Senquip ORB FAQ

This document is a collection of responses to questions that are commonly asked by new users of the Senquip ORB range of products. If you cannot find an answer to your question below, please contact us at support@senquip.com.

I've logged into the webserver but there is no data showing.

The ORB measures data during every measurement cycle. Once measured, if there is a connection available the ORB sends the data and then erases it, ready for the next measurement cycle. If you have accessed the ORB webserver and the ORB has not yet executed a measurement cycle, there may be no data to show. Data will show if you remain logged into the webserver and a scheduled measurement cycle occurs.

I can't see the ORB on my local Wi-Fi network.

If you know an ORB IP address on your local Wi-Fi network then you can login to the ORB's webserver provided it is active. The ORB webserver will be inactive if the ORB is asleep unless you have selected the "Webserver always on" option. The webserver will also be disabled if GSM or Wi-Fi and GSM communication options have been chosen as it is a significant security risk to leave the webserver active if the ORB is operating on an open network like the internet.

I've enabled GPS but I'm not seeing any GPS data.

In order to supply GPS data such as position, speed and number of satellites, the ORB needs to connect to the GPS satellite constellation. It is likely that the ORB is mounted in a location where it can't make contact with the GPS satellites or where reception is poor. Make sure that the ORB is mounted with the cable gland down and that there is no significant metal above the ORB. In poor reception areas, the ORB may require more time to acquire GPS data. Try increasing the GPS *Max Time* to 240 or even 360 seconds.

I'm not receiving data on every measurement interval.

When a measurement interval is complete, the ORB will attempt to send the data via Wi-Fi (if enabled) and then via GSM (if enabled) . If the ORB is unable to send the data, by default, it will be discarded and the ORB will return to sleep. In areas where Wi-Fi and GSM coverage is poor, some data may be lost. If it is important that data is collected for every measurement interval, enable the *Online Buffer* in endpoint settings. When the buffer is enabled, if data cannot be sent at the end of a measurement cycle, the data will be saved to memory and sent when connection is achieved.

I'm not sure if my Wi-Fi network is reliable enough to operate the ORB on Wi-Fi only.

Wi-Fi networks can be affected by the number of transceivers, the geometry of the site and the environment in which the ORB is mounted. To receive information of the quality of the connection made by the ORB to your network, enable the *Report Network Info* option in endpoint settings.

I have many ORBs installed and I'm struggling to identify them.

Once you have many ORB's installed, it can be difficult to identify which ORB is performing which function. It is highly recommended that each ORB is named using the *Device Name* setting when first installed and that ORB's are

added to logical groups on the Portal. If an ORB has not been named and it needs to be identified, turn the GPS on in order to determine the ORB location.

How do I attach a GPS and GSM antenna to my ORB-X1-G?

The ORB-X1-G has additional GSM connectivity and GPS positioning ability. The antennas for GSM and GPS are built into the ORB and there is no need for an additional antenna. For best GPS reception, please ensure that the ORB is mounted in a position where the top of the ORB can see the sky without being obscured by metal. A clear view of the sky will allow a high quality GPS fix, meaning more accurate positioning and speed data and quicker time to fix, meaning a lower power solution.

Do I need to add AA batteries as a backup in a solar installation?

The ORB is shipped with an internal LiPo battery already installed. The lithium battery will, in most solar application be sufficient to power the ORB during the night and in low sunlight conditions. The ORB reports the internal LiPo battery and can report on low LiPo battery. It is recommended that the LiPo battery be monitored for a while after a solar install to make sure that the LiPo battery is being sufficiently charged by the solar panel. AA batteries are only required in applications where there is no permanent or solar power available. They can of course be added as an additional backup when using permanent or solar power.

I'm running on solar and am loosing data at night and on cloudy days.

It is likely that your solar panel is not supplying enough energy to power your application and charge the ORBs internal LiPo battery. See the FAQ on conserving energy.

How do I conserve energy on my ORB?

For low power installations such as solar and battery installs, to save energy, consider the following:

1. Increase your *base interval*. In applications where measured data is not changing quickly, you may be able to increase the base interval. A longer base interval means that the ORB spends longer sleeping between measurement intervals and so saves energy.
2. Increase your *transmit interval.* In some applications you may not need every measurement that is taken to be reported but are more interested in receiving an alert when a warning or alarm condition occurs. In these cases, increase the transmit interval so that data is not transmitted on every measurement interval – a once a day measurement may be enough.
3. Turn off peripherals that are not needed. If you are not using the serial port, GPS or other peripheral, make sure that they are turned off.
4. Reduce the interval of peripherals. An ORB mounted on a pole is unlikely to move; a once day GPS update may be sufficient. The GPS, serial and current sources are the most power hungry peripherals, use them sparingly.
5. Consider using voltage sensors instead of current sensors. Sensors like liquid level sensors are often available in current or voltage versions. A 4-20mA sensor will draw 20mA at full scale whereas a voltage version may only draw 1mA. Where using the serial and current sensors, reduce the wait times before measurement and before returning to sleep.
6. Make sure that the ORB is not always on and that the webserver is off.
7. Under endpoint settings, do not send human readable time. The smaller the sent of data you send, the lower the power of your ORB.
8. Senquip is constantly working on code improvements to reduce the power of your ORB. Make sure that your ORB is running the most recent firmware version.

I've opened my ORB and the lights are not on.

Your ORB is most likely sleeping; this is good as it conserves power. The lights will come on when the ORB next wakes for a measurement cycle. If you want to access the ORB immediately, press the setup button to access the ORB's webserver. If you want to be able to access your ORB at anytime, select the *always on* and *webserver always on* options.

What SIM card should I use?

The ORB uses a Micro SIM. The SIM can be either 1.8V or 3.3V; the ORB will adapt automatically to either. The SIM needs to be for an operator that supports a CAT-M1 network. Senquip can provide SIMs for use in Australia. For volume applications, Senquip can provide ORBs with SIM cards that are soldered to the CPB during manufacture. Soldered SIMs are more reliable in high vibration environments.

I wired my ORB incorrectly; have I damaged it?

The ORB has certain protections to prevent incorrect wiring from damaging the device. Switching the ground an power wires, for example will not damage the ORB. There are some inputs such as the serial, current sense and thermocouple inputs that can be damaged if connected to supply voltages. The output on the ORB is current limited and will shut-down in the case of an over-current event. The output will need to be turned off after an over-current event to reset the internal fuse.

Do I need a fuse in-line with the power supply of my ORB?

It is always a good idea to include a fuse in the supply to any electronic device. A 1A fuse would be a suitable size for use with the ORB.

I have changed a setting on the Senquip Portal but the ORB has not changed behavior.

When a setting is changed on the Senquip Portal, it is added to a queue that is stored on the portal. When the ORB next connects to the portal, the setup message is sent to the ORB. You can check if there are any messages pending for your ORB as they will be shown at the top of the settings page in the portal. Note that in order for remote configuration to be possible, the *Configuration via Senquip Portal option* must be selected on the portal.

The ORB that I'm setting up via the webserver keeps switching off.

The ORB webserver is activated by pressing the setup button and then connecting to the ORB's wi-fi. The ORB will exit the webserver when settings are saved and it executes a reset, when the lid is closed or when no activity is detected for a few minutes. To ensure that the webserver does not close-down when you are configuring the ORB, make sure that you do not cover the ORB's light sensor and that you are not inactive for extended periods of time.

I've enabled GPS and the ORB is now taking longer to connect to my network.

Since I have enabled GPS, the orange light flashes for a long time before it goes solid, indicating no network connection for a long time. To keep the network connection via Wi-Fi or GSM active consumes a lot of power. To minimise power consumption, when the GPS is enabled, connecting to the network is delayed until the GPS has acquired a position fix or the GPS *Max Time* is reached and the GPS is turned off. During the GPS acquisition time, the orange light will flash as the ORB does not have a network connection. So, although the orange light flashing for a long time seems to indicate a long network connection time, this isn't necessarily the case.

Do I need a Premium Senquip Portal subscription to remotely configure my ORB?

If you own an ORB, you can configure it via the Senquip Portal for free, for ever. If you would like Senquip to store your data on the portal and be able to view current and historical data, then you will need a subscription. For most users, a standard subscription which allows for 60 second updates and a month of data storage will be sufficient. For users who need faster updates and longer-term storage, a Premium subscription can be considered.

If I perform a factory reset, will I lose my settings?

Yes, a factory reset will remove all your settings including your network settings. After performing a factory reset, you will need to connect to the ORB via the internal webserver to re-establish an internet connection.

If I perform a firmware update, will I lose my settings?

No, performing a firmware update preserves your settings. If the firmware update introduces new settings, these will be set to the default value.

I have lost my password, what can I do?

If your ORB is connected to your Senquip Portal account, you can continue to view your ORB data and continue to make configuration changes. If you have changed your password, and have forgotten your new password, a factory reset will restore the original ORB password. If you have lost the original ORB password, please contact Senquip who will assist you in recovery.

Can I use AA NiCd batteries in my ORB?

NiCd batteries are generally rated at 1.2V. Although the ORB will operate from 1.2V batteries, they will not last very long. It is recommended to use high quality Alkaline or Lithium batteries. For longest life, use 1.6V or 3.6V lithium batteries.

Why does the ORB operate on the LTE CAT-M1 network rather than that 3G or 4G?

The 3G network is being turned-off in Australia and New Zealand from 2020 and will be replaced by the 4G and later, the 5G network. The 4G and 5G networks are fast networks designed for voice and high-speed data. IOT devices are low speed devices and do not require the speed available on the 5G network. As network speeds go up, the complexity of the modems required to operate on those networks as well as the power consumption and cost increases. In response to demand from the IOT industry, network operators have launched LTE CAT-M1 and LTE NBIOT networks. These two networks are designed for lower speed devices that cost less, consume less power and achieve longer range from existing mobile towers. The ORB can operate on both LTE CAT-M1 and LTE NBIOT networks but favours LTE CAT-M1 because:

- LTE, of which CAT-M1 is a part, will be the only cellular technology going forward;
- CAT-M1 allow low power modems to be used, meaning longer battery life;
- CAT-M1 allows dynamic transfer between towers, making it ideal for mobile applications;
- The networks are modern and will be supported for many years to come;
- The networks offer the best coverage in Australia and New Zealand.

Is my data secure?

Yes, your data is safe. To ensure the highest levels of security, ORBE uses a NIST validated, ultra-secure hardware crypto element for key and certificate storage and cryptographic processing. The crypto-element is pre-loaded with certificates for Amazon Web Services (AWS), allowing for immediate, out-of-the box, secure communication with the Senquip Portal. Users can load additional certificates to allow secure communications with other servers, using the Senquip Portal.

How long does a firmware update take?

The time taken to perform a software update depends on the network type chosen and the signal strength of the connection. A typical update over Wi-Fi will take 15 seconds and a GSM update will take 15 minutes. The orange light will flash during the update process. If the upload is interrupted, it will need to be restarted. A failed firmware upgrade will not harm the ORB.

If a firmware update fails, will my ORB be harmed?

If a firmware update fails, your ORB will not be harmed. The Firmware update will need to be restarted.

How long will the internal LiPo battery in the ORB last?

The lithium battery is expected to last 5 years without significant degradation. The life of the battery may be reduced if it is exposed to temperatures above 55°C or below -10°C, if it experienced an unusually high number of charge, discharge cycles or if it is left in a discharged state for an extended period of time. Spare LiPo batteries can be sourced from Senquip and can be replaced by a qualified technician.

Why does ORB not allow the Webserver to be on when operating on GSM?

When the ORB is operating on the GSM network, it will receive an IP address that is open to the internet. If the webserver is enabled, the ORB may be exposed to malicious attacks by automated "bots" that will try to break the password and gain access to the ORB. By turning off the webserver, the risk of attack is eliminated. Settings can still be modified via the Senquip Portal over the secure, encrypted connection with the ORB.

I've received my ORB, pressed the setup button and nothing happens.

When the ORBs are shipped, they are placed in freight-mode to preserve the internal battery and to prevent the device from transmitting when being transported. To exit shipping mode, apply power to pins 1 and 2 or insert batteries.

Why does the first measurement after a reset take longer?

It is important that data sent to the Senquip Portal or other endpoint are sent with the time that the data was measured. Without a time, we don't if the data is recent or whether it has been delayed by the network. When the ORB firsts boots after a reset, for instance when a setting has been changed, it does not know what time it is. The first action taken by the ORB is to connect to the network and then to query network time from an NTP server such as Google NTP. This can take a few seconds and is why first measurement may take slightly longer.

How long can I run my ORB off AA batteries?

To achieve maximum life, use high quality Lithium batteries such as Ultimate Lithium™ from Energiser®. Battery life will depend entirely on your application, the rate of measurement, transmissions and the types of sensors attached. As a guide, if your ORB was to be left sleeping, it could achieve up to 10 years of life. In a typical battery powered application, where the ORB is communicating over GSM, with once per hour updates, the ORB can be expected to last 2 years on a set of batteries. The ORB can be configured to monitor its batteries and report low battery conditions.

I've set my ORB-X1 to transmit at 60 second intervals but the Portal says I need to upgrade my plan?

The maximum transmit rate on the Standard Senquip Portal plan is 60 seconds. This limit has been set because at data rates faster than 60 seconds, the cost of processing and storing data becomes significant. To be sure that your transmit settings are valid for use with the standard plan; make sure that the rate at which you transmit in both normal and exception conditions is above 60. For instance, if your base interval time is 5 seconds and your transmit interval is 20; that is fine as a transmission will, under normal operation be sent every 5 x 20 = 100 seconds. If your exception interval is however set to 10, then under circumstances where an exception is present, a transmission will be made every 5 x 10 = 50 seconds. In this case, you will need to change the 10 to 12 or upgrade your plan.

How accurate is the GPS on my ORB-X1-G?

GPS position accuracy depends on many factors such as the mounting position, orientation, visibility of the sky, weather conditions and time of day. The best position accuracy will always be obtained when the ORB is mounted vertically in a position where it has a clear view of the sky. To enhance GPS position accuracy, the ORB-X1-G can track GPS, GLONASS, BeiDou/Compass, Galileo and QZSS satellites.

With a clear view of the sky, the position accuracy of the GPS is better than 2.5m 50% of the time and battery than 5m 95% of the time.

Why is my AA battery voltage reading lower than I expect?

If you have inserted four 1.5V AA batteries into your ORB-X1, you would expect the battery voltage shown on the portal to be 6V. It may instead show 5.5V. The reason for this is that there is some internal resistance in your battery such that when current is drawn from it, the measured voltage drops. If, for instance, the ORB was drawing energy from the AA batteries to charge the internal battery when a measurement was made, the measured battery voltage would be slightly lower than 6V. There is also a small amount of protection circuitry between the battery and the measurement circuit and again, we would expect a small drop across this circuitry.

How can I force the ORB to accept a change made on the Portal during sleep?

Since the ORB is not in contact with the Senquip Portal during sleep, no changes can be made until the next transmit interval. To force the ORB to make immediate contact with the Portal, press the reset button on the ORB. After reset, the ORB makes immediate contact with the Senquip Portal and will load any outstanding settings. This is most useful when you have set a long sleep period and want to test a quick change before deployment.

I can't see historical raw data on the Senquip Portal.

The Senquip Portal stores measured data in the Senquip Cloud which is powered by AWS. As standard, data is stored for 30 days and is then discarded. If you would like to view historical data for longer than 30 days, please upgrade your portal plan to a Premium service for 2 year data storage. Note that although you may not be able to see data on the Portal, that Senquip may be able to retrieve it if you upgrade to a Premium plan.

I haven't used my ORB for a while and it is taking a long time to make a first connection.

If you leave the ORB unpowered for an extended time and you have set the ORB in a high power mode by for instance setting a fast update rate, the internal LiPo battery will have run flat. When the ORB first receives power, it evaluates the internal LiPo battery and if it is found to be extremely flat, the ORB will pre-condition the LiPo before resuming normal operation. If you open the lid during pre-conditioning, you will see the green light pulsing slowly during pre-conditioning.

I have inserted a SIM but the ORB is not updating the Senquip Portal.

Firstly, check the state of the orange network status LED. If the orange light is flashing, then the ORB has not been able to establish a connection with the internet. To further diagnose the problem, enter setup mode on the ORB and browse to the *Network* tab. Make sure that the GSM Connection setting is enabled and that the correct APN for your SIM card has been entered. Typical APN's for Telstra in Australia would be telstra.m2m and telstra.internet. Save your changes to restart the ORB.

Can I sample data faster than 60 seconds on a standard portal plan?

The limit on a standard portal plan is to how fast you can transmit data. On a Standard plan, you cannot transmit data faster than at 60 second intervals. On a Premium plan, you can transmit as fast as at 5 second intervals. This does however not mean that you can't sample faster. Say for instance that you needed to sample data at 10 second intervals and you are on a Standard plan. Set the *base interval* to 10 and the *transmit* and *exception intervals* to 6. The ORB will wake every 10 seconds, take a measurement and check for exceptions. If there is an exception, it will transmit immediately. If not, it will transmit every sixth measurement. If you need access to all 6 measurements, tick the batch measurements option. In this case, all 6 measurements will be sent once every 60 seconds.

Can I stop Senquip from having access to our data?

Unless you give a Senquip employee access to an ORB by giving them view, user, or admin status, Senquip employees will not be able to view your data. Sometimes, you give a Senquip employee access to your device in order that they may assist you in setup. As an administrator, you can remove this access at any time. If data security remains a concern, you can stop a Senquip device from sending data to the Senquip Portal by unchecking the *Send Data to Senquip Portal* option in the Endpoint settings. Data can still be sent to the server of your choice by completing the UDP, HTTP or MQTT endpoint settings for your server. For more information, see the Senquip Privacy Policy that can be found in the footer at the bottom of the Senquip website.

I have been using the hotspot on my phone to test ORBs and it is not working anymore.

The Wi-Fi Hotspot feature available on most smartphones is typically limited to between 3 and 5 active device connections. Once this limit is reached, the smartphone will not allow further devices to connect. We note that one some newer smartphones, this limit has been increased to 10. We also note various work arounds to increase this limit.