

INSTALLATION INSTRUCTIONS BY MODEL:

The Small SubSolution (TSSS), The Sports Car SubSolution (TSCS), The Low Bass Solution (TLBS), The Competition SubSolution (TCSS), The B.I.G. SubSolution (TBIG): These units can simply sit in the back of your van, hatchback, or sport utility vehicle. However, be sure it's low behind a seat or secured with cargo straps to keep it in place in an accident. Don't install inside a closed trunk, as most of the bass will be wasted. The TLBS and TLBT are sonically identical. The TLBS has a molded port, while the TLBT has a round telescoping port. If you have a trunk, use the TLBT.

The Low Bass Trunk Solution (TLBT): The TLBT installs in the trunk, and ports its sound thru the rear deck via a 4" port tube. In most cases, there is an opening in the metal of the rear deck. If not, just tin-snip a rough opening larger than 4", then cut, with a carpet knife, a hole in the cardboard/carpet rear deck, that you've traced around the tube. Then slide the tube down thru the hole, and into the TLBT, and secure the bottom with angle brackets to the floor.

The Pickup Truck Solution (TPTS), The Pickup 2X SubSolution, (TP2X), The Frontier Crew Cab SubSolution (TFPS): In most cases, the pickup SubSolutions will safely sit behind the seat of your truck. The unit can be mounted with flat metal brackets or back straps by first attaching them to the box (using wood screws) and then securing it to the wall behind the seat with sheet metal screws.

The Jeep Wrangler SubSolution (TJWS): This unit takes a little work to install, but it is so worth it. Since it mounts under the floor, it takes some tools and some time, and some silicone, but it's usually only about an hour or two total, and not that scary. Be sure to see the website (www.subsolutions.com) for complete install instructions and photos.

The Porsche SubSolution (TPSS): This unit takes a little work to install, but it is so worth it. Since it mounts under the bonnet, and vents its' energy through the heater duct, it takes some time, and patience, to install. Be sure to see the website (www.subsolutions.com) for more complete install instructions and photos.

The Ram Truck Xtra Cab Solution (RTXC), The Ram Truck Quad Cab SubSolution (RTQC), The Ford Truck SubSolution (FTXC): In most cases, these will simply sit in place. The unit can be mounted with 2, 3, or 4 flat metal brackets or back straps by first attaching them to the box (using wood screws) and then securing it to the floor with sheet metal screws.

The Toyota Tacoma Double Cab Solution (TDCS): This unit does not need to be screwed into place, because it fits so snugly between the front console and the back seat. It also has "feet" that hug the driveline hump on the floor.

LOOK:

Power supplies in amplifiers are either *regulated* or *non-regulated*. Regulated ones always put out a clean sound even when your car battery voltage drops below 12 volts. Non-regulated ones (while they tend to sound better at full voltage) can begin to distort if your battery voltage drops. So, if you're going to listen to your stereo for very long while parked, and you're not sure what type of amp you have, it's best to idle your engine -- or you might find your self having to buy new speakers.

LISTEN:

Distortion Kills. Your Speakers. It's Really Bad Stuff and you don't want it around. But how can you be sure you don't have some when you turn it up? Can you be sure? Sure. Listen. Just listen. It's easy to hear. It's that extra little fuzzy sound over the top of your music. When you hear it, just turn down the volume and/or the bass a little bit. The point at which it stops is the limit of your amplifiers. (NOTE: be sure your sub amp is adjusted correctly and does not distort before the high-frequency amp does, because distortion is easiest to hear in the mids and highs.)

[Enjoy your music, and don't listen too loud for too long.](#)

Warranty: All SubSolutions have a one year warranty against manufacturing defects. Just send in your unit to: Acoustic Solutions 23844 S. Power Rd., Suite 102-205, Queen Creek, AZ 85242. Be sure to include your name, return address, phone, and a copy of your sales receipt. Even if you've misplaced your receipt we can usually tell if the unit is only about a year old, due to model-year design changes, and we will fix or replace it (often with an upgraded model) and ship it back to you immediately. (you pay the freight to us, we pay the return to you.) If it is clearly a model over a year or two old, or if it has clearly been abused (severely burnt voice coil, or a repeated offense of this), then we have an "out of warranty accommodation repair" service that is just \$45 flat rate (on single-driver units), which includes completely upgrading your unit with our newest designed driver, re-sealing, repainting, and return shipping to you. If this is deemed necessary, we will call you to arrange payment.



Owners Manual

Installing, understanding, and enjoying your new SubSolution™

Information for Your Right Brain:

Congratulations! You have just purchased the best subwoofer available for automotive use. It is small enough to fit in your vehicle and not take up too much important cargo space. It sports a sophisticated, stealth appearance -- unlike typical woofer boxes -- so as not to attract the attention of car stereo thieves. It is very efficient, which saves you the expense of larger amplifiers and their subsequent drain on your car's electrical system.

The amazing sound performance from your SubSolution™ is made possible by a major breakthrough in speaker engineering. Our Intraport™ enclosure technology, together with our specially-fabricated small drivers, seem to bend the laws of physics! This new subwoofer system plays smooth, tight, accurate bass that tracks the music perfectly. SubSolutions™ are top performers in all four of the key aspects of subwoofers: **Quality Sound, Small Size, High Efficiency, and Good Looks.**

Information for Your Left Brain:

SubSolutions™ benefit from an enclosure design unlike any other. The proprietary Intraport™ enclosure technology utilizes unique, pressure-equalizing vents between the front and rear volumes, eliminating the sonic anomalies associated with 5th order band-pass boxes. This speaker system, with its innovative 170 mm driver, not only produces a "flat" frequency response, but it exhibits an extremely high in-car efficiency rating of 102 db! Although everyone agrees that smaller drivers sound better because they react to the music faster (better transient response), smaller cones have also meant lower efficiency -- until now. The SubSolution™ design produces the accurate sound of a small woofer and the high output of a large one.

How *low* a woofer can play at full volume before "rolling off", or starting to be *less loud*, is a critical design criteria and is called the "F3" or "3 db down". It is important to understand that although ultra-low frequencies sound (or *feel*) interesting while parked, you cannot hear them while driving and they demand massive amounts of power from your amplifier -- power that could better serve you by providing distortion-free sound at the frequencies you *do* need to hear. A sub that plays linear down to 27 hz isn't all that smart, unless you have 1000 watts and like to listen in your driveway most of the time. In designing subwoofers, the laws of physics require us to sacrifice *efficiency* for *low frequency*. In other words, to make it play lower, it can't play as loud.

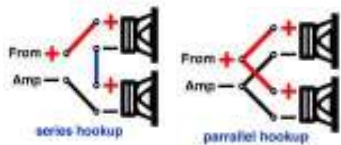
One of the most important things to understand in car audio is the phenomenon of *road noise* and how it can cover up the bass energy that your stereo is trying to play. Human hearing goes down to 20 hertz and that is how low you want your home stereo to play, however, in a car it is much wiser *not* to play frequencies below 40 hertz in order to help the amp and woofer play the frequencies you *do* need (40 and above), much louder and with less distortion.

How to break your speaker:

A "speaker" is made up of two parts; the "driver", and the "enclosure". The enclosure must be just the right type and size to provide the proper air pressure for the driver to push against. ALL drivers have an "excursion limit" which is the farthest they can move in each direction. This is simply the physical limitation of how loud it can go, even if more power is applied.

The SSC™ driver used in all SubSolutions feature a voice coil former which is very strong and lightweight. At the end of the excursion limit, the voice coil former hits the magnet and, announces that it has done so by producing a mechanical sound. It does not break right away, however, eventually will become damaged if it should continue. It is unlikely to continue, though, because the listener will immediately hear this terrible sound and turn down the volume a bit to a level below the excursion limit. In other words, the listeners' ears act as a built-in safety alarm, which protects speakers from damage.

Even if someone were **trying** to break a speaker like this one, he (or she) would have to listen to an awful lot of terrible, rattling noise for quite awhile before it would break. This is one of several good reasons *not* to put a sub box inside of a trunk, closed off from the area you are listening in. The sub can reach its excursion limit (or the amp can reach its distortion limit) and break the woofer without you hearing the warning signs.



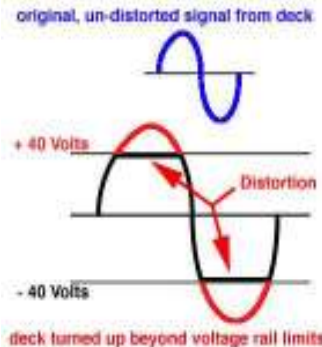
Wiring

In wiring up your SubSolution™ subwoofer(s), you will need to follow your amplifier's wiring instructions. The reason for this is that different amps have different minimum impedance requirements. The most common of these is "2 ohm per channel, minimum impedance". If your amp is this type, then it can be "bridged mono" into 4 ohms; 4 ohms

mono represents the same load to the amp as 2 ohms per channel. This mode (2 ohms/ch. or 4 ohms mono) is the *minimum*, not the required impedance. Most amps will also work very well (in some cases, better) in "4 ohm mode", which is 4 ohms per channel or 8 ohms mono. So, if you have *two* 4 ohm woofers and you want to wire them both up to one of these amps, configure them in series (see diagram). This is because two 4 ohm drivers in series become an 8 ohm load. In parallel, they would create a single 2 ohm load and, since your amp needs 4 ohm mono *minimum*, it would "thermal" after a short time and the protection circuit would kick in -- (or it would break).

Power Handling

SubSolutions subwoofers are very efficient. They will play very well, and sound very good, with as little as 100 watts applied to them. This is unlike most conventional subwoofer drivers sold today. Most are built for maximum power handling (3-400 watts or more) with massive voice coil and other components. This means that all of these drivers are quite in-efficient as a result. They actually play about 10 db quieter than a SubSolution, at a given wattage. So, be sure to use a large amp on those subs. Single-driver SubSolutions can use a smaller, less expensive, easier to install, 50-60 watt/ch. Amp, bridged mono. They will *handle* more power, but it won't be turned into sound, it will just be dissipated as heat. Actually, most subs will handle more power than you think. What they can't handle is distortion. Distortion is what an amplifier puts out when it isn't big enough to play as loud as you would like it to. All amplifiers distort when you turn them up past their maximum output level. It's that extra, "fuzzy" sound over the top of the music. The graph at the right shows how your amp tries to amplify the small signal from your deck without altering its smooth shape. Your amp has a "voltage rail" limit of how big it can do that before it chops off the top and bottom of the sine wave, causing distortion -- which will damage your speakers. **To summarize:** if you've blown a speaker from distortion, (which isn't covered under warranty) and had to get another one you might need a cleaner or more powerful amp. Almost every time a speaker "blows", it is due to distortion. It is very rare indeed that a manufacturing defect in a speaker doesn't show up within the first few hours or minutes of play. For best performance, try to use an amp that will put 200 watts on each SubSolution™ driver. For example, a 50 watt/ch. amp will usually deliver 200 watts mono into 4 ohms. These would be ideal for a single driver SubSolution™. The dual driver models have two drivers and would sound better on an amplifier twice as big, etc.



Bi-amping

It's very important to understand the need to "bi-amp" your vehicles' sound system. That is, to make sure you have a power amp for your door speakers as well as one for your subwoofer. If you don't, and you use the little, "BTL, IC chip" amp that is in your radio ("deck", or "head unit"), you will be missing out on an awful lot of sound quality. ALL IC chip amps put out 12 watts, at 1% distortion, rotten signal to noise ratio, crummy stereo separation, and absolutely no headroom. ALL of them. (despite what they say). When you use a discreet amp, your door speakers will receive a wonderfully clean, powerful signal, with high power, low distortion, great signal-to-noise ratio (no background hiss), and, because it will be bi-amped, all the deep bass is filtered out. Your door speakers will play a whole new tune. Your ears will hear an incredible difference. Your brain will think it's the best idea it ever had.

Crossover Settings

In vehicles, we only need subwoofers to play from 40hz to 90 hertz, but we need them to be very loud in order to hear the rhythm part of the music over the vehicle's road rumble. A separate amp for just the subwoofer is a must for a high performance audio system. It also must have an electronic crossover, either built-in or external, to block both the higher frequencies from going to the woofer (low pass) and the lower frequencies from going to the mids and highs (high pass). Set the "low pass" at about 90 hz -- or slightly lower (80 or 70 hz) if you have a larger amp. The setting for the "high pass" output to the amp that runs the mids and highs should be as low as your door speakers can handle without breaking up at

high volumes. Many two-way crossovers have only one adjustment to determine a "center frequency" point; the sub amp must play from that point and below, and the high-pass from that frequency and above. If so, set it at 90 hz.

Care & Maintenance

Unlike most other subwoofer boxes that are covered with carpet, the durable finish on your SubSolutions™ can be easily cleaned with soap and water, if, for example, a drink should spill on it.

"Sedans", or "Cars with trunks" —

Bass is the resonating of air. In order to hear (or feel) bass, you need to resonate the air near you. If you put a subwoofer inside a closed trunk only a small portion of the bass can be heard or felt in the cab of the vehicle. However, in sedans, there is no other place for a sub, and so one theory (not a very good one), is to put in a huge sub and huge amp and hope it can be heard up front. This idea of wasting ¾ of the bass is not only very expensive, it leads to many blown subs since you can't hear the amplifier's distortion limit or the driver's excursion limit. Some cars have seats that fold down but the opening is smaller than the trunk causing a destructive "loading" effect. In addition, there is the inevitability that you will close the seats up one day, causing the problems previously mentioned.

A simple and very effective solution for sedans is to use a "band-pass" type of subwoofer enclosure since all of the energy is focused into a small tube that can be "ported" into the cab through the rear deck of the car. This way the box can still be in the trunk, but the bass can be in the cab. Two SubSolution™ models are made specifically for installation in these vehicles. The Thru Deck Port Kit adapts The Sports Car SubSolution™ with the use of a 3" port tube. And for audiophiles, The Low Bass Trunk Solution™ provides twice as much bass energy through its 4" port (the four and eight driver models can be modified for trunks as well). It's simply a matter of feeding the energy into the passenger area—where you want the sound!