E30 Motor Run Switching – an Electronic Solution

The revision of the E30 contest class rules to incorporate a 60 second maximum motor run has, for the first time, imposed upon the flyer the need to provide some form of in-flight switching of the power supply to the motor. Whereas, to date it has been sufficient to fully charge a set of nicad batteries, switch them on at launch, and allow them to run until they have run out of charge, the battery will in future, have to be switched off at the end of the timed run.

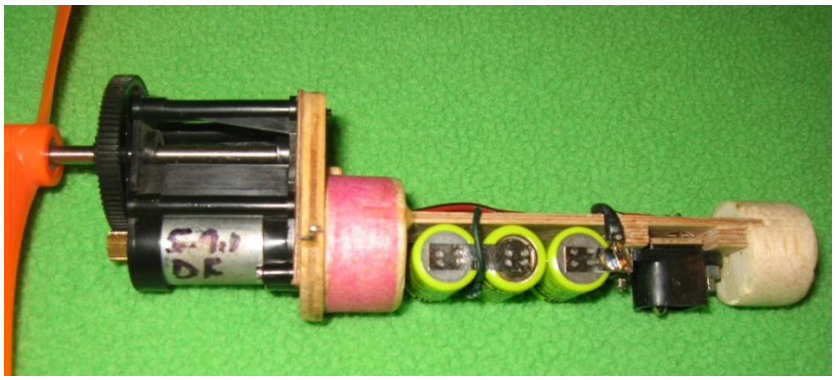
Switching of the motor will require a certain amount of ingenuity on the part of the builder but is not as complicated as it may at first seem. Inclusion of a microswitch, driven by a Tomy timer is a fairly simple solution. Indeed, given that most E30 flyers will use a Tomy driven device to provide the dethermaliser function, it is quite possible to use that same device to drive the microswitch.

However, there are also readily available, electronic solutions to solve the problems, which have come about as a means of flight control in the increasingly popular world of indoor electric free flight. Whilst at first glance, this may seem to be a more complicated method of control, in practice it can actually turn out to be somewhat simpler from the installation point of view with a central circuit board having a pair of wires going to the motor and a second pair going to the battery, and that's it! The start switch is on the board so provided that it can be accessed easily to start the flight as that lovely bit of lift comes through (or more often, that momentary lull amid the day of 15mph winds) then we're away!

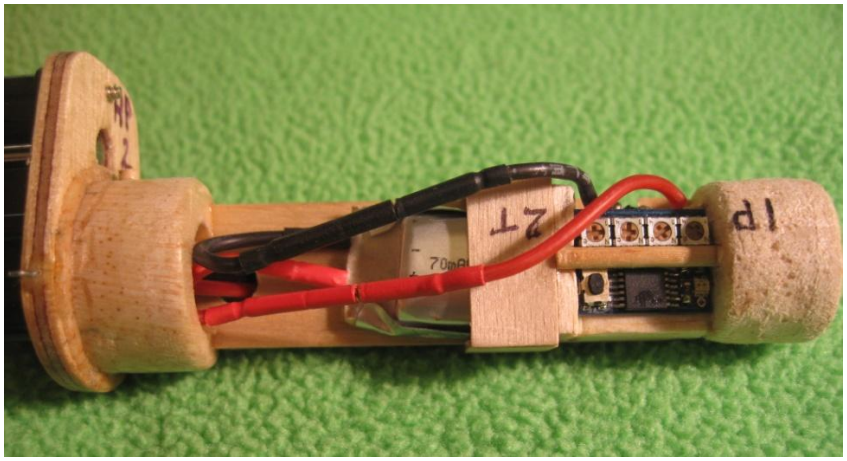
A proven control board is the "Zombie Flight Profiler" which is available for £24.95 from the Atomic Workshop (www.atomicworkshop.co.uk).It has two, user adjustable power/time phases with a 4amp speed controller for directly driving a small brushed motor of the size that most existing E30 flyers are using. Press the on-board start button and the motor quickly ramps up to full speed and into the first phase, then on into the second phase and finally to switch off.

Each phase can be set from 0-65 secs and from zero-full speed so we can easily get a 60 sec, full speed run. It'll run from up to 2 Lipo or 5 nicads cells so either of the class' mandated battery packs will work with it. Adjustment of phase power and time utilises four on-board trim pots and tests have demonstrated that the repeatablilty of the time of the phases is excellent. There are other adjustments available for the ramp up and ramp down periods, the start delay (E30 flyers will probably want all of these set to a minimum) and the type and number of cells and this is achieved with the on-board start button by entering a set-up mode. And best of all, the unit weighs just 1.25g and measures little more than half an inch square.

The next two pictures give before and after shots of the power pod of a contest proven E30. The first shows the pod with its 3 cell nicad pack permanently connected on board – in this form it has been used in the model until now with the unrestricted motor run rule in effect. Once placed in the model, the pack is charged up via the socket with its built-in switch and when ready to fly, the charging lead is unplugged, starting the motor, and the model launched with prop running until the power runs out.



The second picture (below) shows the version for 2011 with a Zombie Flight Profiler controlling a single, 70mAh Lipo on plugs and sockets to drive the motor. Place the pod in the model, and when ready to launch, press the on-board start button via a suitable prong through an appropriately positioned hole in the side of the fuselage to start the motor, then launch and the motor runs until the Zombie switches it off. Note that the battery could just as easily have been a nicad pack which would have avoided the need to add lead to the pod to bring it up to the weight of the previous version and avoid altering the trim or dropping below the 100g minimum class weight.



As supplied, the Zombie comes with 6 wires soldered to the back of the board, 2 for the motor, 2 for the battery and 2 for a connection to a suitable battery charger. These wires are quite thin and in practice it has been found easiest to disconnect all of these from their solder pads and re-connect heavier duty wires (0.25mm^2 silicon insulated cable from Robotbirds - www.robotbirds.com) for the motor and battery whilst ignoring the charger connections, charging being carried out with the battery out of the model. The battery is then connected via 0.8mm gold plated plugs and sockets (with heatshrink sleeve applied to prevent accidental shorting - all available from Robotbirds)

allowing it to be easily replaced with a freshly charged battery for each flight. This removal of the battery is particularly important if using a Lipo cell as there is still a slight draw of current by the Zombieeven when the unit is not running the motor, and if left permanently connected, the battery will be fully discharged in a few days. Lipos do not take kindly to being fully discharged and if they reach this condition they will probably not be able to accept a full charge again. However if the flyer is continuing to use nicad packs then this is not a problem.

Attaching the Zombie to the power pod has proven to be a very convenient arrangement for mounting but other flyers may find it just as easy to go for a permanent fixing within some other area of the fuselage. In practice it is down to the ingenuity of the builder to decide what suits him or her best.

There are other ready built, electronic controllers available that would also do the job perfectly adequately for the needs of E30 flyers. However, for someone wishing to fly the class in 2011, the information presented above describes a solution that has been proven in an E30 model in the air using components that are readily available in the UK and therefore offer a good starting point for someone wishing to go down the electronic switching route.