



Description and operating instructions

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1. Introduction

The GPS-Logger 3 is a complete GPS system that was specifically developed for the needs of model construction field.

It is extremely small and light, but has outstanding features and possibilities.

With up to 10 Hz sampling rate and the micro-SD memory card almost unlimited recordings with high resolution and detail are possible.

Telemetry via 2.4 GHz systems with a return channel is now a firm component of the GPS-Logger 3 and fully integrated.

In line with our philosophy to support as many systems as possible, the GPS-Logger 3 also works via the telemetry:

Jeti Duplex EX

Multiplex M-Link

Graupner/SJ HoTT

Robbe/Futaba FASSTest S.BUS2

JR DMSS

FrSky

Spektrum

PowerBox P2Bus

The telemetry used in the GPS-Logger 3 must be specified, once only, in the settings. This is done either through our PC program "GPS Konverter" or the UniDisplay. On delivery HoTT is selected.

The GPS logger 3 comes with a built-in high-resolution pressure sensor giving via telemetry a high-quality Vario, and the integrated TEK connection enables also the use of compensation nozzles. This provides a vario function with very accurate real rise and fall displays independently from "stick thermals".

For an accurate height measurement, even when operating with TEK nozzle, a second pressure sensor is installed, so irrespective of the speed correct height data is provided.

Conclusions about the in-flight loads are provided by the built-in 3-axis accelerometer. At each waypoint in the recording, and also by telemetry, the acceleration of all three axes can be displayed.

The new competition format OLC, the On Line Contest, is well supported by the GPS-Logger 3. The built in sound sensor (ENL = engine noise level) provides data so that the motor running time in the climb is automatically recognised. The OLC necessary IGC file is created directly on the memory card and digitally signed without any other conversion software being needed.

When operating with Multiplex M-Link all data on the sensor bus is automatically logged by the GPS-Logger 3 and also written to the memory card ➔ MSB Data logger.

In addition to its own measurements, the GPS-Logger 3 can also read all the data live from the UniLog 1/2 via a direct cable connection and write it to the memory card.

Via our UniDisplay all values measured by the GPS-Logger 3 can be directly viewed live. Naturally all settings and alarms can also be programmed easily via the UniDisplay.

The presentation and interpretation of data is made in 3D in Google Earth™. All that is required is to convert into Google Earth™ format using our free software "SM GPS Konverter" and the also free Google Earth™ standard version.

The well known software LogView www.logview.info also supports our GPS-Logger 3. Here, the GPS data can also be converted to Google Earth™ format. In addition the values can be shown in normal curves/tables and much more besides.

Based on Java and therefore suitable for the Mac or Linux in addition to Windows there is the GNU Data Explorer for evaluating the data. → www.nongnu.org/dataexplorer

Whether sailplane, aerobatics plane, helicopter, HLG or Slowflyer, the GPS-Logger 3 can be used in almost any sector due to its small weight and compact size. Naturally the GPS-Logger 3 is not only suitable for flying models, it can also be used in RC-boats, RC-car etc.

2. Differences GPS-Logger 1, GPS-Logger 2, GPS-Logger 3



The GPS-Logger 3 replaces the GPS-Logger 2 with identical functionality. Both are successors of our proven GPS-Logger.

The new GPS-Logger 3 contains all the functions of its predecessor, but was technically further developed in the following points:

- even finer resolution Vario with improved sensor
- new GPS module
- TEK connection horizontally in the direction of the connecting cables



The only functional difference between GPS-Logger 2 and GPS-Logger 3 is the measurement of the air speed (AirSpeed) via the TEK nozzle. This is only available in GPS-Logger 3 for reasons of accuracy (better pressure sensors).

With the firmware v1.26 the supply of the GPS-Logger 1 with new functions ends. Due to the introduction of German/English switching, the firmware is too large for GPS-Logger 1, so future firmware updates will only be available for GPS-Logger 2 and GPS-Logger 3.

From firmware version v1.20 with the introduction of GPS-Logger 3, this manual is only available in the version for the new GPS-Logger 3, but the manual also applies to GPS-Logger 2. All areas that also concern GPS-Logger 1 also apply to it, of course.

3. What the GPS-Logger 3 can do

- 10Hz GPS, and so 10 readings per second → particularly good data resolution
- Micro SD memory card → almost unlimited recording and simple selection of data
- Data stored in plain text on the memory card (NMEA data) → subsequent processing with many programmes possible
- High resolution Vario with TEK connection
- Altitude measurement with a second pressure sensor, with automatic reset to zero at switch on
- Measurement of the air speed (AirSpeed) when using a TEK nozzle
- Integrated 3 axis accelerometer up to + -16g
- Direct creation of the IGC file for On line Contest (OLC) with integrated motor noise sensor for ENL measurement.
- Full telemetry support for Jeti duplex (EX), Multiplex M-Link Graupner HoTT, Futaba FASSTest S.BUS2, JR DMSS, FrSky and Spektrum.
- Direct connection of the UniLog 1/2 and UniSens-E is possible for data capture (Only with HoTT, Jet, and M-Link operation)
- Recording of all data on the Multiplex Sensor Bus when operating with M-Link
- Connector for receiver signal for remote control of certain functions
- Recording of receiver battery voltage
- Powered by the receiver battery
- Internal backup battery for a quick start of the GPS
- Start of recording set by different adjustable conditions
- Current status is indicated by three LEDs
- Direct viewing of recorded values live with our UniDisplay (only with HoTT, Jeti, and M-Link)
- Parameter settings over PC, UniDisplay, or telemetry is possible
- Language for telemetry values and operation switchable German – English via UniDisplay
- Fast conversion of data into 3D presentation in Google Earth™ with our free “SM GPS Konverter” software.
The programme is available on the Internet at www.sm-modellbau.de in the menu option **Software & Updates**
- Support by LogView software www.logview.info LogView is a very comprehensive yet easy to use evaluation programme for the PC that supports a multiplicity of different measuring devices and battery chargers from the model construction field.
- Support by the GNU Data Explorer software www.nongnu.org/dataexplorer
The GNU Data Explorer is based on Java and therefore suitable for the Mac or Linux.
- Free firmware updates via PC possible using our USB interface cable (the firmware file is available on the Internet at www.sm-modellbau.de in the menu option **Software & Updates**)
- Useable almost everywhere due to its compact size and low weight

4. Technical data

GPS Data Rate	1 Hz, 2 Hz, 5 Hz, 10 Hz adjustable.
Memory Type	Micro SD or micro SDHC card (supplied with 4 GB card)
Recording duration	With 10 Hz data rate and full utilization of approx. 200 kByte/minute storage requirement ➔ 14 days recording with 4 GB card
Power supply	Supplied from receiver (from 3,6 V to maximum of 8.5 V)
Power consumption	60 mA in full operation
External connections	1 x connector for telemetry and power supply "Link" 1 x servo pulse input from the receiver COM connection for UniDisplay, UniLog 1/2, and firmware update Slot for micro SD card
Dimensions	35 x 21 x 12 mm
Mass	11 g without cables
GPS Module	Sensitivity up to -165 dBm Maximum acceleration 4g (that refers only to position detection, the module is constructed using SMD techniques and can withstand substantially higher acceleration)

5. Measured values

The following measured values are captured by the GPS-Logger 3. Most of the data is written on the memory card and also transmitted by telemetry. Depending on the telemetry used, it is possible that only part of it is available on the transmitter.

Description	Unit	Content
Zeit (Time)	hh:mm:ss.sss	<ul style="list-style-type: none"> Time from the GPS system, adjusted by the UTC time zone setting; when the correct zone is used local time is displayed.
Breite (Latitude)	xx° xx.xxx' N/S	<ul style="list-style-type: none"> Latitude of the GPS position displayed in degrees °, minutes, decimal minutes 'N (north) or S (south)
Länge (Longitude)	yyy° yy.yyy' E/W	<ul style="list-style-type: none"> Longitude of the GPS position displayed in degrees °, minutes, decimal minutes 'E (east) or W (west)
Speed	km/h	<ul style="list-style-type: none"> True 3D velocity, i.e. speed over ground plus vertical speed
AirSpeed	km/h	<ul style="list-style-type: none"> Air speed when using a TEK nozzle
Höhe (Altitude)	m	<ul style="list-style-type: none"> Height above the starting point; the altitude is measured by the barometric altitude sensor because the GPS altitude is too imprecise. Before the start, the altitude is kept at about 0 m to compensate for drift due to air pressure changes.
Höhe NN (Altitude MSL)	m or mNN	<ul style="list-style-type: none"> Height relative to sea level (MSL = mean sea level) When turning on the GPS height is stored as a reference and further calculated with barometric sensor
Vario	m/s	<ul style="list-style-type: none"> Vario value from barometric Vario sensor
Beschl. X / Y / Z (Acceleration)	g	<ul style="list-style-type: none"> Acceleration in three axes each max + - 16g
Motorgeräusch (Motor sound)	ENL	<ul style="list-style-type: none"> Volume of the drive for the IGC mode in Online Contest (OLC)
HDOP	-	<ul style="list-style-type: none"> Horizontal accuracy The smaller the better and the value should be below 1.5
Flugrichtung (Direction of flight)	°	<ul style="list-style-type: none"> Direction of motion of the model 0° = North, 90° = East, 180° = South, 270° = West.
Entfernung (Distance)	m	<ul style="list-style-type: none"> Distance from the starting point "Distance mode" can be switched between 2D and 3D calculation: 2D only the horizontal distance: 3D a straight line to the model
Richtung (Position)	°	<ul style="list-style-type: none"> direction from the start point to the model 0 ° = Model is to the north, 90 ° = Model is to the East, 180 ° = model is to the south, = 270 ° model is to the West
Strecke (Distance)	km	<ul style="list-style-type: none"> distance travelled (flown)
Gleitzahl (Glide ratio)	1:xx	<ul style="list-style-type: none"> for gliding the ratio of height and distance is calculated here every 100 m distance, a new value is calculated if no value could be calculated, shows "1 -"
Speed bei Gleitzahl (Glide ratio speed)	km/h	<ul style="list-style-type: none"> average speed on the 100 m glide ratio measurement
Empfängerspannung (Receiver volts)	V or VRx	<ul style="list-style-type: none"> Voltage at the supply connection of the GPS logger
Servoimpuls ein (Servo impulse in)	us	<ul style="list-style-type: none"> Measured servo pulse at the "Rx" input, can optionally be used to switch between Min / live / and maximum values,

Luftdruck (pressure)	hPa	<ul style="list-style-type: none"> • Air pressure measurement of the barometric altitude sensor
Richtung relative (Relative direction)	°	<ul style="list-style-type: none"> • Flight direction relative to the starting point • 0° = away from the pilot, 90° = right, 180° = back = 270° to the left
Höhengewinn (height gain)	m	<ul style="list-style-type: none"> • change in height of the last 10 seconds recalculated every second , so a tendency can be recognised when thermalling
Satelliten (Satellites)	-	<ul style="list-style-type: none"> • Number of satellites currently being received
Fix	-	<ul style="list-style-type: none"> • 0 = no fix → no location • 1 = GPS fix → full continuous location possible
FixMode (Fix mode)	-	<ul style="list-style-type: none"> • 1 = no fix → no location • 2 = 2D fix → only horizontal positioning • 3 = 3D fix → complete location possible

6. Operation of the GPS-Logger 3

6.1. Installation

Due to the low weight and the compact design, installation is unproblematic. An attachment with Velcro on boards is sufficient and gives quick access to the memory card.

Attention must be paid to ensure that the GPS antenna is pointing up and there are no shielding materials such as metal or carbon fibre above it.

It has been shown that when used with 2.4 GHz telemetry systems the GPS-Logger 3 should not be installed right next to the receiver antennas.



The direction of the three axes of the acceleration sensors is printed on the label. The Z axis always points down when the antenna points upwards. The assignment X and Y depends on the direction of installation.

6.2. Memory cards

As memory card practically all commercial micro SD cards with FAT16 or FAT32 file system can be used. Also SDHC cards and memory capacities over 4 GB (max 32 GB) are supported. However not all cards are equally suitable, since some cards exhibit an unfavourable behaviour with continuous storing of data. If an unsuitable card is used, the recording may run intermittently or even stop.

We recommend the use only with the card provided or available as an accessory from us.



The card is inserted into the slot on the back and pushed in until it clicks and is flush. The GPS-Logger 3 does not have an ejector for the memory card so the card is simply pulled out again with the fingers. If necessary a small strip of adhesive tape helps.

6.3. Meaning of the LED

The GPS-Logger 3 has three coloured LEDs.

After switching on a run of the three LED indicates the internal initialization.

In operation there are the following signals:

- **orange LED shines permanently**
→ GPS ready, but still no 3D fix, i.e. GPS positioning not yet possible
- **green LED shines permanently**
→ GPS and 3D fix ready, i.e. GPS positioning available
- **orange LED flashes at the set recording rate**
→ GPS recording data, but still no 3D fix
- **green LED flashes at the set recording rate**
→ GPS recording data, 3D fix
- **red LED flashes**
→ no memory card pushed in.

6.4. Basic settings

The settings of the GPS-Logger 3 can be made with our software "SM GPS Konverter" on your PC or laptop, with our UniDisplay, or via the Jeti or HoTT telemetry.

The settings are always backed up in parallel in the GPS-Logger 3 and on the memory card. When using the PC software "SM GPS Konverter" new settings are written to the card, these are then taken up next time you start the device.

➔ In this way it is possible to use different memory cards for different models and automatically get the correct settings.

The following settings are important so the GPS-Logger 3 can measure correctly :

- **"Telemetrie Auswahl"** specifies the telemetry used.
- **"Fixe seriennummer"** so that Jeti and Futaba sensors can be interchanged.
- **"Datenrate"** selects the recording speed
The higher the value the larger the recorded file, but also the fine detail is recorded more accurately. In model operation 10 Hz makes a lot of sense to capture all the detail.
- **"Startmodus"** sets the recording start method. See section 6.6.
- **"UTC Zeitzone"** defines the time zone fixed relative to UTC time (=universal time). E.g. in Germany in summer time set to UTC +2, in the winter set to UTC +1.
- **"Vario Schwelle"** is the threshold for the Vario signal via telemetry, and a Vario tone is only generated via telemetry if the climb / sink is greater than the threshold.
- **"Vario Ton"** sets whether the Vario is active during climb / sink or both. The Vario tone can also be switched off completely here.
- **"Vario Faktor"** specifies the factor by which values are multiplied by the Vario for telemetry. Normally it is 1.0 so that the actual m/s can be displayed. However in special cases with a factor greater than 1 the tone output of the transmitter can be made more sensitive if the transmitter itself cannot do this.
- **"VarioFilter"** allows an adaptation of the response speed of the varios
"Slow" corresponds approximately to the previous evaluation, "medium" and "fast" are correspondingly faster. At the same time, however, the signal of the varios is always more rapid.
- **"IGC Modus"** specifies whether the GPS-Logger 3 records an IGC file.
This is a special operating mode activated for competitions of the Online Contest (OLC) where a digitally signed IGC file is written on the memory card. This file can be used directly for the exchange of competition flights. More under section 9.
- **"Autostop"** sets the recording stop. See section 6.6.
- **"Fixpunkt"** defines the coordinates of a fixed reference point for the "maximum distance" alarm. This may be, for example, the centre of the airfield from which the air space has a fixed radius. With fixed point set using the Fixpunkt option, the current GPS position is adopted as the fixed point. The fixed point can be set via the UniDisplay or in the form of GPS coordinates in the "SM GPS Converter"

6.5. Telemetry Alarms

These alarms are output via the connected telemetry to the transmitter. Depending on the system a beep is sounded and / or there is a warning by voice output.

Once the model has landed the acoustic output stops automatically to ensure that no disturbing messages are output before the model is turned off.

- **“Hohe” (Altitude)** The alarm is active as soon as the set level is exceeded. After 20 seconds the alarm is automatically cancelled and only reactivated when the height is exceeded again. Well suited to fly to a certain altitude or to monitor an altitude limit.
- **“Speed min und max”** The alarm is active when the set speed is exceeded or fallen below.
- **“Entfernung min und max” (Distance)** The alarm is active as long as the set distance (straight line from start point by GPS) is exceeded or undershot.
- **“Strecke” (Route)** The alarm is activated when the set route distance is exceeded.
- **“Rx Spannung” (Rx volts)** to monitor the receiver supply. The alarm is active as long as it is below the set voltage threshold.

6.6. Start and stop of the recording

The GPS-Logger 3 has several possibilities for starting data recording. The appropriate options can be set with our software “SM GPS-Konverter”, with the UniDisplay or via the Jeti Duplex or HoTT telemetry.

Normally you should select one of the possible Startup options and also select Auto Stop. It is then ensured that every flight is automatically recorded separately.

The recording of data can be started/stopped in the following way:

- **Manual start via telemetry:**
The recording is started and stopped in the Jeti Duplex or Graupner HoTT telemetry (text mode) by depressing a key at the transmitter.
This start method functions even when any other start option is selected.
- **Automatic start with 3D-Fix:**
The recording begins automatically as soon as sufficient satellites are received and an initial 3D position determination made (3D-fix).
- **Automatic start with speed > 20 km/h:**
The recording begins automatically as soon as the measured speed exceeds 20 km/h for the first time. The prerequisite is that the GPS already has a 3D-fix.
- **Automatic start at > 20 m distance:**
The recording begins automatically as soon as the distance from the first measured point after switching on exceeds 20 m. The prerequisite is that the GPS already has a 3D-fix.
- **Start by re-inserting the memory card:**
Regardless of the selected start option, a recording can be started immediately on an active GPS-Logger 3 by pulling out and re-inserting the memory card.
- **Automatic stop after landing:**
With the option “Autostop landing” the recording ends automatically 10 seconds after the landing, that is if for 10 seconds the speed is less than 10 km/h.
- **Start / stop with RC signal (servo pulse):**

If the "Startmodus = Rx Signal" option is activated, the recording starts as soon as the pulse from the receiver exceeds a threshold of 1.5 milliseconds (ms). If the pulse is again below this threshold the recording stops again.

With each start of recording the GPS-Logger 3 begins a new file. The file names are numbered consecutively and have the following format:

"YYYY-MM-DD-GPS3-12345-0001.nmea "

To distinguish between different firmware versions these files are always stored in a folder with this format:

"SM GPS-Logger 3 vX.XX"

The start and stop recording is signaled by the Vario via telemetry: the Vario value changes at start-up for 5 s and at stop for 10 s from -2 m / s to +2 m / s.

The recording can also be stopped simply by interrupting the power supply. This is planned and OK.

6.7. Vario

The GPS-Logger 3 has a high resolution Vario sensor with a TEK connection.

TEK = Total Energy Compensation

TEK Düse = nozzle on the aircraft fitted with a hose connection to the Vario, usually mounted in front of the vertical tail.

6.7.1. TEK Connector

TEK put simply means the suppression of "stick thermals" by considering the motion of the model. This is achieved by connecting a nozzle (pitot tube) to the TEK connector of the Vario.

For slower models flying at a constant speed the simple Vario without the TEK nozzle is often sufficient. Here the error due to control inputs is not so great and the thermals can clearly be seen with the Vario. The cleaner and slower you are flying the better the Vario does without the TEK nozzle.



Order No. 2780 angled version

With dynamic models or even with less than perfect flying style the Vario is always indicating, which is not showing the true rise and fall of the model but only a controlled speed or altitude change i.e. the “stick thermals”. We are indeed interested in the thermals, but only whether you are flying in rising, neutral, or falling air mass. If possible regardless of how the aircraft just moved.

Exactly this behaviour is achieved by using a TEK nozzle with the Variometer. This nozzle produces a motion dependent pressure drop simultaneous with increasing speed, a rise which compensates for the height loss. So you press on and the Vario without TEK would indicate sinking. The TEK nozzle compensates for this by indicating the increasing speed available for climbing. The conversion of height (potential energy) into velocity (kinetic energy) is therefore with the TEK nozzle no longer incorrectly displayed as sinking or climbing.

Ideally, with full compensation, it will always show the current sink rate of the aircraft in quiet air. This of course is not a constant value but depends on the speed, buoyancy, and other factors.

The GPS-Logger 3 has a TEK port on the end. The hose of the TEK nozzle is simply plugged into this. In principle all types of TEK nozzle can be used, including the well known Nicks nozzle or the Brunswick nozzle. The nozzles differ in sensitivity to sliding and angle of attack and the possible compensation factor.



Order No. 2781 straight version

We have on offer a nozzle of the Brunswick type. This is very insensitive to the angle of attack and allows complete compensation. In addition the compensation can easily be adapted. For details on our nozzle, please visit our homepage.

6.7.2. Vario Output via Telemetry

The tone of the Vario is made (with the exception of the old Jeti without EX) in each case in the telemetry transmitter or telemetry box. For this purpose the Vario value transmitted from then GPS-Logger 3 is in m/s. Not all transmitters have settings to adjust the sound, to hide certain areas or adjust the sensitivity of the acoustic output.

Therefore, the GPS-Logger 3 has the following settings that affect the transmission of the variable values with all telemetries:

- **“Vario Schwelle”** (Vario Threshold) is the response threshold for the Vario signal via telemetry, so if, and only if, the rise/ fall is greater than the threshold will a Vario tone be generated.
- **“Vario Ton”** (Vario sound) sets whether the Vario is active during climb / decent or both. The Vario sound can also be switched off completely here.
- **“Vario Faktor”** (Vario Factor) specifies the factor by which the values are multiplied for telemetry. Normally it is set at 1.0 so the actual m/s can be displayed on the telemetry. In special cases, however, by using a factor greater than 1, the acoustic output of the transmitter can be made more sensitive if the transmitter itself allows no such adjustments. But you must accept that the displayed and recorded Vario values do not correspond to reality.
- **“VarioFilter”** allows an adaptation of the response speed of the varios

"Slow" corresponds approximately to the previous evaluation, "medium" and "fast" are correspondingly faster. At the same time, however, the signal of the vario is always more rapid.

Example: -

“Vario climbing threshold” is set to 0,5 m/s “Vario sinking threshold” is set to -1.0 m/s

– „Vario tone is set to “on”

→ if the model rises faster than 0.5 m/s, the value is sent

→ if the model rises or sinks more slowly, 0 is sent

If the Vario is always required to be transmitted, set the Vario thresholds to 0.0 m/s and the Vario sound on “up/down”.

6.8 Speed measurement via TEK nozzle

As of firmware v1.26, the GPS-Logger 3, in addition to the GPS speed, can also measure the speed in relation to the air, i.e. the AirSpeed value. The only prerequisite for this is a connected TEK nozzle. The GPS-Logger 2 does not support this function.

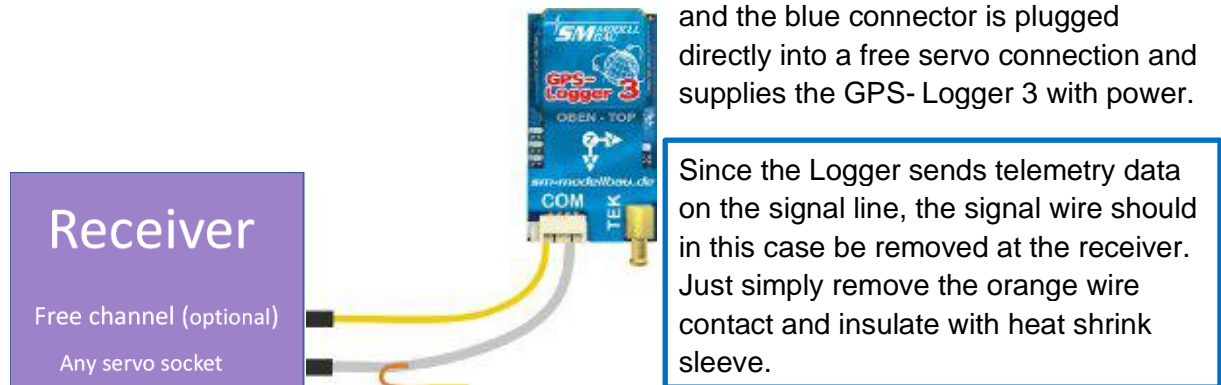
The real air speed is calculated from the pressure at the TEK nozzle and reported via telemetry.

The measurement has a very wide measuring range, which goes beyond our model building speeds (>1000 km/h). Nevertheless, the measuring accuracy and stability is very high. The measuring error depends primarily only on the quality of the TEK nozzle. If it is 100% compensated, like our Braunschweig-type nozzles, the measurement error is minimal.

TEK Vario and AirSpeed measurement with only one nozzle and without additional devices!

7. Connection Examples

7.1 GPS-Logger without telemetry



7.2 Min and Max values switched by receiver channel

Optionally depending on the selected option with "Rx control" or "start mode" the GPS-Logger 3 can be remotely controlled with a free receiver channel. A second connection is needed between the chosen free receiver channel and the single plug on the telemetry cable of the GPS-Logger 3.

If none of these options are used, the GPS-Logger 3 receiver's single receiver port can simply remain free.

7.2.1 Min and max values via receiver channel

The option "Rx control = Min / Live / Max" is used to switch between the transmission of Live, Min, Max values by telemetry. This also makes it possible for telemetry to record the maximum values of the flight in the transmitter e.g. read the maximum height.

.On the transmitter a 3 position switch is programmed for this channel, which must switch the channel between the following values:

- 100% for minimum values (switching point < 1.3 ms servo pulse width)
- 0% for live values
- +100% for maximum values (switching point > 1.7 ms servo pulse width)

7.2.2 Set starting point by receiver channel

With the "Rx control = start point" option, the start point can be set in flight and thus the reference point for the distance and the direction to the model. This possibility is mainly used in the operation in the On line Contest (OLC) to set the starting point to the position of the motor cut-off. For this reason, this function also responds to a changeover from + 100% to - 100% of the receiver signal. This allows the Motor channel (possibly via a Y cable) to set the starting point.

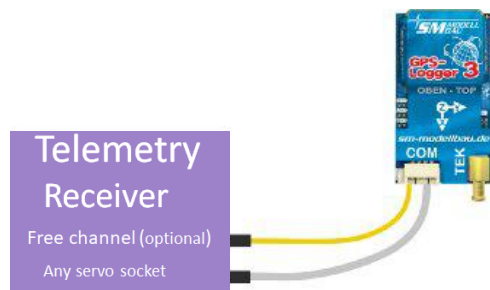
7.2.3 Start and stop recording

With the option "Start mode = Rx signal" the recording of the GPS-Logger 3 can be controlled from the transmitter with a two-stage switch via a free channel. For this, the switch

must be defined in such a way that the free channel travels from -100% (recording stop) to +100% (recording start).

The switching threshold of 1.5 milliseconds (ms) corresponds to the center position of most current remote controls.

7.3 Connection as a telemetry sensor

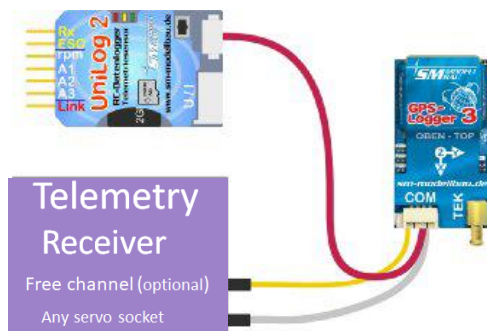


The GPS-Logger 3 is connected with the three-core "LINK" cable with the blue plug directly to the telemetry port of the receiver.

With HoTT, M-Link, Robbe / Futaba S.BUS2, JR DMSS, FrSky and Spektrum, other sensors can also be connected on a V cable.

With Jeti Duplex, more sensors are connected via the E4 expander, or in separate telemetry inputs of the receiver.

7.4 Connection of the GPS-Logger 3 and UniLog 1/2 or UniSens-E



The GPS-Logger 3 can be connected directly to the UniLog 1 / 2 or UniSens-E with the leads stock no. 2720 or 2721.

In this way the GPS-Logger 3 also records the data from the UniLog / UniSensE on its memory card in parallel with its own data. Everything may then be displayed synchronised in Google Earth™ or the GNU DataExplorer.

The UniLog / UniSens-E must be supplied with power via its current sensor or from the receiver, The GPS-Logger 3 is supplied directly from the receiver via the telemetry connection.

Note: Only the three-core cables stock no. 2720 and 2721 may be used! With the 4 core cable no. 2401 the two internal voltages are connected which can cause problems.

The connection to UniLog 1/2 or UniSens-E only works with HoTT, Jeti and M-Link operation. The COM interface cannot be used with the other telemetries.

7.5. Forwarding the data from UniLog 1/2 or Unisens E to Jeti (EX)

Normally with Jeti several sensors must always be connected via a Jeti Expander E2 or E4. In the display on the telemetry unit, the GPS Logger 3 always has the data of UniLog 1/2 or Unisens E via the connection to the COM port (see above).

From firmware v1.16 the GPS Logger 3 can in this case transfers the main EX data to a JetiBox pro or Jeti transmitter. An expander is no longer necessary.

Once a UniLog 1/2 or Unisens E has been detected on the GPS Logger 3, it reports the following sensors in addition on the Jeti System:

- ☐ Voltage
- ☐ Current
- ☐ Capacity
- ☐ rpm
- ☐ Energy
- ☐ Power

The UniSens-E must be supplied with power from the receiver. The "link" cable can be simply put into a free servo output, the orange pulse line being previously removed.

8. Use of the UniDisplay

The UniDisplay and GPS-Logger 3 are connected with the cable provided with the display. The connector location on the GPS-Logger 3 is labelled “COM”. The cable connection can be made either way round, which end is used is irrelevant.

The display is powered by the GPS-Logger 3 and turns on automatically as soon as the GPS-Logger 3 is connected. The GPS-Logger 3 must therefore be supplied with power either via an attached receiver or directly with a receiver battery.

In the case of FASSTest, JR DMSS, FrSky and Spektrum operation the UniDisplay only works if already plugged in when switching on. The telemetry is not activated until the UniDisplay is unplugged again.



Menu:

First the menu is activated. The menu options can be selected with the “plus” and “Minus” buttons, and the appropriate item selected with “Enter”.

Live data display screen 1: .

- “**Plus**” starts and stops the recording.
- “**Minus**” changes between Live/MIN/MAX values.
- “**Enter**” changes between the Live screens 1, 2 and 3.
- “**Esc**” changes back to the menu.

Top right is the current file number. Including changes in the past, Time, date and time.

“**Speed**” shows the genuine 3D speed, thus speed in relation to base plus vertical speed!

“**Hoehe**” is the barometric height in relation to the starting point.

“**Strecke**” is the travelled (flight path) distance.



Live data display screen 2:

A press of “**Enter**” moves to the next screen with more data.

At “**Pos**” “the current position of the GPS is seen in relation to the starting point. The air line distance and the angle in relation to north are shown.

“**GPS**” shows the GPS altitude from sea level (asl). Also shown are latitude (Breit) and longitude (Laeng) of the current GPS position.

“**GZ**” represents the glide ratio of the last 100 m flight path. Following is the calculated average speed on these 100 m. If no value for the glide can be indicated (model climbing), “—” appears here.

Finally the current air pressure measured by the barometric pressure sensor is shown in the last line.



Live data display screen 3:

A further press of **“Enter”** moves to the third screen with more data.

“RxSpannung” is the measured receiver voltage.

“Datenrate” shows the current recording rate.

Then the current status of satellites and GPS.

“ENL” is the value from the motor noise sensor

“g” indicates the three acceleration values in the X / Y / Z axes.

The last line shows the servo pulse measured at the Rx port.



Setup:

Here the menu for all settings of the GPS-Logger 3 appears.

In the second line is the firmware version of the GPS-Logger 3 and also the serial number.

Move through the menu options with **“Plus”** and **“Minus”**, and select the appropriate point with **“Enter”**.

Depending on the telemetry used, there is still a menu point 4 for telemetry settings

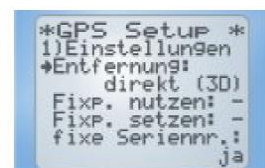
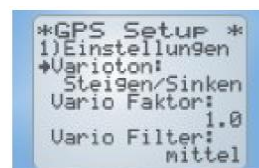
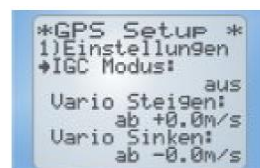
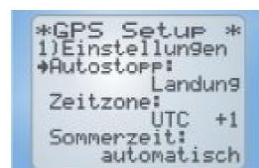


Settings screens :

Here the settings of the GPS are summarized.

Move through the menu options with **“Plus”** and **“Minus”**, and select the appropriate point with **“Enter”**. The arrow then becomes a Dot and the selected value can be changed with **“Plus”** and **“Minus”**. A press on **“Esc”** or **“Enter”** stores the change.

For the individual points see also 6.4. „



GPS Alarms:

Alarms can be set here both with Jeti Duplex and M-Link and are announced from the transmitter module and/or the transmitter.

When the arrow is in the left column and the appropriate menu option activated with **“Enter”**, the value of the alarm can be set.

If with **“Plus”** or **“Minus”** the arrow is shifted to the right and the menu option activated with **“Enter”**, the alarm can be activated (**“+”**) or deactivated (**“-”**) with **“Plus”** or **“Minus”**.



M-Link addresses:

For transfer of GPS-Logger 3 measured values by M-Link, addresses can be assigned here for the display on Multiplex transmitter. Each address may only be assigned once to any attached M-Link sensor, including the M-Link receiver. The Bus system ceases to function with multiple assignments.

If a value is not to be transmitted chose the address “—”. This value becomes the highest permissible Address 15.



Jeti EX values:

Here, all measured values can be transferred to the Jeti transmitter or the JetiBox Profi and can be individually selected. Fewer measured values mean faster transmission, so you can hide the unneeded values here.



Spektrum Init:

The address specifies the assignment in the Spektrum adapter. Here is only important that with Several SM telemetry sensors on the Spektrum adapter no address is assigned twice. Normally the default is OK. This includes all Spektrum sensors supported and operated by GPS-Logger 3 which can be individually selected or deselected. Each type of sensor may only occur once.



Futaba Init:

The compatibility mode for the Robbe Telemetry Box can be activated here.



UniLog Alarms:

Alarms can be set here for operation with Jeti Duplex and the UniLog 1 / 2 or UniSens-E connected to the GPS-Logger 3.

When the arrow is in the left column and the appropriate menu option activated with “Enter”, the value of the alarm can be set.

If with “Plus” or “Minus” the arrow is shifted to the right and the menu option activated with “Enter”, the alarm can be activated (“+”) or deactivated (“-”) with “Plus” or “Minus”.

9. Using in on-line Contest (OLC)

On-line Contest, OLC for short, has been for many years a popular decentralized competition type in man-carrying sport sailplanes and paragliders. Here the flights of the participants are recorded with GPS and then transferred by Internet into the OLC system. There each flight is automatically evaluated according to the Online Contest rules and the participant receives points for the flight.

Starting from 2011 this system is now available for model fliers, so that they also can compare their flights with one another within their own area. Participation is completely free. The flight task is basically the fastest possible speed round a triangular course of predetermined size (of course in pure gliding flight). More details on the OLC website: <http://rc.onlinecontest.org>

The special thing is that it is flown decentralised. Each pilot can therefore fly at any location i.e. if he has the time and desire, if the conditions appear right for it, etc. All the entered flights can be viewed constantly on line, daily detailed evaluations and ranking lists are given, as well as an annual ranking at the end of the year.

The GPS-Logger 3 can directly produce the IGC file which is needed for the flight evaluation in Online Contest. So no more conversion of files is necessary, just the .igc file transferred from the memory card directly into the OLC system and the flight is evaluated. This file is also signed internally by the GPS-Logger 3, so that the OLC server can examine this in file manipulation (this is the highest quality class for documentation).

IGC mode must be activated in the settings of the GPS-Logger 3.

The integrated engine noise sensor provides an ENL value corresponding to the noise level coming from the drive motor. This allows very precise separation of a motor glider or model with retractable engine from a pure glider. This is important for the correct rating of the flights.

In order to obtain optimal values of the ENL sensor, the GPS-Logger 3 should be installed close to the noise source. At the same time the distance to interfering noise, servos for example, should be as great as possible. Ideally, in the climb the sensor constantly shows the maximum value of 999, and while gliding a fluctuating low value.

With the GPS-Konverter, entries for pilot name, model type, model name, and the competition class can also be given. These designations are stored on the memory card and entered into each IGC file. By this means, if you use a separate memory card for each model, the correct data can always automatically be transferred to the IGC file.

Characteristics in the IGC mode:

- The IGC file is written in addition to the normal NMEA file on the memory card.
- The IGC file has a special file name in the IGC format.
- Recording ends automatically as soon as the GPS-Logger 3 is stationary for 10 seconds. During these 10 seconds the green and orange LED flash alternately. In IGC mode Autostop is always active, even if it was not switched on separately.
- It is also possible to start the recording with different conditions as before.

The file is signed and valid for the OLC message only if the recording has ended correctly.

9.1. IGC mode "extended"

From the firmware v1.17 onwards, you can select "normal" or "extended" in IGC mode. "Normal" is the same and creates the IGC file as described above.

In "extended" mode, there are the following additional features:

- ☐ The value Altitude Gain shows the relative altitude opposite the altitude in the start circuit.
- ☐ For alarm "Min Distance" for the start circuit:
 - ☐ the treble gain value is set to 0.
 - ☐ Height and speed frozen on the telemetry for 5 seconds.
- ☐ HoTT telemetry
 - ☐ After the first entry into the start-finish circle (SZK), the relative altitude instead of the altitude is transmitted via Start.
 - ☐ Each time you enter the SCC, the relative altitude and speed are frozen for 5 seconds.
 - ☐ Then the height above ground is displayed for 5 seconds.

10. Telemetry Operation

Apart from its functions as data logger the GPS-Logger 3 is also a full telemetry sensor for different 2.4 GHz remote control systems. From the GPS-Logger 3 the telemetry systems of Jeti Duplex, Multiplex M-Link, and Graupner HoTT Robbe/Futaba FASSTest S.BUS2, JR DMSS, FrSky and Spektrum are supported.

The telemetry operation is similar for all supported system: Live data is displayed on the transmitter or on external display, and with Jeti Duplex and HoTT the GPS-Logger 3 can also be operated from the transmitter. If the system has a voice output, then this is also supported by the GPS-Logger 3.

The alarm output depends on the telemetry system. In some systems the GPS-Logger 3 generates the alarms, in others the thresholds are set directly on the transmitter. Please note the information on this below.

10.1. Jeti Duplex

The GPS-Logger 3 is a complete telemetry sensor for Jeti Duplex 2.4 GHz systems. All measured values can be transferred live to the ground and displayed on the JetiBox. The Jeti Expander E4 for the connection of up to 4 sensors is supported.

The connection to the Jeti Duplex receiver is made with the supplied patch cable between the slots "Link" on the GPS-Logger 3 and "Ext." on the Jeti duplex receiver. With the new REX receivers it must be ensured that the telemetry slot is configured on "JETIBOX / Sensor", or in the Central Boxes on "telemetry input". This setting can be made from the transmitter in the Device Explorer.

10.1.1. Ex Telemetry with the Jeti transmitter and the JetiBox Profi

The GPS-Logger 3 transfers the data using the Jeti EX telemetry to the DCDS – 14/16/24 transmitter or the JetiBox Profi. These data values can be displayed on the transmitter, and voice outputs and alarms can be set. With the built in emulation of the JetiBox the, the GPS logger 3 can also be operated and adjusted from the transmitter as described below.

If a GPS-Logger 3 is exchanged for another, the telemetry values must be re-read in the DC / DS-14/16/24 or the Profi Box. Each GPS-Logger 3 has its own serial number and the Jeti EX system distinguishes the individual devices with it.

From firmware v1.17, however, the option "fixed serial number" can be activated. Any GPS-Logger 3 then transmits the serial number 12567 and the devices can be interchanged.

The following values are displayed in Jeti EX mode. The values are selectable via the PC program or the UniDisplay. The Jeti transmitters can receive a maximum of 32 values at the same time. When using with expander or to increase the transmission rate, unimportant values can be blanked.

- | | | | |
|---------------------|---------------------------|------------------------|---------------------------|
| • Zeit | <i>Time</i> | • Strecke | <i>Route</i> |
| • Datum | <i>Date</i> | • Satelliten | <i>Satellites</i> |
| • Breitengrad | <i>Latitude</i> | • A3 | <i>A3</i> |
| • Längengrad | <i>Longitude</i> | • Rx Spannung | <i>Rx Voltage</i> |
| • Speed | <i>Speed</i> | • Luftdruck | <i>Air pressure</i> |
| • Höhe | <i>Altitude</i> | • Gleitzahl | <i>Glide ratio</i> |
| • Höhe NN | <i>Altitude NN</i> | • Höhengewinn | <i>Height gain</i> |
| • Vario | <i>Vario</i> | • interne Temperaturen | <i>Internal temp.</i> |
| • Flug Richtung | <i>Flight direction</i> | • Beschleunigung X,Y,Z | <i>Acceleration X,Y,Z</i> |
| • Position | <i>Position</i> | • ENL (Geräuschsensor) | <i>(sound sensor)</i> |
| • Richtung relative | <i>Relative direction</i> | • Servoimpuls | <i>Servo pulse</i> |
| • Entfernung | <i>Distance</i> | | |

10.1.2. Operation of the GPS-Logger 3 with the JetiBox

< - Mx
v

After the start of transmission the JetiBox is changed to Mx for the attached sensors.

Firmware v1.20
SM GPS-Logger 3

A press the on the ▼ key changes to the GPS-Logger 3. During initialisation you see start-up screen then the measured data is displayed.

SM UniLog 2 +
SM GPS-Logger 3

If at start-up an attached UniLog 1 / 2 is detected, the starting screen displays accordingly.

A 123.4 km / h 95°
221.8 m +12.8 m /

As soon as the first screen with measured data appears, the different data screens can be selected with presses of ◀ and ▶ keys.

A pressure on the key ▲ starts the recording of data in the GPS-Logger 3, which is indicated by an audible signal. A further pressure on ▲ terminates the recording.

A simultaneous long pressure on the keys ◀ and ▶ changes between the display of Live / MAX / MIN values.

The first item on the screen is an indicator of the current active data screen and/or the status of the GPS-Logger 3:

- | | |
|--|--|
| A first data screen, following screens B, C, etc. | > maximum values are indicated |
| * recording running | < minimum values are indicated |

< Hoehe Alarm >
(AUS) 100 m

A press of key ▼ changes to the settings. Again with the keys ◀ and ▶ the different screens and the desired point are selected.

< Hoehe Alarm >
(EIN) < 200 m >

After a further press of key ▼ the selected value can then be changed (keys ◀ and ▶). With a simultaneous pressure on ▲ and ▼ the alarm is switched **On** (EIN) or **Off** (AUS).

Changed settings are only stored with the move back to the selection level with ▲.

10.1.3. Display of measured values on the JetiBox

A 123.4 km / h 95° 221.8 m +12.8 m /	Top: True 3D velocity, relative flight direction (0° = away from pilot, 90° = right, 180° = back, 270° = to the left) Bottom: Barometric height from start point, current climb rate
B 12.35 km Pos 1043 m 34.5 °	Top: Distance (flight path) Bottom: Current GPS position in relation to start point.
C 1234.5 m NN GZ 1 : 23 (48 km / h)	Top: GPS altitude over seal level (NN) Bottom: Measured glide ratio of the last 100 m flight path followed by the average speed over this 100 m
D 5.08v Rx 951.45 hPa	Top: Receiver battery voltage Bottom: Current air pressure
E 00:14:34.5 01.01.2010 14:55	Top: Elapsed recording time. Bottom: current date / time.
F 46.87208 N 11.14557 123.5 °	Top: Current Latitude Bottom: Current Longitude, followed by current direction of travel.
G 12 Sat 3D-Fix 10 Hz Datei 0001	Top: Number of satellites, GPS status Bottom: Current recording rate, current file number.

If a UniLog 1 / 2 or UniSens-E is attached to the GPS-Logger 3 and is read, the measured values of the UniLog will also appear here. Values the UniLog 1 does not deliver remain free i.e. on 0:

H 23.28 v 221.8 m 36.04 A 1377 mAh	Top: Drive voltage, barometric altitude from starting point Bottom: Drive current, capacity used
I 1750.1 Wmin 2481 rpm 839 W	Top: energy used Bottom: rpm, drive power
J 5.01 VRx 221.8 m +12.1 m / s	Top: Rx voltage, barometric altitude from starting point Bottom: Vario as a numerical value

<div>K 3.61 3.65 3.66</div> <div>3.65 0.00 0.00</div>	<div>Top: Single cells 1 - 3</div> <div>Bottom: Single cells 4 – 6</div>
<div>L A1 - - - - °C</div> <div>A2 44.9 °C</div>	<div>Top: Sensor value at port A1</div> <div>Bottom: Sensor value at port A2</div>
<div>M A3 221.9 Km /h</div> <div>1100us -> 1100us</div>	<div>Top: Sensor value at port A3</div> <div>Bottom: Servo impulse at the Rx connection, servo impulse at the ESC connection</div>
<div>N 971.43 hPa</div> <div>internal 28.1 °C</div>	<div>Top: current air pressure</div> <div>Bottom: internal temperature of the UniLog 1 / 2.</div>

10.1.4. Alarms

When operating on the Jeti transmitter modules, with the display of data on the simple JetiBox, all alarms and also the Vario sounds are generated directly from GPS-Logger 3. All settings are also made on the GPS-Logger 3.

The Jetibox Profi and the Jeti transmitter can, in Jeti EX mode, generate alarms and Vario tones themselves. These are then preset in the Box or transmitter. Alarms that are set in GPS-Logger 3 remain as additional output.

10.2. Multiplex M-Link

The GPS-Logger 3 is also a full telemetry sensor for the Multiplex M-Link 2.4 GHz system. The measured GPS values can be transferred live to the ground and be displayed directly on the Multiplex the Royal Pro or COCKPIT SX transmitter.

The connection is made direct to the M-Link receiver with the patch cable provided as described in section 7.3.

On the ground the data is displayed directly on the Multiplex the Royal Pro or COCKPIT SX transmitters.



The settings for telemetry can be made either with the UniDisplay (see chapter 8) or with our “SM GPS-Konverter” software on a PC. The addresses for display on the Multiplex remote control (the line that the respective value is indicated in) can also be freely selected.

10.2.1. Landing Mode with M-Link

In M-Link after 2 minutes without moving, Latitude and Longitude are displayed on the GPS-Logger 3 on addresses Vario and Speed every 5 seconds. The display changes between the decimal point value with the unit "mAh" and the decimal value with the unit "ml". More meaningful units – such as degrees and minutes – are unfortunately not allowed in M-Link. The values to 4 digits with leading zeros are replaced, from “4912 mAh” “268 ml” is thus “4912” “0268” and in the correct notation 49° 12.0268’.

10.2.2. Alarms

All alarms on M-link are produced directly from GPS-Logger 3. All settings are also made in the GPS-Logger 3.

As an additional feature the GPS-Logger 3 writes all data continuously on the Multiplex M-Link bus system and stores it in parallel with its own data on the memory card. So you can expand your M-Link sensor system to a practically infinitely large Data logger!

Later the values at each individual waypoint can be evaluated directly in a 3D representation in Google Earth™. In addition the curve in Google Earth™ can be coloured according to a selected M-Link value.

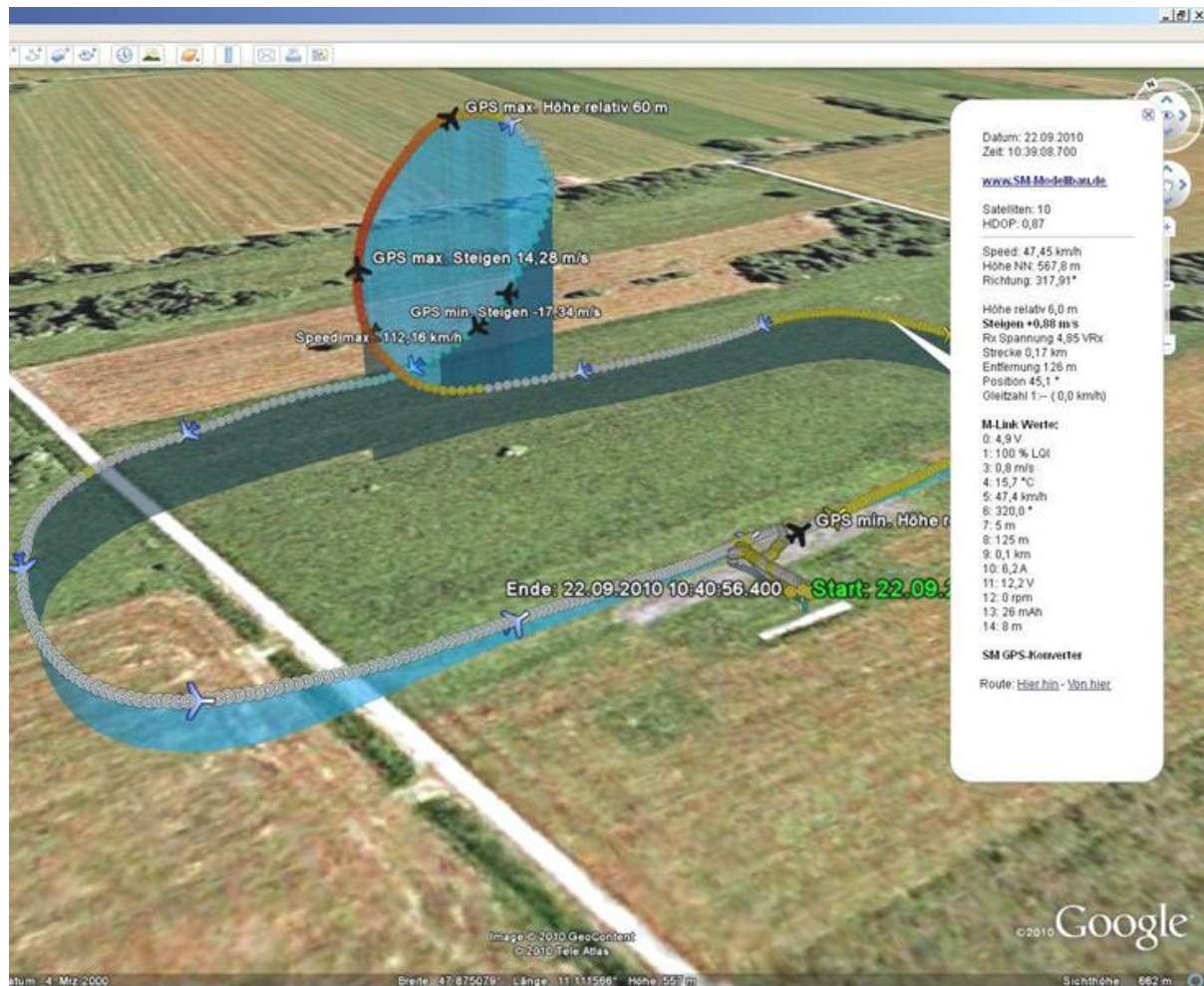


Illustration 1: Airfield circuit with loop. Full M-Link equipment with GPS, UniLog and temperature sensor.

10.3. Graupner HoTT

The GPS-Logger 3 is also a full telemetry sensor for the Graupner HoTT 2.4 GHz system. The measured values can be transmitted live to the ground and displayed directly on either the Smart Box at the HoTT transmitter or directly in the display of the HoTT transmitter. The connection to the HoTT receiver is made with the Patch cable provided, between the connection on the GPS-Logger 3 and “T” on the HoTT receiver.

10.3.1. Alarms

The GPS-Logger 3 supports both the Text Mode” and the “Digital Mode” of the HoTT system. In both modes of operation all adjustable alarms on the GPS-Logger 3 are indicated at the transmitter by beeps or speech output.

10.3.2. Vario

The HoTT transmitter hides the sound output in the range -0.5 m/s to 0 m/s. The GPS-Logger 3 skips that area in order to still obtain a continuous sound output. For a more sensitive response in the acoustic output with HoTT, a “Vario factor” of 2 to 4 can be set in the GPS-Logger 3. The result is a good resolution acoustic output without a gap around the zero point. But you have to accept that the Vario value displayed and recorded in the transmitter does not correspond to reality.

10.3.3 Text Mode

Go to text mode and “Settings, View”. Using the “up” and “down” keys of the left keypad of the transmitter, the “GPS” can be called from the GPS-Logger 3. With a click to the right you now get the text display of the GPS-Logger 3 from the receiver data.



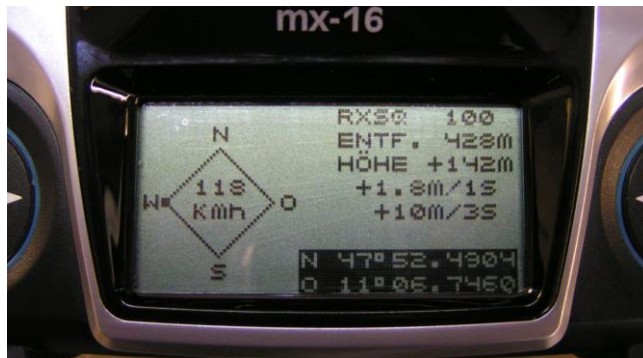
This operation is done with the right keypad of the transmitter. Structure and contents are completely identical to the screens of the UniDisplay, see also chapter 8.

Here all alarms can be set then indicated on the transmitter by beeping or voice output as appropriate.

Operation in text mode appears a bit sluggish since the data cannot be updated so frequently.

10.3.4. Digital Mode

The GPS-Logger 3 sends the data in the “GPS” module format, so that the transmitter can display those values in the appropriate screens. From the default display of the transmitter the Digital mode can be selected using the “left” and “right” keys of the left keypad. With the “up” and “down” buttons “GPS” can now be selected for the display of data from the GPS-Logger 3. Use the “left” and “right” buttons of the left keypad to change between the GPS-Logger 3 screens.



Some values from the GPS-Logger 3 are shown differently:

Vario in m/3s

shows the value “Altitude gain”. The height difference in the last 10 seconds.

Latitude and Longitude

are displayed reversed if that is recorded on the GPS-Logger 3 memory card.

10.4. Futaba S.Bus2

The GPS-Logger 3 can also be used with the Robbe / Futaba FASSTest telemetry as an S.BUS2 sensor. The GPS-Logger 3 is in this case connected like any other sensor to the S.BUS2 slot of the receiver.

Currently the GPS-Logger 3 is not yet registered in the transmitters, so it uses already existing sensor protocols. We tested the integration with the T14SG firmware v1.4, and the T18MZ Firmware v2.3.1 with the receivers and R7008SB R7003SB. Older firmware versions support the integration but possibly incomplete.

With S.BUS2 Servo data sensor values can be connected to the same data line. But since the servo data is far more important than the sensor values we strongly recommend that you make a strict separation. All servos go to the S.BUS1 connection of the receiver, all the sensors on the S.BUS2. Thus, in the event of an error, a sensor can never interfere with the data for the servos. If nevertheless the GPS-Logger 3 is to be operated together with the servos on S.BUS2, is absolutely mandatory that a connection cable No. 9110 is used between GPS-Logger 3 and S.BUS2! Thus the sensor is decoupled from the bus so far that any influence on the servo data is impossible.

10.4.1. Registration on the Transmitter

In order to use the GPS-Logger 3 with the S.BUS2, it must first be connected to the transmitter. For this, the "Link" connection of the GPS-Logger 3 is connected to the "S.I / F" socket on the transmitter. Some transmitters, such as the T14SG, do not provide power to this jack, in this case the GPS-Logger 3 must be supplied with a separate battery via a Y-cable. The GPS-Logger 3 behaves as a Robbe / Futaba sensor and is integrated into the system as well. Please observe the transmitter instructions.

However, the GPS-Logger 3 currently uses six Robbe / Futaba sensor values to represent all measured values. Some values cannot be mapped to the correct unit. Here one must remember the assignment with the T14SG, in the T18MZ you can rename the sensors and thus the assignment is easier to understand.

From firmware v1.17, the GPS-Logger 3 sends the reception quality data output from the receiver S.BUS2 back to the transmitter as a further temperature sensor TEMP125. This allows this value to be used for corresponding alarms in the transmitter. % Values are output in the steps 25/50/75/100.

10.4.2. Robbe Telemetry Box

The Robbe Telemetry Box, as a further possibility of the presentation of the Futaba telemetry data, unfortunately does not recognise the temperature sensor SBS-01T used by GPS-Logger 3. Therefore, there is the option "Telemetry Box" In the settings of GPS-Logger 3, which registers all Futaba SBS-01T sensors through the sensor TEMP125. Thus the GPS-Logger 3 can also be used with the Telemetry Box without major restrictions.

The example of the T18MZ here follows the steps of the application:

If the GPS-Logger 3 is connected to the transmitter and is supplied with power, it is invoked in the sensor menu item "Register". In this way the sensor is registered in the transmitter and assigned free slots. The sensor and transmitter save this assignment.

You must click "Register".

"Reread" and other options do not report the GPS-Logger 3 correctly.

Sensor				Test GPS-Logger				20% 2/2	
Zeitschlitz	Sensor	ID	Zeitschlitz	Sensor	ID	Zeitschlitz	Sensor	ID	
19	Funktion inaktiv		25	Funktion inaktiv		31	Funktion inaktiv		
20	Funktion inaktiv		26	Funktion inaktiv					erneut lesen
21	Funktion inaktiv		27	Funktion inaktiv					Neu anordnen
22	Funktion inaktiv		28	Funktion inaktiv					Anmeldung
23	Funktion inaktiv		29	Funktion inaktiv					Wechsle Zeitschlitz
24	Funktion inaktiv		30	Funktion inaktiv					

To be able to display all values, the menu item "Login" on the transmitter must be called six times in a row. The registration is terminated when the message "Sensor already exists" appears.

When the application of all sensors is complete, the sensor list looks like this:

In T18MZ the sensors can then be renamed.

Sensor				Test GPS-Logger				23% 1/2	
Zeitschlitz	Sensor	ID	Zeitschlitz	Sensor	ID	Zeitschlitz	Sensor	ID	
1	Temperatur	12764	7	Funktion inaktiv		13	GPS-F1675		
2	TEMP125-F1713	12764	8	GPS-F1675	12764	14	GPS-F1675		
3	Funktion inaktiv		9	GPS-F1675		15	GPS-F1675		
4	Funktion inaktiv		10	GPS-F1675		16	Funktion inaktiv		
5	Funktion inaktiv		11	GPS-F1675		17	Funktion inaktiv		
6	Funktion inaktiv		12	GPS-F1675		18	Funktion inaktiv		

11 slots are occupied by the seven GPS-Logger 3 sensors:

Sensor	Name	Slots	Original designation	In GPS-Logger 3	Value examples
1	GPS-1675	4	DISTANCE SPEED HEIGHT VARIO	Entfernung Geschwindigkeit Hohe Vario	248 m 118 km/h 142 m 1.8 m/s
2	SBS-01T	1	TEMPERAT	Direction to model	88°
3	TEMP125	1	TEMPERAT	Satellite	10° C = 10 sat
4	SBS-01RM/O	1	RPM	ENL (Noise Value)	0-999
5	Vario 1672	2	HEIGHT VARIO	Hohe Vario	142m 1.81 m/s
6	TEMP125	1	TEMPERAT	Reception quality from the receiver data	Steps 25/50/75/100
7	SBS-01TAS	1	AIRSPEED	AirSpeed	123 km/h

Now connect the GPS-Logger 3 to the receiver and call up the transmitter telemetry display.

Here again the T18MZ for example.

Telemetrie		Test GPS Logger		20%	
Lmpfänger	Extern	GPS-Logger(Lntfernung)	GPS-Logger(Vario)		
5.1V	0.0V	248m	1.8m/s		
Richtung	88°C	GPS-Logger(Geschwindigkeit)			
Satelliten	10°C	GPS Logger(Höhe)			
		118km/h			
		142m			

See the same values in the T14SG as follows (here the names cannot be changed):

TELEMETRIE		Fl 1/2
Rx-BATT.	1	TEMPERAT
5.1V		+88°C
EMPFÄNGR	SBS-01T	
EXT-VOLT	2	TEMPERAT
0.0V		+10°C
EMPFÄNGR	TEMP125	

TELEMETRIE		Fl 2/2
ENTFERNG	HOHE	
248 m	+143 m	
GPS-1675	GPS-1675	
GESCHWND	VARIO	
118km/h	+1.8m/s	
GPS-1675	GPS-1675	

10.4.3. Alarms

In principle with S.BUS2 the alarms are defined in the transmitter. The GPS-Logger 3 has no way to directly trigger an alarm on the transmitter.

10.5 JR Propo DMSS

The GPS-Logger 3 can also be used with the JR Propo DMSS telemetry. Currently the JR Telemetry has no GPS, therefore in this version only the transfer of height, Vario and speed is possible. GPS data such as coordinates are to be added later.

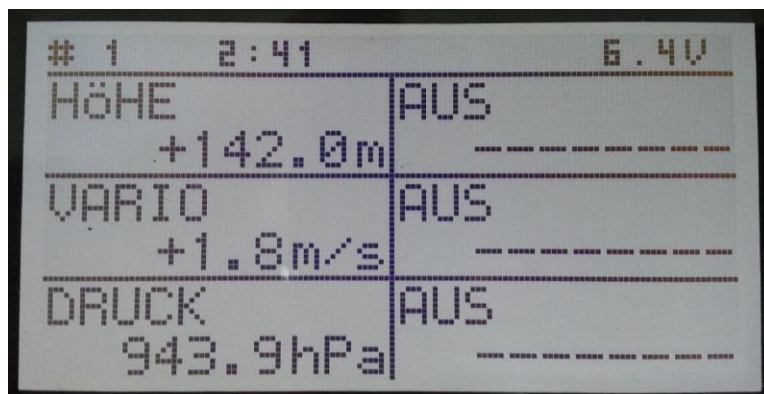
The GPS-Logger 3 is connected like any other sensor to the sensor slot of the receiver and transfers the following data:

>Luftdruck, Höhe, Vario (pressure, height, Vario) (sensor address 0x03 "Pressure/Altitude")
>Speed (sensor address 0x05 "Air Speed")

No more sensors occupying the same addresses can be connected. For the free addresses, further sensors can easily be plugged into the receiver in parallel to GPS-Logger 3 with a Y cable.

We tested the connection with the XG8 transmitter firmware version 0001-0012 and the RG831B receiver.

10.5.1. Presentation on the Transmitter



All values can be displayed directly, and the sequence is freely selectable.

10.5.2. Alarms

In principle with JR DMSS the alarms are defined in the transmitter. The GPS-Logger 3 has no way to directly trigger an alarm on the transmitter. All alarm thresholds and also Vario tone generation are therefore set in the transmitter.

10.6. FrSky

With the FrSky telemetry all receivers with the new "S.Port" connection are supported. The receiver must be connected for telemetry operation in the D16 mode!

The GPS-Logger 3 is in this case connected like any other sensor to the sensor slot on the receiver and transmits the following data:

- | | |
|--|-----------------------------|
| • Height (Höhe) | = "Alt" |
| • GPS Height (NN) (GPS Höhe (NN)) | = "Galt" |
| • Vario | = "VSpd" |
| • Acceleration X,Y,Z (Beschleunigung X,Y,Z) | = "AccX", "AccY", "AccZ" |
| • GPS coordinates (GPS Koordinaten) | = "GPS" |
| • Speed (geschwindigkeit) | = "GSpd" |
| • Direction to the model (richtung zum Modell) | = "Hdg" |
| • GPS time (GPS Zeit) | = "Date" |
| • Distance (Entfernung) | = Address 0x0860 in meters |
| • Satellite (Satelliten) | = Address 0x0870 |
| • Height gain (Höhengewinn) | = Address 0x0880 in meters |
| • Direction of flight (Flugrichtung) | = Address 0x0890 in degrees |
| • Relative Direction (Richtung relativ) | = address 0x08A0 in degrees |
| • Flight distance (Flugstrecke) | = address 0x08C0 in metres |

The sensor address (ID) of the GPS-Logger 3 in the FrSky system can be freely selected in the settings. No other sensors that occupy the same addresses can be connected. For the free Addresses, further sensors can simply be plugged in the receiver with a V-cable parallel to the GPS-Logger 3.

We tested the connection with the Taranis transmitter firmware "opentx-r2940" and the X8R receiver.

10.6.1. Presentation on the Transmitter

GPS-Logger 2 8.20

GSpd	118.0	Alt	1420	11°06.9771E	47°52.1972N
AccX	0.01	AccY	-0.02	AccZ	1.03
Entf	428	Sat	10	HGew	19
Rich	270	Brel	48		

All values can be shown directly on the display. The order on the display is freely selectable.

Here are the sensors with free address already shown with meaningful names, E.g. The sensor 0x0860 as Entf.

10.6.2. Alarms

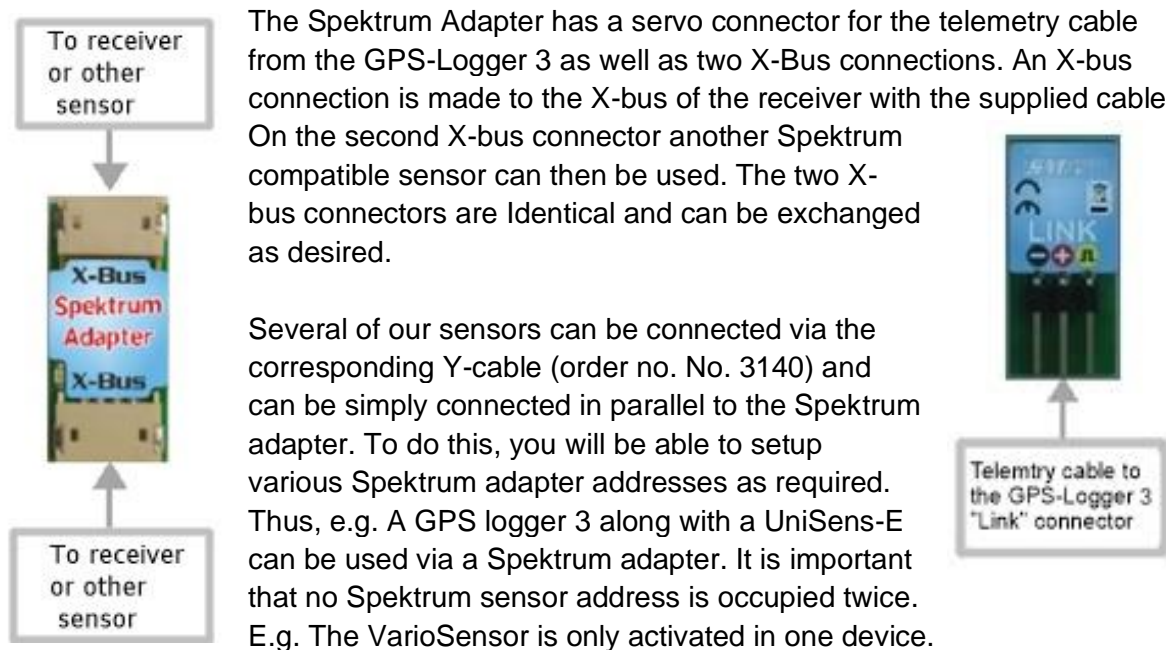
In principle with the Taranis the alarms are defined in the transmitter. The GPS-Logger 3 has no way to directly trigger an alarm on the transmitter. All alarm thresholds and the Vario tone are thus specified in the transmitter.

10.7. Spektrum

As of firmware v1.17, the GPS-Logger 3 can also be used with Spektrum telemetry. The GPS-Logger 3 is equipped with our **Spektrum-Adapter Order-No. 9120** and is connected to the receiver. This adapter translates the telemetry values into the Spektrum X-Bus format.

10.7.1 Spektrum Adapter

The Spektrum adapter is compatible with all telemetry-capable Spektrum receivers and with the TM1000 System. Currently the receivers with integrated telemetry send the data slightly slower than the TM1000, so that there is some longer delay in the vario tones. Therefore, in the GPS-Logger 3 The Vario filter can be set to "fast".



Registration at the Spektrum Transmitter:

The query for the connected sensors with Spektrum comes only once after switching on the receiver. Here the Spektrum adapter responds immediately with the sensors it has learned during the last operation. This means that after every change in the configuration, i.e. after deleting or activating a Spektrum sensor in the GPS logger 3, the system must be first switched on to learn the new sensor types. The Spektrum adapter cannot be changed until the second power up sign in.

LED:

At start-up, the integrated LED goes slowly on and off. Then it flickers in operation, if data is sent by X-Bus.

Each time a sensor is registered or logged off, the LED goes slowly on and off to confirm the operation.

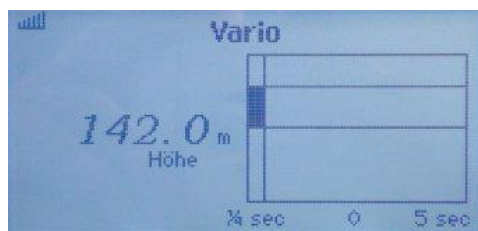
10.7.2. Presentation on the Transmitter

The GPS-Logger 3 can represent a total of four different Spektrum sensor types. All of them can be deactivated individually to avoid double assignments on the X bus. The data can be further processed in the transmitter exactly as in the case of original Spektrum sensors, that is to say speech output, display, alarms and memory are possible.



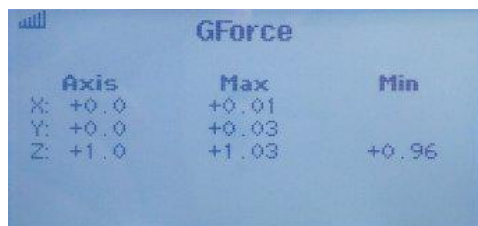
GPS Sensor ("GPS")

- Speed (Geschwindigkeit)
- Height (Höhe)
- Flight direction of the model (heading)
- Distance (Distanz) and direction to the model
(These values are calculated by the transmitter from the difference to the initial coordinates)
- Latitude and Longitude
- GPS time (Uhrzeit)
- Number of satellites



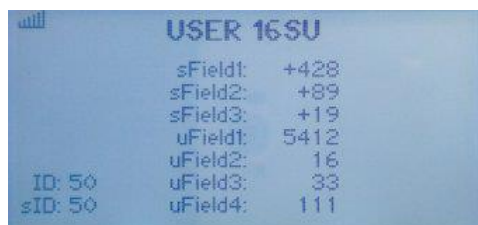
Vario Sensor ("Vario")

- Height (Höhe))
- Vario



Acceleration Sensor ("GForce")

- Acceleration X, Y, Z
- Minimum and maximum values



USER16 Sensor ("USER 16SU")

A sensor with free fields which are thus occupied:

- sField1: Distance to the model in meters
- sField2: Direction to the model in degrees
- sField3: Height gain in meters
- uField1: Flight distance in meters
- uField2: glide ratio
- uField3: Speed with glide ratio in km / h
- uField4: ENL value (noise sensor)

10.7.3. Alarms

In principle, the alarms are defined in the transmitter. The GPS-Logger 3 has no way to directly trigger an alarm on the transmitter. All alarm thresholds and also the Vario tone generation are thus given in the transmitter.

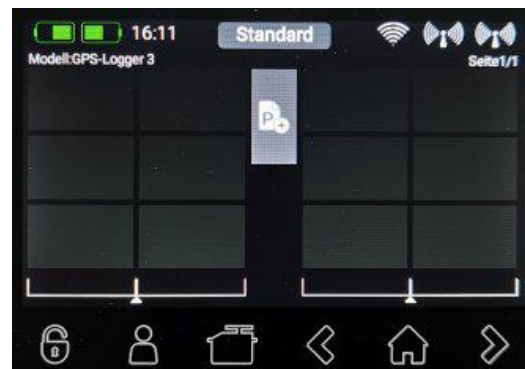
10.8. PowerBox Core P2Bus

From firmware v1.24 the GPS-Logger 3 can also be used with the PowerBox Core telemetry. Currently the GPS-Logger 3 supports the full transmission of all telemetry values and the switching for the units between German/English and meters/feet. A settings menu of the GPS-Logger 3 E is not yet installed.

10.8.1. Presentation on the Transmitter



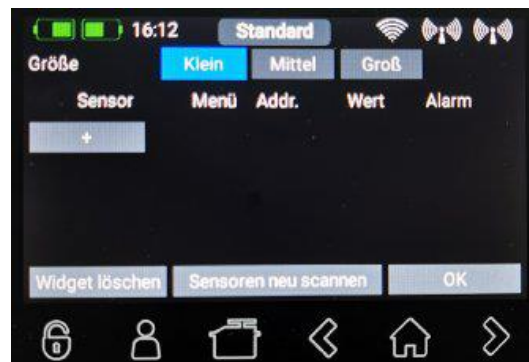
Empty start screen .



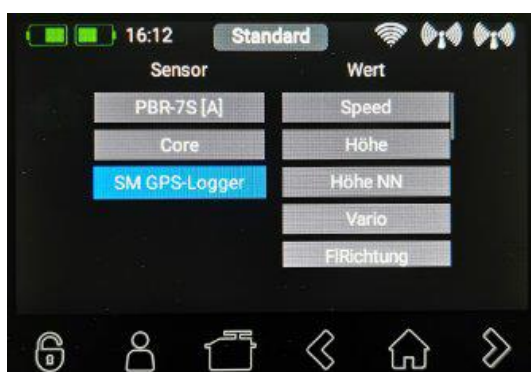
A long press on the free area brings up the window selection.



After clicking on the desired window, with "Telemetry" ...



... a widget will be created. The + opens the sensor list.



Now the desired value can be selected



This widget can also have multiple values displayed alternately, just insert +.



occupied telemetry site ..

A
fully



... it continues on page 2.



Alarms are defined directly in this widget in the transmitter.



A long click on the sensor in the widget also Shows the address of the sensor. This can also with X → Y be changed to allow several similar sensors to be connected.



English designations and units after Changeover in the system. The sensors switched have to be rescanned in a sensor Widget.

10.8.2. Alarms

In principle, the alarms are defined in the PowerBox transmitter. The GPS-Logger 3 has no way to directly trigger an alarm on the transmitter. All alarm thresholds and also the Vario tone generation are thus given in the transmitter.

11. Operation with UniLog 1 / 2 or UniSens-E

The GPS-Logger 3 can be connected directly to the UniLog 1 / 2 or UniSens-E with the leads stock no. 2720 or 2721.

This result in the following possibilities:

- The recording of all measured values from the UniLog 1 / 2 or UniSens-E on the memory card of the GPS-Logger 3 synchronously with the other data.
- Display of the the UniLog 1/ 2 or UniSens-E measured values on the ground via Jeti Duplex telemetry.
- Monitoring of adjustable limit values by Jeti Duplex telemetry.
- Practically unlimited memory expansion for the UniLog 1.
- Evaluation of the UniLog 1 / 2 or UniSens-E data at each waypoint on Google Earth™.

In order to show the battery capacity used from the UniLog 1, the port A2 must be set to "capacity mAh" in the setup!

The connection to UniLog 1/2 or UniSens-E only works with HoTT, Jeti and M-Link operation. The COM interface cannot be used with the other telemetries.

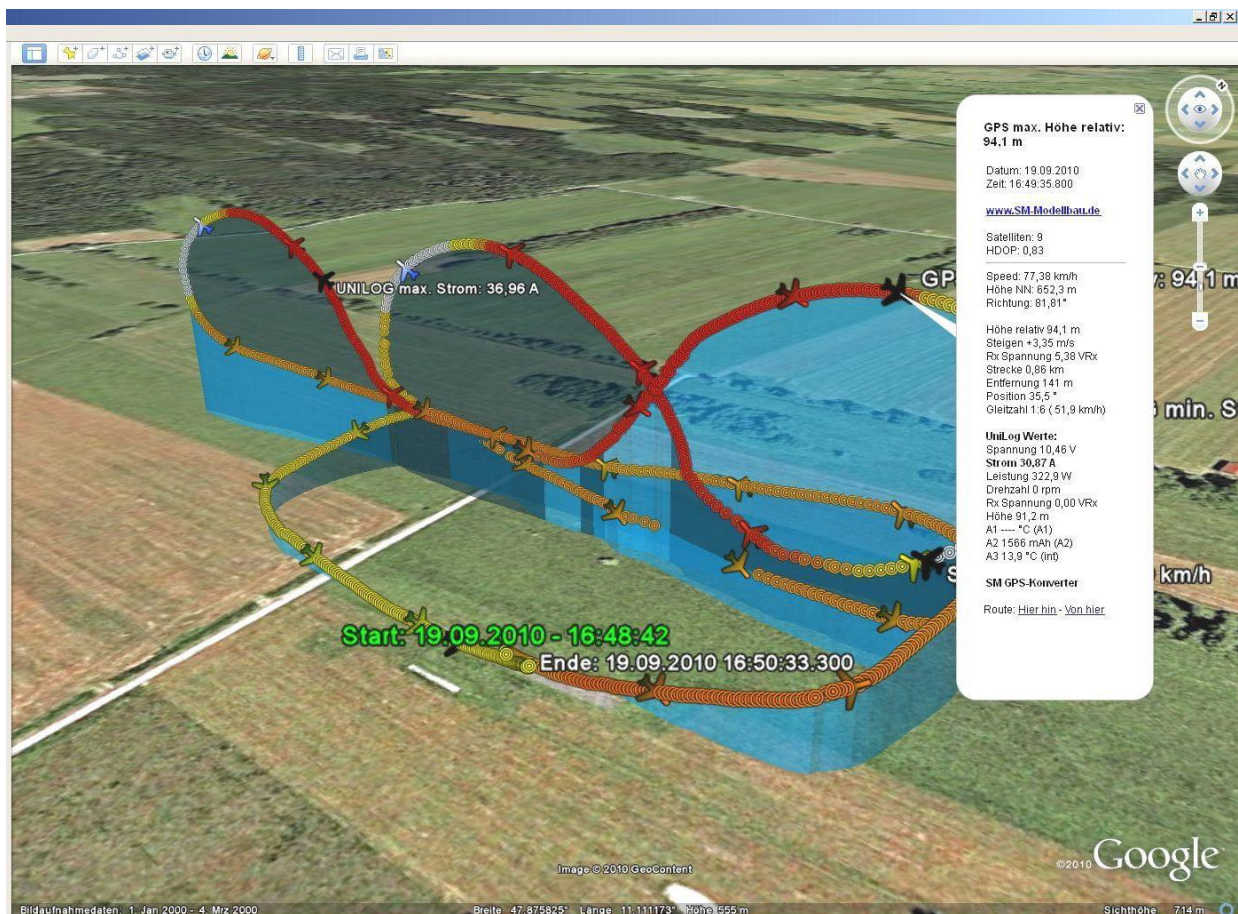


Illustration 2: Cuban Eight with UniLog data

12. The “SM GPS-Konverter” software

On our homepage, in [Software & Updates](#), you will find the free software “SM GPS-Konverter”. Using this, the data is read from the GPS-Logger 3 and converted immediately into .kmz for use in Google Earth™. During conversion several options are available to later colour or highlight certain values in the 3D view.

If you hover the mouse over the buttons, you will see short help texts for the operation.

12.1. File Conversion

The software opens with the “Convert” tab. Here a file can be selected from the GPS-Logger 3 and converted with adjustable options into the Google Earth™ .kmz format. If desired the resulting file can be displayed immediately in Google Earth™.

The screenshot shows the 'Konvertieren' (Convert) tab of the SM GPS-Konverter v1.1.3 software. The interface includes a menu bar with 'Konvertieren', 'Maxwerte', 'GPS Einstellungen', 'IGC Einstellungen', 'live Anzeige', and 'Info'. Below the menu, there's a section for file selection with a button 'Datei vom GPS-Logger wählen' and a text field showing '2010-09-19 SM GPS Logdatei 0025.nmea'. A comment field 'Extra 300, Kunstflug, mit UniLog Daten' is also present. The main area features a 'Zeitausschnitt' (Time Selection) section with a graph titled 'Höhe über Start [m]' showing a red-filled area plot of height over time. A hand cursor is shown hovering over the graph. Below the graph is a time slider with 'Start' and 'Ende' time fields. Further down, there's a 'Dauer' (Duration) section with 'Tage' and 'Stunden' fields, and a 'Wert einfärben' (Color Selection) section with a dropdown menu set to 'Vario (GPS) m/s' and a 'Starthöhe' (Start Height) field set to '548.6 mNN'. At the bottom, there are two buttons: 'kmz Datei für Google Earth erstellen' and 'csv Datei (Tabelle) erstellen'. Callouts on the right side of the image provide additional information: 'First select the file from the memory card' points to the file selection button; 'A comment can be entered here' points to the comment field; 'The graphic provides a quick overview of height or speed in the selected file' points to the graph; 'With the sliders, a section in time can be selected' points to the time slider; 'A manual correction to start height can be made here' points to the 'Starthöhe' field; 'Values to be shown in colour in Google Earth' points to the 'Wert einfärben' dropdown; and 'Create a Google Earth file or a data table file.' points to the bottom buttons.

First select the file from the memory card

A comment can be entered here

The graphic provides a quick overview of height or speed in the selected file

With the sliders, a section in time can be selected

A manual correction to start height can be made here

Values to be shown in colour in Google Earth

Create a Google Earth file or a data table file.

Illustration 3: Conversion (Konvertieren) tab

12.2. Minimum and Maximum Values

Once a file has been converted all the extremes of values can clearly be seen in the “Maximum” window.

SM GPS-Konverter v1.1.3

Konvertieren | **Maxwerte** | GPS Einstellungen | IGC Einstellungen | live Anzeige | Info

GPS-Logger

Höhe NN	545,5 m	710,6 m
Speed	0,02 km/h	115,88 km/h
Höhe relativ	-2,8 m	162,3 m
Vario	-25,16 m/s	16,59 m/s
Rx Spannung	4,59 VRx	5,4 VRx
Strecke	0 km	5,11 km
Entfernung	0 m	208 m
Position	0 °	359,9 °
Gleitzahl	0	99

UniLog 1/2, UniSens-E

Spannung	10,45 V	12,53 V
Strom	-3,81 A	43,1 A
Leistung	-44,5 W	484,4 W
Drehzahl	0 rpm	0 rpm
Rx Spannung	0 VRx	0 VRx
Höhe	-2,2 m	159,2 m
A1	0 °C	0 °C
A2	0 mAh	1303 mAh
A3	13,7 °C	16,2 °C

Values from GPS-Logger

Values from UniLog 1/2 (only when directly connecting the UniLog with the GPS)

Values from M-Link bus (only available with M-Link)

Illustration 4: Maximum values (Maxwerte) Tab

12.3. GPS settings

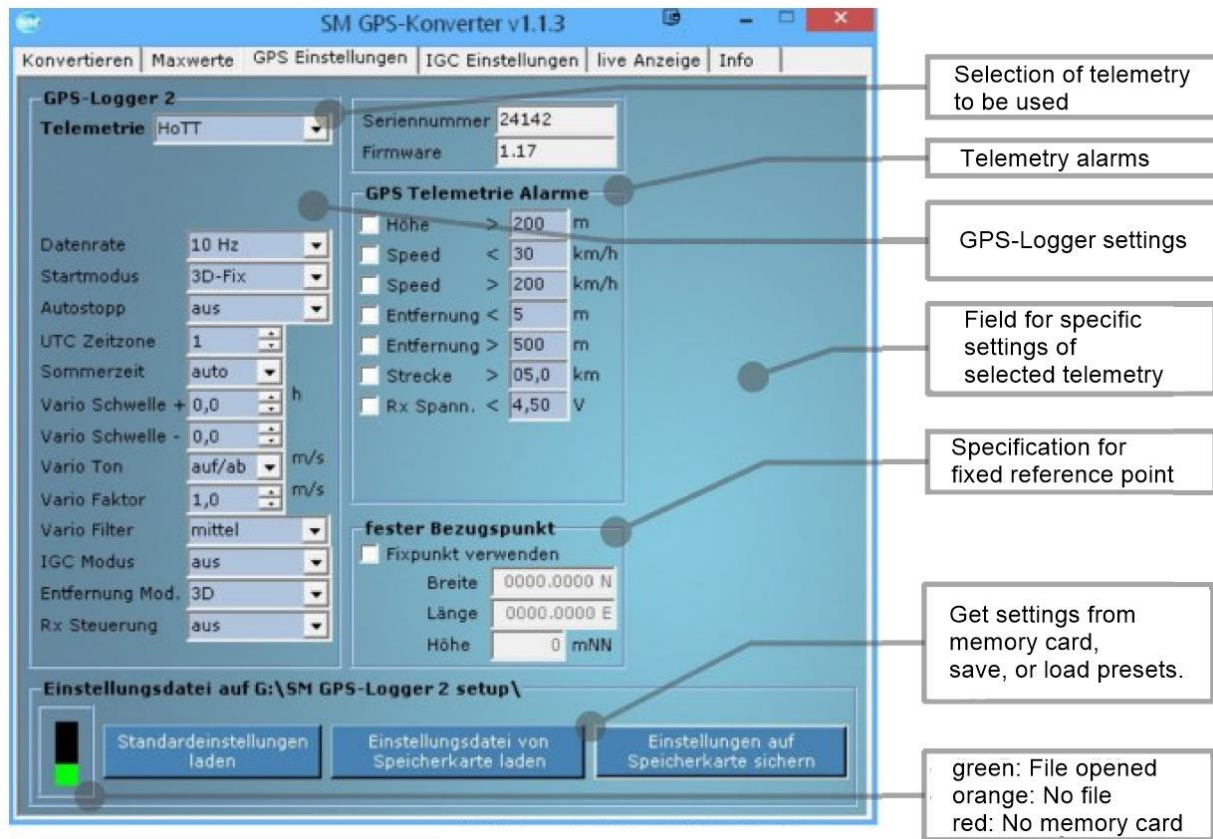


Illustration 5: GPS settings (Einstellungen) Tab

12.4. IGC settings

Here preferences can be specified for the IGC mode. These texts are included in the IGC file from the GPS-Logger 3.

When evaluating the data in the online contest matching fields can thus be filled automatically.

12.5. Live Access to the GPS-Logger 3

If the GPS-Logger 3 is connected to the USB interface on the PC, the terminal function of our software can access the GPS-Logger 3 directly. The display is the same as with the live operation of the UniDisplay. See also chapter 8.

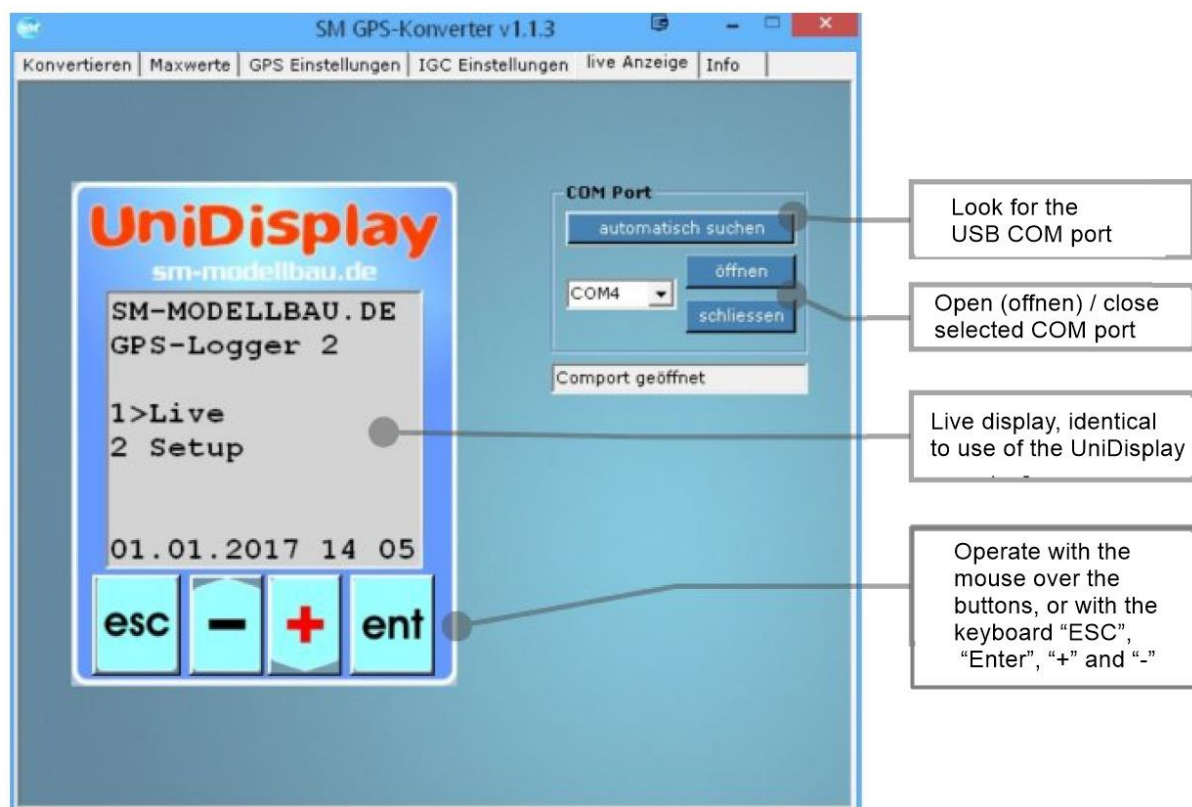


Illustration 6: Terminal Tab

The GPS-Logger 3 must be supplied with external power for connection to the PC!
For example, directly to a 4 cell Receiver battery.

12.6. Info / settings of the SM GPS Konverter

In the “Info” tab can be found programme information and also settings for Google Earth™ and for the automatic online update.

Here the SM GPS Konverter searches on our website for new versions of the programme and the firmware of the GPS-Logger 3 and can install them.

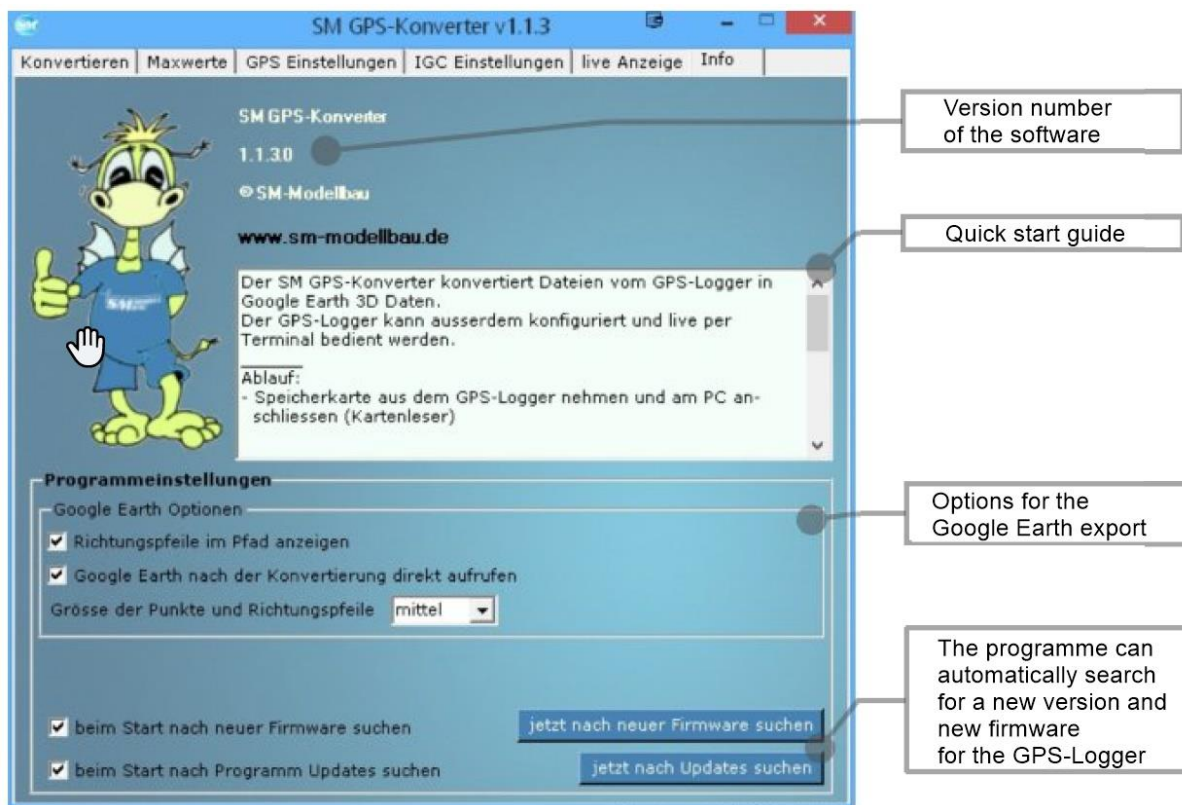


Illustration 7: Info Tab

13. Firmware update of the GPS-Logger 3

New firmware is simply up-loaded to the GPS-Logger 3 via the micro SD memory card. On improvements to the firmware an appropriate file with the update can be downloaded free of charge from our homepage www.sm-modellbau.de in the menu item **Software & Updates**.

If the PC software “SM GPS Konverter” is started, the programme automatically searches for a new firmware on our server. If a newer file is found, the update may be downloaded and run automatically if desired. Thus the GPS-Logger 3 is always up to date.

The file has, for example, the following file name for the version v1.00: **GL2v100.UPD**

The file name of the firmware update and the name of the folder for the update must not be changed!

Procedure:

- The file is copied into the folder “SM GPS-Logger update” on the memory card. If the directory does not exist, it must be created with exactly that name.
- At the next start of the GPS-Logger 3 the red LED flashes during the update procedure.
- Then the GPS-Logger 3 starts with the new firmware.
- The file must remain on the memory card, it is only loaded once.

14. Version history

Here you will find all firmware versions and the changes to the previous version.

You can find the current version of your GPS-Logger 3 firmware with our software “SM GPS-Konverter” or the UniDisplay.

Version	Date	Comment
1.13	02-2014	<ol style="list-style-type: none"> 1 Introduction of the GPS-Logger 2. 2 Telemetry: automatic scan for HoTT / MPX / Jeti has been removed because there were always problems with modified protocols. → HoTT / MPX / Jeti are now selected and fixed as Futaba and JR → default after update is HoTT, if Futaba or JR were not already chosen → Jeti and M-Link users must in any case select the telemetry after the update. 3 FrSky telemetry added (only S.Port protocol). 4 Jeti EX: values can be selected individually for transmission 5 HoTT: with the new receivers with integrated sensors, data is transferred faster 6 FASSTest: distance is initialised by the transmitter after 3D fix. 7 After 3D fix wait for stable readings, orange and green LED at the same time (up to a maximum of 60 seconds). 8 With Vario there is an adjustable factor to increase the sensitivity of the sound on some telemetry systems. 9 HoTT: the Vario range of -0.1 to -0.5 m/s is skipped, since the transmitter produces no sound here. 10 With each telemetry the modified Vario value is now transmitted (→ sound, → threshold, → factor).
1.14	04-2014	<ol style="list-style-type: none"> 1. IGC: the GPS Logger 2 now has its own identifier for the OLC >authorization as ENL Logger 2. IGC: The text templates were not included in the IGC file 3. Start Mode and Telemetry choices were only adopted from the memory card at the second start 4. Recording start and stop is signaled via Vario: the value changes from -2 m / s to +2 m / s when Start for 5 s and at the stop for 10 s 5. FASSTest: negative heights did not display correctly 6. Reduced threshold for auto-stop from 10 km / h to 5 km / h
1.15	06-2014	<ol style="list-style-type: none"> 1. GPS logger 2: random start problem solved 2. GPS logger 2: Set the start position for the distance measurement is now also possible via Rx channel 3. FASSTest: Adjustment for T10J transmitters
1.16	06-2015	<ol style="list-style-type: none"> 1. Futaba: with v1.15 the data were sometimes transferred only after some time

		<ol style="list-style-type: none"> 2. Jeti EX: the settings Vario tone and threshold only affect the tone of the old transmitter modules, the EX value from Vario remains unchanged 3. Jeti EX: the values are now transmitted with different priorities so that the Vario has even faster response 4. Jeti EX: Adjustment for REX receivers 5. JR DMSS: with the RG731BX receiver there was no indication of height and Vario 6. JR DMSS: Airspeed is sent as a separate value 7. M-Link: ENL and the accelerations have their own addresses the GPS Logger 2 8. M-Link: the separate addresses for UniLog 1/2 or Unisens E dropped 9. GPS logger 2: new alarm for minimum distance -> So that can be announced at the OLC of the start / finish circle -> Active as long as the distance is less than the set value -> Alarm announcement at HoTT "maximum distance" 10. Telemetry alarms from UniLog 1/2 or Unisens E are only with Jeti generated by GPSLogger, with all other telemetries the setting is disabled 11. FrSky: Speed is now correctly transferred in kts, the conversion into km / h is adjusted in the transmitter
1.17	02.2017	<ol style="list-style-type: none"> 1. Spektrum telemetry installed via Spektrum adapter: - up to 4 sensors: GPS sensor, VarioSensor, G sensor, USER16 2. M-Link: Rx voltage on own address 3. Futaba: - Compatibility mode for Robbe telemetry box - the signal quality output from the receiver(25/50/75/100) is read in and set to an additional sensor as TEMP125 4. FrSky: new values are transferred with their own IDs - Distance 0x0860 in meters - satellites 0x0870 - Height gain 0x0880 in meters - Direction 0x0890 in degrees - Direction relative 0x08A0 in degrees 5. Calculation of the Vario data optimized and accelerated: - Vario values are now less smoothed but are more up-to-date - Transfer of the Vario value faster especially with Jeti and HoTT - new option "VarioFilter": "slow" corresponds approximately to the previous evaluation, "medium" and "fast" are correspondingly faster - Altitude is faster 6. Gently zero the height when the model is on the ground 7. new option "fixed serial number" sends the serial number 12567 via telemetry with Jeti and Futaba 8. Set starting point by "Rx control" is now carried out when changing from + 100% to -100%, previously reversed. 9. Fixed point (Home) can be saved via the GPS converter or UniDisplay:

		<p>➔ the alarm for distance max. and the value distance then becomes that fixed point (Alternatively 2D or 3D)</p> <p>➔ the alarm distance min. and the direction still refer to the starting point</p> <p>10.new startup mode: "Rx signal"</p> <p>11.new alarm for minimum speed</p> <p>12.new IGC mode "extended"</p>
1.18	03.2017	1. Removed unwanted reboots.
1.19	06.2017	<p>1. Aborts specifically with the GPS-Logger 1 eliminated</p> <p>2. HoTT: on the mc-28 the alarm 'E' no longer produces "pling-pling" but "weak telemetry channel"</p> <p>☒Alarms without corresponding voice output are omitted without replacment:</p> <p>COM plugged in and unplugged, Start and stop saving track</p> <p>3. Futaba: when displaying the signal quality, the values 50% and 75% were reversed</p> <p>4. IGC mode extended: now zeroes the height difference OK when setting the starting point over the Rx channel</p>
1.20	02.2019	<p>1. Introduction of the GPS-Logger 3</p> <p>2. Futaba: with the Vario 1672 sensor, the altitude gain is now transmitted instead of the altitude</p> <p>3. FrSky: Coordinates and Vario are transmitted with high priority.</p>
1.21	03.2019	<p>1. Jeti: assignment of individual values did not fit to the GPS converter</p> <p>2. Vario was no longer updated when a UniSens-E/UniLog 2 was connected</p>
1.22	03.2019	<p>1. GPS-Logger 3: Speeds over 185 km / h led to a mistake</p> <p>2. Calculation of the glide ratio did not work anymore</p> <p>3. OLC: Filter for manual setting of the starting point by receiver channel so short that disturbances do not move the starting point</p> <p>4. OLC: barometric height was missing in the IGC file</p>
1.23	04.2019	1. GPS Logger 1: fix for wrong dates due to "week roll over" in GPS signal at 04/06/2019
1.24	08.2019	<p>1. PowerBox Core (P2BUS) support built in:</p> <ul style="list-style-type: none"> - only possible with the GPS logger 2/3, the GPS logger 1 does not have enough storage space - Currently only display of the measured values, assignment of the address and switchover German /English and metric / feet, no menu - Standard address: 188 <p>2. GPS logger 1: further fix for wrong dates due to "week roll over" in GPS signal</p> <p>3. Alarm for maximum distance is automatically cancelled after 5 seconds, until the next over run.</p>
1.25	06.2020	<p>1. Jeti: Altitude and altitude gain are displayed from 10 m without decimal point.</p> <p>2. PowerBox: Acceleration sensors added to the values</p> <p>3. FrSky: Variovalue is additionally transmitted with ID 0x08b0 with high resolution at GPS-Logger 2/3</p> <p>4. Smooth zeroing of the altitude can now be switched off.</p> <p>5. last firmware update for GPS-Logger 1</p>

1.26	05.2021	<ol style="list-style-type: none"> 1. GPS-Logger 2/3 can now be switched from German to English. 2. speed measurement for GPS-Logger 3 via TEK nozzle added (value AirSpeed) 3. FrSky: Adjustment for SxR receiver, extra address for flight distance (0x08c0) 4. powerbox: distance is now shown in km with two decimal places 5. if distance mode = 2D, speed is now also calculated in 2D only and saved
1.27	08.2021	<ol style="list-style-type: none"> 1. under certain circumstances the GPS-Logger has created 3 empty files 2. HoTT Text did not work anymore with connected UniLog 3. name of the log file changed to YYYY-MM-DD-GPS3-12345-0001.nmea 4. with GPS-Logger 2 the vario value in the \$SMGPS string was always 0
1.28	11.2021	<ol style="list-style-type: none"> 1. Powerbox: airspeed was missing 2. GPS-Logger 3 now evaluates GPS, GLONASS and GALILEO satellites. 3. HoTT: Speed display can be selected manually (Auto/GPS/Airspeed) 4. HoTT: Speed alarm is formed from the selected speed value 5. HoTT: for the mz-16/32, Airspeed is always transmitted in the data. 6. \$GNGNS is now written in the nmea files instead of \$GNGGA.

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