

Vision Auto Lab LLC

Hella Gen 3 HID Ballast Optimization

In performing this procedure, you do so at your own risk and I take no responsibility for the modifications you make or the recommendations in this guide.

I suggest reviewing this entire guide before performing the procedure.

This guide IS NOT intended for beginners or those new to soldering small electrical components.

By continuing you acknowledge and agree to these terms!

WHAT & HOW

The older gen 3 Hella ballasts found on vehicles produced from ~1998-2006 are arguably some of the best ever made, characterized by their lightning fast warm-up and excellent reliability. Their performance can be further improved by replacing a few of the internal components, both ballast efficiency and power output can be increased.

Swapping MOSFETS yields a jump in efficiency from 80.5% to 87% and ballast output can be increased by adding an extra .5w resistor; different ohm ratings will yield different outputs. Please note the correlation between resistor and output:

RESISTOR - OUTPUT

3,3ohm - 41,5W

2,7ohm - 43,0W

2,0ohm - 46,0W

1,7ohm - 48,0W

1,5ohm - 50,0W

1,3ohm - 55,0W

Increasing ballast power will put additional stress on your HID bulb and projector, please familiarize yourself with these byproducts as well as your local laws and proceed at your own risk

TOOLS

- Soldering Tools: Iron, Pump, Solder, Wick
 - T10 Torx Bit + Driver
- Tweezers or Small Needle Nose Pliers
- Small Screwdriver or Small Metal Pick
 - Flush-Edge Wire Cutters
 - Razor or Scissors
 - Thin String or Wire

PARTS (For Modifying a Pair of Ballasts)

- Hella Gen 3 HID Ballasts (x2)
 - Thermal Epoxy
 - Heat Shrink (Small Diameter)
- Wiring Harness (Recommended For Ballast Install)
- IRF1405 (x2) <http://www.digikey.com/product-detail...5PBF-ND/812209>
- FDP3682 (x4) <http://www.digikey.com/product-detail...3682-ND/974298>
- Heatsink (x2) <http://www.digikey.com/product-detail...S300-ND/373776>
- Resistor (x2) <http://www.digikey.com/product-detail...R5/1.5H-ND/129>*

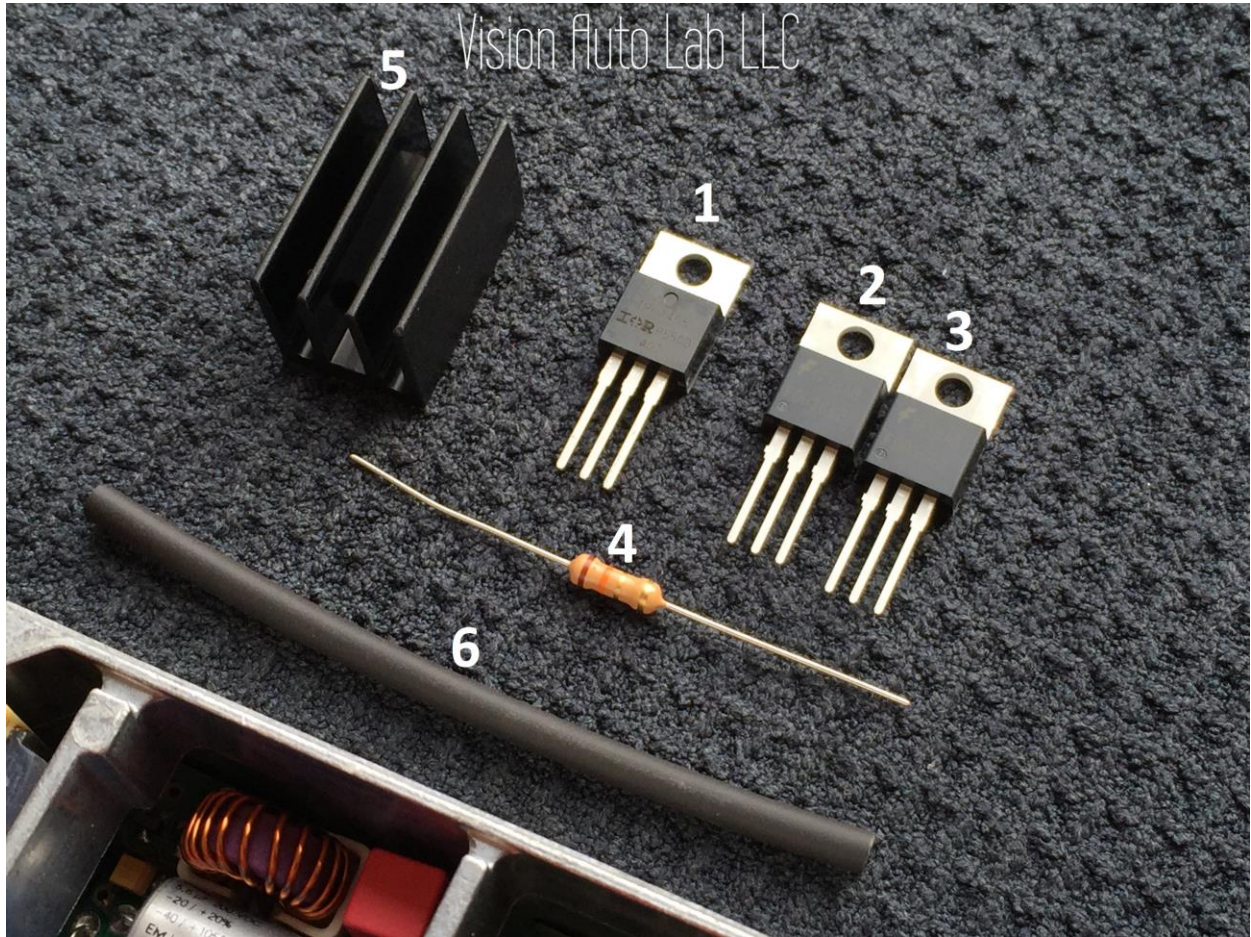
*1.5ohm resistor linked, please confirm you have correct ohm rating for desired output



Using your T10 Torx bit and driver remove the 4 screws which hold the top and bottom plate in position.



With the 2 large ballast covers removed, viewing the ballast from the top carefully remove the 3 small braces, picture above shows braces removed.



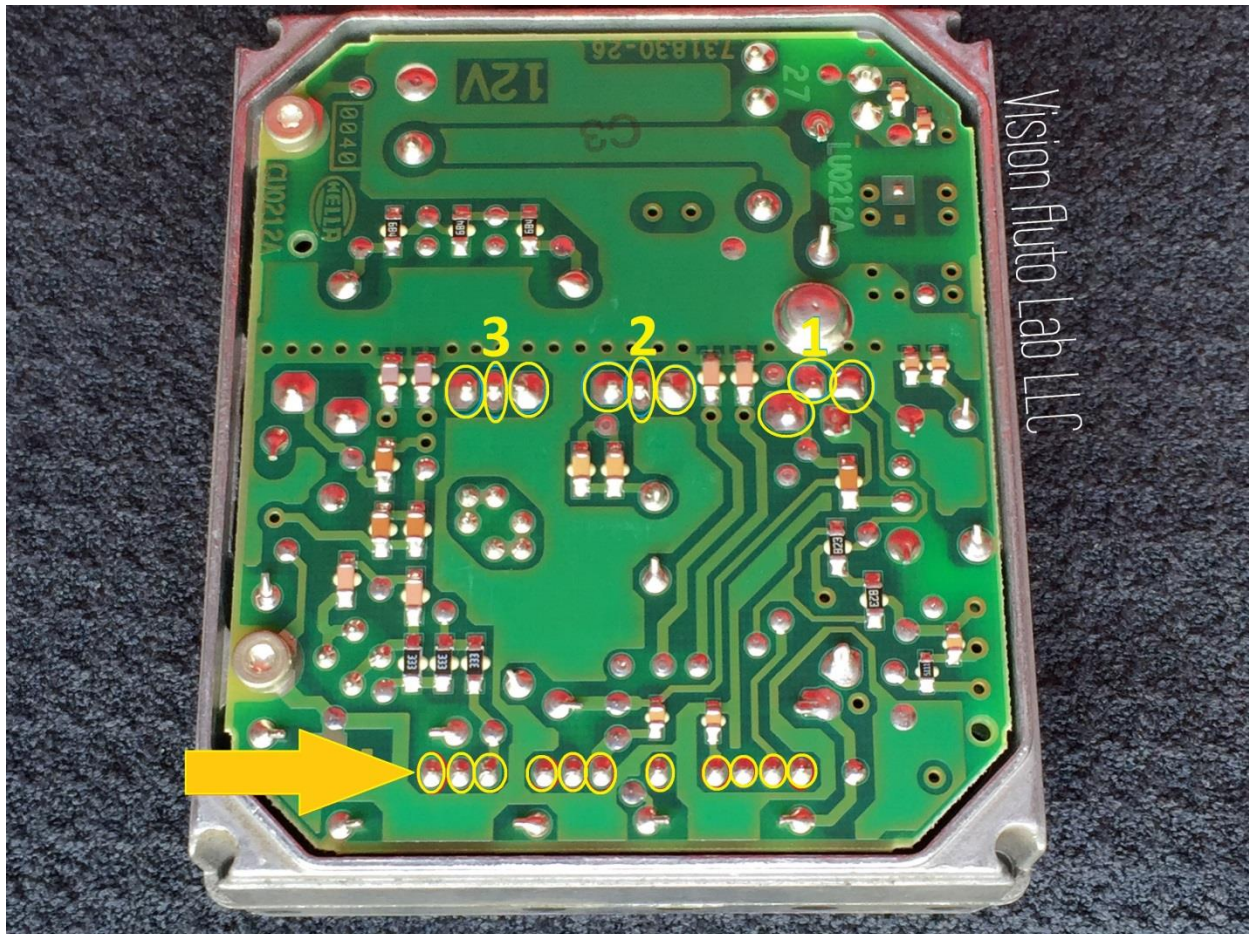
Confirm you have the correct components.

- 1) IRF1405
- 2) FDP3682
- 3) FDP3682
- 4) Resistor
- 5) Heatsink
- 6) Heat shrink

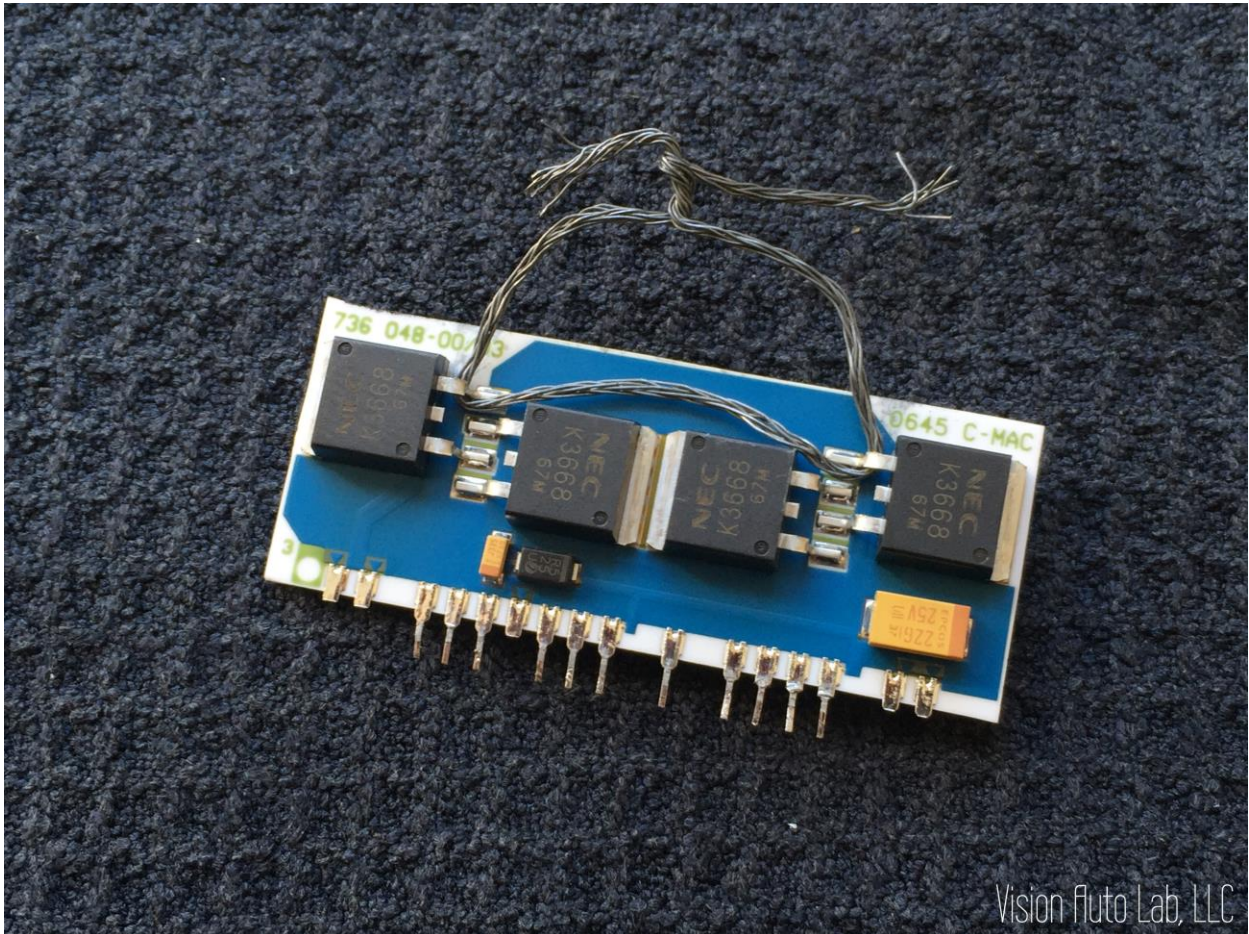
*Thermal Epoxy Not Shown



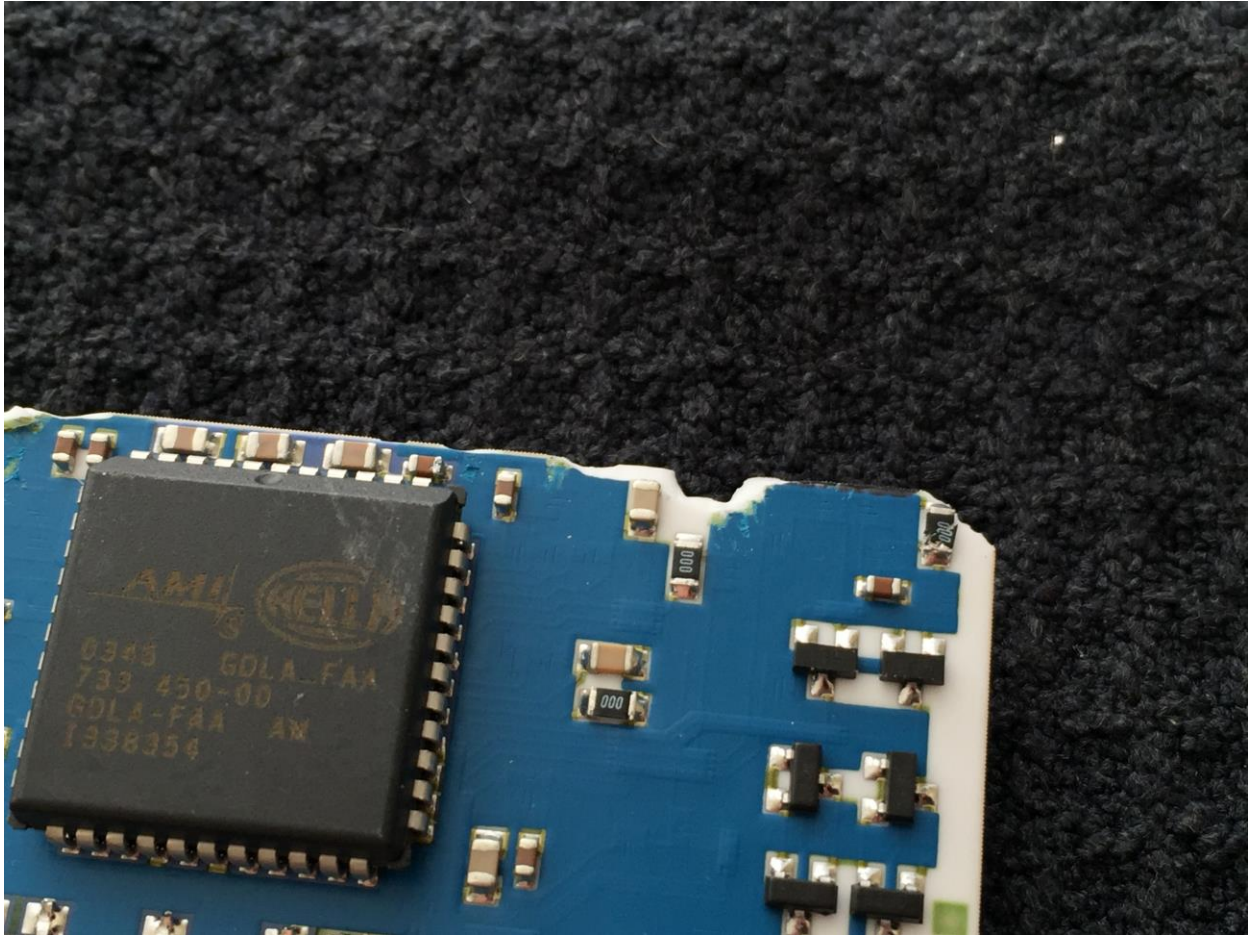
Looking at the ballast from the top you can see the 3 MOSFETs which will be replaced up top; 1, 2, and 3) along with a small perpendicularly mounted board which will be desoldered and removed from the main board.



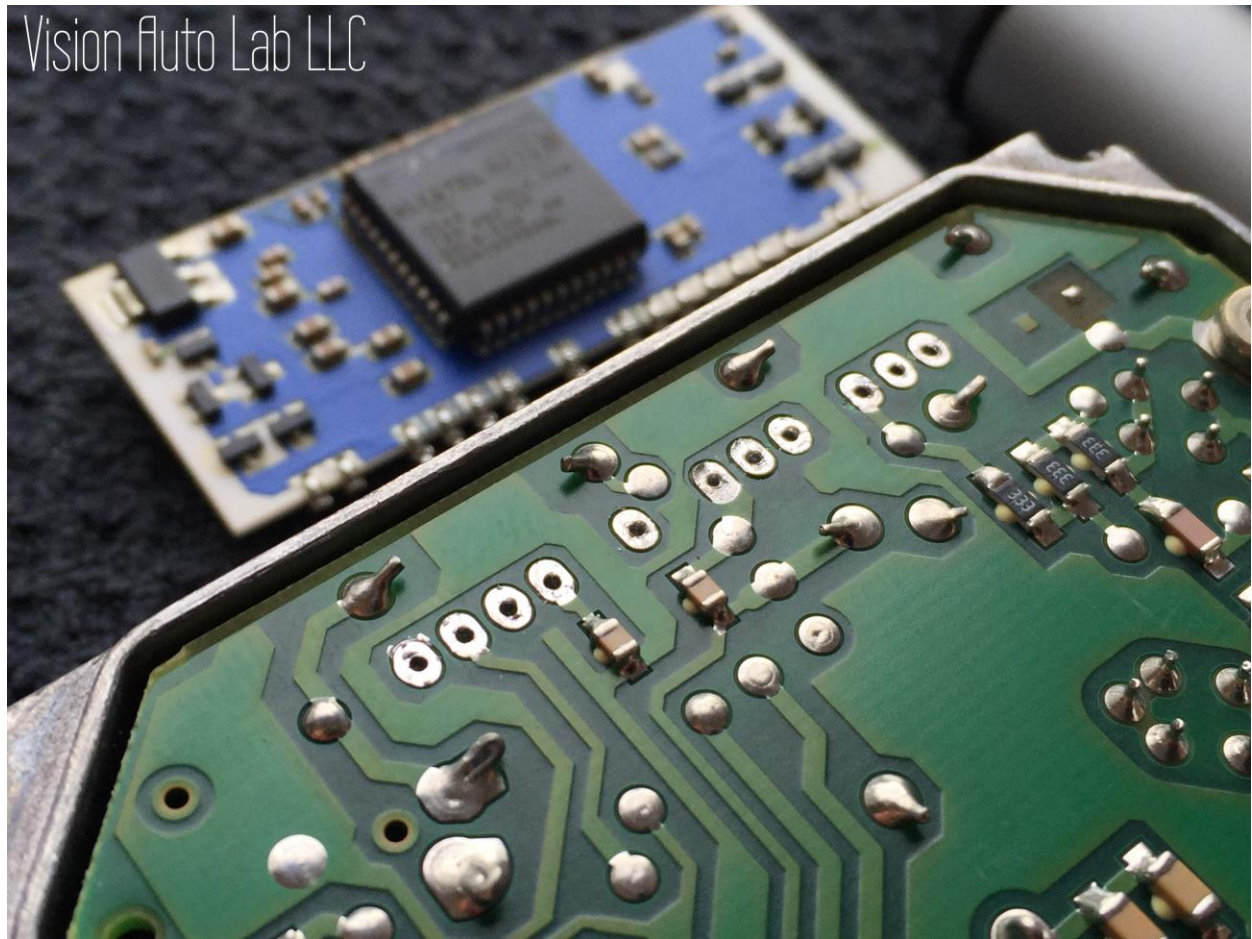
Looking from the bottom of the ballast we can see the soldering points for both the 3 MOSFETs (3 pins each) up top and the small board (10 pins) at bottom. Take note that one MOSFET has a staggered pin, this is where the ARF1405 will go.



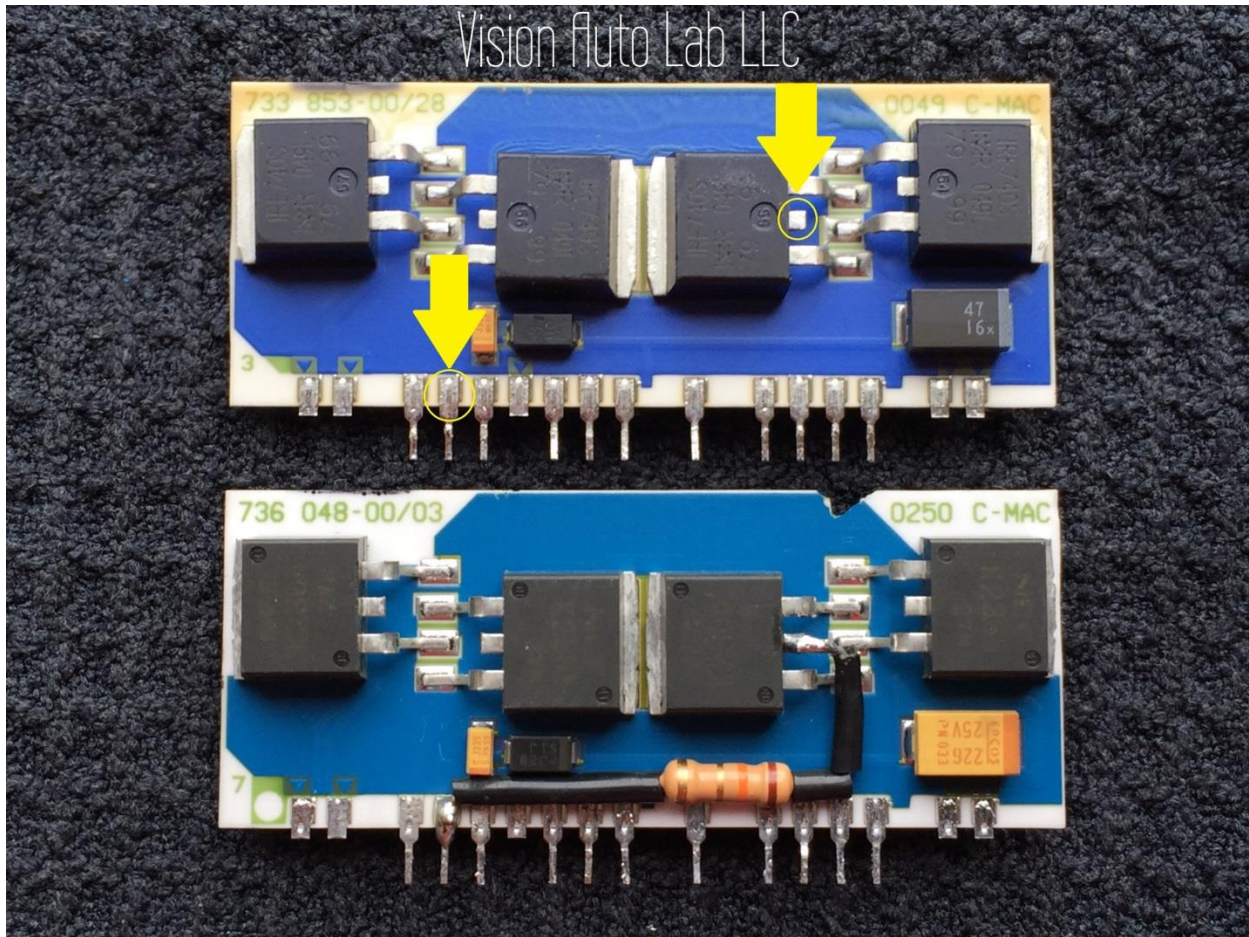
Time to desolder. I recommend starting with the board. Once the pins are free and it is ready to be pulled out thread your string or wire through the legs of the other components as shown above, The board is fragile and using string is the safest way to remove it once free. **DO NOT USE PLIERS TO REMOVE THE BOARD.**



This picture shows the damage that can happen when using pliers to remove the board,

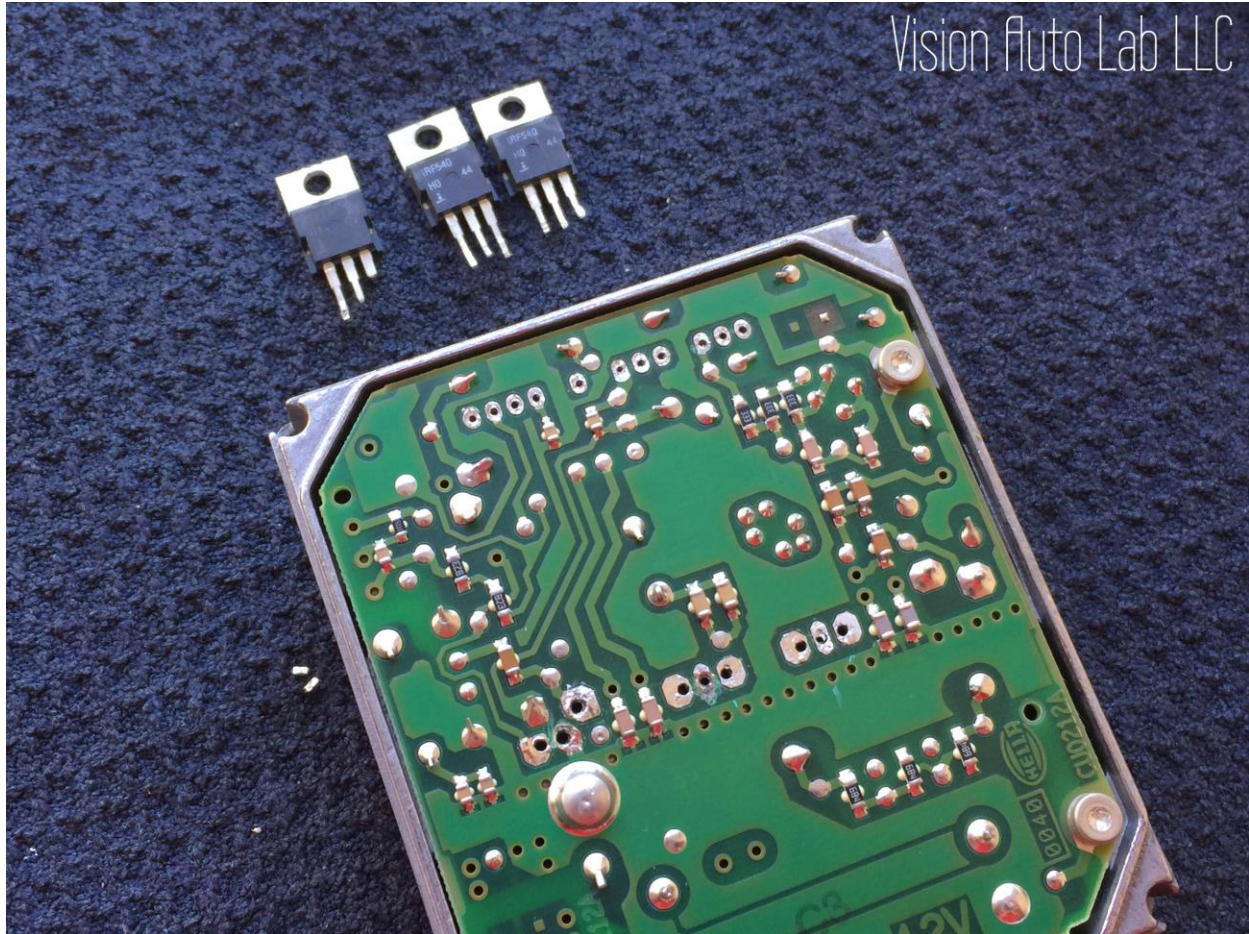


With secondary board removed clean up any excess solder and prepare the holes for reinstalling the board.

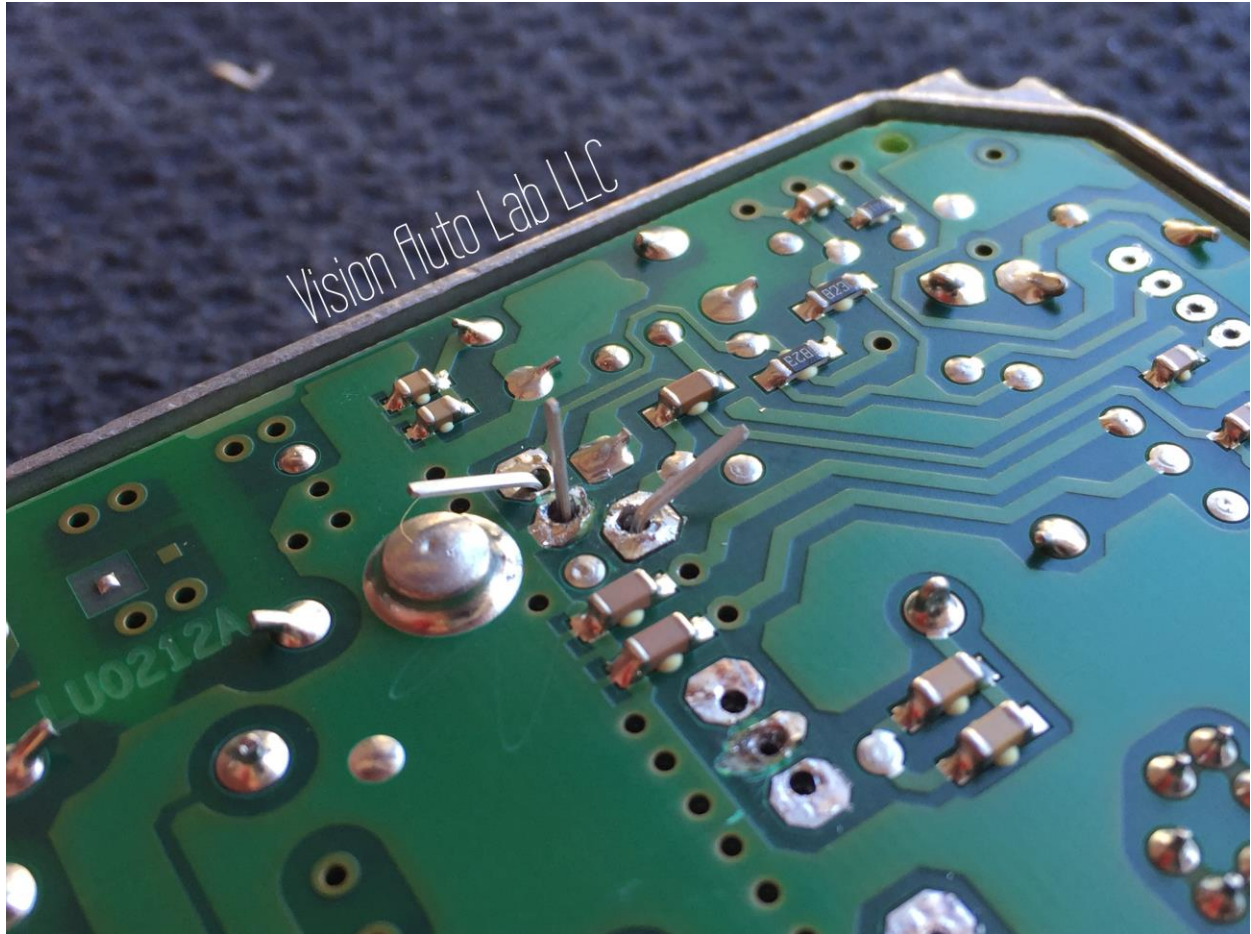


With your secondary board removed you can easily access to soldering points to add your resistor. Add your resistor to the points shown above. Take care when applying your heat shrink and make sure there is no unwanted metal-on-metal contact.

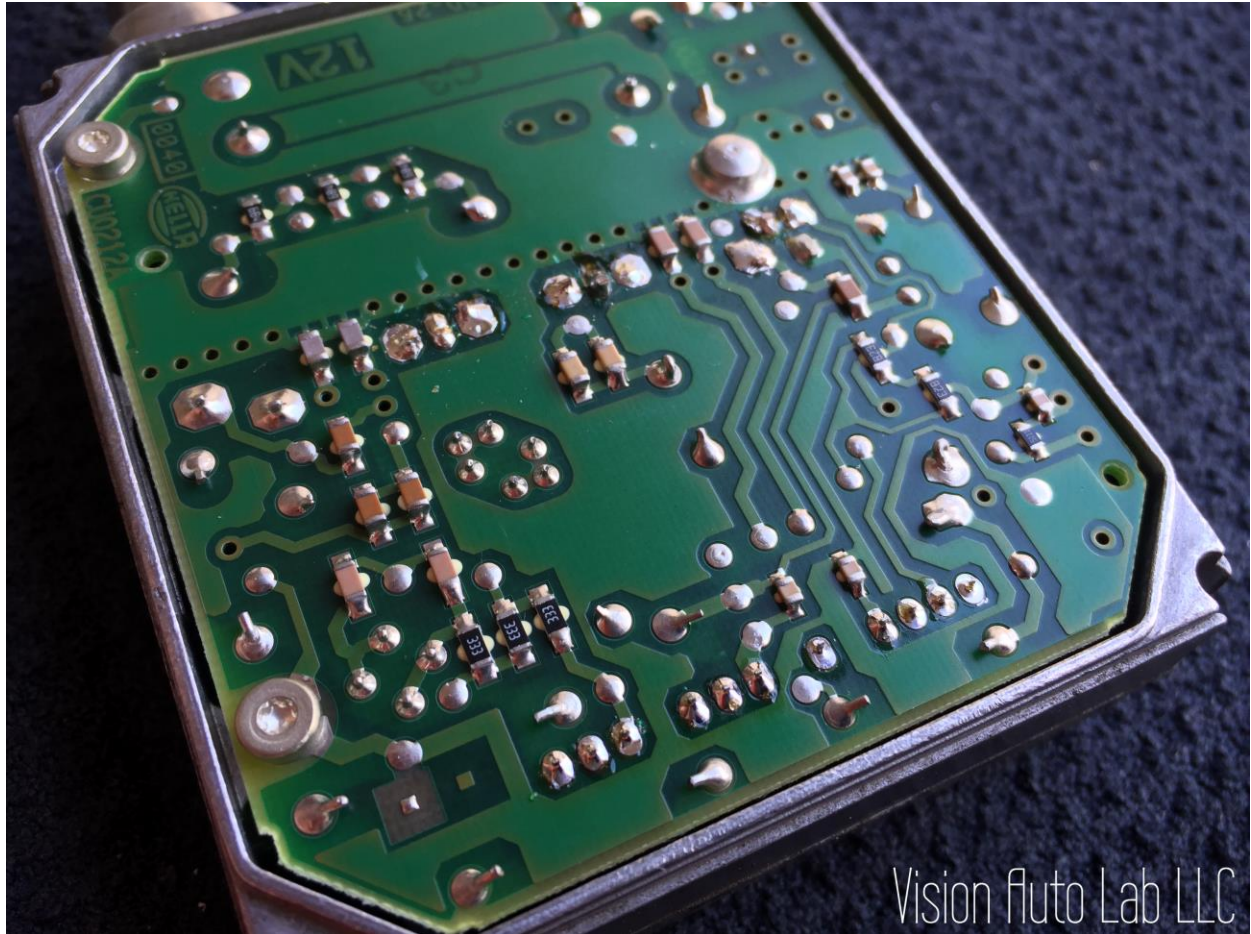
Once the resistor is added to the secondary board you can carefully replace and solder into position.



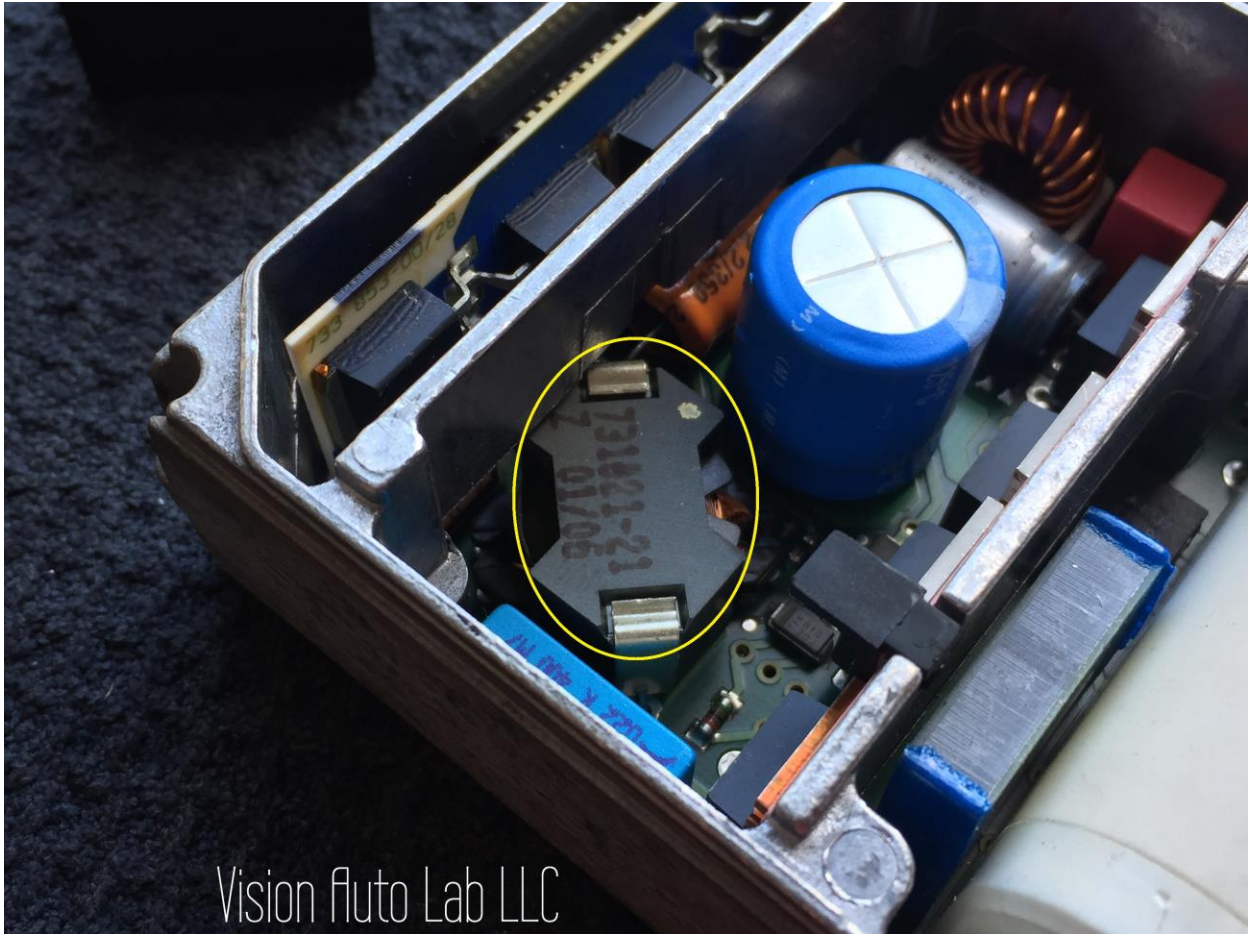
Next desolder and remove the original MOSFETs. Replace these with the IRF1405 (x1) and FDP3682 (x2) in the proper locations, IRF1405 will go into the position with the staggered pin location, FDP3682s will occupy the other locations with the pins locations in-line.



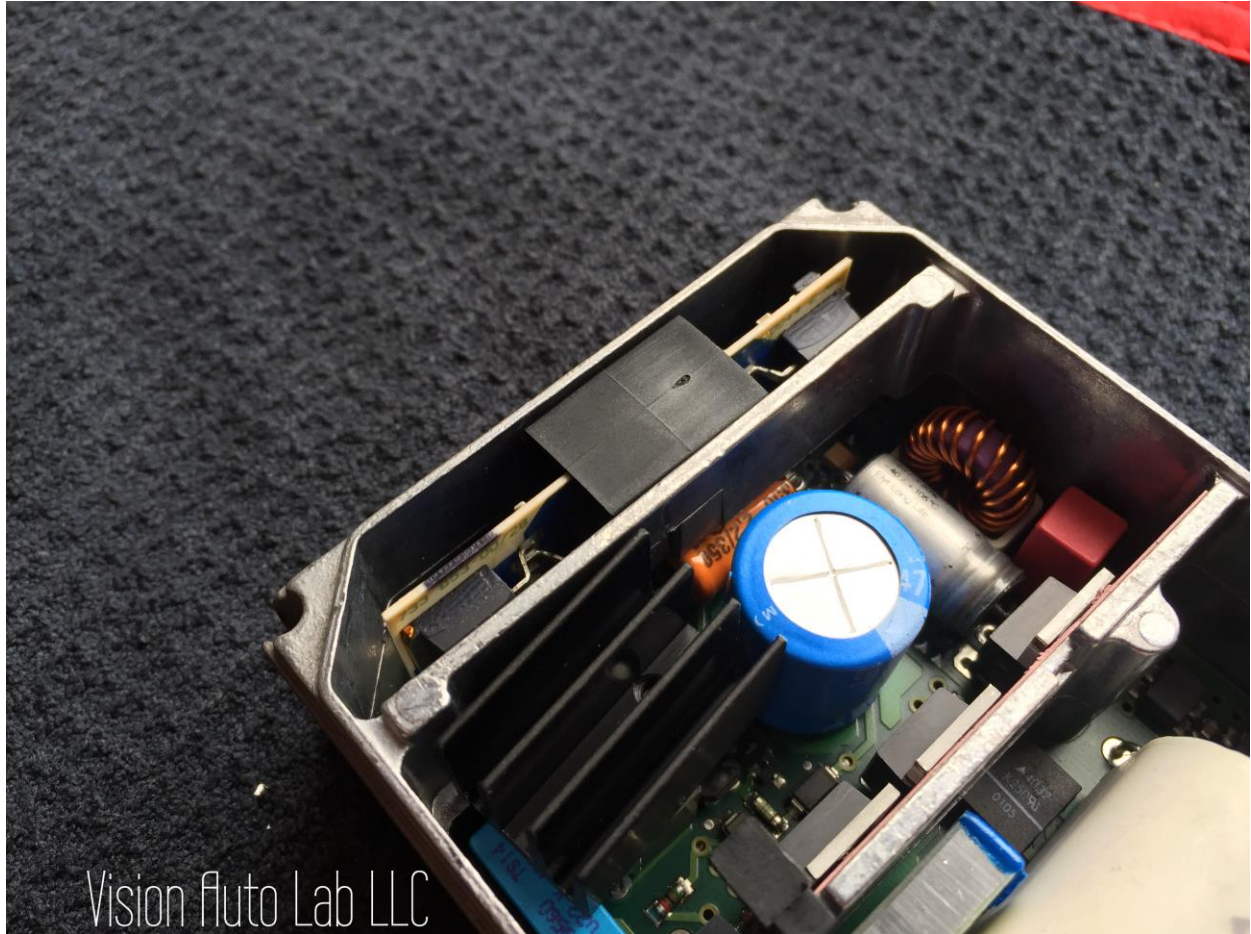
TIP: Once the MOSFET is slid into position, spreading the pins will help keep it in position while the ballast is inverted for soldering.



Once the 3 MOSFETs are soldered take your wire cutters and remove the excess pin length. The picture above shows the secondary board and 3 MOSFETS reinstalled and soldered in position with the MOSFET's pins trimmed.

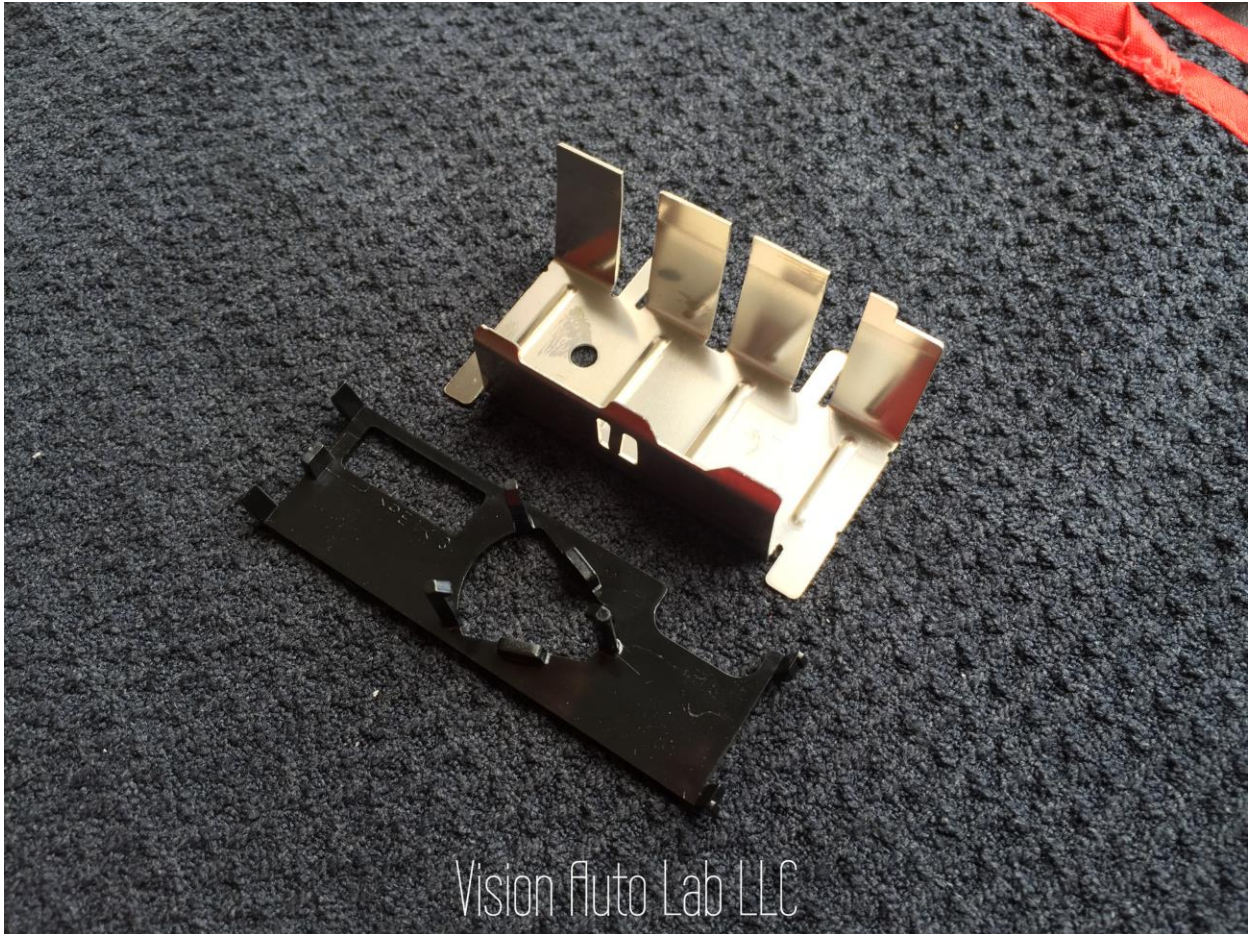


While viewing the ballast from the top, add a small amount of thermal epoxy on top of the EPCOS and install the metal heatsink.



Heatsink installed.

Place the small plastic brace back onto the secondary board.



The other larger braces which were originally in the middle compartment will not be used, they can be discarded.



It is a good idea to label your ballast to designate the increased power. It will help avoid any potential confusion in the future.

The top and bottom ballast covers can now be reinstalled, take care not to over tighten the 4 screws.

After the modifications have been completed test and confirm proper ballast function.

Repeat the process for the other ballast.

NOTES

- A wiring harness is recommended when installing the ballasts.
- Confirm your headlights are aimed properly.
- Use at your own risk.