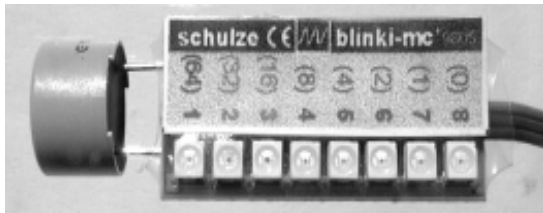




operating instructions; date of issue 08 MAY 1998



1 HIGHLIGHTS

blink-mc is a new on-board monitor for your receiver voltage, utilizing the latest micro-processor technology.

blink-mc can be configured to special types of batteries and discharge load currents for a precise display of the receiver voltage in your special case.

blink-mc is connected to an unused receiver output or via a Y-lead (no receiver signal) directly to the battery.

blink-mc combines following functions in one part:

- Measures the receiver operating voltage under load (while the model is in flight), stores the value, and displays it constantly until the receiver is switched off.
- Configures itself automatically to the operating voltage of your receiver battery having 4, 5 or 6 cells.
- The piezo-sounder of the blink-mc informs you when the battery reaches a critical state while the model is flying.
- The built-in piezo-buzzer can be used as a model-finder, i.e. helps you to locate a lost model.
- Simultaneously displaying two voltage parameters relating to the on-board battery:
 - a) the mean minimum voltage, in the form of a continuously glowing LED;
 - b) any momentary voltage collapse, in the form of a flashing LED at the lowest measured voltage value.

In general terms you should assume that the battery's internal resistance is excessive if the difference between the minimum voltage LED (flashing) and the mean voltage indicator (continuous light) is great.

- An integral glitch counter informs you of the number of occurrences of interference (glitches) during the flight. It does this by counting the glitches (pulse variations) at the receiver output to which you have connected the unit.
- Simplified activation of the model-finder and displaying glitch counter data.
- Configuration of the 3-coloured LED voltage display (matched to your receiver battery and its load profile) by means of 2 solder patches.

2 IMPORTANT SAFETY NOTES

Please read these entire operating instructions before you put blink-mc to work. Always keep these operating instructions handy with blinki.

- blink-mc is exclusively for use in battery powered RC models. All other usage is prohibited.
- Use blink-mc only if the receiver is powered with a separate receiver battery pack. If the receiver is powered with BEC in electric models, then the battery monitoring function of the blink-mc is inoperative.
- blink-mc will operate correctly under the conditions described herein; any unauthorised modifications made by user void both blinki's usefulness as well as its warranty.

• blink-mc is sensitive to humidity. Parts which have got wet may not function properly even after thorough drying. You should send them back to us for cleaning and testing.

• Fasten blink-mc on a place which is protected from mechanical loads, vibration, dirt and contamination. Avoid it from mechanical pressure and shock.

• Check the wiring of your RC-components regularly for loose wires, oxidation or damaged insulation, as well as for errors and misconnection.

• Make sure to test performance of your complete receiver installation thoroughly before flight to make sure it operates as you expect. Carry out a range check before each flight. Then check blink-mc again, then go fly safely.

• We cannot state with certainty the voltage level at which it is not safe to fly again as we have no knowledge of the types of battery you use and the loads to which they are subjected. For this reason you will need to carry out your own experiments to establish the safe level and adjust the voltage display (if desired) with the help of 2 solder patches (see configuration).

• Disconnect your battery pack from the receiver when not in use or while charging.

3 MOUNTING

The blink-mc is very light, and can easily be attached to your model using Velcro (hook and loop) tape, double-sided tape (servo tape), contact cement or acid-free silicone sealant. If you want to use the model-finder function glue the sounder directly over a small opening in the fuselage (circuit board upright) to allow the sound out. If necessary bend the sounder carefully through 90°. This can only be done once!

4 INITIAL USE

Connect the receiver cable to a vacant receiver socket.

When you switch on the receiver all the lights in the chain of LEDs glow continuously for about three seconds to place a load on the receiver battery. The unit then displays the appropriate number of cells by means of the corresponding LED. At the same time the model-finder sounds 4 .. 6 times according to the number of cells. After that the bank of LEDs indicates the operating voltage of the receiver battery.

Important: If blink-mc reports the wrong number of cells this should be viewed as a serious warning: If the indicated number of cells is too low, your battery is already too far discharged or defective.

Note: Please check the power supply voltage in your model before take-off by operating all the control sticks on your transmitter simultaneously. You will now see a voltage display under load, varying with battery type, capacity, age and servo load. The display is constantly updated and corrected while the model is in the air.

The two voltage memories and the glitch counter in the blink-mc are not erased until you switch off the power supply.

5 GLITCH COUNTER AND MODEL FINDER

If blink-mc is connected to a vacant receiver socket you can operate this channel from the transmitter. In this case you can call up two important auxiliary functions simultaneously: Interference (glitch) counter and model-finder.

If you connect blink-mc directly to the battery via a Y-lead (no receiver signal), both functions are disabled.

When you switch on the receiver the glitch counter measures the pulse width of the associated servo output. From this point on if the blink-mc encounters lower values or isolated



higher values. It counts each occurrence as interference (of course, the glitch counter's interrogation process is not interference, and is therefore not counted). For this reason the associated channel must only be varied at the transmitter for the purpose of switching on the buzzer and/or interrogating the system preferably by means of a toggle switch.

PCM receivers: If the PCM receiver is set to enter Hold-Mode when interference occurs, the glitch counter will not recognise the interference because the receiver itself eliminates any change in the output signal. For this reason please configure the system for fail-safe operation in such a way that the PCM receiver produces very short signals at the channel to which the blinki-mc is connected. For normal flying set the pulse width of the channel to neutral, because you will need the longer signals to interrogate the glitch counter and switch on the model-finder.

Display: The LED #8 flashes to indicate "glitch counter interrogation" mode. One (or none if no glitches) of the remaining 7 LEDs now indicates the number of occurrences of interference encountered in the flight. The number of glitches is the number in brackets printed on the sticker on the unit. At the same time the sounder beeps to act as a model-finder. If the model-finder sounds continuously after you have switched on the receiver battery and run through the start-up routine, you need to set the channel to which the blinki-mc is connected to a shorter pulse width. If you are using a PCM receiver in a model aircraft we recommend setting a pulse width which corresponds to the servo neutral position.

6 BOARD CONFIGURATION

Blinki-mc is factory calibrated to work with "standard" battery packs, i. e. 500 ... 700 mAh receiver batteries often delivered by the radio manufacturer. If you use high performance sintered cells or use another load, the following explains how blinki's display can be interpreted when using different applications. We have even given the opportunity to match blinki's display to different cell packs and loads.

The micro processor in blinki-mc has been programmed to recognise one of four different "breakpoints" in the behavior of Ni-Cd cells, i.e. the 1 C or 2 C discharge curves for standard and high performance sintered cell packs. "1 C" means discharge of a 500 mAh pack "at Capacity", that means with an average of 500 mA during flight (this is typical for a standard radio with four servos and gives you about one hour flight time). "2 C" means the discharge at twice Capacity (1000mA from 500 mAh cells) or 1/2 hour of flight time.



Caution: blinki-mc is factory calibrated for curve 3 (standard pack, 1 C). This means, that should you instead use a sintered cell pack at 1 C (curve 1) it will be almost empty when yellow LED 3 lights. You can watch out for this or you can change the configuration of the blinki-mc.

Checking and changing the configuration:

For most applications changing will not be necessary. If desired and you do not feel comfortable working on this micro electronics, send blinki-mc back to the manufacturer's service.

If LED 4 or 5 lights (about half capacity) after flight and you have well more than half of the capacity left over in the pack, you can re-configure the blinki-mc for a lower curve = higher curve number. If remaining capacity is much less than half capacity, then you can re-configure the blinki-mc to a higher curve = lower curve number. Check the configuration in a second way: Charge an empty pack with about 12 % of its capacity and discharge it with your servos in use (on the ground). After a short time the red LED will light.

How to do configuration: Carefully cut away the shrink tubing at the solder patches (without damaging SMD-parts or the PCB). Connect the proper patches with a small amount of solder (see photos below). Repace heat shrink tubing.

7 LEGAL MATTERS

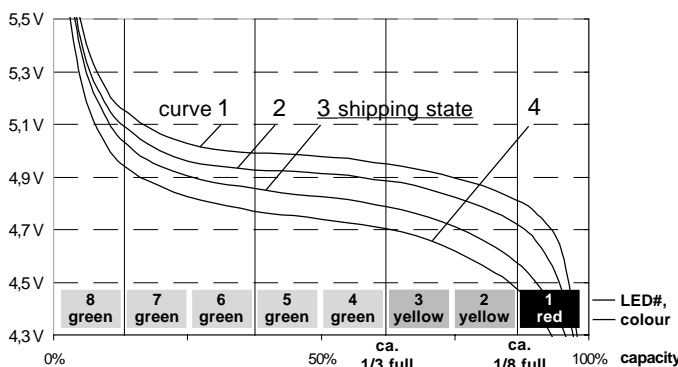
CE certification: The products described in this manual are manufactured in accordance with all specific and mandatory European CE guidelines.

Liability limits: We at Schulze Elektronik GmbH are unable to monitor methods of installation and operation, and have no control over how you fit, use and maintain the devices we produce. For this reason we accept no liability for loss, damage or costs which arise from the incorrect or incompetent use of our products, or are connected with that use in any way.

8 TECHNICAL DATA

Weight:	~ 7,5 g
Dimensions incl. buzzer:	~ 43 x 16 x 12 mm
No-load current drain:	~ 3 mA
Current per LED:	additional 10 mA
Current buzzer:	additional 35 mA
Mean value assessment:	8 volt. values within 1 sec
Glitch detection:	measured pulse widths > +- 80 µs
Glitch counter interrogation:	pulse width > 1,75 ms
Model-finder activation:	pulse width > 1,75 ms

Used 4 discharge voltage curves (4-cell battery pack)



Left: shipping state curve 3

Strap / mark:
open / white
closed / black

Curve 1	Curve 2	Curve 3	Curve 4
Pure sintered cell at 1 C	Pure sintered cell at 2 C	Standard-cell at 1 C	Standard-cell at 2 C
typical e. g. Sanyo scR-type 500AR, 1100SCR, 2000RC		e. g. Panasonic / Sanyo P-170SCR / KR-1700SCE	