INSTALLATION GUIDE

FREIGHTLINER CASCADIA GEN1 UNDER-GLOW 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.

JULY 2022 UPDATE – IMPORTANT!

These instructions make reference to some ALUMINIMUM FLAT BAR. That is no longer the case. We are now including PLASTIC FLAT BAR instead of the aluminum flat bar. The plastic flat bar should be mounted the same way as the aluminum with one exception when mounting to the bottom of the fuel tanks: make sure the plastic flat bar is securely fastened to the fuel tank in multiple places across the entire length of the flat bar (not just on the two ends as some of the photos show). The goal is to minimize the amount of flexing the plastic flat bar does.

BEFORE YOU START

It's simply not possible to provide detailed instructions for all installation scenarios. Far too many variables and truck 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 however we must assume the installer has the skills, knowledge and tools necessary to do the work using the information we provide. You may need to vary your installation based on your truck. 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.

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 before mounting.

<u>Tools You May Need</u>

Sockets/wrenches in the sizes necessary to remove the driver's side steps to access the battery bank, wire cutters/strippers, crimping tool, electrical tape, rubbing alcohol, shop rag or two, rivet gun and a heat gun (or hair dryer) for the heat shrink connections. We also suggest a 12vdc multi-meter to confirm/check voltages.

<u>RGB/MULTI-COLOR KIT Installations</u>

Installation of this led light kit takes 6 to 8 hours depending on whether or not you're adding this light kit

to an existing installation or installing this kit as a stand-alone. Wiring diagram is included at the end of the guide.

SINGLE COLOR KIT Installations

Installation of our single color kit typically takes 6 to 8 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 the on/off wireless switch we offer, you do not need a relay provided the grill 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.

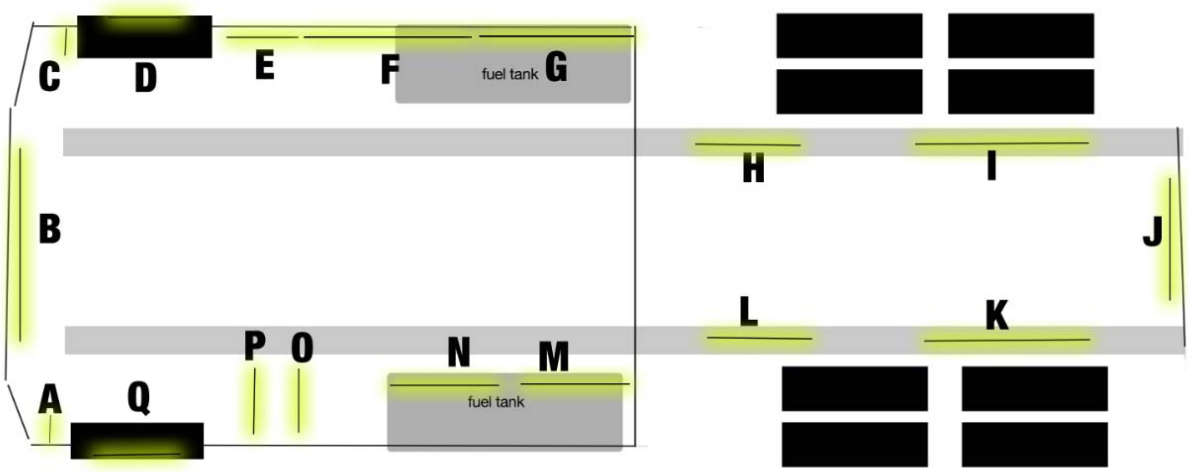
Mounting & Placement Locations / Planning Your Install

All 17 of the LED strips in this kit are built on our Heavy Duty LED strips. Each Heavy Duty LED strip is encased in rubber with a 12" to 36" power lead. Each LED strip will have to have it's power lead extended (using the included power lead cable) based on where the LED strip is located on the truck. In total there are 16 different mounting locations in this kit and all of the power leads need to be carefully run.

The mounting areas are focused in the following areas (see diagram below):

- 3 - Heavy Duty LED strips under the front bumper (A, B C)
- 6 - Heavy Duty LED strips under passenger's side of the truck (D - J)
- 1 - Heavy Duty LED strip across the rear (J)
- 7 - Heavy Duty LED strips under passenger's side of the truck (K - Q)

The LED strips can be moved or adjusted slightly according to available mounting locations on your truck. The goal is to provide full perimeter under-glow lighting such that you only see the glow from the lights.



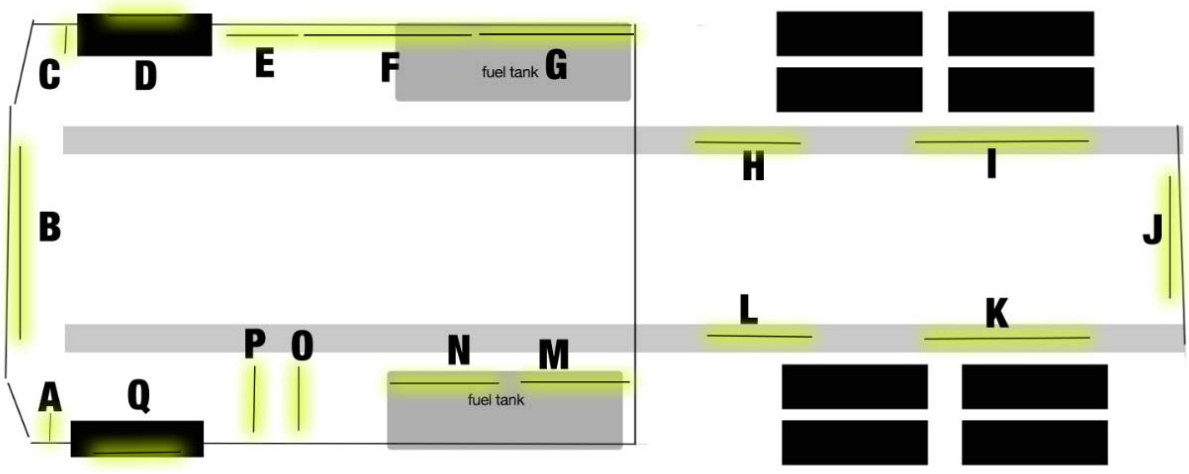
For power, you'll need access to the driver's side steps to access the batteries. Also, if you're installing an LED controller, the LED controller can be mounted in either the driver's side storage box or the passenger's. We prefer to use the driver's side as it is closest to the battery bank. While either location will work, be aware if you mount the controller in the passenger's side, you'll need to extend the positive battery cable a little further than if you mounted the controller in the driver's side storage. The 12vdc + power going to the LED Controller should connect directly to the 12vdc+ terminal on your truck's battery bank. You can connect the ground wire on the LED controller to any metal part of the chassis. Regardless of which side bay you use, you will need to drill a hole in the floor of that box to connect power to the battery box, led wires and antenna. All of the Heavy Duty LED strips include a 1' or 3' power lead. Most of the strips will need to have additional power lead cable added which we include in the kit (heat shrink is included to make these connections.)

Where possible, we recommend connecting all of LED strips in similar locations together and then running one feeder cable back to the LED controller. Doing so reduces the total number of power leads coming back to the LED controller. We will typically connect the following LED segments together – creating 4 groups of led strips - and then use a single feeder cable to connect each of those LED groups back to the controller (or power): A, B, C + D, E, F, G, H, I + J, K, L + M, N, O, P, Q

Regardless, we strongly recommend planning out your install on paper first. Be sure to wrap all power leads in split-loom which is also included and then secure them to the truck using zip ties.

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. Placement locations do not have to be exactly as what you see here as not all trucks have the same layout but it should be close. Refer to the below lettered diagram for LED strip placement.



Front Bumper Area (left to right):

- A - 15 LED strip under the bumper. Mounted on 12" plastic angle.
- B - 30 LED strip under the bumper. Mounted on 24" plastic angle.
- C - 15 LED strip under the bumper. Mounted on 12" plastic angle.

Passenger's Side (front to rear):

- D - 15 LED strip in wheel well
- E - 45 LED strip mounted on 33" plastic angle.
- F - 75 LED strip mounted on 75" plastic angle (along with segment G).
- G - 55 LED strip mounted on 75" plastic angle (along with segment H).
- H - 30 LED strip mounted to top frame rail shinning downward.
- 1 - 60 LED strip mounted to top frame rail shinning downward (between air bags).

Driver's Side (front to rear):

- Q - 15 LED strip in wheel well
- P - 30 LED strip mounted on 24" aluminum flat bar secured to bottom of air tank 1.
- O - 30 LED strip mounted on 24" aluminum flat bar secured to bottom of air tank 2
- N - 75 LED strip mounted on 75" plastic angle (along with segment M)
- M - 30 LED strip mounted on 75" plastic angle (along with segment N)
- L - 30 LED strip mounted to top frame rail shinning downward.
- K - 60 LED strip mounted to top frame rail shinning downward (between air bags).

Rear:

- J - 30 LED strip across the back bumper. Mounted on 24" plastic angle.

WHAT'S INCLUDED

In addition to the LED light strips, power leads (and controller / switch if ordered), 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.

- 18 (or 20) AWG Feeder Cable – 4 Conductor will work for both RGB and Single Color. Use this cable to extend the LED power leads back to the battery box and/or the LED controller/switch.
- 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.
- 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 in a number of places to secure the LED power lead to the truck as well as to fill in holes drilled. Butyl will only work if you apply it to a clean surface so make sure you first clean the surface with rubbing alcohol.
- Heat Shrink (½" and 1/8"): We include heat shrink for extending the power leads on each of the 16 heavy duty LED strips as well as sealing the connections to the LED controller if purchased. The 1/8" heat shrink is used to seal each of the individual connections; there will be 4 per LED strip if RGB and 2 per LED strip is Single Color. Then, the 1/2 " heat shrink is used to seal over top of that group. We have included a photo further on in this guide showing how this is done using quick-disconnect connectors (not applicable to this kit) but the concept remains the same.
- 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. Here is a LINK to a page on our website that list some of these items: https://www.boogeylights.com/other-items-you-might-need/ .

If you purchased a SINGLE COLOR kit without an LED Controller we do not include any switching devices with the kit. We assume you already have a switch available in your truck or will be installing another switch of some type. Regardless of how you decide to switch your single color LEDs, be mindful of the amperage that adding 615 LEDs will draw. If you're considering adding these LEDs to an existing circuit (e.g. with your existing marker or running lights) we strongly suggest using a relay vs simply tapping into the existing circuit. This is especially important on newer trucks where the LCM will likely throw an error when you add 615 more LEDs to the system.

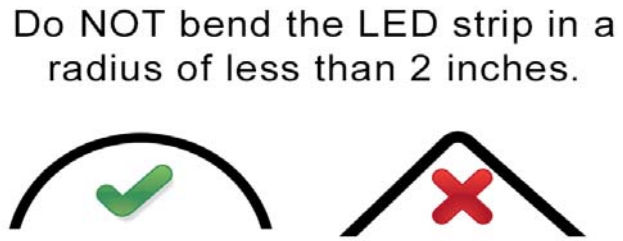
Follow these steps for mounting your LED strips:

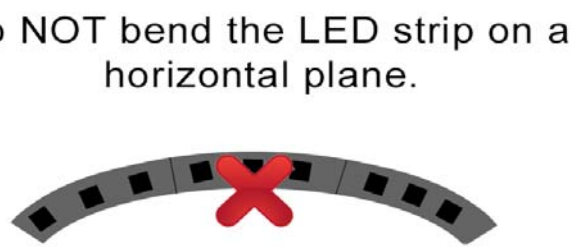
- The area where you are mounting the LEDs has to be clean: free of all dirt, oil or anything that might affect the LED from sticking. You only get one opportunity to mount the LEDs so it's critical the area be prepared properly.

- Use rubbing alcohol 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).

  If the area is especially greasy, you'll need to clean it with a degreaser or similar solvent. IF you do, be sure to use rubbing alcohol on the surface next to completely remove any left-over residue from the degreaser.

- 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.

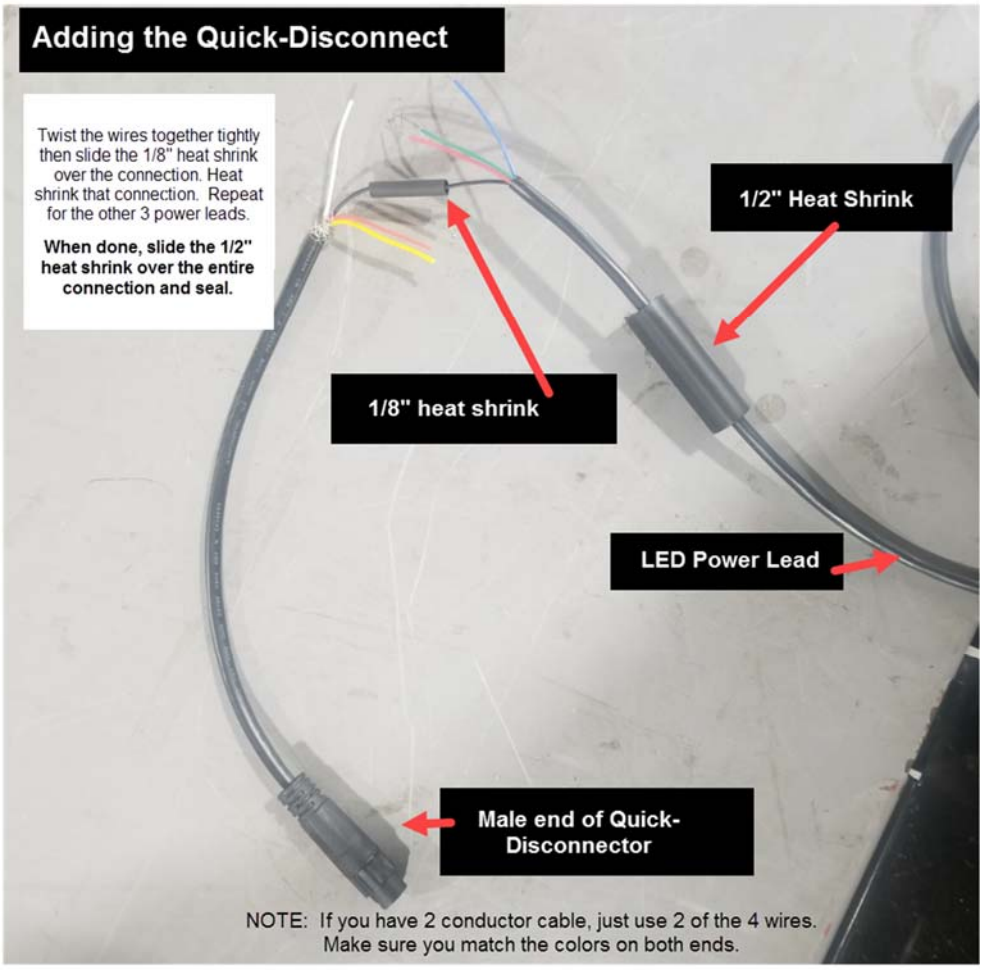




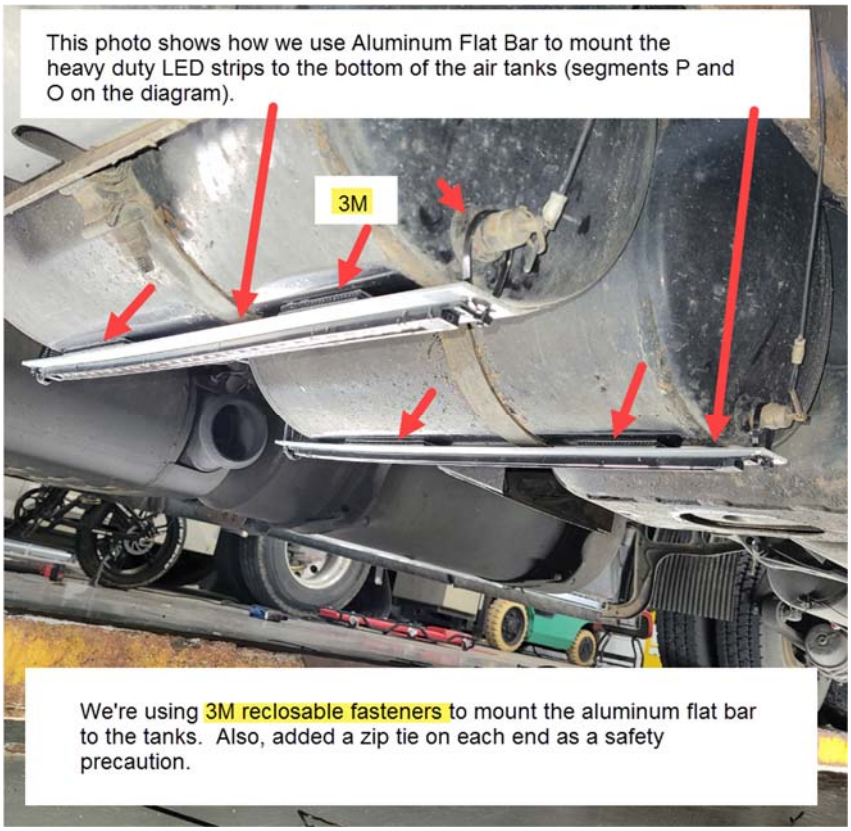
- Peel off the red backing tape that protects the 3M adhesive tape on your LED strip. Be careful not to let the tape touch anything. The 3M backing tape on these LED strips are one-use only. They cannot be reused.

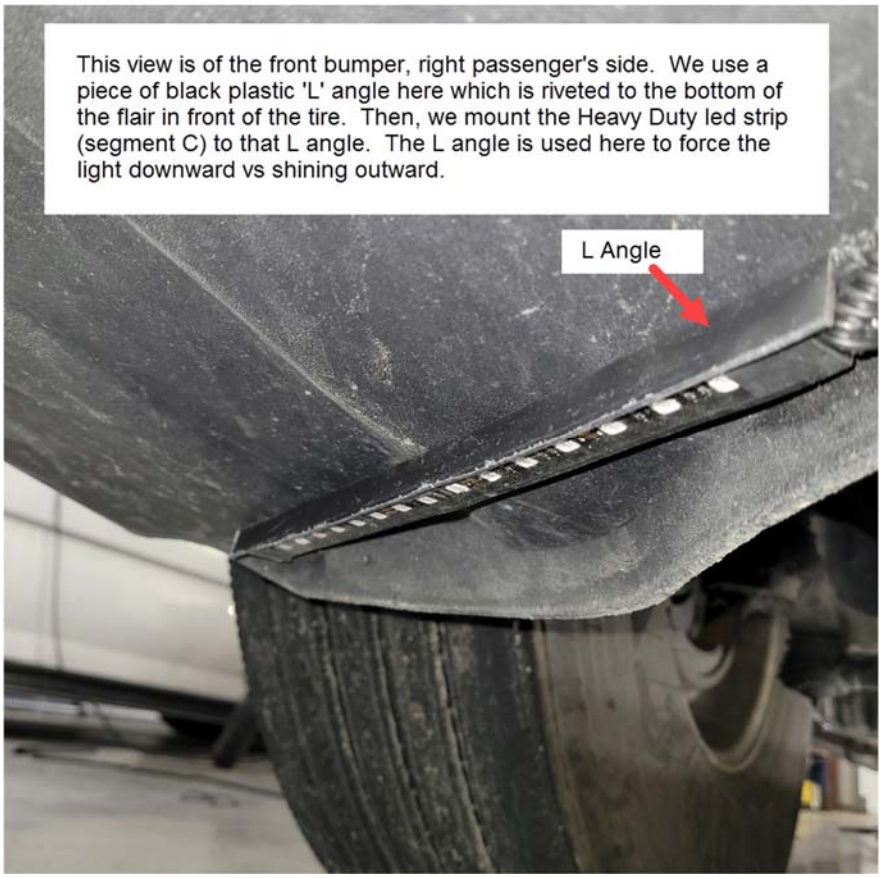
Carefully push the LED strip to the area you have prepared. You will want to apply only enough pressure to the strip to make sure it is firmly mounted. *You only get one opportunity to do this.* Once the LED strip touches a properly prepared surface that has been promoted, that LED strip will be very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

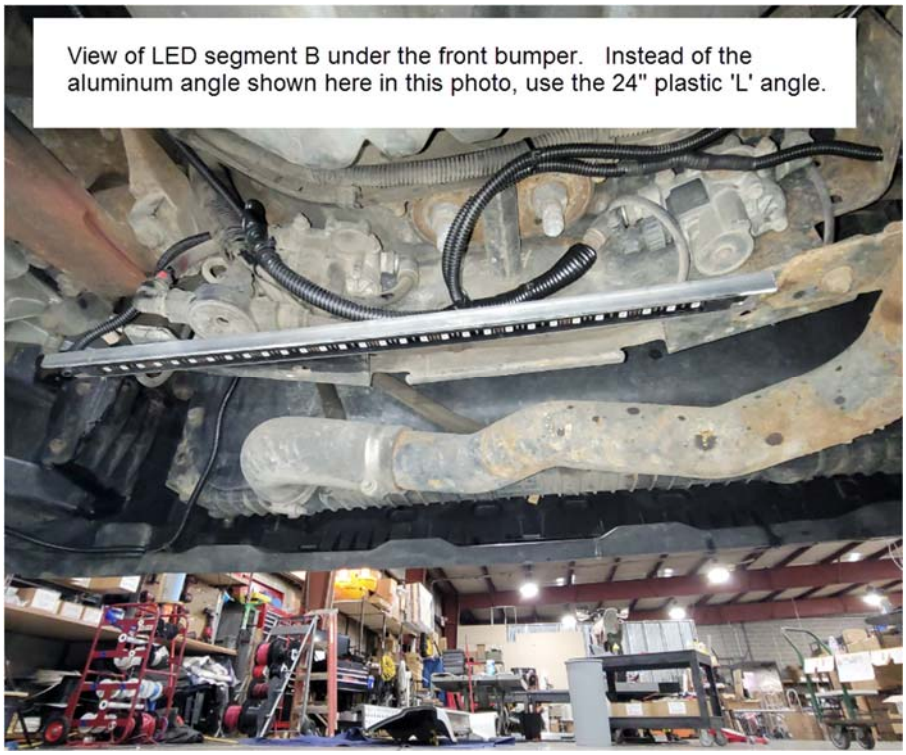
Here's a photo showing how to use the 1/8" and 1/2" heat shrink to connect and seal the feeder cable connections to the power leads of each Heavy Duty led strips. Tightly twist the copper wires together. Important that none of the copper wire strands poke through the heat shrink. Make sure they're all laying down (and not pointing outward). Then, slide the 1/8" heat shrink over the connection and heat shrink that connection. Repeat for the other 3 (or 1 if single color LEDs). When those connections have been made, slide the ½" heat shrink on top of the bundle and heat shrink. For the 1/8" heat shrink you only need about an inch (1") or 1.25" of heat shrink to seal each connection. Use 2 or 2.5 inches of the ½" heat shrink to cover the bundle. Note: The under-glow kit does not include any quick-disconnect connectors. This is for illustration of how to use the 2 different heat shrink sizes when extending the heavy duty LED strip power lead mjo75" plast .



PHOTOS OF THE INSTALLATION

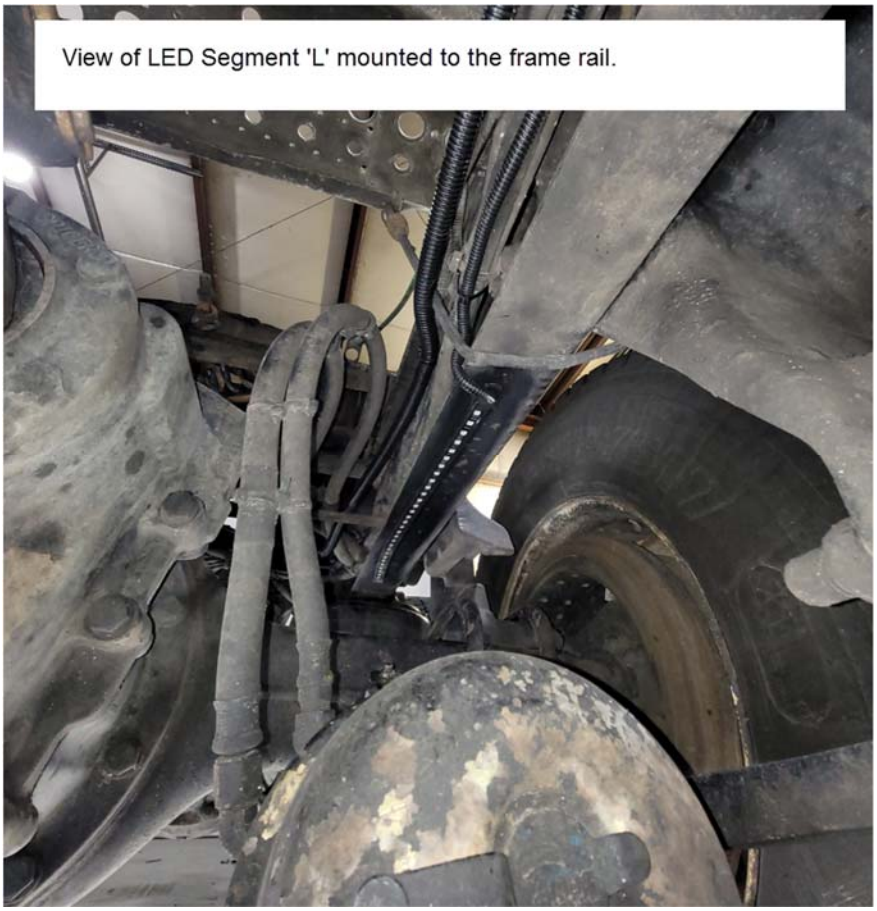



This view is of the front bumper, right passenger's side. We use a piece of black plastic 'L' angle here which is riveted to the bottom of the flair in front of the tire. Then, we mount the Heavy Duty led strip (segment C) to that L angle. The L angle is used here to force the light downward vs shining outward.
L Angle


View of LED segment B under the front bumper. Instead of the aluminum angle shown here in this photo, use the 24" plastic 'L' angle.

View of LED Segment 'E'. Mounts to the 33" plastic 'L' angle (aluminum angle not used as shown in this photo).

View of LED segments N and M mounted to 75" plastic 'L' angle.



View of LED Segment 'L' mounted to the frame rail.

View of LED Segment 'I' mounted to the frame rail.

View of LED Segment 'J' mounted across the rear of the truck, mounted to 24" plastic 'L' angle.