

iAccTimer v 2.0

The timer with accelerometer controls ESC and makes time sequences usual for control line models. It also controls motor RPM regarding actual flying parameters. It allows setting delay time, flight time, flight power and strength of active RPM control. Controller is programmable by Jetibox.

The main function is to control ESC so that it makes flying slot after short delay on ground and then stops the motor for landing. The power during this flying time slot is managed by the controller on base of G sensor so that the flying speed is more stable.



Parameters:

- power supply 3V to 5.5V for flying (4.8V to 5.5V for programming)
- all programmable times are controlled on base of the calibrated internal RC oscillator
- pulse width range is 1ms to 2 ms programmed in 200 steps from 0 to 200

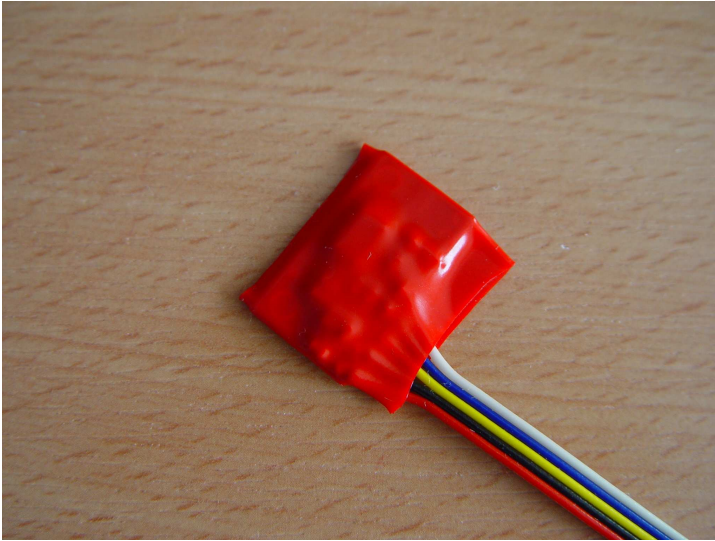
Warning:

Be careful, prop on the motor is danger! Controller and ESC itself can any time start the motor. So be careful anytime the power is connected to the ESC.

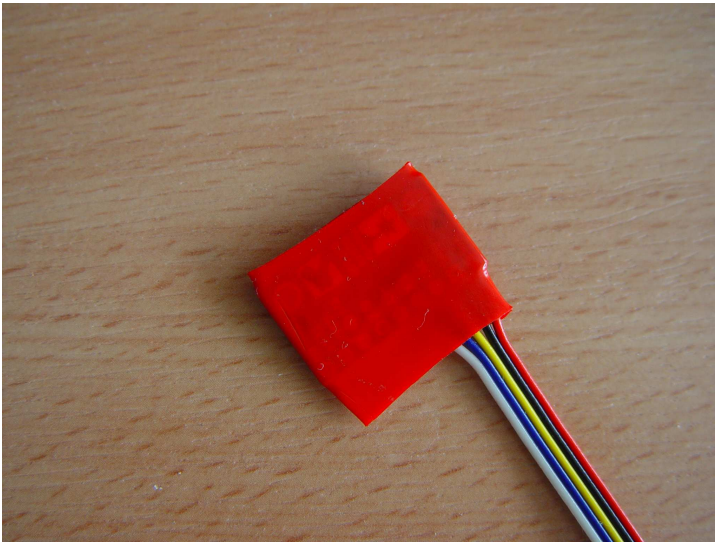
Installation:

Timer consists of two parts, the sensor (red on the first picture) and the controller (yellow on the same picture). The sensor has to be firmly mounted on plane, for example by foam double side mounting tape, so that the flat side of the sensor is oriented UP, wires to front. Be sure, that the flat area of the sensor is parallel to wing area.

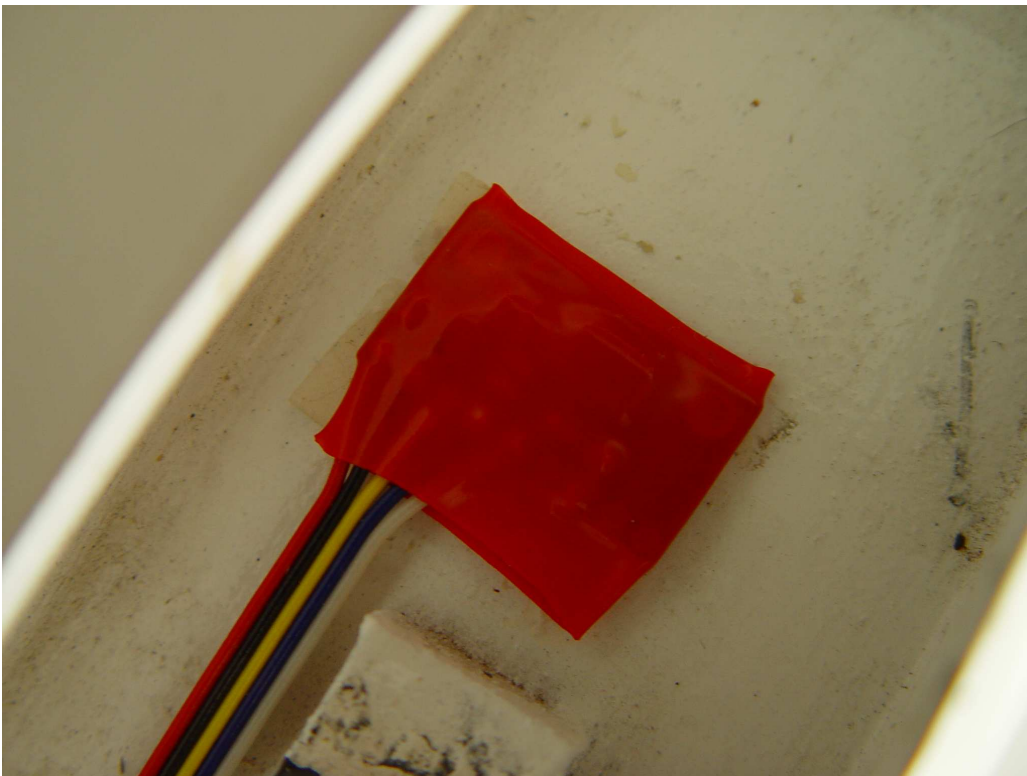
Component side of the sensor: (must be oriented down)



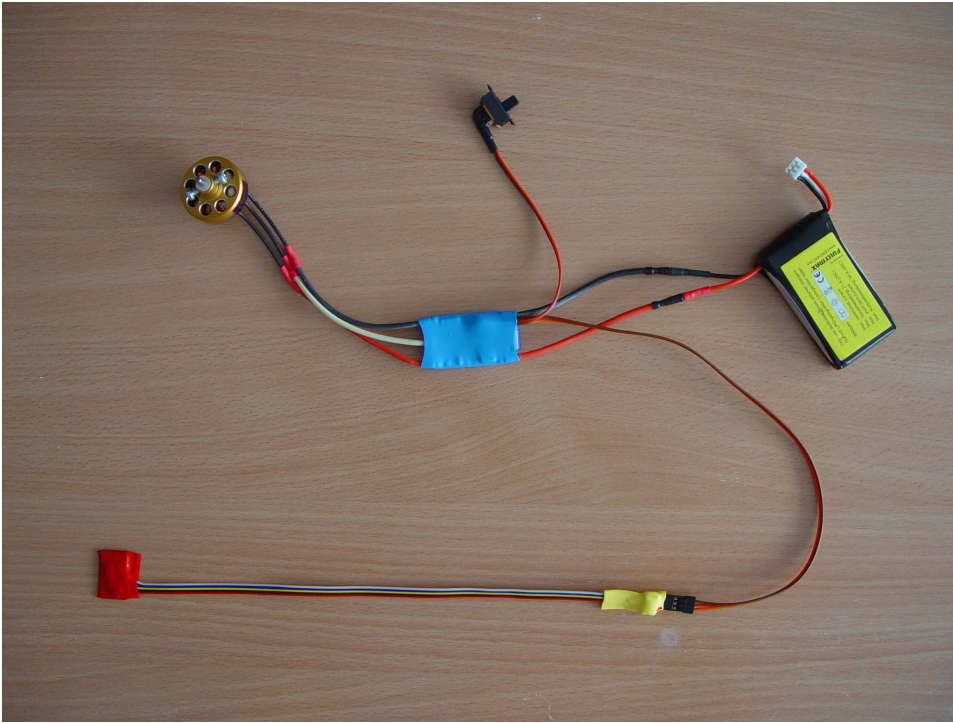
Flat area for mounting tape: (must be oriented up):



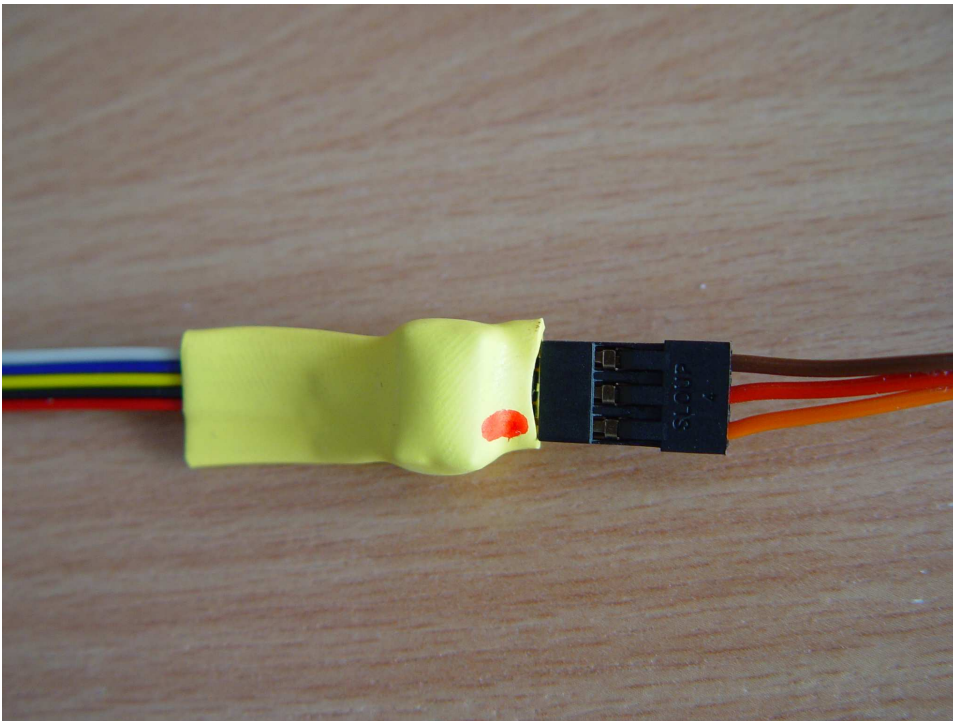
Example of proper installation on the bottom of converted piped airplane in the pipe tunnel:



Electric connection is on following picture:

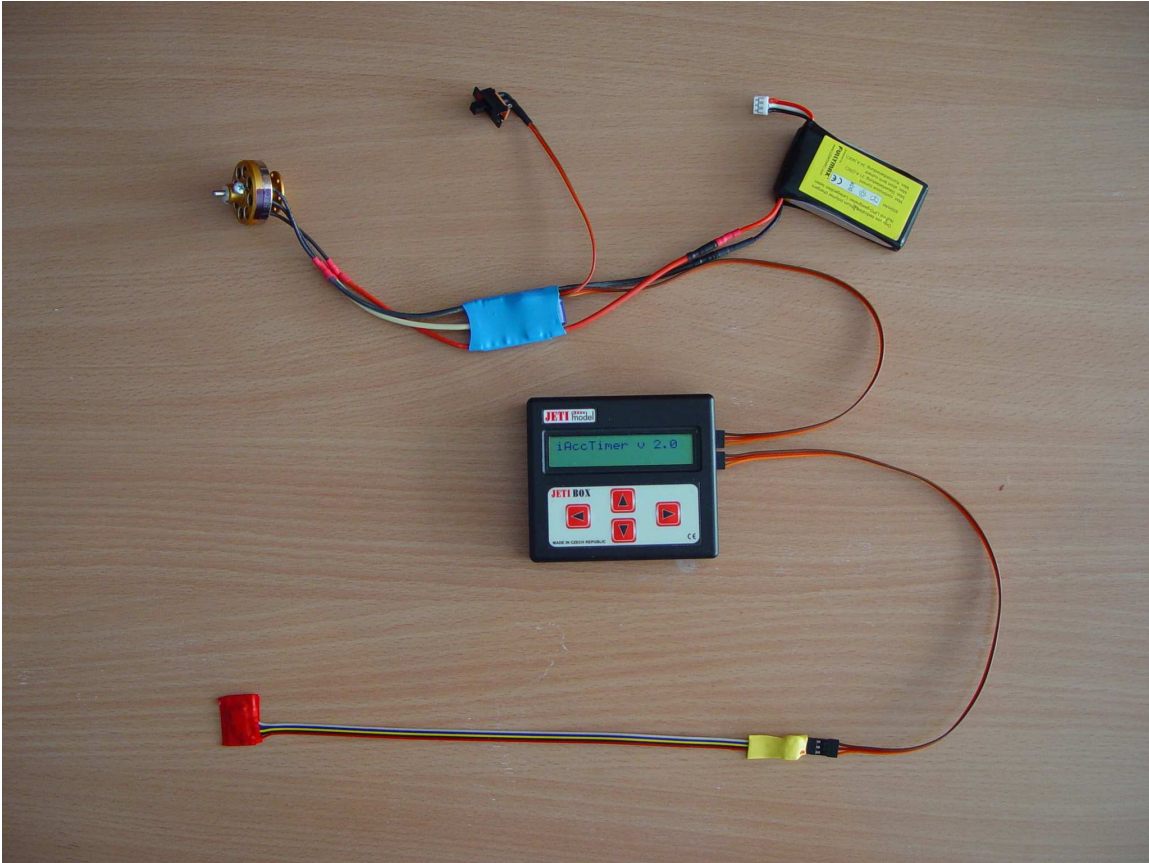


Simply connect the controller to ESC so that the point on controller connector goes to orange signal wire of ESC:



Programming:

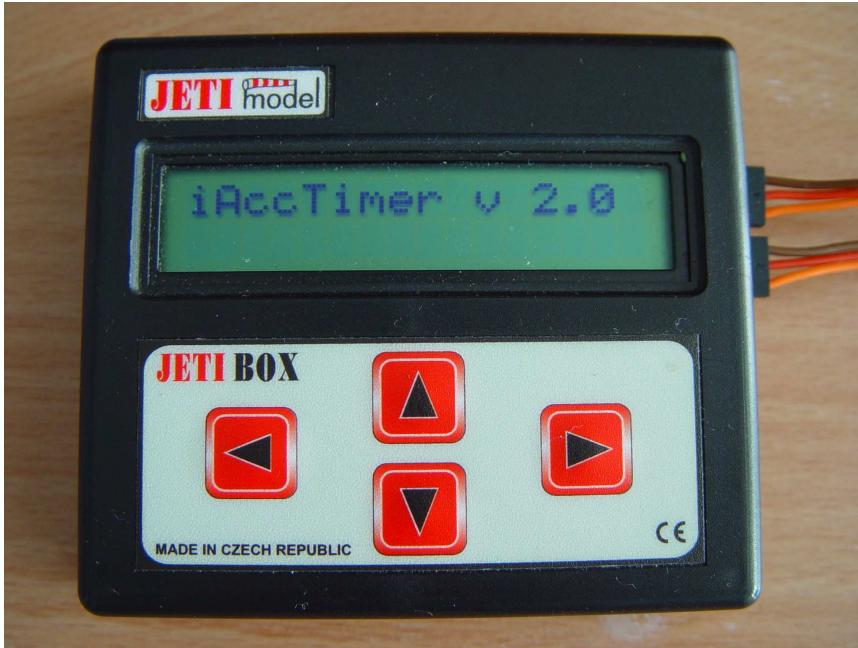
Connect the upper connector of the Jetibox to the 4.8 to 5.5V power supply (the picture shows power supply from the ESC) and connect the controller to the lower connector by the extension cable delivered with Jetibox.



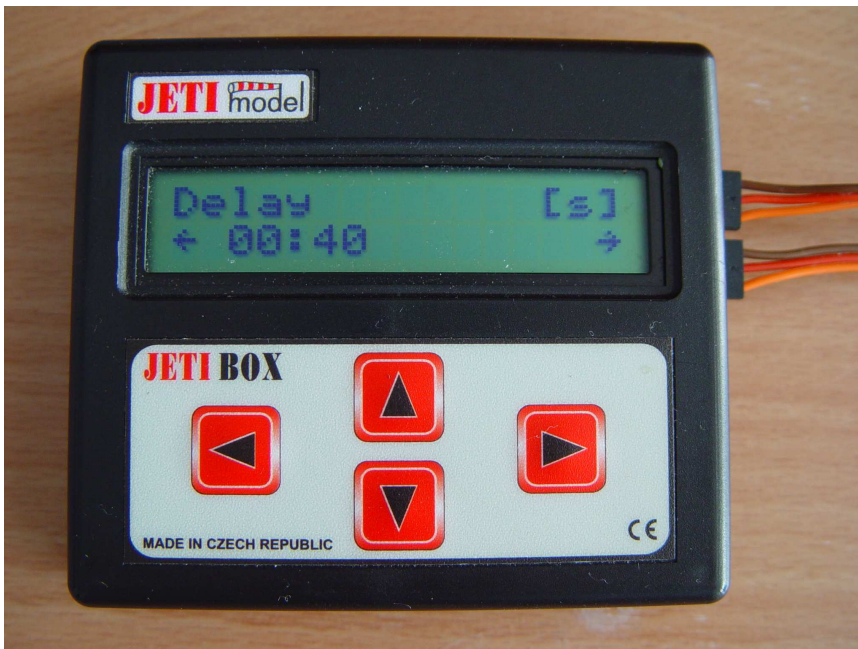
Color dot on the controller marks signal pin, which must be always connected to orange wire of the extension cable like we explained earlier.

Controller has set of 7 parameters adjustable in separate screens. Buttons up and down are for choosing parameters, while right and left are for changing values.

Switch on the controller and you will see first informative screen:



Press the “down” button and you will see first parameter:



It is “delay”. Buttons right and left can change its value. Next parameters are accessible again by “down” button.

There are following parameters:

1/ The **delay** is time interval between switch on and start of the model. Value is in seconds. Counting starts with power supply.

2/ The **flight time** in seconds and minutes.

3/ **Target throttle** in units from 0 to 200 means average power to the ESC.

4/ **Min throttle** in units from 0 to 200. This is lowest throttle made by controller in extreme. Means if controller decides to brake, output throttle cannot be lower than this number.

5/ **Max throttle** in units from 0 to 200. This is maximal throttle made by controller in extreme. Means if controller decides to accelerate, output throttle cannot be higher than this number.

6/ **Calibration** 0 or 1. This parameter is used for calibration flight. 0 means usual flight, 1 means calibration flight.

7/ **Sensitivity** in units from 0 till 200 defines strength of active regulation. 0 means active regulation switched off, 200 means strongest regulation.

Adjusting:

1/ Set properly parameters **delay**, **flight time** and keep **sensitivity** = 0 (active regulation off)

2/ Set your ESC to proper setting, so that the ESC works in governor mode in useful range.

3/ Set **target throttle** parameter so that the prop has necessary RPM for proper flight speed.

4/ Trim the model without active control and be sure to minimize ill movements of model in maneuvers. Sensor “sees” all those ill movements and on base of their forces can do regulation mistakes. Be sure also to use well balanced prop. If you need to change lap times, just change **target throttle** parameter.

5/ Set **calibration** parameter to 1 and do calibration flight. Model will start and keep wanted speed several minutes. Pilot must do whole flight in level altitude. Model will stop the motor after calibration itself. It will ignore flight time, so be prepared to earlier or later landing. It will add a power for short time before landing. It is warning before motor stop. Choose a calm day if possible. Controller will automatically clear calibration parameter to 0, so next flight will be normal. If you later feel that model changes lap time after changing sensitivity parameter, if you change line length, if you change target throttle (because of different prop etc.) do the calibration again.

6/ Set Min and Max boundaries to values allowing approximately +/- 10% of target rpm. It depends on ESC regulation line.

7/ Go up slowly with parameter **sensitivity**. For example set it to 10, make a flight, and if you see that the effect is small, set it to twice as value as before, or to half of that if it is too much. If you are somewhere close, go slowly. The regulation is “feed forward” type, so it can be easily overdone.

8/ Try to use lower lap times if active control works well and model has enough line tension overhead.

Tips and tricks.

If the active regulation is not symmetric, it can be adjusted by its position to the wing area. For example if the inboard maneuvers are slower than outboard, try to tilt the sensor a little bit to center of circle, by shimming of its inner side (it is mounted from bottom side of fuselage, so shimming its inner side will push its left side a little down and so the board will be tilted to center of the circle)

If you are not happy with properties in corners, try another place of the fuselage. For example if regulation adds the power in every corner too much, try to move the sensor a little back to tail. The cable is long enough to be mounted on almost any place of the fuselage.

Usage of Rabe rudder is helpful. If you do not use Rabe rudder, try to mount the sensor as close as possible to center of wing, where hinging is only angular, and does not create any acceleration.

If the regulation tends to oscillate in level flight, it is FAR overdone, got to sensitivity at least half or better quarter of actual.

If regulation does unexpected “kicks” to power (not oscillation), it could be because of resonance of fuselage, try to balance the prop.

If you see that regulation acts too late, for example accelerating down the hill, problem can be in too slow ESC. Means cannot change motor RPM as quick as necessary.

Be sure that components do not move inside the fuselage, especially sensor and its cable must be fixed well on firm part of the model.

Recommended setting:

I highly recommend using controller with Jeti Spin ESC. It allows setting good regulation boundaries and reacts quickly on changed control signal. Here are well working settings for model with prop working at 9000 RPM, for example APC 12x6 (older type) on motor AXI 2826.

ESC setting:

Operation mode: Heli 3D
Motor pole nr: 14
Gear 1:1
Max rotor RPM: 10 000
Min rotor RPM: 7000
Sensitivity: 1
Initial point: FIX
Fix initial point: 1,25ms
End point: 2.0ms
Auto Inc end point: OFF
Throttle curve: linear

Heli 3D setting will allow quick reactions to signal change and allow quick rpm change. Motor pole and gear settings will set shaft to magnets gear ratio, so the ESC can keep real RPM set by Jetibox.

Sensitivity 1 means good reaction time for rpm regulation, it means that ESC can quickly change input power as reaction to changed load on the shaft.

Fixed initial and end points are necessary for keeping the same rpm during whole flight, do not use auto incrementation, it will change your rpm during flight.

Minimal rpm 7000 at 1,25ms and maximal rpm 10 000 at 2ms will prepare regulation line from 1,5ms (100 in controller units) and 8000 till 2,0ms (200 in controller units) at 10 000 rpm. It means we can use safely range 9000 rpm at 1,75ms (150 in controller units) +/- 1000 rpm. And we have still reserve 1000 rpm down to 1,25ms (50 in controller units), so the ESC will not try to go to brake mode on lowest throttle signal.

Controller settings:

Target throttle: 150
Min throttle: 100
Max throttle: 200
Sensitivity: 50

This setting will set rpm to 9000 with limited boundaries +/- 1000 rpm. Sensitivity says how much to reacts, but if the reaction is too strong, it will be limited by min and max parameters.

Following picture shows regulation line and all ESC settings in green color. Timer settings and regulation is red. It shows also how the sensitivity to flight changes translates to RPM change. Higher sensitivity and steeper ESC regulation line make stronger rpm reactions.

