

**PowerBox Systems®**

World Leaders in RC  
Power Supply Systems

# Instruction Manual

# GPS II



The logo features a stylized lightning bolt graphic in the center, composed of two overlapping shapes: a red one with a white outline and a white one with a red outline. This graphic is set against a light gray circular background. A thick red horizontal line with a white outline passes through the center of the lightning bolt. The text "PowerBox Systems" is written in a bold, italicized, blue sans-serif font with a white outline, positioned horizontally across the middle of the image, overlapping the lightning bolt and the red line.

***PowerBox Systems***

**Dear customer,**

We are delighted that you have decided to purchase the **GPS II** from our range.

We wish you every success with your new **GPS II**, and hope you have loads of fun with it.

## **1. Product description**

The **GPS Sensor** was originally introduced to provide a means of speed-dependent gain adjustment for our **iGyro**, but the **GPS II** is an entirely new development, and can now be used with all current telemetry systems.

This latest generation of GPS receivers is extremely agile, and capable of measuring speed even when there are rapid changes in speed or direction. The radial helical aerial provides outstanding reception in any flight attitude, while the supplementary pre-amplifier improves reliability of reception under difficult conditions.

The **GPS II** module is a very compact unit which virtually any model can accommodate. The integral LED provides information about receiver status.

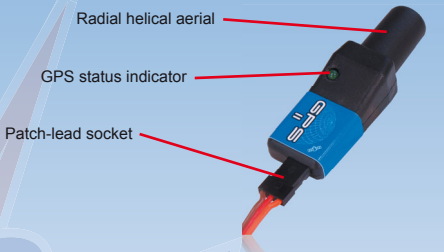
It is possible to set up alarms, addresses and other parameters using the **PowerBox USB interface** and the free **PowerBox Terminal** program; the actual facilities vary according to the telemetry system in use. However, the USB interface function can also be carried out by the USB adapters made by Jeti or Multiplex.

Software updates can be loaded using the USB adapter, so there is nothing to prevent future expansion.

## Features:

- Latest generation of GPS
- Helical aerial for panoramic reception (even inverted)
- Reception even under difficult conditions
- Fast response to speed changes
- GPS status indicator LED
- Accurate 3D speed
- Altimeter function
- Distance function
- Distance covered
- Geo co-ordinates
- Supports the following telemetry systems:
  - Futaba FASSTest
  - Multiplex M-Link
  - Jeti EX
  - Graupner/SJ HoTT
  - JR DMSS
- Updateable

## 2. Connections



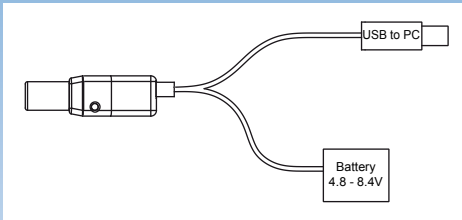
## 3. Initial steps, setting up the unit

By default the **GPS II** is set up to work with the **iGyro** and the M-Link telemetry system. If the GPS is required to work with a different telemetry system, it must first be set up to suit. This requires a USB interface and the Y-lead supplied in the set. The **PowerBox USB lead** can be used as USB interface, but USB adapters made by other manufacturers are also suitable. To date we have checked the following types: Multiplex and Jeti.

Download the **PowerBox Terminal** program from our website, and follow the installation instructions. Use the following link to locate the program and the associated instructions:

<http://www.powerbox-systems.com/downloads/powerbox-terminal.html>

Connect the **GPS II** to the USB adapter and a battery using the Y-lead. Any type of battery with a voltage in the range 4.8 - 8.4V can be used.



The next step is to start the Terminal program:

The screenshot shows the "PowerBox-Systems Terminal" application window. The title bar reads "PowerBox-Systems Terminal". The main window has a blue header with "PowerBox Terminal" and a navigation bar with tabs: "Software Update", "Save / Restore", "LightBox", "GPS II" (selected), and "Info".

On the left side, there is a white panel with the text "Bitte führen Sie die folgenden Schritte aus:" followed by a numbered list:

- 1 Stellen Sie sicher, dass Ihr PowerBox GPS an einem geladenen Akku angeschlossen ist.
- 2 Verbinden Sie den USB-Adapter mit Ihrem GPS und dem Computer.
- 3 Klicken Sie auf "Weiter"

At the bottom of this panel is a blue button labeled "Weiter".

On the right side, there is a white panel with the "PowerBox Systems" logo and the text "World Leader in RT Power Supply Systems". Below this, it says "PowerBox Gerät". At the bottom of this panel is another "PowerBox Systems" logo and the text "World Leader in RT Power Supply Systems".

You have already completed steps 1 and 2; click on **Continue** at the bottom. A count-down now starts, while Terminal waits for the **GPS II** to switch to PC control; this screen now appears:

The screenshot shows the 'PowerBox Terminal' software window. The title bar reads 'Powerbox-Systems Terminal'. The main window has a blue header with the 'PowerBox Terminal' title and a navigation bar with tabs: 'Software Update', 'Save / Restore', 'LightBox', 'GPS II', and 'Info'. The 'GPS II' tab is active. Below the header, there is a 'Software Update' button. The main content area is divided into several sections:

- Telemetriesystem:** Radio buttons for 'iGyro', 'M-Link' (selected), 'S-Bus2', 'Jeti EX-Bus', and 'Hott'. There is also an 'IR-XBus' option below.
- GPS Konfiguration:** Two radio buttons: 'Optimiert für Geschwindigkeitsmessung' (selected) and 'Optimiert für Positionsbestimmung'.
- Adresskonfiguration:** A list of sliders for 'Geschwindigkeit 3D' (set to 9), 'max. Geschwindigkeit 3D' (set to --), 'Höhe' (set to 10), 'max. Höhe' (set to --), 'Entfernung' (set to 11), 'max. Entfernung' (set to --), and 'zurückgelegte Strecke' (set to 12).
- Alarm Konfiguration:** Three sliders for 'Alarm Geschwindigkeit' (set to 900 km/h), 'Alarm Höhe' (set to 2000 m), and 'Alarm Entfernung' (set to 5.0 km).

On the right side of the window, there is a 'PowerBox Systems' logo with the tagline 'World Leaders in RC Power Quality Systems' and a 'GPS II' label. Below this is an image of a blue and black GPS II receiver module.

The first step here is to select the telemetry system you wish to use. The lower part of the screen displays various set-up facilities which vary according to the telemetry system you select.

The GPS configuration option is used to set up the **GPS II** for your intended purpose.

**Optimised for speed measurement:**

In this mode the GPS receiver is optimised for rapid speed changes and best possible three-dimensional speed detection. This is the default setting.

**Optimised for position detection:**

In this mode the GPS receiver is set up for maximum positional accuracy. Speed detection is slightly less rapid.

**Settings according to the telemetry system in use:**

**iGyro:** clicking on this option selects the M-Link telemetry system, and resets all settings.

**Multiplex M-Link:** you can access Address Configuration to arrange the sequence of the values as displayed on the transmitter. Maximum values can also be generated; these are switched off by default. Alarms are set up at the **GPS II** using Alarm Configuration.

**Futaba S-BUS 2:** no configuration possible; all alarms are set up at the transmitter.

**Jeti EX BUS:** alarms can be entered both at the **GPS II** and at the transmitter.

**Graupner HoTT:** alarms are set up at the **GPS II**.

**JR X-BUS:** no configuration possible; alarms are set up at the transmitter.



## 4. Installation, connections

Since the **GPS II** features a radial aerial, it can be installed in any attitude. Ideally the aerial should face up or to one side. The only important point to observe when installing the unit is that there should be no shielding materials in the vicinity, as large areas of carbon fibre or metal have an adverse effect on reception.

If it is not possible to install the unit close to the **iGyro** or receiver, the patch-lead can be extended. Lengths up to 2.0 m present no problem.

### Connecting the different systems:

#### **Multiplex M-Link:**

Connect the sensor directly to the receiver's Telemetry input. Multiple sensors can be connected using a Y-lead.

#### **Futaba S-BUS2:**

Connect the sensor directly to the receiver's S-BUS2 input. Multiple sensors can be connected using a Y-lead. The sensor must first be connected to the transmitter for registration. The registration process is described in our **Expert Forum**.

#### **Jeti EX:**

Connect the sensor directly to the receiver's EXT input. If you wish to connect multiple sensors, you will need an "Expander E4 EX". The data to be displayed is selected at the transmitter.

#### **Graupner/SJ HoTT:**

Connect the sensor directly to the receiver's Telemetry input. Multiple sensors can be connected using a Y-lead.

#### **JR X-BUS:**

Connect the sensor directly to the receiver's SENS input. Multiple sensors can be connected using a Y-lead.

## 5. The unit in use

We deliberately decided against using a buffer battery with the **GPS II** to store the last satellite data, as we wished to avoid the wear associated with this. This means that the **GPS II** has to seek and locate the satellites every time it is switched on. The process takes 30 to max. 60 seconds, but this does not present any problem, as it usually takes much longer than this to prepare a model for flight between switching on and taking off.

The status of what is known as the “FIX” is indicated by the integral LED: if the LED flashes, this indicates that the receiver is seeking satellites; a continuously lit LED indicates that the GPS is ready for use.

## 6. Updating

If new functions become available, or improvements are made to the performance of the **GPS II**, these can be loaded in just a few minutes by means of a software update. Once again this requires **PowerBox Terminal** and a USB interface. Start the Terminal program, and select the **GPS II** at the top of the screen. Wait ten seconds, then briefly click the **Software Update** button. The **Continue** button now appears at the bottom of the screen; click on this.

Two options are now available:



**Online Update:** ideally the computer should be connected to the Internet. The Online Update function now automatically loads the most recent file from our server.

**Select file:** installing **PowerBox Terminal** copies the Update files onto the computer. You will find the file using this path:

**C:\PowerBox Terminal\Programm\update\**

This means that the software can be updated without an Internet connection, although this file is only as up-to-date as the time when the Terminal program was installed.

Once the correct file is located, click on: **Carry out update now**  
The **GPS II** is ready for use again when the status indicator reaches 100%.

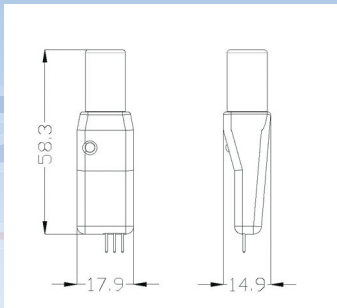
## **7. Information on accuracy**

There is a widespread belief that GPS cannot measure speed accurately in three-dimensional space, but this is not so. The **GPS II** employs the latest generation of receivers which measure speed by exploiting the Doppler effect, rather than by comparing the current position with the previous one. This measurement process is fast and very accurate.

The positional accuracy of a GPS system is subject to the usual fluctuations, and even the latest receivers have not improved on this aspect of performance. However, the error is generally less than 10 m, and is therewith negligible for modelling applications.

## 8. Specification:

Max. horizontal speed:	1200 km/h
Max. vertical speed:	360 km/h
Operating voltage:	4.0 - 9.0V
Current drain:	max. 60 mA
Weight:	14 g incl. patch-leads
Dimensions:	58 x 18 x 17mm



## 9. Set contents

- GPS II
- Patch-lead, 24 cm
- Y-lead
- Self-adhesive pad
- Operating instructions

## 10. Service note

We are anxious to offer good service to our customers, and to this end we have set up a Support Forum which deals with all queries concerning our products. This relieves us of a great deal of work, as it eliminates the need to answer frequently asked questions time and again. At the same it gives you the opportunity to obtain help quickly all round the clock - even at weekends. All the answers are provided by the **PowerBox Team**, guaranteeing that the information is correct.

**Please use the Support Forum before you telephone us.**

You can find the forum at the following address:

**[www.forum.powerbox-systems.com](http://www.forum.powerbox-systems.com)**

## 11. Guarantee conditions

At **PowerBox Systems** we insist on the highest possible quality standards in the development and manufacture of our products. They are guaranteed **“Made in Germany”!**

That is why we are able to grant a **36 month guarantee** on our **GPS II** from the initial date of purchase. The guarantee covers proven material faults, which will be corrected by us at no charge to you. As a precautionary measure, we are obliged to point out that we reserve the right to replace the unit if we deem the repair to be economically unviable.

Repairs which our Service department carries out for you do not extend the original guarantee period.

The guarantee does not cover damage caused by incorrect usage, e.g. reverse polarity, excessive vibration, excessive voltage, damp, fuel, and short-circuits. The same applies to defects due to severe wear.

We accept no liability for transit damage or loss of your shipment. If you wish to make a claim under guarantee, please send the device to the following address, together with proof of purchase and a description of the defect:

### **Service Address:**

**PowerBox-Systems GmbH  
Ludwig-Auer-Straße 5  
D-86609 Donauwörth  
Germany**

## 12. Liability exclusion

We are not in a position to ensure that you observe our instructions regarding installation of the **GPS II**, fulfil the recommended conditions when using the unit, or maintain the entire radio control system competently.

**For this reason we deny liability for loss, damage or costs which arise due to the use or operation of the GPS II, or which are connected with such use in any way. Regardless of the legal arguments employed, our obligation to pay compensation is limited to the invoice total of our products which were involved in the event, insofar as this is deemed legally permissible.**

We wish you every success with your new **GPS II**.

Donauwörth, March 2014

A handwritten signature in black ink, appearing to read "E. Neubauer". The signature is written in a cursive style with a large initial "E".



**PowerBox Systems®**

*World Leaders in RC  
Power Supply Systems*

**PowerBox-Systems GmbH**

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