GPS LOGGER

Firmware Version 2.01

INSTRUCTION MANUAL

The GPS LOGGER is a telemetry device that offers fast and accurate real-time position detection and feedback. It uses multiple satellite navigation systems to achieve maximum precision and resolution. Logging of all the data is possible due to its large integrated Flash memory. The logged data can be downloaded and analyzed on a computer using the free MAV Manager software.

GPS LOGGER 3

Compared to the previous versions, the GPS LOGGER 3 features faster acquisition time, improved positioning accuracy, and better performance in challenging environments. The integrated low-noise amplifier, anti-jamming system and SAW filter reduce interference from other radio signals, which is especially useful in remotely controlled vehicles.

Features

- Small dimensions, high measurement accuracy.
- Large industrial memory for data logging.
- Latest generation GPS chipset supporting multiple satellite systems.
- 3-axis magnetometer/compass for external navigation purpose.
- Backup supercapacitor for fast position fix after powering off.
- Voltage measurement and logging.
- Automatic telemetry detection: Duplex EX, Hott, MSB, S.Bus2, P²Bus, Frsky telemetry.
- Automatic timezone detection.
- Configuration through the transmitter.
- Firmware updates.

	GPS LOGGER 1	GPS LOGGER 2	GPS LOGGER 3
Dimensions	28x30x9mm	30x31x11mm	30x31x11mm
Weight	14g	18g	18g
GNSS Chipset	u-blox M8	u-blox M8	u-blox M10
Position accuracy	2.5m	2.5m	1.5m
Memory	256MB	256MB	256MB
Supported positioning systems	GPS, GALILEO, GLONASS	GPS, GALILEO, GLONASS	GPS, GALILEO, BEIDOU
Recording time (5 samples/s)	66hours		
Sampling	10Hz, 5Hz, 2Hz, 1Hz		
Flash endurance	100.000 erase cycles		
Operating current	50mA	50mA	40mA
Operating temperature	-20 – 85°C		
Supply Voltage	3.5 – 8.4V		
Telemetry	Duplex EX, Multiplex MSB, Graupner Hott, Futaba S.Bus2, PowerBox P²Bus, FrSky F.Bus, S.Port		
Status LED	YES		
GNSS receiver sensitivity	-167dBm		
GNSS max. acceleration	4G		

AVAILABLE TELEMETRY

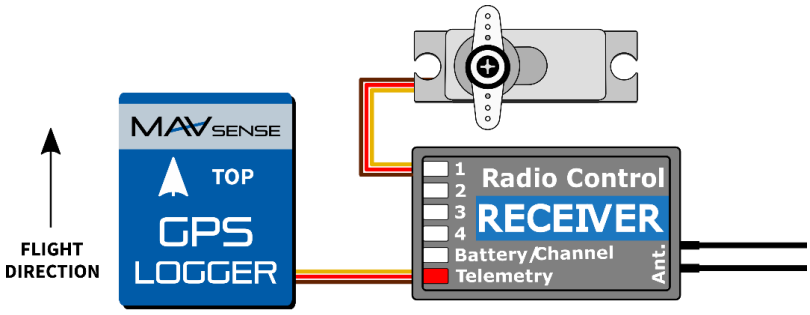
The telemetry options depend on the used radio control system. The complete data are automatically logged in the internal Flash memory.

Parameter	Description
Timestamp	Current precise GPS time.
Latitude	Coordinate North/South.
Longitude	Coordinate East/West.
Status	Indication of activity (1=got fix) or fault condition.
Sattelites	Number of detected satellites.
Abs. altitude	Altitude above the mean sea level.
Distance	Distance from the „Home position“.
Speed	2D/3D speed referenced to the ground. The speed type can be set in the configuration.
Rel. altitude	Altitude relative to the “Home position”.
Course	Direction of the flight (heading). Values in range 0°-359°: 0° = North, 90°=East, 180°=South, 270°=West. Compass heading is used if the speed is zero.
Azimuth	Position of the model with respect to the “Home position”. Values in range 0°-359°: 0° = North, 90°=East, 180°=South, 270°=West.
Temperature	Internal temperature.
Magnetometer X/Y/Z	3-axis magnetometer value. It can be used for further calculations.
Voltage	Receiver voltage. (logged only)
Trip	Distance travelled during the flight. (logged only)

INSTALLATION

Connect the GPS LOGGER to the receiver telemetry port. Place the device on top of the plane, so that the internal patch antenna is not shielded in any direction. Shielding materials, such as metal, carbon or anything conducting, can reduce the performance of position detection. Additionally, make sure that the 2.4GHz antennas are located at least 20cm or more from the GPS LOGGER. Try to avoid any mechanical stress on the sensor and avoid any close contact with components producing heat (such as engines or speed controllers). Use a soft double-sided adhesive tape, or Velcro as an alternative.

For good performance of the integrated magnetometer it is necessary to install the device at least 20cm away from magnetized objects and cables powering servos/motors. In addition, please keep the device orientation with respect to the flight direction as shown in the picture below.



Power up the receiver with GPS LOGGER attached. The red LED flashes once to indicate correct initialization. After a few seconds (or a minute if the device has been unpowered for more than a day), the device reports “3D position fix”. From this moment on, the device can start logging depending on the condition set in the configuration. The logging is indicated by a flashing LED synchronously with the sampling rate.

Each time the logging is started, a new file is created at the internal Flash storage. The log files are named according to current date and time in the following format:

"G*YYYYMMDD HH*h*NN*.log" (where YYYY = year, MM = month, DD = day, HH = hour and NN = minute).
Example: G20210605 20h47.log

It is not necessary to delete old log files manually. As soon as there is not enough free space, the oldest log files are deleted automatically. The internal file system is robust an immune against power failures, so battery may be disconnected at any time.

TELEMETRY AND SETTINGS

The device is compatible with JETIBOX and HOTT SMART-BOX for programming. The JETIBOX menu is divided into three sections:

- **Actual values** – displays the latest telemetry values (altitude, distance, position, temperature) together with minimums and maximums.
    - Reset Min/Max – press LEFT+RIGHT buttons together to reset all minimums and maximums.
- **Settings** – basic settings of the sensor
    - **Language** – you can choose the language of the JETIBOX screen.
    - **Timezone** – press LEFT+RIGHT to switch between automatic timezone detection and manual configuration. If the "Auto" mode is used, the detected timezone is displayed as soon as the sensor has a position fix. If the timezone is detected incorrectly, switch to "Manual" mode and type the zone using LEFT or RIGHT keys. For example, Central Europe uses GMT+1, while US Eastern Time uses GMT-5.
    - **Apply DST** – set "Yes" if you want to use the Daylight Saving Time (or Sommer Time) – this function will add or subtract one hour depending on your current location.
    - **Speed Measure** – set "2D" option in case you need to use just groundspeed measurement (walking, boat, and car). In case of a flying model, use "3D" measurement type to include also vertical component. This parameter influences the speed, distance and trip (route) measurements.
    - **Telemetry Speed** – choose the type of information you need vs data rate:
        - **Normal/All** – full telemetry mode, offers standard rate with all telemetry values available.
        - **Fast/Position only** – just position, altitude and timestamp are available to get the maximum telemetry update rate.
    - **GPS Profile** – set the GPS profile according to supposed usage. This parameter influences accuracy and speed/latency of position detection.
        - **Air 1G** – flying objects that do not change direction very fast (large scale models, gliders, cinematic drones...).
        - **Air 2G** – faster flying objects that perform basic maneuvers (trainers, EPP...).
        - **Air 4G** – fast flying objects that are capable of aerobatics (3D aerobatic models, F3A, jets). Default option.
        - **Walk/2D** – slow motion on the ground.
        - **Car/2D –** a mode suitable for a car.
    - **Log Period** – set the logging period according to your preferences. The maximum value (10Hz) stores data 10 times per second and can cover all details of the flight. Please note that with higher logging rate also the size of log files grows faster.
    - **Logging** – set the condition that must be fulfilled to start logging:
        - **Auto/Fix** - the logging starts automatically as soon as the position is determined (the logger gets 3D fix).
        - **Auto/10kmh** - the logging starts automatically as soon as the logger gets 3D fix and the speed exceeds 10km/h.

        - **Start/Stop** – the logging starts after the 3D fix and speed exceeds 10km/h. It stops after 10 seconds below 5km/h.
    - **Home Location** – if "Automatic" mode is used, the home location is determined after each startup – it is the position where the GPS LOGGER gets its first position fix. The following telemetry is calculated with respect to the home location: Relative altitude, distance and azimuth. In "Manual" mode the last known home location is used.
    - **Set Home Location** – by pressing LEFT+RIGHT arrows you can set the current GPS coordinates as a reference point. The home location is updated independently on the Auto*/Manual* settings. The home location is updated also if you press LEFT+RIGHT arrows on the JETIBOX main telemetry screen.
    - **Minimum Satellites** – set the minimum number of detected satellites before confirming the 3D position fix.
    - **Startup HDOP** – set the initial required "horizontal delusion of precision" before confirming the 3D position fix. The HDOP parameter says how much we can trust the position measurement where lower value is better. For example, value 2.0 states that the typical deviance of current measurement from ideal position is up to 2 meters.
- **Service** – In this menu you can view the device version and reset it to the default factory configuration.
    - **Memory/Free** – shows the available space at the internal Flash memory.
    - **Format** – in case of a file system error you may format the Flash memory. Please note that this procedure erases all the data – even configuration.
    - **Clear logs** – deletes all log files.
    - **Compass, Compass (Home)** – displays current magnetometer measurement compared to an ideal measurement, which is calculated on the basis of the GPS location.

Graupner Hott Menu Structure
The GPS LOGGER offers telemetry as a standard GPS telemetry module.

```
 GPS LOGGER  VX.XX
REL. ALTIT     81m
DISTANCE      150m
SPEED        72km/h
TRIP         1500m
LAT.    12°34.5678N
LON.    12°34.5678E
DD/MM/YYYY HH:MM:SS
```

```
 GPS LOGGER  VX.XX
MAX.ALTIT     180m
MAX.DISTANCE  250m
MAX.SPEED   150km/h
HDOP/VDOP  1.1/1.5
9xSAT  25.5°C  5.0V
>RESET MIN/MAX
               2/5
```

```
 GPS LOGGER  VX.XX
>LANGUAGE    English
TIMEZONE       Auto
     Europe/Prague
APPLY DST       Yes
SPEED MEASURE    3D
PROFILE      Air 1G
               3/5
```

```
 GPS LOGGER  VX.XX
>RECORD PERIOD  10Hz
LOGGING  Auto/3DFix
HOME LOCATION  Auto
 Set Home Now
MINIMUM SATS      5
STARTUP HDOP    2.0
               4/5
```

```
 GPS LOGGER  VX.XX
>FACTORY DEFAULTS
CLEAR LOGS
FORMAT
MEMORY      256.0MB
FREE        189.5MB
               5/5
```

Futaba and Multiplex connection

Futaba and Multiplex systems do not offer wireless device configuration. The telemetry transmission is possible with the following fixed sensor slots:

	Futaba S.Bus2	Multiplex MSB
Speed	8	9
Altitude	9	10
Time	10	-
Vario	11	-
Latitude	12-13	-
Longitude	14-15	-
Distance	-	11
Satellites	-	12
Course	-	13
Note	Manual detection in the menu Linkage – Sensor. Choose F1675 GPS on slot **8**.	Automatically detected by the transmitter.

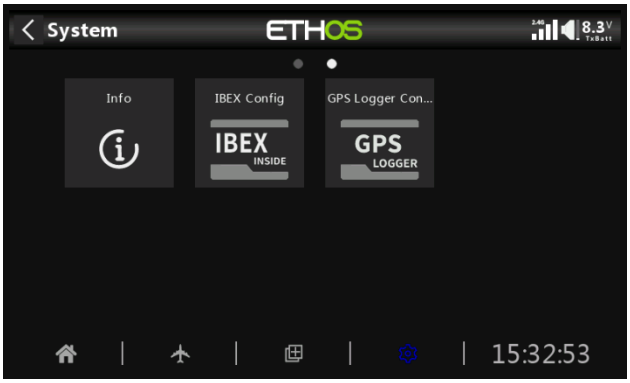
PowerBox telemetry

The GPS LOGGER recognizes the PowerBox P2Bus telemetry protocol. Connect the Telemetry cable to the P2Bus port of the receiver. The transmitter scans for attached sensors as soon as the receiver is powered up and the sensor telemetry should be available within 2.5 seconds. After that you are free to assign the telemetry to any desktop widgets and alarms. Available telemetry is similar to the Duplex EX telemetry (see above). The sensor configuration through the PowerBox transmitter is not available at the moment.

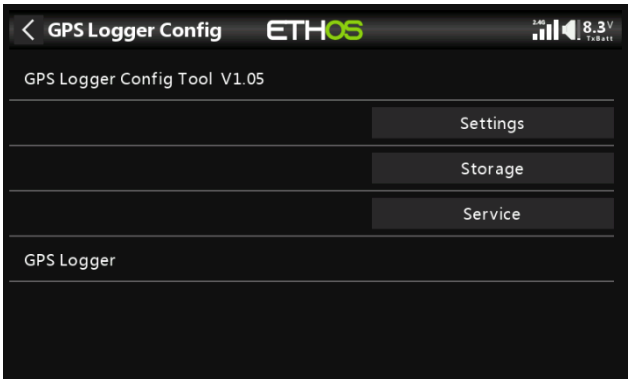
FrSky Integration

The GPS LOGGER is compatible with S.Port, FPort and FBus capable receivers, allowing both telemetry and configuration capabilities. The sensor receives channel information and sends back telemetry data. It can decode all channel data from FBus 8 up to FBus 24.

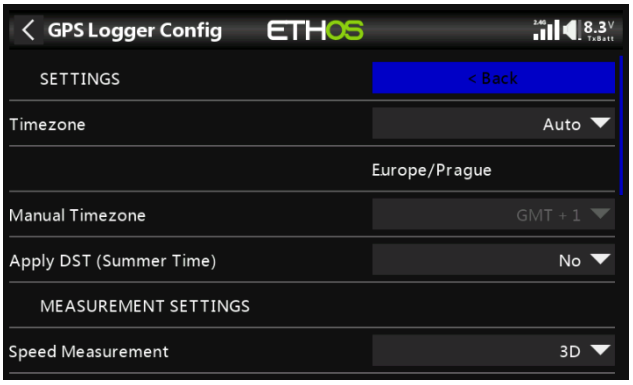
To configure the controller, the Ethos system (minimum version 1.4) is required. You need to download the corresponding Lua application to your transmitter and place it in the "scripts" folder. Launch the application from the second page of the *Configuration* menu. Note that only one GPS LOGGER should be connected to the telemetry bus at a time to avoid address conflicts.



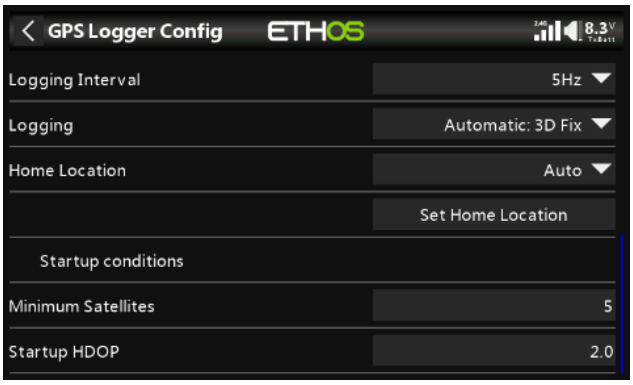
The GPS Logger Config app is available in the Configuration menu.

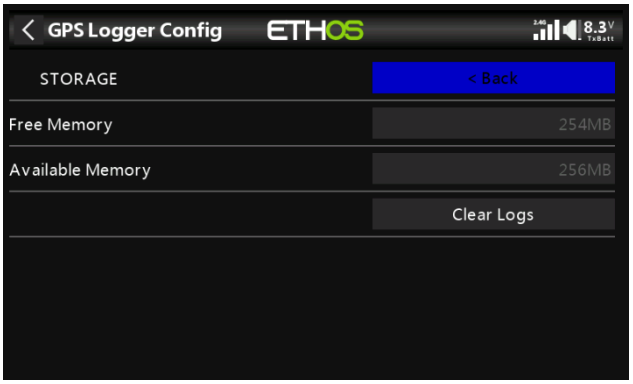


The GPS Logger main menu offers links to all submenus.

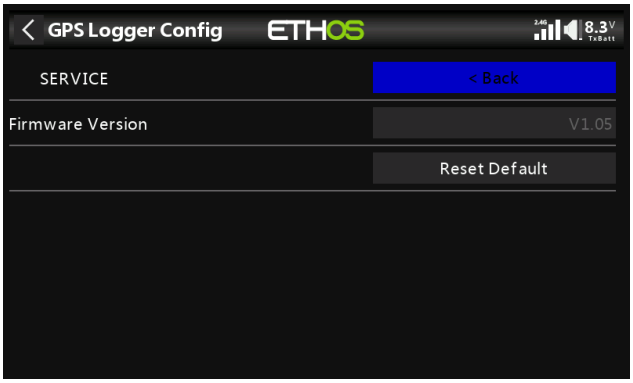


GPS Logger Settings





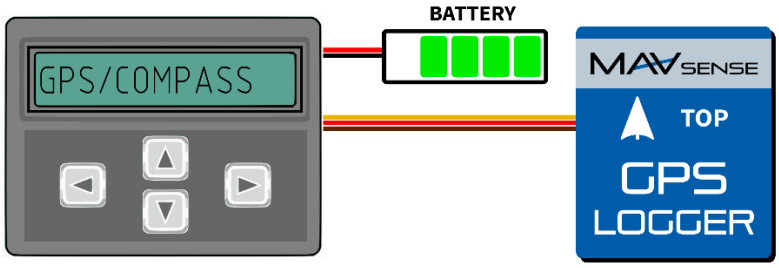
Storage information



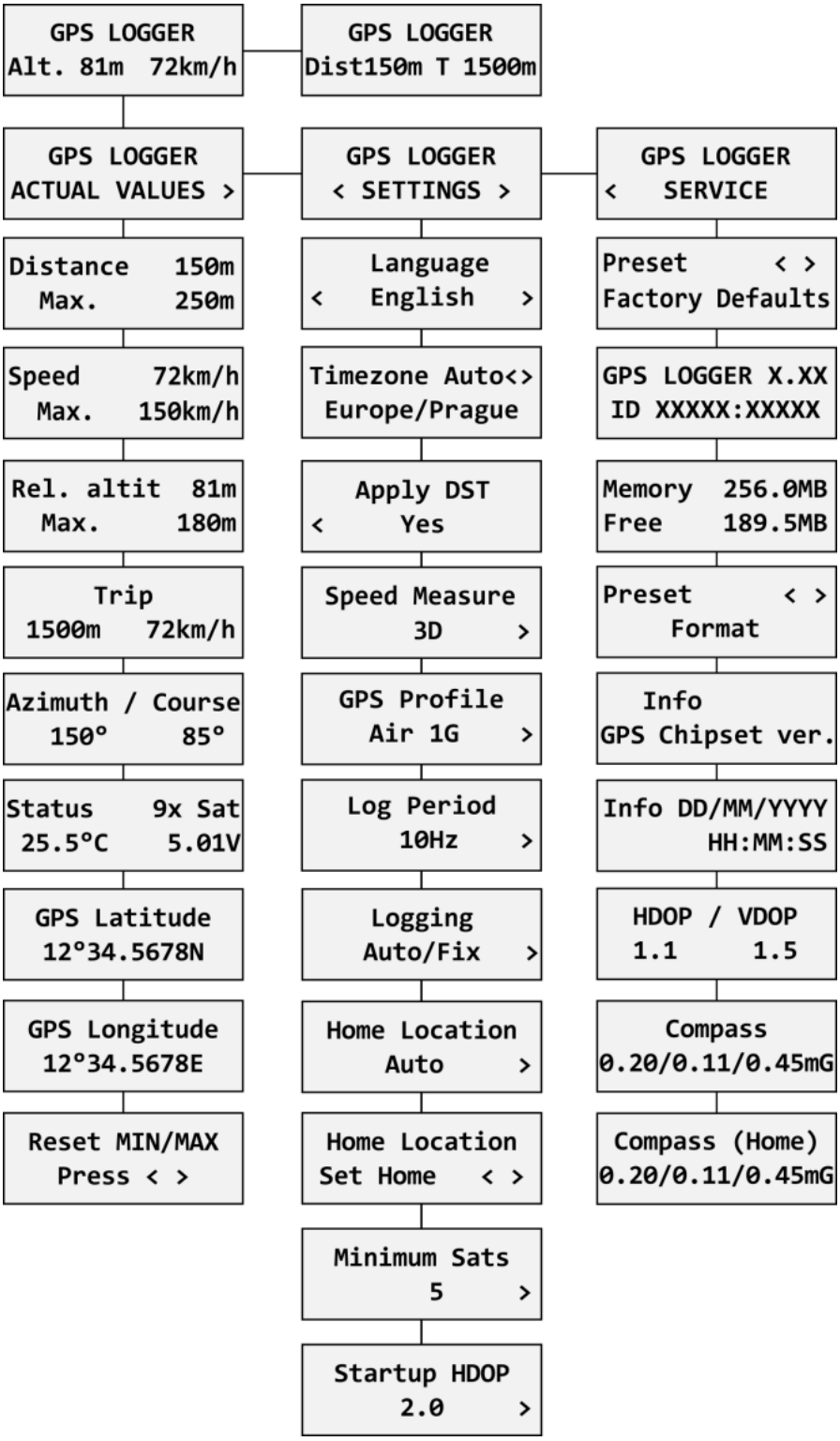
Service/Reset menu.

JETIBOX Connection

Plug the GPS LOGGER into the sensor slot of the JETIBOX. Power it up with a battery of appropriate voltage (4.5 - 8.4V). Now you can configure the sensor using the arrows on the JETIBOX.



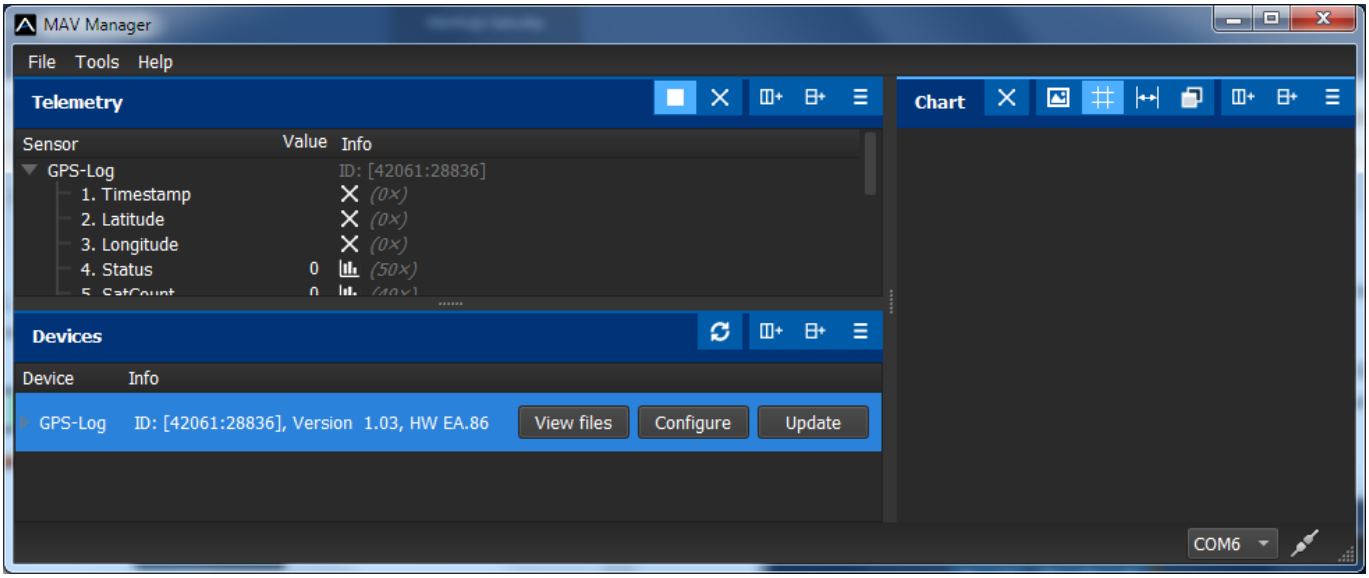
Complete JETIBOX menu structure



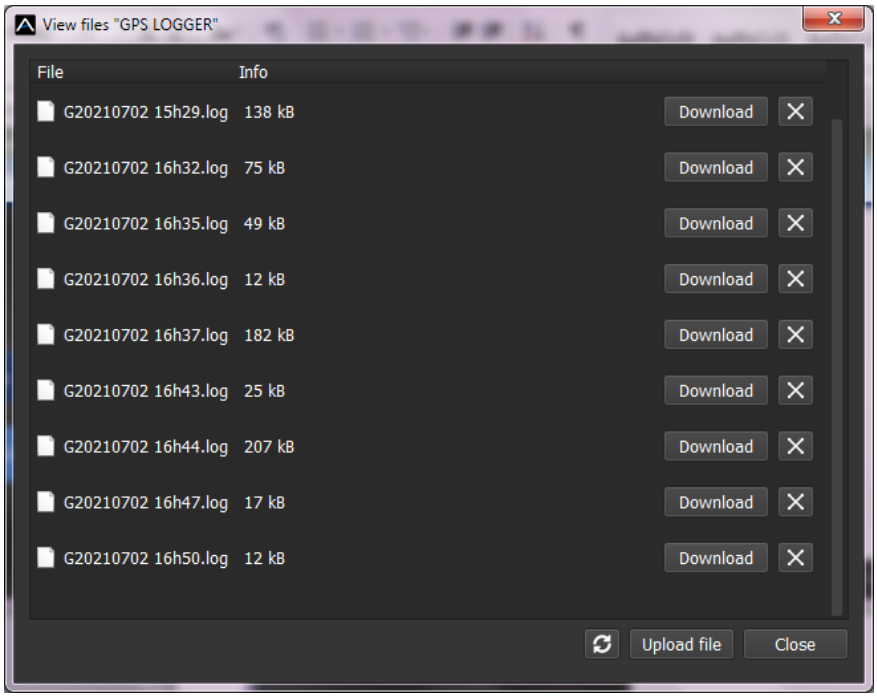
ANALYZE LOG FILES

The free MAV Manager software can be used to download and analyze the GPS data after the flight. You can download it from the manufacturer website.

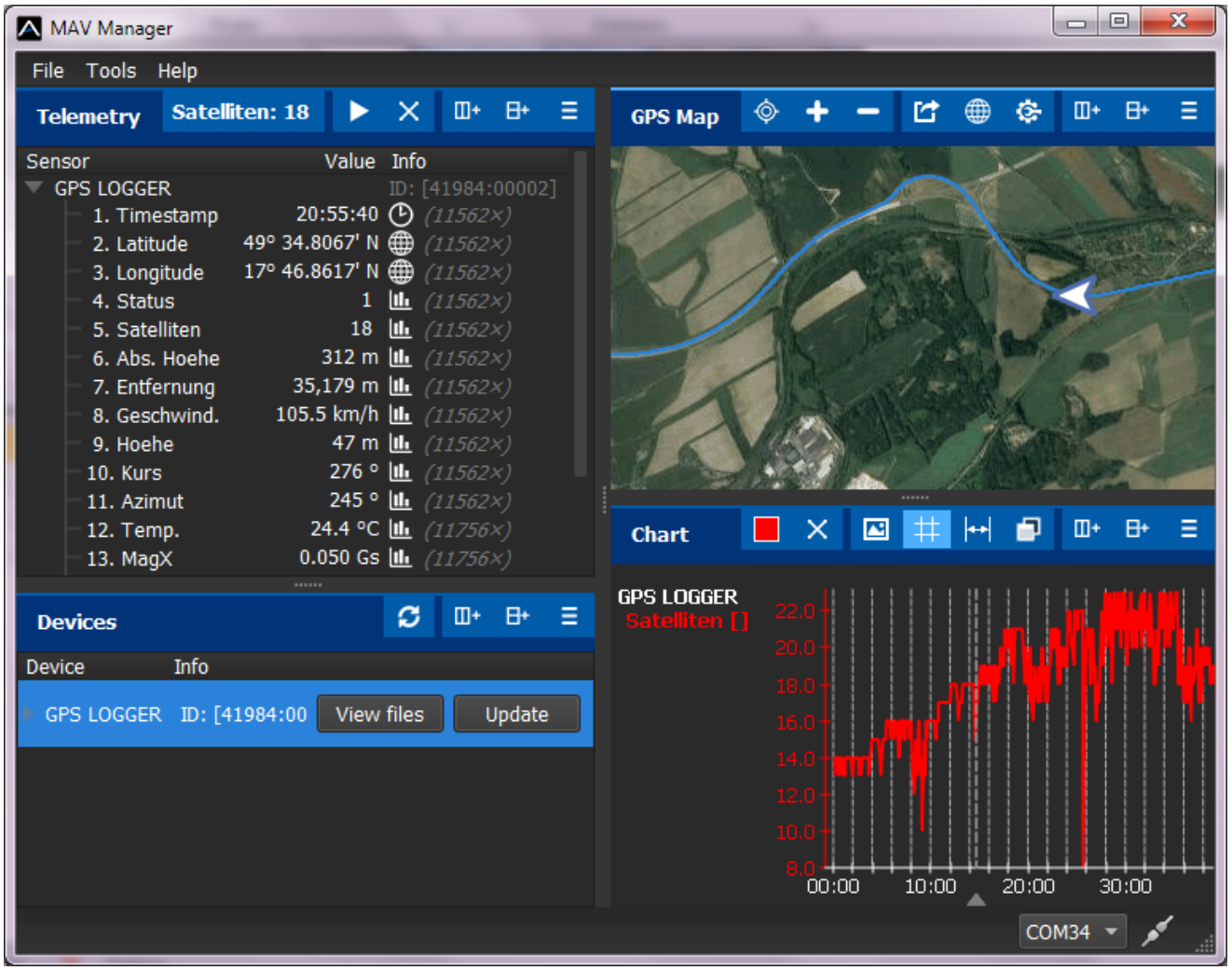
1. Connect the MAV USB interface to the computer. Attach the GPS LOGGER to it.
2. Launch the MAV Manager and select the correct serial port at the bottom of the screen (COMxx). The GPS LOGGER will be recognized automatically.
3. Press “View files” in the list of devices.



4. Select the log file and press the “Download” button. You will be asked to select the destination filename. As soon as the transfer finishes, you will be asked if you want to open the downloaded file. Press “Yes”.



5. You can view the logged data in a chart or map. Save the log file, or export the coordinates to KML.



SAFETY INFORMATION

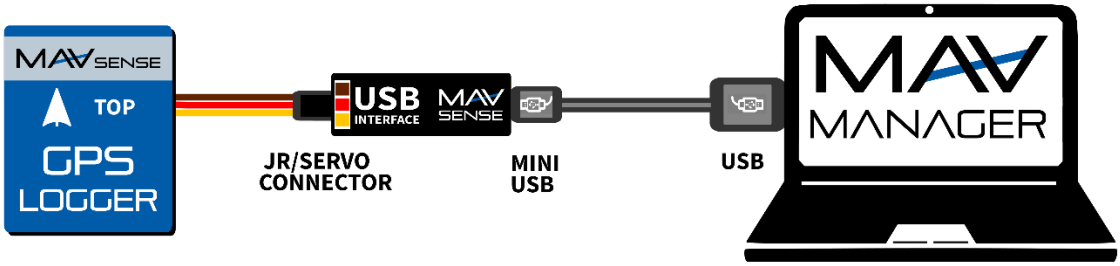
- Operate the GPS LOGGER always in dry environment and within the device limits stated in this guide. Never expose the device to excessive heat or cold.
- Never apply mechanical stress or excessive force to the GPS LOGGER. The sensing element can be damaged or measure imprecisely if the force is applied.
- Do not remove the enclosure from the device and do not try to implement any changes or modifications. This can lead to a total destruction and to the denial of any warranty claims.
- Always check the polarity of the connection. Never inverse the polarity – this could lead to total destruction.

FIRMWARE UPDATE

Firmware updates for the GPS LOGGER are transferred from a PC via the USB interface. The required programs and files are available at www.mavsense.com.

Install the MAV Manager software and the USB drivers on your computer. Check the system requirements.

1) Connect the USB interface to your PC, run MAV Manager - Updater and select the correct COM Port.
2) Connect the GPS LOGGER according to the picture below.
3) Select the correct *.BIN file and press the Update button.

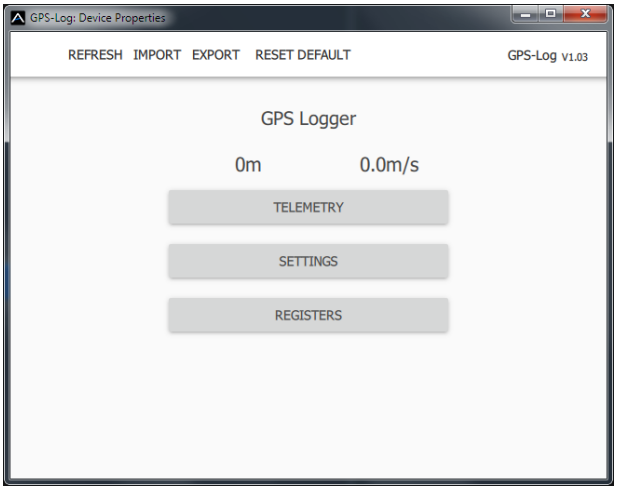


Note: The GPS LOGGER will be automatically detected by the MAV Manager.

PC CONFIGURATION

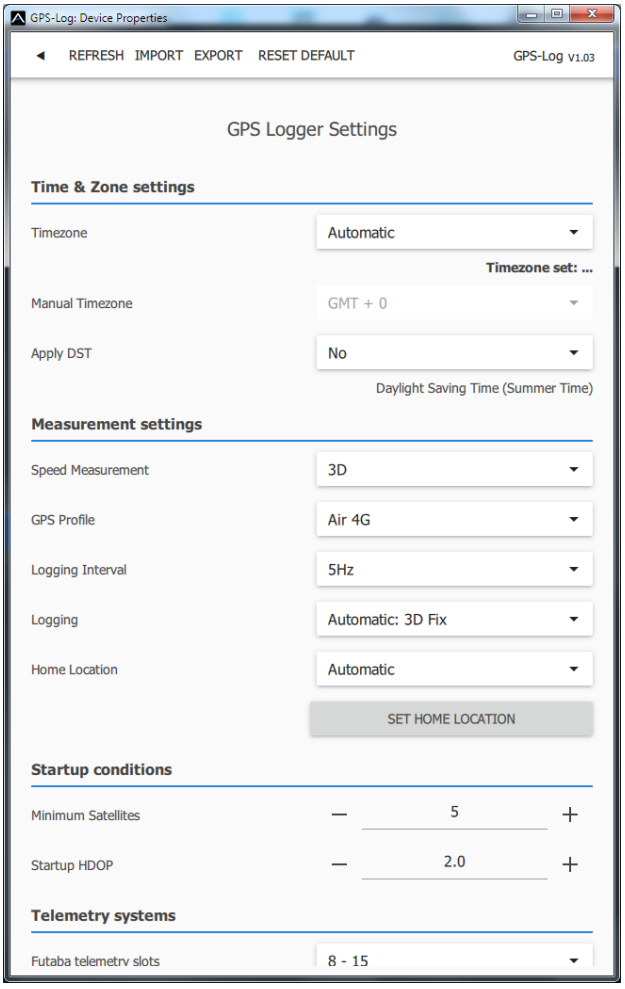
It is possible to use the MAV Manager software (1.6.0 and later) to conveniently configure all device settings, display real-time telemetry and make a backup of the configuration. The configuration menu contains four buttons in the top toolbar:

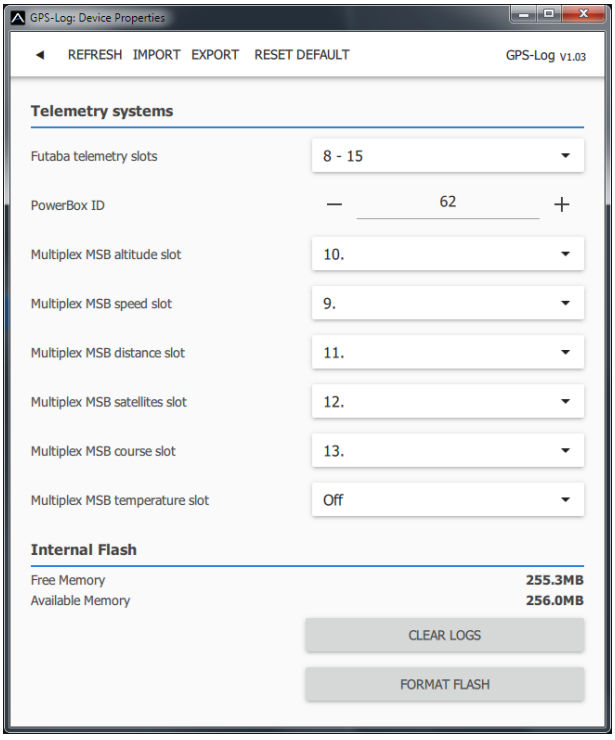
- **Refresh** – forces the configuration to be reloaded from the device.
- **Import** – imports the settings from a file. If you have several devices and want identical settings for all of them, simply import the same settings to each device.
- **Export** – exports the settings from the device to a file. You can easily create a backup configuration stored in your PC. After creating a backup, you may easily experiment with the settings and later revert back to the original configuration by pressing the "Import" button and choosing the original exported file.
- **Reset default** – resets the device to factory defaults and reloads all the settings.



Connect the GPS Logger to your PC using the USB interface. The device will be automatically detected by the MAV Manager. The device properties are available after pressing the "Configure" button.

Real-time telemetry with min/max values. The MAV Manager is also able to create a log file from the real-time telemetry data, which can be viewed, analyzed, imported and exported.





GPS Logger settings. Every time you make any change in the configuration, the new value is immediately transferred to the device and saved to memory. There is no need for additional confirmation.

You are able to modify the telemetry settings as well as clear log files from the internal Flash.

WARRANTY

We grant a warranty of 24 months from the day of purchase under the assumption that they have been operated in conformity with these instructions at recommended voltages and that they were not damaged mechanically. Warranty and post warranty service is provided by the manufacturer.

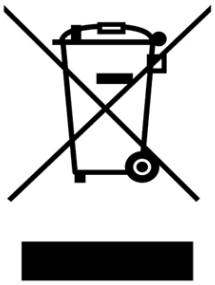
Distributor

GB: ESG-JETI-FIALA UK, B M Jones, 15 London Road, Hassocks, West Sussex, BN6 9NT, United Kingdom.
E-mail: sales@esoaringgadgets.co.uk | Website: www.esoaringgadgets.co.uk | Phone: 44(0)7740181861

Manufacturer

MAV Sense s.r.o.
E-mail: info@mavsense.com | Website: www.mavsense.com

Information on Disposal for Users of Waste Electrical & Electronic Equipment (private households)



This symbol on the products and/or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.
For proper treatment, recovery and recycling, please take these products to designated collection points, where they will be accepted on a free of charge basis. Alternatively, in some countries you may be able to return your products to your local retailer upon the purchase of an equivalent new product.
Disposing of this product correctly will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling. Please contact your local authority for further details of your nearest designated collection point.
Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

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If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

Information on Disposal in other Countries outside the European Union

This symbol is only valid in the European Union.
If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.