INSTALLATION INSTRUCTIONS

FREIGHTLINER CASCADIA
GRILL & AIR VENT LED LIGHT KIT

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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.

ABOUT THIS GUIDE

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 (e.g. Under-Glow or Under-Cab), 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.

SINGLE COLOR KIT Installations

Installation of our single color kit typically takes 2 to 3 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 strongly suggest adding a relay to the circuit. Do not direct connect to the existing marker light circuit as doing so will likely cause the LCM to throw an error code.

There are three mounting locations in this kit (grill, driver air vent, passenger air vent) and 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 as well as the grill itself. If you're installing an LED controller 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.

In putting together this installation guide we assume the installer has access to and has a basic understanding of using the tools needed to complete this installation. We also assume the following:

- The installer knows how to remove the front grill and the two air vent covers on the hood. HINT: To remove the grill you need to carefully pry off the Freightliner insignia on the front of the grill which will expose a mounting screw that has to be removed. There are also bolts on the inside which need to be removed (open the hood to do this).
- The installer knows how to remove the truck's driver side steps to access the batteries.
- The installer understands 12vdc electricity, the importance of not overloading a circuit, making electrical connections using crimp on connectors, the importance of having a fuse in the circuit at the battery location and polarity.
- How to access the batteries, remove / connect battery connections, how to make electrical connections (e.g. crimping) and the importance of making sure all electrical connections are sealed properly (e.g. no water intrusion).
- How to run power lead cabling such that the power leads and related wiring are secured in a way as to protect them from chafing, pinching or melting because they're too close to the engine or other extreme heat source.

TOOLS & SUPPLIES YOU WILL LIKELY NEED

Metric tools (e.g. T-27 torx, 10m socket), drill w/ ¼" drill bit, wire cutters, wire strippers, crimping tool, electrical tape, rubbing alcohol, shop rags. You'll also need a ladder to reach the air vents when the hood is open.

BEFORE YOU START

We suggest you carefully review the following before you begin:

1. It's simply not possible to provide detailed instructions for all installation scenarios. The information in this manual is intended to be used as a guide. You may need to vary your installation based on your unique situation. This is particularly the case with electrical wiring and LED placement.

2. 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).

3. Make sure you know where your electrical connections will terminate. For this kit, you can purchase it with and without an LED controller.

- If you're purchasing without an LED controller, we assume you already have one (e.g. included with the Under-Cab light kit) and know how to add the LED strips in this kit to that controller. Or, if you purchased a single color kit (without a controller), you know how to connect the LED strips to an existing circuit and / or how to wire in a relay.
- If you purchased this kit with an LED controller, the LED controller should be located in the driver's side storage box on the forward wall. We include some 3M Quick-Lock to mount the controller to the wall. The LED power leads and power cable coming from the controller will need to exit the storage box through the floor and then connect to the battery box. We supply the battery lugs, battery extension cable and fuse holder to make the power connection. It's important this be done properly. If you are unfamiliar with 12vdc power, we strongly suggest you ask someone who is familiar with it to assist you in this process.

  We also include some LED power lead feeder cable that can be used to extend the power leads for the LEDs coming out of the LED Controller down to the battery box area. We find it easier if we make all of our connections at the battery box area than to try to run all of the power leads from the LED strips all the way to the LED controller mounted inside the storage box.

MULTI-COLOR INSTALLATIONS: We have included two wiring diagrams later on in this guide. One is for the SINGLE ZONE Heavy Duty LED controller. The other for the DUAL ZONE Heavy Duty LED controller. Most customers installing the multi-color grill and air vent lights as a stand alone light system will have the single zone led controller.

SINGLE- COLOR INSTALLATIONS: Single color LEDs do not require an LED controller to operate. They do however require a switch somewhere in the circuit to turn them off/on. There are a number of ways to do this but regardless of how you decide to switch your single color LEDs, you need to be mindful of the amperage that 150 LEDs will draw. If you're adding these LEDs to an existing circuit (e.g. with your marker or running lights) we strongly suggest using a relay vs tapping into the existing circuit. This especially important on newer trucks where the LCM will likely throw an error when you add 150+ more LEDs to the system.

4. Bench test your setup. We know this takes a few extra minutes but we STRONGLY suggest you bench test your lights AND your controller 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 before mounting.

BTW … Did we mention we suggest bench **testing your LEDs and** controller before installing? You would be surprised at how many people don't take our advice on this step.

LED PLACEMENT

These are the LED placement locations we used for this kit. It's important to follow this placement pattern to ensure the LED strips are protected. Mounting them in any other way voids warranty. We include some photos at the end of the guide showing further details.

Grill Area:

You'll need to remove the grill first. Open the hood to access the mounting bolts on the back side. Also, carefully pry the 'FREIGHTLINER' insignia off the front of the grill which will expose the last remaining mounting bolt. We mount a single 120 LED strip around three sides of the inside of the grill area (left, right, top). It's important you first put down some Butyl tape in the three seams as shown in our photos below before the LED strip is mounted. The LED strip cannot span those seams without Butyl tape being put down first. Be sure to clean the area first with rubbing alcohol and then prime with 3M adhesion primer. Butyl tape sticks much better if you do this. The LED strip starts on the passenger's side and ends on the driver's side (see photo). 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. A Torx T-27 is required. 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. There are four bolts – 10mm. 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've included a photo to show you where this is. 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 strip to the inside of the air vent. When mounting the strip, mounting it against the outside wall from inside the vent such that the light coming from the LED strip is facing inward. Also, place a zip tie mount on the inside of that vent too and then zip tie the power lead that is attached to the LED strip to that zip tie mount. This will stop the power lead from flopping around inside that air vent plenum. We have included a photo of what we're referring to below. Be sure to seal the bottom of the hole you drilled (with the power lead going through it) with Butyl tape. Also, we suggest using some zip tie mounts on the inside of the hood to secure the power lead against the hood. See photos.

You'll notice the LED strip with the longer power lead (20') is what should be installed on the passenger's side of the truck. The LED strip with the 15' power lead should be installed on the driver's side of the truck. The passenger's side

power lead should be secured using zip ties across the front of the truck at the base of the grill and over to the driver's side where it can be connected to the driver's side air vent power lead AND the grill light power lead. From there all three LED strips (grill + passenger's side air vent + driver's side air vent) can use one single feeder cable that runs up the driver's side frame rail and into the battery box – or driver's side storage bay depending upon your installation.

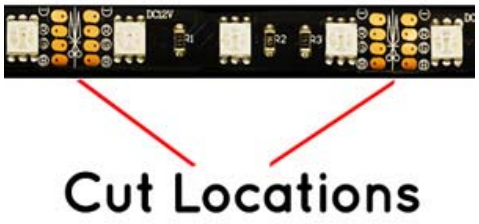
WHAT'S INCLUDED

In addition to the LED light strips and power leads, this kit includes some additional items you'll need. Here's a quick review of those items and why we include them. Some of the photos at the end of this guide reference these items too.

- 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. See photos.
- 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 create a 'butyl bridge' inside the grill (3 seams) as well as 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.



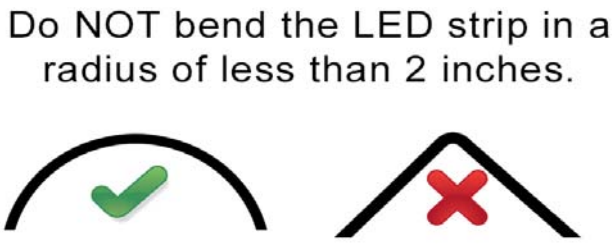
Follow these steps for mounting your LED strips:

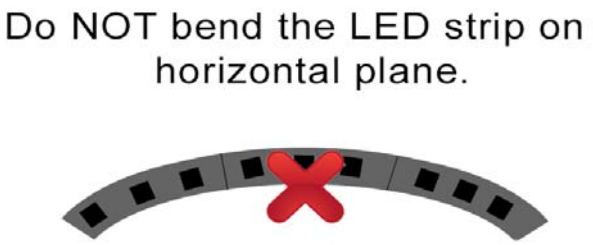
- The area where you are mounting the LEDs has to be clean: free of all dirt, oil or anything that might affect the LED from sticking. You only get one opportunity to mount the LEDs so it's critical the area be prepared properly.

- 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.

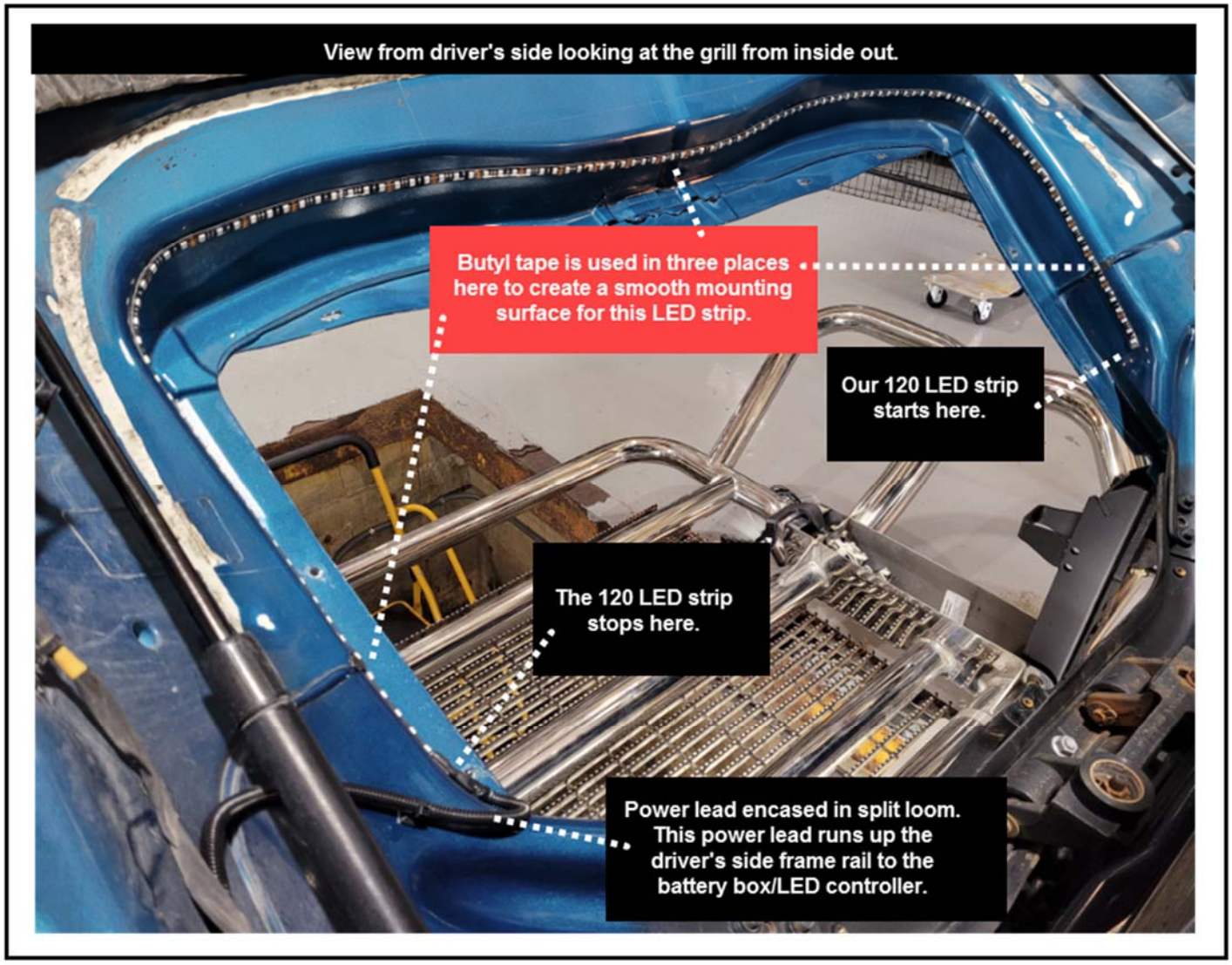


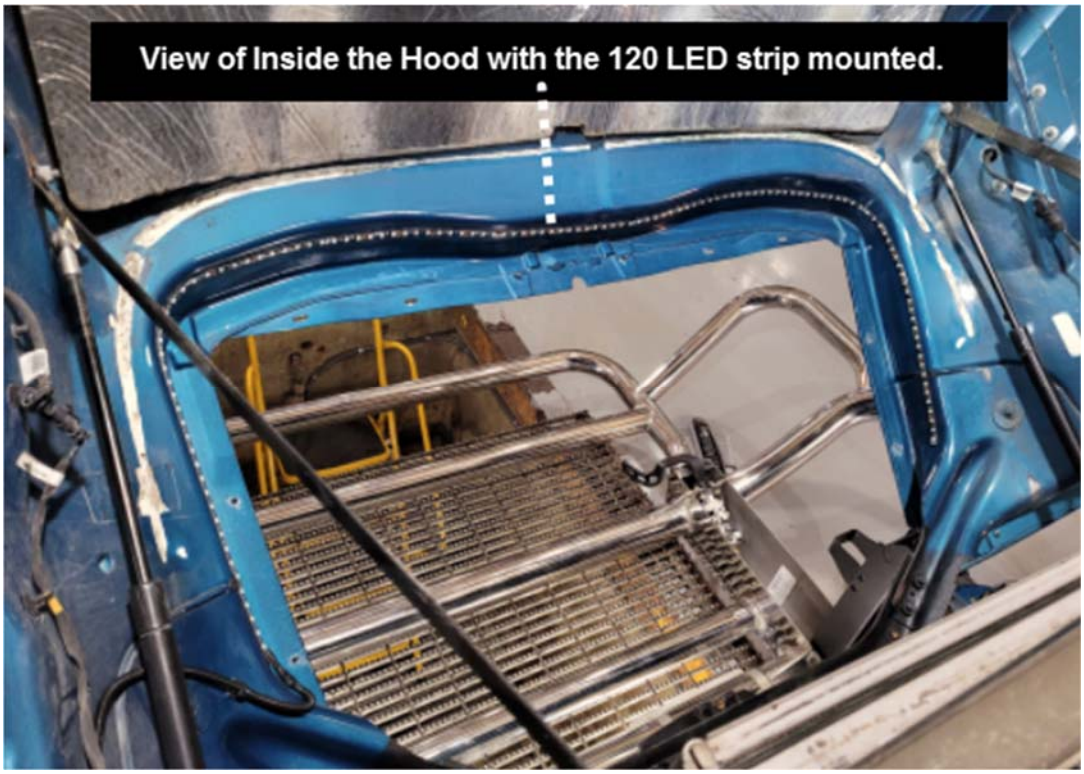


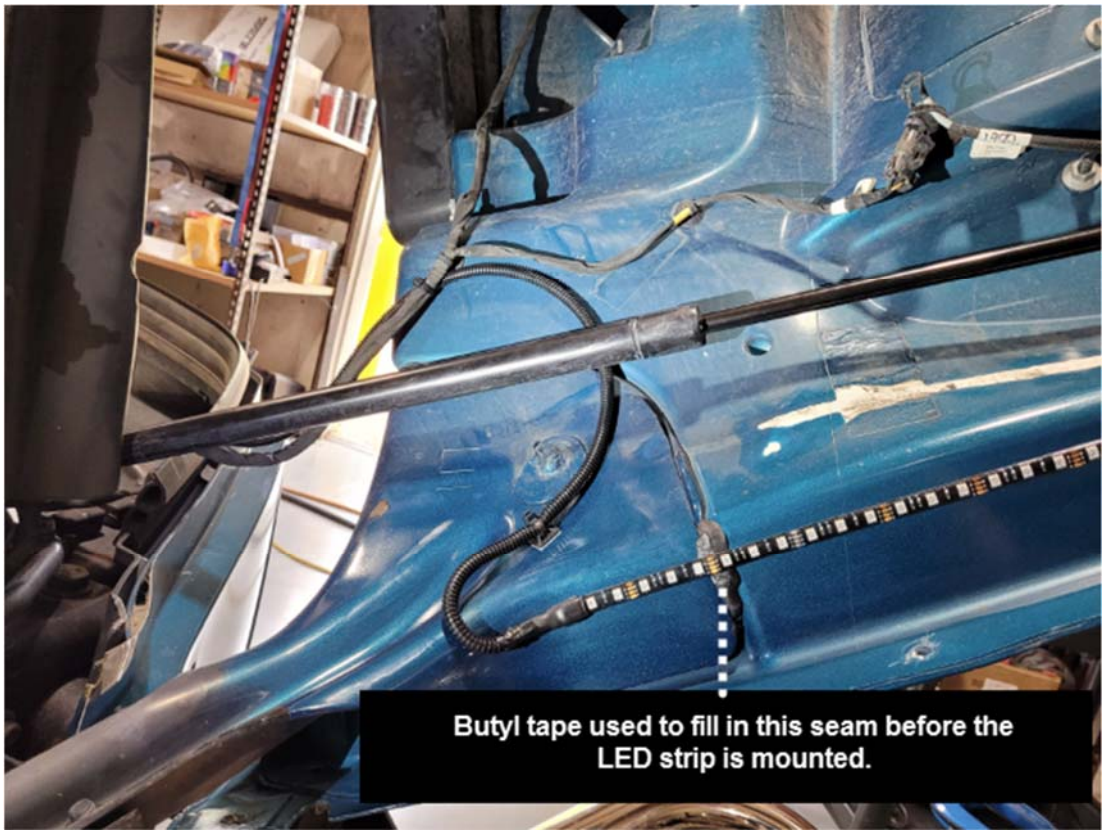
- Carefully push the LED strip to the area you have prepared. You will want to apply only enough pressure to the strip to make sure it is firmly mounted. *You only get one opportunity to do this.* Once the LED strip touches a properly prepared surface that has been promoted, that LED strip will be very 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.

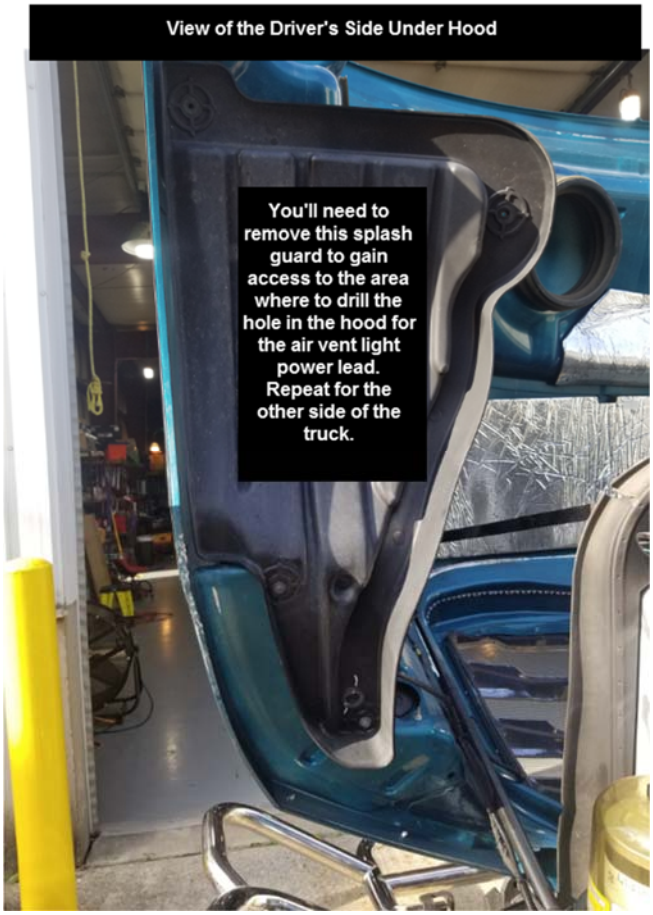
INSTALLATION PHOTOS

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.

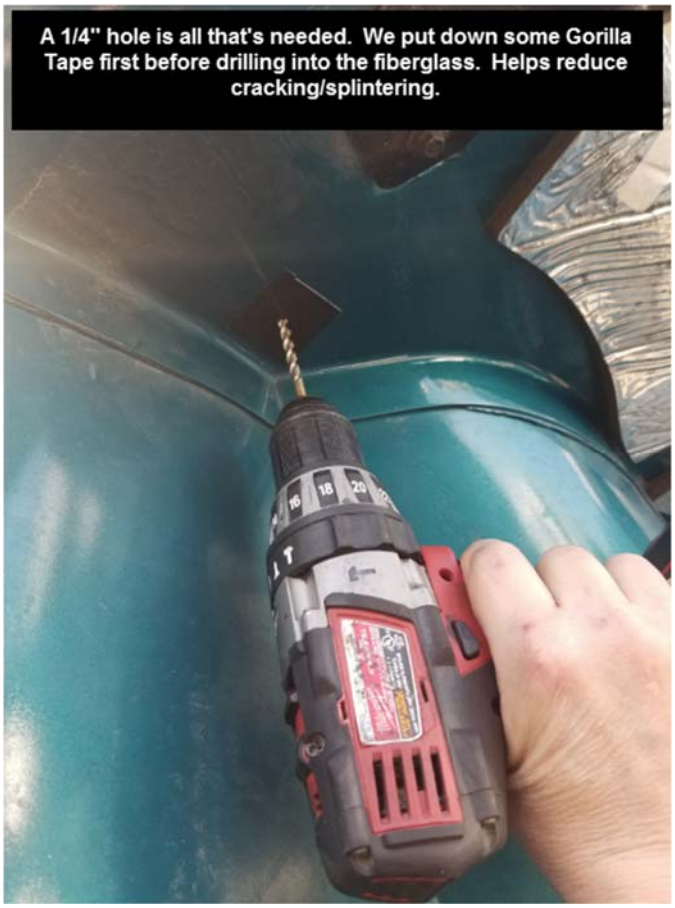



View of Inside the Hood with the 120 LED strip mounted.

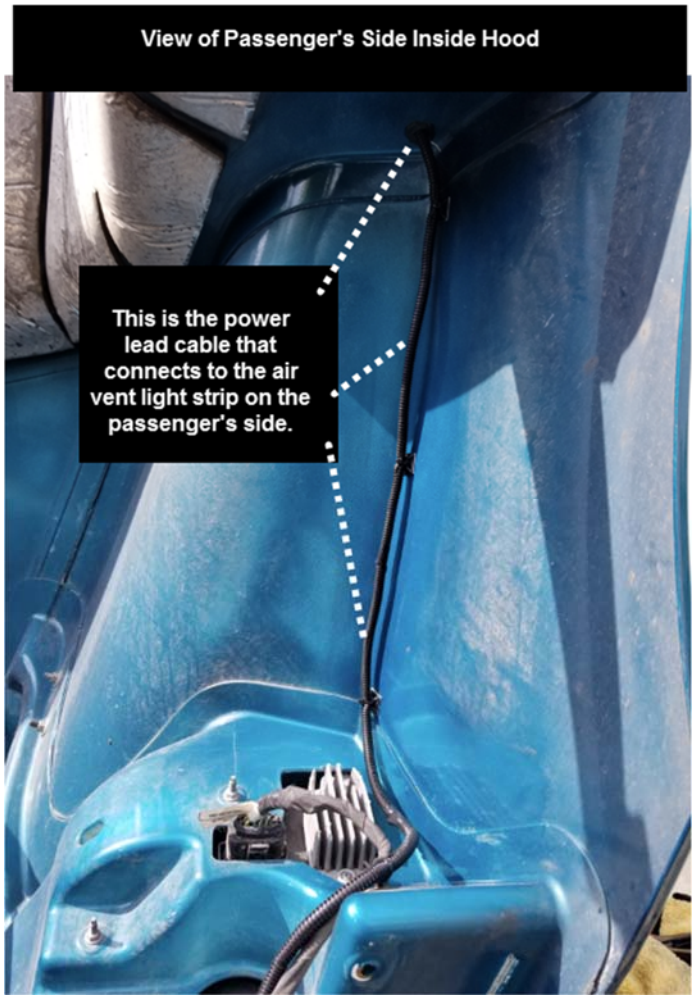

Butyl tape used to fill in this seam before the
LED strip is mounted.

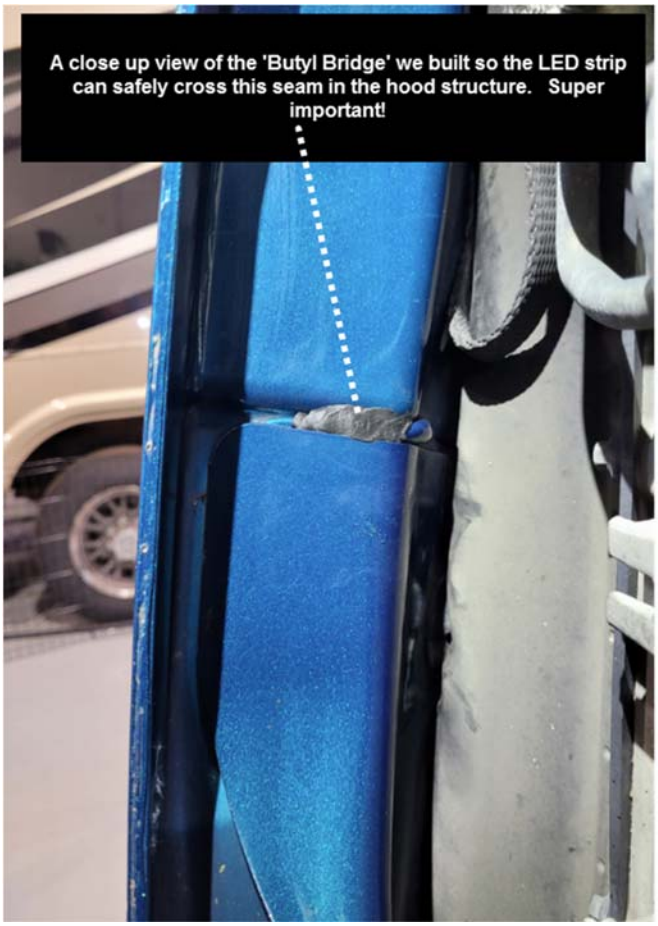

View of the Driver's Side Under Hood
You'll need to remove this splash guard to gain access to the area where to drill the hole in the hood for the air vent light power lead. Repeat for the other side of the truck.

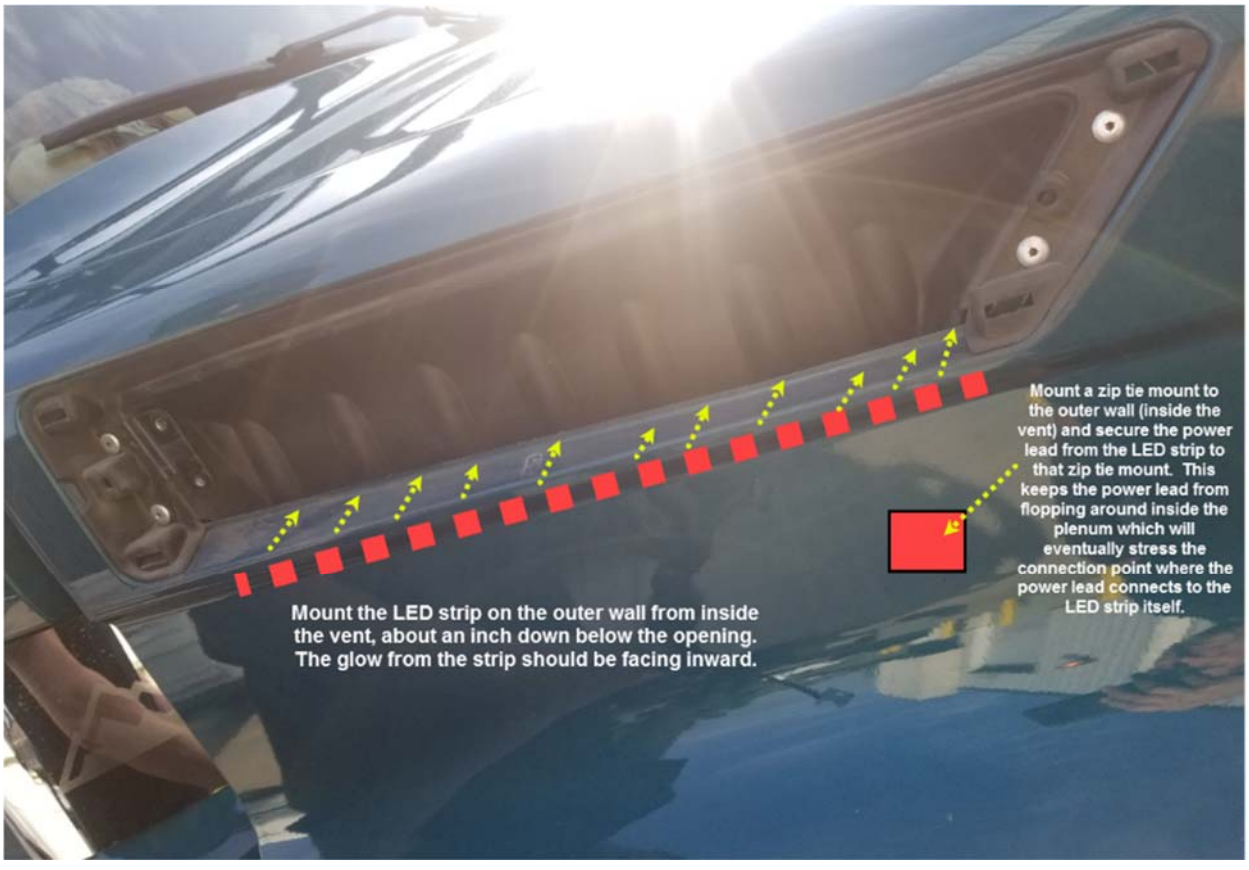

Drill a 1/4" hole here for the air vent power lead to exit the hood structure.


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.


View of Passenger's Side Inside Hood
This is the power lead cable that connects to the air vent light strip on the passenger's side.


A close up view of the 'Butyl Bridge' we built so the LED strip can safely cross this seam in the hood structure. Super important!


Mount a zip tie mount to the outer wall (inside the vent) and secure the power lead from the LED strip to that zip tie mount. This keeps the power lead from flopping around inside the plenum which will eventually stress the connection point where the power lead connects to the LED strip itself.
Mount the LED strip on the outer wall from inside the vent, about an inch down below the opening. The glow from the strip should be facing inward.


LED CONTROLLER MOUNTED
Power leads go through this hole we drilled in the floor of the storage box which runs down to the battery box.


View of the LED Controller mounted in the Driver's Side Storage Box
The LED Controller is "stuck" to the wall using 3M Quick-Lok which makes it easy to remove if needed.
1/2" hole drilled here

Heavy Duty (single zone) LED Controller Wiring Diagram

COMBO Bluetooth + Wireless RF Controller

NOTE: If the distance from the LED Controller to the battery is more than 18”, we strongly recommend adding another INLINE FUSE on the positive side of the circuit at the point at which the 12vdc+ connects to the battery.

[BLWDHDCOMBO 07-20-21]

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DUAL ZONE, HEAVY DUTY COMBO CONTROLLER

Bluetooth + RF / Wiring Diagram

The Dual Zone Heavy Duty controller has TWO 12vdc, 20amp inputs. It's important to connect both of them to a 12vdc power source capable of handling the amperage. This controller can power a maximum of 1500 RGB LEDs per zone. Do not overload.

NOTE: If the distance from the LED Controller to the battery is more than 18", we strongly recommend adding another INLINE FUSE at the battery.

MAX of 1,500 LEDS

LED Strip Blue, Red, Green & Black Wires
Connects w/ Red, Green, Blue and Black Wires from Controller. Connect with a crimp on connector. Each wire represents its respective light color. BLACK is the GROUND wire.

Each LED strip needs to connect to the controller. If you need to extend the power leads, we offer extension wire.

Zone 1

Controller RED Fused Wires (Both Zones)
Connects to positive side of battery

to 12vdc Ground

Controller Black Ground Wires
Connects to negative side of battery.

Depending upon load, you may need to use 2 different 12vdc power sources

Zone 2

to 12vdc Ground

COMBO CONTROLLER: OPERATE VIA RF WIRELESS OR BLUETOOTH

RF REMOTE CONTROL

Long Range M7 Wirelss Remote
(Uses 27A 12v Battery)

BLUETOOTH ENABLED

Bluetooth wireless

ANDROID APP ON Google play

Download on the App Store

Download the FREE Boogey Lights APP from APP store.

Download the APP operating manual from www.BoogeyLights.com

MAX of 1,500 LEDS

LED Strip Blue, Red, Green & Black Wires
Connects w/ Red, Green, Blue and Black Wires from Controller. Connect with crimp on connector. Each wire represents its respective light color. BLACK is the GROUND wire. Each LED strip needs to connect to the controller. If you need to extend the power leads, we offer extension wire.

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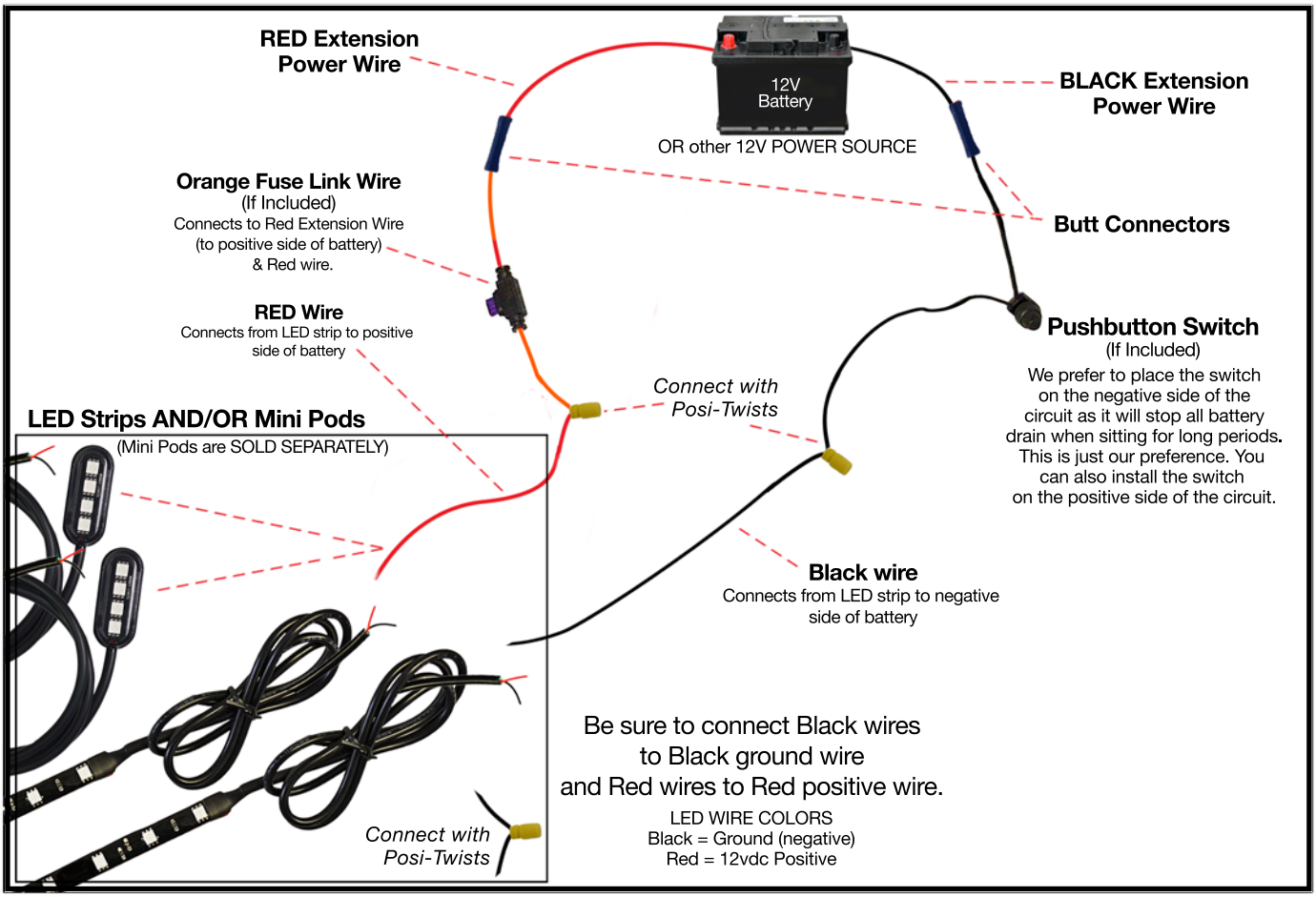
Single Color Wiring Diagram
without Remote Control



[BLWDSCNR 01/18/18]

Scotchloks (red) - If Included - Can be used to connect to existing vehicle wiring if desired.

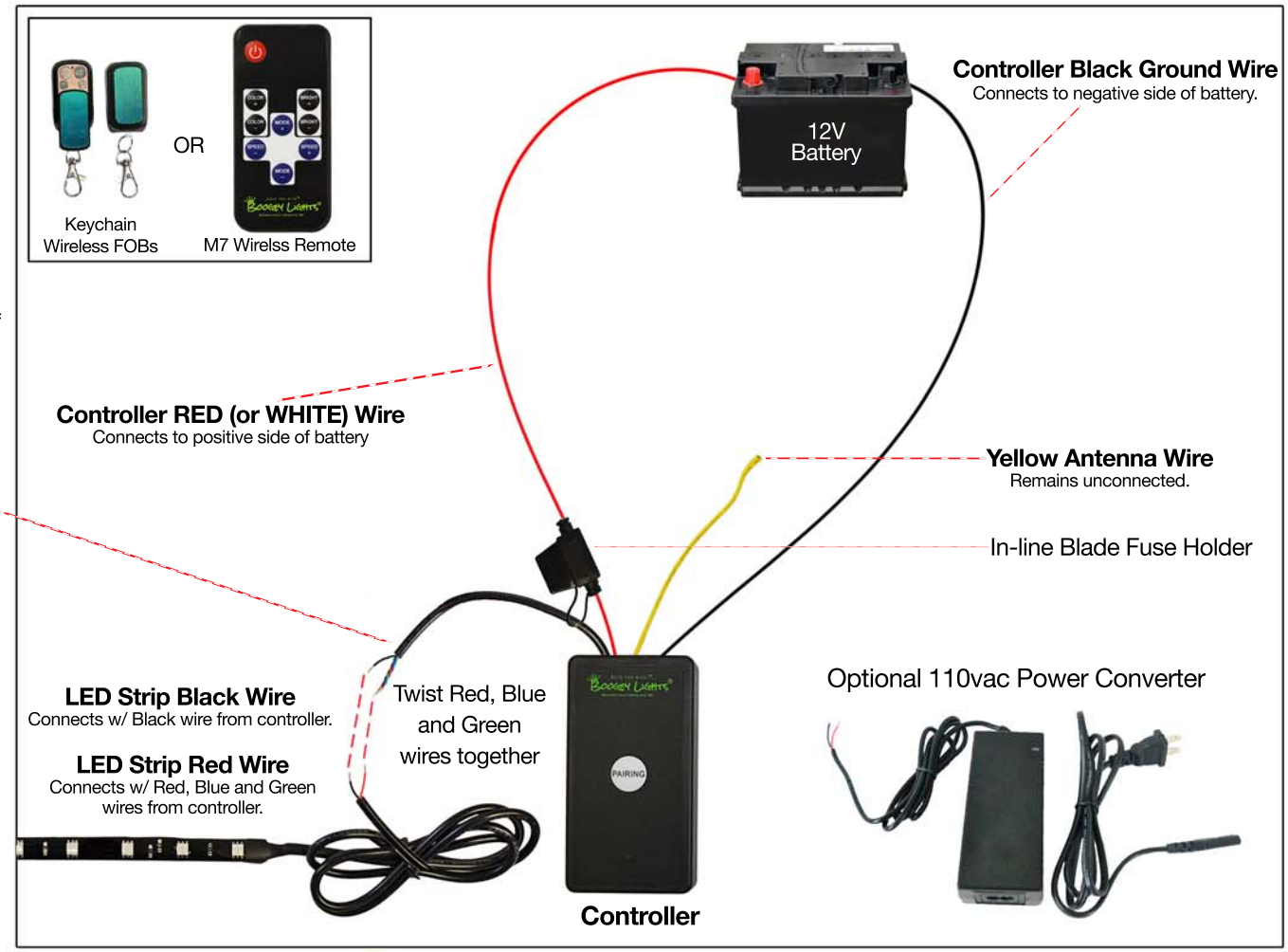
Wiring Diagram - Single Color LEDs

Using a Multi-Color Wireless RF Controller

IMPORTANT!
Our multi-function wireless RF controllers are capable of working with both multi-color RGB LEDs and single-color LEDs.

To make them work with Single Color LEDs you will need to twist the RED, GREEN and BLUE wires that come out of the controller, together. Then, once twisted together, connect them to the RED power lead wire going to the LED strip.

The BLACK wire coming out of the controller will connect to the BLACK power lead wire going to the LED strip.



PLEASE NOTE:
Controller and power adapter (if used) is water resistant but NOT waterproof. Be sure to mount in a dry location.

110VAC APPLICATIONS

If you are using the optional 110VAC power adapter instead of 12vdc power, you would connect the POSITIVE wire coming from the 110VAC power adapter to the POSITIVE wire of the controller. Connect the NEGATIVE wire coming from the 110VAC power adapter to the black wire of the controller (which is the ground wire). Then, plug in the 110VAC power adapter cable into your 110VAC power source.

[BLWDSCWMCR 01/04/18]

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