

Stealth High-End Stereo Installation

In a 1963 Avanti R2

Updating old cars with new technology has been going on since people were driving Model T Fords. When I bought my 1963 Avanti R2, I first addressed the “must do” jobs like replacing the brakes, re-coring the radiator and the like. Then my itching turned immediately to updating the audio: not just a little, but upgrading it to state of the art. I began my quest with one hard and fast rule that made life considerably more difficult. I set out to install an impressive system that would be completely undetectable by observers or occupants, even on close inspection. I am pleased to say that I have accomplished this feat to my satisfaction. Simply put, the audio system in this car sounds *almost* as good as the high-end system in my new Infiniti sedan, but without any butchery of my Avanti’s beautiful 1963 Space-Age era interior.

Follow along with me to see how I did it. You can follow my lead, step by step and do an identical installation, or simply use this as fodder for your own big ideas.



➤ Before...or after? You can't tell, and that's exactly the point. This is an “after” shot. Head unit hidden in the glove box; speakers out of sight under the dash; controls under the lid of the center console; and amplifiers in the trunk.

Step One: Setting Goals. Every successful project starts with a clear set of goals and objectives. Mine were as follows:

- I wanted sound that was well above average in quality, with ample power and versatility to play CDs, attach my iPod, and maybe add satellite radio later.

- I wanted the original Studebaker AM radio to remain in the dash for the sake of original appearance, and for it to light up when the interior gauges glowed red.
- I wanted absolutely nothing to show, so that passengers would have no clue as the modern upgrades.
- I needed to be able to control the sound from the driver's seat without taking my eyes off the road.
- This was not to be a "cost is no object" installation. The result needed to cost under \$1000, in the same neighborhood of the cost of a high end sound system as a factory option in a new luxury car.
- And finally, I wanted to cut as few holes as possible to —preferably no holes at all, if such a thing was possible.

Step Two: Selection of the head unit. Since I wanted to leave the 1963 vintage radio in the dash, I obviously could not install the new radio in that spot. I took careful measurements of the Avanti's glove box, being careful to allow room for the wires that need to exit from behind. I found that the available space was perfect for a standard DIN sized head unit, the most common size on the market. Now, these units are meant to be operated using the buttons on the front of the radio, so I realized I would need one that had a very full featured remote control available for it as an option. (For those who would consider putting this unit in the dash, it will fit, but will require a hole to be cut. Outside of a very few specialty units, there are no longer commonly any "shaft style" car stereos available on the market, those like the original factory radio where there are two knobs mounted on shafts on either side of a dial. Today's units require a full rectangular hole for the radio to slip in.)

Researching further, I learned most head units so equipped come with an accessory infrared remote. That means that the remote must be able to "see" the head unit for it to work, useless if the stereo was in the trunk or behind the glove box door. While RF (Radio Frequency) remotes were available for

Another option: Custom Autosound makes a unit is designed exactly for a project such as this, with a amplifier/tuner that has no face or controls on it at all, and is designed to mount out of sight in the trunk. Called "SecretAudio" it uses a wired remote control attached to the head unit, and conveniently the remote is almost the identical size as the ashtray assembly opening in the Avanti console. The specifications for this stereo are quite robust on paper, allowing many different inputs including Satellite Radio, a CD Changer, and iPod. It also allowed the connection of up to two external amplifiers for better sound. I ultimately decided against this unit, though it probably would have been a very fine choice. My reasoning was that in using a more mainstream head unit, I would be able to find a better selection of features and have better long-term dealer and factory support for any troubleshooting. I have had mostly good experience over the years with Custom Autosound units, however I usually found myself accepting limitations that I would have preferred to avoid. (For example, the specifications of the SecretAudio unit say that the unit will not support charging the battery of iPods made after 2008. That's just an example of the sort of thing I am talking about). I want to emphasize that the Custom AutoSound unit is a valid option, and encourage others to check it out. (www.Customautosound.com)

some units, meaning that they can operate the stereo even if it is out of sight, I found that these controls offered only a few functions. So unless I was happy only using the remote to change CD tracks and raise and lower the volume, I would need to have physical access to the head unit while driving to do most anything else.

With some additional searching, I discovered that stereos made for use on boats—marine units—came with the option of attaching a full-featured, wired remote control unit. Typically on boats the radio is mounted under cover or below deck to keep it out of the elements, and having a full-featured remote is a common optional accessory. I reasoned that this might be a good choice for the Avanti, with the head unit in the glove box and the remote possibly stored in the console. I chose the Sony CDX-M60UI, because it fit in the Avanti's glove box, had a full-featured wired remote available as an option, offered a CD player, iPod attachability, and allowed remote amplifiers and a subwoofer to be connected for better sound.

I purchased all of my gear from Crutchfield, (www.crutchfield.com) based on my long standing satisfaction with their expertise, professionalism and customer service. Their technical support is unmatched, and they are there on the phones working until midnight EST-- matching the odd hours I spend in the garage working on the car. Finally, they are an authorized dealer for all the products they sell, and I admit to having been burned once in the past with gray-market audio gear purchased over the Internet that when it turned out to be defective, was without warranty and in the end a waste of time and money. To me, the extra few dollars I spend with Crutchfield is easily justified by the phone time I have spent asking questions of their professional installers during this project.

Step Three: Speaker Choice and Placement. For those so inclined, there is plenty of room to cut giant holes in the rear deck panel for 6x9 speakers. The doors can be carved to accept 5" speakers in their front bottom edges, or even larger openings can be hacked in the rear of the front doors instead. But since I wanted no additional holes and nothing visible that varied from stock, I dismissed these options. Avanti doors are too precious to hack holes in, as well as risking introducing problems with rattles, structural integrity and interference with the window lowering mechanism. But still I wanted full and strong bass, as well as brilliant highs with a sense of spaciousness in the stereo image. Difficult, but not impossible, I found.

My installation employs a total of seven speakers placed throughout the car. I have used the stock factory openings in the dash and rear deck for dual voice coil "center" speakers, and separate component speakers (woofers and tweeters) as my main front speakers. Pioneer 6" woofers are mounted inside the console, back to back and facing out, and accompanying tweeters are mounted beneath the dash at both ends. Finally, a subwoofer is hidden in the trunk to add the needed bass to fill out the sound. I use two external amplifiers to drive all of these speakers, both mounted to a carpeted panel behind attached with screws and Velcro to the rear panel in the trunk.

If you think that subwoofers and external amplifiers are only for teenagers with those slammed low-rider Toyotas you can hear throbbing before you can see them, occupants and bystanders immersed and assaulted by their thumping bass—you may be surprised that all the high-end sound systems in luxury

cars employ both amps and subwoofers in their design, just all carefully hidden. When not abused, these add-ons create reach full and vivid sound that makes all kinds of music sound better at all levels, not just with Hip Hop music played blasting loud.

The photos that follow show the installation process step by step. Granted, this is not an easy job for a beginner, but there is really nothing exotic here that can't be done in a garage workshop with some basic power tools, patience and ingenuity.

Step Four: Installation

We'll start with the woofers mounted inside the console. My Avanti does not have air conditioning; therefore the console header is surprisingly empty as you can see when the side panels are removed. I elected to build a sealed enclosure for the twin Pioneer 6" speakers and then mount the completed box enclosure inside the console, securely screwing it to the transmission hump

For a project like this, it is always best to mock up everything in cardboard first. Tape it all together and slide it into place. If it doesn't fit, it is far easier to trim it down and try again with cardboard than wood. Despite measuring carefully my first attempt in cardboard ended with a box that was a bit too big, and would not fit.

The sealed speaker box isolates the woofers from each other. Yes, they could be mounted without the box, screwed directly to the plywood trim

panels, but when placed so closely back-to-back like this, the sonic effects would be undesirable, probably cancelling out the bass and causing untold buzzing and rattling of anything and everything loose inside the dash.



These photos show the basic construction of the speaker box using 3/8 plywood. Notice that the speakers are separated from each other by a solid wooden baffle inside the case. The box is



bolted to the transmission hump with two sturdy L-brackets. It fit tightly enough that I did not need additional points of connection, but I tested carefully by applying very loud music and listening for undesirable vibrations before I buttoned everything up.

I then made baffles from 1/8" plywood on either side of the console to allow the sound to escape, and mounted these in place of the factory console side trim panels. I could have cut holes in the original panels and if I was working on a Mustang I would probably have done so, as replacement panels are easily procured. But this is an Avanti after all, and the parts are original. I have stored the factory parts safely away in my box of extras in the attic. A future owner will thank me, I hope.



I made patterns by tracing the original parts, rendered them first in cardboard and trimmed them to fit before transferring the tracings to wood. 6" round openings are covered with thin black cloth, then the rest of the panel is covered with black carpeting. I purchased a 3' x 4' black nylon loop carpet with bound edges at Home Depot for all of \$29.00. I'll use this to carpet the trunk as well. While I could have had all the edges bound by an upholstery shop, I decided that for now I could do without.



Tweeters are highly directional, and in this installation they are especially important because they are the only speakers mounted on the left and right sides of the car. So besides reproducing the highs they also give depth and a sense of separation to the stereo sound. I first experimented with them above the dash, and no matter how I pointed them, they were too "hot" sounding. I found that the best solution was to mount them lower, below the dash pointed about 45 degrees towards center. Here, they added highs and depth to the sound but did not assault my hearing. As an added benefit they are completely hidden from view. While I painted the surrounds dash-color, painting them black would make them disappear from view entirely.



The head unit fits tightly inside the glove box, sitting on a four inch square 1/2" piece of wood; everything is secured in place with Velcro. (Below) Using a 1" hole saw I bored a hole in the back left corner of the glove box for all the wires to pass through. I suggest removing the felt liner before cutting the hole and gluing the liner back afterwards. In use,

the head unit generates heat, but so far there is no sign of overheating. If heat turns out to be a problem I can install a small accessory 12V fan made especially for cooling electronics.

Concerning wiring, any time external amplifiers are used it is wise to run a dedicated, fused power line directly from the battery instead of branching off of an existing circuit. Purchase a car stereo wiring kit from your audio dealer. Route the heavy gauge power wire directly to the amp(s) being careful of sharp edges along the way that could cut through the insulation.

For a neater installation, I also drilled a hole in the driver's side seat platform to allow the heavy gauge power cable to pass straight through instead of going over the hump. Keep all wires that carry power separated from those that carry audio signals to prevent the chance of interference with the audio. The 12V power leads (amp, power antenna, trigger wire for remote amps) run along the driver's side of the console.

The audio cables are all kept together, bundled and isolated on the opposite side of the console. Black tape neatly wraps everything; wire ties connect the new wires to old ones. I chose not to drill holes in the console to route the audio wires headed for the trunk, doing my best to hide them along the bottom edge of the console and tucking them under the carpet. They can be seen on close inspection, but to me this is less objectionable than boring big holes to route them.



My installation uses two external amplifiers. One is a mono amplifier specifically dedicated to the subwoofer. The other two channel stereo amp powers the front component speakers (separate woofers and tweeters). The amplifier

built inside the dash head unit powers only the center front and center rear speakers in my installation. Use a heavy gauge cable to connect the amplifier to ground at the bolt on the top of the left rear frame rail. Remember that electricity forms a loop, and it makes little sense to carry the current to the amp with a heavy duty cable and then use a thin gauge wire to ground the amp to the chassis.

The stock dash speaker is replaced with a Retrosound 4 x 10 speaker with dual voice coils, allowing both left and right channels to be attached to the same speaker. I have found that adding a center front speaker helps center the soundstage and adds clarity to vocals. Don't expect the dash speaker to do too much of the work. The bass comes from the dedicated woofers and subwoofer, the brilliant highs from the under dash tweeters. Installing this speaker requires the agility and flexibility of a contortionist. It was clearly originally installed at the factory before the dash was bolted into the car.

(Right) A similar dual voice coil 5x7 speaker is used in the factory location on the rear deck. It provides audio fill and balance to the system for front seat occupants and is helpful for rear seat passengers to enhance the clarity in vocals.



In steel bodied cars, external amplifiers are mounted on wood to prevent an undesirable condition known as "ground loop", and then the wood is screwed to the steel car body. While this is not truly necessary on a fiberglass car like the Avanti, I cut a 1/4" plywood panel exactly the size of the panel behind the gas tank, and screwed the amps and power connectors to this panel, after gluing more of our carpeting to the panel. I then

attached the panel to the trunk back with screws along the very top edge (where there is a steel bracket that runs the width of the back seat). Then I used Velcro to attach the rest of the contact area to the fiberglass trunk panel. First, it was far easier to attach and wire the amps on the workbench instead of doing it while stuffed into the trunk like Patricia Hearst. Secondly, the fewer holes I drill in my Avanti the happier I am. And finally, I just don't like the idea of all those sharp screw points poking fractions of an inch from the gas tank, in the horrible event of an accident.

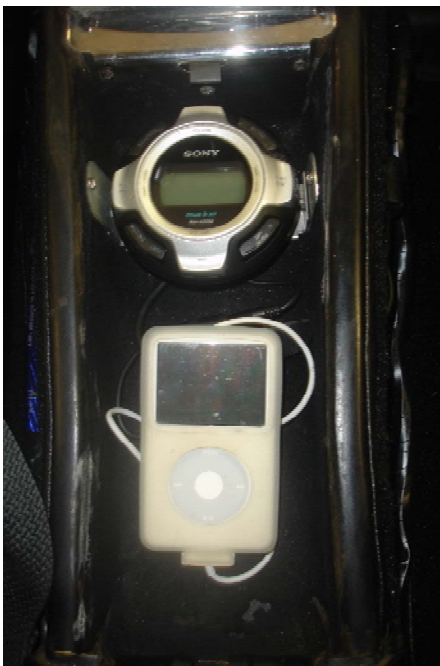
Speaker wiring tip: The front center dash speaker does a really good job of filling in the vocals and centering the sound stage. However, I found it to be a bit too harsh and loud compared to the better quality main component speakers under the dash. I solved the problem by attaching the center front speaker to the head unit's REAR speaker outputs. Now, when I adjust the fade between the front and back settings, I am actually adjusting the blend between the front floor and front dash speakers. This way I am able to dial in just enough dash speaker to make it seem invisible. Finally, the center deck back speaker simply connects to the head unit's FRONT speaker outputs. The back speaker is really only to fill in the sound anyway, it does not do much of the system's work.



I used a Bazooka Bass Tube Subwoofer in the trunk because it takes less room than a standard box. However, the spare tire well of the Avanti offers a potential ideal mounting place for a custom subwoofer enclosure that those teenagers in the slammed Toyota would die for. A junkyard space saver spare from a Chrysler or Ford can easily be used in the trunk instead, or the spare can be omitted entirely. (How many

times have you ever had to use a spare on your classic car?) The bass comes nicely into the car's interior with the small Avanti mystery trap door shut, but sounds even better with it open. Perhaps that's the real reason they put it there in the first place?

The Subwoofer's amplifier provides a separate remote rotary level control to allow adjustments to the bass level from the cabin, without having to wade through various menus on the head unit to change the loudness of the subwoofer. (Sigh- who decided that old fashioned buttons and knobs were obsolete anyway?). Stealthily, I mounted this control far enough under the dash where it can be easily reached without looking, but can't be seen from the passengers' seats. (See above, just to the left of the parking brake shaft)



Finally, the *Sony Marine Remote Commander* mounts out of sight inside the console, with slight modifications to its factory bracket. I drilled a 1/2" hole between the passenger seat and the center console's storage box to allow the remote control's wires to enter the console invisibly. I elected to remove the console pushbutton lock because it interfered with closing the lid with the Remote in place. Moving the remote backwards one inch would have allowed me to leave the lock in place, but I found it harder to reach that way. I cut a small banking plate out of sheet metal to cover the hole from the missing lock button. If I wanted to be truly obsessed I could be even trickier by finding a junkyard glove box button and fitting it in the empty hole.

Conclusion

The system sounds quite good, with ample power handling and excellent dynamic range. Admittedly, housing the component woofers in the center console in the foot well is a compromise, as it muffles the low-midrange sound somewhat and narrows the width of the sound stage. This is a reasonable compromise, I suppose, when I consider the alternative would have been to take a jigsaw to those rare doors.

I know I am being critical, but the sound is admittedly not as perfectly flat and transparent as the high-end Bose sound system in my Infiniti G35, which seems to sound great with every recording from any source with almost no adjustment. The Avanti's highly custom installation requires some fiddling with the myriad of tone controls for some types of source material to get it to sound its best. And of course, the interior of the Avanti is noisier and less isolated from road and engine noise. Applying Dynamat or another acoustic material to the floor and firewall can help greatly, but I figure that without air conditioning I will be driving with the windows open much of the time anyway, so this step can wait.

I like the way the hidden antenna raises when AM or FM is selected, and then automatically retracts to become invisible when listening to CD or iPod.

The Remote Commander gets a "B Minus" from me, as some important functions are still only available by using the buttons on the head unit, notably the afore mentioned tone controls. And while full track, album names and other program information scrolls across the small screen on the head unit, the Remote unit dumbly provides a static display of the first six letters of the title. Its round shape and large buttons may be ideal for use on a boat in the rolling sea; I can't help wishing it was smaller so it could be mounted in the ashtray opening rather than inside the console.

Mission accomplished. I needed to drill only three relatively small holes, all in hidden places, and should anyone ever want to return the car to its original configuration it would be easy to do so by removing everything I have installed in just a couple of hours.



I sometimes find myself reaching for the volume knob on the antique chrome Studebaker radio in the dash while I am driving, and perhaps if I was more clever I could figure out how to make that old and obsolete rotary switch control the volume of my new stereo too; something to think about for another project and another day.