LIGHTBOX

SR

Dear customer,

we are delighted that you have selected the **LightBox SR** from our range of products. We are confident that this unique lighting control unit will bring you much pleasure and success.

1. Product description

More and more pilots are keen to produce models which are not only 100% true to scale visually, but also lack nothing in terms of working systems. Naturally these functions include a fully controllable lighting system which simulates every function of the full-size machine.

The newly developed **LightBox SR** from **PowerBox Systems** can control every imaginable light sequence in your model, and is easy to set up using the **Terminal PC interface**, which is available at no charge.

The system caters for landing lights, flashers and simulated beacons, and even an afterburner control system. The intervals and burn times for the flashing light function are user-variable, as is the speed of rotation for the beacon. The switching point for all functions is also user-variable. Only one channel is required to switch the various lighting circuits on and off independently.

As you would expect, the **LightBox SR** is pre-configured in such a way that it can be used immediately, without any adjustment. With a single conventional receiver output it is possible to switch landing lights, two flashers and one beacon on and off.

Features:

- Four outputs, separately user-variable
- Landing light, flasher, beacon and afterburner functions
- Can be controlled via PWM or serial signal
- Following serial systems are supported:
  Futaba S-BUS, Spektrum SRXL, Graupner SUMD, Multiplex M-Link, Jeti EX
  and UDI, JR X-BUS, **PowerBUS**
- User-variable switching thresholds
- Fully configurable lighting functions
- Simple PC interface
- Many currently available USB adapters can be used for programming, e.g.
  PowerBox, Jeti, Multiplex
- Can be powered from the receiver, PowerBox or external battery
- Stand-by circuit for external battery
- Fused outputs
- Low-voltage cut-off
- Fail-safe function
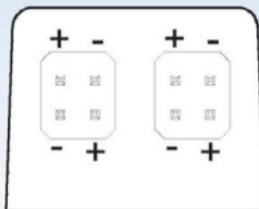- Update capability

2. Connections

Input for optional external battery

Outputs for the LEDs

Socket for the USB Interface Adapter

Input for PWM or serial signal

Polarity of the LED outputs:

3. First steps

Connect the **LightBox SR** to the receiver, and connect the LEDs to the unit. Take care to maintain correct polarity, as shown in the diagram above. Connecting the LEDs incorrectly will do no harm, but the LEDs will not light up.

Caution: most LEDs require a series resistor in the circuit; if you are not sure about this, ask the light manufacturer for information.

If you intend to use an external battery for the lighting system, simply connect it to the socket marked *ext. Battery*; a special circuit then automatically switches over to this input. If the battery is flat, or the cable defective, the circuit does **not** switch automatically to the receiver power supply. This ensures that the receiver battery is not subjected to an additional load even if an error occurs.
The power supply can take the form of a 1S - 3S LiPo or LiFePo pack. The wide input voltage range of 2.5 V – 13 V allows the use of a broad range of lighting sets. It is also possible to wire multiple LEDs in series and use them with a higher battery voltage in order to minimise the current.

If you wish to operate the **LightBox SR** without entering any settings at the PC, the default settings for the various functions are as follows:

Channel	Function	Switching threshold
LED output 1	Continuous light	+ 50%
LED output 2	Flashing light	- 50%
LED output 3	Flashing light	- 50%
LED output 4	Rotary beacon	- 50%

With these standard settings, a single conventional servo output at the receiver and a three-position switch operate the unit as follows: the first position switches 2 x flashing light and 1 x beacon; at the second position an additional landing light can be activated.

The low-voltage cut-off threshold for the lighting system is set at 2.5 V; the unit switches itself off at this point.

4. Setting the LED functions using the PC

If you wish to assign other functions to the outputs, or activate the serial input, you will need to use the *PowerBox Terminal* program, which can be downloaded from our website:

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

The program is free, and can be used to update the **LightBox SR** as well as adjust its settings. Instructions for installing the program can also be found in the Download area. Once you have installed the program, connect the **USB Interface Adapter** (Order No. 9020) to the PC. Other makes of USB adapter, such as those made by Jeti or Multiplex, can also be used.

Connect the UNI plug on the adapter lead to the *USB input* on the **LightBox SR**. If you have not yet installed the **LightBox SR** in a model, the power supply can take the form of any battery in the range 4 V - 9 V. Plug the battery into the socket marked *Receiver*.

Don't start the *Terminal* program on your PC until have completed these steps. Select *LightBox* at the top of the window, and click on *Continue*. You will now see the following screen display:

Explanation of functions:

Solid Light: Switchable continuous light, typically used for landing lights or cockpit illumination

Flash Light: Flashing light, typically used for navigation lights or stroboscopic effects

Beacon Light: Rotating light function, simulating a rotary beacon

Afterburner: Simulated afterburner

Various settings are available, depending on the function you select:

ON/OFF Setpoint: the switching point is set here. For example, if you wish to switch on the landing light together with the landing flaps using only one channel, you can select the switching point in such a way that the landing light only comes on when the flaps are deployed.

Channel: this function is only displayed if you have selected a **serial** input signal. In this mode a different channel can be assigned to each function; this makes it possible to switch all four outputs on and off independently of each other.

ON/OFF Time: this function is used with the flashing light function, and controls the duration of the light bursts, and the interval between them.

Speed: defines the speed of rotation of the rotary beacon.

Reverse: at this point you can set the range in which the output is active, i.e. below or above the Setpoint (switching threshold).

All the settings are automatically **stored immediately**, and are executed in real time. This means that you can see the result of any changes by observing the lighting system itself.

5. Fused outputs

All four LED outputs are fitted with integral fuses. If an output is overloaded, or a short-circuit occurs in the wiring system, that output is switched off. This ensures that the receiving system is not affected if an error occurs, even when the lighting system draws its power through the receiver.

The maximum current per output is 1.2 A at the maximum voltage of 13 V. The maximum permissible current load on all outputs is 4 A.

The fuses reset themselves as soon as the overload situation is corrected.

6. Low-voltage cut-off

To avoid the danger of deep-discharging the power source, the **CUT OFF VOLTAGE** option can be used to set a threshold at which the LightBox switches off all consumer units. If you intend to power the lighting system via the receiver, we strongly recommend that you program a suitable threshold.

Recommended thresholds:

	Battery Type	LiPo	LiFePo
Cell count			
1		3.5 V	3.0 V
2		7.0 V	6.0 V
3		10.5 V	9.0 V

Note: if the receiver is powered by a stabilised voltage (e.g. from a **PowerBox** battery backer), the *CUT OFF VOLTAGE* is set at a point about 0.3 V - 0.4 V below the stabilised voltage. For 5.9 V this would be a *CUT OFF VOLTAGE* of 5.6 V. However, a long power cable to the **LightBox SR** may necessitate a lower cut-off threshold.

7. Technical Data

Operating voltage RC- Input:	4.0 – 9.0V
Power supply ext. Akku:	2.5V – 13.0V
Current drain, running:	19mA
Current drain, stand-by:	150µA
Switched channels:	4
Maximum current load:	1.2 A per channel
Maximum current load:	4.0 A total
Signal input:	PWM or serial
Dimensions:	58 x 19 x 15 mm
Weight incl. patch-lead:	22g
Temperature range:	-30°C to +75°C
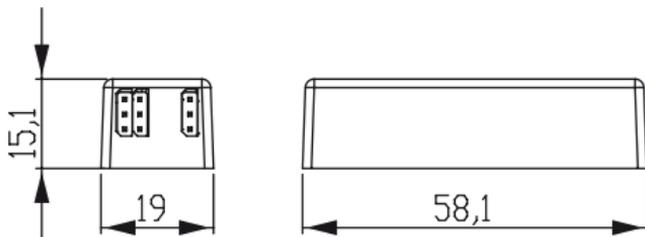
8. Set contents

- **LightBox SR**
- **Patch-lead 24cm**
- **4 x LED connecting lead**
- **Self-adhesive pad**
- **Operation instruction in German and English**

9. 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 <u>before</u> you telephone us.

You can find the forum at the following address:

www.forum.powerbox-systems.com

10. Guarantee conditions

At **PowerBox System**s 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 **LightBox SR** 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

11. Liability exclusion

We are not in a position to ensure that you observe our instructions regarding installation of the **Power Box LightBox SR**, 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 Power Box LightBox SR, 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 **Power Box LightBox SR**.

Donauwörth, June 2014