

BROOKERDYNAMICS

Instruction/Installation Manual Rev 1

**Audi B8.5 A5/S5
SwitchBack DRL**

Instructions for the installation of SwitchBack DRL Boards and Controller for 2013-2016 Audi A5/S5

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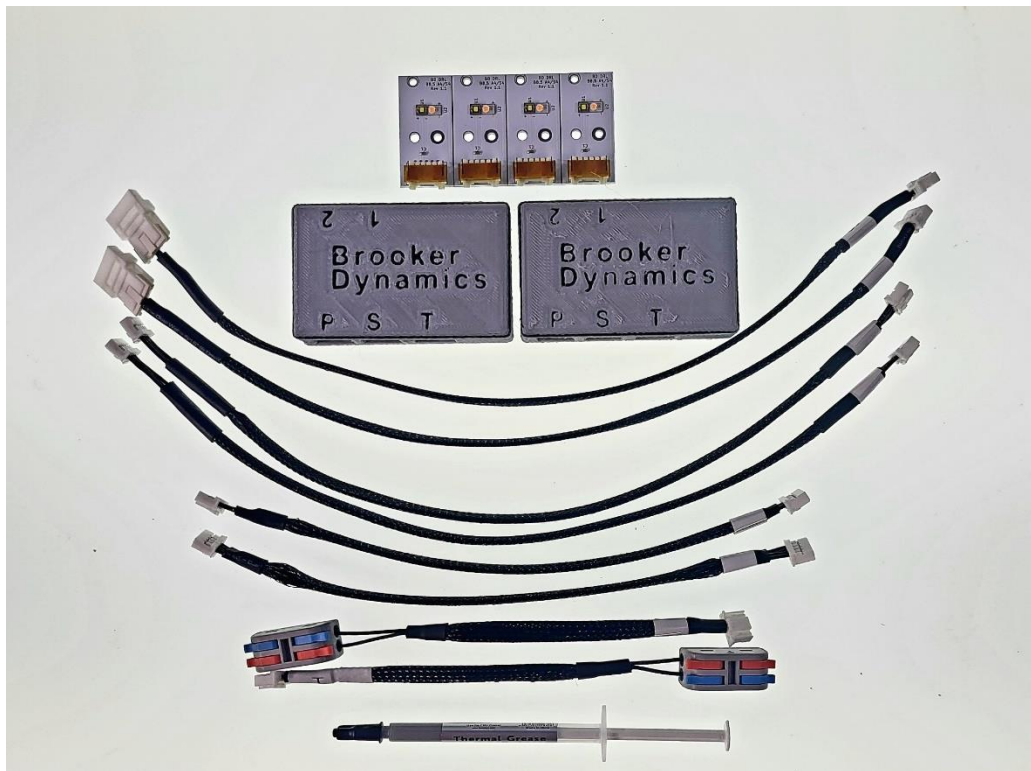
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Introduction

This manual is an overview of the installation of SwitchBack DRLs for Audi A5/S5 MY 2013-2016 which feature the LED daytime running lights. This kit will add a switchback function to your headlights' DRLs allowing them to be used for your front signaling light. This kit includes a driver module which passes through power to the white LEDs, contains the necessary circuitry to prevent bulb error warnings for the DRL, and provides power to the amber LED. The factory DRL driver module is retained for driving the white LED. If your DRLs are non-functional due to a failed DRL driver, you must first replace this component before attempting replacement of the DRL boards included in this kit. This is likely the case if you have a bulb warning and both DRLs in a headlight are nonfunctional. If your DRLs are extremely yellow, it could be the result of aging DRL light tubes. It is recommended that you replace those while you have your headlights apart.

Included in this kit:

- Four (4) SwitchBack DRL boards
- Two (2) SwitchBack driver modules
- Two (2) Secondary white signal cable extensions
- Two (2) 12" long JST PA cables for connecting to DRL board
- Two (2) 8" long JST PA cables for connecting to DRL board
- Two (2) Turn Signal pigtails with JST PA connectors
- Thermal Adhesive



Tools Needed for Installation:

- Small flat head screwdriver
- Large flat head screwdriver
- T20 Torx screwdriver
- Needle Nose Pliers
- Box Cutter/Sharp blade
- Chisel or similar tool for prying off original PCB
- Wire Brush, Isopropyl Alcohol, and towel
- Heat Gun
- File (optional)



These tools are the tools I use to complete this installation myself. There are better methods used by professionals, which can reduce the risk of damage. For example, it would be preferable to use an industrial oven with accurate temperature control to remove the headlight lens. Unfortunately, this type of equipment is not available to the average DIYer, so I've written this manual with that in mind. If you do not feel comfortable attempting these repairs with the tools you have available, reach out to a professional installer. It is a relatively basic installation for anyone familiar with modifying vehicle headlights. I take no responsibility for damage you or your installer may cause during the installation of these DRL boards. Careful and patient

work will go a long way to ensuring you complete the installation without damaging any part of your headlight.

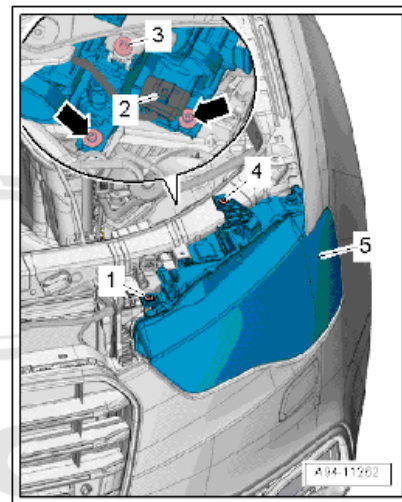
Removal of the Headlight from the Vehicle

Parts of this section are drawn from the factory erwin manual. There are also other sources online which may provide additional information as to the removal of the headlight. It's relatively easy, First you must remove the front cover above the center grille which is held on with pop rivets. Then remove the two torx screws on top of the headlight, and loosen the two screws on the rear of the headlight near the bottom. There is no need to remove those rear screws. Just loosen them and then the headlight can slide forward. There is a drain tube attached on the side closest to the middle of the vehicle which will need to be removed. Do not forget to reinstall this tube later, failing to do so can lead to condensation in your headlamp. These instructions were pulled from the A4/S4 manual. At this time I do not have access to the manual for an A5/S5. I presume the layout is very similar though the actual bolt locations may differ slightly. Besides, the primary scope of this manual is the DRL replacement, so I recommend you search online for other guides on removal of the headlamp itself if needed.

1.2.2 Headlamp, Removing and Installing, Halogen Headlamps from MY 2013

Removing

- Turn off the ignition and remove the key.
- Turn the headlamp switch to "0".
- Remove the lock carrier cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Front Bumper; Overview - Bumper Cover .
- Disconnect the connector -2-.
- Remove the bolts -1 and 4-.
- Remove the bolt -3- and remove the adjusting mechanism from the headlamp housing.
- Loosen the screws -arrows- a few turns from the headlamp housing.
- Remove the headlamp -5- toward the front from the body.
- The ventilation hose may need to be removed from the bracket to do this depending on the date of manufacture.

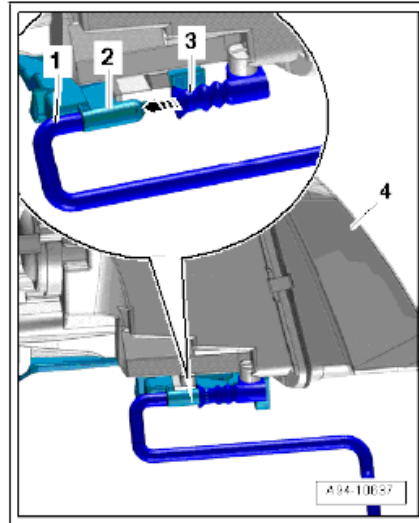
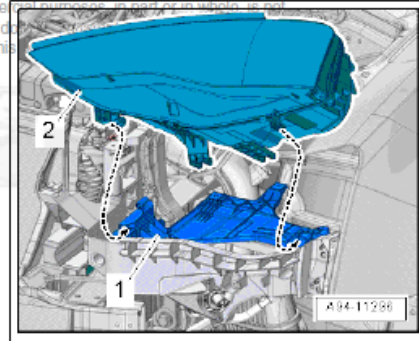


Installing

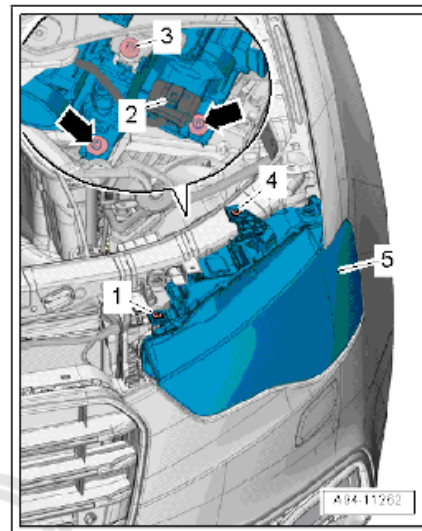
- Tightening specification. Refer to ["1.1.2 Overview - Headlamp, Halogen Headlamps from MY 2013", page 116](#).

Install in reverse order of removal. Note the following:

- When inserting the headlamp -2- into the mount -1-, make sure the guide tracks on the headlamp engage in the guides on the mount -arrows-.
- Headlamp must slide gently into mount and without using force.
- When sliding the headlamp -4- in, make sure the headlamp ventilation -3- slides evenly into the mount -2- for the ventilation hose -1- -arrow-.



- Tighten the bolts -1, 3 and 4- and -arrows-.
- Install the lock carrier cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Front Bumper; Overview - Bumper Cover .



Removal of Headlight Lens

The removal of the headlight lens is a tricky process which can be accomplished by a DIYer with patience and caution. The headlights in the B8.5 A5/S5 use a type of butyl sealant which becomes hard at ambient temperatures, but with a moderate amount of heat it becomes very malleable. The key to removing the lens is to heat the sealant to a high enough temperature to reach malleability without damaging the plastic components of the headlamp. With an industrial oven this can be done easily with accurate temperature control. Since that's unlikely to be available to most of the people purchasing these boards, I've described the process for removing the lens with a heat gun, flat head screwdriver, and knife below. In addition to this manual, I would recommend watching some videos on the process. I've linked a few below for reference:

Using a heat gun (also includes headlamp removal from vehicle)

<https://www.youtube.com/watch?v=wTW4YESJPp0>

Using an oven, but very detailed:

<https://www.youtube.com/watch?v=0cwlgsRyHqM>

Step 1 Remove clips:

Remove the retaining clips around the headlamp lens. I slide a small flat head screwdriver under them and twist to pop them off. Set aside for reinstallation later.





Step 2 heat up adhesive:

Heat up the glue at the seam between the lens and headlamp housing. Do this gradually, continuously moving the heat gun around the seam several times without leaving it in one spot too long. For a cautious approach use the low setting on your heat gun to preheat the seam, but you'll likely need the high setting to reach temperatures where the glue will release.

Step 3 Separate the seam:

Pry apart the seam, slowly, but carefully. It seems easiest to start near the middle at the point of the lens. Using a wide flat screwdriver, insert the tip into the seam and twist lightly. If the seam doesn't separate relatively easily, you likely need more heat. As you separate the light it can be easier to run a sharp blade across the glue where it becomes stringy. This can help prevent the headlight from resealing as you work your way around the seam of the headlamp. Work your way from the starting point to the other end of the lamp by separating both the top and bottom seams at the same time. Apply additional heat as needed.



Removing the Light Tube Shroud

Step 1 Remove trim around light

The first step to removing the light tube shroud in the A5/S5s is to remove one piece of trim around the light tubes which is preventing access to one of the screws holding the shroud in place. Start by carefully prying in the location below:



This will release a couple of clips holding the silver trim. It will take a good amount of force to pry this apart but be careful not to hold or rub against the chrome trim. It will rub off very easily. Next you will need to continue prying at the location in the following picture.



As you do this the trim should continue to release. Work your way to the top of the shroud and pry here next:



At this point you can likely reach the screw, but it may be easier to continue removal, so the light tube can be removed which will make shroud removal easier. Pry along the top of the shroud near each of the tabs shown below.



Next you can remove this trim, by prying in this final location. There are several tabs in this location, so it can be difficult to remove this section. After that the top light tube can be removed relatively easily.



Step 2 Remove screws:

First remove the 5 screws (T20) holding the shroud in place. The screw in the top right of the second image is very difficult to spot. It is the one we uncovered by removing part of the trim.





Step 3 Remove LED Board on rear of headlight:

On the back of the headlight you will find a heatsink which holds one of the two LED boards in these headlights. Remove the two screws holding this in place and pry the heatsink out of the headlight. This should be relatively easy. Then remove the screws holding the inside LED board to the bottom of the headlight. If you follow the lower inner light tube to it's source you will find this board held with a plastic bracket. I do not have a picture, but there are two screws holding that bracket in place. Remove those two screws, but leave the board in place. If you can reach the plug for this board, you can remove that at this time.

Step 4 Separate light tube shroud:

Now it should be relatively easy to remove the plastic shroud holding the light tubes. Start by prying out at the top outside corner of the shroud. Again, be careful not to damage the chrome trim. Once removed you can remove the inner LED board. You will also want to unhook the connector powering the side marker LED. It is located on the back side of the shroud below the headlamp lens.

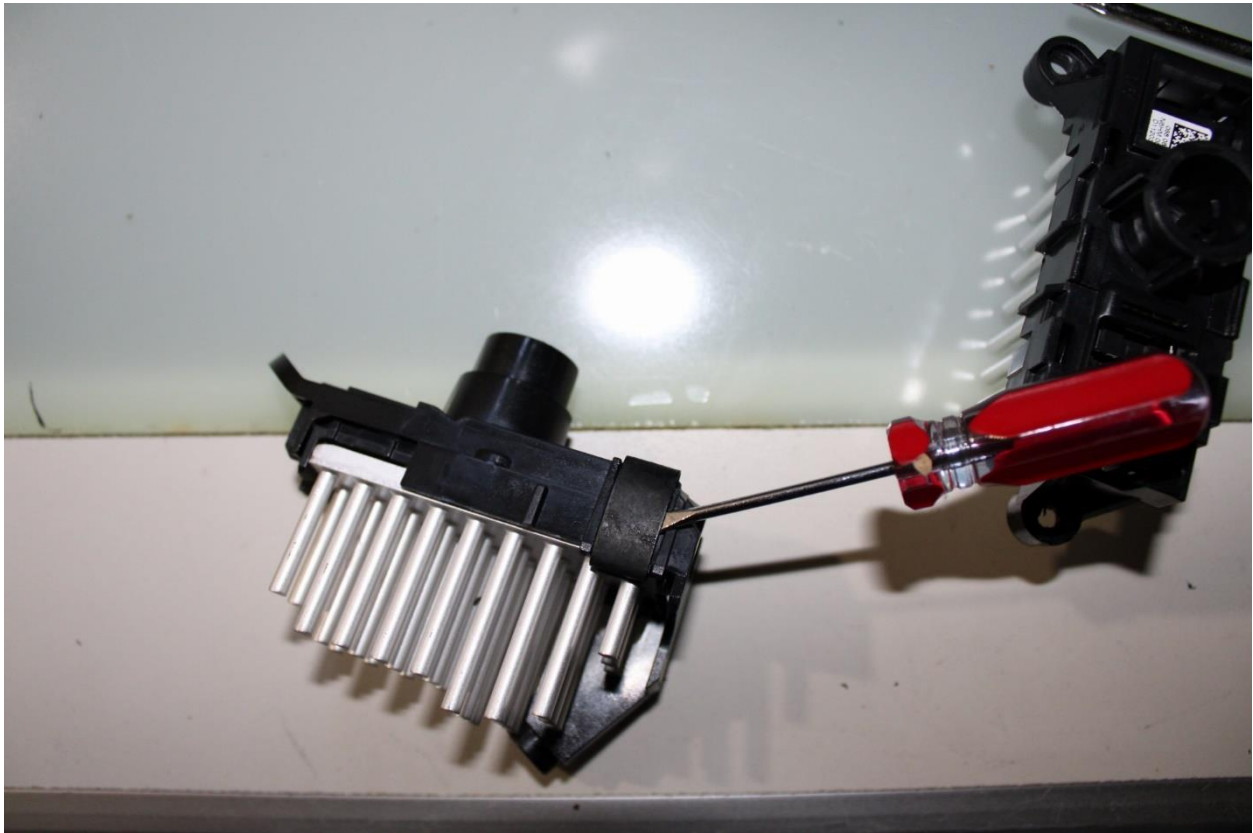


Removing the original PCBs

This section was originally written for the A4/S4, but the process for the A5/S5 is very similar.

Step 1 Remove DRL module housing:

Remove the housing for each DRL module. These modules have clips similar to the ones holding the headlight lens on. Remove those and then you can release the plastic clips holding these in place. The outer lamp has clips on the top and bottom, and the inner lamp has clips on the sides. Keep these separate from the clips for the headlight lens, they are slightly larger than those.





Step 2 Remove module clamping covers:

At this point you have two identical modules. Next you must remove the plastic cover from each heatsink. Each has 4 clips; two on top, and two on bottom. Remove them and pry off the covers.

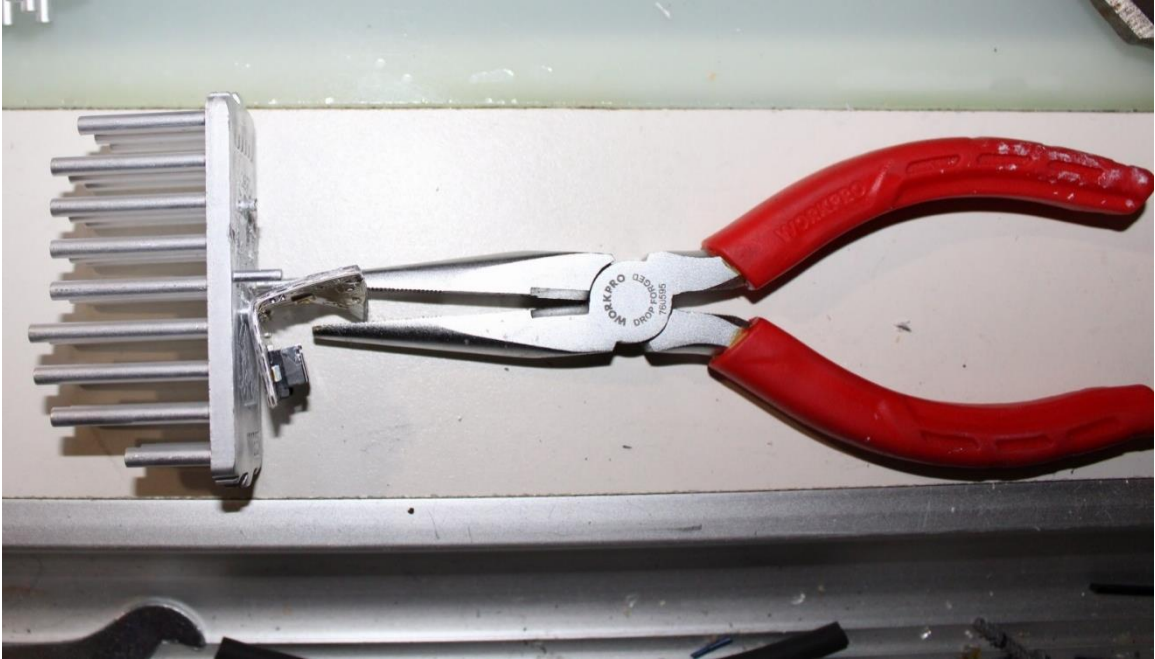


**Step 3 Remove original PCBs:**

Finally, you have two heatsinks with OEM DRL boards glued to them. Removing these PCBs can be a bit tricky, and, unfortunately, I haven't figured out a way to remove them without destroying the factory boards. If you're doing this though, they likely aren't any good anyway. I start in the corner of the board with a sharp knife, and then move to a chisel. The sharp edge seems to work well at prying off the board. At some point, you may find it beneficial to use pliers to help pull the board off.







Installing the SwitchBack DRL boards:

Step 1 Prepare heatsinks:

Clean up the heatsinks. Use a wire brush with isopropyl alcohol and a towel to remove as much of the factory glue as possible. You can use some sandpaper or a wire wheel if you have one.



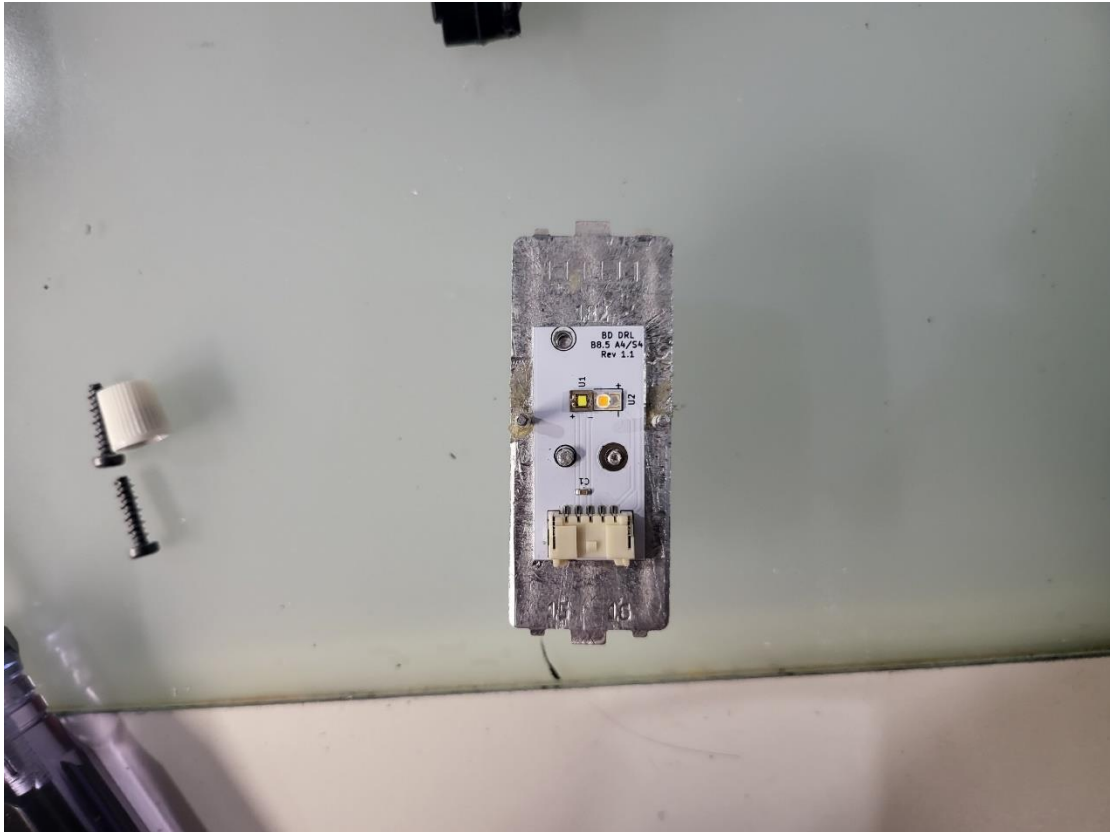
Step 2 Straighten heatsink Pins:

Straighten the pins. As far as I can tell the factory installation method involves mushrooming the pins to hold the boards in place while the adhesive dries. This leads to misshapen pins with different diameters between heatsinks. To counter this, the holes in the replacement PCBs are somewhat oversized, but in some cases, I've still had issues with installing new boards. It is a good idea to clean up the pins at this stage. A file would work best, but I've also found that grabbing the pin with some needle nose pliers and spinning it around can do a good job of removing burrs and some of the mushrooming. Just don't grip them too hard, on one occasion I broke a pin off. If this happens, it's not a big deal. Two pins are enough to properly locate the DRL board. Test fit the PCB onto the pins. Do not apply excessive force to do so, as it will be difficult to remove the board again without damaging it. If the boards fit easily, you can move onto the next step. If not continue cleaning up the pins until you can get the boards on without a significant amount of force.

**Step 3 Apply thermal paste:**

Place a small pea of thermal paste on the heatsink in the location under the LED. It would be a good idea to do all four at the same time and share the entire tube of thermal paste among all 4 boards. Then install the switchback DRL board, ensuring the paste is adequately compressed under the board.





Install SwitchBack DRL Kit

The installation of the Switchback kit is straightforward, but there are some things to note. All cables are labelled with corresponding inputs and outputs on the driver module. You must make sure the correct cables are plugged into the correct ports. Also, these JST PA connectors can be a bit finicky to work with. Be patient as you insert or remove them to avoid damaging the connectors.

Step 1 Connect the Turn Signal pigtail

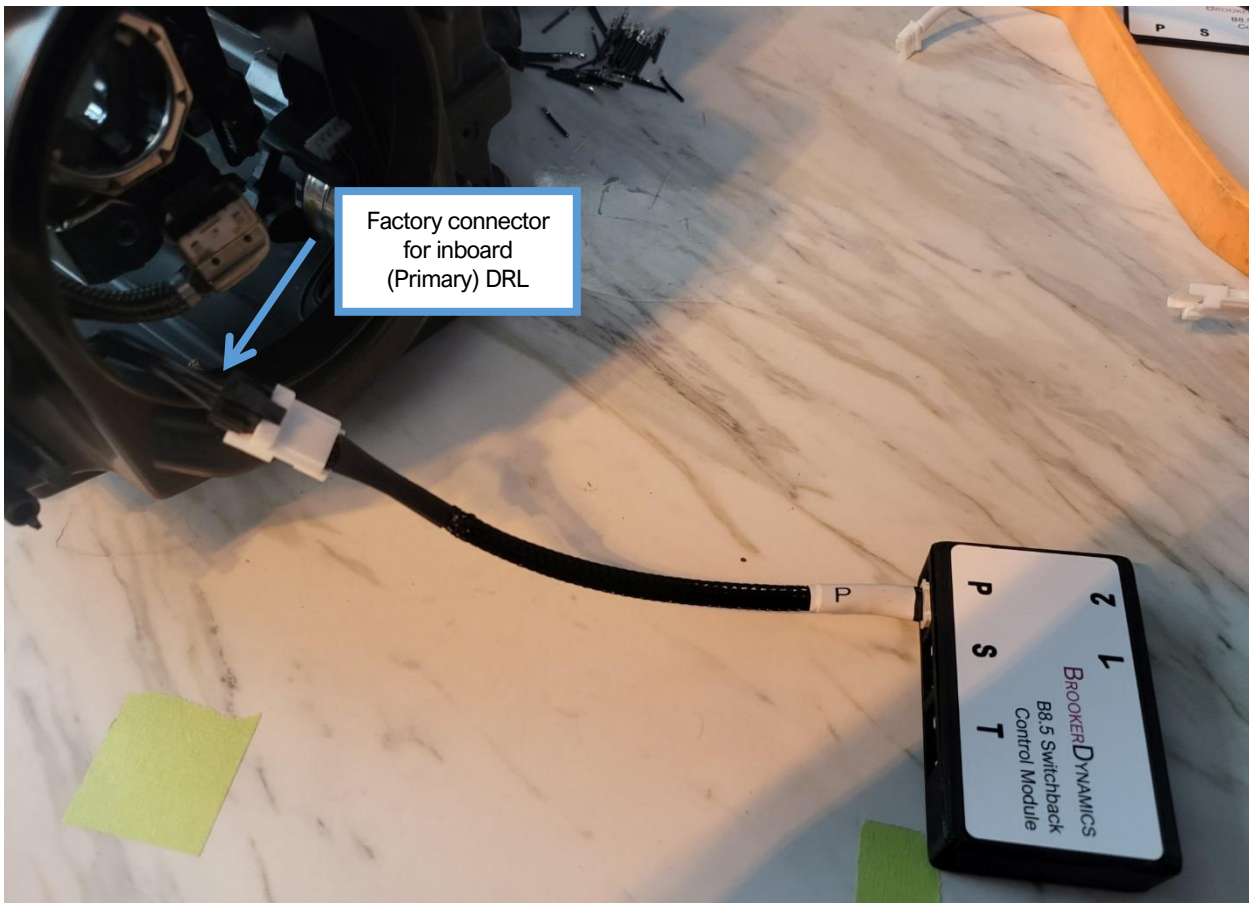
Next, we'll need to splice into the turn signal wires to get power to the amber LEDs. This is the only "wiring" you will have to do for this install. The turn signal pigtail, labelled "T", includes a lever connector to do this easily with a reliable connection. You'll need to cut the wires going to the halogen turn signal bulb. Strip about 3/8" of both wires, and the wires on the halogen housing if you intend to retain that bulb. Then simply insert the wires into the lever connector as shown below. There is no need to worry about polarity when connecting these wires. My control module has a rectifier for that.

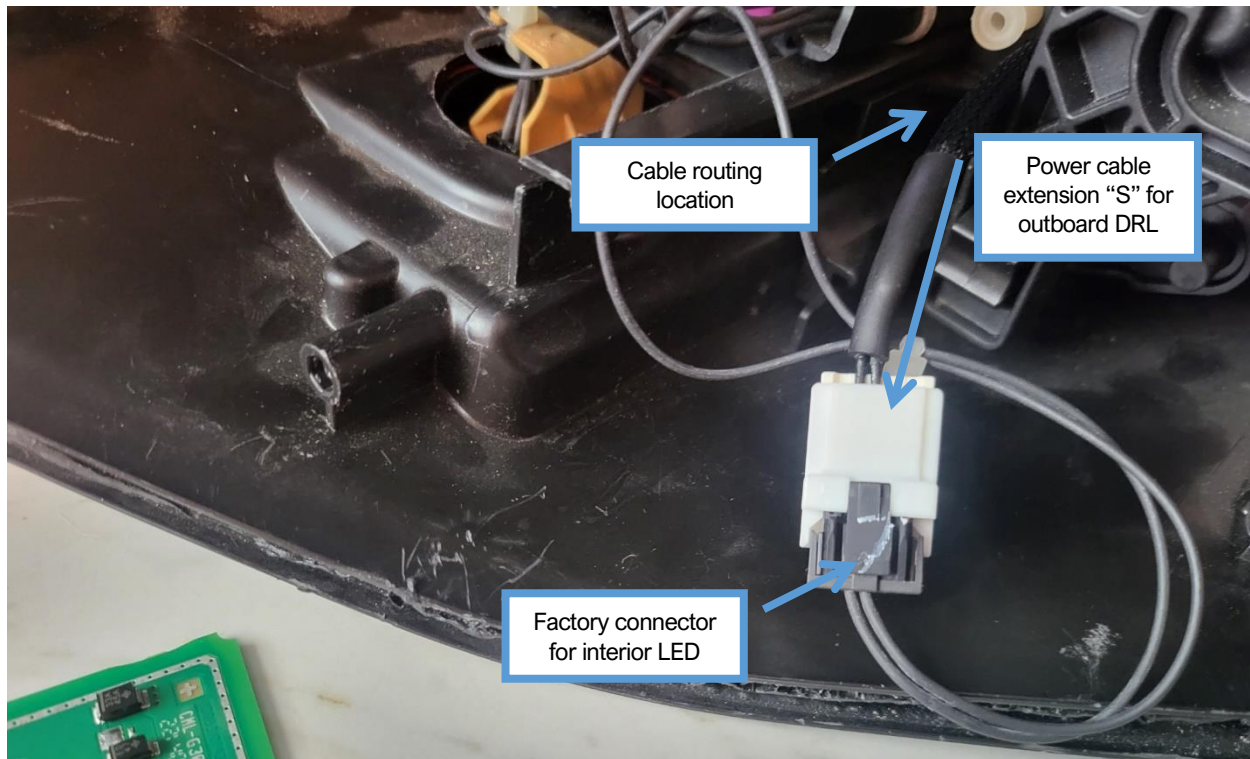




Step 2 Connect the control module to the 3 inputs

This is probably the most critical part. There are 2 extension cables labelled P and S. The primary (P) one should plug into the plug which connected to the board with two LEDs. This plug has 5 wires attached. The secondary one should attach to the plug which powered the single LED board, it only has two wires.





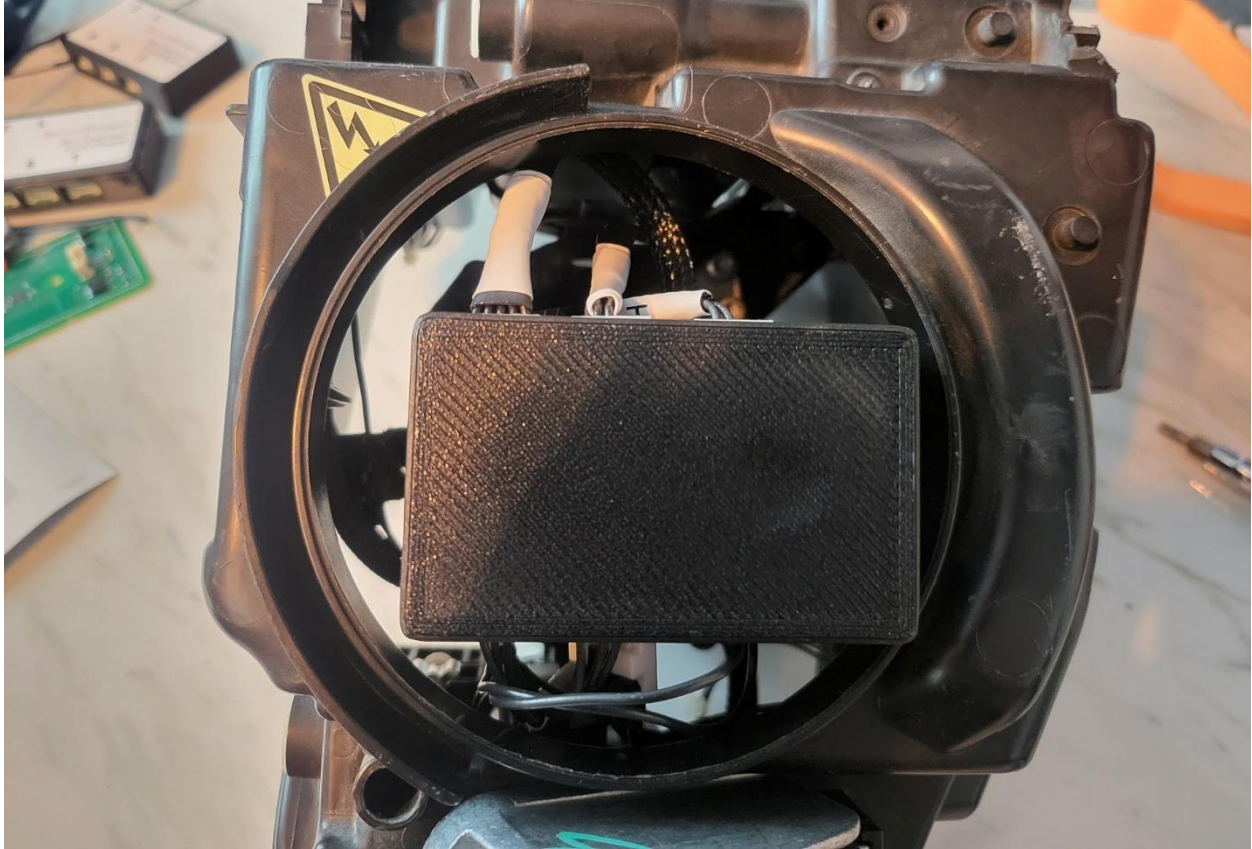
Step 3 Install DRL Modules and connect the 2 outputs

Now you can install the assembled DRL modules in their corresponding locations. On the outboard side, remember not to install the top screw, that one is installed after the shroud with light tubes goes back on. There are two cables to connect each of the DRL boards to the control module. Cable 1 is a 12" cable which should be around the projector, avoiding any mechanisms inside the light. It will plug into the inner LED board. Cable 2 is a shorter 8" cable which can be plugged into the inboard DRL module. Make sure both are plugged into the correct port as labelled on the Switchback module. On the A5/S5 kit these two cables have a wire connecting them to each other at the end which plugs into the control module.

Step 4 Cable manage all the wiring.

It can be a bit of a rats nest inside these lights. My recommendation is to have the module sit behind the xenon headlamp. You can attach it to the circular headlamp cover with some Velcro or zip ties to help keep it in place. This will make it easy to work on in the future.





Step 6 Program BCM

To test the headlights before assembly we'll need to program the BCM to enable switchback. There are two changes to make/verify for this. I prefer VCDS, but you should be able to use any of the alternatives that can do long coding modifications. Both of these bits should be active.

First confirm that the factory option to "wink" DRLs hasn't been deactivated:

```
Disable LED 'wink' on turn signal
[09 - Cent. Elect.] [Coding - 07] -> Long Coding Helper -> Byte 3
Bit 7 - Turn off LED-strip DRLs with indicators (1 = active)
```

Then modify the factory code to enable "wink" with headlamps on:

```
Enable DRL "wink/switchback" with headlights on:
[09 - Cent. Elect.] [Coding - 07] -> Long Coding Helper -> Byte 27
Bit 4 - DRL (Daytime running lights) shutdown with turn signal active [PR-8EX/8EY]
(1 = active)
```

You may also want to increase the brightness of your white DRL. In some locations the default brightness seems to be set at 8 which can lead to a bulb error with these kits. I recommend increasing that to a range between 20-40. If you get a bulb error this is likely the culprit.:

Adjust LED brightness

[09 - Cent. Elect.] [Security Access - 16] (enter security code. One of the default codes is- 20113)

[Adaptation - 10] -> Channel 3

Set between 5 and 100

Step 7 test headlamps before final assembly

Now that you've coded in the switchback function you can temporarily plug in your headlights and check that everything works. Cycle the ignition on and run through various turn signal/flasher tests. If something isn't working double check the connections. You should not receive any Bulb warnings for the DRLs.

Step 8 Reassemble everything else:

You got this far. Just work backwards and put everything back together.

There is a control board on the bottom of the turn signal reflector housing. This controls the side marker LED. If you choose to remove the turn signal reflector, remove this board, and leave it connected inside the headlamp.

I typically reuse the original glue for the lens, and I haven't had any issues, but I've included a link to some butyl tape in case you'd like to have some on hand. This may be a good time to replace the lens if it's in bad shape, or the light tubes if you broke one. You can find replacements on AliExpress.

Butyl Tape:

https://www.amazon.com/gp/product/B07CTQ67X9/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1