RC Camera Control

User Guide v1.2
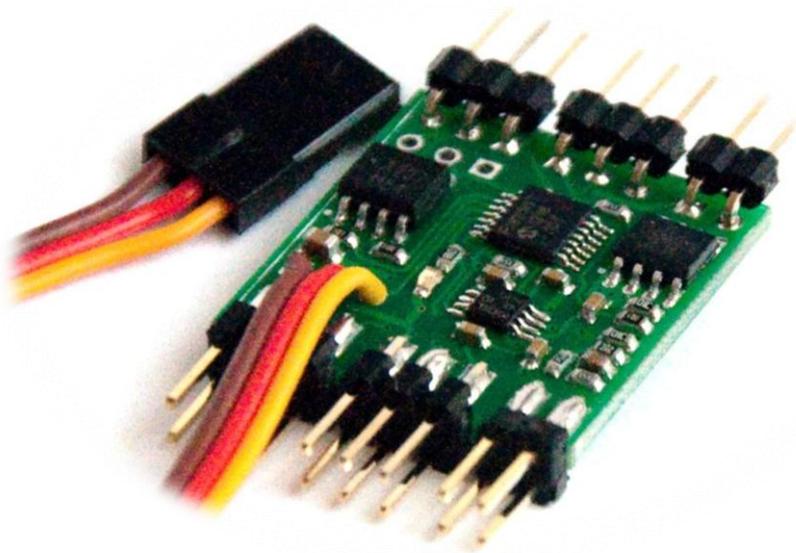
INTRODUCTION

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)
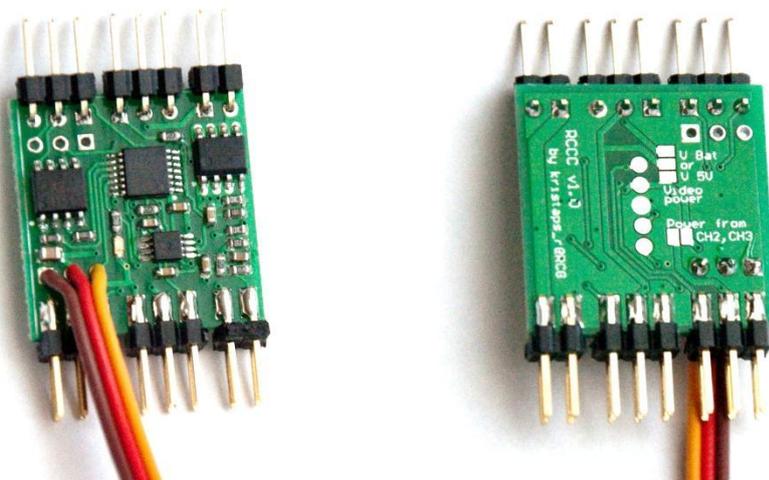

CAUTION!

There is no reverse polarity protection and it is physically possible to connect connectors reversed! Please be careful with connections.
All connectors have GND pin on left side if facing connectors and board with components on top.

Ground Common

TOP (components soldered)

| CH2 | V1 | V3 | Sw | Vout | Shutter |

CH1 (cable)

| CH3 | V2 | Bat |

Facing input connectors   *Facing output connectors*
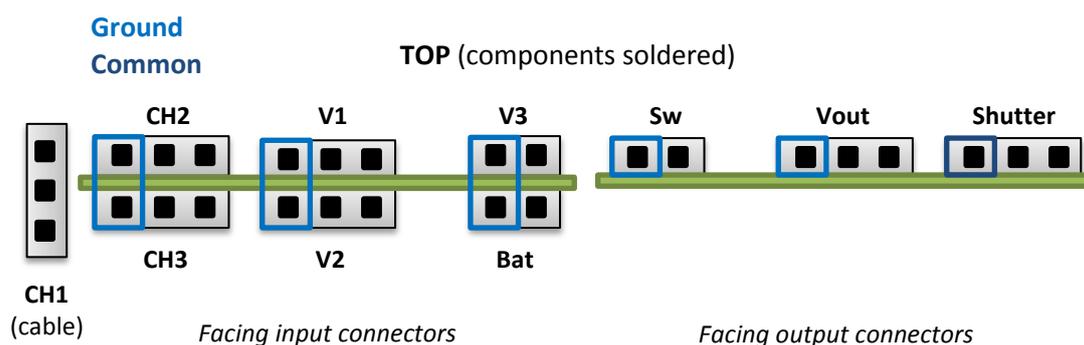
BOTTOM (no components)

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

CONNECTING

Camera shutter

Shutter
C F S

| Default mode	GoPro mode
C – Common	C – Ground
F – Focus	F – Mode
S – Shutter	S – Not used
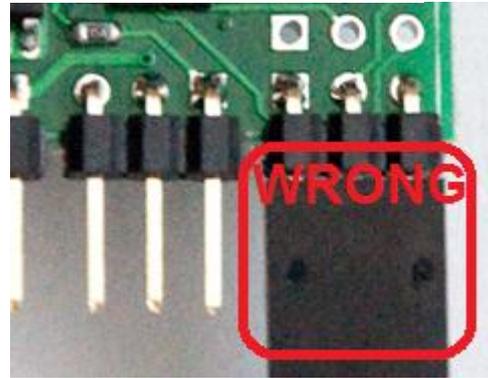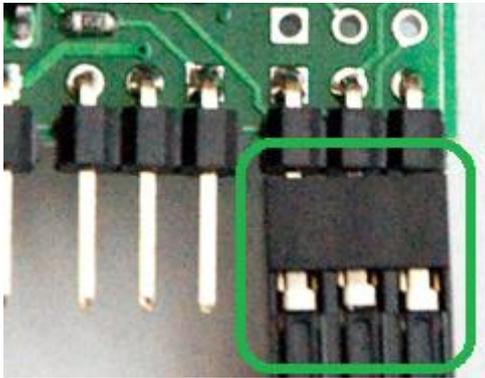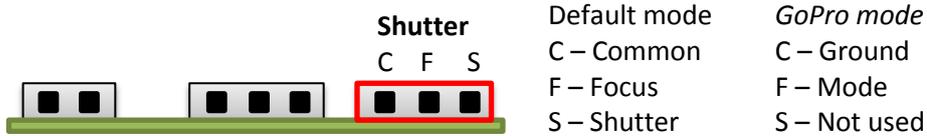
Connect camera shutter cable to RCCC board. If you use cables from *kristaps_r* then connect them so that connector contacts are seen if looking from top of the board like in picture.

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.
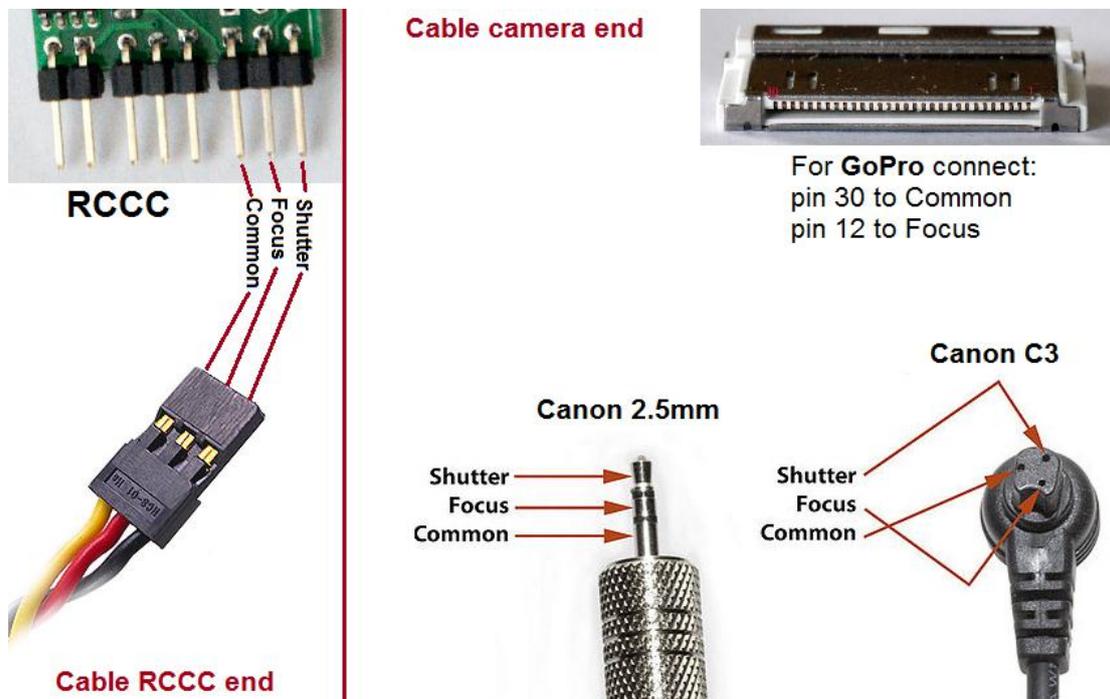
Some information about shutter connector pin outs: http://www.doc-diy.net/photo/remote_pinout/

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 changing **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. Pushing switch will turn GoPro ON, pushing switch one more time will turn GoPro OFF.

Video devices

G – Ground
F – Power
S – Video
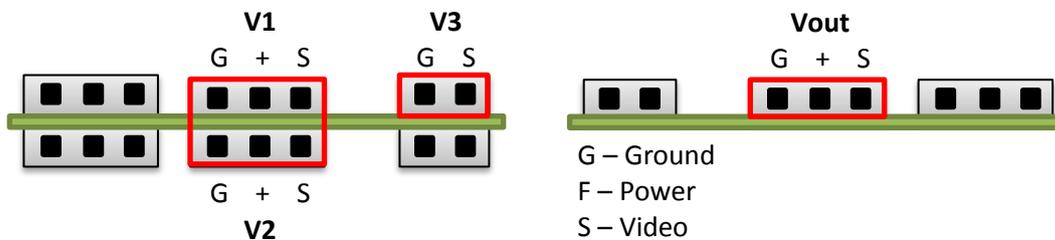
Connect video sources (video camera, photo camera …) to video input connectors **V1-V3**.

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 **V1** and **V2**

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:

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

Please read video camera and video transmitter manuals to find voltage needed to power them.
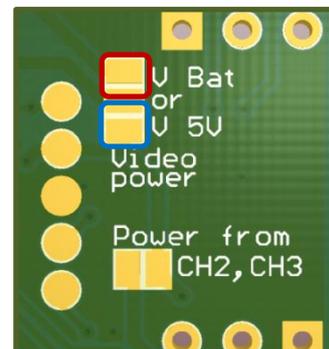
WARNNG!   Do not solder both jumpers **V 5V** and **V bat** at same time. At least one jumper connection must be opened.

High current switch
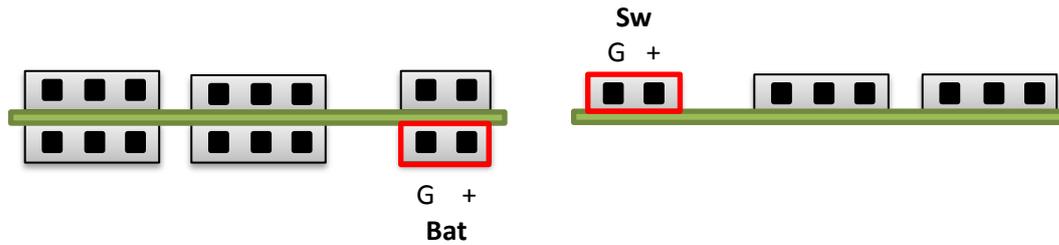
Connect battery to **Bat** connector. Connect load (LEDs) to be powered to switch output **Sw**.

You can use 2 state switch to control switch output.

Switch output has permanent connection of + pin from Bat connector + pin. Ground pin is switched.

WARNNG!   Please follow polarity!

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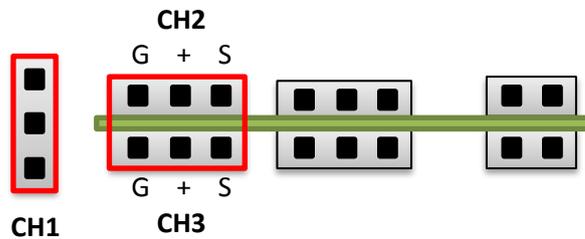
Connect your RC receiver sum PPM output to RCCC **CH1** connector.

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:

RCCC channel	Function
CH1	Shutter control
CH2	Video source control
CH3	High current switch output

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.
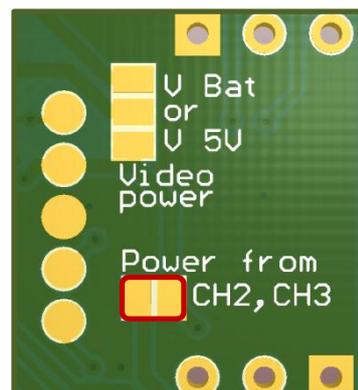
CONFIGURING DEVICE

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.
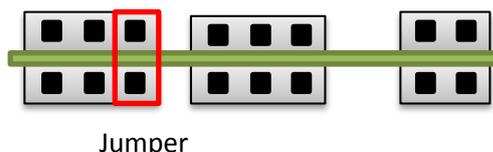
If you use regular PWM RC signals and after you enter setup mode by connecting jumper on **CH2** and **CH3** signal pins you have 30 seconds to disconnect jumper and connect cables from receiver to **CH2** and **CH3**. This is indicated by fast flashing LED for 30s. When 30s ends device remembers current PWM channel states as OFF states. Then setup begins from Step 4.

After entering setup mode (fast flashes), LED flashes one time long indicating Step 1 of configuration. Configuration is done in 2 sections - Channel setup and Additional setup.

> *Channel setup (PPM)*

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

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 <u>Additional setup</u> steps you must do following for each step:

1. Choose enable or disable option:
   a. <u>enable</u> – set <u>Video source channel</u> to maximal value (V2)
   b. <u>disable</u> – set <u>Video source channel</u> to minimal value (V1)
2. To accept your choice <u>change Shutter channel switch state</u>.

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.

LOW BATTERY DETECTION

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 <u>warning</u> level **Switch** output will be toggled approximately once per second.

When voltage falls below <u>critical</u> 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