

# TRAILER LIGHTING CONVERTER INSTALLATION

## AUDI A3 (8P SPORTBACK), US MODEL, 2006+

The Audi A3 is part of a new generation in automotive electronics, which brings both a new ability to customize it easily as well as new issues to take into account when tapping into or modifying the electrical system.

With modern technology, everything in the A3 is handled through one of several onboard computer systems. Every switch and device (including light bulbs) is part of the Controller Area Network (CAN) which runs throughout the car. This means that many features can be modified by altering the settings of the CAN system computer. Changing these settings can be accomplished with a commercially-available software program and interface cable, and is something frequently done by Audi enthusiasts.



These instructions will guide you through installing a trailer lighting interface on the Audi A3's variable-voltage lighting system in a problem-free manner. No computer settings will need to be changed, and following these instructions ensures that if any of the settings are changed at a later date, the trailer interface will be unaffected.

Here's a comparison of "the old way" vs. how the A3's lighting system behaves:

*The old way:* There were separate bulbs (or separate filaments within a single bulb) for 'tail' and 'brake' lights. The difference in brightness between 'tail' and 'brake' was due to the wattage of the bulbs; they both received about 12 volts; and they were hard-wired to perform only whichever function they were intended for.

*How the A3 works:* In addition to dedicated turn signals and backup (reverse) lights, the Audi A3 has three bulbs on each side that can act as tail *and/or* brake *and/or* 'rear fog' lights. These bulbs are all of the same type, and only have one filament each. The computer applies reduced voltage to one or more bulbs on each side, making them glow at 24% of their maximum brightness to act as tail lights. Which bulbs are activated, and the percentage of brightness, are dependent on the settings in the car's computer. When you step on the brake pedal, the computer increases the tail light voltage to make the bulbs glow at 100% of their maximum brightness to act as brake lights. Again, which of the bulbs are affected is dependent on the computer settings. The behaviour can be changed by altering the computer settings, no re-wiring needed. A3's sold in other countries have the taillights configured differently to meet local regulations as necessary.

Unfortunately, this variable-voltage system does not work properly for US trailer wiring - trailer taillights expect to receive about 12 volts, not 3.5 volts - and the fact that the 'brake' and 'tail' lights on the car can be re-arranged in software means that those wires cannot be relied upon to always behave in the same way. There is a simple solution to this: Use things on the car that will always behave as desired. This means using the center, high-mount brake light on the car for 'brake', and using the license-plate lights for 'tail'. Both of these circuits only have 'off' and 'on' states (not variable-voltage), and both only have one purpose and cannot be re-programmed. The converter specified puts no load on the lighting circuits, they are only used for sensing the voltage present.

Enjoy towing safely with your Audi A3!

### STEP-BY-STEP INSTRUCTIONS

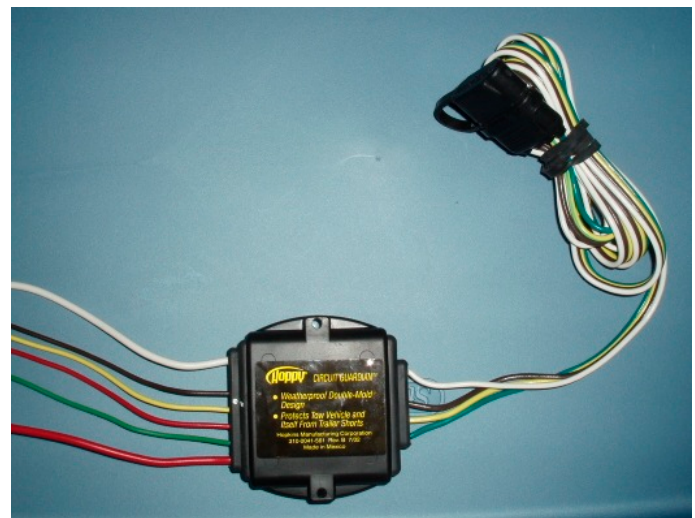


### ALL MATERIALS AND TOOLS LISTED



### COMPLETELY INVISIBLE WHEN INSTALLED





## WIRING CONVERTER

The converter used for the A3 is the **Hopkins Manufacturing (Hopyy) 46365**. This model is specified because:

1. It isolates the load of the trailer lighting from the vehicle lighting circuits. The connections to the wiring of the vehicle lights are for sensing voltage only. A separate, dedicated power source connection provides power for the trailer lights.
2. It protects the vehicle from short-circuits in the trailer lighting.
3. It will not interfere with the vehicle's 'bulb failure' diagnostics
4. It has been tested and found to work properly when installed as described in these instructions.

### The packaging includes:

- A length of red wire for +12V power
- Some small zip-ties
- A package of dielectric grease.
- 4 tap-splices (1 will be used for the power line; the other 3 will *not* be used - they are too large for the rest of the vehicle wiring connections)
- A screw (will not be used)
- An in-line fuse (will not be used)

The converter box itself has the trailer harness ribbon & 4-flat connector attached to one side, and 6 hookup wires on the other side:

- LARGER RED: +12V
- GREEN: Sense wire for Right Turn Signal
- SMALLER RED: Sense wire for Brake Light
- YELLOW: Sense wire for Left Turn Signal
- BROWN: Sense wire for Tail Lamp
- WHITE: Ground



## TOOLS & MATERIALS

All of the tools and materials listed below can be obtained at hardware or home-improvement stores.

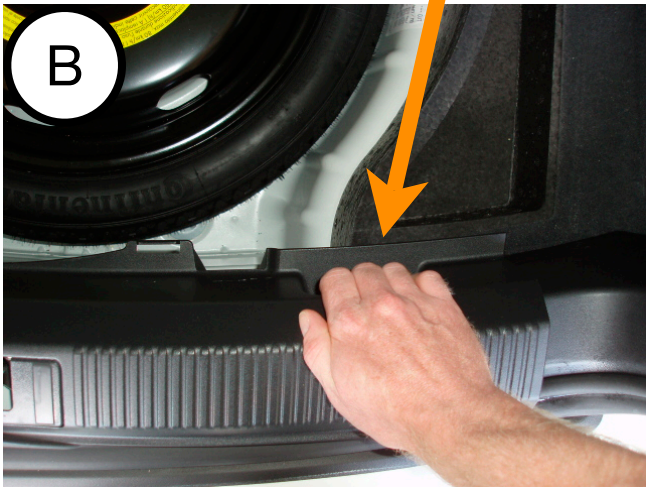
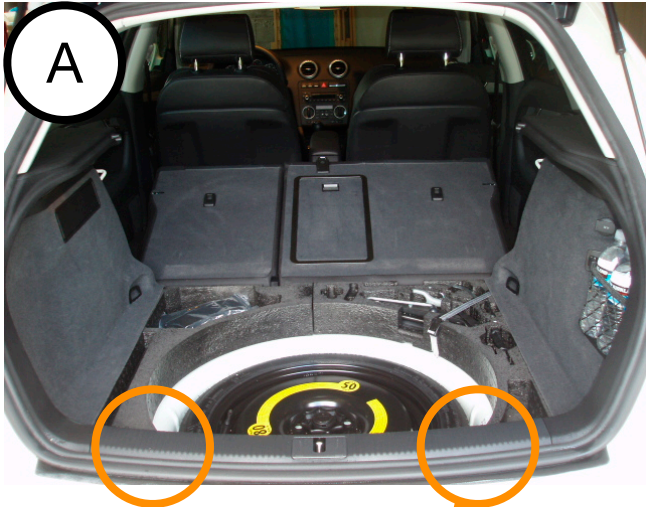
The use of a wire crimping tool for securing butt-splices is highly recommended. Using other tools to crimp a splice may result in poor connections or damage to the wire, splice or insulation.

A DC voltmeter is highly recommended for verifying that the correct voltage is being provided to the trailer lighting connector.



QUANTITY	TOOLS & MATERIALS NEEDED
	<i>THESE ITEMS ARE IN ADDITION TO THE MATERIALS SUPPLIED IN THE HOPKINS 46365 CONVERTER PACKAGING</i>
1 Roll	18 gauge primary wire (green)
4	18-22 gauge tap splices (no larger, since the vehicle wiring is very small gauge)
1	18-22 gauge butt splices
1 Tube	Goop™ brand clear silicone adhesive/sealant
1 Roll	Electrical tape
1 Package	Standard-size (e.g. 7") zip-ties
1 Package	Mini zip-ties
1	Torx T-25 driver
1	Pliers
1	10mm socket & driver (deep socket recommended)
1	Wire crimp/cut tool
1	Razor blade or sharp knife
1	12V test light, and/or voltmeter (recommended)





## PREPARING THE CARGO AREA

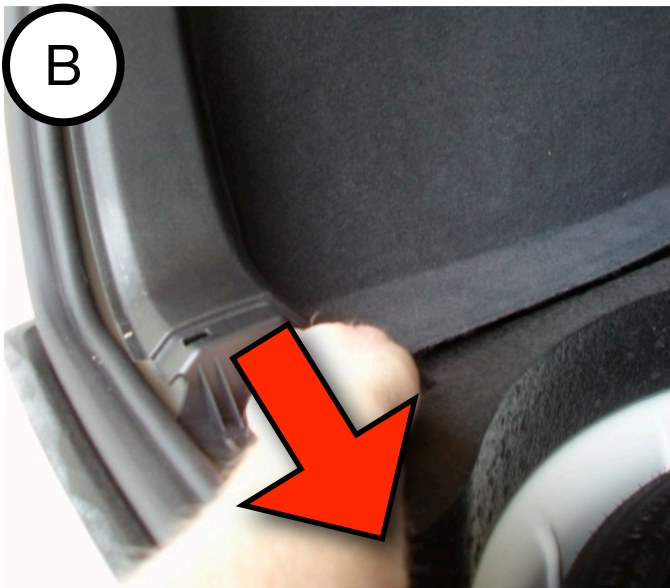
- Open the rear hatch
- Remove the cargo area cover (shelf)
- Remove the cargo net (if present) & any rubber cargo liner (if present)
- Fold down both rear seatbacks
- Remove the carpeted floor panel which covers the spare

The crosspanel (black plastic trim) along the edge of the hatch opening must be removed. Figures 'A' and 'B' above indicate the locations to grasp::

- Grasp it above the cargo net hooks as shown in 'B' above, and pull straight upward. Four clips will pop out of their spots loudly as it comes up.
- Pull evenly on both left and right sides at once, not at an angle.

Note how the gasket originally overlaps the crosspanel, and the crosspanel pulls out from under it. When the crosspanel is reinstalled later, the gasket will need to be returned to its original position overlapping, not pinched by, the crosspanel.

Figure 'C' above shows the cargo area with the crosspanel removed. The painted metal that is now visible is a hollow channel. As part of this installation, 2 wires will be run across from the left to the right side (for right turn signal sense, and +12V) through this channel.



## LEFT SIDE: OPENING THE INTERIOR SIDE PANELS

### READ THIS ENTIRE STEP BEFORE PROCEEDING:

- Use a T-25 driver to remove the torx screw from the left side panel as shown in Figure 'A'. (Also remove the corresponding torx screw from the right side panel at this time.) Label these, and set them aside.
- Grasp the lower rigid part of the left side panel as shown, and pull outward (towards the right side of the car) as shown in Figure 'B'. This will pop out the clips holding it in, and begin to peel it from behind the hatch gasket.
- **IMPORTANT:** See Figure 'C' above. As you loosen and pull out the side panel, there are some clips along the top where it meets the upholstery. Be careful loosening these. Once those

clips are loosened, the short wiring harness going to the cargo area light will be visible.

- **IMPORTANT:** See Figure 'D' above. Carefully press on the clips to pop the cargo area light outward (from behind), then feed it through the opening so that the wiring is no longer limiting the movement of the side panel. (This is easier than trying to unplug the electrical connector from the light while the light is still in place.)

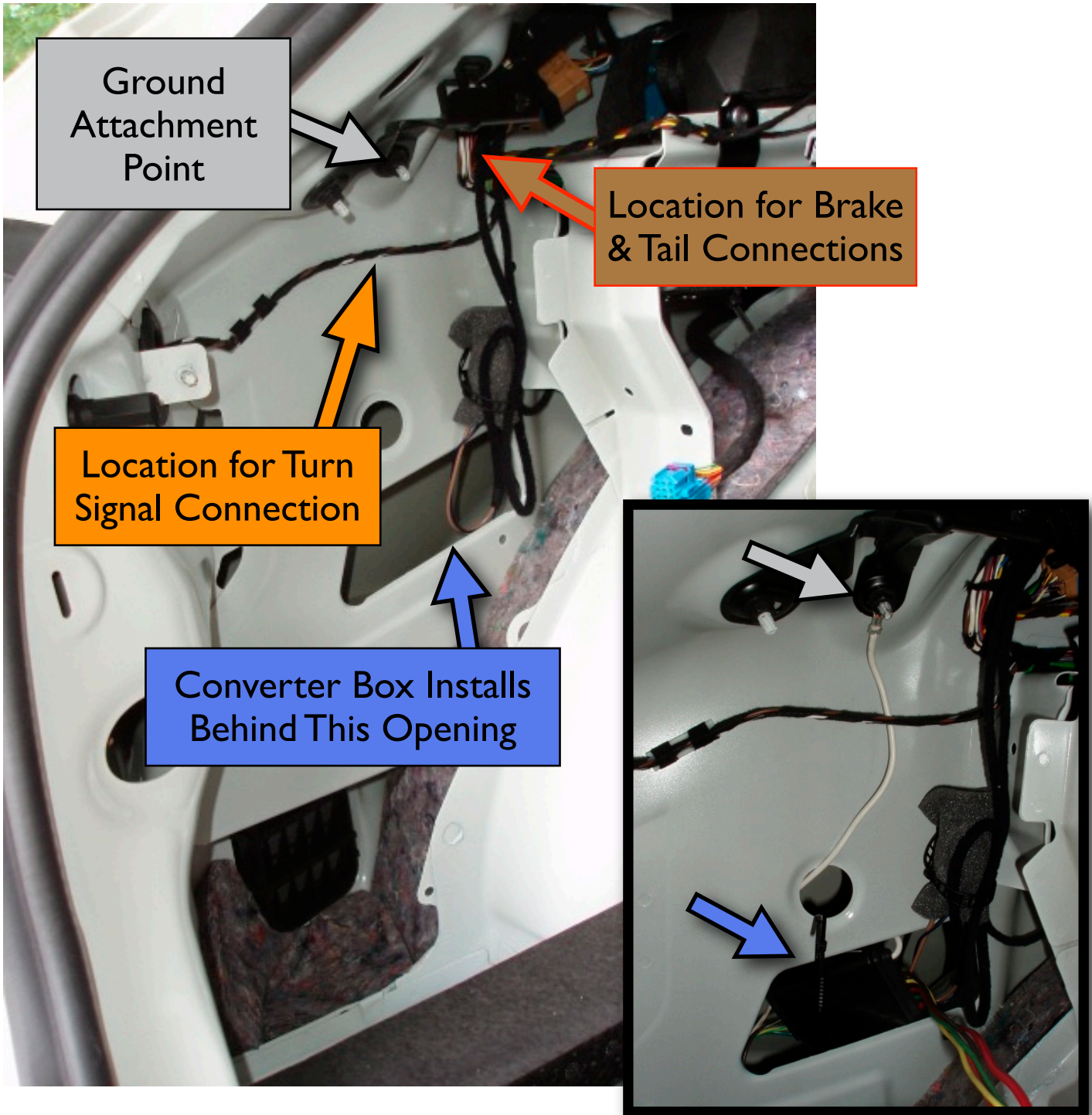
The side panels will not be completely removed, just opened enough to reach the installation areas.





## LEFT SIDE: SUBWOOFER REMOVAL

- Do not remove the entire side panel. Carefully pull it out as shown and leave the front part of it still attached to the car. This provides sufficient working space.
- The subwoofer will be removed next. There are three total fasteners holding it in - two nuts and one bolt. Remove all of them using a 10mm socket, label them, and set them aside.
- Unplug the wiring harness (blue plug) from the subwoofer (see inset photo above). The subwoofer can now be lifted out and set aside.



## LEFT SIDE: OVERVIEW

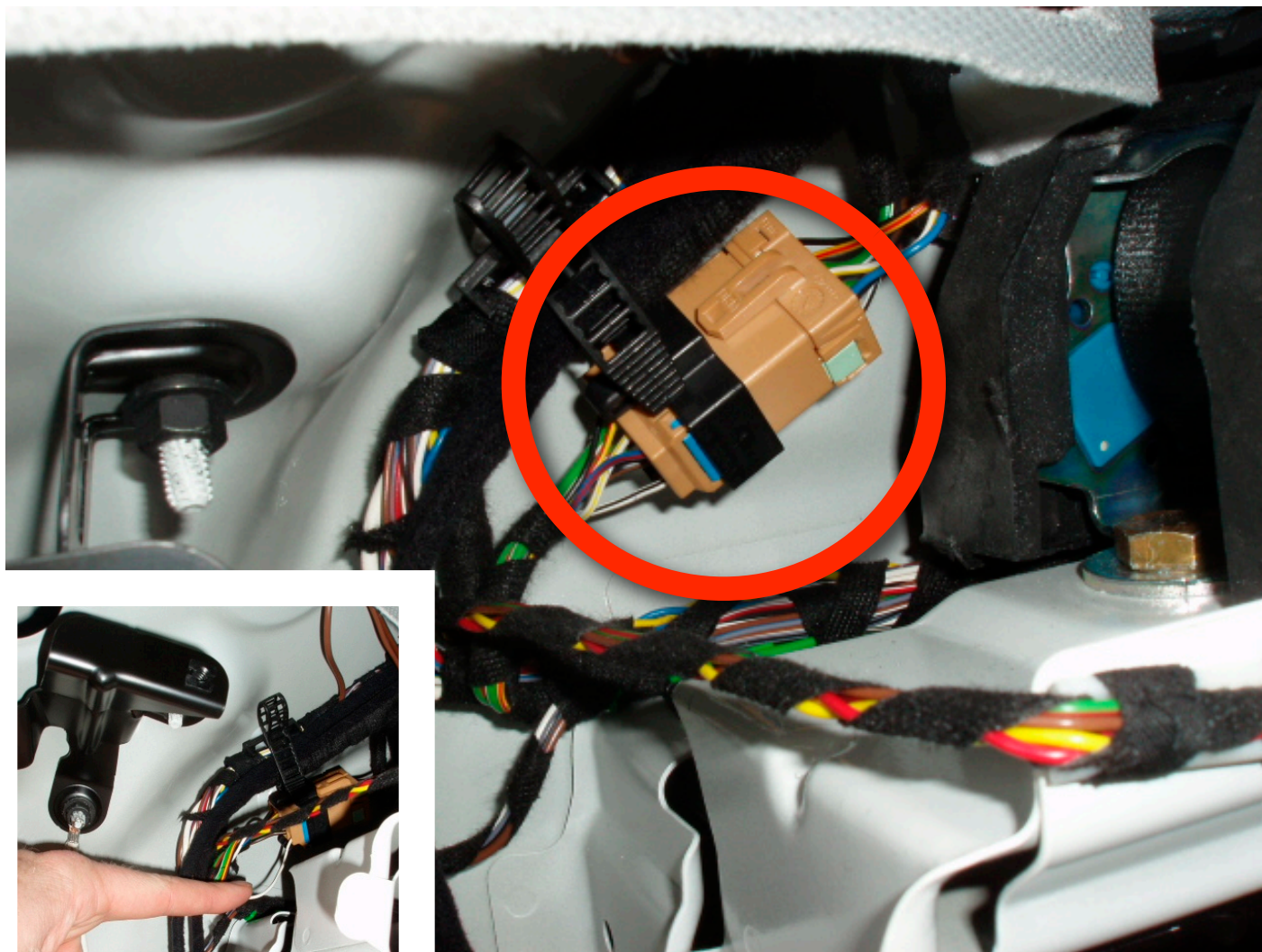
- The photo above shows the left side with the subwoofer removed. There is sufficient space between the outside skin of the fender and the structural support panel behind the subwoofer that can be used for the converter box. **Do not encroach on the space used by the subwoofer.**
- Note the locations of the bolt which will be used for the grounding wire, and the

working locations where taps into the vehicle harness will occur.

- Place the converter box behind the structural panel as shown in the inset photo, and secure loosely with 1 or 2 zip-ties. It will be tightened down later, but some slack is helpful for now.
- The WHITE wire from the converter box (negative ground) is run through the round opening as shown in the inset

photo above up to a bolt where it is attached using the round lug connector already present on the wire. Use a socket to remove & replace the nut when attaching the ground wire lug connector. Wrap the wire with electrical tape where it passes through the opening to prevent chafing.





## LEFT SIDE: BRAKE & TAIL CONNECTION (1 OF 2)

Locate this connector on the left side of the vehicle. This BROWN 8-pin connector (designated 'T8B' in the service manual) is where the wire that will be used for the brake sense is located.

It will be a WHITE WITH BLACK wire located at PIN 4 of the connector.

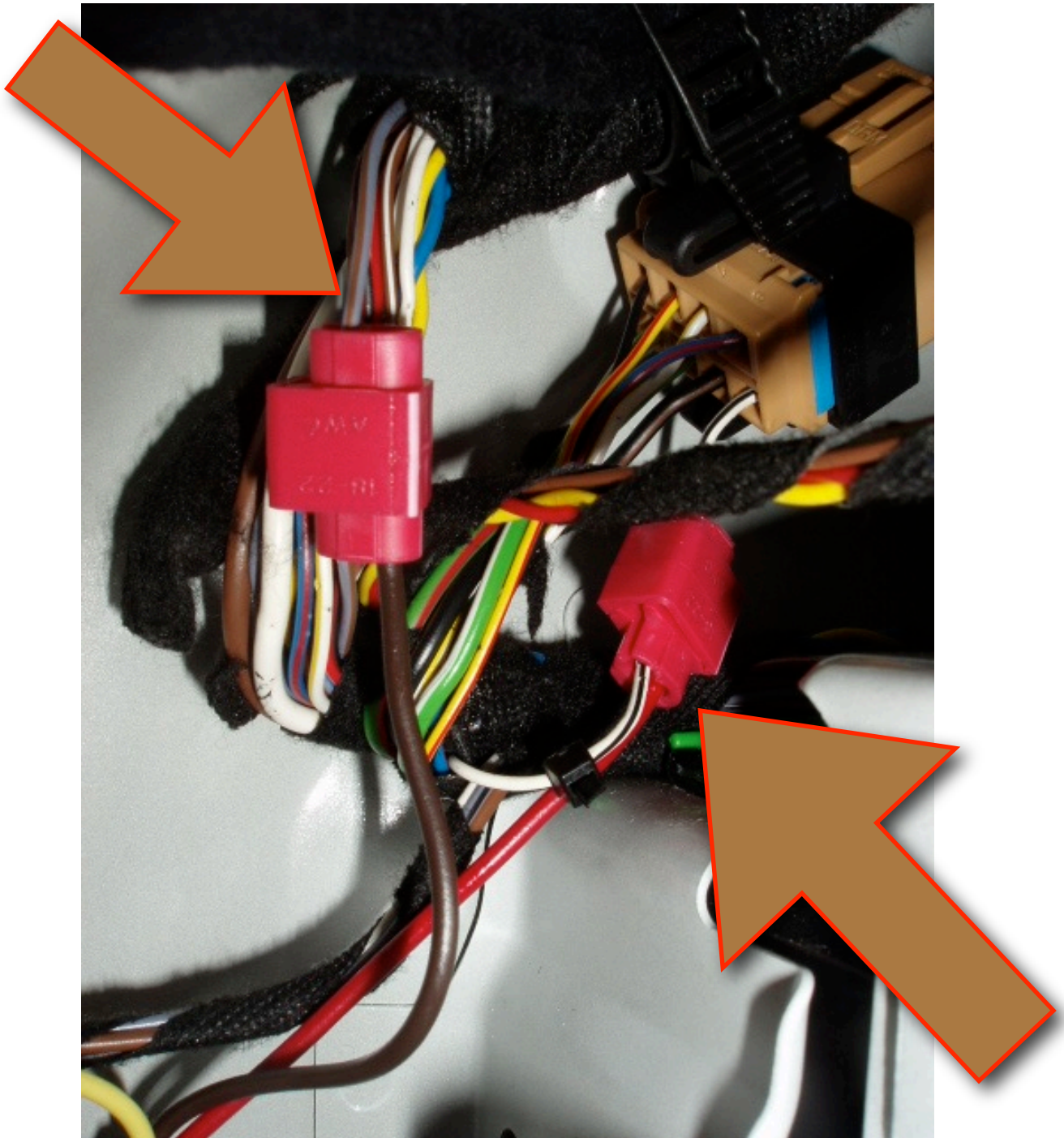
- Cut the fabric wire wrap and separate out the WHITE WITH BLACK wire from the bundle (see inset photo above).
- Do not cut the wire.
- Use a voltmeter or test light to verify that this wire receives +11V or more when the brake pedal is depressed.

This is the wire that runs to the centre high-mount stop light (CHMSL) - the

brake light at the top of the hatch. This is the only brake light on the A3 that is *not* programmable, *not* variable-voltage, and has only 'off' and 'full-voltage-on' states. It is therefore suitable to use for this connection.

**Continued on next page...**





## LEFT SIDE: BRAKE & TAIL CONNECTIONS (2 OF 2)

- Using an 18-22 gauge tap-splice, attach the SMALLER RED wire from the converter to the WHITE WITH BLACK wire as shown. Zip-tie the wires together securely as shown for strain relief. This completes the 'brake light' connection.

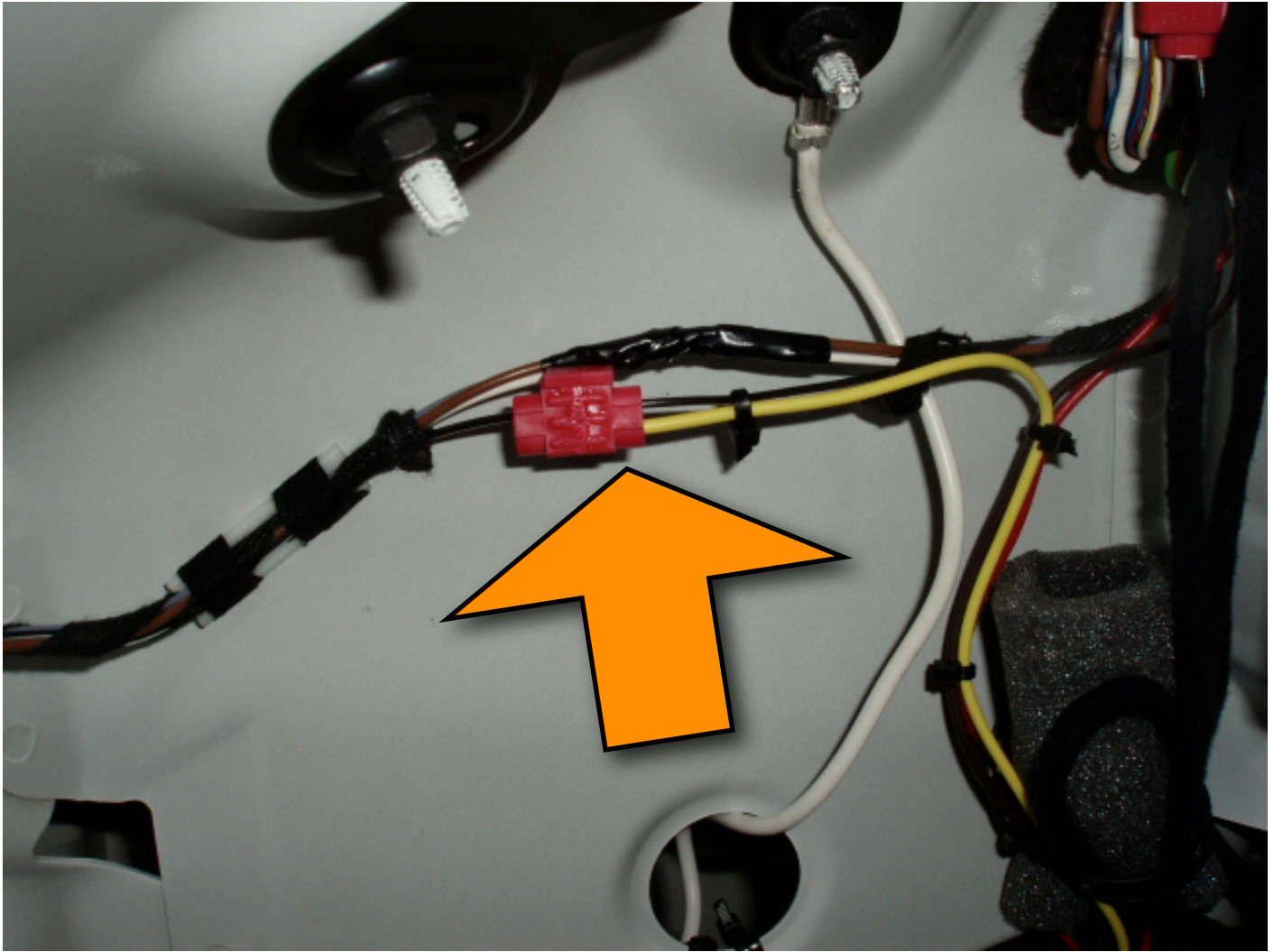
Next, look in the **adjacent** wiring bundle for the GREY WITH BROWN wire in the bundle that goes up the D-pillar of the car.

- Cut the fabric wire wrap, and locate and separate out the GREY WITH BROWN wire from the bundle.
- Do not cut the wire.
- Use a voltmeter or test light to verify that this wire receives +11V or more when the parking lights are turned on.

This is the wire that runs to the licence plate lights. This is the only tail light on

the A3 that is *not* programmable, *not* variable-voltage, and has only 'off' and 'full-voltage-on' states. It is therefore suitable to use for this connection.

- Using an 18-22 gauge tap-splice, attach the BROWN wire from the converter to the GREY WITH BROWN vehicle wire as shown. Zip-tie the wires together securely as shown for strain relief. This completes the 'tail light' connection.



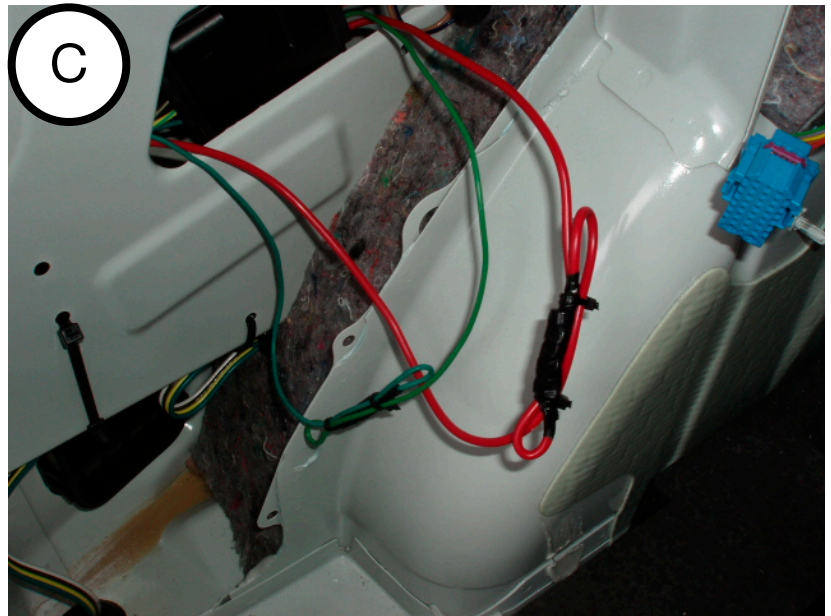
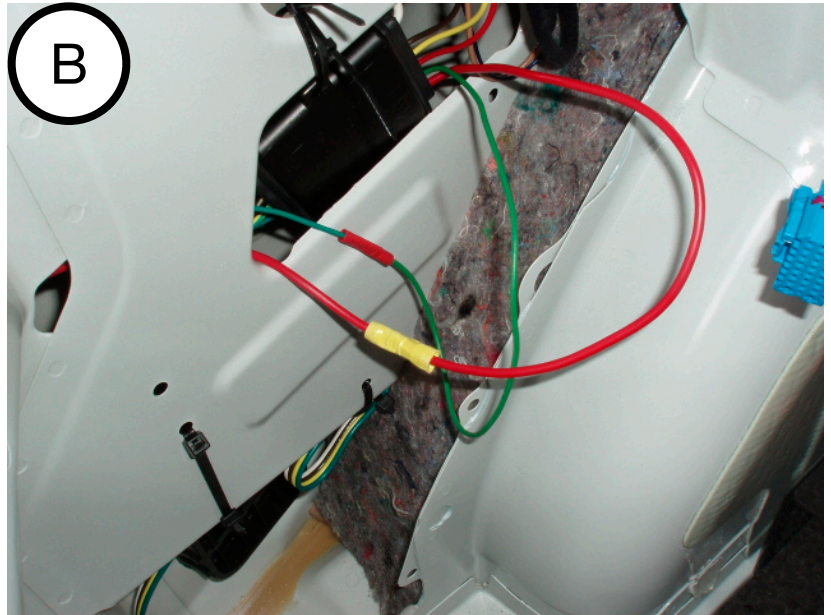
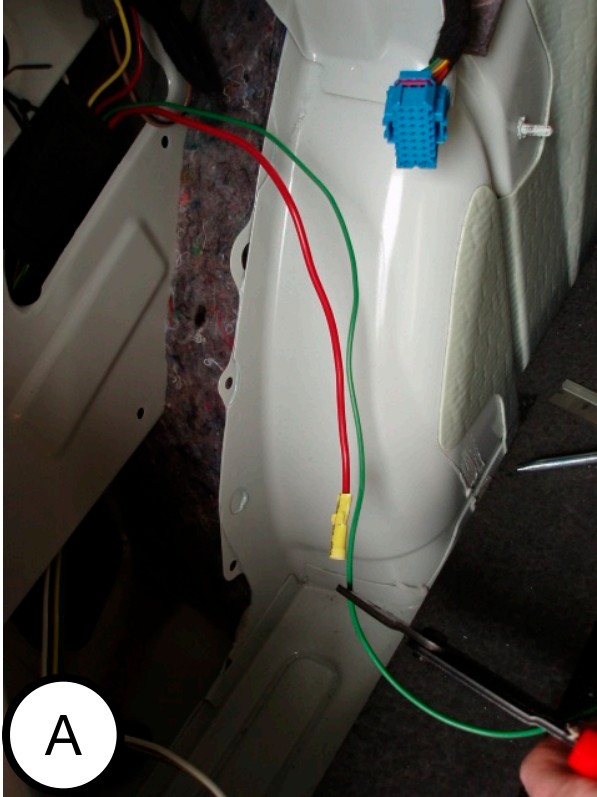
## LEFT SIDE: TURN SIGNAL CONNECTION

Locate the small bundle of wires going along the panel towards the taillight as shown.

relief. This completes the left turn signal connection.

- Cut the fabric wire wrap.
- Locate and separate out the BLACK WITH WHITE wire.
- Do not cut the wire.
- Use a voltmeter or test light to verify that this wire receives voltage concurrent with the left turn signal being on. You can also visually trace this wire to the left outboard taillamp assembly, where it should terminate in Pin 3 of the left outboard taillamp assembly connector.
- Using an 18-22 gauge tap-splice, attach the YELLOW wire from the converter to the BLACK WITH WHITE vehicle wire as shown. Zip-tie the wires together securely as shown for strain





## LEFT SIDE: EXTENDING POWER & RIGHT TURN SIGNAL WIRES

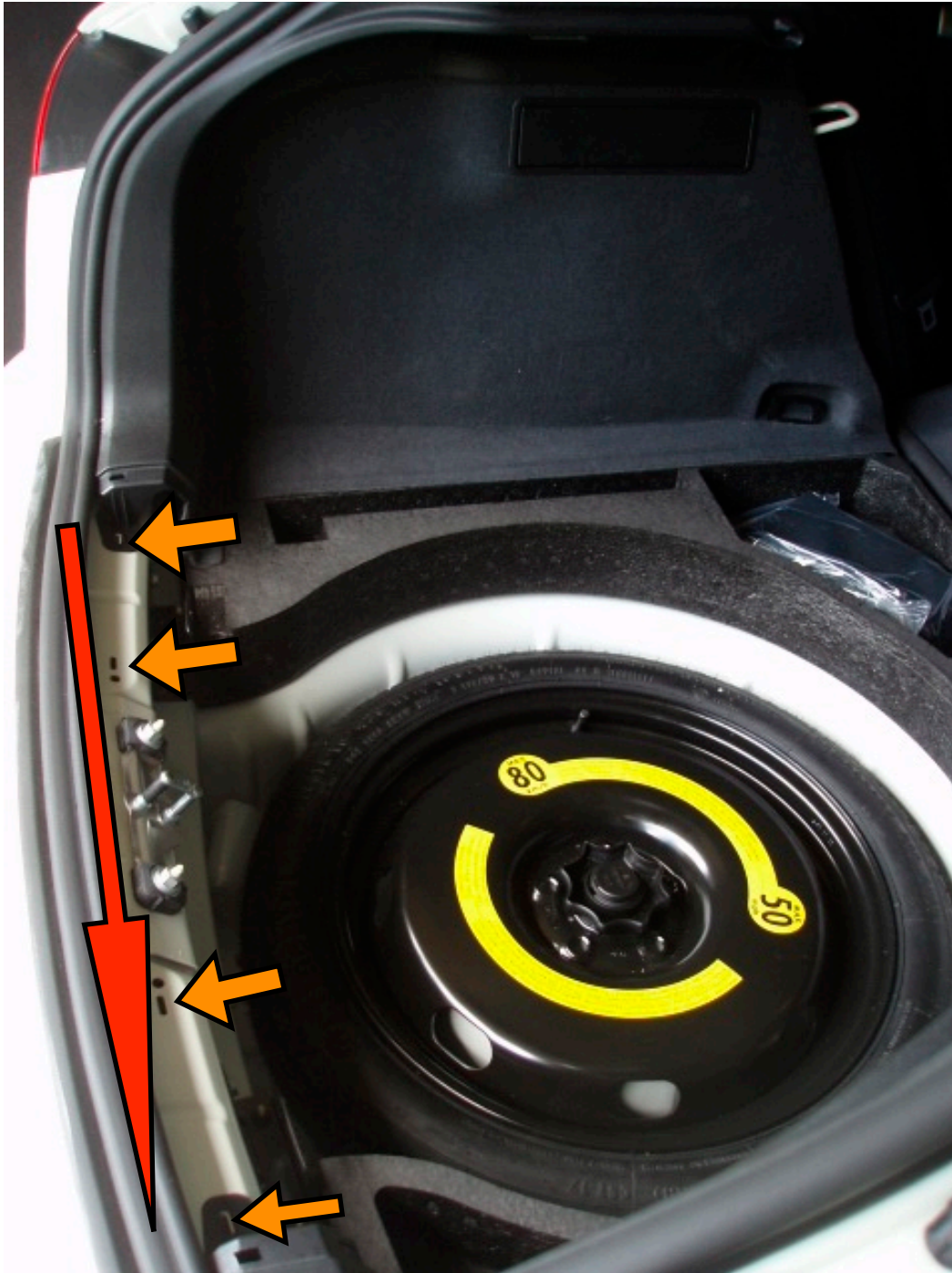
The LARGER RED wire from the converter is for +12V power to the trailer lights, and the GREEN wire from the converter is for the right turn signal. The LARGER RED power wire is fairly short, with a butt-splice already crimped onto it. The GREEN turn signal wire is not long enough to reach to the right side of the vehicle and will have to be extended. Since they will be routed together through a location that will be hidden and not easily accessible for any future maintenance, the GREEN wire splice should be made near the converter box at the

same length as the LARGER RED wire splice.

- The GREEN wire will be clipped to the same length as the LARGER RED power wire. **See Figure 'A' above.**
- Using the already-present butt-splice on the RED power wire, attach the length of red 14 gauge wire that was supplied in the converter package. **See Figure 'B' above.**
- Using an 18-22 gauge butt splice, attach a corresponding length of 18-gauge green hookup wire to the short-

ened GREEN wire from the converter. **See Figure 'B' above.**

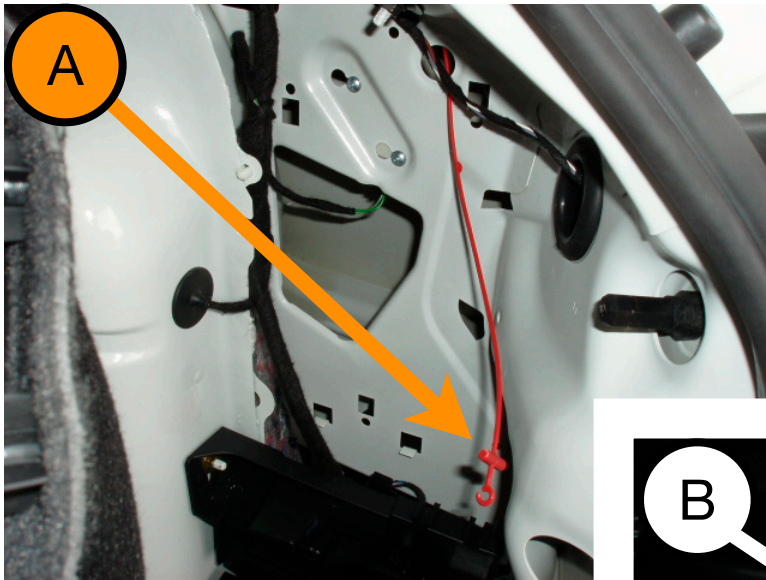
- Seal the splices with electrical tape, coil up some excess wire (in case adjustments are needed in future), and secure with zip-ties. **See Figure 'C' above.** Place all the wiring behind the structural panel so that it will not interfere with the subwoofer once it is reinstalled. Secure the RED and GREEN wires wherever possible with zip-ties, and use electrical tape to prevent chafing against metal edges where appropriate.



## ROUTING POWER & RIGHT TURN SIGNAL WIRES

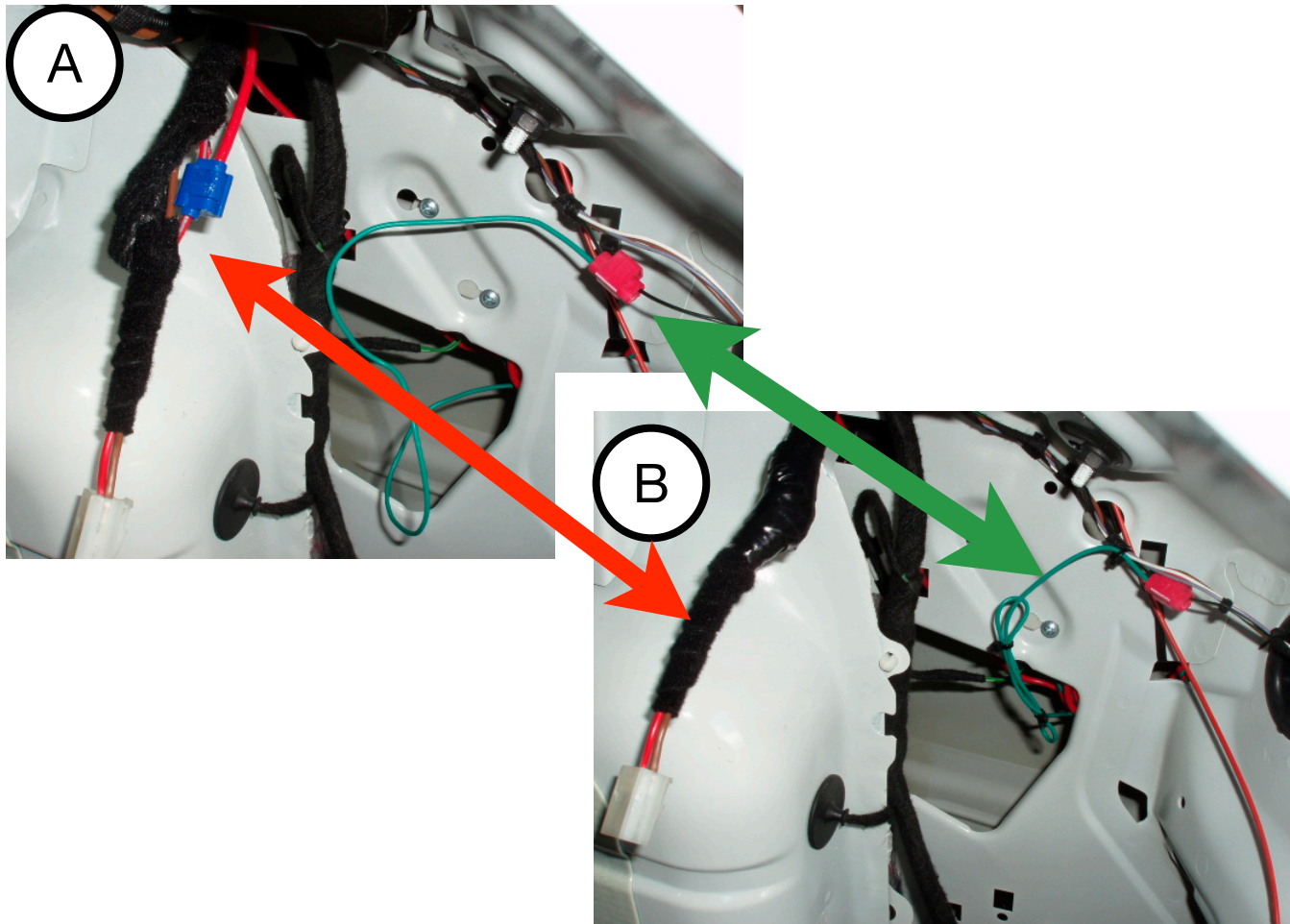
- Route the LARGER RED and the GREEN wires through the **inside** of the painted metal channel from the left side of the car to the right side (direction indicated by the red arrow).
- Secure the wires with zip-ties to prevent movement and chafing, but do not block the rectangular openings on top used by the metal clips which fasten the plastic crosspanel trim piece (some trim fastener openings indicated by the orange arrows).





## RIGHT SIDE: OPENING THE INTERIOR SIDE PANEL

- Loosen the right side panel following the same procedure as previously described for the left side.
- **NOTE:** There is no light fixture on the right side, however, there are **two** items to disconnect carefully before pulling the panel open.
- The **first item** is the red plastic line indicated in Figure 'A' above. This is the fuel-filler lid emergency release. It is clipped to the inside of a small access port on the side panel. It will need to be re-attached when the panel is replaced.
- The **second item** is the power cable for the 12V power outlet mounted on the side panel, as indicated in Figure 'B' above. The wiring for the power outlet is very short. Squeeze the plastic clip on the plug to unlock it and pull it straight off the back of the outlet.
- This +12V line will be the power source for the trailer lights. The function of the power outlet will not be disturbed.



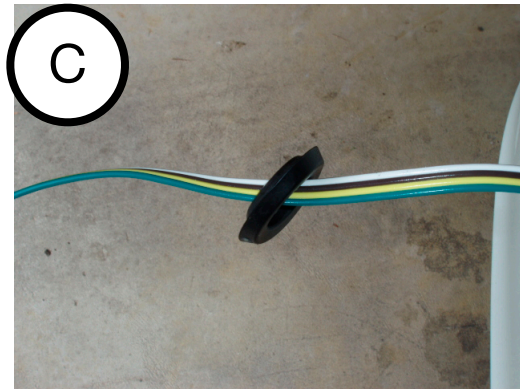
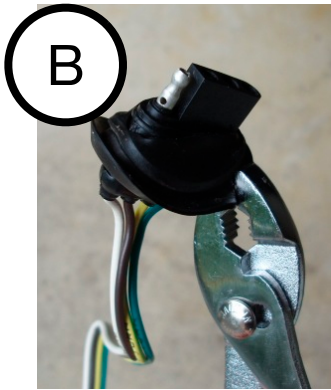
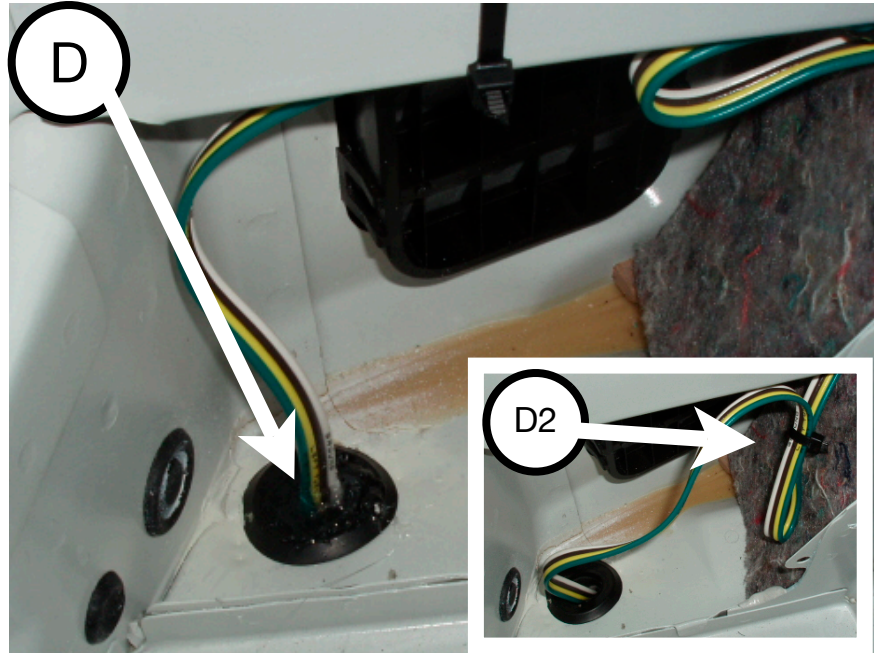
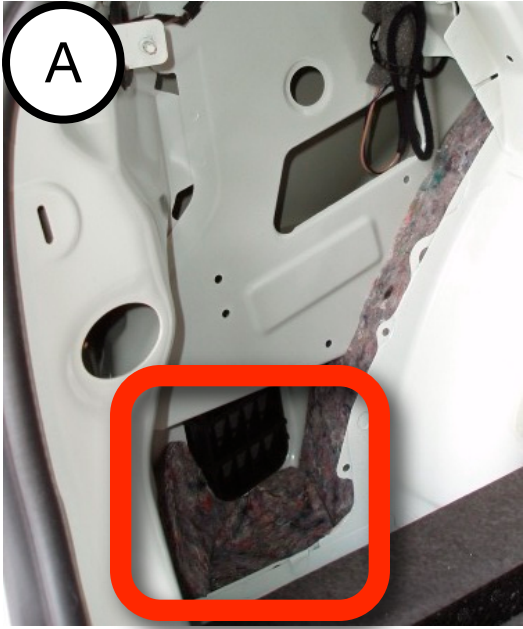
## RIGHT SIDE: POWER & RIGHT TURN SIGNAL CONNECTIONS

- Once the LARGER RED (power) and GREEN wires are routed to this area, they can be trimmed as necessary. Leave a generous amount of excess length to allow for positioning and any future maintenance/adjustments.
- Locate the small bundle of wires going along the panel towards the taillight as indicated by the green arrows in Figures 'A' and 'B' above.
- Cut the fabric wire wrap (if present).
- Locate and separate out the BLACK WITH DARK GREEN wire, Do not cut the wire.
- Use a voltmeter or test light to verify that this wire receives voltage concurrent with the left turn signal being on. You can also visually trace this wire to the right outboard taillamp assembly, where it should terminate in Pin 2 of the right outboard taillamp assembly connector.
- Using an 18-22 gauge tap-splice, attach the GREEN wire from the converter to the BLACK WITH DARK GREEN wire as shown in the Figures above.
- Zip-tie the wires together securely as shown for strain relief.
- Next, cut the fabric wire wrap from around the wiring for the 12V power outlet.
- Locate and separate out the LARGE RED WITH GREY STRIPE wire.
- Do not cut the wire.
- Use a voltmeter or test light to verify that this wire receives +11V or greater.
- Using one of the larger tap-splices which was supplied in the converter packaging, attach the LARGER RED wire from the converter to the RED WITH GREY STRIPE vehicle wire.
- Zip-tie the wires together securely for strain relief, and seal with electrical tape as indicated by the red arrows in Figures 'A' and 'B' above.
- The power connector must be securely re-plugged into the power outlet.
- The red emergency fuel-filler release must be re-clipped to the small access port on the side panel before the side panel is re-attached.

Do not completely fasten down the side panel until after you completely test the interface.

Verify that correct voltages are present for the tail, left turn, and right turn pins on the trailer connection ('brake' should provide voltage to both left & right 'turn' pins simultaneously). Perform the test using a voltmeter between the respective pin and the ground pin on the trailer connection when the corresponding lights are activated on the vehicle.





## LEFT SIDE: ROUTING TRAILER CONNECTION TO OUTSIDE OF VEHICLE

- Return to the left side, and remove the piece of insulation indicated in Figure 'A'.
- Locate and remove the large black rubber grommet underneath that insulation.
- Use a razor blade or sharp knife to cut a slot through the **middle** of the grommet. Do not cut the outer ring - it should remain intact to properly seal and reinstall.
- Insert the trailer plug through the slot from top to bottom (orientation is important!). Do not apply any lubricant since the grommet needs to be clean and dry for the next step. Use pliers to work the grommet over the plug. See Figure 'B' above
- Slide the grommet along the trailer wiring ribbon, and feed the plug through the hole in the panel to the outside of the vehicle (Figures 'C' and 'D2').
- Replace the grommet in the hole and make sure it is securely seated all the way around.
- Zip-tie a loop in the ribbon cable to allow for any future repair/adjustment slack (as indicated in Figure D2). and secure it to the structural panel with zip-ties using the nearby holes.
- Seal the middle part of the grommet with generous amounts of 'Goop™' brand clear silicon adhesive, completely filling the recessed area in the grommet and sealing around the wiring ribbon. (as indicated in Figure 'D', above)
- Cut a slit in the insulation in order to slip it around the wire ribbon and replace it as shown in Figure 'E', above.
- Outside the the vehicle, route and attach the ribbon wiring along the hitch as desired. Secure it so that no stress is applied to the wire where it passes through the grommet, in order to maintain a tight seal.
- Now, secure the converter box behind the structural panel as firmly as possible using zip-ties. Do not encroach on the space where the subwoofer will be reinstalled. Attaching the converter securely is essential to prevent rattles, especially from the normal vibrations of the subwoofer.

Make sure all wiring is secure (no rattles, no chafing), insulated where appropriate, and not putting any strain on any of the connections.

Test operation as previously described. If successful, proceed with the re-assembly checklist.

# REASSEMBLY

## RIGHT SIDE PANEL:

1. Verify power connector plugged securely into 12V power outlet.
2. Verify fuel-filler emergency release attached to access panel.
3. Replace side panel, snapping all clips into place.
4. Peel the rubber hatch gasket over the edge of the side panel before completely snapping it in (the side panel should not be on top of or pinching the gasket).
5. Replace the torx screw.

## LEFT SIDE PANEL:

1. Re-install subwoofer using the 2 nuts & 1 bolt. These should be tightened to 4.5 N-m (3.3 ft-lbs).
2. Replace the blue plug into the subwoofer connection, making sure that it clicks into place tightly.
3. Re-install light fixture and wiring. If the light does not appear to work when plugged in, it may have timed out from the hatch being open. Close and re-open the hatch to test light operation.
4. Replace side panel, snapping all clips into place.
5. Peel the rubber hatch gasket over the edge of the side panel before completely snapping it in (the side panel should not be on top of or pinching the gasket).
6. Replace the torx screw.

## CROSSPANEL:

1. Re-install the plastic crosspanel, making sure that all of the spring clips are accounted for, snap into place properly and no pinching, chafing or other interference occurs with the newly-routed wires.
2. Peel the rubber hatch gasket over the edge of the crosspanel before completely snapping it down (the crosspanel should not be on top of or pinching the gasket).

## CARGO AREA:

1. Replace the carpeted floor panel which covers the spare.
2. Secure both rear seatbacks in upright position.
3. Reinstall the cargo net (if present) and any rubber cargo liner (if present).
4. Reinstall cargo area cover (shelf).

**END**

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