Introduction:

Let me start by saying **USE AT YOUR OWN RISK!**

As some people have discovered the Jetta/Golf V vehicles equipped with controller 3C0937049D do not support fog light operation. This document outlines a semi OEM procedure on how to get the fog lights installed and functioning. The procedure requires some basic soldering skills a little electronics knowledge and a lot of patience.

Parts:

From Any VW Dealer or online aftermarket dealer:

Driver Side Lower Vent – 1K0853665E9B9
Passenger Side Lower Vent – 1K0853666E9B9
Driver Side Fog Light – 1T0941699B
Passenger Side Fog Light – 1T0941700B
Plastic Nuts (Secures Fog-Light) – N90535301
Screws (Secures Fog-Light) – N0139671
Euro Switch with automatic function - 1K0941431A
Euro Switch without automatic function - 1K0941431C

12 gauge automotive or primary wire:

Preferably Red in color to be used for +12VDC. Approximately 10 feet in length (consider 15 to 20 feet if you are going to use a Bosch type relay). Can be purchased at any auto parts store or hardware store.

14 gauge automotive or primary wire:

Preferably brown or black in color to be used for ground. Approximately 10 feet in length. Can be purchased at any auto parts store or hardware store.

Ring terminals:

They should be rated for 12 or 14 gauge wire. The opening should be large enough to fit through the mounting screw in the grounding location and the +12 VDC supply in the fuse box located under the hood. Can be purchased at any auto parts store or hardware store. Look at the fog light harness for reference.

Heat Shrink Tubing:

You can buy these at any local auto parts store, hardware store, or Radio Shack.

Split Flex Tubing:

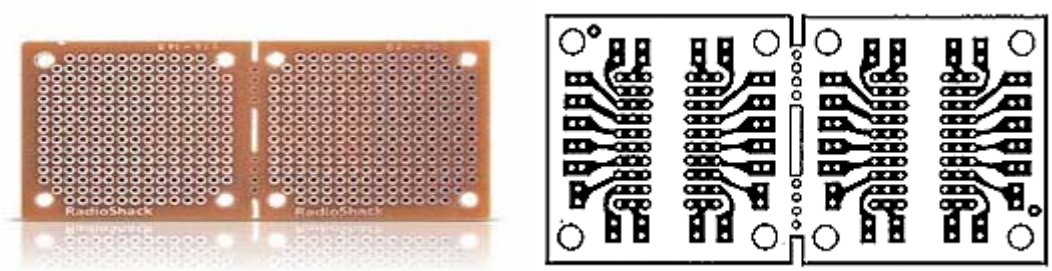
You can buy these at any local auto parts store, hardware store, or Radio Shack.

Relay Base Port with terminals:

None of local auto parts stores in my area carried a generic relay socket. Ordered from http://www.jegs.com there are different types but the best choice is the block style because it can be secured with some double sided tape or screwed into place. Search the Internet for alternatives. Make sure it comes with the wiring terminals otherwise you may have to purchase them separate. Jegs Part Number 80133.

General Purpose IC PC Board:

You can purchase this from any local Radio Shack store. Part Number 276-159.



Reed Relay 0.5 amp SPST 12VDC:

Can be purchased from any local Radio Shack store. Part Number 275-233.

Diode:

Can be purchased from any local Radio Shack store. Part Number 1N4001.

Mini Blade Fuse Holder:

You can purchase this from any local Radio Shack store. Part Number Part Number 270-1237. Automotive stores carry

these as well the brand is called Buss or Bussmann Part Number HHM.

Golf/Jetta V Fog light wiring harness:

Can be ordered from http://www.euro-parts.us trigger wire included with harness.

Relay (one of two options):

Hella Solid State Relay - The only place I had success with sourcing this relay was my local 4 Wheel Parts store. Hella Part Number 87251. For other distributors in your area look at the following link http://www.hellausa.com

Bosch Relay – Can purchase this type of relay from most local auto parts stores or online auto parts retailers. Bosch part number 0332019150 or 0332019151.

Project Box:

Used to enclose electronics

Could not find anything small enough so I used a battery holder instead. Radio Shack Part Number 270-411. I gutted the interior of the battery holder removing the wires, springs, and on/off switch. I also broke off the channels separating the batteries in order to fit the circuit board. Turned out to be a perfect fit.

Tools:

3M Friction Tape.
3M double sided tape(squares).
Electrical terminal crimping tool.
Wire cutters.
Wire strippers.
Zip Ties / Cable Ties.
T-30 Torx Screw Driver.
T-20 Torx Screw Driver.
Small Pliers.
Soldering Iron.
Solder.
Metric socket/ratchet set.
Heat Gun or hair dryer

General Comments:

In the steps outlined below there are references to crimping terminal connectors to wires. The process used for this task involved the following steps:

1. Strip the end of the wire to the appropriate length.
2. Place a piece of heat shrink tubing through the wire.
3. Connect the terminal to the end of the wire.
4. Crimp the terminal to the wire.
5. Solder the wire at the crimp location to the terminal. A bit of overkill but it does eliminate the chance of anything coming loose.
6. Heat shrinking the tubing around the crimp/connection.

When soldering to not get crazy with the solder a little goes a long way avoid creating huge clumps of solder. When soldering in and around the interior of the car use an old towel or sheet to protect the surrounding area from falling solder.

Two new wires will be added to harness one that will supply +12 VDC to the solid state relay (fused) and one that will ground the solid state relay and the custom circuit. From this point on the +12 VDC wire will be referred to as (Red +12 VDC) and the ground wire will be referred to as (Black Ground).

Steps:

Remove the bumper as outlined in the EMT OEM Fog Light retrofit document.
http://forums.vwvortex.com/zerothread?id=1961788

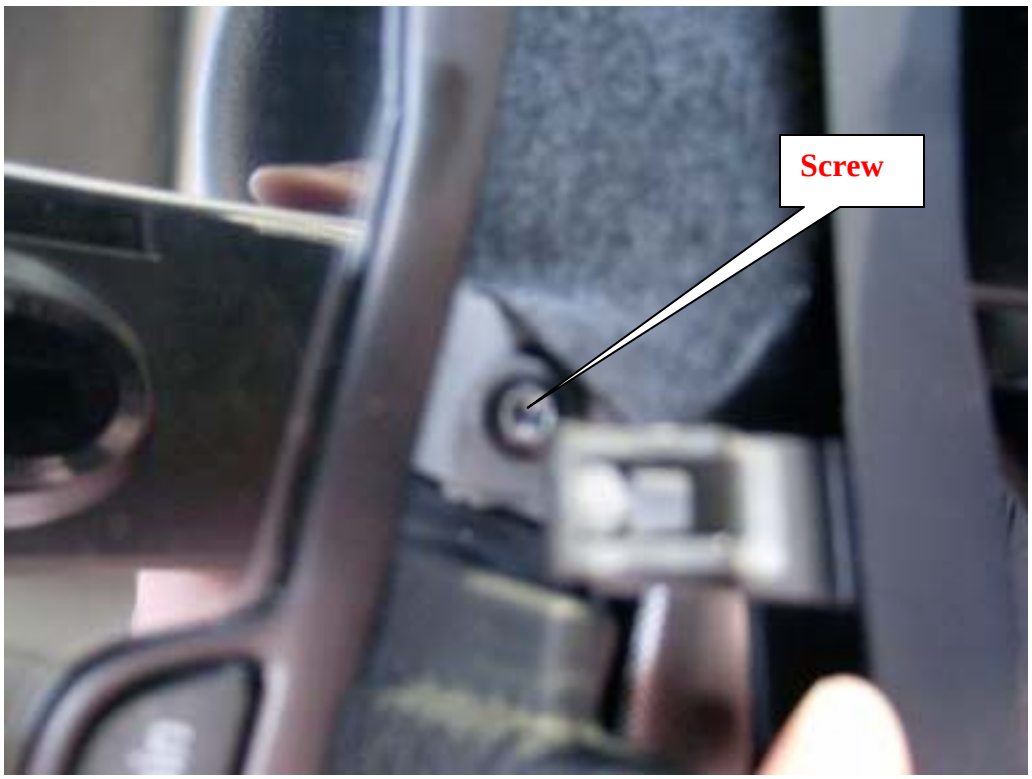
Remove the battery by unbolting the terminals and removing the battery skirt. At least on the TDI you have to unbolt the air box cover and move it to the side in order to remove the lower battery bolt.

Locate the fuse box next to the battery and remove the cover.

Remove the light switch and disconnect the harness from the rear of the switch. You have to press the switch in and turn slightly to the right in order to release it.

Remove the dash panel to the left of the steering wheel where the light switch plugs in. There are 4 screws holding it in place. Two located underneath the dash, one located in the light switch housing, and one located under a trim piece by the instrument cluster.

To remove the trim piece grab it on both ends and pull out firmly. The bottom of the trim is attached to a dust cover. It will not come out all the way. Do not pull on it hard otherwise you risk breaking something. The screw is located on the left side and it will be a tight fit for the torx screw driver. Be careful!


Screw

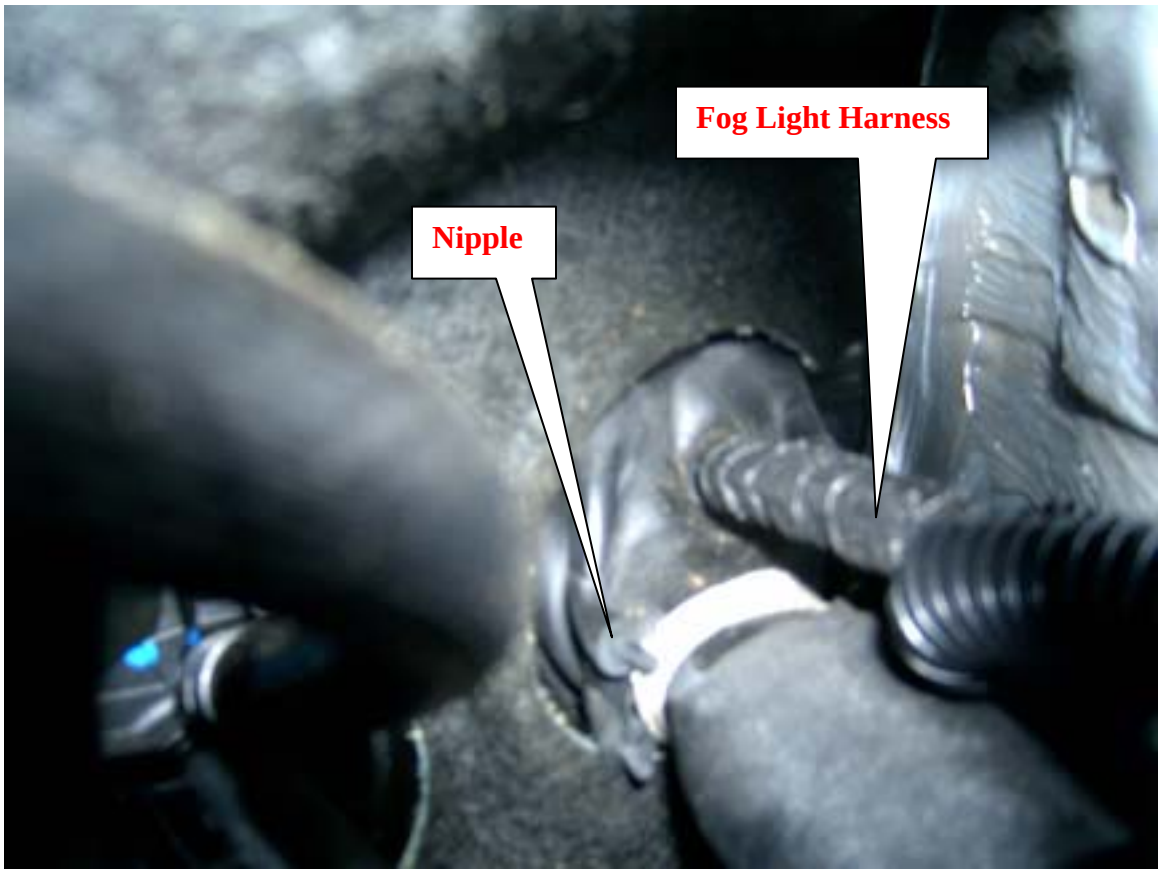
Remove the panel exposing the work area.

Cut the connectors from the fog light harness they will be replaced with the relay base terminals. These are the two gray wires that will supply voltage to the fog lights. Do not cut the ring terminal off of the ground wire that is part of the harness!

Align the (Red +12 VDC)and(Black Ground) wires to the end of the gray wires mentioned above and stretch them along the length of wiring harness. Use the friction tape to secure the two wires to the wiring harness at regular intervals. Leave the wires unsecured near the location of the harness ground wire.

Located at the rear of the battery pan you will notice a wiring harness coming through the fire wall. If you look closely you will notice that the harness is going through something that looks like a diaphragm (black in color). You will also notice that the diaphragm has some small nipple looking things attached to it. Using small wire cutters cut the end off of one of the nipples. Be careful not to tear the diaphragm or cut too much off the end. The space is extremely tight.

Tape the end of the fog light wiring harness securing the newly added (Red +12 VDC) and (Black Ground) wire to the gray fog light +12 supply wires. Push the taped end of the wiring harness through the open nipple. Go underneath the dash and look for the fog light harness to the left of the steering column. Pull the harness through and nun it up the dash through the back of the fuse panel. Make sure you leave plenty of wire exposed to work with. This is where you are going to wire the fuse and custom electronics.



Under the dash locate the fog light harness place your hand near where the harness comes in contact with the diaphragm

nipple and pull the harness toward you. At the contact point use the friction tape to loop around the harness building it up on the harness. Two inches on either side of the contact point along the length of the harness should do it.

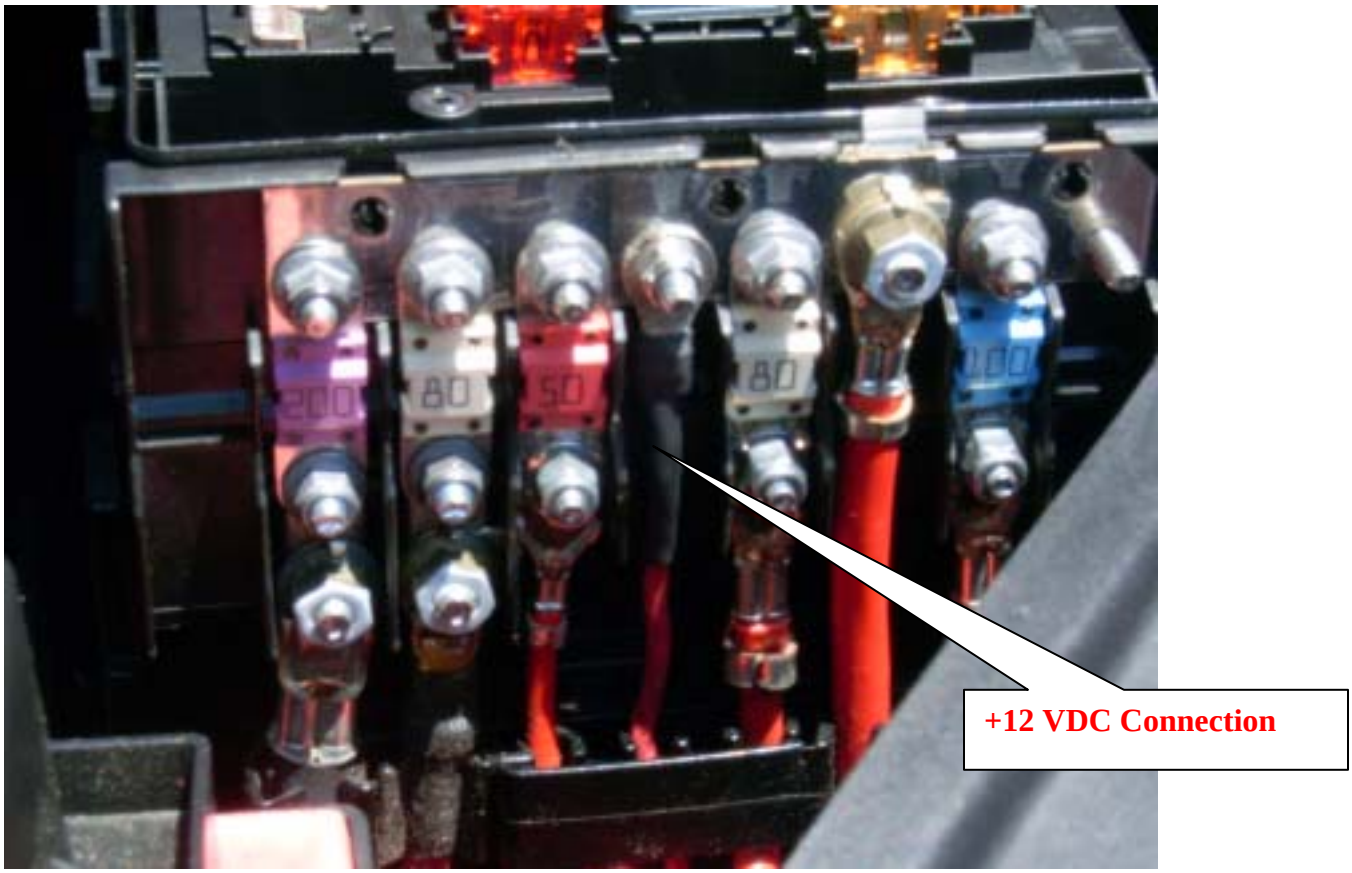
Locate the fog light harness under the hood behind the battery pan and pull slowly out toward the front of the car. Stop when approximately 2 inches of the harness wrapped with the friction tape are exposed. The build up of friction tape should cause the diaphragm nipple to expand around the friction tape and form a tight seal. Do not over do it with the friction tape!

Once you are satisfied that the harness is in place and you have plenty of room to work with on both ends use the split flex tubing under the hood to incase the fog light harness along the entire length. You will expose the fog light ground (ring terminal), the two new (Red +12 VDC)and(Black Ground) wires you added, and the fog light hookups at the end of the harness from the slit or end of the tubing. Use some friction tape at regular intervals along the split tubing to wrap small sections and secure it in place. Make sure you push the split tubing up against the firewall exit point of the harness around the diaphragm to provide some insulation.

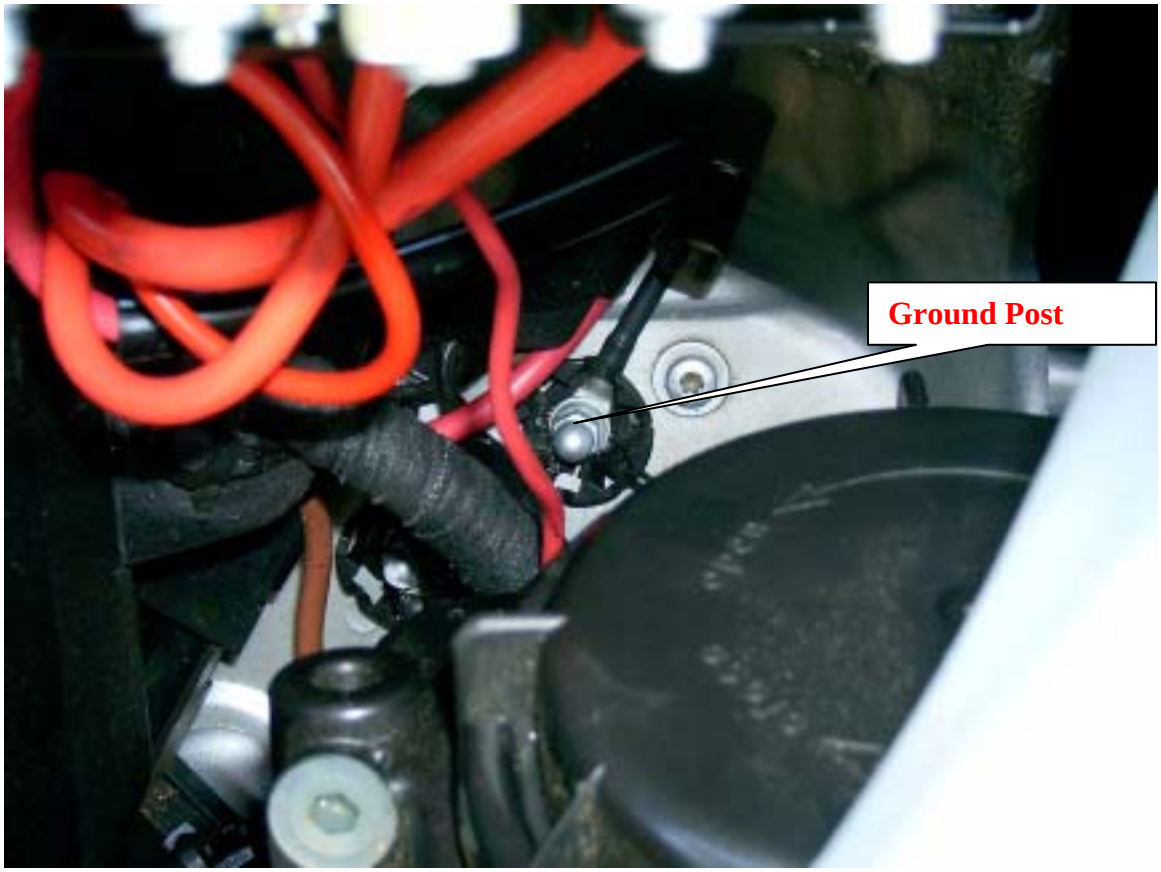
Take the other end of the harness with the fog light hookups and fish it to the side of the battery, under the air box, and into an opening next to the air box. This should bring the harness to the front of the vehicle. Use zip ties (cable ties) to secure it in place.

Add the fog lights to the bumper and double check to make sure you have plenty of room to plug the harness into the fog lights. If you are satisfied with you work so far you can bolt the bumper back to the car as outlined in the EMT OEM Fog Light retrofit document. Or wait until the end.
http://forums.vwvortex.com/zerothread?id=1961788

Locate the end of the (Red +12 VDC)wire you added to the harness and align it up to the outside of the fuse box where you will bolt it. Cut the excess off and crimp a ring terminal to the end of the wire. Bolt the finished product onto the side of the fuse box (look closely at image for reference).



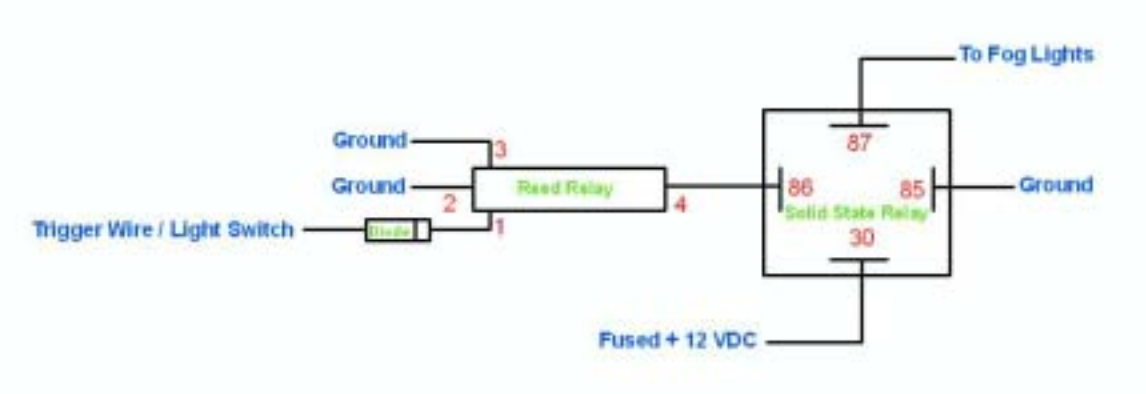
Located next to the air box are grounding posts. Trim the (Black Ground) wire you added to one of the posts. Save the excess wire you will need it later.



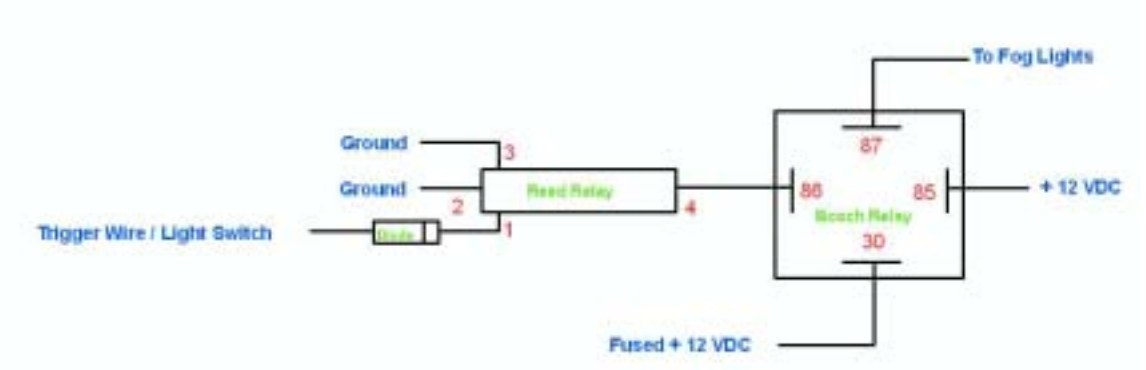
Crimp a ring terminal to the end of the (Black Ground) wire and bolt it to the grounding post. At this time bolt the brown ground wire that comes with the fog light harness to the grounding post.

The next step is to build one of these circuits depending on the type of relay that will be used.

Solid State Relay



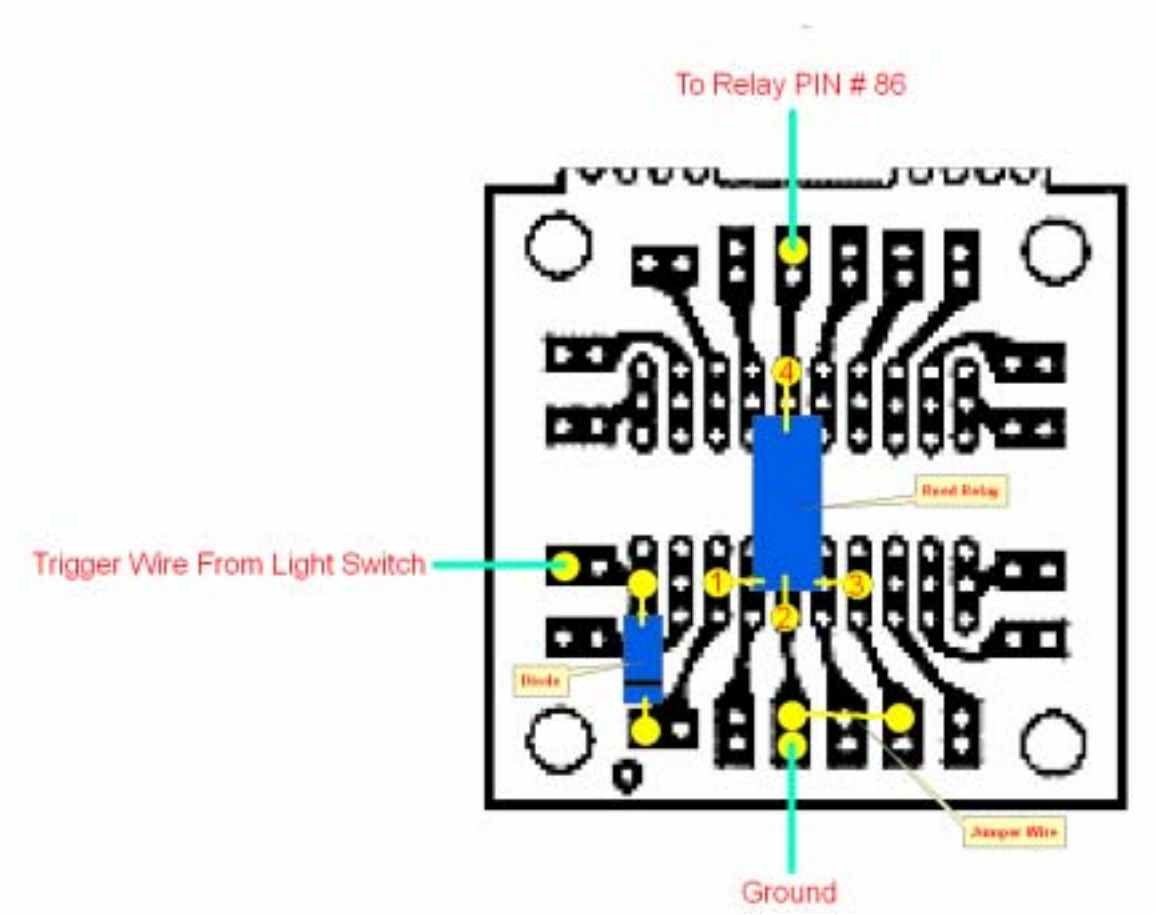
Bosch Relay



Take the circuit board and snap it in half. You only need one half hold on to the other half incase you make a mistake.

The picture below is the bottom view of the circuit this is where the soldering takes place. The reed relay, diode, jumper, and wires plug into the openings on the other end of the board. The reed relay pins are not numbered I used numbers in the diagram for reference.

If you have never soldered in the past take some time and practice. Do not clump up the solder on the circuit board otherwise you will not be able to close the project/battery box or even worse you could cause a short.



Plug the reed relay to the circuit and solder the pins in place.

Cut a small piece of left over ground wire and plug it into jumper locations between pins 2 and 3 of the reed relay.

Use about 6 inches of left over wire to create the ground lead between the pins 2 and 3.

Solder the jumper wire and ground wire to the circuit.

The circuit ground wire will eventually be twisted to the (Black Ground) wire that was added to the harness and crimped to one of the relay base terminals ending up on PIN #85 of the solid state relay.

Use about 6 inches of left over ground wire to solder into jumper PIN #4 of the reed relay.

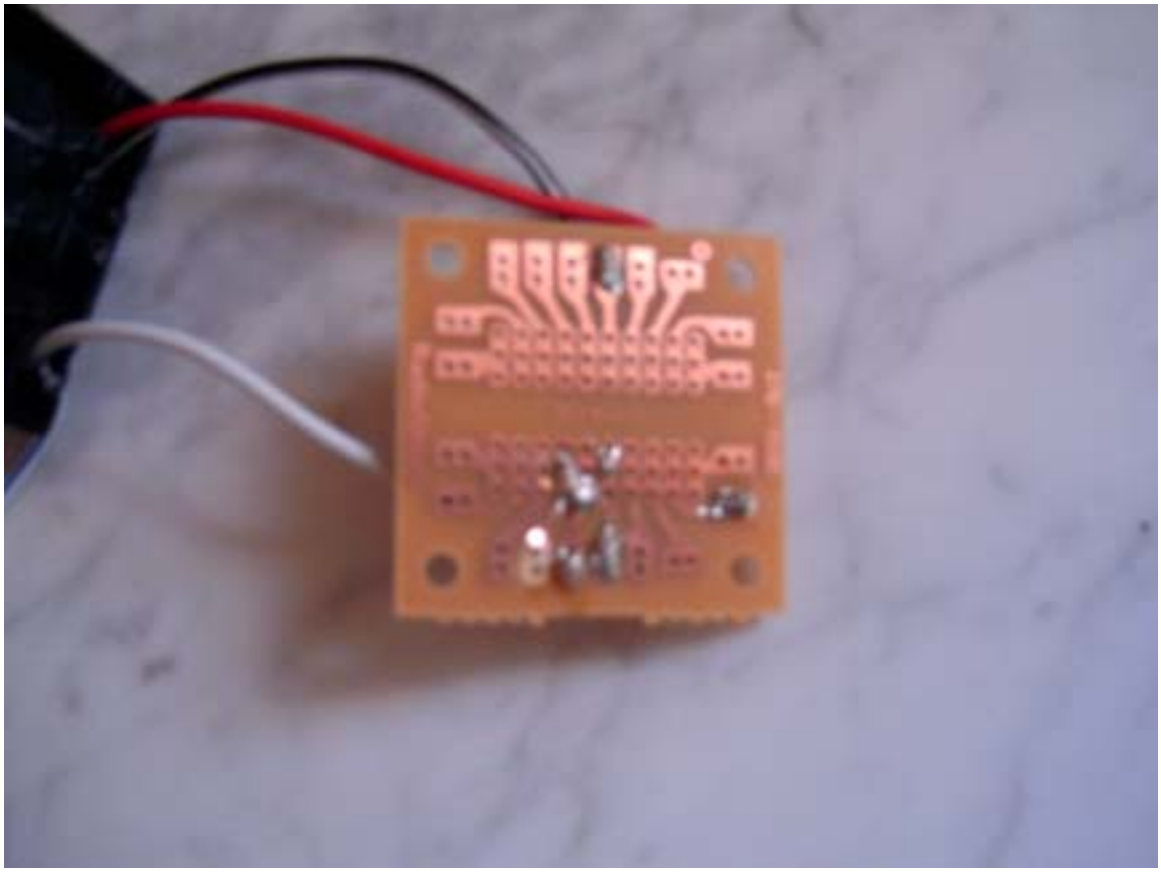
Plug the diode to the circuit as indicated by the diagram and solder it in place. Make sure you pay attention to the diode polarity otherwise the circuit will not work. The diode has a silver stripe on one end this end should be

wired to PIN #1 of the reed relay the other end will be connected to the trigger wire.

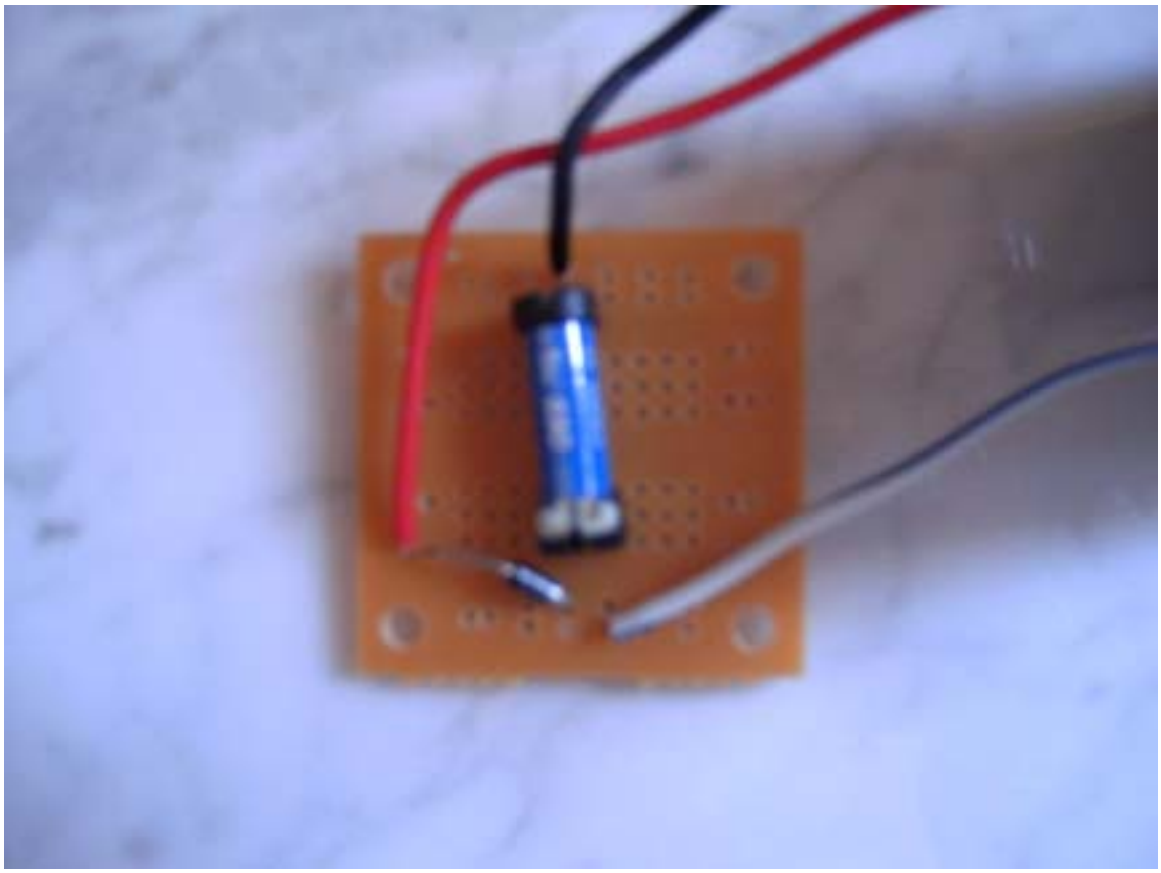
Take the trigger wire supplied with the harness and cut it half. You only need one half save the other as a backup. Strip the cut end of the trigger wire plug it into the circuit and solder in place.

You should end up with something like this.

Bottom View

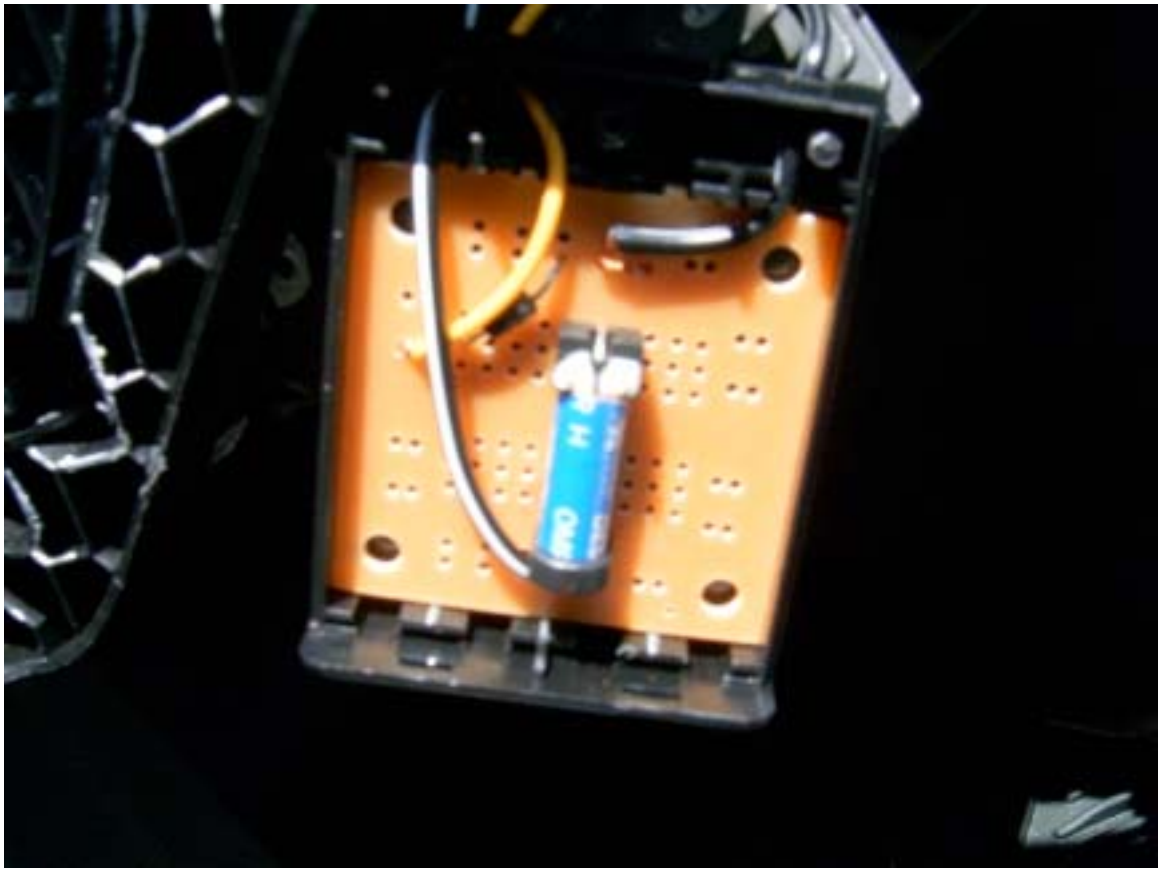


Top View



Open the battery box and remove the internal components. If you purchase a project box there is nothing to remove. The springs, wires, and switch must be removed. Use pliers to break off the battery separators running along the length of the box.

Place the finished circuit board in the battery box. It should snap into place and fit snug. Run the wires through the openings in the battery box. Screw the battery box lid back in place.



Specific to the Hella Solid State Relay:

On the end of the wire corresponding to jumper PIN #4 of the reed relay crimp a relay base terminal. Plug it into the relay base port corresponding to PIN #86 of the solid state relay.

Solder one end of the Mini Blade Fuse Holder to the (Red +12 VDC) wire you added to the fog light harness this will become the fused +12 VDC supply for the relay. Use some heat shrink tubing to insulate the solder point. On the other end of the Mini Blade Fuse Holder crimp a relay base port terminal and plug it into the relay base port corresponding to PIN #30 of the solid state relay.

Take the ground wire of the custom circuit and twist it together with the (Black Ground) wire added to the fog light harness. Crimp a base port terminal to the twisted end of the wires. Plug it into the relay base port corresponding to PIN #85 of the solid state relay.

Take the two gray +12 VDC wires of the fog light harness and twist them together. Crimp a relay base port terminal and plug it into the relay base port corresponding to PIN #87.

Specific to the Bosch Relay:

On the end of the wire corresponding to jumper PIN #4 of the reed relay crimp a relay base terminal. Plug it into the relay base port corresponding to PIN #86 of the solid state relay.

Solder one end of the Mini Blade Fuse Holder to the (Red +12 VDC) wire you added to the fog light harness this will become the fused +12 VDC supply for the relay. Place a base port terminal and some heat shrink tubing to the other end and plug it into relay PIN # 30.

Use the remaining red wire to provide +12 VDC to relay PIN # 85. The same supply can be used for both PIN # 30 and PIN # 85 essentially splicing the two together. If so you may want to consider using a larger diameter red wire to compensate for the extra load. The best approach would be to provide separate +12 VDC for these two pins. If you take the second approach then make sure you accommodate this by adding another wire to the harness.

If the Bosch relay you purchased is a change over relay (SPDT) type relay take the two gray +12 VDC wires of the fog light harness and twist them together. Crimp a relay base port terminal and plug it into the relay base port corresponding to PIN #87.

If the Bosch relay you purchased is a normally open (SPST) type relay crimp a relay base port terminal to each +12 gray wire. Place one wire to PIN #87 and the other to PIN #87a.

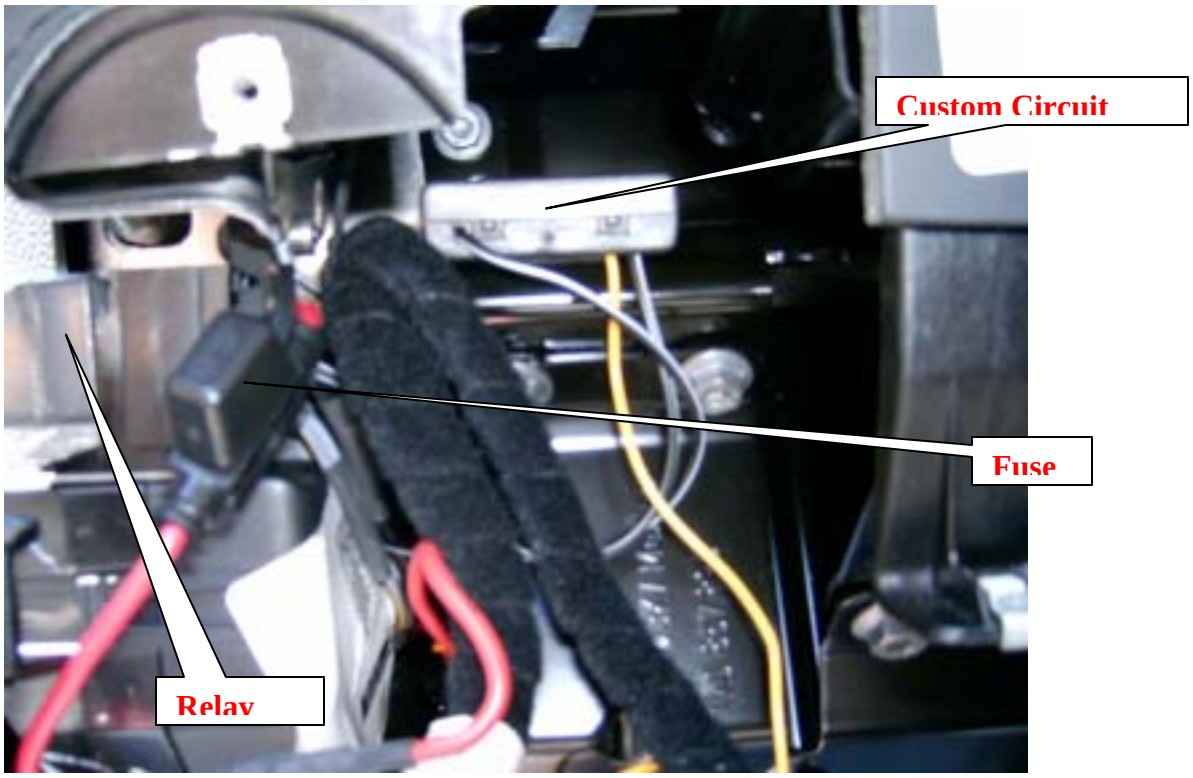
For both types of relays:

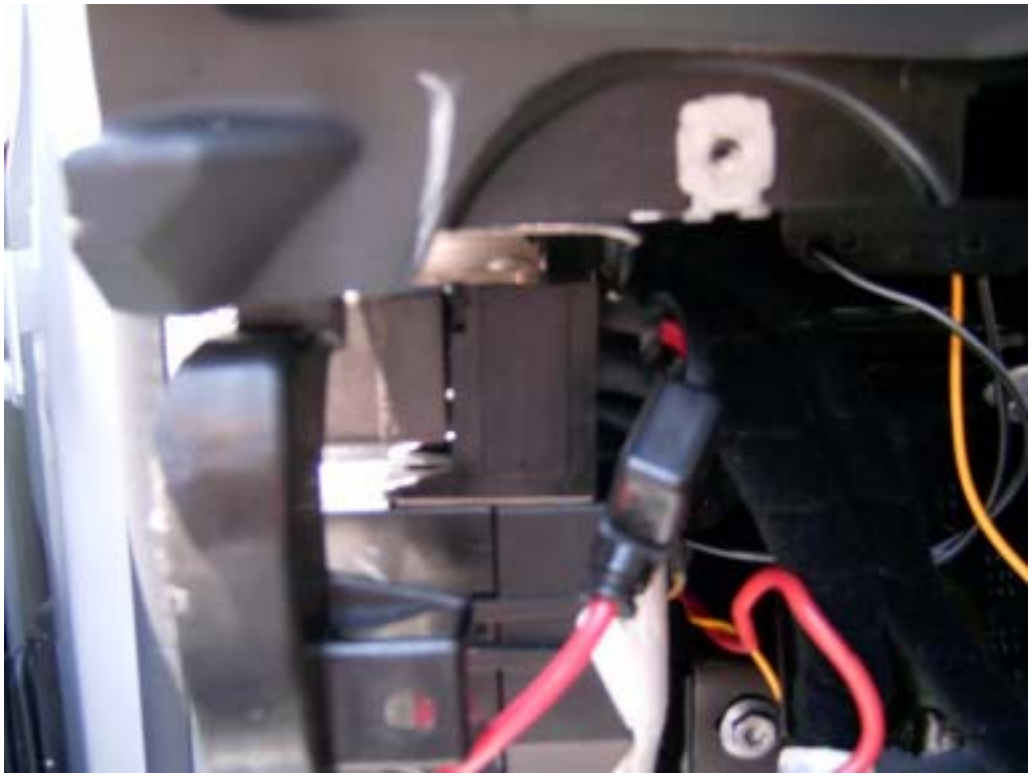
Double check to make sure everything is properly wired. Once you are satisfied plug the solid state relay into the base port.

Use some 3M double sided squares to secure the relay base port on top of the fuse box (see pictures below).

Use some 3M double sided squares to secure the battery box containing the custom circuit to the metal dash support behind the light switches (see pictures below).

Plug the end of the trigger wire to the light switch harness PIN #5.


Custom Circuit
Fuse
Relay



Plug the light switch to the light switch harness.

Add a fuse to the mini blade fuse holder.

Replace the battery and battery skirt.

Test the lights to make sure everything is working.

Once the test is successful bolt all the remaining pieces together.

You are done!

Some interior pictures:

Some exterior pictures: