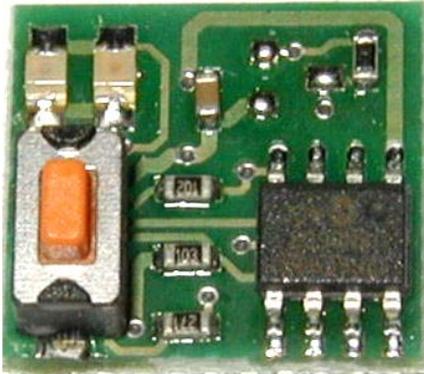




RC Switch: the complete solution for digital camera control



1. Overview

RC Switch is an electronic switch for low current loads, that can be controlled by a channel of your RC Receiver system.

It can be connected on a dedicated channel or it can be used in parallel with an existing function.

RC Switch is designed mainly to control a digital photo camera, but it can be used for different applications like switching on and off leds, lamps, sound cards, smoke system or other electronic devices that you can install on your RC model (imagine a remote fire button for the gun machine on your warbird replica...).

2. Connections

RC Switch board has a cable with a standard connector that can be fitted in a free channel of the receiver; if the **RC Switch** is to be connected in parallel with an existing function, a **Y** harness adaptor is required.

The output of the **RC Switch** board has a small connector with two wires, one black and one red: the black one is GND and must be connected to camera ground, while the red one is the command output. If the connections are reversed, the switch is not operative, but there is no risk to damage the switch and the connected device.

A pushbutton on the switch is used to enter the programming function and for local activation of the switch and two state leds display the state of the **RC Switch** in different conditions.

3. Programmable functions

The switch can be programmed by the user to adapt to different RC systems and configurations.

It is possible to define the neutral and the active position of the switch without modify the setup of your Tx.

RC Switch can be controlled by a switch, by a pushbutton, by a stick or by a slide on the Tx, and the user can easily select the most convenient position to take photo (switch or stick full up, full down, centered,...).

An additional feature called **auto-on** function is also provided; some cameras have an auto shut-off function that preserves the battery life switching off the camera after a time (from 30" to 90") with no operation, i.e. if no pictures are taken.

To avoid that the camera will switch off during remote operation it is possible to program the RC Switch to take a picture after a programmable delay from the last command (**auto-on** function).

In this way you can concentrate yourself in piloting your model, without the risk of having the camera switched off.

This function can be disabled if it is not required and when it is enabled the time-out interval can be programmed from few seconds up to 10 minutes to adapt to different cameras.

4. Mode Set Up

The **RC Switch** has two operation modes that can be selected each time the system is powered on: single and continuous mode output.

In **single mode** the output is activated for a fixed time of approx. 0.6 seconds even if the command stays in **on** position for a longer time; to trigger again it is necessary to switch the command **off** and then **on** again.

In **continuous mode** the output will follow exactly the command, staying active for all the time the command is on.

The selection between these two modes is done by setting the command on the transmitter before switching on the receiver: if the command is in **off** position the activation is in single mode, while if it is in **on** position continuous mode is selected.

When the **RC Switch** is connected to a digital photo-camera the continuous mode can be used for video capture.



The mode selection is not permanently stored in the microcontroller memory and the selection is done every time the **RC Switch** is switched on.

This allows to go in single or continuous mode without modifying the system programming.

The selected function mode is confirmed by the led color at power on:

Green means that the selected mode is **single**

Red means that the mode is **continuous**.

Note: *When the continuous mode is selected, to avoid false output activation, you must release the command (stick or switch) after power on to activate normal operation.*

5. State LED indication

Two leds, one red and one green, are used to signal some conditions and to drive the user in the programming procedure.

At the start-up (power on) there are four possible conditions:

Condition	LED indication
1. Memory error or invalid parameter stored.	Red led flashing at high rate
2. Start of programming procedure	Six red blinks (see the detailed description of the program sequence)
3. Normal function with single shot output mode selected	2 sec. solid green and then flashing green every 2 sec.
4. Normal function with continuous output mode selected	2 seconds solid red and then flashing red every 2 sec.

Mode set-up table

During the normal function one led (red or green according with the selected mode) blinks at every 2" and the green one turns on during output activation either by command or by internal timeout.

6. Power On mode / programming

If the system is powered on normally and the memory contains valid data, the system starts in normal function mode, as described in the Mode set-up table.

At the first activation or if the memory is blank or if data are not valid, the system starts in error state: the red led is flashing at high rate and the only way to restore the normal condition is to restart the system in programming mode.

Each time the system is powered with the pushbutton pressed, the programming procedure starts.

Note *the program procedure will not start automatically when an error is detected in the data memory: the user must power on the system with the pushbutton pressed.*

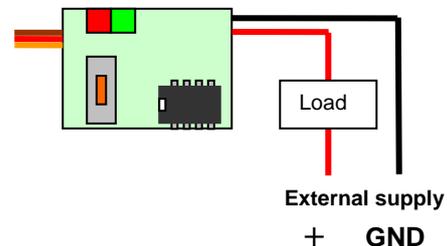


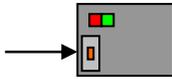
Figure 1: Diagram for drive an external load such as a led, lamp, buzzer, electronic sound cards, smoke system, etc.; if an inductive load is connected (as relays, coils or motors), diode and capacitor protections are required. The external power source indicated on the diagram can be taken directly from the main battery pack and the maximum allowed load current is 150 mA.

If the main battery or the BEC voltage is used to supply the load, the black wire connection it is not required, as the GND is already present on the switch.



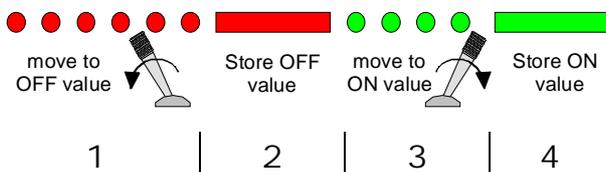
7. Programming procedure

To start the programming sequence, power on the system with the pushbutton pressed.



It is now possible to program the command position and the **auto-on** function.

Command position set-up in a simple 4 steps programming sequence:



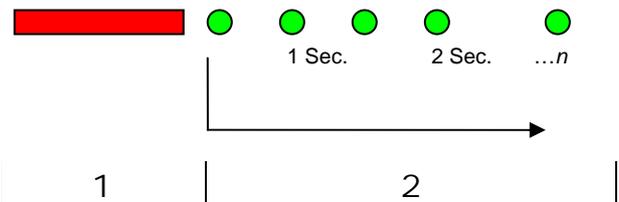
- 1 At power on in program mode you have six blinks of the red led to set the command in the neutral position [the position in which the switch is not active].
- 2 When the led stops blinking the current position is stored in microcontroller memory and the red led stays on for 2 seconds; when the green led starts flashing it is possible to release the command.
- 3 During the four green blinks set the command in the active position [the position you prefer to take a picture]...
- 4 ...and wait for the green led on at the end of the data store; when the red led turns on it is possible to release the command.

If the red led is blinking at high speed the programming sequence has been aborted for an error: please verify that the **off** and the **on** commands are not stored at the same value, or at two values very close and repeat the sequence by disconnecting and applying power again.

It is recommended to use at least half (50%) of the command travel (i.e. 0% to 50% or 50% to 100%) and to not modify trim set-up on the selected channel after system programming.

Auto on function programming: function enable/disable and timeout interval set-up.

This sequence starts immediately after the end of the previous one, with the red led switched on for 5 seconds.



- 1 Pressing the pushbutton while the red led is on disables the **auto-on** function and terminates the program sequence.
- 2 Otherwise, the **auto-on** function is enabled, the time count starts, the green led blinks at each 0,5" and ends when the pushbutton is pressed.

In both cases at the end the green led turns on for 2" to indicate that data are saved in memory and then switches off.

The programming procedure is terminated and the RC Switch must be powered off and on again for the new set-up to take effect.



8. Programming examples

Case 1: you want to program the camera switch on the aileron channel, taking picture when you move the stick from the central position to full right; your camera will switch off after a 30" time interval with no operation and you decide to program the **auto-on** function to take a picture every 28" in automatic mode to keep camera on.

You Operation	RC-Switch	
	Display	Effect
Connect the switch on the aileron slot of the receiver, press the push-button and switch on the system (first Tx and then Rx).		Programming procedure starts
Move the stick in neutral position	Six red blinks	
	Red Led on	The current stick position is stored (neutral)
Move the aileron stick full right and hold	Four green blinks	
	Green Led On	Position stored (active)
Release stick	Red Led on	Waiting for time-out enable.
Start counting 28 sec. with a clock or by counting the led flashes (one every 0.5 seconds)	Green Led flashing at 0.5"	Counting the time
press the push-button after 28"		
	Green Led on	Data saved in memory
	Led off	Procedure end
Disconnect power		

When you power on system with:

Stick in central position (neutral)	Green Led on and then flashing	Single shot mode selected
Stick in full right position (active)	Red Led on and then flashing	Continuous mode selected.

Case 2: you want to program the camera switch connected on a Tx switch (two position) operating on ch. 5, taking picture when you move the switch up; your camera will not automatically switch off and you don't need the **auto-on** function.

You Operation	RC-Switch	
	Display	Effect
Connect the switch on ch 5 on the receiver, press the push-button and switch on the system (first Tx and then Rx).		Programming procedure starts
Move the TX switch to down (neutral) position	Six red blinks	
	Red Led on	The switch position is stored (neutral).
Move the switch to up position	Four green blinks	
	Green Led on	Position stored (active)
Press the push-button while led is on red	Red Led on	time-out disable.
	Green Led on	Data saved in memory
	Led off	Procedure end
Disconnect power		

When you power on system with:

Switch down (neutral)	Green Led on and then flashing	Single shot mode selected
Switch up (active)	Red Led on and then flashing	Continuous mode selected.