Z TRON CL ESC Controller and Timer

Model CLT2, rev 1.0

The CL timer/ESC controller is a small lightweight board (1" x ¾", 2 grams), with the following features,

1. ESC (Electronic Speed Controller) controller and timer for your CL flights to a selected duration from 0.5 minute to 8.0 minutes in 16 steps (see table below). It will work with brushed or brushless ESC motor controllers.
2. Adjustable speed, from full-off to full-on and anywhere in between.
3. Landing Gear servo output for slow realistic motion (active only for selected flight duration 2.5 – 8.0 minutes).
4. In addition to the landing gear, three motor blips warning the pilot about the end of duration can be selected.
5. Soft motor speed ramp up and ramp down to conserve the motor gears and avoid excessive current spikes.

1. Flight duration selection

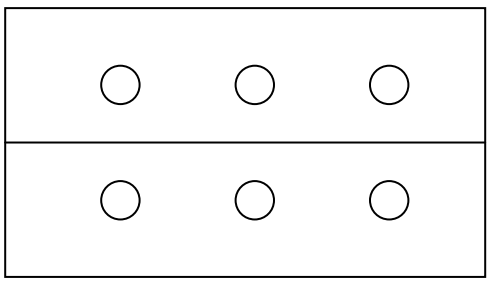
Sw1	Sw2	Sw3	Sw4	Duration (minutes)
OFF	OFF	OFF	OFF	0.5
ON	OFF	OFF	OFF	1.0
OFF	**ON**	OFF	OFF	1.5
ON	**ON**	OFF	OFF	2.0
OFF	OFF	**ON**	OFF	2.5
ON	OFF	**ON**	OFF	3.0
OFF	**ON**	**ON**	OFF	3.5
ON	**ON**	**ON**	OFF	4.0
OFF	OFF	OFF	**ON**	4.5
ON	OFF	OFF	**ON**	5.0
OFF	**ON**	OFF	**ON**	5.5
ON	**ON**	OFF	**ON**	6.0
OFF	OFF	**ON**	**ON**	6.5
ON	OFF	**ON**	**ON**	7.0
OFF	**ON**	**ON**	**ON**	7.5
ON	**ON**	**ON**	**ON**	8.0

Switch 5.
OFF = No motor blips before the end of the time duration.
ON = Three motor blips 15 seconds before the time expiration (get ready for landing).

Switch 6.
OFF = the motor and timing will start as soon as the ESC powers up.
ON = the motor and timing will start 2 minutes after powering up the ESC.

2. The speed is programmed using the small potentiometer, located below the switches. Clock-wise will decrease your speed and counter clock-wise increases the speed. Use a tiny screwdriver to turn the delicate pot.
3. The top 3-pin header connector is for the ESC connection and the bottom (close to the edge of the board) 3-pin header connector is for the Landing Gear servo connection (see diagram below).

GND + Signal



ESC Connector

Landing Gear Connector

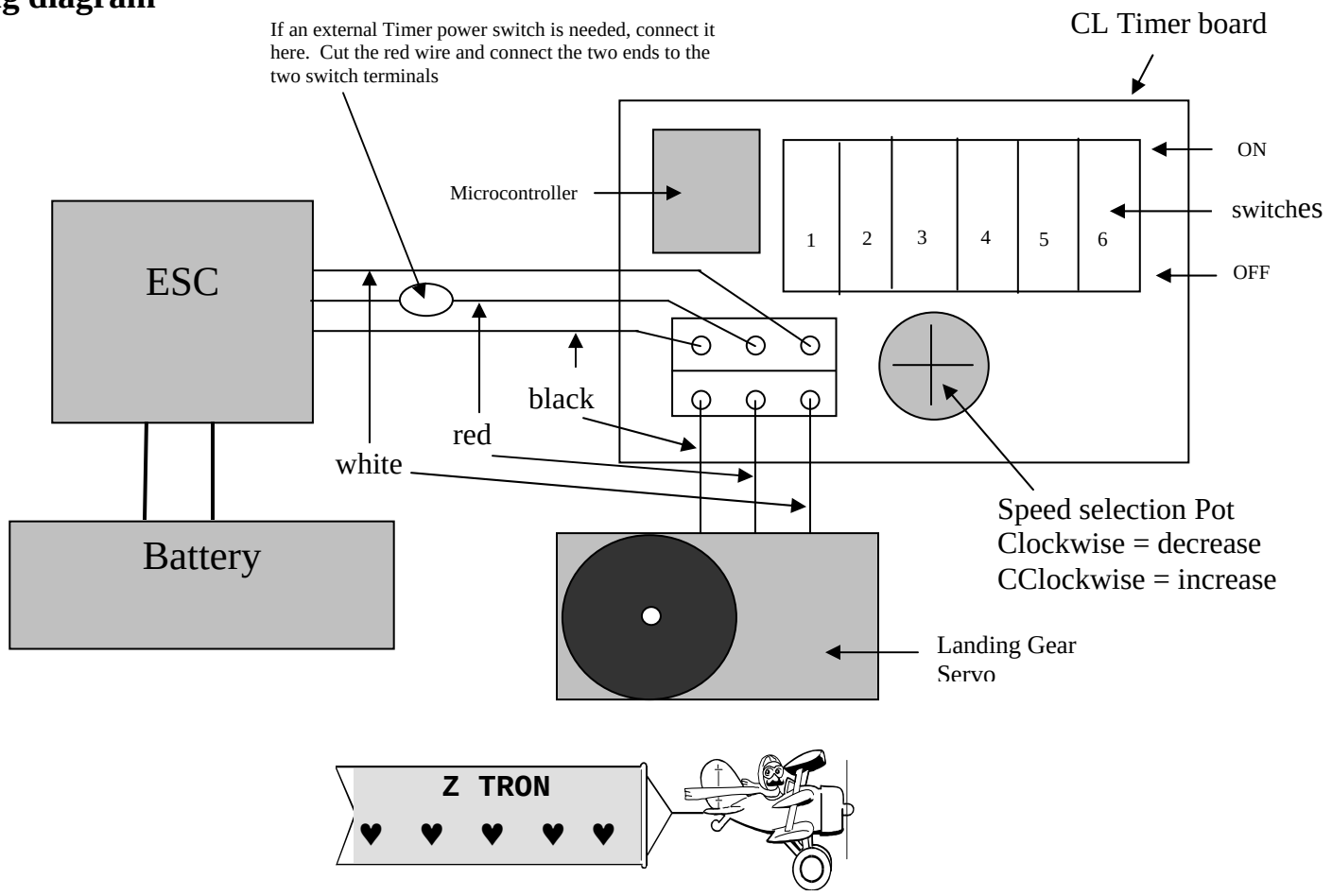
Note: Since the servo connector is on the opposite side of the board, make sure the negative (GND) cable is the one close to the edge of the board

4. Switch #5 is for the 3 motor blips selection at the end of the duration, in preparation for landing.

Setup Instructions

With the power off (battery disconnected), connect the 3 pin ESC cable to the 3 pin ESC Timer connector. Observe the wire colors. Black (negative, close to the edge of the board) on the left, and red (positive) in the middle.
As soon as you power up the system, the Timer will send a full off pulse to the ESC for about 2 seconds. Some ESCs need that in order to operate normally. Now the Timer will ramp up the selected motor speed. The ramping up of the speed decreases the motor/gear stress and avoids a large battery spike that could have otherwise been produced.
The motor will stay at the selected speed for the selected duration. At the end of the duration, the motor speed will ramp down and proceed to a full stop. The Timer continues communication with the ESC to keep full off, till the power is turned off.
If the Landing Gear is connected, the output will retract the gear 50 seconds after the beginning of the time and activate the gear down 15 seconds before the end of the time duration. If the motor 3 blips are selected (sw#5 ON), they will alert the pilot 15 seconds before the end of the time duration.
Switch #6 is for the starting time. If the switch is left OFF, the timer will start timing as soon as you power up. If the switch #6 is ON, the timer will delay the motor and time start by 2 minutes.
If you need to control that time externally, switch #6 will work the same way but the Timer will only be powered when an external switch is turned ON. That external switch will interrupt the + line of the ESC cable to the Timer. This way, the ESC can be turned ON but the motor will not go on till the external switch is turned ON.
Please make sure you disconnect the battery from the system after flying.
For the ESCs that have the little enable switch, make sure you disconnect the battery after the flight because even with the switch off the ESC still draws power for its circuits. This is absolutely critical when you use Lithium Polymer cells that will be destroyed if they are drained below their minimum voltage (about 2.7V per cell).

Wiring diagram



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