



# PyroSwitch

## Secured RC switch for smoke cartridge ignitors

hardware version V3.3 – software version V3.34



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### Safety measures

Manipulating this pyro-components like ignitors, smoke cartridge or other elements have fire or explosion risks. Handle this articles carefully, take care during the electrical connections that all safety measures are taken and focus on the work. The ignitors, even on a lower pyro-risk table, are sensitives to the electrical chocs and inducted current. It is highly recommended to put the connectors cables in short circuit until the final installation. Safety equipments like gloves and glasses are mandatory. After the flight and also in case of non ignition, disconnect the ignitors in your model. Do not keep the ignitors connected with the PyroSwitch module. Short-cut again the cables of the ignitors to avoid risks.

### Main purposes of the PyroSwitch module

- Module controlled by microcontroler.
- Two ignition lines for smoke cartridge.
- Filtered and precise control of the receiver RC signal.
- Power supply from the RC installation, no secondary battery needed.
- Check of the RC Signal command to avoid miss-firing by wrong RC switch positions on the radio control sender.
- Limitation of the output command duration for few milliseconds, avoiding also abnormal power consummation of the ignitors.
- Wrong conditions and alarm management.
- Indication of valid RC signal.
- Indication by the end of firing if RC signal was disrupted.
- Indication of electrical continuity in the ignition circuit.
- Delay between both ignitors firing to limit the electrical consummation.
- Short cut protection in the ignition pyro-circuit.
- Indication of firing order to confirm the order was send for ignition of the smoke cartridge.
- Usage of Mosfet transistors with very small internal resistance for a better power supplying of the ignitors at firing.
- For more security, module equipped with a mechanical switch in the ignition circuit and with is 'OFF' position avoid wrong firing. The connections and the system are so protected in this situations.



## Power supply and connection

The PyroSwitch module can be connected directly to an output from the receiver or on a channel of a RC power supply system. Use in this case the **analog mode** for the output control.

Power voltage from 4.8V to 8V, compatible with the most RC power supply systems.

The voltage of the ignitor impulse is the same as the voltage of the module power supply. The common ignitor used here need 30mA under 5V for good ignition. Take care to use this ignitors.

## Equipments

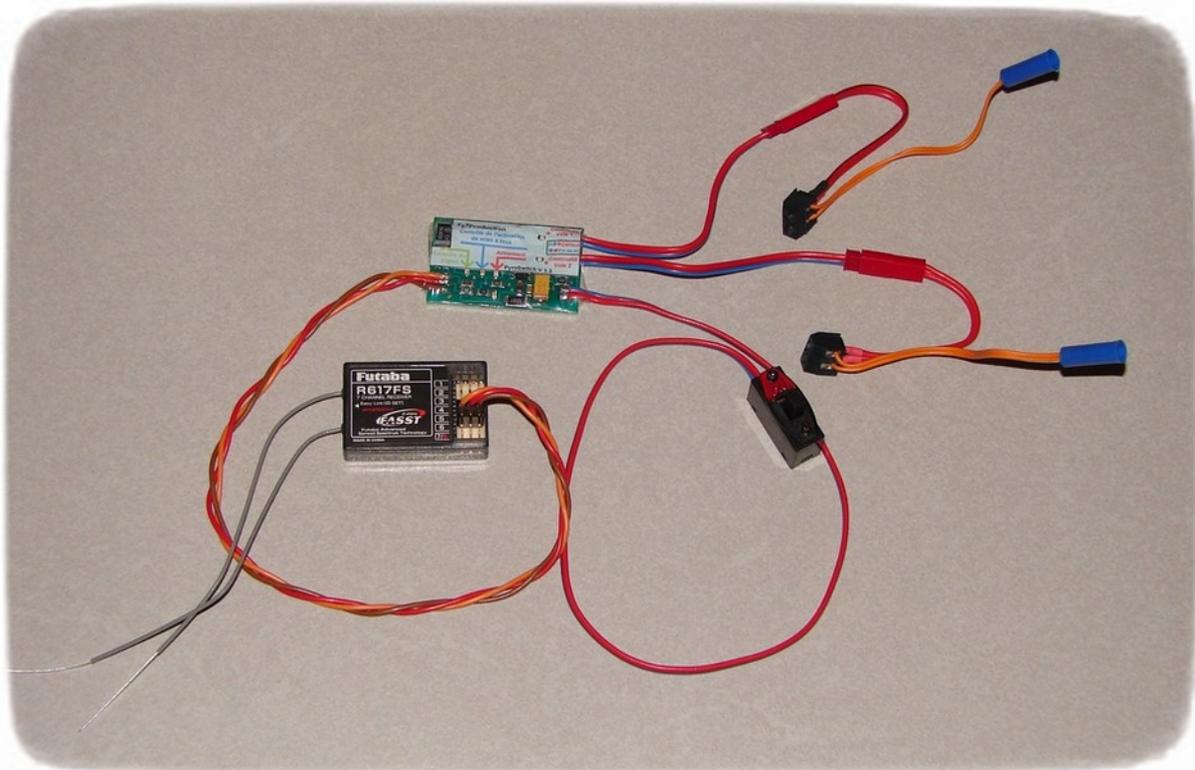
The PyroSwitch module is composed with:

- one connection cable to the RC receiver,
- two cables with JST connectors for ignitors connectivity,
- one power supply control light (LED) with **green** color,
- one control light for the RC signal (LED) with **green** color,
- one control light for the output activation (LED) with **blue** color,
- one control light for the armed status (LED) with **red** color,
- two control lights for continuity in the ignition circuit with **red** color,
- one activation mechanical switch (**ON/OFF**) to secure the firing.

## Usage

The ignitors cables are connected to the PyroSwitch module with JST connectors. Use the appropriated connectors into the circuit to realize the connectivity.

**The mechanical activation switch** should be installed in an easily access place of the model but protected from wrong handling to avoid not wanted status changing.



The module will be installed in a place where you can see the control and activation lights.

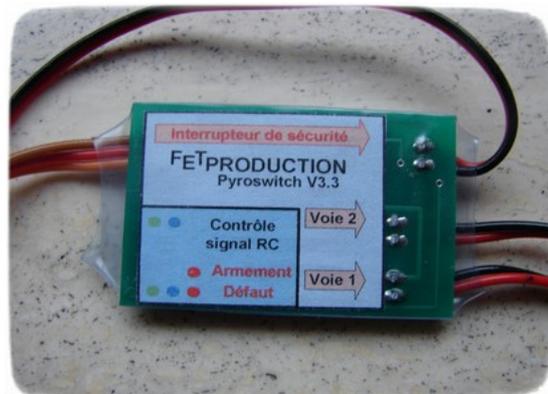
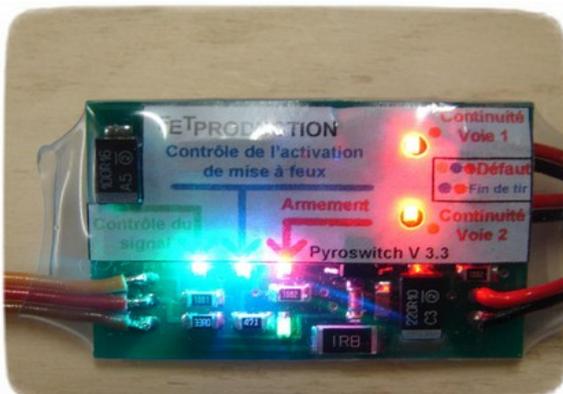


**Installation and connections must be done with the mechanical activation switch in 'OFF' position and the RC reception system must be powered off for maximum security.**

The microcontroller supervise the module and inform you with the control **LEDs** of the actual conditions in place:

- Firing test by activating the RC sender switch (mechanical activation switch 'OFF') and **green LED** RC signal RC is lighting. The switch on the RC sender send a test order and the **blue LED** by lighting will indicate the right test order.
- Mechanical activation switch is 'ON', the **red LED rouge Armement** is blinking to inform you that the system is yet armed. The firing happen by toggle the programmed switch on the RC sender. When the airplane is back on earth, a blinking of the **red** and **blue LEDs** inform you that the ignition was done. If one of the both continuity control **red LED** is off (or both) and if the circuit was right mounted, this mean that a fault happen during the flight.
- Once armed, by a disrupted RC signal, a blinking sequence with an alternated **green LED** RC signal and **red LED Armement** inform you that a default happen.

**In summary, no abnormal condition can authorize a firing of the ignitors.  
A fast blinking of the 5 control lights indicate a abnormal situation.**



**Only the steps:**

- 1 – no control lights,**  
(with exception of power supply and continuity control lights),
- 2 – armed with the mechanical activation switch on 'ON',**
- 3 – ordered firing by the RC sender command,**

**... authorize the PyroSwitch module to provide the right energies to the outputs 1 then 2 for firing the ignitors.**

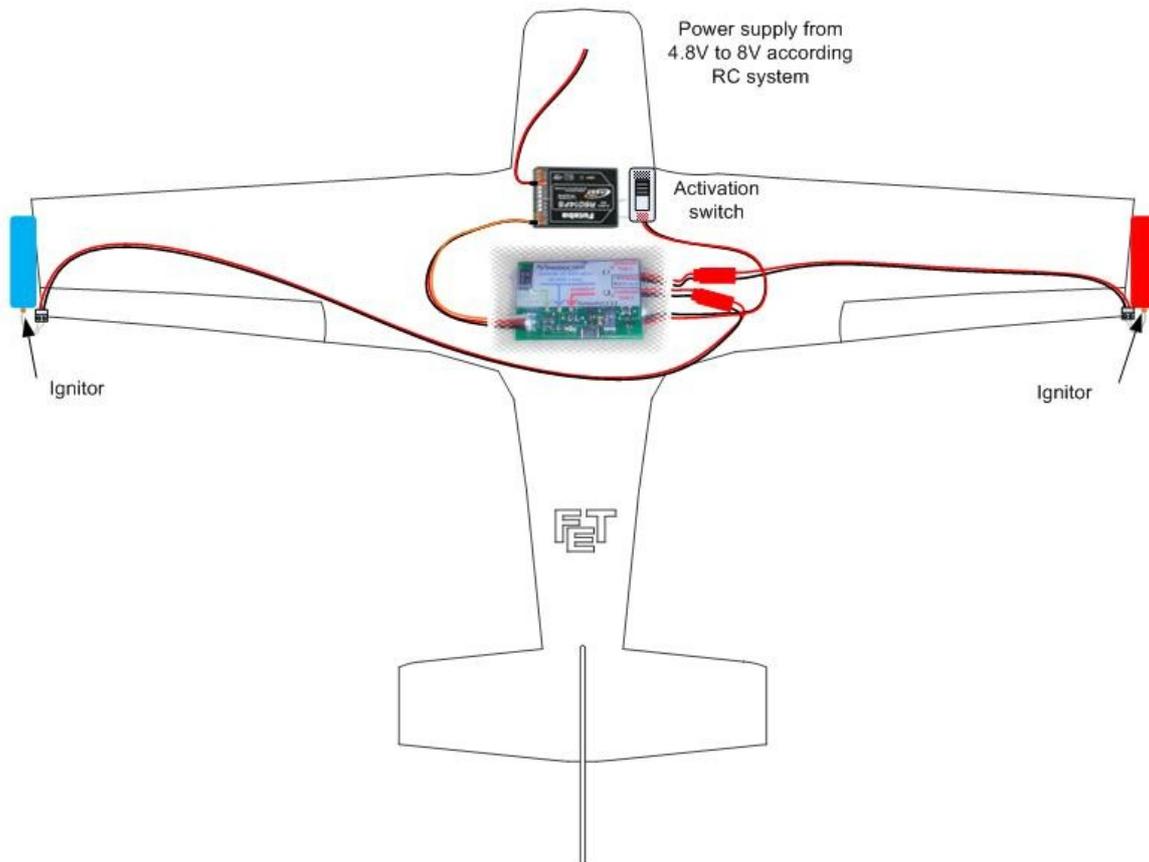


- If you power on the receiver with the mechanical activation switch in position 'ON', the **5 LEDs** will be blinking to inform you of a wrong condition.
- If you power on the sender with the firing switch active and then power on the receiver, PyroSwitch indicate you a wrong condition.
- If you power on the sender and you power on the receiver, the continuity LEDs indicate if the ignitors are connected.
- Once PyroSwitch armed and if a RC signal disruption appear on the command channel (for example a bad connection on the servo connector) PyroSwitch detect it and memorize it. If the connection is always broken, the firing is not possible. If the RC signal is again connected, PyroSwitch was armed before and stay armed. This is a wanted function to give the possibility to firing the smoke during a competition or event.
- Also if you power on the RC receiver and the RC signal is not present or wrong (sender not powered) the **green LED** RC signal control will blink.

If the test is confirmed, just before closing the cockpit, activate the ignition system by switching the mechanical activation switch in position 'ON'.

- The **red** continuity **LEDs** confirm the good connections and only the **red** arming **LED** is blinking slowly indicating that the system is ready and the ignition system is armed.
- If a disruption in the RC signal happened, the blinking sequence will be different with a alternated blinking of the **green LED** and the other LEDs.

### Connection plan in the airplane



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