

Installing the KT Dreamworks LED Turn signal mirror kit in a Toyota Prius

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Disclaimer:

This guide was written by an average Prius fanatic to assist others who may be so inclined to add this modification to their vehicle. It is assumed that if you are going to attempt this installation that you are familiar with auto mechanical systems, auto electrical systems, and basic hand tools. This guide is meant to be informative but cannot be guaranteed to be complete nor to represent what is found in your vehicle. The author disclaims any liability or responsibility for anything that happens to your vehicle as a result of following these instructions, including damage to your vehicle, personal injury, emotional distress, paper cuts, and anything else I may have forgotten. Bottom line: Please use good common sense and don't sue me if anything goes wrong!

Introduction:

The purpose of this guide is to assist in the installation of the KT Dreamworks LED turn signal mirrors in a Toyota Prius. The KT Dreamworks kit is available from Tommy Leung of KT Dreamworks. This company is an aftermarket automotive specialist based in Taiwan. Their website address is:

http://ktdreamwork.catalogxp.com/catalog/router/htm/cid_1008/liid_510/pid_8254/LED-side-mirror-covers.html .

Sigma Automotive also carries a similar JDM spec kit, though it costs about twice as much as the KT Dreamworks kit. The KT Dreamworks kit for the Prius is the ISO3 model. The mirror covers come pre-painted to match your vehicle, so you must provide your paint color code. For example, Driftwood Pearl is 4S2. You can find your paint code on the driver's side door jamb info plate. The turn signal mirrors use 6 high brightness LED's on the corner of the cover. The light is conducted through the rest of the clear plastic light guide. The installation is straightforward but requires a significant amount of interior disassembly. Plan on spending at least half to a full day to perform this installation.

I would recommend that you disconnect your 12v battery before attempting this installation. I did not disconnect mine as I needed power for testing during various phases of the installation, so I used extra caution during the procedures. Be aware that having the doors open for any length of time tends to drain the battery. I almost ran mine flat until I hooked up a battery charger to compensate for the drain of the interior lights.

For an excellent guide on disassembling the Prius dash components, see Chris Dragon's Stereo Accessory Installation Guide which can be found on Hobbit's web site:

<http://techno-fandom.org/~hobbit/cars/chris-dragon-dash.pdf>

Let's begin:

Tools you will need:

- 10mm and 12mm socket wrench with extension
- Diagonal wire cutter, mini and thin needle nose pliers
- flexible "grabber" tool
- Standard and Phillips screwdrivers, including jeweler's sizes, T25 Torx
- Wire stripper
- 35w pencil type soldering iron and solder
- zip tie assortment
- Scotchlock wire tap connectors
- heat shrink tubing assortment, 1/16", 3/32", 1/8" dia
- heat gun
- Digital voltmeter
- Solid 22 ga wire approximately 4 feet in length
- Stranded wire, 22 ga, approximately 10 feet in length
- Two RXE020 resettable fuses or 5x20mm 0.250A fuses with in-line holder
- Interior door panel removal tools or stiff flat blade putty knife
- Electrical tape
- Flashlight
- Mirror
- 9 volt battery with battery snap
- KT Dreamworks or Sigma OEM LED turn signal mirror covers for the Toyota Prius
- Cold beverage of choice to celebrate the completion of this project



Here is a representative sample of the tools required to perform this installation.

Save your battery:



If you choose to work on a 'live' car, you will discharge your battery from the current draw of the dome and door lights remaining on for the many hours it takes to complete this installation. Hook up a battery charger now so you don't damage the 12v battery by discharging it too much.

Prius Disassembly:

Begin by removing the lower glove compartment. Release the glove compartment latch, then press together on each side of the glove box to release the catches and drop the box out of the dash. Disconnect the damper shock on the right hand side of the box by popping the shock arm from the plastic peg. The damper shock is shown in the photo below as highlighted by red arrow on the right. Remove the box and set it aside.



Now, remove the silver passenger air vent to the left of the glove compartment. One method is to grab it from the top and bottom and pull straight back. Another method is to reach around the inside of the glove box opening and push the assembly out. I find it helpful to push it from the inside to get it started which makes it easier to remove from the outside. Now is a good time to clean out the cabin air filter. It is located in the top part of the white box shown in the center of the above picture. If it's really dirty it's best to replace it. They are less than \$20 at the dealer, or you can make your own from a household air conditioner filter. I like to vacuum mine every 4-6 months to keep it clean, and it probably won't need to be replaced for a long time.

Door Panel Removal Preparation



Use the angled awl to remove the cover plate behind the door release handle. This will expose a Phillips head screw which can be removed.



Next remove the Phillips head screw from the door handle cup and remove the plastic insert.

Switch Console Removal



At this time, make sure your power mirrors are positioned such that the top edge is in as far as it will go and the bottom edge is extended out as far as it will go on both driver's and passenger's side mirror. This will help later when it is time to remove the mirror glass. Now remove the power window control panel. It lifts straight up and has a few plastic snap latches that secure the switch panel to the inside edge of the door trim. The best way to get it started is to get your fingers underneath the front side and begin working it upwards.

The connector shown on the right side has a press-to-release snap catch and the connector shown on the left side has a retaining housing that slides backwards (towards the wire harness) then allows the connector to be removed. Remove both connectors and set the switch panel aside.

Tweeter Pod Removal



↑
Top

↑
Bottom

Now the tweeter pod can be removed by grasping it and pulling straight back, away from the door. You can take the BFI (Brute Force and Ignorance) approach and yank it really hard, or you can be more gentle and pull the top part away then lift it off the white plastic peg at the bottom. The left side of the above picture is the top of the tweeter pod and the right side is the bottom towards the door panel. Quite often, the metal spring at the top will pull off the plastic and fall inside the door panel, trapped between the mirror body and the sheet metal of the door. Don't worry – you will get it back. I was able to retrieve mine with a thin needle nose pliers. If it has fallen too far inside, do not panic - when you remove the mirror assembly from the door, it will fall out.

Door Panel Removal



The interior door panel is the next part to be removed. Before getting to that, remove the puddle light at the lower outside edge of the door panel. Pop the light out with a small flat screwdriver and disconnect it from the wire harness. Tuck the wires back inside the door panel. Now, feel along the bottom edge of the door panel for the recessed hand-cutout and give it a firm yank. The bottom of the panel will pop loose. One reason I really like Toyota is that they use special compressible plastic pins, not the cheap “Christmas tree” pushpins typically found on “other” cars. This allows the pins to be removed several times without having to replace the pins each time or live with annoying squeaky loose panels. Use the flat blade scraper or special V notched door panel removal tool to compress the pins and they will release fairly easily. There are 8 push pin clips that need to be released then the door panel lifts up about 1” and the panel will be free.



Toyota Plastic door push pin

Mirror Glass Removal



Pop the lower clips with a flat screwdriver to release the mirror from the motorized backing plate.



Pivot the mirror to about 45 degrees and pull at an angle to release the top hinge clips.

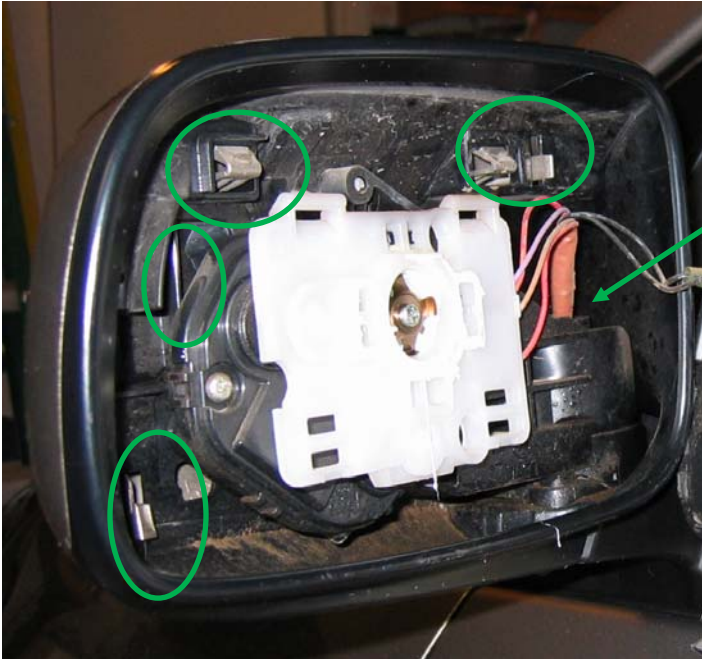
Remove the mirror glass using a small flat blade screwdriver to pop the two clips at the bottom of the mirror free from the backing plate. The clips are about 1 1/2" in from the left and right edge of the mirror and snap into the bar formed by the double horizontal openings on the white motorized backing plate shown in the photos. Use a 1/4" flat blade

screwdriver with a small diameter shank and gently put pressure between the mirror glass and the white plastic backing until the mirror glass clips pop free. The glass will still be attached at the top pivot and will not easily fall out. The mirror glass must be pivoted to about 45 degrees before it will pull out (downward and away from the housing). Do not pull to hard since the mirror heater is attached to the back of the glass by wires. Once the glass is free from the backing plate, remove the quick-connect terminals from the mirror heater and set the glass somewhere it will not be broken. The mirror heater is a resistive element and is not polarized so the connections do not need to be marked with regard to which pin they belong to.



This is a view of the mirror glass once it has been removed from the white backing plate. The white backing plate connects to the X-Y motor drive mechanism to provide the pan/tilt of the mirror. The connection circled in red is the power connection for the mirror heater, the clips circled in yellow near the top are the hinge clips, and the clips circled in green near the bottom are the snap clips.

Mirror Front Cover Removal



There are 6 plastic snaps that hold the painted front mirror cover to the mirror body. Press on these clips with a flat blade screwdriver and pop the front free while working around each clip one at a time. There are two clips that are obscured from the camera in this view, one on the middle left hand circle and the other indicated by the arrow on the right.

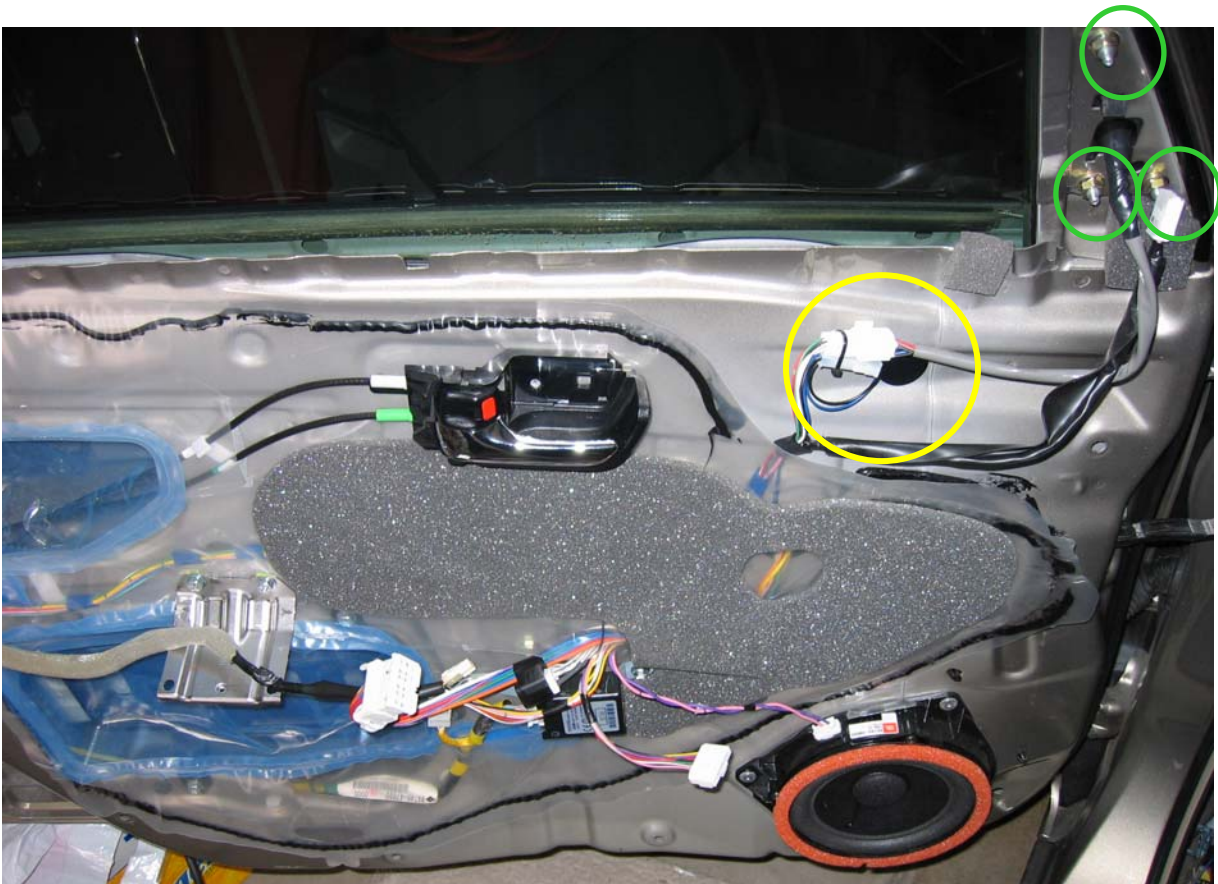


This is the OEM mirror cover once it has been removed from the housing.



A side by side comparison of the LED turn signal mirror cover (left) with the OEM mirror cover (right).

Mirror Body Removal

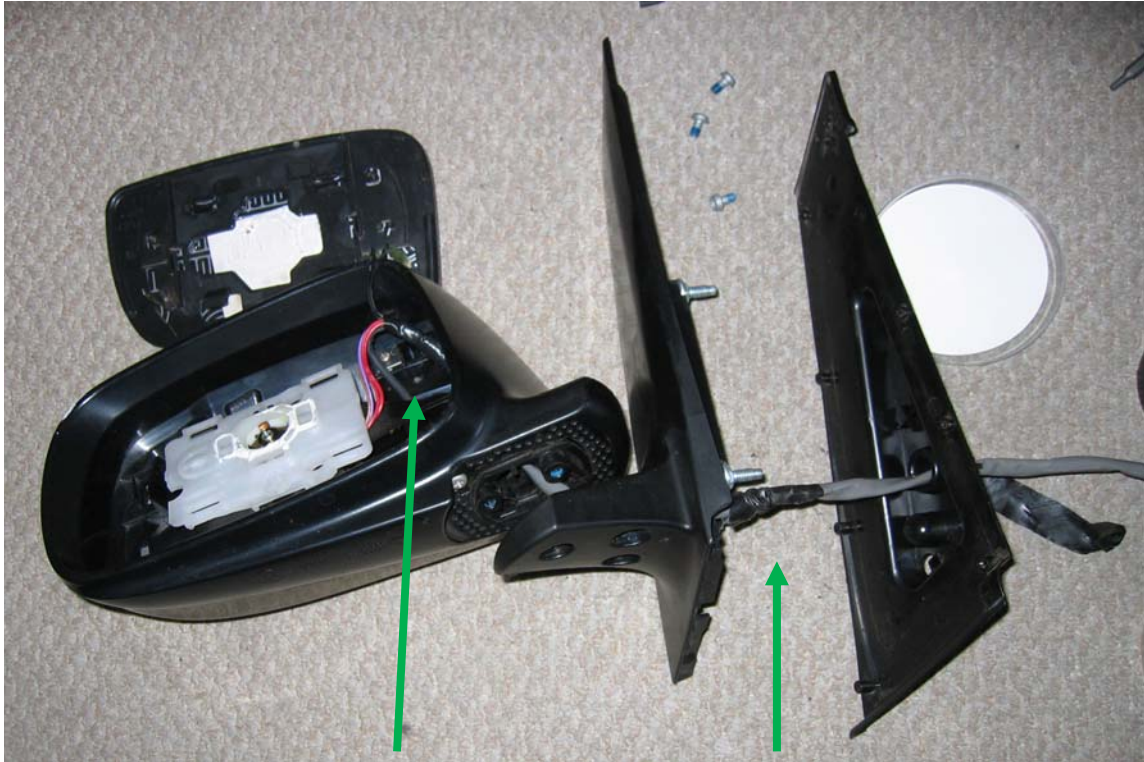


Now that the interior door panel has been removed, we see all the goodies hidden behind it. The loose connector in the upper right hand corner is the tweeter pod connection. The connector circled in yellow is for the power mirror motors. Disconnect this connector from the door wiring harness and set aside. Continue by removing the three 10mm nuts holding the mirror assembly to the door body. There is a plastic catch whose only purpose is to keep the mirror from falling out when all the nuts are removed, but it is still a good idea to support the mirror assembly from the outside before removing the last nut so it does not fall off and damage anything.

Mirror Modification



Now that the mirror body has been removed, I cleaned all the dirt and gunk from inside the housing with a damp paper towel then installed the new LED covers onto the mirror body. The LED covers use wedge shaped plastic pieces to secure the cover to the housing. Be careful to not mix these up when they are removed and re-installed, or the cover won't secure properly. Next, check the fit of the mirror cover to the housing. It should be tight and flush with no gaps. If there are any gaps, it helps to use a flat screwdriver to hold the inside snaps away from the housing while pushing the cover flush. The LED covers do not have ramped snap housings and can take some trial and error and screwdriver assistance to get them seated properly. Don't overdo it – they are plastic and could break easily!



The mirror must be completely disassembled from the pivot bracket in order to route the LED wires through the plastic pivot. Don't worry, there are no spring-loaded components to go flying. Just remove the three T-25 Torx head screws at the bottom of the plastic panel and the mirror housing will come loose. The rubber gasket at the right just pulls away from the plastic bracket.

Remove the electrical tape from the end of the grey cable jacket inside the mirror and at the interface between the rubber gasket. Straighten out the grey cable jacket as best as possible to make it easier to route the new wires through. I used a length of 20 awg solid wire with a Teflon jacket as a lead pulling wire. Feed the lead wire beginning on the right side of the assembly (the side that is inside the car) until it emerges inside the mirror housing end.



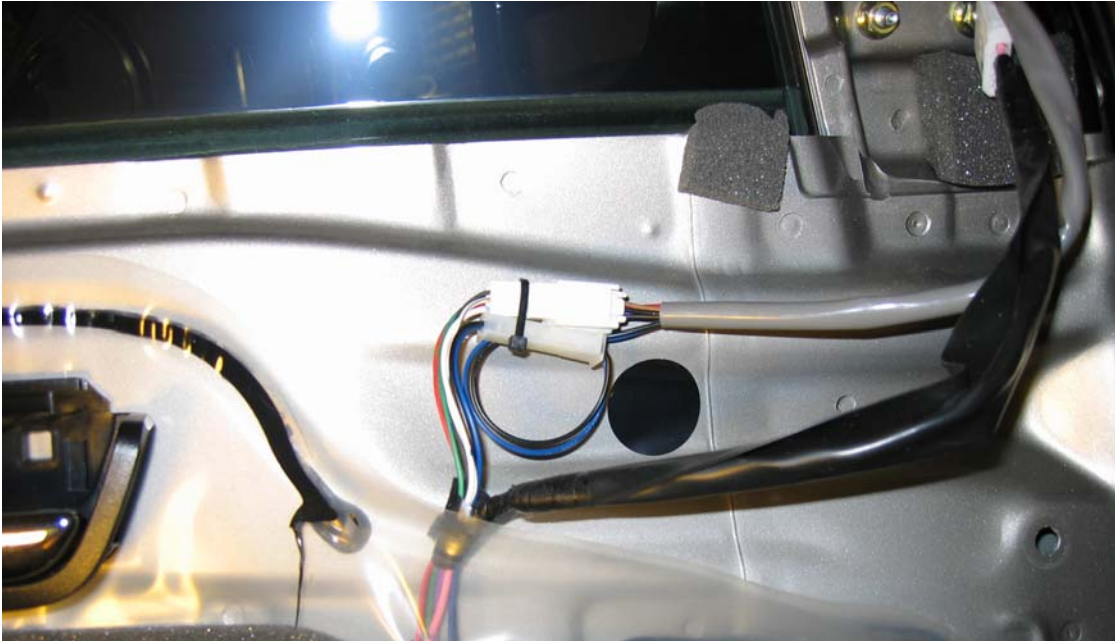
Install a 6" length of heat shrink tubing on the blue and black wires to hold them together and insulate them until they are inside the grey cable jacket.



Solder wires and feed through.

Once the lead wire is through, strip about 1/2" of insulation from each of the LED turn signal wires and also from the lead wire. Twist the blue, black, and lead wire inline and solder them together. Pull the wires through the cable jacket and once through cut them free from the lead wire. Re-tape the cable jacket on both the inside of the mirror housing and on the rubber gasket. Re-assemble the mirror housing bracket by securing the three screws on the bottom of the mirror housing. Install the wires for the heated mirror glass then re-install the mirror glass into the backing plate. The mirror assembly can now be re-installed on the vehicle door. **Do not over tighten the three nuts holding the assembly – the bolt studs can snap loose if over tightened!**





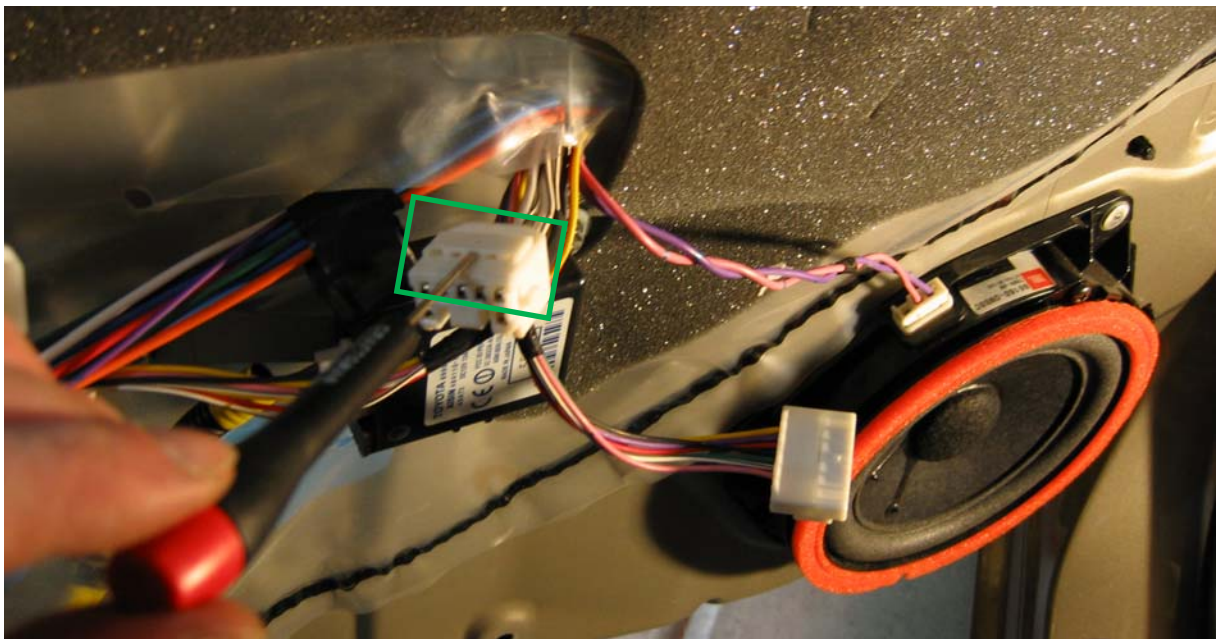
After installing the mirror body, I chose to connectorize the LED turn signal mirror with a 2 pin Molex connector. If the mirror housing ever needs to be removed, it will be a simple matter to unplug the connector and remove it along with the power mirror assembly. The connector for the LED turn signal cover is zip tied to the power mirror motor connector which is fastened to the door.

The connector part numbers are:

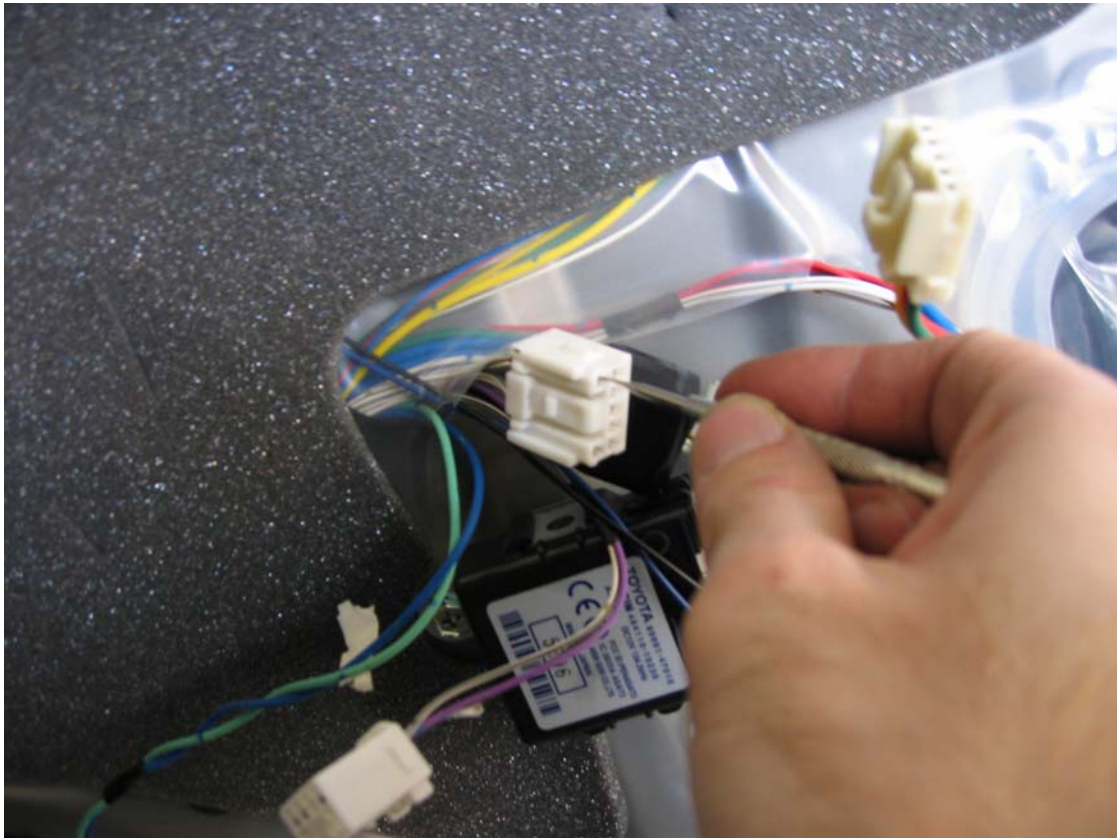
- 39-01-3022 Molex 2 pin plug (2pcs required)
- 39-01-3023 Molex 2 pin housing (2pcs required)
- 39-00-0039 Molex female socket (4pcs required)
- 39-00-0041 Molex male pin (4pcs required)



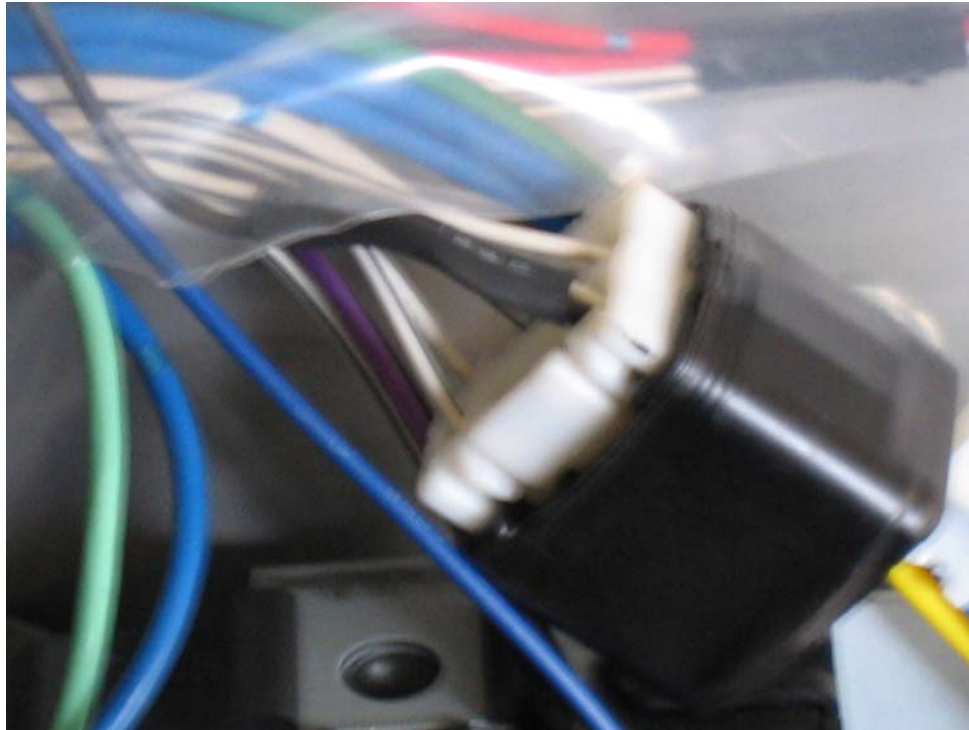
Locate the connector on the door with only white wires with black stripe, circled in green above. This is a ground junction block, and all of the wires are ground wires. Press the release tab and remove the connector from the taped housing.



Use a small flat blade jeweler's screwdriver to lift the pin release tab.



Use the small flat blade screwdriver to lift the release tab inside the housing, between the pin and the housing. The box pin then slides out the back. Solder the black wire from the LED turn signal to the metal crimp pin, insulate and strain-relieve with heat shrink, then re-install the pin into the housing. I chose one of the smaller 20 ga wires for this to allow more room when reinstalling the pin into the housing.



Re-assembled ground connector.

If you want to avoid soldering, the other option is to use a Scotchlock connector from Radio Shack to join the ground wires together:



< A Scotchlock connector from Radio Shack
P/N: 64-3081

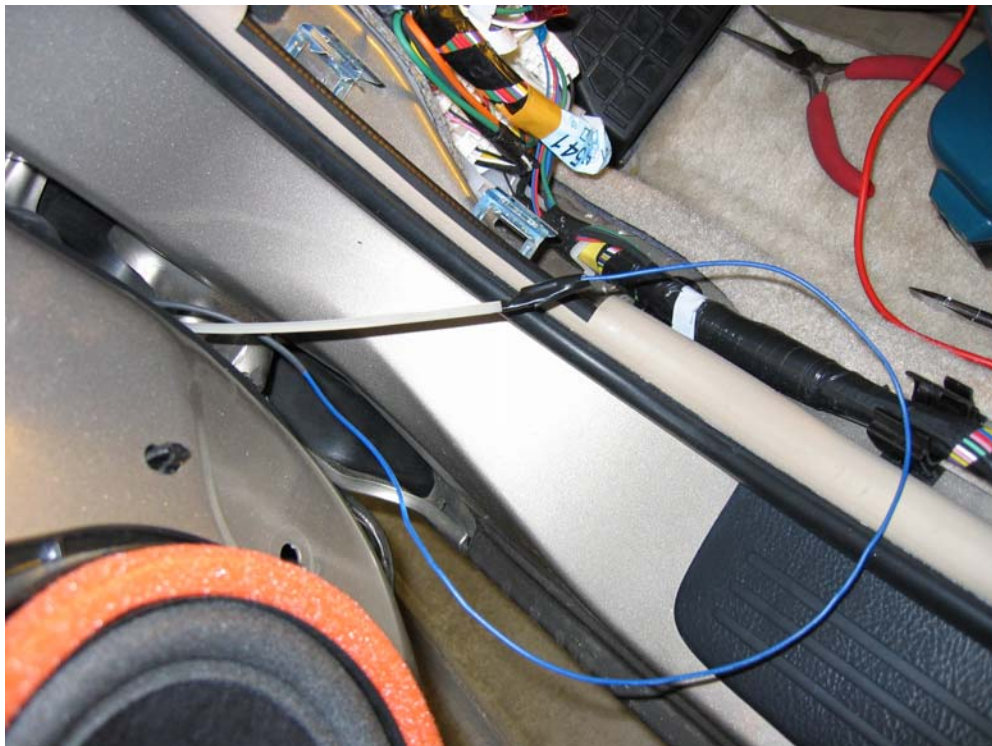
Prepare the blue wire from the LED signals by adding a 18" length of heat shrink tubing to give it additional abrasion protection. Peel back about 6" of the plastic water barrier, beginning in the upper right hand corner of the door. Only peel back enough to allow you room to work. Feed the blue wire inside the door panel and around the support braces. Be careful to avoid the window guides and route the blue wire around the guides towards the wire bundle in the rubber pass-through grommet.



The remaining blue power wire for the LED signals must be routed through the rubber door to body wire channel. Remove the rubber grommet from the door end by squeezing together at the center and rolling the grommet out of the door. Once it is started, it will come out easily by working around the perimeter.



Feed a long plastic zip tie through the wire channel from the inside. It helps to squeeze the rubber channel to help ease the zip tie through.



Tape the blue wire to the zip tie and pull through the wire channel.



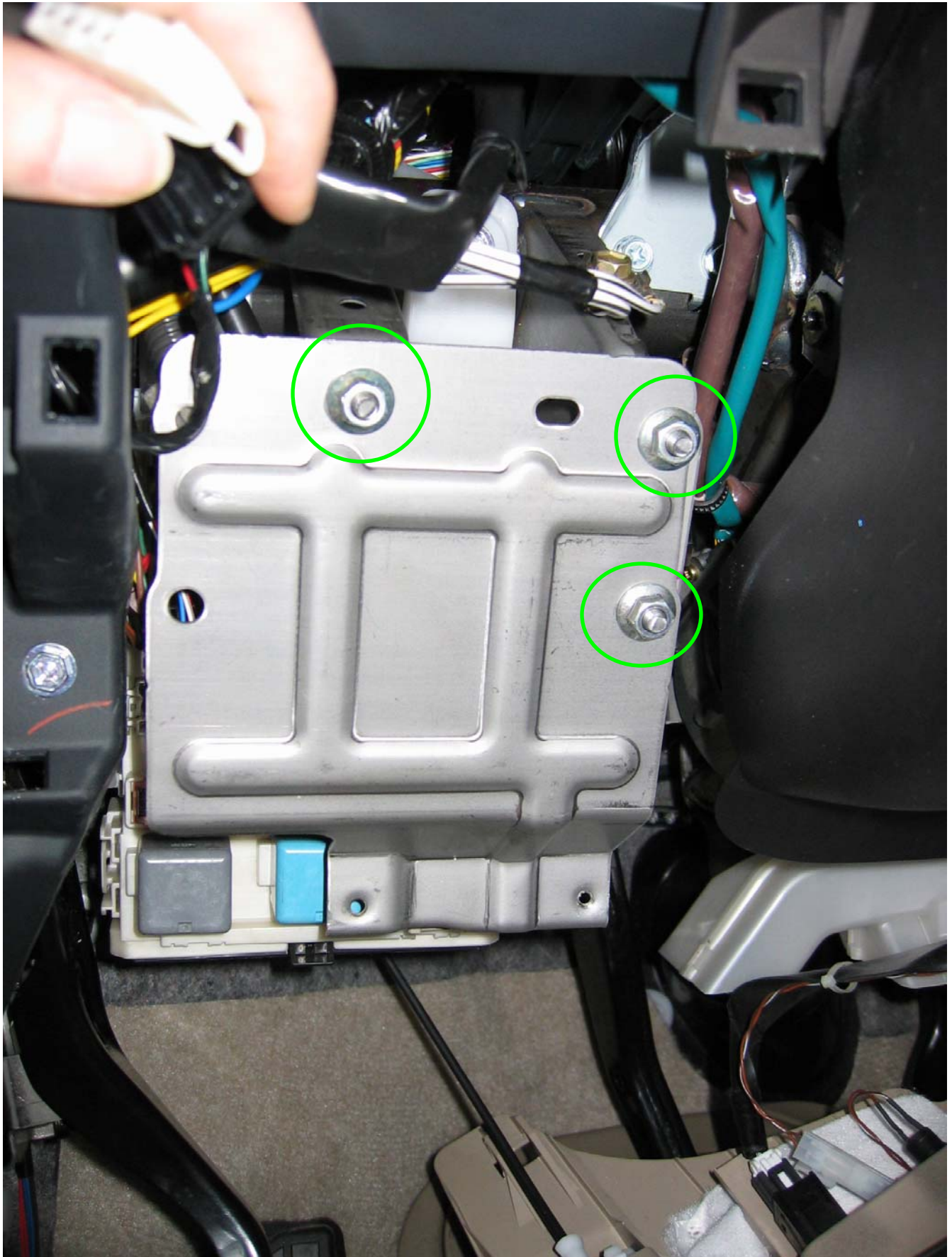
After an additional protective layer of heat shrink tubing has been installed over the blue wire, route it around the window slides and into the rubber wire channel.

Perform the same procedure on the passenger side door and mirror. The blue wire provided with the turn signal mirror covers is not long enough to reach across the dash, so an extension wire will have to be soldered to the wire and routed along the inside of the dash, behind the radio. A 20 or 22 gauge stranded wire is sufficient for this purpose. The chosen wire color for the passenger side turn signal wiring is light green, while the wire color for the driver's side turn signal wiring is yellow. A short length of yellow wire (approximately 24") must be added to the driver's side wire as well.

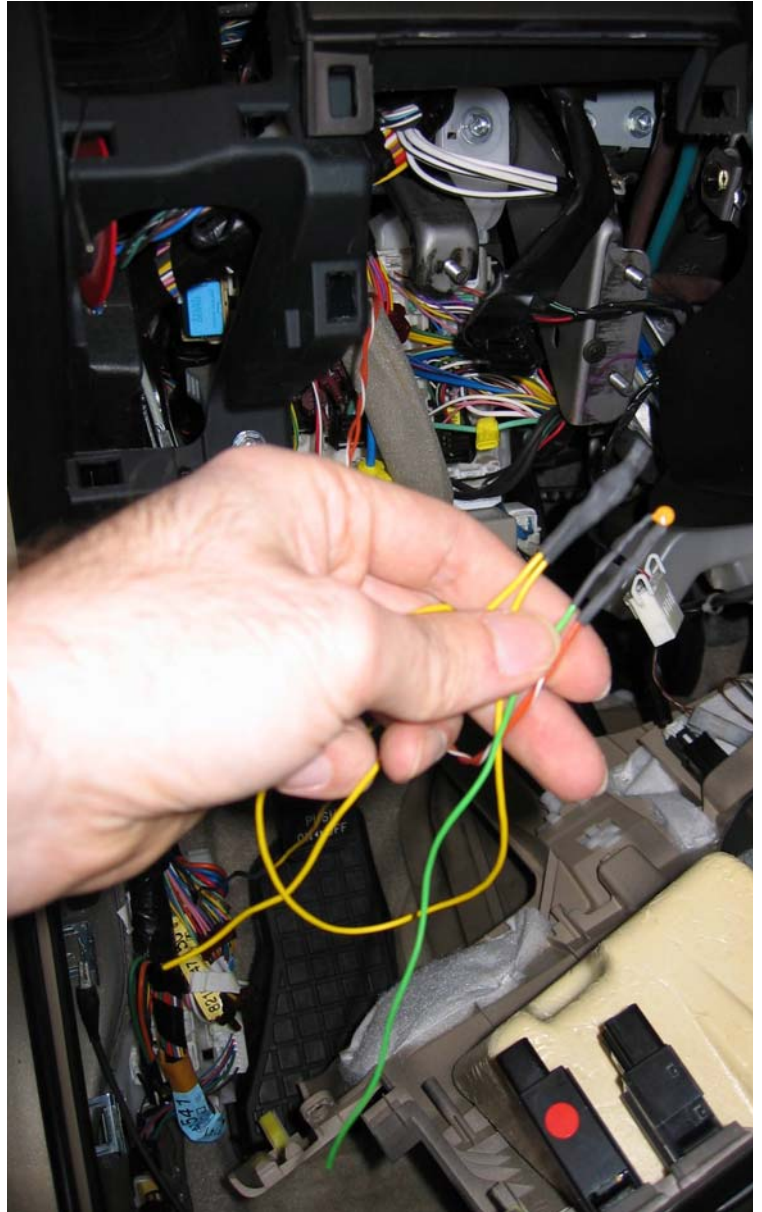
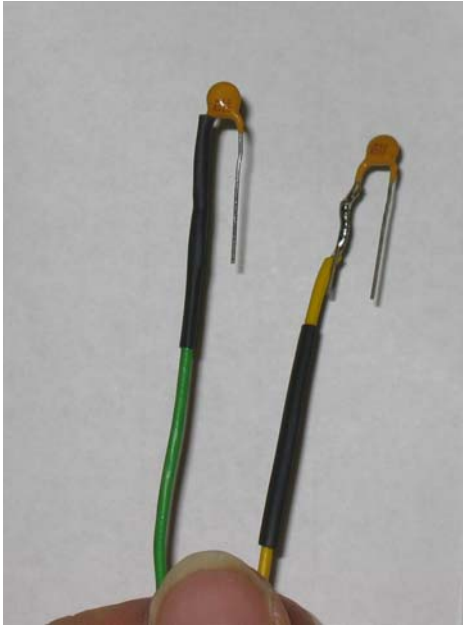
Dash Disassembly



Begin by removing the driver's side left vent panel. Grab it from the top and bottom and gently pull straight back. It is held in by the same yellow plastic spring clips used on the rest of the dash. Now remove the two screws holding the lower plastic panel to the dash (circled in green). The dark and tan parts are pinned together and will pull away as one piece. This large panel is also held in by the yellow plastic spring clips. The hood release cable and wiring for the smartkey and keyfob receptacle will limit how far you can move the panel once it is loose. After the two screws have been removed, gently pull the large dash panel free from the dash.



Remove the three 10mm nuts holding the metal cover panel in place.



fas
j;lj

Prepare the wires for connection to the Prius wiring harness. I chose to use Raychem RXE020 automatic resetting fuses for the installation. Should anything short to ground in the door harness wiring, these will go open circuit and prevent damage to the wiring. Once the fault is removed, they automatically reset after a brief time. Apply a short piece of heat shrink tubing to the wire then twist around the leg of the fuse, solder, and heat shrink. Do the same to the other leg and install a short (6") piece of wire for connection into the Prius wiring harness. Install a larger piece of heat shrink over each assembly when finished to insulate everything. Remember: yellow wiring is for the driver's side and green wiring is for the passenger side connection.

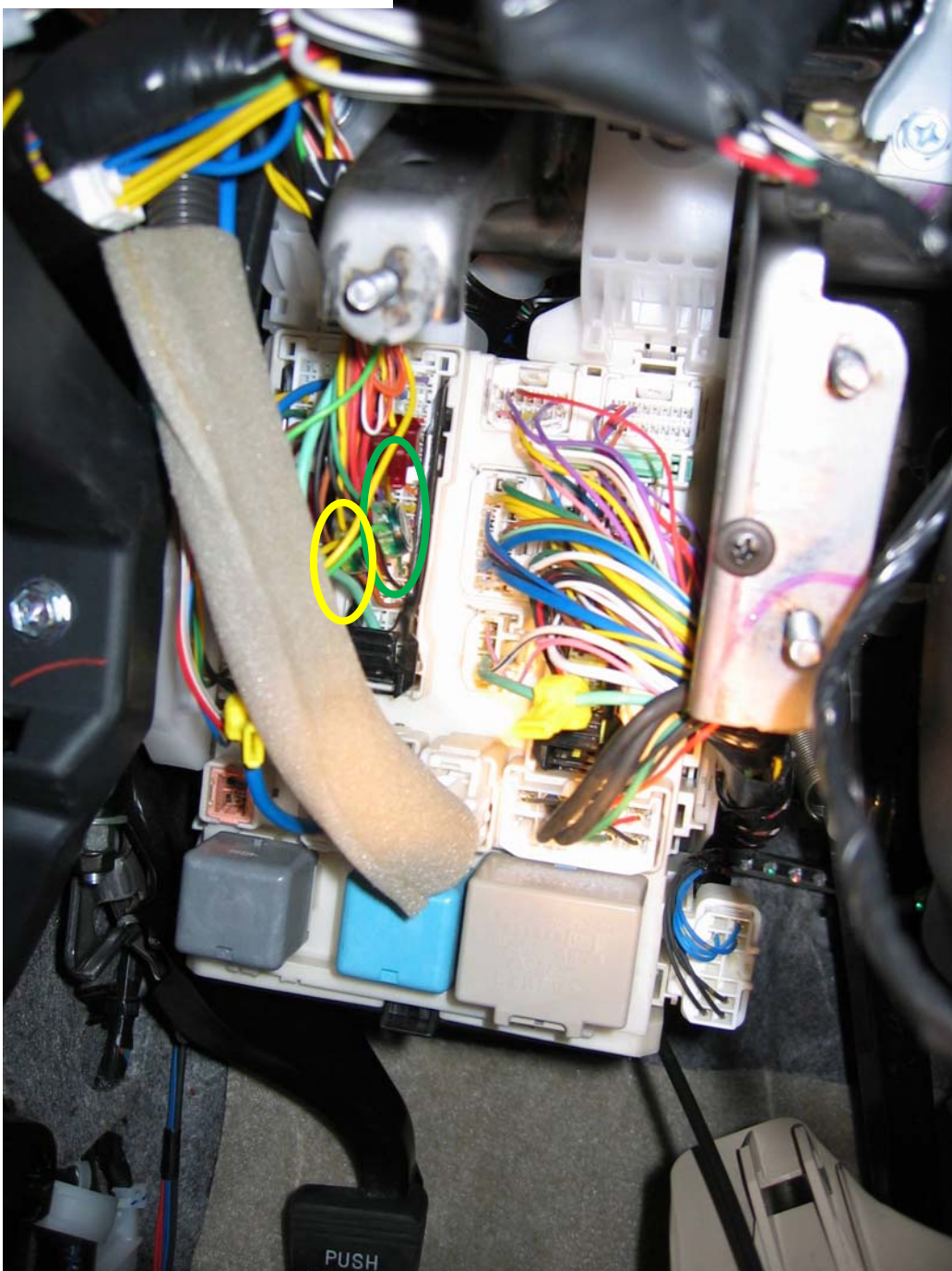
If you do not have access to the Raychem fuse, an alternate is to use a 5x20mm glass fuse with an inline holder, or a mini-blade type automotive fuse. Representative part numbers are:

1pc Radio Shack P/N: 270-1046 0.315A fast acting 5X20mm fuse (4pk)
2pcs Radio Shack P/N: 270-1238 5A fuseholder for 5X20mm fuse

For the next step of bridging the connection to the Prius wire harness, I chose to use 3M Scotchlock connectors from Radio Shack (P/N: 64-3081) to tap into the wires.



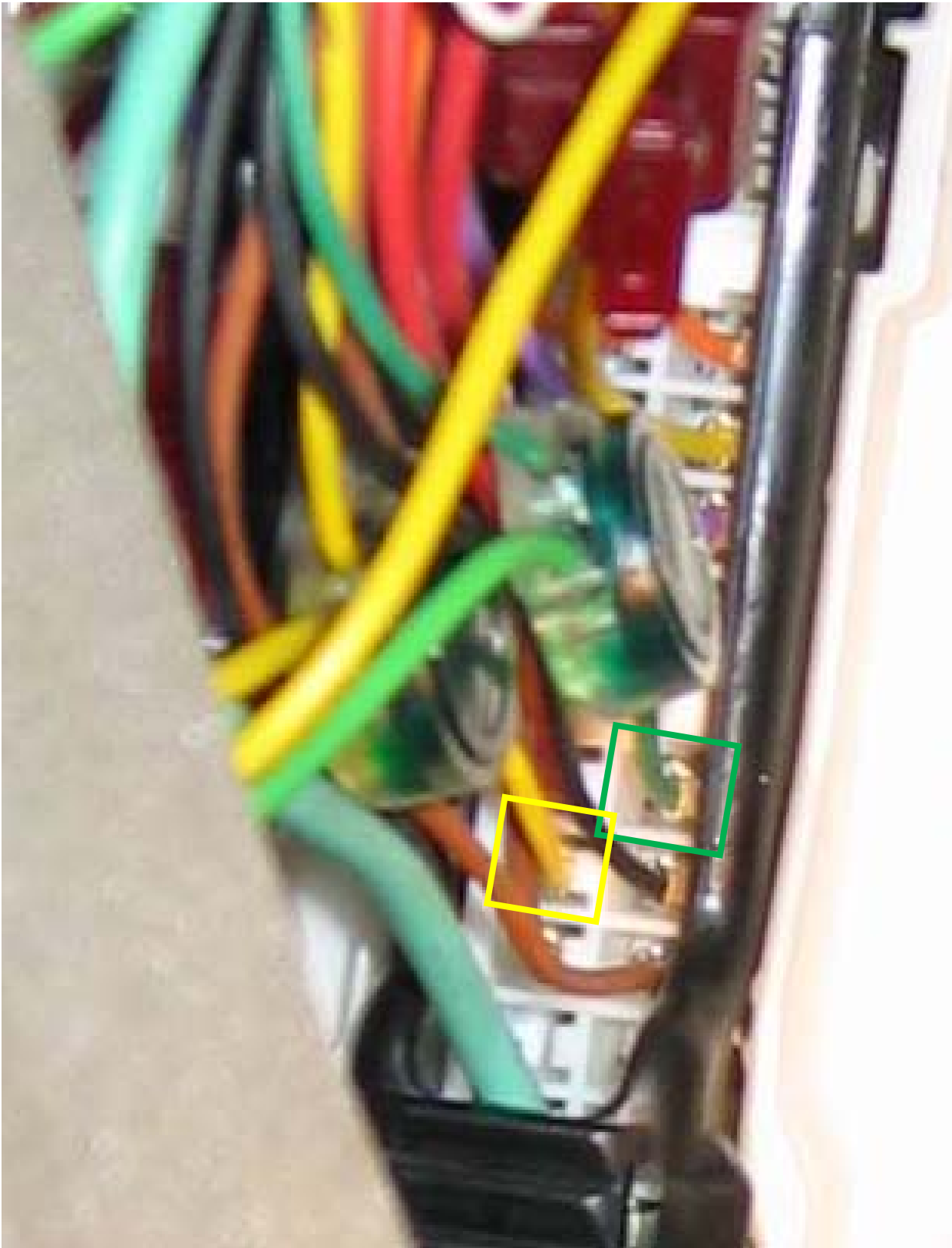
< A Scotchlock connector from Radio Shack



The connections to the Prius wiring harness are shown in the yellow and green circles.



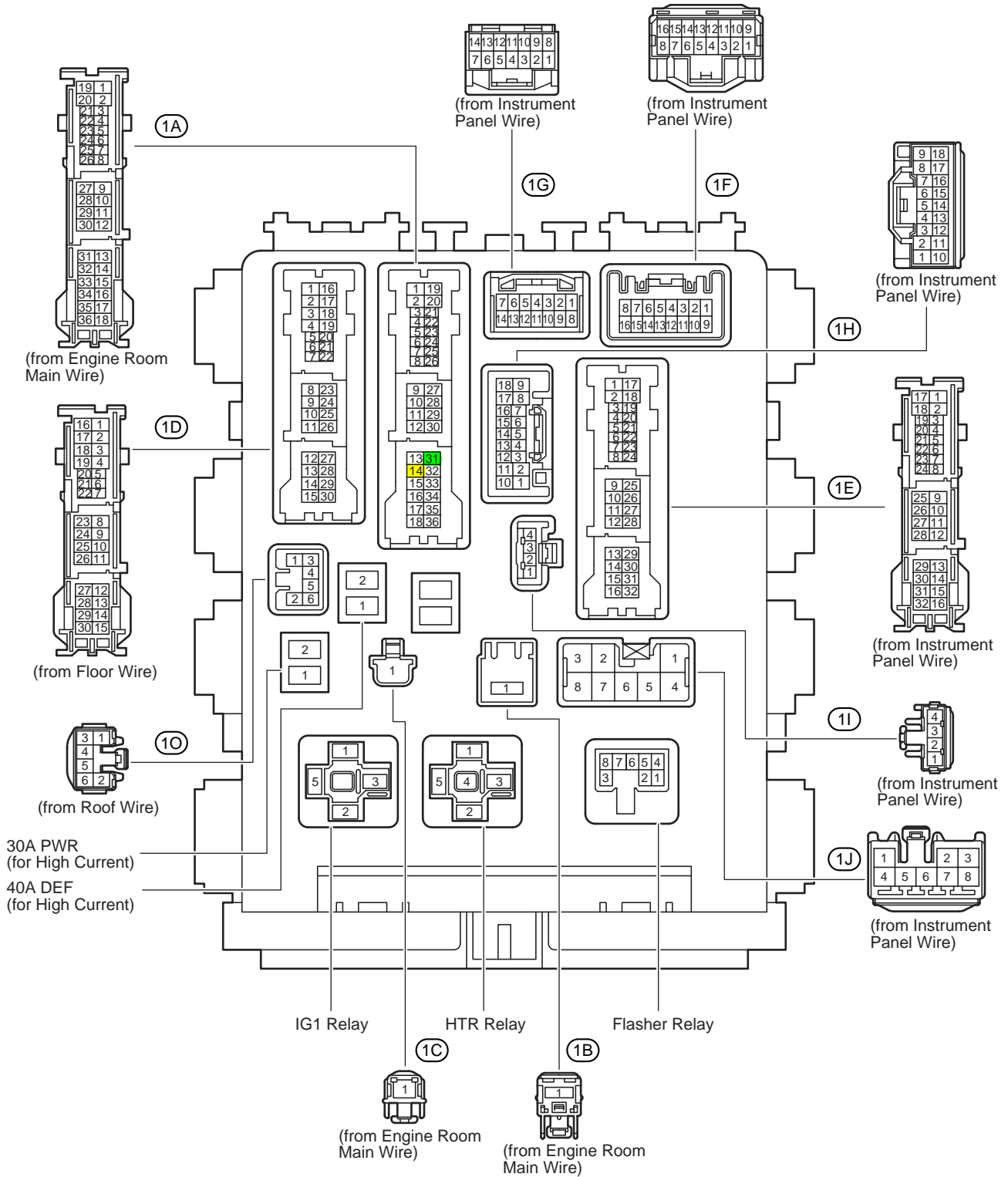
A close up view.



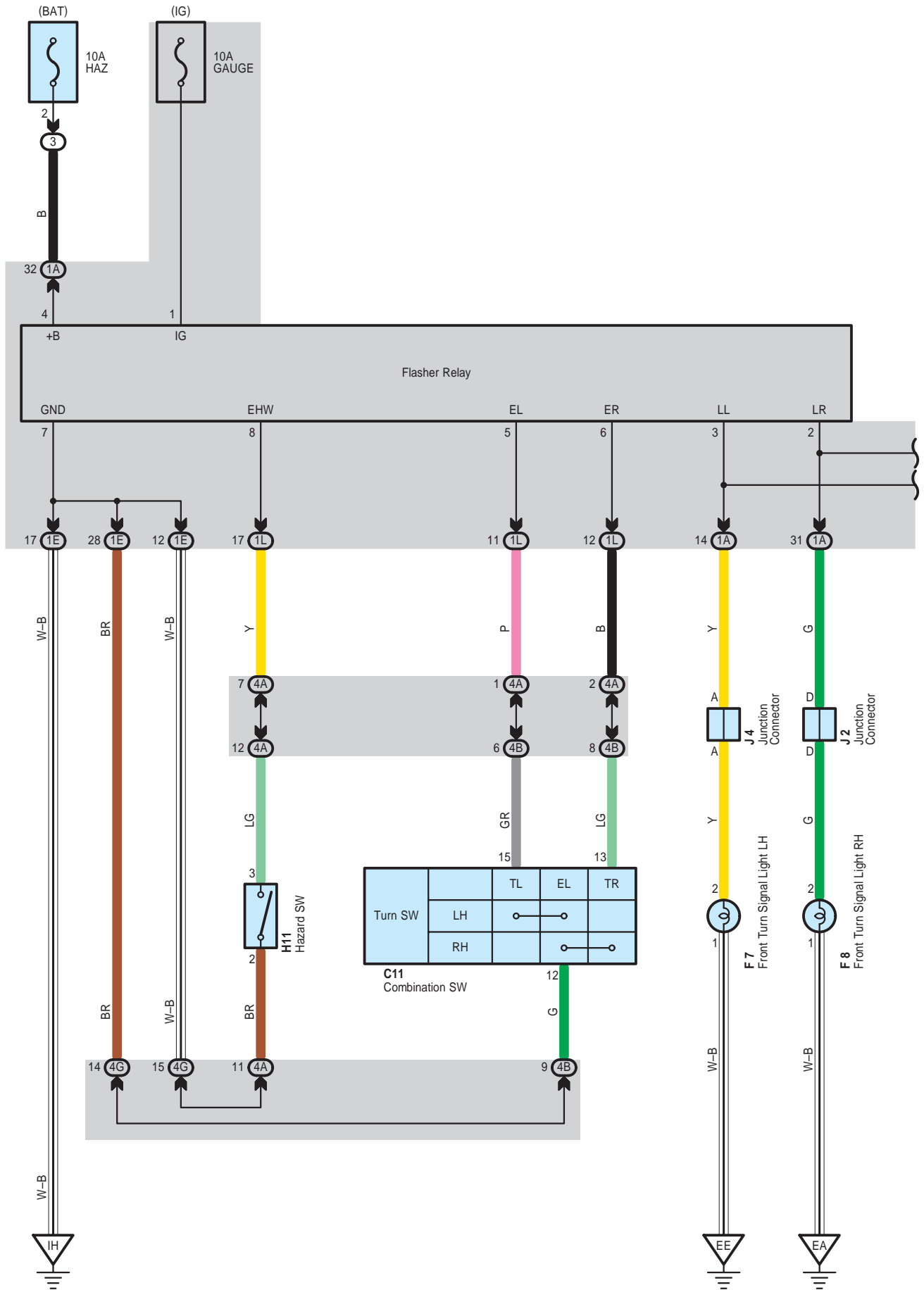
Even closer. The yellow wire connects to pin 14 of connector 1A, the green wire connects to pin 31 of connector 1A

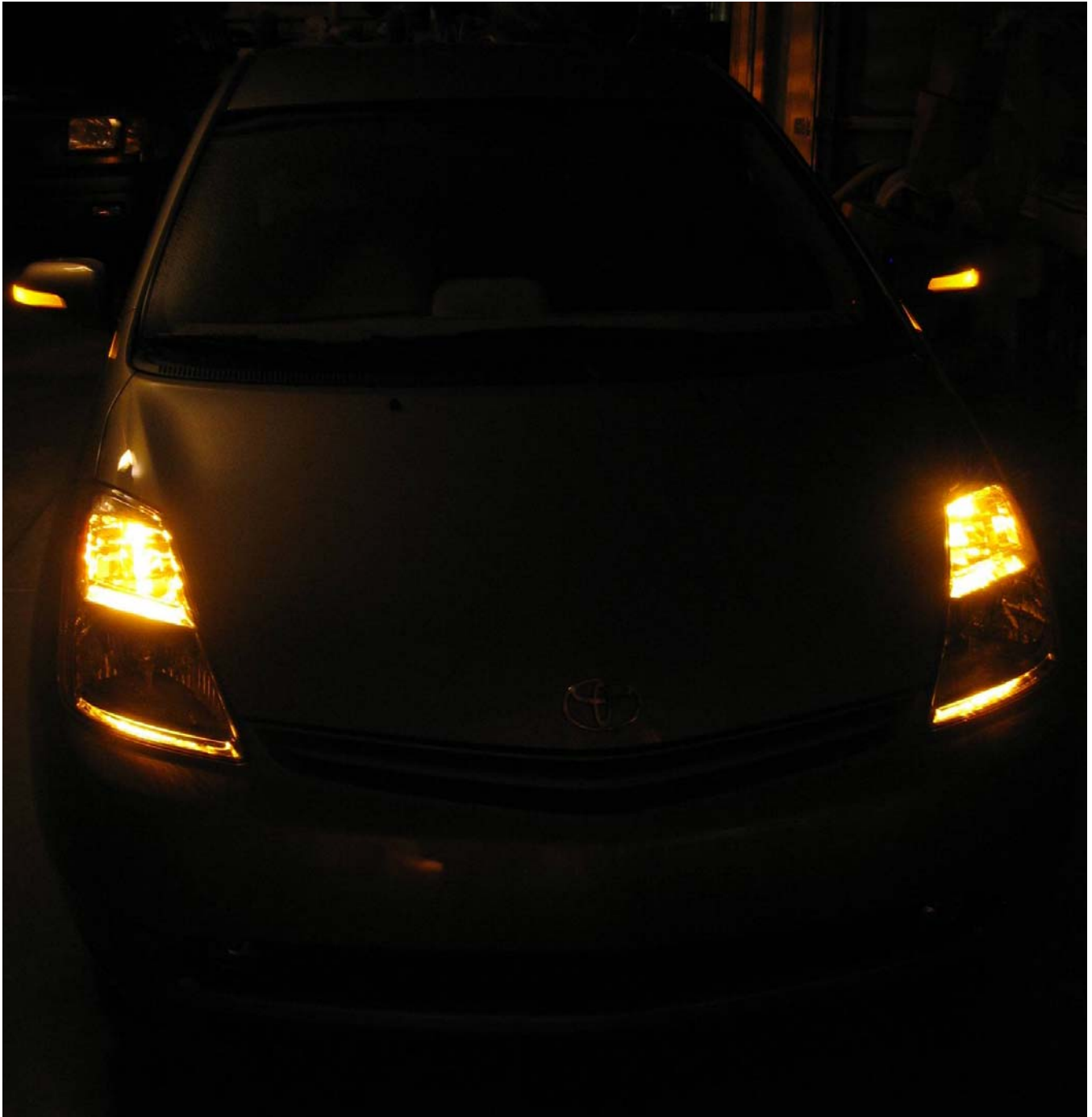
F RELAY LOCATIONS

○ : Driver Side J/B Lower Finish Panel (See Page 20)



Turn Signal and Hazard Warning Light





IT WORKS! YEAH BABY!!!

Have fun your new turn signal mirrors! You still need to check your blind spot when changing lanes, but I feel this modification provides a worthwhile enhancement to the safety of the vehicle. You might even find yourself signaling in front of other Prii just to let them know yours is special!