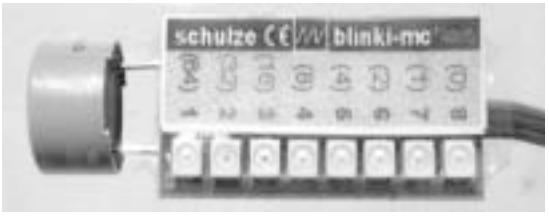


1 HIGHLIGHTS

blinki-mc3 is a new on-board monitor for your receiver voltage, utilizing the latest micro-processor technology.

blinki-mc3 can be configured to special types of batteries and discharge load currents for a precise display of the receiver voltage in your special case.

blinki-mc3 is connected to an unused receiver output or via a Y-lead (no receiver signal) directly to the battery.

blinki-mc3 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-buzzer of the **blinki-mc3** informs you when the battery reaches a critical state or the receiver signal is lost.

• The buildt-in piezo-buzzer can be used as a model-finder, i.e. helps you to laocate 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 via auxiliary channel.

• 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 **blinki-mc3** to work. Always keep these operating instructions handy with blinki.

• Use **blinki-mc3** only if the receiver is powered with a seperate receiver battery pack. If the receiver is powered with BEC in electric models, then the battery monitoring function of the **blinki-mc3** is inoperative.

• **blinki-mc3** is exclusively for use in battery powered RC models. All other usage is prohibited.

• **blinki-mc3** will operate correctly under the conditions described herein; any unothorised modifications made by user void both blinki's usefulness as well as its warranty.

• **blinki-mc3** 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 **blinki-mc3** 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 **blinki-mc3** 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 the pot and/or the two solder patches (see configuration).

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

3 MOUNTING

The **blinki-mc3** 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.
Caution: if the **blinki-mc3** detects fewer cells than your pack contains, take extreme care: in spite of the "green light" your battery is already flat or faulty.

If the unit detects too many cells (e.g. immediately after the battery has been charged) remove a little energy from the battery by operating all the servos simultaneously for a few seconds, then switch the receiver off briefly and on again.

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 **blinki-mc3** are not erased until you switch off the power supply.

5 GLITCH COUNTER AND MODEL FINDER

If **blinki-mc3** 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 **blinki-mc3** 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 **blinki-mc3** 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 and minimum hold-time at the channel to which the **blinki-mc3** 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-mc3** 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 CONFIGURATION

The voltage display of the **blinki-mc3** is set to an average discharge curve (for 1 C), i.e. the mean between the two curves 1 and 3 shown below. However, the discharge voltage curve of batteries varies according to cell type and load (internal resistance). Since the purpose of the **blinki-mc3** is to calculate and display the battery's capacity from its voltage, we have included in it a method of adjusting the display to suit different battery types. In most cases the **blinki-mc3** gives good results provided that the voltage is displayed correctly over the range LED 7 (yellow) and 8 (red). The **blinki-mc3** recognises the essential voltage discharge curves of the two generally used types of battery - pure sintered cells and hybrid cells - and their voltage curve at a discharge current of 1C. A current of 1C flows when a 500 mAh cell is discharged with a load of 500 mA, at which rate the battery is discharged after one hour. At a load of "twice the capacity" (2 C with a 500 mAh battery = 1 A; with a 2000 mAh battery = 4 A), the battery is discharged after just half an hour. At 0.5 C the battery will last 2 hours.

Checking and altering the configuration: for most applications no changes need to be made.

If you find it absolutely essential to alter the setting, the simplest adjustment is usually sufficient: rotating the trim potentiometer (trim pot) to adjust the LED display using the load current typical for your application. Rotating the pot to the left offsets the display for a lower load (below 1 C); rotating it to the right offsets it for a higher load.

You can check the function of the red LED as follows: charge about 12% of the full capacity into a discharged battery pack, and then discharge it while you operate the servos in the model (model on the ground). After a short period (about 60 seconds) the red LED should light up and glow continuously.

If this is not the case, use this procedure: carefully cut through the heat-shrink sleeve over the pot using a scalpel blade, taking care not to damage the circuit board or the components. Now rotate the pot slowly until the red LED just lights up. Seal the hole in the heat-shrink sleeve with a little adhesive tape. You may now find that the unit warns you of a flat battery prematurely in practical flying conditions, due to the increased load caused by the servos in your model. If so you can correct the display simply by adjusting the pot slightly as described above. Once you have found the correct setting it makes sense to fix the pot with a drop of contact cement.

If you wish to set up the capacity display even more accurately to suit the batteries you use, this is possible by means of the two pairs of solder pads located immediately to the right of the trim pot. Bridging (soldering across) the right-hand pair of pads sets the **blinki-mc3** to the typical discharge curve of sintered cells; bridging the left-hand pair of pads sets it to the typical discharge curve of hybrid cells. You can check whether this adjustment is necessary by connecting the unit to a half-full battery; it should show the battery state as LED 4, 5 or 6. You only need to make a change if this is not the case. Note that you must re-adjust the trim pot if you bridge the contacts.

7 LEGAL MATTERS

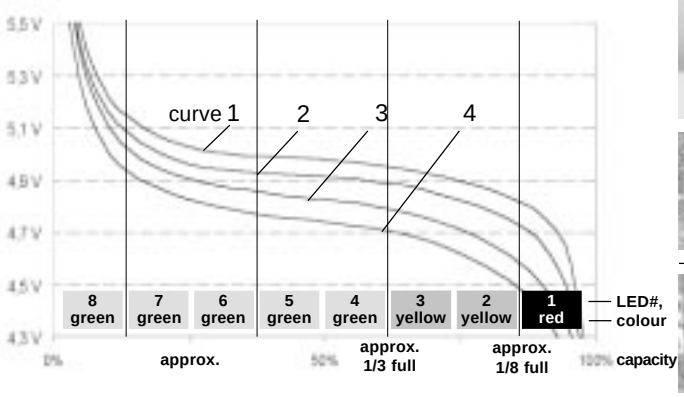
CE certification: The products described in this manual are manufactured in accordance with all specific and mandatory European CE guidelines.

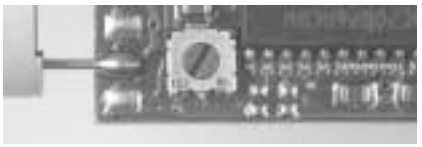
Liability limits: We at Schulze Elektronik GmbH are unable to monitor methods of installation and operation, and have no control over how you fit, use and maintain the devices we produce. For this reason we accept no liability for loss, damage or costs which arise from the incorrect or incompetent use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

8 TECHNICAL DATA

Range of Ni-Cd-:	4...6 cells
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
Buzzer warning (LED 2 or 1 is continously on):	1x / 2x in 2 sec
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 discharge voltage curves (4-cell battery pack)





Left: shipping state

Strap / mark:
open / white
closed / black

Curve 1 (Pot centered)**:** Pure sintered cell at 1 C
Curve 2 (Pot turned right a litte bit): 2 C
Typical e. g. Sanyo scR-Typen
500AR, 1100SCR, 2000RC

Curve 3 (Pot centered)**:** Standard cell at 1 C
Curve 4 (Pot turned right a litte bit): 2 C
Typical e. g. Panasonic P-170SCR
or Sanyo KR-1700SCE