Early 12v BMW 2002
High and Low Beam Relay
Wiring Directions

As 2002 owners, upgrade lighting systems that include additions of driving lights and auxiliary gauge panels, upgrade of sealed beam headlights to H4s, and dash lights to PIAA 5w super whites, the stock relay and switch configuration also needs upgraded.

There are options in upgrading the relay and switch system. One option is to purchase an upgraded harness (#30815 - For H-4 halogen lights, #30816 - For H-4 halogen lights w/HB5 bulbs) from a supplier like Painless Wiring (http://www.painlessperformance.com/catalogframe.htm). The other option is to purchase components and build the harnesses. The home built system costs about half of the packaged unit but requires a couple of hours of fabrication time plus some basic knowledge of soldering and insulating connections.

For clarification, the early model 2002s low beam circuit does not have a relay but it is fused in the stock fuse block on number three and four. The high beam circuit does not have a relay or a fuse.

This procedure includes instructions to add two relays to the early model 12v 2002s for high and low beams. Some suggest the addition of relays will improve light output by 10% - 15%.

For those that have additional gauge lights, adding a relay to that circuit may also reduce stress to the stock switch.

Listed below are the needed parts. The part numbers listed are Susquehanna Motorsports (610.944.3233 or www.susquehanna.com/susq) part numbers. Note: Susquehanna's web site has a good tips section on wiring schematics, which I took much of my information from, and the site has a section on wire selection. Dave at Susquehanna is a wealth of knowledge and very willing to help.)

Parts list:
From Susquehanna Motorsports
2 - relays #87483 ($10.16 each)
2 - relay base kits #87123B (includes the crimp connectors #87272) ($2.56 each)
2 - H4 adapters #66490 ($7.85 each)

From Radio Shack or other supplier
1 role - friction tape
7 colors of 14 gauge primary wire (fewer colors may be used, careful tagging of the wire is crucial. You may notice in the schematic and photo, I only used five, wish I had used seven)
Solder
Shrink wrap tubing

Zip ties
Dielectric grease (Permantex 67VR)
Connections to 12v power and to ground. (The type connections depend on owner's preference and particular configuration.

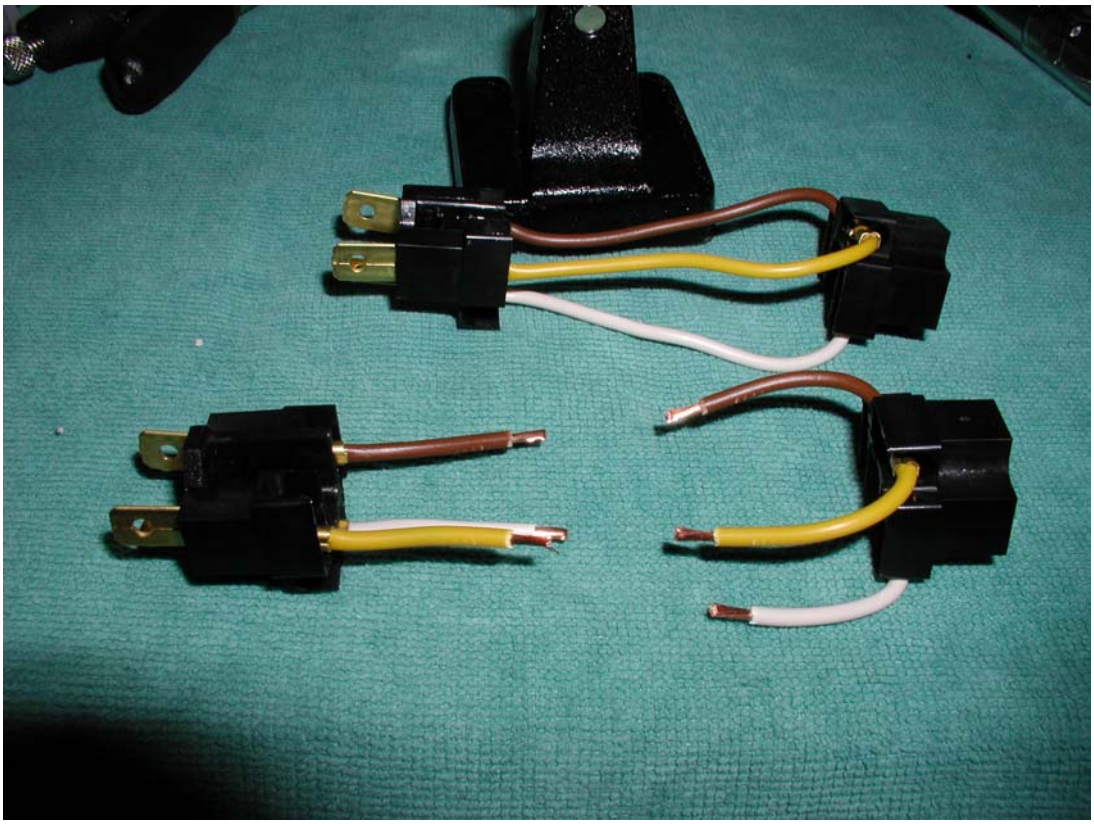
Tools needed:

Soldering iron (I prefer the new butane units available at Sears or Radio Shack.
Crimpers - this a specific tool to crimp the connectors used on the relay base ports. Radio Shack #64-410
Wire cutters and strippers
Needle nose pliers
Jewelers screw driver or small pic.
Helping Hands Wiring Vise from Radio Shack helps to hold the wires while soldering, convince your wife, or bribe your kid to help.

Assembly instructions

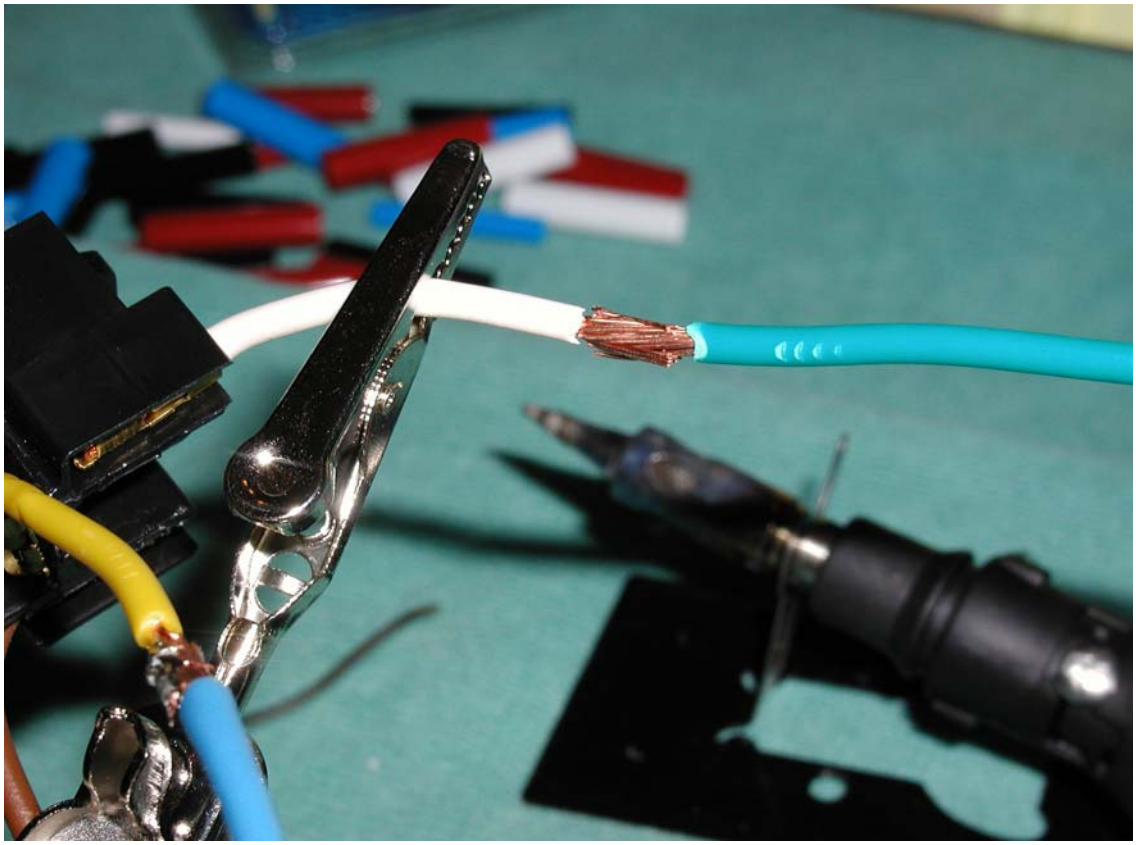
Determine mounting location for relays. This location will determine the lengths of wire needed.

Cut the three wires on the H4 adaptors halfway between the male and female ends. Now you will have four adaptors, two female adaptors and two male adaptors. You will not use one of the male adaptors in this procedure.



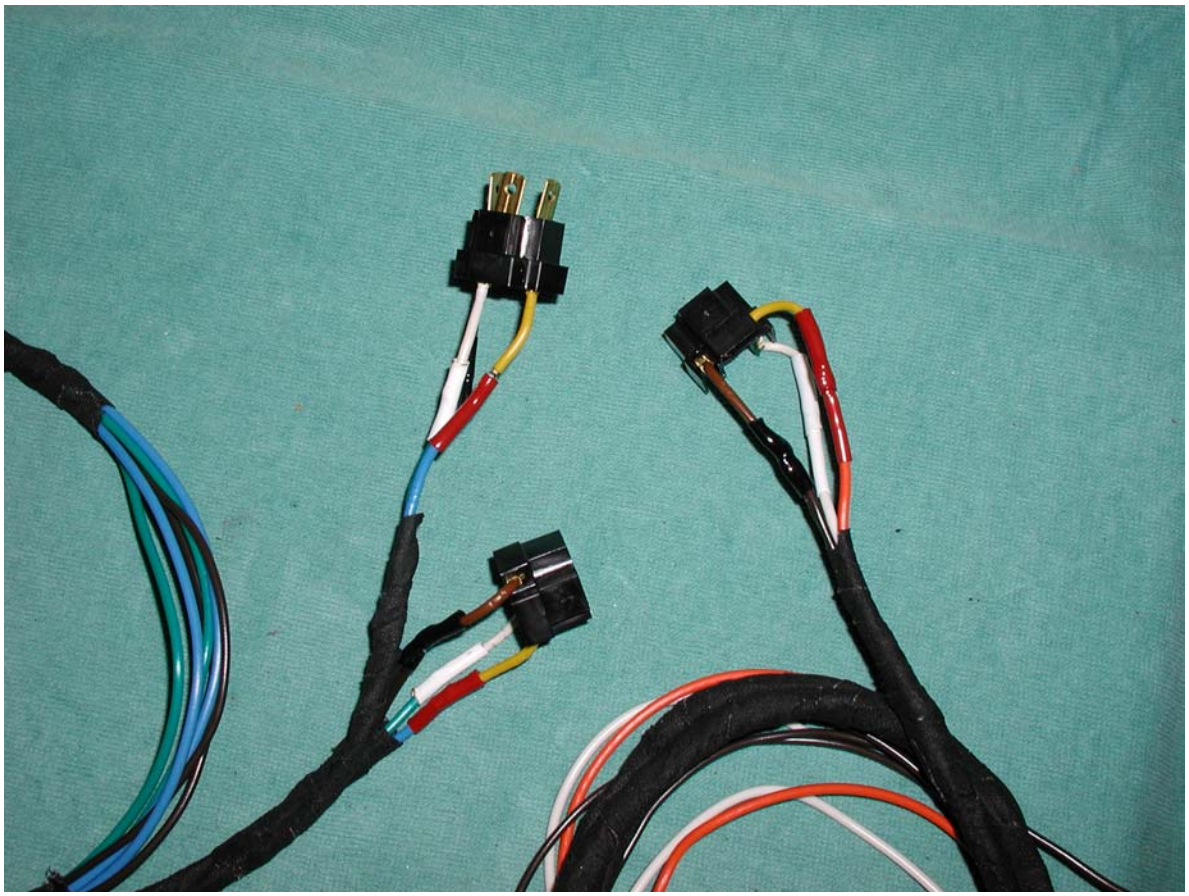
Assemble the harness for the right headlight assembly:
(I chose to ground the headlight assemblies on the driver's side inner fender well. They can be grounded at other places. The ground point chosen determines the length of ground wire.)

Solder lengths of wire to the three leads coming from the female H4 adaptor. The leads from the connector are yellow, white, and brown. The brown wire (on the left side of the connector) is the ground. The yellow wire on the top of the connector is the low beam. The white wire on the right side is the high beam.



Insulate the solder connections with shrink-wrap tubing.

Wrap the harness with friction tape.



Assemble the harness for the left headlight assembly This procedure is exactly like the right harness, but the wires are shorter. Hold off on wrapping the harness. You may want to include the next step in the harness too.

Assembly of the harness that will switch the relay:
This next step is assembling the two wires that "switch" the relay on and off.

On one of the male H4 adaptors, remove the ground connector from the plastic base. This is done by inserting a small jeweler's screwdriver or pick in the top of the base and bend back the small barb that holds the connector in the base and pull out the connector. This is easy as long as you insert the screwdriver in the correct place.

Now you have an adaptor with two brass connectors not three. Solder lengths of wire to the yellow and white lengths of wire that were on the H4 adaptor. Remember the wire you solder to the yellow wire, it will terminate on the low beam relay point 86 and the wire you connect to the white wire will terminate on the high beam relay point 86.

Insulate the solder joints with shrink-wrap tubing.

Now you can wrap this harness with the left headlight harness in friction tape.

Connections to the relays:
Ensure you know where you will install your relays in your car so you will have sufficient lengths of wire in this step.

Cut the wires the proper length to terminate into the relays and to reach whatever ground point you will use.

Note on grounding. As 02 owners know, grounding is important and we often have to remove things as we work. I chose to terminate my wiring to the one of the screw holes that holds the stock tii air-box on, but you will need to determine your grounding point. I also used separate ground wires for the four grounds you need, one for each headlight assembly and one for each relay. I terminated these on the body with short pieces of wire, ring connectors, and spade tips. Then I used insulated spade tips and short pieces of wire to terminate to the relays and placed insulated spade tips on the ground wires coming from the headlight assemblies. You may not want to go through all of this for the ground, your choice, just get good grounds.

Now, it is time to connect this nest of wires to the relay bases. Take your time and get rid of any distractions. As a review, connections to these relays are:

30 – from battery power
86 – from switched power
85 – to ground
87 – to headlight assembly
87 – to your other headlight assembly

Crimp the spade tip connections on the wires; you should have 10 wires to connect to the two relay bases.

Mark one relay base, **high beam** and the other **low beam**.

You are making the connections into the relay bases by snapping the connectors into the bottom of the bases. Later the relay will push into the top of the base. Before you snap any of the connectors into the base, set the relay into the base and somehow, make note of which hole in the base corresponds the number on the relay, **take your time and get a good system going**. This is important.

Disconnect the battery!

Connect the three wires from the right headlight assembly:

- connect the wire from the low beam to the low beam relay base, point 87,
- connect the wire from the high beam to the high beam relay base point 87, and
- connect the ground wire.

Plug the H4 adaptor into the headlight.

Connect the three wires from the left headlight assembly;

- connect the wire from the low beam to the low beam relay base, point 87,
- connect the wire from the high beam to the high beam relay base point 87. and
- connect the ground wire.

Plug the H4 adaptor into the headlight.

Connect the two wires from the switched adaptor:

- connect the wire from the low beam to the low beam relay base, point 86,
- connect the wire from the high beam to the high beam relay base point 86.

Plug the new male adaptor into the female plug previously connecting the driver's side headlight. You may use dielectric grease on the metal connections. Tape the connection to ensure it stays together.

Connect the ground wires, from point 85 on both relay bases, to a ground point.

Connect battery power to point 30 on both relay bases.

Installing the relay bases and relays:
These bases "gang" together so only one screw is needed to secure the relays to the car. If you reference the picture of my installation, the third relay is to my driving lights, it wires in the same manner as the headlights.

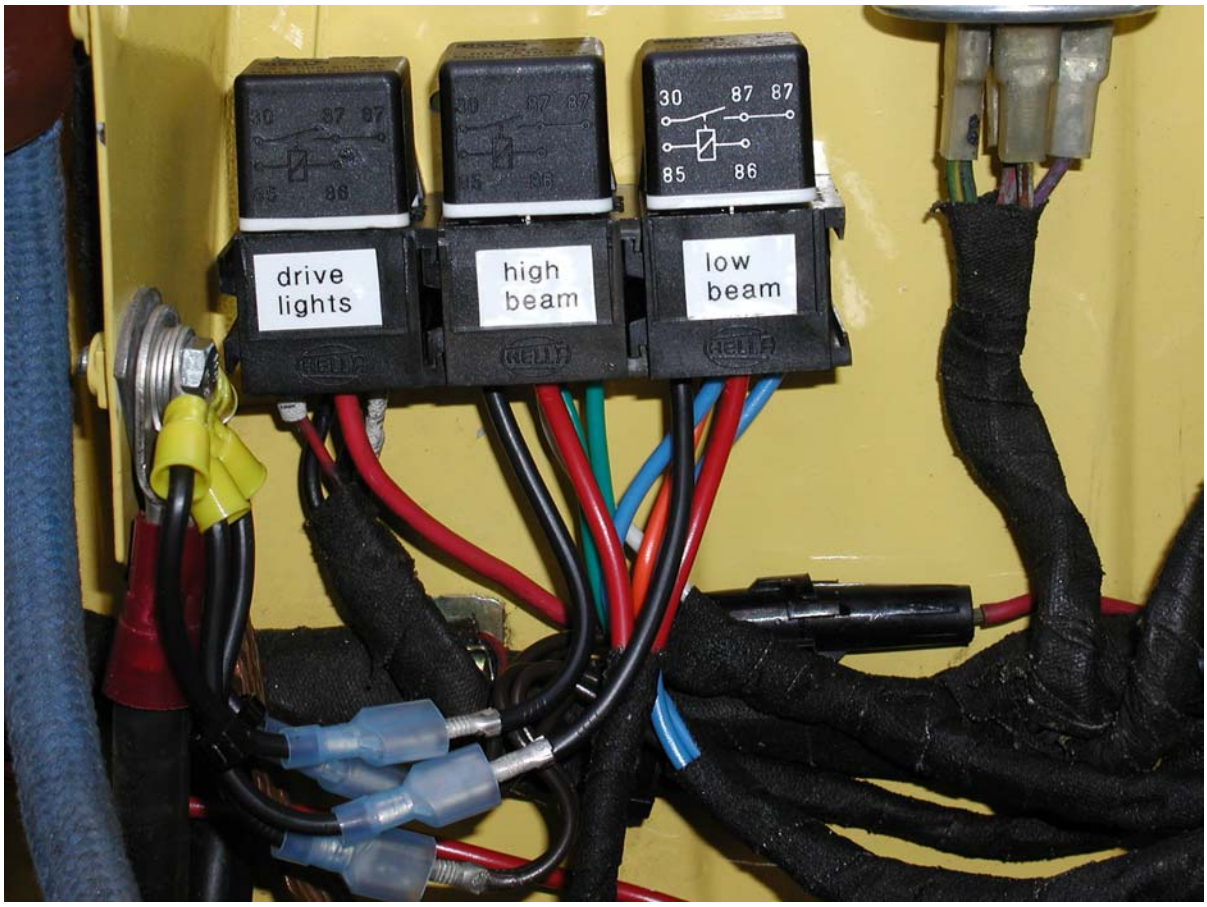
Install the relay bases to the car with a sheet metal screw.

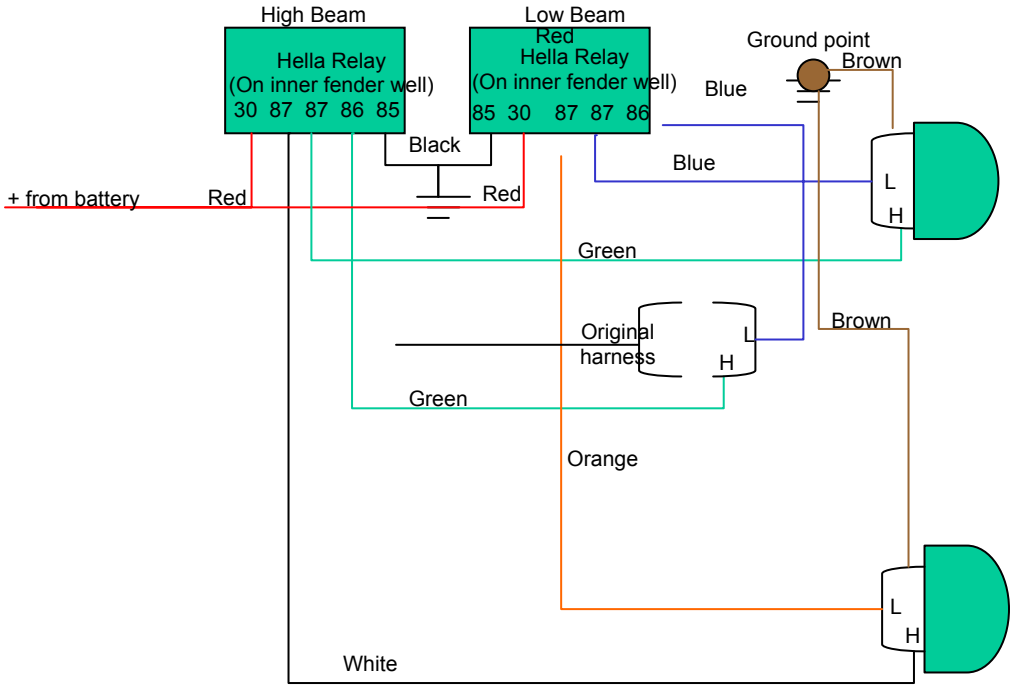
Smear dielectric grease on the male relay plugs and gently, but firmly, press the relays into the relay bases. Turn on the battery, if you are unsure of your work, unplug the lights and use a DVM to verify all the connections.

Then check the lights and hope for no smoke! If smoke comes out, you cannot put it back in. ☺

Please verify all of these directions and connections; I am neither an electrician nor a technical writer.

Bill Williams


drive
lights
high
beam
low
beam
30
87
87
85
86


High Beam
Hella Relay
(On inner fender well)
30 87 87 86 85
Low Beam
Red
Hella Relay
(On inner fender well)
85 30 87 87 86
Ground point
Brown
Blue
Black
Blue
+ from battery
Red
Red
L
H
Green
Original
harness
L
H
Brown
Green
Orange
L
H
White