

S P I L B A

ONYX 1

User Manual



Ver. 3.0

Date: 01/03/24

Content

| | |
|-------------------------------|----|
| Presentation of ONYX 1..... | 3 |
| What does it include? | 4 |
| How should I connect it?..... | 5 |
| GNSS antenna positioning..... | 6 |
| Positioning the device | 8 |
| Using the SDCARD | 9 |
| How does ONYX 1 work?..... | 10 |
| How to format in FAT32? | 12 |
| LED indicators..... | 13 |
| Usage recommendations | 14 |

Presentation of ONYX 1

ONYX 1 is a Data Acquisition system that was designed exclusively with customer needs in mind. Aware that small details make big differences, an extremely robust system was designed, easy to use and with extraordinary overall performance.

ONYX 1 incorporates in its design the innovative global satellite navigation system “GNSS”. Through this multi-constellation system, not only North American satellites in orbit (GPS) are used, but also Russian (GLONASS), Chinese (BEIDOU) and European (Galileo) satellites. This capacity provides greater speed in starting the equipment and guarantees that it always remains functional even in adverse conditions (clouds and mountains partially affect all satellite positioning systems). The simultaneous use of all satellite systems means that the stored position and times have the highest precision on the market. When the data obtained with ONYX 1 is analyzed, it is discovered that details can be seen that are not perceived in other systems of this type.

On the other hand, ONYX 1 offers its customers the possibility of analyzing accelerations and rotations in their vehicle instant by instant. Its accelerometer and gyroscope allow you to evaluate the vehicle's performance in a much more complete way by even analyzing the behavior of the suspensions by recording the rolling and pitching movements.

ONYX 1 data acquisition records all activity to an external SD or SDHC memory card. Memory cards are of very varied types with different access speeds, each user has different brands, models and capacities with performances that vary from manufacturer to manufacturer and between originals and alternatives. For all these reasons, operating difficulties usually arise in almost all the computers that use them, and it is quite common to discard cards that unexpectedly “do not work” in some. ONYX 1 was designed with the user in mind and to solve this problem, Spilba created an intelligent memory card handling algorithm. Thanks to this system, the device accepts any type and capacity, if they are formatted in FAT32.

As a result of the natural vibrations present in a vehicle, even more so in a competition vehicle, the metal conductors of the memory cards can stop making contact, causing the loss of information from a training session, or worse still, a session of career. To avoid this problem, Spilba developed automatic time synchronization for ONYX 1. In this way, even in the most adverse situation, the data acquired up to the moment of synchronization will be recorded.

It is often difficult to place the equipment in the position recommended by the manufacturer. Being aware of this, and the annoying task of calibrating equipment every time it is in a new place, an automatic calibration system was mounted on ONYX 1. Every time the equipment is turned on, it automatically detects the position in which it is located and corrects future measurements considering its own inclination.

A quick and easy read of equipment status is essential when time is short. With this philosophy came the design of the ONYX 1 fronts. Its four indicator LEDs and the accompanying figures allow you to have the complete status of the device immediately. The design of the rear panel with its clear indicators reflects which accessories should be connected to each connector, avoiding possible confusion.

What does it include?



- 1. Data acquisition system ONYX 1*
- 2. Antenna GNSS HG (High Gain)*
- 3. Main wire (2mts)*
- 4. Quick installation guide*
- 5. Spilba stickers and card*

How should I connect it?

ONYX 1 data acquisition was designed so that the user does not have to worry about anything else than improving their performance. To meet this objective, it only has two connectors: one for the GNSS antenna and another for the power supply. First you must connect the GNSS antenna as indicated in the figure.

Note: The antenna used is an active bi-band antenna (+5VDC). Any other that is used in its place could be damaged or cause the acquisition to malfunction.



The equipment is powered by +9VDC~24VDC. Although the equipment has protection against excessive voltages, extreme values could damage it. To power the acquisition, you must use the cable provided in the standard kit, shown in the figure.

Connect terminal 1 (bayonet type) to the acquisition and terminals 2 (wires) DIRECT to the vehicle battery (+12/+16VDC).

Remember that once the equipment is powered, it will begin calibrating the accelerometer. It is recommended to fix ONYX 1 in its final position before feeding it so that it is correctly calibrated.

Once powered, the 'POWER' LED (red) on the front panel will light up. If you do not respond to this behavior, contact technical service.

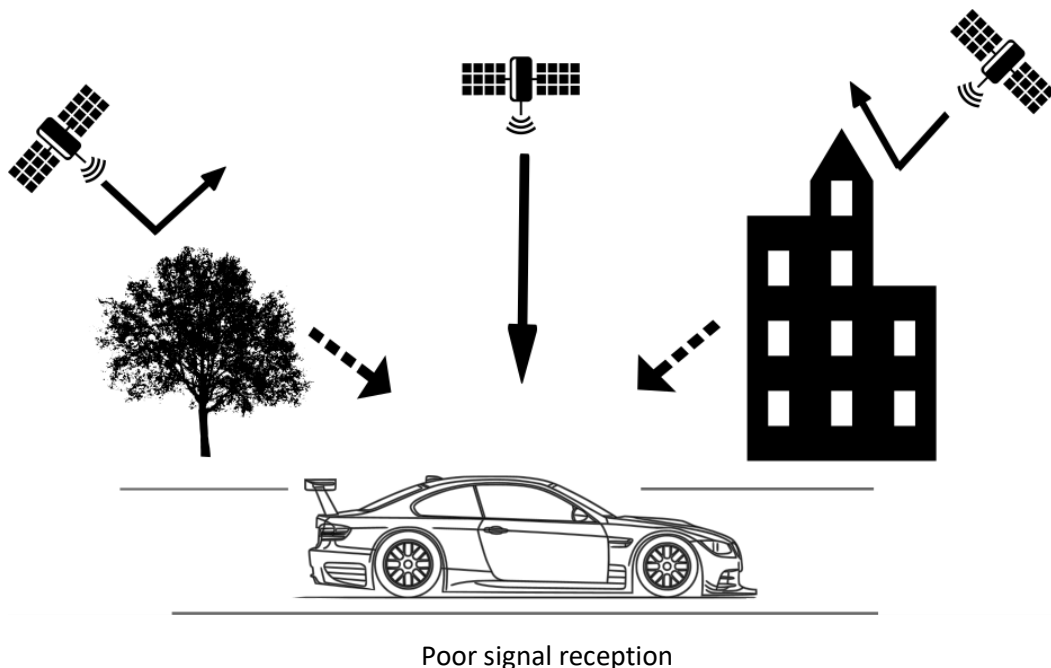
DO NOT USE ANOTHER POWER CORD THAN THE ONE PROVIDED BY THE MANUFACTURER. DO NOT ATTEMPT TO REPAIR THE SAME. COULD DAMAGE THE EQUIPMENT.

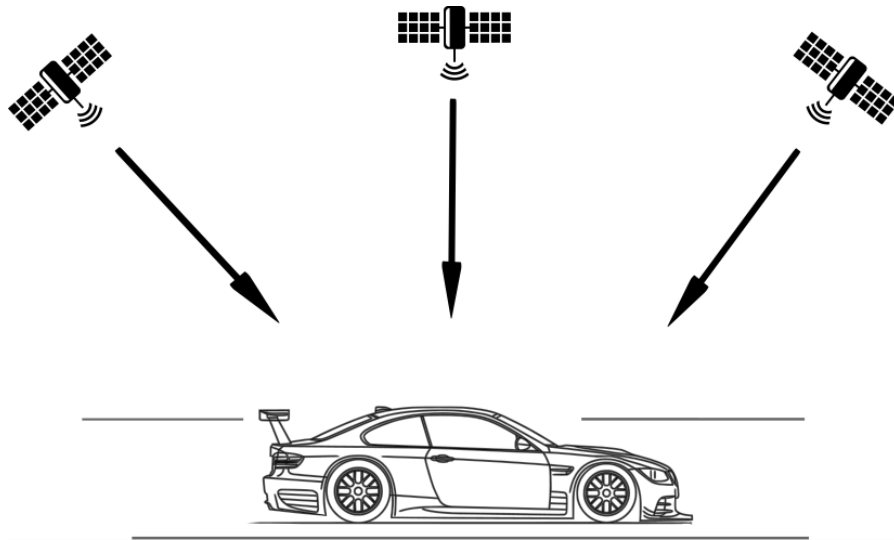
GNSS antenna positioning

The GNSS HG antenna delivered with the equipment is an active bi-band antenna high gain. To obtain the best possible signal and not damage it, it is important to avoid the connection cable having very acute angles or excessively small bending radii. Before connecting it to ONYX, make sure that there are no dust particles on the connector. In case of breakage, malfunction, or considerable deterioration, contact an official distributor for replacement.

The antenna features a magnetic mount for simple and quick placement on the vehicle roof. For optimal signal reception, ensure it is positioned at the highest point in the vehicle away from any obstructions that could block satellite reception.

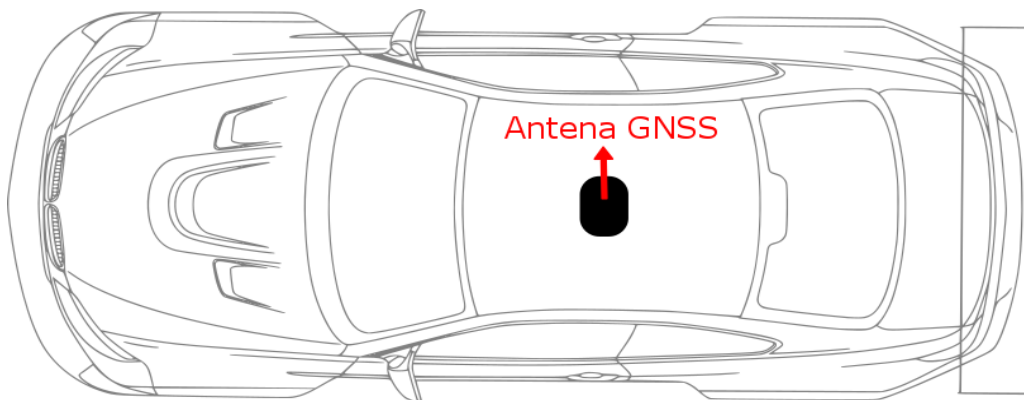
Note that when using GNSS equipment, reaching the sky without obstacles is very important. Objects such as high-rise buildings, trees, etc., can attenuate the received signal, causing a reduction in the number of satellites, or introducing unwanted reflections that can reduce the accuracy of the equipment.





Optimal reception

Locate the antenna in the center of the roof of the vehicle as shown in figure, in this way, the antenna will be located at the highest point and the subsequent measurements will be referred to its central point.



Example of antenna location

Positioning the device

ONYX 1 incorporates a 6-dimensional accelerometer in its technology, that is, it has an integrated accelerometer and a gyroscope in the 3 axes (X, Y, Z). For this reason, the position in which it is installed is of utmost importance.

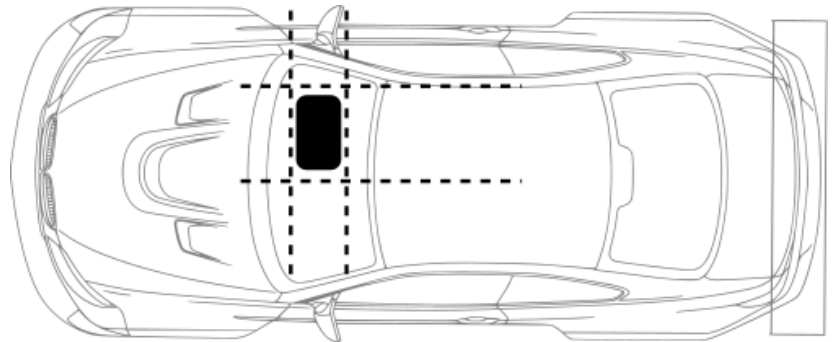
The equipment must be located as horizontal as possible and with the front of it (side that has indicator LEDs and SDCARD) pointing towards the rear of the vehicle. For the best use of the parameters obtained, it is optimal to place the device as close as possible to the center of mass of the vehicle.

Note: Any small deviation from the optimal position will be automatically corrected by the equipment.

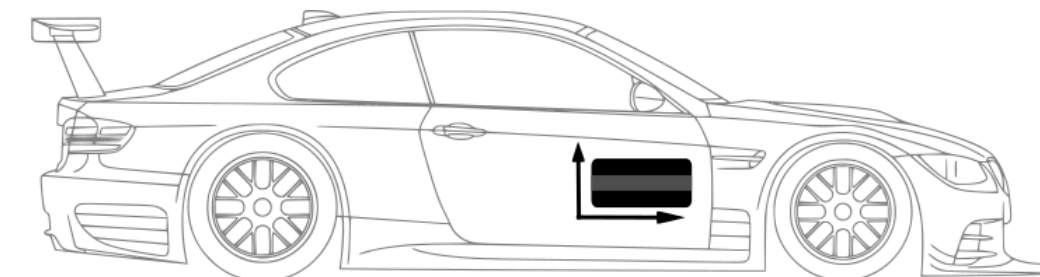
Figure below shows the correct installation of ONYX 1 assuming center of mass.



Front view of the vehicle. The back of the device should be visible, that is, the power and GNSS antenna connector



Top view of the vehicle. The equipment must be placed aligned with the axles of the vehicle



Side view of the vehicle. The equipment must be placed horizontally

Using the SDCARD

ONYX 1 works by recording data in an SD (Secure Digital) or SDHC (Secure Digital High Capacity) memory, which must be formatted in FAT32. The size of the card can be any, that is, ONYX 1 can handle any memory capacity. However, the maximum size supported by the FAT32 system is 2TB.

When the card is inserted, a 'Data' folder will be automatically created where the information will be stored, preserving the integrity of other stored files. At the moment prior to the acquisition, a '.vbo' extension file will be created that will contain the information coming from the GNSS module as well as the accelerometer and gyroscope, acquired at 10 samples per second.

The name of the files generated by the acquisition will have the following format:

ddmmaa_RUNXYZ.vbo

Where:

- dd: Day.
- mm: Month.
- aa: Year.
- XYZ: is the run number (:001,015,183).

If the SDCARD was not correctly inserted and recognized by the device, it will never begin the acquisition (see "LED indications" section). For this reason, make sure you have inserted and confirmed that the SDCARD is working properly.

A new file will be generated every time the vehicle travels at more than 10km/h for a period greater than 1 second. This will prevent the generation of unwanted files when moving the vehicle into the box.

On the contrary, it will stop collecting information by closing the file when it detects that the vehicle speed is below 5km/h.

How does ONYX 1 work?

With three simple steps you will have your acquisition working:

1. Secure the equipment according to the “Positioning the device” section described above. Remember that if it is not exactly as in the figures, ONYX 1 will correct the error.
2. Connect the power and GNSS antenna as explained in the “How should I connect it?” section, detailed above. After finding a satellite signal (approximately 30-60 seconds), you must verify that the status of the front panel is as follows:



For more information see “LED Indicators”. If the status of your equipment does not match that of the image, check if you connected the GNSS antenna correctly, disconnect the power and reconnect it, you should clearly notice how the bayonet-type connector is blocked. If the problem persists, contact technical service.

3. Before hitting the slopes, if you want ONYX 1 to record your activity, insert a memory card into the slot marked “SD.”

The new status of the light indicators may be any of the following, according to the available capacity of the inserted memory:



















If the LED indicator corresponding to “SD” does not light, remove, and reinsert the card. If after this procedure it still does not turn on, it is possible that the card is damaged, and it is recommended to change it. If the LED indicator turns red, it is possible that the memory runs out in the middle of the acquisition and valuable data is lost. It is recommended to empty the card before hitting the track.

3. Ready! ONYX 1 itself will begin storing data when the vehicle exceeds 10km/h for more than 1 second. An indication that the equipment has started with the acquisition is the “REC” indicator in flashing red. Once the vehicle is stopped, ONYX 1 will automatically stop recording. Before removing the memory card, check that the “REC” indicator light is green. On the memory card you will have, ordered by day and run number within the folder named “Data”, the files that were generated during the test.
4. You are ready to analyze data from your PC!

How to format in FAT32?

There are a lot of information in Google and YouTube where you can find the best way to format your card accordingly your operating system. Please, find your best option and if you continue with troubles, don't hesitate to contact us for more information.

LED indicators

| Nombre | Estado | Descripción |
|--|---|--|
|  POWER |  | OFF |
| |  | ON |
|  GNSS STATUS |  | OFF |
| |  | Waiting for signal |
| |  | More tan 4 satellites |
|  SDCARD STATUS |  | SDCARD absent or not recognized |
| |  | Recognized with less than 30% capacity |
| |  | Recognized with less than 70% capacity |
| |  | Recognized with more than 70% capacity |
|  REC |  | Not available for recording |
| |  | Steady: Recording |
| |  | Ready* |

* Device ready to acquire data or extract SDCARD.

Usage recommendations

To ensure optimal performance and extend the product's lifespan, it is recommended:

- Follow the user manual for product connection and installation.
- After using the equipment, store it in a dry place, free from dust, and protected from direct sunlight.
- Before using the equipment, check that both the GNSS antenna connector and the power connector are not obstructed by any unwanted particles and ensure that the connecting cables do not show visible damage.
- Securely attach the equipment's power terminals to the battery contacts to prevent undesired interruptions in acquisition.
- Use the GNSS antenna provided with the equipment; otherwise, you may experience lower performance in acquisition.
- Remember that the accelerometer calibration is performed when turning on the device. Make sure to place it in the final position before turning it on.
- Format the memory card in FAT32 before using it in the device. Refer to the "How to format in FAT32?" section of this manual.
- Avoid excessive impacts on the device.