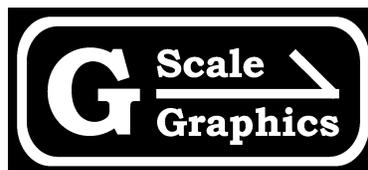
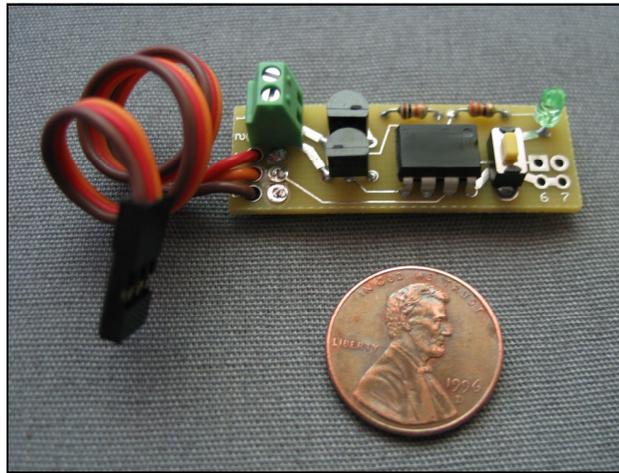


# ***RIC Trigger***

## **Operation and Installation Manual**



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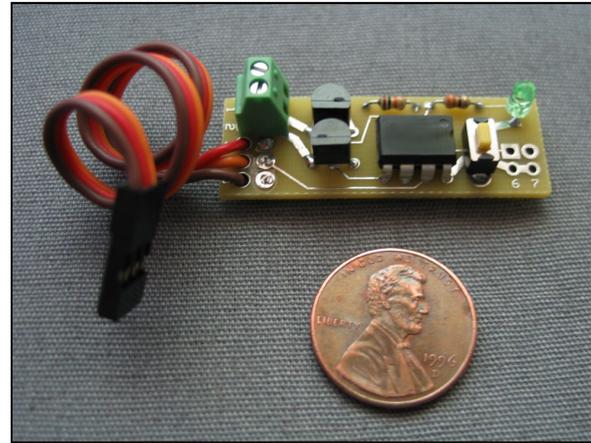
[www.GScaleGraphics.net](http://www.GScaleGraphics.net)

## Overview

The R/C Trigger board can be used with any standard hobby radio receiver to control two separate functions. When connected to a stick operated channel, you have independent control of each of the two outputs. Various means of controlling the outputs are user programmable.

The outputs can be used to trigger sound boards, LEDs, lamps, or relays.

When used with the RailBoss Plus R/C controller for large scale trains, this board can be operated from the Rudder channel when configured for two train operation, or from the Channel 5 (Gear) switch.



*R/C Trigger board  
with 6" R/C cable permanently attached.*

## Installation

### R/C Cable

Any unused channel of the receiver operated by a self-centered stick or a toggle switch can be used. The connector should usually be inserted with the orange (or white) data wire towards the inside of the receiver.

### Output Terminal

See the wiring diagram at the end of this manual. In most cases, only a single wire is needed to complete the circuit for one output. The return path (common), to the negative terminal of the traction battery is usually made via the receiver and the ESC connected to it.

### Wiring

Always use stranded wire 26-22 Ga. wire and tin the ends with solder prior to making any connections. Any wiring connections or splices not directly connected to a component must be covered. Use heat shrink tubing or wire nuts.

### Skills

Most connections to the R/C Trigger board can be made via screw terminals or connectors. However, basic wiring and soldering skills may be required to make proper connections to some the load circuits.

### Installation of the Board

The board can be mounted most anywhere, but allow space for access to wiring, and no metal should be in contact with the board. Double-sided foam tape on the bottom side of board can be used to secure the board to a plastic surface. Handle the board by the edges, avoiding direct contact with the circuitry. Static electricity can damage the components. Try to ground yourself by touching something metal prior to handling the board. Refer to the wiring diagrams at the end of this manual.

### Testing

The on-board green LED can be used to check out the R/C connection. This should be all you need to get going.

#### Power-up with Transmitter OFF

When power is first applied to the board, and the transmitter is off, the LED should be flashing a "heartbeat". i.e. a quick on, with a longer off time. This tells you the board is getting power from the receiver.

#### Turn the Transmitter ON

If the receiver has been properly bound to the transmitter, and the R/C connector is oriented properly, the R/C Trigger board will flash the LED 3 times, indicating it is ready. It will then remain on solid.

#### Check R/C Operation

From the factory, the board is programmed for **Option 1**, momentary operation of both outputs. Assuming you are using a "stick" channel of the radio, moving the stick up/down or left/right should turn off the LED. Returning the stick to center should turn it back on.

## Configuration Modes

The two outputs controlled by the R/C channel can be configured for a number of different options and functions, using either a self-centering stick channel, or a toggle switch channel.

### **Option 1: T1 and T2 Momentary**

Both outputs are momentary. i.e. the output will be on as long as the stick is held off-center. Returning the stick to center turns the output off. This mode is most commonly used for triggering a sound board.

Momentary left/up: T1 ON (board LED OFF) until stick release  
Momentary right/down: T2 ON (board LED OFF) until stick release  
Center position: T1 and T2 OFF (board LED ON)  
Switch On: T1 OFF, T2 ON  
Switch Off: T1 ON, T2 OFF

### **Option 2: T1 Momentary, T2 Latching**

T1 is momentary, as in mode 1, but T2 latches. The first momentary command turns it ON, the next one turns it OFF. The latching function may be used to keep a bell sound ringing until you want to turn it back off.

Momentary left/up: T1 ON until stick release  
Momentary right/down: T2 changes from ON to OFF, or OFF to ON  
Center position: T1 OFF, T2 latched either ON or OFF.  
(Not for use with a switch)

### **Option 3: T1 Latching, T2 Momentary**

Same as Option 2, except T1 latches, T2 Momentary.

Momentary left/up: T1 changes from ON to OFF, or OFF to ON  
Momentary right/down: T2 ON until stick release  
Center position: T1 latched either ON or OFF, T2 OFF.  
(Not for use with a switch)

### **Option 4: Toggle mode (T1 On/T2 Off or T1 Off/T2 On)**

This mode can be used with LEDs or lamps.

Momentary left/up: T1 ON, T2 OFF  
Momentary right/down: T1 OFF, T2 ON  
Center position: T1 and T2 remain in last state  
Switch On: T1 OFF, T2 ON  
Switch Off: T1 ON, T2 OFF

### **Option 5: Crossing Lights (alternating flashes)**

This mode can be used with LEDs or lamps.

Momentary left/up: T1 and T2 both change from ON to OFF, or OFF to ON. Stop flashing, both OFF  
Momentary right/down: T1 and T2 flash alternately for 20 seconds, then both OFF  
Center position: T1 and T2 remain in last state  
Switch On: Start flashing, continuously  
Switch Off: Stop flashing, both OFF

### **Option 6: Ditch Lights (alternate fading on/off)**

This mode can be used with LEDs or lamps.

Momentary left/up: T1 and T2 both change from ON to OFF, or OFF to ON  
Momentary right/down: T1 and T2 flash alternately for 20 seconds, fading on and off, then both stay ON  
Center position: T1 and T2 remain in last state  
Switch On: Start flashing, continuously  
Switch Off: Stop flashing in 20 seconds or less, both OFF

# Programming Procedure

Several different operating modes are available for the outputs, Trigger 1 (T1) and Trigger 2 (T2).

## Enter Programming Mode

Hold the yellow push-button down while turning on power to the R/C trigger board. Release the button. The LED will begin flashing.

## View Current Option Code

The LED will flash the option code currently programmed; e.g. two flashes followed by a pause indicate option 2.

## Change the Option Code

Momentarily press the push-button during the pause to advance the option to the next higher number, until you get the desired number of flashes.

## Save the Option Code

Press and hold down the push-button for about 4 seconds until the LED starts flashing rapidly, which indicates the save is complete.

## Exit Programming Mode

Turn off power. Upon return to power, the new option will be activated.

Option	Operating Mode
1	T1 and T2 Momentary
2	T1 Momentary, T2 Latching
3	T1 Latching, T2 Momentary
4	Toggle mode (T1 On/T2 Off or T1 Off/T2 On)
5	Crossing Lights (alternating flashes)
6	Ditch Lights (alternate fading on/off)

# Operation

Turn on power to the R/C Trigger, or the device powering it.

The transmitter can be turned ON before or after powering the R/C Trigger.

Any time the transmitter is OFF, the R/C Trigger LED will flash a "heartbeat". The outputs T1 and T2 will maintain their current state, or continue flashing until they time out. When the transmitter is turned back ON, the LED will flash 3 times, indicating it is ready.

Programming can be initiated anytime the R/C Trigger is powered up by pressing the yellow programming button.

The outputs can be activated any time the Transmitter is ON using the appropriate channel on the Transmitter.

# R/C Trigger Board Specifications - Revision "New"

## Mechanical

Physical Size: PCB – 1.6" X 0.55", Max component height – 0.5". Weight: 0.2 Oz.

User Connections:

- TB1 (Outputs): Screw clamp terminal strips accept individual wires  
30 to 20 AWG Requires a 1/16" or 5/64" slotted screwdriver
- R/C cable (Inputs): Male servo lead, 6" long.

## Electrical

Power Input via R/C cable at terminals 3(+), 5(-):  
Nominal 5.0V. 2.0V min to 6.0V absolute max  
Power Consumption: < 20 ma

Open Collector Outputs at terminals 1 and 2:  
Max load: 400 ma each  
Outputs connect to common (terminal 5) when activated.

R/C data input at terminal 4:  
3 to 5V logic.  
Standard servo timing - 1.0 to 2.0 msec pulses, 18-25 msec period.

## Firmware

RC-2T (Factory programmable)

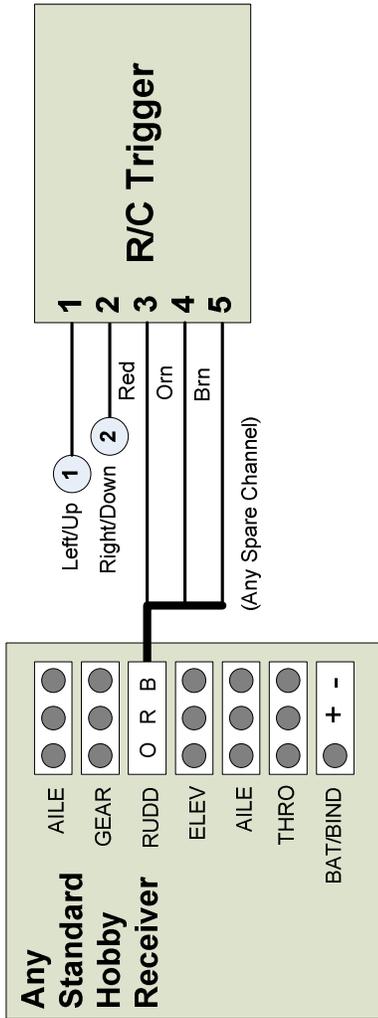
## **Trouble Shooting**

- Can't get the 3 LED flashes, indicating ready. Check the orientation of the R/C cable in the receiver. Make sure the receiver is getting power. Check the receiver for proper binding, if applicable.
- Outputs are not operating properly. This depends a lot on what you are driving, but the main thing is to make sure there is a return path for the R/C trigger board. Terminal 5 of the R/C Trigger board (Brown wire) must be connected to the negative side of the battery used for the output circuit. This patch is normally achieved through the device powering up the receiver; e.g. the RailBoss or other ESC.
- User programming changes don't seem to work. Make sure you hold down the button for 3-5 seconds until the LED flashes rapidly, to save the changes prior to power down.
- One output is erratic, falsely triggering with the stick in the center position. Make sure the trim tab is set to center position. Or, you may have to move the trim tab away from the direction that is falsely triggering. Cycle power on/off. The R/C Trigger recalibrates each time it is powered up.
- If the outputs are operating backwards from the desired stick direction, you can either swap the wiring at the terminal strip (Terminals 1 and 2), or you can change the Normal/Reverse switch for the channel you are using on your transmitter (if so equipped).



# R/C Trigger Board

## Wiring Diagram



### Notes:

#### R/C Trigger Outputs

- Open collector outputs switch to common (Battery -) upon activation.
- Maximum load for each output is 400ma.
- Terminal 1 goes low for stick left/up.
- Terminal 2 goes low for stick right/down.

#### Sound Boards

- Connect outputs directly to sound board trigger inputs.

#### LEDs

- Resistor value is normally sized for 10 to 20 ma of current.

#### Lamps

- If the voltage rating of the lamp is less than the voltage of the traction battery, a resistor may be used to drop the voltage.

#### Relays

- Relay coil current must not exceed 400ma. A diode must be used as shown to protect the R/C Trigger from damage.

### Receiver Power

+5V from ESC  
When other channels are also connected to an ESC or BEC powered from the traction battery (e.g. RailBoss or other Electronic Speed Controls), the receiver is powered by those connections. In which case, no connections to the BAT input are required.

### 4 AA Batteries

When no ESC is present, power must be provided to the BAT input, usually via 4 AA batteries (Nominal 4.8 to 6V).

The negative (-) terminal of receiver battery pack must be connected to the negative (-) terminal of the traction battery pack.

