


Yesterday, 10:54 PM



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Location: Clemson, SC  
Posts: 1,229  
Rep Power: 61



## Rear Subwoofer

The upgrade is complete - in order to do it the way I like to do my projects, it took me significantly longer than I thought it would - probably 20 hours in it all together, but the test listen today makes it seem totally worth it compared to the "muddy" Bose system sound I had previously.

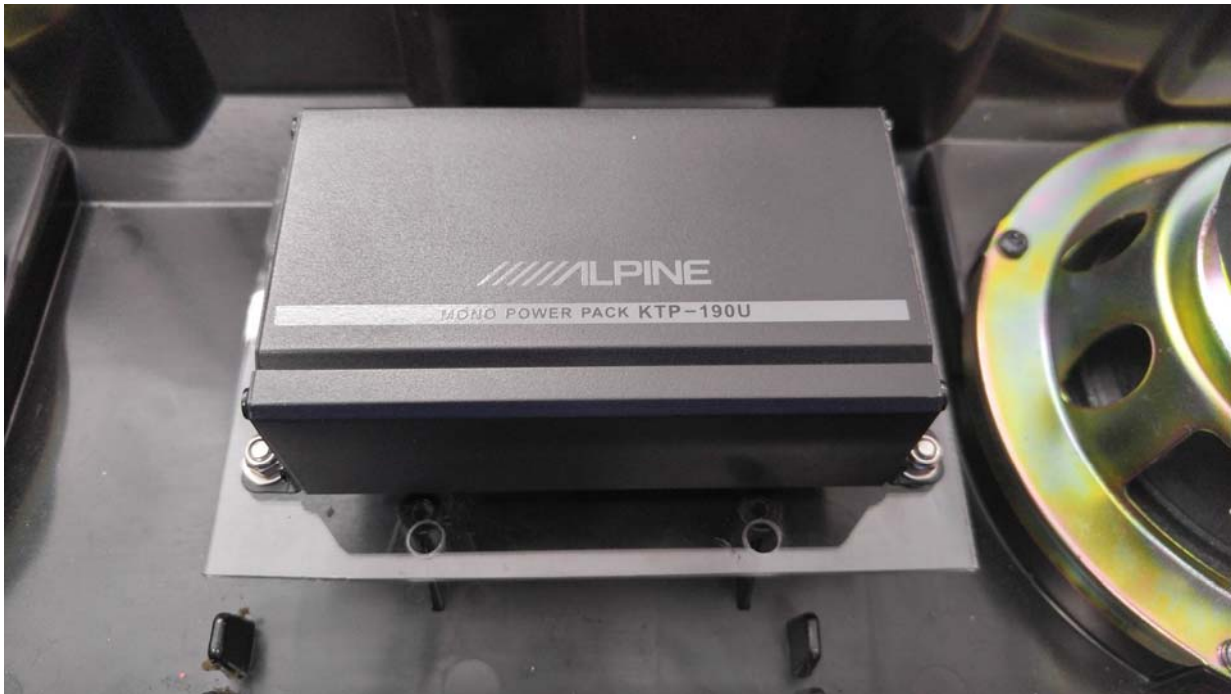
What I installed were:

- 2 x IS 200 - 8" Woofers with tweeters
- 4 x IC 100 - 4" Co-Axial speaker set with positionable center tweete
- 3 x TIS 1.5 tweeters for top of dashboard, including center speaker
- 2 Focal Utopia Be WS 13 5.25" subs driven by an Alpine KTP-190U Mono Amp

Here's the photo documentary with some comments of my install. I started in the rear with the Bose Sub and worked my way forward. I'm going to do each section in a separate post to not risk losing it. Captions are under each photo



*Here is a photo of all the OEM Bose equipment that was replaced - not shown here is the small subwoofer amp*



*I went with this Alpine amp because it was rated more powerful than the OEM Bose unit, but did not need heavier gauge wire than what is in the plug on the outside of the subwoofer box. To start with, I made a mounting plate for the replacement subwoofer amp out of a piece of Lexan. Drilled holes to line up with the old mounting hole posts and then new holes for the amp mounting holes. I purposely shifted the mounting to the right a bit to allow space for the wiring to exit on that side.*



*I used some stainless washers between the amp and the plate to isolate the metal amp body from the Lexan plate to prevent the possibility of melting the plate.*



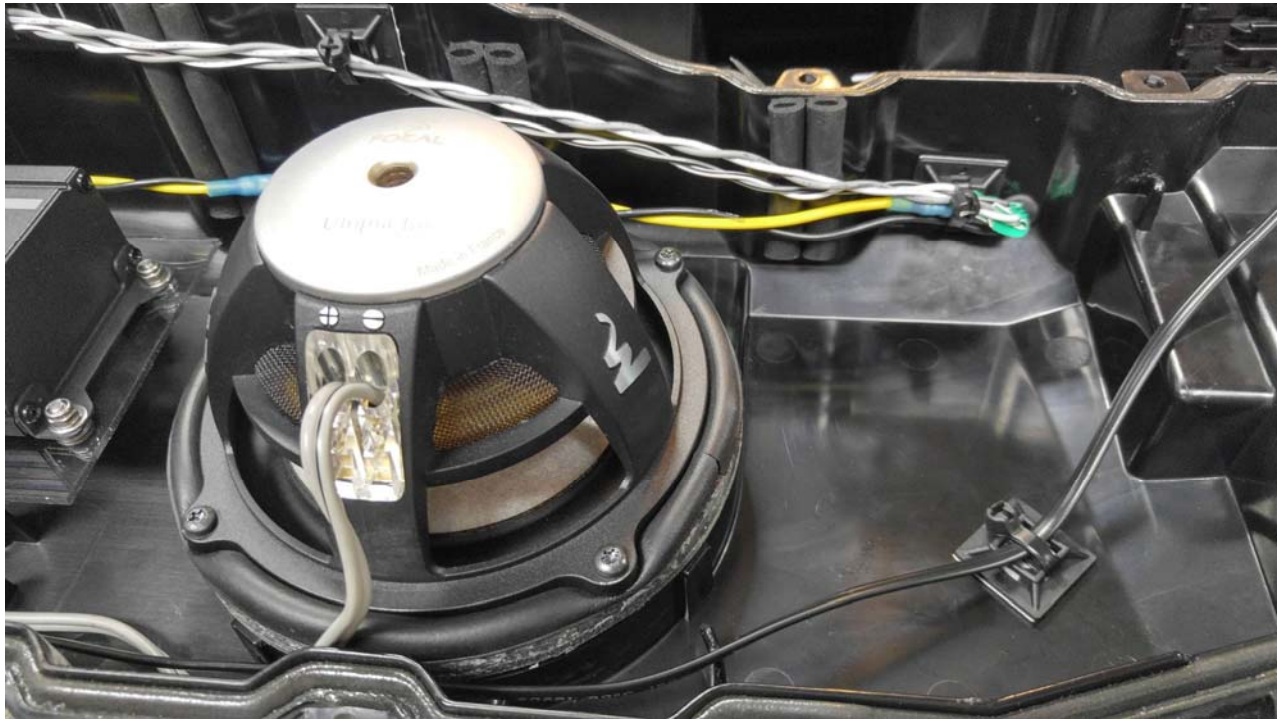


*The mounting holes of the Focal subs were close, but did not align to the existing holes in the Bose sub box, so I fabricated adapter rings out of a polymer Kitchen cutting board. The plate mounts to the original holes and then I drilled new holes into the plate for the subs.*



*I used foam weatherstripping to seal the speaker circumference to the mounting plate (the oem hole already has an integrated similar sealing ring). I wanted to make sure all the air pushed through the port and there weren't any losses or vibration between the pieces.*





*First Focal sub installed and wired*



*Comparison between the Focal sub on the left and the OEM Bose sub on the right - too bad noone can see the quality of the Focal unit since it's sealed up in a box.*

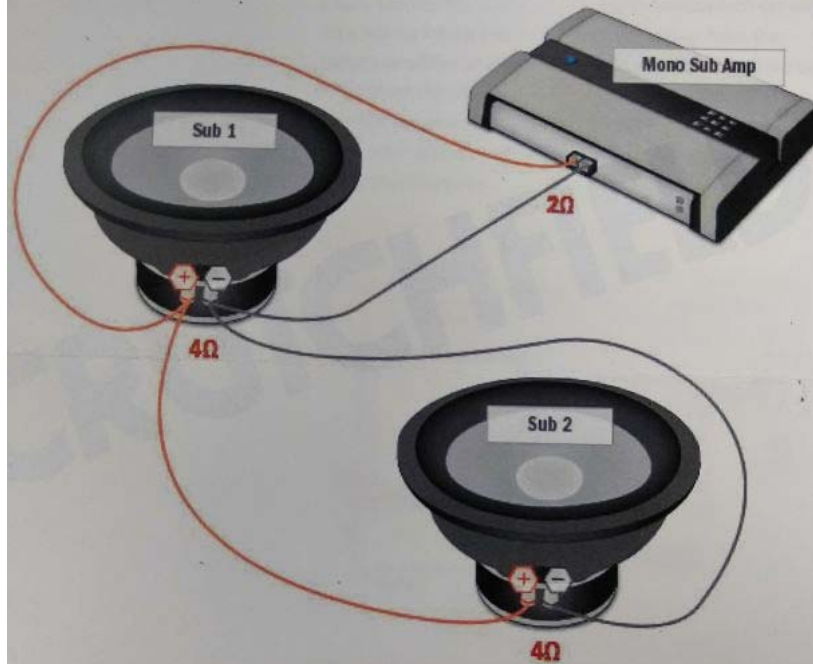


*Completed and wired rear sub box.*



## Crutchfield's Subwoofer Wiring Diagrams

Two 4-ohm subs, mono amp: 2-ohm load



### Wiring Diagram Legend

- Positive Wire
- Negative Wire
- Bridged Wire
- Ω Impedance Level (In Ohms)
- Positive Terminal
- Negative Terminal

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*Subs were wired in this fashion from the single output from the Alpine Amp. This creates a 2 Ohm load - same as the OEM setup.*




*This is the OEM connector on the outside of the sub box. The Red wire is 12v + in, the Brown Wire is Ground, white is the Remote turn on lead for the amp (not used with this Alpine unit as it has signal sensing for auto turn on), and then the yellow wires are the signal input wires. Solid yellow for + and striped for -. The Amp needs bass signals on both the L & R + and - inputs (4). Crutchfield advised me to tie together both + inputs to the solid yellow & both - inputs to the striped one.*

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**Rear Seat Speakers**



*I traced the shape of the OEM mounting plate onto a piece of Lexan than then cut it out with my band saw and hole saw in a drill press. I had to break off one of the 4 speaker mounting tabs to prevent interference with the speaker grill mounting slots. I used a bracket I have for mounting things into slatwall which fit into the slot in the car to hold it perfectly. Once I had the plate built, I covered it with some black vinyl so it would look good through the speaker grill.*



*On the backside of the mounting plate I used more of the foam weatherstripping to make the plate seal with the opening which pushes all the sound forward (OEM plate has this molded in).*





*This particular model of Focal Speaker has the extended tweeter with can be rotated & aimed. I went with these because being able to point the tweeter at the listener's ears makes for clearer highs in the music. You also want to try not to obstruct the tweeter with a grill in order to achieve the cleanest sound, so I modified the OEM speaker grill to allow the tweeter to protrude through.*



*I used a 1.75" hole saw in the drill press, which was just about perfect, then used a thick rubber o-ring around the circumference of the tweeter before attaching the grill in order to give it a nice finished look. Now you can tell there's an upgrade in there, but I think it looks pretty clean and sounds great.*

At this point, I did a test listen to the system, and honestly, wasn't that impressed - grrrr.

In hindsight, what was happening is that it takes more power (volume) to drive these Focal speakers than it does the Bose, so the Bose speakers remaining in the system were still overpowering both the Subs and the rear speakers and not working all that well together.


I forged on....

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### Front Door Speakers

On to the Front Doors where I'd be replacing the 6" Bose units with 8" Focals and another set of the IC100 Coaxial versions for the 4" midrange



The holes of the Focal 8" speaker lined up perfectly with the OEM speaker mount, however, because they're much higher quality and have a larger magnet, they're quite a bit deeper than the plastic vented panel would allow. I used a razor knife and some wire cutters to remove the plastic vented area from the speaker mount.





I then placed a Boom Mat speaker baffle into the opening, which encapsulates the speaker. These do 2 things - they protect the speaker from any moisture that gets inside the door and the foam acts as a seal to the mounting surface (same thing I'd been doing with the weatherstripping during the other installations). Tip: there is not enough clearance around the 8" speaker to get the mounting bolts in once the speaker is mounted so those need to be in the holes first.



Note the bolts in the mounts already. Once I had the speaker wired up through the baffle, and mounted to the mount with the baffle sandwiched between, I trimmed off the protruding corners of the foam with a razor knife.



Speaker attached to mount with baffle, ready to install back into the door.





There is just enough room to get a ball end allen key into the socket caps of the gold bolts. Tighten each one a little and keep moving around until all of them are tight.



Pleasantly, the 4" coax speakers also line up with the mounting holes in the door panel. I broke off 2 of the 4 mounting tabs, and used the thin foam ring that came with the Focal speaker grills for the face of the speaker to press against once mounted in the door panel.



In test fitting the speaker mounting screws, I noticed they were bottoming out in the door panel holes before securing the speaker well. I put the screw through a metal washer then decent thickness rubber washer to not only cushion the speaker mount and prevent vibration, but also allow the screw to securely attach the speaker to the door panel without bottoming out.





4" speaker installed in door panel




Then on the back side I adhered some foam rubber drawer liner to the back of the speaker with a couple of glue dots. The purpose is to make sure the metal magnet doesn't come in contact with the metal inner door panel, causing a metallic vibration or noise.

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Dash Tweeters & Center Speaker

Last install section...



Once I removed the OEM center speaker, I realized it was in a fairly deep hole. Tweeters sound best when they're as far up as possible so I didn't want to just set the tweeter in the bottom of the cavity. I happened to have a perfectly sized rubber stopper on-hand so I mounted the tweeter mount to the top of the rubber stopper. This would allow me to securely mount the tweeter in the center cavity, but have it up near the top of the dashboard for the best sound.





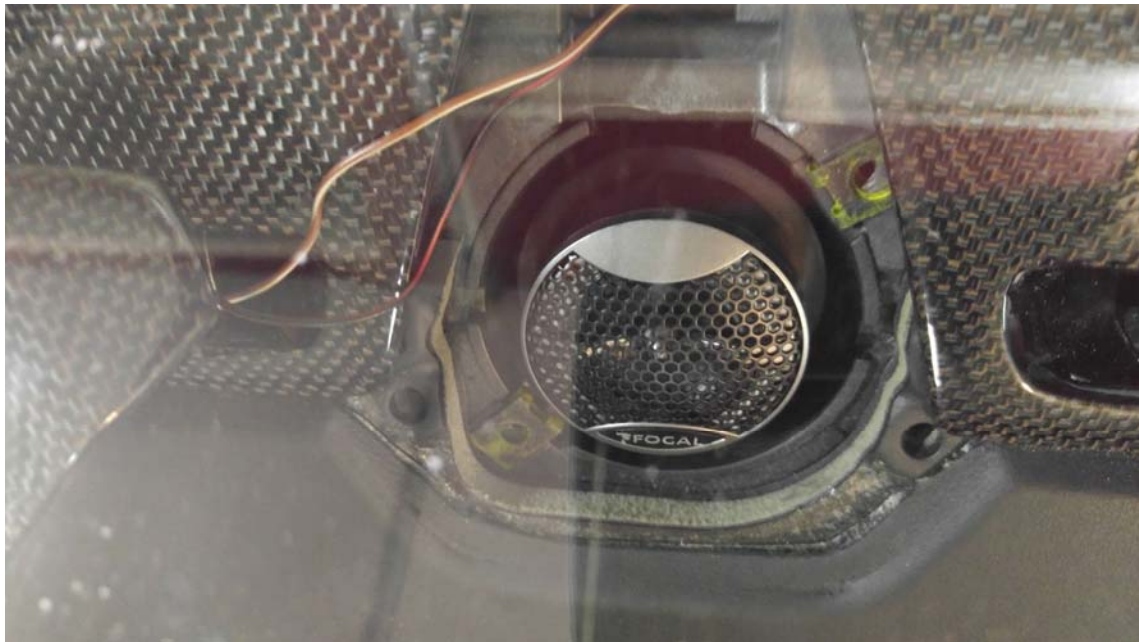
Top view of the mount screwed into the top of the rubber stopper. You can see the hole drilled through the stopper at about 10 o'clock for the tweeter wires to pass through.



Fully assembled tweeter on the mount



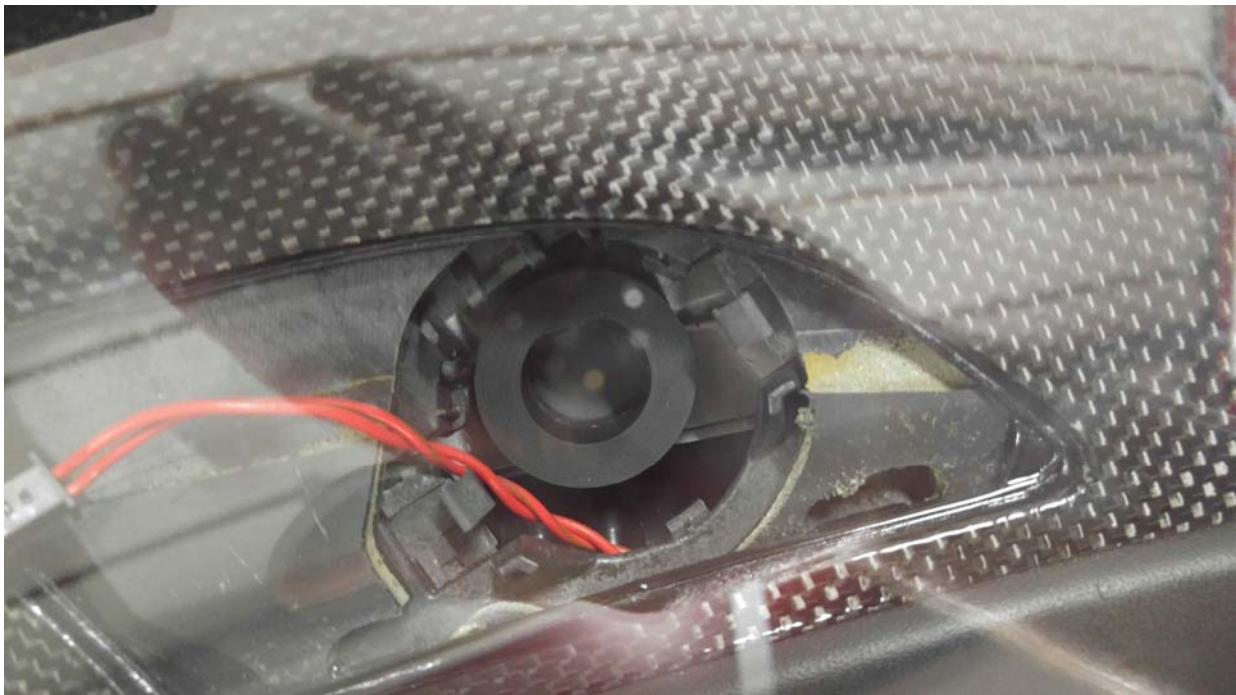
In looking into the speaker cavity, there is a section that has a bottom support. I used some 3M trim tape in the corresponding position of the rubber stopper and adhered the bottom of the stopper to this support.



Tweeter installed in center hole. Wires are from the sensor on the speaker cover.



Wanted to do something similar on the 2 side tweeters to keep them from being too low in the cavities. These rubber pieces I had fit the bill perfectly - don't know what they came from. I did the same thing with the 3M trim tape on the bottom side.

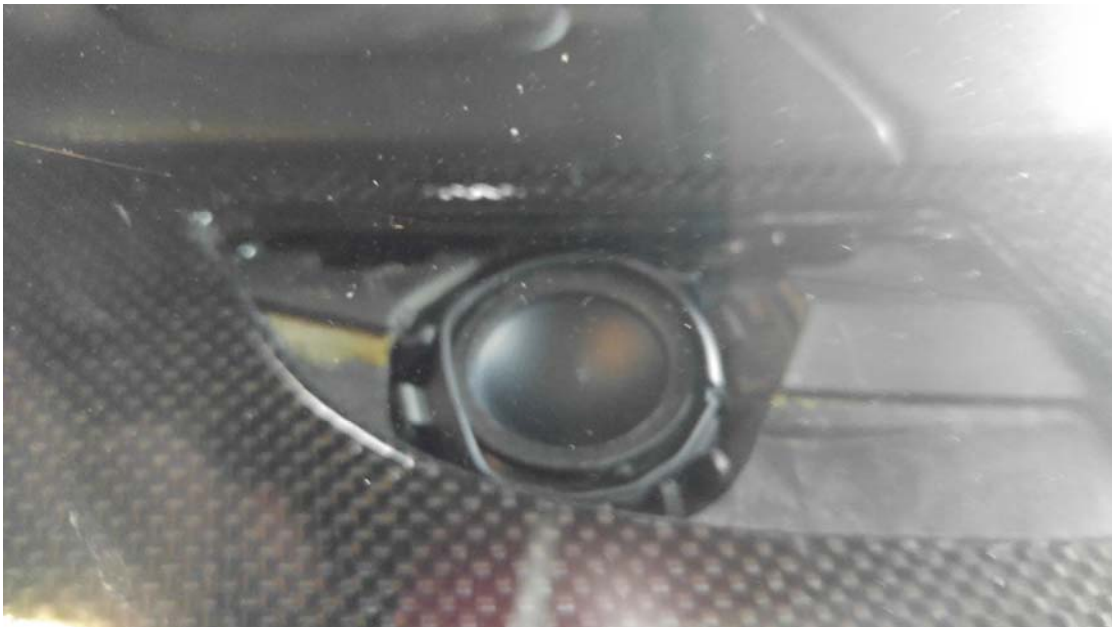


Rubber spacer adhered into side tweeter opening





I then wrapped the circumference of the tweeter with thin silicone adhesive weatherstripping so that once I squeezed it into the clips it would be held securely and not vibrate or rattle.




Tweeter installed in side dash opening.

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Today, 12:08 AM



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## Audio Nirvana

I then reinstalled the door panels into the car.

This time when I fired up the system, everything was much clearer, better balanced, and sounded so good.

When I purchased the Alpine Mono Amp for the Sub, I also bought their Rux-2 Knob which lets you adjust the gain on the amp remotely. Many reviewers on Amazon said the amp isn't powerful enough to need this and that without it, it would just run at full power, which was fine. I bought it just in case and am glad I did, because what I found is that the optimal setup is to turn the Bass setting on the PCM all the way up to +9 which then drives the 8" door speakers with decent low-range sound, and then with the Rux knob, I can optimize the fill bass from the Subwoofer to get the sound just right for the source or song I'm listening to. You can definitely hear the difference in bass as you turn the knob from Min to Max and in most cases, I think it will be set at around 2/3rds.

I spent a good bit of time figuring out where to mount the Rux Knob, and after trying a couple different locations, decided on the driver's seat near the seat controls was a nice out-of-the-way location, yet easily accessible with my left hand while driving. Mounted it with the 3M Trim adhesive again.



The other settings I'm using on the PCM are a Treble of -3. With the number of tweeters installed and the clarity from them, a lower treble setting provides for the right sound balance to my ears.

I turned off the Surround Sound feature as the speakers seemed to be much clearer and I could adjust the sound and balance from the whole system much better with it turned off - it was probably optimized for the Bose speakers. I haven't driven the car yet, so AudioPilot is still engaged as I like the volume compensation, but I'll play around with it on and off to see if the sound is better one way or the other.

I'm also Faded a bit to the rear and to the right so that in the Driver's seat, I can hear sound from all the speakers.

With the limited listening time I've had since the install, I think I'm going to be really pleased with the overall result, plus I plan to keep this car forever so the variable cost on the time invested will be reduced over the years 😊

If anyone has questions, feel free to ask. Thanks to all those who blazed this trail before me as I probably would not have undertaken the project without prior success stories from you.



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2009 Cayenne Turbo S (undergoing Misha Widebody conversion & color change)