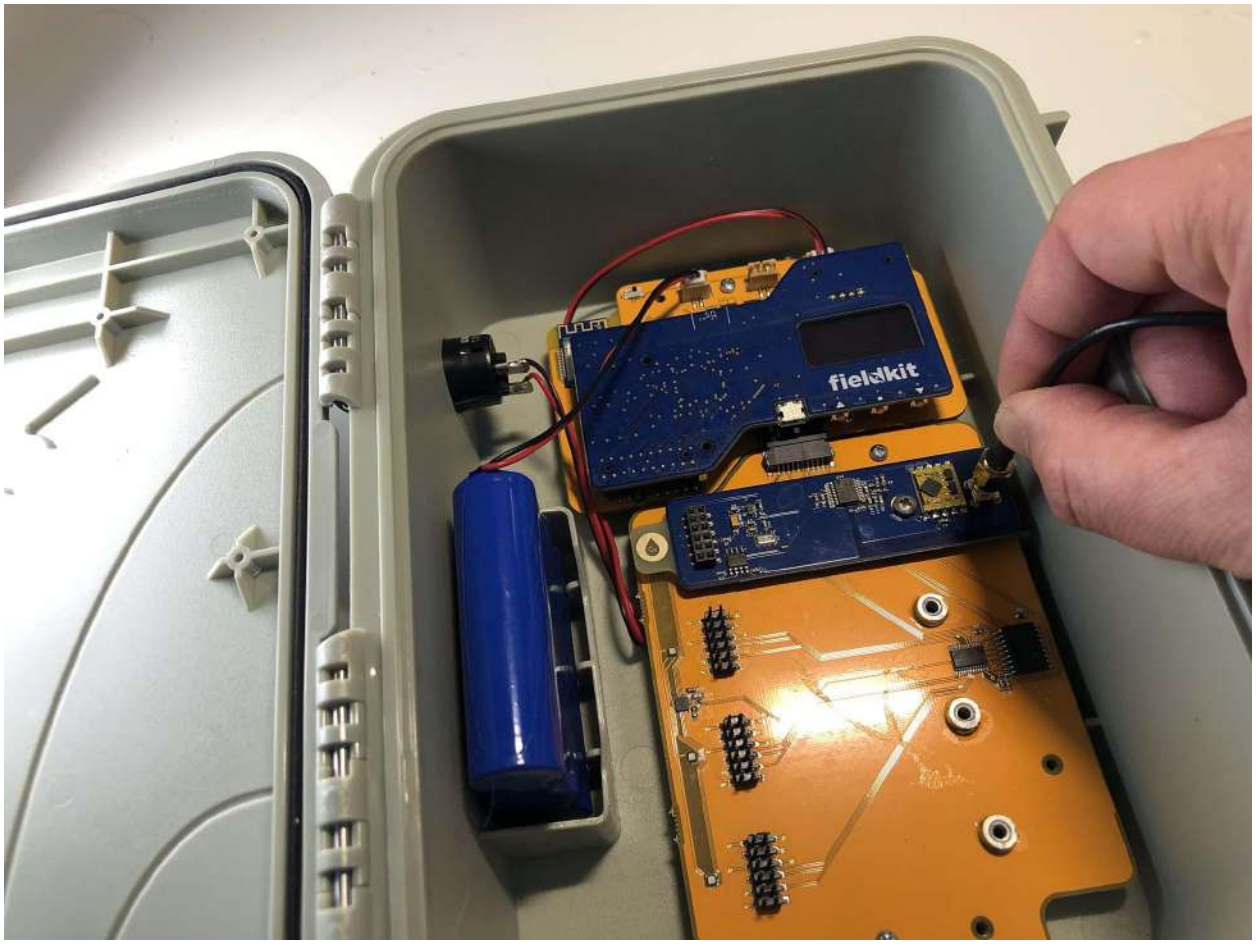
Your Dissolved Oxygen Pack consists of a Dissolved Oxygen Module Board and a Dissolved Oxygen Probe. The Dissolved Oxygen Pack components for FieldKit are color-coded yellow.

Important Note: Before calibration, examine your module board and probe cable for a Calibration ID (CAL ID) decal. All probe and module pairs that have the same CAL ID printed on them have been calibrated together in the lab and will not require calibration before their initial use. Additionally, if you have multiple probes of the same type, take care to match the CAL ID number on the probe cable and the module board when setting up the station (see image below). Failure to do so may result in inaccurate data and a need to recalibrate.



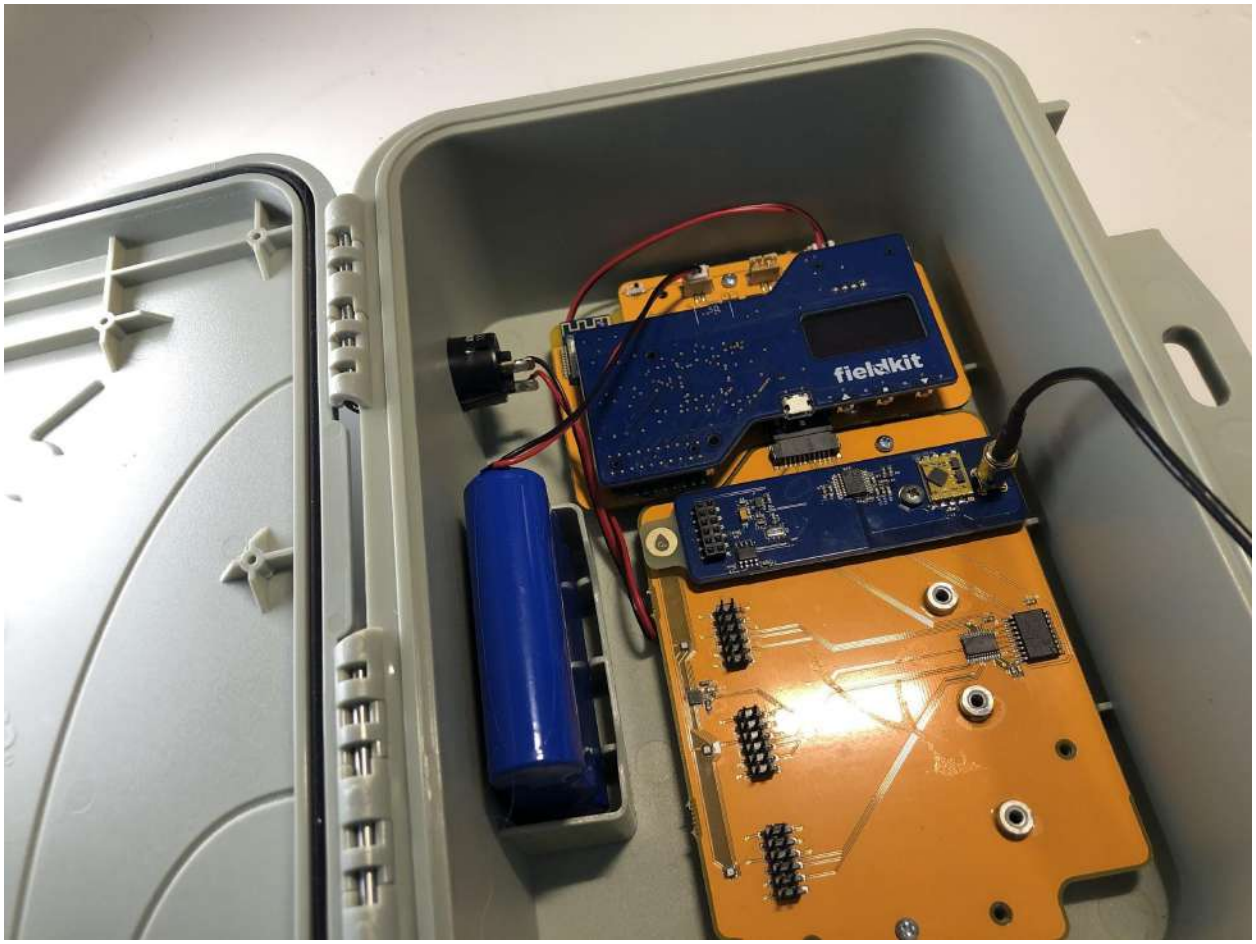
1. Do you have everything?

Collect the Dissolved Oxygen Probe. The Dissolved Oxygen Module Board should already be attached to your station.



2. Attach to station

Screw the Dissolved Oxygen Probe cable into the Dissolved Oxygen Module Board.



3. Congratulations!

Your Dissolved Oxygen Module is now activated and ready for calibration.

Calibrate Dissolved Oxygen Sensors

Calibrate the sensors on your Dissolved Oxygen module for accurate data readings.

Measuring Dissolved Oxygen

Dissolved Oxygen is measured in percent saturation (%). Dissolved oxygen measurements come from what's essentially a tiny battery made from a concentrated salt and water solution and a porous plastic membrane, along with two metal electrodes. Since any of those parts of the probe can get dirty, or otherwise damaged, we need to calibrate the probe and module board to correct for any errors.

Important Note: Double-check that your Dissolved Oxygen meter is measuring percent saturation (%), as many simply calculate the percentage of oxygen relative to the maximum amount that can be dissolved in water at a given temperature. This will not work without further calculation to convert to %, as that is the default unit used by FieldKit.

Three-point Transfer Calibration

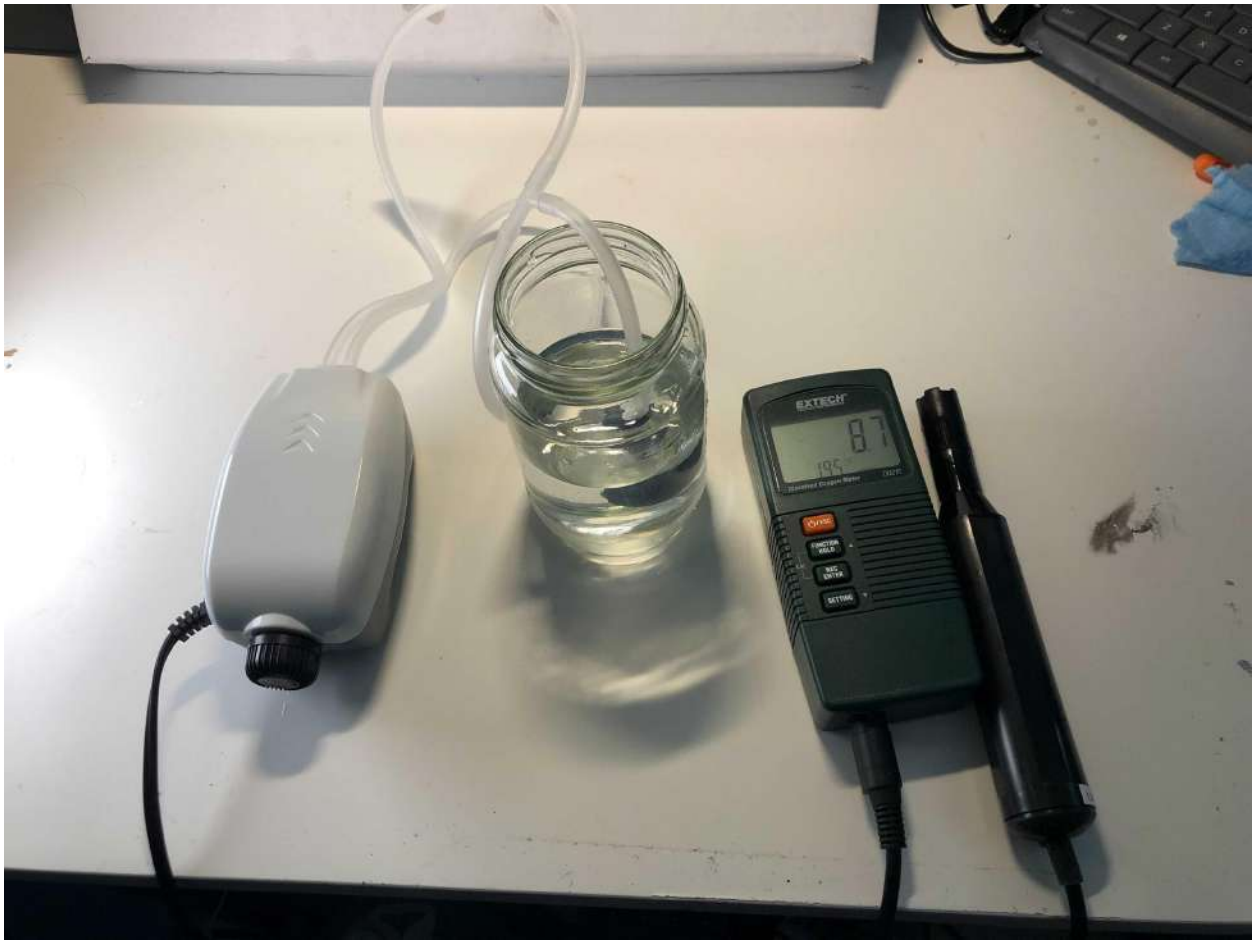
Make sure you have a cup of water, an aquarium air pump, tubing and airstone, and a standard Dissolved Oxygen meter or test kit.

During this transfer calibration process, you'll enter 3 separate calibration points and check that they correlate with readings from an external standard. This will take the form of a Dissolved Oxygen meter or an aquarium maintenance test kit in order to make certain that the probe and module board are behaving in the way that we expect them to.

Since this calibration is being done with two measuring devices, it is called a transfer calibration, meaning that the precision of measurement of the trusted device, or standard, is being *transferred* through simultaneous measurement of the same quantity to the thing being calibrated, what's referred to as the Device Under Test, or DUT.

Equipment

- Dissolved Oxygen Pack
- Cup of water
- Aquarium air pump, tubing, and airstone
- Standard Dissolved Oxygen meter or test kit (like those used for aquarium maintenance testing)



Option 1: Standard DO Meter

Option 2: Aquarium Test Kit

Option 1: Dissolved Oxygen Meter

1. Do you have everything?

Gather together a cup of water, an aquarium air pump, tubing and airstone, and a standard Dissolved Oxygen meter.

2. Calibration Point 1

First, you'll get a baseline reading of the amount of oxygen dissolved in the water that you're using for the calibration.

a) Insert Dissolved Oxygen Probe

Place the Dissolved Oxygen Probe in a cup of water with your standard dissolved oxygen meter probe.

b) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Dissolved Oxygen probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the reading from the Dissolved Oxygen meter into the app field. *Note: This field will be pre-populated with "5%". If yours is different, you should override it with the Dissolved Oxygen meter's reading.*

c) Success

When the timer stops, hit the “Calibrate” button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

3. Calibration Point 2

Then, you’ll get some oxygen dissolved in the water using a bubbler and measure its concentration.

a) Add the Airstone

Place the aquarium pump air stone into the cup alongside the Dissolved Oxygen Probe and your standard meter.

b) Turn the Air Pump to Low for 1 Min

Turn the air pump to low for one minute.

c) Turn off the Pump

Turn off the pump.

d) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Dissolved Oxygen probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the reading from the Dissolved Oxygen meter into the app field. *Note: This field will be pre-populated with "7.5%". If yours is different, you should override it with the Dissolved Oxygen meter's reading.*

e) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

4. Calibration Point 3

Finally, you'll attempt to saturate the water with as much oxygen as it can hold to calibrate the upper end of the probe's range.

a) Keep Everything in the Cup

Leave the aquarium pump air stone, Dissolved Oxygen Probe and your standard meter in the cup.

b) Turn the Air Pump to High for 1 Min

Turn the air pump to high for one minute.

c) Turn off the Pump

Turn off the pump.

d) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Dissolved Oxygen probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the reading from the Dissolved Oxygen meter into the app field. *Note: This field will be pre-populated with "9%". If yours is different, you should override it with the Dissolved Oxygen meter's reading.*

e) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

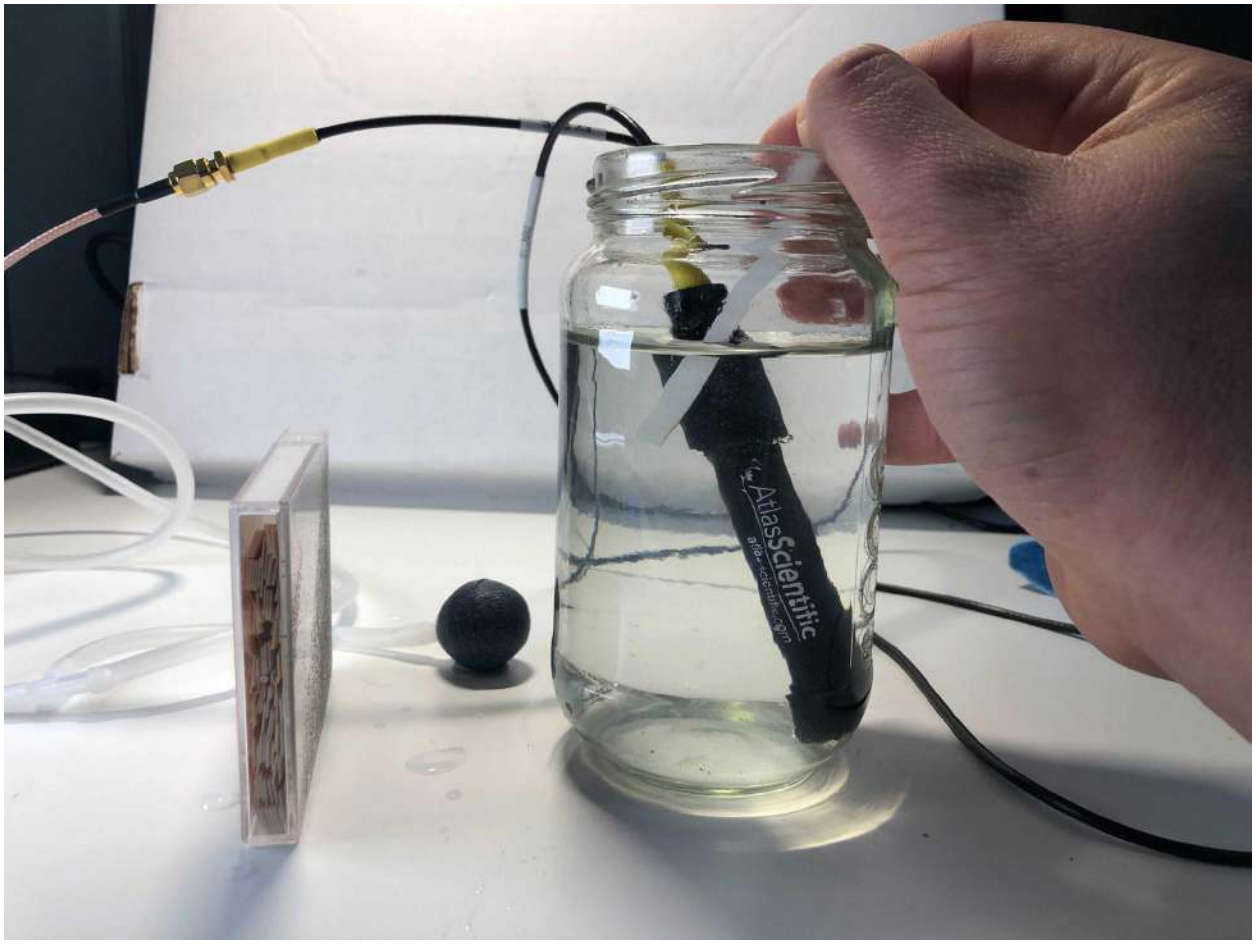
5. Congratulations!

You've now completed your dissolved oxygen calibration.

Option 2: Aquarium Maintenance Test Kit

1. Do you have everything?

Gather together a cup of water, an aquarium air pump, tubing and airstone, and an aquarium test kit.



2. Calibration Point 1

First, you'll get a baseline reading of the amount of oxygen dissolved in the water that you're using for the calibration.

a) Insert Dissolved Oxygen Probe

Place the Dissolved Oxygen Probe in a cup of water.

b) Follow Test Kit Instructions

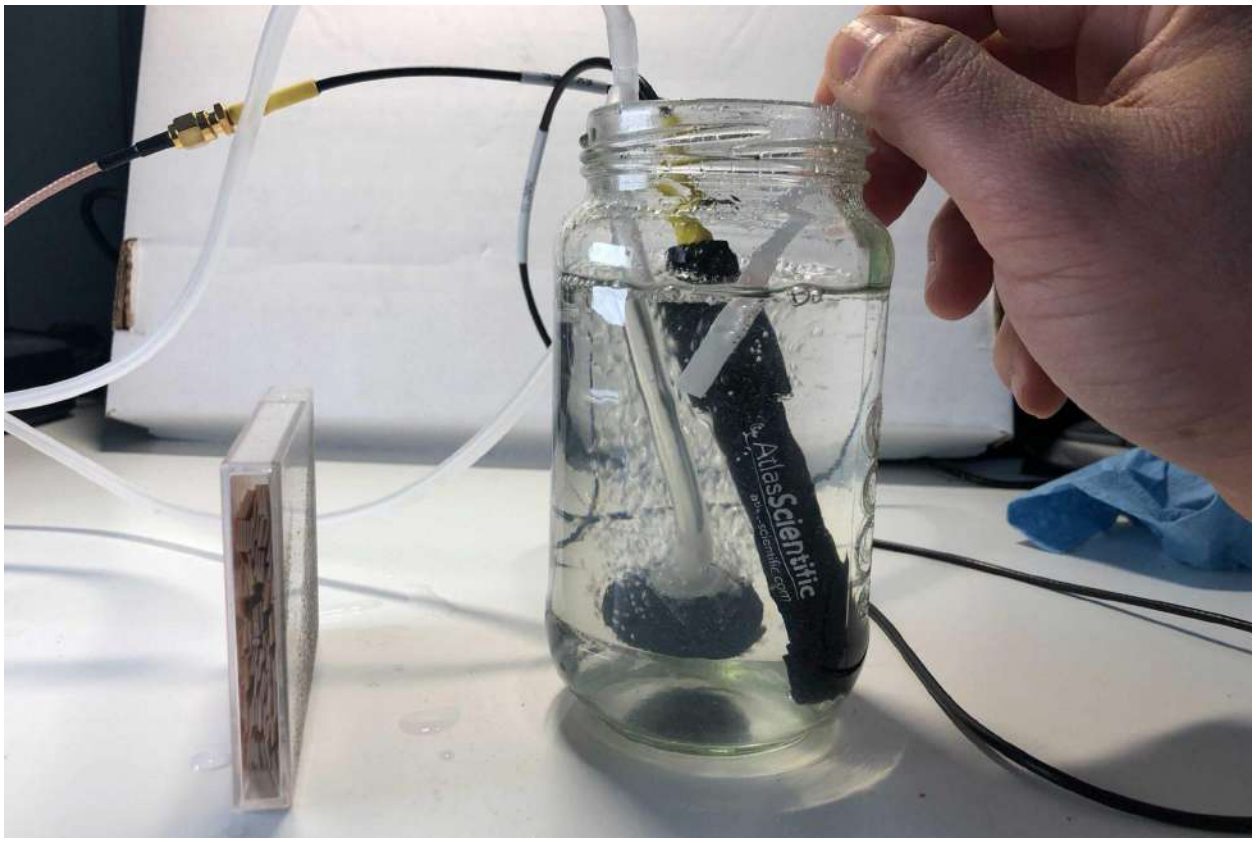
Follow the instructions that came with your test kit (your standard) to test the same cup of water and get your standard value. *Note: We don't list out every step here because each test kit may be slightly different (e.g. some use test strips while others use liquid reagents in a test vial.*

c) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Dissolved Oxygen probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the reading from the test kit into the app field. *Note: This field will be pre-populated with "5%". If yours is different, you should override it with the test kit's reading.*

d) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.



3. Calibration Point 2

Then, you'll get some oxygen dissolved in the water using a bubbler and measure its concentration.

a) Add the Airstone

Place the aquarium pump air stone into the cup alongside the Dissolved Oxygen Probe and your test kit.

b) Turn the Air Pump to Low for 1 Min

Turn the air pump to low for one minute.

c) Turn off the Pump

Turn off the pump.

d) Follow Test Kit Instructions

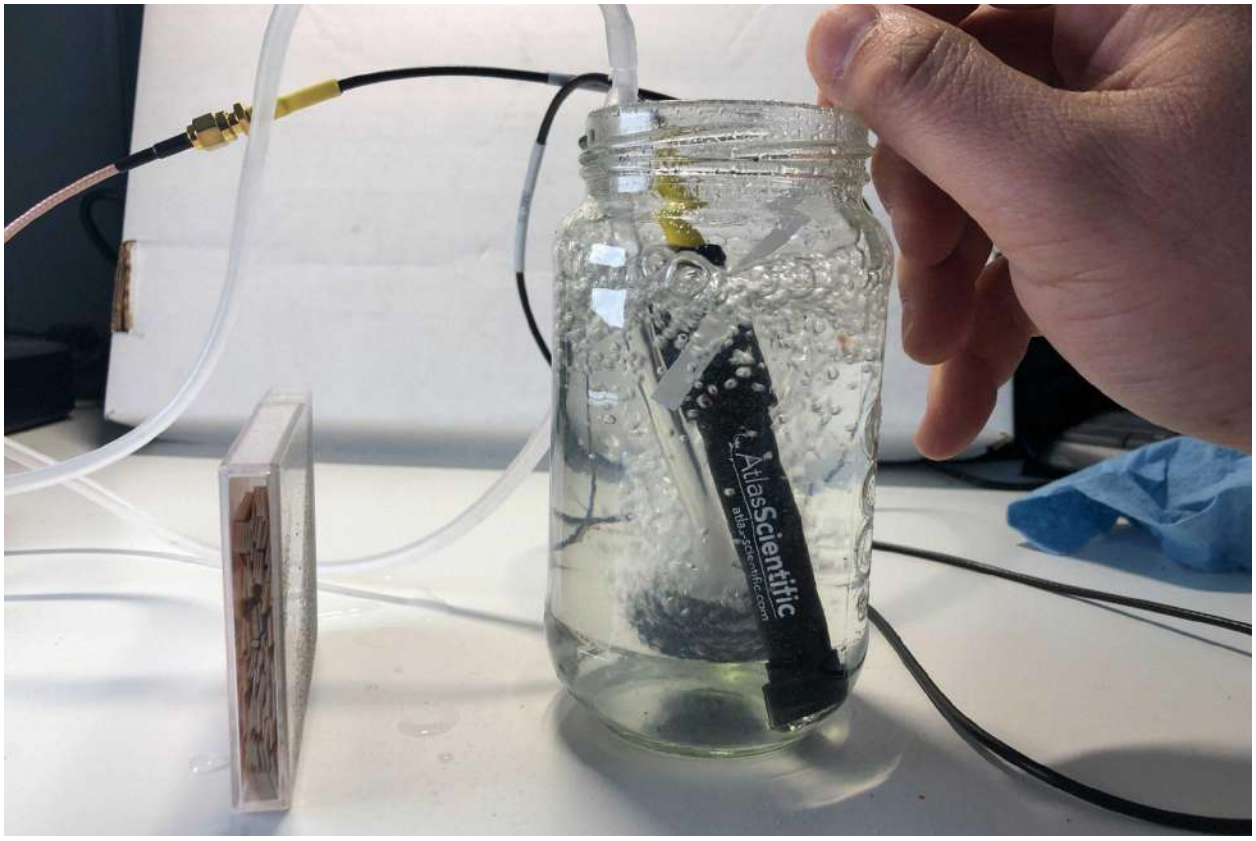
Follow the instructions that came with your test kit (your standard) to test the same cup of water, and get your standard value. *Note: We don't list out every step here because each test kit may be slightly different e.g. some use test strips, while others use liquid reagents in a test vial.*

e) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Dissolved Oxygen probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the reading from the test kit into the app field. *Note: This field will be pre-populated with "7.5%". If yours is different, you should override it with the test kit's reading.*

f) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.



4. Calibration Point 3

Finally, you'll attempt to saturate the water with as much oxygen as it can hold to calibrate the upper end of the probe's range.

a) Keep Everything in the Cup

Leave the aquarium pump air stone, Dissolved Oxygen Probe and your test kit in the cup.

b) Turn the Air Pump to High for 1 Min

Turn the air pump to high for one minute.

c) Turn off the Pump

Turn off the pump.

d) Follow Test Kit Instructions

Follow the instructions that came with your test kit (your standard) to test the same cup of water, and get your standard value. *Note: We don't list out every step here because each test*

kit may be slightly different e.g. some use test strips, while others use liquid reagents in a test vial.

e) Enter Standard Value as Readings Stabilize

Allow time for the reading on the Dissolved Oxygen probe to stabilize. In the app, the timer will count down. As you wait for the timer to count down, enter the reading from the test kit into the app field. *Note: This field will be pre-populated with "9%". If yours is different, you should override it with the test kit's reading.*

f) Success

When the timer stops, hit the "Calibrate" button. This will record both the current sensor value and the standard value together, which allows us to later calibrate the sensor.

5. Congratulations!

You've now completed your dissolved oxygen calibration.

Distance Module Setup

Assemble Distance Pack

Your Distance Pack consists of a Distance Module Board, a Distance Sensor Board, a CAT5 cable and an Ultrasonic Rangefinder that acts as a distance sensor.

1. Do you have everything?

Collect the following:
1) Distance Module Board
2) Distance Sensor Board
3) CAT5 Cable
4) Ultrasonic Rangefinder
5) Distance Sensor Enclosure (not included)

The Distance Module Board should already be attached to your station.

Important Note: The Ultrasonic Rangefinder is waterproof, but its connection on the back is not. You'll need to put it inside an enclosure or under a hood of some sort, based on your specific deployment situation. If you're using an external enclosure, this will need to have a threaded opening for a ¾ inch NPT connection. An easy option is combining a weatherproof outlet box like this one, a weatherproof cover like this one and a ¾" NPT cable gland.

2. Insert CAT5 Cable into Distance Sensor Board

Insert one end of the CAT5 cable into the Distance Sensor Board.

[image coming soon]

Insert Cable

Make sure you insert it in the right direction.

3. Put Ultrasonic Rangefinder in Enclosure

Place the Ultrasonic Rangefinder into the enclosure that you have identified as the best fit for your particular deployment.

[image coming soon]

4. Attach Distance Sensor Board

Plug the Distance Sensor Board into the 7-pin connector on the distance sensor. Note that both the connector bodies should be on the same side of the circuit boards, so that the pins are connected correctly and not flipped.

[image coming soon]

5. Attach to Station

Time to plug into your FieldKit station.

[image coming soon]

Insert CAT5 Cable into Distance Module Board

Make sure that the other end of the CAT5 cable is securely inserted into the Distance Module Board.

6. Cable Management

As the Ultrasonic Rangefinder may need to be some distance from the FieldKit station itself, the cables are long for the benefit of those who may need to place it further away. If the instruments are placed near one another, please use the included zip ties for cable management.

[image coming soon]

7. Explore Mounting Solutions

There are a few ways to approach mounting. Experiment and find a mounting solution that will work for your particular deployment location.

[image coming soon]

Zip-Ties to Mount and Secure

You'll use the zip-ties to help mount and secure your Distance Sensor Enclosure. They are also useful to hold your hanging cable against whatever your Distance Sensor Enclosure is mounted to.

Other Options

You can also use a 1" hole in the cable plate on the FieldKit itself to mount the Ultrasonic Rangefinder with a ¾" NPS/NPT nut.

8. Congratulations! Now Test it Out!

You should now have an assembled Distance Sensor! Make sure you know how to place your Distance Sensor before heading out into the field. If you have questions, feel free to reach out to the FieldKit team.

[image coming soon]

Weather Module Setup

Assemble Weather Pack

Your Weather Pack consists of a Weather Module Board, Weather Sensor Board, a CAT5 cable and a Weather Instrument Cluster (Rain Gauge, Anemometer and Wind Vane) plus accompanying cables and hardware.

1. Do you have everything?

Collect the following:

1) Weather Module Board

2) Weather Sensor Board

3) CAT5 Cable

4) Stevenson Screen + Arm

5) Rain Gauge + Arm

6) Anemometer, Wind Vane + Arm

7) Mounting Pole (2 parts)

8) Hose Clamp

9) Weather Instrument Cluster Screws

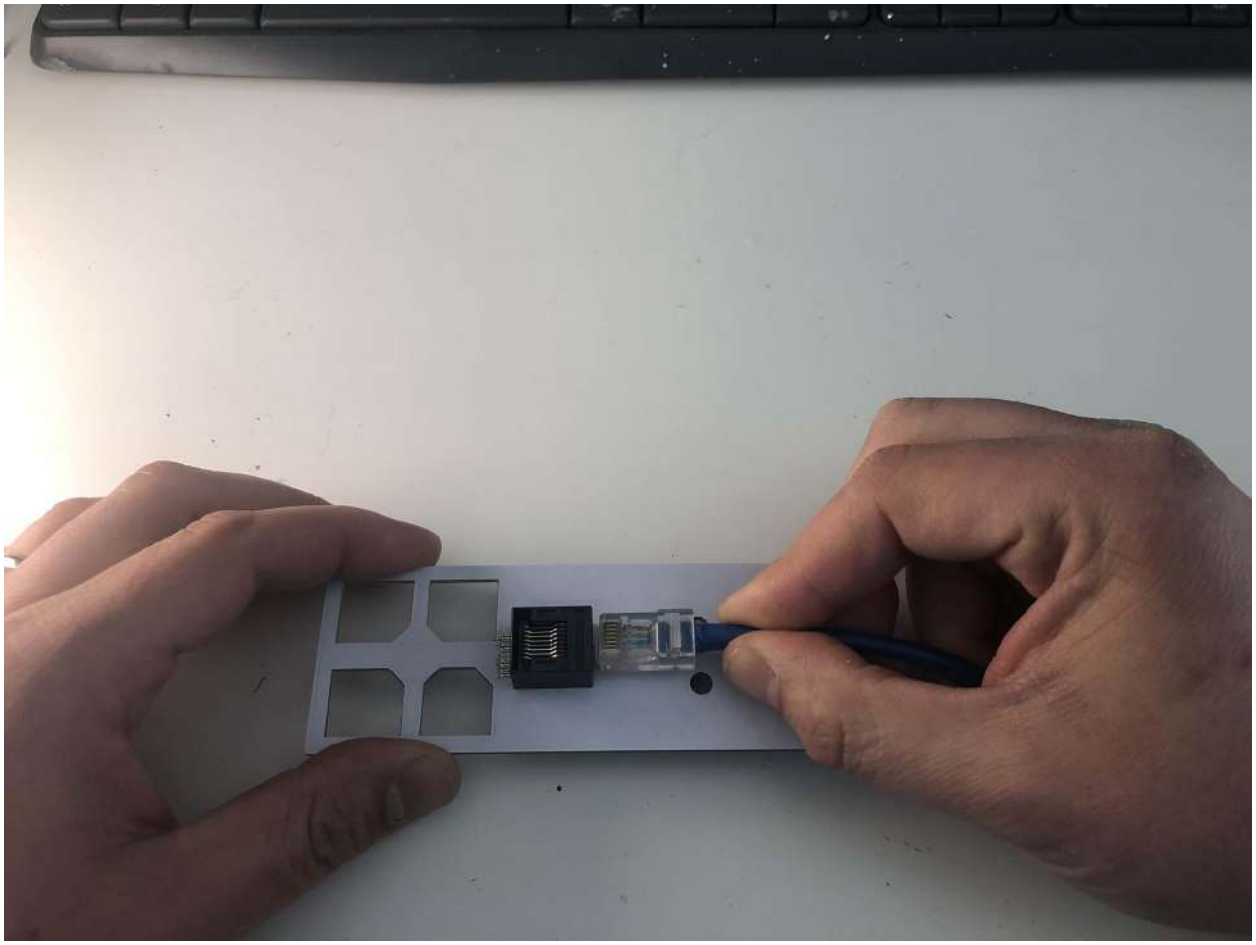
The Weather Module Board should already be attached to your station.

You will also need a compass—we recommend the Suunto A-10 Compass or equivalent—to align the wind vanes when setting up the Weather Instrument Cluster (not included).

Quick Tip: As you unbox your weather instrument cluster, you will notice that the screws to construct each piece are packaged with the corresponding parts of the cluster. This is in addition to the screws that come with the rest of your FieldKit station.

2. Insert CAT5 Cable into Weather Sensor Board

Insert one end of the CAT5 cable into the Weather Sensor Board.

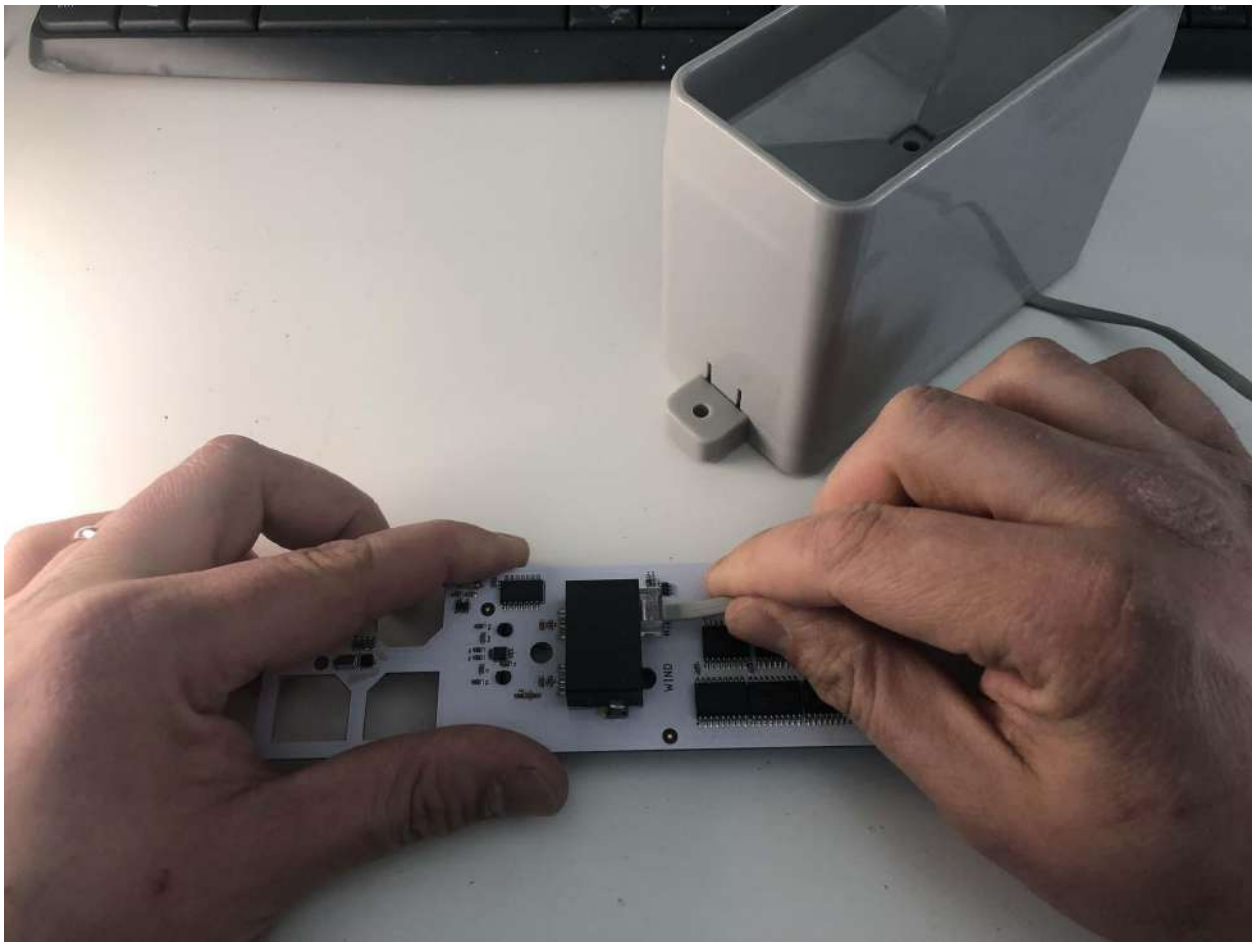


Insert Cable

Make sure you insert it in the right direction.

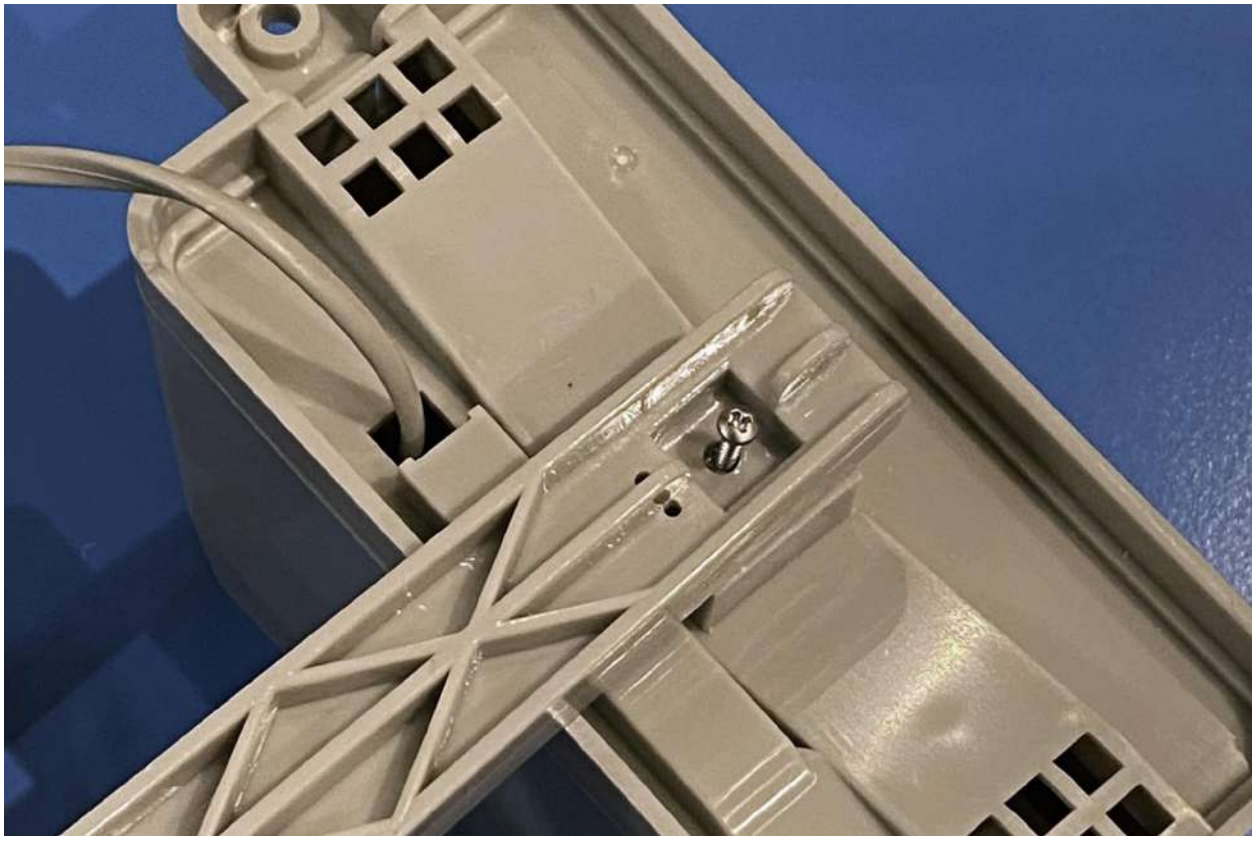
3. Connect Rain Gauge

The Rain Gauge measures rainfall. It doesn't require emptying, as it's a tipping-bucket type. Inside is a tipping bucket (a bit like a see-saw) with areas where rain collects. When one side is full, it tips over, emptying out the water. Push in the tabs on the sides of the housing and open it up to see how it works!



Insert Rain Gauge RJ11 Jack

Unravel the Rain Gauge wire. Turn over the Weather Sensor Board, and insert the RJ11 jack from the Rain Gauge into the slot on the Weather Sensor Board marked "RAIN."

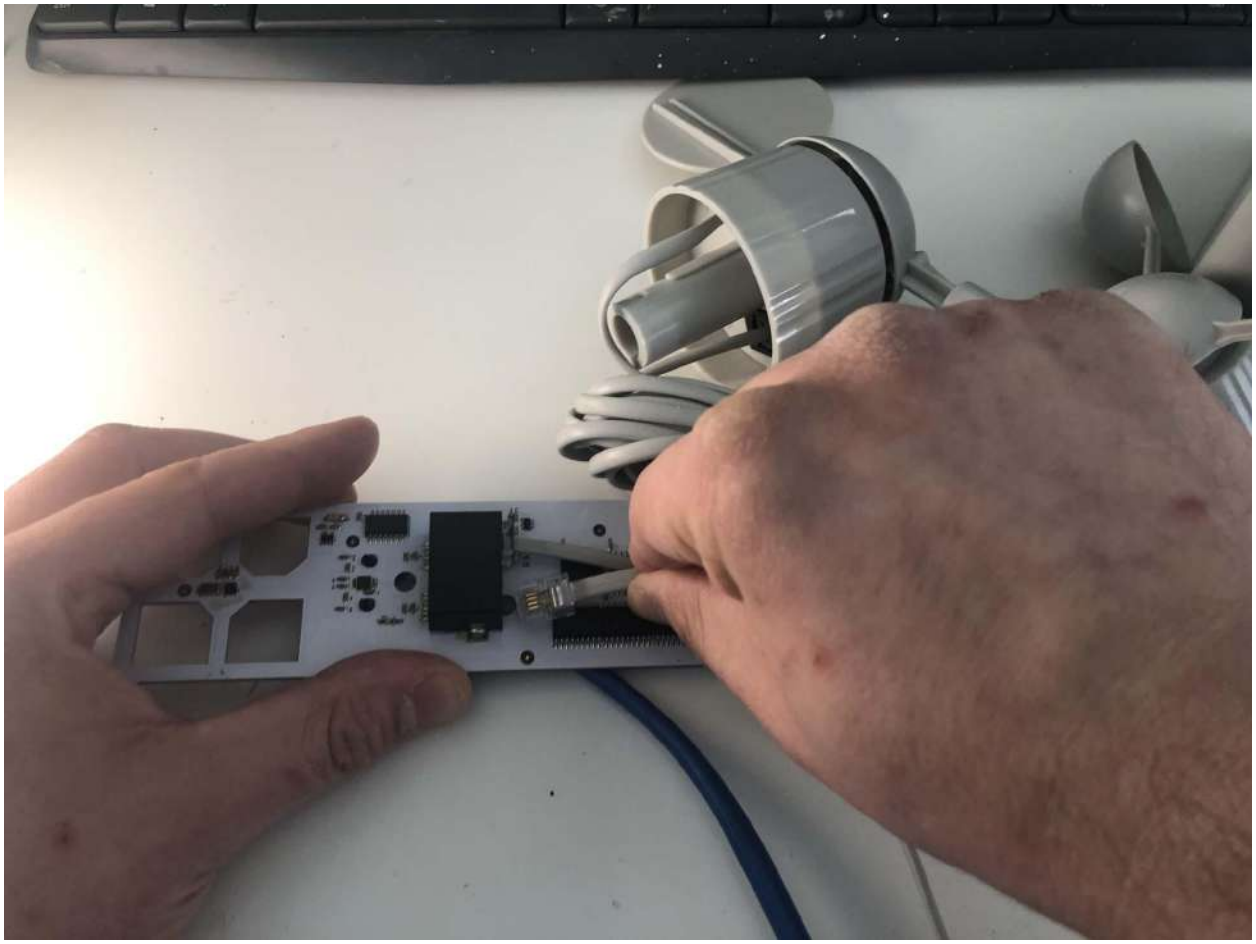


Attach Rain Gauge Arm

Attach the Rain Gauge to the Arm with the screw provided.

4. Connect Wind Vane and Anemometer

The Wind Vane shows you the direction that the wind is blowing, and the Anemometer measures wind speed.



Insert Wind Vane RJ11 Jack

Unravel the wires from the Wind Vane and Anemometer. Insert the RJ11 jack from the Wind Vane into the slot on the Weather Sensor Board marked “WIND.”

Insert Anemometer RJ11 Jack

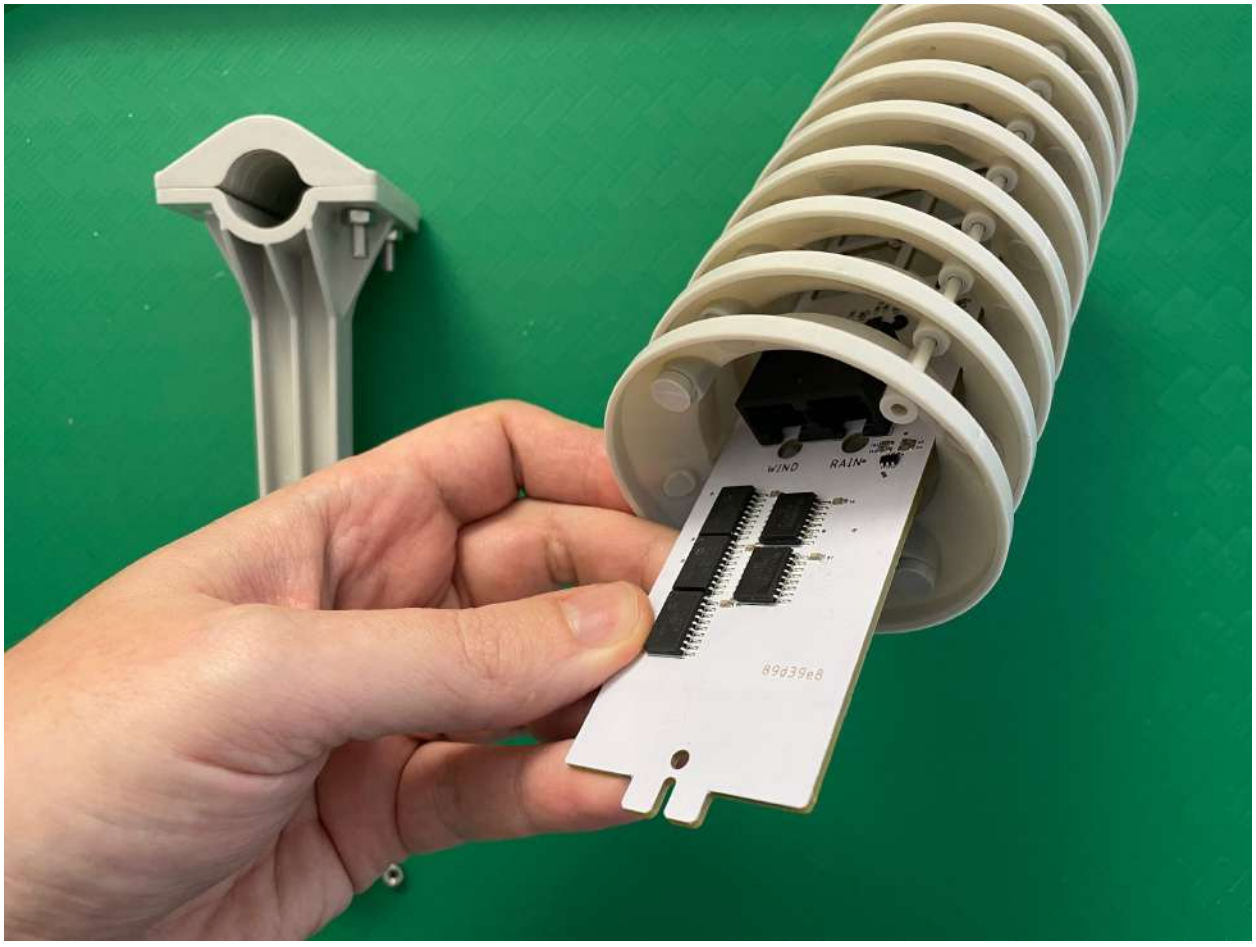
Insert the RJ11 jack from the Anemometer into the Wind Vane so that they are connected (the Anemometer switch conductors are shared between the Anemometer and the Wind vane.)

Attach Anemometer and Wind Vane onto Arm

One by one, push the Anemometer and Wind Vane onto the arm, and screw them in.

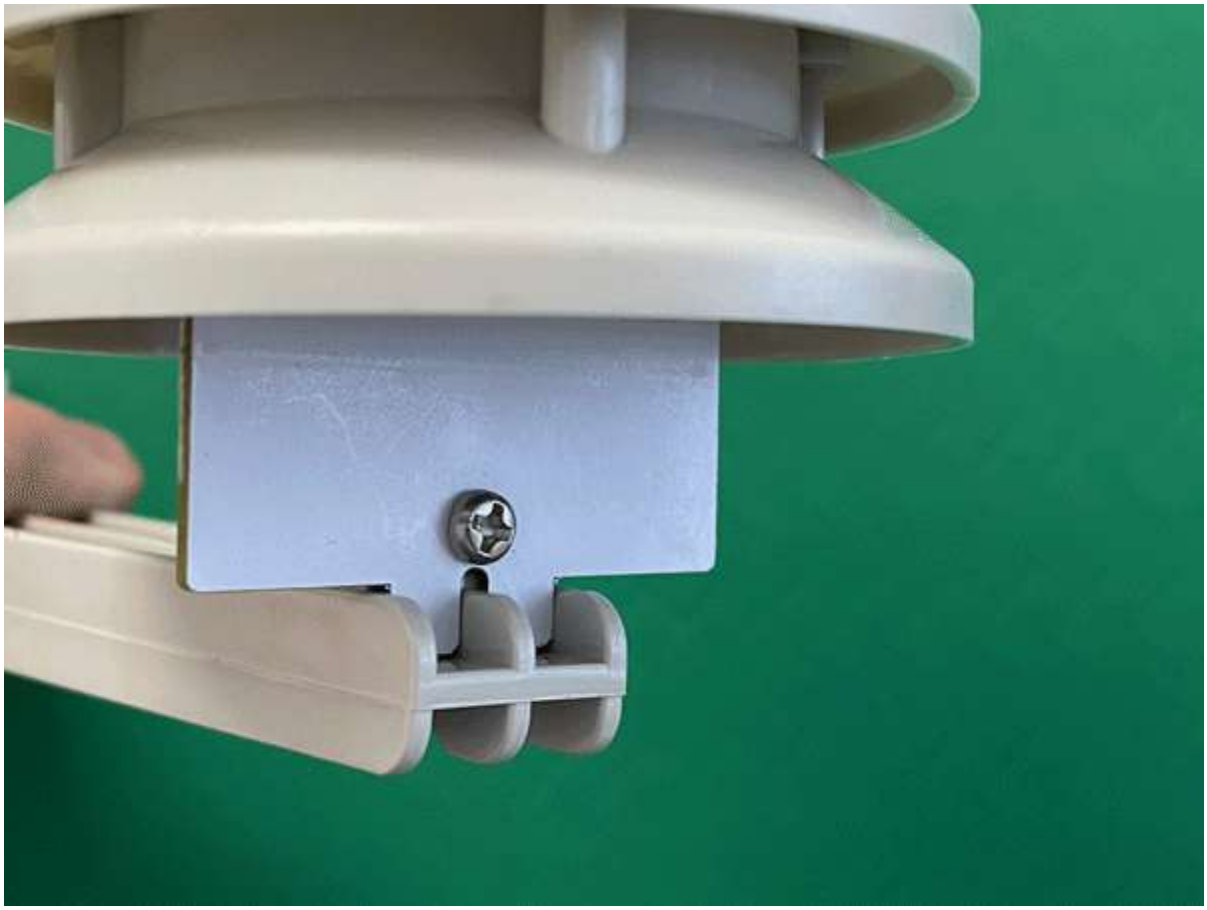
5. Place Stevenson Screen

The Stevenson Screen is a breathable enclosure that protects the Weather Sensor Board circuitry from the elements without interfering with the sensors.



Insert Weather Sensor Board

Insert the Weather Sensor Board into the Stevenson Screen.

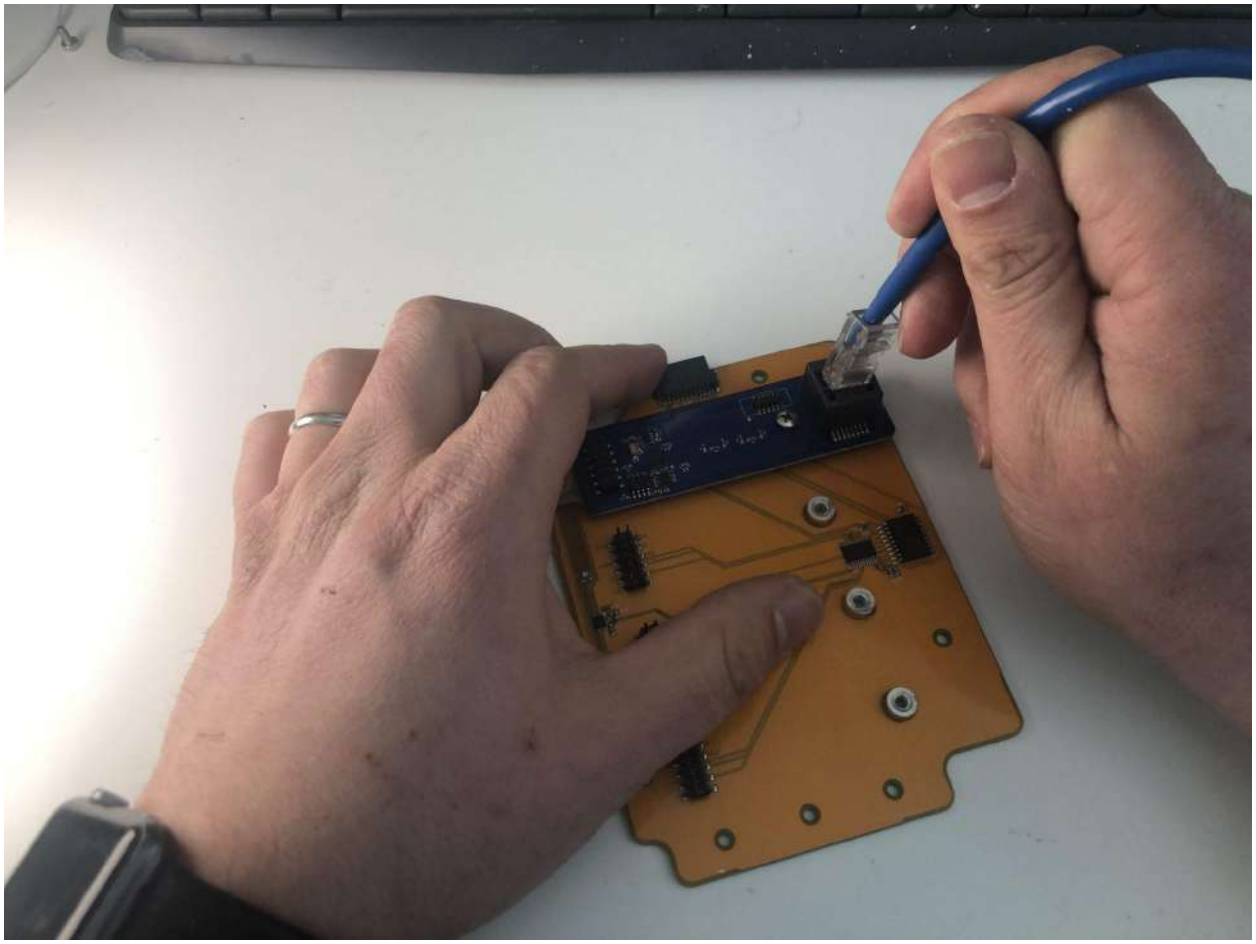


Attach Stevenson Screen Arm

Attach the enclosed board to the Arm with the screw and nut provided. To tighten, we recommend holding the nut with a pair of needle-nose pliers and tightening the screw by hand with your screwdriver.

6. Attach to Station

Time to plug into your FieldKit station.

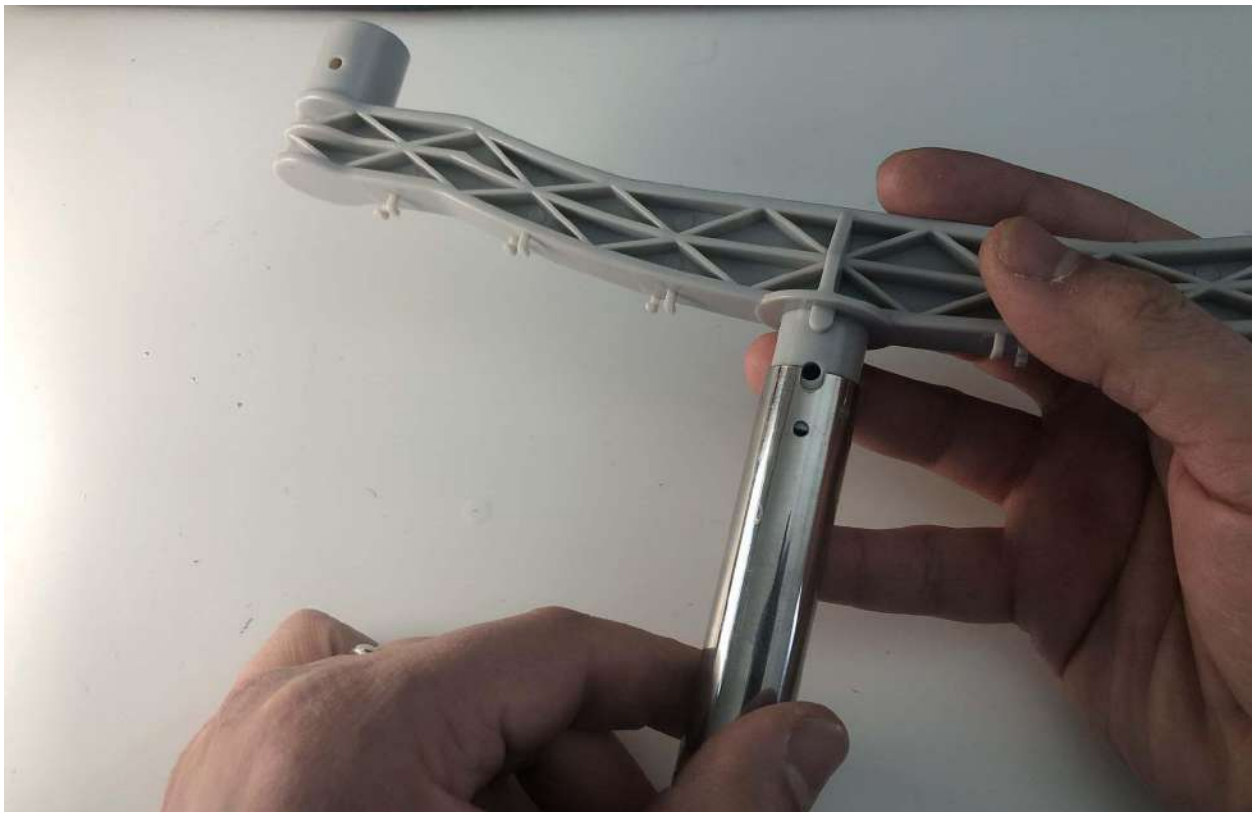


Insert CAT5 Cable into Weather Module Board

Make sure that the other end of the CAT5 cable is securely inserted into the Weather Module Board.

7. Position Instruments

Now that everything is connected, assemble the pole and mount your instruments. It's a good idea to do all this before you head out into the field to gather any extra hardware needed, and land on an optimum configuration.

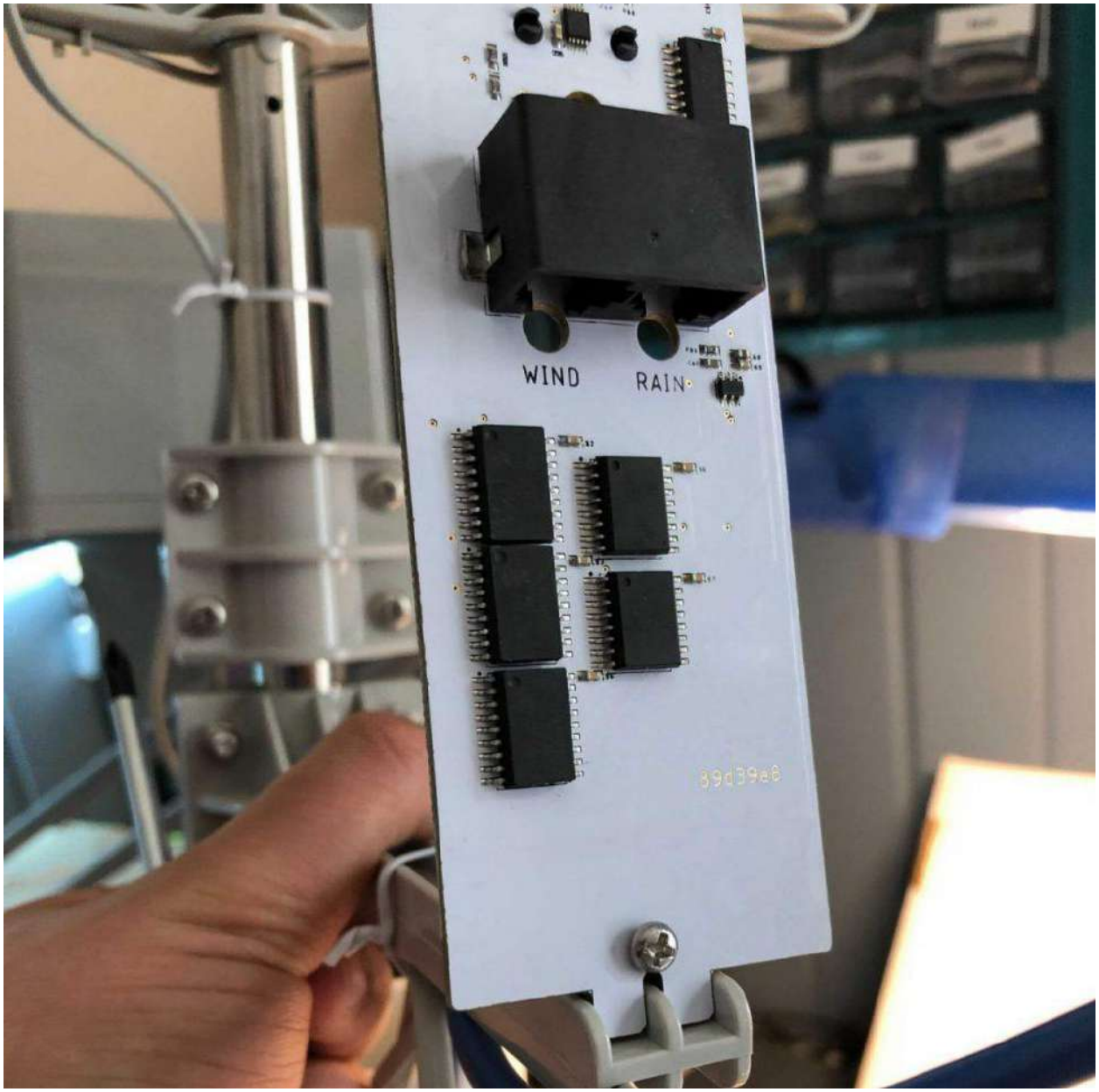


Assemble Mounting Pole

The mounting pole comes in two pieces. Take a moment to identify which piece has a notch at the end, then slide the two pieces together to create one longer pole. The notched end should be at the top of the assembled mounting pole when completed.

Add Anemometer and Wind Vane Arm to Pole

Add the Anemometer and Wind Vane Arm to the top of the assembled pole and snugly line up the notch at the end of the mounting pole with the corresponding area on the arm and note the screw holes in each. Use the included screw to secure the arm to the mounting pole.



Add Stevenson Screen and Rain Gauge Arms

Take the Stevenson Screen Arm and Rain Gauge Arm, and loosen the pole openings by unscrewing the screws slightly.

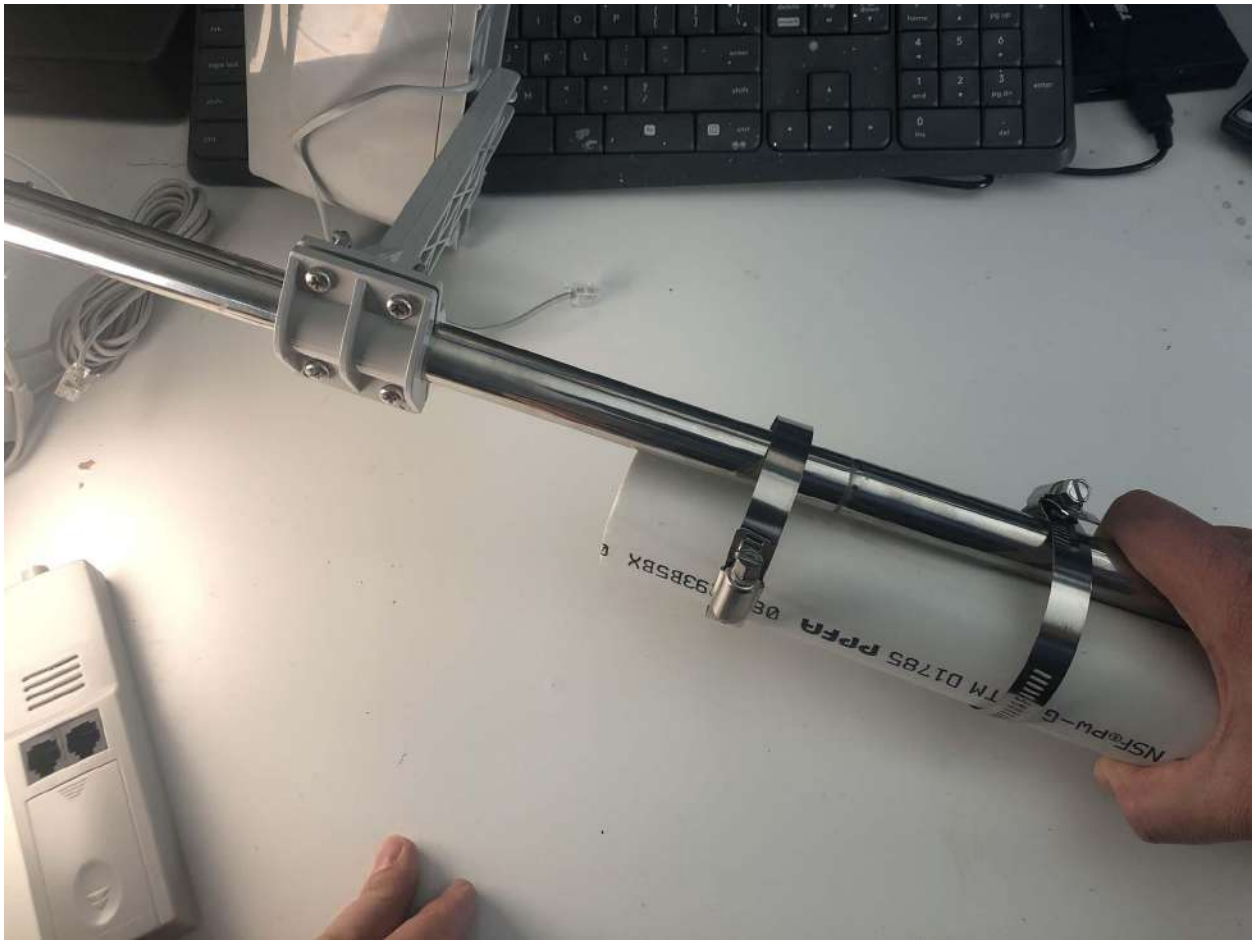
Slide the one assembled pole through the instrument arms, and tighten the screws so that they are secure on the pole.

8. Cable Management

As the Anemometer and Wind Vane need to be at least 5 m above open ground to give you representative wind data, the cables are long for the benefit of those who choose not to place the Stevenson Screen close by. If the instruments are placed near one another, please use the included zip ties for cable management.

Slide Wire into Clips

On the bottom side of the Anemometer and Wind Vane Arm there are clips to hold the wires in place. Slide the wire from each instrument into the clips.

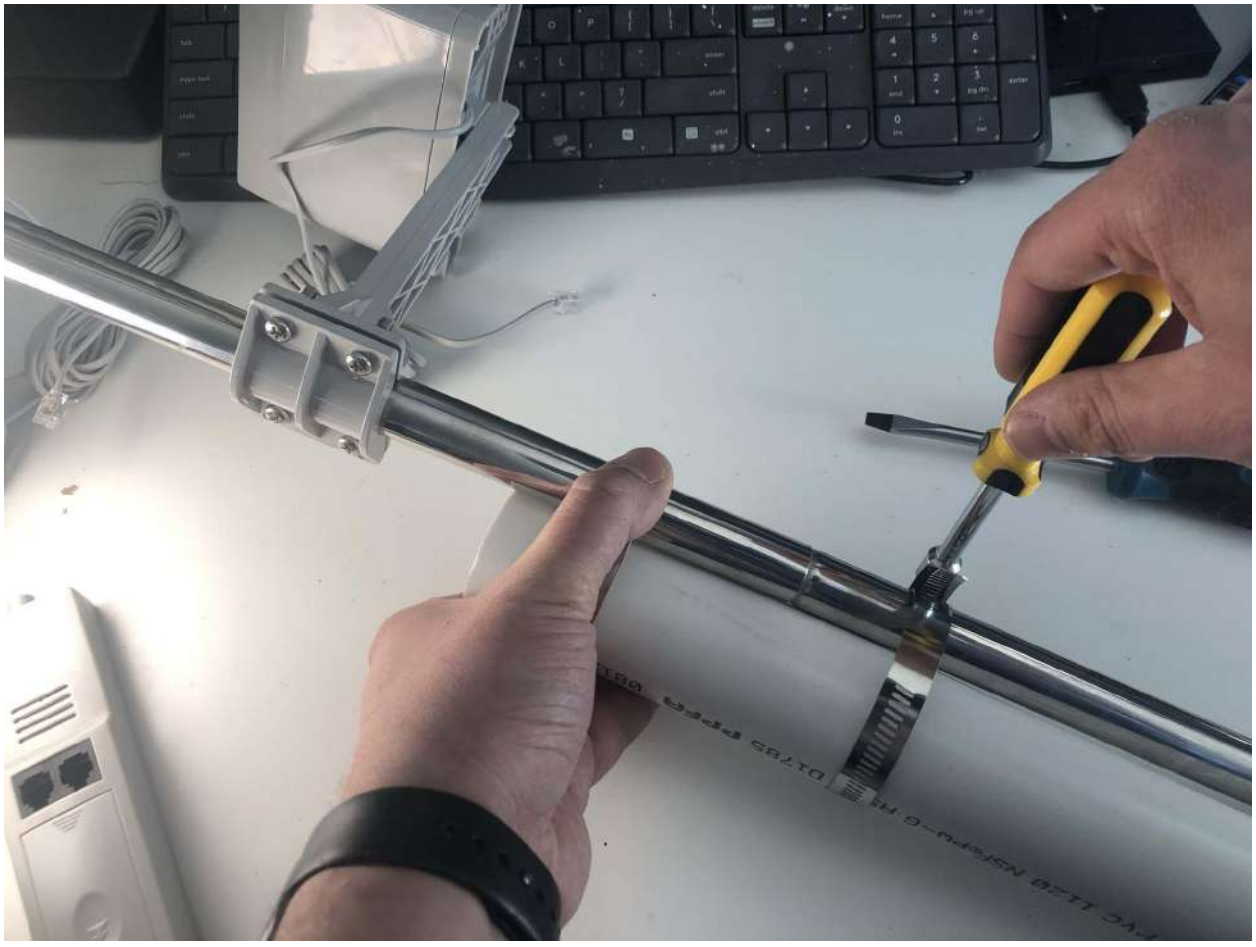


Secure onto the Mounting Pole

Run all of the remaining wires down the assembled pole, and secure them with the hose clamps (you may also want to source some zip ties to be extra secure). This will avoid them being yanked out of the circuit boards by strong winds.

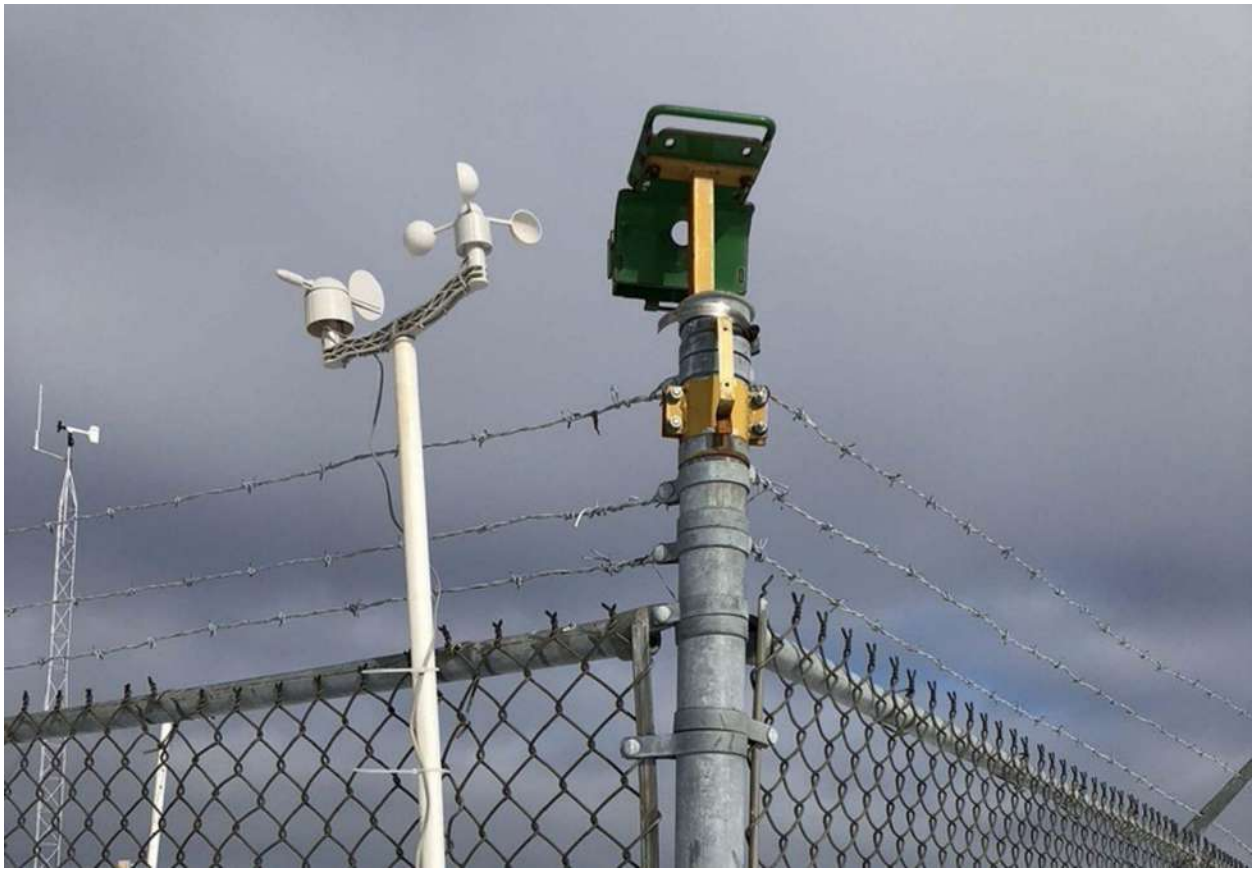
9. Explore Mounting Solutions

There are a few ways to approach mounting. Experiment and find a mounting solution that will work for your particular deployment location.



Hose Clamps to Mount and Secure

You'll use the Hose Clamps to help mount and secure your weather cluster. They are useful to hold your hanging cables against the pole and attach the pole itself to a mast in the environment that reaches the appropriate height to take accurate measurements (more than 5 m above the ground.) Tighten the hose clamps using a flat head screwdriver.



Other Options

Plan for the terrain of your deployment location, and identify which type of mast in the environment you will use to mount your Weather Instrument Cluster. The mast you have in mind might be thicker than the diameter of the Hose Clamps provided, so visit your local hardware store for something with the right specifications.

10. Congratulations! Now Test it Out!

You should now have an assembled Weather Instrument Cluster! Make sure you know how to place your Weather Cluster before heading out into the field. Check out the Weather Deployments section and do a test run at home to make sure you're prepared.

Calibrate Weather Sensors

The sensors belonging to the Weather module are factory calibrated and do not require additional field calibration.

Congratulations!

Your readings should now be accurate.

Important Note: Remember, these are only live data readings at this stage. Your FieldKit station won't be recording data until you complete the deployment process and hit "Record Data."

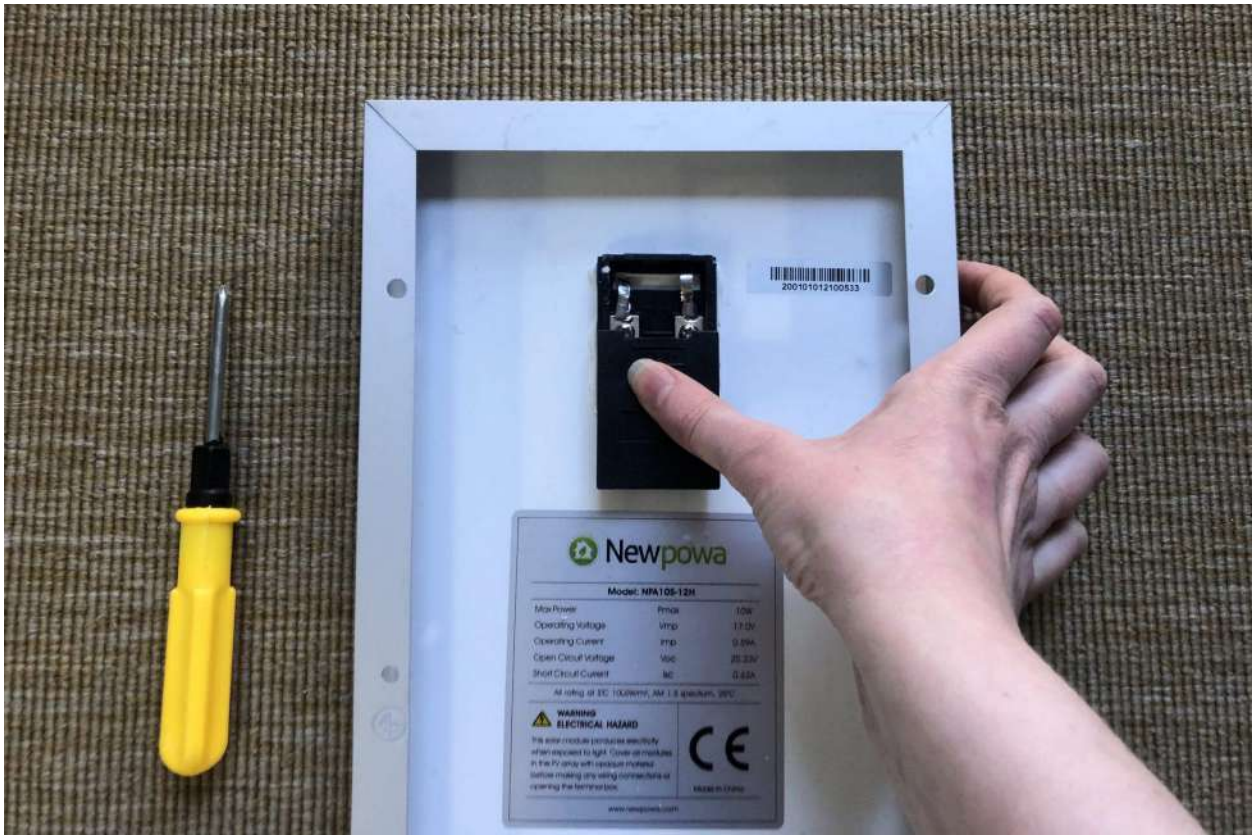
Set Up Solar (Optional)

You may have purchased a FieldKit Solar Panel. If so, we recommend assembling and testing the panel (by attaching the cable) at least once before leaving home, so that you know everything is in working order and you have a plan for deployment. If you prefer to transport the cable separately from the panel, you can simply disassemble them before heading out to the field and re-assemble onsite.

Important Note: High-pitched whining or beeping noises may sometimes be audible, especially when charging from solar power; these are expected and part of normal operation.

Assemble Solar Panel

To assemble your solar panel:

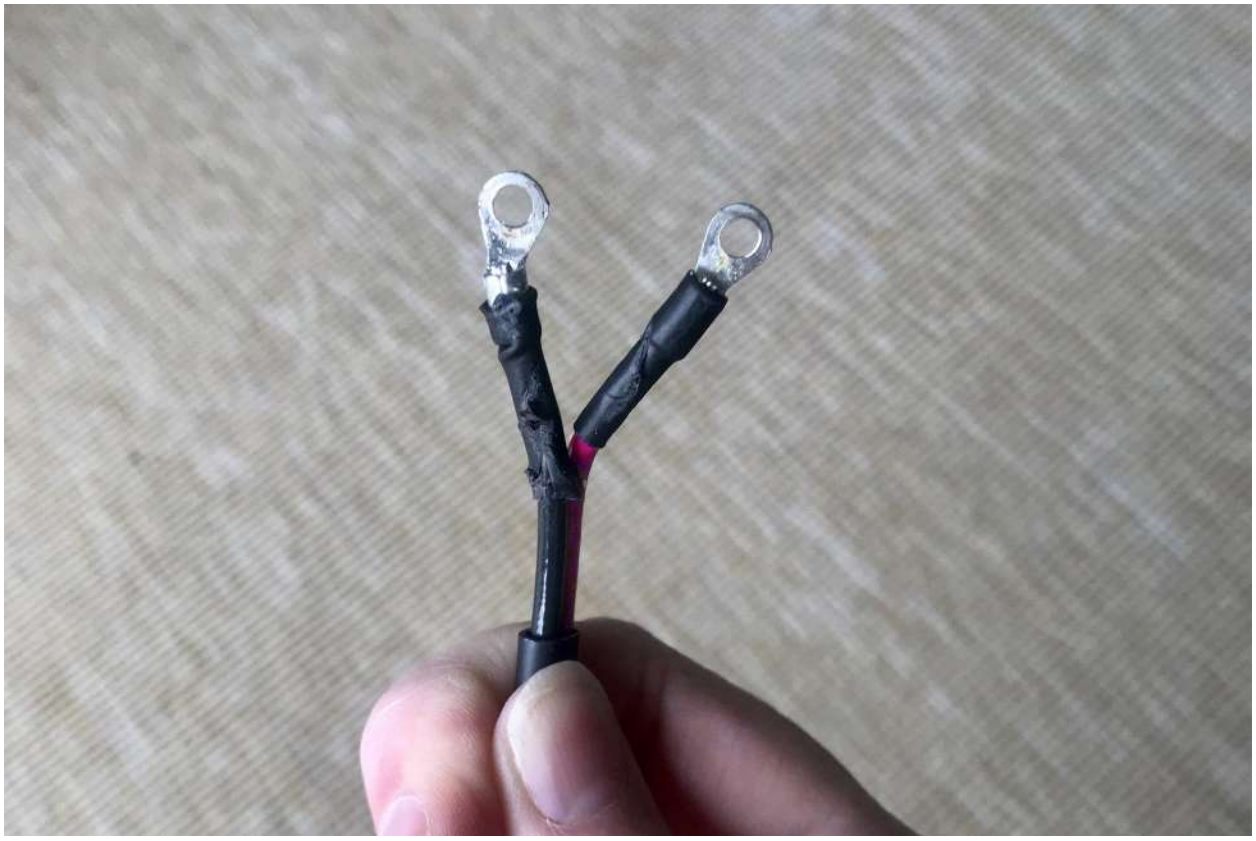


1. Slide Off Box Lid

Turn the panel onto its front, so the back side is facing up. You'll see a black box on the back of the panel. Slide off the box lid by applying some pressure where it says "OPEN" and pulling down.

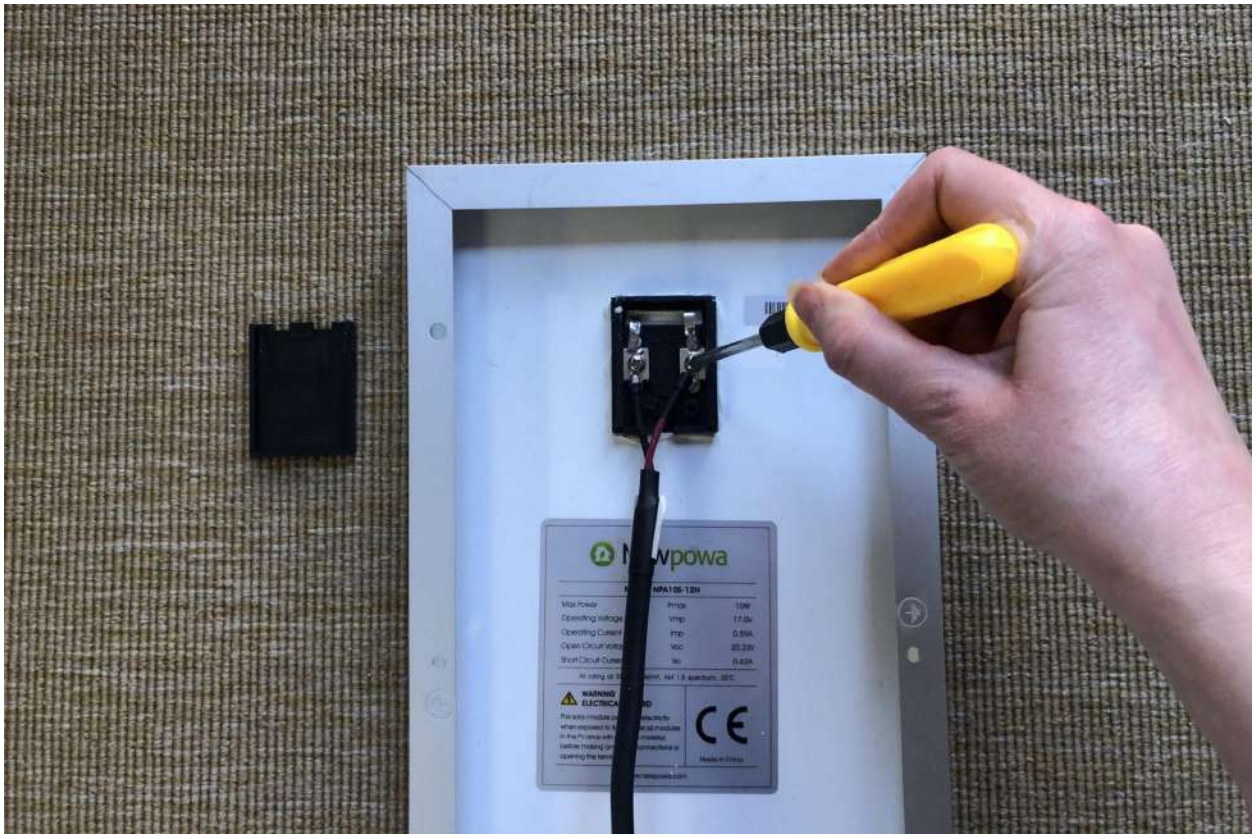
2. Remove Screws

Remove each of the two screws and washers from the threads within the box.



3. Find Cable

Locate your solar panel cable. Take the end that terminates in two wires, one red and one black, each attached to a metal lug (a circular metal finding).



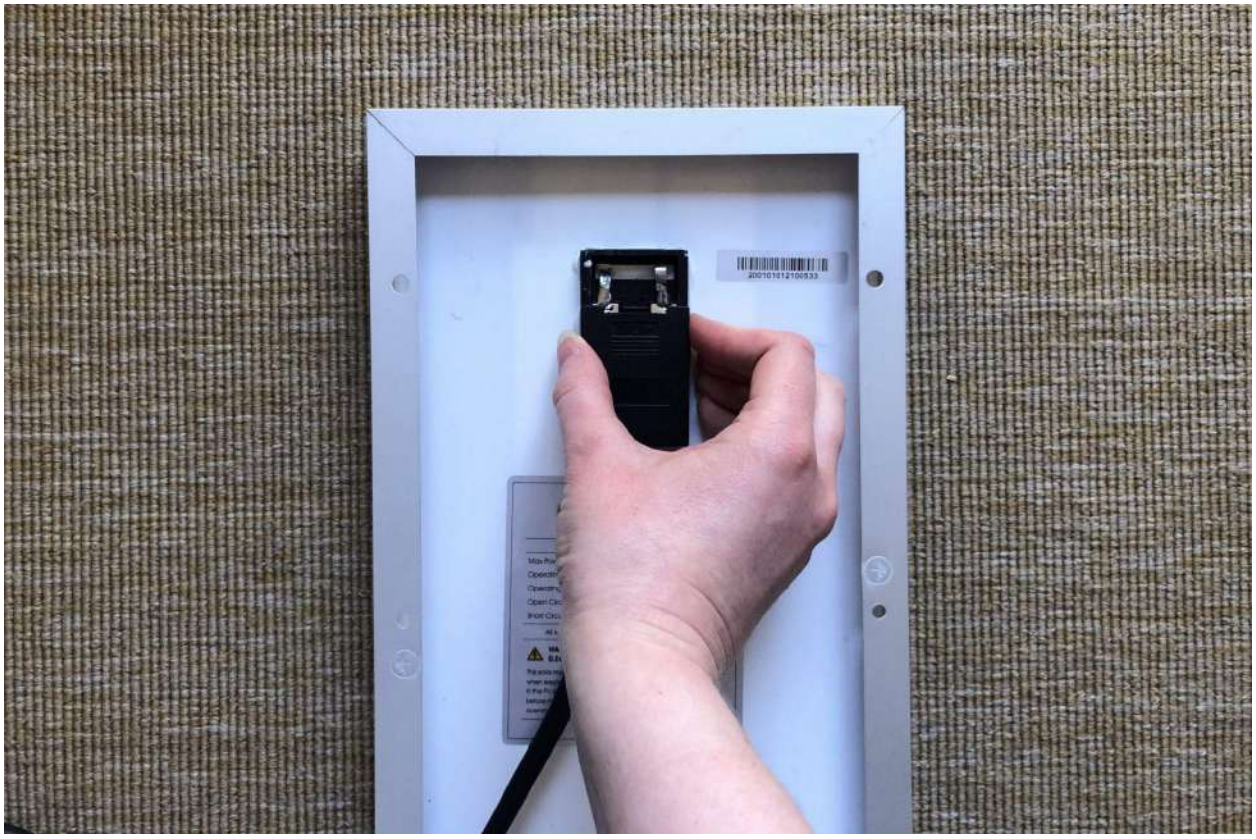
4. Attach Cable

Place the two lugs over the threads in the box, then reinstate the screws and washers. Screw them back into place.

Important Note: Be sure to assign the lug on the red cable to positive (+) and the lug on the black cable to negative (–).

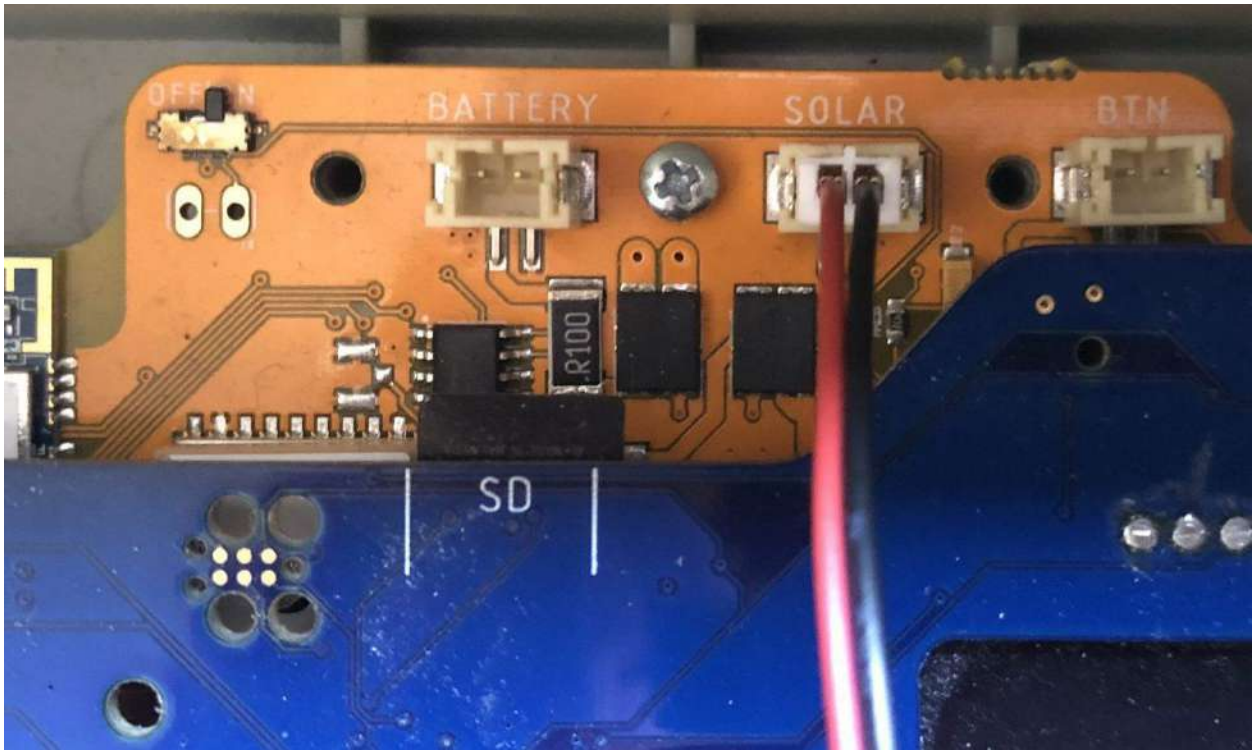
5. Sculpt Wires

Bend and mold the wires so that they fit into the groove. They are quite stiff, so don't be afraid to push them with some force. It will be a snug fit.



6. Slide On Box Lid

First, make sure everything is sitting as flat as possible. Then, apply some pressure and slide the lid back onto the box.



7. Insert Solar Cable

Take the other end of the solar cable and insert it into the top middle socket of the Upper Board where it says “SOLAR.”

Warning: Before inserting the battery, solar and button cables, double check that you are connecting them to the correct sockets (labelled “BATTERY,” “SOLAR” and “BTN”). Inserting cables into the wrong sockets can permanently damage your FieldKit.

Place Solar Panel

During deployment, you’ll need to ensure you’re placing your solar panel in the optimum conditions to charge the battery that’s powering your station. Read more about this in our section on Solar Deployments and in our Care Instructions section.

Ready to Deploy

Now that you know your live data readings are accurate, you're almost ready to start recording data.

Before heading out into the field, take the time to plan your deployment. How often and at what time of day will you take readings? Consider where you're going. Think through the land regulations, safety considerations, tools needed for the job, replacement parts and the weather conditions. We encourage questions and discussions about these topics and other tips for optimum deployment in the FieldKit Community Forum.

We believe that documentation is important. So while early versions of FieldKit will automatically start recording data, we're working on new functionality to encourage users to realize the benefits of deploying in order to start recording data. That's how this Product Guide is written.

Pre-Deployment Checklist

1. Data Capture Plan

Consider the appropriate data capture schedule for your project. How often and at what time of day will you take readings? Where will you deploy your station?

2. Take Notes and Pictures!

Plan to help your team and the community better understand their environment, and improve future troubleshooting with some contextual notes and pictures. You'll use the app to do this in the field once you initiate the deployment process.

3. Access Issues

Check-in with landowners and stakeholders before deploying your FieldKit. If deploying on state- or federally-owned land, review protocols or contact park personnel. Obtain permits as needed.

4. Double-check Station

Ensure your FieldKit Station is fully constructed and operational before taking it into the field. Assemble your cable plate if you haven't done so already. If you are shipping your FieldKit or otherwise expect a long journey, we recommend transporting your station with the cable plate

and probes removed and safely packaged and then re-assembling your cable plate when you reach your destination.

Important Note: Check out our Care Instructions to ensure you're setting yourself up for success. Do not skip this step.

5. Data Storage Back-up and Firmware Updates

We recommend that you check for firmware updates and update your station firmware when you are near your station and have a reliable internet connection. Do this before you go into the field to deploy your station or plan to leave it alone for a long period of time. For detailed instructions on how to update your firmware, check out Update the Firmware.

In order to back up your data and update your firmware, (which we highly recommend), make sure a microSD card* is in the FieldKit cardholder on the Upper Board.

6. Verify Power Source

What are your power sources? If you're not using a solar panel or plugging into power directly, is your FieldKit fully charged or equipped with fresh batteries?

7. Consider Mounting Materials

Are you mounting your FieldKit to a post? To a tree? If leaving it in the field for an extended period, make sure you've got the materials to attach it safely and securely without damaging the environment.

8. Leave (Almost) No Trace

Beyond your FieldKit Station, be sure to clean up after yourself and leave the location as you found it, so take a trash bag. In the future, when you've completed your deployment and removed your FieldKit, it should be like you were never there!

9. Weather Forecasting and Extra Tools

Check the weather forecast and prepare accordingly. Bring a multitool with a screwdriver for last-minute adjustments in the field.

10. Take Care of Yourself!

Tell someone where you're going, especially if it's going to be remote. Respect nature—beware of rough terrain or dangerous animals. Read more on Safety in the Field here.

Unsure About Anything?

If you have any questions or concerns about deployment, the FieldKit Community Forum is a great place to go for help. Unsure how to set up your station in a new environment? Curious about how to plan for bad weather? Here you can learn from other people using FieldKit stations (as well as the FieldKit team). Visit the Community Forum

Deploy Station

It's time to put your FieldKit to work and start recording environmental data out in the world.

Take your station to your deployment location, choose a data capture frequency, and document the process. The more information you gather in photographs and field notes during deployment, the more context you and your team will have to work with when analyzing the data later.

We believe that documentation is important. So while early versions of FieldKit will automatically start recording data, we're working on new functionality to encourage users to realize the benefits of deploying in order to start recording data. That's how this Product Guide is written.

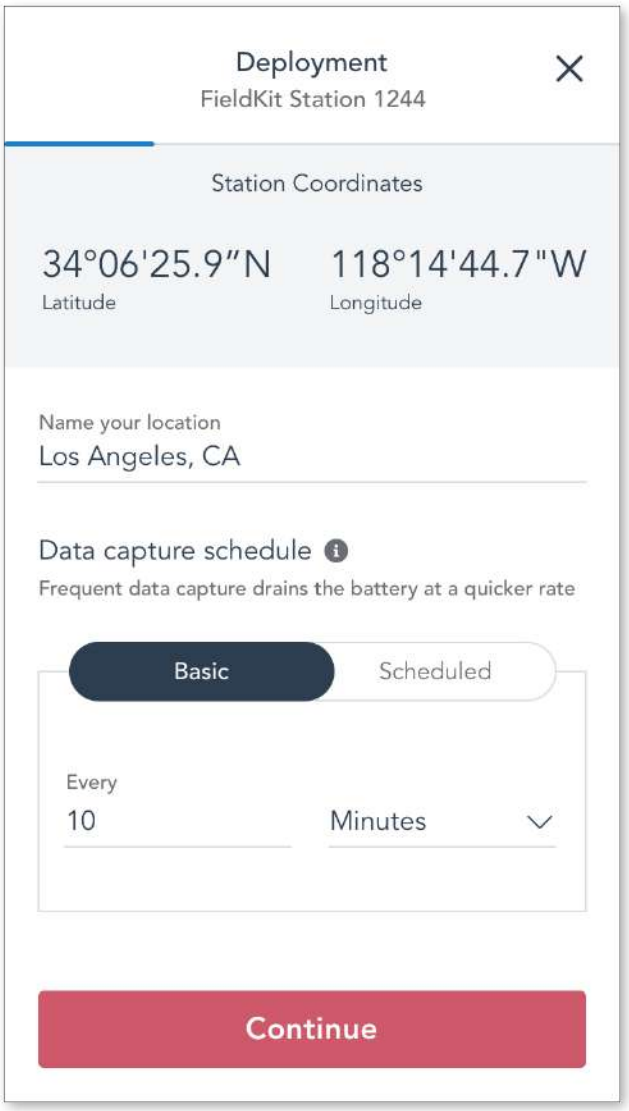
1. Mount Station Securely

Mount the case to a post or a tree with non-invasive mounting solutions, so that your station is protected from the elements and any curious animals!

2. Deploy Station

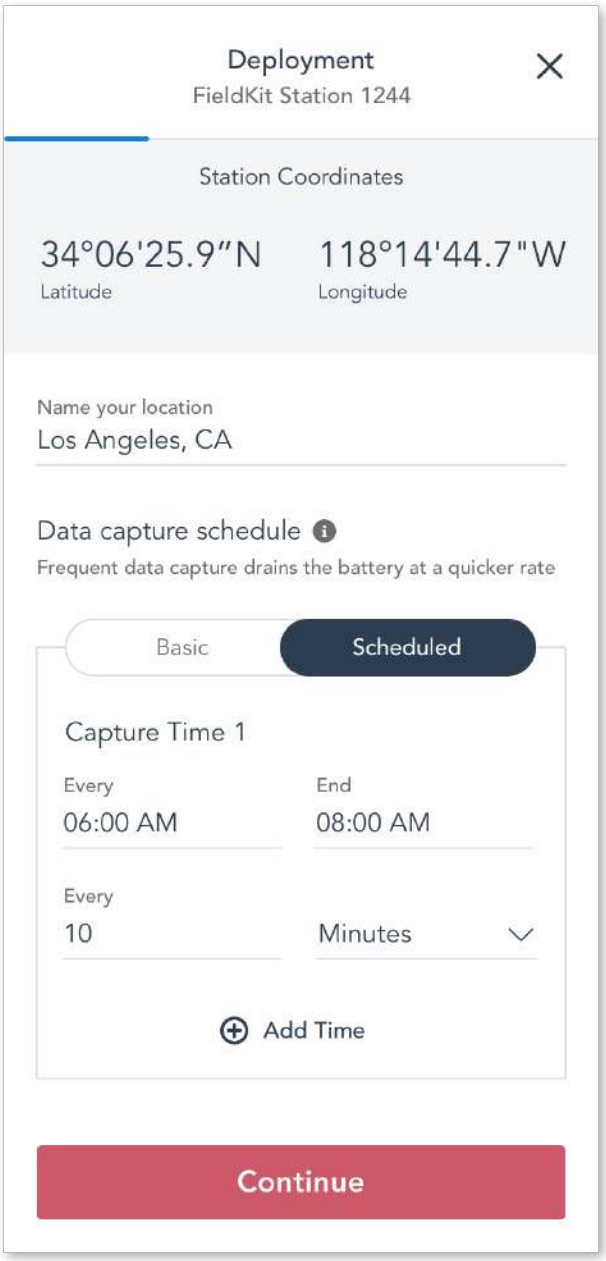
Once your station is secured, make sure that external instruments like probes or the weather cluster are properly set up. For more information, see our general Care Instructions and the sensor-specific deployment guidance below.

Ensure your power sources are in place (battery, micro-USB or solar). See the Set Up Solar section for guidance on setting up your solar panel if you are using one.



3. Name Deployment Location

In the app, name your location for future reference. Depending on your connectivity, we'll detect your GPS coordinates or locate your position on a map.



4. Set Data Capture Schedule

Check the FieldKit app to ensure each sensor is still reading live data. These data readings are not being recorded at this stage. Your FieldKit station won't be recording data until you complete the deployment process and hit "Record Data."

Set your preferred data capture schedule. Indicate when and at what interval data readings should be recorded. Note that more frequent intervals of data capture drain the battery faster.

Choose which type of data capture schedule to set:

Simple Data Capture Schedule

Set your station to take data readings at a set interval of minutes or hours. This is useful for projects that need a consistent amount of data over a 24-hour period.

Example: *Every 5 minutes*

Example: *Every 1 hour*

Complex Data Capture Schedule

Set your station to take data readings at one or multiple specific times of the day, each at a set interval of minutes or hours. This may be useful for projects where most data is best gathered around certain events like sunrise or sunset, thus you'll save battery by not recording (at all or at the same rate) around the clock.

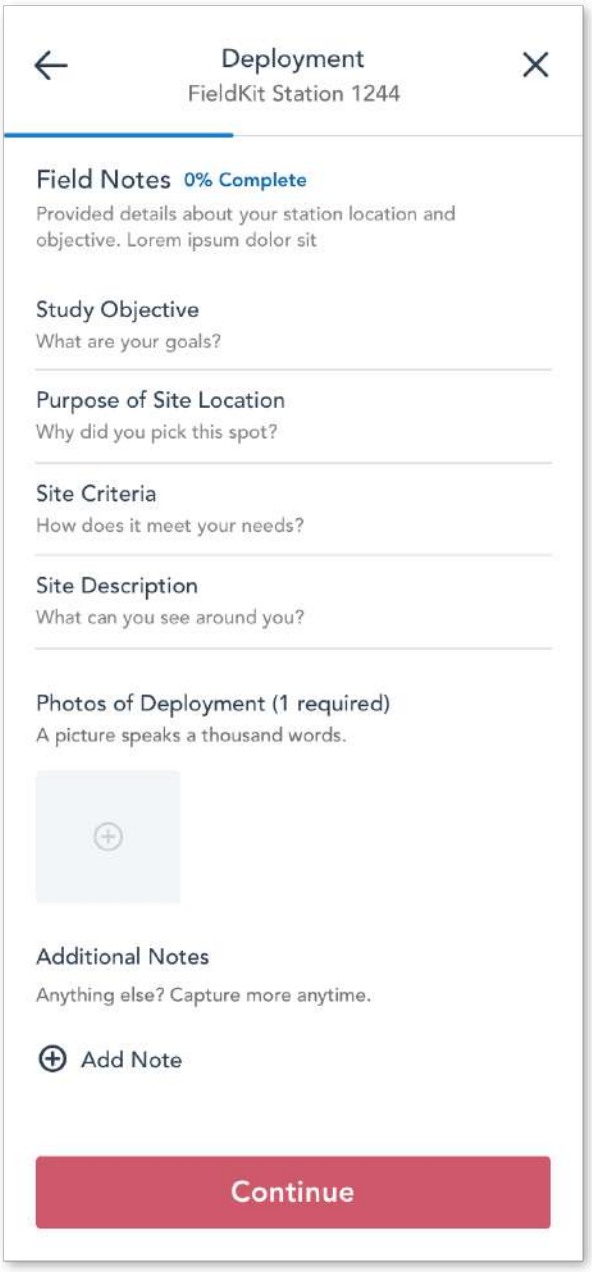
Example:

Capture Time 1: Starts at 04:00 and ends at 07:00 and records every 1 minute

Capture Time 2: Starts at 07:00 and ends at 17:00 and records every 1 hour

Capture Time 3: Starts at 17:00 and ends at 19:00 and records every 1 minute

Capture Time 4: Starts at 19:00 and ends at 04:00 and records every 1 hour



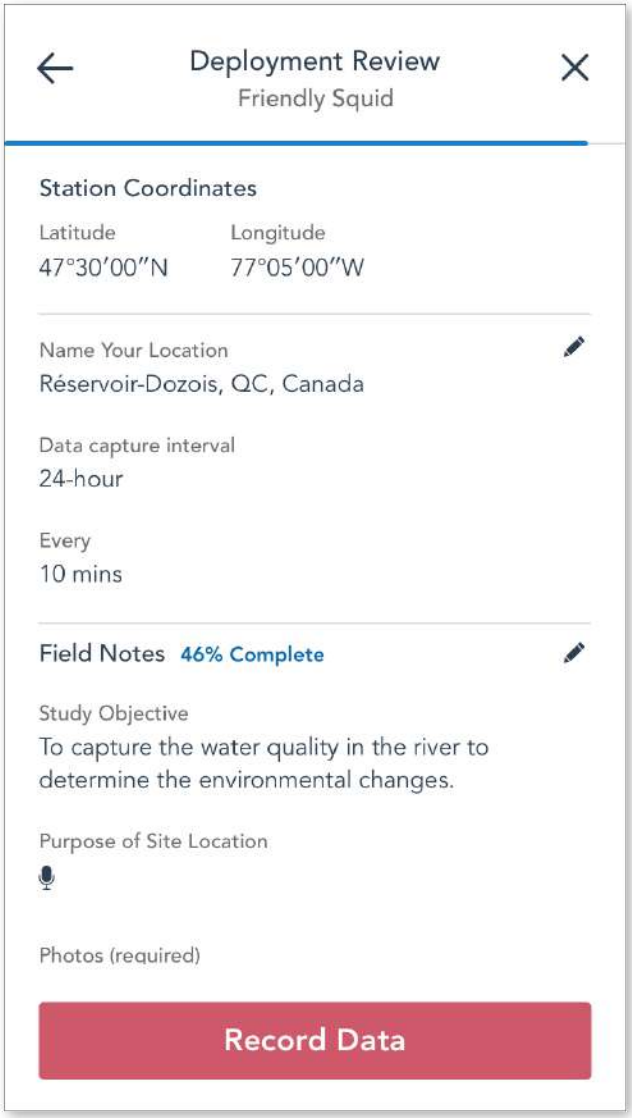
5. Document Deployment Conditions with Field Notes

By providing some context to your deployment, not only are you helping the wider community better understand their environment—you're also helping your future self and your teammates gain clearer insights from the data.

Plus, if your station encounters issues, a little admin work now could save you lots of time and headache in the future, especially if your FieldKit station is deployed in a remote location.

Start with some notes. If your hands are full, you can take an audio recording of yourself through the app to capture your thoughts in the moment. You can do this by clicking into a section of the Field Notes and then clicking the microphone icon at the lower right hand side of the screen. Otherwise, type detailed notes that can inform data analysis and future visits to the station.

Then snap some pictures of your deployed FieldKit station and the surrounding area. Is it set up near any landmarks? Are there any hazards around?



6. Hit "Record Data" to Begin Data Capture

Double-check the 'Deployment Review' page. Is your information correct? Review everything as if you are a future version of yourself or someone new to the study. Would you be able to understand everything? Great! You're ready to start recording data. Hit "Record Data."

7. Congratulations! Now Capture Some Initial Data

You are now deployed and recording data. We recommend hanging around to gather a few readings to sync that initial data capture to the FieldKit app. This will verify that your FieldKit is recording data properly.

8. Final Punch List Before Walking Away

Make sure that the gaskets in your FieldKit Case (lid and cable plate) are sitting snugly in the grooves, nice and flat, not stretched or twisted, and the lid is properly closed using the lid clasps for maximum water resistance.

Clear up after yourself, leave the location as you found it, and leave with the peace of mind that your station is secured, protected and working.

Important Note: Take a moment to revisit our Care Instructions, the sensor-specific deployment guidance below and your Pre-Deployment Checklist to ensure you've set yourself up for success before you walk away. Do not skip this step.

Weather Deployments

Here are some things to think about when deploying Weather sensors.

Make Sure Nothing Has Shifted in Transit

Make sure your Rain Gauge is clear of the Anemometer and Wind Vane and did not shift during assembly.

Mount 5M Above Ground

Ensure the Weather Instrument Cluster is set up in an area with unobstructed air flow and is attached to a mast more than 5 meters above the ground. This is to avoid boundary effects and record accurate measurements.

Is Everything Standing Straight?

Ensure the whole thing is plumb (standing up straight). To do this, tie a string with a weight on it to the top of the Wind Vane arm, then adjust the mast until it is parallel with the string. You can also simply place a bubble level on top of the Rain Gauge.

Line Up with Due North

Locate the cardinal directions on the Wind Vane—you'll place it in the field with the "N" mark facing north.

Anchor Securely in Case of Strong Winds

Anchor your station securely in place when leaving it in the field, especially if your location might experience intense winds.

Cover Cables for Protection

Use some sort of cable cover (such as wire loom or metal cable jacketing) to prevent the cables from being chewed on by rodents or other wildlife.

Water Deployments

Here are some things to think about when deploying Water sensors.

Remove Protective Caps from Probes

The Dissolved Oxygen and Electrical Conductivity probes have black protective end caps that must be removed before deployment. Retain these caps and replace them on the ends when not using the probes to protect your equipment, after rinsing your probes in clean water. The pH probe has an end cap containing a buffer solution and an o-ring to prevent leakage of the solution. When removing this cap, take care not to lose the o-ring nor spill the solution, as these should be replaced on the end of the pH probe when not in use. While in the field, you can keep the solution from spilling by placing cling wrap or a square piece cut from a plastic bag over the top of the jar and then screwing the lid into place.

Warning: The buffer solution used with the pH probe is important for maintaining the life of the probe. If you spill the solution, fill the cap with clean water temporarily and replace the solution as soon as possible. The solution used in the FieldKit pH probes is a 4M Potassium Chloride Solution (KCl). To replace it, you can purchase pH Storage Solution from a laboratory supplier or use the instructions here. The solution will not cause harm to the skin but should not be ingested. Never store your pH probe in deionized or distilled water, as this can deionize the probe, rendering it unusable.

Submerge the Bottom of the Probes

Ensure that the bottom of each probe is submerged in the water by at least 5 cm (~2 inches). The entire probe and its cable are waterproof and can be fully submerged safely.

Protect Against Freezing

Make certain that pH, Electrical Conductivity and Dissolved Oxygen probes are not allowed to freeze in place, as this will damage them. The temperature probe will be fine in freezing conditions.

Take Initial Measurement

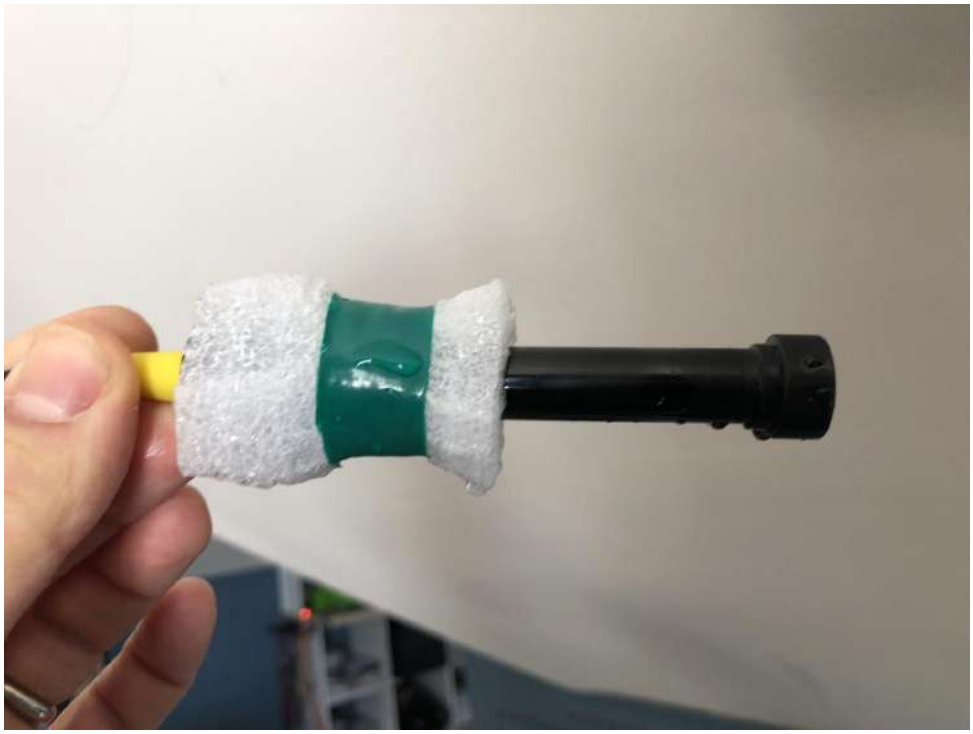
For measurement of stage height in bodies of water with the distance sensor, make certain to first get a measurement of the height of the sensor above the bed directly below it using a plumb bob in order to know what distance to subtract from to get your stage height.

Consider Placing Probes in Stilling Well

If deploying in moving water, consider putting your probes in what is known as a stilling well: a section of pipe held above the bed to allow for water to slow down and allow sufficient contact time with probes to make an accurate measurement.

Use Protective Cable Cover

Use some sort of cable cover (such as wire loom or metal cable jacketing) to prevent the cables from being chewed on by rodents or other wildlife.



Attach Probe Using Float if Necessary

If deploying in water with a changing level, probes may be attached so that they're entirely submerged, but Dissolved Oxygen is measured with respect to overpressure, which is the sum of atmospheric pressure and the pressure of the water column. In order to keep this as simple as possible, we recommend putting this probe on a float inside of a stilling well so that it's always submerged by the same amount. A simple float can be made from open cell poly packing foam and electrical tape. Just make sure that the bottom of the probe is submerged by 5 cm!

Solar Deployments

Here are some things to think about when deploying solar panels.

Warning: Before inserting the battery, solar and button cables, double check that you are connecting them to the correct sockets (labelled “BATTERY”, “SOLAR” and “BTN”). Inserting cables into the wrong sockets can permanently damage your FieldKit.

Optimize Sun Exposure for Solar Panels

Make certain that your solar panels are facing the direction where they will be getting the most sun (i.e. not being shaded by trees or buildings). A general guideline is to mount them at an angle corresponding to your latitude and toward the sun.

For example, if I were at 42° N and I had trees screening to my east, I would aim my panel to the southwest at an angle of 42° from a line parallel to the ground. If I were at 31° S, with trees screening to my northwest, I would aim my panel northeast at 31° degrees.

Use Protective Cable Cover

Use some sort of cable cover (such as wire loom or metal cable jacketing) to prevent the cables from being chewed on by rodents or other wildlife.

Sync Station Data

FieldKit is more than just data collection.

Syncing your data to your phone and, subsequently, the FieldKit web portal allows you to visualize station data, discover trends and patterns, and share your findings with anyone.

While early versions of the FieldKit app require you to manually sync data by hitting the "upload" and "download" buttons, we're working on in-app data sync settings to provide the option to automate this. Also, while we list two ways to sync data in a remote location with no internet, early versions of FieldKit require you to use the in-app option. We're still working on the microSD card option.

Data Sync Phone Settings

In Settings > Data you can choose your phone's data sync settings:

- Auto Sync Station Data
  Toggle on to automatically download data from your station to your phone.
- Auto Sync Portal
  Toggle on to automatically upload data from your phone to the portal when you have internet access.
- Mobile Data Usage
  Depending on your phone's data plan, you might also choose to toggle this on to avoid using mobile data. That way, you only sync data to the portal over WiFi, rather than the cellular network.

Syncing Station data in a connected location (with internet access)

For connected locations with internet access, we recommend adding a list of preferred WiFi Networks to sync station data straight to the FieldKit web portal (Station Settings > Data), and toggling on "Auto Sync Station Data" and "Auto Sync Portal" (Settings > Data). That way your station will periodically join these networks and automatically sync station data. If unable to join these networks, the station will use its own Station WiFi as a fallback.

Syncing Station data in a remote location (no internet)

For remote locations with no internet access, you will need to physically return to your FieldKit station to sync your data. When you return to your station, you can sync data in two ways:

1. Use the app to connect wirelessly to the station via the Station WiFi, which will sync station data to your phone only. When you have an internet connection later, you can upload that data to the FieldKit web portal.

2. Manually swap out the microSD card with your data backups for a fresh one.*

   *MicroSD cards are not included in FieldKit products, but we highly recommend that you buy one separately. You need a microSD card to collect logs for diagnostics and troubleshooting, back up your data and update your firmware.

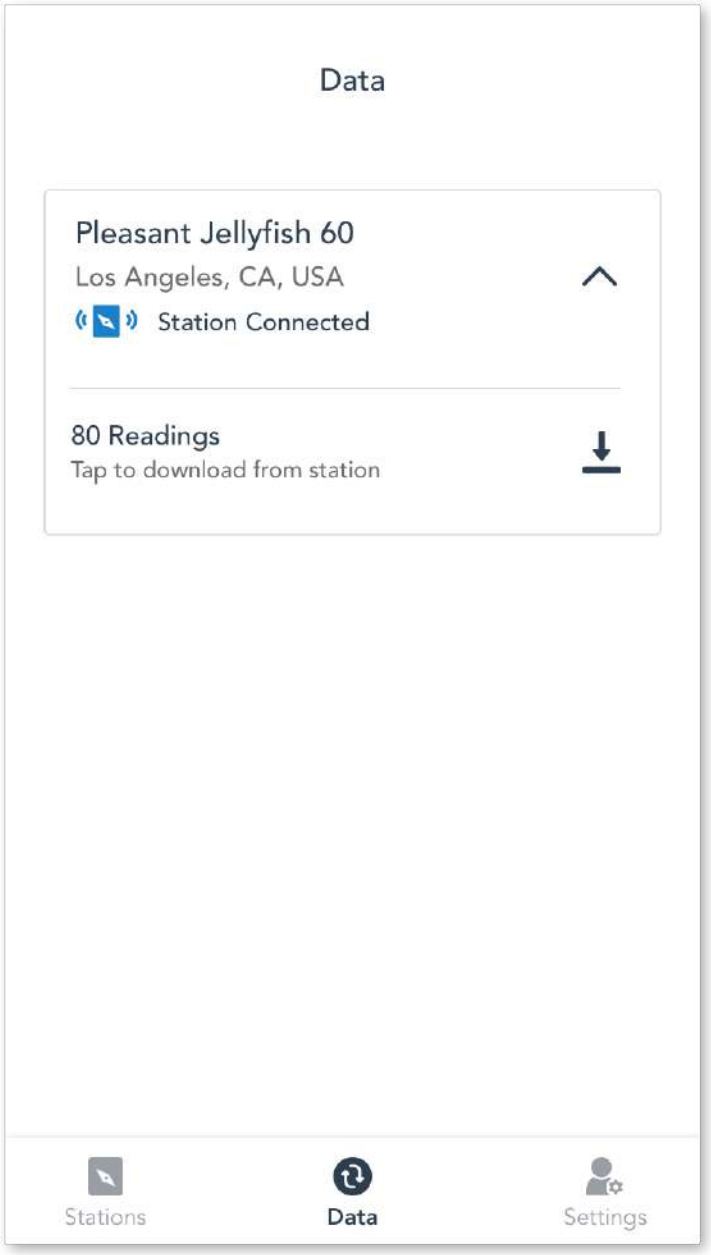
1. Plan Ahead

If you're planning on syncing station data after a long period of data capture, you run the risk of consuming more storage than is available on your phone. Thus, you may want to free some up before leaving for the field.

Quick Tip: To avoid a situation where you run out of phone storage or time onsite to sync data, you might prefer to take an empty microSD card with you. That way, you can simply swap out the full microSD card for the empty one. Later, you can download the data to your phone or another device using a microSD card adaptor.

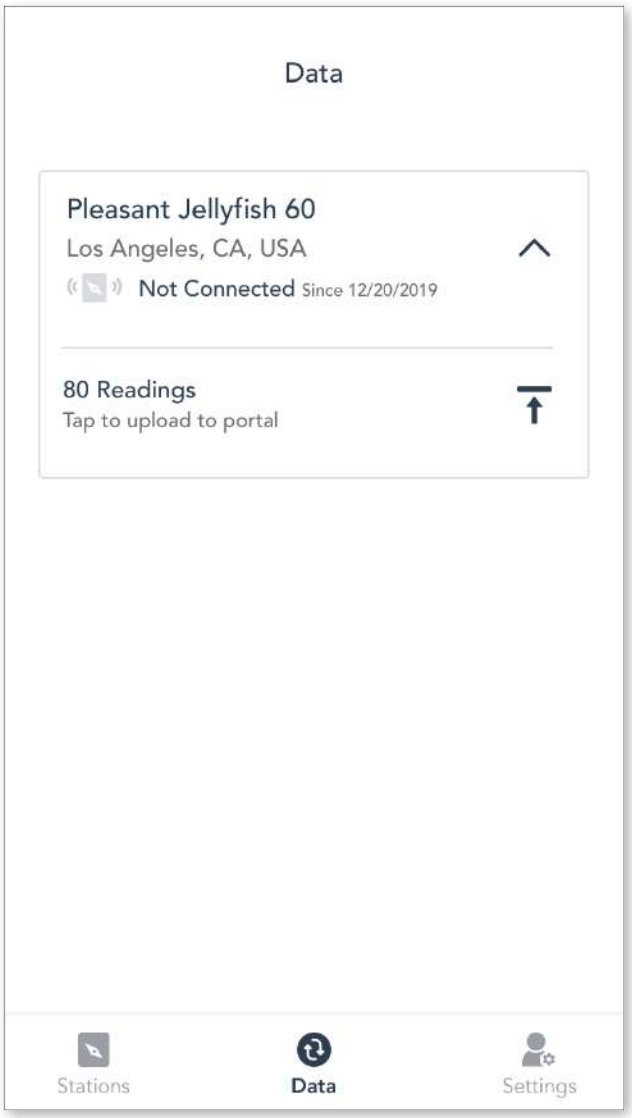
2. Turn on Station WiFi

Your station has an access point with its own WiFi signal. It acts like a hotspot so you can connect to it via your mobile device and transfer data. Press the button to enable station WiFi.



3. Download Station Data to your Phone

Once you are connected, if you've toggled on "Auto Sync Station Data", your phone should automatically begin downloading the station data to your phone. Otherwise, hit the download icon on the "Data" screen to manually download the data. Once downloaded, it will confirm how many data readings have synced.



4. Upload Data to FieldKit Portal

Once you have the data on your phone and have internet access, you are ready to sync it to the FieldKit web portal. Disconnect your phone from the Station WiFi and join either a cellular network or a WiFi network to start the upload. Hit the upload icon on the "Data" screen to manually upload the data to the portal.

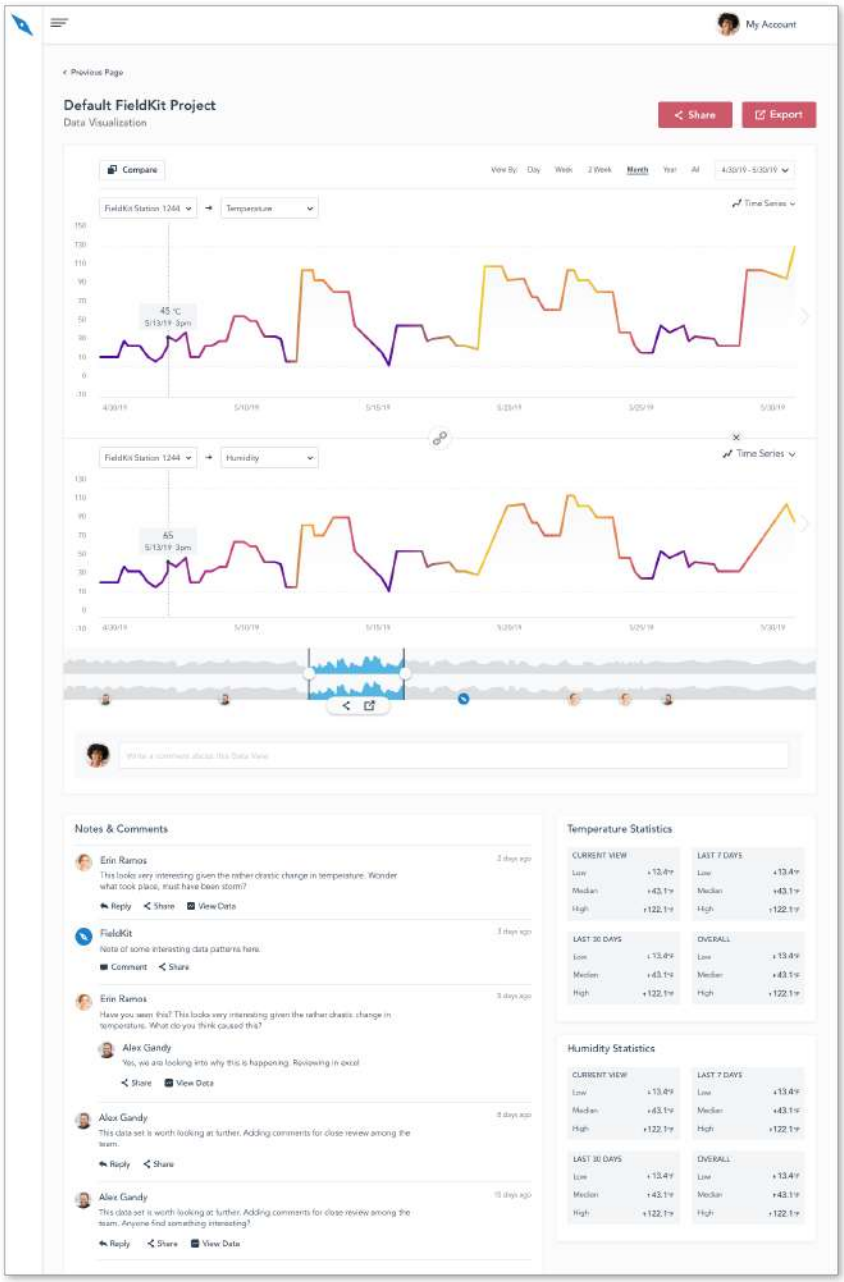
Warning: Syncing to the portal over a cellular network may incur data and/or roaming charges. Check with your provider for more information, or to be safe just use a WiFi network.

Review Data

Once your station is installed and your data is synced to both your FieldKit app and the FieldKit web portal, you can easily interact with your data.

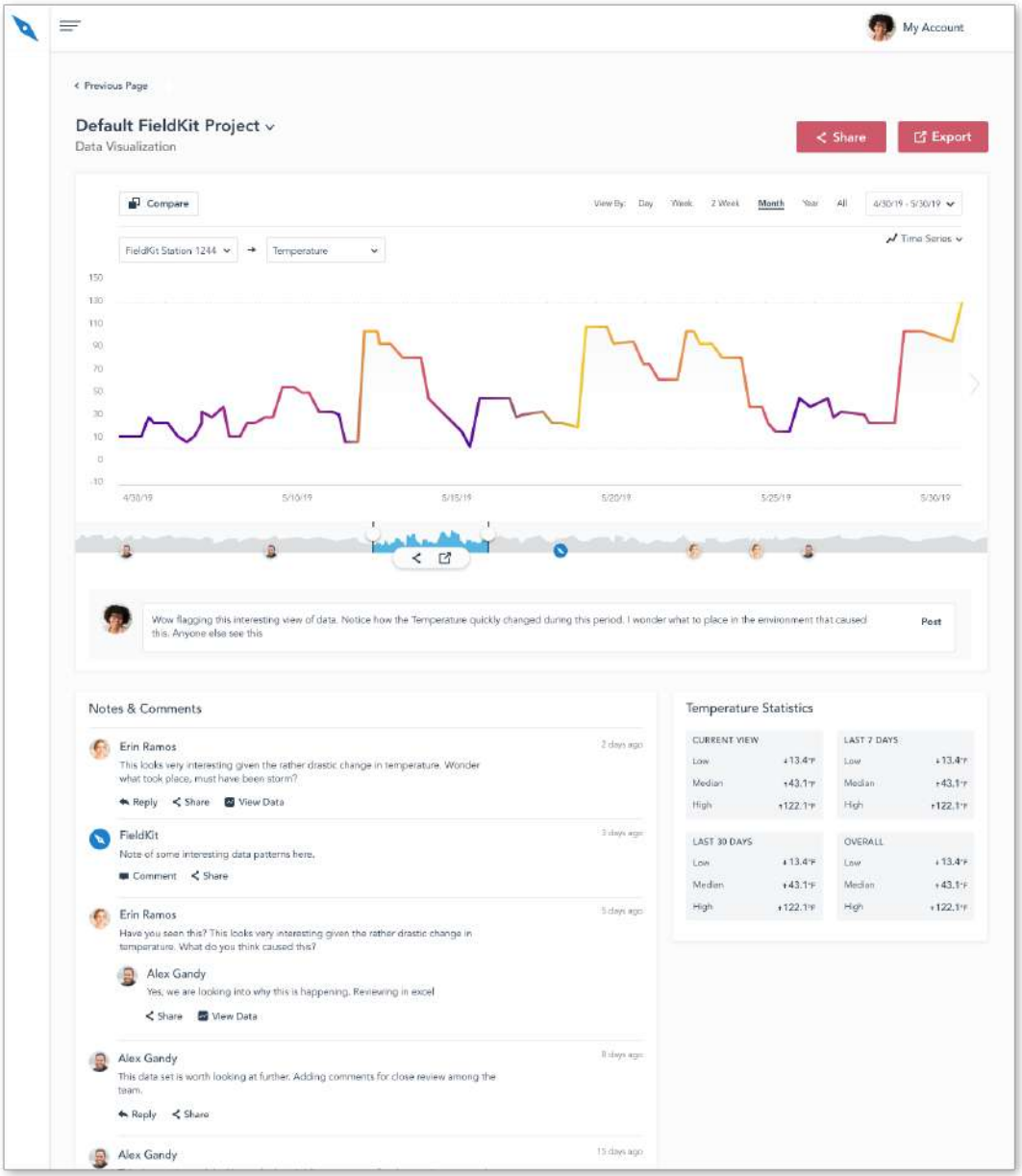
Our visualization interface allows you to spot patterns, trends and anomalies, and to flag and share them for collaborators and the FieldKit community. The best experience for reviewing data is on a desktop.

We hope you will eventually be able to benefit from the functionality below, but not all of these features are in place yet within the FieldKit web portal. We are working on bringing in data verification and controls.



1. Make Comparisons with Data

Data visualizations allow comparison between time periods on one sensor or between different sensors in the same time period.



2. Comment on Data

Annotation features allow you to flag and share interesting data within your team or with the broader FieldKit community.

3. Verify Data

Verify the quality of data by checking the FieldKit metadata. This includes:

- Provenance information
- Verified calibration specs

- Links to details of station installation

4. Control the Fate of Your Data

The data lifespan is not tied to the lifespan of your FieldKit project. You can:

- Backup data to your own device
- Control permissions on who can access the data
- Establish peer-to-peer networks to share your data securely

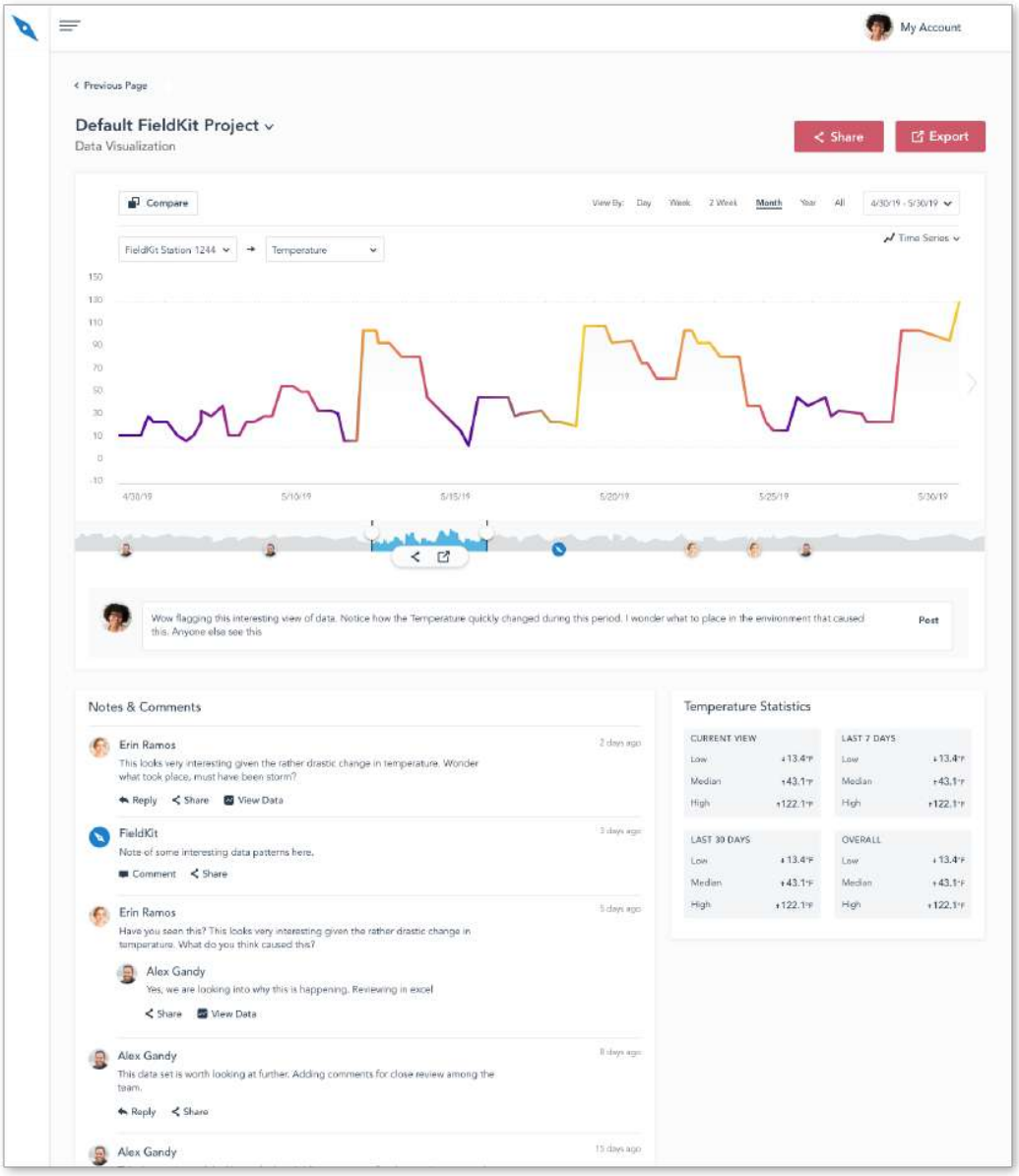
Share Data

The FieldKit platform is a hub for environmentally conscious people around the planet.

You can share what you've discovered with your stations, get help with analysis and compare your data with those close-by and far away.

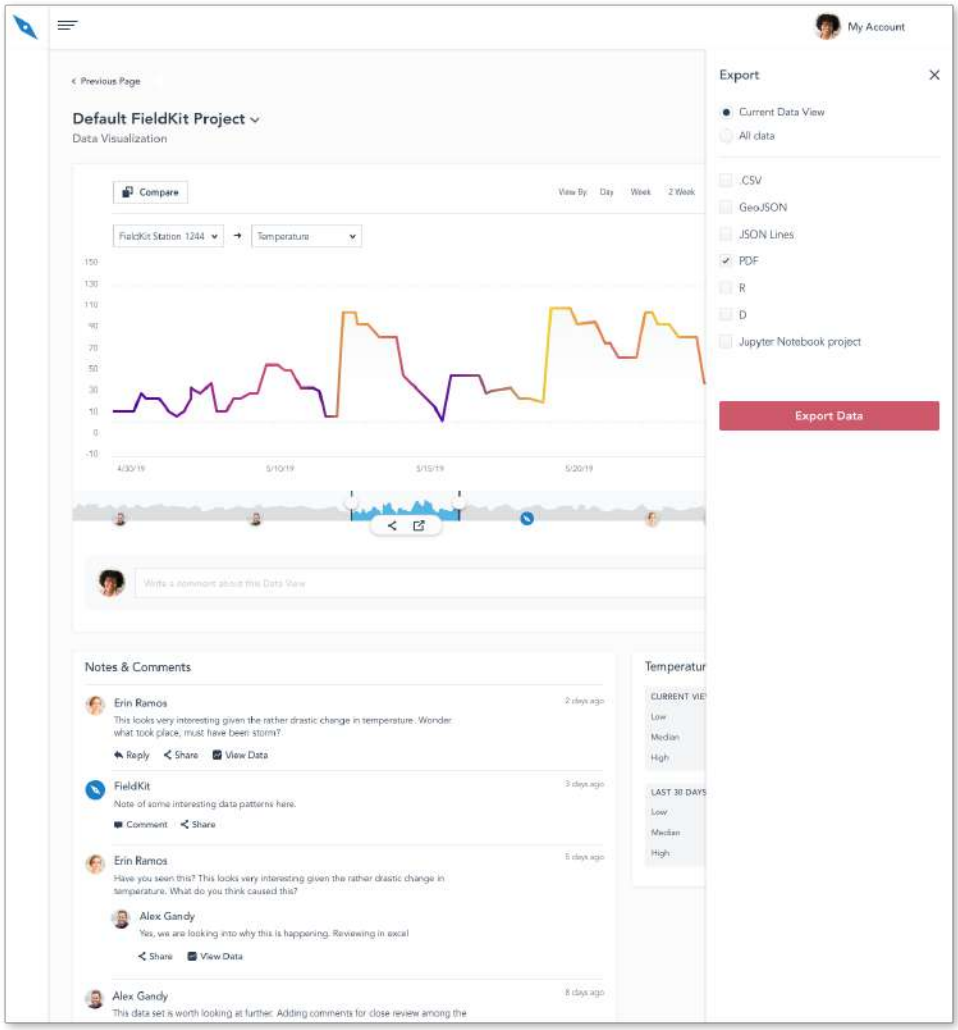
Each visualization can be shared as a link which takes you to the interactive visualization. We also make it easy to download your data, so you can use it in your research or send it to colleagues and collaborators.

We hope you will eventually be able to benefit from the functionality below, but not all of these features are in place yet within the FieldKit web portal. We are working on richer share and export functionality.



1. Share Data between Teammates and Other Collaborators

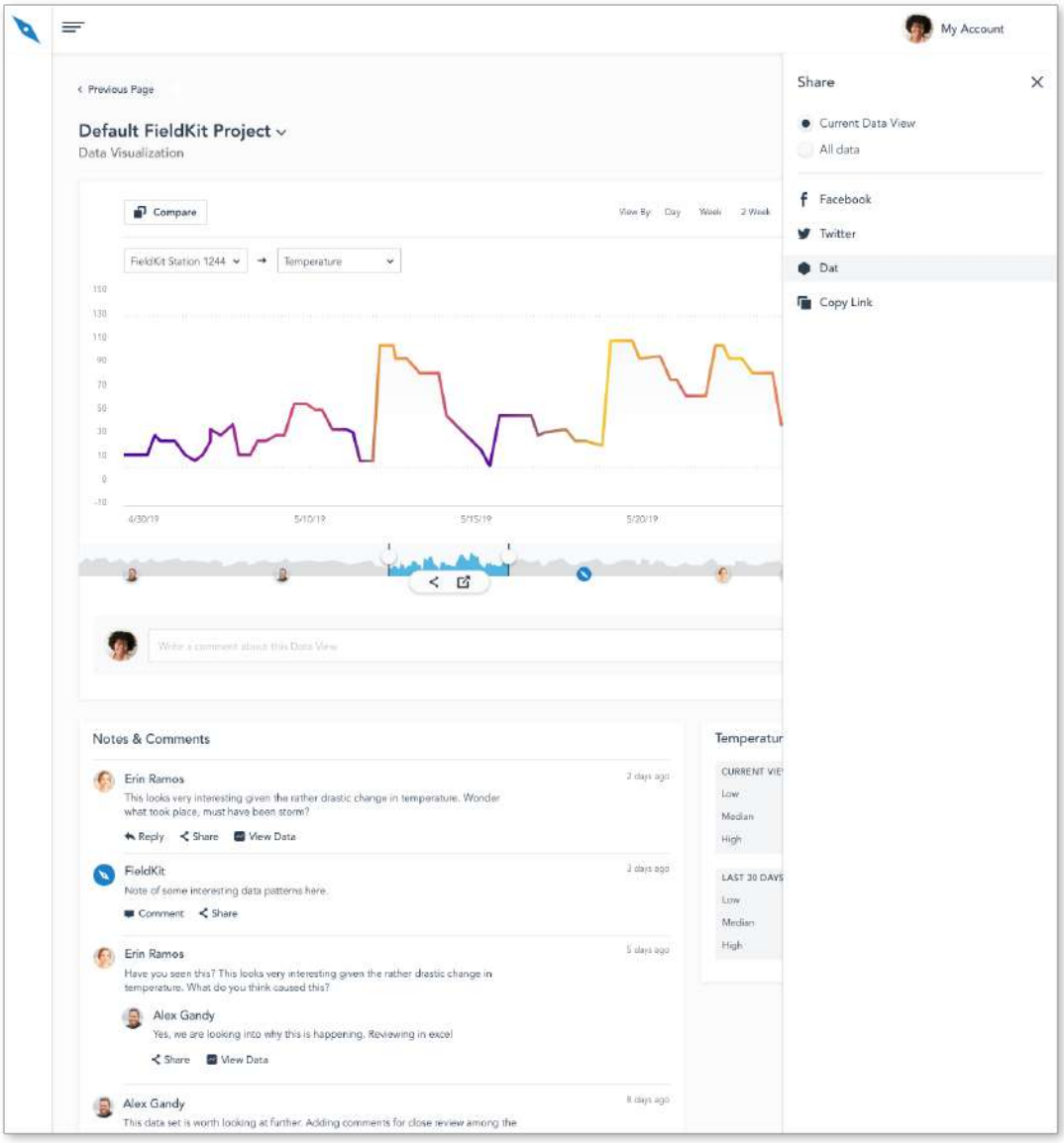
Raw data from sensors can be shared from the station page securely via the DAT protocol. Data can also be shared via ‘data views,’ offering data points or ranges for easy sharing on social media.



2. Export Data

Data from any visualization can be exported in the following formats:

- CSV
- JSON Lines
- raw
- GeoJSON
- PDF data report
- R, D3, Jupyter Notebook projects with working code examples



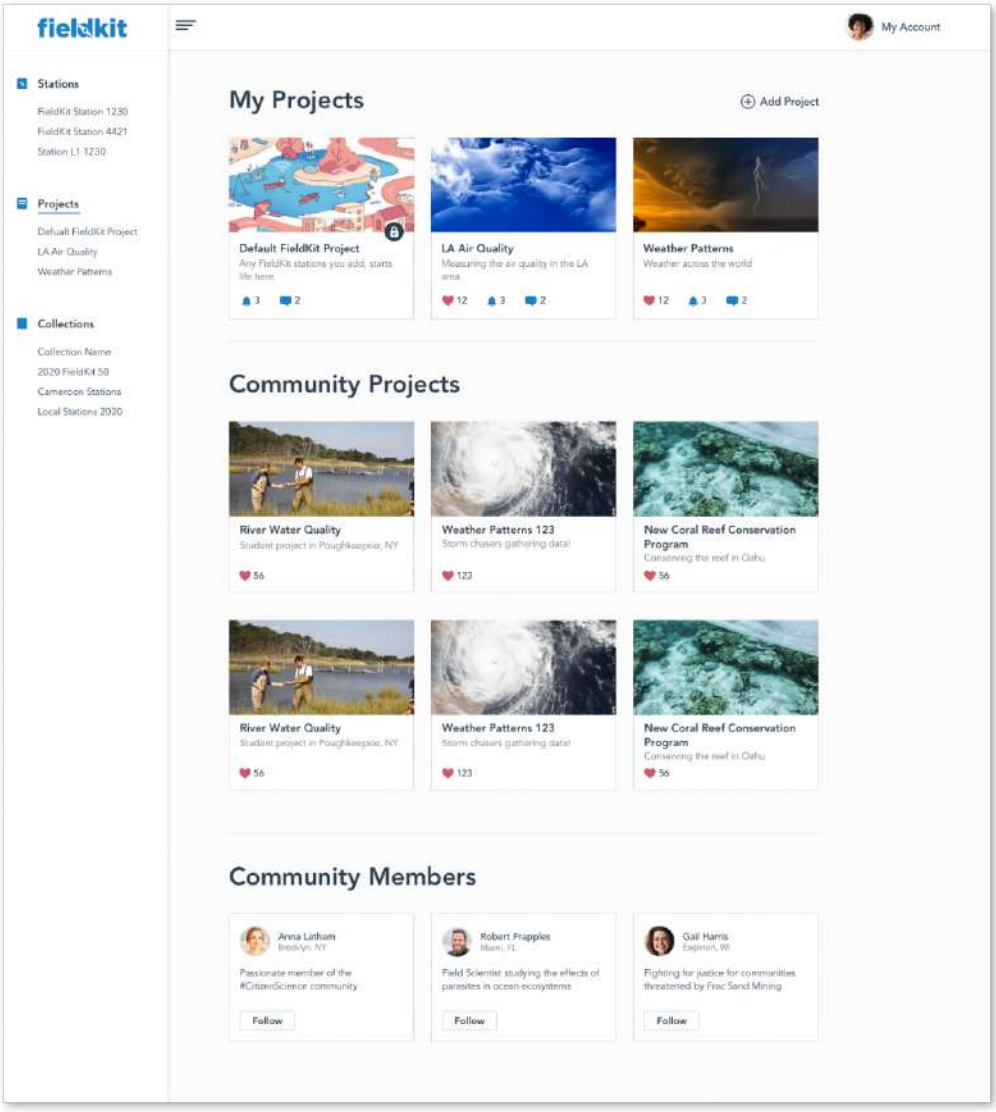
3. Social Share

Share a link to a view of your data on your social media.

Connect with the FieldKit Community

Data works better together.

FieldKit is dedicated to supporting a strong community of users and developers, building both local and global connections. On the FieldKit platform, you can engage in discussions with scientists, educators, tech experts and curious individuals—all working to document our ever-changing environment and advocating for a better future.



We invite everyone in the FieldKit community—users, researchers, enthusiasts and anyone else who is interested—to join us in the FieldKit Community forum. Together, our members share resources, ask questions, think through problems, collaborate on new ideas and work to build a

better world. As a FieldKit user, it's also a great place to learn from others using the FieldKit technology.

Upon joining the Forum, you will have access to a Main Community Hub (for general discussions) as well as a FieldKit Help area (to troubleshoot specific problems with your station, the app, or the portal). More content, members and subject areas are being added to the Forum every day, so check in frequently!

App Interface

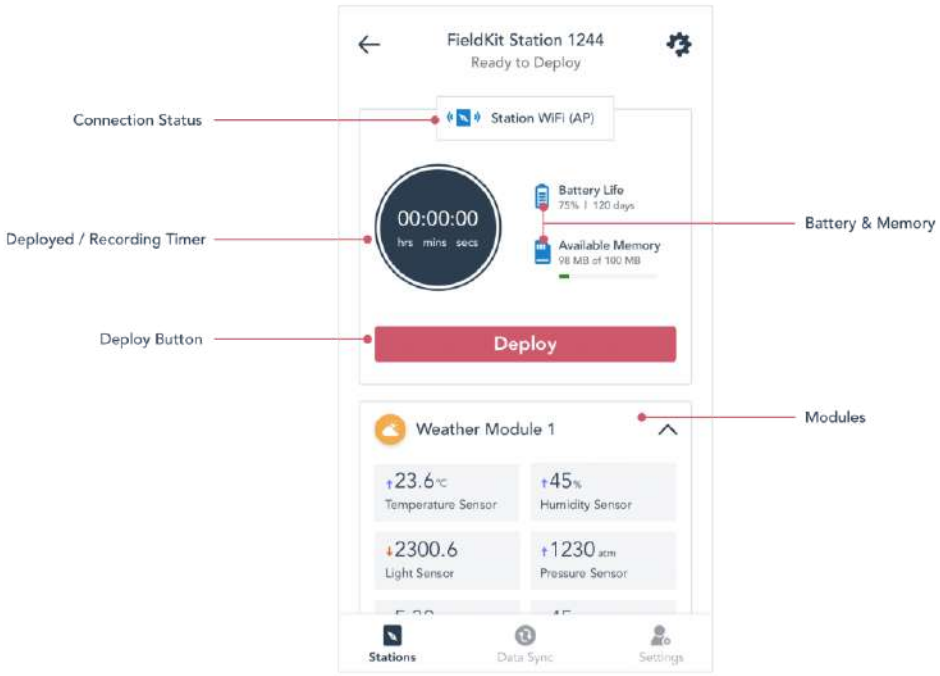
Configure your FieldKit Station using the app.

Navigation Bar

Explore the app to view your stations, sync data and update settings:

- Stations
  Manage all your stations.
- Data
  Download data from the station and upload data to the portal.
- Settings
  Configure global app settings.

We believe that documentation is important. So while early versions of FieldKit will automatically start recording data, we're working on new functionality to encourage users to realize the benefits of deploying in order to start recording data. That's how this Product Guide is written.



Station Detail

- WiFi Connection Status
  With a station-to-phone connection, you can view real-time readings and sync data to your phone.
- Battery and Memory Status
  Monitor battery life and memory for optimum station performance. Readings displayed here are from when you last connected.
- Deployed / Recording Timer
  When the timer is counting, your station is deployed and recording data.
- Deploy Button
  To start recording data, head to your deployment location and hit “Deploy.” You’ll add helpful notes and pictures to document the process.
- Modules
  When you’re near your station and connected, you can view real-time readings for each sensor on that module.

Station Screen Interface

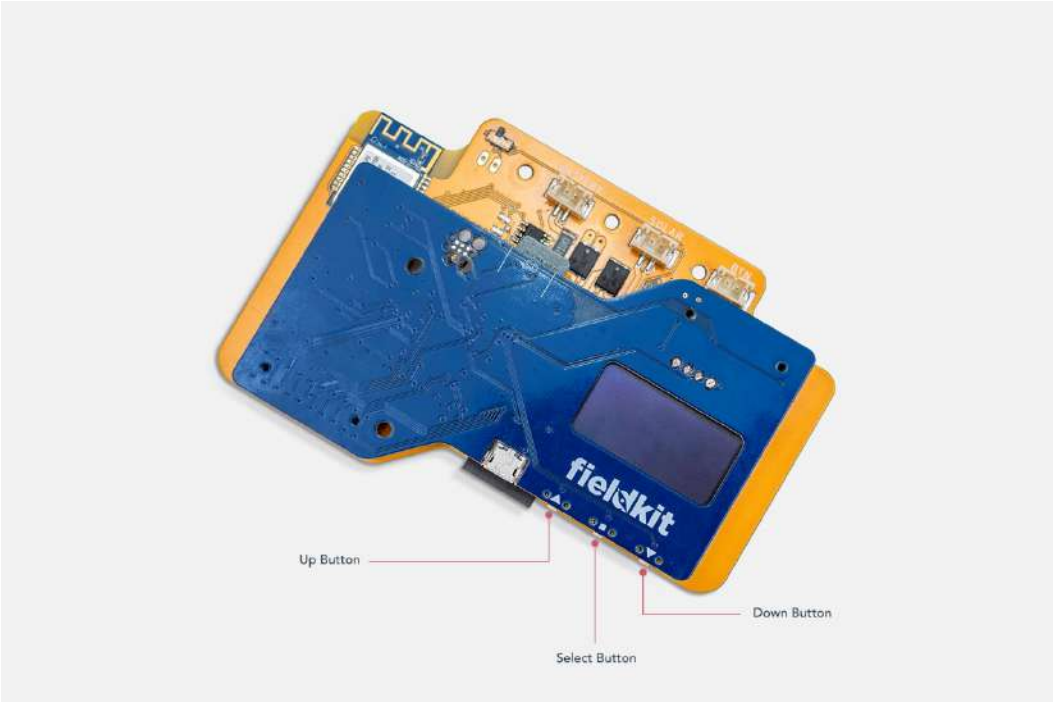
Configure your FieldKit Station using the station screen.

Either for convenience or help with troubleshooting, sometimes you will directly configure your FieldKit Station using the station screen.

We believe that documentation is important. So while early versions of FieldKit will automatically start recording data, we're working on new functionality to encourage users to realize the benefits of deploying in order to start recording data. That's how this Product Guide is written. Also, in early versions of FieldKit, the visual design of the station screen has not yet been deployed. With screen design in beta, a key difference is the WiFi Icon. Currently the same icon displays regardless of whether you are connected via the Station WiFi (access point) or a WiFi Network (internet).

Buttons

Scroll through the pages of the station screen menu by pressing the physical "up" and "down" buttons located below the screen on the Upper Board. Select and deselect menu options by pressing the middle "select" button.



Startup Sequence

When turning on your station (using the top left ON/OFF switch), the screen display turns on and the display startup sequence begins. The Conservify logo appears briefly followed by the station name and startup diagnostics.

Once the station has successfully booted up, the display turns off. Pressing any button below the screen (or the Wake button) turns the display back on. After a period of inactivity, the display will then turn off.

Important Note: When your station is running low on battery, the station conserves power by disabling the screen display and startup sequence. Press any button below the screen (or the Wake button) to turn the display back on.

Header

The persistent header icons provide a quick glimpse into the station's status:

Battery Status

The number of bars in the Battery icon corresponds to how much battery life is remaining. More bars mean more battery life. Remember to charge your battery or swap it out for a new one regularly.

Recording Status

If the Recording icon is flashing, the station is recording data.

WiFi Connection Status

If the WiFi icon is flashing, the station is broadcasting its Station WiFi (access point) but you are not yet connected via your phone. You may open your phone's WiFi Settings, locate the Station WiFi and connect to your station. Then proceed to the mobile app.

If the WiFi icon is static, your phone is already connected to your station.

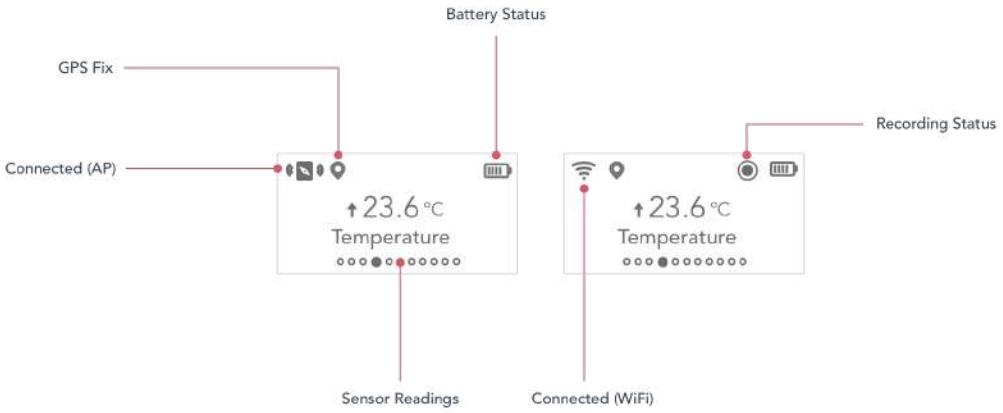
Note: You will see one of two possible WiFi icons, depending on whether your station-to-phone connection is via the Station WiFi or a known WiFi Network (internet).

GPS Fix

When the GPS icon appears, the station's coordinates are known.

Sensor Readings

A paginated sensor readings menu sits in the center of the display. Scroll through the latest readings on each sensor.



Main Menu

To launch the main menu from the home screen, press the middle “select” button. Navigate to the menu options by pressing the “up” and “down” buttons. Select an option by pressing the “select” button.

Readings

Scroll through the latest readings on each sensor, plus power, memory, and uptime diagnostics. Hit “select” to go back.

Info

- (Back)
  Navigates back one menu.
- Build
  Displays the Firmware Build number.

Schedules

- (Back)
  Navigates back one menu.
- Readings
  Set your preferred data capture schedule from the options offered. Configure data capture schedule in the app for more customization. Note that more frequent intervals of data capture will drain the battery faster.

Network

- (Back)
  Navigates back one menu.
- Enable
  Turns on the Station WiFi (access point), so that you can connect to your station with your phone.
- Choose:
  - (Back)
    Navigates back one menu.
  - Create AP
    When you first hit the Wake button, your station creates its own Station WiFi (access point), and subsequent button presses simply enable the Station WiFi

again. This functionality does the same thing as hitting the Wake button for the first time, i.e. your station creates its own Station WiFi (access point).

- Upload Rsm
  If your station has been configured to periodically upload data directly to the web portal*, use this option to force a data upload *(both data readings and metadata)* from your station straight to the portal, resuming from the *last point of data upload.*
- Upload all Meta
  If your station has been configured to periodically upload data directly to the web portal*, use this setting to force a data upload from your station straight to the portal of *all metadata.*
- Upload all Data
  If your station has been configured to periodically upload data directly to the web portal*, use this setting to force a data upload from your station straight to the portal of *all data readings*.
- WiFi Duration
  Choose how long your Station WiFi remains active (after being triggered by the Wake button or the Network > Create AP or Network > Enable options on the station screen).

When your station is set to "Idle Off" and becomes idle, i.e. experiences a few minutes of networking inactivity, it will turn off its Station Wifi. This saves power.

When set to "Always On", the Station WiFi remains active. This drains the battery faster, so it only works for stations directly plugged into a power source (versus using a battery or solar panel). In the app, you can then configure your station to periodically upload data directly to the web portal at set intervals.*

In the app under **Station Settings > Networks > WiFi > Upload Schedule you can enable Station WiFi to be "Always On" by setting a data upload schedule for your station to upload data straight to the web portal (bypassing the app). Enabling "Always On" only works for stations powered from the wall.*

Modules

- (Back)
  Navigates back one menu.
- Status
  Scroll through the Modules and hit "select".
  - (Back)
    Navigates back one menu.
  - Home
    Takes you back to the home screen.

Tools

- (Back)
  Navigates back one menu.
- Self Check
  Runs a self check and displays the status of various hardware components.

rtc	real time clock
tem p	upper/core temperature gauge
bg	battery gauge
sg	solar gauge
qspi	quad spi memory (firmware)
spi	spi flash memory (readings)
wifi	wifi module
gps	gps
sdo	open sd card
sdw	write sd card
bpm	backplane module mux
bps	backplane module shift
led	led controller
lora	lora module

- Watch GPS
  Enters a diagnostic mode that displays live GPS information. Used mostly for troubleshooting.
- GPS Mode
  Allows the user to configure the station for Fixed Mode or Moving Mode. In Fixed Mode the GPS will only be used periodically to verify the time. In Moving Mode the GPS will be left and frequently polled for location. *Note: using Moving Mode will have a significant impact on battery life.*
- SD Upgrade
  With a microSD card containing new firmware inside the station microSD card holder,

your station will be rebuilt with updated firmware, and the screen should then confirm the new firmware build number. Read more about updating your firmware.

- Flash SD
  Writes flash memory to the microSD card for diagnostics/debugging purposes when troubleshooting. You're unlikely to use this unless instructed to do so by the FieldKit support team.
- Format SD
  Formats the microSD card that is inserted in a way that the station can read the card.
- Run Fsck
  Runs a file system check to verify the integrity of readings in memory. Used mostly for troubleshooting.
- Export CSV
  Exports all the readings in memory to CSV files on the currently inserted microSD card. You might use this functionality in the field if you want to check the data on-the-fly. To do this, you would export to CSV on the station, then insert the microSD into your phone or another device using a microSD card adaptor, and then review the data.
- Factory Reset
  Should be used with caution. Erases all readings and configuration for the station, returning to factory defaults. Note: Your station's default name may change after a factory reset due to changes in firmware.
- Restart
  Restarts the station, flushing any logs and data to memory, ensuring that important information has been written to the microSD card.

Safety

You are in charge of your own safety, so do your research and plan ahead, but here are some suggestions to help guide you.

Feel free to ask questions or share concerns via the FieldKit Community forum; both other community members and our team will be happy to share our experiences and advice from our years in the field.

Station Safety

Avoid Power Lines

Avoid deploying your FieldKit near power lines or other utilities.

Cable Plate Facing Down

Avoid installing your FieldKit with the cable plate facing any direction other than down to avoid water intrusion.

Secure FieldKit Clasps

Make certain to firmly close the clasps of your case after working on the internal components of the FieldKit.

Invest in MicroSD Adapter

You may want to invest in a microSD-to-SD adapter cable to make servicing your microSD card easier, and to make it easier to see the card if you drop it.

Check Battery Connection

Check any batteries to make certain that the connector is correctly polarized: red is (+) and black is (-).

Securely Mount Station

If deploying your FieldKit in a tree, on a post, or anywhere more than two meters above the ground, make certain that your attachment points are secure.

Protect Sensor Cables

Make certain to use some sort of protection (like cable loom tubing, cable armor, or a grease-and-cayenne-pepper combination) on your sensor cables so that they won't be chewed on by animals.

Check out our Care Instructions for more details.

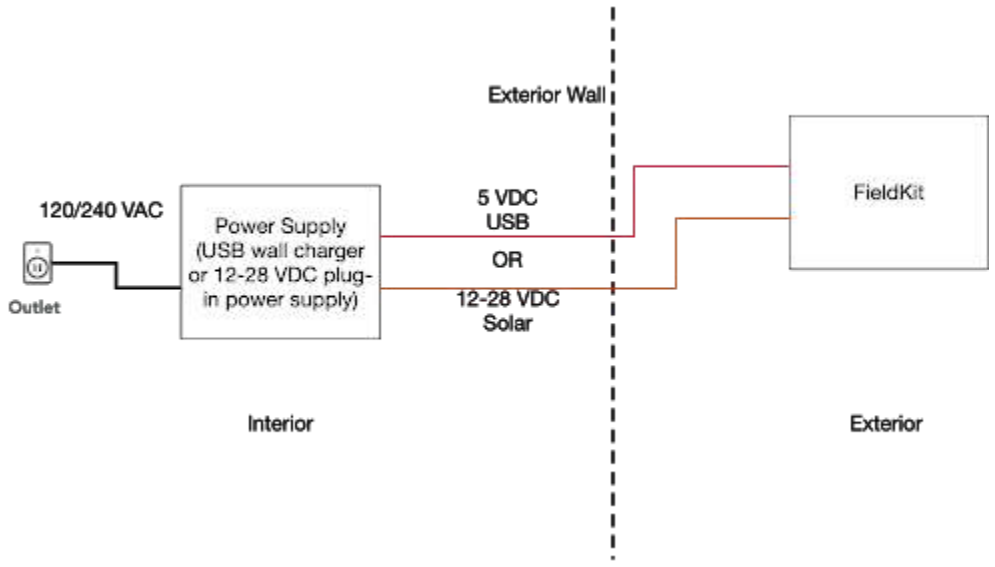
Personal Safety

Wear a Helmet

If deploying your FieldKit above head level, please wear a helmet.

Check Voltage Exposure

If running power to your FieldKit outside, make certain the low voltage DC part of the power run is the one exposed to the elements, not the wall power (high voltage AC) side.



Get Permission to Deploy

Always get permission to deploy your FieldKit in any particular environment.

Protect Battery Pack

Do not short or puncture the battery pack.

Don't Travel Alone

Tell someone where you're going, especially if it's going to be remote.

Prepare for the Terrain

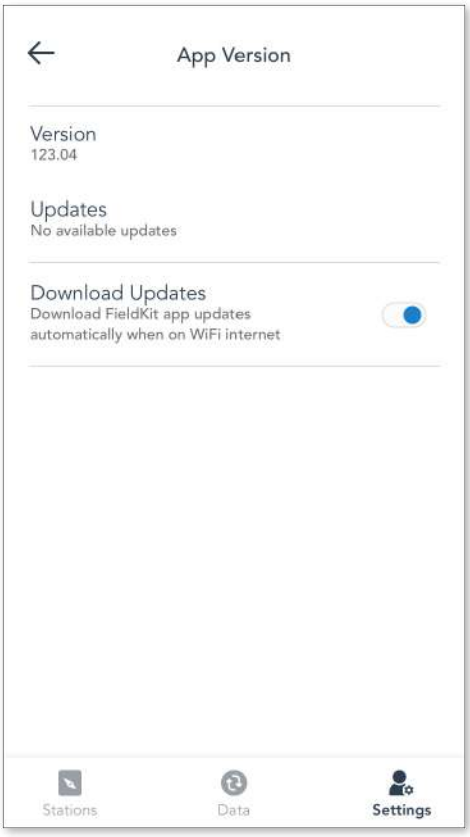
Respect nature—beware of rough terrain or dangerous animals.

Station Maintenance

To keep up-to-date and running smoothly, your FieldKit Station needs regular attention, whether that be the software, firmware or physical hardware.

Update the App

Make sure you have the latest version of the mobile app installed on your phone. You can either do this through your phone's settings, or go to **Settings** > **Help** > **Version** and toggle on "Download Updates" for automatic updates.



Update the Firmware

Make sure you have the latest version of the firmware installed on your station. You can do this in one of two ways:

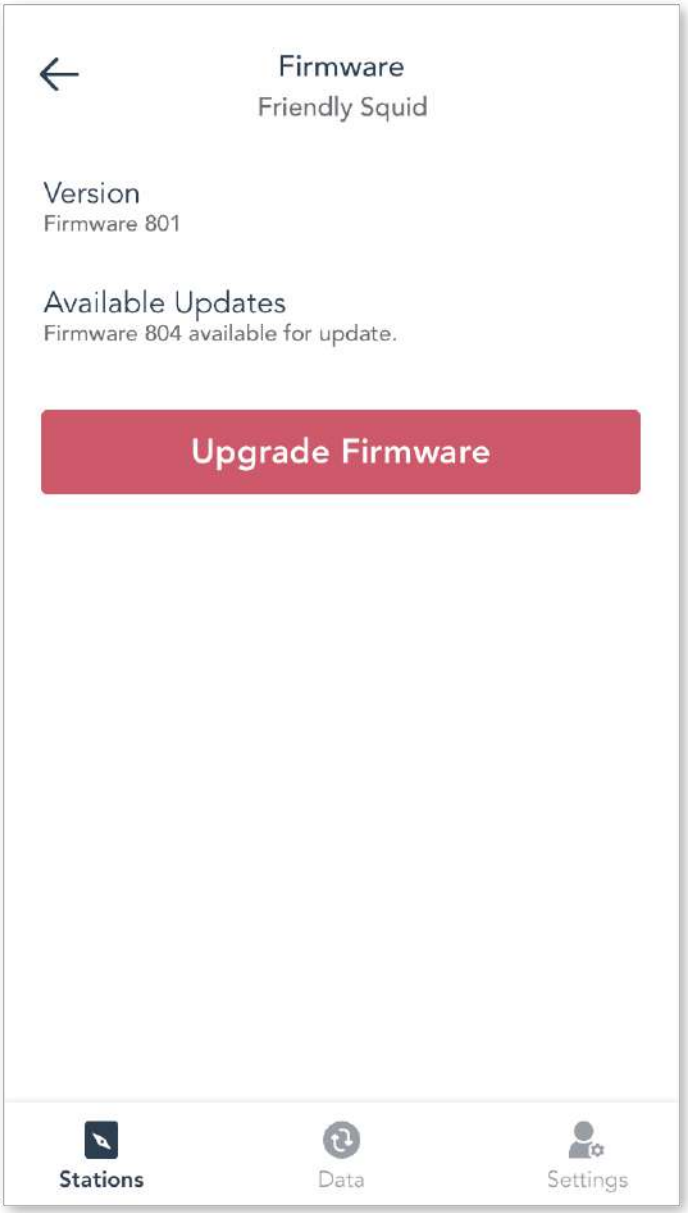
1. Mobile app
2. Station

Important Note: In both situations, you need to ensure that you have a microSD card in the Station microSD card holder. MicroSD cards are not included in FieldKit products, but we highly recommend that you buy one separately. You need a microSD card to collect logs for diagnostics and troubleshooting, back up your data and update your firmware.

Update Firmware through the Mobile App

To update your station's firmware through the mobile app, you have to first force the system to check for new firmware (by logging into the app), and then have an active phone-to-station connection.

Station firmware cannot be updated without a microSD card inserted in the station's card holder. FieldKits do not come with SD cards.



1. Insert a microSD card into the microSD card holder on the Station.

2. On your phone, make sure that you are connected to the internet so you can log in.

3. Log in to the app (this will force a check for new firmware).

4. Connect to your FieldKit Station (via either the Station WiFi or a WiFi network). Note: you may need to open your phone's WiFi settings to swap WiFi networks.

5. Go to Station Settings > Firmware.

6. Click "Update Firmware."

7. The app screen should now confirm the new firmware build number.

8. If it's nearby, you can double check that your Station has rebooted and the screen now displays the new firmware build number.

Update Firmware through the Station

To update your station's firmware through the station itself, you have to download the latest firmware version onto a microSD card, configure it, and use the Station screen menu. To confirm via your phone, you have to first force the system to check for new firmware (by logging into the app), and then have an active phone-to-station connection.

Station firmware cannot be updated without a microSD card inserted in the station's card holder. FieldKits do not come with SD cards.

1. Insert a microSD card into your computer.
2. Download this zip file.
3. Uncompress the zip file into root of the microSD card.
4. Transfer all files from within the uncompressed zip file into the top level of the microSD, so that there are no subdirectories.
5. Remove the microSD card from your computer and insert into your Station.
6. On your Station screen, go to **Tools** > **SD Upgrade**.
7. Your station will reboot with updated firmware, and the screen should now confirm the new firmware build number.
8. If you have the app available, make sure that you are connected to the internet so you can log in. Log in and connect to your FieldKit Station. Under **Station Settings** > **Firmware**, it should now display the new firmware build number.

Recalibrate your Sensors

You need to recalibrate your sensors at regular intervals to keep them accurate. Check the Set Up Modules section and navigate to your particular sensor for details on how often to recalibrate.

Look After the Hardware

The better you look after your physical hardware, the longer it will last. Check out our Care Instructions for more details.

Troubleshooting

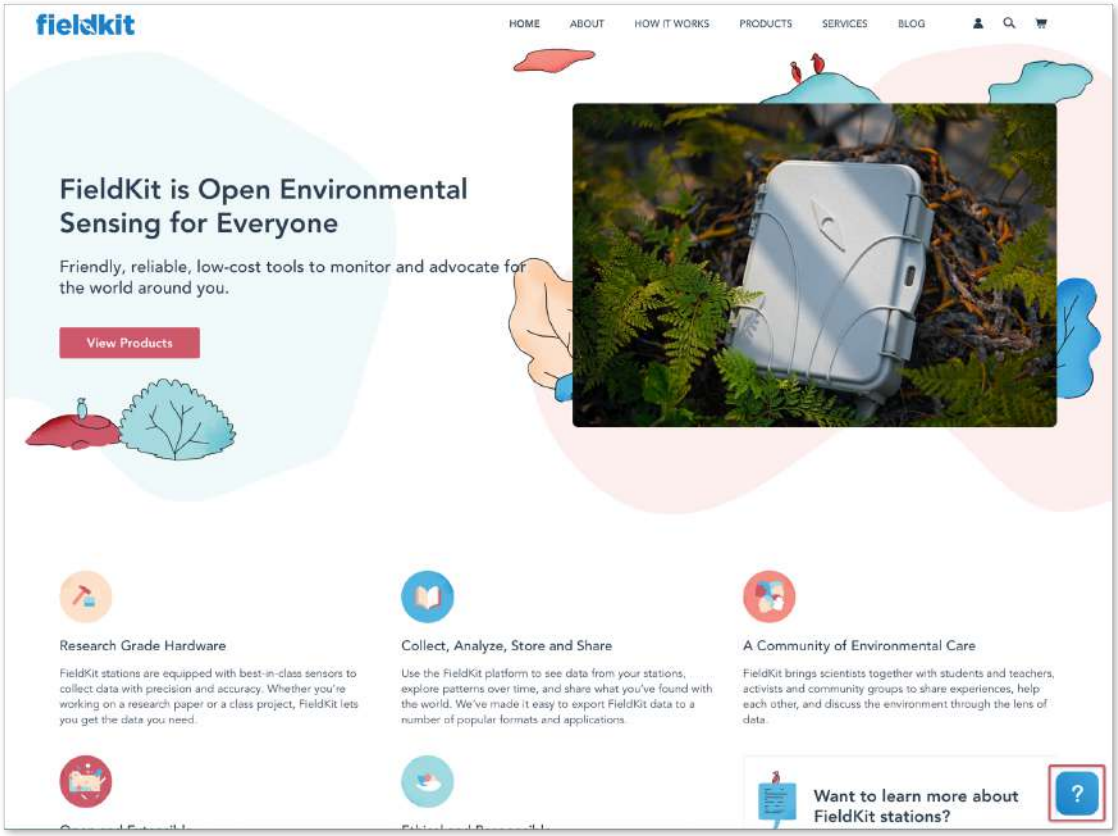
If you run into issues with your FieldKit Station, please reach out to us for support.

Visit our Help Center

If you have an issue or question, you might find an answer in our Help Center.

Submit a Support Ticket

The best way to get swift help regarding any issues with your FieldKit Station, the app, or the web portal is to submit a support ticket. You can do this from any page on our website by clicking on the blue Question Mark Icon in the bottom right hand corner of your screen or via our support portal.



What information should I include?

The following information is invaluable for our support team to understand, assign and resolve the issue as quickly as possible:

1. Category

Are you asking a question or reporting a problem?

2. Name

Your name.

3. Email

Your email address.

4. Subject

A simple one-line description of the issue.

Example: *Screen hangs on "Fetching Station information"*

5. How Can We Help?

A more detailed explanation of the issue with steps for our team to follow in order to reproduce and solve the issue. Plus some technical details.

- Steps to Reproduce
- Platform (Are you on the mobile app? Or the web portal?)
- URL or Page Name
- App Version (In Settings > Help)
- Browser/OS/device
- Diagnostics (In Settings > Developer, hit "Upload Diagnostics" and paste the phrase into your ticket)

Example:

When on the FieldKit mobile app on the "Connect your FieldKit Station" page, the screen hangs on "Fetching Station information".

Steps to Reproduce

1. *Open app*

2. *Go through Onboarding steps to Connect your FieldKit Station" page*
3. *Go to phone wifi settings and join Station WiFi*
4. *Come back to app – Screen hangs on "Fetching Station information"*
5. *After a while, get bored and close the app*
6. *Open app again and go to Stations page, and the station is there and is connected*

App Version: 561

Browser/OS/device: iphone 6s, ios 13.3.1

Diagnostics: motor bouquet debrief

6. Expected vs Actual Results

For us to see the issue from your perspective, it's helpful to understand what you're expecting to see, and how that differs from your actual experience.

Example:

Expected – The screen does not hang on "Fetching Station information". It appears for a couple seconds, and then takes me to the Stations page where the station is listed and connected.

Actual – The screen hangs on "Fetching Station information" forever and I get stuck in the process, forcing me to close the app.

7. I am in the Field Right Now

Tick this checkbox to let us know if you are in the field and need urgent assistance!

8. Images / Annotated Screenshots

A picture speaks a thousand words, and an annotated picture is even better.

Example: *https://www.screencast.com/t/E6A6bgEVh*

Data Management Plan

The types of data generated and/or used in this project include JSON database entries representative of environmental conditions including one or more of the following:

- pH
- Electrical Conductivity (µS/cm)
- Water Temperature (°C)
- Dissolved Oxygen (mg/L)
- Distance (m)
- Wind Speed (m/sec)
- Wind Direction (°)
- Air Temperature (°C)
- Relative Humidity (%RH)
- Barometric Pressure (kPa)
- Location (Lat./Long., DegDec, WGS84)

These are to be found on the FieldKit web portal and are retained until deleted by the user. All data will be private to the user unless specifically made public by the user. No charges will result from leaving the data on FieldKit servers.