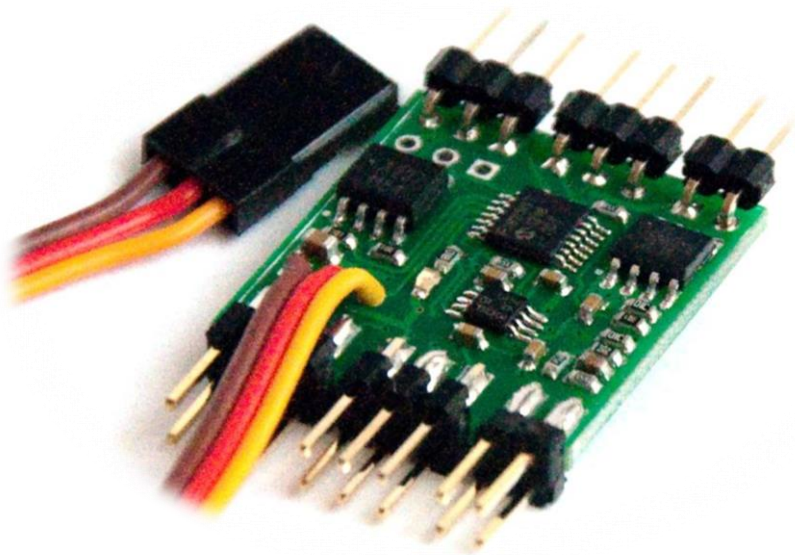


# RC Camera Control

User Guide v1.4  
(RCCC v1.1 FW1.06)



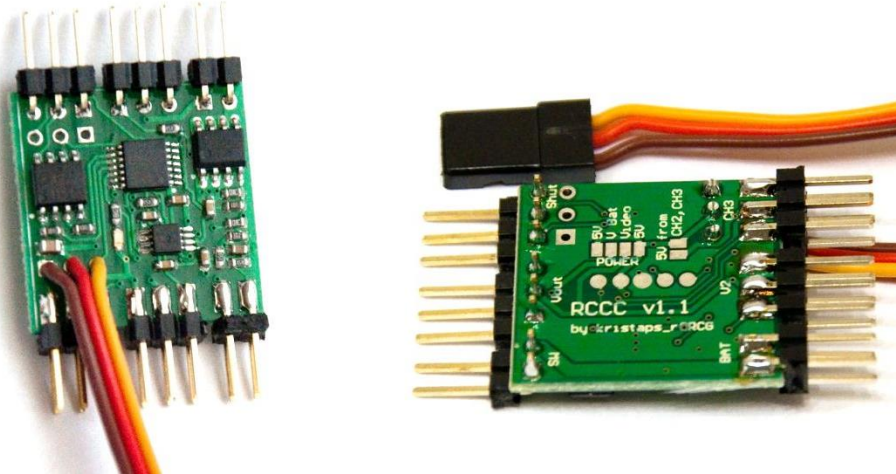
7/10/2013  
kristaps\_r@RCGroups

## INTRODUCTION

RC Camera Control board (RCCC) is multifunctional control board designed to for aerial photography or First Person Video flying.

RCCC has following features:

- Camera shutter release control (Focus, Shutter and GoPro mode)
- Video source selection (switch one of 3 video inputs to video output)
- High current switch output (Turn On/Off LEDs ...)
- LiPo battery low voltage alarm
- Sum PPM or 3 PWM input from RC receiver (Shutter, Video source, Switch)

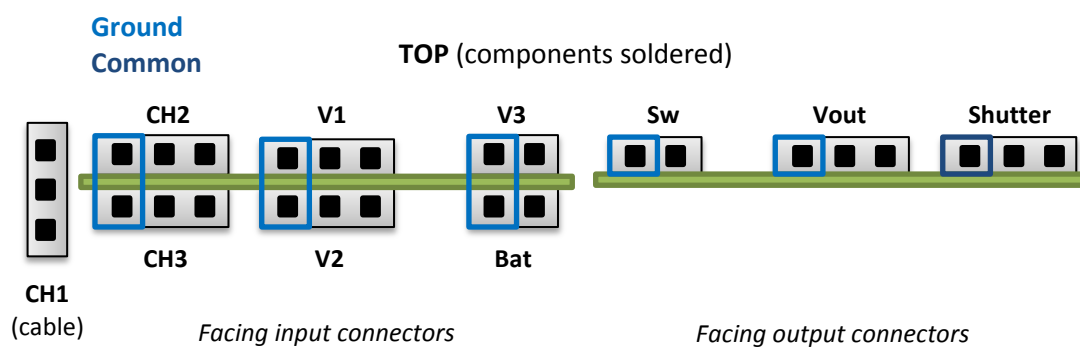


### CAUTION!

*There is **NO reverse polarity protection** and it is physically possible to connect connectors reversed! Please be careful with connections.*

***Isolate board** from short circuits if placing near metallic elements!*

*All connectors have **GND pin on left side** if facing connectors and board with components on top.*

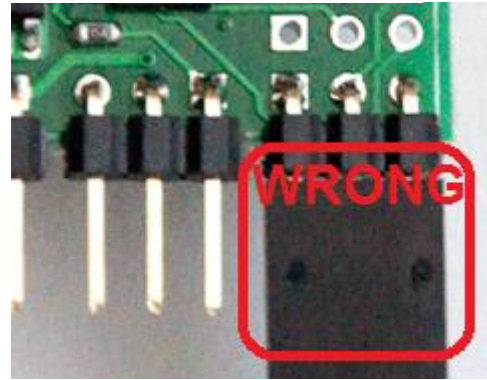
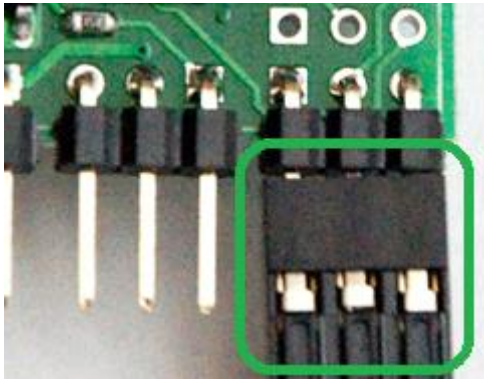
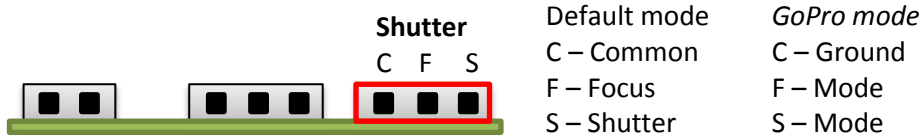


### BOTTOM (no components)

<b>CH1</b>	Video source /sum PPM	<b>Bat</b>	Battery connector
<b>CH2</b>	Switch	<b>Sw</b>	Switch output
<b>CH3</b>	Shutter	<b>Vout</b>	Video output
<b>V1</b>	Video in 1	<b>Shutter</b>	Shutter connector
<b>V2</b>	Video in 2		
<b>V3</b>	Video in 3		

## CONNECTING

### Camera shutter



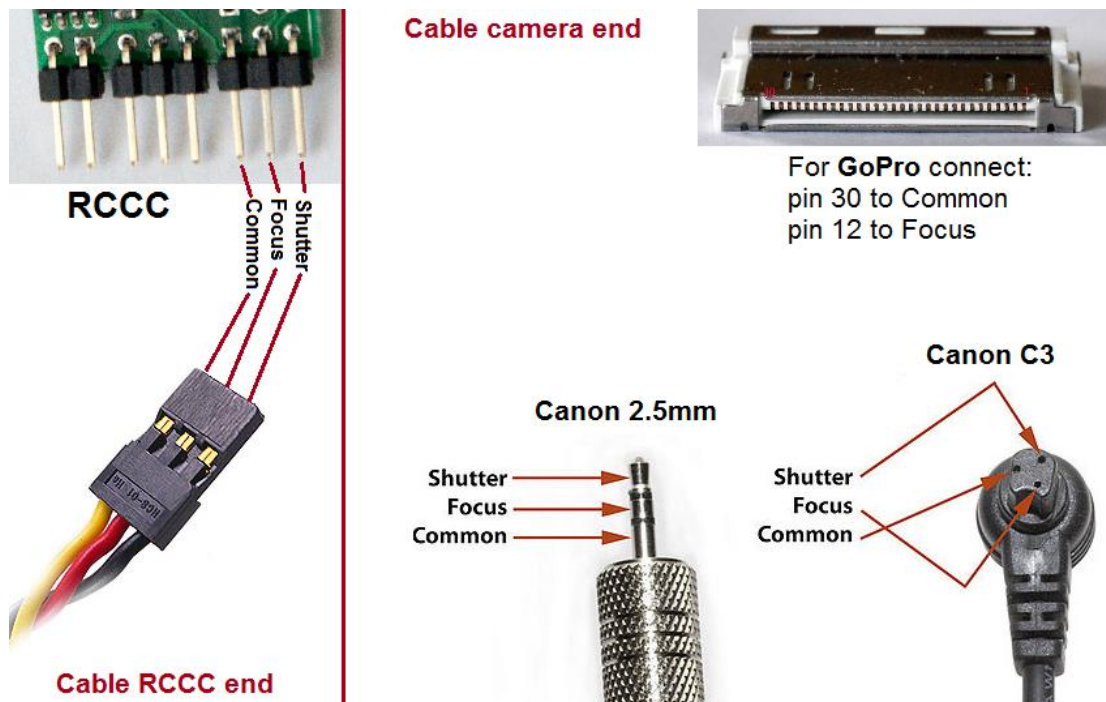
Connect camera shutter cable to RCCC board. If you use cables from *kristaps\_r* then connect them so that connector contacts are seen if looking from top of the board like in picture.

Use 3 state switch for Focus and Shutter control or 2 state switch for immediate Shutter control.

You can use RCCC shutter function with all C3 plug and 2.5mm plug Canon cameras, Nikon cameras, GoPro HERO and HERO2 (HERO3 not tested) and other cameras.

**NOTE!** For GoPro cameras you have to configure RCCC in setup mode.

You can also make your own cable for camera shutter.



Some information about shutter connector pin outs:

<http://www.cameraaxe.com/wiki/index.php?title=CameraCables>

[http://www.doc-diy.net/photo/remote\\_pinout/](http://www.doc-diy.net/photo/remote_pinout/)

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## GoPro mode

To enable **GoPro mode** you have to configure it in setup step 4.

Shutter control in GoPro mode turns ON and OFF GoPro camera. To start recording after power ON you have to put GoPro in One Button Mode (see GoPro user manual).

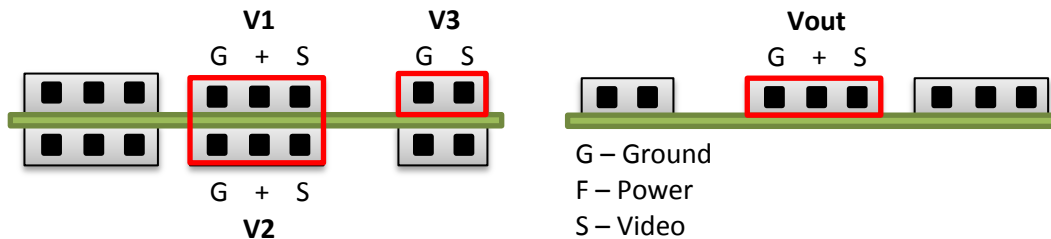
It is possible to change way you turn GoPro ON and OFF by enabling **GoPro toggle mode** in setup.

If **GoPro toggle mode is disabled** GoPro follows state of RC transmitter switch dedicated to control GoPro camera. If switch is ON then GoPro will turn ON, if switch is OFF then GoPro will turn OFF.

If **GoPro toggle mode is enabled** then GoPro will change its power state each time when switch is changed from OFF to ON state. This is usable if you have momentary switch on your RC transmitter (like Trainer switch). Pushing switch will turn GoPro ON, pushing switch one more time will turn GoPro OFF.

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## Video devices



Connect video sources (video camera, photo camera ...) to video input connectors **V1-V3**.

Connect video transmitter to video output **Vout**.

You can use 3 state switch to switch between all 3 video sources or 2 state switch to select between 2 video sources.

Video source is selected based on video control channel value:

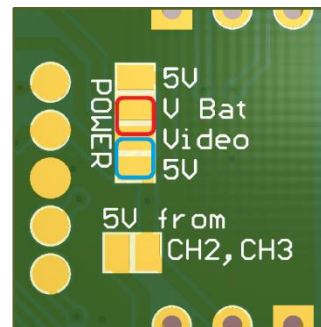
- 0% (1.0ms) **V1**
- 50% (1.5ms) **V3**
- 100% (2.0ms) **V2**

Video inputs **V1**, **V2** and video output **Vout** connector power pins (middle) are connected together so you can feed power for your video camera or video transmitter to one connector and have powered other connected video devices.

You can also choose to power cameras and/or video transmitter by soldering jumpers in bottom of board.

That will connect according power source to video connector power pins:

- **5V – 5V from RC receiver**
- **V bat – voltage from battery input**

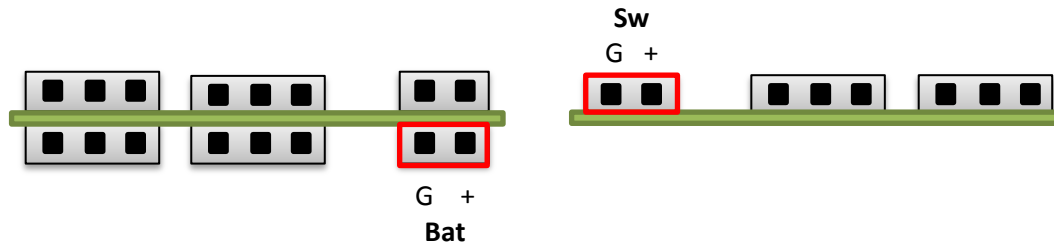


Please read video camera and video transmitter manuals to find voltage needed to power them.

**WARNING!** Do not solder together both jumpers **5V** and **V bat** if battery connected to **Bat** connector.

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## High current switch



Connect battery to **Bat** connector. Connect load (LEDs) to be powered to switch output **Sw**. You can use 2 or 3 state switch to control switch output. Switch has 3 states depending on control channel value:

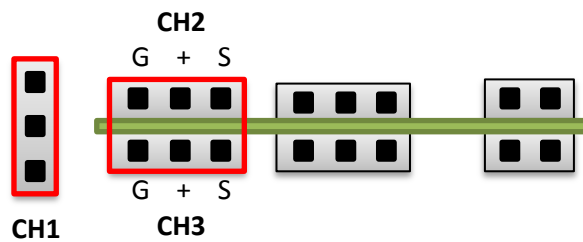
- 0% (1.0ms) **Switch OFF**
- 50% (1.5ms) **Switching like strobe (2 impulses every second)**
- 100% (2.0ms) **Switch Steady ON**

Switch output has permanent connection of + pin from **Bat** connector + pin. Ground pin is switched. Switch can handle **3A** continuous current and 5A current for 20s.

**WARNING!** Please follow polarity!

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## RC inputs



### PPM input

Connect your RC receiver sum PPM output to RCCC **CH1** connector.

RCCC can accept 16 PPM channels. Up to three of them will be used.

**NOTE!** If used first time please see how to configure device.

### 3 PWM inputs

To use device with regular servo outputs from RC receiver (PWM) connect RCCC to according channels of your RC receiver. Default functions of RCCC channels are:

RCCC channel	Function
<b>CH1</b>	Video source control
<b>CH2</b>	High current switch output
<b>CH3</b>	Shutter control

Function mapping to channels can be changed in Setup mode (see page 5).

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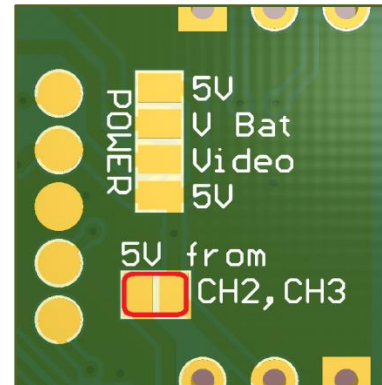
## START USING DEVICE

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RCCC is powered from **CH1** input that is connected to RC receiver. If you want to power board from **CH2** or **CH3** connectors solder together pads of solder jumper **shown in picture** under board.

Do not use 6 volt BEC or ESC to power RC receiver and RCCC board. **Maximum voltage for RCCC board is 5.5V**. You have to use 5V BEC or ESC.

When device is powered it starts waiting for valid control signal from RC receiver indicating this state by slowly flashing LED.



After valid signal from RC receiver is detected LED goes OFF.

If battery monitor is enabled LED flashes number of times according to LiPo cell count detected.

**WARNING!** Maximum voltage for RCCC board is 5.5V. Use 5V ESC or BEC.

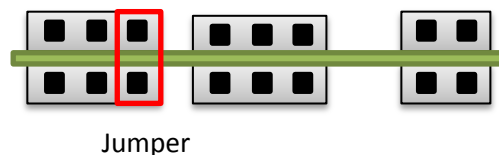
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## CONFIGURING DEVICE

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If you are using sum PPM signal from RC receiver for first time device automatically enters Setup mode. This is indicated with fast flashes after RCCC detects signal from RC receiver.

Setup mode also can be enabled by connecting **CH2** and **CH3** signal pins and then powering on RCCC.



Setup mode is slightly different if using sum PPM or regular servo connection to RC receiver.

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### PPM input

In PPM Setup mode Enable channel is used to enable or disable options. It is recommended to use one of RC transmitter sticks with auto centering. Enable channel is set after entering setup mode (fast flashes):

1. Move 4 times stick on RC transmitter from one end to other until LED on RCCC board flashes one time.
2. Set state of Enable channel stick to state that will be Disable state and hold until LED starts flashing. Opposite stick end will be Enable state.

After Enable channel is set, LED flashes one time long indicating Step 1 of configuration. Configuration is done in 2 sections - Channel setup and Additional setup.

#### *Channel setup*

**Step 1:** Video source control

**Step 2:** High current switch control

**Step 3:** Shutter control

#### *Additional setup*

**Step 4:** GoPro mode (Default OFF, page 3)

**Step 5:** GoPro toggle mode (Default OFF, page 3)

**Step 6:** Low battery detection (Default OFF, page 6)

First 3 steps are for Channel setup. In each of those 3 steps you must do following:

1. Toggle 4 times switch on RC transmitter you want to be used for that function after that LED flashes fast step number.
2. After that you have 2 seconds to put switch in position that will be OFF state for that function.
3. LED flashes long indicating number of next step.

If you don't want to use some control channel you have to move Enable channel stick to Disable state.

At end of Step 3 channel settings are saved and you can turn OFF device if you don't want to proceed with Additional setup.

In Additional setup steps you must move Enable channel stick to position according to your choice: Enable or Disable. After you move stick LED flashes long indicating number of next step. You must return stick to center.

At end of programming LED flashes fast and then enters normal operation mode and device can be used.

**NOTE!** Remember to remove jumper used to enter setup mode.

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### Regular servo inputs (PWM)

If you use regular PWM RC signals and after you enter setup mode by connecting jumper on **CH2** and **CH3** signal pins you have 30 seconds to disconnect jumper and connect cables from receiver to **CH2** and **CH3**. This is indicated by fast flashing LED for 30s. When 30s ends, LED flashes one time long indicating Step 1 of configuration. Configuration is done in 2 sections - Channel setup and Additional setup.

#### *Channel setup*

- Step 1:** Video source control
- Step 2:** High current switch control
- Step 3:** Shutter control

#### *Additional setup*

- Step 4:** GoPro mode (Default OFF, page 3)
- Step 5:** GoPro toggle mode (Default OFF, page 3)
- Step 6:** Low battery detection (Default OFF, page 7)

First 3 steps are for Channel setup. In each of those 3 steps you must do following:

1. Toggle 4 times switch on RC transmitter you want to be used for that function after that LED flashes fast step number. **You have 4 seconds for this step!**
2. After that you have 2 seconds to put switch in position that will be OFF state for that function.
3. LED flashes long indicating number of next step.

If you don't want to use some control channel you have to wait 4 seconds in Step1 without toggling switch.

At end of Step 3 channel settings are saved and you can turn OFF device if you don't want to proceed with Additional setup.

In Additional setup LED flashes step number and waits 4 seconds to enable this function. If you want to enable according function toggle channel that is connected to RCCC CH1. If you didn't toggle CH1 then function will be disabled.

At end of programming LED flashes fast and then enters normal operation mode and device can be used.

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## LOW BATTERY DETECTION

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If enabled in setup device will automatically detect LiPo battery cell count on power up if battery is connected to **Bat** connector and flash LED and toggle **Switch** output number of times equal to LiPo battery cell count detected. RCCC can measure LiPo batteries from 1S to 4S

During operation RCCC board monitors voltage of battery. If battery voltage falls below warning level **Switch** output will be toggled approximately once per second.

When voltage falls below critical level **Switch** output will be toggled rapidly.

If LED strips are connected to **Switch** output, then you can see low battery warning from ground while you are flying.

**Warning** level is **3.5V** per cell and **critical warning** level is **3.33V** per cell. So for 3S LiPo battery that will be 10.5V and 10V

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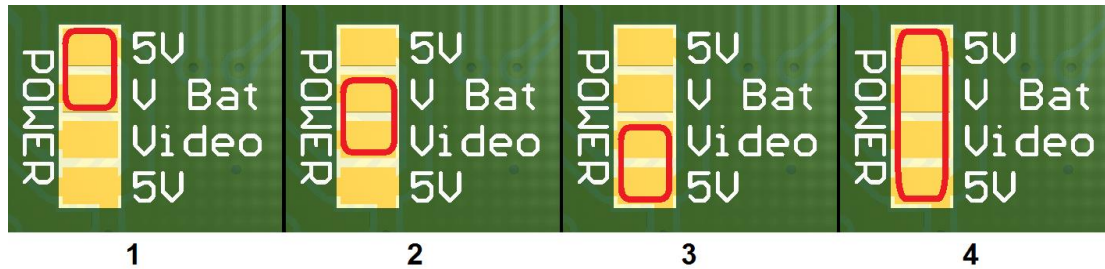
## VOLTAGE SOLDER JUMPERS

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Solder jumpers are located on bottom of device PCB. There are 4 pads located close to each other. They expose contact area of 3 different voltage circuits:

- **5V** – 5 volts powering RCCC board from RC receiver.
- **V Bat** – voltage connected to **Bat** connector
- **Video** – middle pin of **V1**, **V2** and **Vout** video connectors used to power video camera or transmitter

You can solder neighbor pads to have different voltage connections:

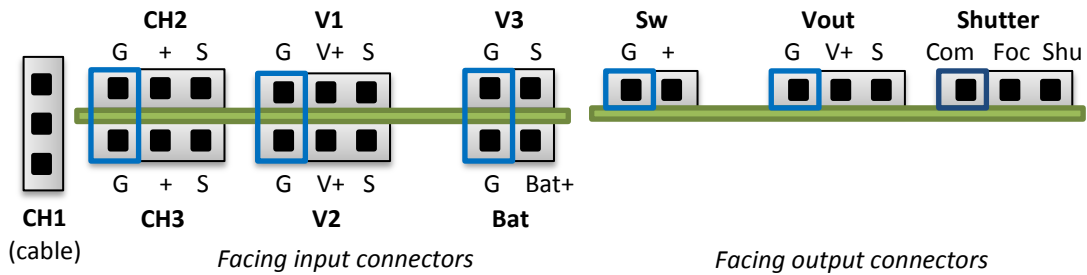


1. **5V** power **Switch** output for 5V LEDs.  
*Don't connect battery to **Bat** connector!*  
*Don't short circuit **Bat** connector!*
2. **Battery** power **Video** connectors and **Switch** output.
3. **5V** powers **Video** connectors. **Battery** powers **Switch** output.  
*Don't connect power to **Video** connectors!*
4. **5V** powers **Video** connectors and **Switch** output.  
*Don't connect battery to **Bat** connector!*  
*Don't short circuit **Bat** connector!*

**WARNING!** Do not solder together both jumpers **5V** and **V bat** if battery connected to **Bat** connector.

# RCCC 1.1 QUICK GUIDE

## TOP (components soldered)



## BOTTOM (no components)

<b>CH1</b>	Video source/sum PPM	<b>Bat</b>	Battery connector
<b>CH2</b>	Switch	<b>Sw</b>	Switch output
<b>CH3</b>	Shutter	<b>Vout</b>	Video output
<b>V1</b>	Video in 1	<b>Shutter</b>	Shutter connector
<b>V2</b>	Video in 2		
<b>V3</b>	Video in 3		

## Control channels

Control value	CH1 Video source	CH2 Switch	CH3 Shutter
0%	V1	OFF	Idle/GoPro OFF
50%	V3	Strobe	Focus
100%	V2	Steady ON	Shutter/GoPro ON

## Setup (Jumper on CH2, CH3 signal pins)

	Channel setup (PPM)	Regular servo output (PWM)	
Step 1	Set Enable channel	Reconnect CH2 and CH3 to RC receiver	
Step 2	Video source control		
Step 3	High current switch control		
Step 3	Shutter control		
	Additional setup	Default	Information
Step 4	GoPro mode	OFF	Page 3
Step 5	GoPro toggle mode	OFF	Page 3
Step 6	Low battery detection	OFF	Page 7

## Solder jumpers



- 5V power **Switch** output for 5V LEDs.  
*Don't connect battery to **Bat** connector!*  
*Don't short circuit **Bat** connector!*
- Battery** power **Video** connectors and **Switch** output.
- 5V powers **Video** connectors. **Battery** powers **Switch** output.  
*Don't connect power to **Video** connectors!*
- 5V powers **Video** connectors and **Switch** output.  
*Don't connect battery to **Bat** connector!*  
*Don't short circuit **Bat** connector!*
- CH2** and **CH3** powers RCCC board.

**WARNING!**  
Do not solder together both jumpers **5V** and **V bat** if battery connected to **Bat** connector.