

Lessons Learned – The Hard Way !

Introduction

The following pages are not intended to be a guide of “how to” install an in car audio system. They are more of a note of my experiences in an attempt to provide anyone who reads the document some guidance and allow them to benefit from my experience. A guide of what not to do and suggestions of where to buy and who to ask for help.

Like many others before, I was unimpressed by the all too common ‘base audio’ system in my car and decided to upgrade. With no amplifier or tweeters it could never impress.

I quickly realised that it would be best if I completed this in two stages to maintain good levels of ‘attention to detail’ and to avoid me trying to ‘rush’ the job and breaking any one of the numerous pieces of plastic trim which would have to be removed.

The first stage would involve fitting new speakers and the second would focus on the amplifier and subwoofers.

Above all else I wanted to maintain the ‘factory finish’ appearance of the car and complete the job myself.

Stage One.

Following weeks of research I looked at all the speaker options I could find which included plug and play offerings from Gladen, Rainbow, Focal, Bavsound, Rockford Fosgate, Match (Audiotec Fischer) and MB Quartz, the list goes on. Luckily, during this time I stumbled upon a car audio company near Bishops Cleeve called Audiofile-Incar...

<http://www.audiofile-incar.co.uk/audio-upgrades/bmw-1-2-3-4-5-6-7-and-x-series>

I spoke to the owner ‘Gary’ who was nothing short of excellent with his help and advice. He is a man that should be listened to as he and his company have been installing audio upgrades in BMWs for many years. In fact the bulk of his business comes from this sector of the market.

To cut a long story short I followed his advice and opted for the Focal ES100k ‘kit’ which includes a tweeter, mid range and passive crossover for each side. The Focal ES100k speakers are not ‘plug and play’ upgrade units however they offer a considerably higher quality of sound. I decided not to buy a pair of the highly recommended Earthquake SWS-8x subwoofers (4ohm) just yet as I was intent on finishing stage one before moving on to stage two. When speaking to Gary I discovered that he has previously trialed all other options suitable for an F10 and found them to work best with no cutting of any trim required. I was sold. This option was not the easiest to fit, but after looking at the quality of some ‘plug and play’ speakers it made perfect sense to me. Why go to all the trouble of upgrading and not do it properly? Having said that, the installation can be made a little easier when fitting the speakers by using ‘adaptor rings’ which can be found on UK EBay by a seller from Birmingham who calls himself ‘bassboxcaraudio’. He sells the two types of adaptor rings needed, i.e. one pair for the Focal mid range speakers (high grade aluminium) and another for the subwoofers (made from MDF). Although not the most talkative person around he delivered both sets of adaptor rings very quickly. The quality of the Focal adaptor rings is excellent.

Along with the speakers, I decided to use sound deadening as suggested by Gary in order to get the most from the system. It dramatically reduces resonance. In this case I opted for 2mm ‘Dynamat Xtreme’...

<https://www.deadening.co.uk/collections/dynamat>

I also used Stinger HPM 16 gauge hyper twist premium OFC speaker cable... all of which (including connectors) was supplied by Gary in kit form. Not the cheapest option, but in addition to supplying the kit Gary offered ‘Tech Support’ if I should get stuck. Priceless.

<http://stingerelectronics.com/catalog/wire/SHW516B50>

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Next I bought a pair of tweeter grilles from my local BMW dealer which were cheaper than EBay!

Left tweeter grille part number, BMW call it a 'cover': 51.33.7.255.779
Right tweeter grille part number: BMW call this one a 'cover' too: 51.33.7.275.780

I spent a few days pottering around the car at a comfortable pace fitting the speakers and addressing issues as they arose (I used this Bavsound video on You Tube as guidance for taking the thing apart)...

<https://www.youtube.com/watch?v=jRy5-f9OJss>

The first issue was the fact that the tweeters did not fit in the OEM 'sail panels' correctly. Not wanting to glue them in place I asked a friend of mine to 3D print two adaptor rings as suggested by the following link. It worked perfectly!

<http://www.e90post.com/forums/showthread.php?t=1344441>

Next I fitted the midrange speakers to the door cards using the aluminium adaptor rings bought from 'bassbox' on EBay and spent a good few hours fitting sound deadening to each door frame, inner door skin and both door cards.

A door card before work starts.



Mid range speaker fitted to door card with adaptor ring.



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A door card, now finished with Dynamat and crossover for tweeter and mid range



An 'almost' finished door frame and skin...



After soldering the speaker cable to each terminal, I wrapped the new wiring in Tesa tape and secured it. Next I re-sealed the waterproof membrane to the door frame with a heat gun and fitted the door cards with the two switches on each passive crossover set correctly (for no amplification). Once complete and tested I couldn't help but have a listen to the system... The difference was immediately noticeable and the audio detail significantly better. However, I felt as if the rear speakers could do more. Some believe that rear speakers are a waste of time for the driver and others swear by the fact that they embolden the sound. Personally, I go with the latter. With the restricted depth under the parcel shelf and not wanting to heavily modify it I 'cheated' this time and bought a pair of 'plug and play' speakers. I opted for a pair of Rainbow IL-X4 Mix and bought them from 'extremeaudio' in Germany via Amazon UK. 'Extremeaudio' were the cheapest by far and very quick in delivering the speakers.

<http://www.rainbow-audio.de/en/speaker/intelligence-line/bmw/>

These speakers pale in build quality when compared to the Focal ES 100k components I had just installed but as they were only to provide 'rear fill' this was not overly important. They did the job. Removing the rear grilles and fitting plug and play speakers is a very simple task indeed. However, I did solder the wire to the speaker terminals (always best to do this) and cover all again with Tesa tape.

With an overall sound that had improved dramatically I found myself on the slippery slope of car audio upgrading and could not help myself from taking the next step... Subwoofers and an amplifier !

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Stage Two.

I already knew which subwoofers I would be fitting (thanks to Gary again) but the amplifier was a different case. I know that 'Audiofile-Incar' use the JL Audio XDv2 range but I was a little apprehensive on fitting an aftermarket amplifier as I had never done it before. I wasn't too keen on cutting into the car wiring as I wanted to leave it looking as original as possible. This also gave me the option to remove it all with ease should I sell the car and buy a similar one in future. With this in mind the research started again and I looked at all the amplifier options and boiled it down to two possibilities...

The JL Audio XD700 5v2 or the BimmerTech (Audiotec Fischer) PP82DSP.

In the end I went for the significantly more expensive BimmerTech option as all the necessary cabling was supplied and coding the car to 'HiFi' included in the price. A signal processor or DSP is integrated into this amplifier which I knew would be required later to correctly setup the soundstage. I have used BimmerTech before for a reversing camera upgrade and they were very good. Sadly this time they failed to reach the same level of customer service. They failed to answer many of my pre-purchase questions and once delivered I found faulty fuses in the kit and an amplifier that did not have any pre-loaded tuning file for my car. In the end I got this all sorted but it could cause trouble for others with less technical experience (I've been an engineer for over twenty years).

The BimmerTech amplifier kit on my garage floor (for a UK 'base audio' model)



With 'sketchy' fitting instructions provided with the amplifier, I looked and looked for a UK based forum on how to install the amplifier, but the best I could find was an American version which is significantly easier as they just replace the OEM amplifier. My car had none of the wiring at all so I had to start from scratch. Nevertheless the next link was of some use...

<http://www.2addicts.com/forums/showthread.php?t=1218371>

The 'kit' from BimmerTech includes everything you will need to install the amplifier into a car with only the 'base stereo' option – which was **not** clear in one of the answers I received from "Peter" (BimmerTech). In addition I was advised that the PP82DSP amplifier would drive the Earthquake subwoofers adequately if I decided to install them. Unfortunately this is not accurate. Later, Earthquake technical support confirmed that an additional subwoofer amplifier is required to supplement the PP82DSP to adequately drive the Earthquake SWS-8x, enabling them to perform to the best of their abilities.

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Over a full day I patiently installed all of the wiring for the amplifier which included fitting a couple of harnesses and a five metre long cable from the head unit to the amp itself which I decided to install in the stock location – left hand side of the boot.

PP82DSP Amplifier installed in the left hand side of the boot.



Being patient for once in my life I chose this moment to install the Earthquake SWS-8x (4 ohm) subwoofers which I had just bought from a reliable seller on EBay...

<http://www.ebay.co.uk/itm/2x-Earthquake-Sound-SWS-8X-High-Performance-Shallow-Sub-1-PAIR-Ring-Adapters-/282448242950?hash=item41c33a2906:g:r4IAAOSwRUhZAI87>

As quite a lot of the car interior was currently in my garage at this time it made perfect sense.

An excellent guide to fitting these can be found on the Earthquake European website...

http://earthquakeeurope.com/Products/Car-Audio/Subwoofers/SWS/SWS-8X/Pdf/EU/BMW-SWS_UpgradeGuide.pdf

This guide (made by another BMW owner) is so helpful, Earthquake themselves use it to describe fitment of their subwoofers to a BMW.

After removing both subwoofer enclosures I ground back the 'fins' at the bottom of each and fitted the MDF adaptor rings previously mentioned using draught excluder tape to seal them in place. I also used some left over sound deadening for the bottom of each enclosure and on the floor of the car where the enclosures sit.

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Subwoofer enclosure sound deadening



Car floor beneath enclosure also sound deadened.



Subwoofer in place before fitting the spacer and OEM grille



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As stated in the fitting guide a grille spacer must be used so that the subwoofer voice coil does not hit the OEM grille when refitted and being driven 'hard'. Not readily available off the shelf I decided to order two 10mm thick 'A4' sized sheets of Perspex from Trent Plastics. The 'A4' sheets arrived the next day...

<https://www.trentplastics.co.uk/acrylic-plastic-perspex-sheets/coloured-acrylic-perspex-sheets-sub/coloured-acrylic-perspex-sheets>

Using a jigsaw I cut out two grille spacers as directed in the guide and cleaned them up with a file. Both subwoofers were then fitted to their enclosures with adaptor rings in place and the whole assembly re-fitted to the car. Before returning the front seats to their correct locations I ran a cable provided by BimmerTech in the kit from the amplifier to each subwoofer and soldered the ends. Please note that the cable provided by BimmerTech does not allow for wiring the subwoofers in parallel (this caused issues as I will explain later).

I returned both front seats to their positions and bolted them down to the correct torque using marks I had made on each bolt head prior to removing as a guide.

A Baysound video on how to remove the subwoofers and unbolt the seats can be seen here...

<https://www.youtube.com/watch?v=5xVeFzETQ5A>

As a final task, I removed both door cards again and changed the passive crossover switches to the setting more suitable for amplification as directed in the manual (the manual does not show switch positions for no amplification).

So with the Focal components, subwoofers, sound deadening, speaker cable, speaker adaptors and amplifier fitted I struggled a little to set the integrated signal processor (DSP) correctly for my setup. The DSP tuning file emailed to me by BimmerTech was for a left hand drive car which included a centre speaker that I did not have or want – they destroy front soundstage. Becoming a little frustrated by answers from Poland I asked Audiotec Fischer for a little guidance, and being a German company, they put me on to their UK based distributor – Midbass from Birmingham.

<http://midbass.com/>

All the praise in the world would not be enough for 'Alan' (sales manager) and 'Ash' (R&D manager) from Midbass. They were excellent from the start despite me not buying any kit from them at the time. They were always helpful and correct in their advice – many companies provided the wrong information which caused confusion at times and sent me off down the wrong road. If I had been aware of Midbass earlier, I would have bought all the amplifier kit required from them instead of BimmerTech and saved myself hundreds ! Live and learn !!!!!

Using the information given to me by 'Midbass' I spent the next day or so playing a well known (and well produced track) and a lossless sample of 'pink noise' in the car and adjusted the equaliser settings, timing, response curves and frequencies as best I could with the aid of some analytical software, new knowledge and patience. A rather useful starter guide found was this one...

<http://www.carstereochick.com/2012/08/09/how-to-properly-set-an-equalizer-in-a-car-audio-system/>

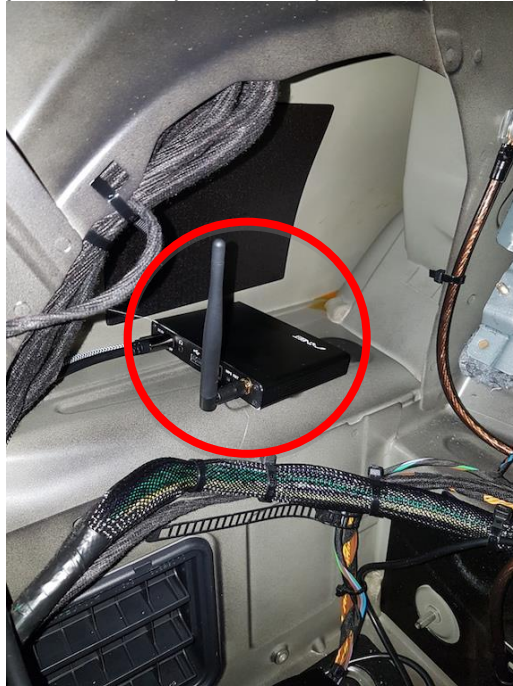
It is quite simple in its approach and description but its very useful for someone like me who has never setup a car audio system before.

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With the amplifier/DSP correctly setup the car audio system was transformed. The soundstage, imagery and detail were abundant. However, there were two minor issues yet to resolve. Firstly, I remembered something that Gary from 'Audiofile-Incar' had said about the head unit. Basically it reduces the quality of the source regardless of what file type is used in a USB storage device. No matter how good your audio system is, be it in the house or in a car, a poor source or recording will only be amplified at the speakers – pardon the pun ! To solve this I 'borrowed' his idea and fitted a Neet Airstream Pro bought from Amazon. This is a WiFi music receiver which can feed the amplifier lossless audio files via an optical cable. The result – no audio file degradation. All it requires is a power source which I took from the rear cigarette lighter fuse in the boot (number 147) using a blade fuse tap, an optical cable which can be bought from Amazon for around £5 and a source. I chose my phone to be the source as it already had all my music on a 128Gb external micro SD card. The Neet box sets up a mini WiFi network which I logged into and played through. A much clearer cleaner sound was produced. Well worth the £30 for the Neet box and an hours work. All of this was completed with absolutely no visible modification to the interior of the car.

Fitting and using a 'Neet' box as a music source may also have the added benefit of bypassing the need to have a car coded to 'HiFi'. I am not 100% sure of this but it seems logical to me.

Neet Airstream Pro fitted just above amplifier with optical output



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The second and hopefully final issue was the lack of bass 'punch'. Everything else was fine, but the bass was lacking which leaves an incomplete sound in the car. After a little more research I discovered my mistake... the amplifier bought from BimmerTech only supplies 55w to the subwoofers - in fact all eight channels. The low output wattage combined with the fact that they are not wired in parallel and the small enclosures results in a severely hampered subwoofer performance. Simply put, the subs were not being driven properly. Having no prior experience in car audio I put trust in the advice provided by BimmerTech... it was wrong!

Ideally, this is how I should have my subwoofers wired (thanks to Crutchfield)



Becoming fully aware of my mistake I then looked into available options for achieving bass 'punch' with the PP82DSP amplifier. Unfortunately none really exist. Not allowing for the 'bridging' of subwoofer channels I can do little more than fiddle with the DSP settings to try and enhance the bass. This of course has the knock on effect of taking away from the overall true sound. I did consider the addition of a separate subwoofer enclosure in my boot, but as Midbass pointed out this would not work. My car does not have folding rear seats or a 'ski flap' therefore resulting in the boot acting like a steel enclosure which would make it very difficult for the bass to penetrate. I later found out that 'Gary' agreed with this, so bowing to the superior knowledge of two very trustworthy sources I now find myself at a crossroads. I could remove the BimmerTech amp and fit a more suitable unit or add a monoblock amp to the existing setup and drive the subwoofers properly. As with everything it all comes down to cost in the end. The re-sale value of my amplifier is low despite it being in 'brand new' condition. Therefore I will most likely add a monoblock amplifier for around £250, I just wish I had paid more attention to the PP82DSP specifications earlier on and saved myself a further step.

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Conclusion.

If you are planning to fit speakers and an amplifier to your car, consider the Focal ES100k's. They are more work to fit but well worth the effort. Rather than install a passive crossover I might (in future) run the components 'actively' and wire directly to each component. This would have the advantage of being able to set the DSP for each tweeter and mid range speaker independently rather than set for the pair. On the amplifier front, if I had to do it all again, I would listen more to 'Gary' and buy a JL Audio XDv2 or HD series amplifier with an Audison 'Bit Ten D' signal processor.

The Audiotec-Fischer PP82DSP is good but its lack of power to all outputs especially the subwoofer channels is a serious flaw and is exacerbated when fitting a reasonable set of subwoofers.

I feel BimmerTech have correctly identified a niche market and are supplying good kit to BMW owners. However, over the years they are becoming nonchalant in their success and need to regain their past customer service ethic. Their answers to customers technical questions must be correct. I understand that they receive hundreds (perhaps thousands) of emails per week, but saying that there is no difference between a 4 Ohm and 2 Ohm subwoofer is wrong! (just one example of many questions answered incorrectly).

After reading all of this you may feel I have gone too far in my quest to upgrade the audio in my car. Why not just fit some 'plug and play' speakers with the BimmerTech amplifier? Wouldn't this be good enough? Well, for most people the answer is probably YES. However as my brother pointed out I am (subconsciously) comparing my car audio system to the setup in my house. I have Naim Audio 'high end separates' in my front room connected to a pair of Sonus Faber speakers sitting on custom stands fixed to the floor which took years to build up in stages and cost a significant amount of money. Am I mad? Perhaps. However, after having spent years becoming used to the system in my house anything less than very good is a waste of time for me, leaving only a sense of frustration I would rather mute the sound and sing myself!

If you think I have gone too far think again, I could have done this...



Thanks for reading.