



## **BMW E46 Subwoofer System by BSW Installation Guide: ib110 for BMW 3 Series, M3 Convertible '00-'06 (E46)**

Please note: This is a supplement for the installation videos that you will find on our website ([www.bavsound.com](http://www.bavsound.com)). Locate your vehicle and find the respective video installation guide covering the D.110 Subwoofer Upgrade. There are details we go over in the installation videos that cannot possibly be covered as effectively through the written word. This guide is meant to help you in the garage. We still suggest taking your computer/tablet/phone to the car with you and streaming the videos to make sure everything goes off without a hitch. Now, let's get started!

### **You'll need:**

- Bavsound tool kit (or some variety thereof - the video highlights the tools needed for this particular installation) - <http://www.bavsound.com/product/414/361/BSW-Interior-Disassembly-Tool-Kit/>
- Wire Crimpers
- Metric Wrench / Socket Set
- Tunes in the garage (your choice)

### **Before you Begin**

- **Please review and familiarize yourself completely with these instructions before starting work on your vehicle!**
- Ensure that your bass and treble settings are set to their default middle positions before installing your new speaker upgrade. Once you've installed your Stage 1, you can reset the bass and treble settings to taste. Keep in mind that we generally recommend keeping them both very close to center as large adjustments introduce distortion into the audio signal and will lower performance of your system.

- Be sure and watch this video which covers wiring connections for the new Bavsound amplifier in your E46: <http://vimeo.com/28744796>
- Also, here's how we'll tune the amplifier once we've installed it: <http://vimeo.com/28743443>

### **We're going to proceed as follows:**

1. Bavsound Amplifier Placement
2. Disassembling the back seat area
3. Disassembling the trunk
4. Power/ground wire connections
5. Making appropriate wiring connections for audio inputs
6. Installing the subwoofer enclosure
7. Tuning/testing the system

### **Amplifier Mounting Options:**

You'll want to start by first deciding exactly where you want to mount your new amplifier. From there, you'll decide on appropriate paths to run your wiring. **Don't do anything permanently until you have completed the rest of the install!** This step is only so you can plan your install out first! There are several places in the convertible trunk that you can mount the amplifier, as it's so compact.

We recommend not screwing the amplifier down, as it's lightweight enough to be held to any surface using velcro. Besides, screwing into the car's metal is dangerous, and we love these cars too much to risk damaging something.

**Mount the amplifier to the back wall of the trunk.** We oftentimes mount the amplifier on the back wall of the convertibles on the driver's side. With the bottom of the amplifier resting on the floor, the male velcro does a fantastic job of otherwise adhering the amplifier to the back carpeted panel.

**Mount the amplifier on top of the spare tire underneath the floor.** (This is not an option for M3 owners – see option below). You'll need to remove and relocate the tool kit attached to your spare tire cover by popping it out off of the tire tray with a panel removal tool. We simply attach the amplifier and tool kit in their new locations using two strips of very strong Velcro for each.

M3's have the option of removing the M Mobility kit and mounting the new amplifier in the same location. You'll bend back the aluminum tabs towards the floor, and the amplifier will rest on top of them, while remaining concealed underneath the factory

floor panel. Simply screw the amplifier to the trunk floor.

### **Interior Disassembly**

To make the installation as simple as possible, we'll get the car the entire way apart first, and then we'll make our connections.

1. First look underneath the armrests on the side panels on either side of the vehicle. You will see two holes there. Inside are 8mm bolts that secure the panels to the vehicle. Remove these. We have also seen these as Torx T20 bolts.



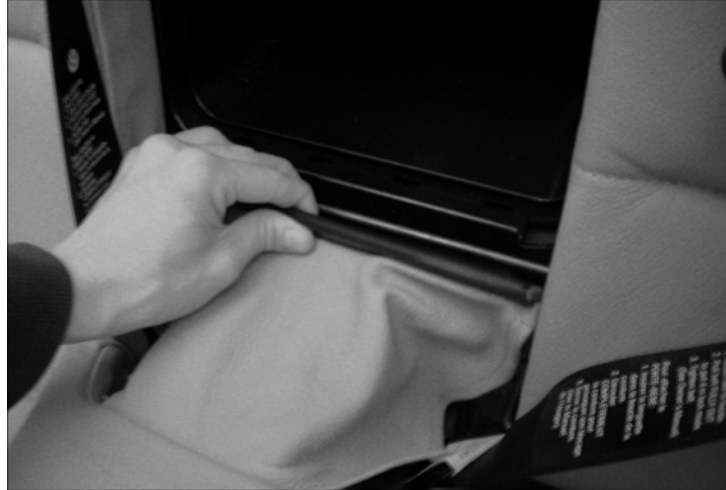
2. Pull the side moldings from the door jams back, and place your fingers behind the panel containing the speakers. Firmly pull towards you, and the panel will release itself. Now, slide the panel down and toward the front of the vehicle. Unplug the tweeter.



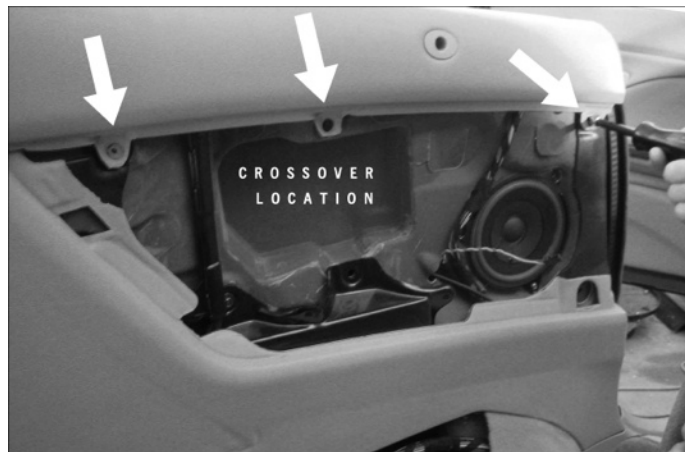
3. At this point, it makes things a bit easier to remove the seating area of the backseat to grant better access to the side panels. Simply lift upward and the seat will free itself.



4. Unhook the leather flap that attaches the cushion to the back portion of the backseat and remove the seat bottom.



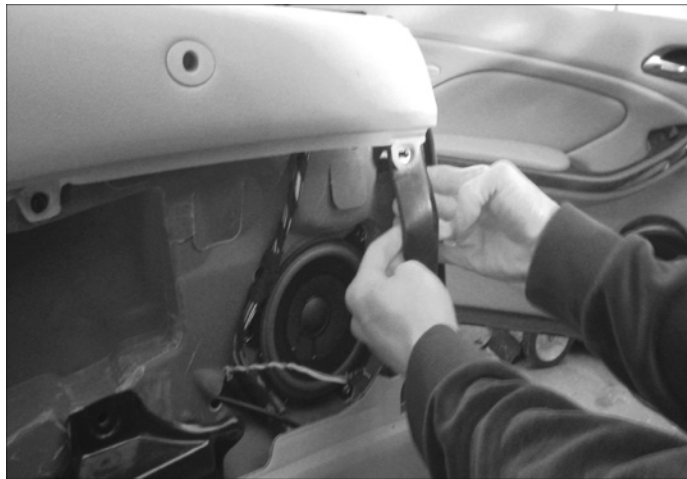
5. Now, look back to the area uncovered by the side panels. You will see three 7mm bolts along the bottom edge of the top panel. Remove these.



6. Starting at the rear of the panel, pull toward you and downward.

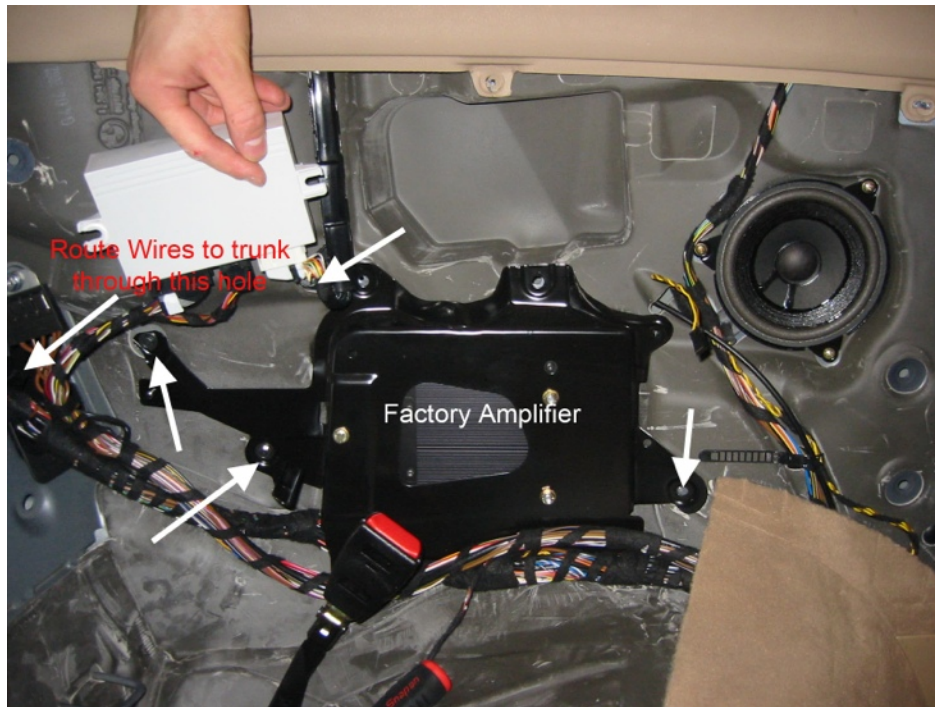


7. Now pull outward and downward, freeing up the top edges of the panel, then remove this panel.

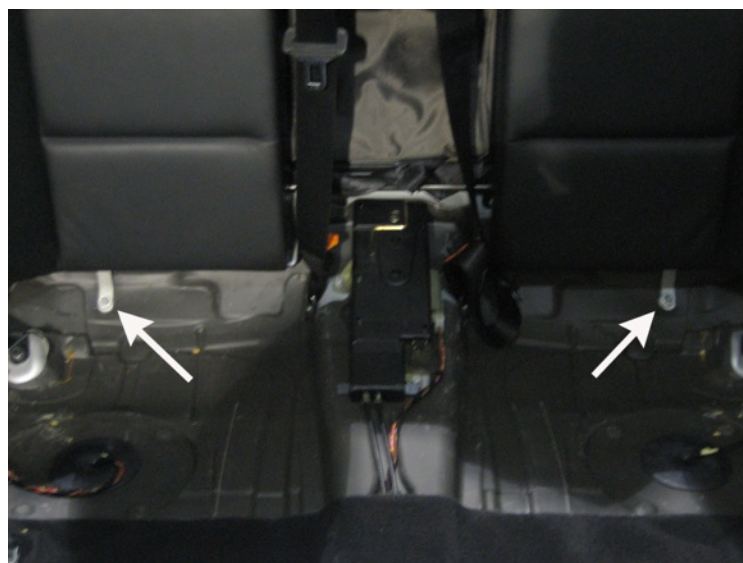


8. The panel will come out, revealing the factory amplifier in its housing. **Here is where all of your wiring connections will be made.** The arrows below show where the 8mm bolts are used to secure the amplifier bracket housing. A large harness going into the side of the amplifier contains all of the connections we'll need.

**Unbolt the amplifier and it's housing at this point. We'll need to also unbolt the amplifier from its housing. Remove the 3 brass nuts that secure the amplifier to the bracket.**



9. We now need to remove the back cushion of the backseat. To do this, first lift both headrests up as high as they can be lifted. You don't have to remove them completely.
10. Now, look on the bottom section of the back cushion and you'll see where it attaches to the vehicle using a 10mm nut on each side of the car. Remove these nuts, and the bottom portion is now free.

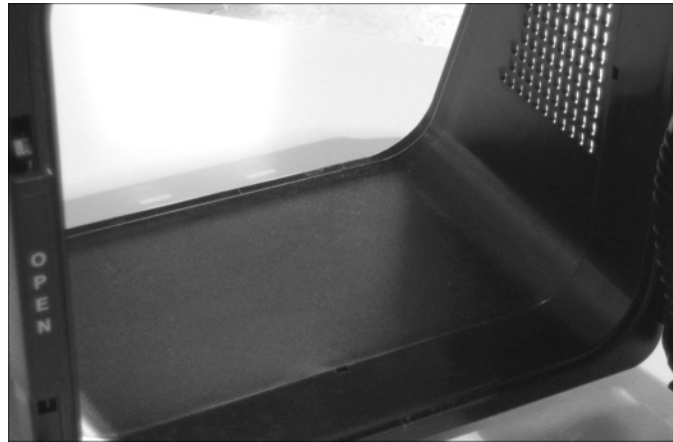


11. Lift the headrests upward a few notches, and simply lift upwards. The seat back will free itself. Now unwrap the seat belts from the cushion, and remove from the vehicle.

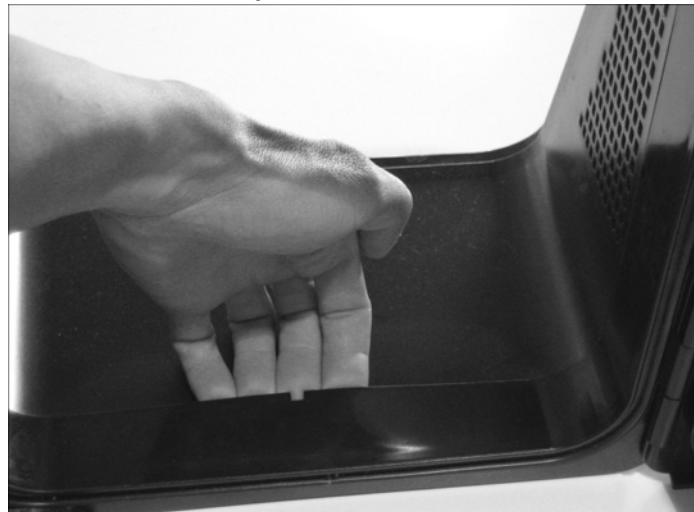
### **Factory Subwoofer Removal (HK Cars Only)**

We also need to remove the factory subwoofer, which is easiest to do from the trunk.

1. Open the subwoofer door to where the ski pass is completely open. You will see a seam along the bottom floor of the ski pass about 2" in from the trunk.

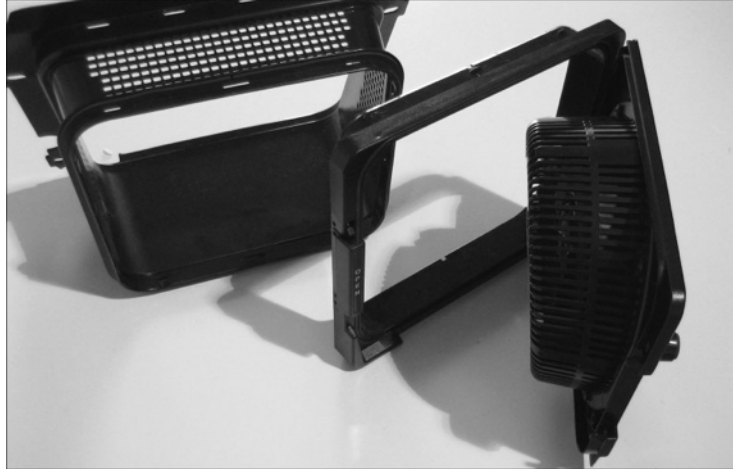


2. Wedge your fingers (I know, ouch) or panel tools underneath the seam and lift upward and outward towards you.

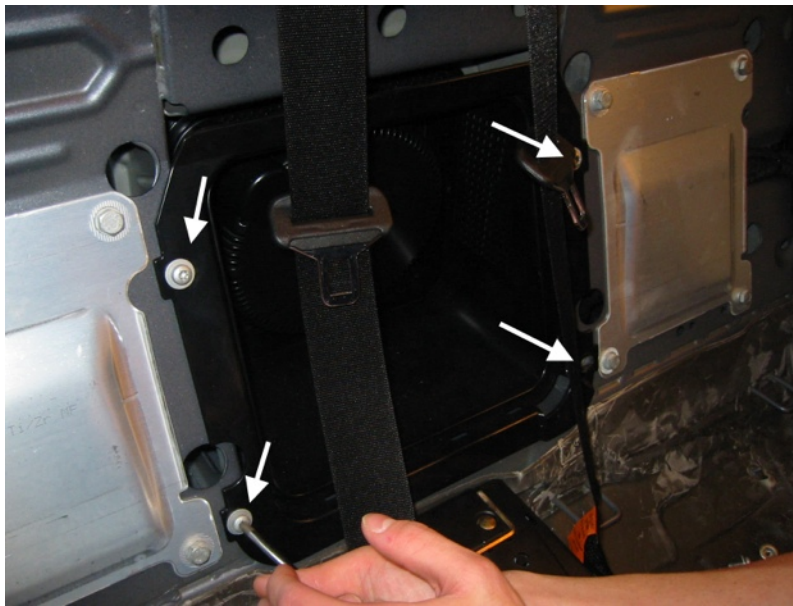


3. The subwoofer portion of the ski pass will free itself. Unplug the wiring harness from the subwoofer, and tuck it away behind the carpet.

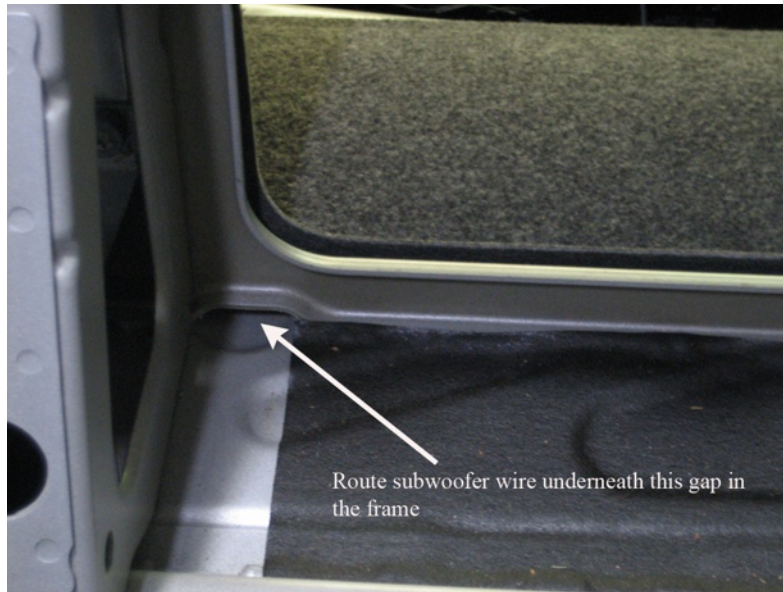




4. The front half of the enclosure can be removed from the inside of the cabin. It is secured using 4 Torx T30 bolts. Remove these and the pathway is now clear for the new enclosure to be installed.



5. We can now bolt the new enclosure into the car. This couldn't get any easier. Unravel the wire coming from the bottom of the enclosure. Slide it through the small gap underneath the bottom of the ski pass on the passenger side as it enters the trunk.



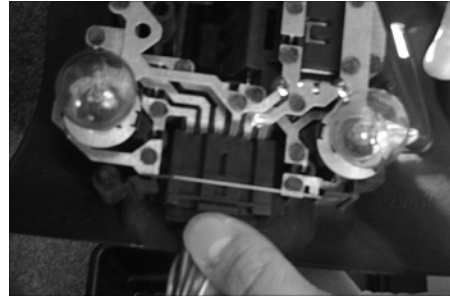
**IMPORTANT:** It is imperative that the enclosure seal tightly against the rear wall. The speaker wire **CANNOT** impede this seal. Make sure that the speaker wire enters the trunk in such a way that doesn't affect this seal.

6. Now simply bolt the new enclosure into place using the factory hardware. Make sure that the bolts are **VERY** secure, and you're ready to begin installing the amplifier at this point. Here's what the completed install should look like:



**Trunk Disassembly:**

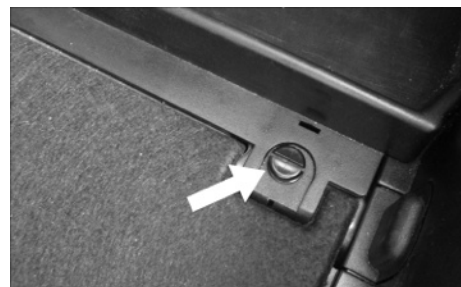
1. Begin by removing all items from the trunk of the vehicle and make sure that all tail lights are in working order. If not, now is a good time to replace them. Also remove the carpet that covers the floor of the trunk, as it will reveal several fasteners that you will remove later.
2. Remove the tail light covers. Push inward on the clip, and the light will release itself. Now depress the wiring clip attached to the light bulb housing to release the housing, and move the housing safely away from your working space.



3. Now, look to the floor of the trunk. You will see that the two plastic casings on either side of the trunk are secured by plastic screws on the passenger side and fasteners on the drivers' side. Remove the fasteners using your panel removal tool as shown. The plastic screws on the passenger side can be removed using a flat head screwdriver. The battery is located underneath this panel on the passenger side.



(Driver's Side)



(Passenger's Side)

**Now, remove the two plastic fasteners on the carpeted driver side panel out of the trunk, remove the panel, and you'll see the pass through into the trunk.**



### **Power, Ground, and Turn-On Amplifier Connections**

(see supplemental video at <http://vimeo.com/28744796>)

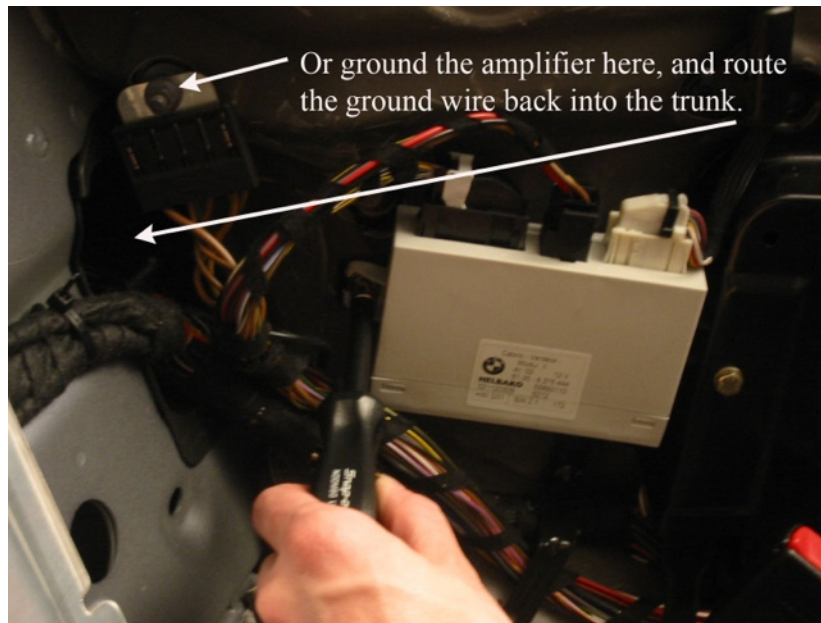
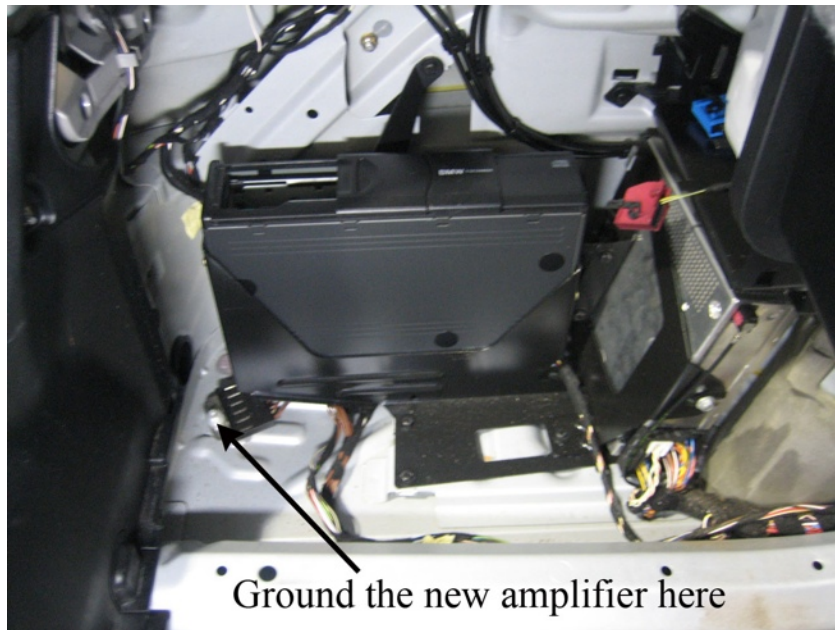
**IMPORTANT:** Before you make any connections, disconnect the negative battery terminal from the battery. This will reduce the chance of electrical damage to the vehicle.

Your new amplifier produces quite a bit more power than the original amplifier. As a result, the original amplifier power and ground wires simply aren't large enough to provide the new amplifier enough power. So, we'll attach the new, included power connections in locations that differ slightly from the original amplifier's connections.

Additionally, we have to have a way to tell our new amplifier to turn on. The original amplifier gets a signal from the vehicle's head unit via a small wire. Since this wire doesn't provide the amplifier power, it is also sufficient for our new amplifier, so we will reuse this connection.

### **Ground Wire (Included Large Gauge Black Wire): Connect to GND terminal on new amplifier**

We'll use any factory ground location in the trunk area where an existing 10mm bolt can be found. These photos show a couple of different factory ground bolts:



**Power Wire (Included Red Wire): Connect to +12V terminal on new amplifier**

Run the large red wire to the positive terminal of the battery. Loosen and remove the 10mm nut on top of the terminal that secures the actual terminal to the battery. Put the

amplifier power wire ring over the bolt, and tighten the nut back down with the terminal on the battery. This is the primary power supply for your new amplifier. Connect the other side of the power wire to the **+B** terminal on the amplifier. **ONLY** when both sides of the wire are connected should you install the included fuse into the in-line.

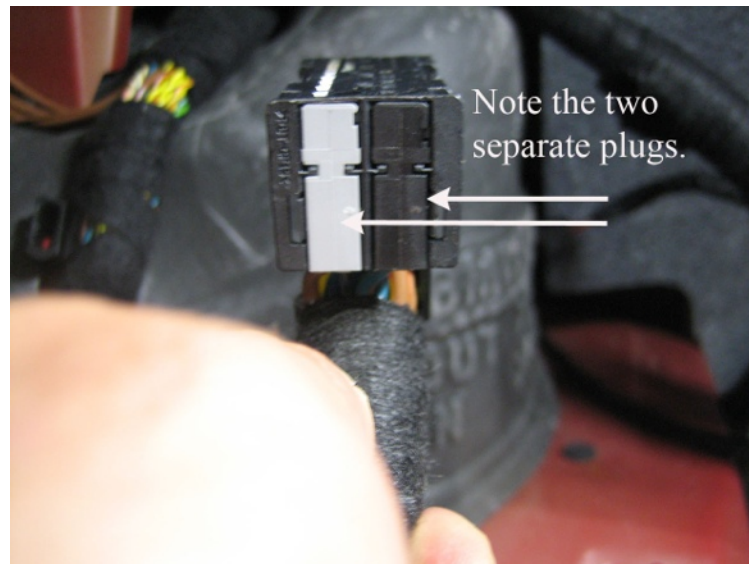
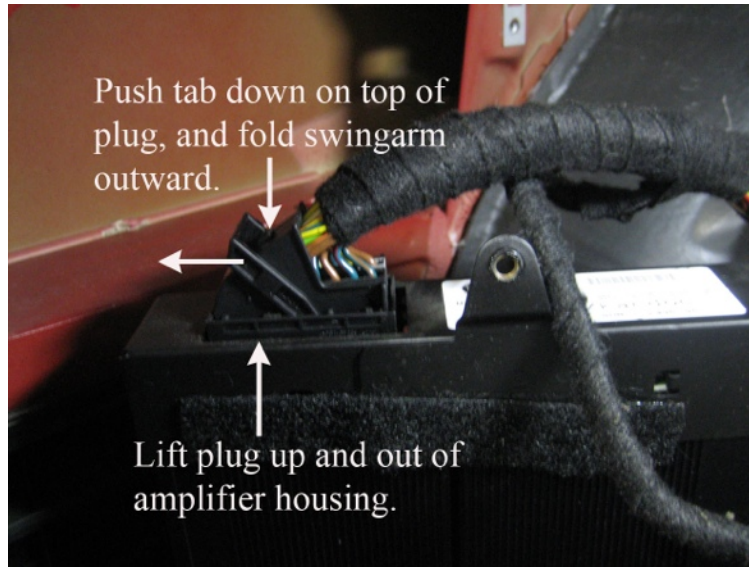


**Remote Turn-On Wire (Smaller gauge Blue Wire): Connect to Turn On terminal of new amplifier.**

- **It is important to remember here that we are essentially "T'ing" into the factory wires.** It is important that the factory signal flow be allowed to continue back into the factory amplifier.
- **For connection instructions, both written and visual, please see the next section "Audio Input Connections". Both the remote turn on and audio input connections are made in the same manner.**

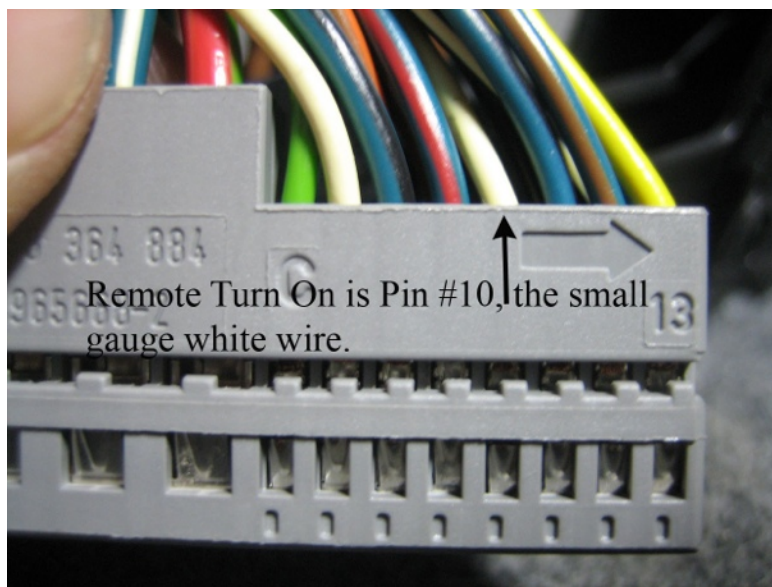
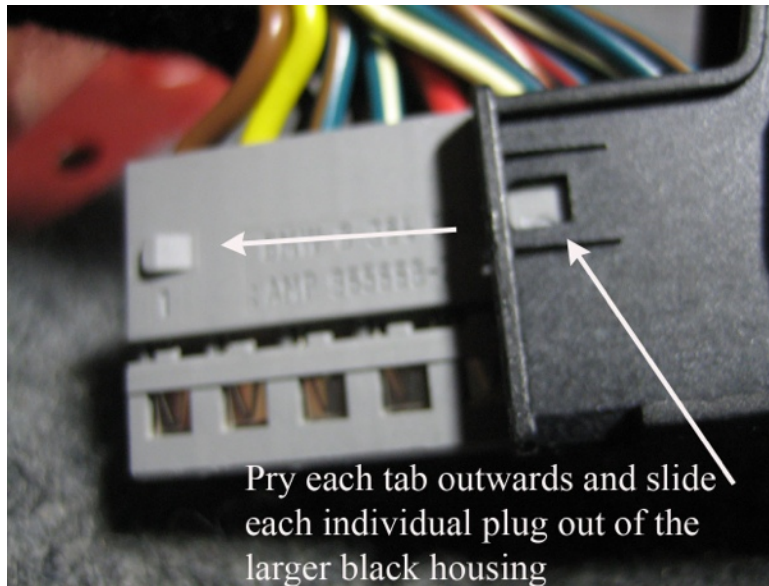
In the large plug going into the factory amplifier, we'll need to find the remote turn on wire. You'll notice a large black housing around the plug, with two separate plugs inside of this black housing.

**The wire we'll be looking for is in the GREY plug.** It's a small gauge **White wire.**



Once you've identified these two plugs, we need to remove them from the outer black housing. Once removed, **the remote turn on wire is in the grey connector, Pin #10.**





### **Getting the music to your new amplifier (Audio Input Connections)**

**Again, it is important to remember here that we are essentially "T'ing" into the factory wires.** It is important that the factory signal flow be allowed to continue back into the factory amplifier.

1. You'll need to isolate the following four (4) wires. They will be twisted together in pairs as they enter the factory amplifier.

- Blue w/Black Stripe (+) twisted with Brown w/Orange Stripe (-)
- Yellow w/Black Stripe (+) twisted with Brown w/Orange Stripe (-)



**Visual Representation of Tapping into the Factory Wires:**

Here is a visual of how we'll make the connections. Basically, we're just "T'ing" into the factory wire, so you'll want to cut the wire directly in half, **at a minimum of 6" away from the factory plug.**

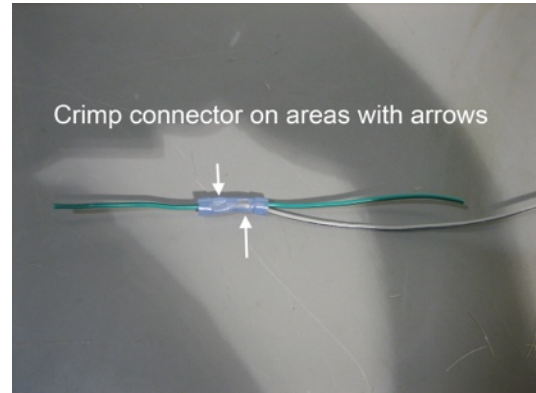
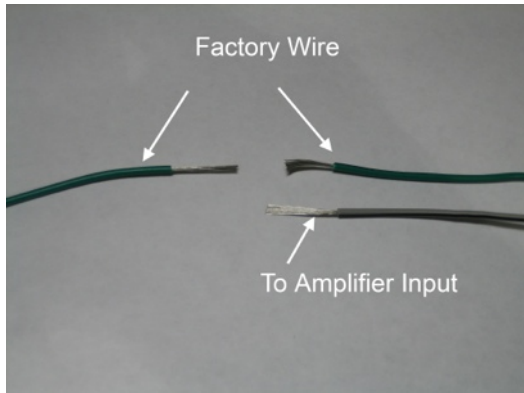
First, orient yourself with the **RCA Cables** that you received with your order. There are four individual wires coming out of one of the ends of the cable twisted together in two pairs.

- White (+) twisted with Red (-)** connects to **Blue/Black (+) and Brown/Orange (-)**
- Yellow (+) twisted with Red (-)** connects to **Yellow/Black (+) and Brown/Orange (-)**

Connect the wires from the RCA Cables to the appropriate wire in the BMW amplifier harness using the included **blue** butt connectors. Left and right here is not relevant, so don't worry

Wire Color on RCA Cables	Wire Color at Factory Amplifier
White (+)	Blue w/Black Stripe
Red (-)	Brown w/Orange Stripe
Yellow (+)	Yellow w/Black Stripe
Red (-)	Brown w/Orange Stripe

1. After stripping back approximately ¼' of the insulation from the wires, exposing the copper wiring itself, twist one side of the factory wire that you cut in half together with either the included blue remote turn on wire or one of the RCA leads, of course depending on your connection.
2. Insert these two wires into one side of the butt connector, and crimp tightly.
3. Insert the remaining half of the white wire into the unused side of the butt connector and again crimp down tightly.



Visual of RCA connections

**PLEASE NOTE:** When making these connections, please keep in mind that the wires at the original BMW harness are twisted in pairs. These pairs **MUST** remain together when making your connections since there may be multiple instances of the same wire color and there would be no way to identify which wire is appropriate for which

connection if the wires are separated.

2. **Double-check your connections!** With the variety of wire colors and the number of wires present in this area of the trunk, it's easy to make a mistake. Before going any further, it's absolutely worth your time to insure that you've made the right connections. Go over the connections you've made one more time being sure to verify colors are correctly matched and correct any mistakes, if present.
3. Run the RCA cables and remote turn on wire back through the large hole on the driver's side of the back wall into the trunk and over to the mounting location of the amplifier and plug the RCA cables into the input section of the amplifier. It doesn't matter which RCA plugs into which input, as subwoofer sound isn't stereo. **Connect the remote turn on wire to the "Turn On" input on the amplifier.**



### **Connecting the Subwoofer**

Now, we need to get the music from the amplifier to the subwoofer. Use the wire with (+) markings for positive, and the wire with (-) markings for negative. We will be bridging the amplifier, so connect the (+) wire to the L+ terminal and the (-) to the R-terminal.

### **Testing the Actual Installation Prior to Tuning**

First things first, after physically completing the installation, make sure your amplifier is powered up properly. It needs to turn off and on with the key. The power light should

turn off when you take the key out of the ignition. Test this out a couple of times to make sure. If it does not, and you are having trouble figuring out why, give us a call or drop us a line. Trust us, it won't be anything major. Go back over the above connections, and you'll undoubtedly find a small, silly mistake.

Now, go to the front of the car, and turn on the stereo. Put in your favorite CD (not a burned CD, but one that was professionally mastered and recorded), and tune in to your favorite track. We recommend using a very dynamic type of music, with many types of musical variations within the CD. Make sure that your bass settings on your radio are set in the middle or slightly lower. This will decrease distortion and increase the overall sound quality in the vehicle.

### **General Tuning Tips - Baseline Settings**

Use very light pressure when adjusting the dials on the amplifier. Use a small, jeweler's type flat-head screwdriver to make your adjustments.

Make sure all bass and treble settings on your radio or EQ are flat, or in the middle.

1. Preliminarily set the gains, crossovers, and crossover frequencies as follows:  
Gains: Both gains,  $\frac{1}{4}$  of a turn clockwise, or roughly 9 o'clock.  
Crossovers: Set the crossover to LOW.  
Crossover Frequency: Start with  $\sim 80\text{hz}$ .  
Boost approximately  $\frac{1}{4}$  turn clockwise
2. LOC gains - Set these approximately  $\frac{1}{4}$  turn, or roughly 10 o'clock

### **Gain Adjustments:**

-Begin turning up the volume until you hear the music at a reasonable level and increase the volume slightly up to the point that you begin to hear distortion coming from your interior speakers. Now, back down the volume until the distortion disappears and stop there. Head back to the trunk and slowly begin adjusting the gain(s) of the amplifier until you are content with the amount of bass being produced by the subwoofer without any audible distortion of the woofer. Make sure that this blends in with the rest of the music, and you're on your way to a rich, full sound.

When adjusting the amplifier gains, do everything in very small increments.

We recommend  $\frac{1}{8}$ <sup>th</sup> turn adjustments of the gain to find that sweet spot where there is no distortion and plenty of volume.

Everyone listens to music differently, so the tuning process may take some of us days, while others can do it in a matter of minutes, whether they're a beginner or not.

The tuning is the most important aspect of the installation. Don't rush any aspect of the tuning. You may ride around a few days and find that you need to make some adjustments. Don't worry, this is perfectly normal.

**Crossover Adjustments:**

This can be tricky, but if you keep your ears open, it shouldn't take long at all.

Here are some tricks to finding that sweet spot.

Try turning up the crossover a bit to around 90hz. If you don't hear distortion, this may be a good spot for you. Keep your ears open!

-You can also readjust the bass on the radio down a notch or two to compensate for the distortion, but again, keep your ears open.

### **Boost Adjustments:**

You can adjust this as much as you'd like, but you've got to keep your ears open for distortion. This is essentially an artificial boost at 45hz, so if you like boomier bass you'll likely adjust this slightly higher.

Keep a fine ear out for any distortion, and once you've found that sweet spot where the volume and the fullness you desire is ideal, you shouldn't ever need to adjust the amplifier again.

### **Troubleshooting Guide**

Invariably you'll come across one or two things in your install that didn't quite match up or weren't perfectly clear to you. We've put together several common things that may come up during an install, and how to isolate and troubleshoot them if they do. It is very advantageous to have a digital multi-meter on hand to troubleshoot anything electrical in your BMW. They can be found at any hardware store for around \$20-\$30.

**No Sound from subwoofer:**

- The fuse wasn't installed inline on the red 8 gauge power wire at the battery. This is very often overlooked. Pop in the fuse, and you'll be good to go.
- There isn't a connection between the amplifier and the subwoofer. Did you route the included speaker wire from the amplifier to the subwoofer enclosure?
- Amplifier isn't turning on properly. See next section.

**Amplifier isn't Powering Up:**

- The fuse wasn't installed inline on the red 8 gauge power wire at the battery. This is very often overlooked. Pop in the fuse, and you'll be good to go.
- Check to make sure you've found the correct remote turn-on wire. This is a very common oversight. Set your DMM to direct current and place one lead on the ground terminal of your amplifier and one on the remote turn on terminal. Turn

the car and the radio on. If you don't have 12-14 volts on the remote turn on terminal, your connection may be the issue.

- Make sure your power and ground connections are correct. Using your DMM, again check each terminal to make sure that a connection has been established.
  - Ground Connection: Set the DMM to its continuity section. Place one lead of the DMM on the amplifiers ground location where you screwed into the chassis, and the other lead on the negative battery terminal. If you don't see any continuity, move your ground wire until you do.
  - Power Connection: Set the DMM to direct current again, and place one lead on the amplifiers power terminal and the other on the amplifiers ground terminal. You should see 12-14 volts. If not, check your inline fuse.

Subwoofer sounds muffled or quiet:

- Check to make sure your phasing is correct between the amplifier and the subwoofer. Positive should go to positive, and negative to negative.
- Your input signals are out of phase. Check to make sure that your input connections are exactly as outlined in the guide. An easy test is to simply cut one of the input wires and see if the sound output increases exponentially.