



BAVARIAN SOUNDWERKS

BMW E39 Subwoofer System by BSW Installation Guide: t110 for BMW 5 Series Wagon '97-'03 (E39) – With Premium Sound (DSP)

Tools Required:

- Panel Removal Tool
- Metric Wrench / Socket Set
- Small, Flat Head Screwdriver
- Philips Head Screwdriver
- Wire stripper / crimper tool
- Drill (for amplifier mounting)
- Roll of black electrical tape

We're going to proceed as follows:

- Locating the factory amplifier
- Mounting the new amplifier
- Power connections for the new amplifier
- Audio inputs for the new amplifier
- Connecting the new amplifier to the new subwoofer enclosure
- Installing the new subwoofer enclosure
- Tuning/testing the new amplifier

Accessing the factory amplifier:

Simply fold down and remove the compartment on the driver's side of the hatch, and you'll see the factory amplifier. It will be the large black box with 3 plugs on top of it.

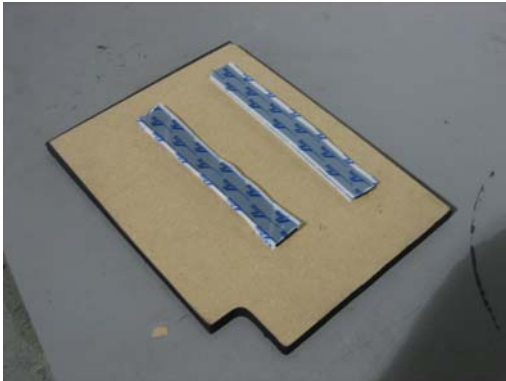
Here's where we'll be making our remote turn on connection, which is the wire that tells the new amplifier to turn on.

Mounting your new Amplifier

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. In the wagons, we typically mount the new amplifier in the same compartment as the factory amplifier.

We've sent a black board to you, which the amplifier will mount to using the included screws that came inside of the amplifier box. Once you've mounted the amplifier to the board, you'll attach the amplifier to the front of the factory amplifier using the two included Velcro strips.

Don't mount the board/amp assembly until you've made all wiring connections and tuned the amplifier.



Power Connections to your New Amplifier:

*Before you make any connections, we recommend disconnecting the negative battery terminal from the battery. This will eliminate any chance electrical damage to the vehicle.

- **REMEMBER-We're also going to be routing the subwoofer speaker cable and RCA Cables over to the battery area, so go ahead and route all of the cables together using the following procedure.**

Power Wire (Red Wire)

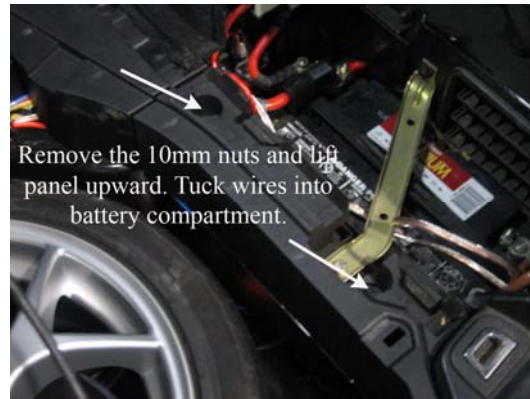
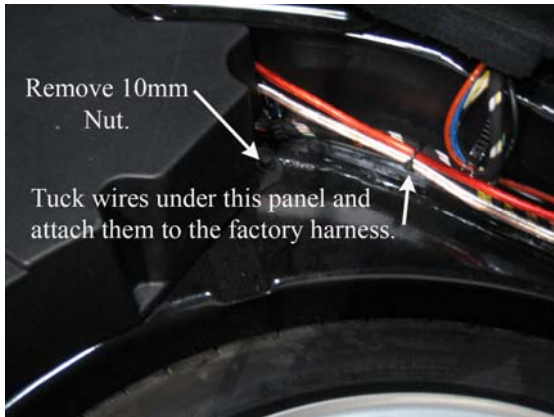
- You'll want to route the large red wire to the **positive** terminal of the battery. The battery is located on the passenger side of the hatch behind the removable panel and beneath the factory subwoofer enclosure (which we'll be removing). To route the power wire from the passenger side of the hatch over to the battery, see the photo sequence below:



Here is the general flow of the routing.



Remove the four 10mm nuts and lift the panel upward.



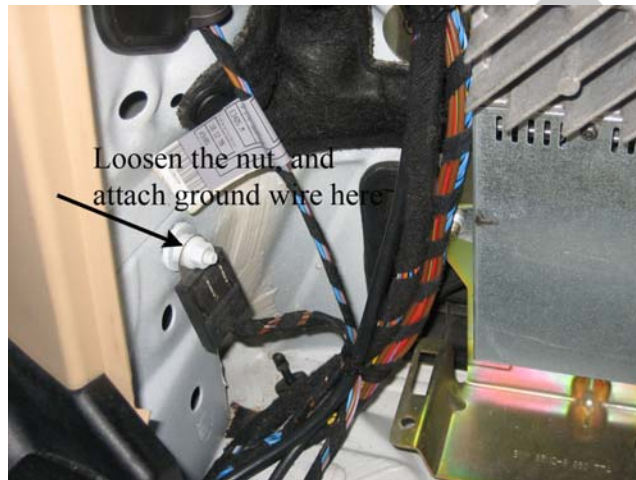
Now, loosen and remove the 10mm nut on top of the Positive terminal that secures the actual terminal to the battery. Put the amplifier power wire ring over the bolt, and tighten the nut back down with the terminal on the battery. This is the primary power supply for your new amplifier. This wire will be connected to the +12 terminal on the amplifier.



Do NOT put the fuse into the fuseholder until you have inserted the other end of the power into the amplifier and secured the connections.

Ground Wire (Black Wire)

- The large black wire goes to a chassis ground. We will be using a factory ground bolt located right next to the factory amplifier, closest to the rear of the vehicle. This wire will connect to the GND terminal on the amplifier. Just remove the factory 10mm nut, slide the terminal over the bolt, and tighten the nut back down.

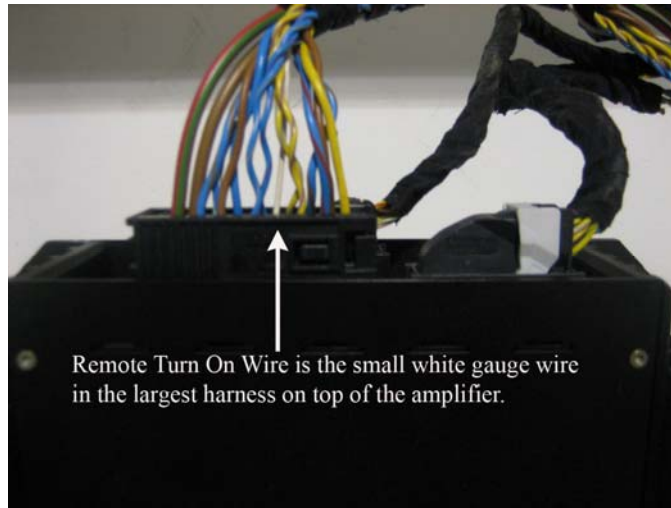


Remote Turn-On Wire: Connection made at factory amplifier

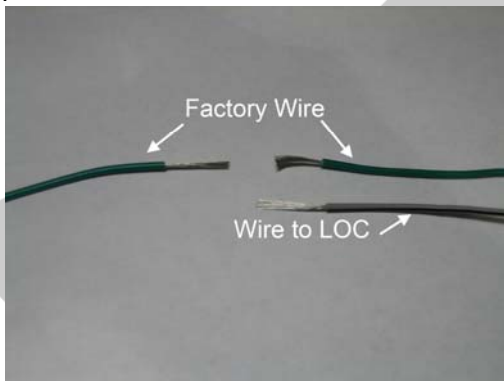
It is important to remember here that we are essentially "T'ing" into the factory wire.

It is important that the factory signal flow be allowed to continue back into the factory amplifier.

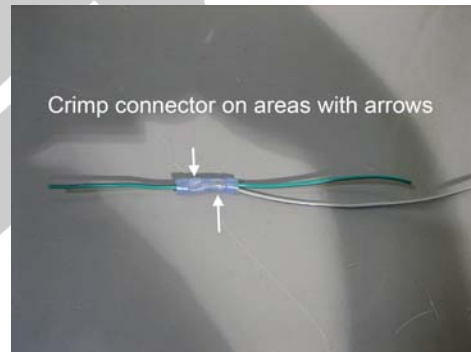
-Locate the **small gauge white wire** going into the factory amplifier in the largest plug on top of the amplifier, closest to the rear of the car. Tap into this wire with the included blue wire and red butt connector. Run this to the REM input terminal of your new amplifier.



Cut the white wire in half approximately 4" off of the plug, so that we can reattach the wires without any issue.



With the factory wire cut in half, twist the wire from the LOC together with one side of the factory wire. Insert these twisted wires into one side of the red butt connector and crimp down tightly, securing the connector.



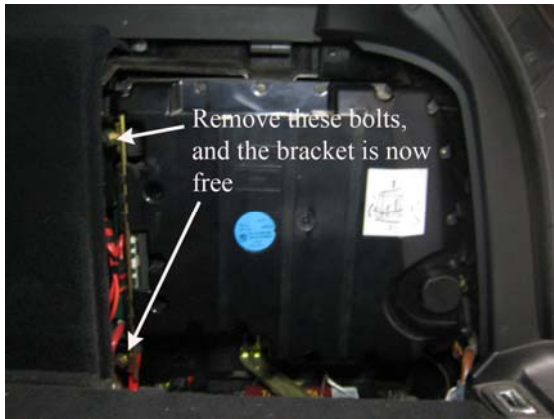
Using the remaining side of the factory wire, insert the wire into the open side of the butt connector, again crimping tightly to ensure a solid connection.

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

Use the supplied blue butt connectors to make the connections. First we need to remove the factory subwoofer enclosure to access the plug we'll need to make the audio connections.

Factory Subwoofer Removal:

This is easy, as you've probably already removed at minimum the subwoofer enclosure in order to change battery. Fold the subwoofer outward by loosening the large plastic nut in the photo on the left. Once the enclosure is extended into the cabin, lift it upward and slide it out of its bracket. Unplug and remove. We need to remove the mounting brackets for the woofer as well, also shown below. Here's a visual of what we're removing:



1. Using your 10mm wrench, yes wrench as it's a very tight fit to remove the bracket closest to the front of the car, remove the bolts and the bracket assembly will free itself. At this point, go ahead and tuck the factory subwoofer wiring harness back into the confines of the wheelwell.
2. Now, remove the rearmost bracket using a 10mm socket to remove both the nut on the outer wall and the bolt on the rear wall. Reattach the outer wall nut after the bracket has been physically removed.

Audio Input Connections:

We'll be making our connections at the plug that was disconnected from the factory subwoofers. You'll see 8 wires in this plug. We'll only be using four (4) of them.

1. Find the following two pairs of wires. **Cut the wires in half** approximately 1" off of the plug so we'll be able to make our connections.

Yellow w/Black Stripe (+) and Yellow w/Grey Stripe (-)
Blue w/White Stripe (+) and Blue w/Brown Stripe (-)

2. Strip back the insulation on each wire approximately $\frac{1}{4}$ ", exposing the copper wire. Insert this into one end of the blue butt connector. Crimp down tightly using a quality crimping tool. Do the same thing on the wires coming off of the LOC, and insert these wires into the remaining end of each butt connector. Follow the guide below.



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NOTE – Wire colors can change If you see any wire with a black, red, or purple stripe, its positive (+). Solid color wires **other than brown** are also positive.
-If you see any wire with a brown or grey stripe, it's negative (-) Solid Brown wires **are always** negative.

3. Now, orient yourself with the Line Level Adapter. There are four individual wires coming out of the unit.

Wire Color at LOC	Wire Color at Factory Subwoofer Plug
Purple(+)	Blue w/White Stripe
Purple/Black Stripe (-)	Blue w/Brown Stripe
Green (+)	Yellow w/Black Stripe
Green/Black Stripe (-)	Yellow w/Grey Stripe

Once these connections are made, plug the RCA cables into the LOC and tuck it safely back into the wheel well.

Speaker Wiring Connections (connecting the amplifier to the subwoofer enclosure)

From the new amplifier we'll need to route the included 12 gauge speaker wire to the subwoofer enclosure. We'll use the following guide to highlight your connections.

Subwoofer Terminal		Connection at Amplifier
Red	Connects to:	L (+) Output
Black		R (-) Output

Installing the new Enclosure:

So, with all of that out of the way, we can simply drop our new enclosure into the space previously occupied by the factory subwoofer. Before you do, we'll need to remove one last Torx T25 bolt, which will be used in securing the new subwoofer enclosure in place.



Before you drop the enclosure into place and secure it down with the Torx Bolt, make sure the enclosure is already plugged in and that the positive and negative are correct.

Let's tune the amp and rock out!

Amplifier Tuning

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.

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: $\frac{1}{4}$ of a turn, or roughly 9 o'clock.
Crossovers: Set the crossover to **LPF**.
Crossover Frequency: Start with approximately 90hz.
Turn the Bass Boost to approximately 9 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 1/8th 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 100hz. 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.**

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.

Make any installation notes here:

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(s):

- 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.

Subwoofers sound 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.