

# Volt Logger

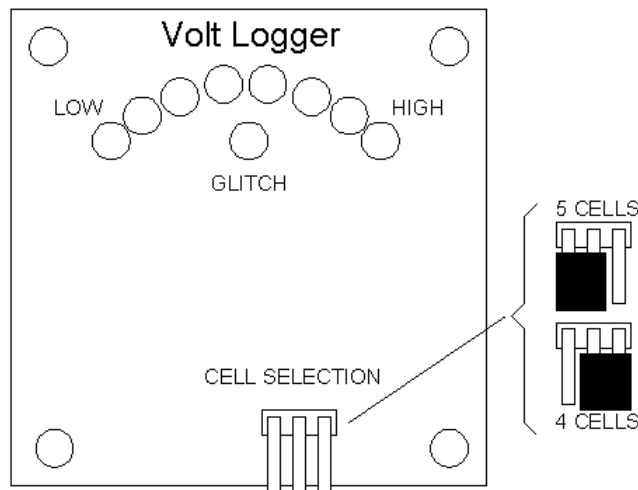
The Volt Logger is an accessory for monitoring the performance of the receiving end of a radio controlled model. The Volt Logger plugs into a receiver channel and combines three functions into one compact unit by monitoring remaining battery voltage, counting the number of glitches received, and by providing a lost model alarm. The advantage is that battery voltage monitoring and glitch counting is done under dynamic rather than static conditions, and the result is logged on the display for viewing upon model retrieval.

The Volt Logger monitors battery capacity by measuring battery voltage and displaying the result on a colour coded eight LED bar graph display. The five Green and two Yellow LED's indicate remaining voltage from 0 to 100 %. The Red LED indicates a voltage below the 0% remaining capacity level has been measured and the battery pack should be recharged. The peizo sounder is also activated to give an audible warning of a flat battery. As the battery voltage discharge characteristic is non-linear, a conversion function is employed to show remaining voltage as a linear display. During use, the lowest voltage measured is logged while the current voltage is displayed, and two LED's will be glowing. Battery voltage usage should be checked before the receiver is switched off, as this clears the memory. Provision has been made for jumper selection to suit four or five cell battery packs.

Logging of the lowest voltage measured, and the linear display, makes it possible to estimate remaining battery charge. An example is where a battery pack gives approximately sixty minutes use before being deemed as discharged, and the Volt Logger shows a logged value in the centre of the display. Therefore, approximately thirty minutes of use can be expected before the pack needs recharging.

The number of glitches received since switch-on is displayed on an orange LED as a sequence of flashes separated by a pause. This gives an indication of the number of times radio contact has been lost, or interference has caused distortion of the servo control signal. This is useful for resolving interference problems from sources such as spark ignition motors, electric motors, and metal to metal contact. It can also show a loss of receiver sensitivity due to accident damage.

The lost model alarm becomes operative about one second after the last valid servo control pulse has been received. Therefore, by switching the transmitter off, the lost model alarm is activated and the source of the sound can be tracked.



Shown above is the layout of the printed circuit board for the Volt Logger. Selection for use with four or five cell battery packs is accomplished by placing the supplied header on the appropriate pins.

## *Specifications*

Size 42 x 40 x 10 mm

Battery capacity remaining display on five Green, two Yellow, and one Red LED

Accepts four or five cell packs\* via jumper selection

Current consumption less than 30mA (lost model alarm off)

Reverse polarity protection

Valid servo pulse width 0.8 to 2.2 milliseconds, 22 milliseconds maximum frame time, Positive\* pulse

Glitch Counter display on Orange LED, counts up to 255 glitches

Lost model and low voltage alarm via peizo sounder

\* Other combinations available upon request. Contact the distributor for advice.

### *Interpretation of the Battery Capacity Display*

Observation of the Volt Logger display over time will enable the user to quickly identify emerging problems in their radio control equipment. Below are common situations and probable causes.

Low voltage logged as Red while current voltage is showing top Green, or large drop during servo movement, followed by recovery.

- Large voltage drop caused by:
  - Excessive wiring resistance through excessive length from battery to receiver
  - Excessive connector or switch resistance caused by dirt or corrosion
  - Corroded wiring(black wire syndrome)
- Large current draw caused by:
  - High load on servo, or servo underrated for application
  - Stalled servo due to a mechanical stop
  - Mechanical binding in pushrod
  - Faulty servo
- High battery pack internal resistance
  - Battery pack needs cycling or replacement
- Short time between recharging
  - See above Large current draw and High battery pack internal resistance
  - Insufficient battery capacity for the application
- Erratic Volt Logger operation
  - See above Large voltage drop, Large current draw, and High battery pack internal resistance
  - Low battery pack voltage from one or more cells zero volts, shorted, or reverse polarity

### *Interpretation of the Glitch Display*

There are no definite rules for the glitch display, however, up to three glitches per use is probably acceptable performance. Eight to ten glitches, and above, probably constitute unacceptable performance and the cause of the problem should be investigated and rectified.

### *Installation*

Install the printed circuit board in the model where the LED display can be easily viewed from the outside. An ideal set up would be in a windowed cockpit away from direct sunlight. An alternative is a small slot in the side of the model, covered by clear film. Install the printed circuit board securely, taking care not to short circuit any of the tracks on the printed circuit board. Mount the lost model alarm sounder in a convenient location.