

BROOKERDYNAMICS

Instruction/Installation Manual Rev 1

**Audi B8.5 A4/S4
SwitchBack DRL**

Instructions for the installation of the SwitchBack DRL Kit for 2013-2016 Audi A4/S4

Brooker Dynamics
Tyler Brooker
1225 N Alexander Ave
Royal Oak, MI 48067
Email: btb.tyler09@gmail.com

Table of Contents

Table of Contents.....	2
Introduction	4
Removal of the Headlight from the Vehicle	6
Removal of Headlight Lens.....	8
Step 1 Remove clips:	8
Step 2 heat up adhesive:	9
Step 3 Separate the seam:	9
Removing the Light Tube Shroud.....	11
Step 1 Remove screws:	11
Step 2 Turn Signal cover:.....	12
Step 3 Final screw:.....	12
Step 4 Separate light tube:.....	12
Removing the DRL Modules.....	15
Step 1 Corner Lamps:.....	15
Step 2 Remove DRL modules:.....	15
Step 3 Testing new Boards:.....	17
Removing the original PCBs.....	18
Step 1 Remove DRL module housing:	18
Step 2 Remove module clamping covers:.....	20
Step 3 Remove original PCBs:	21
Installing the SwitchBack DRL boards:.....	25
Step 1 Prepare heatsinks:.....	25

Step 2 Straighten heatsink Pins:..... 26

Step 3 Apply thermal paste and install DRL board:..... 27

Install SwitchBack DRL Module and wiring 30

Step 1 Remove Projector Housing (optional): 30

Step 2 Connect the Turn Signal pigtail 32

Step 3 Connect the control module to the 3 inputs 33

Step 4 Install DRL Modules and connect the 2 outputs 35

Step 5 Reinstall the projector 36

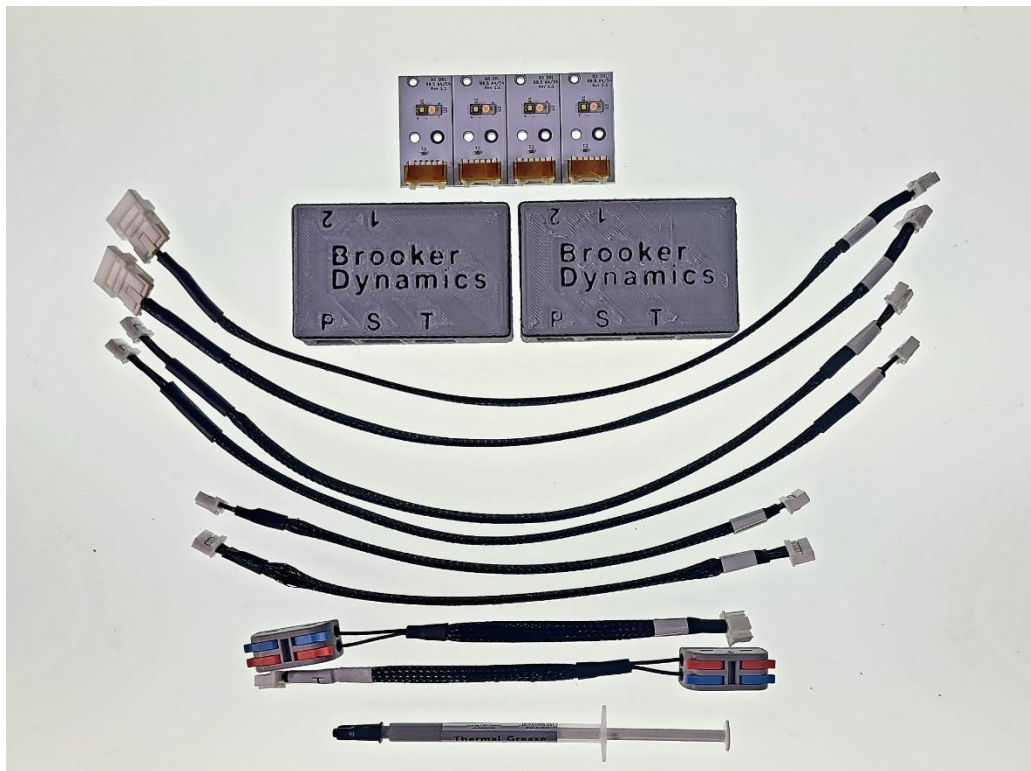
Step 6 Reassemble everything else 37

Introduction

This manual is an overview of the installation of SwitchBack DRLs for Audi A4/S4 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 Paste



Tools Needed for Installation:

- Small flat head screwdriver
- Large flat head screwdriver
- T20 Torx screwdriver
- Needle Nose Pliers / Wire Strippers
- 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 install without damaging any part of your headlight.

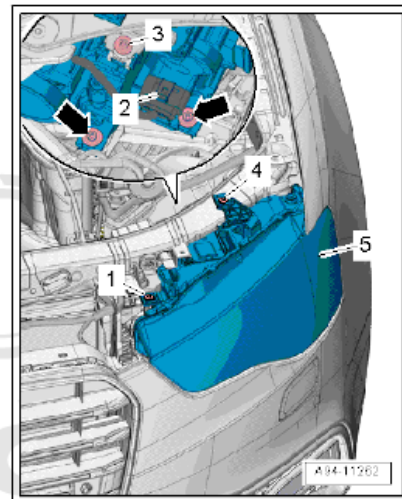
Removal of the Headlight from the Vehicle

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.

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.

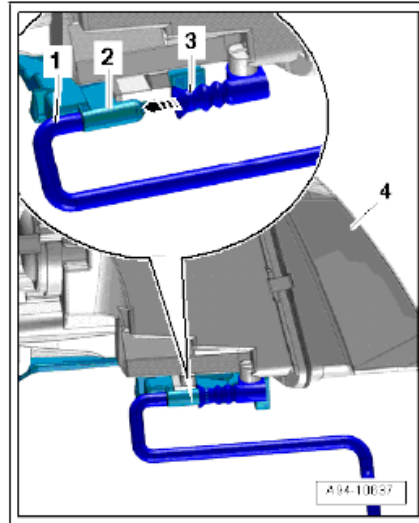
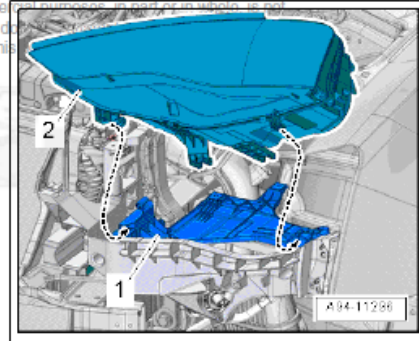


Installing

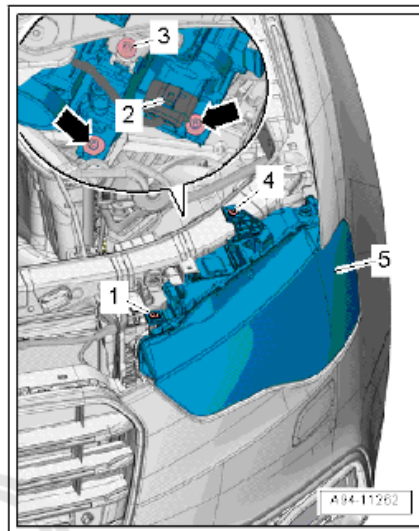
- Tightening specification. Refer to ["1.1.2 Overview - Headlamp, Halogen Headlamps from MY 2013", page 116](#).

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 A4/S4 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:

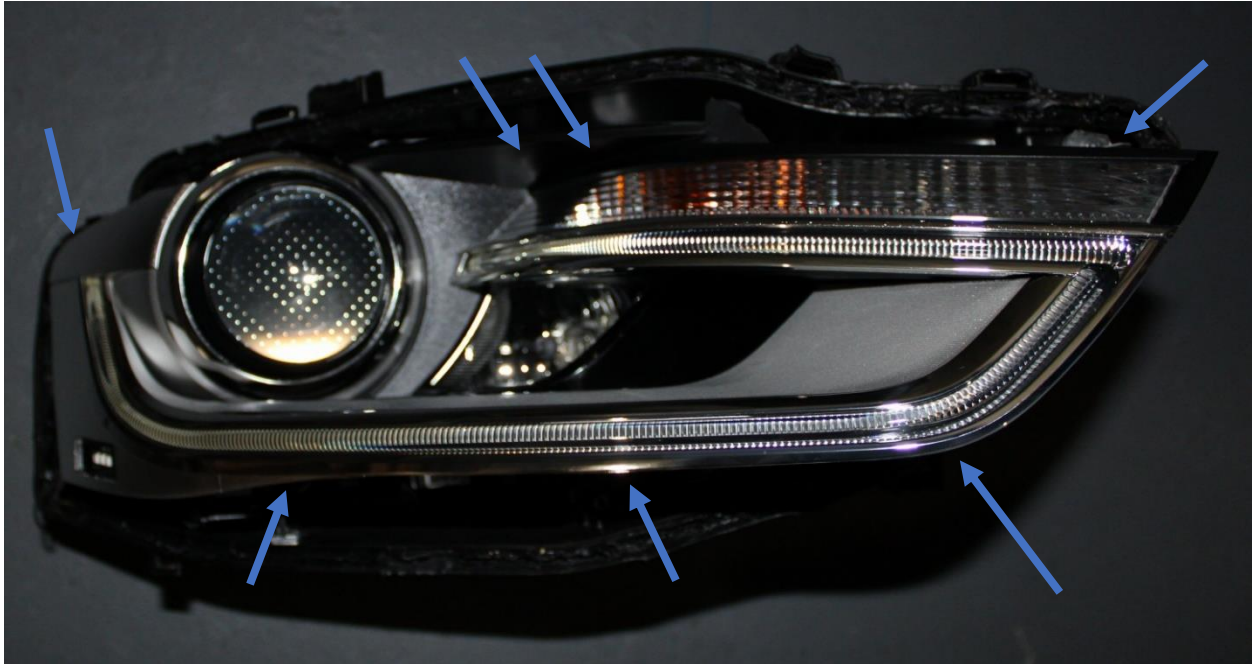
Pry apart the seam, slowly, but carefully. It seems easiest to start near the middle at the point of the lens. Using a wide flat screwdriver, insert the tip into the seam and twist lightly. If the seam doesn't separate relatively easily, you likely need more heat. As you separate the light it can be 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 screws:

First remove 7 of the screws (T20) holding the shroud in place. The screw in the top left of this image is very difficult to spot. An additional image shows the screwdriver being used to remove this screw.



Step 2 Turn Signal cover:

Remove the black plastic cover above the Turn signal housing. It's held on with one of the screws removed in the previous step and a plastic clip at the point of the lamp.

Step 3 Final screw:

Remove the 8th screw holding the light tube shroud in place. It's hard to spot, but it sits behind the black shroud you removed in the previous step.



Step 4 Separate light tube:

This process can be un-nerving as it takes a significant amount of force to remove the light tubes from their housings. Start on the outer light tube and pull straight out on the shroud until the light tube releases from the housing. Once this tube releases, you'll need to pull out the second tube. This one is a bit harder to grab on to. I grab around the tube between the turn signal housing and corner light housing. If your headlamp lacks the corner lights, this may be slightly different. Once you pull the second light tube out, you'll need to unplug the side marker LEDs. It is a clip style connector you'll need to squeeze to unplug. I like to use needle nose pliers for this connector.

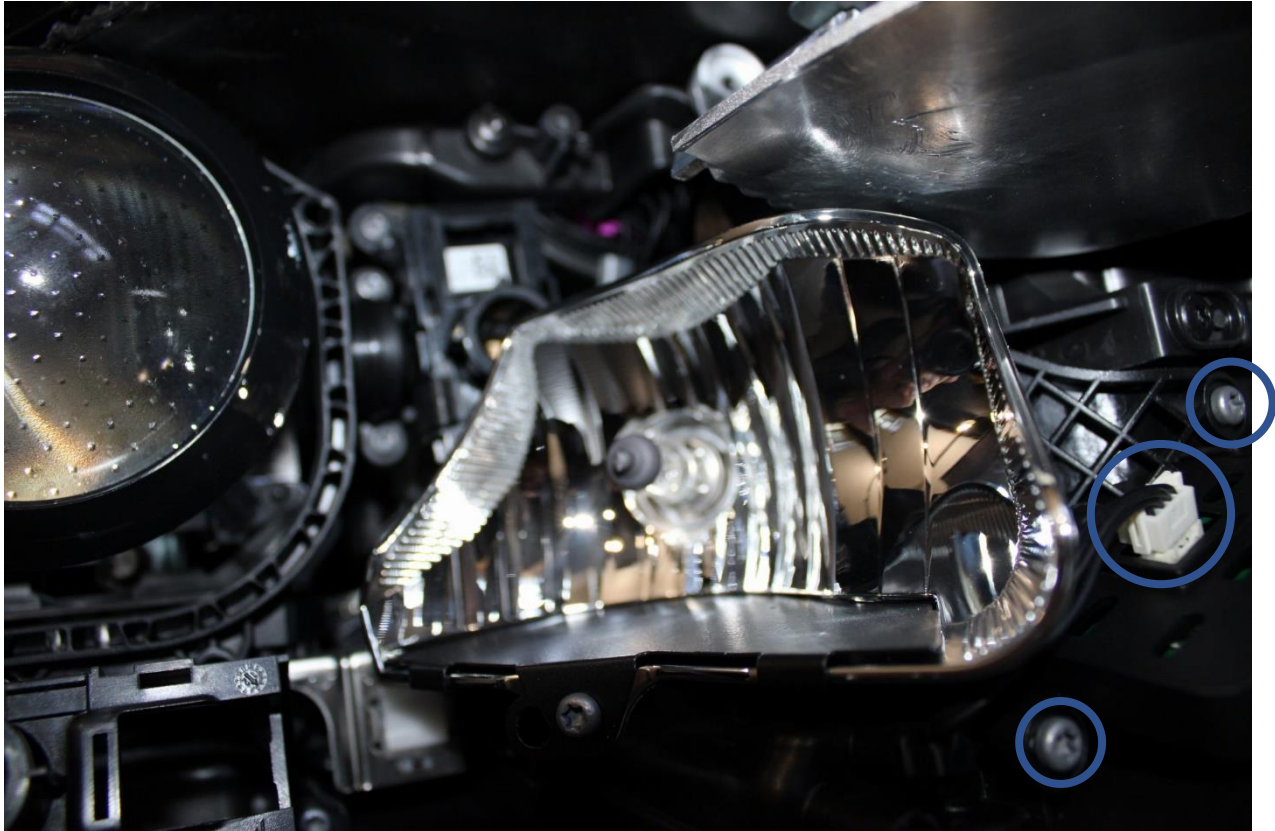




Removing the DRL Modules

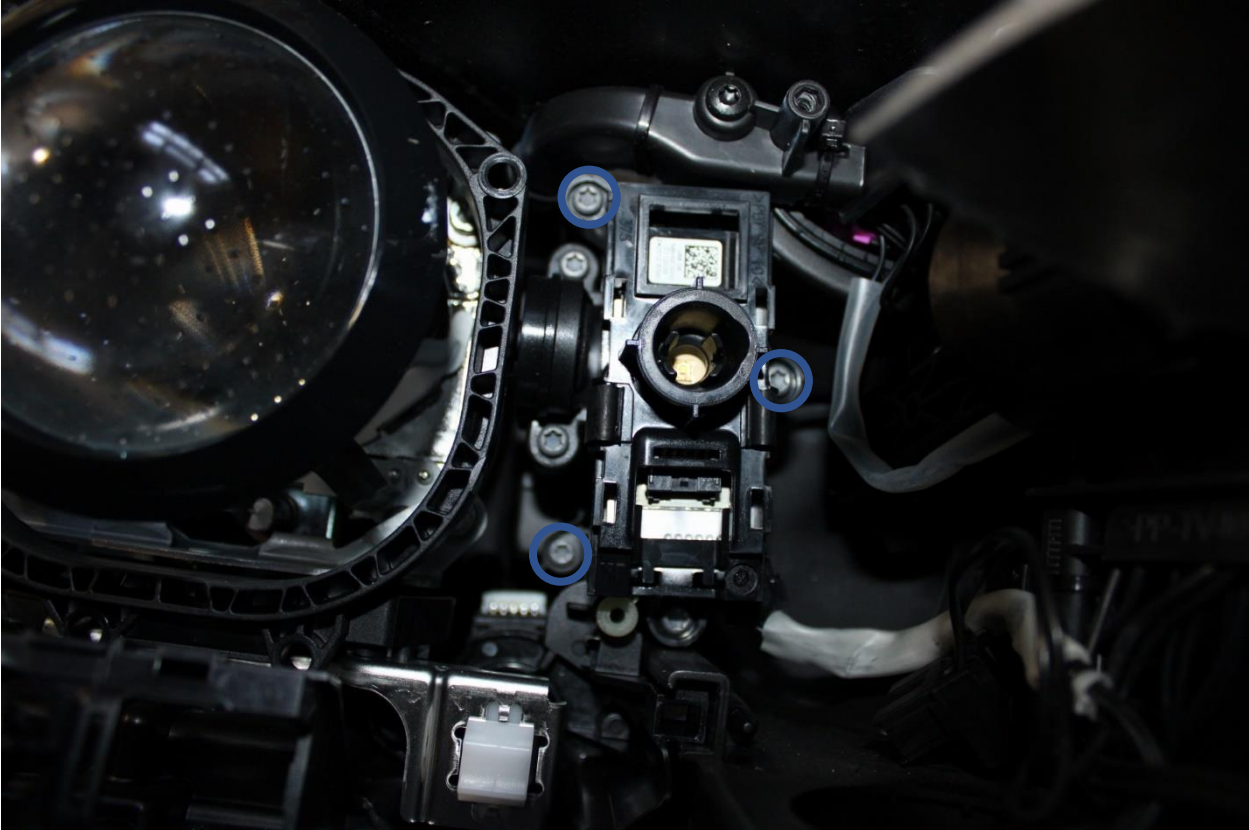
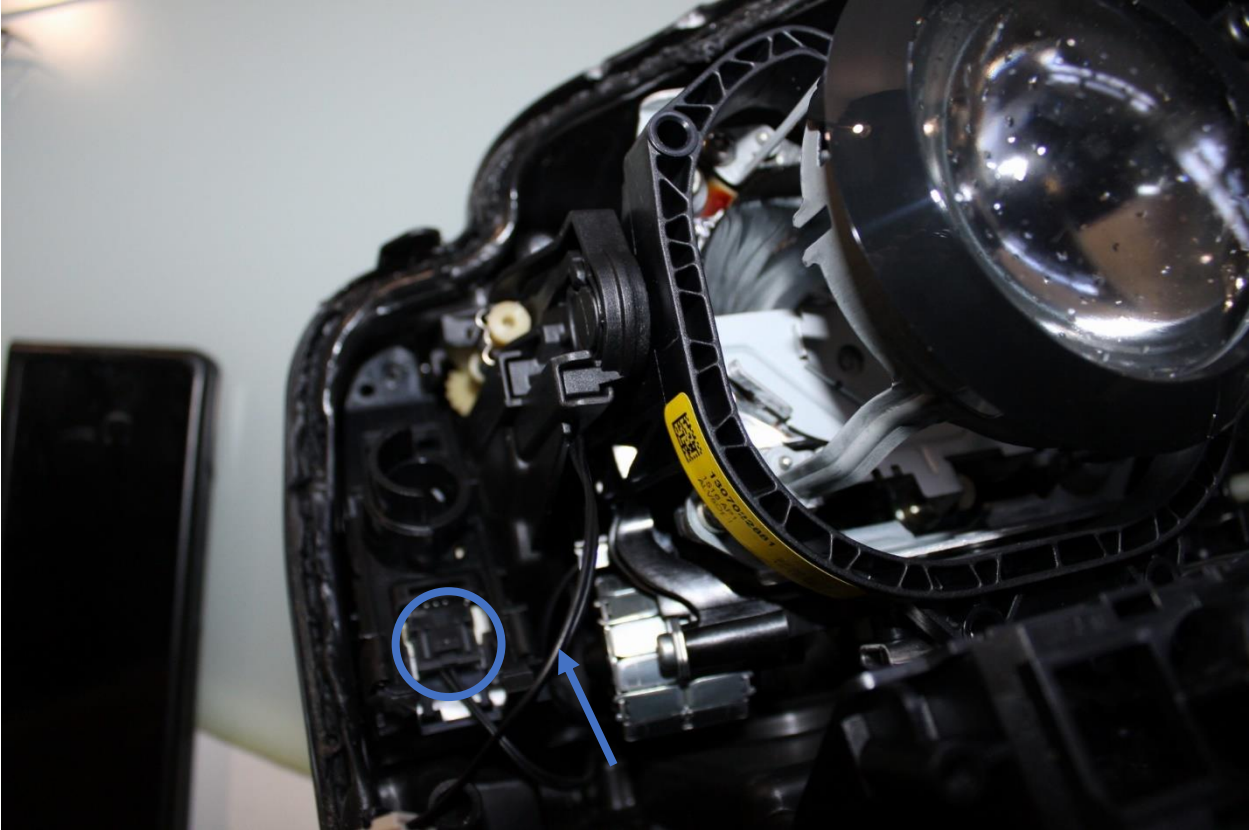
Step 1 Corner Lamps:

If you have cornering lamps, you'll need to remove that before proceeding. There are two screws and a connector to remove, and the component will slide out. You'll need to unplug or remove the bulb now too.



Step 2 Remove DRL modules:

Remove the DRL Modules. The outer module has one torx screw to remove, and you can unplug the cable at this point as well. The inner module has three screws to remove. Both modules will pop out once you remove the screws.





Step 3 Testing new Boards:

(Optional, but recommended)

At this point I like to verify that the boards I'm about to install work as expected. All the boards shipped to customers have been tested on a bench, but shipping could cause damage if the packages are mishandled. To test the boards, you can plug two of your included boards into the cables unplugged from the factory DRL modules in the previous step. Just set them in the headlight, or tape them to the headlight housing with a bit of electrical tape. Without reassembling your headlight, you can set the headlamp back in place in your vehicle, plug in the headlight harness, and turn your vehicle ignition on. Both LEDs should light up as you'd expect the daytime running lights to. Do not leave the DRLs running for more than a minute or two like this. The aluminum PCB will dissipate heat for a short run, but they are designed to work in conjunction with the larger heatsinks which are part of each DRL module. If you perform this test and you have a bad board, or your boards do not work, reach out to us. Your board may have been damaged in shipping.

Removing the original PCBs

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.

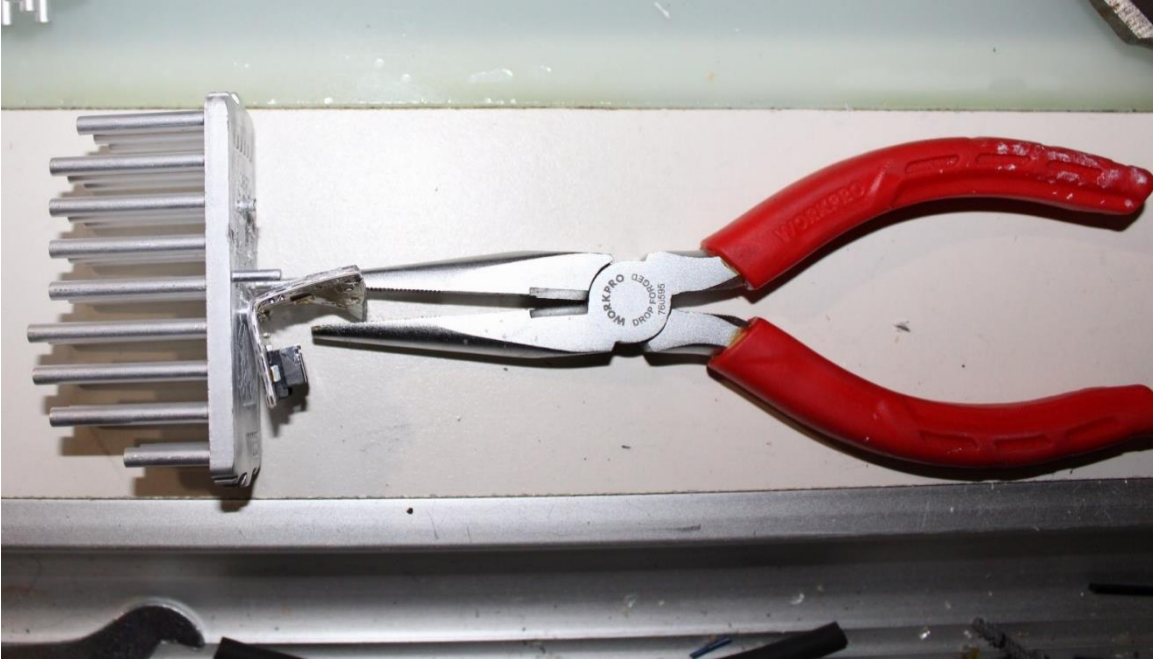


**Step 3 Remove original PCBs:**

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.



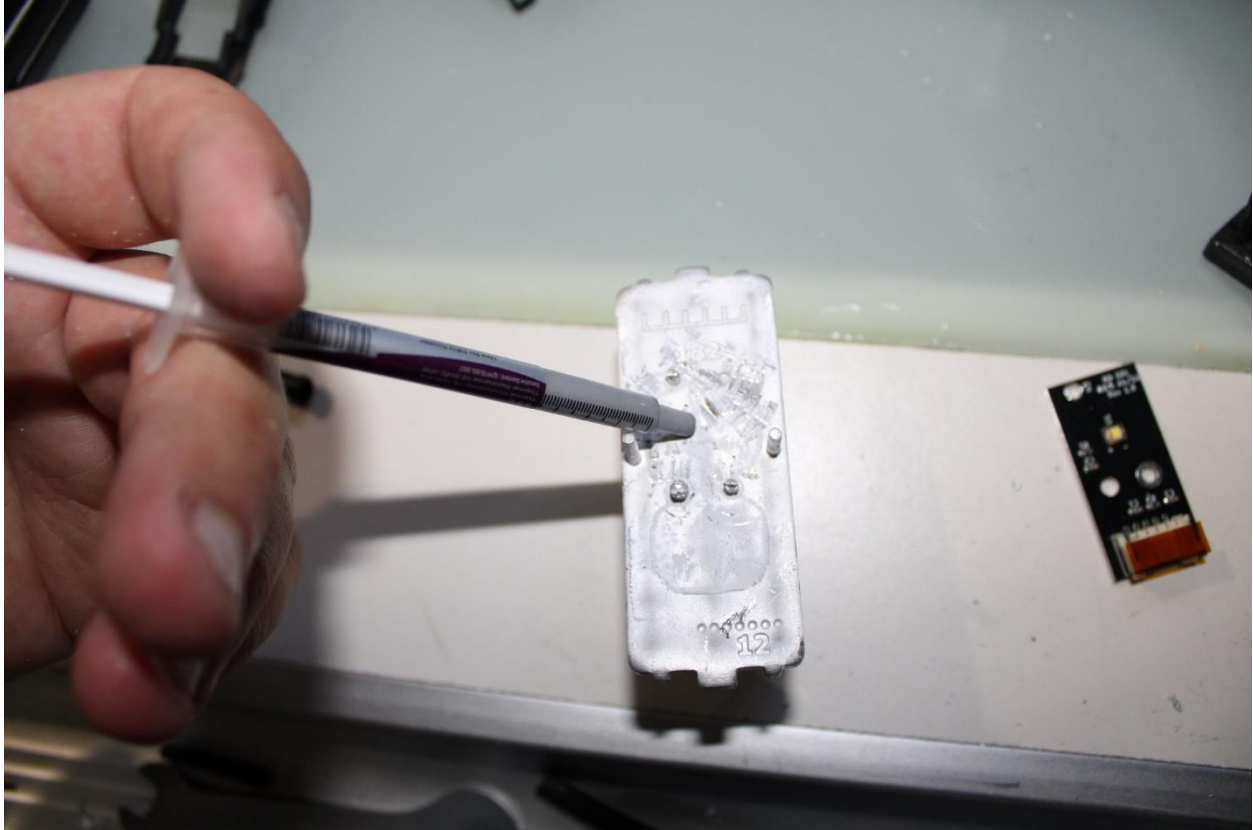
**Step 2 Straighten heatsink Pins:**

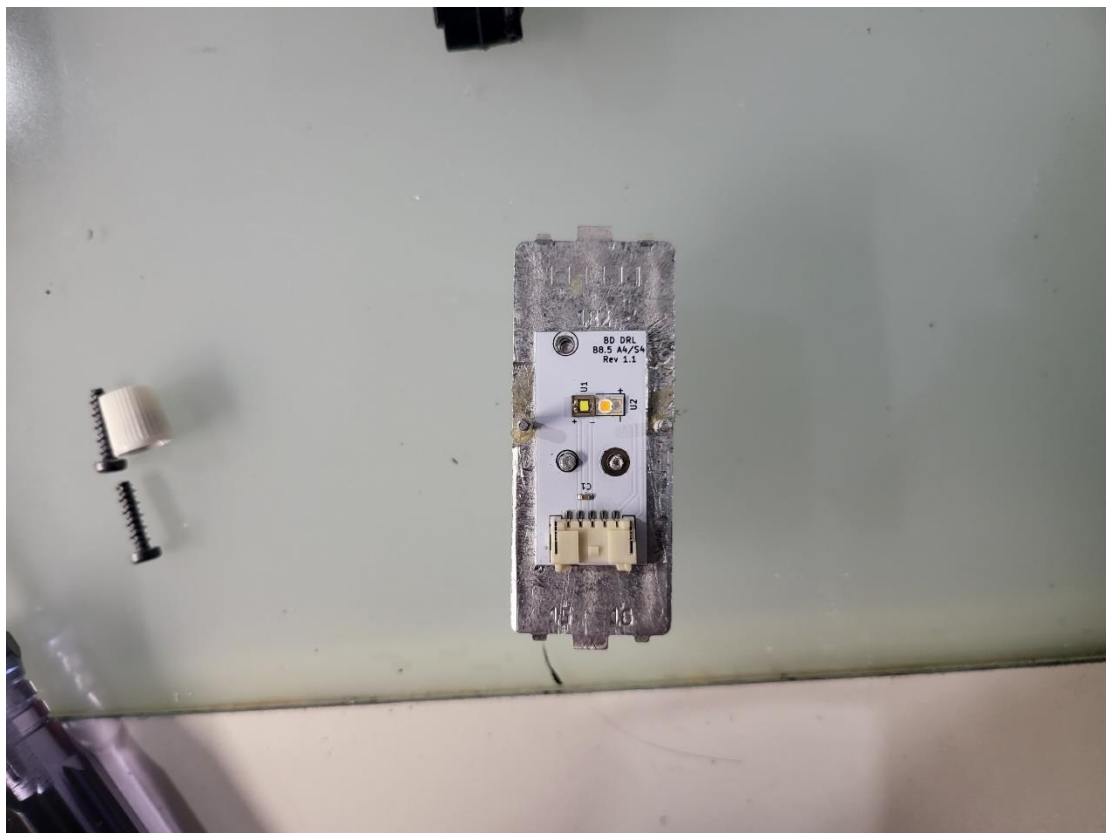
Straighten the pins. As far as I can tell the factory installation method involves mushrooming the pins to hold the boards in place while the adhesive dries. This leads to misshapen pins with different diameters between heatsinks. To counter this, the holes in the replacement PCBs are somewhat oversized, 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 and install DRL board:

Place a small pea of thermal past 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.



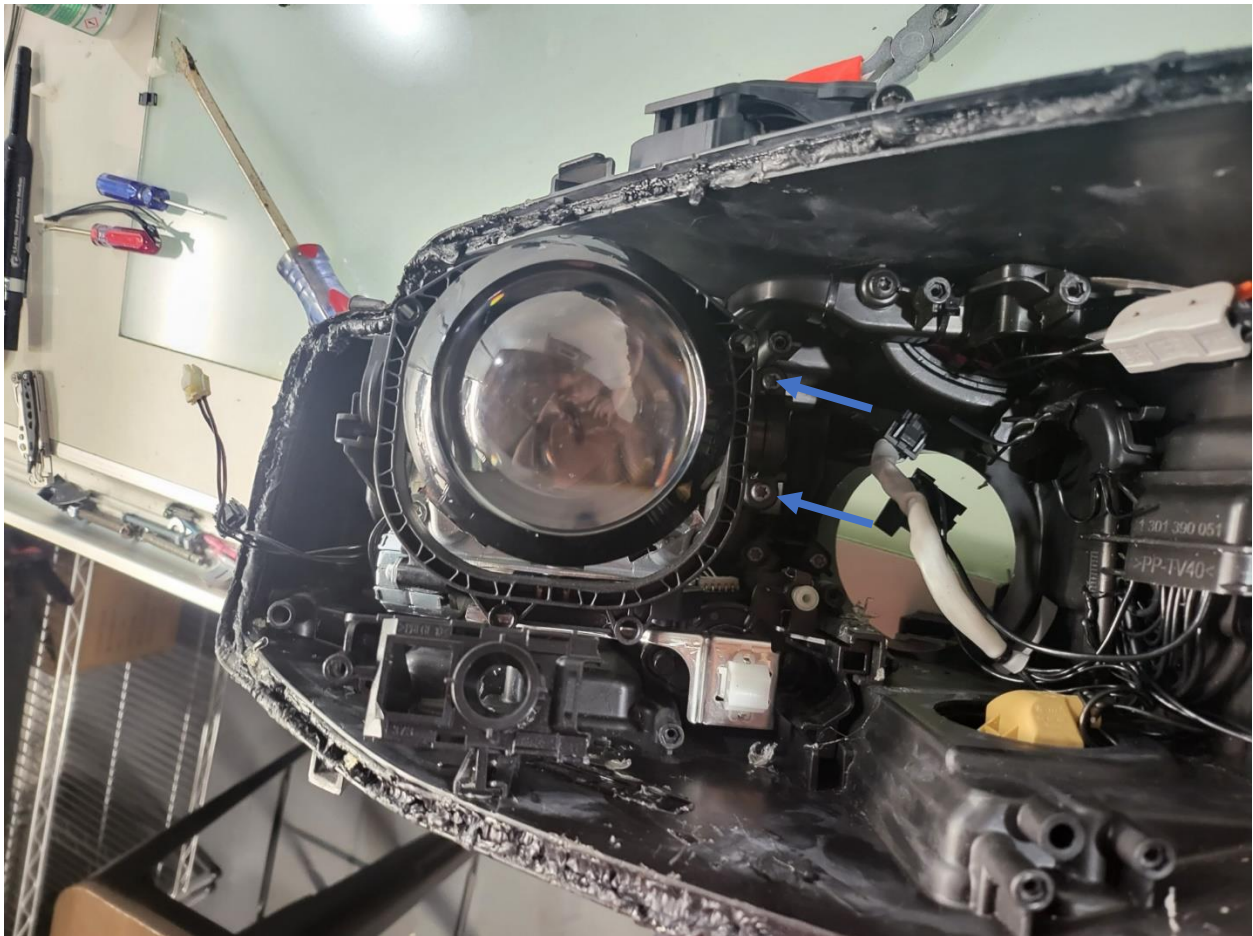


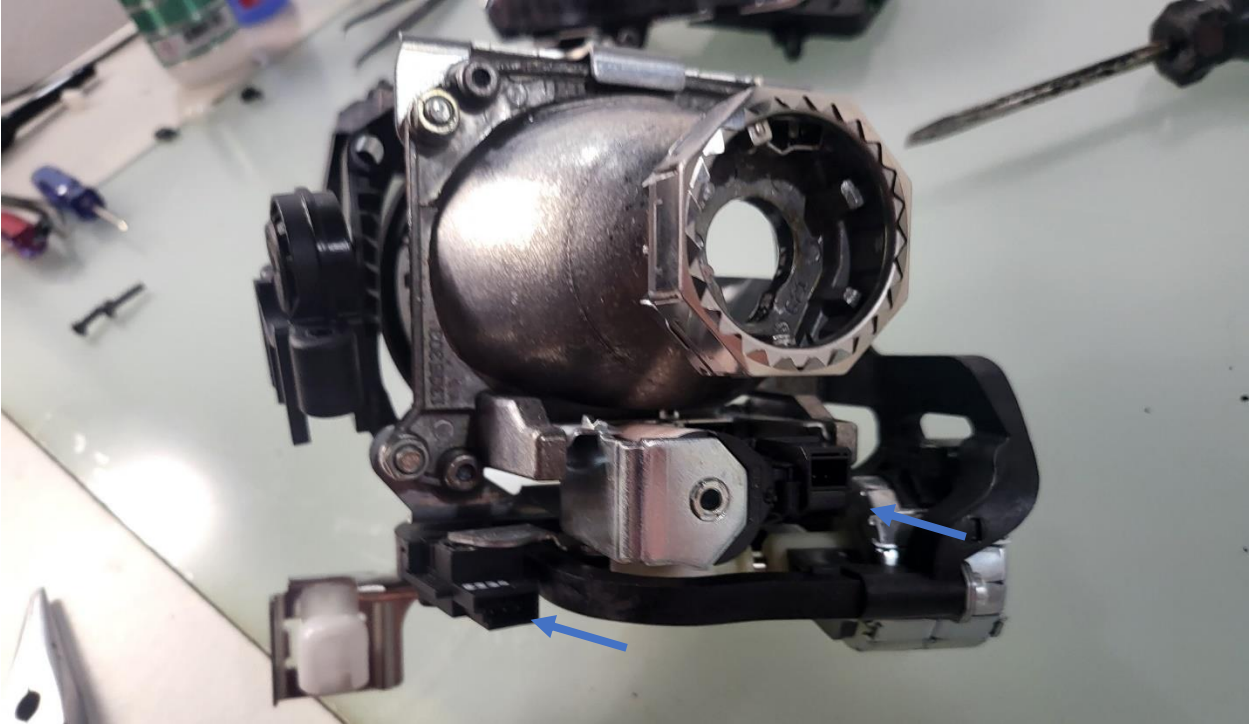
Install SwitchBack DRL Module and wiring

The installation of the Switchback kit is pretty 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 Remove Projector Housing (optional):

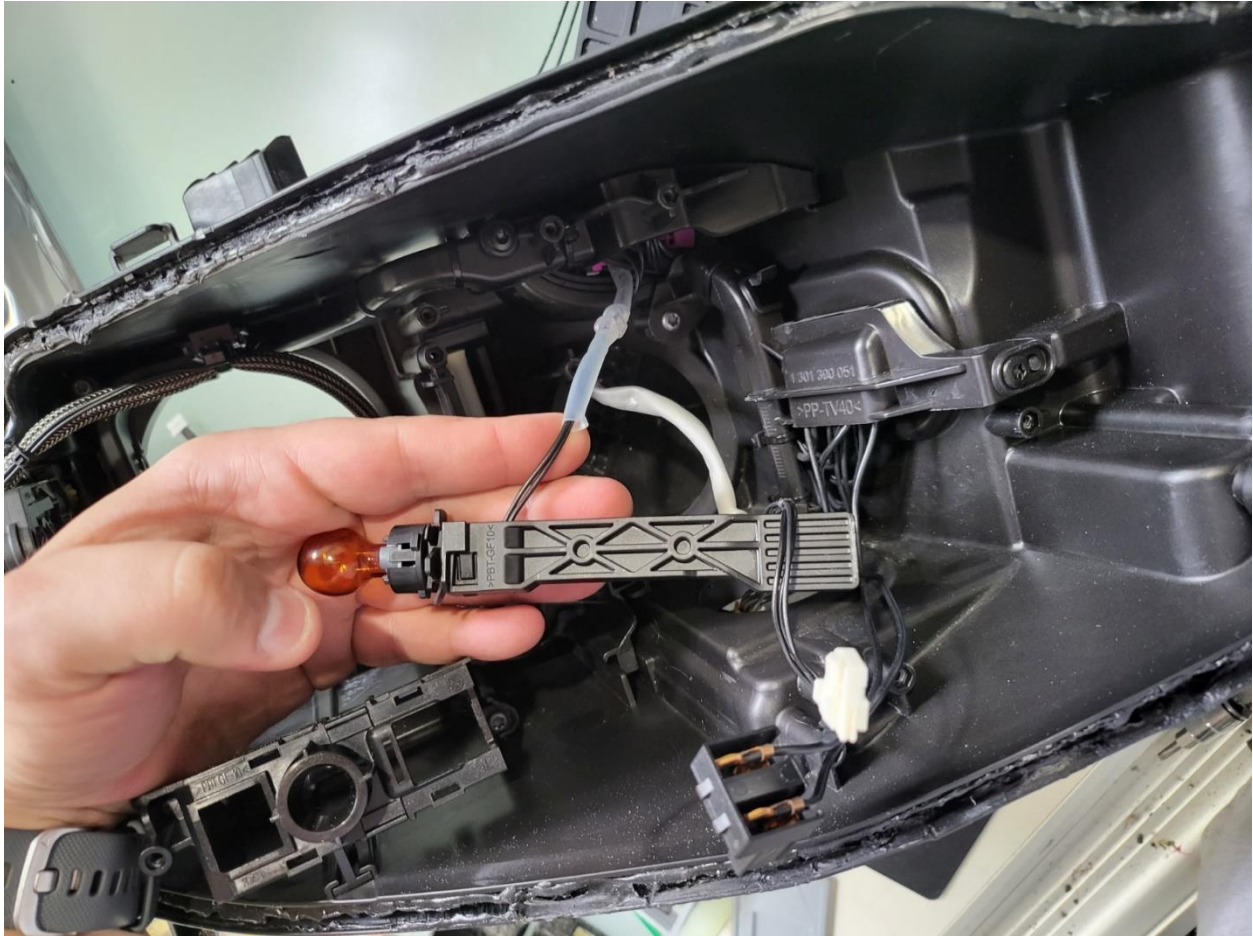
In my earlier installs I never did this, but I now find it's much easier to route the cables if you get this out of the way and it's relatively easy to uninstall/reinstall. There are two T20 screws on the side near the original turn signal. Remove those and it's easy to pull the projector housing out. There are some joints on the opposite side and bottom just below the screws to be aware of as you do. On the Adaptive Headlights there are 3 cables connected to the projector housing, just remove those carefully for now, and keep track of which one goes where. Two of them are interchangeable, but for reference the one zip tied to the primary DS3 bulb cable goes to the solenoid for the high beams. Now would be a good time to upgrade projectors too. EM Tuning sells an excellent G5 projector kit that I'm very happy with. Below are a picture with the two screws pointed out, and two pictures with the connector locations called out.





Step 2 Connect the Turn Signal pigtail

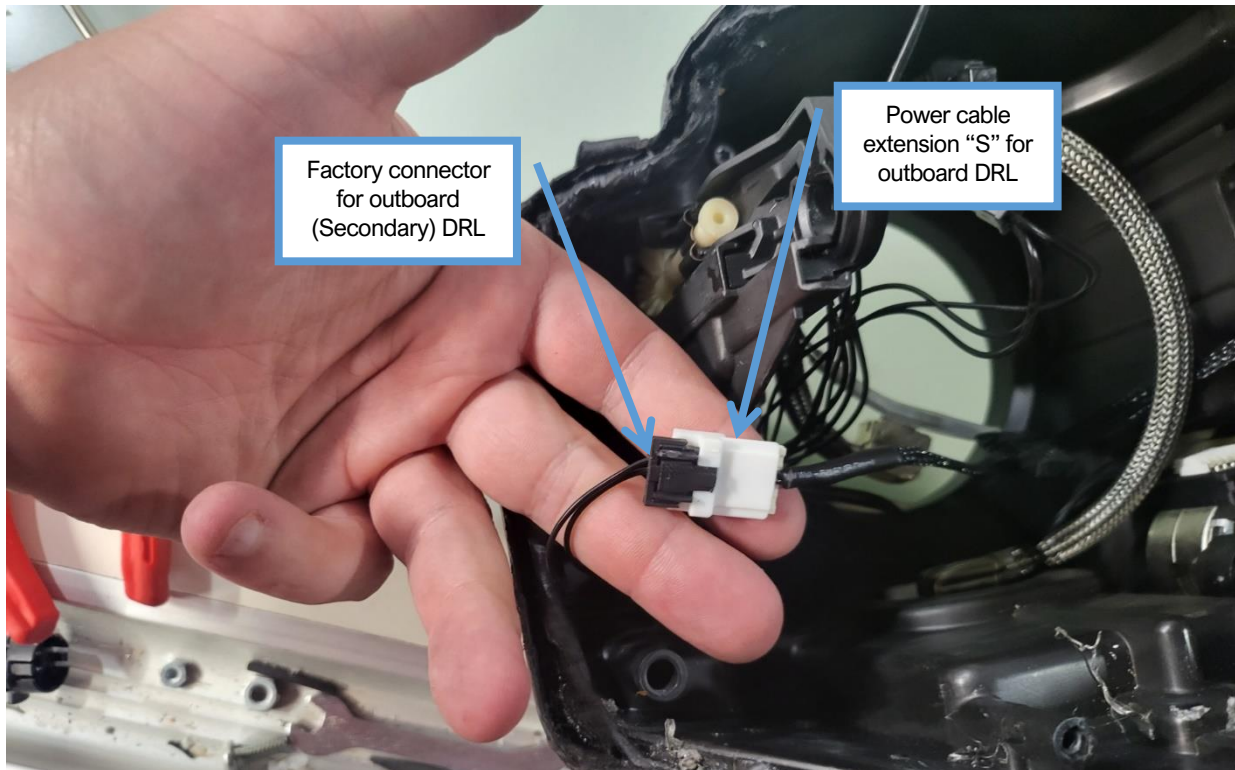
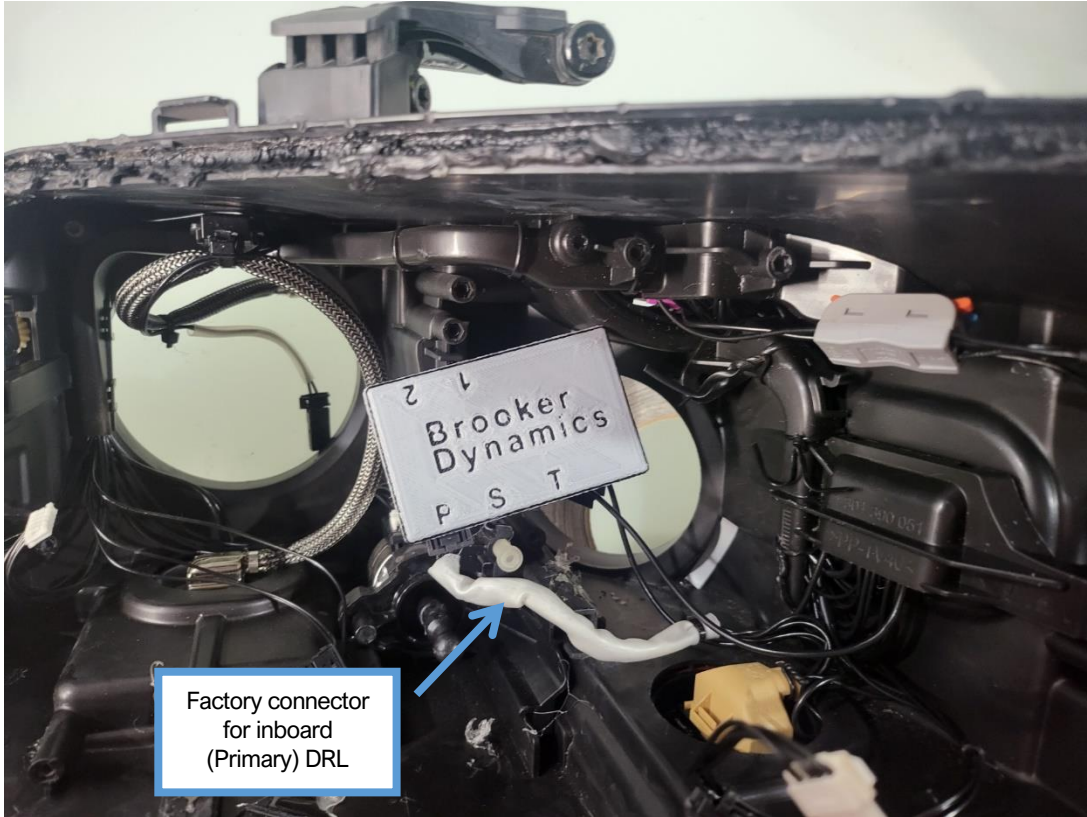
Next, we'll need to splice into the turn signal wires to get power to the amber LEDs. This is the only "wiring" you will have to do for this install. The turn signal pigtail, labelled "T", includes a lever connector to do this easily with a reliable connection. You'll need to cut the wires going to the 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.

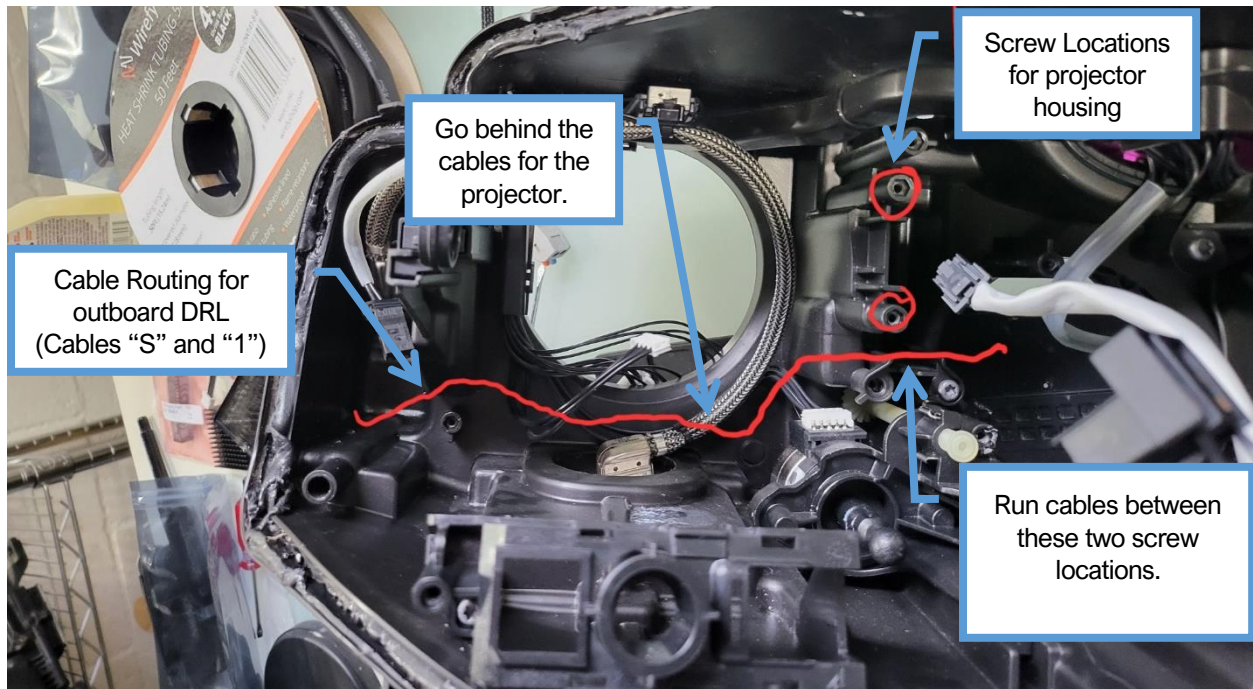




Step 3 Connect the control module to the 3 inputs

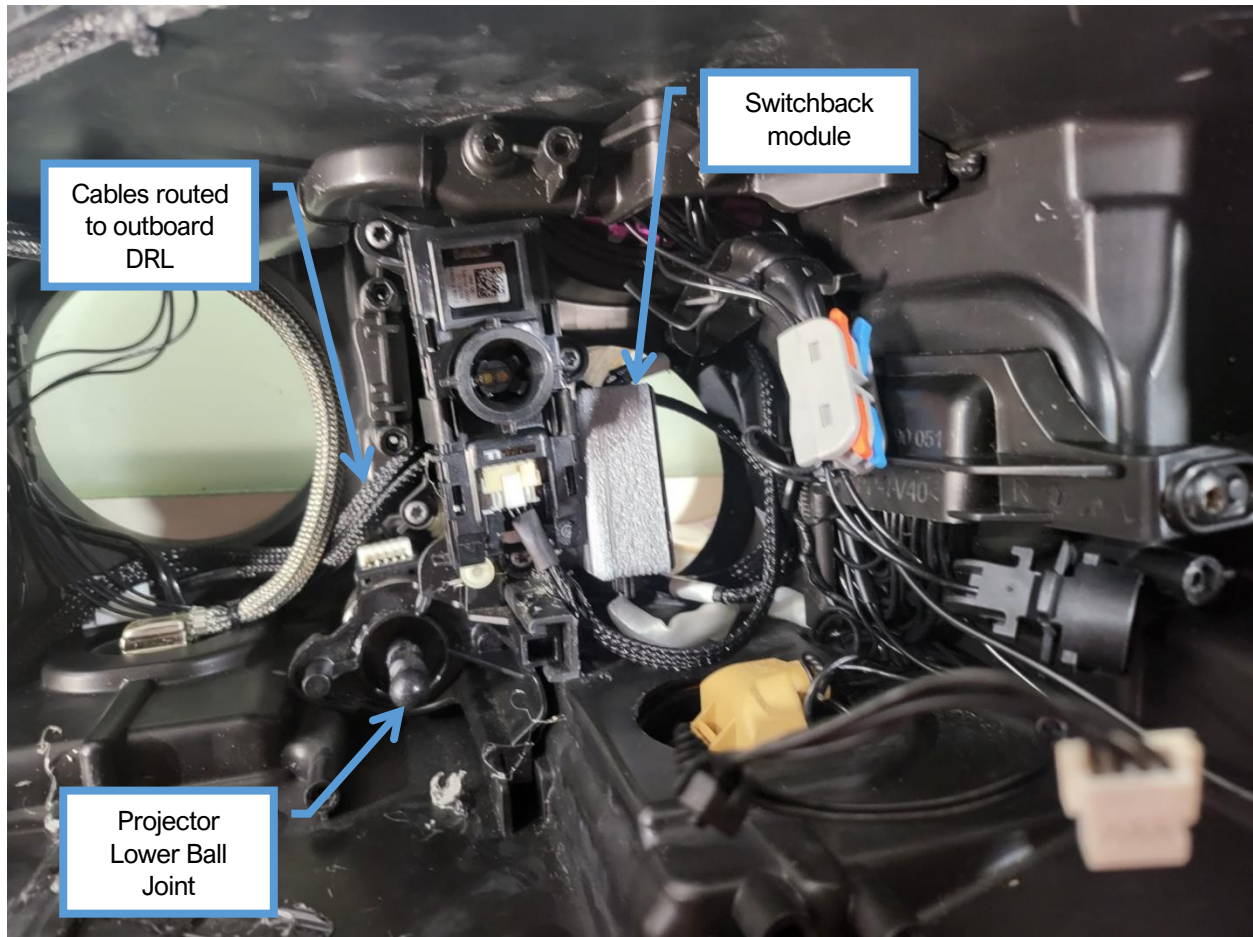
This is probably the most critical part. It is very important that the port labelled P is plugged into the DRL plug near the turn signal access hole. This is a JST PA connector with 5 wires (the other one only has 2) and a semi-opaque white sleeve. Once that is plugged in, grab the extension cable labelled "S" and route it over to the other plug on the outside edge of the headlight. The optimal routing is to go behind the projector as shown in the image below. Finally plug in the turn signal pigtail in the port labelled "T".





Step 4 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 routed as shown above and plugged into the outboard DRL module. 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. If you have a cornering light, you will need to route the 8" cable to avoid interfering with the rear mounting point for that corner light housing. The final result, will look something like the image below. Just manage the cables as best you can, it can be a tight fit.



Step 5 Reinstall the projector

Now you can reinstall the projector housing. Just make sure that lower ball joint and the pin on the outboard side get into their socket.

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 headlamps 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)
```

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

Step 8 Reassemble everything else

You got this far. Just work backwards and put everything back together. It'll be a tight fit in the access hole for the turn signal, especially if you have the cornering light and keep the factory turn signal. 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. I also included links to smoked reflectors from B8 drivers as it could be a good chance to delete the amber reflectors. Klearz is supposed to be making a new batch soon, so we may actually be able to get some new reflectors soon.

Lens:

https://www.aliexpress.com/item/2255800884314832.html?spm=a2g0o.order_list.0.0.4c681802m861Z1&gatewayAdapt=4itemAdapt

Light Tube:

https://www.aliexpress.com/item/3256802906648780.html?spm=a2g0o.order_list.0.0.4c681802m861Z1&gatewayAdapt=4itemAdapt

Butyl Tape:

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

Reflectors:

<https://b8drivers.com/collections/lighting/products/b8-b8-5-e-code-reflectors?variant=12602585546806>