

BackpAQ V3 Quick Start

Introduction

BackpAQ is a versatile, portable system designed to enable teachers and students to accurately measure, record and visualize air quality inside, outside and anywhere in the community. It consists of low-cost handheld devices that sense, display and transmit data from a set of sensors to a cloud-based dashboard. A companion app runs on a smartphone which is paired with the device and provides a detailed real-time view of various sensor readings using gauges, graphs and geo-based mapping.

The BackpAQ dashboard, AQView, provides a comprehensive set of data visualization, charting, graphing, reporting and export capabilities.

All sensor data is available on the BackpAQ AQView website.

To access the website, go to:
<https://www.backpaqlabs.com/>
 and under “YAQA” select “YAQA Community Sensor Map”

All users need to be pre-provisioned by the YAQA Project Administrator in order to access the data and system.

Finally, this guide is meant to be literally a quick start. Please see the BackpAQ User Guide for a more comprehensive guide to getting the most from your BackpAQ.

BackpAQ Device Display

When BackpAQ starts up the small OLED display should look similar to this:

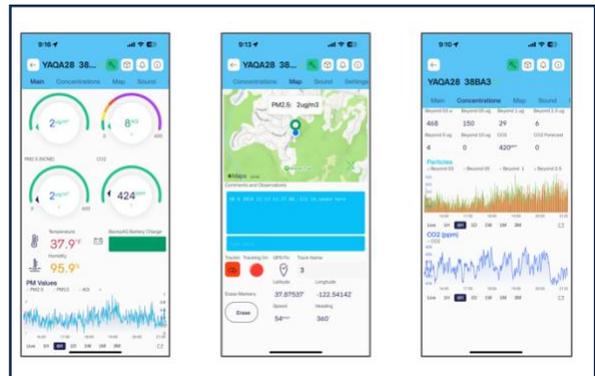


Figure 1. The display shows the basic particulate (PM) and CO2 values. For a more detailed look at what you are measuring, use the BackpAQ app.

BackpAQ App – Screens & Navigation

A key part of the BackpAQ system is the BackpAQ app which runs on your Apple iOS or Android smartphone. The app can display all the particulate data the sensor is capable of, as well as CO2 data, using an extensive set of gauges, charts, graphs and maps.

Figure 2. The app is organized with a set of 3 pages



“Main” page provides a view of the key particulate data values: PM1, PM2.5 and PM10. It also shows CO2, temperature, and humidity, as well as other functions such as BackpAQ battery level and selection of PM “conversions” if needed (see User Guide for a detailed explanation.)

“Concentrations” shows specific estimates of the number of particles of different diameters in number and graph form. CO2 levels are also displayed here in graph form.

“Map” displays in real time where the BackpAQ is currently collecting measurements and what the PM 2.5 value is at each point. Markers will change color depending on the PM2.5 value at that point.

Pro-tip: As you walk around, you can use the app to make notes by entering text in the **COMMENTS** window the bottom of the screen. These notes are geocoded to the location where they are captured and will be viewable on the AQView website.

AQView Community Air Quality Portal

To really drill down into the data that your BackpAQ has collected you need to utilize the AQView toolset.

AQView provides a comprehensive set of data mapping, visualization and charting tools which really bring the air quality data to life.

Very generally, AQview displays each BackpAQ sensor's data (yours and your fellow teachers and students) on a Google Map, in approximately the location of the BackpAQ's last position. You can click on the icon representing the BackpAQ to see the current sensor values, as well as options to display in graph form.

Figure 3. AQView main community sensor map showing historical data graph for PM2.5, CO2, Temperature and Humidity



Figure 4. You can also choose to display the “track” that you recorded as you walked around (for example) the school or your neighborhood



BackpAQ – Starting Up

Starting Up BackpAQ

When you first power on your BackpAQ, it may not yet know your local WiFi networks or hotspots. So, when operating BackpAQ for the first time, it will open up an access point that will allow you to connect directly with your phone to set things up. Generally, please follow these steps:

1. Charge your BackpAQ if you haven't already. The red charge light will glow if it needs to charge, green when fully charged
2. Place your BackpAQ Monitor and smartphone side by side
3. Turn on your phone and go into “settings” to activate the hotspot.
4. Turn on the BackpAQ (toggle switch at rear) and observe the fast-blinking LED
5. As the BackpAQ goes through it's “warmup” and connects to WiFi, the LED will change from fast-blink to slow “breathe”, indicating sync with the hotspot and the cloud
 - a. If the LED continues to fast-blink it might indicate that the hotspot is not active or other issue with the phone. Best advice is to power cycle both devices
6. When ready for use, you should see air quality data appear on the small OLED display on the BackpAQ
7. Back on the phone, open the Blynk IOT app (you may have to scroll to locate the app). You should be pre-logged in so the app should start and you may see a set of several BackpAQs
8. Select the BackpAQ that's assigned to you and click to open
9. If all is OK, you should see AQ data updating on the app and on the BackpAQ OLED display.

Re-Setting WiFi

You may want to reconfigure your BackpAQ to use a different WiFi connection or smartphone. In that case, there is a simple process to follow:

1. Turn on your BackpAQ...the LED should be flashing quickly (see Figure 5.) for 30 seconds.
2. If currently connected to WiFi or hotspot, the Indicator LED should be “breathing” light blue.. Next, push the red reconfig button (on top below the LED) for 10 seconds. The LED should now return to fast blink.
3. BackpAQ will now act as an Access Point (AP). It means that your device will broadcast its own WiFi network with an SSID (name) similar to Blynk Device-1234
4. On your phone, open the BackpAQ app, click on your BackpAQ icon (eg, “9A42D”), tap the three horizontal bars in the top right-hand corner, then tap “Reconfigure” at the

bottom.. Choose “Connect to WiFi” and confirm that the device is ready to be provisioned (LED blinking) by tapping “Ready” in the app. If BackPAQ doesn’t see the temporary network then click on “Connect Manually” to do this manually in your phone’s WiFi settings.

5. The app will then scan for devices and show you the device details and ask for permission to join the network (select Join), then ask you to select the SSID and enter the WiFi password.
6. Once done the data is sent to the device and stored, and you can exit when asked (Apply, Done, Exit to App).

BackPAQ Operating Controls and Status LED

Figure 5. During various phases of BackPAQ operation the LED indicator light will flash & change color to indicate different modes of operation.

LED Color/Appearance	Operating Mode	Notes
WHITE BLINK	Reset Button Pressed	
FAST BLINK WHITE	Reset Button Held	
GREEN BLINK	Reset Configuration	
BLUE BLINK	Waiting for Configuration	
FAST BLUE BLINK	Configuring	Configuration underway
LIGHT BLUE BLINK	Connecting to WiFi	
FAST LIGHT BLUE BLINK	Connecting to Blynk Cloud	
LIGHT BLUE “BREATHE”	Normal Operation	BackPAQ running normally
MAGENTA BLINK	OTA Update	Over The Air software update is underway



Figure 6. Display, indicator LED (upper right)

BackPAQ can be turned on and off by operating the silver or black switch on the back of the device. (See **Figures 6, 7, 8** for the different parts of the BackPAQ.)

After turning on BackPAQ, you will hear a fan on the inside and the indicator LED will blink (see Figure 5: “Understanding the Indicator LED” above.)

If your BackPAQ does not turn on, it may need to be charged! To charge your BackPAQ, use the USB-micro charging cord connected to a USB (5V) source. The Battery Charging light turns red when the BackPAQ is charging and turns green when the BackPAQ is fully charged.



Figure 7. Power switch, reconfig switch, charging jack and CO2 sensor



Figure 8. PM sensor outflow (left) and inlet