

*Remote Control Systems*

**2.4 Ghz RADIO CONTROL**

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## **Rx65b**

Instructions for 3 amp speed control.

### **Electronic Speed Controller**

USE RCS TX-3, TX-5 & TX-7 for Low OFF control

or:

TX-4 for both **Centre OFF** & **Low OFF**.

Ch # 5 (Bind button on TX) triggers terminal # 5.

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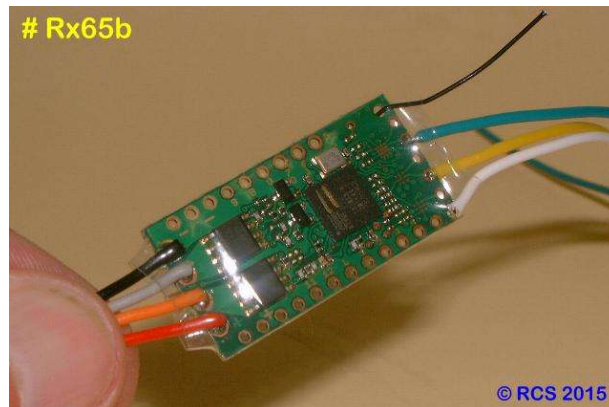
Page # 3 Binding & Operating the # **Rx65b** ESC.

Page # 4 Programming the # **Rx65b** ESC.

Page # 5, 6, 7 & 8 = wiring diagrams.

N.B. COLOUR PDF WIRING INSTRUCTIONS ARE HERE:

<http://www.rcs-rc.com/pages/instructions>



## INSTRUCTIONS.

Thank you for purchasing this Microprocessor based **Electronic Speed Control (ESC)** R/C system.

THE **RCS # Rx65b** SYSTEM IS IN ONE PART. THERE IS A BUILT IN 2.4 Ghz RX.  
SERVO LEADS ARE NOT NEEDED.

A 2.5 AMP POLYSWITCH FUSE IS SUPPLIED & MUST BE USED TO PROTECT BATTERY WIRING.

Another 2.5 amp Polyswitch is supplied for motor overload protection.

THE # **Rx65b** IS A PREWIRED DELTANG R/C Rx65b ESC.  
THE SYSTEM IS READY TO USE AS IS, ONCE THE RX PART IS "BOUND" TO THE TX.  
THE # **Rx65b** IS SUPPLIED SET FOR "**CENTRE OFF**" CONTROL METHOD.  
THIS CAN BE CHANGED TO "**LOW OFF**" CONTROL.

**DO NOT CONNECT TO MAINS POWER (110 – 240V AC).**

THE # **Rx65b** CAN BE USED WITH BATTERY POWER ONLY.  
THEY HAVE CONSTANT BRIGHTNESS DIRECTIONAL LIGHTS & 1 x SOUND TRIGGER.

FOR THE # **Rx65b** USE 7.2v – 18v **ABSOLUTE MAXIMUM** = Nominal 14.8 volts.  
TAKE INTO ACCOUNT FULLY CHARGED BATTERIES CAN & DO EXCEED THE **NOMINAL** VOLTAGE.  
VOLTAGE DROP FROM IN – OUT IS ABOUT ½ A VOLT UNDER A LIGHT LOAD.

We tested this system three times during manufacture. It was working normally when it left the factory.  
If damage in transit has occurred, please return to place of purchase for attention.

**THIS ESC IS GUARANTEED FOR ONE YEAR.**

You will supply the DSM2 2.4 Ghz Digital Proportional R/C TX handpiece.  
You will also supply a locomotive or trail car, the 7.2 – 14.8 volt traction batteries,  
ON-OFF switch and wires where necessary, to connect the ESC to the battery and motor(s).  
Where soldering is necessary, we recommend a low wattage soldering iron and resin core solder.

**WE SUGGEST YOU MARK THE TX TO IDENTIFY THE OPERATOR.**

## CAUTION

DO NOT ATTEMPT TO ALTER THE TUNING OF THE RADIO EQUIPMENT.  
DO NOT USE RADIO CONTROL EQUIPMENT IN THUNDERSTORMS.

CHILDREN UNDER 12: ADULT SUPERVISION RECOMMENDED DURING USE.

## INSTALLING THE # **Rx65b** ESC.

We use, recommend & prefer any of our own DSM2 TX handpieces for the # **Rx65b** ESC.

With Centre OFF control you can only use the TX-4 handpiece.

With Low OFF control the small knob (TX-3, TX-5 & TX-7) sets the direction. The large knob is used for speed control.

Programming changes can be made by consulting page # 4 & here: <http://www.rcs-rc.com/pages/battery-r/c/basic-3>

For full programming codes go to <http://www.deltang.co.uk/rx65a-v611-p.htm>

### LOCOMOTIVE SEPARATION.

2.4 GHz R/C systems are not separated with crystals. Every TX has a unique identifier code. They are all legal for air & ground use. The # **Rx65b** has a built in 2.4 GHz RX and can be bound to any DSM2/DSMX TX.

You can bind as many # **Rx65b** ESC's to one DSM2/DSMX TX hand piece as you wish.

“**BINDING**” must be done before the system can be used. See below for the “**BINDING**” procedure. There is no binding plug used and binding is fully automatic. Once bound to a TX the RX/ESC will stay bound to that particular TX.

It is possible to bind the RX's inside a loco from the outside. The front headlight output is also tied to the RX/ESC LED and will give a visual indication that binding is taking place and when binding is complete.

### MOUNTING THE ESC.

You can mount the # **Rx65b** PCB with double stick tape or non-conductive silicone. Do not allow metal objects to touch the PCB. Damage to the PCB may result.

### PLACING RX ANTENNA.

After some years of using 2.4 Ghz we are now confident that it does not matter where you place the RX and antenna.

We have at least 150' + range with the system in plastic locos. There is **NO** “glitching” or “Rusty Bolt Effect”.

2.4 GHz RX's have been successfully used for some years with the RX & antenna inside a dummy water tank of a live steam loco and inside expensive brass electric locos. In these instances range may be slightly reduced.

### CRUISE CONTROL.

If you turn the 2.4 Ghz TX OFF to save the batteries the loco will cruise on until the batteries go flat. You can “Cruise” along until the TX is turned ON again & manual control resumed. The operating program ignores DSM2 TX Fail safe. See page # 4 for how to turn ON the “Fail safe” which will slow down then stop the loco after a few seconds signal loss.

### POWER SOURCES.

As is, the # **Rx65b** can only be used with battery power. Ensure the battery pack is fully charged before use.

Connect the traction battery, which **MUST BE FUSED**, as per the wiring diagram. **POLARITY IS VERY IMPORTANT.**

If a full wave bridge rectifier with adequate filtering is employed, it is possible to use a constant track voltage as power.

**RCS** R/C offers a variety of installation kits for on board use such as the # **BIK-U3/6** which has screw terminals to simplify installations. For trail car installations we also have the # **BIK-TC2/3** and # **BIK-TC5**.

### MOTOR CONNECTION.

With # **Rx65b** connect the motor(s) as per the wiring diagrams to **M** & **M**. The Orange **M +** motor output is positive (+) in a forward direction. Our extensive testing has shown the system doesn't need any motor “Noise” suppression.

### SHORT CIRCUIT & OVERLOAD PROTECTION.

**RCS** has supplied 2 x Polyswitch fuses. It is essential the battery supply be fused for overall system protection. See the wiring diagram pages. The other Polyswitch fuse should be inserted in the motor drive circuit.

### LOCOMOTIVE LIGHTING.

The **RCS** # **Rx65b** ESC has Front (white wire) & Rear (yellow wire) open collector/open drain directional lighting outputs. Please note: Maximum current is 2 amps per terminal. A suitable resistor must be used in conjunction with the LED's you will be using. You can run multiple LED's or incandescent bulbs with the outputs.

**IT IS MOST IMPORTANT THAT THE LIGHTS BE COMPLETELY ISOLATED FROM ANY OTHER WIRING.**

Instead of rewiring some locos, sometimes it is much simpler to control the regular loco wiring by simply reversing the traction battery voltage. You can use the # **RELAY-1v3** to do this as it can save a lot of wiring in many locos. It is especially useful in USA Trains® locos to control incandescent bulbs or LED's up to 1 amp & smoke features.

Please note: If the # **RELAY-1v3** has been used, the lights will flash alternately, not together as with transistor outputs. When the speed control knob is in neutral only one set of lights will be lit.

The instructions assume the operator has used the available front & rear transistor lighting outputs or # **RELAY-1v3**.

If you do not have any lighting outputs connected you **MUST** be able to observe the LED on the ESC.

### SOUND SYSTEM TRIGGERS.

The # **Rx65b** ESC has 1 x sound trigger pre-set on Terminal # 5 (the Green wire) to be controlled by the Ch # 5 button on all TX's. If more sound system triggers are required please consider using an RCS ALPHA-3v2 instead.

## “BINDING” THE *Rx65b* ESC.

**Prior to using this system Binding must be carried out by the operator. Unless already bound.**  
The loco front headlight is set up internally to follow what the RX/ESC LED is doing.

### HOW TO “BIND”.

1. Turn on the RX/Loco. The RX LED & headlight will blink slowly waiting to go into “BINDING” mode. Wait 20 seconds until the RX LED & headlight flicker rapidly indicating the RX is ready to be bound. Then:
2. Press & hold the Binding button (Above hexagon symbol) & turn the TX power switch to ON and hold both buttons. When RX flashes release both buttons.
3. The TX button and RX LED & headlight will blink slowly a few times & then both will go solid ON. The headlight will flash once and then go out.
4. Binding is complete.

## OPERATING THE *Rx65b* ESC.

**CENTRE OFF: THE THROTTLE KNOB MUST BE CENTERED BEFORE TURNING THE SYSTEM ON.**  
**LOW OFF: THE THROTTLE KNOB MUST BE SET FULLY LEFT (CCW) BEFORE TURNING THE SYSTEM ON.**

The following directions refer to the RCS TX series hand pieces.

When operating always turn the TX on first. (Not binding) Then turn the loco ON. The **ESC** & loco lights will stay OFF. After between 1 - 2 seconds the RX will recognise the TX. The RX LED on ESC will come ON & not blink. Both front & rear loco lights (if fitted) will stay OFF until a direction is selected and speed ramped up.

If the default motor & lights direction is incorrect please see Page # 4 PROGRAMMING of the full instructions. To change the default start direction use **1, 1, 6, 2**. To go back to the default use: **1, 1, 6, 1**.

### **Rx65b CENTRE OFF CONTROL. (TX-4 only)**

#### **FORWARDS - SPEEDING UP.**

To select forwards direction twist the knob from neutral slowly clockwise (CW) to the right. The Front LED will come on just as the loco speeds up following the knob setting.

**SLOWING DOWN.** Turn the knob back to the left (CCW) to set desired speed.

**STOPPING.** . Completely stop the loco by bringing the knob back to neutral.

#### **REVERSE - SPEEDING UP.**

To select reverse direction twist the knob slowly to the left (CCW). The Rear LED will come on just as the loco speeds up following the knob setting.

**SLOWING DOWN.** Turn the small knob back to the right (CW) to set desired speed.

**STOPPING.** . Completely stop the loco by bringing the small knob back to neutral.

**SHUTTING DOWN.** When you have finished operating, turn off the loco(s) before the TX. If you leave the loco(s) turned on the headlight will start blinking to indicate the loco is not receiving a TX signal.

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### **Rx65b LOW OFF CONTROL. (All other TX handpieces).** ESC will require resetting to LOW OFF.

#### **FORWARDS.**

Both lights will be out. To select forwards:

**TX-3, TX-5 & TX-7**, twist the direction knob fully to the right. (CW).

#### **SPEEDING UP.**

Gently twist the knob clockwise (CW). The front light will come on just as the loco starts to accelerate away after slightly turning the knob.

The speed is proportional to the knob position with a small amount of momentum built in to prevent sudden jerky movements. Let the knob go once the desired speed has been reached. The speed will stay the same until the knob is rotated CW or CCW. Min - Max speed takes 2 x seconds.

#### **SLOWING DOWN.**

Turn the knob CCW back to the desired speed. Max - Min speed takes 2 x seconds.

#### **STOPPING.**

Turn the knob completely CCW back all the way to stop. The **ESC** LED & front light will be ON.

#### **REVERSE.**

You must completely stop the loco first. The Throttle knob must be at Min. (i.e. fully CCW).

**TX-3, TX-5, TX-7**, then twist the direction knob fully to the left (fully CCW) to select reverse. No neutral.

To speed up, slow down & stop in reverse see **SPEEDING UP, SLOWING DOWN & STOPPING** above.

As you speed up in reverse the appropriate directional light will illuminate.

## PROGRAMMING THE *Rx65b* ESC.

We have set up the # *Rx65b* with features we think will be the most useful for average Large Scalars. The system is infinitely programmable but the instructions are too detailed to publish here in their entirety. Please visit <http://www.deltang.co.uk/rx65b-v611-p.htm> for information on how to invoke programming mode and how to actually change the various features. Return TX-5 Aux knobs to neutral before commencing programming.



**STEP # 1** Turn TX handpiece ON.



**STEP # 2** Press and hold both F2 & F4 buttons.

### STEP # 3

Turn Rx65b RX/ESC ON. Wait for RX/ESC LED to flicker fast then release F2 & F4 buttons.

RX/ESC is now ready for programming.

The small direction change (Ch # 3) knob is used for making & confirming programming changes. We strongly recommend programming only one ESC at a time only.

### STEP # 4

TO MAKE A MENU ITEM LEVEL CHANGE:

Twist direction knob CCW (Left) and return enough times to equal required setting. If a lower # is required from a higher # keep twisting the direction change knob to the left. It will eventually go back to the start. i.e. 1 x blink. LED will count total required blinks then:

### STEP # 5

TO ACCEPT A MENU ITEM LEVEL CHANGE:

Twist direction knob CW (Right) & return.

Once LEVEL change has been accepted Next LEVEL follows. (i.e. Back to STEP # 4).

Once changes to all LEVELS have been accepted the ESC LED will go solid ON.

If other MENU items are to be changed START at STEP # 1 and repeat. The system is then ready to operate.

Once programming mode has been invoked here are some examples of what you might like to change.

#### Centre OFF operation.

We supply the Rx65b ESC set to "CENTRE OFF" operation which has 150° speed & direction control on Ch # 1 from Centre OFF to full speed each way.

You can opt for "LOW OFF" control on the throttle knob with this code = **1, 1, 2, 1, 3**

#### Low OFF operation.

If the Rx65b ESC has been set to "LOW OFF" operation and you wish to change it back to "CENTRE OFF" control on the throttle knob, use with this code = **1, 1, 1, 1**

**Fail Safe.** This is supplied turned **OFF** in case you wanted the loco to continue running with the TX turned OFF:

If you want to reactivate fail safe use **5, 4, 1** and then sleep mode use **5, 3, 1** depending on the settings you wish to use.

To disable the fail safe again use **5, 4, 5**. and then sleep mode use **5, 3, 7**.

You might like to reverse the default start direction so you can add a loco back to back with another.

To do so use **1, 1, 6, 2**. To go back to the default use: **1, 1, 6, 1**.

Maybe you want to switch a cab light ON and OFF. Perhaps using terminal # 2 on a # LT-SW4v2.

To change from momentary to latch ON - OFF. Use **3, 4, 2, 4, 1**. Back to momentary, use: **3, 4, 1, 4, 1**.

It is possible to make any of the four extra functions latch ON – OFF. Contact RCS for specific codes.

**Ch # 5 Bind button:** This is the default for a sound trigger on terminal # 5.

We advise you not to tamper with the switching codes.

Contact RCS if you have any other requests and we can send you the programming codes for the particular feature you wish to change.

If you have trouble programming please call RCS and we will walk you through the steps.

#### TROUBLE SHOOTING.

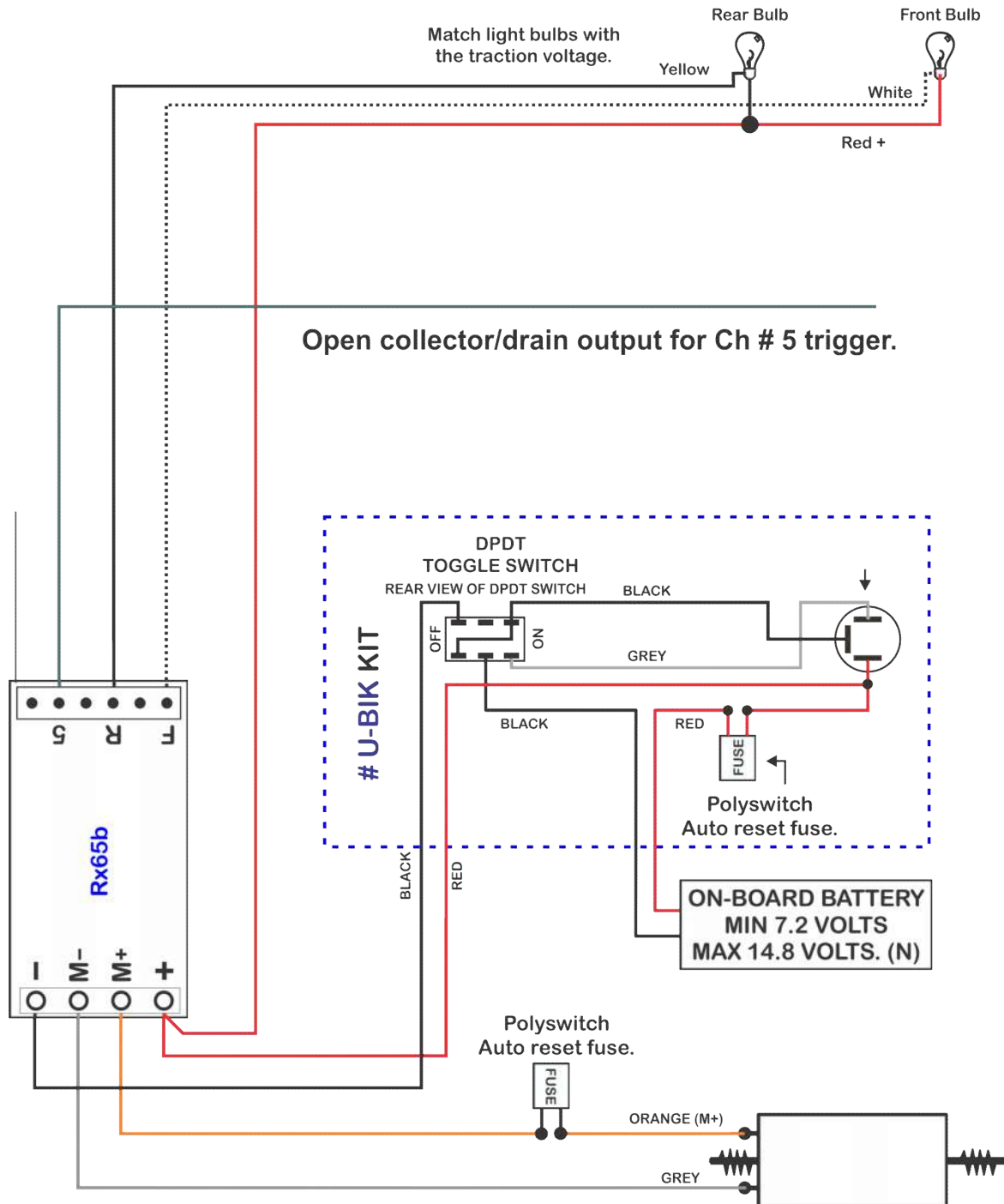
**PLEASE ADVISE US OF ANY PROBLEMS ENCOUNTERED & WE WILL INCLUDE THEM HERE.**



# WIRING THE RCS # Rx65b ESC with Battery power. How to wire incandescent lighting.

**N.B. Maximum current on each output is 2 amps.**

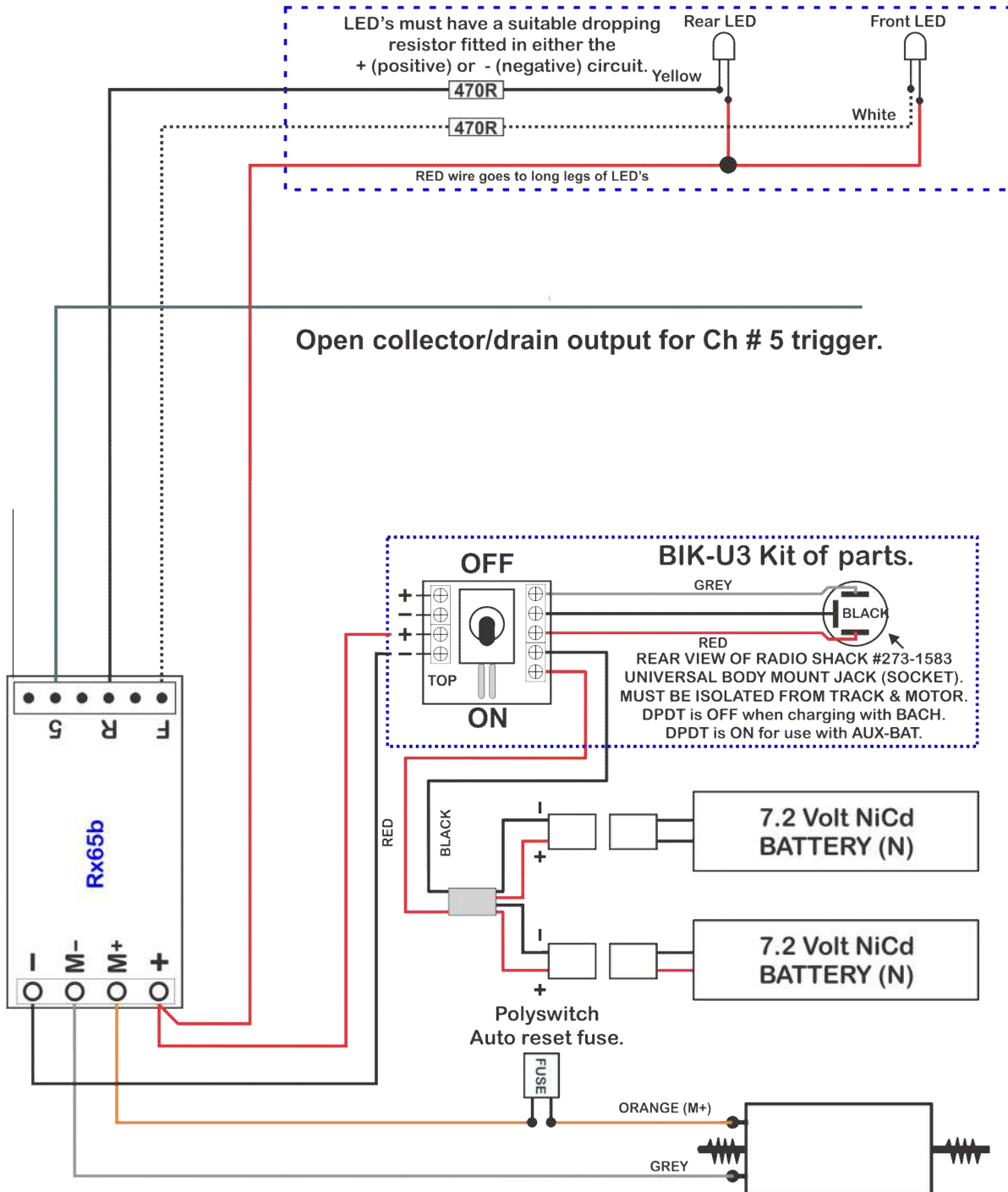
The ● symbol indicates where wires are joined.



# WIRING THE RCS #Rx65b ESC with Battery power using # BIK-U3. How to wire LED lighting.

**N.B. Maximum current on each output is 2 amps.**

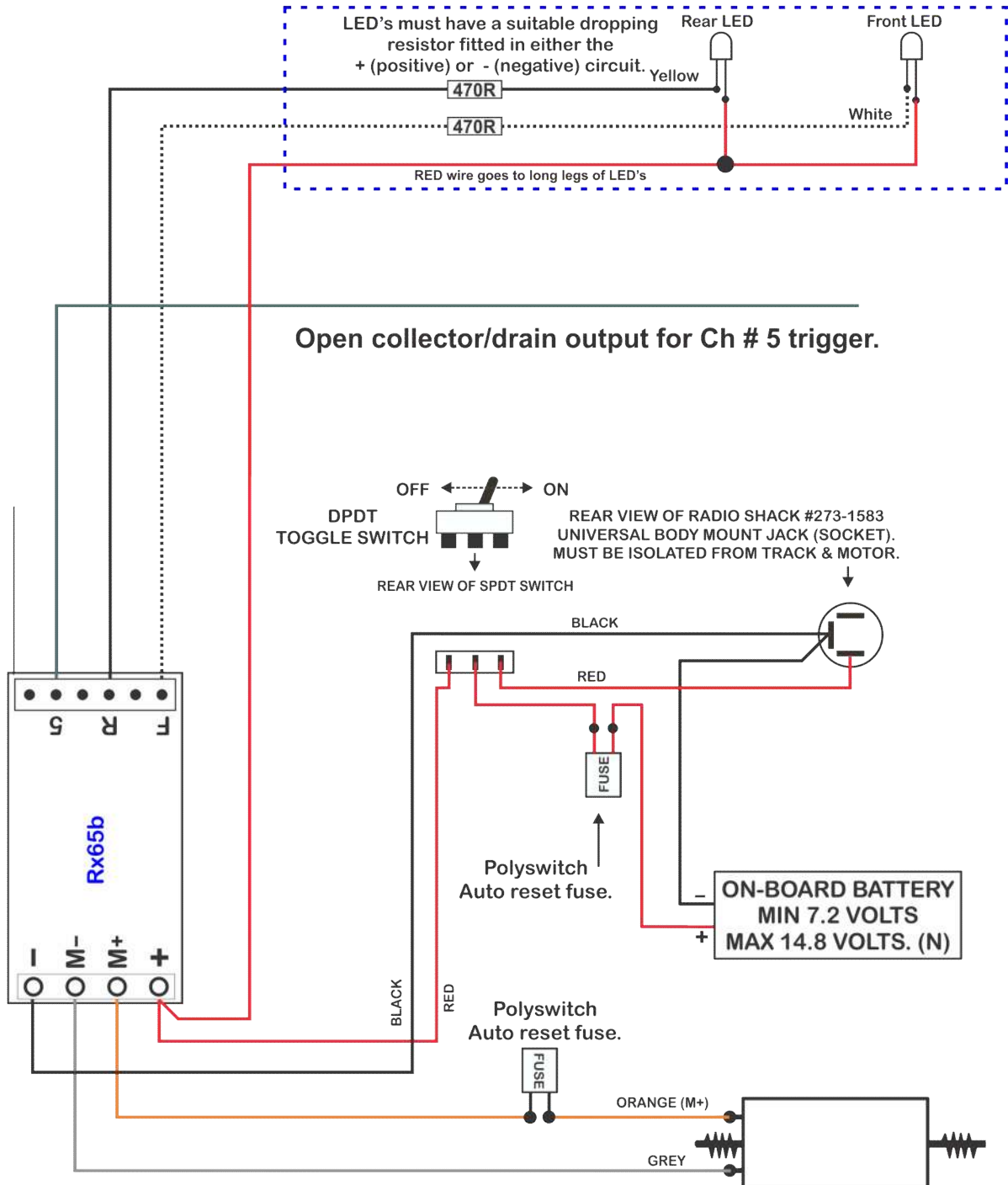
The ● symbol indicates where wires are joined.



# WIRING THE RCS # Rx65b ESC with Battery power using an SPDT switch. Cannot use AUX-BAT.

**N.B. Maximum current on each output is 2 amps.**

The ● symbol indicates where wires are joined.

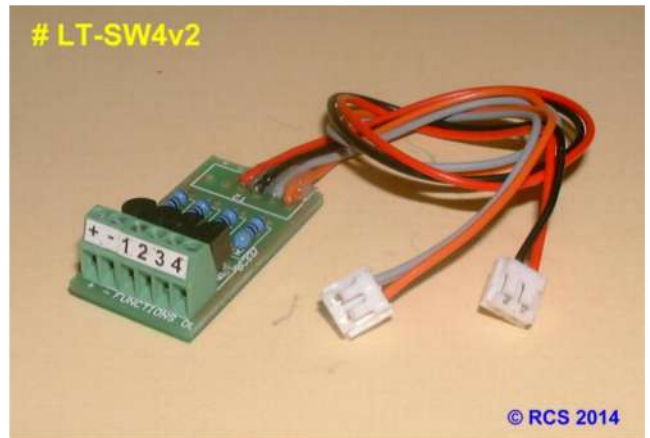


**How to wire LED lighting.**



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**# LT-SW4v2.**  
 PLUG IN 4 x WAY TRIGGER OUTPUTS  
 FOR THE # ALPHA-3v2 ESC.

This simple plug in 4 output interface goes between the # ALPHA-3v2 and most of the after market sound systems available. There is nothing to service or adjust.

