

## **Modifying the exterior lighting of the Ram truck**

The Ram truck has been designed and developed using standard incandescent lights. These lights are controlled by a computerized module called the “Central Body Controller” (CBC). This module controls the left front, right front, left rear and right rear lighting independently. The CBC utilizes “smart” technology that has the ability to monitor the current (amperage) on some of the lighting outputs. These monitored outputs include the headlamps, turn lamps, stop lamps and reverse lamps. The module is able to detect both electrical short and open circuit conditions. The module has a preset allowable current (amperage) operating range for each of these outputs. If while in normal operation the current detected falls outside this preset range, then a fault is set in the module. In the case of too high of current the circuit will be shut off. This fault condition will remain true until the current level falls back into the normal range. In the case of the turn lamp circuits, if the module detects too low of current then the module will assume an open circuit condition (burned out bulb) and the blinker will flash at a double flash rate.

This detection is in place to assist the customer in determining if there is an active short in the lighting circuit or a burned out bulb (open circuit).

You can also get into these fault conditions by adding additional lamps to the circuits or by changing the lamp specifications (i.e. changing the type of lamp used). This would include, but is not limited to, the use of LED's. By using them you run the risk of causing lighting faults or loss of lighting functionality.

The question then becomes, “can you use LED lighting on Ram trucks”? The answer is yes, but special care and procedures need to be followed to use LEDs successfully.

## **Use of LED lamps in conjunction with the original equipment incandescent lamps:**

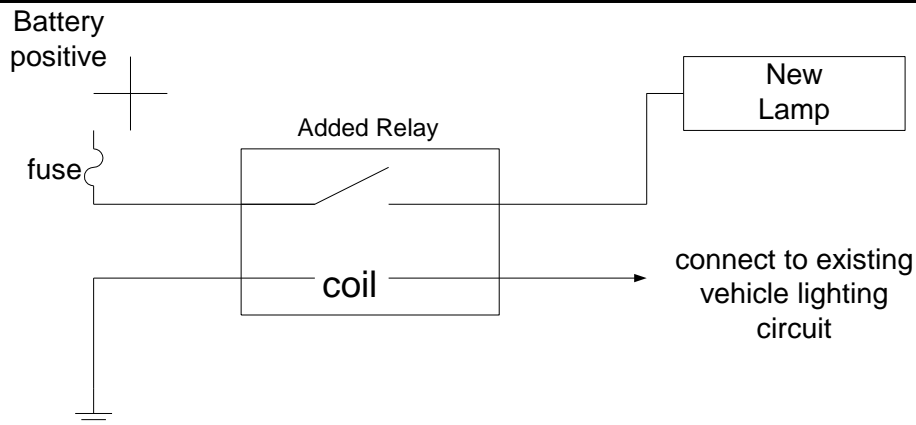
If you are keeping the original incandescent lamps (or the aftermarket equivalent) and you want to add additional LED lamps for use as stop, turn, reverse or park lamp function you can do so with no additional changes to the vehicle or its electrical system.

## **Adding additional incandescent lamps to the original equipment incandescent lamps:**

Customers sometimes desire to add additional lamps to the exterior lighting circuits. This is possible but requires adding a relay to control the additional lamps. By correctly wiring the relay into the lighting circuit you only add the additional coil resistance of the relay. This will maintain the correct operating current (amp) range of the circuits and no faults will be set. A relay will need to be added to each side of the vehicle (left and right).

Below is a sample relay circuit which can be utilized to add additional lamps

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When this type of circuit is used please understand that there is no way for the vehicle to perform any diagnostics on the added lamps.

As a general statement the CBC does not provide a large enough current range on the head, turn, stop or reverse lamp circuits to add any additional incandescent lamp loads. It is therefore strongly recommended that the above procedures are followed for modifying the exterior lighting.

## Replacing incandescent bulbs with LED's:

### For 2013 there are two different methods to eliminate fast flash and error codes when replacing rear stop/turn incandescent bulbs with LED's –

Method (A) -

Cut and adds wire to a circuit at the CBC, refer to photos below.

Method (B) -

Add power resistors to the rear light circuits. This is the same procedure that could be employed from previous model years. Wire a 9 or 10 ohm, 50 watt power resistor in parallel with each LED. The resistor must be capable of surviving exterior exposure on the vehicle with consideration for vibration and expected life cycle. As power resistors may get hot under normal operation it is suggested that they be places in an area with adequate ventilation and heat dissipation. It is further suggested that they be located very near the LED's; this is to help with any future service related maintenance or repairs to the lighting circuits.

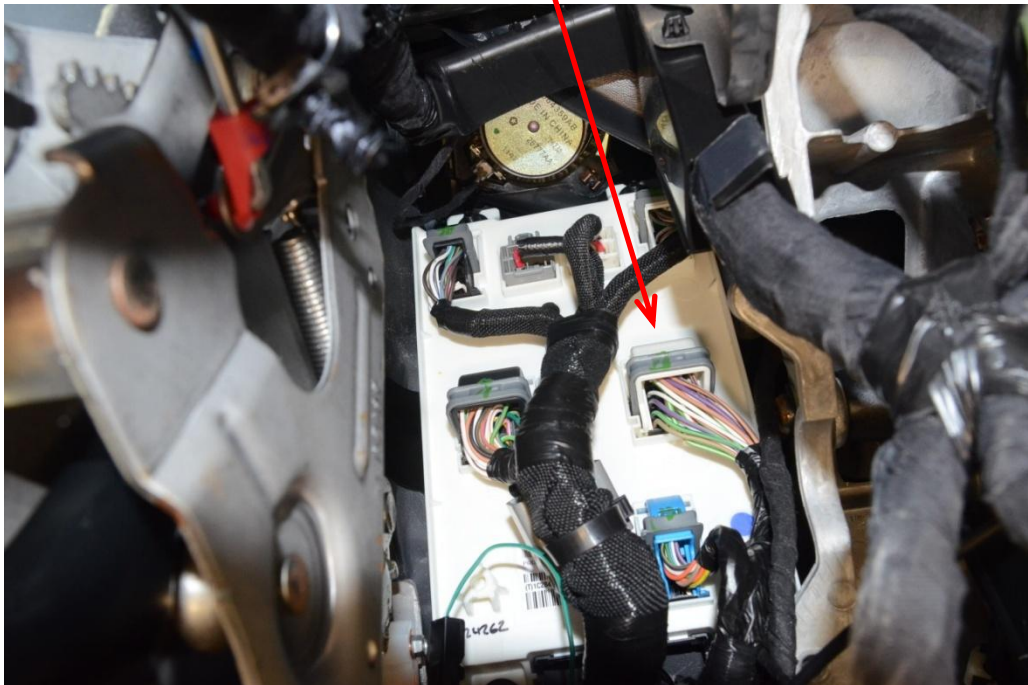
**Method (A) :**



CBC module location under dash

**Method (A) :**

Connector to be modified



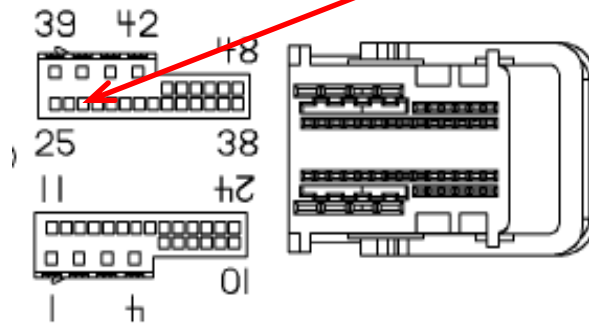
To remove connector from the CBC, push in tab while simultaneously lifting bail

**Method (A) :**

Connector removed from the CBC



Circuit L563 cut and insulation stripped from the connector side of the cut circuit. L563 is a WT/GY wire in cavity #27.



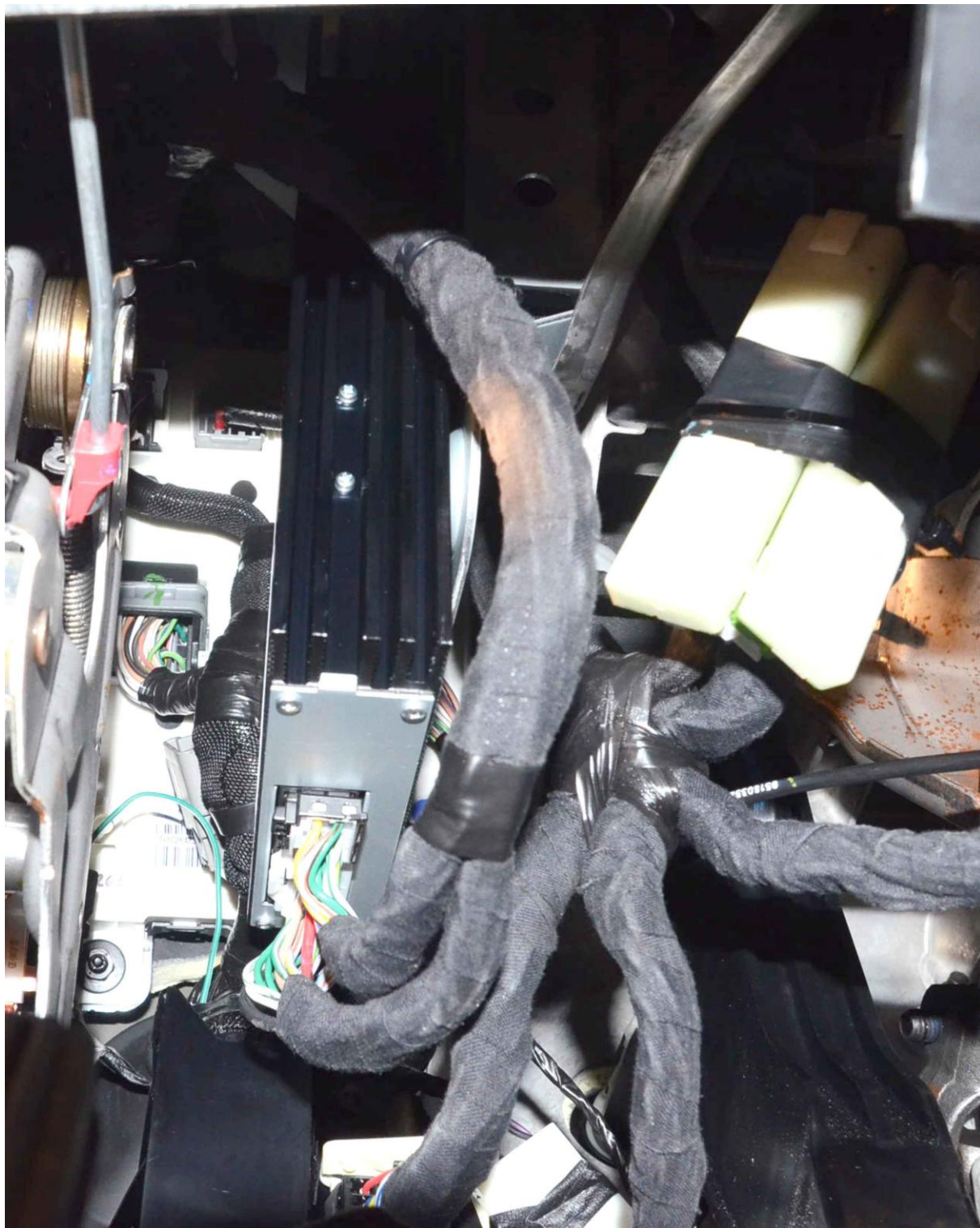
**Method (A) :**

Circuit L563 cut and insulation stripped from the connector side of the cut circuit. L563 is a WT/GY wire in cavity #27.



Additional wire and a ring terminal soldered onto the connector side cut circuit, ground the ring terminal at an appropriate location

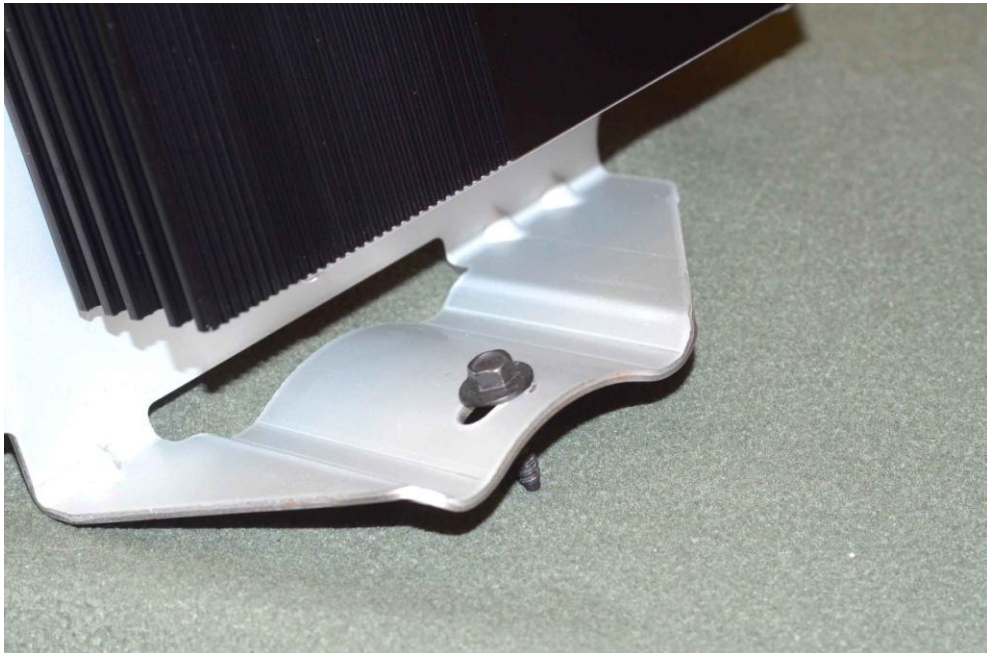
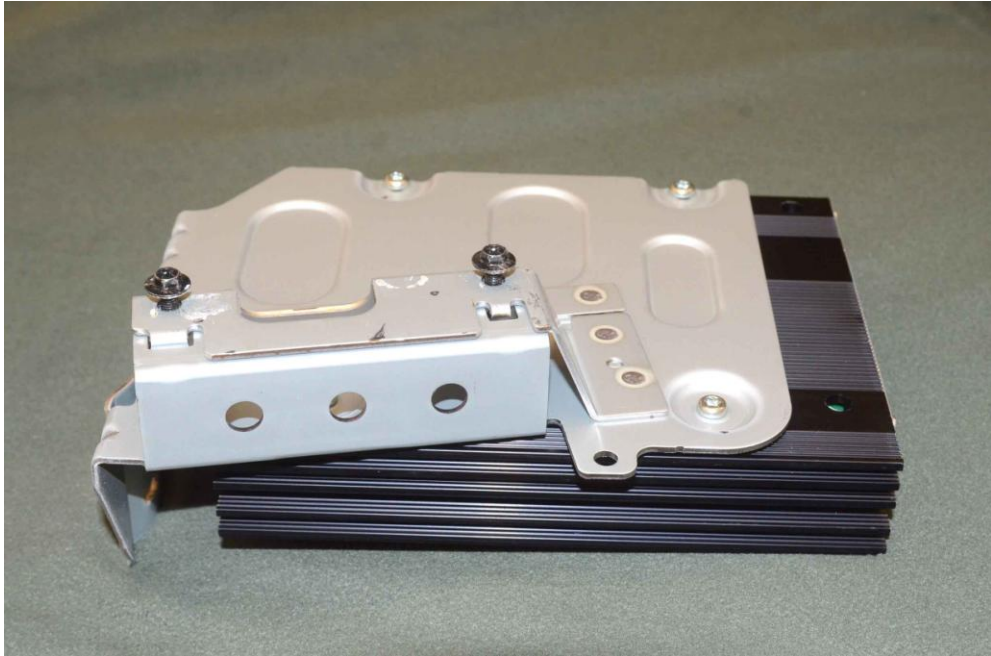


**Method (A) :**

If the vehicle is equipped with a premium radio and auxiliary amplifier, the amplifier will need to be temporarily removed to gain access to the CBC connector

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## Connecting Aftermarket Tail Lamps to Ram LED System

Aftermarket tail lamps can be added to a Ram truck with production LED tail lights. But, special provisions must be made to eliminate the “fast flash” and the lamp out indication in the cluster. This is done by adding a relay that will ground the diagnostics circuit when the turn signal bulb/LED array is on.

OEMs are required to perform diagnostics on certain lighting circuits. In the tail lamps, this requirement applies to the turn signals. In vehicles with LED tail lamps, there is circuitry built into the LED array that determines if the LEDs are illuminating when the turn signal is on. The LED array sends a voltage out on the diagnostics circuit. The diagnostics voltage is read by the CBC. (Central Body Controller) The CBC controls all exterior lighting on the vehicle. When the turn signal array is illuminated, the voltage on the diagnostics circuit is low. Conversely, when the array is off, the diagnostics voltage is high. The diagnostic voltage cycles as the turn signal flashes. The CBC compares the state of the diagnostic voltage to the desired state of the turn signal circuit. If the states are incorrect, the CBC tells the Cluster there is a turn signal fault and the cluster “fast flashes” the turn signal indicator and displays a bulb out message.

To add aftermarket tail lamps, disconnect the production tail lamps in the vehicle. Connect the ground, stop/turn, back up and park lamp circuits of the vehicle to the appropriate circuits provided with the aftermarket tail lamp. (see attached schematic for details) Attach one side of the coil of a normally open SPST relay to the stop/turn lamp circuit. Ground the other side of the coil. Attach one side of the relay contacts to the diagnostics circuit. Ground the other side of the contacts. The attached schematic shows both relay grounds being made through tail lamp ground circuit. If this is not convenient, the relay grounds may be tied to chassis. Separate relays must be used for the left and right turn signals.

The preferred method for connecting the aftermarket lights to the vehicle wiring would be to use some sort of sealed connector system. Weather Pack has commercially available sealed connector systems. If no connector is available, the vehicle harness connector should be removed and the tail lamp circuits should be butt spliced to the vehicle harness. All splices should be soldered and sealed using self-sealing heat shrink tube. If there is a need to leave the vehicle harness connector intact, a center spliced may be used. All splices should be soldered and sealed. The harness connector must be capped. Bundle all splice wires together and secure with tie wraps.

Mount the relays in a location that is shielded from the environment and protected from damage.

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