

GAIA APIMAMA Sensor User Manual

Online Version: <https://aqicn.org/gaia/apimama/>

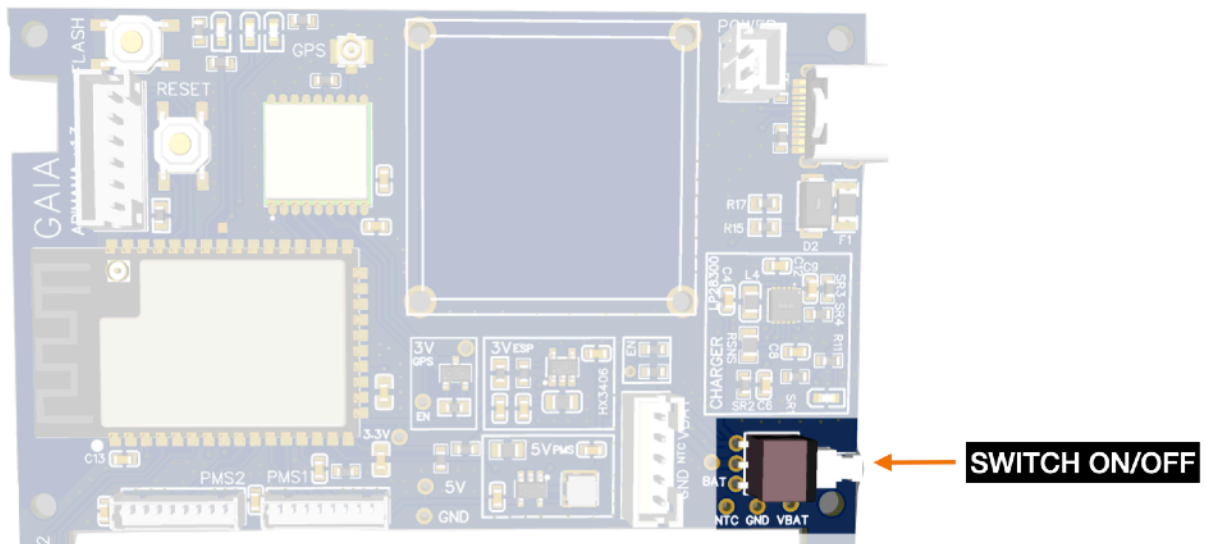
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Version 1.0

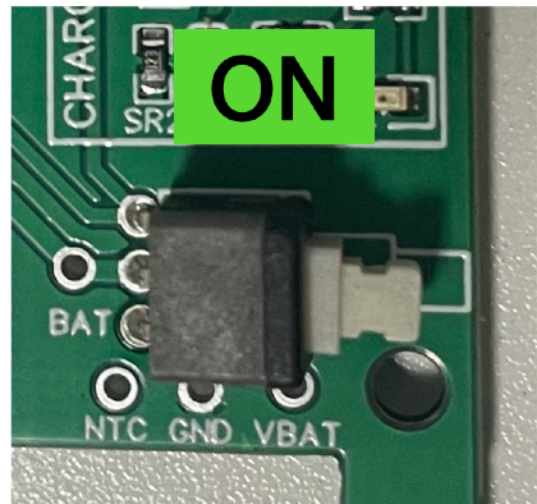
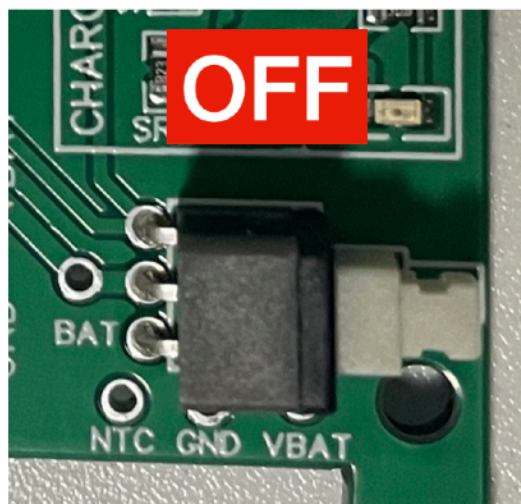


Switching ON/OFF

Switching on the sensor can be done using the small push button on the right:

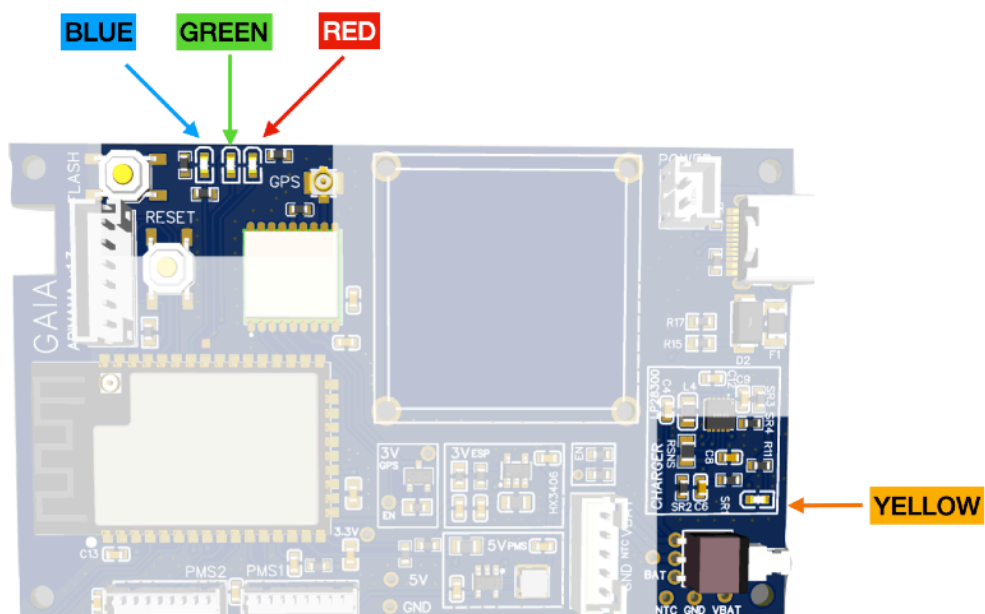


The sensor is ON when the switch is pulled-in.



LEDs Meaning

There are 3 main LEDs on the top and one LED on the RIGHT:



Color	Meaning
YELLOW	Battery Charing - the LED is active when the battery is being charged. If the USB is connected, but this LED is turned off, then the charging is full
BLUE	Sensing activity - the BLUE LED is blinking every 2 seconds during PMS sensing and GPS decoding
RED	Heart beat - the RED led is blinking every 2 seconds when the sensor is powered on and the GPS is not active
GREEN	GPS Heart Beat - this GREEN led is complementary to the RED led. It is blinking every 2 second when to indicate that the sensor is power, and the GPS managed to get the location

There are some special cases: When the RED and GREEN led are blinking together every 2 seconds, there is not enough power in the battery (less than 2.8V, and the CPU does not send to save power).

Accessing Data via USB

To access the data, insert the USB cable into the USB. C port. When the sensor is sleeping (eg the BLUE LED is not blinking), it is necessary to wait for until 2 minutes for the sensor to wake up before seeing the USB drive.

Once the sensor is awake, a file with the format can be seen on the USB disk drive.

```
apimama-xxxxxx-v1.0.csv
```

Where xxxxxx is the sensor ID (should be something like “35345a”).



Note that the disk drive is only 720KB. So, after getting the CSV from the USB drive, the best is to delete the old file from the USB disk. With 720KB the sensor should be able to store up to 7 days of data.

After reading/ copying and deleting the CSV file, you first need to eject the USB disk, and then wait for the sensor to go back to sleep (eg BLUE led not blinking). It can take up to 2 minutes between the time the USB disk is ejected and the Sensor goes to sleep.

CSV Data Format

The CSV columns are the following:

Colum	
idx	Unique reading ID - this value is incremented for each reading (every 2 minutes)
boot-count	DEBUG - Number of times the sensor restarted since the battery was plugged in
gps-max-wait-time	Maximum time in seconds the sensor will wait for the GPS to get the lat/lon
gps-fetch-time	Actual time it took for the GPS to get the lat/lon (if equal to max, then GPS timeout)
gps-isotime	Time provided by the GPS
gps-lat	GPS Latitude
gps-lon	GPS Longitude
gps-nsat-used	Number of satellites the GPS used to compute the lat/lon
gps-nsat-view	Number of satellites the GPS saw
gps-epoch	Epoch time provided by the GPS
gps-antenna	Antenna status - should be OK, other the antenna has issue
gps-boot	DEBUG ONLY - If more than 1, that means the GPS is unstable
met-t	Temperature in Celcius
met-rh	Relative Humidity
esp-t	Internal Sensor temperasture
pm-sensor	ID of the PM sensor used to get the PM2.5 data (0/1)
bat-voltage	DEBUG ONLY - Battery voltage
bat-ntc	DEBUG ONLY - Battery NTC voltage
sw-build	DEBUG ONLY - Software Version
crc	DEBUG ONLY - CRC

Each time the sensor is active (eg every 2 minutes), the PM sensor will get 15 PM realigns (for each the PM10.0, PM2.5 and PM1 reading), and will provide the following columns:

Colum	
pm2.5-min	Minimum of all PM2.5 values
pm2.5-avg	Mean value of all PM2.5. Values
pm2.5-max	Maximum of all PM2.5 values

In some cases, when the sensor is starting, there can be abnormally high wrong readings due to dust accumulation. This phenomenon usually occurs a few times daily, depending on the atmospheric condition. The sensor SW copes with those abnormal readings and provides a mean and IQR value for the considered valid readings.

Colum	
f-pm2.5-mean	Mean value from the filtered PM2.5 values
f-pm2.5-iqr	Inter Quantile Range from the filtered PM2.5 values