**INSTALLATION INSTRUCTIONS**

# WESTERN STAR
# GRILL & AIR VENT LED LIGHT KIT

RULE THE NITE™

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**Thank you for purchasing genuine Boogey Lights® L\ED Lighting products! We know you're anxious to get started but we strongly recommend taking time to read through these instructions. You'll likely save yourself some grief and aggravation if you do. For additional installation support refer to www.BoogeyLights.com or give us a call at 800.847.1359 for assistance.**

# BEFORE YOU START

It's simply not possible to provide detailed instructions for all installation scenarios. Far too many variables and variations. **The information in this manual is intended to be used as a guide.** It is not a detailed step-by-step how-to installation manual. We do not spell out every single step along the way. We cover the essential steps related to installing this kit. Beyond that we assume the installer has the skills, knowledge and tools necessary to do the work using the information we provide as a guide. You may need to vary your installation and/or make adjustments based on your vehicle. This is particularly the case with electrical wire routing and switching. If you're unsure about how to do the installation – particularly the electrical components – we urge you to seek assistance from someone who has those skills. **Do not expect this guide to teach you how to do it.**

Make sure you have ample area in which to work and that the area is protected from rain or cold temperatures. The 3M adhesive tape works best if applied when the air temperature is above 40 degrees (and of course is DRY).

Bench test your setup. We know this takes a few extra minutes but we STRONGLY suggest you bench test your lights (and LED controller if purchased) on a table before doing anything further. While we test every light strip and controller before shipping, bench testing your lights will eliminate the possibility of any problems with the lights or controller before mounting. Also, the process of bench testing gives you an opportunity to understand the wiring system without interference from other wires, connectors and cables. You can use any 12vdc battery to do this (e.g. car battery, motorcycle battery, lawn tractor battery or 12vdc power supply). Bench testing takes an extra 10 or 15 minutes. You can also use a common 9vdc battery to test your lights if you don't have a 12vdc bench testing power source available (the lights won't be as bright). It's simple to do and can potentially save you hours of time and frustration down the road. Please take our advice. Bench test your LEDs AND controller/switches before mounting.

RGB/MULTI-COLOR KIT Installations

Installation of this led light kit takes 3 to 5 hours depending on whether or not you're adding this light kit to an existing installation or installing this kit as a stand-alone. If the LED Controller is already installed with another kit , this kit will simply tie into that controller. If you need to also install the LED Controller, it will take additional time to do this. Wiring diagram is included at the end of the guide.

SINGLE COLOR KIT Installations

Installation of our single color kit typically takes 2 to 4 hours. With single color installations we always recommend using a dedicated on/off switch OR if you want to tie them into an existing circuit (e.g. marker lights), we suggest adding a relay to the circuit. If you purchased any of the on/off wireless switches we offer, you do not need a relay provided the grill lights (and/or optional air vent lights) in this kit are the only lights you're switching on it. The single color on/off wiring diagram is included at the end of this guide.

Know your Power Consumption

Regardless of which switching mechanism you're using, it's important to be mindful of the amount of amperage you're drawing through your lighting circuit and not exceed the circuit component limitations. The amount of power (amps) you're pulling through the circuit will vary based on a combination of three factors: 1) The number of LEDs in the circuit, 2) the amount of copper wire in the circuit and 3) the input voltage to the circuit. It's important to keep in mind that the amperage ratings for the switches/controllers/LEDs assume 12.5 vdc input voltage. If you're wiring your lights to a vehicle that has a charging mechanism (e.g. alternator), the input voltage will likely increase when the engine is on; particularly as RPMs increase. It's not unusual for an alternator to charge the battery at a rate of 13.5 to 14 vdc depending upon the vehicle. Increasing the input voltage to the LED Controller/LEDs will also increase the amperage

draw of those LEDs because they'll burn brighter. For example, we've seen circuits that draw 17 amps when the engine is off and the input voltage is 12.5vdc but jump up to drawing 24 amps when the engine is on and RPMs increased. This is because the input voltage jumps to 14vdc when the engine is running. This is why we strongly suggest measuring actual amperage drawn for your particular installation to make sure it's fused and wired appropriately. If you are not familiar with DC electricity and how to measure both voltage and amperage draw, we urge you to seek the assistance of someone who does. Improperly sized circuits can cause fires and/or damage other electrical systems in your vehicle.

## LED MOUNTING LOCATIONS

There are a possible total of three mounting locations in this kit (grill, driver air vent, passenger air vent). All of the power leads need to be carefully run over to the driver's side frame rail and back to the battery bank area on the driver's side. You will need to remove each of the air vents but can usually access the grill from the inside of the hood. If you're installing an LED controller or other wireless switching control with this kit, you'll need to remove the driver's side steps to access the batteries. Also, the LED controller is mounted in the driver's side storage / jockey box. You will need to drill a hole in the floor of that box to connect power to the battery box, led wires and antenna.

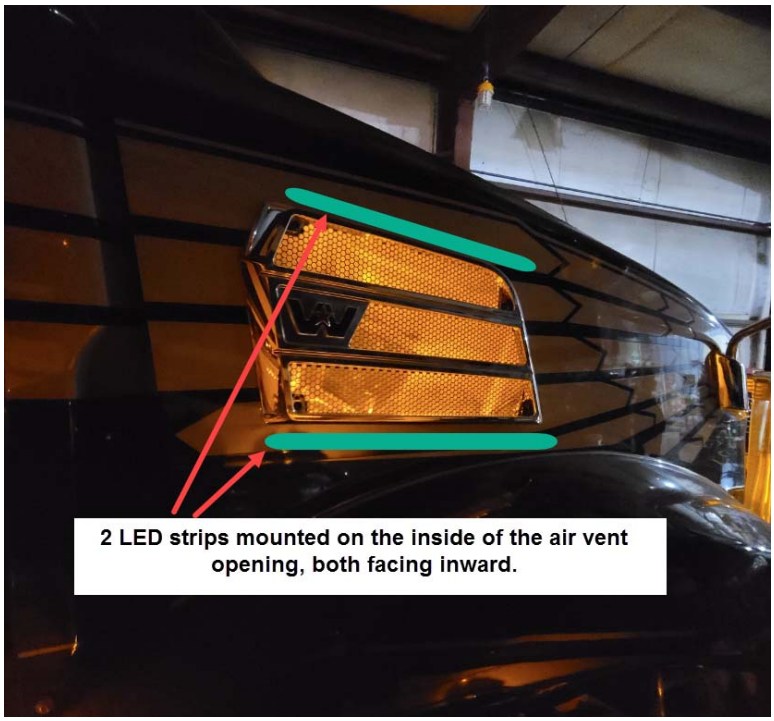
**Grill Area:**

You'll need to open the hood to gain access to the inside of the grill. For the Western Star the way the grill is designed requires each of four LED strips to be mounted vertically on the braces inside the grill. Here's a photo:

The power lead for each LED strip should face downward where all four of them can be wired together and then run back to their power supply (controller, etc). It's important the mounting surface be properly prepared by removing all grease/dirt/oil with rubbing alcohol. Then, apply the 3M promoter to the mounting surface before attaching the LED strips. More detail on this process is included later on in this guide. The power lead needs to be encased in split loom which then needs to run up the driver's side frame rail to the battery box or LED controller depending on your configuration. Before doing this though we recommend you install the air vents next so you can connect the air vent power leads with the grill power lead and then run just one power lead cable back to the battery box/led controller. Make sure the power lead is routed in such a way that it isn't pinched by the hood closing, chaffing or mounted too close to the engine or other extremely hot surfaces.

**Air Vents:**

You'll first need to remove the two air vents on each side of the hood. We found it easier to do this when the hood was closed. Next, open the hood and remove the two black plastic splash guards on each side of the truck. This will give you room to get under the air vent plenum. Next, you'll need to drill a ¼" hole at the base of each air vent compartment. We like to put down a piece of Gorilla tape before drilling into fiberglass. Helps reduce splintering. Once you've drilled the ¼" hole on each air vent, you'll need to "fish" the power lead wire through that hole you just drilled. We found it easier to accomplish this by first pushing a coat hanger (or similar "fish tape" like wire) up from the hole we just drilled so it comes out the air vent in the hood (or at least within reach of your hand from inside the vent). Then, temporarily tape the led power lead to that fish tape/coat hanger and pull it back through the hole you just drilled. At this point you're ready to mount the LED strips to the inside of the air vent. When mounting the strips, mounting them against the outside wall from inside the vent such that the light coming from the LED strip is facing inward. We mount one led strip on top of the vent and one on the bottom as shown here:



**2 LED strips mounted on the inside of the air vent opening, both facing inward.**

You'll notice that each LED strip has it's own power lead. We prefer to wire them together inside the air vent and then fish a single power lead out of the air vent under the hood. This way you are drilling a smaller hole in the bottom of the hood. That said, you could just as easily fish both power leads through the hood too. Just be aware however that doing so requires a larger hole be drilled in the bottom of the hood so both power leads can be fished through that hole. It's up to you. Either way, be sure to seal around that hole and power leads with some butyl tape which we include in the kit. It's important that hole be air tight. Also, we suggest using some zip tie mounts on the inside of the hood to secure the power lead against the hood so they don't flop around.

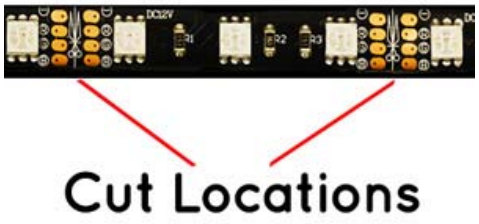
## WHAT'S INCLUDED

In addition to the LED light strips and power leads (and LED controller and/or switch if purchased), this kit includes some additional items you'll need. Here's a quick review of those items and why we include them.

- 18AWG (or 20AWG) Feeder Cable – 4 Conductor for RGB, 2 Conductor for Single Color. Use this cable to extend the LED power leads back to the battery box and/or the LED controller.
- 3M Adhesion Primer. Used to prep the surface before attaching the LED strips AND the 3M quick-lock tape. *Always, always, always* use this adhesion primer with 3M adhesive products if you want the bond to hold.
- 3M Quick Lock Reclosable Tape. This is a heavy duty "Velcro like" product. Used to mount the LED controller (if purchased) to the wall in front of the driver's storage compartment.
- Split Wire Loom / ¼". All power leads and the battery extension cables need to be protected from chaffing. Wrap them in this first.
- Split Wire Loom / ½" . We include the ½" split wire loom to be used when you're connecting multiple power leads together. Helps protect that connection.
- Battery Extension Cable (if LED Controller is purchased). We include some 12awg cable to extend the battery power inputs going to the LED Controller to the battery. Be sure to wrap this extension cable in split loom.
- Fuse Holder – 25AMP (if LED Controller is purchased). Insert this fuse holder on the 12vdc positive side of the battery connection before the battery extension cable. This is critical.
- Battery Terminal Lugs (if LED Controller is purchased). We include a couple of battery terminal lugs that attach to the battery extension cable (crimp on) to make it easy to connect the positive and negative power leads to the truck's battery to the LED controller. It's a much better way to make this connection than to just simply wrap the bare cable around the battery post.
- Butyl Tape. We use butyl tape to seal the holes we drilled in the hood for the air vent power leads. We also use it in a few places on this installation to help hold power lead wires in place. Butyl will only work if you apply it to a clean surface so make sure you first clean the surface with rubbing alcohol.
- 8" Zip Ties. We include some zip ties which you'll need to secure the LED power leads to the truck.
- Crimp On Wire Connectors. These are used to secure the wire connectors at the LED Controller as well as making all power lead connectors to the feeder cable. We recommend wrapping each connector after it's crimped with electrical tape to protect it from water intrusion.

NOTE: Every installation varies a little so you may need to purchase additional items (or more of them such as zip ties) for your install.

**CUTTING YOUR LEDS**- If you need to cut your LED strip you can do so as long as you cut in the proper location – which is every three LEDs as shown in the below photo. Cutting incorrectly could damage your lights and is not covered by the warranty. If you cut the strip, be sure to use the included heat shrink tubing to seal the cut end. You can also use silicone found at your local hardware or RV store. If you do need to cut your LED strip, we strongly suggest doing so BEFORE you mount the strip.



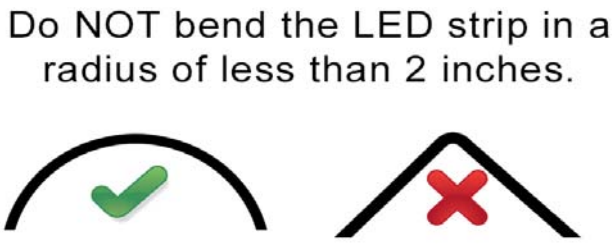

*Follow these steps for mounting your LED strips:*

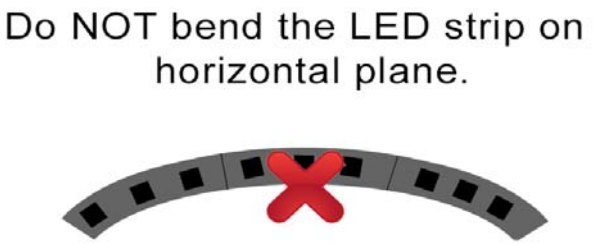
- The area where you are mounting the LEDs has to be clean: free of all dirt, oil or anything that might affect the LED from sticking. You only get one opportunity to mount the LEDs so it's critical the area be prepared properly.

- Use the supplied alcohol pads to clean the area where you are going to mount the LED strip. Be sure to let the alcohol dry completely before proceeding to the next step. (Note: Do not use acetone or similar cleaner).

- Next, use the 3M Adhesion Promoter supplied with your kit to "paint" on the promoter where you are going to mount the LED strip. ***This is an important step. Do not bypass.*** Allow the promoter to dry for 60-90 seconds.

- Peel off the red backing tape that protects the 3M adhesive tape on your LED strip. Be careful not to let the tape touch anything. The 3M backing tape on these LED strips are one-use only. They cannot be reused.

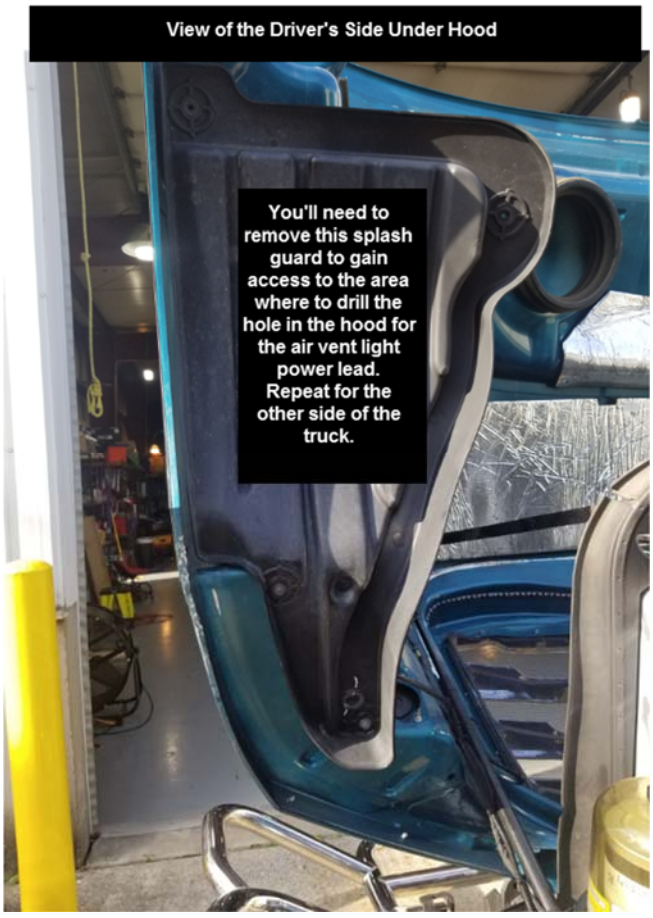


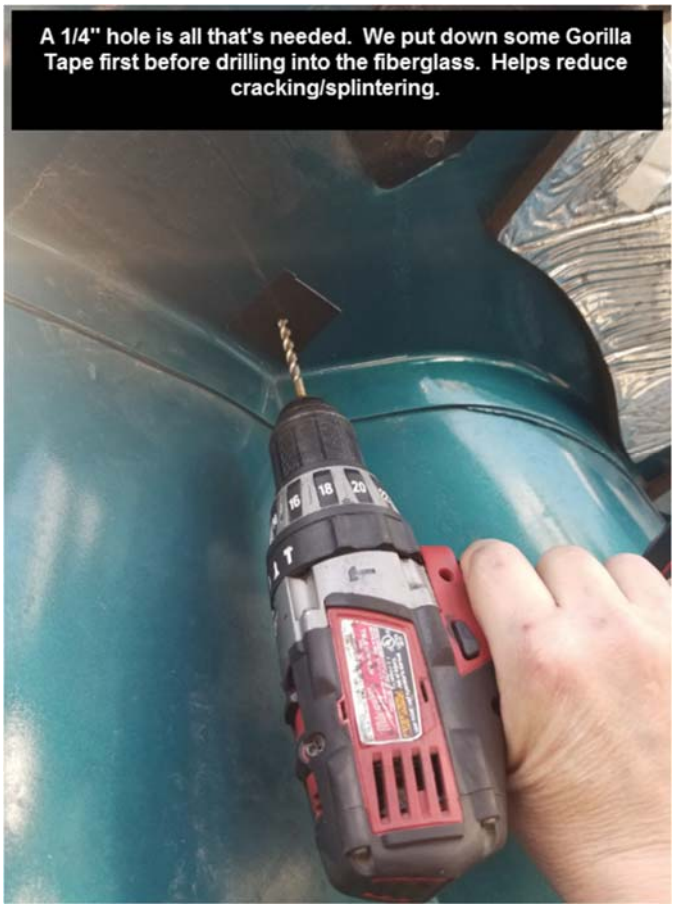




- Carefully push the LED strip to the area you have prepared. You will want to apply only enough pressure to the strip to make sure it is firmly mounted. *You only get one opportunity to do this.* Once the LED strip touches a properly prepared surface that has been promoted, that LED strip will be very difficult to remove. Moreover, if you do remove the LED strip, the strip cannot be used again without adding another layer of 3M adhesive tape to the back. DO NOT press too hard as too much pressure can damage the LEDs and connecting wires in the strip. Also, do not pull, stretch or twist the LED strip. Too much tension on the strip will also damage the LEDs such that some of the LEDs in the strip will not illuminate. The strip must be mounted flat against a single continuous mounting surface, in a straight line. Really important that the ENTIRE STRIP be stuck to the mounting surface and that you NOT attempt to span across multiple mounting surfaces.

**INSTALLATION PHOTOS**

Here are some photos with comments on the installation we did in building this kit. We've commented on key parts of the installation along the way. NOTE: These photos are from our Freightliner Cascadia installation kit but the process is the same for the Western Star.





A 1/4" hole is all that's needed. We put down some Gorilla Tape first before drilling into the fiberglass. Helps reduce cracking/splintering.


Close up view of the hole we drilled under the passenger's side air vent where the power lead exits the hood structure. We use Butyl tape to seal the hole.



NOTE: The photos here are of our HEAVY DUTY LED CONTROLLER which is used for large LED installations which typically include Under-Glow and/or Under-Cab lighting systems. For the Western Star Grill and Air Vent kit, you won't have an LED controller this large.

# Single Color Wiring Diagram w/o Remote Control

## Using A Hard Wired Switch

### FUSE

Important the positive connection is fused within 6” or less of the connection to the power source.

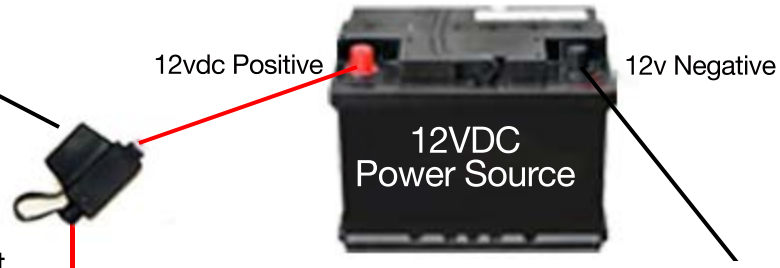
### CABLE GAUGE

12vdc power drops quickly even over short distances. Always use the largest cable gauge wire you can for running both the positive and negative cables to the power source. We suggest at least 12awg. 10awg is even better.

### SWITCHING

There are lots of options when it comes to SPST switches. The switch shown here is for illustration only. We offer a number of switching options including push-button, toggle and dimmer/on-off switches. You can also use your own switch.

Regardless of the type of switch you use, it’s important the switch is capable of handling the total amperage of the LEDs you’re switching (plus 10% for safety). If in doubt, use a heavy duty 30/40amp 12vdc RELAY. Use the switch to trigger the relay (mili-amps) but pull the main power through the relay.




Instead of running the ground wires to the negative terminal on the battery, it’s usually easier to connect the negative side of the LED strips to the vehicle ground. Just make sure there’s a good ground by making sure you’re connecting the ground wire to bare metal of the vehicle chassis (eg. no paint or rust.)




RED = 12VDC Positive
BLACK = 12VDC Negative

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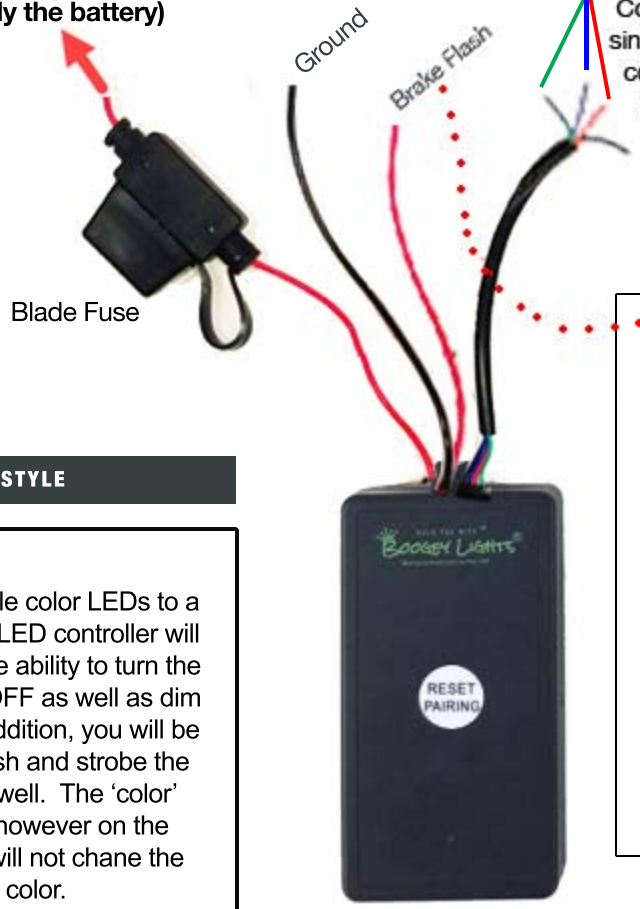
# Using a Multi-Color LED Controller with Single Color LEDs


**Red Fused Wired connects to 12vdc positive (usually the battery)**

Black wire from controller connects to 12vdc Ground

**LED STRIP WIRES:**
Red & Black Wires

**Twist the red, green and blue wires together coming from the LED controller.** Connect those to the RED power lead on the single color LED strip. Connect the black wire coming from the LED controller to the black power lead on the single color LED strip.




## POWER SOURCE CONNECTION

If the distance between your power source and the LED controller is more than two feet and you're having to extend the battery cable, be sure to use heavier guage wire (e.g. 10AWG or 12AWG) when doing so. Also, make sure to add another fuse of equal or higher amperage as the blade fuse attached to the LED controller within 6" or less of the battery connection.

## Brake Flash Integration
(Red wire w/o Fuse)

If your LED controller has this extra red output wire (without the blade fuse) simply cap it. This is a brake flash input wire that can be used in multi-color operating environments. Do not leave it exposed.

**The M7 RF remote control version of the LED Controller does not include this brake flash feature and as such, will not have the extra red wire shown here.**

## RF WIRELESS CONTROL: KEY FOB or M7 STYLE

### RF REMOTE CONTROL

OR

Remote Control Option
KEY FOB or M7

Wiring single color LEDs to a multi-color LED controller will give you the ability to turn the lights ON/OFF as well as dim them. In addition, you will be able to flash and strobe the lights as well. The 'color' buttons however on the remotes will not chane the color.

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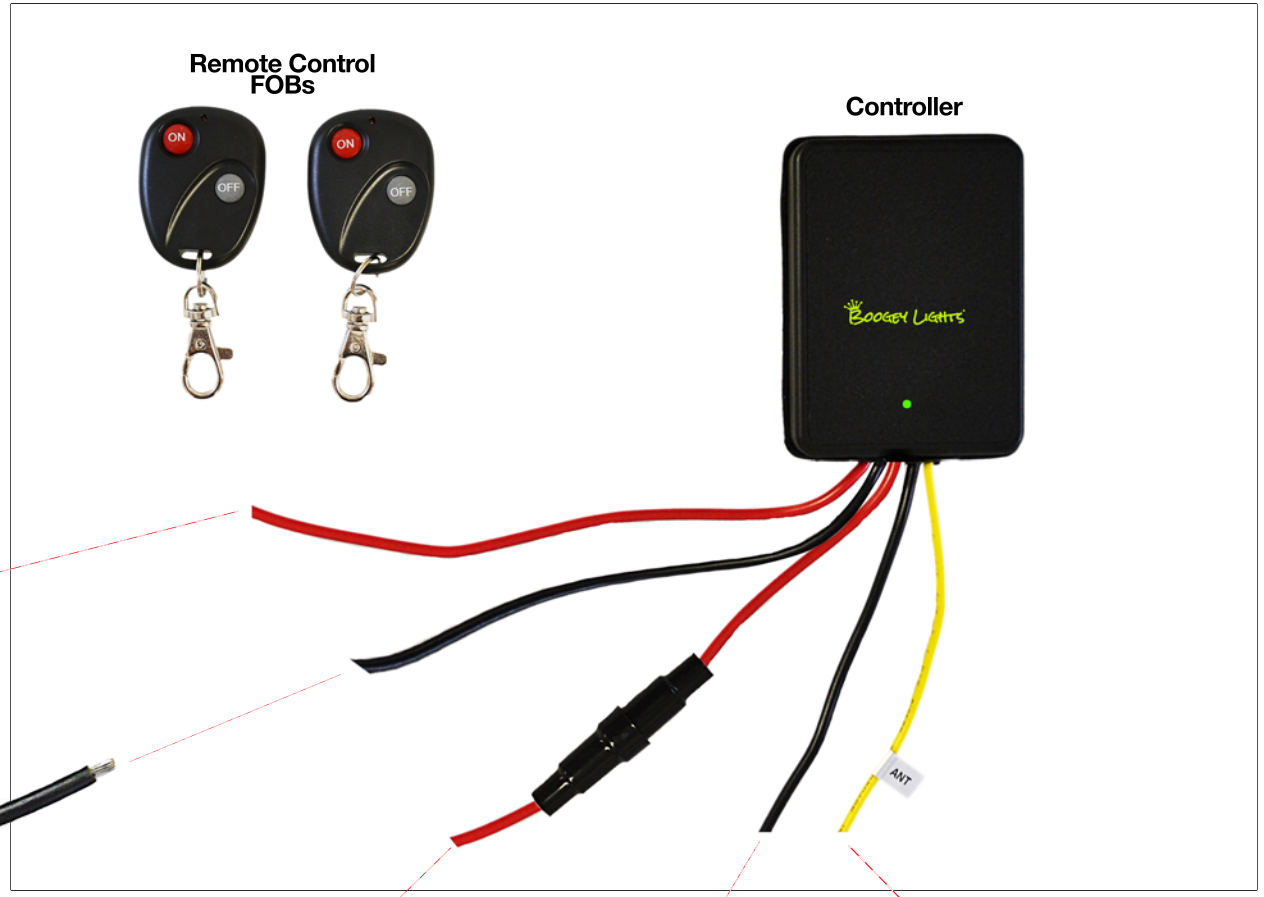
# Single Color Controller Wireless On/Off Remote

NOTE: Max amperage is 5 amps.  If you need to go larger, use a heavy duty 40amp relay.




BLWDSCOO[5-29-18]

**LED Strip Red Wire**
Connects with Red Wire from Controller.
12v+ to LED strip

**LED Strip Black Wire**
Connects with Black Wire from Controller.
12v- to LED strip

**Controller Red Wire**
Connects with Positive Terminal 12V Battery.
**12vdc + to vehicle battery**

**Controller Black Ground Wire**
Connects with Negative Terminal on 12V Battery.
**12vdc - to vehicle battery**

**Yellow Antenna Wire**
Remains unconnected.

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# Multi-Color RGB Wireless LED Controller
# COMBO Bluetooth + RF Wireless Remote Wiring Diagram


**Red Fused Wired connects to 12vdc positive (usually the battery)**

Black wire from controller connects to 12vdc Ground

Ground

Brake Flash

Blade Fuse

**LED STRIP WIRES:**
**Red, Green, Blue & Black Wires**
Connects w/ Red, Green, Blue and Black Wires coming from the LED Controller (in the wire loom). Each wire represents its respective LED light color. BLACK is the GROUND wire.

## POWER SOURCE CONNECTION

If the distance between your power source and the LED controller is more than two feet and you're having to extend the battery cable, be sure to use heavier guage wire (e.g. 10AWG or 12AWG) when doing so. Also, make sure to add another fuse of equal or higher amperage as the blade fuse attached to the LED controller within 6" or less of the battery connection.


## Brake Flash Integration
(Red wire w/o Fuse)

All *KEY FOB* PLUS & SUPER Combo LED controllers include Brake Flash integration. A feature typically used on motorcycles as a safety feature, when 12vdc power is applied to this circuit (e.g. the brake pedal is pressed), the LED controller will energize JUST the RED leds (or whatever LED color you have wired to the RED output wire from the wire loom bundle attached to the LED controller).

**If you aren't using the brake flash feature, simply cap this red input wire; do not leave it exposed.**

**The M7 RF remote control version of the LED Controller does not include this brake flash feature and as such, will not have the extra red wire shown here.**

**COMBO LED CONTROLLER: RF WIRELESS + BLUETOOTH**

### RF REMOTE CONTROL

OR

Remote Control Option
KEY FOB or M7

### BLUETOOTH ENABLED

Bluetooth wireless

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