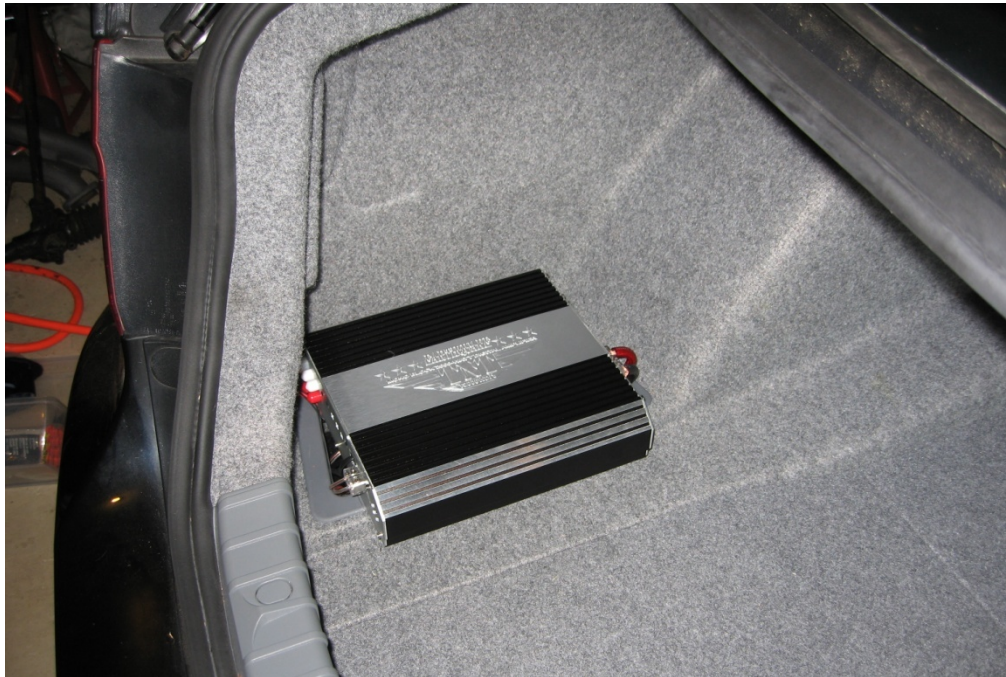


BMW e90 Sub and Amp Upgrade

By: *azwillNJ*

Follow these step by step instructions to upgrade your stock under seat subwoofers to Earthquake Sound SWS-8 subwoofers with an Earthquake Sound TNT T2000WD/1 amplifier. This tutorial was written about a non-Logic7 2008 e90 328xi sedan with iDrive and folding rear seats, however, it is possible that this install could be used with other cars as well.



Parts list

- **1 – Earthquake Sound TNT T200WD/1**
 - 2000 watt TNT series class D digital amplifier
 - Specs:
 - Number of channels: 1 / MONO Block
 - Max Power output: 2000 Watts
 - RMS Power 2-Ohm: 1 x 1000 Watts RMS
 - Damping Factor: >800
 - Cross over slopes: 24dB/OCT
 - THD: >0.005
 - SNR: 104dB
 - Class: D
 - Speaker Connection: 8 Gauge
 - Power Connection: 4 Gauge
 - Input Type: High Level and Low Level RCA
 - Dimension: 2.31" x 9.75" x 13.3125
 - MSRP: \$399.00
- **2 – Earthquake Sound 2 Ohm SWS-8**
 - 8" shallow mount subwoofer
 - Specs:
 - 300 Max
 - 2 1/8" mounting depth
 - Over 1.5" long throw excursion
 - 1.5" aluminum VC (4-ohm)
 - MSRP: \$173.00
- **1 – Earthquake Sound AK-5000 Wiring Kit**
 - Full wiring kit with all the wires you will need for the install.

AK-5000 KIT INCLUDES:		
Red Power Wire	17 ft (5.18m)	4-Gauge
Black Ground Wire	3 ft (0.9m)	4-Gauge
Speaker Wire	20 ft (6.1m)	16-Gauge
Blue Remote Turn On Wire	16 ft (4.8m)	16-Gauge
Silver Twisted-Pair RCA Interconnect	18 ft (5.5m)	Straight
Black Split Loom	6 ft (1.83m)	OD 8mm
Gold Plated ANL Fuse Holder	ANL Fuse	150 A
- 4 x 4 Gauge gold "O" ring terminal, 2 red/2 black. - 4 x 4 Gauge gold "U" ring terminal, 2 red/2 black. - 4 x 14-16 Gold "U" terminal for speaker terminals on amp, 2 red/2 black. - 4 x 0.25" Female disconnects for speakers, 2 red/2 black. - 1 x 14-16 Gauge gold "U" terminal for remote turn-on wire, 1 black. - 1 x 16-22 Gauge butt connector for remote turn-on wire, 1 red. - 1 x Self tapping screw, 1 tinned. - 10 x black cable ties, 120mm long. - 1 x grommets in black.		

- **1 – Medium sized sheet of Lexan Plexiglas**
- **1 – Roll Frost King Rubber weather seal 3/8" Wide, 3/16" Thick, 10' Long from Home Depot**

Tools Required

- Soldering Iron
- Dremel
- Drill
- Band saw or equivalent (for Cutting the Lexan)
- High temperature hot glue gun
- Solder
- Wire cutters
- Wire strippers
- Heat Shrink Tubing
- Electrical Tape
- Phillips Head Screw Driver
- Torx 50 driver
- Torx 40 driver
- Torx 20 driver
- 10mm wrench

Stage 1 – SWS-8 subwoofer install

Step 1 – Remove the positive battery cable

Remove the positive battery connection to eliminate the risk of shorting something out.

1. Open your trunk and locate the battery panel on the passenger side of the car and remove the panel.
2. Using the – wrench remove the nut for the positive battery connection and move the wire safely away from the battery.

IMPORTANT: Do not close your trunk with the battery disconnected, as far as I know the opener is operated electronically and will not open without power. If you have the folding rear seats I would recommend folding the seat backs down so if you do get locked out you can use the emergency release.

Step 2 – Tilting the seats

Since the subwoofers are located under the front seats it is required to remove the bolts holding the front seats in place and tilt the seats back to gain access to the area.

1. Slide the seats as far back as they will go and locate the Torx 50 bolts on each seat rail that are holding the seat to the frame and remove both bolts.
2. Slide the seat all the way forward and remove the 2 rear Torx bolts.
3. Gently tip the seats back.

IMPORTANT: There will be a wire connecting the seat to the car, do not disconnect or alter this wire in any way. This wire deals with the power to the seats as well as the airbag system, disconnecting this wire will cause the airbag system to malfunction and will cause you to pay a visit to your dealership.

Step 3 – Removing the sub enclosures

With the subwoofers exposed you can now remove the enclosures to begin mounting the SWS-8's.

1. Using the Phillips head screw driver remove the 6 screws holding the cover in place and remove the cover, the subwoofer and enclosure should now be visible.



2. From this point, you will need to remove the sub enclosure from the car, there are 2 nuts holding the enclosure to the frame, remove both 10mm nuts (circled below).



3. Gently tip the enclosure up from the side you just removed the bolts from and slightly pull it out of the hole. There will be a connector for the speaker (circled) attached to the enclosure. Squeeze the connector to release the lock and pull the connector out of the enclosure.



4. The enclosure is now completely free and can be removed from the car.

Step 4 – Mounting the SWS's

The SWS-8's are slightly deeper than the stock subs which require some slight modifications to the stock enclosures to accommodate the extra depth. Work slowly and carefully to make sure nothing is damaged during the modification process. It is also very important to wear proper eye and safety protection when working with power tools, especially when using the Dremel which will be used in this step.

1. Remove the stock sub from the enclosure; this can be done by unscrewing the 4 Torx 20 screws around the sub and lifting it straight up.
2. If you look inside the enclosure you will notice several ridges on the bottom of the enclosure, you will need to carefully Dremel the highlighted ridges away and level out the bottom of the enclosure as shown.



3. If you have looked at the SWS sub versus the stock sub you will notice that there is a notch that the connector plug goes into that is present on the stock sub but not on the SWS. This notch needs to be sealed in order to properly seal the SWS in the enclosure.
4. Use a piece of paper to create a template of the notch and trace the template onto the Lexan, be sure to trace the template twice, as there are 2 enclosures.

5. Put on your safety equipment and cut the Lexan patterns out, you will also want to create a notch in the Lexan for the wires to pass through and out of the enclosure. It is not important for these to be perfectly cut or perfectly fitting as we will be hot gluing them in place and the hot glue will provide a very good seal, see the pictures below for what mine looked like.



- The next step is to create a seal around the SWS-8's to do this, put 2 layers of the Rubber Weather Seal tape around the rim of the sub, be sure to avoid the screw holes.



7. The next step is to wire the sub. Cut a length of speaker wire about 18 inches long and strip one end. Pull the wires apart so they are long enough to reach both terminals on the sub. Slide some heat shrink tubing up both of the separated wires far away from the ends and twist the ends onto the terminals of the sub.
8. Take out the soldering iron and solder the connections, make sure to take note of which wire is positive and which is negative.
9. Wait for everything to cool down and slide the heat shrink tubing onto the freshly soldered terminals and shrink it in place with the soldering iron.
10. The next step is to mount the subs in the enclosure, this step is kind of tricky because you need to make sure that you have enough slack in the wire to both mount the sub and connect the wires to connections in the car before the hot glue dries. After applying the hot glue you will need to work quickly to make sure you achieve the desired adhesion and seal quality from the hot glue. Also be careful because the hot glue could severely burn you if it comes in contact with your skin.
 - a. Heat up your hot glue gun for about 10 minutes to make sure that it is at its maximum temperature.
 - b. Remove the protective film from the Lexan inserts you made previously.
 - c. Squeeze a bead of hot glue onto the enclosure around the opening where the Lexan will go.
 - d. Pass the wire through the notch in the Lexan that you made.
 - e. Push the Lexan with the wire through it into the opening on the enclosure and push down with a decent amount of pressure until the glue has cooled down and is dry.
 - f. Squirt some hot glue around the wire notch to seal it and hold the wire as still as possible until the glue dries.
 - g. Put the sub in the enclosure, replace the original screws and tighten. Do not tighten the screws too much, they are self tapping screws that are going into plastic and it would be very easy to strip the plastic.
 - h. Step back and admire your hard work.





11. Now that you have the sub mounted in the enclosure it's time to put it back in the car. To put them back in just follow the removal steps backwards.
12. Once the enclosures are back in the car and securely mounted it's time to connect the wires to the car. Instead of splicing the existing wires I choose to cut the connectors off and keep them in the event I have to return the car to stock. Cut the stock wires about 2 inches away from the plug and strip the wires to prepare them to solder.
13. Connect the wires from the subs to the wires from the car matching up the positive and negative for both sides of the car, see the table below for the correct polarity. Once the proper polarity is determined solder and heat shrink the connections.

Channel	Driver Side	Passenger Side
Positive	Red/White	Red/Blue
Negative	Brown/Yellow	Brown/White

Step 5 – Creating Lexan Speaker Trim

As you know, the stock subwoofers had a black perforated speaker grate over them that made them seamlessly blend into the carpet. This was all well and good when we had the boring stock subs in but now that we have some power in there and want to show them off this won't do. On a more serious note, if the stock cover is used the SWS-8 will hit it when the sub hits hard because the travel of the voice coil is much greater than the stock sub. This will lead to bad sounding music and possible damage to the voice coil which will destroy your sub. However, without a cover the carpet will not be secured around the sub and it will sloppily fray upward. To remedy this situation I have created a speaker trim out of the left over Lexan, read on to find out how...

1. Step one is to take the existing speaker grills and trace their outlines on a piece of Lexan. Again, make sure to make 2 patterns, one for each sub.
2. Once you have the initial outline take a ruler and create another line that is offset an inch inside of the outline. Essentially what you are doing is creating an inch wide trim piece that will go around the outline of the sub opening. When making the offset line do not offset the longest side, this will not be used.

3. Cut it out; go slowly and carefully, this is a piece that people will see so you will want to make the workmanship fairly high quality. After you have cut out the pieces you should have what looks like a very wide U.



4. The next step is to place the stock grill over your newly fabricated trim piece, try to align the 2 as closely as possible and use a marker or pencil to mark where each of the screw holes are. Try to be as accurate as possible or you will have problems with mounting them later.
5. After marking the holes it's time to drill them out, use a drill bit that's slightly smaller than the head of the screw but not too small for the shaft to fit through. Again, go slowly and be careful when drilling the holes. I also choose to countersink the holes for a more finished look but you don't really have to if you don't have a countersinking bit.
6. Screw your completed trim piece into the existing holes in the car with the stock screws... and that's it, you're done.

At this point you are done with the subwoofer install. If you are not going to install an amplifier you can bolt the seats back down, reconnect the battery, and enjoy your new SWS-8's. The subs will run nicely with the stock amp, and you will notice a big difference between the stock subs and the SWS-8's. However, if you like me and want more power, keep the seats unbolted and read on.

On a side note, the long side of the trim piece was excluded from the final product because with that side in place it would interfere with the excursion of the subwoofer. Additionally, that side is not really required as the seat mounting rail does a nice job of holding the carpet in place.

IMPORTANT: When you reconnect the battery and start the car for the first time the ECU will go crazy for about a minute and tell you that almost every system in the car has malfunctioned. This is a normal test procedure that the

car runs through when it is powered back on, start the car, shut the car off, remove the key, and reinsert the key to clear all the errors.

Subwoofer install pictures



Stage 2 – Amplifier install

Step 1 – Remote Wire

A remote wire is a wire that is connected to a switched 12 volt positive line that goes on and off with the ignition (i.e. cigarette lighter) somewhere in the car and is wired to the amp. The purpose of the remote wire is to tell the amp when the car powers on and therefore when the amp should power on. I choose to tap off of the cigarette lighter socket in the armrest console. The location for the remote wire that I chose was based on the fact that I also hard wired my radar detector to the same line. There might be better places to pull from, but this is the one that I choose.

1. The first step is to remove the rear panel off of the console to gain access to the power connector. To do this, pull the panel towards the rear of the car at the points highlighted in the picture. There are 4 clips holding the panel in place that are behind the highlighted regions, make sure not to break them or the panel wont re-attach properly. I used 2 plastic putty knives to wedge in there to release the clips. Additionally, there is a wire connecting the console with the car, be careful not to break this wire when removing the console.



2. Once you have removed the panel you will see a few wires, you will want to focus on the brown and red wires on the left side of the opening. Using a small screw driver release the clip and disconnect the plug to get some more room to work.
3. At this point it's time to splice (see the last page for a full description on how to splice a wire) the red positive wire leading to the cigarette power plug, once you have spliced the wire twist the remote wire to the newly spliced positive line and solder them together. On a side note, if you wish to hard wire a radar detector or other 12 volt accessory you can wire it to the same place, you will just have to splice and solder the negative cable as well.

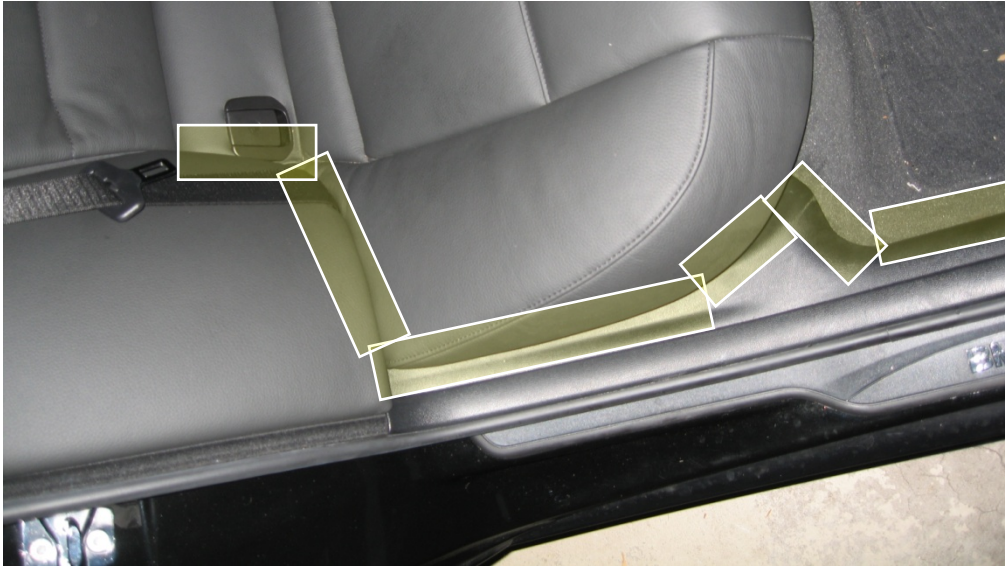
4. After you have spliced and soldered the wires, securely tape the connection with electrical tape and plug the power cable back in. (In the picture below, the blue cable is the remote wire, and the black phone cord is going to my Passport 8500 radar detector)



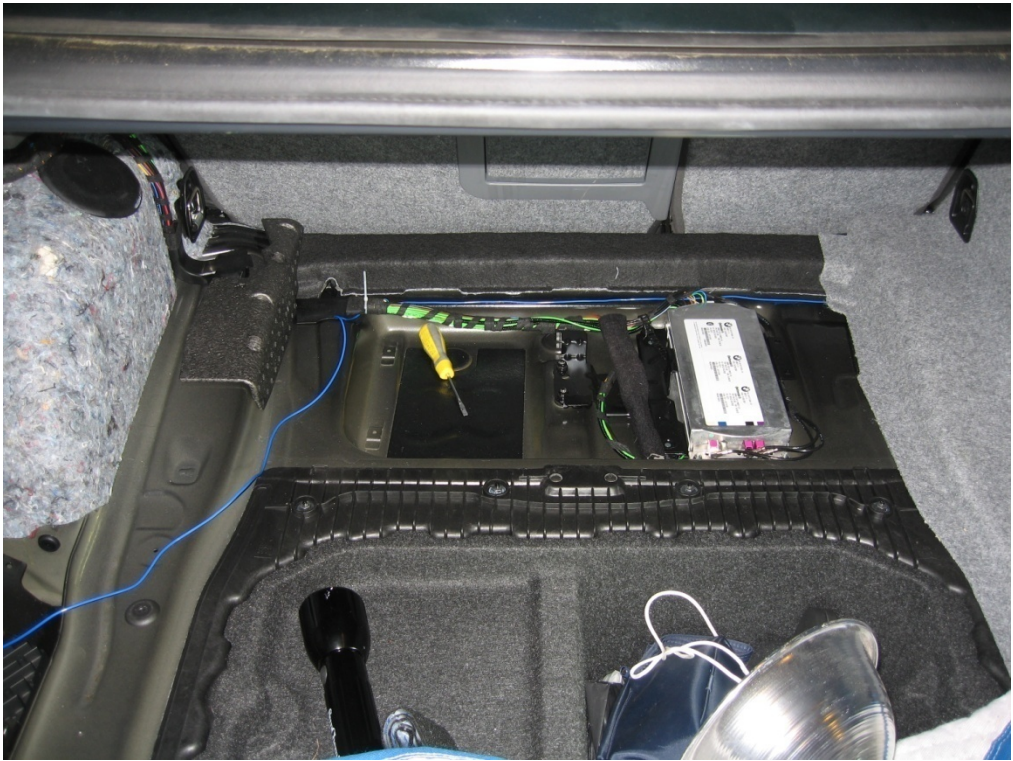
5. Now that you have the remote wire set up its time to run the cables to the trunk. Tuck the wires under the bottom of the plastic trim piece towards the passenger side of the car all the way to the seam of the carpet. When you reach the seam, follow that across the passenger side floor to the trim piece near the door and begin to tuck the wire under that piece towards the rear of the car. (see the picture below for the route of the wire)



6. Follow the trim all the way along to the back seat when you reach the seat you will need to pop the side of the seat up to allow the wire to pass underneath the seat and out of the way. To do this grasp the seat near the corner and pull straight up with a significant amount of force. You will feel and hear the clip pop up and the seat in that corner will be free. Once the seat is free, pass the wire under the seat and towards the seatbelt following the crease towards the rear of the car. When you reach the seat back fold the seats down and pass the wire to the left of the hinge in the crease. (If you don't have folding seats you will have to find another way to get the wire into the trunk.. sorry but I don't have any more information about how the seats are attached to the car if you don't have the folding ones.)



7. Once the wire is past the hinge and into the trunk you can shut the seat back and clip the seat back down, the easiest way to do this is to just sit down, you will feel it clip back into place.
8. At this point you will need to remove the floor of the trunk. To do this open the storage compartment and lift up at the very back of the lid, there is nothing holding this piece down, it should just lift right out.
9. Run the wire along the back of the trunk area around all the components and the storage compartment to the amp compartment at the rear driver side of the car.



Step 2 - Removing the trunk panels

You will need to remove the trunk panel on the left side to better access the wiring harness that you will be tapping into. You technically don't have to remove the panel, but doing so will make the install much easier.

1. Remove the CD tray by sliding your fingers under it and pulling up.



2. Get a flathead screw driver and pry the clips holding the panel off. When you look at the clips there will be 2 pieces, you will want to pry these apart. Do not try to pry the whole thing off the panel at once, you will break it. Once you have separated and removed the first piece then pry the second piece off, again, do not attempt to do this in one step. (see the highlighted areas below for the locations of the clips)



3. After you have removed the clips you will need to remove the Torx 40 bolt that holds the black trunk hook in place and the plastic pieces around that area.



4. Once you have removed the clips and the hook the panel is free. Fold down the rear seats and pull the panel out of the trunk.



Step 3 - Wiring the inputs and outputs for the amp

This part of the installation is the most crucial; you will be cutting into a wiring harness that is essentially the main wiring for the sound system for the entire car. You will need to wire the outputs to the subs, as well as inputs from the rear speaker channels.

IMPORTANT: This procedure is extremely risky and if you mess anything up you will have serious problem on your hands. Follow the steps slowly and carefully and make sure to insulate and tape everything properly to prevent something from shorting out.

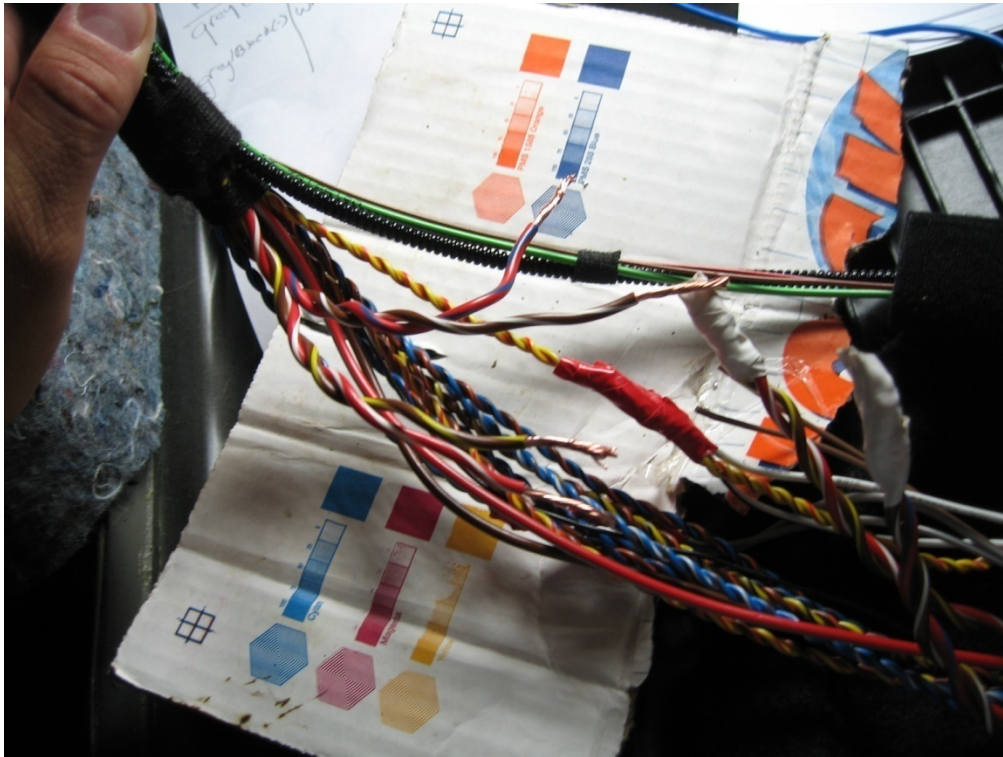
1. Disconnect the wire from the stock amp. There is a little button you need to push in on the clip and then slide the latch from the right side to the left side and the clip will release.
2. Unclip the wiring harness from the wall up to the large rubber cap on the side of the car and un tape the wires so you have more room to work. If you look at the harness you will see that the wires are twisted into pairs, these pairs represent the plus and minus lines for each channel of the speaker system.
3. First we will get the lines ready for the inputs. Refer to the table below for the proper colors of the wires to use. Once you have identified the correct wires to use you will need to splice them and solder some speaker wire to the spliced wires (see the last page for detailed instructions on how to splice a wire). Make sure to keep the colors for positive and negative consistent between the different leads, also be sure to leave enough slack on the wire to reach the amplifier. (I spliced the rear channel speakers because I have iDrive and if you tap the front you will be feeding the amp with the navigation instructions as well)

Channel	Right Rear	Left Rear
Positive	Blue/Green	Yellow/Red
Negative	Blue/Brown	Yellow/Brown



- Next is to wire the lines to the subwoofers. For these lines you will need to physically cut the wires from the stock amplifier instead of splicing them because you will now be powering the subwoofers from your aftermarket amplifier. Again, see the table below for the correct wire colors, and make sure you left enough slack to reach the aftermarket amplifier.

Channel	Driver Side	Passenger Side
Positive	Red/White	Red/Blue
Negative	Brown/Yellow	Brown/White

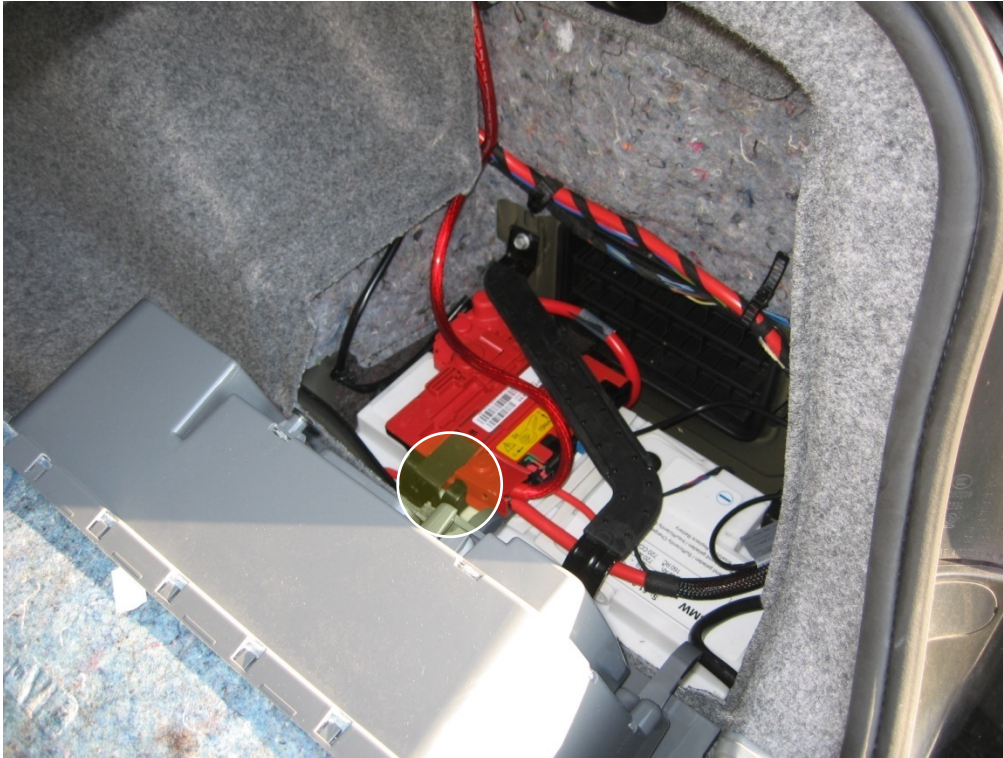


- Once you have connected all the wires you will need to tape everything up with electrical tape. Tape every soldered connection and the 4 cut wires coming out of the stock amplifier. Use plenty of tape to make sure you have proper protection against shorts.

Step 4 – Getting power for the amp

Normally getting power for an amp is the hardest part because you have to cut through the firewall and deal with all that, but in the 3-series BMW was kind enough to put the battery right in the trunk. All you need to do is connect the large red power wire to the positive terminal and run it to the amplifier. However, the line is too thick to go under the carpet directly to the amp, so I choose to go up and over the trunk area... read on.

1. The first step is to remove the battery cover and gain access to the battery compartment.
2. Once you have gained access to the battery you need to get a wrench and connect the end of the red positive cable to the bolt shown in the picture below. (note: the cover won't close all the way with the new wire connected)



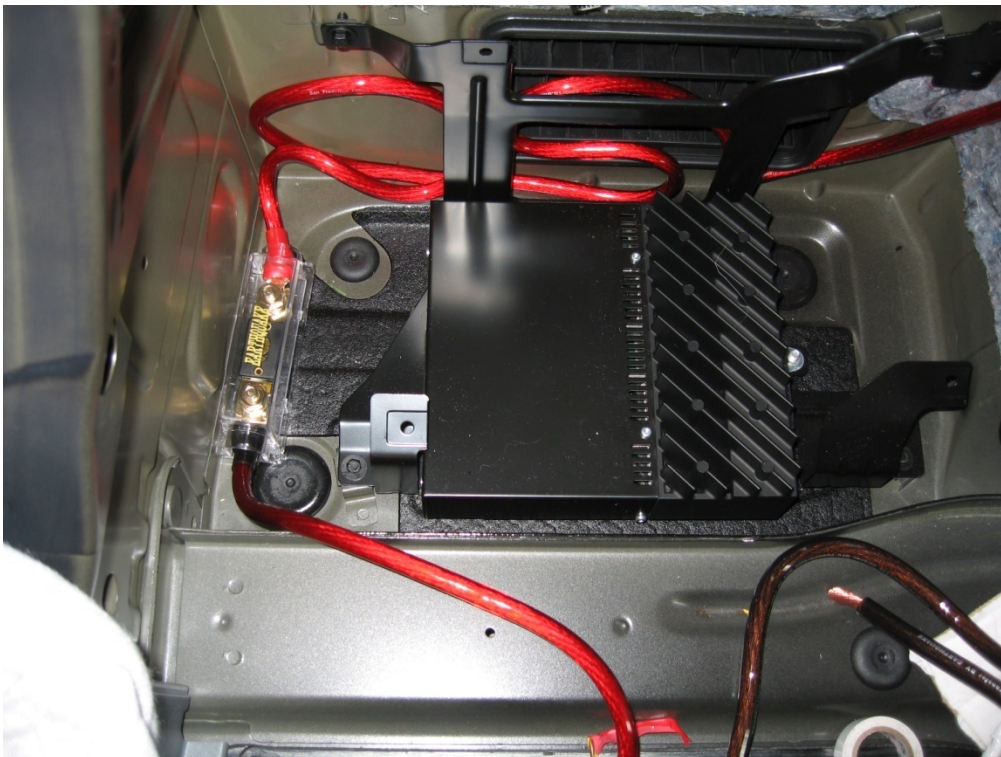
3. Tape the loose end of the wire very good to prevent it from shorting against the frame while you are running it to the other side of the car.

4. Chase the cable up the side of the car under the trunk panel towards the steel U channel that holds the top of the trunk compartment together. Once you get to the channel, chase the wire all the way across the trunk to the other side and pull any excess slack through, see the pictures below for more information.

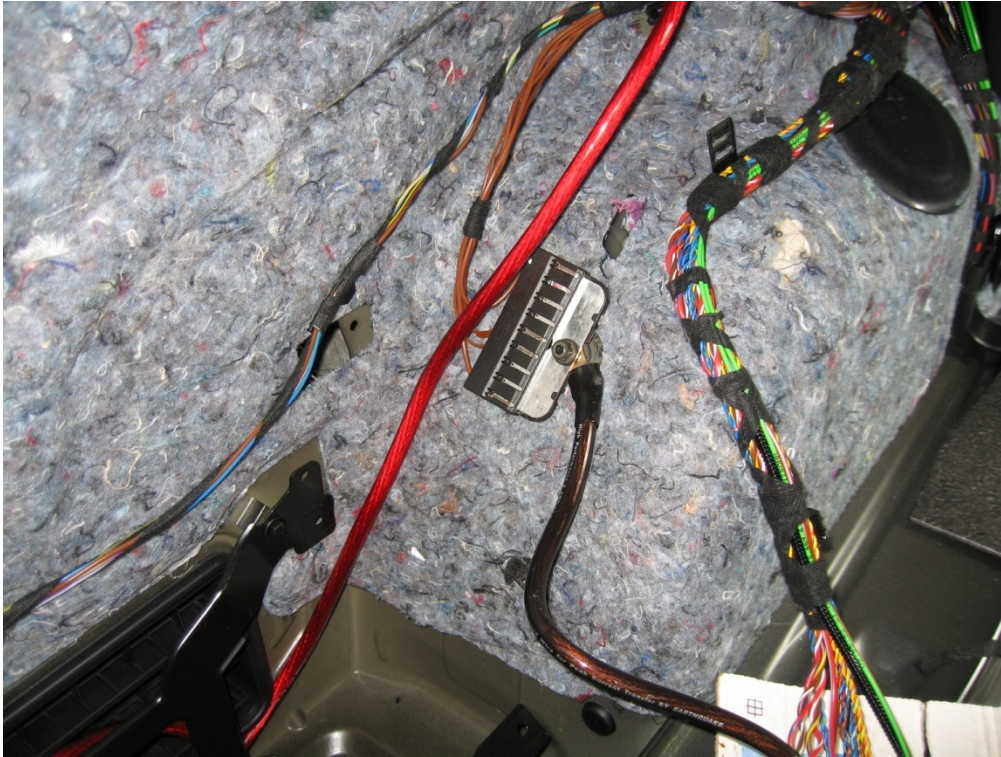




5. The next step is to wire in the fuse that came with the wiring kit, I Velcro'ed it to the frame so I could remove it and replace it if I needed to. See the picture below.



- The only wire left to run is the negative power wire for the amp, for this one all you need to do is connect one end to the negative block located on the driver side of the trunk, see the picture for more information.



Step 5 – Testing

At this point you are essentially done with all the hard part, and you are ready to begin testing.

- Connect all the wires: sub left, sub right, input left, input right, remote, positive power and negative power to the amplifier.
- Put the stock amplifier plug back in.
- Reconnect the positive cable to the battery and turn the gain on the amplifier all the way down.

IMPORTANT: When you reconnect the battery and start the car for the first time the ECU will go crazy for about a minute and tell you that almost every system in the car has malfunctioned. This is a normal test procedure that the car runs through when it is powered back on, start the car, shut the car off, remove the key, and reinsert the key to clear all the errors.

- Start the car and put on some music, you will initially notice that there is no bass at all, this is normal as the gain setting has been turned all the way down.
- Slowly increase the gain control until you have reached a suitable level for the subwoofers.
- Further adjustment can be found in the owner’s manual for your amplifier.
- If everything worked and you are getting sound you can move on, if not, begin retracing your steps and checking connections.

The install is done, the subs are booming, it’s time to put the panels back in and show off your new system. Bolt down the seats, replace the trunk panels, tape and tie wrap any loose ends and your done! Congratulations

How to splice a wire

Follow these steps to splice a wire. Be careful when using the razor blade, and be careful not to cut too deep into the wire.

1. Get a nice length of the wire you intend to splice, at least 1.5 inches.
2. Take a sharp razor blade and begin to shave the insulation off the wire until you are down to the bare wire in one place.
3. Take the razor and slice the insulation all the way around the wire at the top and bottom of the shaved area.
4. Gently peel insulation off the wire between the cut marks and use the razor blade to clean up any loose material.
5. Twist the additional wire around the newly stripped segment and solder it in place.
6. Tape it up with electrical tape and you're done.

Disclaimer: I am not in any way shape or form responsible for anything that may happen to you or your car. This tutorial explains what I did and what worked for me and is intended to be for educational purposes only. Things change and vehicles can be different, please be smart when installing something this complex, take your time and work carefully. Always be sure to take proper safety precautions when working with tools, this includes but is not limited to gloves, eye and ear protection. If you feel that you cannot complete any part of the installation please seek professional help rather than risk your well being or the integrity of your BMW.