Remote Key Fob Control for Top Lowering in 1997-2006 Jaguar XK8 / XKR Convertibles

Introduction

Jaguar omitted the very desirable ability to control the convertible top operation with the remote key fob. Besides the high 'coolness' factor, it is convenient, can be handy for saving time as you approach the vehicle, can help you to locate the vehicle in a busy parking lot, and of course attract attention to your beautiful vehicle.

The convertible top is controlled by a fairly sophisticated dance between the Body Processor Module (BPM), the Security and Locking Module (SLM) and the Driver Door Module (DDM). Unfortunately it is not easy to break up this party. It is possible, however to fool the system into thinking you are lowering the top with the door lock key switch when you are actually using the remote with some relatively simple circuitry. This is the approach that is detailed here.

For information on availability of a full version that also raises the top, and is simpler to install and comes in kit form see the FAQ in Appendix D.

Disclaimer:

This modification can be implemented by someone with basic automotive wiring and repair skills, such as experience installing a car radio. You need to read and understand these instructions thoroughly. When you do the work, you need to check it, and recheck it before applying power. Having a second person check it is a good idea. ***Certain wiring errors may do expensive damage to the electronics in your car.*** If you are confident and careful, you can do this. If you are unsure, you should have this done by someone with the proper experience. If you damage your car, it is entirely your responsibility.

These instructions are provided in good faith and believed to be accurate and reliable, but are not guaranteed to be so. I do not have access to Jaguar engineering information. This means there is the possibility that I omitted some important details that could cause problems, including physical harm to your vehicle or to you or to others. I do not believe this to be the case, but it is possible. ***If you choose to implement this, it is entirely at your own risk and you assume all responsibility and liability.***

Parts List:

- **Qty 1,** DEI 528T Pulse Timer Relay (http://shop.ebay.com/i.html?_nkw=dei+528t&_sacat=0&_odkw=dei+528t&_osacat=0&_trksid=p3286.c0.m270.l1313)
- **Qty 3,** Bosch style automotive SPDT relay with integral negative spike suppression (http://www.boardrelays.com/Detail.asp?Product_ID=303.110_BU5083W) . (**Note**: Do not substitute relays without spike suppression, they may cause electronic malfunctions in your vehicle).
- **Qty 2,** 1N4001 Diode (available at Radio Shack, catalog #276-1101, but any 1 Amp silicon rectifier diode will do)
- **15 feet**, Type, SJW, SJOW, or SJOOW , 18 AWG, 3 conductor, waterproof, flexible Rubber Line Cord (available by the foot from Home Depot, many hardware stores, electrical supply shops or http://cgi.ebay.com/10-feet-18-2-UL-SJ-SJO-SJW-SJOW-A-80-C-Power-Cable-/150560934122?pt=LH_DefaultDomain_0&hash=item230e2188ea
- **Qty 7**, 18-22 AWG .250 female quick disconnects (red)
- **Qty 3**, 14-16 AWG .250 female quick disconnects (blue)
- **Qty 2**, 10-12 AWG .250 female quick disconnects (yellow)
- **Qty 5**, **5 foot lengths** 18-22 AWG stranded PVC insulated wire, preferably one of each Red, Black, Violet, Orange and Grey (but any color will do as long as each end in labeled with a masking tape flag).
- **Qty 1**, **6" length** 18-22 AWG stranded PVC insulated wire, preferably Blue (but any color will do).
- Fabric (friction type) electrical type
- Vinyl electrical tape
- Double faced carpet tape
- Masking tape
- Heat shrink tubing (3/16")

- Industrial Strength Self Adhesive Velcro (available at Home Depot)
- Electronics grade solder
- Assortment of tie wraps (at least 2 of them should be black in color)
- Spray silicone lubricant
- (optional) Spare door panel fir tree push-terminals (in case some break upon removal of door panel Jaguar p/n KTC100017, about $1.20 each)
- (optional) assortment of 20-22 AWG and 18 AWG Posi-taps to use instead of solder tapping: http://www.posi-lock.com/posiplug.html. (These are more reliable than T-taps, which I do not recommend).

Tools List:

- #2 Philips screwdriver
- Trim / panel clip removal tool (panel clip pliers recommended: http://www.harborfreight.com/panel-clip-pliers-67399.html)
- Ratchet set with 7mm, 8mm, 10mm. and 13mm sockets
- T27 torx driver or socket
- Jack
- Jack stand
- Lug wrench to fit your wheels
- Soldering iron
- Wire strippers
- Wire cutters
- Long nose pliers
- Quick connect crimping tool
- Scissors
- Awl or sharp nail
- Hammer
- Heat gun / hair dryer for heat shrink tubing

Part One - Relay and timer pre-wiring and setup

Step 1: Reference the wiring diagram in **Appendix A**. In a comfortable work area, away from the car, wire all of the interconnections between the three relays, the DEI 528T timer with crimp on .250 quick connect terminals. The connections are summarized below:

From	To	To
Pulse Timer, brown wire	Relay 2, terminal 86, yellow quick connect	Relay 2, terminal 87a, red quick connect
Pulse Timer, black wire **with white stripe**	Relay 1, terminal 87, red quick connect	
Relay 1, terminal 85, 6" blue wire, red quick connect	Relay 3, terminal 87a, red quick connect	

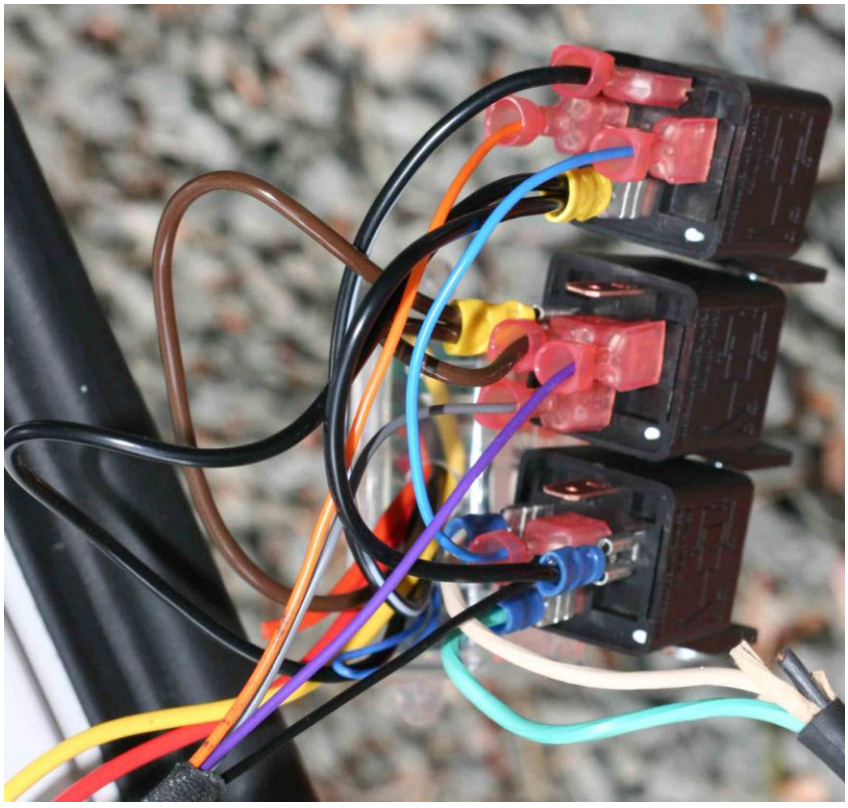
Step 2: Wire the grey, violet, orange, red and black 5 foot 8-22 AWG wire also, and using fabric electrical tape and/or tie wraps bundle these five wires into a cable. All of these wires will be unconnected on one end for now.

Do not wire the 15 foot line cord (white and green wires in the photo) yet, that will be done later.

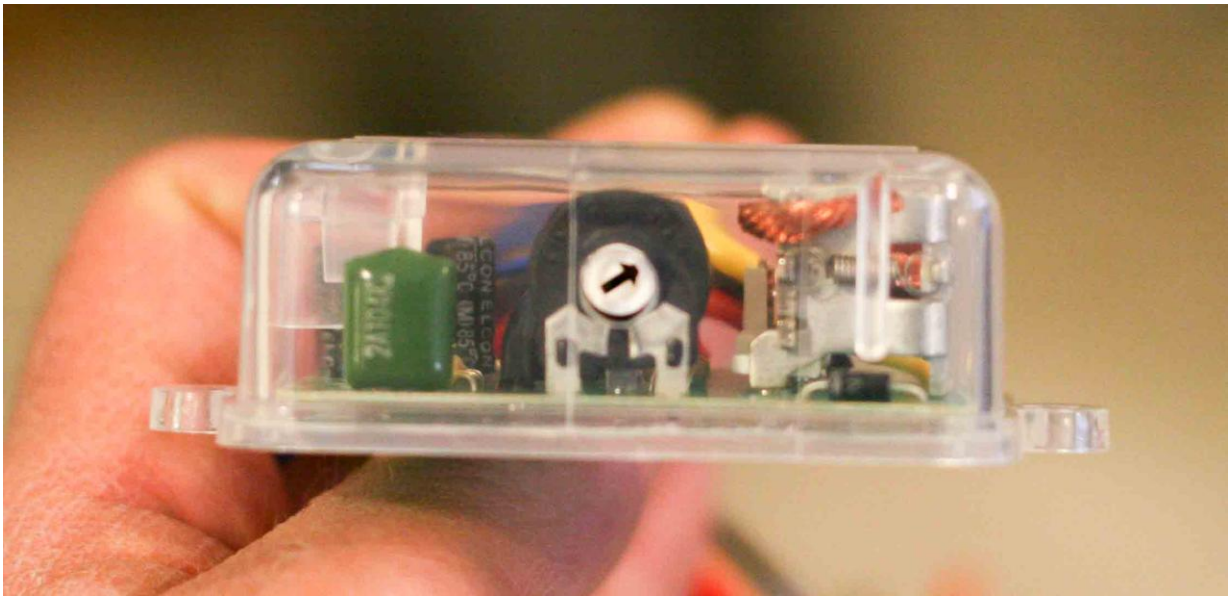
The connections are summarized below:

From	To	To	To
5 ft. red wire (crimp or solder splice)	Pulse timer, yellow wire	Pulse timer, red wire	
5 ft. black wire	Relay 3, terminal 85, blue quick connect	Relay 1, terminal 30, yellow quick connect	Pulse Timer, black wire
5 ft. orange wire	Relay 1, terminal 86, red quick connect		
5 ft. grey wire	Relay 2, terminal 30, red quick connect		
5 ft. violet wire	Relay 2, terminal 85, red quick connect		

The assembly should look like the photo below (except the line cord with the white and green wires will not be connected). Relay 1 is at the top, Relay 2 in the middle, Relay 3 is at the bottom.



Step 3: Set the timer to the 2 o'clock position to provide for an approximate 35 second delay:



Step 4: Cut the unused orange wire off on the timer near the housing.

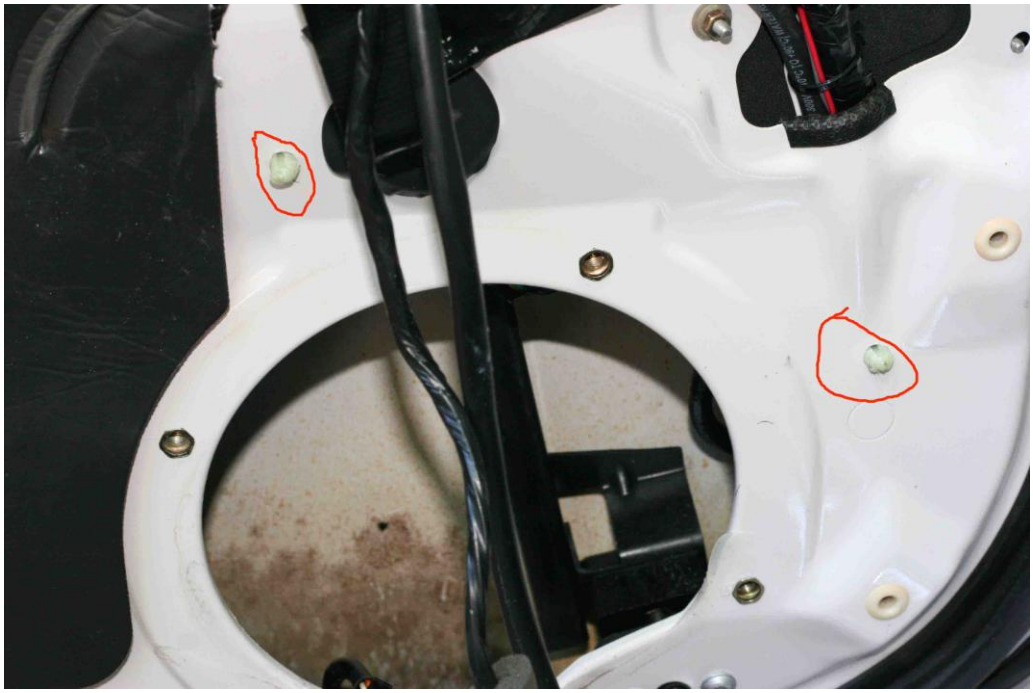
Part Two - Installation

Step 1: Work on level ground since you will be jacking up the car later. Raise the windows. Open the driver door. Remove the negative battery terminal the trunk with a 10mm ratchet in and bend the terminal away so it does not touch the negative battery post. Do not ignore this step...the battery must be disconnected or you seriously risk vehicle damage.

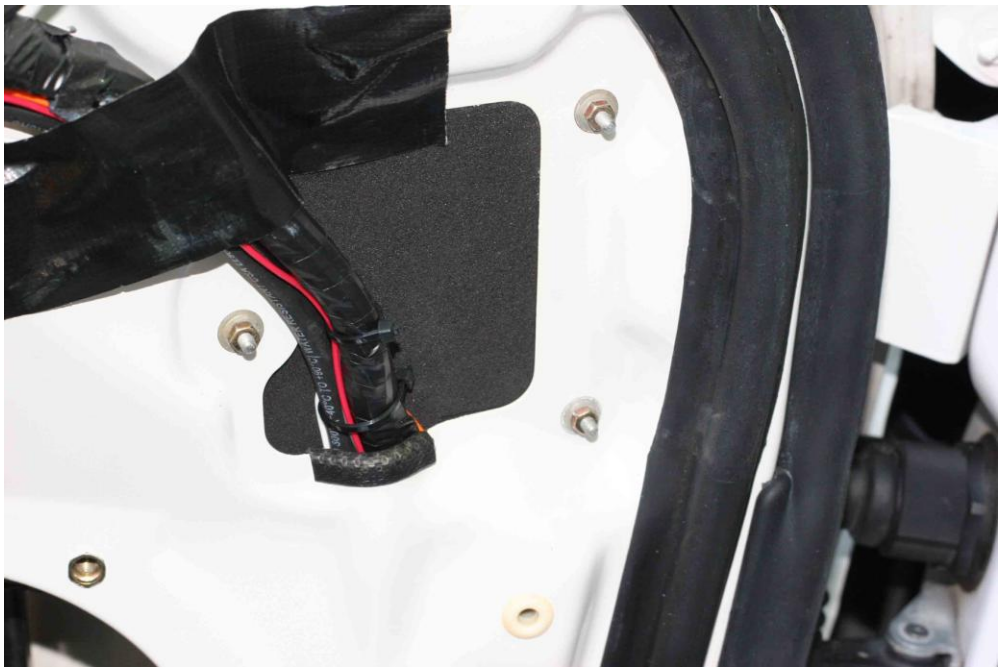
Step 2: Carefully remove the driver door panel and associated hardware (a.k.a. door card). Reverend Sam of Jaguarforums.com describes this process in his YouTube video: http://www.youtube.com/watch?v=a3wMh_R3fws. I recommend using the trim panel clip remover pliers in the tool list, wrapped in masking tape to make this job easier and prevent damage...especially on vehicles where the door panel has never been removed before. Set the panel aside for later. It is good to have a few fir tree push terminal fasteners (Jaguar p/n KTC100017) available as spares, because these are inexpensive, and some may break.

Step 3: Remove the driver door speaker (4 bolts with 8mm ratchet) and associated door panel bracket mounted on two of the speaker bolts. Unplug the speaker and set it and the foam baffle behind it safely aside.

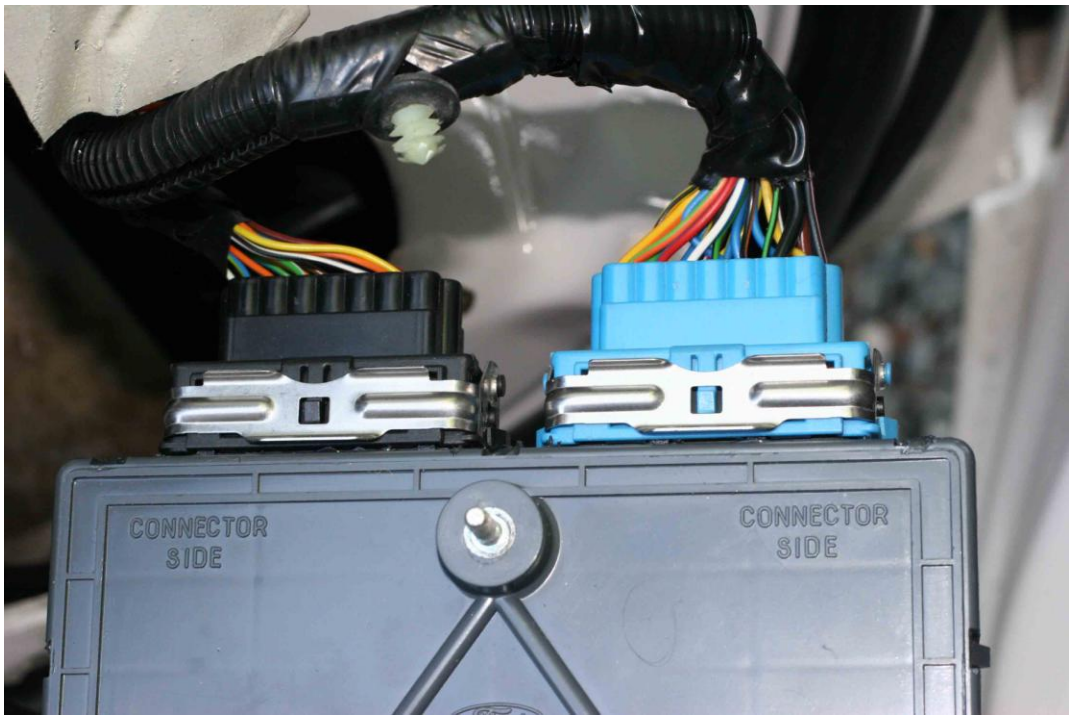
Step 4: Using the striking face on a hammer, press (don't hammer) the two harness mounting clips near the speaker opening circled in red below into the inside of the door.



Step 5: Remove the three 7mm bolts retaining the Driver Door Module behind the sheet metal of the inner door (note: your wiring will look different...some of these photos were taken after the new wiring was added).



Step 6: Carefully extract the driver door module from the inside of the door cavity with the attached cables through the speaker opening. Make sure you do not lose the foam gasket inside the door.



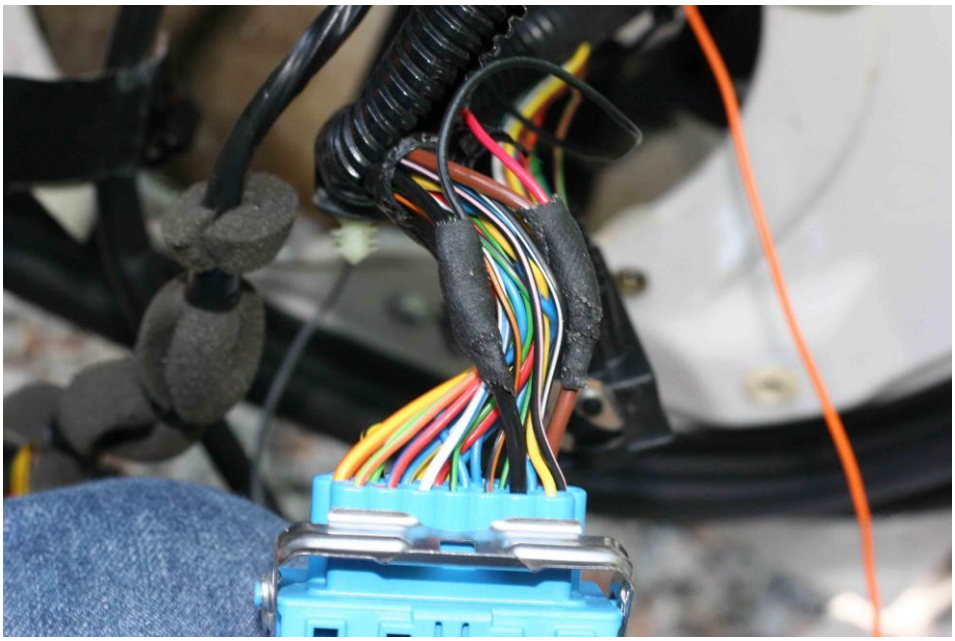
Step 7: Remove the black and blue connectors from the Driver Door Module. To remove a connector, depress the square button while lifting the metal tab end nearest the module upwards. The connectors will self-extract during this process.

Step 8: Carefully remove at least an inch of the electrical tape wrapping each of the harnesses near the connector.

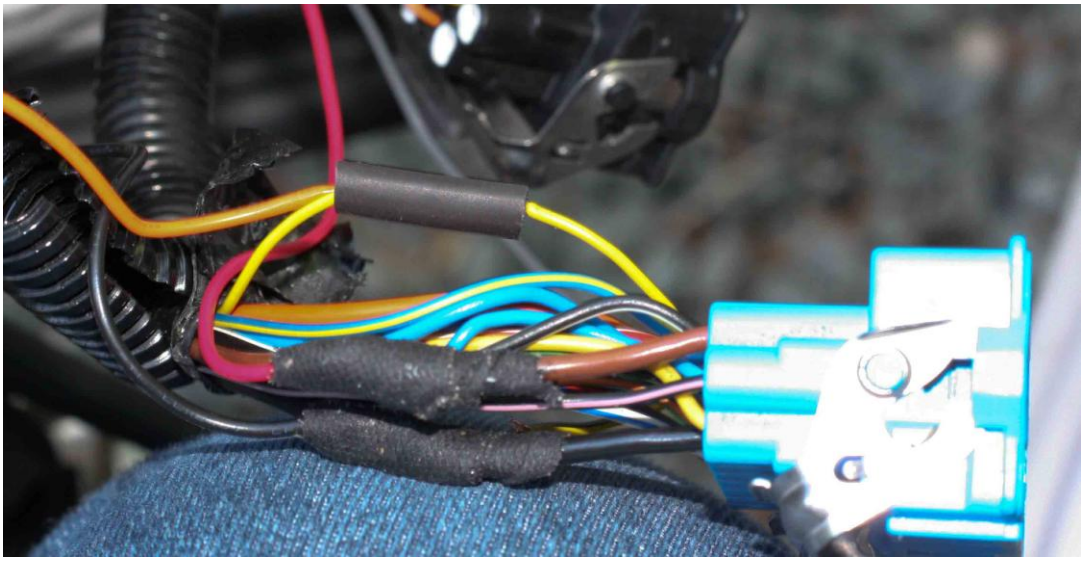
Step 9: Carefully peel off the upper half of the plastic vapor barrier, exposing the full wiring harness going across the door.

Step 10: Tie wrap the red, black, orange and grey and violet wire assembly to the existing harness, leaving enough wire so that the relay/timer assembly can be placed about 12" below the location of the puddle lamp. The wire should be threaded to follow the same route to the Driver Door Module connectors out through the speaker opening that the existing harness takes.

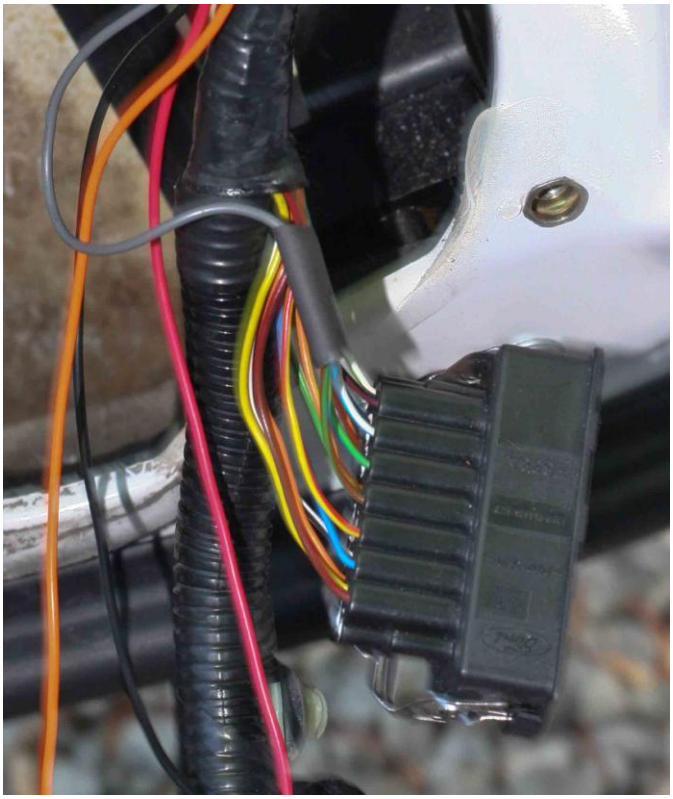
Step 11: Starting with the blue connector (DD10) , solder tap the black wire (terminal 17) to the black wire of the relay/timer wire assembly. Solder tap the brown wire (terminal 1) to the red wire of the relay/ timer wire assembly. Both these solder taps are shown in the photo below, covered with friction type electrical tape. Note that the connector terminal numbers are also embossed on the connector body.



Step 12: Continuing with DD10, the blue connector, solder tap the yellow wire (DD10, terminal 5) to the orange wire from the relay/timer wire assembly. Double check this is the SOLID yellow wire on terminal 5, and not a yellow wire with a colored stripe. See below.

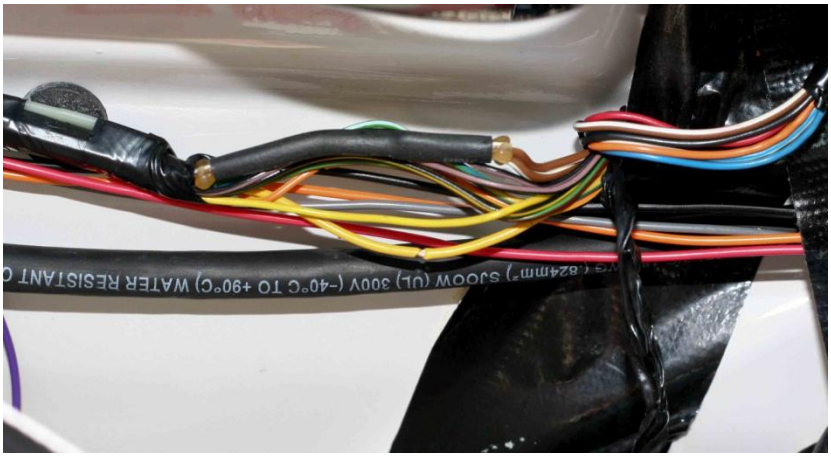


Step 13: Moving on to the black connector, DD11, locate terminal 4, the green wire with a brown stripe. Solder tap this wire to the grey wire from the relay/timer harness. See below.



Step 14:. Re-tape both of the Driver Door Module connector harnesses with vinyl electrical tape up to near the connector bodies.

Step 15: Locate the section of harness in the upper central area of the door where the cable splits off to the door handle. See below. Unravel a couple of inches of electrical tape from the harness to the left of the split. Note the two solid yellow wires. One is a **heavier gauge** (shown with insulation cut in the photo). This is the ONLY yellow wire we want to work with. Cut through this heavier yellow wire approx. where the insulation is split in the photo.



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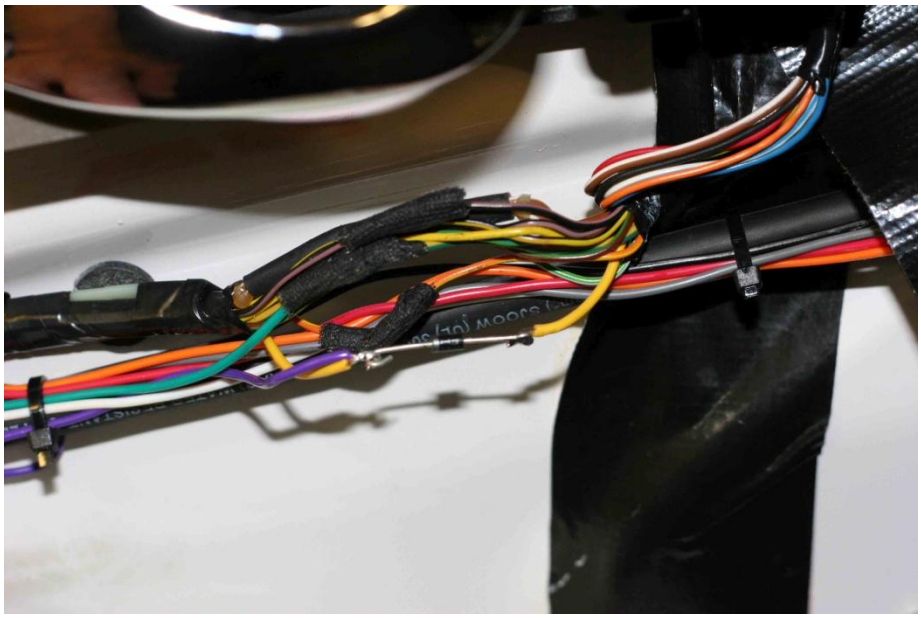
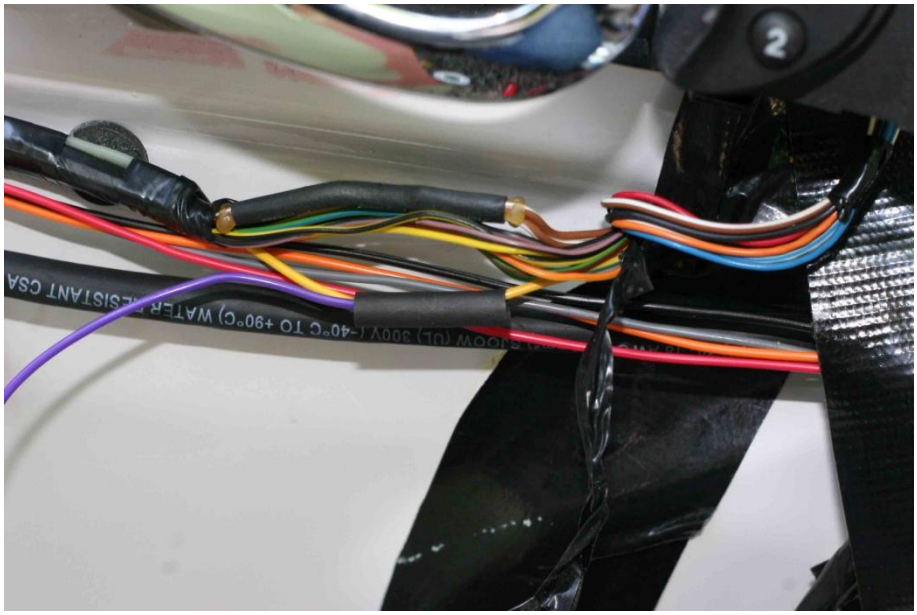
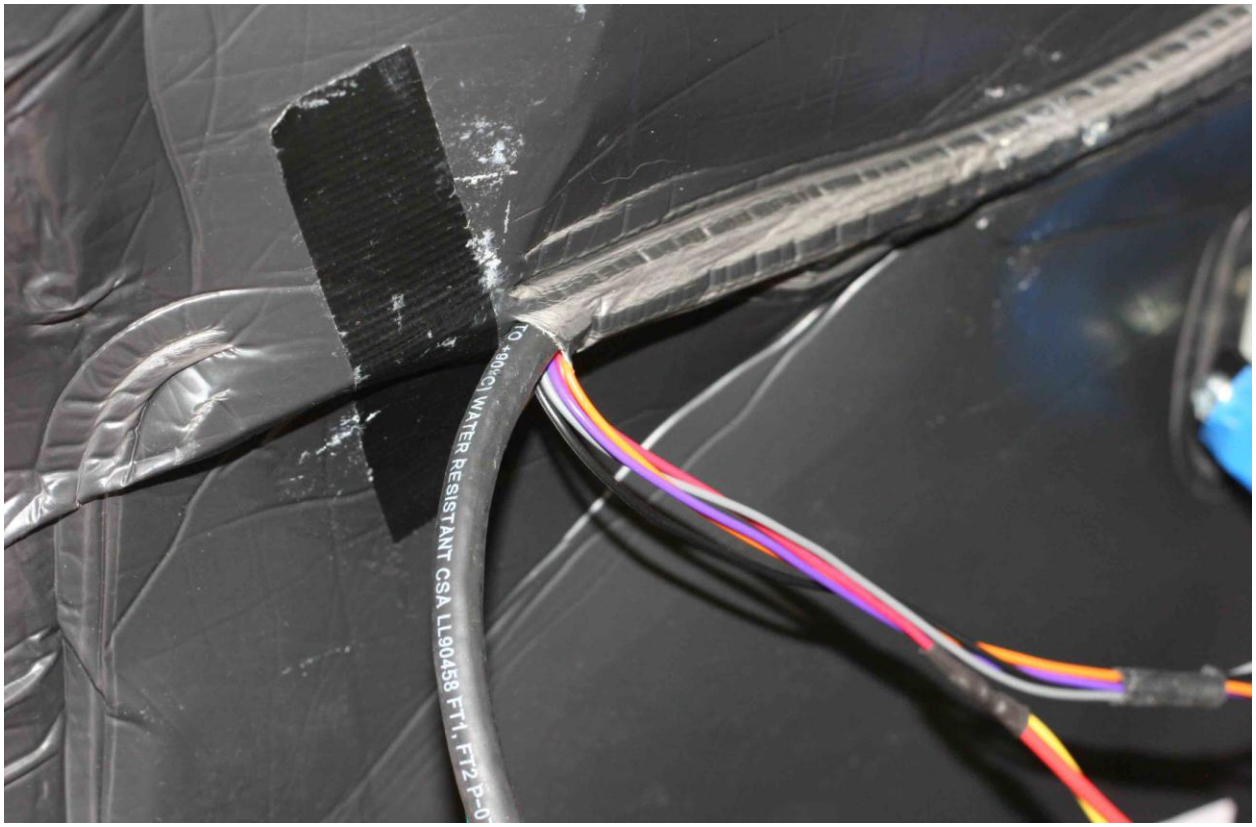
Step 16: Pull the violet wire from the relay/timer wire assembly back from the speaker area to the central area of the harness discussed in step 14 above. Solder the CATHODE (white striped side) of a 1N4001 diode to the LEFT side of the cut yellow wire AND to the violet wire. Slide on heat shrink tubing. Solder the ANODE of the diode the RIGHT side of the yellow wire. This is illustrated below photos:





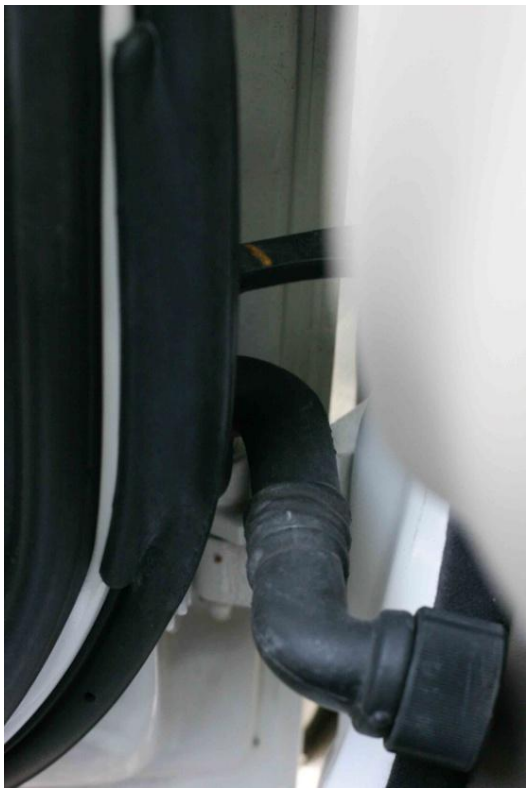
Shrink the tubing with a heat gun and re-tape the harness with vinyl electrical tape.

Step 17: Pierce the vapor barrier with a small hole at the end of the 'stretched' area of the film which covers the harness. Take the 5-wire cable and line cord and pass them from behind through the hole as shown below:

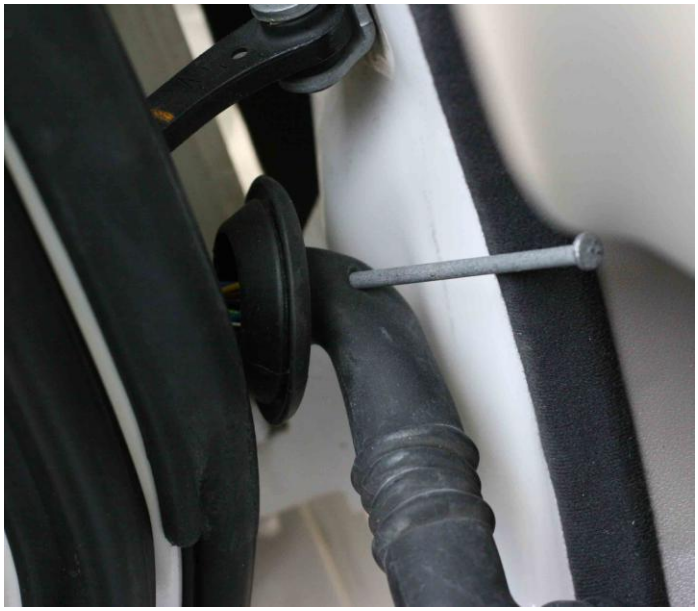


Step 18: Apply double faced carpet tape in sections to the back of the vapor barrier in areas where it was previously peeled off. Remove the tape backing and restore the vapor barrier to its original position adhered to the inner door.

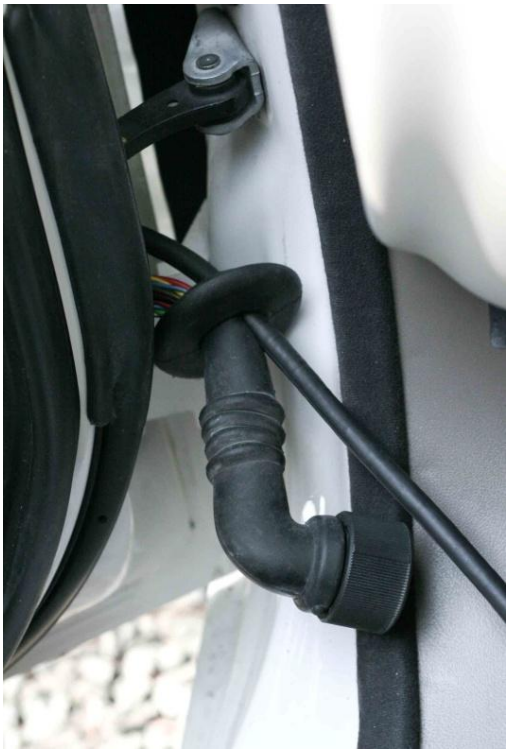
Step 19: Open the door fully. Turn the knurled plastic connector between the door and body harness counterclockwise to until the connector disengages. Remove the harness grommet end from the body and rotate it as shown below, with the connector facing outward:



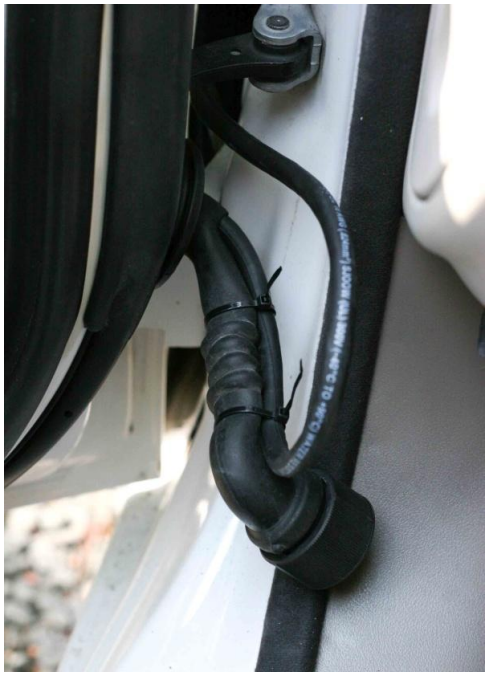
Step 20: Carefully pierce the rubber boot precisely as shown in the photo below with awl or sharp nail. Be very careful not to damage wires in the boot.



Step 21: Spray a small amount of silicone lubricant on one end of the 15 foot rubber line cord. Force it through the pierced hole. from the outside. Pull about 4-5 feet of cable through and thread it through the exact same path as the other wiring harnesses in the door. Tie wrap it to the other harnesses along the way.



Step 22: Neatly dress the cable to the boot with two black tie wraps as show below:



Step 23: Cutoff the tie wrap tails. Take the loose end of the cable and push the remaining cable through the adjacent open cavity of the fender. Reinsert the grommet in the door, and rotate the boot back to its original position. Re-insert the round connector into the body with a clockwise turn until it stops. The final product should look like the photo below, with the new cable tie wrapped behind the boot and barely visible:

Step 24: Set the emergency brake. Unlatch the hood. On level ground jack up the driver's side front wheel and remove the tire. Support the car with a jack stand for safety.

Step 25: Remove the left front wheel well liner. Reverend Sam also has a YouTube video with this procedure: http://www.youtube.com/watch?v=r4A3q1cuNSs

Step 26: Retrieve, pull free and straighten out the line cord cable stuffed in the fender wheel well cavity in Step 22.

Step 27: Tie wrap the cable to the purge valve bracket at the same place the purge valve's electrical harness is tied down. Make sure the cable is slack to allow movement for door opening.

Step 28: Following the purge valve harness, tie wrap the line cord cable to the purge valve harness near where it enters the car's body on the upper right of the wheel well, then tie wrap the cable to the hose that wraps around the perimeter of the wheel well along the top.

Step 29: Once on the left side of the wheel well, thread the cable up into the opening to the engine compartment.

Step 30: Replace the wheel well liner. Replace the wheel. Lower the car and tighten the lug nuts.

Step 31: Open the hood. Locate the fusebox on the driver's side. Lift the rubber boot over the ground cable and remove the ground cable with a 13mm socket. Spray the fusebox mounting release latch tab in the front of the fusebox liberally with silicone lubricant. Let it soak for a few moments. Then pull UP firmly on the latch until it raises. Once the latch it released, slide the fusebox toward you until it is free.

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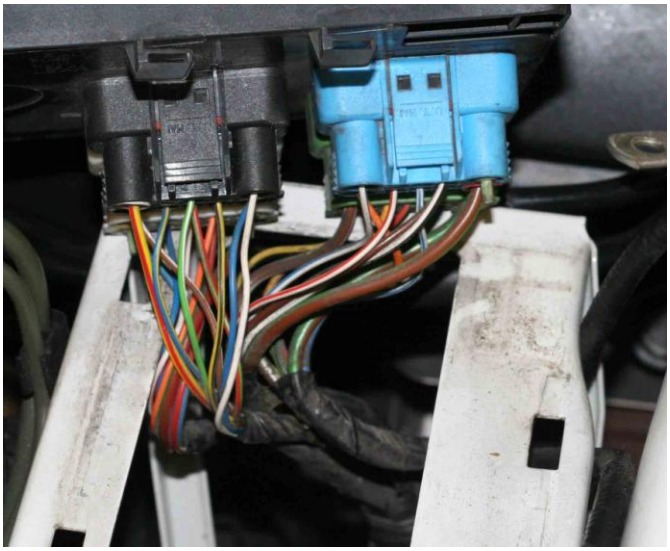
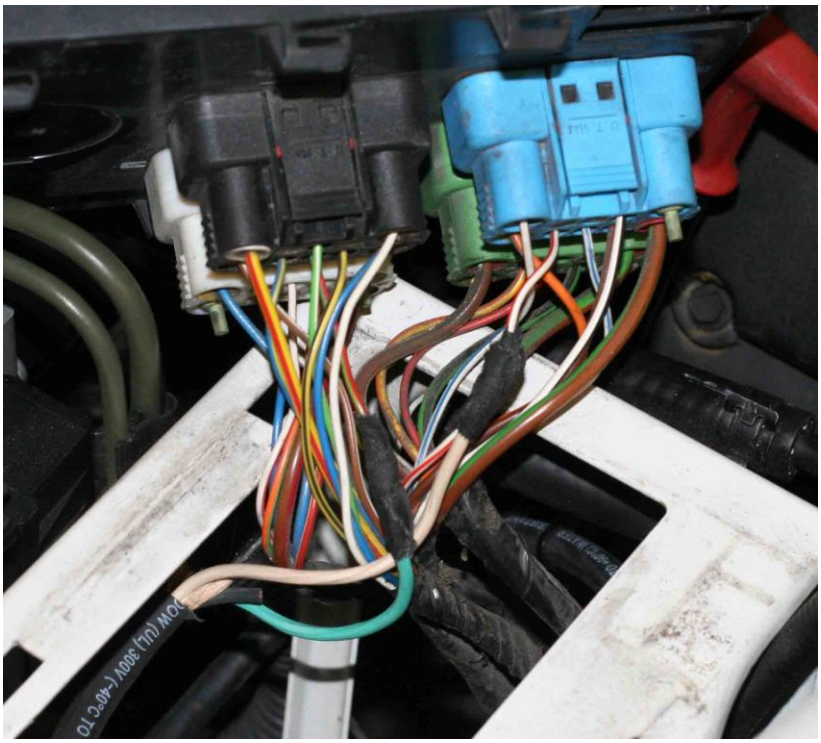
Step 32: Tilt up the fusebox, exposing the blue and black connectors on the underside.



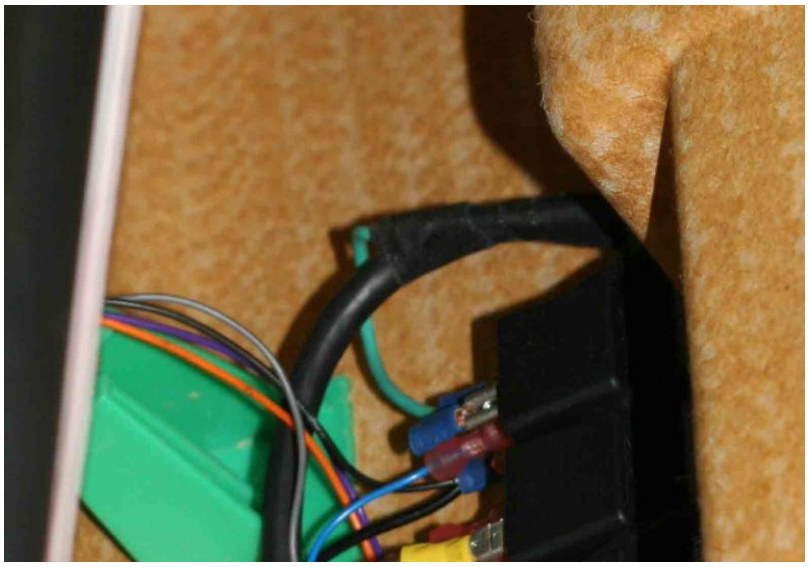
Step 33: Route the line cord cable from the wheel well to the fusebox and up through the opening underneath it. Strip the outer rubber insulation about 4 inches back. Solder tap the green wire from the rubber line cord to the green/red wire on the black connector LF6, terminal 9. Solder tap the white wire from the rubber line cord to the red/white wire on the blue connector LF8, terminal 8. The black wire in the rubber line cord can be cut back to the outer jacket, it is not used.



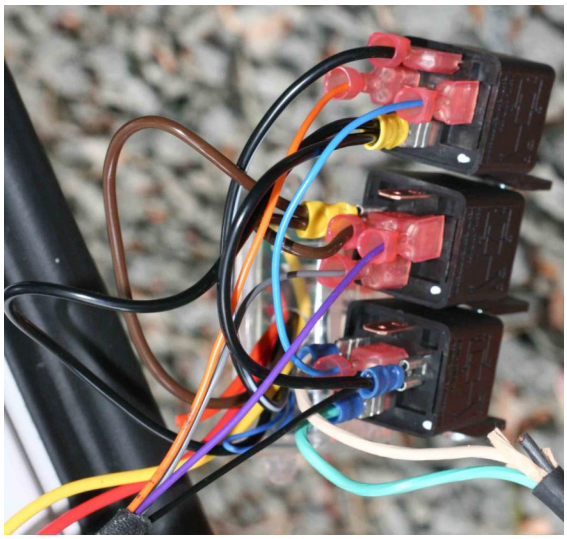
Step 34: Wrap each harness in vinyl electrical tape, taking are to cover the solder taps. Reinstall the fuse box, sliding it forward in it's mount and depressing the latch. Reinstall the ground cable, and rubber cover. Shut the hood.

Step 35: Open the driver's door. Cut about four inches off of the end of the line cord cable at the door.. Strip the 8" outer jacket off of the line cord cable. Cut 4" off of each wire. Discard the black and white wires, and save the green 4" wire. Splice diode D2 inline between the green wire in the cable and the 4" green wire. The cathode (white stripe) must face into the black cable: See photo below. Cover the diode and connections with heat shrink tubing after soldering

Step 36: Fold the diode back over the black line code cable jacket and tape it in place with electrical tape. This will provide protection and strain relief for the diode.

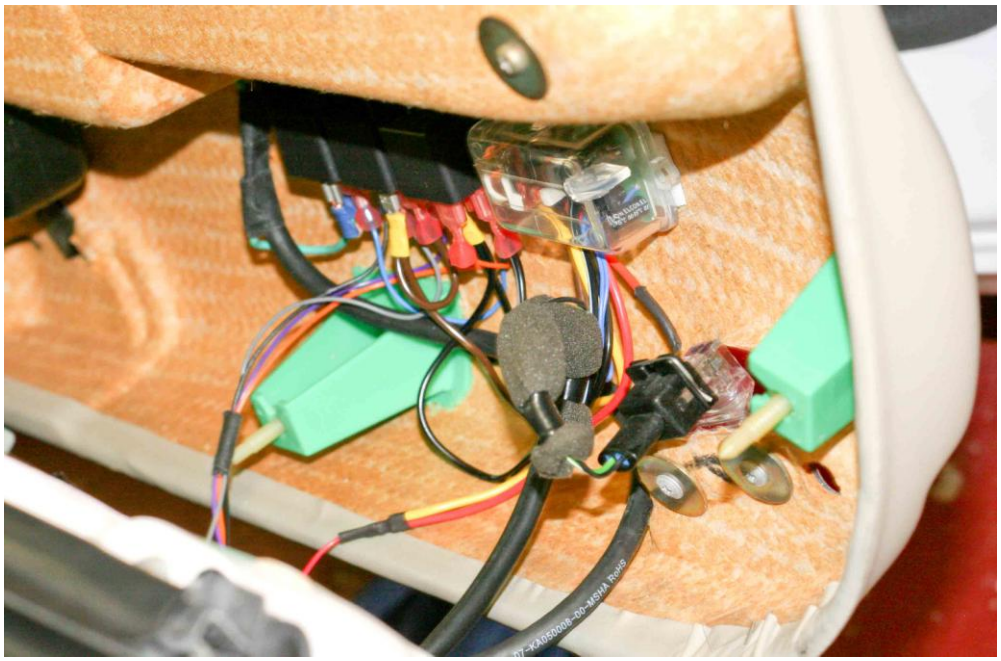


Step 37: Crimp blue quick connects on the green and white wires. Connect the green wire to Relay 3, terminal 30. Connect the white to wire Relay 3 terminal 86. The black wire is not used and can be trimmed back to the cable jacket.



Step 38. Reinstall the Driver Door Module connector and the driver door module, with gasket inside the door with three 7mm nuts. Re-insert the two cable nylon cable clamps into the holes in the door panel. Reinstall the speaker and door trim bracket with four 8mm bolts..

Step 39: Apply a strip of industrial strength self adhesive Velcro to the three relays and to the timer. Peel the backing and adhere it to the empty well in the inner door trim adjacent to the puddle lamp as shown below.



Step 40: Reinstall the puddle lamp connector. Reassemble the door panel trim and hardware on the door per the video instructions from Rev. Sam.

Step 41. Reconnect the battery. If possible, check the battery and make sure you have at least 12 volts before proceeding on to Part Three.

Part Three - Initialization and Testing

Step 1: Turn on the ignition. Roll the windows all the way down, holding the window down button until you hear a click. Now roll the windows up, holding the up button until you hear a click. Repeat this procedure a second time**.** Check that the window auto-drop function when either door is closed now works normally.

Step 2: With the ignition on, lower the top from inside the car. Make sure you hear a 'ding' at the end of the cycle. Then raise the top from the inside of the car. If there is any malfunction, go back to step 1 and repeat again. If it works, go to the next step.

Step 3: With the ignition off, lower the top from the key lock. Make sure you hear a 'ding' at the end of the cycle. Then raise the top from the key lock. If there is any malfunction, go back to step 1 and repeat again. If it works, go to the next step.

Step 4: Check that your headlights work normally with ignition on in low beam, high beam and auto.

Step 5: Lock and unlock the door with the remote outside of the car. Make sure this works normally.

Step 6: Turn off the car, exit and lock the door with the remote.

Step 7: Press the headlight button once (low left button) on the remote key fob. On some cars the button may show a picture of a headlight. On other cars it may show a picture of a horn. The low beams should go on for about 25 seconds and then go off automatically.

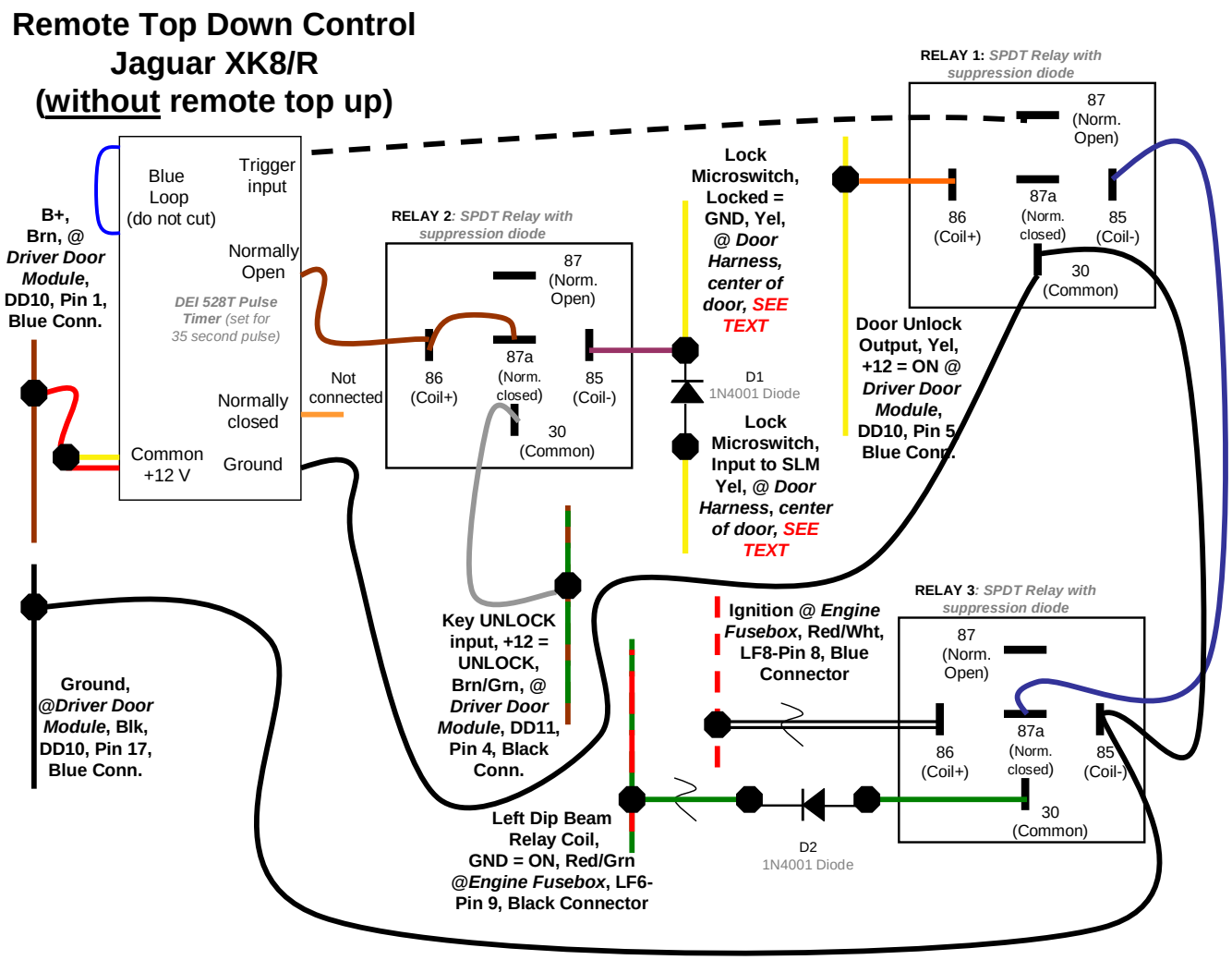
Step 8: The door must still be locked. Press the headlight button on the remote key fob once. Then immediately press the unlock button on the key fob. The top should drop!. Smile...you are almost there.

Step 9: Raise the top with the door lock. Press the headlight button on the remote key fob once. Then immediately press the unlock button. When the top starts lowering, press the lock button mid-cycle. The top should stop! Wait a couple of seconds, and press the unlock button again. The top should continue dropping until finished.

Step 10: ***Break open a well deserved cold brew !***

Congratulations, if all of the above worked, you are done !!

Appendix A - Wiring diagram



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Appendix B - Operating Instructions

To drop the top, simply press the headlight (lower left) button on the remote key fob once. Then immediately press the door unlock button on the key fob.

Notes:

1. The remote will only drop the top if the doors are locked. If the doors are unlocked, lock them with the remote first.

2. The remote will only drop the top if the ignition is off.

3. To interrupt the cycle, depress the door lock button.

4. To restart the cycle after it was interrupted, if the headlights are still on, depress the unlock button.

5. To restart the cycle after it was interrupted if the headlights are off, depress the headlight button on the remote key fob once. Then immediately press the unlock button on the key fob.

6. If after a restart from an interruption, the top stalls again unintentionally, depress the unlock button a second time.

7. On some cars the headlight button (lower left button) may show a picture of a headlight. On other cars it may show a picture of a horn.

8. There may be up to about a 20 second delay after dropping the top with the remote before the top can be raised again.

9. This modification does not support raising the top with the remote. Raise the top with the console switch or the key lock. See the **FAQ** in **Appendix D** for information on a version that also raises the top.

See a video demo at http://www.youtube.com/watch?v=diUu8VidgwQ

Appendix C - Troubleshooting

I press the headlight button, and the headlights stay on instead of going off after 25 seconds.

- Diode D2 is backwards or otherwise wired incorrectly.
- Diode D2 is defective

I used to hear completion 'ding' tone when the top finished it's drop cycle. Now I do not hear a tone, and the top motor just continues to run for another 15 seconds or so after the top is down.

- Diode D1 is backwards or otherwise wired incorrectly.
- Diode D1 is defective.

When I initiate the remote top down, the cycle starts, but does not complete.

- Check that the timer is set correctly at the 2 o'clock position.
- You may have a very slow top, try the 3 o'clock position on the timer.

The door locks do not work any longer.

- Recheck all your wiring very carefully
- Make sure the driver door module connectors were fully seated when replaced..
- Relay1 or Relay 2 is defective.
- Check fuse # 15 in the Driver side fusebox and fuse #4 in the passenger side fusebox. If either of these are blown, recheck your wiring before replacing them.

I followed the instructions and it doesn't work.

- Recheck all your wiring very carefully.
- Defective timer or relay.
- Check fuse # 15 in the Driver side fusebox and fuse #4 in the passenger side fusebox. If either of these are blown, recheck your wiring before replacing them.

The alarm goes off when I hit the headlight button or the door lock button.

- Wait 30 seconds or more between successive presses of the headlight button.
- Redo initialization and testing step 1.

My car electronics is acting really crazy now

- Have your battery load tested and charge it or replace it if necessary. Then redo Part Three - Initialization and Testing.
- You did not use the proper relays with negative spike suppression.

Appendix D - FAQ

What if I want to raise the top also?

I plan to manufacture a unit which will both lower and raise the top with the remote. Availability is expected summer 2011. Email me at WhiteXKR@comcast.net for information.

I encourage you to contact me if you are interested. The more interest I get, the lower the manufacturing cost due to volume, and the lower the price will be.

Can you provide a kit of parts?

The manufactured unit will be sold as a complete kit.

Can installation be made easier?

Yes, the manufactured kit will be designed around a printed circuit module, so there will be no assembly involved, and the unit will be pre-tested. All wiring will also be pre-cut. Posi-Tap connectors will be provided to eliminate soldering.

Can I have this installed this for me.

A car customization shop may do this for you if you provide them with this write-up, or the kit when it is available. If you live within driving distance of Washington DC, I am willing to do a limited number of installations. Email me at WhiteXKR@comcast.net for information.