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Section 2: Electrical

Section 2: Electrical

Electrical Basics

Inside a vehicle, electricity is supplied through "hot" wires, comparable to the pressurized supply pipes of a plumbing system. At various points along the wires are outlets in the form of lights, switches and receptacles. Turning on a light switch is somewhat like opening a faucet to let water run — an electric current flows through the hot wire to make the light glow. Once the electricity has done its work, its potential drops to zero, just as water loses pressure after flowing through a sink or laundry tub. The electrical system has "drains" — which are the ground wires that return the current to its source just as a plumbing system has drain pipes through which water runs into the sewer mains or the ground.

The light or equipment powered by the current, technically called the load, can be compared to a water wheel that remains motionless until a stream of water causes it to turn. A load may be one of two kinds. The first consists of a resistance — a material that permits the passage of electric current, but only with difficulty, and thereby creates heat. The tungsten filament of an incandescent bulb is resistance; so is the heating element of an electric heater of a coffee pot. A load may also be an inductance — typically a motor with windings of copper wire, in which the magnetic fields generated by the current create motion. At any moment, the demand on an electrical system depends on the number of loads in operation and their consumption of energy, just as demand on a water system depends on how many faucets are opened and how wide they are opened.

The mechanics and physical fittings of the system are simple. Current moves throughout the vehicle in wires of different sizes, according to the current a circuit may have to carry. Power is supplied directly to equipment through connectors.

Electrical Terms

VOLT is the unit of electrical potential, equal to the difference of electrical potential between two points on a circuit.

AMPERE is the unit used to measure the amount of current - that is, the number of electrically charged particles called electrons - that flows past a given point on a circuit each second. It is similar to measuring the amount of water flowing through a pipe at any given point. The larger the pipe is, the more water that can flow past the point per second. Similarly, the bigger the wire is, the more current that can flow through it at any given point. Current that has lost its voltage still has amperage as it completes the circuit and returns to the battery.

WATT is the unit of power. It indicates that rate at which a device converts electric current to another form of energy, either heat or motion, or to put it another way, the rate at which a device consumes energy.

The relationship of volts, amperes and watts to one another is expressed in a simple equation that enables you to make any calculations you may need for proper and safe electrical modifications to the vehicle. Volts x amperes = watts. If the current is at 12 volts and a device requires 4 amperes of current, the equation will read 12 volts x 4 amperes = 48 watts.

To figure the current needed for a device rated in watts, turn the equation around: watts/volts = amperes. For example, if you have a piece of equipment, such as a communications radio, that uses 120 watts: 120 watts/12 volts = 10 amperes.

General Guidelines For Vehicle Modification

- Provide circuit protection (fuses) for all wiring. The fuse rating should not exceed either the rated wiring current capacity or the total current requirements for all the add-on components on the circuit. Install fuses as close to the point of tapped power as possible.
- Document all revisions to the electrical system and place with the vehicle Owner's Literature. Color code and/or label all revisions or additions to wiring.
- Provide protective covering in all areas that could be damaged during normal equipment installations.
- Disconnect the negative battery cable of vehicles stored on site to reduce the possibility of draining the battery by lights or other equipment.
- Do not allow control panels attached to the instrument panel to protrude into the driver and passenger air bag deployment zones. For additional information, refer to Section 5: Reference Information in this guide.
- Do not install switches and gauges in the driver or passenger knee impact areas.
- Inspect all Ford gauges, lights and switches for correct operation after instrument panel work is performed.
- Properly secure any relocated or removed wiring while working behind the instrument panel to prevent chafing, squeaks and rattles.
- Provide adequate retention for wiring harnesses so that they are clear of bolts, corners or edges which could abrade the wires during normal vehicle operation.
- Anticipate incorrectly routed wiring situations and protect all wiring from penetration by screws and raw edges.
- Weather-seal all electrical connectors exposed to the elements.
- Do not use quick splice connectors or wire nuts.
- Install the fuse panel so fuses are readily accessible.
- Make sure that connections are easily accessible for assembly and service.
- Make sure submersible connectors do not lose their seals under extreme assembly conditions such as bending wires 90 degrees immediately after the connector.
- Whenever using connectors, use a socket (female) connector on the electrical source side and a plug (male) connector on the electrical load side to reduce the possibility of a short circuit when disconnected.

Section 2: Electrical

- Air bag restraint systems must remain intact as received from Ford Motor Company. Before any vehicle modifications are performed, the system must be disarmed by following the instructions provided in the current Workshop Manual.
- Adherence to the above guidelines is not to be construed as approval by Ford Motor Company of any specific revisions or additions to the vehicle's original electrical system.

Keep-Alive Memory Power

The electronic engine and transmission control modules require battery power to be supplied at all times in order to maintain the keep-alive memory. Keep this in mind when installing load disconnect switches or solenoids.

Equipment Grounding Guidelines

- Do not ground the body to the transmission or transmission crossmember. Ground accessories to the chassis or the vehicle battery.
- Splicing into circuitry relating to the electronic engine and/or transmission control systems is not acceptable because of the adverse effect on the electronic system operation.
- Adequately protect electrical connections exposed to the elements.

Wire Insulation

- Polyvinyl Chloride (PVC), rated at 90°C (194°F), is the standard wire insulation that is acceptable for inside body use but is not acceptable for under hood/under body wiring.
- Hypalon insulation should be used on links only (Ford Specification ESB-M1L54-A).
- Cross-linked Polyethylene (XLPE or SXL), rated at 135°C (275°F), is the required insulation for under hood/underbody applications (Ford Specification ESB-M1L123-A).
- GXL can be used as an alternate wire (Ford Specification ESB-M7L85B) as long as the concentricity specifications are met. To provide a water-resistant seal in conjunction with crimp connectors, a Duraseal crimp connector is recommended since it is designed to account for outside wire diameter that is smaller than the present SXL wire.

Terminals and Connectors

Connector Types

- Submersible (Sealed) — A connector that is capable of being immersed in water.
- Weather-resistant — A connector that will retain its sealing and connection qualities while being exposed to adverse weather conditions.
- Duraseal crimp — A supplier trade name for a sealed wiring repair or splice.

When a connection is not defined (typical situation — harness-to-harness connectors), the following suggestions should be implemented:

- Determine the connector type. If it will be located in a hostile environment, use a submersible (sealed) connector; if not, use an open connector. A hostile environment is defined as being exposed to water and/or salt accumulation and/or high temperatures (i.e., under hood, exterior panels and footwells). Use in-line connectors with secondary locks to prevent the terminal from being pushed out.
- Do not use single wires smaller than 14-gauge in a 2-way or larger weather-resistant connector (the very large style), since the wire may break during disengagement.
- Use Hypalon, XLPE or Elexar insulation in submersible connectors to maintain sealing integrity. PVC is not acceptable because cold flows and allows setting in a deformed pattern, therefore compromising the integrity of the seal.
- Determine the terminal type. Base your decision on wire gauge, current carrying capacity, connector type and insulation type.
- Use non-detent low insertion force terminals whenever possible.
- Do not use low insertion force female terminals in weather-resistant connectors.
- Analyze circuit requirements (signal levels, current, voltage) to determine the proper plating material (such as gold). Use of non-plated terminals is not recommended.
- Do not use plugs to seal holes in micropin connector grommets. It is very easy to forget to insert them during manufacturing and ruin the seal. Only use a grommet with the necessary number of holes or use dummy wires at least 600 mm (24 in) long.
- Fully align connectors prior to terminal connection — terminal cavities should have minimum tolerance to prevent terminals from floating, bending or pin push-out during mating/engagement.
- Make sure connectors of similar type and color are identifiable to the operator to eliminate crossed connections and minimize assembly time. Avoid using similar types and colors of connectors close together.
- Be sure that connectors have positive locking devices that allow easy installation with a low insertion force and easy removal. The connector snap should be easily felt and heard.
- Eliminate the use of edgeboard, tang-type and molded-over connectors. The use of blade-type weather-resistant connectors is restricted to high current applications which cannot be handled by submersible connectors.

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Circuit Protection and Electrical Load

- Modification to existing vehicle wiring should be done only with caution and careful consideration of effects on the completed vehicle's electrical system. Anticipated circuitry should be studied to determine the required circuit protection and to avoid feedback loops.
- Added circuitry must be protected either by a base vehicle fuse or circuit breaker, or by a similar device supplied by the modifier.
- When adding loads to a base vehicle-protected circuit, make sure that the total electrical load through the base vehicle fuse or circuit breaker is less than the device's load rating.
- Use 80% of the fuse rating to determine maximum steady state load to reduce nuisance fuse failures.
- Use 135% of the fuse rating when sizing wiring to protect the circuit in the event of an overload. Fuses will last for 1 hour at 135% of their rating.
- Total current draw is the sum of the base vehicle's circuit current requirement (measured with an ammeter) and the anticipated add-on component current requirements.
- Never increase the rating of a factory installed fuse or circuit breaker.
- If the total electrical load including additional electrical components, on any circuit, is less than the fuse protection rating or the capacity of some limiting component (switch, relay), the items to be added can be connected directly to that circuit. The headlamp switch circuits should never have additional lighting or electrical components directly connected.
- Added devices that exceed the current capabilities of the factory-installed system are best controlled through the use of a relay or separate switch. The coil of the relay can be fed from the circuit in the factory harness (now acting as a signal circuit) with added wiring providing feeds to the added electrical device. The relay selection is important and depends on current requirements, number of cycles expected in the relay lifetime, whether the relay is to be operated intermittently or for long periods of time and whether the relay is exposed to weather conditions or is installed in a protected area. When the current requirements of a circuit exceed the capacity of an available relay, the load should be reduced or divided through the use of additional relays.

Wire Protection Requirements

General Notes:

- Anticipate any potential problems and design accordingly to accommodate. Try to anticipate what could go wrong and modify your designs to address any adverse impact.
- Review all connector applications and electrical systems to determine the need for solder, grease, weather-resistant or sealed connectors. Make sure components and wire insulation are compatible with greased connectors (important for long-term durability).
- Make sure that drip loops or other means are provided to prevent water leakage into the vehicle through wiring assemblies that pass through the dash panel.
- Use greased or sealed connectors in floor pan troughs which are subject to moisture coming through the carpeting.
- Use XLPE insulation for uncovered runs that exceed 305 mm (12 in).

Electrical Protection

- Correctly route wires away from noise-generating wires or components. However, if routing near noisy wires or plugging into noisy components is unavoidable, additional protection must be designed into the harness.
- Shielding — Electro Magnetic Interference (EMI) — Consider shielding if you must route close to high-current or noisy circuits. Use shielded wire and ground one side. Seal all splices in wire assemblies that use bare coaxial shielding (braid or tape) for EMI suppression, and insulate or tape over all shielding ends that terminate near any open connectors. This prevents splice and terminal shorts to the shielding. Minimize the length of conductors which extend beyond the shield. Failure to do this reduces the effectiveness of the shield.
- Spike suppression, in general, is accomplished by connecting a diode or resistor-diode combination across the terminals of the noisy component. The diode should be sufficiently close to the component (both electrically and physically) so that inductive spikes are clamped off. Make sure the diode is connected with the proper polarity.

Proper routing and retention will reduce the likelihood of chafing or pinching. When this ideal routing is unattainable, the following additional protection is needed:

Mechanical/Environmental Protection

- Tape — Tape is the most basic means of protection. It contains the wires in a loose bundle and provides limited environmental protection. It does not protect against chafing and pinching.
- Kendall Polyken Fiberglass Base Tape (Ford Specification ESB-M3G38-A) is used for engine compartment applications. This durable tape provides against cut-through and abrasion commonly found in underhood applications.
- Polyken 267 is a substitute tape that may be used in lower temperature areas of the engine compartment (apron area).
- Convolute — Use convolute for all underhood/underbody applications or when increased temperature, abrasion or pinch resistance is required. Convoluted tubing comes in different diameters and materials to accommodate different temperature ranges and harness sizes.
- Use polyethylene convolute when abrasion is the only consideration; this convolute is adequate up to 96°C (205°F) maximum. Use nylon convolute when underhood/underbody or abrasion and temperature are considerations; nylon convolute is adequate up to 177°C (350°F) maximum.

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- On all engine-mounted wiring or bend points. Use vinyl tape on the outside of the convolute to prevent wiring from looping out. This tape must be able to withstand temperatures 135°C (275°F) or higher.
- Tape convolute junctions with abrasion-resistant tape (Polyken 267, fiberglass).
- Scroll — Similar to convolute, but without the ridges. Scroll is used where harness rigidity is required, especially for maintaining critical locator dimensions. Use scroll for short lengths only, as it is quite inflexible.

NOTE:

This is not meant to be an all-inclusive list of methods for physically protecting the wires. There are other means of protection available that are not listed.

Grommets and Sealing Requirements

Any additional wiring routed through sheet metal must pass through a grommet that both seals the opening and locates the wire(s). Two-piece grommets (rubber with plastic inserts) are recommended to facilitate installation and retention.

- Locate grommets so they are accessible for proper seating (achieved by pulling) in sheet metal holes.
- Ramp grommets at the insertion end to facilitate installation and sealing.
- Be sure that the direction of the hole punch is in the direction of grommet seating and the hole is burr-free.
- Make sure the grommet moulding compound will adhere to the harness to prevent slippage.
- Make sure the grommet will withstand the environment (temperature, splash).
- Be sure that holes are large enough to allow the installation of the harness without causing circuit damage.
- Use adhesive tape on main trunks or branches with at least a 50% overlap to prevent wicking through grommets. Be certain to diaper-wrap the takeouts.

Wire Routing

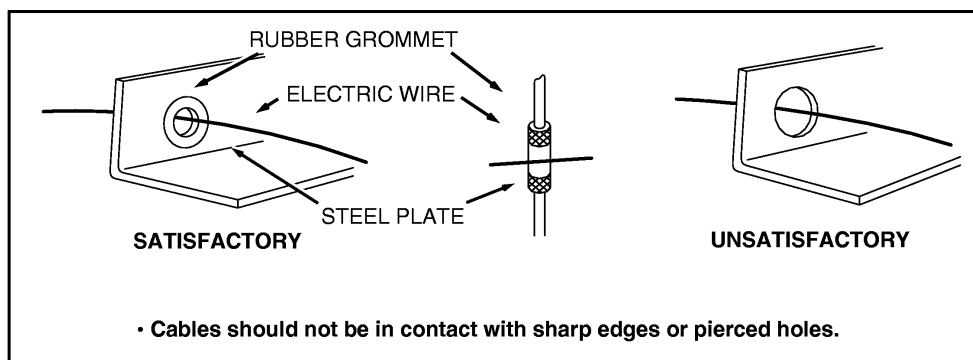


WARNING:

Do not place electrical component attachments or ground screws adjacent to vehicle fuel tanks, fuel filler pipes, fuel lines, fuel vapor lines or carbon canisters. Failure to follow these instructions may result in personal injury in the event of a collision.

Wire harness routing should conform to the following:

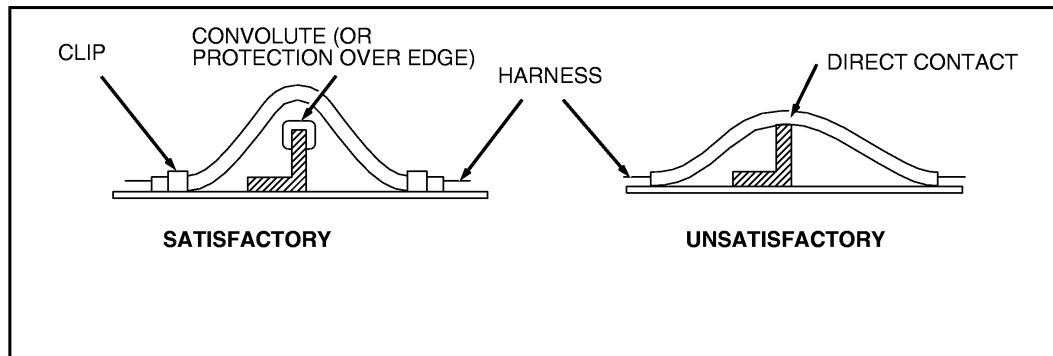
- Protect wires routed through holes in sheet metal or castings with a grommet whether or not conduit is used (see figure below).



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- Route wires to avoid metal edges, screws, trim fasteners and abrasive surfaces. When such routing is not possible, use protective devices (shields, caps) to protect the wires. Cover metal edges with a protective shield and fasten the wiring within 76 mm (3 in) on each side of the edge (see figure below).

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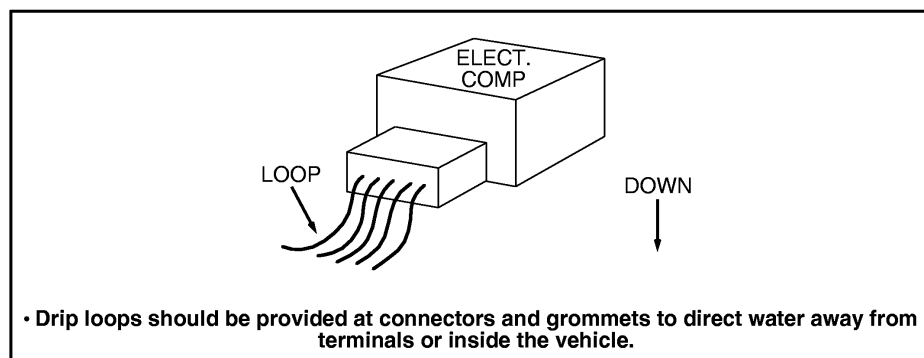
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- Route wires to provide at least 76 mm (3 in) of clearance to moving parts in their extreme movement location, unless positively fastened and protected by a conduit.
- Avoid wire routing without conduit in areas where temperatures exceed 82°C (180°F). Minimum clearance of 152 mm (6 in) should be maintained from exhaust system components. Heat insulation and heat shields must be used on the wires routed in high-temperature areas.
- Make certain that all underhood or underbody wiring is cross-linked polyethylene high temperature insulation wire 135°C (275°F) (minimum rating) consistent with SAE specification J1128 Type SXL wire. Normal PVC wire must not be used in underhood or underbody applications.
- Make sure all ground locations are readily accessible for installation, service and verification.
- Do not place ground attachments in high-splash areas.
- Do not route underbody wiring over the exhaust system.
- Under hood/underbody wiring must be routed in conduit for protection. Minimum conduit rating is 177°C (350°F).

Wire Retention and Routing

Use the following criteria to determine the location of retainers:

- Size and weight of wire bundle.
- Holes with poor accessibility that prevent installation of locators.
- Movement of wires that can result in abrasion, squeaks and rattles.
- When wiring is routed between 2 members where relative motion can occur, the wiring should be secured to each member with enough wire slack to allow flexing without damaging the wire.
- Wiring exposed to weather must provide a drip loop to prevent moisture from being conducted into the device through the wire connection (see figure below).

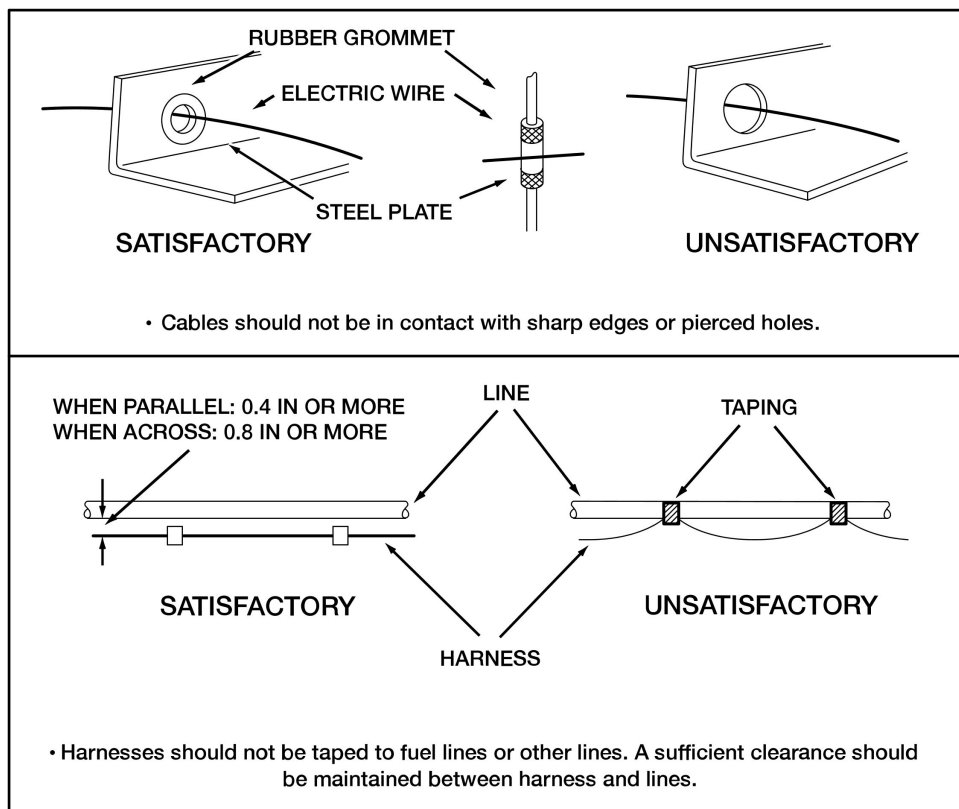


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- Avoid routing wires into areas exposed to wheel splash. When such routing cannot be avoided, adequate clipping and/or protective shields are required to protect the wires from stone and ice damage. Allow adequate slack in wiring between the engine and stationary components to compensate for engine roll.
- Avoid routing wires under the frame side members or at points lower than the bottom frame flange.

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- Use plastic "zip" straps for "bundling" only (securing to other wires).
- The wire retainers and grommets installed by the assembly plant are usually designed to accommodate only the Ford-installed wires. Additional wiring or tubing should be retained by additional clips. When added wires or tubes are routed through sheet metal panels, new holes with proper wire protection and sealing must be used.



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For retainer screws, the following guidelines apply:

- Avoid using fasteners that are too long for the application or are in an area which might damage vehicle components, including wiring, brake lines, fuel tank and lines, powertrain components, exhaust system and suspension.
- Do not use pointed screws for attachments. Also check that screws used in the vicinity of the wiring are blunt-ended.
- To minimize the potential for wiring shorts, do not use drill point screws. Trim components (including wiring shields) should use pin-type attachments instead of screws.
- Always check areas that screws protrude into for verification that an interference condition to other components does not exist.
- Make sure that retainers used are capable of withstanding the environment over the vehicle's life expectancy.

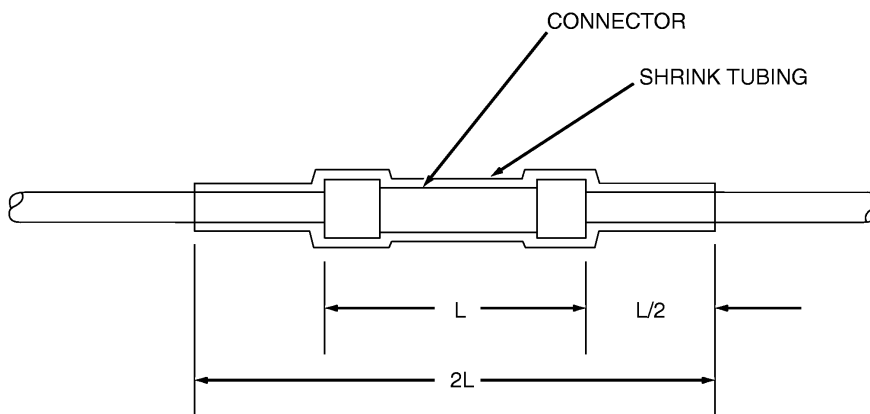
Splices and Repairs

For quality splicing and to reduce potential problems, the following guidelines are recommended:

- Stagger the splices within a harness to reduce increased harness diameter. Splice only on straight areas as installed, not on bends.
- Strip wire ends making sure that individual conductor strands are not damaged.
- When soldering, make sure an adequate mechanical joint exists before applying solder. Use only resin-core solder. Acid-core solder should not be used since it may result in corrosion.
- For crimp joints, use butt-type metal barrel fasteners and the proper tool at the appropriate setting for the wire size (such as Motorcraft crimp tool S-9796) specifically designed for this type of work.

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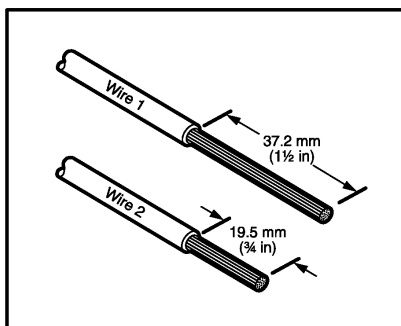
- Make sure splice joints are adequately sealed and insulated. In an outside environment, use Duraseal butt connectors or equivalent. A durable substitute splice joint can be achieved by using a bare metal barrel, crimping, flow-soldering and covering with shrink tubing. Quality electrical tape can be used inside the vehicle but is not recommended for an outside environment.
- Be sure that the new wire is not a lesser gauge than its original mating wire.



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Recommended Splicing Method — Solder (For 16 AWG and Smaller Diameter Wire Only)

1. Disconnect the battery ground cable.
2. Strip wires to appropriate length.

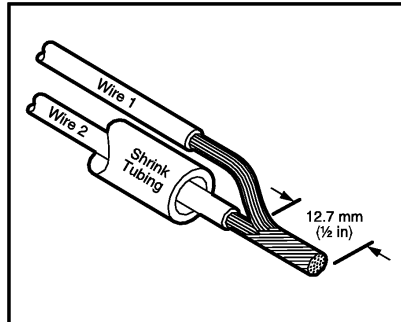


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3. Install heat shrink tubing.
4. Twist the wires together.
5. **NOTE:**
Use resin-core mildly-activated (RMA) solder. Do not use acid-core solder.

Solder wires together.

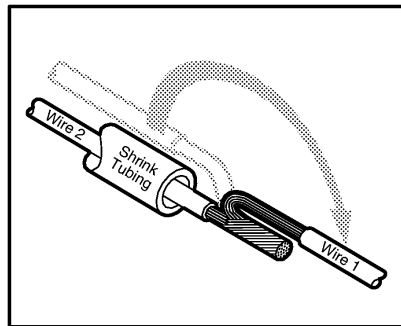
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6. **NOTE:**
Wait for solder to cool before moving wires.

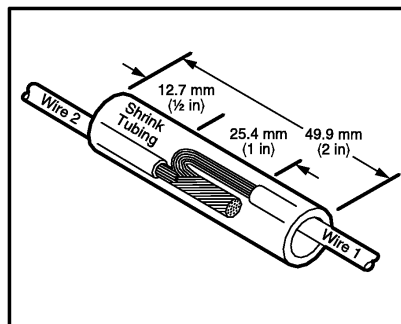
Bend wire 1 back in a straight line.



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7. **NOTE:**
Overlap tubing on both wires.

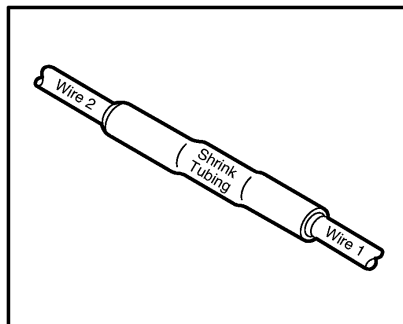
Evenly position heat shrink tubing over wire repair.



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8. Use a shielded heat gun to heat the repaired area until adhesive flows out of both ends of the heat shrink tubing.

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9. Reconnect the battery ground cable.

Sealed Connectors

Ford Part Number	Part Name	Class
E6FZ-14488-A	Butt Connector Gauge: 18-22, Color: Red	C
E6FZ-14488-B	Butt Connector Gauge: 14-16, Color: Blue	C
E6FZ-14488-C	Butt Connector Gauge: 10-12, Color: Yellow	C

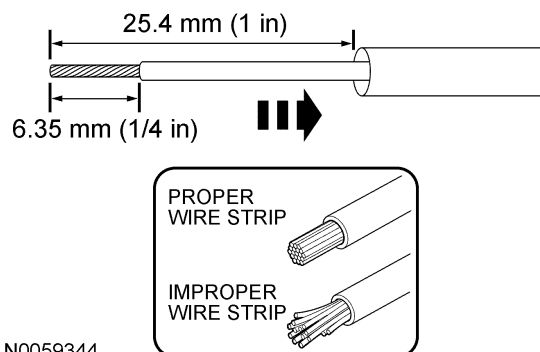
Heat Shrinkable Tubing (Heat Shrink) (Ford Specification ESB-M99D56-A2)

Heat shrinkable tubing is available in various diameters for different splice sizes and configurations. When shrunk, it forms a small, flexible hermetic seal.

Other methods (tape, PVC mold) do not provide a hermetic seal and are not recommended. Splice balancing is critical with heat shrink insulation. If the splice is extremely unbalanced (more circuits on one side than the other), heat shrink insulation will not provide a proper seal. Evaluate the use of double terminals instead of splices where practical in these situations.

Recommended Splicing Method — Crimp (For 10–22 AWG Diameter Wire to Like Wire Diameter)

1. Disconnect the battery ground cable.
2. Strip wires to appropriate length.
3. Install heat shrink tubing.



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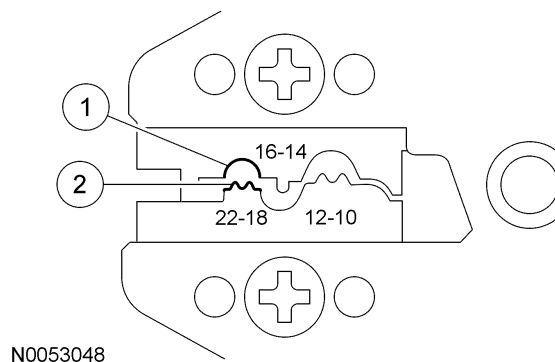
4. Select the appropriate wire slice for the wires to be spliced from Rotunda Wire Splice Kit 164-R5903.
5. **NOTE:**

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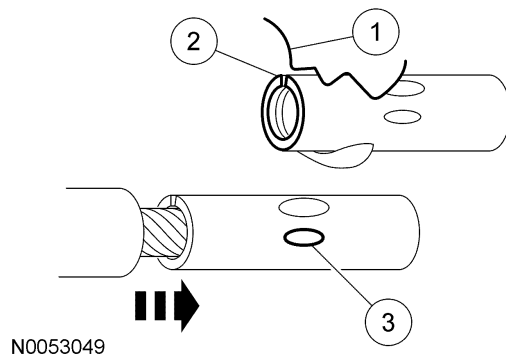
Rotunda 164-R5901 Pro-Crimper supplied with the wire splice kit is the only tool that can be used with these splices.

Identify the appropriate chamber on the Rotunda Pro-Crimper by matching the wire size on the dies with the wire size stamped on the butt splice.

- (1) Cavity
- (2) Indenter

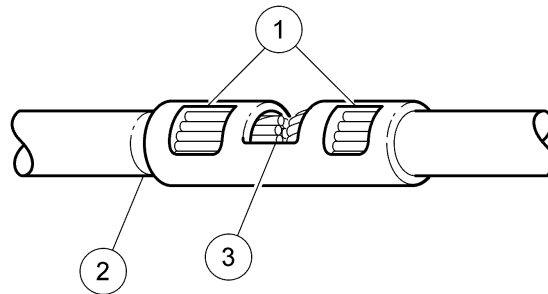


- 6. Crimp the connector.
 - (1) Center one end of the wire splice in the appropriate crimping chamber.
 - (2) Insert stripped wire into the barrel.
 - (3) Holding the wire in place, squeeze the tool handles until ratchet releases.



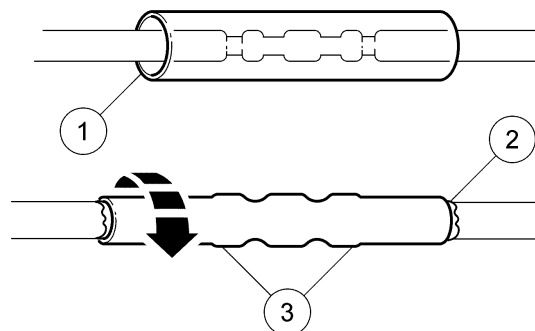
- 7. Repeating Step 6, crimp the other half of the splice.
- 8. Check for acceptable crimp.
 - (1) Crimp should be centered on each end of the butt splice.
 - (2) Wire insulation does not enter butt splice.
 - (3) Wire is visible through inspection hole of splices.

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N0053050

9. Evenly position supplied heat shrink tubing over wire repair.
10. Use a shielded heat gun to heat the repaired area until adhesive flows out of both ends of the heat shrink tubing.



N0053051

11. Reconnect the battery ground cable.

Heat Shrinkable Tubing (Heat Shrink) (Ford Specification ESB-M99D56-A2)

Heat shrinkable tubing is available in various diameters for different splice sizes and configurations. When shrunk, it forms a small, flexible hermetic seal.

Other methods (tape, PVC mold) do not provide a hermetic seal and are not recommended. Splice balancing is critical with heat shrink insulation. If the splice is extremely unbalanced (more circuits on one side than the other), heat shrink insulation will not provide a proper seal. Evaluate the use of double terminals instead of splices where practical in these situations.

Electrical Systems Management

Care must be given in deciding what equipment should be installed into a police vehicle given the power demands of the equipment and the power available from the vehicle. A power load strategy should be developed to minimize the risk of running out of power. Examine the proposed equipment for vehicle installation. Add up the current requirements. If the current requirements exceed what the vehicle can reasonably be expected to be able to provide, the battery will begin discharging to provide the power to the equipment that the generator is unable to provide. After some period of time, the vehicle will shut off as the battery voltage decreases to a level that cannot sustain vehicle operation.

There are alternatives that can be considered to minimize system electrical overload. Consider the current requirements of equipment before it is purchased and installed. Modern light bars and radios use a fraction of the current than units made as recently as 1996. As the light bar is the most power intensive unit installed on most police vehicles, considerable attention should be given to its current requirements. Changes in officer habits while in the field can make a difference as well. When a vehicle is sitting at an accident scene and no one is in the car, the air conditioner can be turned off until the officer is ready to get back into the vehicle. The air conditioner is among the largest current users of non-police equipment. As such, it can impact available power for other uses as well.

Alternator Output

On 2013 Sedan and Utility Police Interceptors, the alternator is controlled by the PCM.

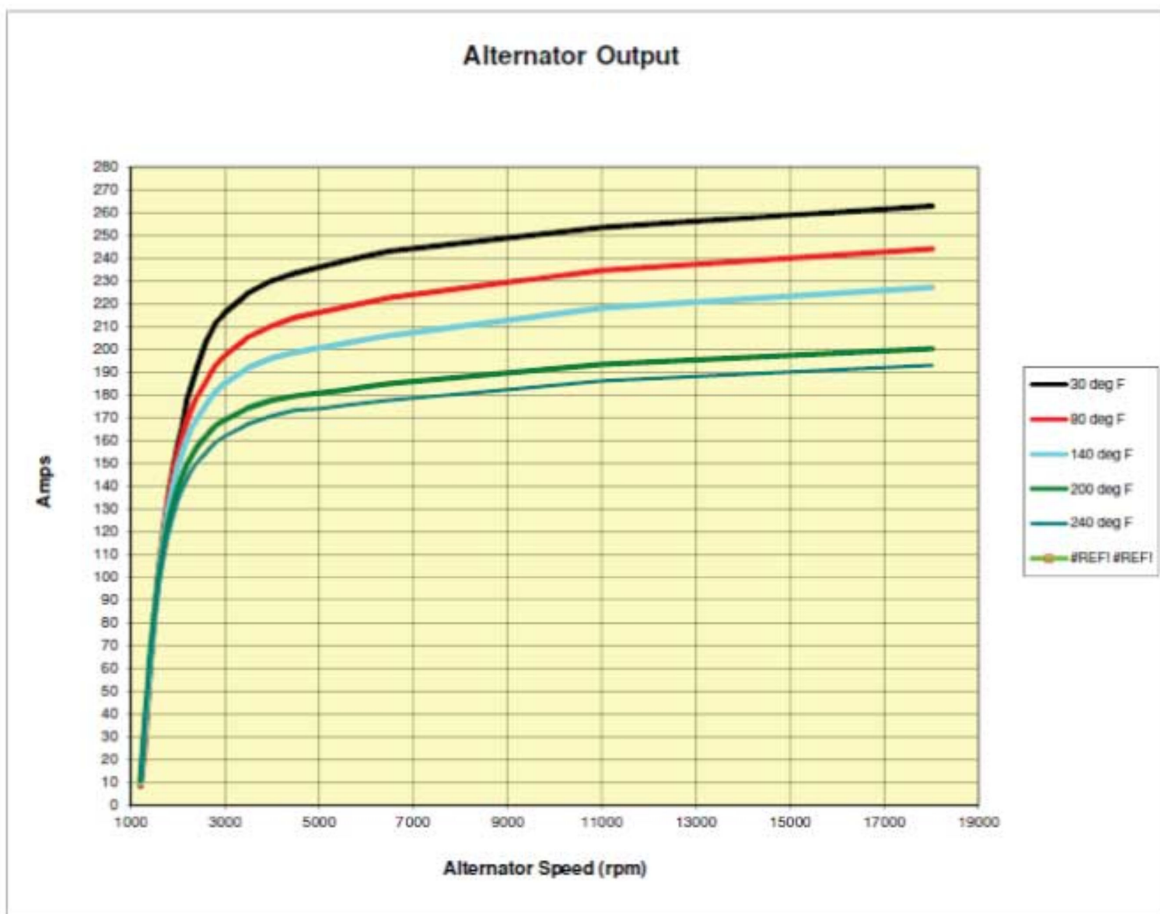
Section 2: Electrical

The Police Interceptor alternator is different from that used on the standard retail vehicles. The Police Interceptor has a 220 amp alternator. This results in significantly greater current output, especially at idle, where police vehicles need it most.

- Alternator amp output:
 - Maximum output for the Police Interceptor is 220 amps
- Alternator drive ratio, determined by generator pulley size:
 - Sedan Police Interceptor 2.67:1
 - Utility Police Interceptor 2.67:1
- Idle speed:
 - Police Interceptor 600 rpm

NOTE:

In order to calculate engine rpm from the graph below, divide the alternator speed by 2.67 (or 3 as an approximate). Alternator speed/3.0 = engine rpm.



N0140614

Charging Margins

Alternator output varies with engine speed and ambient temperature as illustrated in the Alternator Output Section. The worst case scenario for police vehicles is when the vehicle is idling for long periods of time on a very hot day. Lower engine speeds while idling, coupled with high under hood temperatures that may approach 93°C (200°F), combine to minimize power output from the generator. At the same time, electrical

Section 2: Electrical

demand on the vehicle is often at its highest because the air conditioner loads are added to the usual electrical loads experienced in emergency situations.

Vehicle Component Electrical Loads

Vehicle component electrical loads are shown in the table below. Not all features are powered all the time, so actual vehicle loads on the power supply system will vary.

Component	Amps
Base	
Miscellaneous Base Loads	19.1A
Cooling	
Cooling Fan (variable speed)	48A High Speed 12A Low Speed
Climate Control	
A/C Clutch	3.5A
A/C Fan-to-Face — High Speed (recirculating air)	18.9A
A/C Fan-to-Face — Medium/High Speed (recirculating air)	15.2A
Heater Fan-to-Foot — Medium/High Speed (fresh air)	13.9A
Lighting	
Exterior and Instrument Panel Lamps (non-dimmable)	3.2
Headlamps — Low Beam	Part of Police Load
Headlamps — High Beam (incremental)	Part of Police Load
Brake Lights (with High Mount Stop Lamp)	3.3A
Heated Features	
Heated Rear Window (includes heated mirrors)	26A
Other	
Radio	2.4A
Wiper Speed 1 (low)	2.3A
EPAS	70A (13% sized for CLCC)
Police Load	65A (80% sized for CLCC)
Typical Vehicle Load = 60-70 Amps	

NOTE:

Cooling and Climate Fan sizing measured from wind tunnel data (at the ambient temperatures of 110°F for AC and 30°F for Heat).

NOTE:

Police Load includes all lighting except for Exterior and IP lights. Police vehicles we measured had higher worse case lighting loads operated in wig/wag - strobe version than baseline. For CLCC, we assume 80% duty cycle throughout the three drive cycles. For EPAS sizing, it is assumed 100%.

NOTE:

EPAS peak load is 70A, for CLCC max duty cycle is 13%, for EPAS it is again 100%.

Typical Police Equipment

Loads for equipment commonly found on police vehicles are shown in the table below. Not all equipment will be operating at the same time, so actual loads on the power supply system will vary.

Section 2: Electrical

Component	Amps
Communications Radio	4.0 (9.0 w/mic active)
Mobile Data Transmitter	3.0
Light Bar	28-43
Light Bar with All Internal Accessory Lights Activated	36-63
Spot Lights (each)	7.8
Alley Lights (each)	1.0
Radar	0.8
Digital Video	0.5

PCM — Red Area

NOTICE:

DO NOT make electrical connections to vehicle electrical systems not specifically designed for police equipment installations.

Do not install any components into the PCM or PCM harness. Connecting into this system may affect engine and transmission operation. Vehicle speed output available in 14-way connector at base of center stack see Chapter 2 Section 28 for Front Power Access and Signals for pinout. For example: connection of aftermarket electrical equipment into the brake light circuit or any other circuit which is connected to the PCM, anti-lock brake computer, air bag system or any other vehicle system will cause vehicle malfunction.

Headlight and Tail Light Modifications

NOTICE:

To prevent current spike damage to the Body Control Module (BCM), do not splice into any lighting circuits

Headlight Flashers (Wig-wag)

NOTE:

It is recommended that wig-wag function is accomplished through a dedicated solution. Ford offers a high-output durable LED based solution that combines wig-wag, turn signal, and park lights.

Tail Light/Brake Light Flashers (Wig-wag)

Adding tail light flashers (wig-wag) to the brake light circuit requires that the splice location is inside the trunk area. Splicing into the brake light circuit at any other location will cause critical systems on the vehicle to malfunction. Circuit protection devices have been added to the vehicle to accommodate tail light flashers. These protection devices will only be effective if the tail light flasher (wig-wag) module is spliced into the section of the brake light circuit that is in the trunk area.

Disabling Brake Lights

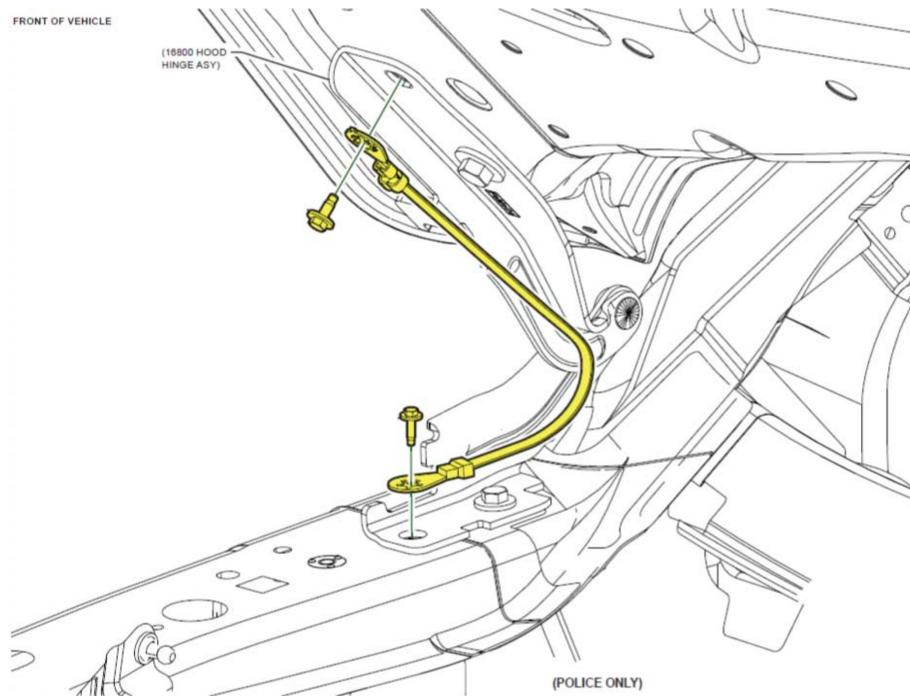
Do not disable the brake light circuits for any reason. For additional information, refer to Section 2: General Information in this guide.

Brake Applied Signal

For brake output circuit see 14-way connector pin 8 in BU5T-14A459-BA located at bottom of instrument panel above driveline tunnel between front seats. For access to this connector, remove valence panel per process in Chapter 2 Front Power Access and Vehicle Signals.

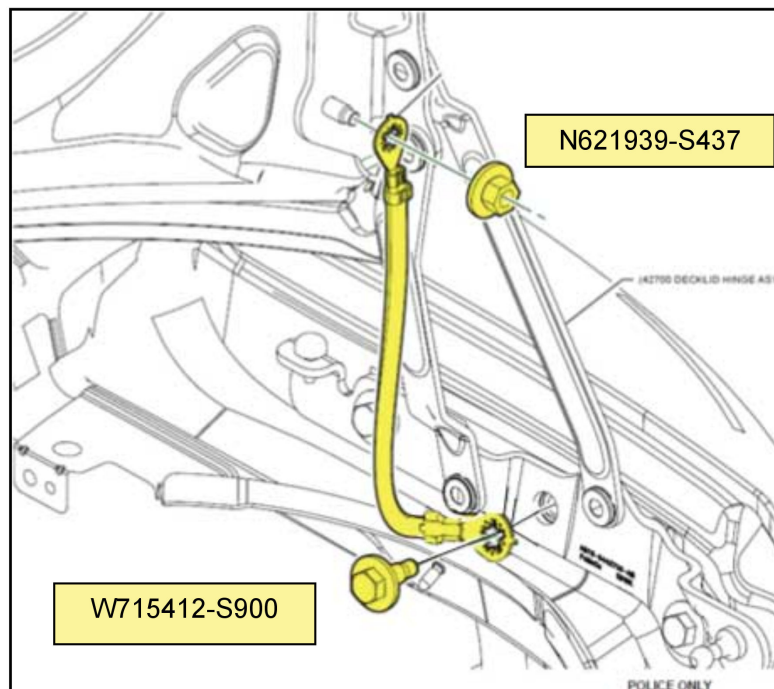
Section 2: Electrical

Sedan Intercepter - Front Ground Strap - Passenger Side Hood



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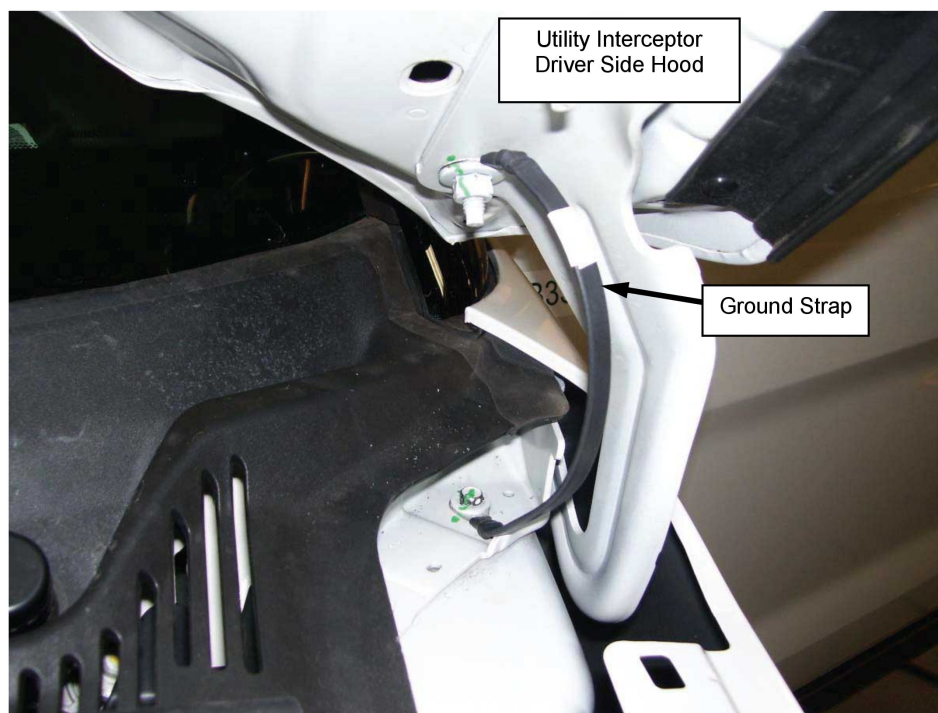
Sedan Intercepter - Trunk Lid Strap - Passenger Side



N0140616

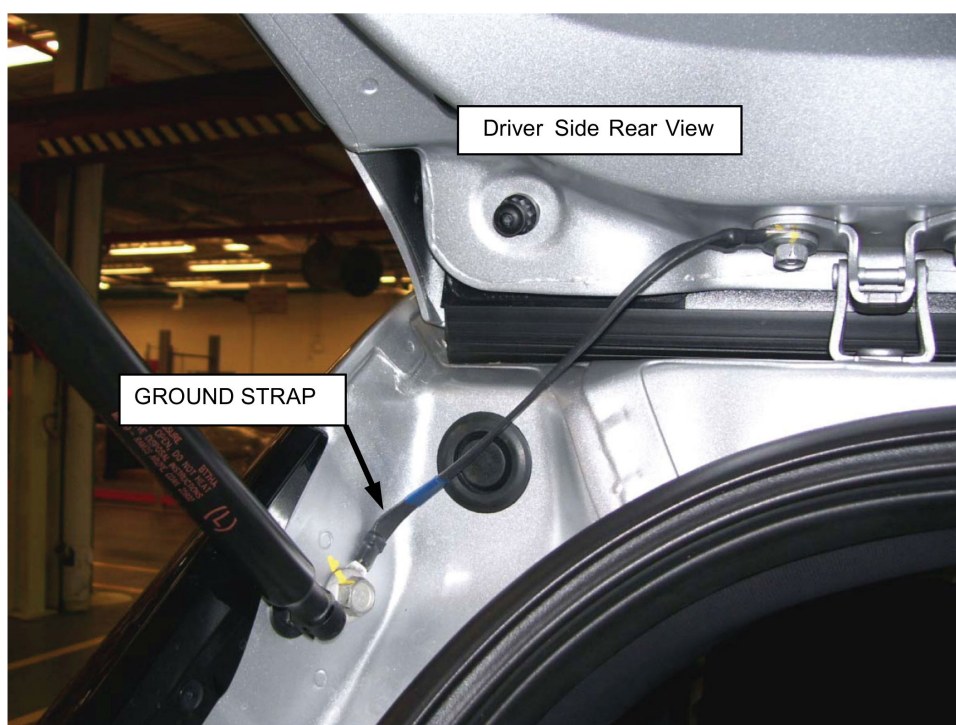
Section 2: Electrical

Utility Interceptor - Front Ground Strap - Passenger Side Hood



N0140617

Utility Interceptor - Liftgate - Driver Side



N0140618

Section 2: Electrical

Regular Production Options (RPO)

Product Information see: www.fordpoliceinterceptor.com

Siren/Speaker

NOTICE:

Exposure to loud sounds can damage hearing. Hearing by those inside or outside in near proximity of the vehicle can be damaged. Hearing protection should always be used with exposure to sirens and horns. Sirens and horns should not be turned on indoors that will expose yourself or others to the sound generated. Refer to federal, state, and or local recommendations for requirements applicable to your area. Guidance is provided in OSHA Standard 1910.95 under "Permissible Noise Exposure".

- Exposure to sounds produced by typical sirens and horns (near or greater than 120 dB) could result in permanent hearing loss.
- Certain packages for both the Sedan and Utility Police Interceptors include system designed siren amplifiers and speakers. Using a siren and/or speaker(s) from other manufacturers may reduce the output, the overall warning effectiveness of the siren system and possibly cause reduced component useful life. Your system should be tested to conform to federal, state, and local performance standards. Packages for the Sedan and Utility Police Interceptors are tested to SAE J1849, 500 feet audibility, OSHA Sound Compliance Standards and have been salt spray tested for corrosion and durability.
- Adhere to all Ford Police Interceptor Modifier Guide, Owners Manual, diagnostic manual safety and precaution procedures when servicing or relocating the vehicle or warning system.
- Loud sounds can damage your hearing as well as others in or within close proximity to your emergency vehicle. Exposure to very loud sounds in short duration or longer duration to moderately loud sounds can also damage hearing. For hearing conservation guidance, refer to federal, state, or local recommendations. OSHA Standard 1910.95 provides guidance on "Permissible Noise Exposure"
- Effective sirens and horns produce loud sounds (120 dB) that may cause permanent hearing loss. Always minimize your and others' exposure to siren sound and wear hearing protection. Do not sound the siren indoors or in enclosed areas where you and others will be exposed to the sound.
- Siren amplifiers and speakers are designed to work together as a system. Combining a siren and speaker from different manufacturers may reduce the warning effectiveness of the siren system and may damage the components. You should verify or test your combination to make sure the system works together properly and meets federal, state and local standards or guidelines. The factory installed components are tested and verified to support SAE J1849, 500 ft. Audibility, OSHA Sound Compliance Standards, and have been salt spray tested for durability.
- Frequently inspect the speaker to ensure it is clear of any obstruction, such as mud or snow, which will reduce maximum sound output and could lead to premature speaker failure.
- Follow all safety and precautions procedures in the Ford Police Interceptors Modifier Guide, Owners Manuals and diagnostic manuals when servicing or moving this equipment.

NOTICE:

The lives of people depend on your safe operation of this system. It is important to read and follow all instructions shipped with the products. In addition, listed below are some other important safety instructions and precautions you should follow:

Signaling Limitations

- Be aware that the use of your visual and audible signaling device does not give you the right to force your way through traffic. Your emergency lights, siren, and actions are REQUESTING the right-of-way.
- Although your warning system is operating properly, it may not alert everyone. People may not hear, see or heed warning signal. Your must recognize this fact and continue driving cautiously.
- Situations may occur which obstruct your warning signal when natural or man made objects are between your vehicle and others.

Driving Limitations

- At the start of your shift, you should make sure that the light/sound system is securely attached to the vehicle and operating properly.
- If the unique combination of emergency vehicle equipment installed in your vehicle has resulted in the siren controls being installed in a position that does not allow you to operate them by touch only, OPERATE CONTROLS ONLY WHILE YOUR VEHICLE IS STOPPED.
- If driving conditions require your full attention, you should avoid operating the siren controls while the vehicle is in motion.
- File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees.
- Failure to follow these safety precautions may result in property damage, serious injury, or death to you, to passengers, or to others.

Configuration Instructions

The factory installed system is an extremely versatile electronic siren and light control system. Available siren tones are: wail, yelp, priority, hi-lo and an air horn sound. Horn ring control of siren tones is provided. Public address and radio rebroadcast are also available. Eight relays are available for controlling light bars, other auxiliary lights and accessories.

Section 2: Electrical

For operations and configuration instructions, refer to the corresponding section of this manual.



WARNING:

Property damage, serious injury, or death to you or to others may result if the factory installed system is improperly programmed.

Programming, if desired by the police agency, is to be performed at the time of installation. It is NOT intended for operators to "customize" the unit's operation for their individual preferences. It is the police agencies' responsibility to determine compatibility, suitability, and ensure proper programming of the factory installed system.

The person responsible for programming MUST be familiar with local codes and procedures for safe emergency vehicle siren and light operation.

- Since many factory installed features are programmable, operation is described for the "Standard" program. Refer to the supplied Operation and Configuration section of this manual for additional discussion of the "standard" program. It is the operator's responsibility to understand how his particular unit is configured (programmed) to operate.
- The factory installed key pad is designed to assist the operator's selection of functions. Each control head switch is recessed and aids in guiding the operator's finger to the switch's center for activation. When a switch is pressed, tactile feedback provides function selection indication as follows: a click is felt, a beep is heard, and the selected function's key illuminates brightly.

Individual LED Flash Pattern Programming



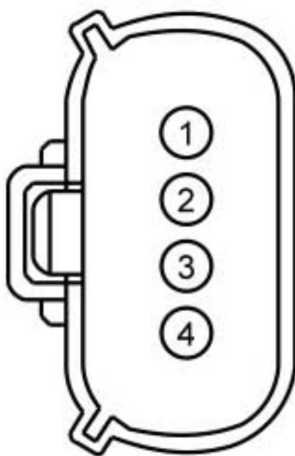
WARNING:

Police Package warning lights are a high-intensity Light-Emitting Diode (LED) type. Do not stare directly at these lights, as doing so may cause temporary blindness and/or eye damage. Failure to follow this instruction may result in personal injury.

NOTE:

When cycling through flash patterns, most flash patterns include an off/on pattern followed by an inverse on/off pattern. Setting the LED on one side to the on/off and the other to off/on creates the alternating pattern effect which should not be confused with synchronization which applies to the pattern timing between LED groups. For proper synchronization, the correct flash patterns must be selected for the individual flashing LEDs. Refer to the Explorer, Taurus Police Interceptor Modifier Guide for specific flashing LED patterns.

1. Disconnect the flashing LED to be programmed.
2. Connect ground to pin 4, component side of the flashing LED.



N0146097

Section 2: Electrical

Connector Pin #	Circuit #	Signal Name/Function
1		Power from I/P Blunt
2		Scan Lock (CAP04 <=> LT, cap05 <=> RT)
3		Sync
4	GD	GND

N0141106

NOTICE:

This step will activate the individual flashing LED. The flashing LED must be active to change the flash pattern.

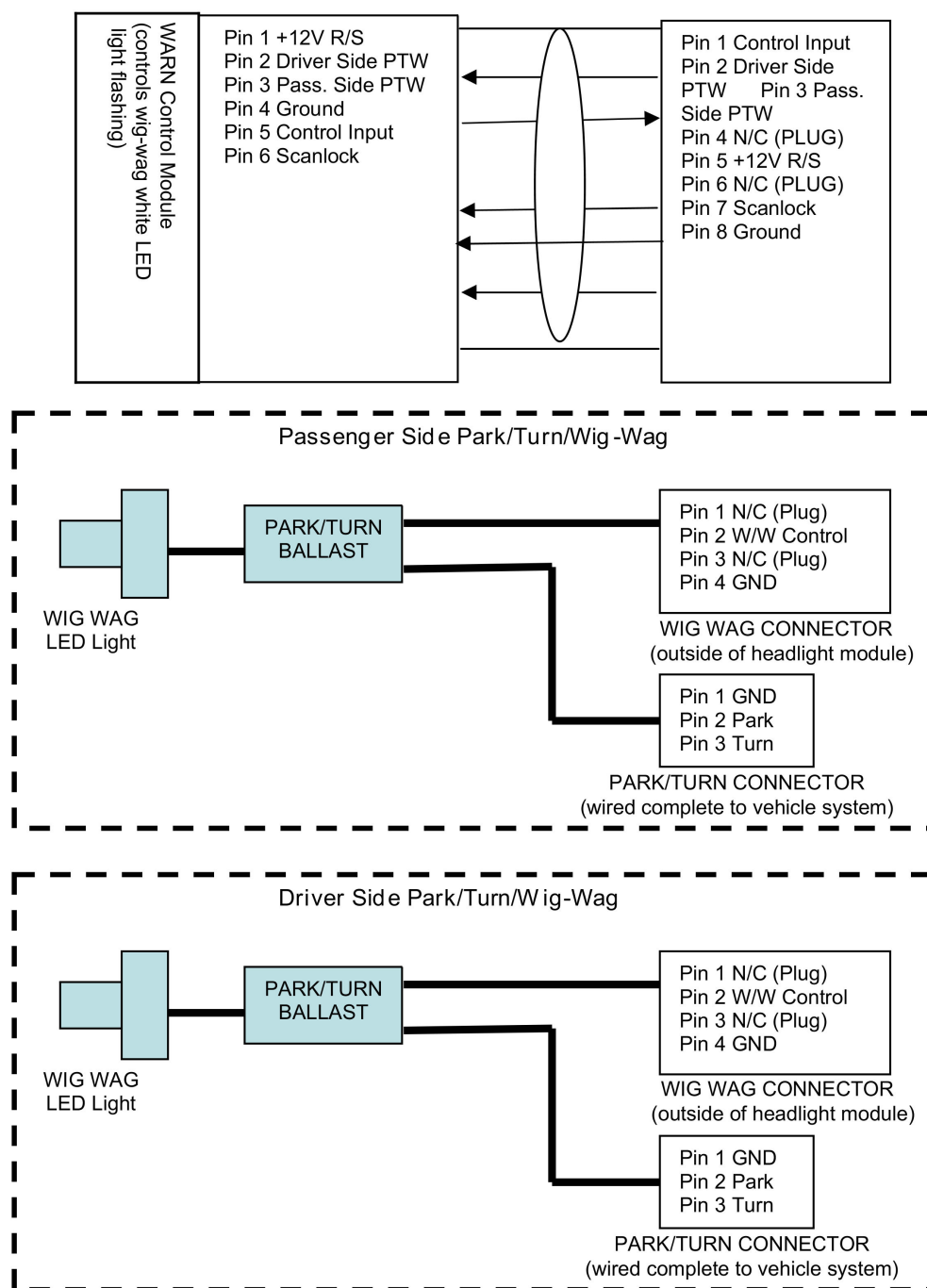
3. Connect 12 volts to pin 1, component side of the flashing LED.
4. Change the flashing LED flash pattern:
 - To cycle forward to the next pattern, connect 12 volts to pin 2, component side of the flashing LED for less than 1 second.
 - To cycle back to the previous pattern, connect 12 volts to pin 2, component side of the flashing LED for greater than 1 second.

Sedan/Utility Interceptor Wig-Wag

WARN Control Module controls the wig-wag (white LED lights in headlight module) alternating flash.

- With full OEM wire harness, no further wiring is required for wig-wag function. The amber turn signal/Park function is wired complete into the vehicle harness and will function without additional wiring.
- Without full OEM wire harness, upfit wiring is required to connect the control circuit, WARN control module and white LED wig-wag light pigtail for wig-wag function. The amber turn signal/Park function is wired complete into the vehicle harness and will function without additional wiring.

Section 2: Electrical



N0146596

Group LED Flash Pattern Programming

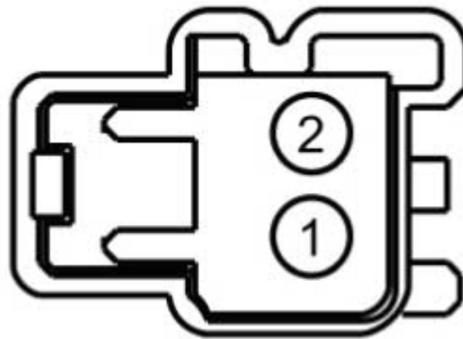
NOTE:

When cycling through flash patterns, most flash patterns include an off/on pattern followed by an inverse on/off pattern. Setting the LED on one side to the on/off and the other to off/on creates the alternating pattern effect which should not be confused with synchronization which

Section 2: Electrical

applies to the pattern timing between LED groups. For proper synchronization, the correct flash patterns must be selected for the individual flashing LEDs. Refer to the Explorer, Taurus Police Interceptor Modifier Guide for specific flashing LED patterns.

1. Activate the flashing LEDs in the group to be programmed.
2. Locate the pattern programming circuits at in-line C4231. To change the flashing pattern:
 - Sedan - Connector C4231 located right side of trunk
 - Utility - Connector C4231 located in the left rear corner of the vehicle near floor.



N0146096

3. For park/turn/warn, grille, front corner and tail lamp flashing LEDs:
 - To cycle forward to the next pattern, connect 12 volts to pin 2 of in-line C4231 for less than 1 second.
 - To cycle back to the previous pattern, connect 12 volts to pin 2 of in-line C4231 for greater than 1 second.
4. For high mount and deck lid flashing LEDs:
 - To cycle forward to the next pattern, connect 12 volts to pin 1 of in-line C4231 for less than 1 second.
 - To cycle back to the previous pattern, connect 12 volts to pin 1 of in-line C4231 for greater than 1 second.

Utility - Interceptor Rear Cargo Door Release

Function same as retail vehicle operation

Unlock the vehicle, engage the liftgate handle and pull up on the rear liftgate door. FOB release for rear cargo door:

Sedan - Luggage Compartment Lid Release Switch

The new standard configuration is effective with all job 1 orders

- Sedan Interceptors are shipped from the assembly plant with trunk release activated on Run/Start power.
- Converting to activate trunk release on Battery power, hot all the time, requires Integrated Diagnostic Service (IDS) tool to enable this function.

NEW Sedan Upfitter Wire Bundle Dash Panel Pass-Through

Certain Police Interceptor vehicles come equipped with Auxiliary Dash Panel Pass-Through Wire Circuits (Upfitter Auxiliary) depending on selected option packages.

New for 2015 MY, the STANDARD Upfitter Auxiliary Pass-Through Wire Circuits (6 twisted pairs) can be used by the vehicle modifier.

- The vehicle interior end of the Aux Upfitter Circuits is found beneath the Instrument Panel near the Body Control Module (BCM).
- The underhood end of the Aux Upfitter Circuits is found taped to a harness underhood near the Battery Junction Box (BJB).

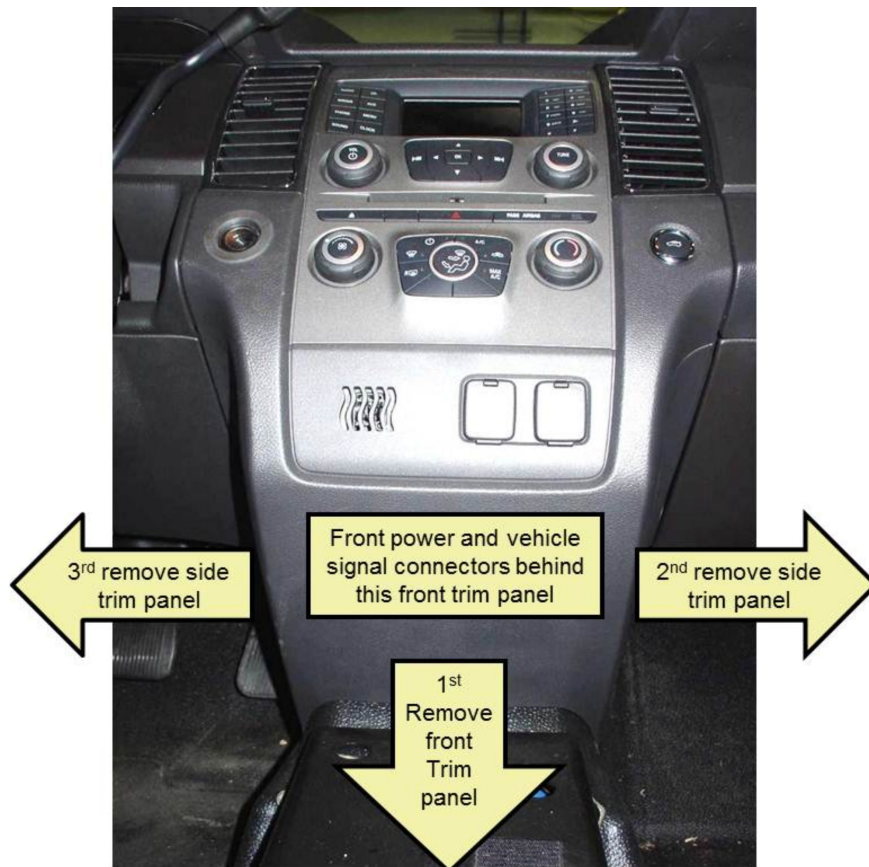
1. Twisted Pair A (20AWG)

- White
- White / Blue

Section 2: Electrical

2. Twisted Pair B (20AWG)
 - Yellow
 - Yellow / Black
3. Twisted Pair C (20AWG)
 - Green
 - Green / White
4. Twisted Pair D (20AWG)
 - Blue
 - Blue / White
5. Twisted Pair E (14AWG)
 - Orange
 - Orange / Black
6. Twisted Pair E (14AWG)
 - Black
 - Black / White

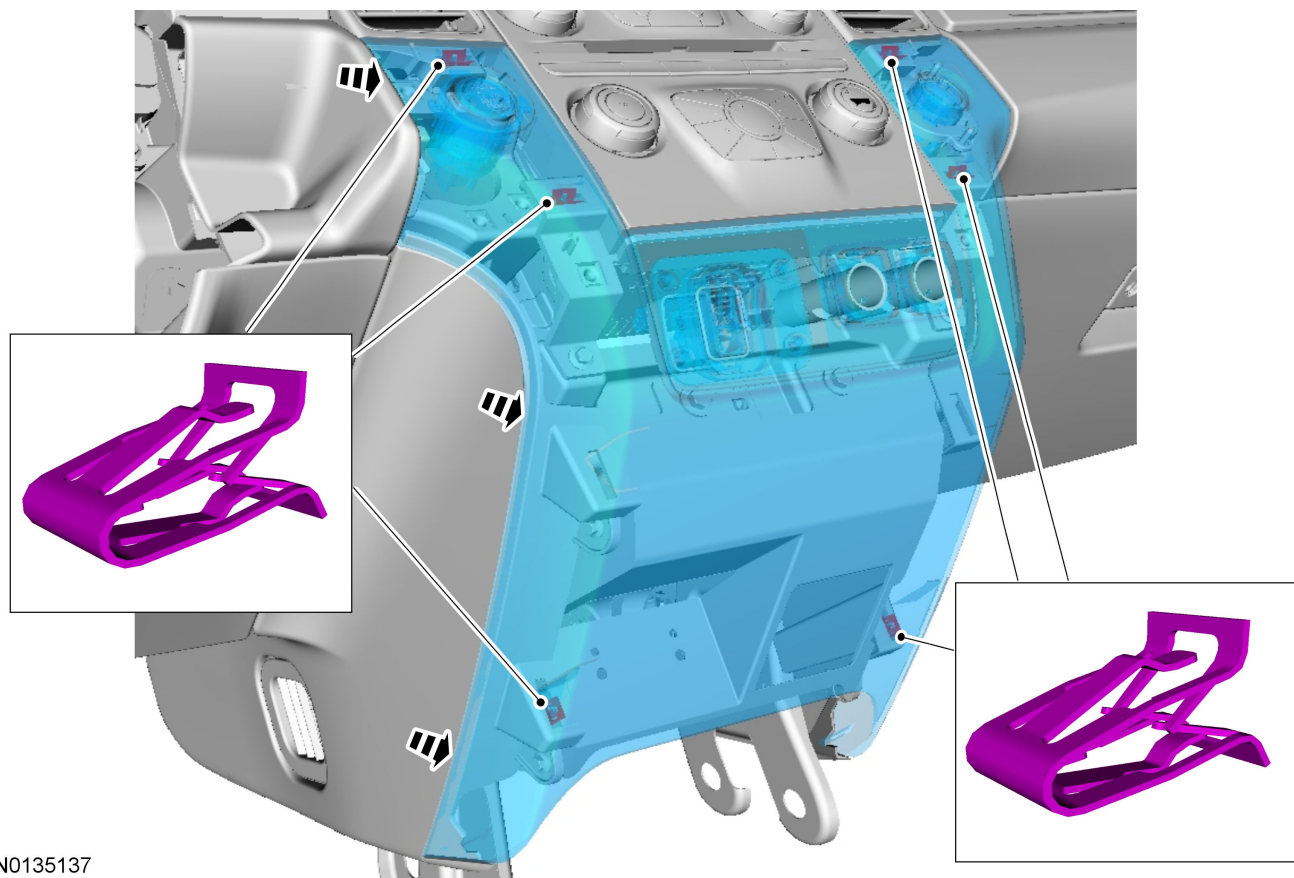
Sedan — Lower Center Instrument Panel Removal and Installation



N0151478

1. Remove the lower center instrument panel finish panel.

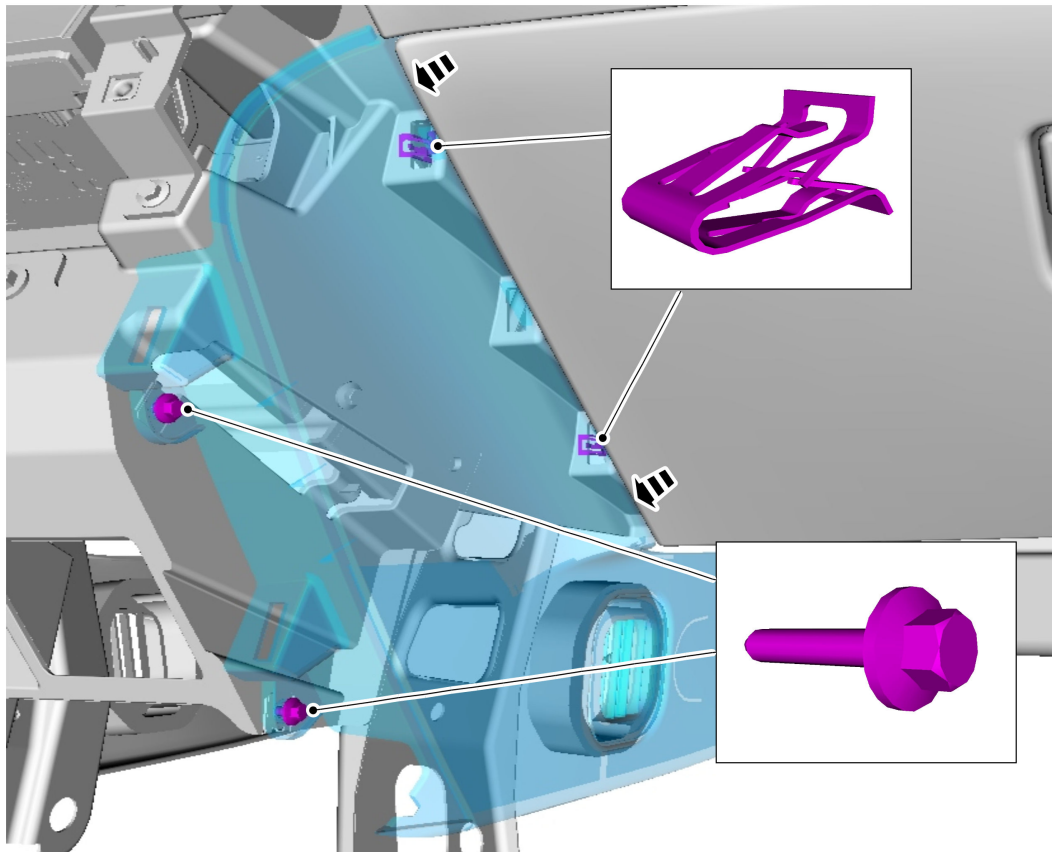
Section 2: Electrical



N0135137

2. Remove the LH and RH lower cowl panel side trim.

Section 2: Electrical

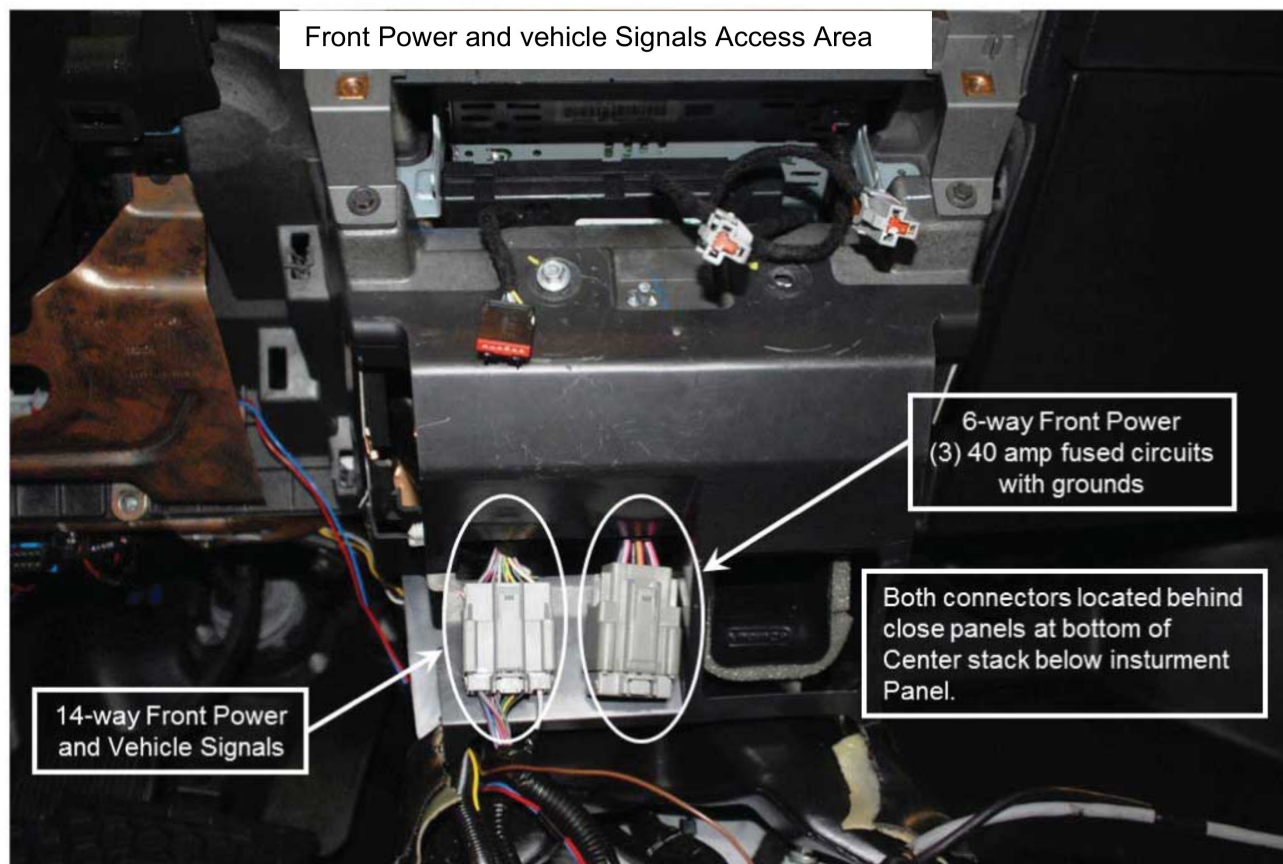


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Sedan — Front Power And Vehicle Signals Access Area

- Located behind lower center instrument panel trim panels
- Siren speaker at Instrument panel center stack (4 Pin)
- Power/vehicle signals at instrument panel center stack (14 Pin)
- Police lights at instrument panel center stack (14 Pin)
- Police radio connector at instrument panel/center stack (4 Pin)
- 40A auxiliary power at instrument panel/center stack (6 Pin)

Section 2: Electrical



N0151471



Part# 3U2Z-14S411-BJAC



Part# 3U2Z-14S411-HEA

N0151470

Connector View For Connector 3U2Z-14S411-HEA Continues On The Next Page.

Pin Number	Description	Fuse	Wire Color
1	B+ (40A)	BJB #40	VT-RD
2	B+ (40A)	BJB #6	BN-RD
3	B+ (40A)	BJB #16	VT-RD
4	Ground	IP Tunnel	BK-BJ

Section 2: Electrical

(Continued)

5	Ground	IP Tunnel	BK-BJ
6	Ground	IP Tunnel	BK-BJ

Connector View For Connector 3U2Z- 14S411-BJAC.

Pin Number	Description	Fuse	Wire Color
1	B+ Feed #1 (20A)	IP #2	GY-RD
2	Steering Wheel Switch #1 Output (1A) Grnd	GNRL Function Module	GY-BN
3	Steering Wheel Switch #2 Output (1A) Grnd	GNRL Function Module	WH-VT
4	Steering Wheel Switch #3 Output (1A) Grnd	GNRL Function Module	GN-BN
5	Steering Wheel Switch #4 Output (1A) Grnd	GNRL Function Module	YE-GY
6	Start (2A)	BJB #95	BN-BU
7	Run/Start #1 (20A)	BJB #73	WH-BN
8	B+ Feed #2 (20A)	IP #32	BU-RD
9	Vehicle Speed Output (VSS)	PCM	VT-OG
10	Delay Accessory (15A)	IP #17	GN-VT
11	B+ Feed #2 (15A)	IP #5	YE-RD
12	Park Detect Signal (Transmission)	Sifter GRND	GN
13	Driver Door Ajar Signal	IP #9 GRND	GN-VT
14	Run/Start #2 (20A)	IP #74	VT-BN

NOTE:

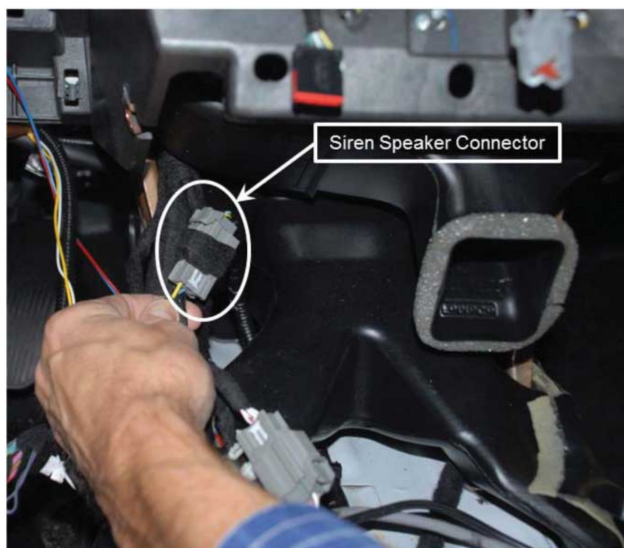
Fuse sizes are given to help locate the fuse in the Power Distribution Box (PDB). Ford recommends that current be limited to 85% of the value: 20 Amp should be limited to 17 Amp 15 Amp should be limited to 12 Amp.

Park Detect: Sources a ground when the vehicle is in park. This circuit is capable of grounding 1 Amp.

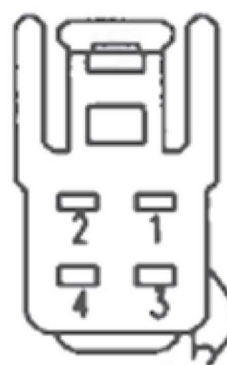
Drivers Door Ajar: This circuit is a sense only grounded circuit when the door is closed. It is used to supply a module that has pull up resistors in its input.

Section 2: Electrical

Sedan — Siren Speaker Connector



Siren Speaker Connector



Part# 3U2Z-14S411-LUB



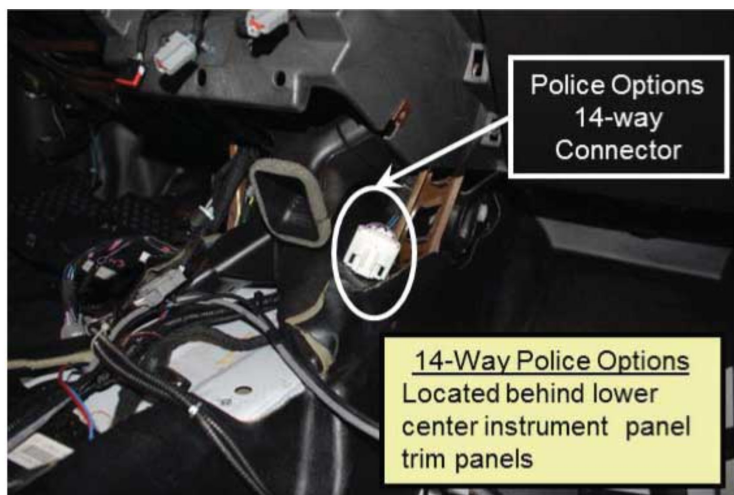
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Connector View For Connector 3U2Z- 14S411–LUB.

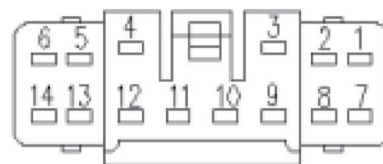
Pin Number	Description	Wire Color
1	Siren Driver Side Feed (+)	YE
2	Siren Shield Driver Side (-)	
3	Open Passenger Side Front (+)	
4	Siren Return Passenger Side Front (-)	BU-WH

Section 2: Electrical

Sedan — Police Options 14-Way Connector



Police Options 14-Way Connector



Part# CU2Z-14S411-APA



N0N015474

Connector View For Connector 3U2Z- 14S411-APA Continues Onto The Next Page.

Pin Number	Description	Wire Color
1	Wig Wag Control	VT
2	Front Corner LED Power Control	VT-OG
3	Front Flasher Power Control	BN-YE
4	Speaker (-) at Grille (Option)	GN-BU
5	Open	

Section 2: Electrical

(Continued)

6	Front Corner LED Light Sync	GY-OG
7	Dimmer	VT-GY
8	Brake Output Signal Ground	BU-OG
9	Speaker (+) at Grille (Option)	BN
10	Open	
11	Open	
12	Open	
13	Open	
14	LED Flash Pattern	GY-BN

Front WIGWAG Power: Supplies power to the wigwag connectors at the headlamps.

Front Flasher Power: Supplies power to the flasher relay.

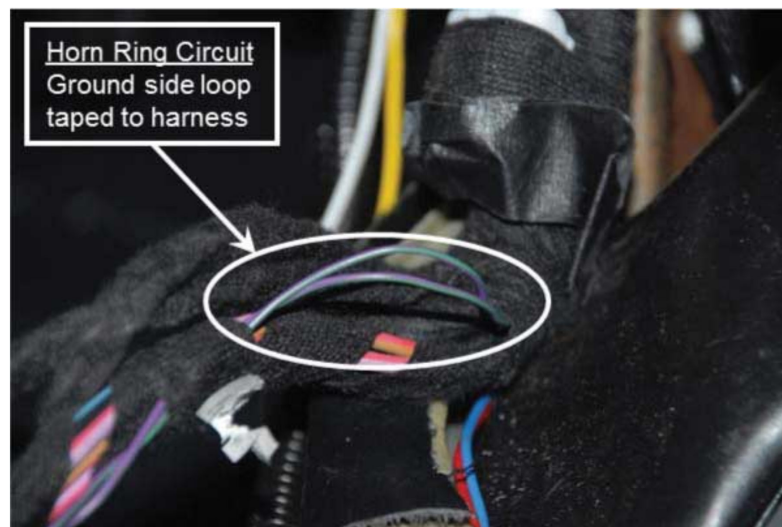
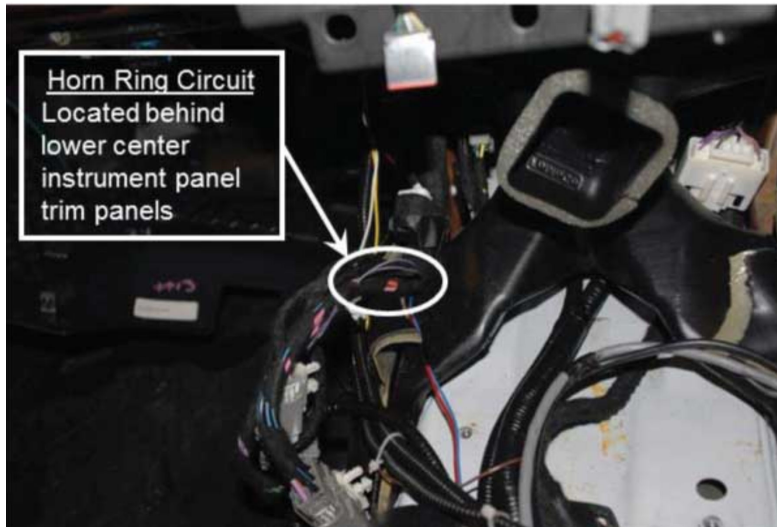
Dimmer: Circuit supplied to allow backlight dimming of aftermarket equipment.

Brake Output: Fused Brake output.

Sedan/Utility — Horn Ring Circuit

ground side loop of horn ring circuit from Body Control Module (BCM) VT-GN wire loop taped to harness from above the opening in lower center instrument panel trim panels.

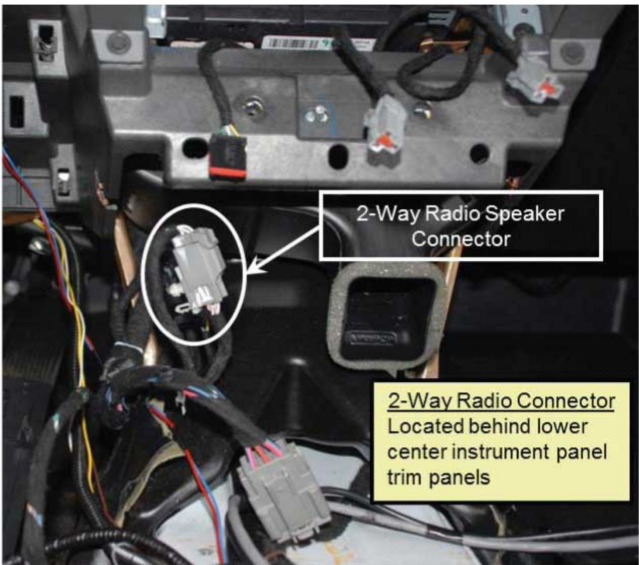
Section 2: Electrical



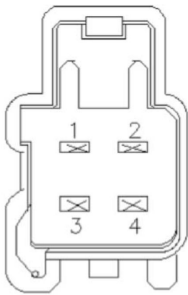
N0151475

Section 2: Electrical

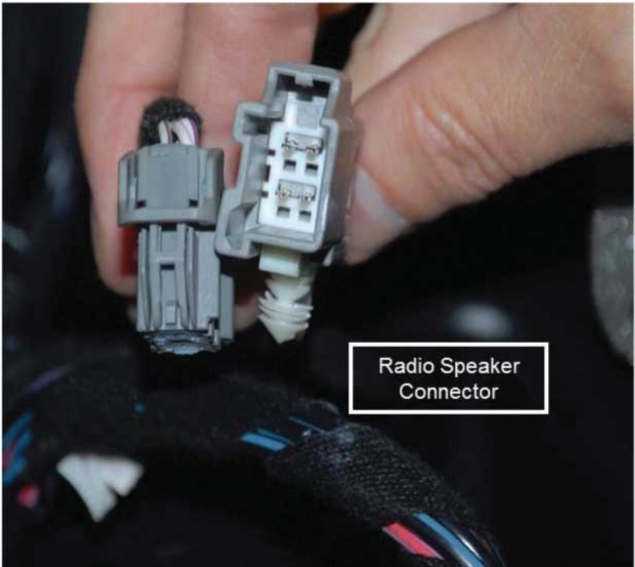
Sedan — Radio and Speaker Connector



Radio and Speaker Connector



Part# 3U2Z-14S411-BUB



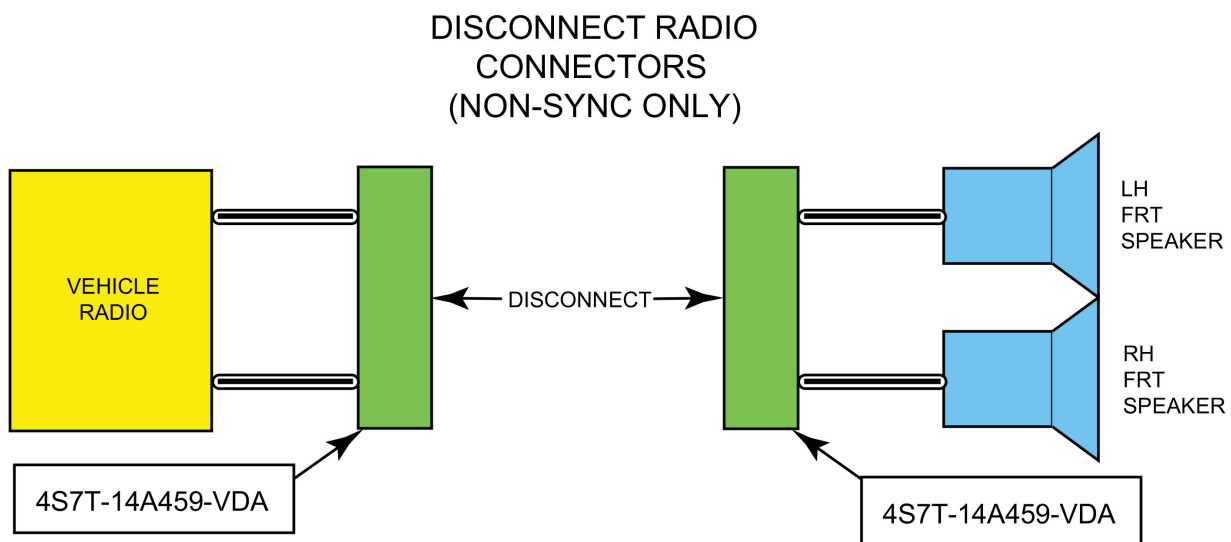
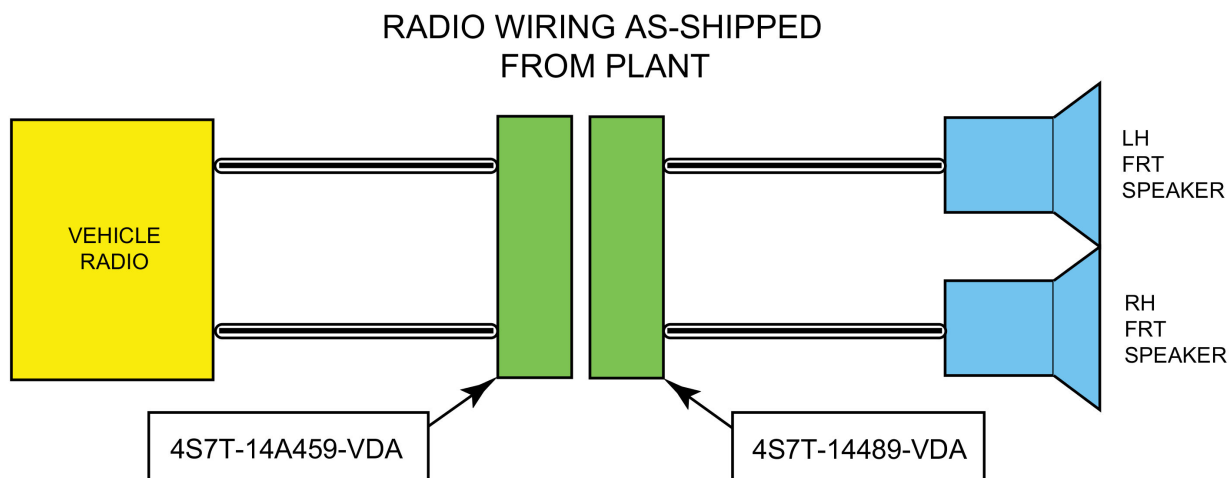
Part# 3U2Z-14S411-LUB

N0151472

Connector View For Connector 3U2Z- 14S411–BUB.

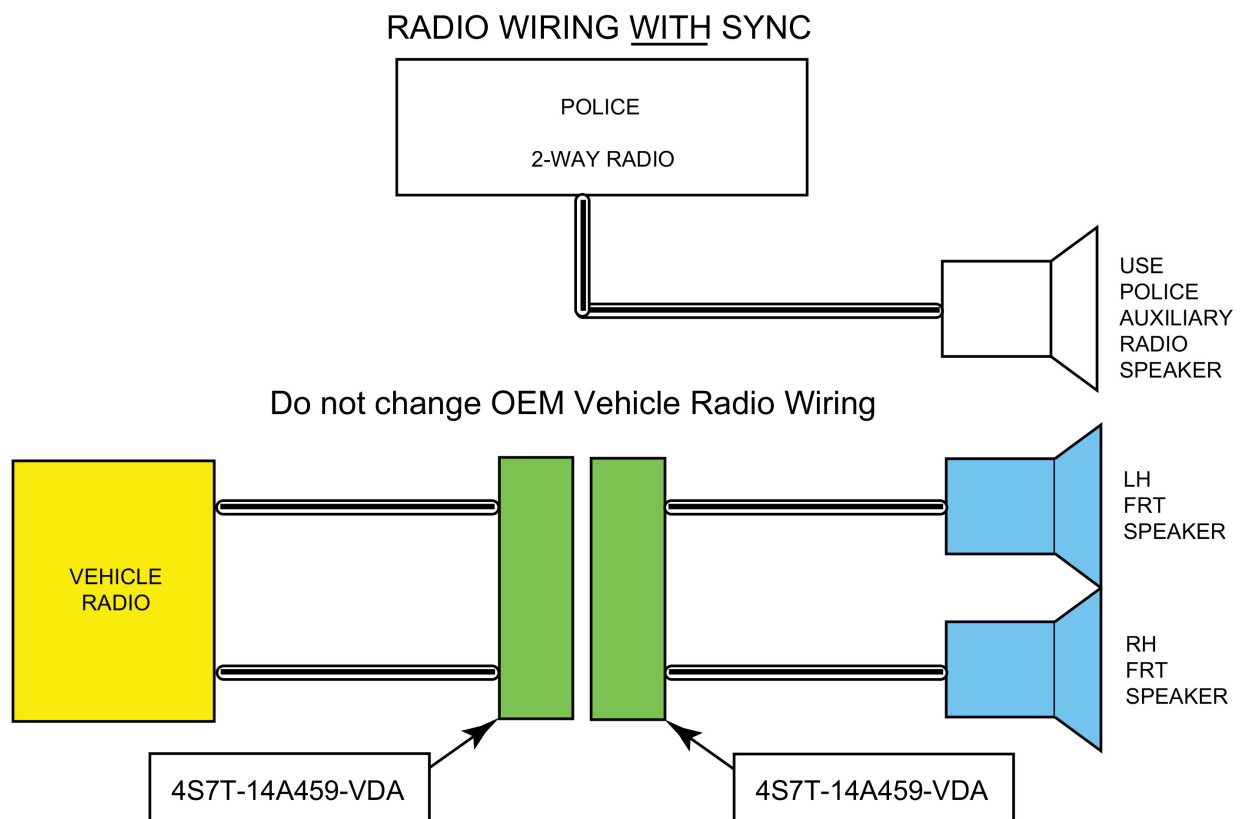
Pin Number	Description
1	Driver Side Front Speaker (+)
2	Driver Side Front Speaker (-)
3	Passenger Side Front Speaker (+)
4	Passenger Side Front Speaker (-)

Section 2: Electrical



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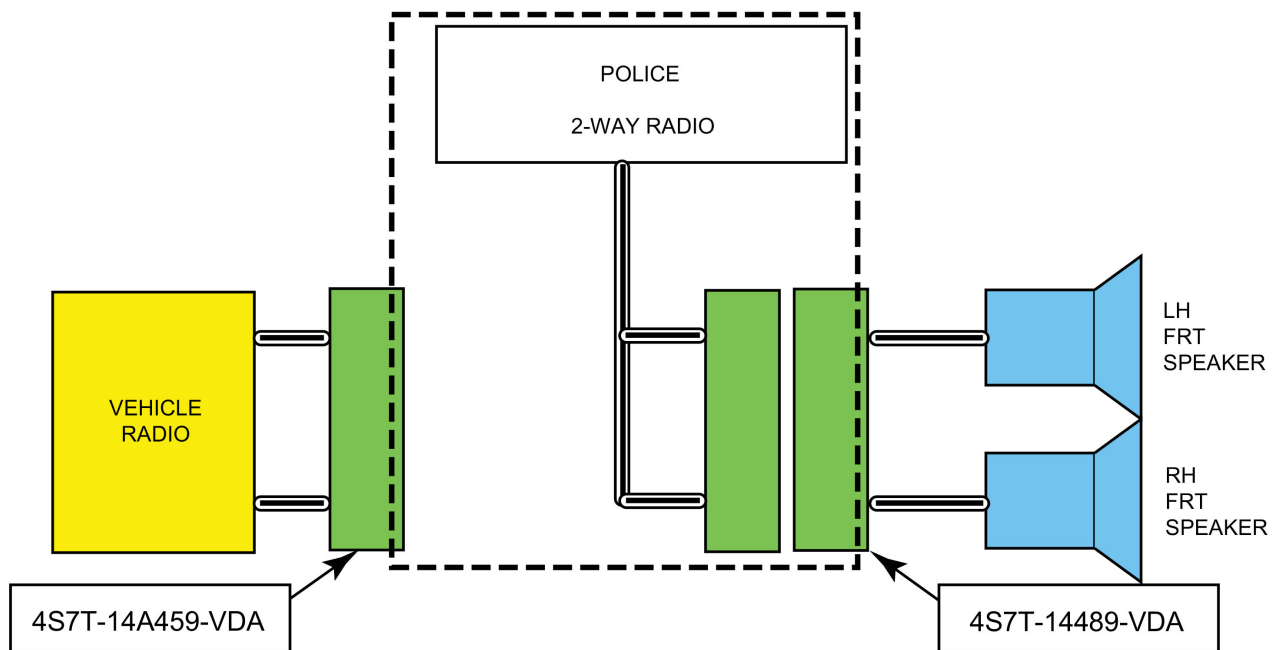
Section 2: Electrical



N0150583

Section 2: Electrical

INSTALL POLICE 2-WAY RADIO AND MAKE
CONNECTIONS TO OEM CONNECTORS
(NON-SYNC ONLY)



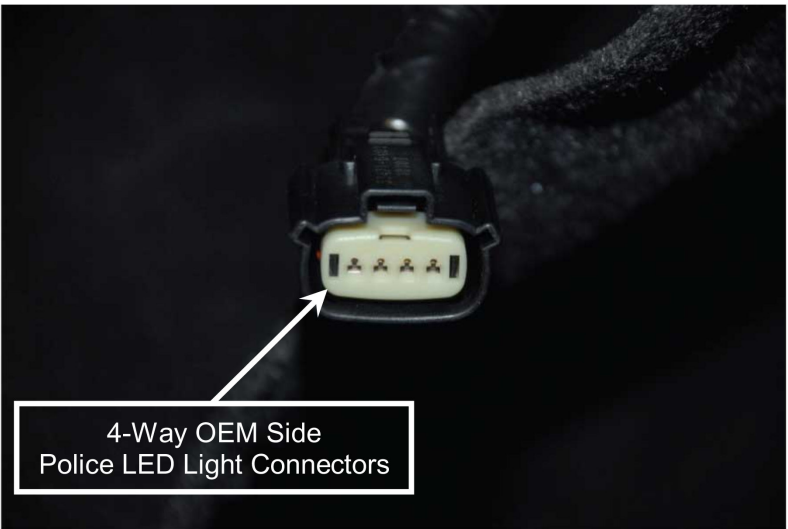
N0150581

Section 2: Electrical

Sedan – 4-Way Connector For All Police LED Light Heads



4-Way Connector For All Police LED Light Heads



N0151525

Connector View For Connector 8U2Z-14S411-TA

Pin Number	Description
1	Control Power
2	LED Light Pattern
3	LED Light Synch
4	Ground

Section 2: Electrical

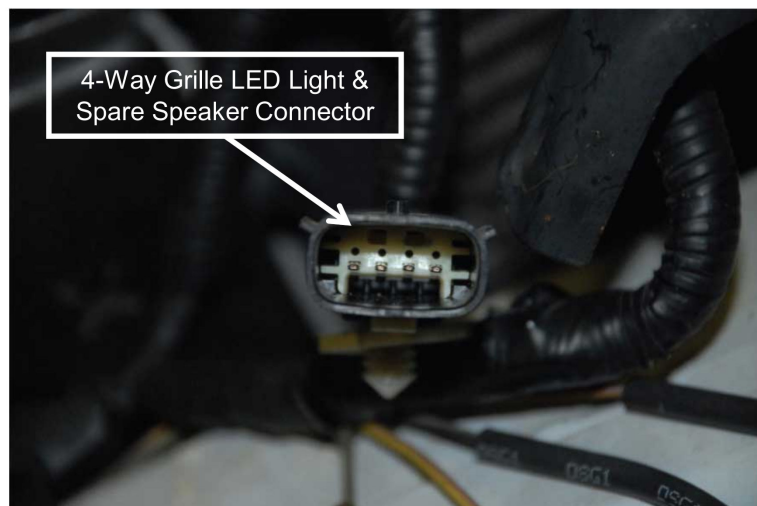
Sedan — Grille LED Light Connector



Grille LED Light Connector
Attached above front bumper



Part# 8U2Z-14S411-TA



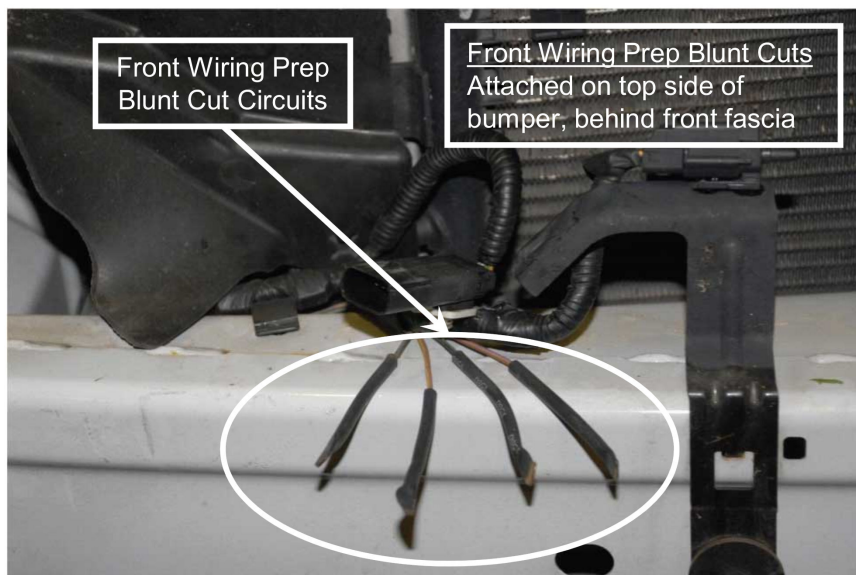
N0151479

Connector View For Connector 8U2Z-14S411-TA.

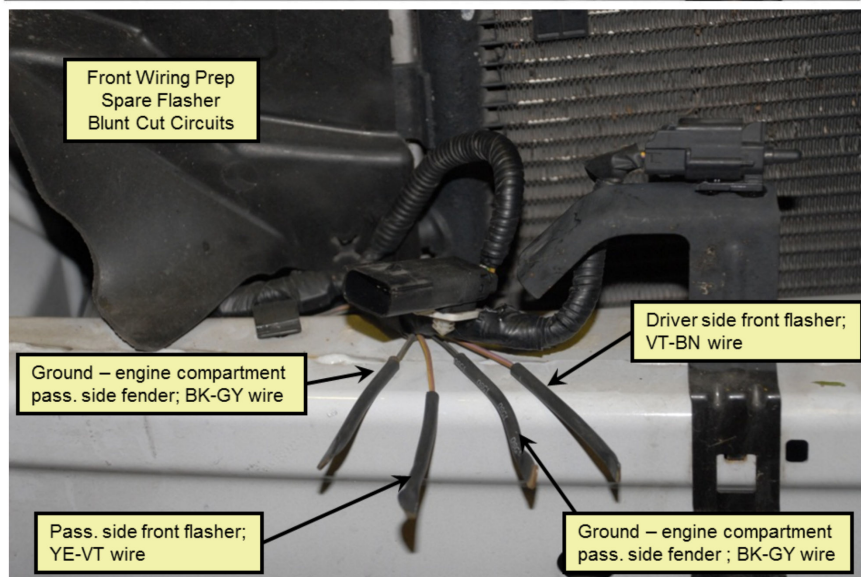
Pin Number	Description	Wire Color
1	Grille LED Light Ground	BN
2	Grille LED Light Pattern	GY-BN
3	Speaker (-)	GY-OG
4	Speaker (+) Spare	BK-GY

Section 2: Electrical

Sedan — Front Wiring Prep Blunt Cut Circuits



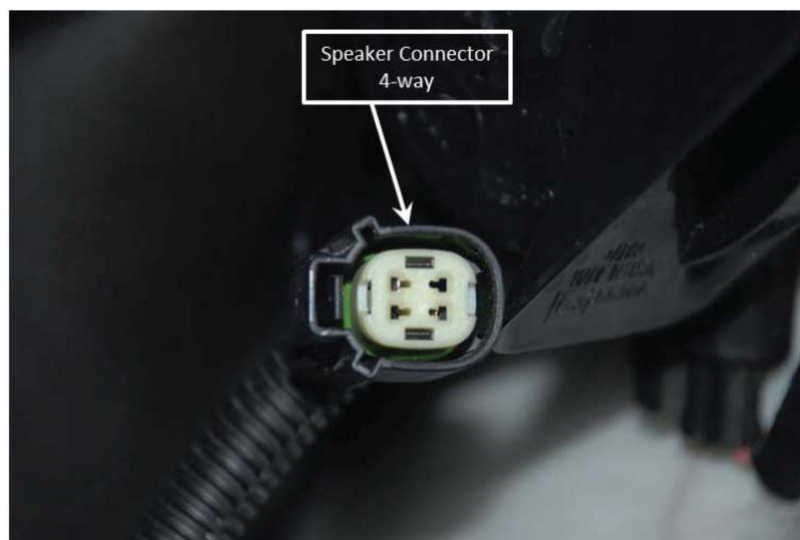
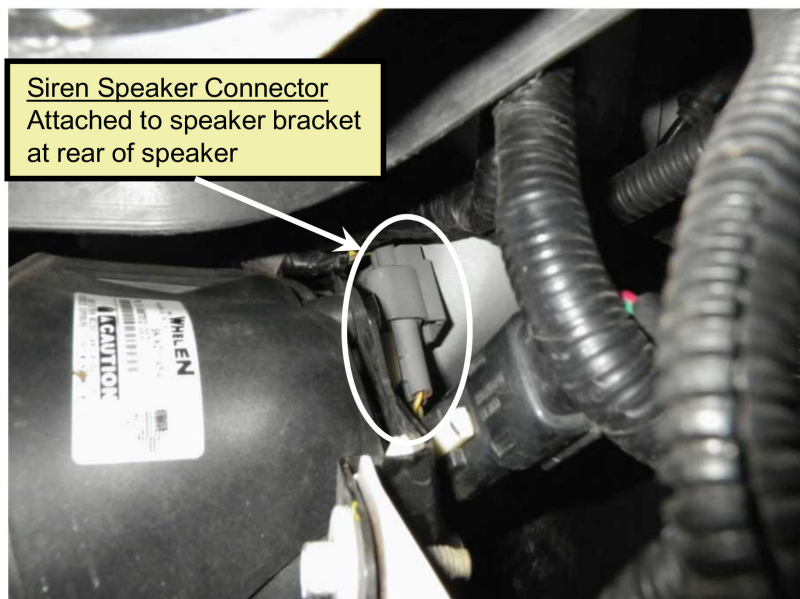
Front Wiring Prep Blunt Cut Circuits Attached to Front Bumper



N0151480

Section 2: Electrical

Sedan — Siren Speaker Connector



Siren Speaker Connector



Part# BU2Z-14S411-TA

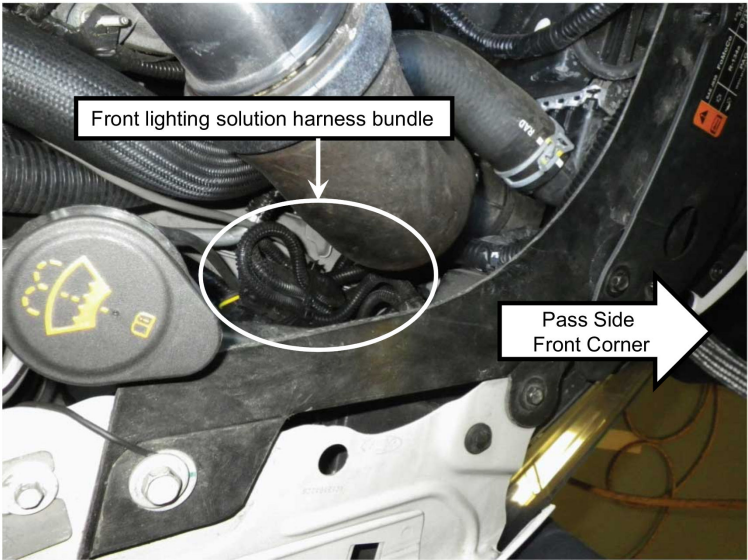
N0151481

Connector View For Connector BU2Z-14S411-TA.

Pin Number	Description	Wire Color
1	Siren (+)	YE
2	Open	
3	Open	
4	Siren (-)	BU-WH

Section 2: Electrical

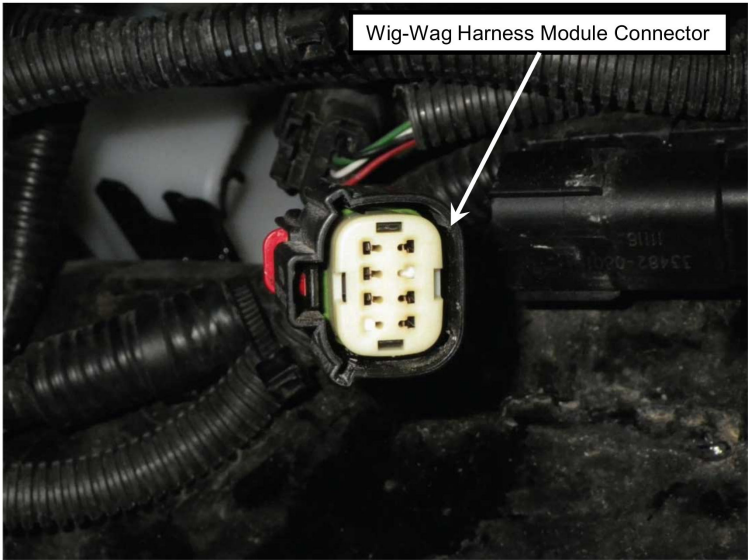
Sedan — Front Lighting Solution Wig-Wag LED And Front Corner LED Lights Connector.



Front Lighting Solution Wig-Wag LED And Front Corner LED Lights Connector



Part # CU2Z-14S411-ALA



N0151482

Connector View For Connector CU2Z-14S411-ALA Continued On The Next Page.

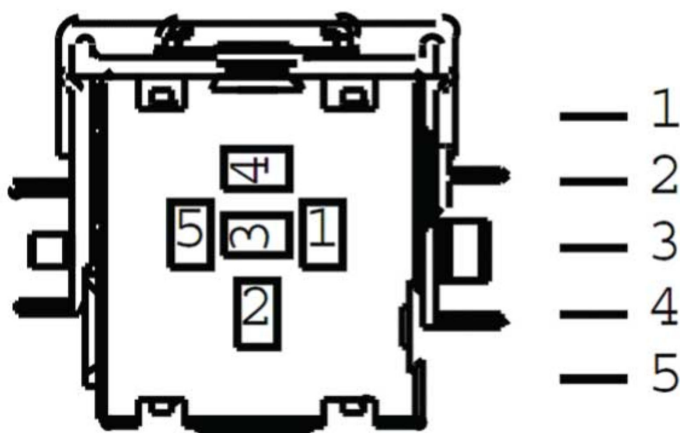
Pin Number	Description	Fuse	Wire Color
1	Wig-Wag Control		VT
2	Wig-Wag Passenger Side Pattern		GN-WH
3	Wig-Wag Driver Side Pattern		GY
4	Open		
5	Wig-Wag Run/Start (20A)	BJB #74	VT-BN

Section 2: Electrical

(Continued)

6	Front Corner LED Lights Control/ Power		
7	Front Corner LED Lights Pattern		GY-BN
8	Wig-Wag Ground		BK-GY

Sedan — Flasher Relay



DU5T-14D089-AA

N0141078

Connector View For Connector DU5T-14D089-AA.

Pin Number	Circuit Number	Signal Name/Function
1		Flasher Power
2		
3		
4		Right Side Flasher Blunt Cut
5		Left Side Flasher Blunt Cut

N0141079

Front flasher power is supplied through the second 14 way power connector and is available on the Sedan and Utility. The right and left blunt cuts are located in the front grille area.




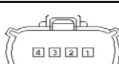


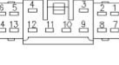
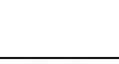




The rear flasher relay is used to turn modifier supplied decklid flashers on in the Sedan when the trunk is open.

NOTE:

Fuse sizes are given to help locate the fuse in the PDB. Ford recommends that current be limited to 85% of the value (40 Amp should be limited to 34 Amp).

Section 2: Electrical

Sedan — Pigtail Information

2013MY SEDAN/UTILITY POLICE INTERCEPTOR PIGTAIL INFORMATION							
CONNECTOR PICTURE	HARNESS	DEVICE	CONN. TYPE	PIN	FUNCTION	Service Pigtail #	INFO
	14290	POL FLASH	8-WAY	1 2 3 4 5 6 7 8	WW INPUT WW RH PTRN/PWR WW LH PTRN/PWR WW R/S STROBES PWR PATTERN WW GND	CU2Z-14S411-ALA	Must splice cavities 1 and 6 together if function is not being used. Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	LH WIG WAG RH WIG WAG	4-WAY	1 2 3 4	WW INPUT WW SCN LOCK WW SYNC WW GND	8U2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	SIREN SPEAKER	4-WAY	1 2 3 4	SIREN + (UNUSED) (UNUSED) SIREN -	BU2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	LH SIDE CORNER MARKER RH SIDE MARKER	4-WAY	1 2 3 4	Power Pattern Sync GND	8U2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	GRILLE & LOUD SPEAKER	4-WAY	1 2 3 4	TDM GRL GND TDM PATTERN LD SPKR - LD SPKR +	8U2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14401	POLICE POWER & VEHICLE SIGNALS	14-WAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14	WIGWAG LAMP CONTROL SIDE LAMP PWR CONTROL FRONT FLASHER PWR CONTROL LOUDSPEAKER NEG OPEN SIDE LAMP SYNC CONTROL DIMMER BRAKE OUTPUT LOUDSPEAKER PWR/TDM GRILL OPEN OPEN OPEN OPEN SIDE STROBE PATTERN	CU2Z-14S411-APA	0.64 CAVITIES- 2TAD-0.75mm 2.8 CAVITIES- 2TAD-1.0mm 0.64 CAVITIES- 1/2/5/6/7/8/13/14 TERMINAL 3F2T-14474-RA 2.8 CAVITIES- 3/4/9/10/11/12 TERMINAL 97BG-14474-BBA
	14401	SIREN	4-WAY	1 2 3 4	SIREN FEED/LEFT FRONT SPK + SIREN SHIELD/LEFT FRONT SPK - OPEN/RIGHT FRONT SPK + SIREN RETURN/RIGHT FRONT SPK -	3U2Z-14S411-LUB	WIRE TYPE- 2TAD-1.0mm TERMINAL 97BG-14474-ABB
	14401	2-WAY RADIO	4-WAY	1 2 3 4	LEFT FRONT SPK + LEFT FRONT SPK - RIGHT FRONT SPK + RIGHT FRONT SPK -	3U2Z-14S411-LUB	WIRE TYPE- 2TAD-1.0mm TERMINAL 97BG-14474-ABB
	14401	2-WAY RADIO	4-WAY	1 2 3 4	LEFT FRONT SPK + LEFT FRONT SPK - RIGHT FRONT SPK + RIGHT FRONT SPK -	3U2Z- 14S411-BUB	WIRE TYPE- 2TAD-1.0mm TERMINAL 97BG-14421-ABB
	14401	POLICE FEATURES & BRAKE OUTPUT	14-WAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14	B+ FEED 17AMP CNTRL BUTTON 1 CNTRL BUTTON 2 CNTRL BUTTON 3 CNTRL BUTTON 4 POL START POL R/S #1 B+ FEED #2 17AMP VSS DEL ASSY B+ FEED #3 12AMP PARK DETECT DRV DOOR AJAR POL R/S #2	3U2Z-14S411-BJAC	1.5 CAVITIES- 0.75mm 2.8 CAVITIES- 1.5mm 0.64 CAVITIES- 2/3/4/5/6/9/10/11/12/13 TERMINAL 97BG-14474-ABB 2.8 CAVITIES- 1/7/8/14 TERMINAL 97BG-14474-BCA WIRE TYPE- 2TAD
	14401	POLICE POWER	6-WAY	1 2 3 4 5 6	POLICE B+ 34AMP POLICE B+ 34AMP POLICE B+ 34AMP GROUND GROUND GROUND	3U2Z- 14S411-HEA	WIRE TYPE- 2TAD-4.0mm TERMINAL 97BG-14474-CCA
	14A227 (D258 ONLY)	POLICE INLINE	2-WAY	1 2	CHMSL LAMP DECKLID	3U2Z- 14S411-LAB	WIRE TYPE- 2TAD-0.50mm TERMINAL 97BG-14421-AAB

N0150616

Sedan — Rear Power Access

The rear power access point is a battery access port for police auxiliary equipment mounted in the trunk. It is capable of supplying 80 amps of battery voltage. Voltage to the positive terminal of the rear power access point is supplied through two 50A fused circuits crimped together,

Section 2: Electrical

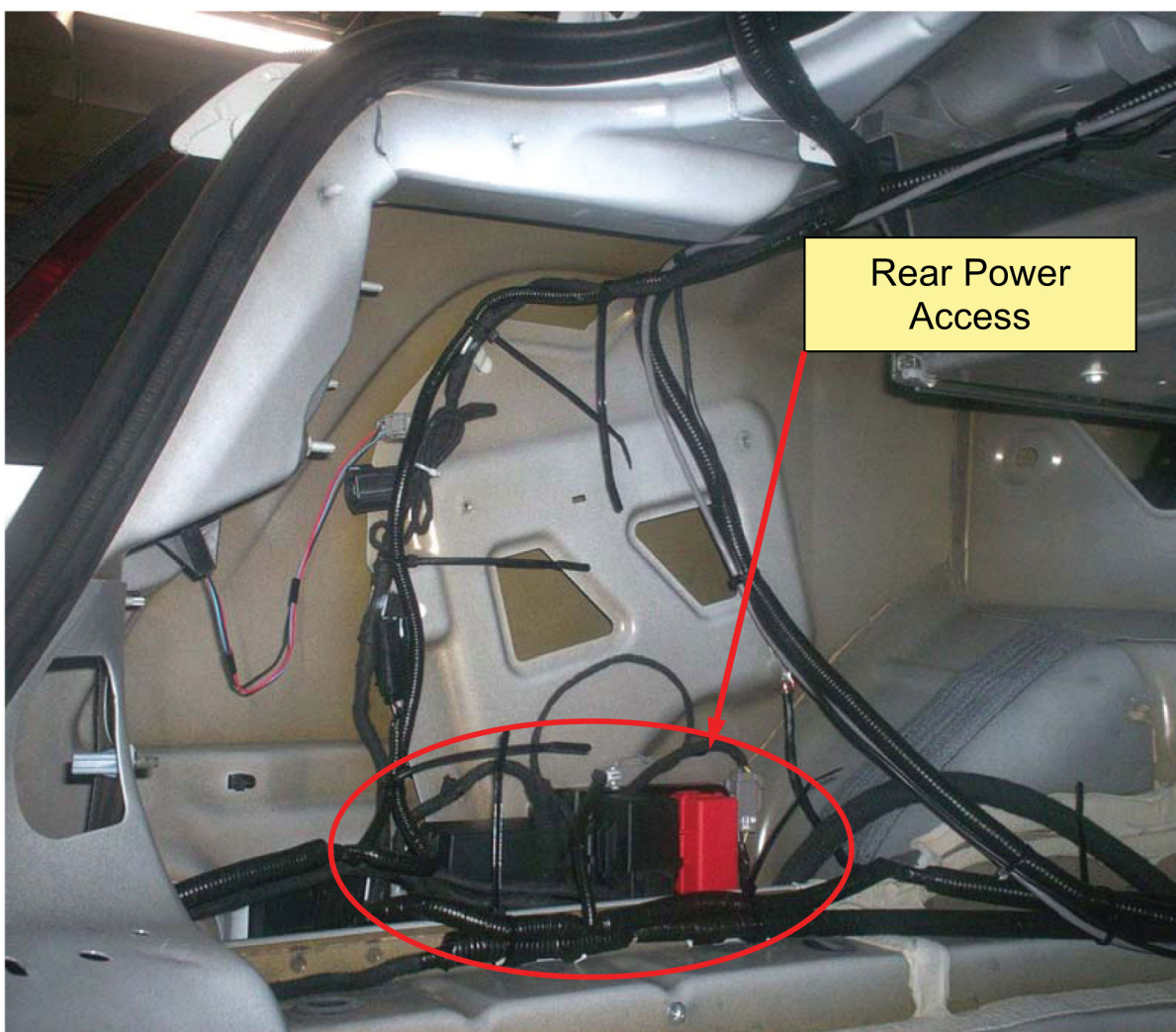
connected to the battery through under hood battery junction box (BJB) fuses #1 and #2. Battery access is provided by 2 studs contained in an enclosure, mounted in the trunk behind the carpet, on the driver side fender support. The terminal with the red wire is the battery positive. Remove both fuses in the BJB before removing the cover to the rear power point. Make sure load devices can be turned off and are switched off when reinserting the fuses.



WARNING:

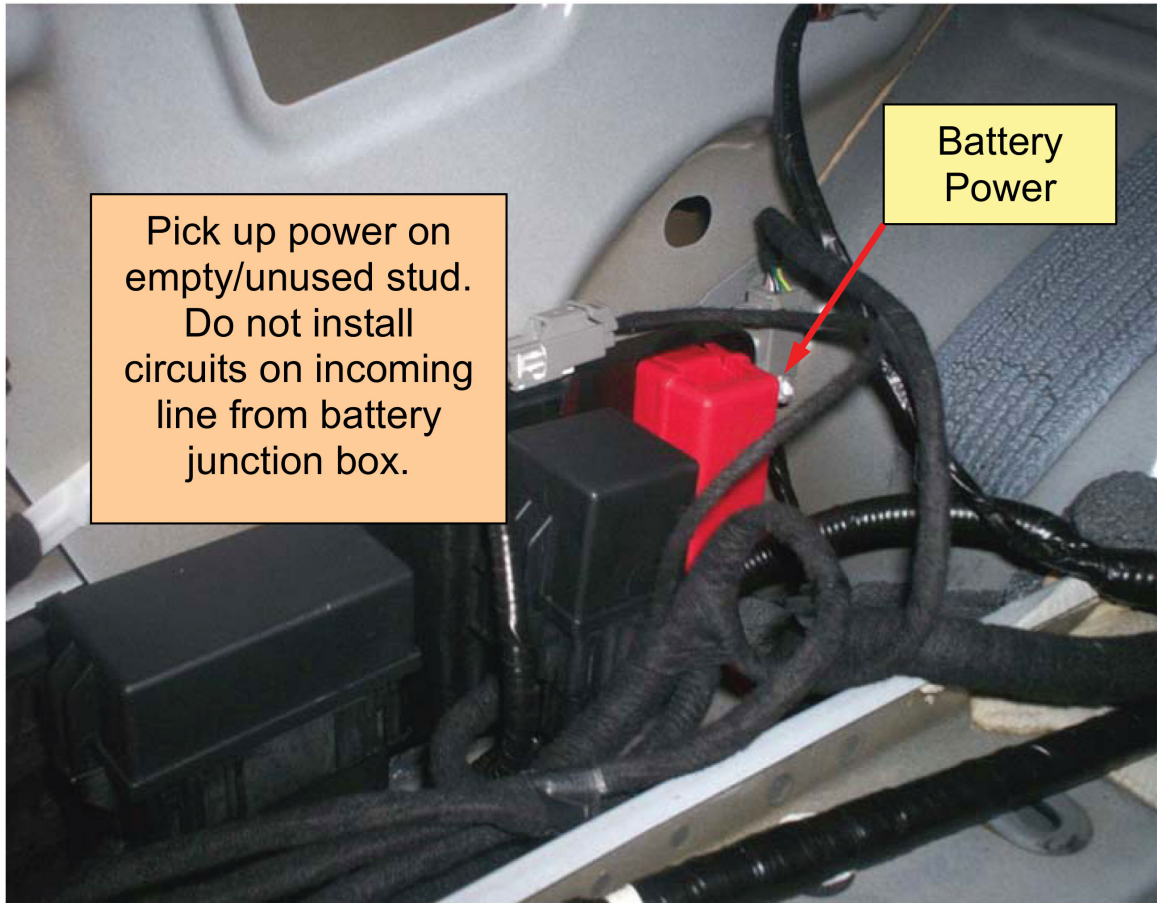
Under no circumstance should the rear power access point cover be removed without first removing the battery junction box (BJB) fuses #1 and #2. Removing the cover without removing the fuses could result in an electrical hazard. Turn off load devices before inserting the fuses. Failure to follow these instructions may result in personal injury.

It will be necessary to remove trunk lockable storage if equipped, to access rear power point section 4.



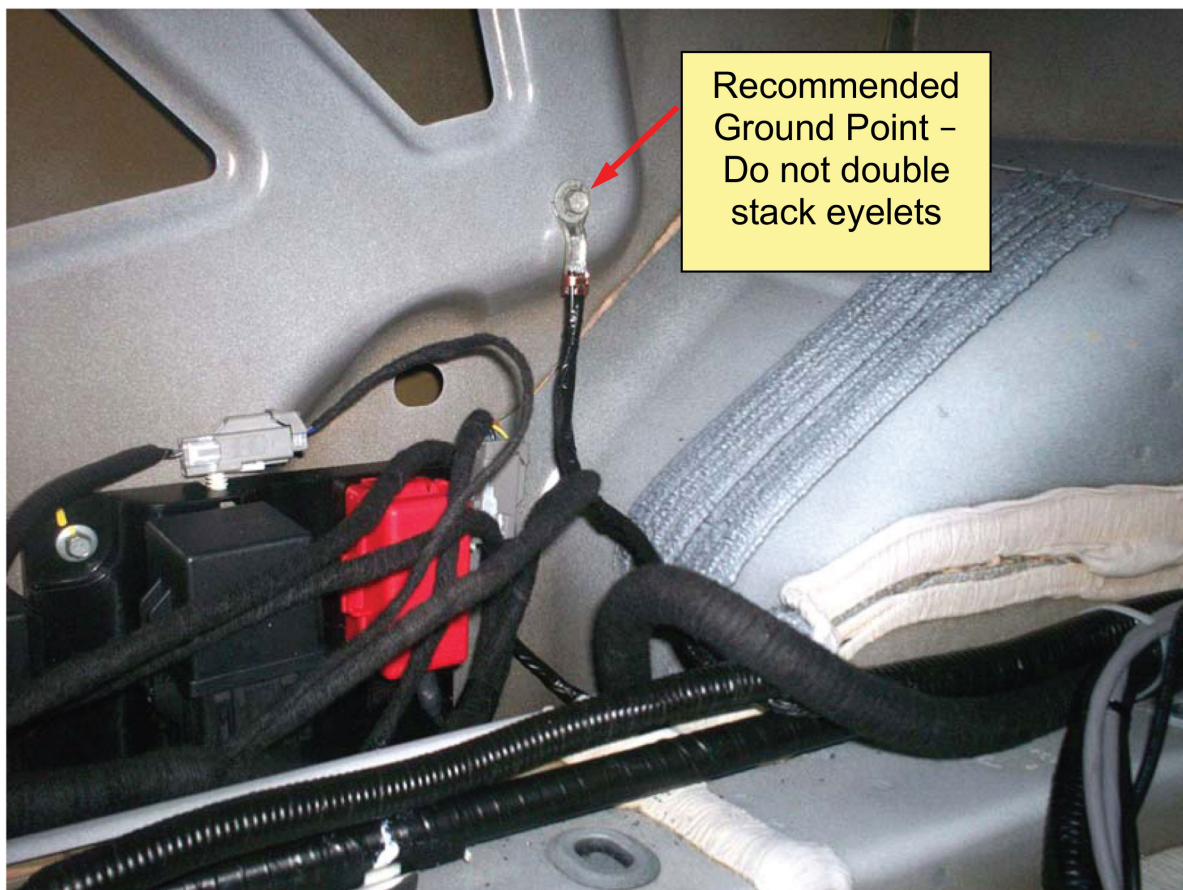
N0141041

Section 2: Electrical



N0141043

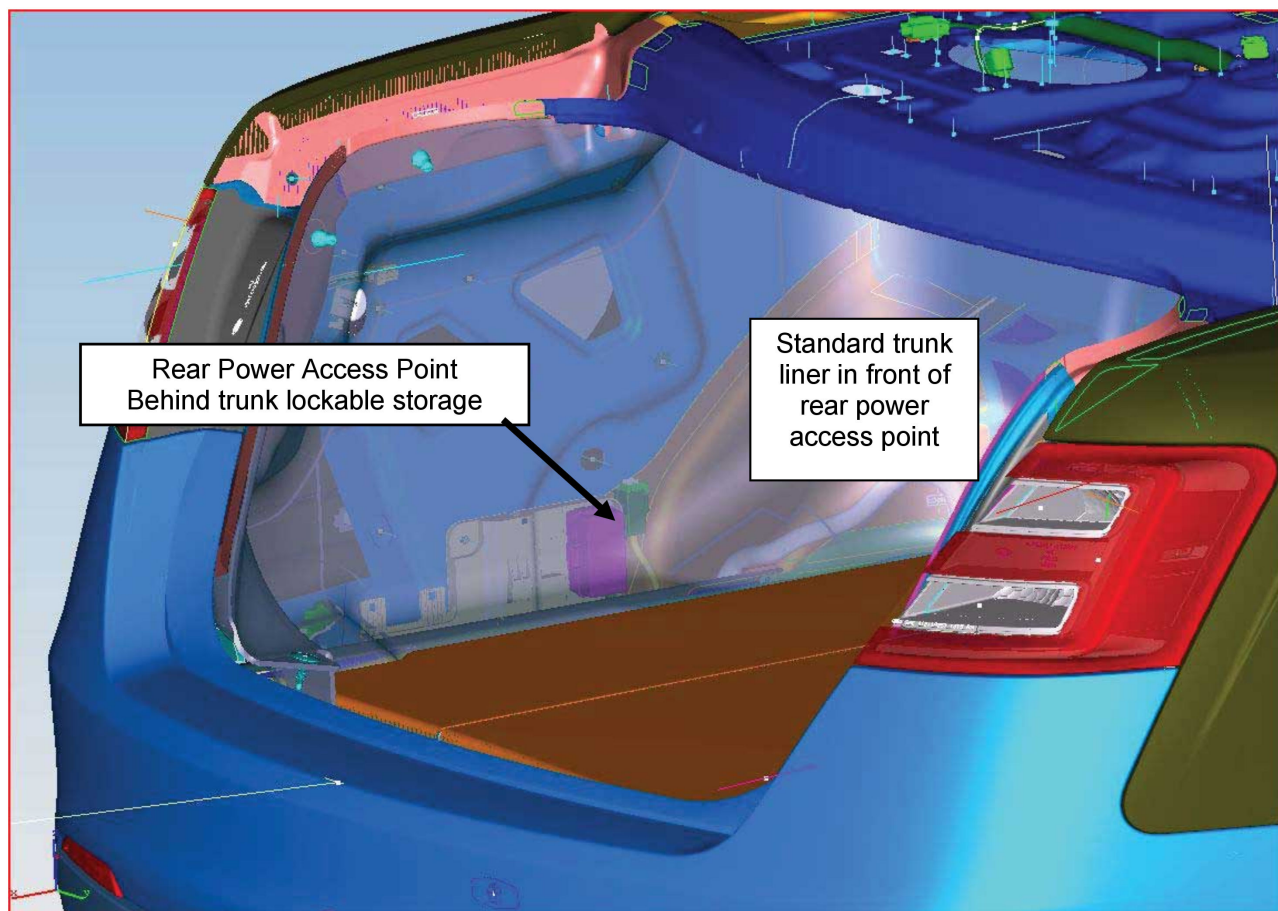
Section 2: Electrical



N0141044

Sedan Interceptor with standard trunk liner

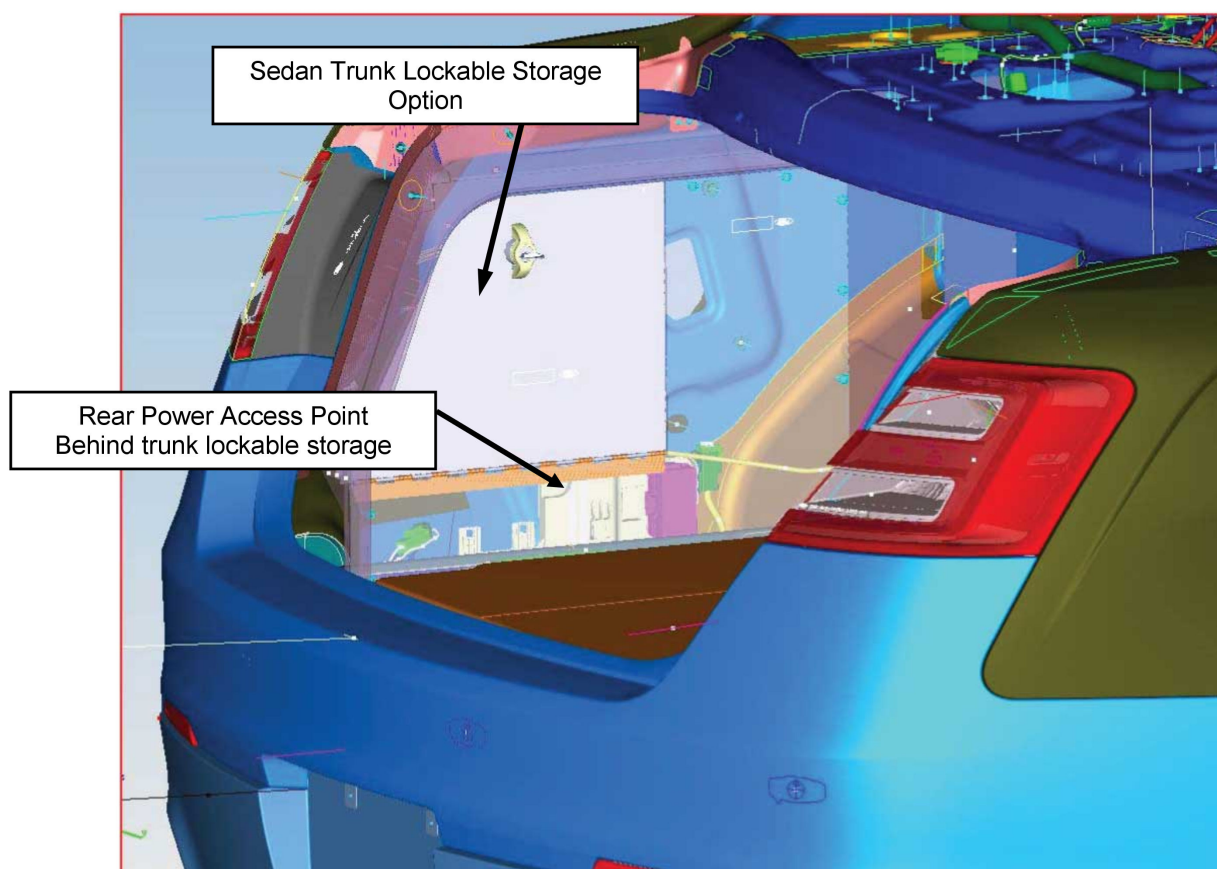
Section 2: Electrical



N0141042

Sedan Interceptor with optional lockable trunk storage

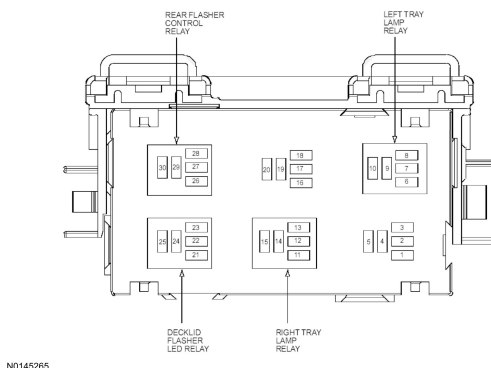
Section 2: Electrical



N0141046

Section 2: Electrical

Sedan — Trunk Relay Center



Sedan — My Fleet Management

Allows configuration of following functions using an Integrated Diagnostic System (IDS) service tool

- Ability to set vehicle maximum speed from 90 MPH to the factory maximum speed setting.
- Ability to set maximum radio volume from 0% to 100%.

Sedan — Courtesy Lamp Disable (Dark Mode)

This option offers deletion of the illuminated entry function. Upon vehicle power-up, the Smart Junction Box (SJB) will not provide interior lighting during entry or exit of the vehicle. The interior lighting will, however, still operate on demand whenever the dome lamp switch is active. If the dark car feature is necessary, the assembly plant enables this feature through the SJB. The vehicle can be configured by entering diagnostics, enabling/disabling the courtesy lamps and then exiting diagnostics.

Use the following steps to enable or disable the courtesy lamps:

1. Connect the IDS (at the latest calibration) to the vehicle via the DLC.
2. Allow the IDS to ID the vehicle. Select the Tool Box.
3. Select Module Programming, Programmable Parameters, Interior Lighting, then the TIC.
4. A screen will come up to remind you to turn the ignition on.
5. Select Dark Enable and the TIC.
6. During configuration the lights will flash and the system changes from Disabled to Enabled.
7. Final Screen: Module configuration complete, check/clear any DTCs that may have been set.

Section 2: Electrical

Sedan — Steering Wheel Switches



Configurable Steering Wheel Switches:

- ⌚ 2 switches with two positions (up/down) each
- ⌚ Total of 4 grounded outputs sourcing available for operating police equipment
- ⌚ 4 grounded outputs allocated at bottom of I/P center stack in 14-way connector

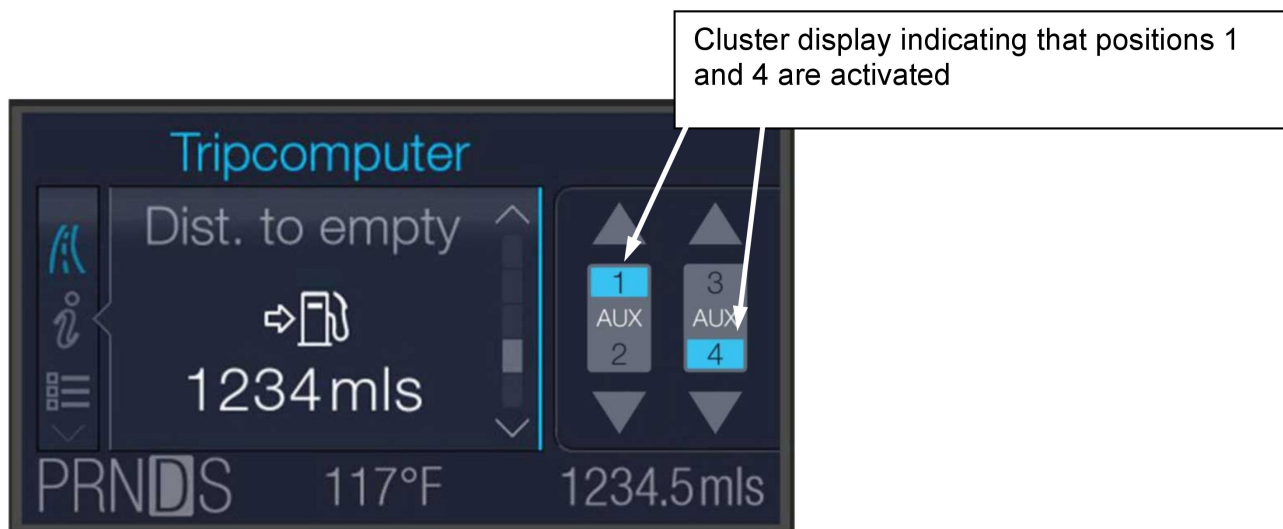
N0141056

Steering Wheel Operation

- 2 switches are available for configuration as indicated above.
- Each switch has 2 positions (up/down).
- Four total ground side switching outputs are available in 14-way connector located behind the close out panel at the bottom of the Electronic Finish Panel (EFP).
- Any combination or all of the four outputs can be turned on simultaneously.
- To activate a switch/output, push the desired switch in the direction of the label either above or below the switch.
- To deactivate that function, push the desired switch in the same direction as was used when activating the output.
- Cluster display will illuminate the switch/position while activated.

Section 2: Electrical

Sedan — Steering Wheel Switch Cluster Display



N0141057

Fuse Information

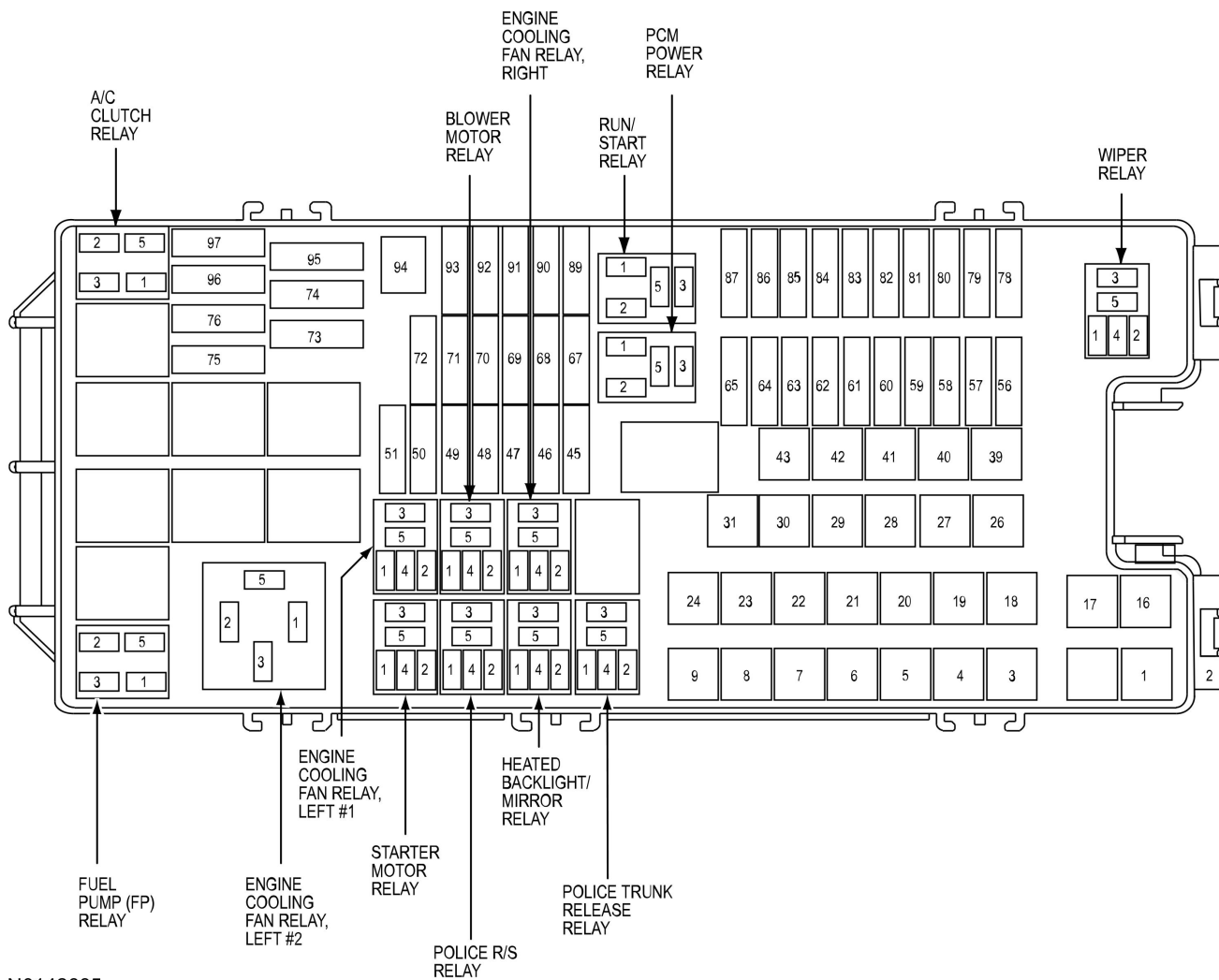
If electrical components in the vehicle are not working, a fuse may have blown. Blown fuses are identified by a broken wire within the fuse. Check the appropriate fuses before replacing any electrical components.

NOTE:

Always replace a fuse with one that has the specified amperage rating. Using a fuse with a higher amperage rating can cause severe wire damage and could start a fire.

Section 2: Electrical

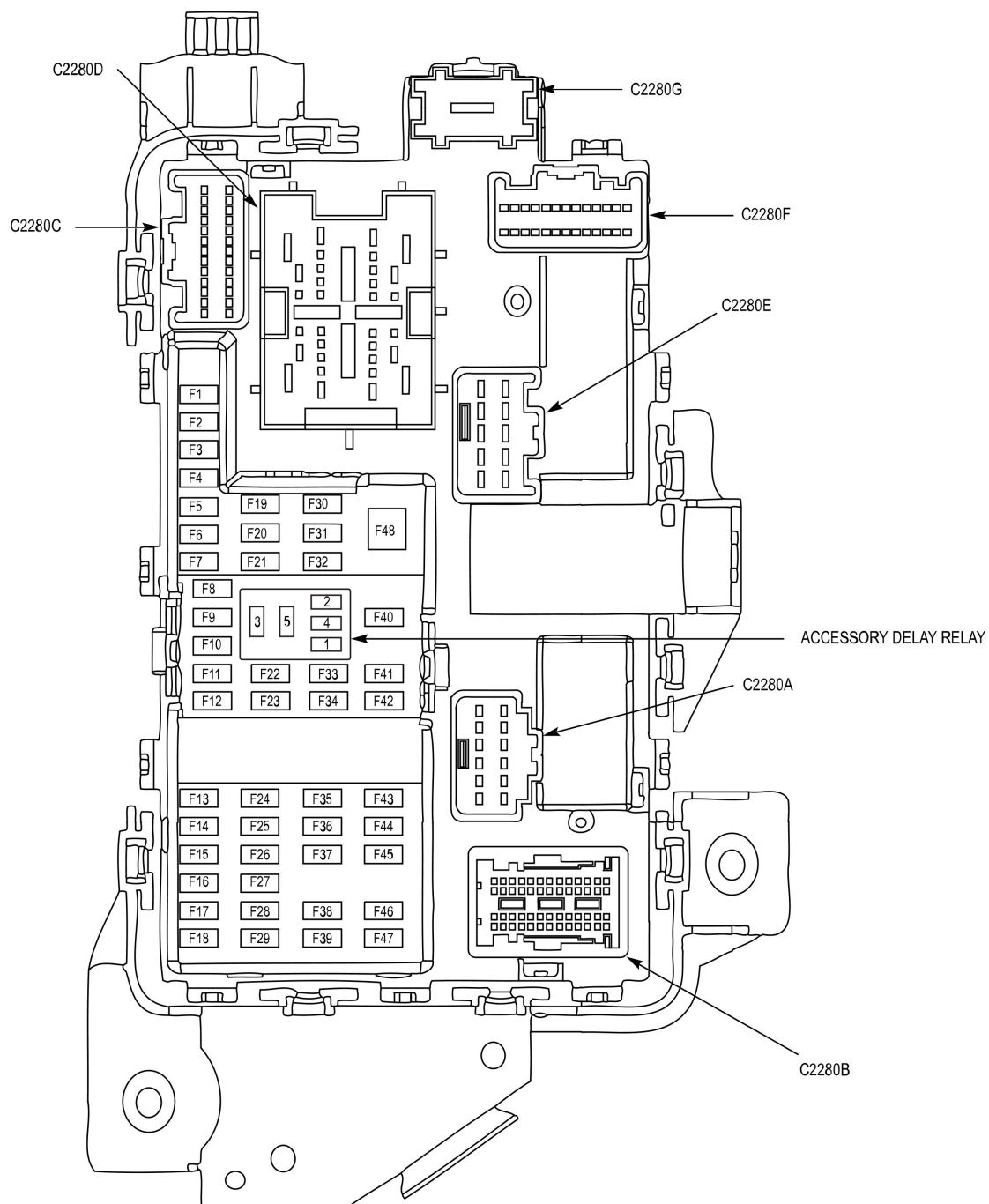
Sedan — Battery Junction Box



N0142685

Section 2: Electrical

Sedan — Body Control Module



N0142686



WARNING:

Always disconnect the battery before servicing high current fuses.

Section 2: Electrical



WARNING:

To reduce risk of electrical shock, always replace the cover to the power distribution box before reconnecting the battery or refilling fluid reservoirs. The power distribution box is located in the engine compartment. It has high current fuses that protect your vehicle's main electrical systems from overloads. If the battery has been disconnected and reconnected, refer to Changing the Vehicle Battery in the Maintenance chapter.

Mating connectors, terminals and subcomponent availability are managed for Ford Fleet and Pool Accounts through Ford Component Sales. Ford Component Sales, LLC (FCS) uses Globe Component Products or Dynamic Supply Solutions (DSS) to process and coordinate all Fleet and Pool Purchase Orders. By using Globe or DSS, FCS is able to offer the Fleet and Pool community reasonable minimum order quantities while still having the benefit of Ford Production pricing benefits.

Electrical Component Resource

See part numbers and supplier in the chart below to obtain terminals and connectors.

Section 2: Electrical

POLICE INTERCEPTOR CONNECTOR FORD TO SUPPLIER PART NUMBER CROSS REFERENCE MATRIX					
COMPONENT IN VEHICLE LOCATION	FORD COMPONENT CONNECTOR PART NUMBER	SUPPLIER	SUPPLIER PART NUMBER	UPFIT HARNESS SIDE PART NUMBER	SUPPLIER PART NUMBER
ION Grill LEDs @ Behind Grille Light Heads (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
ION Rear CHMSL LEDs @ Light Heads (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
ION Rear Decklid/Liftgate LEDs @ Light Heads (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
VERTICE Front Corner LEDs @ Headlight Modules (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
VERTICE Rear Corner LEDs @ Rear Tailights (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
PARKTURN/WARN LEDs @ Headlight Modules (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
PARKTURN/WARN LEDs @ Headlight Module (3 Pin)	7T4T-14A464-BA (000)	MOLEX	33471-0301	7T4T-14A624-AA (000)	33481-0301
Siren Speaker @ Driver Side Behind Fascia(2X2 Pin)	5W7T-14A464-GA (004)	MOLEX	33472-4416	5W7T-14A624-BA (002)	33482-0416
WARN CONTROL MODULE @ Underhood near Coolant Bottle (4X2 Pin)	5W7T-14A464-GA (000)	MOLEX	33472-0801	5W7T-14A624-DA (000)	33482-0801
Relay Center & CENCOM (5X2 Pin)	4S7T-14489-VJA	YAZAKI	7283-6455-40	4S7T-14A459-VJA	7282-6455-40
At CENCOM (2X2 Pin)	4S7T-14489-VDA	YAZAKI	7283-6449-40	4S7T-14A459-VDA	7282-6449-40
At Cooling Fan (2 Pin)	4S7T-14489-VAA	YAZAKI	7283-6443-40	4S7T-14A459-VAA	7282-6443-40
Siren Speaker @ Instrument Panel/Center Stack (2X2 Pin)	4S7T-14A459-VDA	SUMITOMO		4S7T-14489-VDA	
Power/Vehicle Signals @ Instrument Panel/Center Stack (2x7 Pin)	4S7T-14459-YRA	SUMITOMO		4S7T-14489-YRA	
Police Lights@ Instrument Panel Center Stack (2x7 Pin)	BU5T-14A459-BA	SUMITOMO		4L3T-14489-AC	
Police Radio Connector @ Instrument Panel/Center Stack (2x2 Pin)	4S7T-14489-VDA	SUMITOMO		4S7T-14A459-VDA	
40A Auxiliary Power @ Instrument Panel/Center Stack (3x3 Pin)	BU5T-14A459-AA	YAZAKI		4S7T-14489-YMA	
WIRE GAUGE or Part Number	COMPONENT TERMINAL NUMBER	SUPPLIER	SUPPLIER PART NUMBER	HARNESS TERMINAL PART NUMBER	SUPPLIER PART NUMBER
Based on wire size					
14, 16	33012-2001	MOLEX	33012-2001	33000-0001	33000-0001
18, 20	33012-2002	MOLEX	33012-2002	33000-0002	33000-0002
22	33012-2003	MOLEX	33012-2003	33000-0003	33000-0003
Based on wire size					
16, 18	7116-4101-02	YAZAKI	7116-4101-02	7114-4101-02	7114-4101-02
20, 22	7116-4100-02	YAZAKI	7116-4100-02	7114-4100-02	7114-4100-02
4S7T-14459-YRA / 4S7T-14489-YRA	Terminals for Pins: 1, 7, 8 97BG-14474-BCA 2, 3, 4, 5, 6 97BG-14474-AAB	SUMITOMO			
BU5T-14A459-BA / 4L3T-14489-AC	Terminals for Pins: 1, 2, 7 3F2T-14474-SA 6, 14 3F2T-14474-RA 9 97BG-14474-BBA	SUMITOMO			
4S7T-14489-VDA / 4S7T-14A459-VDA	2TAD-0, 75 1.5MM FLAT				
For 40A Auxiliary Power Connector	97BG-14421-GCA	YAZAKI			

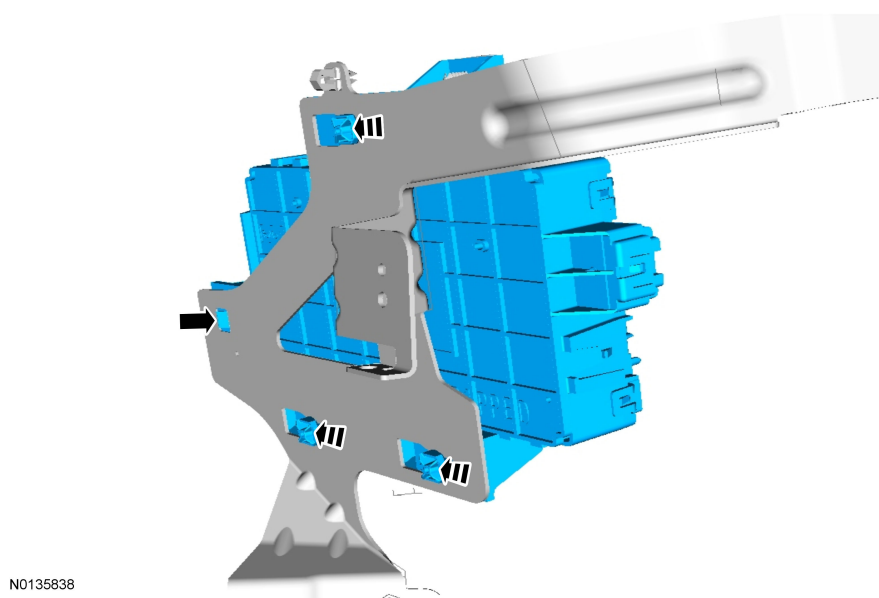
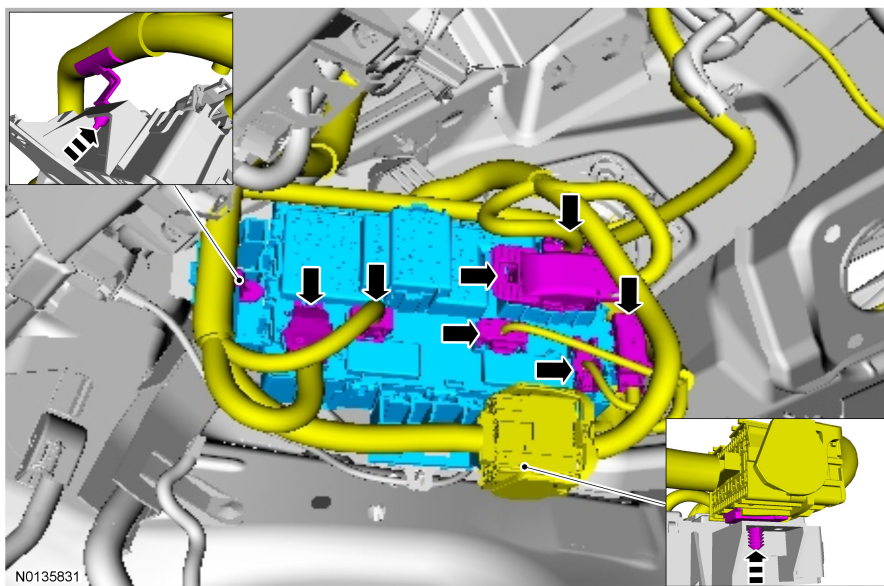
N0146595

Sedan — Body Control Module

The Body Control Module (BCM) is located behind the steering column opening panel. It acts as a gateway module by receiving information in one format and transmitting it to other modules using another format. For example, the BCM receives the vehicle speed data from the PCM over the HS-CAN. The BCM converts the data into a MS-CAN message and sends (gateways) the message to other network modules such

Section 2: Electrical

as the HVAC module. This enables network communication between modules that do not communicate using the same network (HS-CAN or MS-CAN).



Section 2: Electrical

Sedan — Electrical Component Resource

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NEW Utility Upfitter Wire Bundle Dash Panel Pass-Through

Certain Police Interceptor vehicles come equipped with Auxiliary Dash Panel Pass-Through Wire Circuits (Upfitter Auxiliary) depending on selected option packages.

New for 2015 MY, the STANDARD Upfitter Auxiliary Pass-Through Wire Circuits (6 twisted pairs) can be used by the vehicle modifier.

- The vehicle interior end of the Aux Upfitter Circuits is found beneath the Instrument Panel near the Body Control Module (BCM).
 - The underhood end of the Aux Upfitter Circuits is found taped to a harness underhood near the Battery Junction Box (BJB).
1. Twisted Pair A (20AWG)
 - White
 - White / Blue
 2. Twisted Pair B (20AWG)
 - Yellow
 - Yellow / Black
 3. Twisted Pair C (20AWG)
 - Green
 - Green / White
 4. Twisted Pair D (20AWG)
 - Blue
 - Blue / White
 5. Twisted Pair E (14AWG)
 - Orange
 - Orange / Black
 6. Twisted Pair F (14AWG)
 - Black
 - Black / White

Utility — Power and Vehicle Signal Access Areas

- Located behind lower center instrument panel trim panels
- Siren speaker at instrument panel center stack (4 Pin)
- Power/vehicle signals at instrument panel center Stack (14 Pin)
- Police lights at instrument panel center stack (14 Pin)
- Police radio connector at instrument panel/center stack (4 Pin)
- 40A auxiliary power at instrument panel/center stack (6 Pin)

Section 2: Electrical

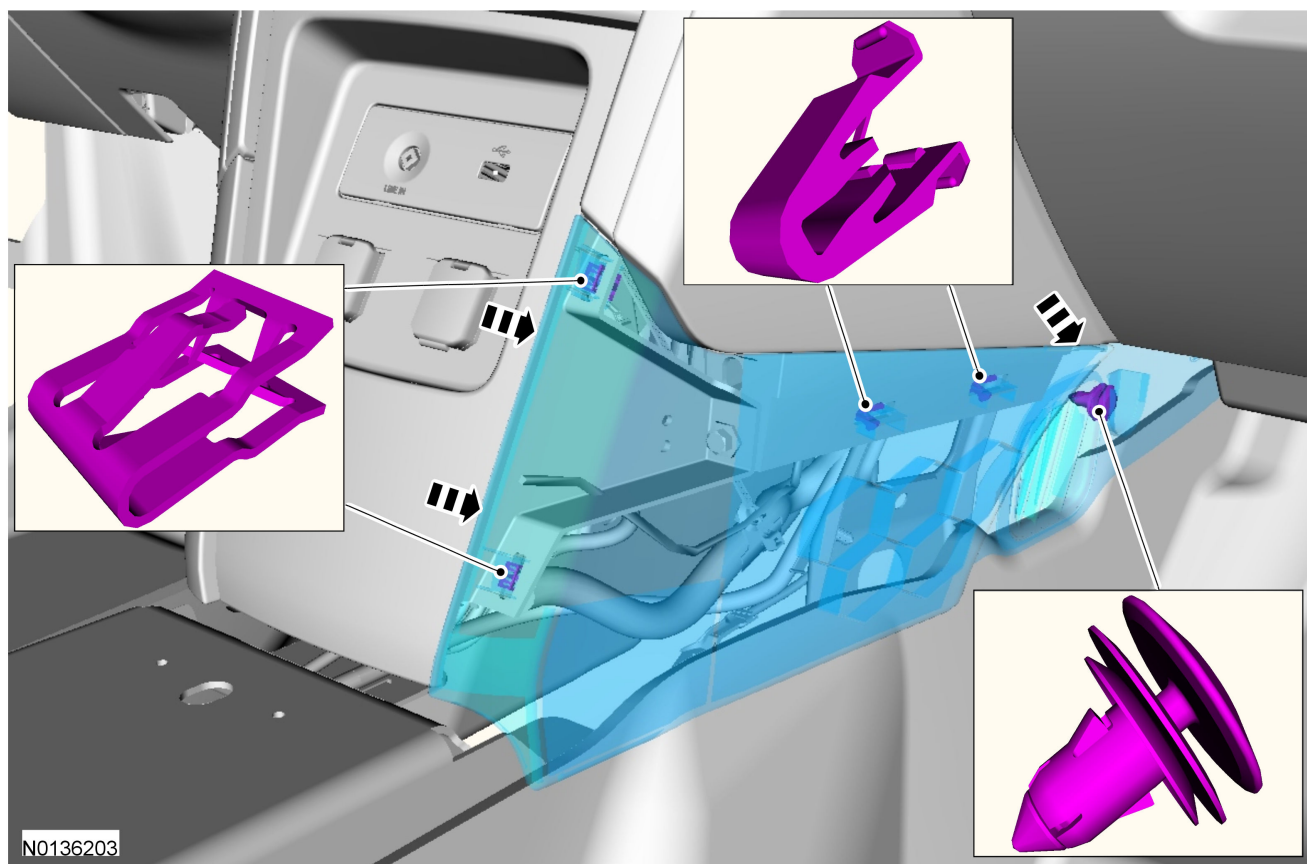


N0151524

Utility — Lower Center Instrument Panel Removal

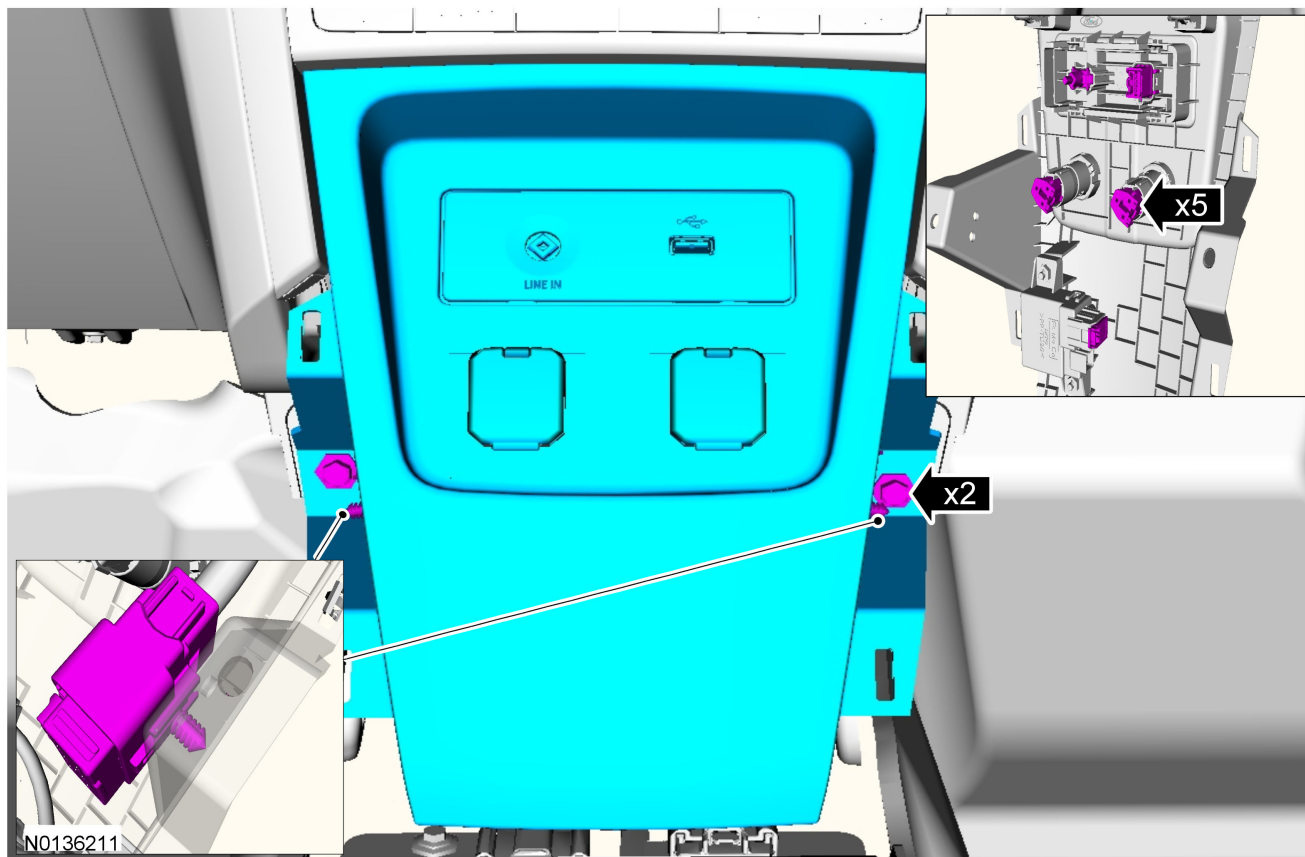
1. Remove the driver and passenger side lower center instrument panel finish panels.

Section 2: Electrical



2. Remove the 2 fasteners then carefully remove panel.

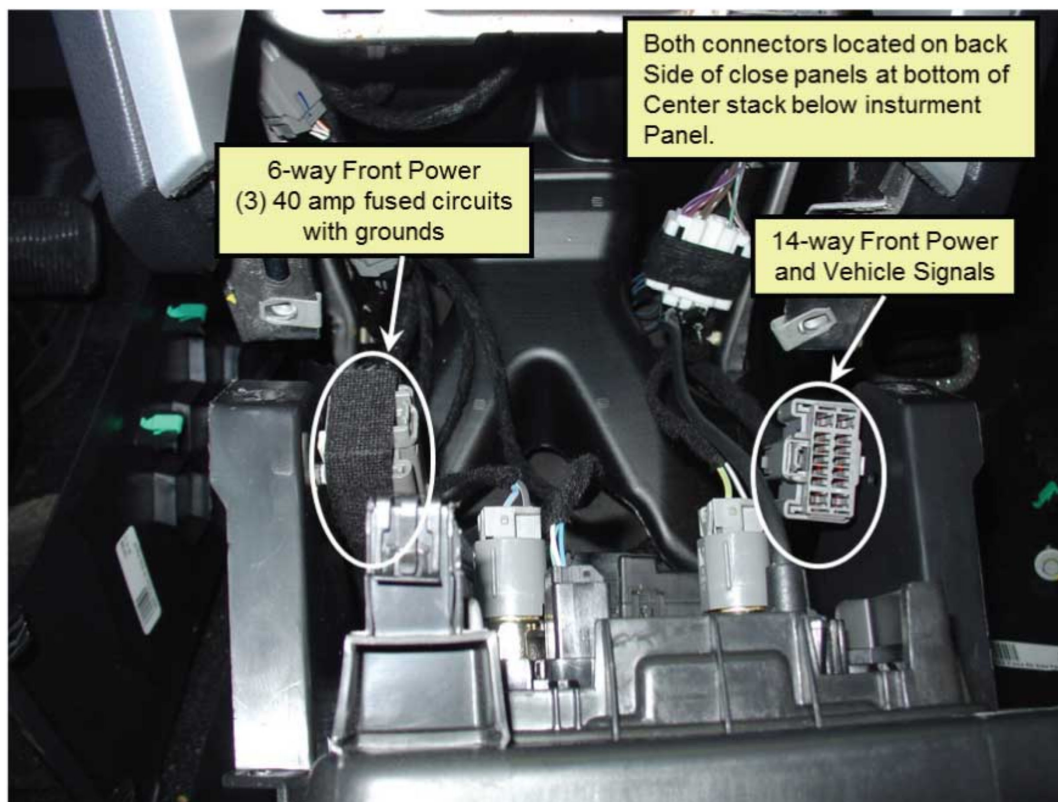
Section 2: Electrical



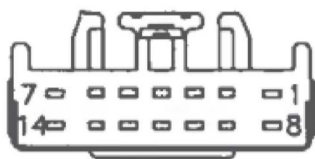
Section 2: Electrical

Front Power And Vehicle Signals Access Area

Front Power and Vehicle Signals Access Area



N0151483



Part# 3U2Z-14S411-BJAC



Part# 3U2Z-14S411-HEA

N0151470

Connector View For Connector 3U2Z-14S411-HEA Continued On The Next Page.

Pin Number	Description	Fuse	Wire Color
1	B+ (40A)	BJB #40	VT-RD
2	B+ (40A)	BJB #6	BN-RD

Section 2: Electrical

(Continued)

3	B+ (40A)	BJB #16	VT-RD
4	Ground	IP Tunnel	BK-BJ
5	Ground	IP Tunnel	BK-BJ
6	Ground	IP Tunnel	BK-BJ

Connector View For Connector 3U2Z- 14S411-BJAC.

Pin Number	Description	Fuse	Wire Color
1	B+ Feed #1 (20A)	IP #2	GY-RD
2	Steering Wheel Switch #1 Output (1A) Grnd	GNRL Function Module	GY-BN
3	Steering Wheel Switch #2 Output (1A) Grnd	GNRL Function Module	WH-VT
4	Steering Wheel Switch #3 Output (1A) Grnd	GNRL Function Module	GN-BN
5	Steering Wheel Switch #4 Output (1A) Grnd	GNRL Function Module	YE-GY
6	Start (2A)	BJB #95	BN-BU
7	Run/Start #1 (20A)	BJB #73	WH-BN
8	B+ Feed #2 (20A)	IP #32	BU-RD
9	Vehicle Speed Output (VSS)	PCM	VT-OG
10	Delay Accessory (15A)	IP #17	GN-VT
11	B+ Feed #2 (15A)	IP #5	YE-RD
12	Park Detect Signal (Transmission)	Sifter GRND	GN
13	Driver Door Ajar Signal	IP #9 GRND	GN-VT
14	Run/Start #2 (20A)	IP #74	VT-BN

NOTE:

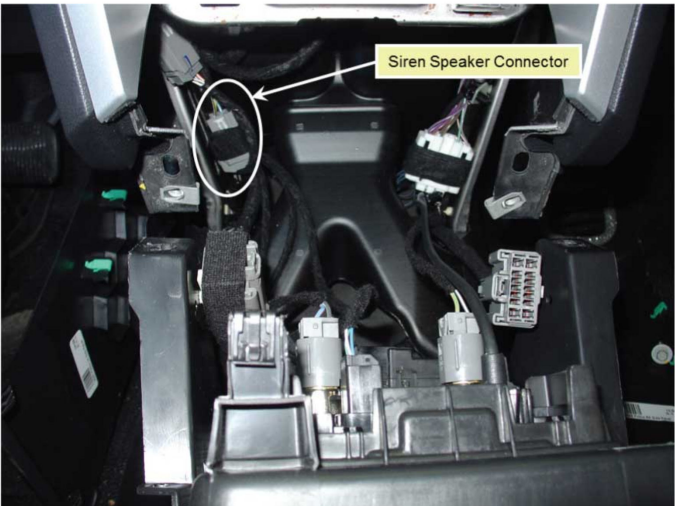
Fuse sizes are given to help locate the fuse in the PDB. Ford recommends that current be limited to 85% of the value: 20 Amp should be limited to 17 Amp 15 Amp should be limited to 12 Amp.

Park Detect: Sources a ground when the vehicle is in park. This circuit is capable of grounding 1 Amp.

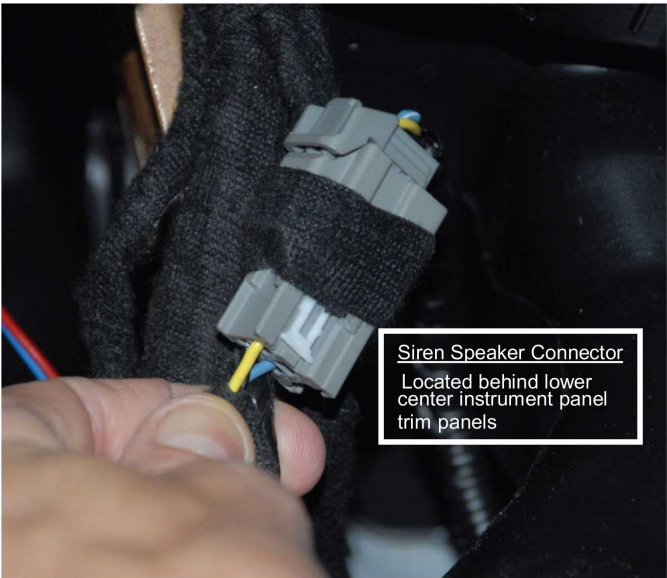
Driver Door Ajar: This circuit is a sense only grounded circuit when the door is closed. It is used to supply a module that has pull up resistors in its input.

Section 2: Electrical

Utility — Siren Speaker Connector



Siren Speaker Connector



Part # 3U2Z-14S411-LUB

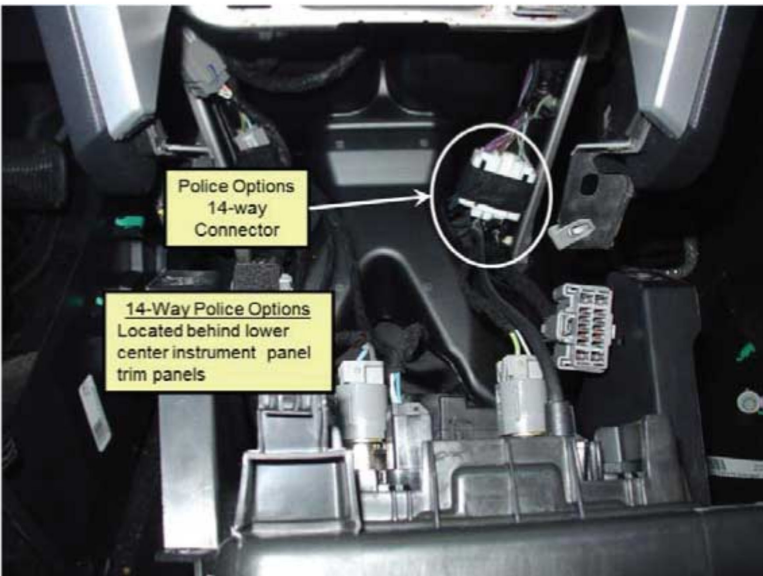
N0151517

Connector View For Connector 3U2Z- 14S411–LUB.

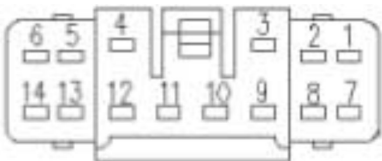
Pin Number	Description	Wire Color
1	Siren Driver Side Feed (+)	YE
2	Siren Shield Driver Side (-)	
3	Open Passenger Side Front (+)	
4	Siren Return Passenger Side Front (-)	BU-WH

Section 2: Electrical

Utility — Police Options 14-Way Connector



Police Options 14-Way Connector



Part # CU2Z-14S411-APA



N0151518

Connector View For Connector 3U2Z- 14S411-APA

Pin Number	Description	Wire Color
1	Wig Wag Control	VT
2	Front Corner LED Power Control	VT-OG
3	Front Flasher Power Control	BN-YE
4	Speaker (-) at Grille (Option)	GN-BU
5	Open	

Section 2: Electrical

(Continued)

6	Front Corner LED Light Sync	GY-OG
7	Dimmer	VT-GY
8	Brake Output Signal Ground	BU-OG
9	Speaker (+) at Grille (Option)	BN
10	Open	
11	Open	
12	Open	
13	Open	
14	LED Flash Pattern	GY-BN

Front WIGWAG Power: Supplies power to the wigwag connectors at the headlamps.

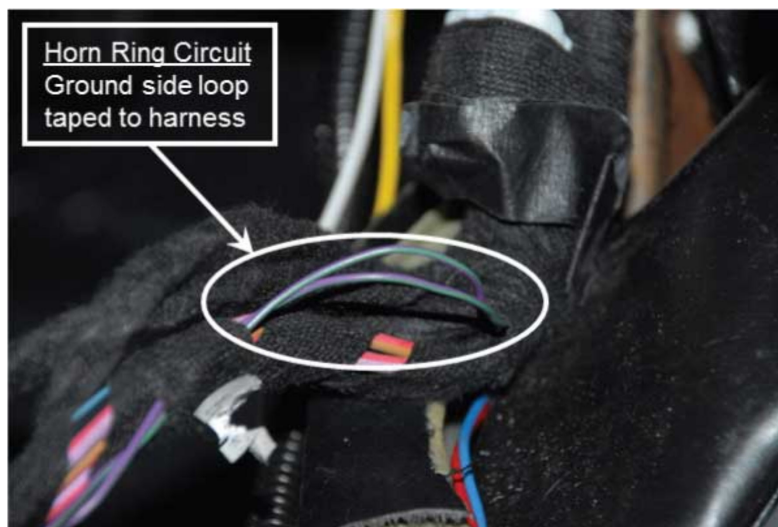
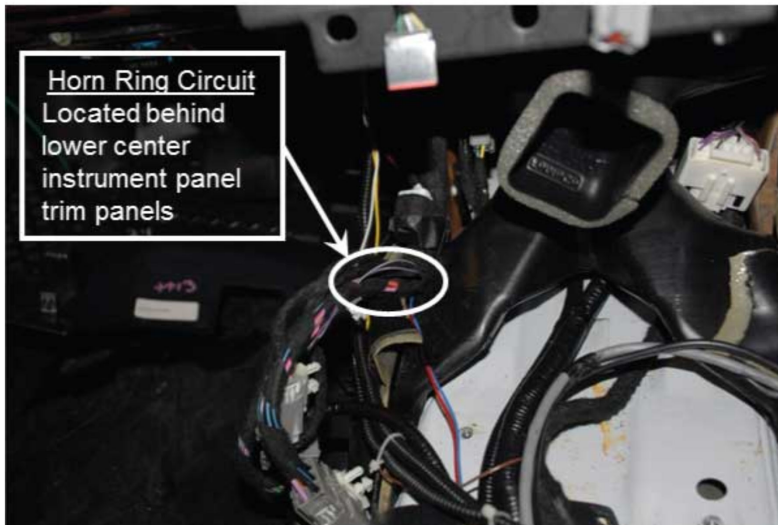
Front Flasher Power: Supplies power to the flasher relay.

Dimmer: Circuit supplied to allow backlight dimming of aftermarket equipment.

Brake Output: Fused brake output.

Section 2: Electrical

Utility — Horn Ring Circuit



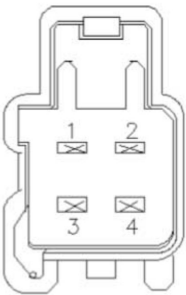
N0151519

Section 2: Electrical

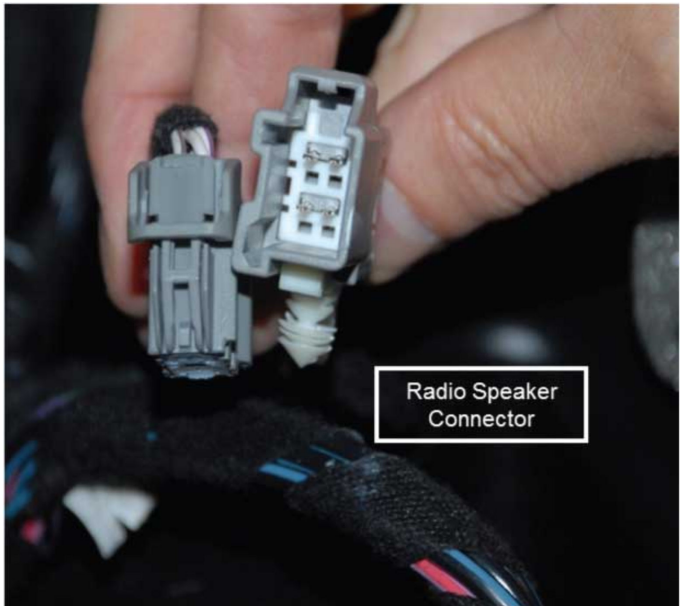
Utility — Radio And Speaker Connector



Radio and Speaker Connector



Part # 3U2Z-14S411-BUB



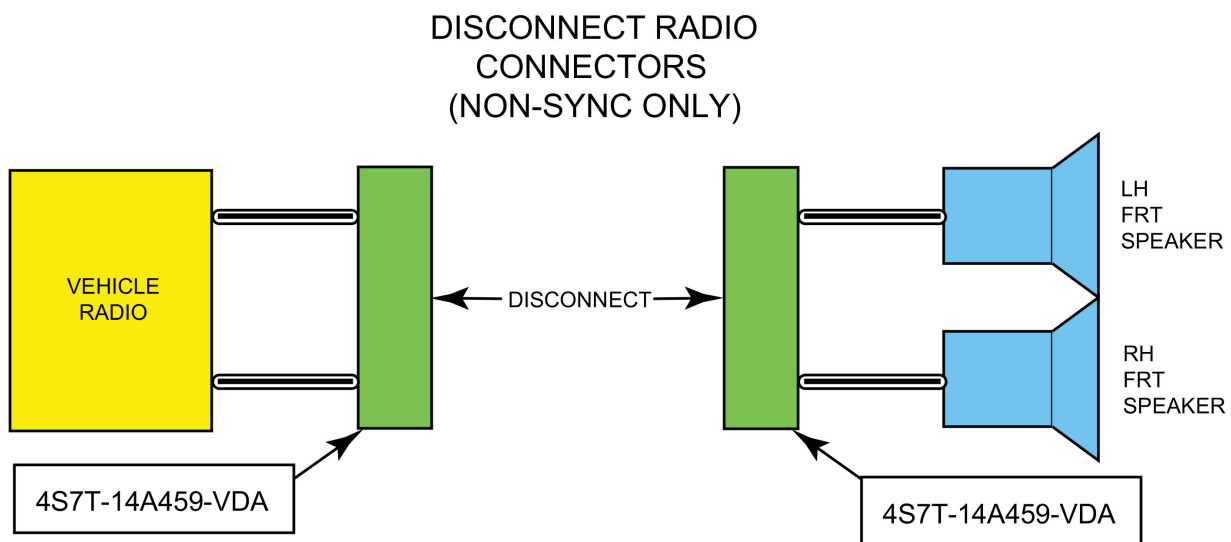
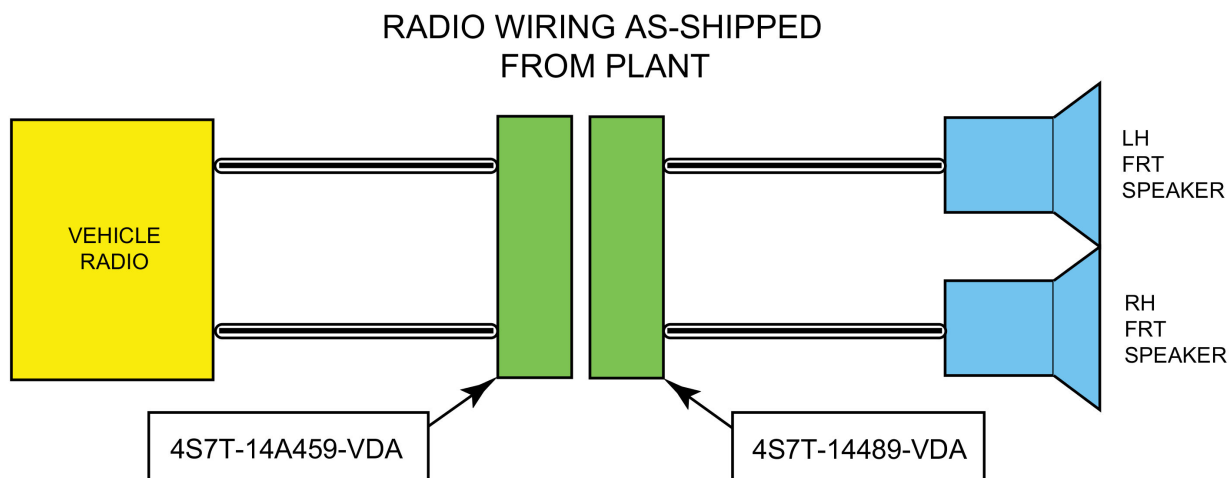
Part # 3U2Z-14S411-LUB

N0151516

Connector View For Connector 3U2Z- 14S411-LUB

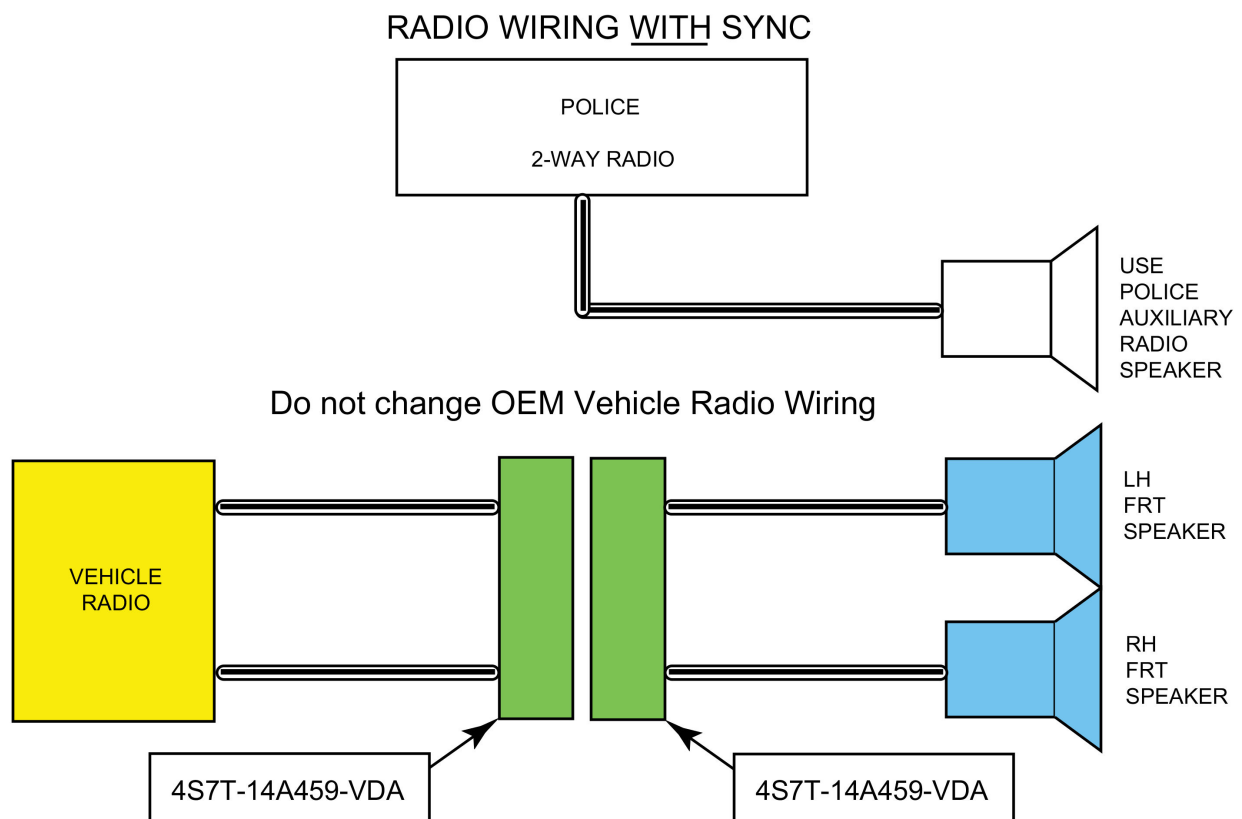
Pin Number	Description
1	Driver Side Front Speaker (+)
2	Driver Side Front Speaker (-)
3	Passenger Side Front Speaker (+)
4	Passenger Side Front Speaker (-)

Section 2: Electrical



N0150582

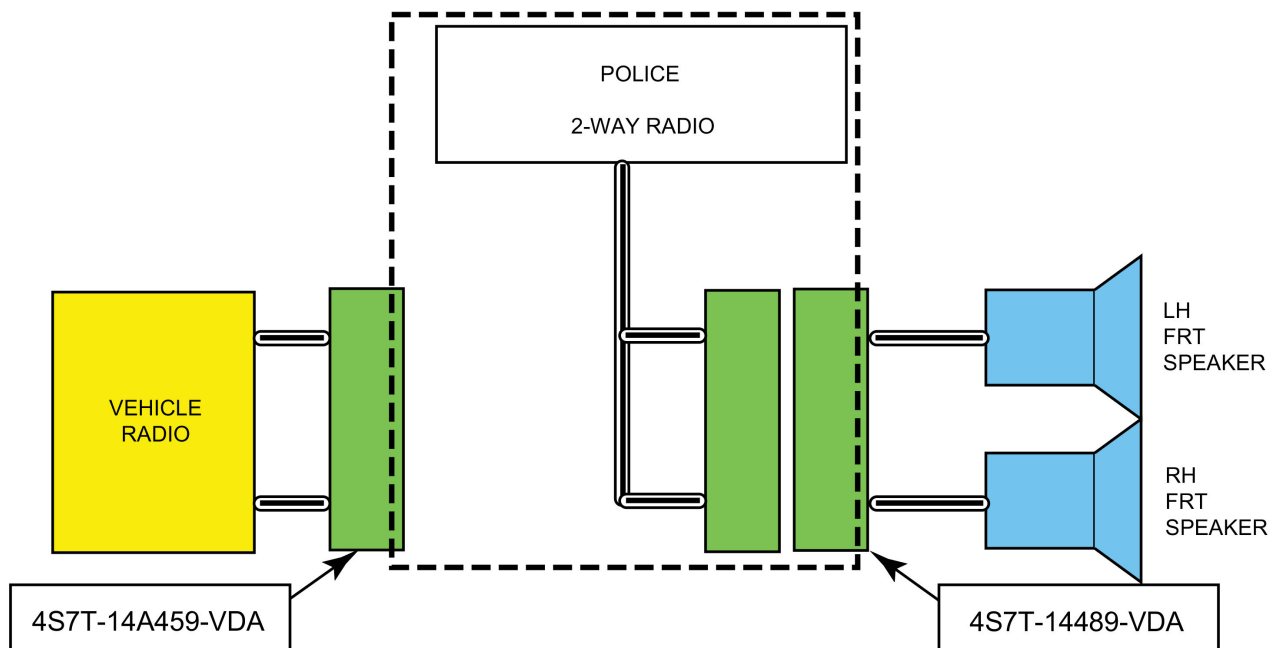
Section 2: Electrical



N0150583

Section 2: Electrical

INSTALL POLICE 2-WAY RADIO AND MAKE
CONNECTIONS TO OEM CONNECTORS
(NON-SYNC ONLY)



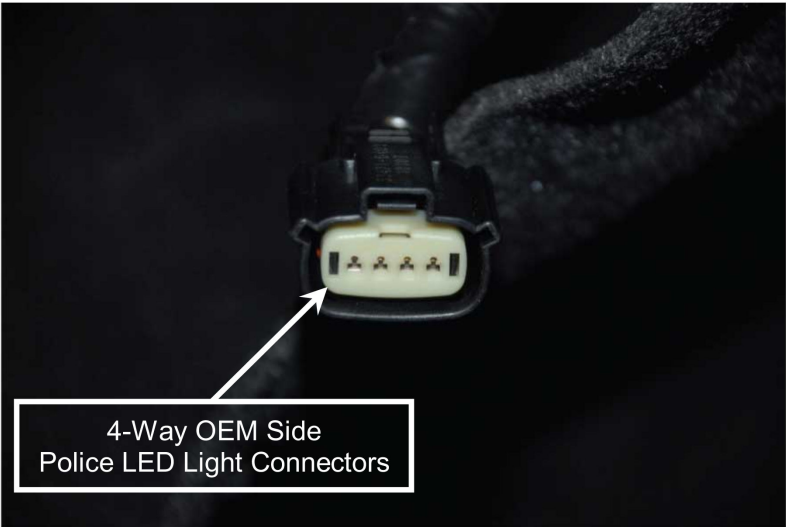
N0150581

Section 2: Electrical

Utility – 4-Way Connector For All Police LED Light Heads



4-Way Connector For All Police LED Light Heads



N0151525

Connector View For Connector 8U2Z-14S411-TA

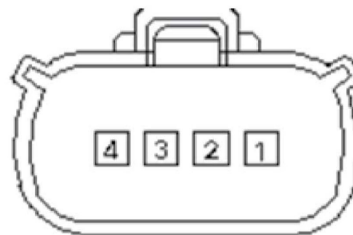
Pin Number	Description
1	Control Power
2	LED Light Pattern
3	LED Light Sync
4	Ground

Section 2: Electrical

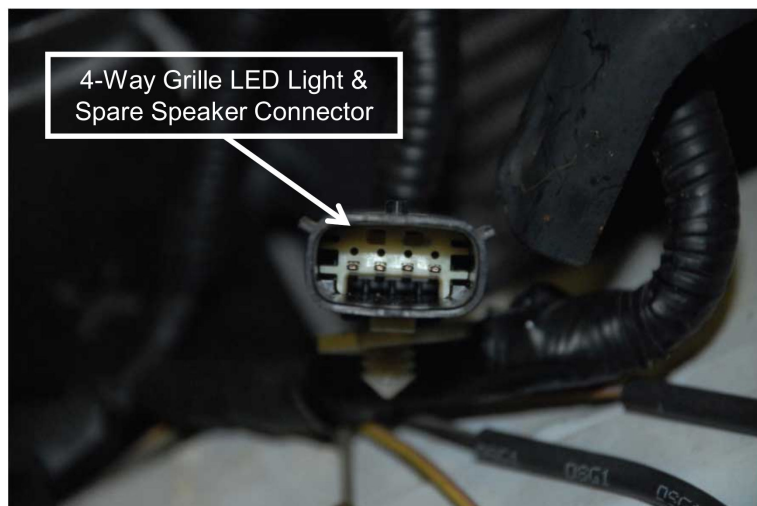
Grille LED Light Connector



Grile LED Light Connector
Attached above front bumper



Part# 8U2Z-14S411-TA



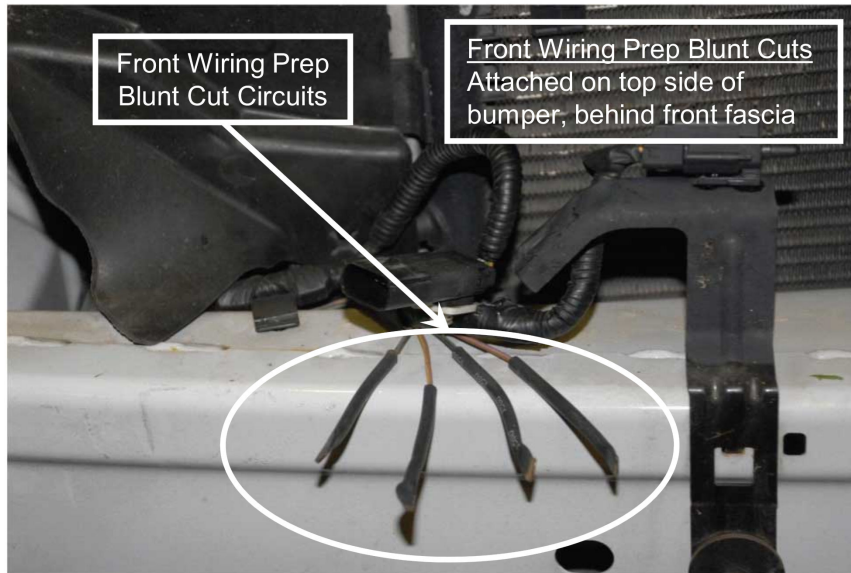
N0151479

Connector View For Connector 8U2Z-14S411-TA.

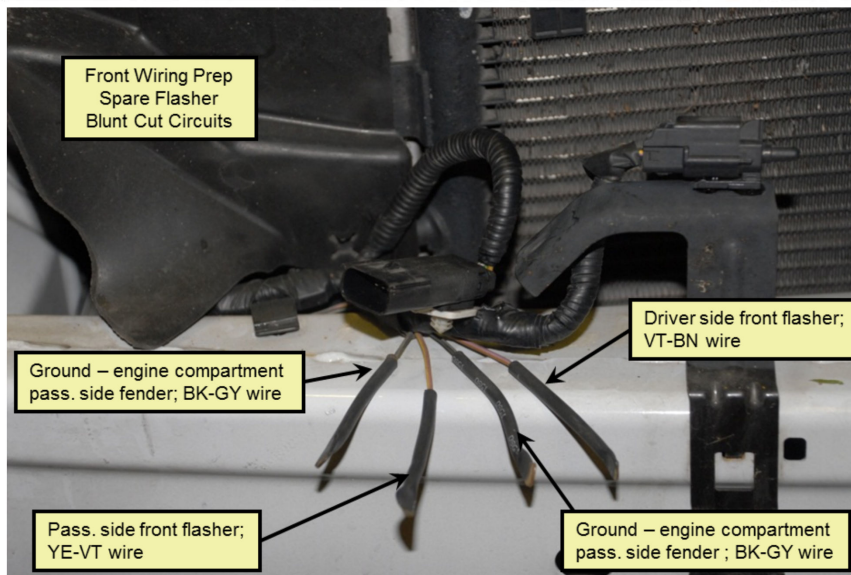
Pin Number	Description	Wire Color
1	Grille LED Light Ground	BN
2	Grille LED Light Pattern	GY-BN
3	Speaker (-)	GY-OG
4	Speaker (+) Spare	BK-GY

Section 2: Electrical

Utility — Front Wiring Prep Blunt Cut Circuits



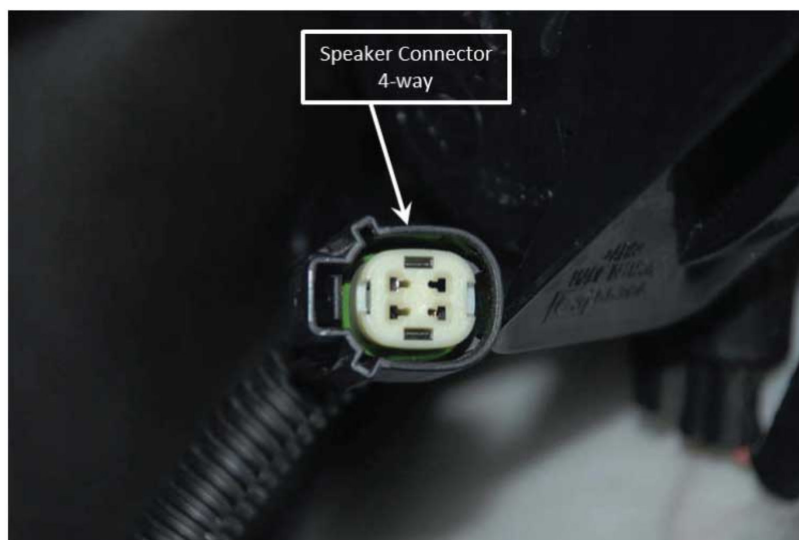
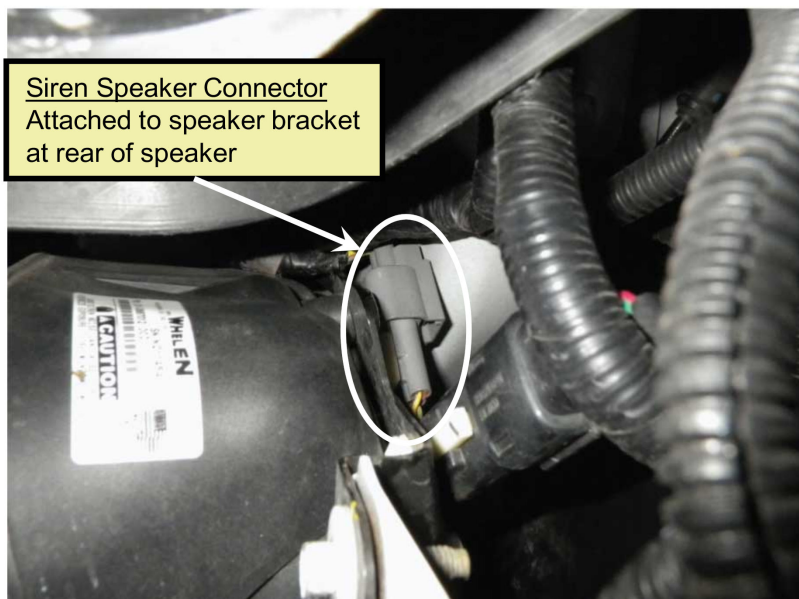
Front Wiring Prep Blunt Cut Circuits Attached to Front Bumper



N0151480

Section 2: Electrical

Utility — Siren Speaker



Siren Speaker Connector



Part# BU2Z-14S411-TA

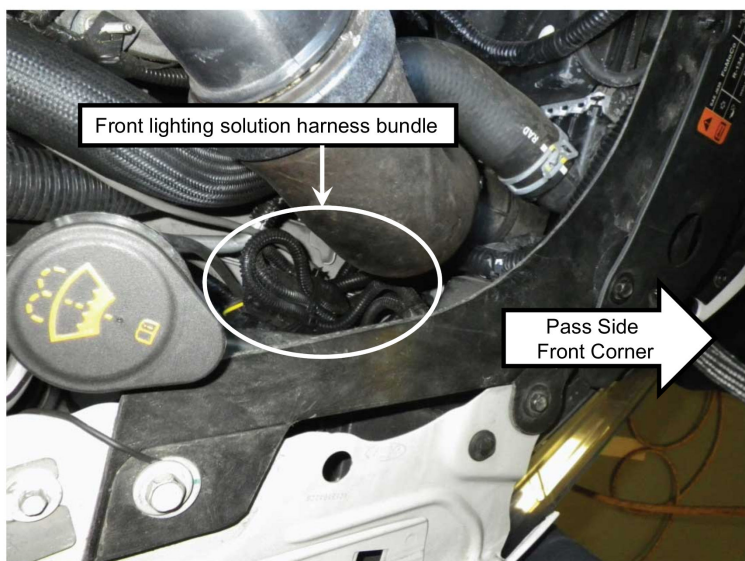
N0151481

Connector View For Connector BU2Z-14S411-TA.

Pin Number	Description	Wire Color
1	Siren (+)	YE
2	Open	
3	Open	
4	Siren (-)	BU-WH

Section 2: Electrical

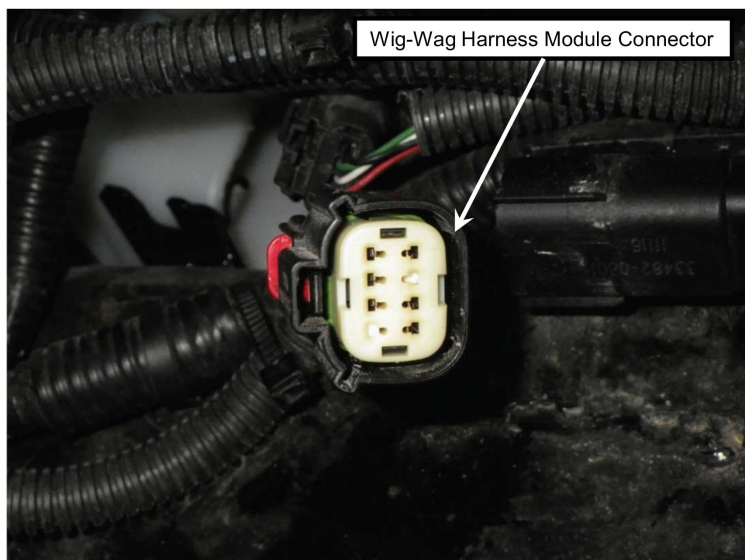
Utility — Front Lighting Solution Wig-Wag LED And Front Corner LED Lights Connector



Front Lighting Solution Wig-Wag LED And Front Corner LED Lights Connector



Part # CU2Z-14S411-ALA



N0151482

Connector View For Connector CU2Z-14S411-ALA Pin Out Continued On The Next Page.

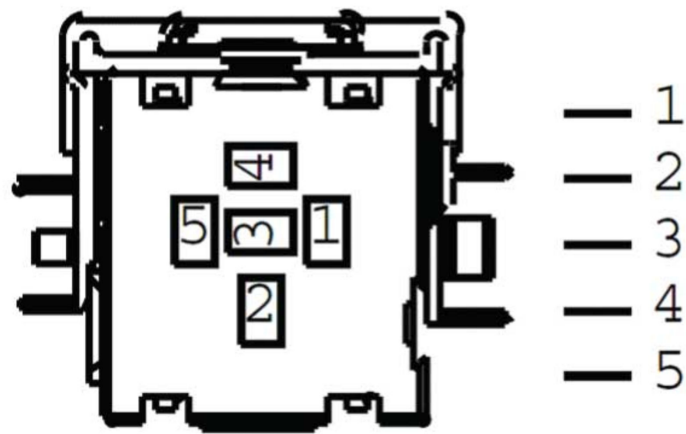
Pin Number	Description	Fuse	Wire Color
1	Wig-Wag Control		VT
2	Wig-Wag Passenger Side Pattern		GN-WH
3	Wig-Wag Driver Side Pattern		GY
4	Open		
5	Wig-Wag Run/Start (20A)	BJB #74	VT-BN

Section 2: Electrical

(Continued)

6	Front Corner LED Lights Control/ Power		
7	Front Corner LED Lights Pattern		GY-BN
8	Wig-Wag Ground		BK-GY

Utility — Flasher Relay



DU5T-14D089-AA

N0141078

Connector View For Connector DU5T-14D089-AA

Pin Number	Circuit Number	Signal Name/Function
1		Flasher Power
2		
3		
4		Right Side Flasher Blunt Cut
5		Left Side Flasher Blunt Cut

N0141079

Front flasher power is supplied through the second 14 way power connector and is available on the Sedan and Utility. The right and left blunt cuts are located in the front grille area.




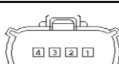


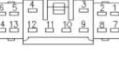
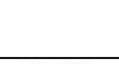




The rear flasher relay is used to turn modifier supplied decklid flashers on in the Sedan when the trunk is open.

NOTE:

Fuse sizes are given to help locate the fuse in the PDB. Ford recommends that current be limited to 85% of the value (40 Amp should be limited to 34 Amp).

Section 2: Electrical

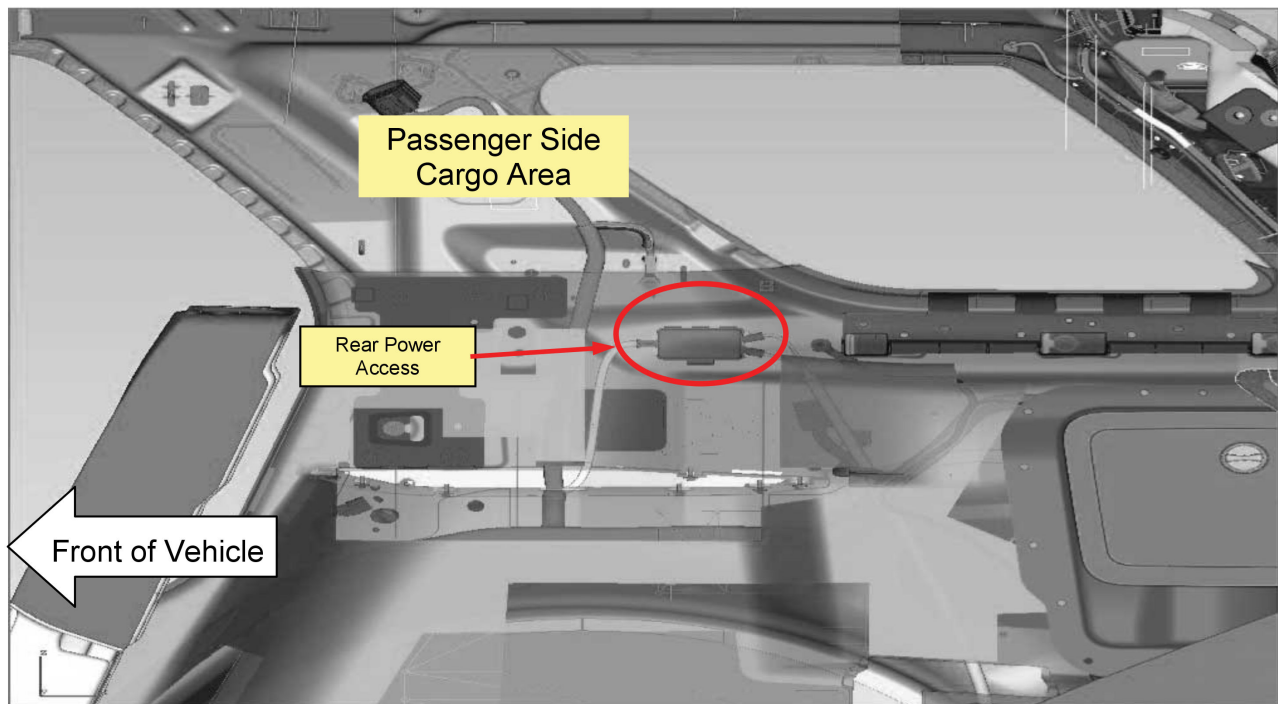
Utility — Pigtail Information

2013MY SEDAN/UTILITY POLICE INTERCEPTOR PIGTAIL INFORMATION							
CONNECTOR PICTURE	HARNESS	DEVICE	CONN. TYPE	PIN	FUNCTION	Service Pigtail #	INFO
	14290	POL FLASH	8-WAY	1 2 3 4 5 6 7 8	WW INPUT WW RH PTRN/PWR WW LH PTRN/PWR WW R/S STROBES PWR PATTERN WW GND	CU2Z-14S411-ALA	Must splice cavities 1 and 6 together if function is not being used. Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	LH WIG WAG RH WIG WAG	4-WAY	1 2 3 4	WW INPUT WW SCN LOCK WW SYNC WW GND	8U2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	SIREN SPEAKER	4-WAY	1 2 3 4	SIREN + (UNUSED) (UNUSED) SIREN -	BU2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	LH SIDE CORNER MARKER RH SIDE MARKER	4-WAY	1 2 3 4	Power Pattern Sync GND	8U2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14290	GRILLE & LOUD SPEAKER	4-WAY	1 2 3 4	TDM GRL GND TDM PATTERN LD SPKR - LD SPKR +	8U2Z-14S411-TA	Wire type- 3TBD-1.0mm Terminal- 7C3T-14474-DA
	14401	POLICE POWER & VEHICLE SIGNALS	14-WAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14	WIGWAG LAMP CONTROL SIDE LAMP PWR CONTROL FRONT FLASHER PWR CONTROL LOUDSPEAKER NEG OPEN SIDE LAMP SYNC CONTROL DIMMER BRAKE OUTPUT LOUDSPEAKER PWR/TDM GRILL OPEN OPEN OPEN OPEN SIDE STROBE PATTERN	CU2Z-14S411-APA	0.64 CAVITIES- 2TAD-0.75mm 2.8 CAVITIES- 2TAD-1.0mm 0.64 CAVITIES- 1/2/5/6/7/8/13/14 TERMINAL 3F2T-14474-RA 2.8 CAVITIES- 3/4/9/10/11/12 TERMINAL 97BG-14474-BBA
	14401	SIREN	4-WAY	1 2 3 4	SIREN FEED/LEFT FRONT SPK + SIREN SHIELD/LEFT FRONT SPK - OPEN/RIGHT FRONT SPK + SIREN RETURN/RIGHT FRONT SPK -	3U2Z-14S411-LUB	WIRE TYPE- 2TAD-1.0mm TERMINAL 97BG-14474-ABB
	14401	2-WAY RADIO	4-WAY	1 2 3 4	LEFT FRONT SPK + LEFT FRONT SPK - RIGHT FRONT SPK + RIGHT FRONT SPK -	3U2Z-14S411-LUB	WIRE TYPE- 2TAD-1.0mm TERMINAL 97BG-14474-ABB
	14401	2-WAY RADIO	4-WAY	1 2 3 4	LEFT FRONT SPK + LEFT FRONT SPK - RIGHT FRONT SPK + RIGHT FRONT SPK -	3U2Z- 14S411-BUB	WIRE TYPE- 2TAD-1.0mm TERMINAL 97BG-14421-ABB
	14401	POLICE FEATURES & BRAKE OUTPUT	14-WAY	1 2 3 4 5 6 7 8 9 10 11 12 13 14	B+ FEED 17AMP CNTRL BUTTON 1 CNTRL BUTTON 2 CNTRL BUTTON 3 CNTRL BUTTON 4 POL START POL R/S #1 B+ FEED #2 17AMP VSS DEL ASSY B+ FEED #3 12AMP PARK DETECT DRV DOOR AJAR POL R/S #2	3U2Z-14S411-BJAC	1.5 CAVITIES- 0.75mm 2.8 CAVITIES- 1.5mm 0.64 CAVITIES- 2/3/4/5/6/9/10/11/12/13 TERMINAL 97BG-14474-ABB 2.8 CAVITIES- 1/7/8/14 TERMINAL 97BG-14474-BCA WIRE TYPE- 2TAD
	14401	POLICE POWER	6-WAY	1 2 3 4 5 6	POLICE B+ 34AMP POLICE B+ 34AMP POLICE B+ 34AMP GROUND GROUND GROUND	3U2Z- 14S411-HEA	WIRE TYPE- 2TAD-4.0mm TERMINAL 97BG-14474-CCA
	14A227 (D258 ONLY)	POLICE INLINE	2-WAY	1 2	CHMSL LAMP DECKLID	3U2Z- 14S411-LAB	WIRE TYPE- 2TAD-0.50mm TERMINAL 97BG-14421-AAB

N0150616

Section 2: Electrical

Utility — Rear Power Access



N0141051

Utility — Remove cargo area passenger side trim panel:

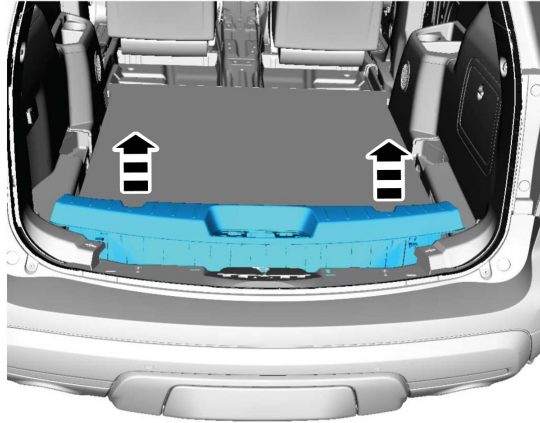
1. Position aside the liftgate weatherstrip.

NOTICE:

To avoid damage to the liftgate scuff plate trim panel, remove any retaining clips from the body and attach them to the liftgate scuff plate trim panel before installing.

2. Pull upward to release the retaining clips.
3. If equipped, disconnect the rear passive start antenna electrical connector and remove the liftgate scuff plate trim panel.

Section 2: Electrical



N0145094

NOTICE:

To avoid damage to the scuff plate trim panel, remove any retaining clips from the body and attach them to the scuff plate trim panel before installing.

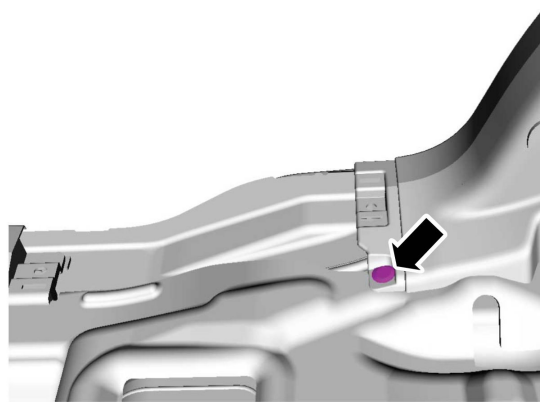
4. Remove the rear door scuff plate trim panel.
5. Remove the quarter trim panel push pin retainer.



N0145096

6. Position the second row seat in the flat position and then tilt the second row seat forward.
7. Position the third row seat in the flat position if equipped.
8. Remove the 2 quarter trim panel tie down hooks.

Section 2: Electrical



N0145095

9. Remove the third row safety belt anchor bolt cover on the quarter trim panel.
10. Remove the third row safety belt anchor bolt.
- To install, tighten to 40 Nm (30 lb-ft).

NOTICE:

To avoid damage to the quarter trim panel, remove any retaining clips from the body and attach them to the quarter trim panel before installing.

11. Pull the quarter trim panel toward the inside of the vehicle to release the quarter trim panel clips and disconnect electrical connectors and remove the quarter trim panel.

Installation

12. To install, reverse the removal procedure.

Utility — My Fleet Management

Allows configuration of following functions using an Integrated Diagnostic System (IDS) service tool

- Ability to set vehicle maximum speed from 90 MPH to the factory maximum speed setting.
- Ability to set maximum radio volume from 0% to 100%.

Utility — Courtesy Lamp Disable (Dark Mode)

This option offers deletion of the illuminated entry function. Upon vehicle power-up, the Smart Junction Box (SJB) will not provide interior lighting during entry or exit of the vehicle. The interior lighting will, however, still operate on demand whenever the dome lamp switch is active. If the dark car feature is necessary, the assembly plant enables this feature through the SJB. The vehicle can be configured by entering diagnostics, enabling/disabling the courtesy lamps and then exiting diagnostics.

Use the following steps to enable or disable the courtesy lamps:

1. Connect the IDS (at the latest calibration) to the vehicle via the DLC.
2. Allow the IDS to ID the vehicle. Select the Tool Box.
3. Select Module Programming, Programmable Parameters, Interior Lighting, then the TIC.
4. A screen will come up to remind you to turn the ignition on.
5. Select Dark Enable and the TIC.
6. During configuration the lights will flash and the system changes from Disabled to Enabled.
7. Final Screen: Module configuration complete, check/clear any DTCs that may have been set.

Section 2: Electrical

Utility — Steering Wheel Switches



Configurable Steering Wheel Switches:

- ⌚ 2 switches with two positions (up/down) each
- ⌚ Total of 4 grounded outputs sourcing available for operating police equipment
- ⌚ 4 grounded outputs allocated at bottom of I/P center stack in 14-way connector

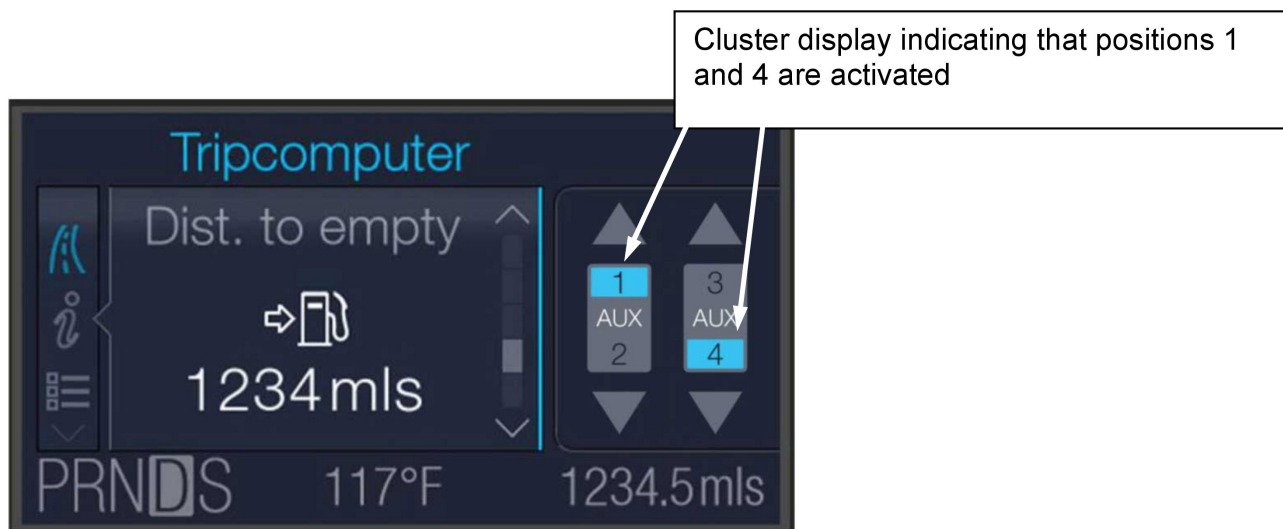
N0141056

Steering Wheel Operation

- 2 switches are available for configuration as indicated above.
- Each switch has 2 positions (up/down).
- Four total ground side switching outputs are available in 14-way connector located behind the close out panel at the bottom of the Electronic Finish Panel (EFP).
- Any combination or all of the four outputs can be turned on simultaneously.
- To activate a switch/output, push the desired switch in the direction of the label either above or below the switch.
- To deactivate that function, push the desired switch in the same direction as was used when activating the output.
- Cluster display will illuminate the switch/position while activated.

Section 2: Electrical

Utility — Steering Wheel Switch Cluster Display



N0141057

Fuse Information

If electrical components in the vehicle are not working, a fuse may have blown. Blown fuses are identified by a broken wire within the fuse. Check the appropriate fuses before replacing any electrical components.

NOTE:

Always replace a fuse with one that has the specified amperage rating. Using a fuse with a higher amperage rating can cause severe wire damage and could start a fire.

Electrical Component Resource

See part numbers and supplier in the chart below to obtain terminals and connectors.

Section 2: Electrical

POLICE INTERCEPTOR CONNECTOR FORD TO SUPPLIER PART NUMBER CROSS REFERENCE MATRIX					
COMPONENT IN VEHICLE LOCATION	FORD COMPONENT CONNECTOR PART NUMBER	SUPPLIER	SUPPLIER PART NUMBER	UPFIT HARNESS SIDE PART NUMBER	SUPPLIER PART NUMBER
ION Grill LEDs @ Behind Grille Light Heads (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
ION Rear CHMSL LEDs @ Light Heads (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
ION Rear Decklid/Liftgate LEDs @ Light Heads (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
VERTICE Front Corner LEDs @ Headlight Modules (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
VERTICE Rear Corner LEDs @ Rear Tailights (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
PARKTURN/WARN LEDs @ Headlight Modules (4 Pin)	4F9T-14A464-HA (000)	MOLEX	33471-0401	4F9T-14A624-KA (000)	33481-0401
PARKTURN/WARN LEDs @ Headlight Module (3 Pin)	7T4T-14A464-BA (000)	MOLEX	33471-0301	7T4T-14A624-AA (000)	33481-0301
Siren Speaker @ Driver Side Behind Fascia (2X2 Pin)	5W7T-14A464-GA (004)	MOLEX	33472-4416	5W7T-14A624-BA (002)	33482-0416
WARN CONTROL MODULE @ Underhood near Coolant Bottle (4X2 Pin)	5W7T-14A464-GA (000)	MOLEX	33472-0801	5W7T-14A624-DA (000)	33482-0801
Relay Center & CENCOM (5X2 Pin)	4S7T-14489-VJA	YAZAKI	7283-6455-40	4S7T-14A459-VJA	7282-6455-40
At CENCOM (2X2 Pin)	4S7T-14489-VDA	YAZAKI	7283-6449-40	4S7T-14A459-VDA	7282-6449-40
At Cooling Fan (2 Pin)	4S7T-14489-VAA	YAZAKI	7283-6443-40	4S7T-14A459-VAA	7282-6443-40
Siren Speaker @ Instrument Panel/Center Stack (2X2 Pin)	4S7T-14A459-VDA	SUMITOMO		4S7T-14489-VDA	
Power/Vehicle Signals @ Instrument Panel/Center Stack (2X7 Pin)	4S7T-14459-YRA	SUMITOMO		4S7T-14489-YRA	
Police Lights @ Instrument Panel Center Stack (2X7 Pin)	BU5T-14A459-BA	SUMITOMO		4L3T-14489-AC	
Police Radio Connector @ Instrument Panel/Center Stack (2X2 Pin)	4S7T-14489-VDA	SUMITOMO		4S7T-14A459-VDA	
40A Auxiliary Power @ Instrument Panel/Center Stack (3X3 Pin)	BU5T-14A459-AA	YAZAKI		4S7T-14489-YMA	
WIRE GAUGE or Part Number	COMPONENT TERMINAL NUMBER	SUPPLIER	SUPPLIER PART NUMBER	HARNESS TERMINAL PART NUMBER	SUPPLIER PART NUMBER
Based on wire size					
14, 16	33012-2001	MOLEX	33012-2001	33000-0001	33000-0001
18, 20	33012-2002	MOLEX	33012-2002	33000-0002	33000-0002
22	33012-2003	MOLEX	33012-2003	33000-0003	33000-0003
Based on wire size					
16, 18	7116-4101-02	YAZAKI	7116-4101-02	7114-4101-02	7114-4101-02
20, 22	7116-4100-02	YAZAKI	7116-4100-02	7114-4100-02	7114-4100-02
4S7T-14459-YRA / 4S7T-14489-YRA	Terminals for Pins: 1, 7, 8 97BG-14474-BCA 2, 3, 4, 5, 6 97BG-14474-AAB	SUMITOMO			
BU5T-14A459-BA / 4L3T-14489-AC	Terminals for Pins: 1, 2, 7 3F2T-14474-SA 6, 14 3F2T-14474-RA 9 97BG-14474-BBA	SUMITOMO			
4S7T-14489-VDA / 4S7T-14A459-VDA	2TAD-0, 75 1.5MM FLAT				
For 40A Auxiliary Power Connector	97BG-14421-GCA	YAZAKI			

N0146595

Electrical Component Resource

Mating connectors, terminals and subcomponent availability are managed for Ford Fleet and Pool Accounts through Ford Component Sales. Ford Component Sales, LLC (FCS) uses Globe Component Products or Dynamic Supply Solutions (DSS) to process and coordinate all Fleet and Pool Purchase Orders. By using Globe or DSS, FCS is able to offer the Fleet and Pool community reasonable minimum order quantities while still having the benefit of Ford Production pricing benefits.

Section 2: Electrical

Utility — Wiring Reference Information

Police Interceptor Sedan and Utility Wiring Diagram Excerpts

The following pages are from sections of both the Police Interceptor Sedan and Utility Wiring Diagrams.

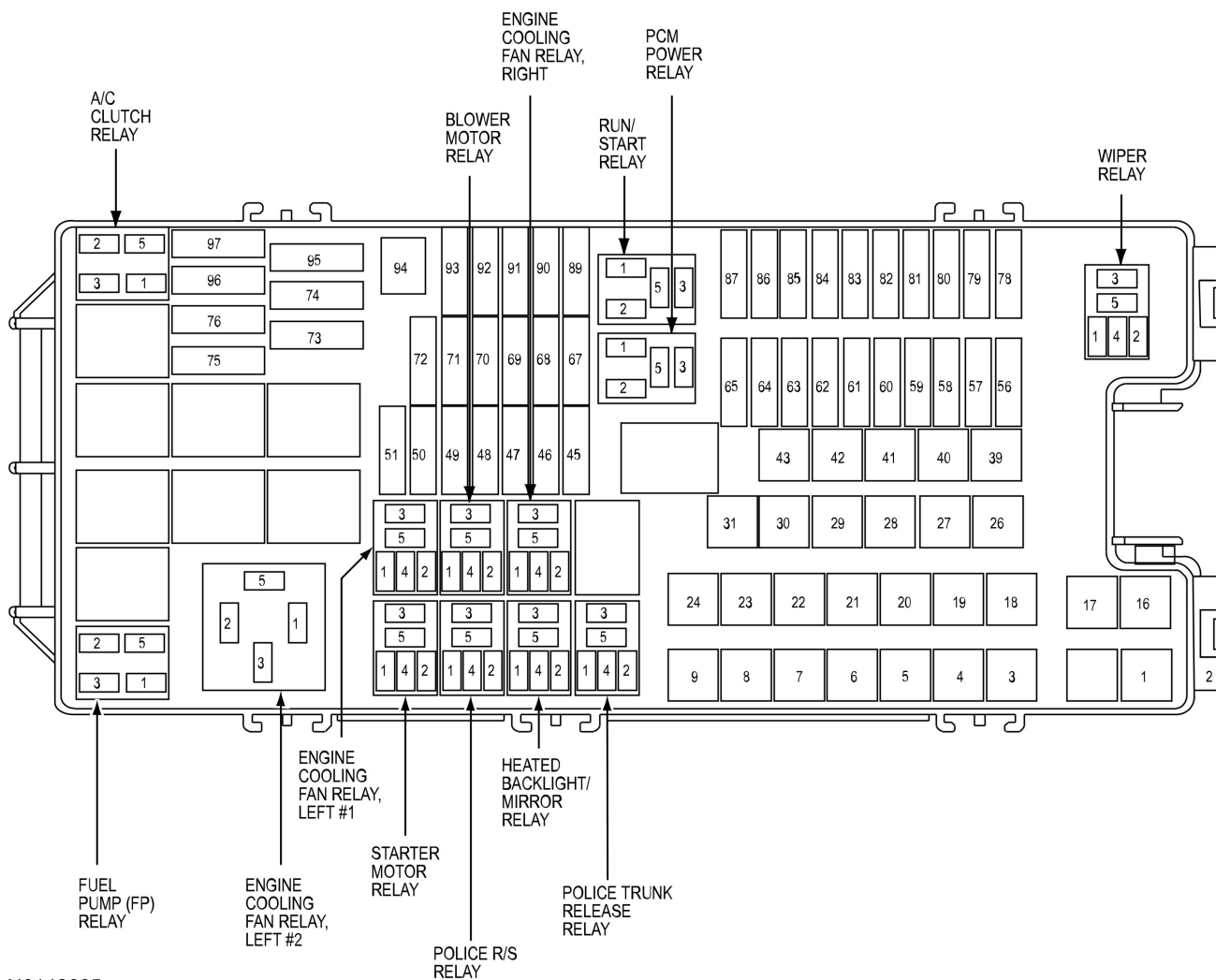
Publication Ordering Information

To obtain information about ordering complete copies of Ford or Lincoln/Mercury publications, call 1-800-782-4356 or at www.helminc.com.

Available publications include Workshop Manuals, Wiring Diagrams, PC/ED Manuals and Owner Guides.

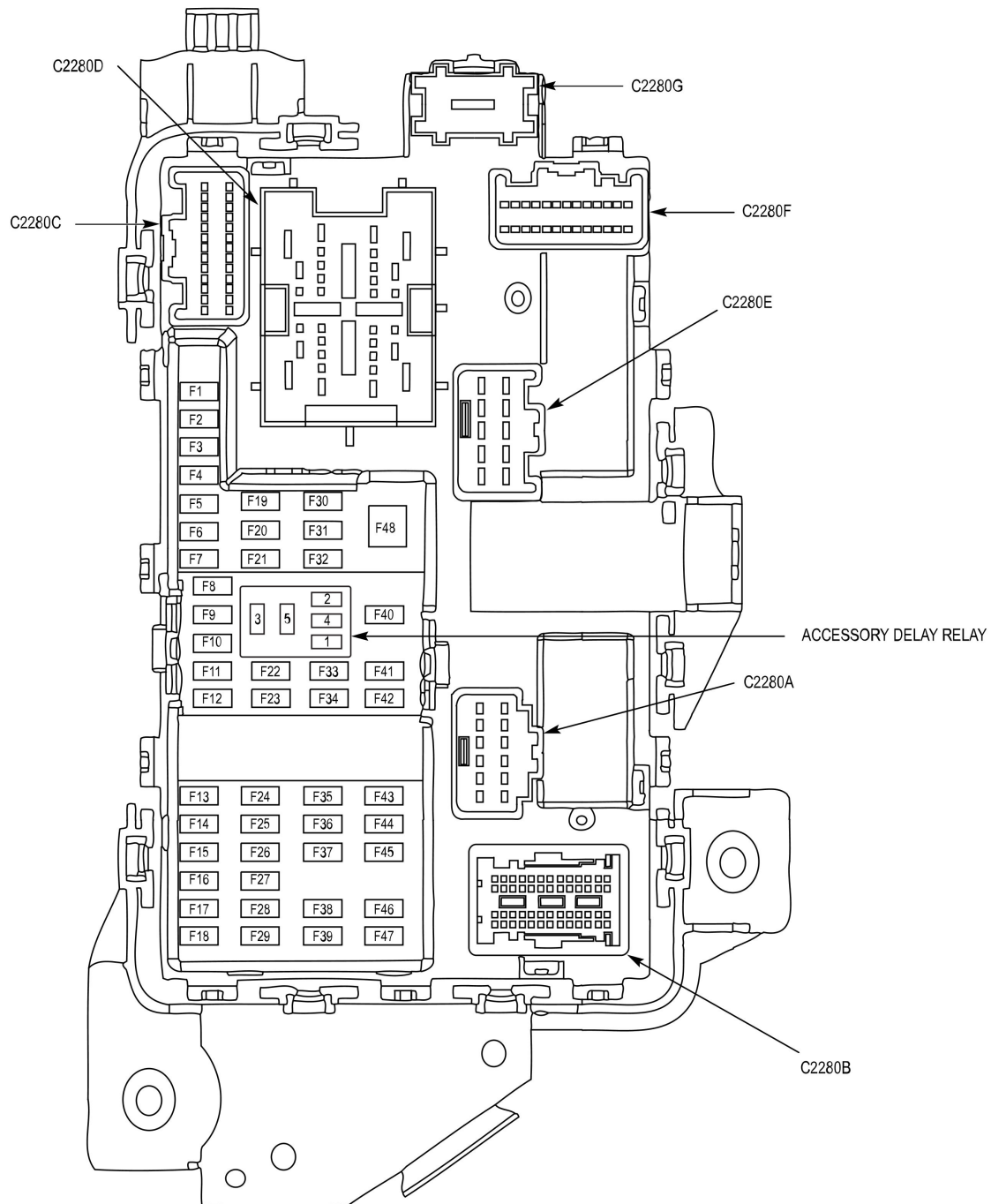
Sedan — Wiring Diagrams: Police Interceptor

Battery Junction Box (BJB)



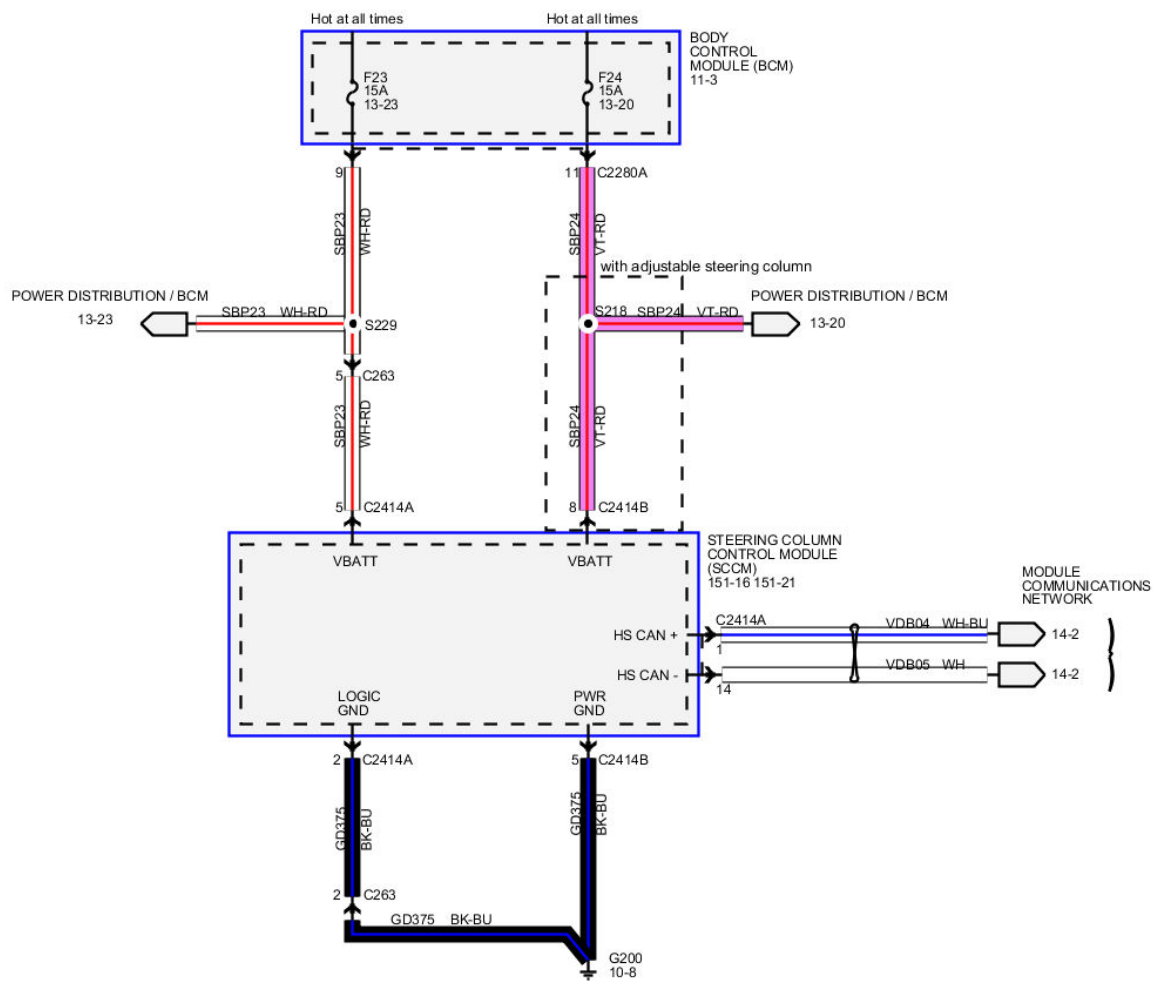
Body Control Module (BCM)

Section 2: Electrical



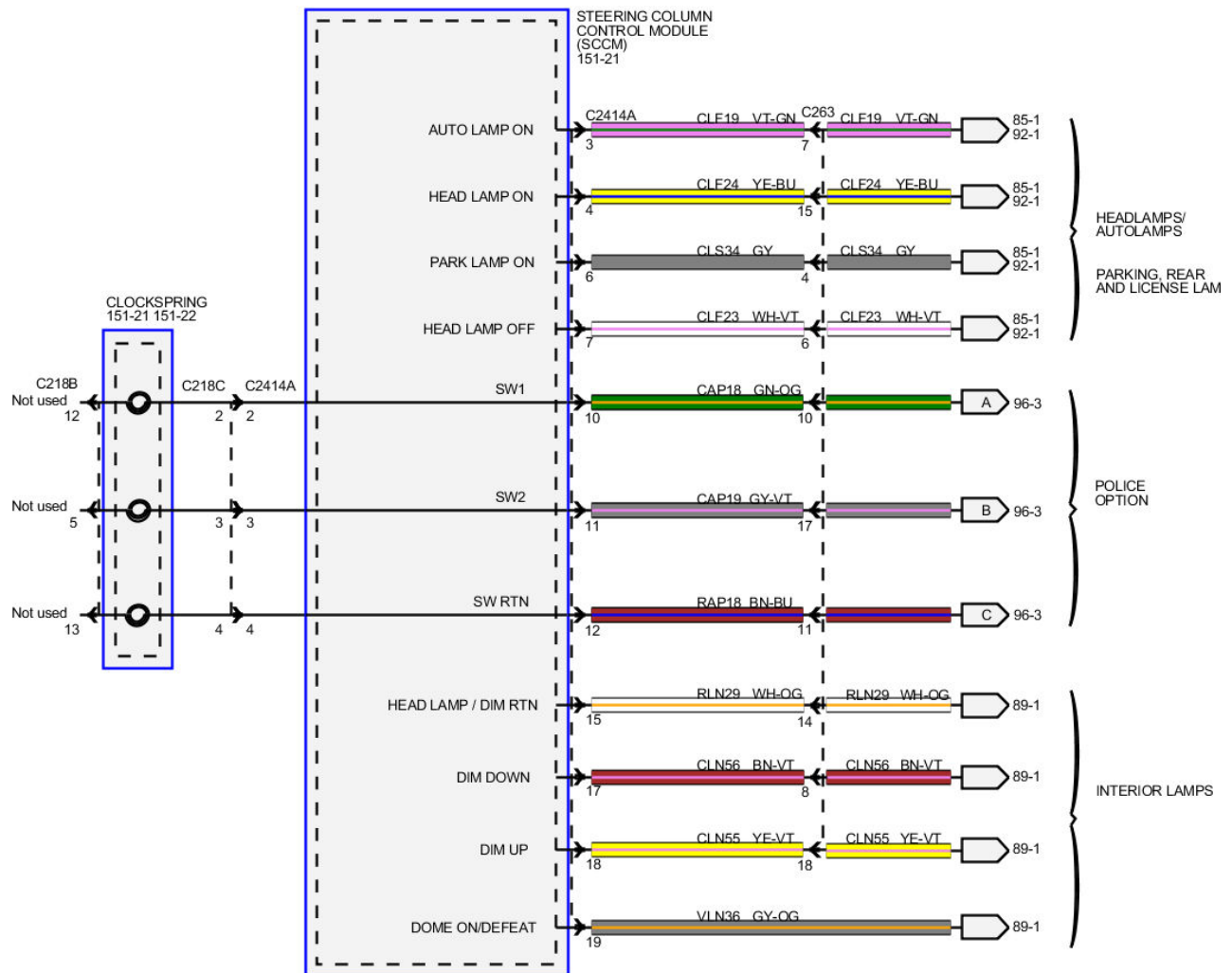
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Section 2: Electrical



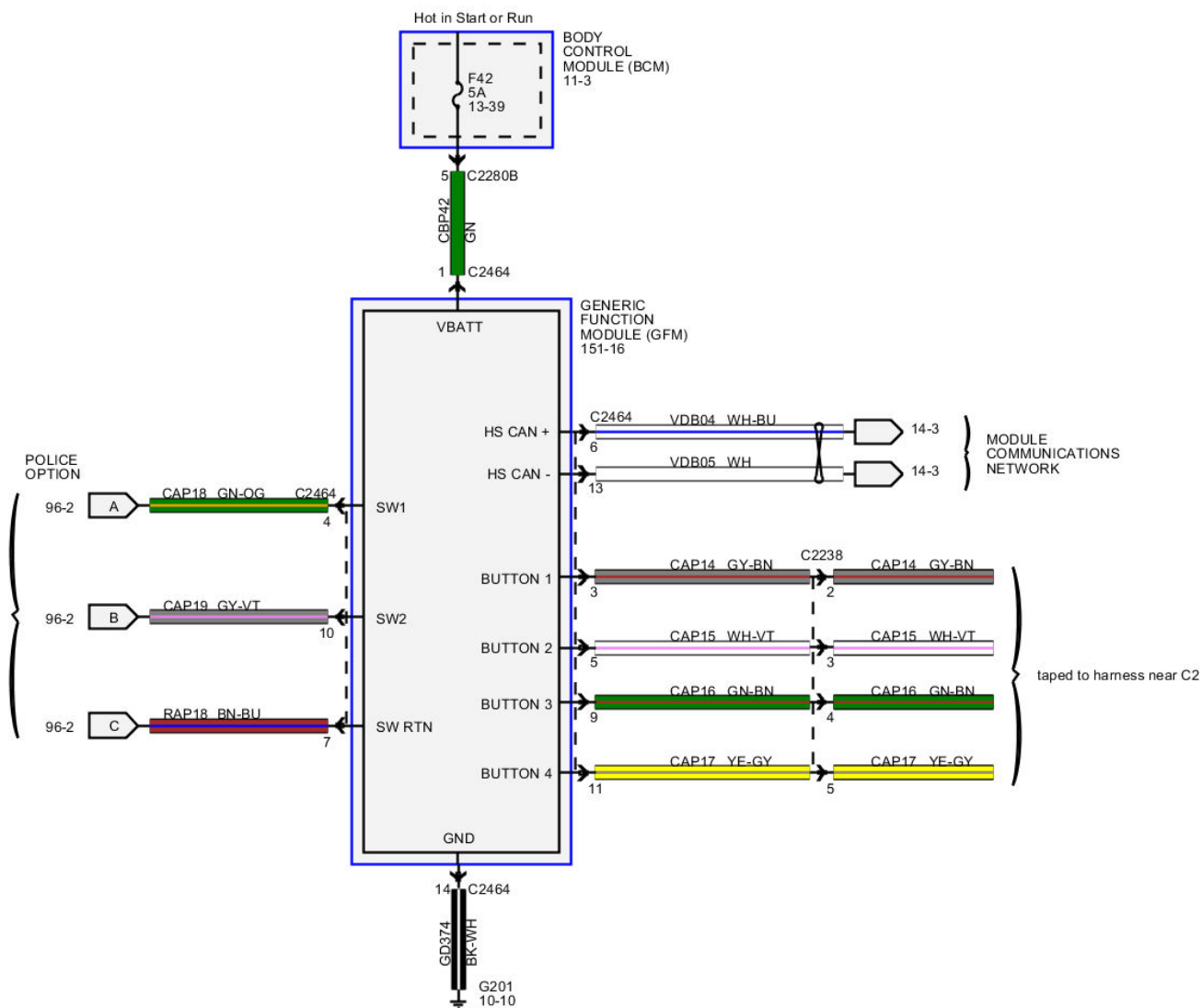
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Section 2: Electrical



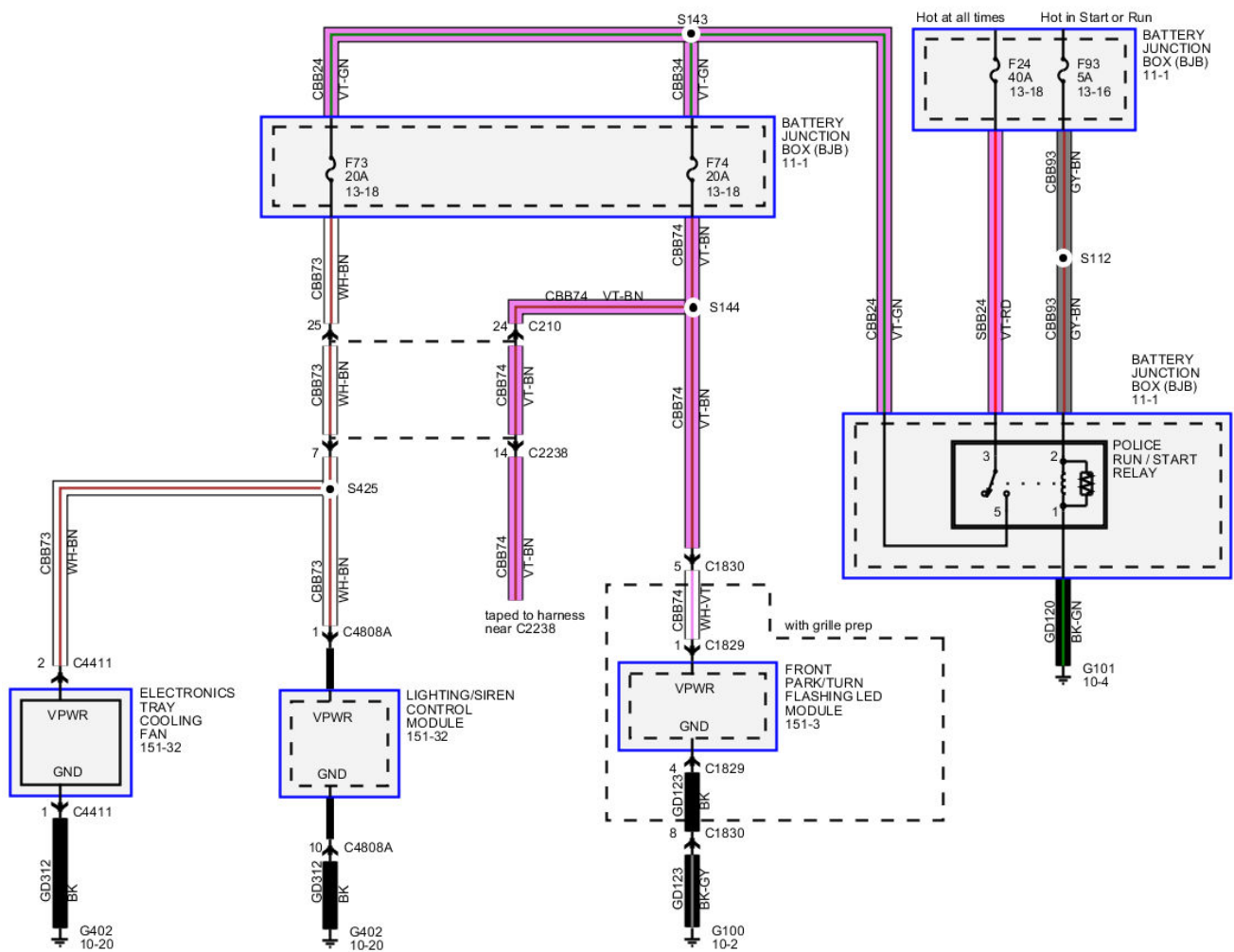
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Section 2: Electrical



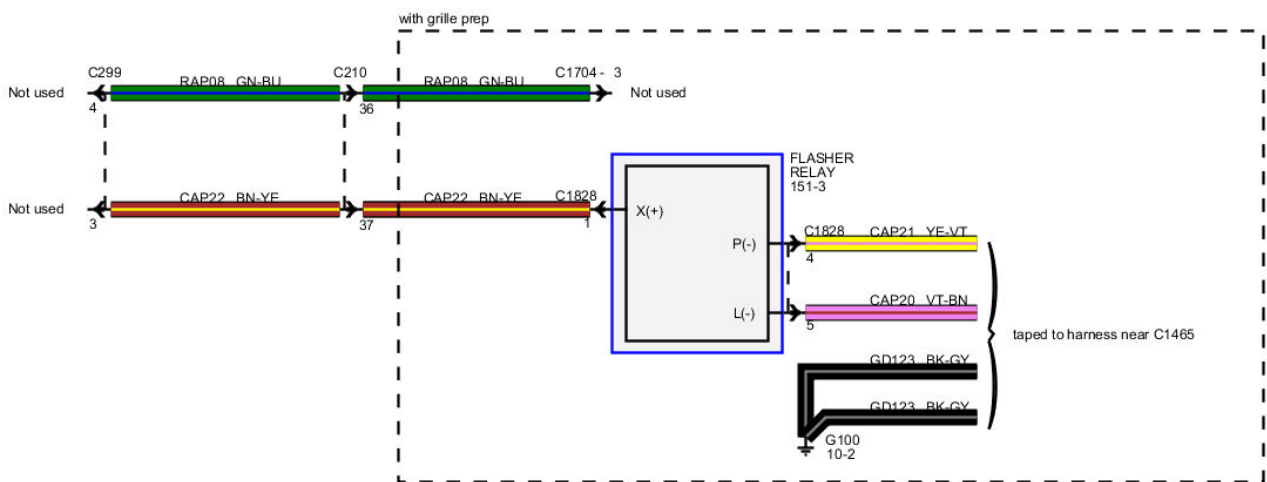
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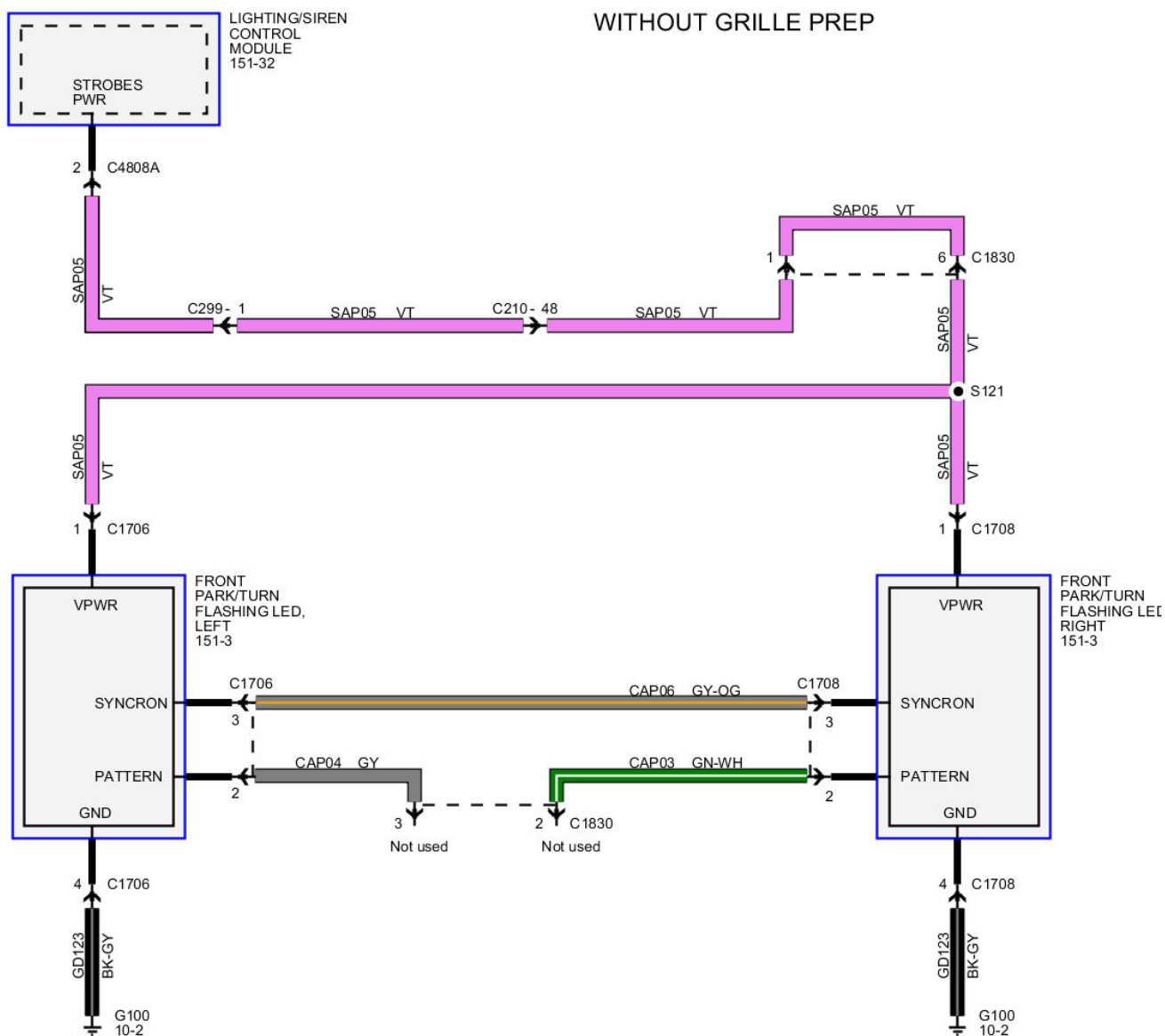
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Section 2: Electrical



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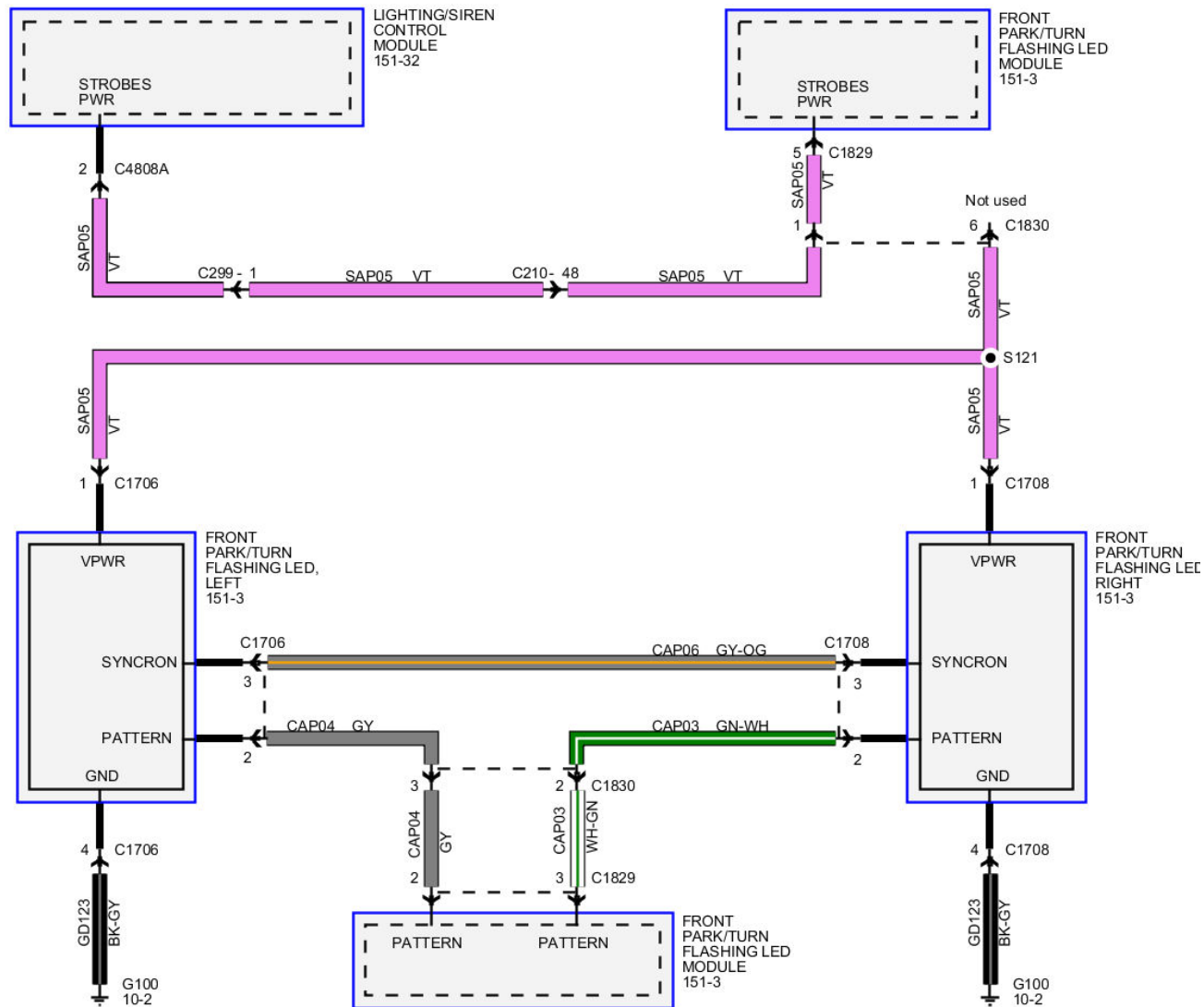
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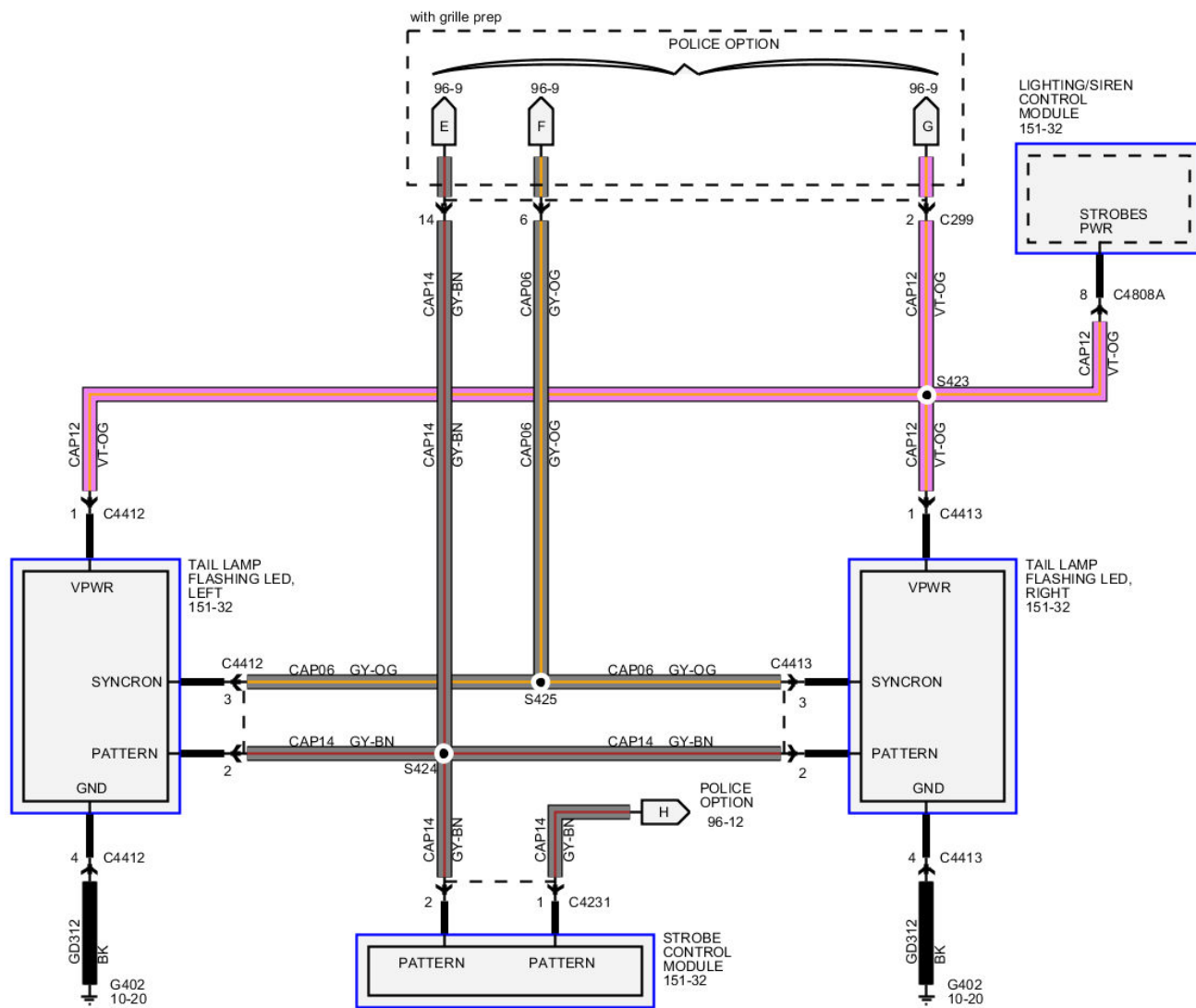
Section 2: Electrical

WITH GRILLE PREP



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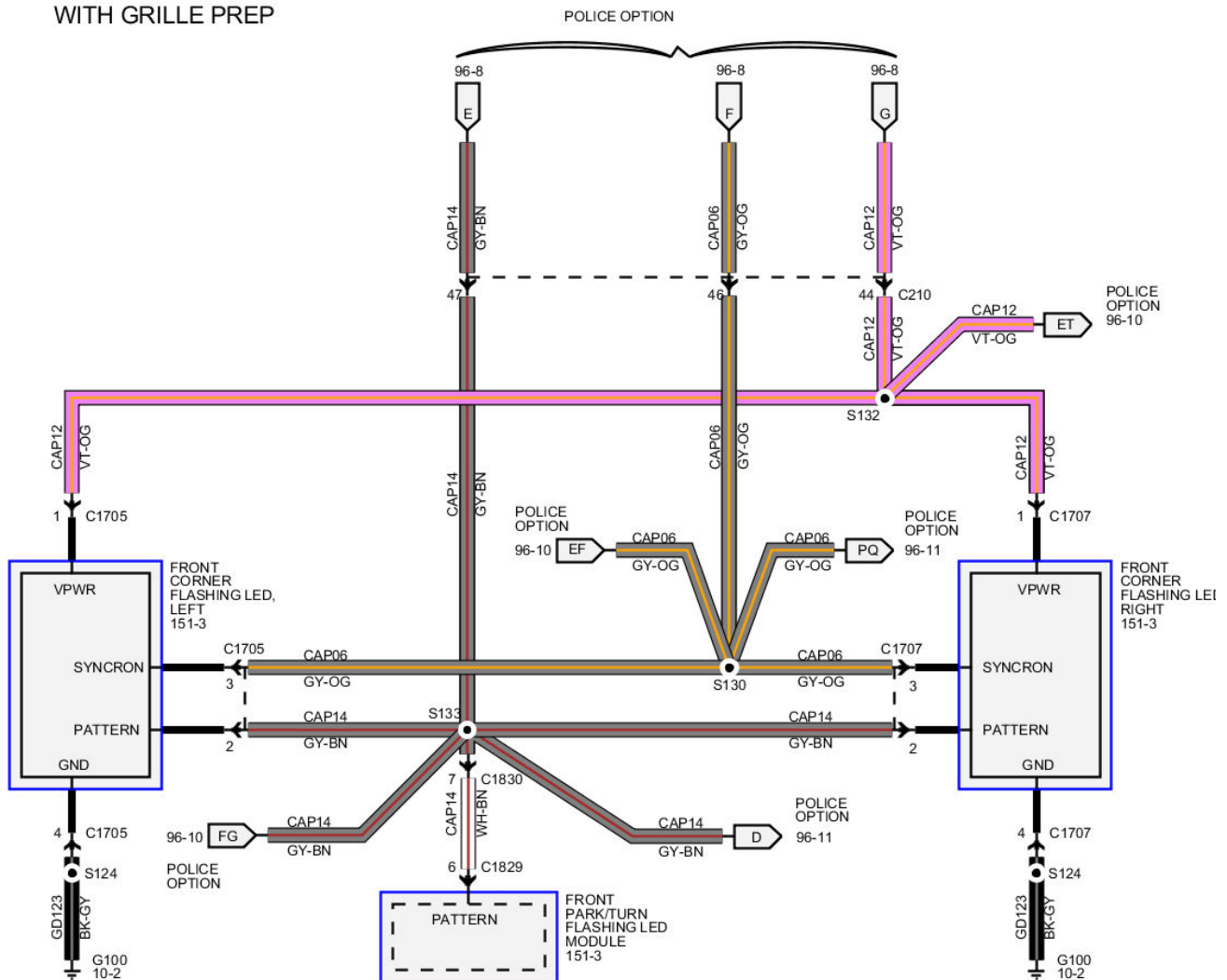
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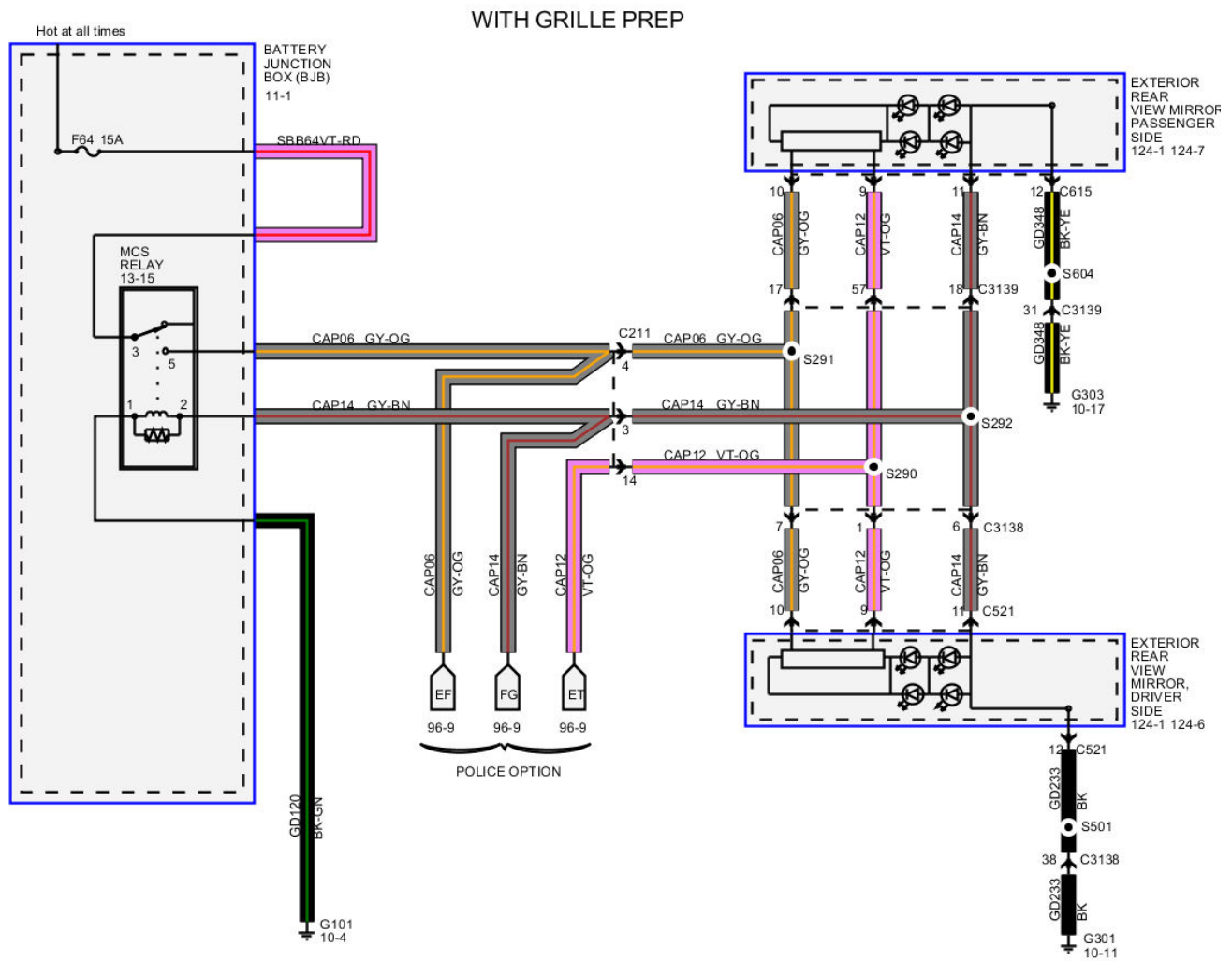
Section 2: Electrical

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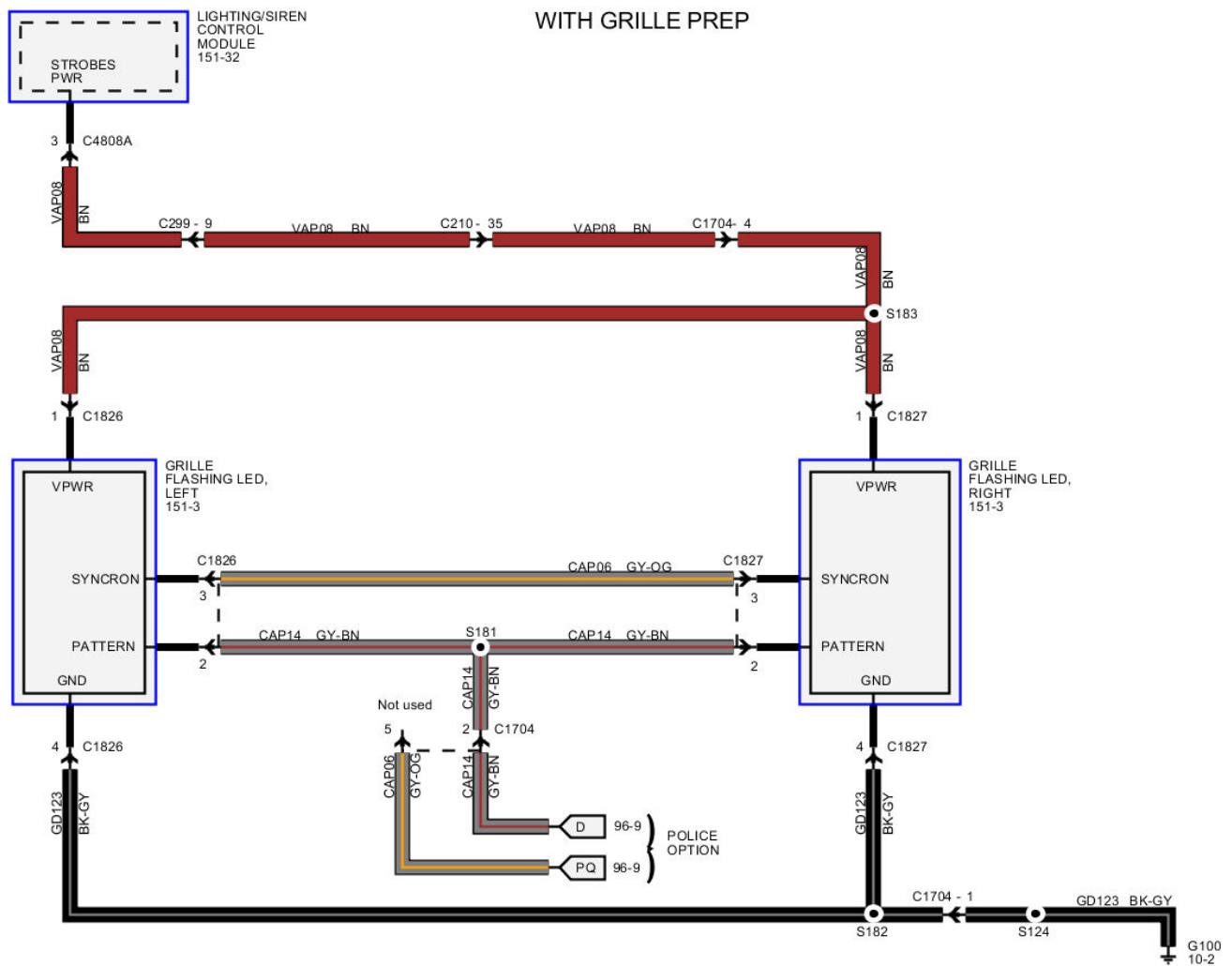
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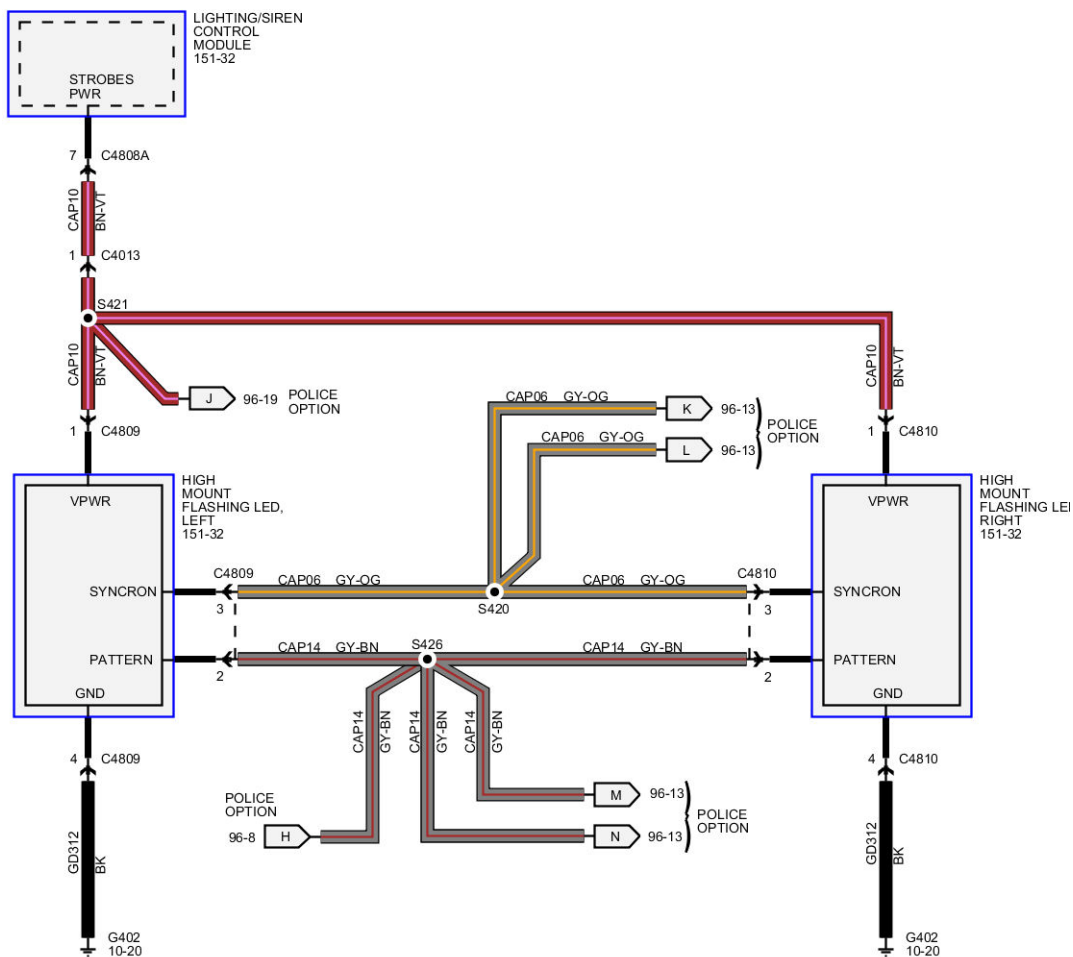
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Section 2: Electrical



N0163451

Section 2: Electrical

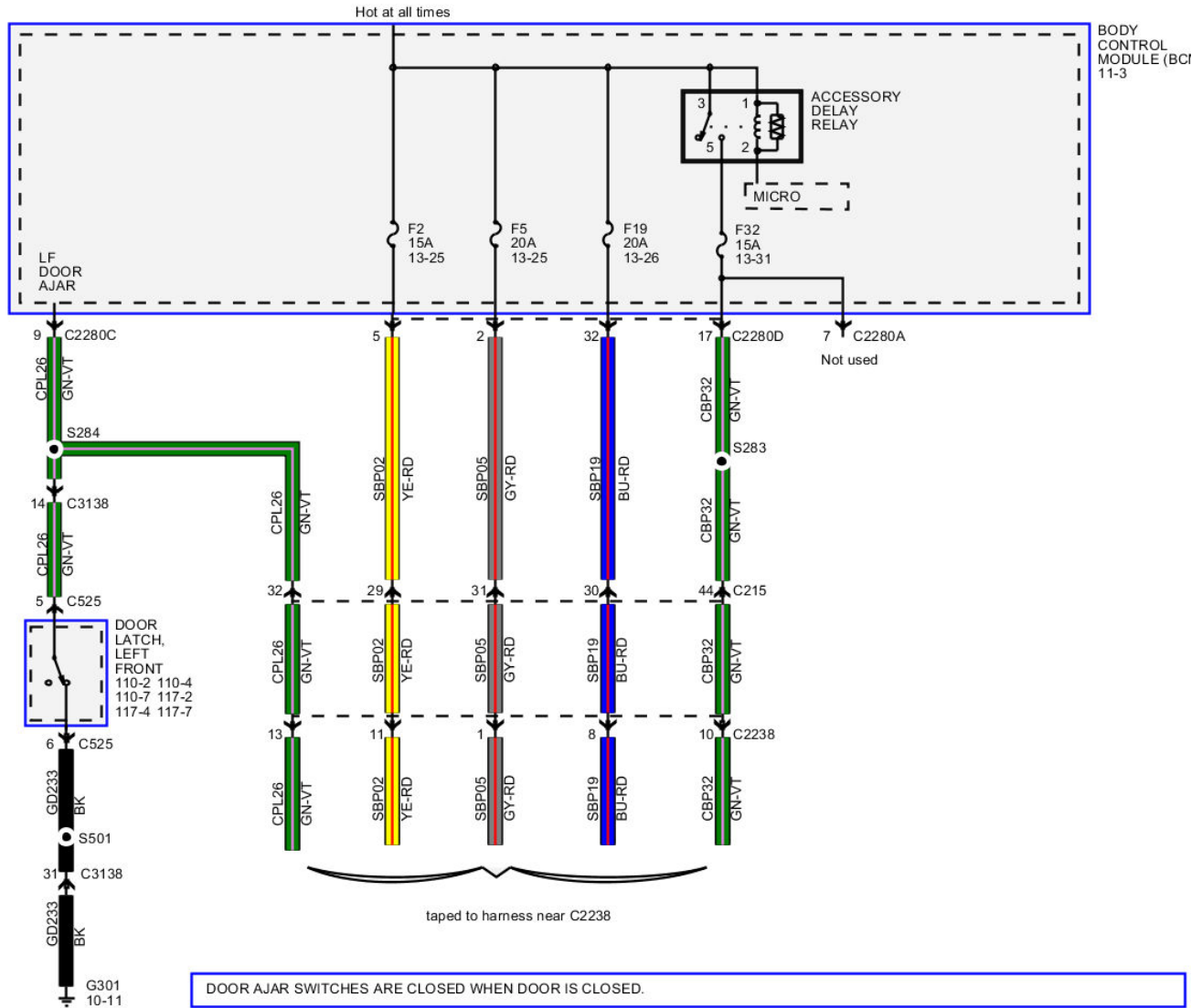


N0163452

Section 2: Electrical



Section 2: Electrical

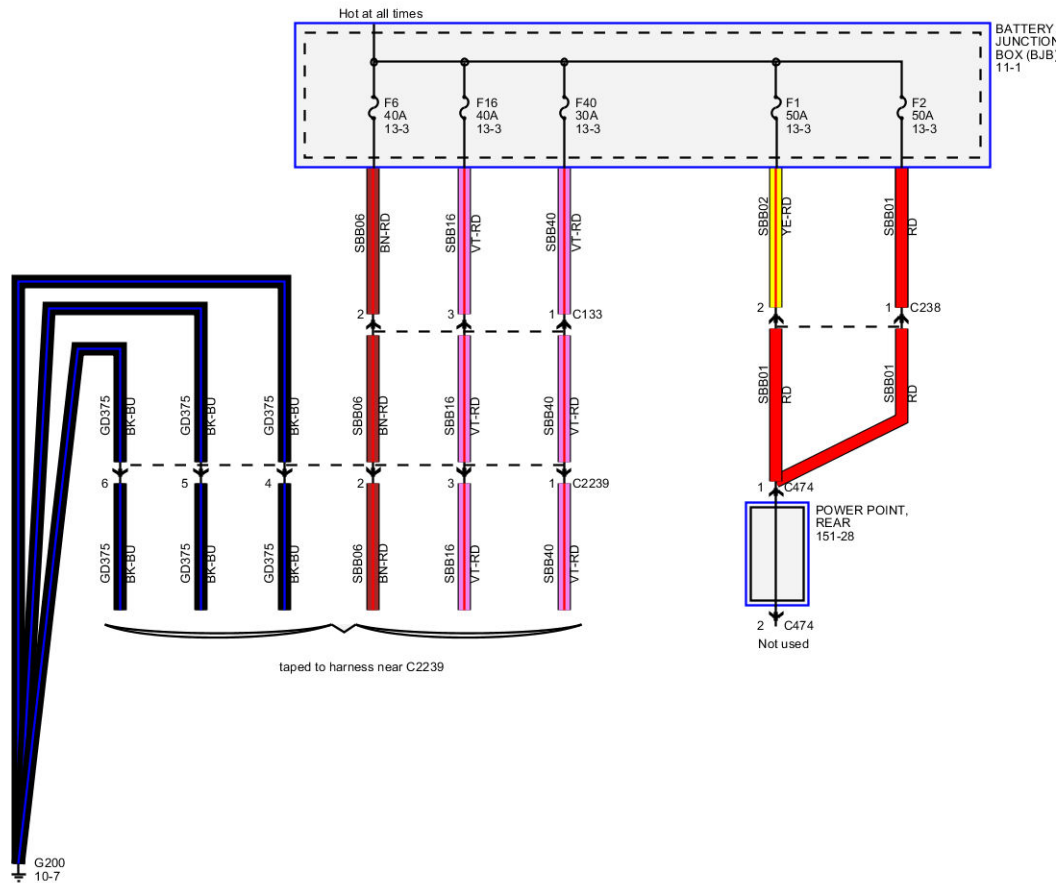


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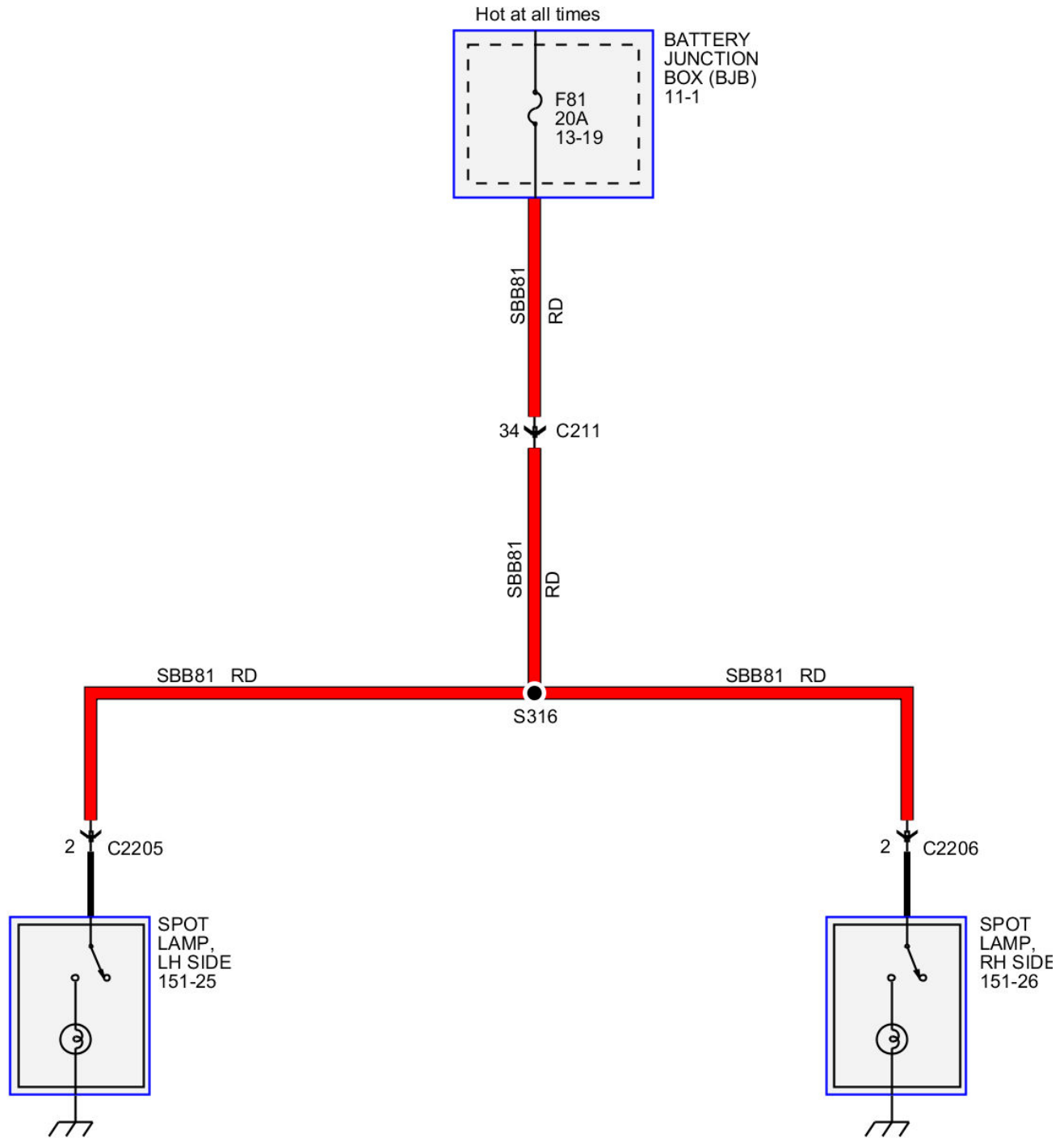


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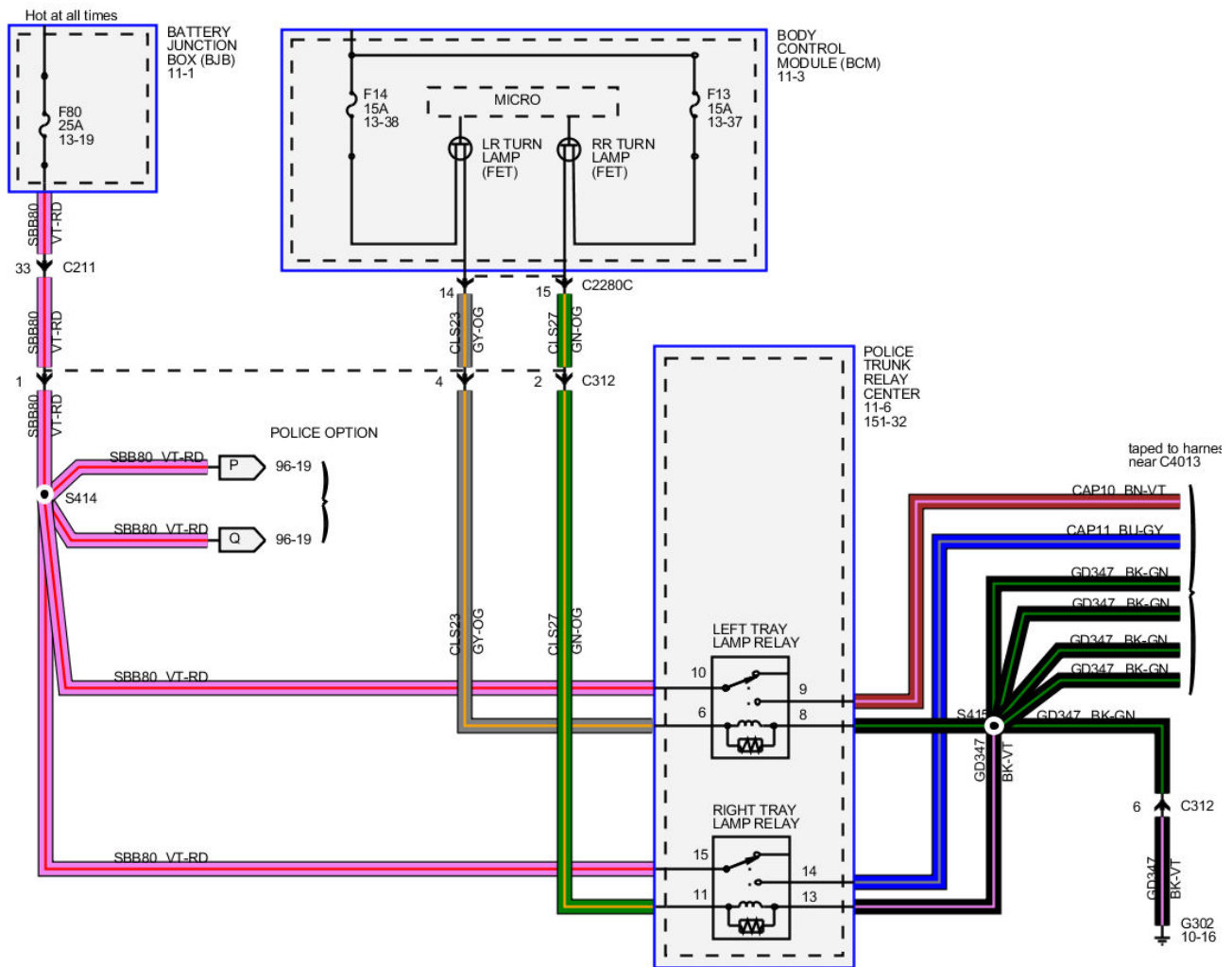
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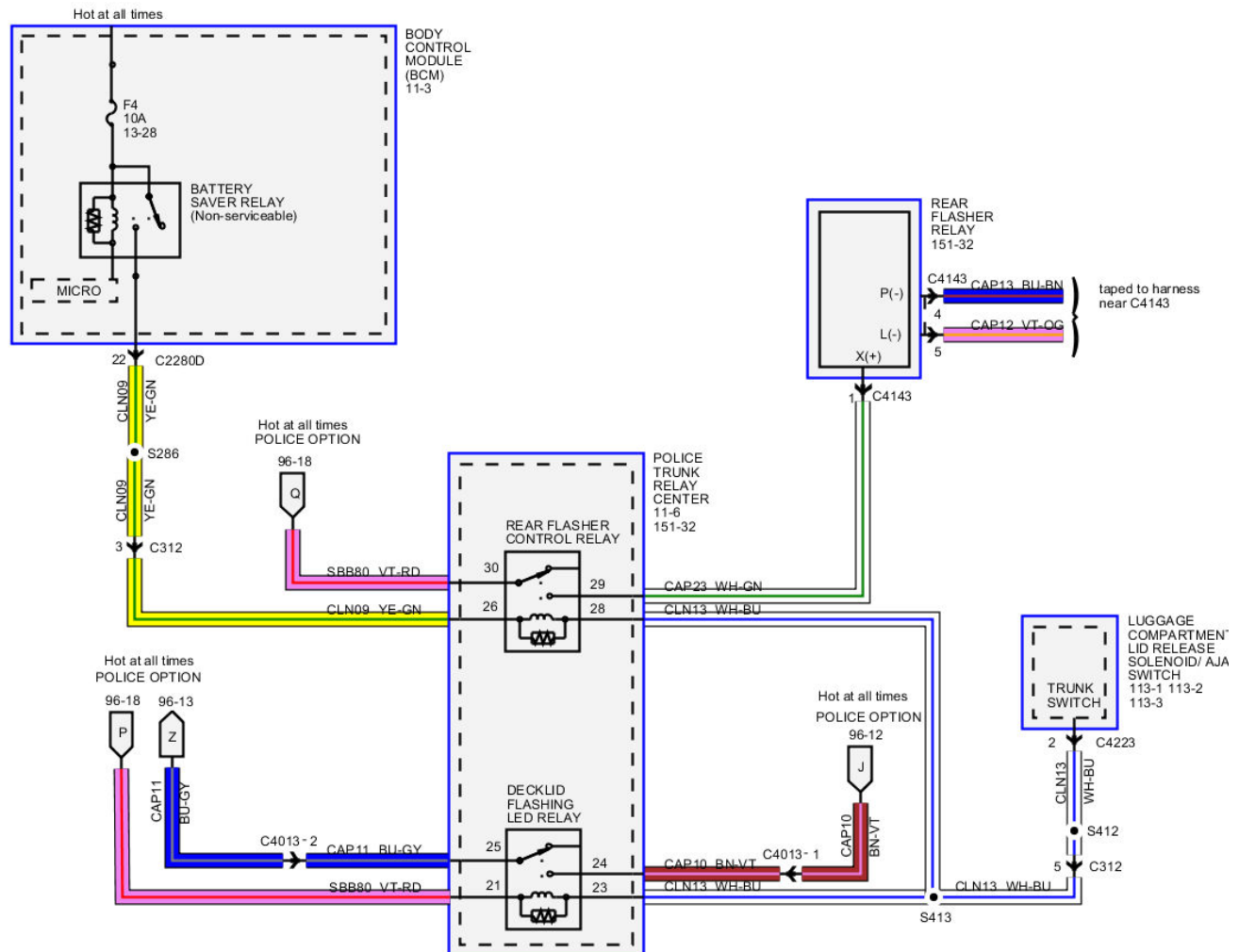
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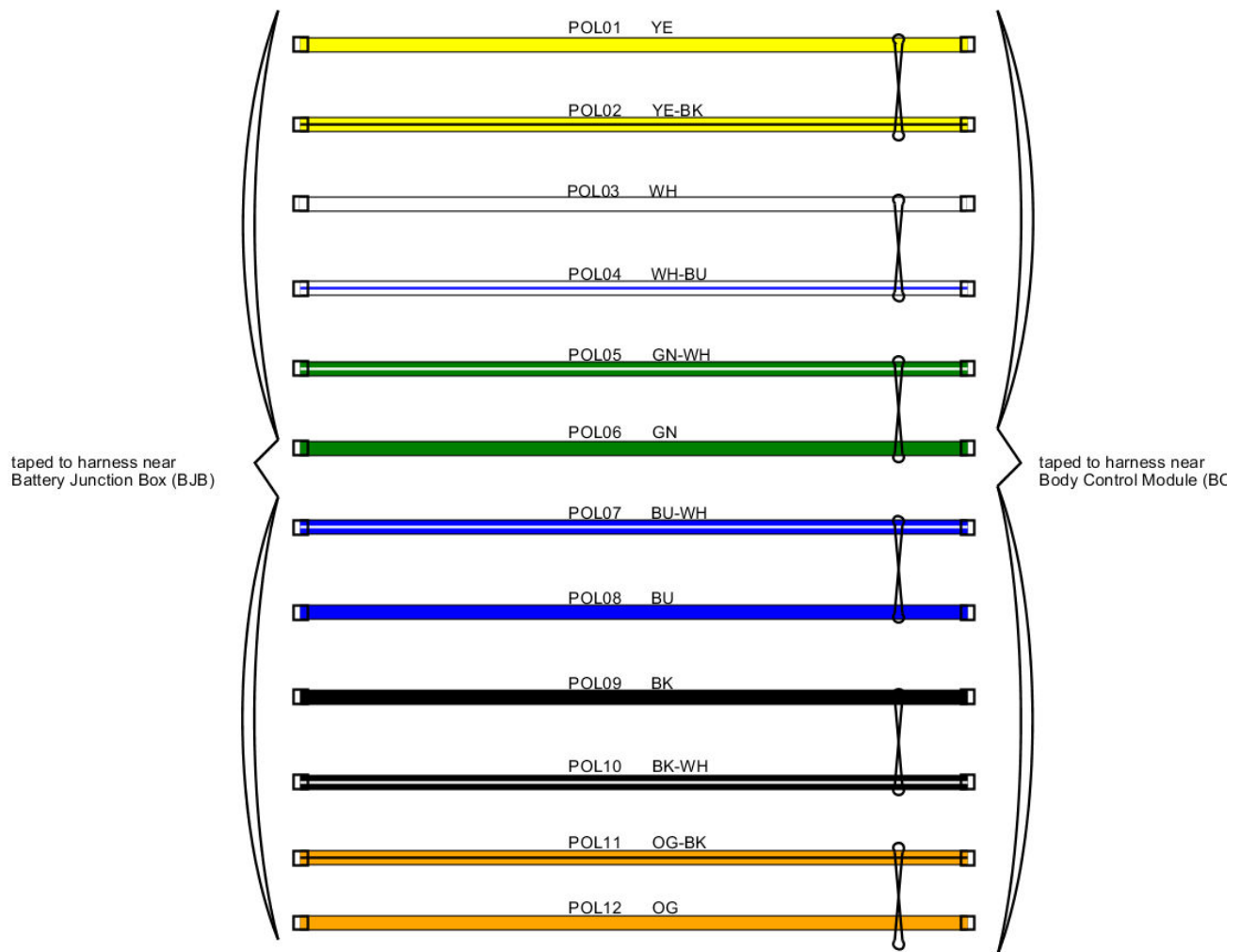
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Section 2: Electrical



N0163459

Section 2: Electrical

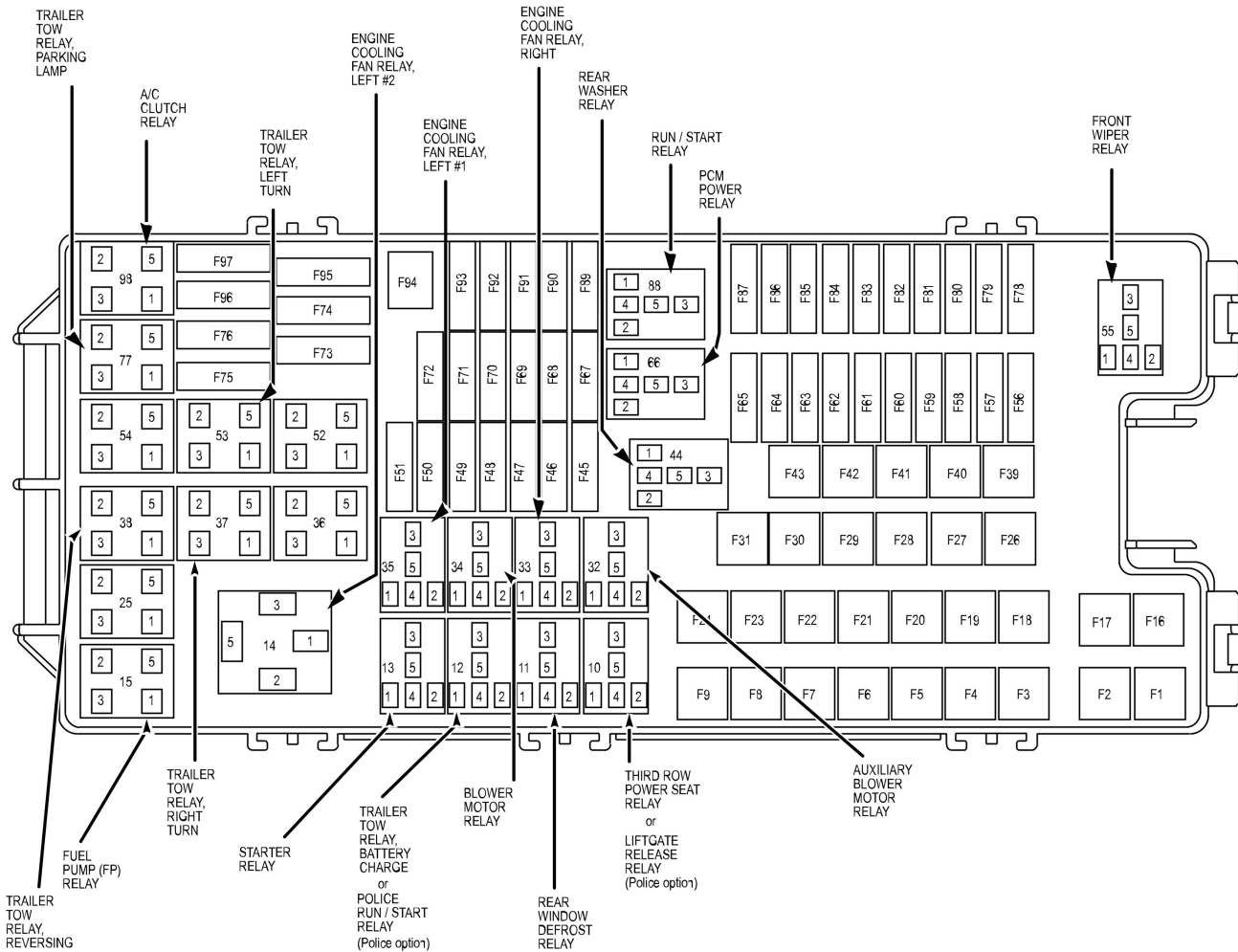


N0163460

Utility — Wiring Diagrams: Police Interceptor Battery Junction Box (BJB)

Battery Junction Box (BJB)

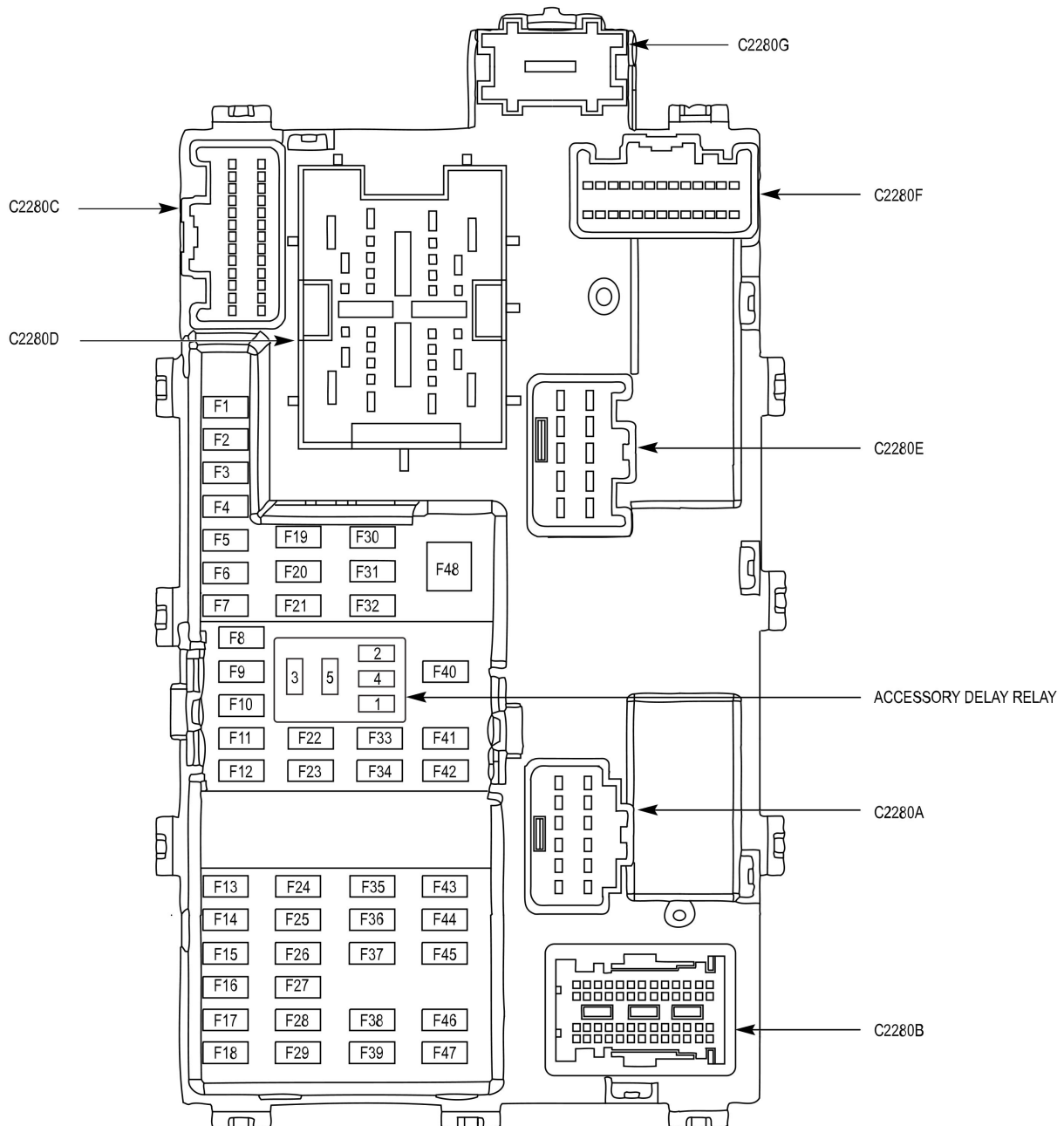
Section 2: Electrical



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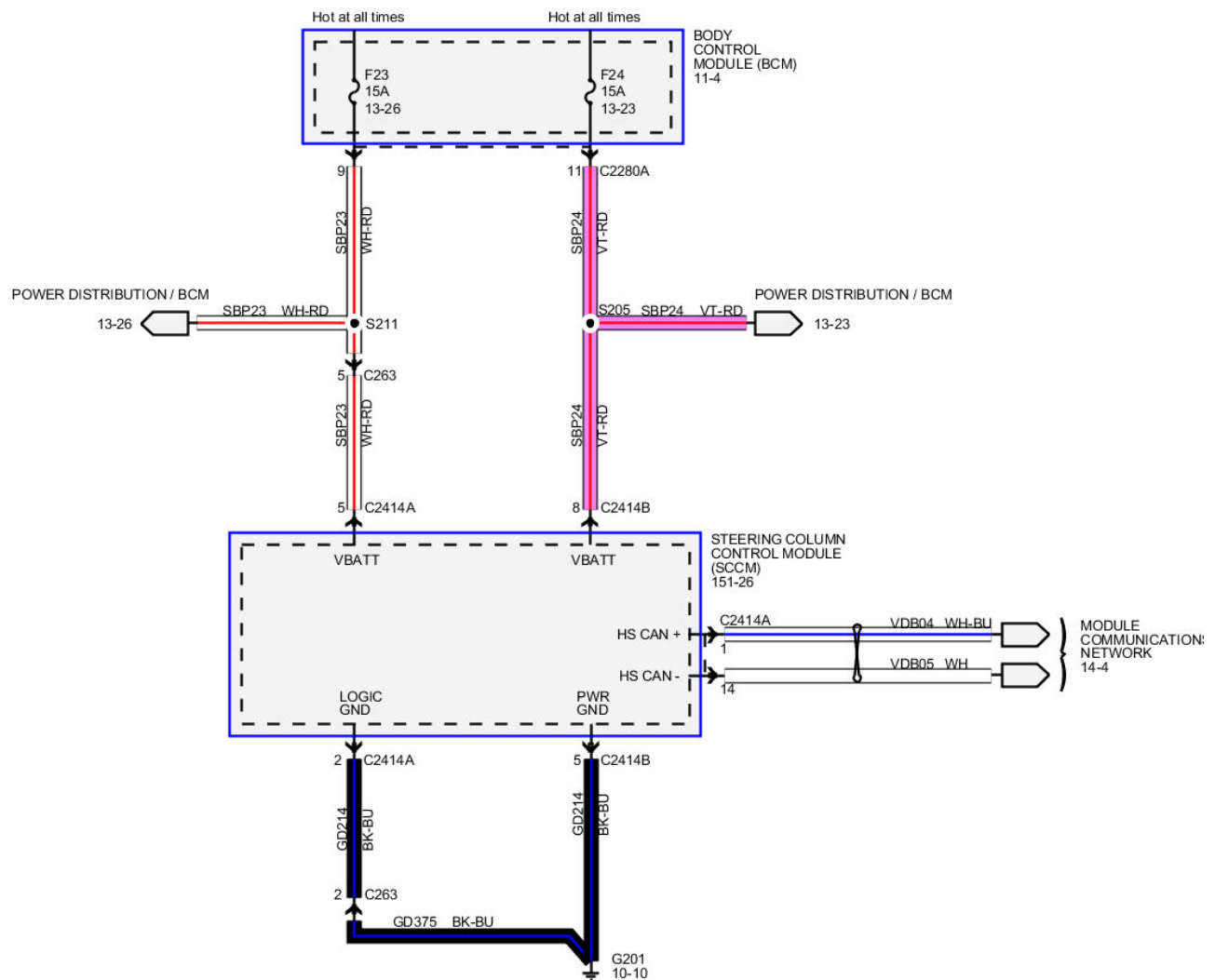
Body Control Module (BCM)

Section 2: Electrical



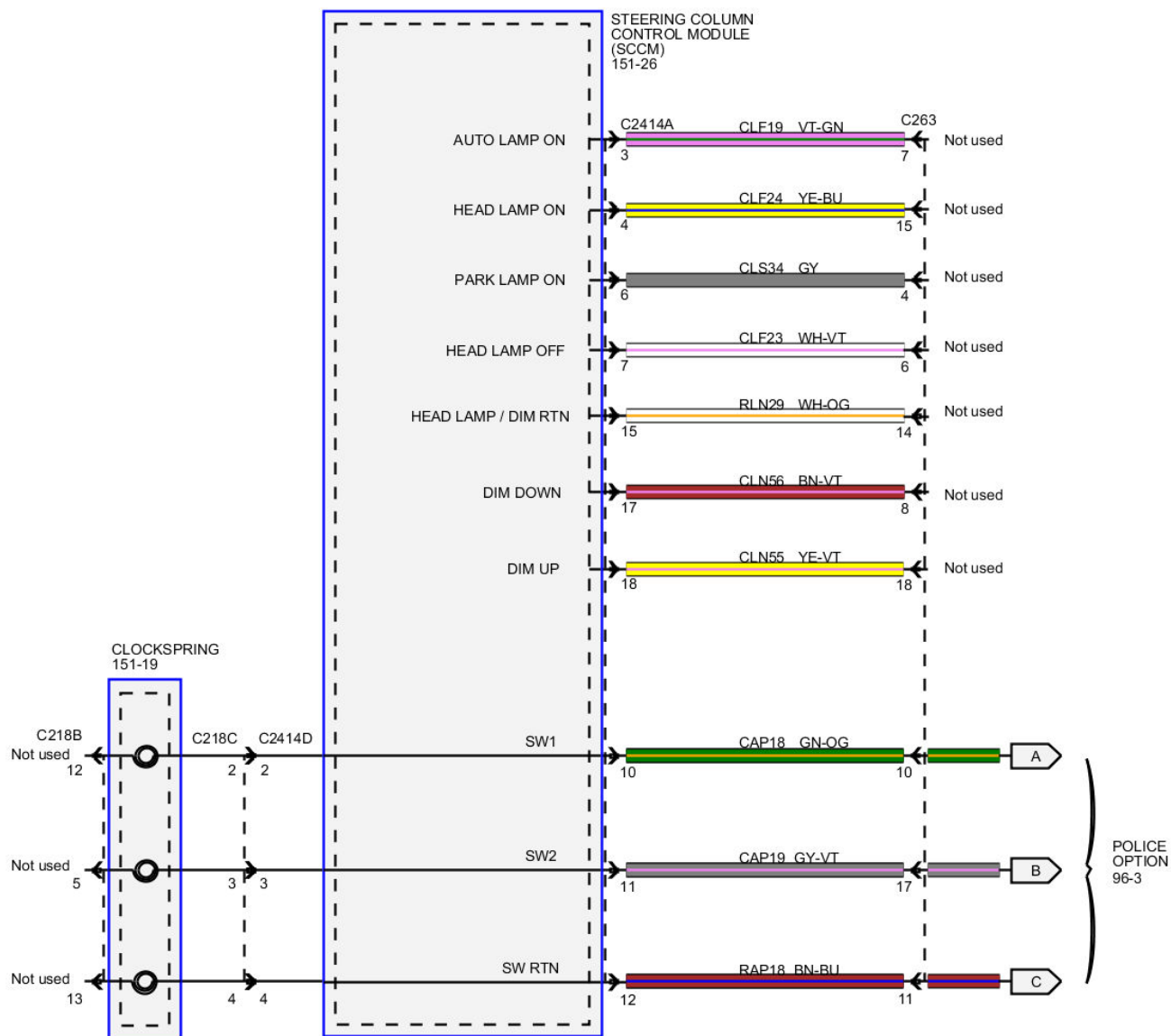
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Section 2: Electrical



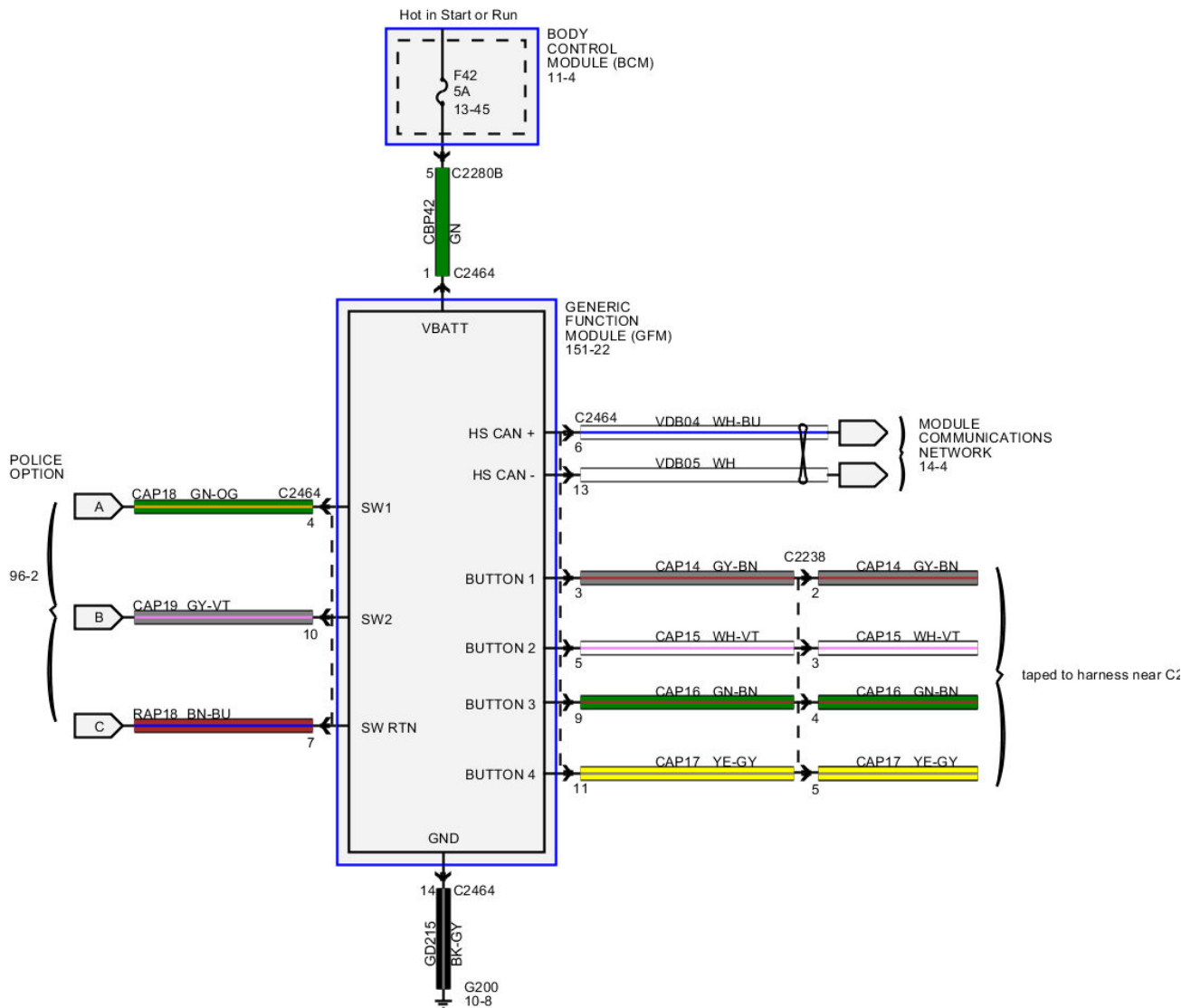
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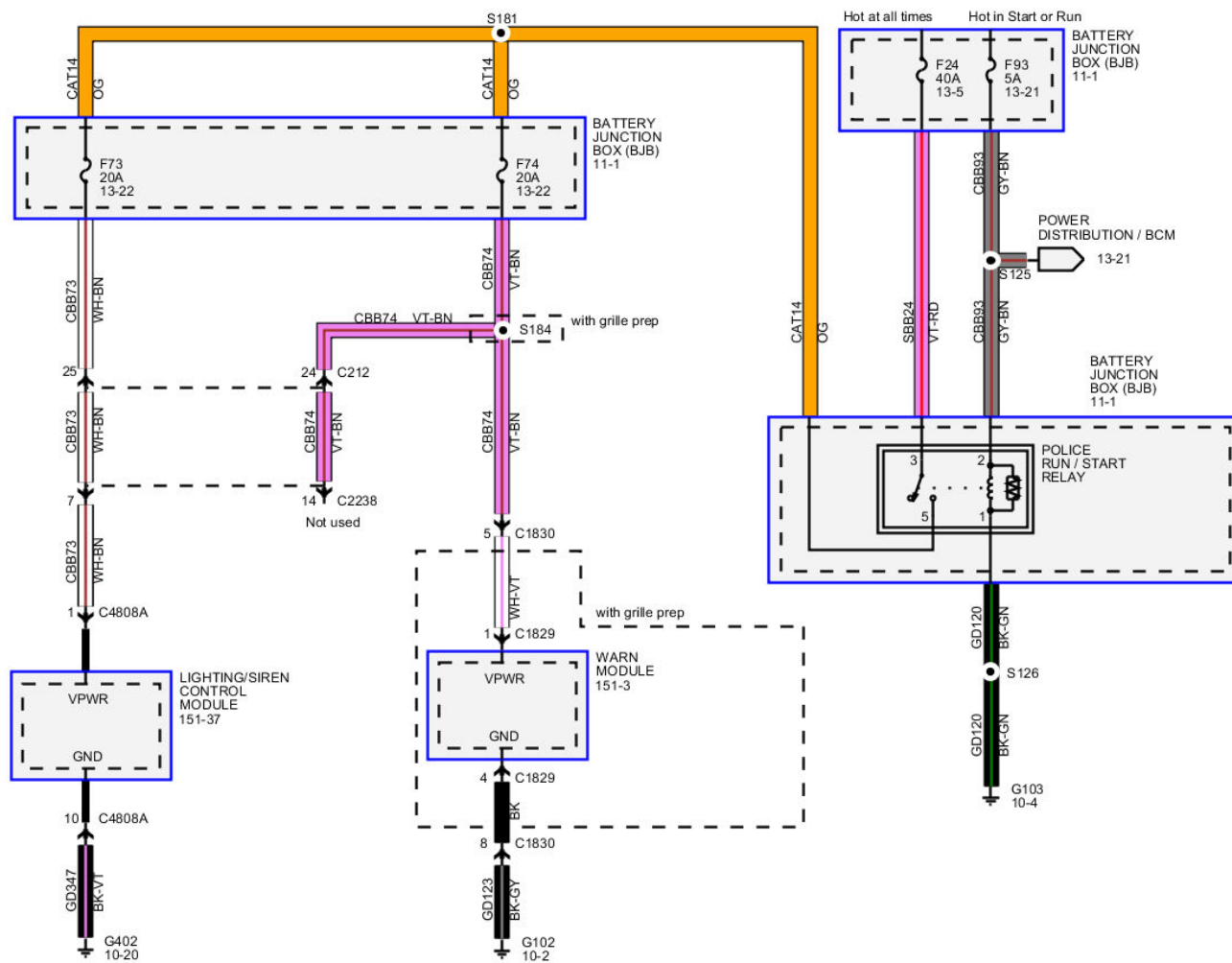
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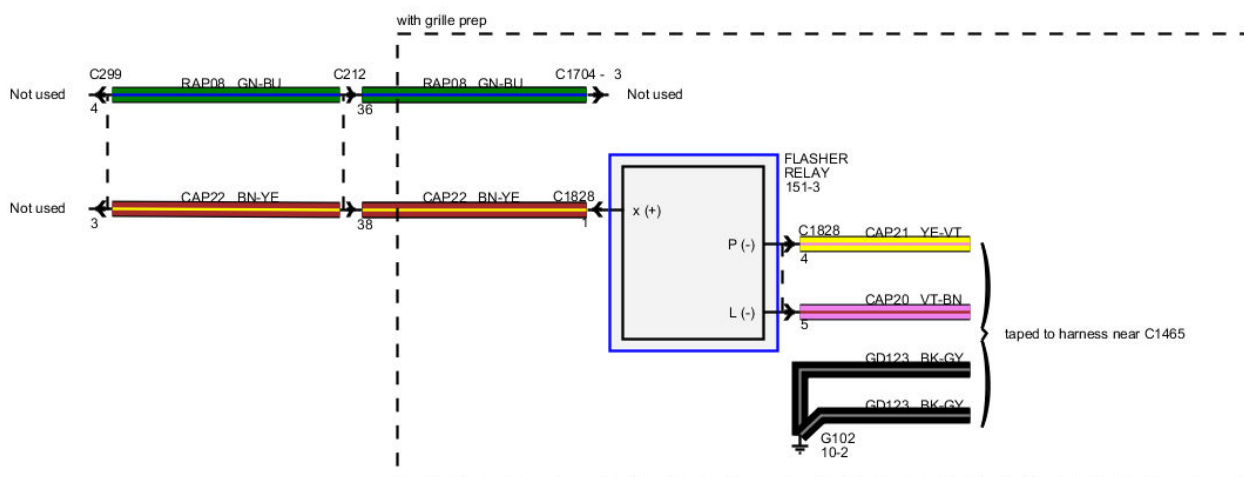
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Section 2: Electrical



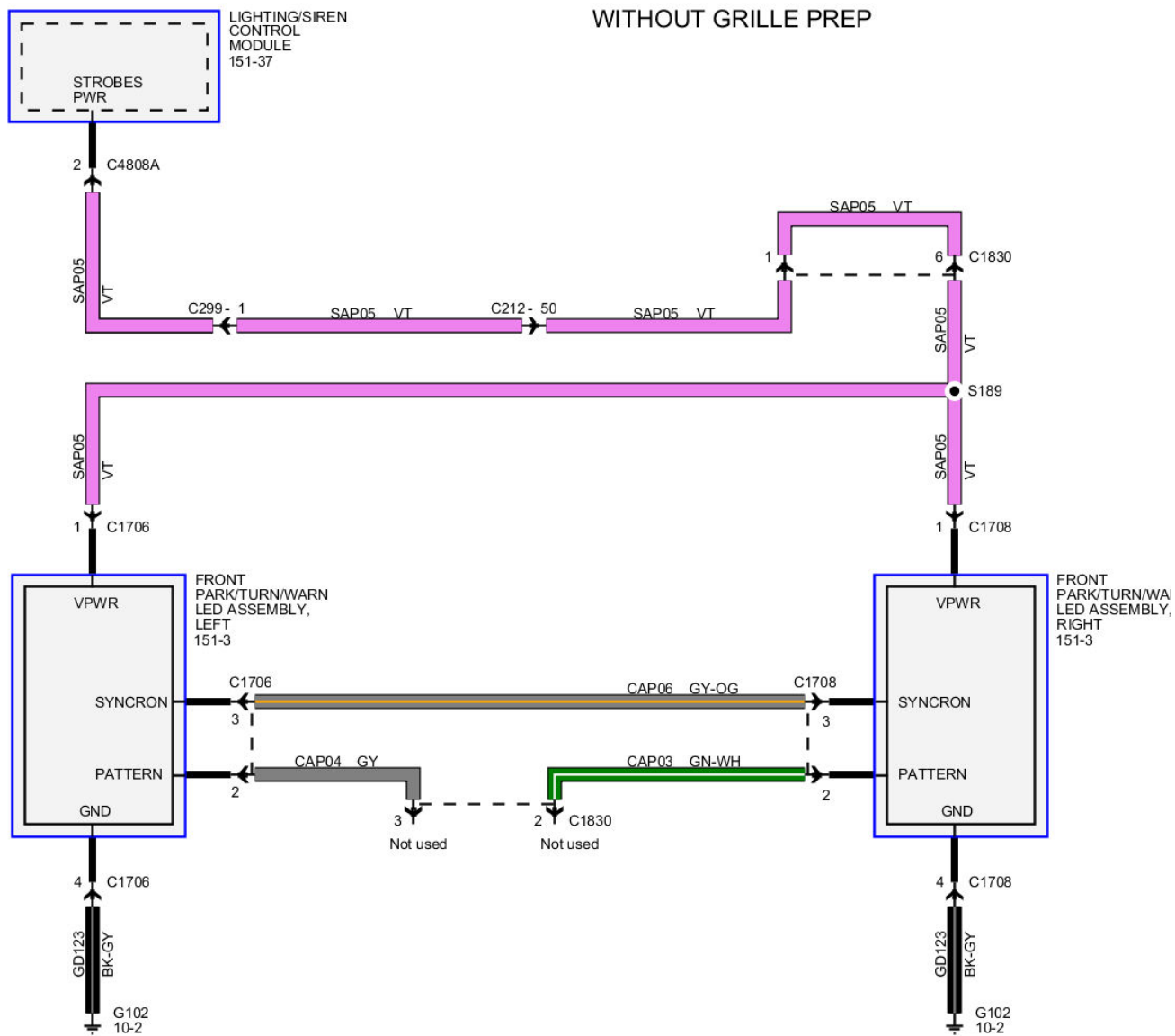
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Section 2: Electrical



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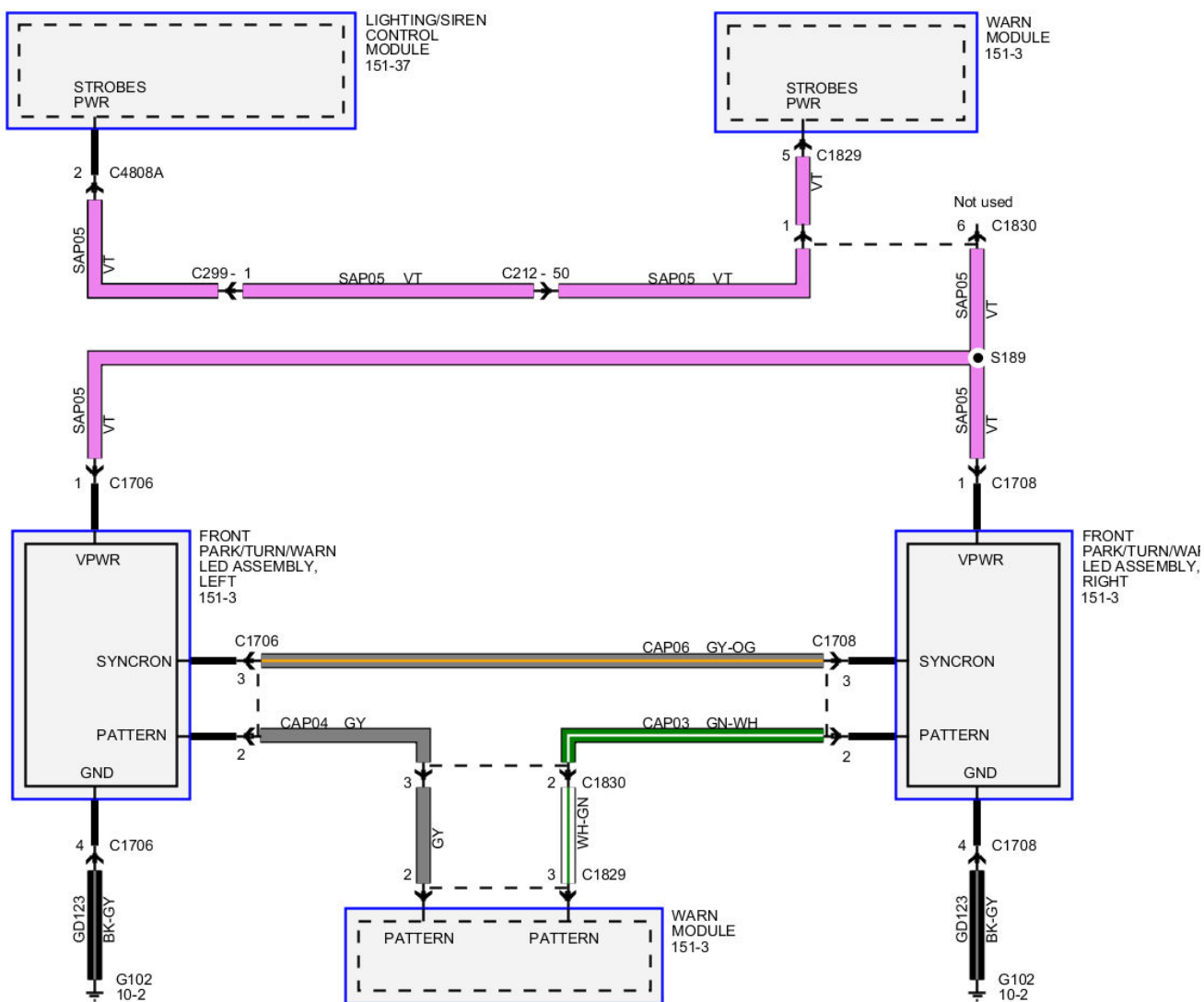
Section 2: Electrical



N0163428

Section 2: Electrical

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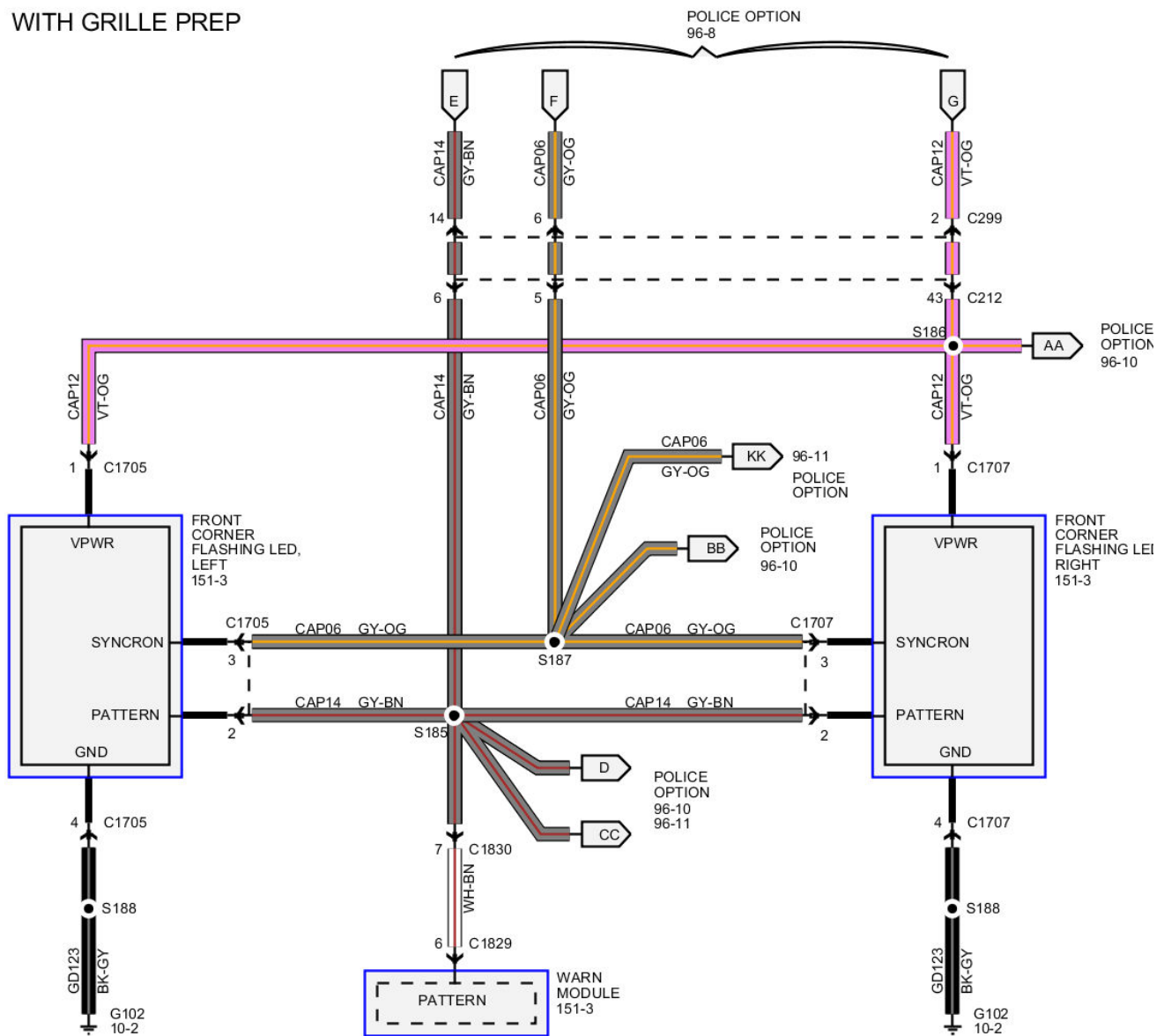
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Section 2: Electrical



Section 2: Electrical

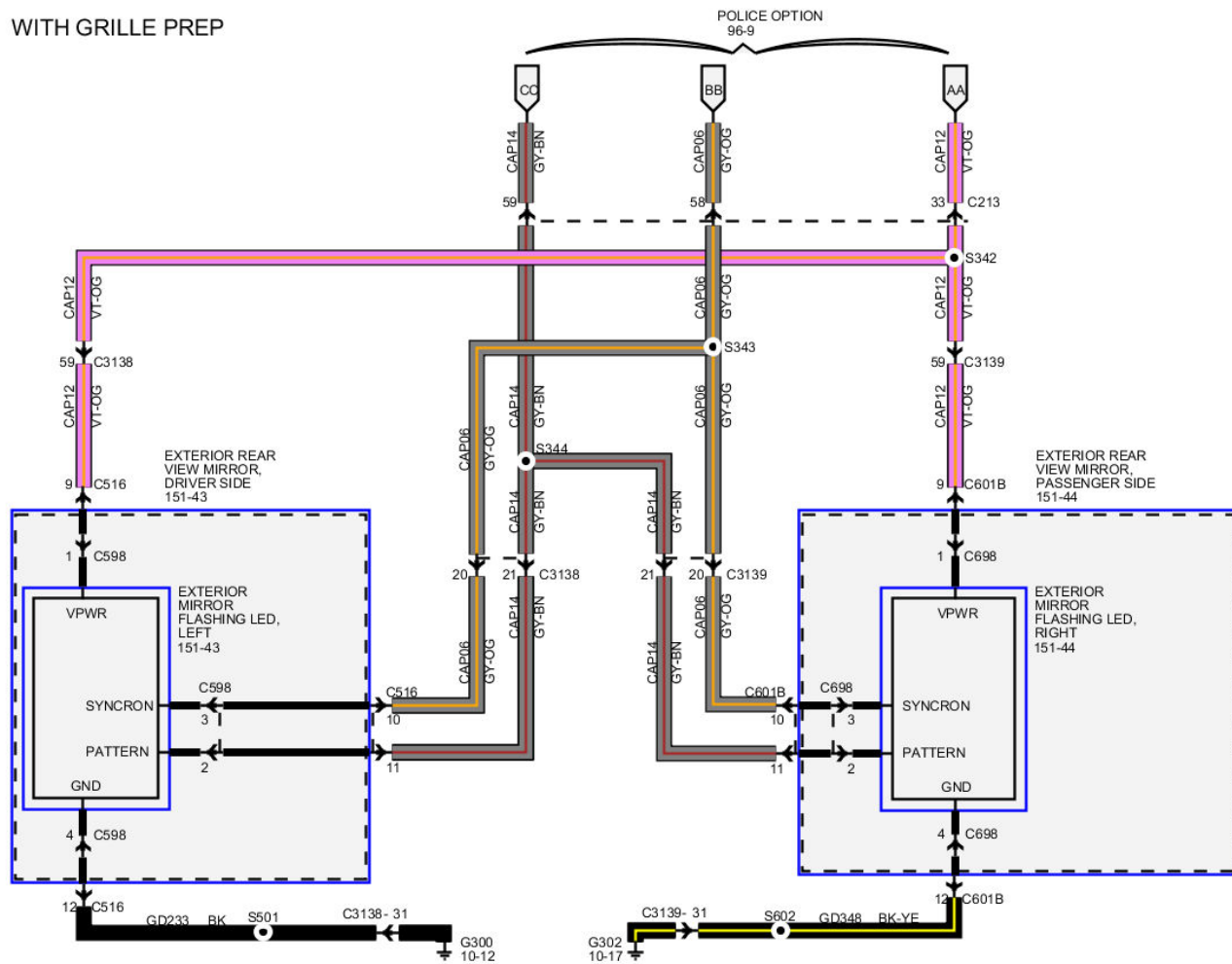
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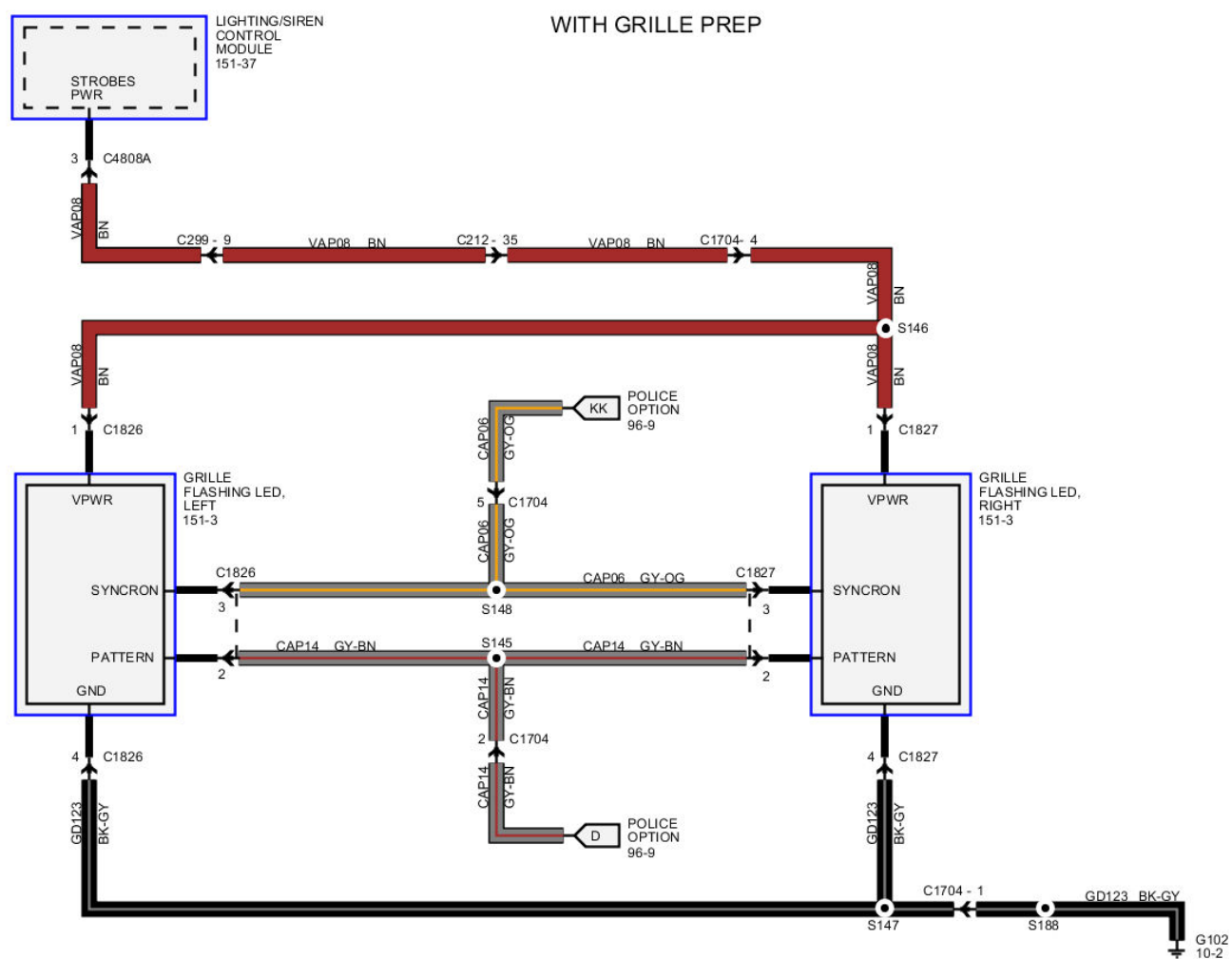
Section 2: Electrical

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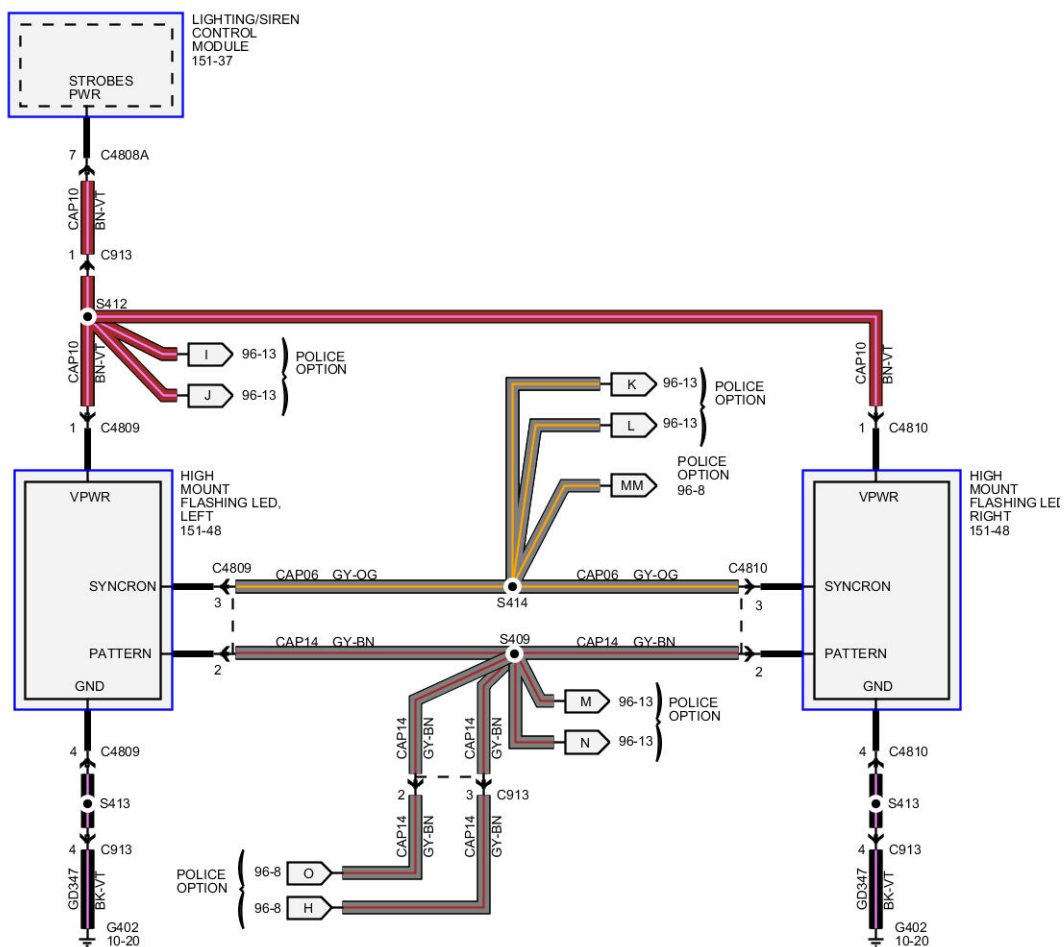
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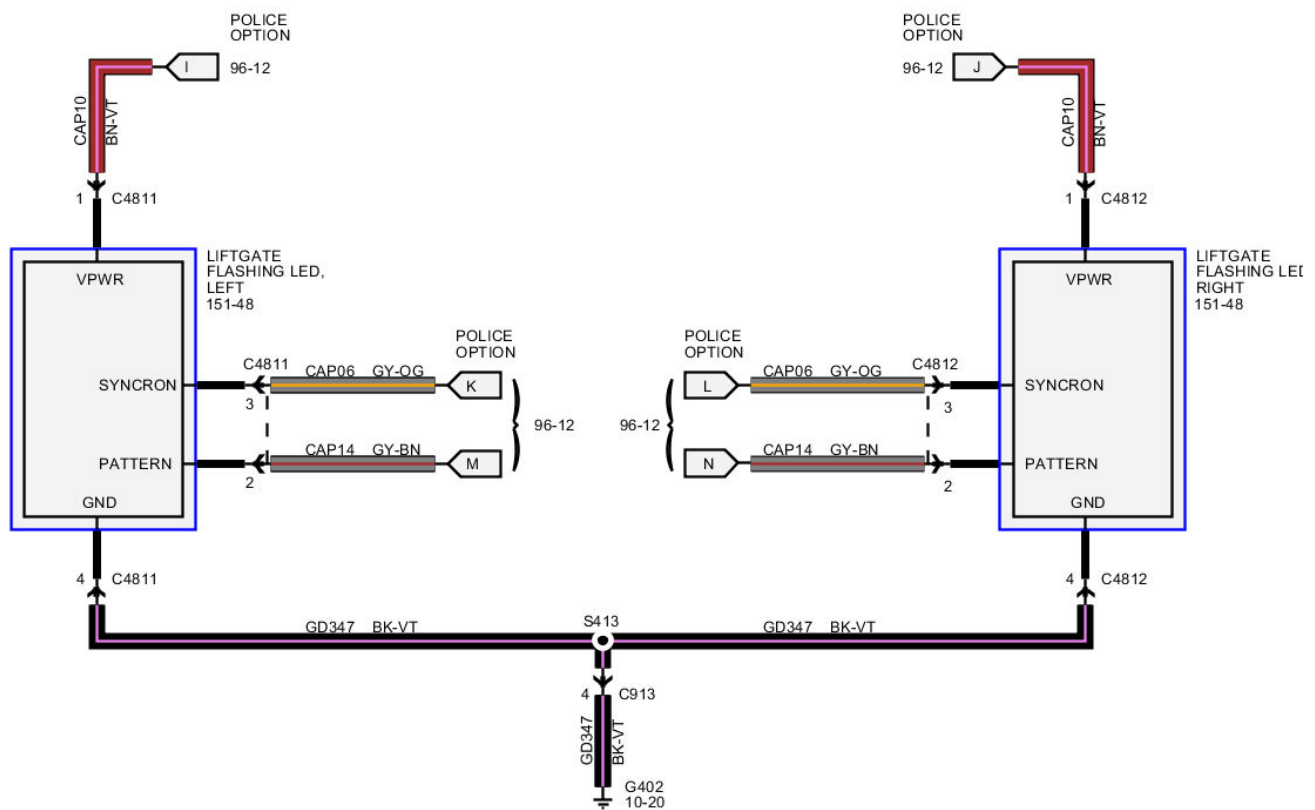
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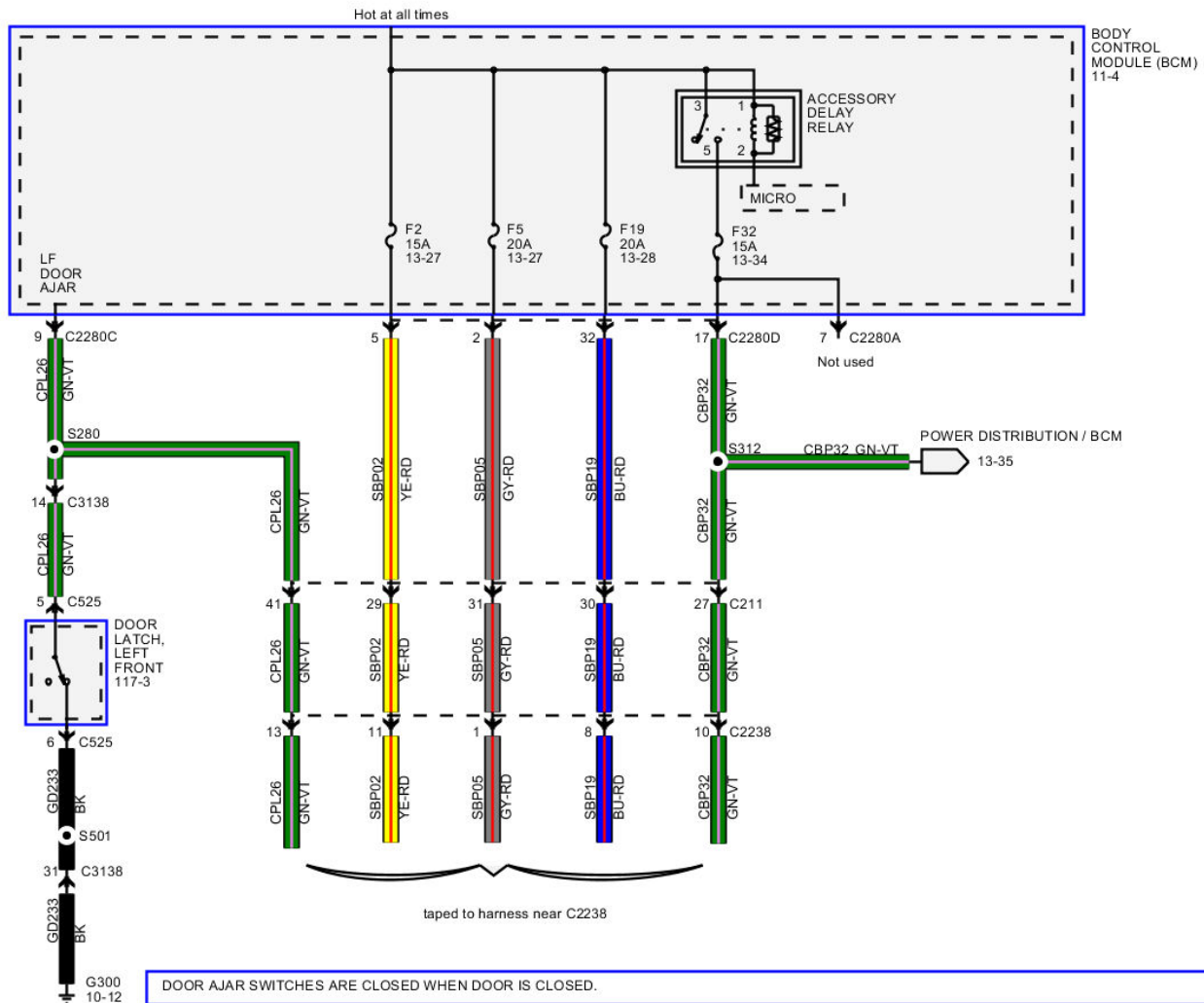
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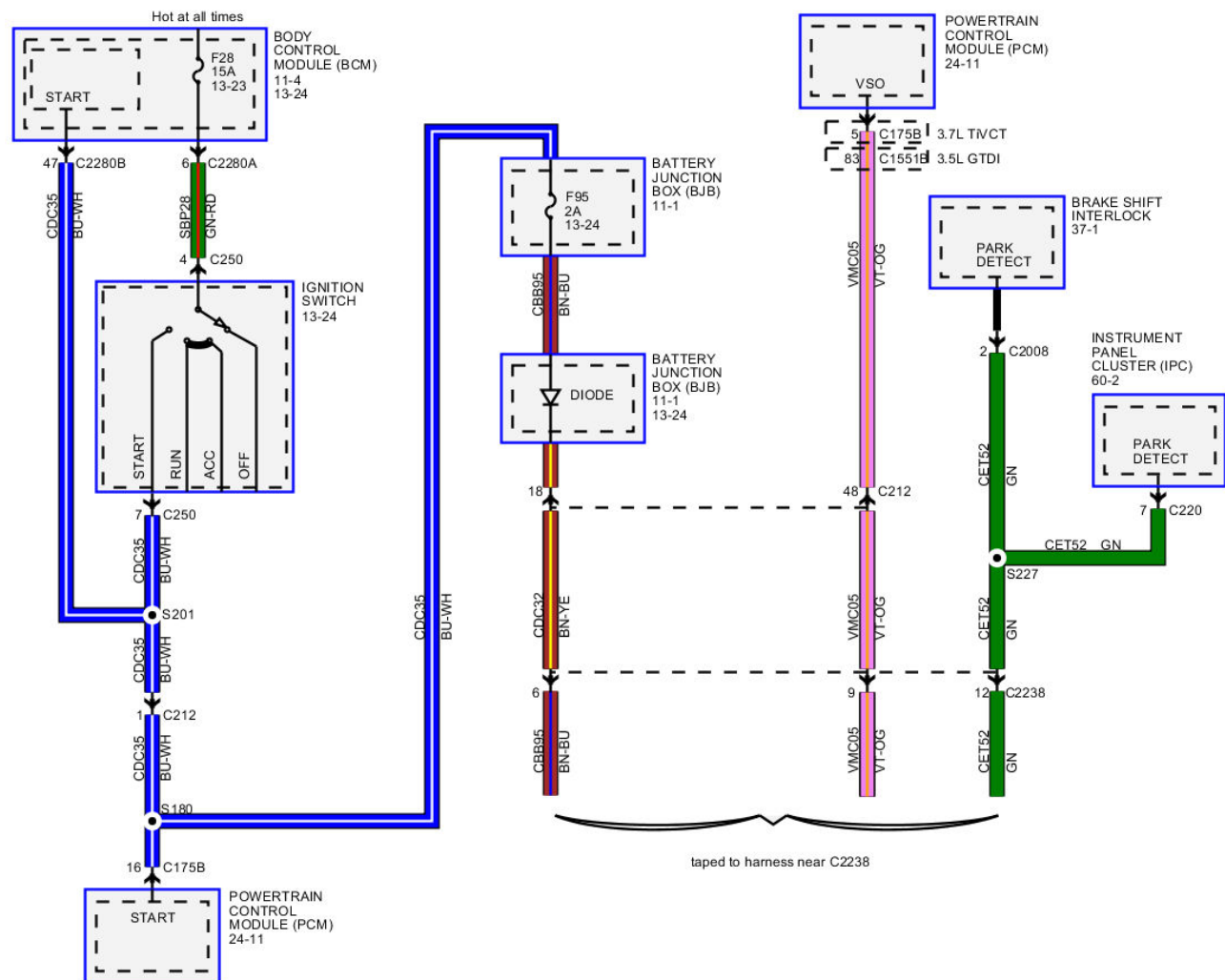
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Section 2: Electrical



N0163436

Section 2: Electrical

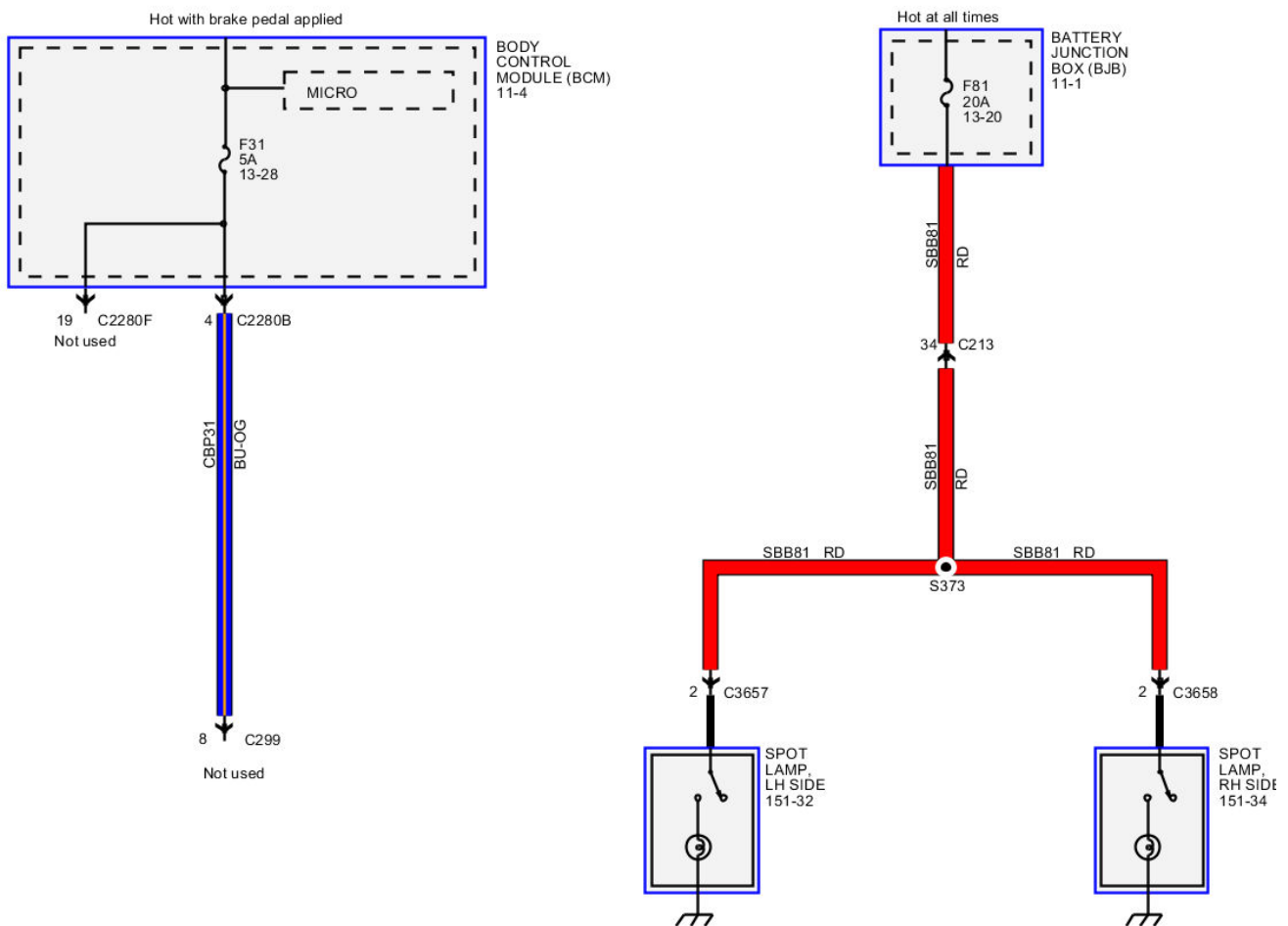


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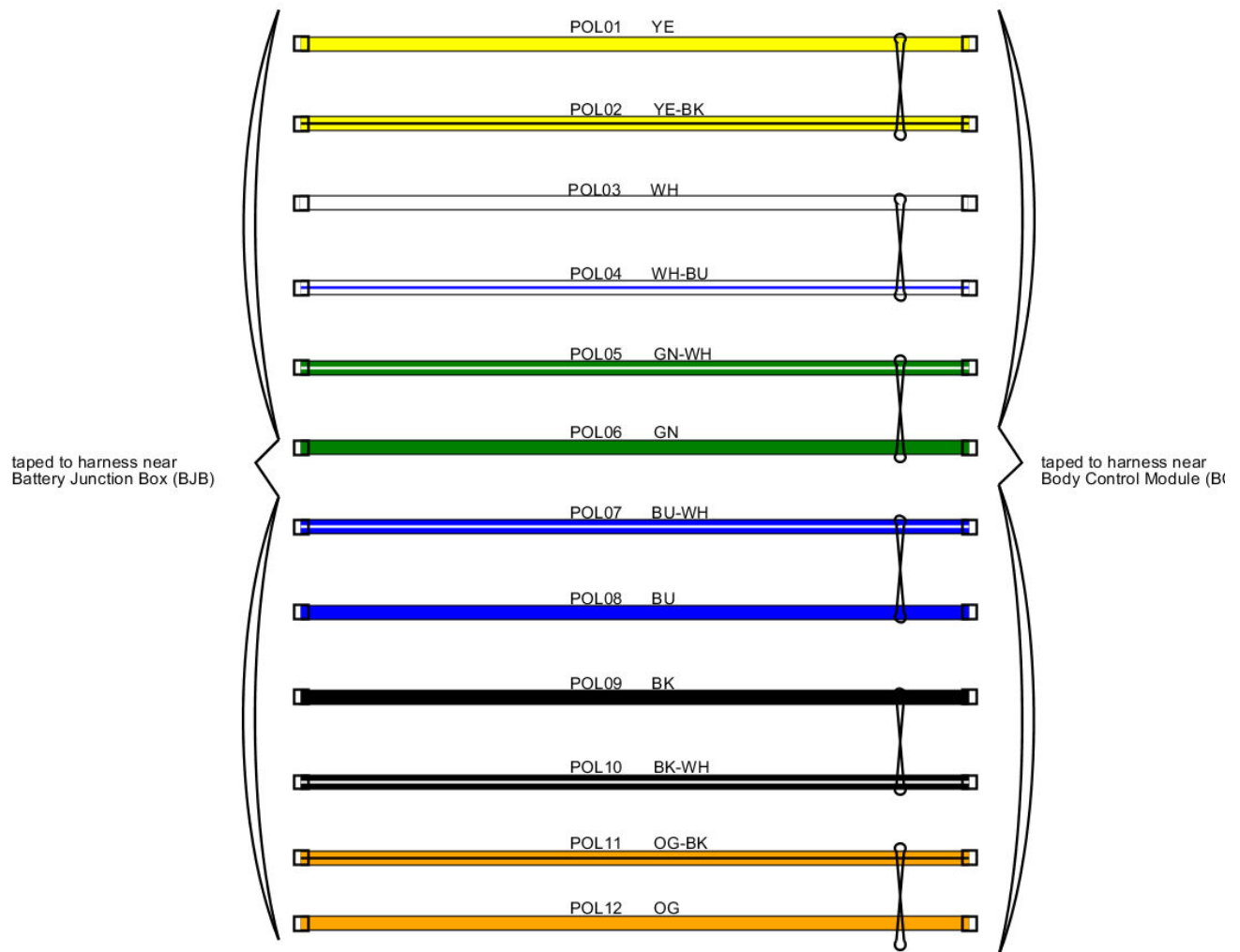


Section 2: Electrical



N0163439

Section 2: Electrical



N0163440