

*Article from Sticks & Tissue 112 (March 2016) reproduced with the kind permission of James Parry (S&T) and Mike Edwards (the author). Mike described the prototype supplied for evaluation as a “dual function” timer – but now in production form it is known as the E-Zee ICFF1*

## **Dual Function E-Zee Timer for i/c powered Free Flight**

**Submission by Mike Edwards ([mike.edwards@adville.ltd.uk](mailto:mike.edwards@adville.ltd.uk))**

Back in October 2015 I was considering building a free flight Junior 60, to home my newly acquired ED Comp Special. I wanted to incorporate a timer to reliably cut the engine, so that I could avoid my normal method of guessing the amount of fuel in the tank at the time of release (I have been known to be a poor judge at times!). I wanted to utilise the original tank and cut off mechanism on the Comp Special.

I was looking into using a mechanical timer to release a sprung line to pull the cut off, when my father showed me an E-Zee DT Timer he had bought from Den's Models ([www.densmodelsupplies.co.uk](http://www.densmodelsupplies.co.uk)). The electronic timer unit was an appealing solution for the fuel cut off timer, as it provided a simple mechanical element using a servo to pull the fuel cut out. I was planning to use two separate timers one for the engine cut off and one for the DT.

I contacted Den Saxcoburg via email to ask if it is possible to get units with extended LED's and push buttons, so that I could place both timer boards inside the fuselage. Having explained to Den why I wanted the two units he advised me that although at present he did not have a dual function timer he thought he could modify one of the electric free flight units he current sells with an ESC and DT function.

Den kindly went away and with the designer Alan Bond produced a modified unit. He promptly sent me the modified unit which fitted my requirement perfectly.

The modified unit was also supplied with the extended LED and push switches. The timer unit is designed to operate on a supply voltage up to a maximum of 5.5V and so lends itself to operation on a single Lipo cell. I initially trialled the system on the bench using two standard servos purchased from the local model shop. These operated ok, but I was concerned that their recommended operating voltage window of 4.8-6.0V may cause a problem. I looked around for a servo designed to operate off a single cell. After some hunting I found a servo sold by Hobby King, deigned to operate at 3.7V but for simplicity were also supplied with standard JR connectors. When tested on a crude work bench rig up these servos seemed to pull the fuel cut off piston with ease (Once they had arrived on a rather slow boat from somewhere). They also have the added advantage of being slightly lighter than the original ones selected at 5.6g each (servo type: Turnigy™ TGY-D56LV Coreless Low Voltage DS/MG Servo - part number 9399000024-0).

Following an extended build period, (mostly due to my novice status) I have now built the Junior 60 with the Comp Special and prototype two function timer installed. Ground testing was carried out in January 2016 whilst waiting for suitable trimming weather. During the ground testing, the system operated repeatedly without fail. I incorporated the LED, push switch and main on/off switch with a 300mAh Lipo into a compartment at the front of the fuselage, allowing the board to be installed into the cabin area safe from diesel contamination.

The final installed weight of the timer, battery switch and servos was just under 45g. The system is easy to use and quick to reset. It can be adjusted via the single push button for engine runs up to 30 seconds (at 1 second intervals settings) and a maximum DT time of 300 seconds (at 10 second intervals settings). The board also contains a potentiometer which allows the travel on the engine cut servo to be adjusted between 0 to 90 degrees. This feature is especially useful as it allows the system to be setup, such that the servo does not stall by trying to pull beyond the cut out stop point.



*Simple pull rod connects to the original Comp Special Cut off – Note Lego men not necessary for correct operation*



*Timer board mounted inside the fuselage with LED and push switch extended to a plywood panel*

Finally, in mid-March a day of suitable weather allowed me to test the system for real. During an outing at Salisbury plain which was blessed, with almost perfect flying conditions. I managed to complete around a dozen short trimming flights. On all occasions the engine cut off and DT system operated correctly.