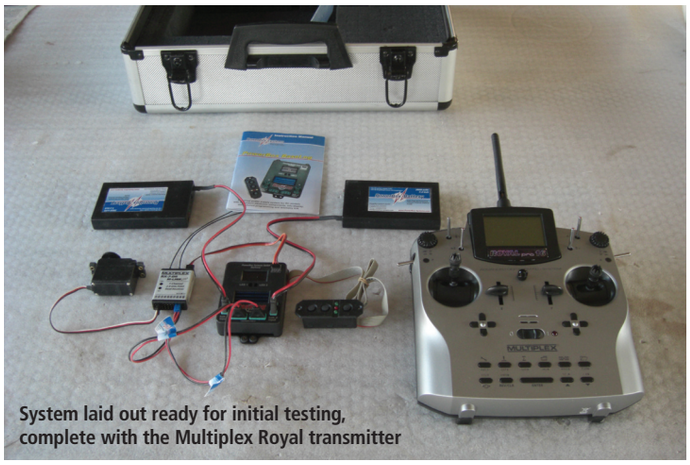
System laid out ready for initial testing, complete with the Multiplex Royal transmitter

The clean design and manufacturing quality of the PowerBox Baselog

Powerbox Baselog

Colin Straus describes and tests this latest telemetry system

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Uses and Compatibility

With the increased sophistication of the latest 2.4 GHz radio systems has come many new possibilities, which were previously either not technically possible, or at best complicated and expensive, one of these being real time telemetry, giving information of what is happening to/within the model whilst it is flying.

Back in 2003 the Jetcat telemetry system was fitted to the large C-17 model I built, and this operated exceptionally well, however it was quite a large and heavy on-board unit, and required a laptop computer on the ground to display the data. It was also relatively expensive, and was biased more towards feedback from and about the turbine/s, although airspeed information about the model was also available.

One extremely useful function that was not available at that time was any data on the battery state of the on-board radio, and this is where the new PowerBox Baselog scores, as it combines an effective battery backer system with a telemetry system, this being fully compatible with both Multiplex and Spektrum bi-directional 2.4 GHz radio systems.

The battery backer side of the system offers the ability to pass a continuous 10 Amps through each of the two independent circuits, with 20 Amps peak per side, so the Baselog is ideal for models where the continuous servo currents are not too great, and which can be provided via the receiver connections, so many mid range jets would be perfectly suited, the models above this being better off with the more sophisticated PowerBox units offering servo supply indirect from the receiver/s.

Normally the limitation in a typical receiver as far as current is concerned is the pin connections, so with all the power having to go through a single lead into the receiver there is a natural current restriction, which means that a model which is utilising large numbers of very powerful servos may exceed this restriction when performing certain manoeuvres, the answer to this being to have the servos fed power indirectly, not through the receiver.

Input power to the Baselog can be 6.0 V (5-cell) Nickel Cadmium or Nickel Metal Hydride packs, 6.6 V (2-cell) Lithium Phosphate or 7.4 V (2-cell) Lithium Polymer packs. The regulated output voltage is user selected as either 5.9 V or 7.4 V, although of course the 7.4 V output is only possible if 7.4 V Lithium Polymer packs are being used.

Connectivity

Testing was carried out using a Multiplex Royal Pro 16 transmitter together with a RX-7-DR M-Link receiver, as this system offers the telemetry downlink function compatible with the Baselog – note that Spektrum Bi-Directional systems are also catered for, with a separate connection to the Baselog.

Connecting the Baselog to the receiver is simple and requires only a single lead between the two, otherwise the connections are as standard for a battery backer, with heavy duty Multiplex connections for both battery in and power out, these leads terminating in standard JR type plugs to suit most modern receivers. If a single receiver is being used then both leads must be connected to the receiver, either directly or via a 'Y' lead for the second power lead I if all the receiver sockets are being used for servos.

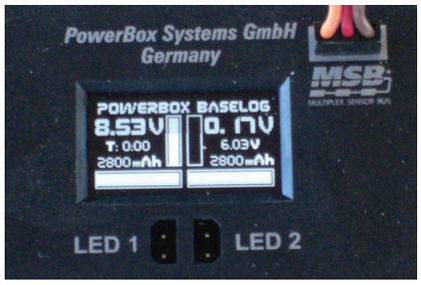
This has the benefit of splitting the current demands of the receiver through two sets of pin connections, effectively doubling the current available to the servos, as long as both batteries are functioning normally. If twin receivers are being used then each receiver will have one power lead connected – in this case I would recommend the use of another PowerBox product, the RRS (Redundant Receiver System) Module, which together with the Baselog gives full redundancy, and means that the model being flown will be protected against any single battery or receiver failure.

Operating the Baselog

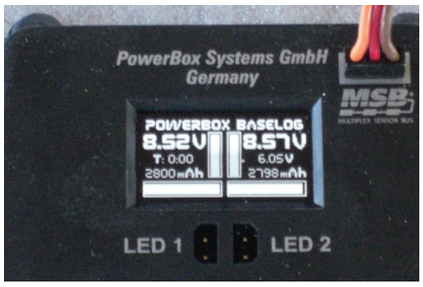
To switch the system on/off a standard SensorSwitch is supplied with the Baselog, offering the security of twin failsafe electronic switches, as well as a simple method of programming the operating parameters of the Baselog unit, the three buttons of the switch being used to scroll through the menus and to select the required option/s.

As is common with many other PowerBox battery systems, the Baselog comes complete with two small LED's on leads, with BEC type connectors, which plug into the Baselog itself.

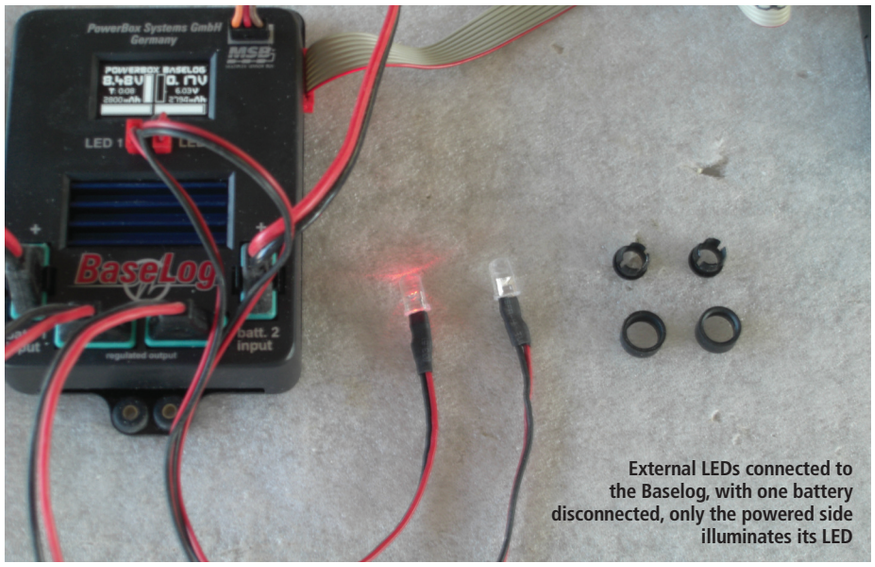
SensorSwitch comes with the Baselog, being a very effective failsafe electronic twin switch



Disconnecting one battery pack results in the voltage display on this side of the backer dropping towards zero



Main display screen of the Baselog showing the voltage and remaining capacity of both battery packs, as well as operating time and output voltage



External LEDs connected to the Baselog, with one battery disconnected, only the powered side illuminates its LED

Transmitter screen, showing the regulated output voltage and that the Link Quality Indicator (LQI) is at 100%

The voltage of both receiver batteries is clearly shown on this transmitter screenshot

Capacity remaining screen shown shortly after a reset to 2800 mAh, where one battery has supplied two mAh only

One receiver battery has been unplugged to simulate a failure, so the voltage display shows it at zero – there is also an audible warning via the transmitter

These can be fitted through the fuselage side of the model, or within the cockpit where they can easily be seen, and will provide an alternative early warning of a problem with one of the battery packs.

The Baselog utilises an OLED screen of 128 x 64 pixels in size, which is at least for me, the first time I have seen this used on a model product. It is certainly a big improvement on the older design of displays, with exceptionally clear and crisp characters, and as such is even easier to read than older units. The information available is comprehensive, and includes the following:

- Battery voltage display for each battery pack
- Minimum value memory display
- Remaining capacity display
- Output voltage to receiver/s display
- Operating time since last reset display

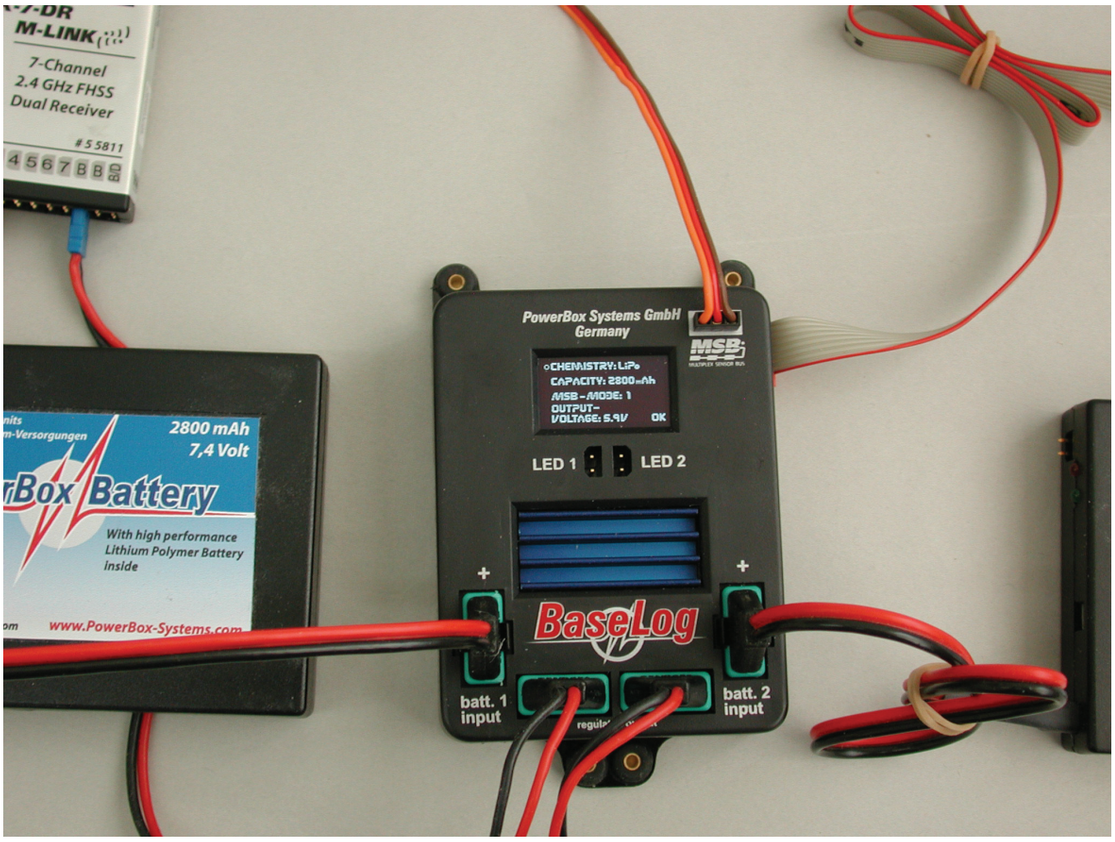
Switching the system on brings up an initial PowerBox logo on the OLED screen for a couple of seconds, this then switching to the main display, which shows the actual voltage of each of the battery packs, the regulated output voltage, the remaining capacity of each of the battery packs, and the operating time since the unit was last reset.

Interestingly, the voltage and remaining capacity are shown both as characters and in a visual format, which makes it very easy to spot a problem such as a low voltage or nearly flat battery pack.

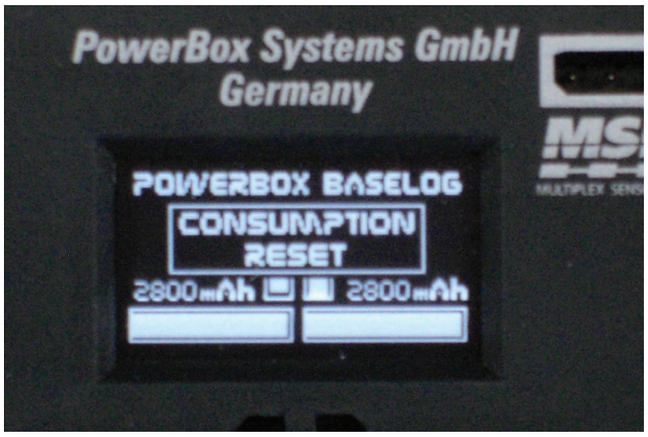
Downlink

Programming the Baselog is very simple, holding one of the SensorSwitch buttons depressed for several seconds to enter, then using the other two buttons to scroll though the various options. If the remaining capacity readout is to be useful it is important to both set the capacity of the batteries being used into the

RIGHT: Baselog connections – note the PowerBox LiPo packs being used



BELOW: Consumption reset screen – this should be carried out every time that the battery packs are charged, simply done by depressing two of the SensorSwitch buttons for a few seconds



ABOVE: Set-up screen gives options of battery chemistry, capacity, downlink mode and output voltage

programme, and then to use the reset function after the each full charge of the batteries – this allows a starting default of full capacity and the remaining capacity then reduces as the receiver and servos consume power.

The downlink function worked perfectly, with full data being displayed on the transmitter screen, it being a very simple job to scroll through the data available, this being battery voltage for each pack, regulated output voltage and remaining battery capacity for each pack. I simulated a complete open circuit failure of one battery pack by disconnecting this whilst the system was switched on, and there was an immediate audible warning through the transmitter as well as the voltage display for this battery dropping to zero volts.

Conclusions

Once again I have to declare myself very impressed with another new PowerBox product. The Baselog is a very effective battery backer, but it is the addition of the downlink data that really sets it apart, offering a real improvement in safety due to the immediate warning of an imminent or actual battery failure, allowing the pilot to carry out an emergency landing in this event, with the model remaining fully flyable on the second battery.

I am sure that it will also be very useful to illustrate the manoeuvres that load the servos most, as this can clearly be seen by the momentary drop in battery voltage/s as the loads occur – this being an interesting topic in itself.

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Baselog Specifications:

Operating Voltage:	4.0 to 9.0 Volts
Usable Batteries:	Li-Po 7.4 V; Li-Fe 6.6 V; Ni-Cad/NiMH 6.0 V
Output voltage:	5.9 V or 7.4 V selectable (7.4 V only with LiPo batteries)
Current Drain:	85 mA (Power On – Baselog only) 10µa (Power Off – Baselog only)
Max Current:	10 Amp continuous on each output, 20 Amp peak
Weight:	88 gram (+15 gram for SensorSwitch)
Size:	93 x 67 x 19 mm