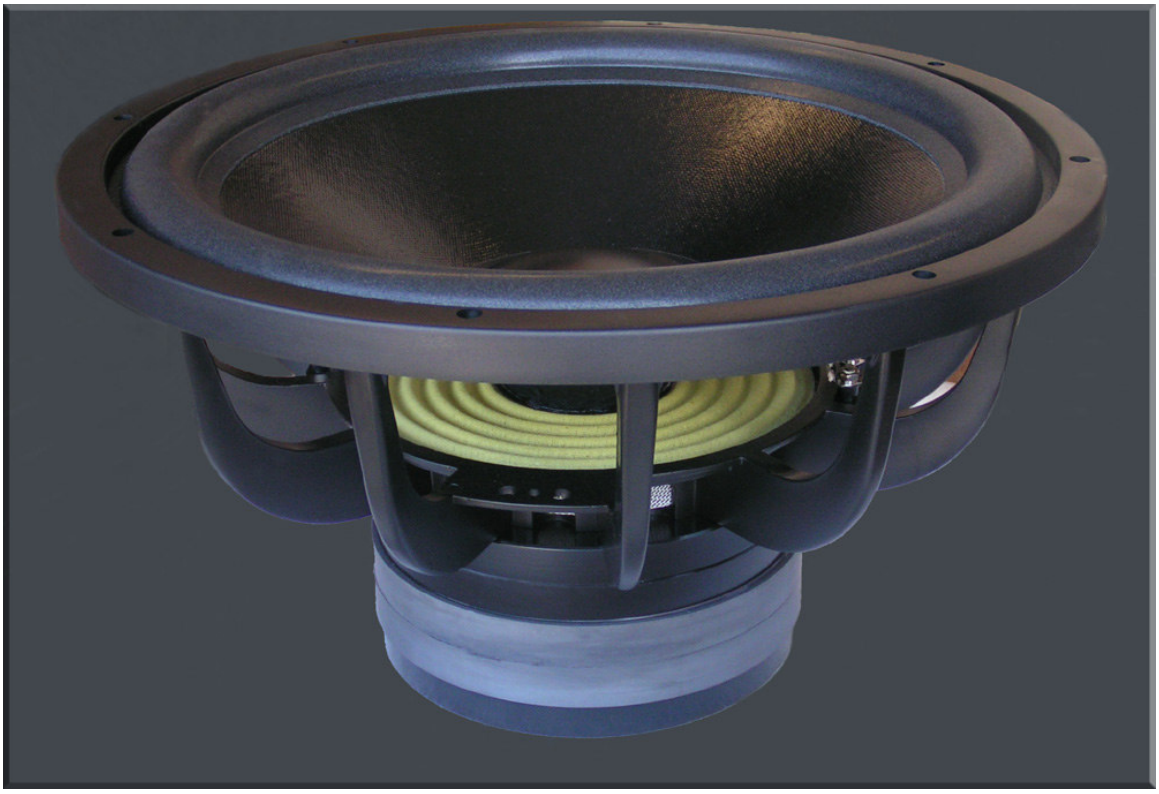
Shiva-X



Introduction

Congratulations! You have made a wise purchase. The Shiva-X is a proven design that provides massive output and incredibly low distortion.

Great. What kind of sub should I build?

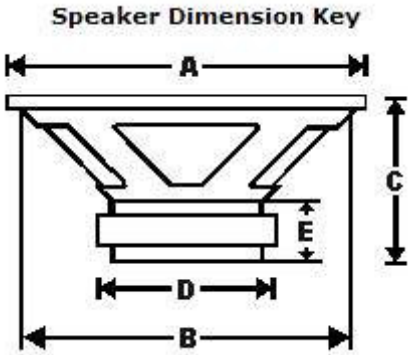
Very good question and there is not one correct answer. It depends on your goals. If you want to build a killer subwoofer for your home theater one of the ported designs makes a lot of sense. The port gives you some free output and the ability to extend the bandwidth. For music only systems most people will be happier with one of the sealed box designs. The sealed designs also give the builder a lot more flexibility in making construction mistakes. If you're a first time DIYer, that may be important. Another bonus to the sealed designs is that they are smaller. Skip directly to our box design section if you want to dig right into box designs.

Performance

Operational Specifications: With Voice coils in parallel. Measured with Praxis @ sea level, @ 55 deg F., drive voltage >1.5V. The driver is broken-in with 12 Hours of operation with a 20Hz sine wave near full excursion. A 12AWG jumper cable is used to connect the voice coils.

Re: DC resistance of VC	3.60 Ohms
Le: Inductance of VC	0.90mH
Fs: Resonance frequency	19.6 Hz
Qms: Mechanical compliance loss	2.60
Qes: Electrical motor loss.	.46
Qts: Total Q of driver	.39
Mms: Moving mass	140g
Cms: Suspension Compliance	0.47 mm/N
Vas: Stiffness of driver scaled by cone size	169L
Sd: Area of the cone	506 cm^2
Vd: Total Diaphragm Displacement volume	2.65L
BL: Motor Strength	11.66
X-Max: One-way linear excursion	27mm
Pmax: Maximum power (music, not RMS)	600W
SPL:	86.3 dB 1W/1M 89.1 dB @ 2.83 Vrms
Volume Occupied by Driver	.15 cubic feet or 4.25L

PHYSICAL SPECIFICATIONS



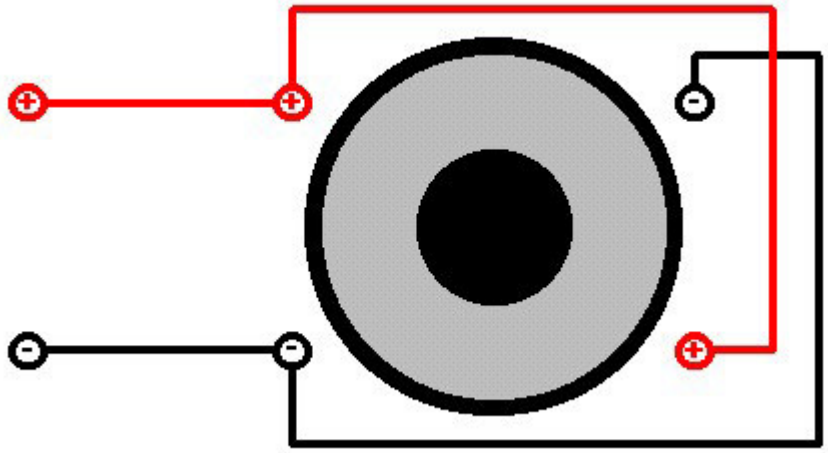
Exodus Audio Shiva-X	
A: Overall Diameter	12 1/2" inches
B: Cutout Hole	11 1/8" inches
C: Mounting Depth	7 ¼" inches
D: Motor Width	7 3/16" inches
E: Motor Depth	3 1/2" inches
Weight	31lbs raw 34lb shipping

Connection Diagrams:

DUAL VOICE COIL WIRING

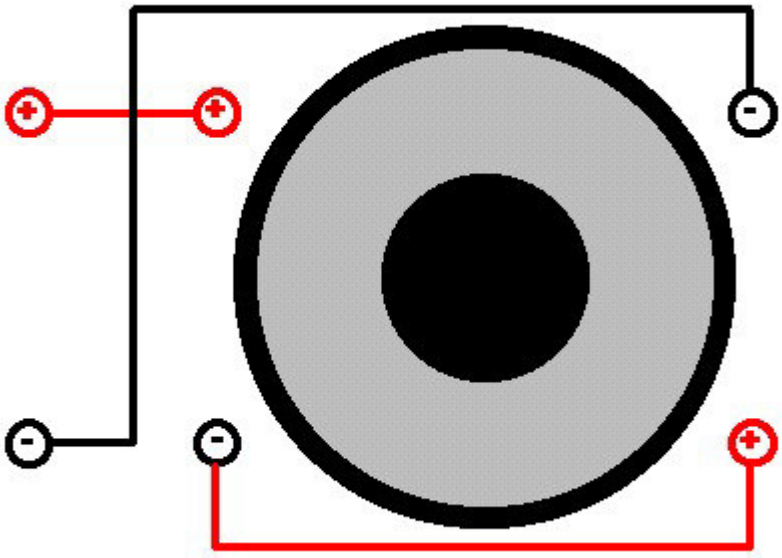
Wiring dual voice coil (DVC) drivers can often be confusing. With a single driver, you're dealing with 3 sets of connections. Two drivers, we're looking at 5 sets of connections!

There are two basic means of connecting a DVC driver: parallel and series. When parallel connecting a driver, this means connecting both voice coils to the amp in the same way. All plus terminals connect, all minus terminals connect:



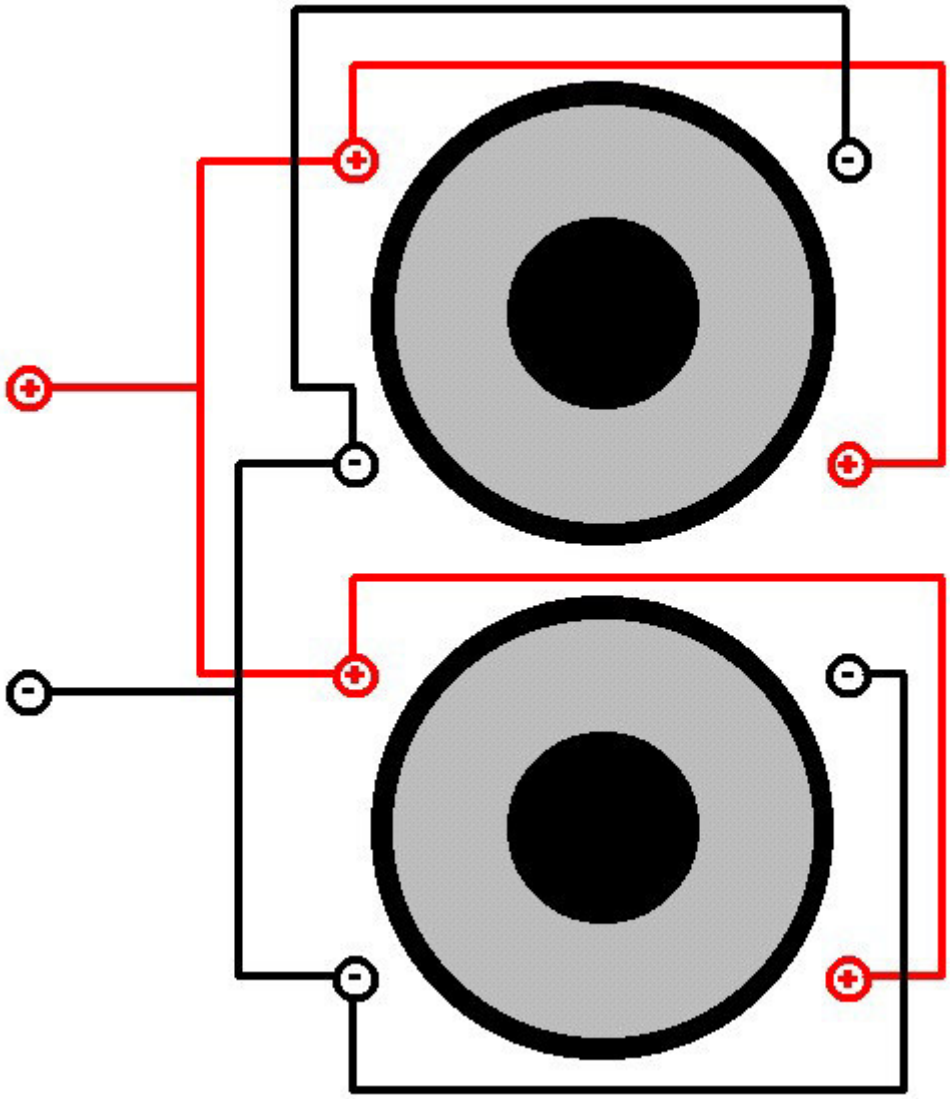
This method of wiring is the most common for DVC wiring. For our dual 8-ohm voice coil drivers, it results in a nominal 4-ohm load (parallel connecting voice coils of the same impedance results in half the impedance of either voice coil). This maximizes the output of our home plate amps, and also produces and impedance compatible with most car stereo equipment.

The other method of connecting DVC drivers is to wire the voice coils in series. This means connecting from the amp to the input of one voice coil, from the output of that voice coil to the input of the other voice coil, then from the output of the second voice coil back to the amp:



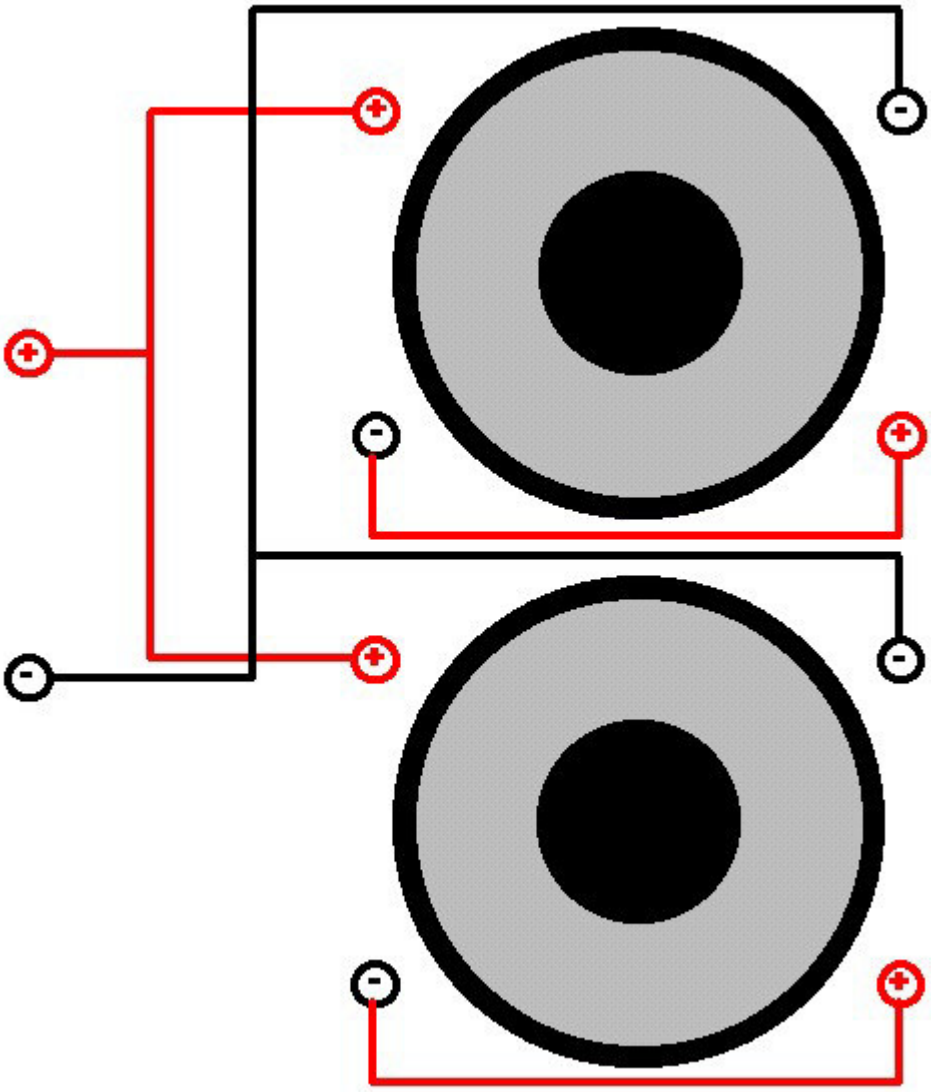
This method of wiring is not as widely used as the parallel case. For our dual 8-ohm voice coil drivers, it results in a nominal 16-ohm load (series connecting voice coils results in the sum of the impedances of all voice coils). This means of wiring is often used when wiring DVC drivers for use in large arrays, or in prosound applications (where 16 ohm loads are widely used).

Combinations of drivers make things a bit more difficult. Wiring two drivers in parallel with voice coils in parallel is often used in car audio. With nominal 8-ohm voice coil drivers, you would end up with 2 ohms, which can maximize power output of many car audio amps:



Note that all the positive terminals are connected together, and all the negative terminals are connected together. The total load, assuming dual 8-ohm voice coil drivers, is 2 ohms.

For home audio arrays, it is often desirable to keep the impedance between 4 and 8 ohms. For DVC drivers with 8-ohm voice coils, it is typical to wire each driver in series, and parallel the drivers:



This results in a final 8-ohm load, assuming each driver has dual 8-ohm voice coils. While this may not "maximize" power output of an amp optimized for a 4-ohm load, it will result in more linear output for the same power input as a single driver.

For additional driver connections, use combinations of the above wiring diagrams. For 4 DVC drivers (each with dual 8 ohm voice coils), wire all drivers in parallel together to create a nominal 1-ohm load. Using the same drivers, wiring each driver's voice coils in series and paralleling each driver will result in an effective 4-ohm load.

Is there anything I need to know before turning it on for the first time?

Once your sub is built put on some music or a movie and enjoy the fruits of your labor. Break-in will occur naturally as the driver suspension loosens up. It's nothing that need concern you though. Enjoy!

Care

The Exodus Subs are built to the highest standards, and are designed to require a minimum of care. Basically… use your head. If you decide to clean the cone, use non-solvent based cleaners. Water based products are the safest.

Legal Stuff

Life Support/Mission Critical Applications:

Exodus Audio products are not fault-tolerant and are not designed, manufactured, or intended for use or resale in hazardous environments requiring fail-safe performance, such as in the normal operation of nuclear facilities, aircraft navigation, communication systems, direct life support machines, heart defibrillators, or weapon systems in which the failure of our product could lead directly to death, personal injury or severe physical or environmental damage.

Certifications:

This product is designed to the highest standards and in accordance with all Exodus Audio internal processes. However this product does not carry any certification relating to safety, standards compliance, or applicability for use in given situations. No certification is expressed or implied. Use of this product is entirely at the user's risk and responsibility.

Responsibility of Use:

DIYCable in no way is responsible for the use of this product. The product is capable of causing medical damage and loss of hearing under extreme use. The customer is solely responsible for proper use and common sense application of the product. Hearing damage is a real threat to exposure to high SPL sound levels. Act accordingly.

Subwoofer Power Ratings:

Power ratings on transducers are just guidelines for use. They are not guarantees of the fitness of a transducer to withstand a given power input. Why? Well, the actual power that can be safely handled by a subwoofer depends upon several variables, including the enclosure design, test signal or program material, amplifier details and ambient tempeture.

Subwoofers by nature are inefficient devices. Most subwoofers are around 1-3% efficient, meaning that for every 100W of power delivered to the transducer, only 1-3W is actually converted into acoustical output. What happens to the other 97-99%? It is given off as heat and dissipated to the environment, primarily (> 95% of it) through convective heat loss as air passes over the voice coil & former.

Obviously, the movement of the coil & former is critical to the device being able to dissipate heat. Consequently, if you run a 1K test tone into the driver at high power under continuous conditions in a small sealed & stuffed box, it is easy to thermally damage a driver. If you use a 20Hz test-tone in free-air, the same driver may be able to withstand the same power indefinitely. For these reasons power ratings are just guidelines. Ultimately the user must understand the conditions under which the driver is going to be used and plan for an appropriate amount of power for the application. This is the same design paradigm that manufactures use. Note: Highly equalized systems quickly reach thermal limits. Careful design is required under heavy equalization especially with test-tones. Music or movies are typically $1/8^{th}$ power. Test tones present a MUCH higher thermal load on transducers. Be careful testing drivers with test tones in high SPL conditions.

It is often best to be conservative with amplifier power. If you under-power the system you will clip the amplifier at the limits of output. That will MOST LIKELY not damage the transducer. Overpowering the transducer can quickly damage the device before the user has a chance to adjust the system levels. Also, amplifiers are capable of power output that exceeds their specifications under short duration transients. These short transients can be enough to damage the system if you are running it under full power conditions. The user is ultimately responsible for operating the transducer within it's limitations.

So what is a consumer to do? We recommend building a subwoofer like you would a bridge. No responsible engineer would build a bridge to operate at its limit. You don't design a bridge to support EXACTLY the weight that it will carry under use. You design a bridge so that it can EXCEED not only the worst-case load, but typically you would design it to have capacity beyond it's maximum expected load. While a subwoofer isn't a bridge and it's failure wouldn't be as catastrophic, it is a very good idea to build the system such that it has MUCH higher capacity than your highest output need. Only through good design and common-sense use will you prevent damaging the system. Since output levels required depend upon the room, program material, user preference etc… It is beyond the scope of this document to determine output needs.

Limited Warranty:

Exodus Audio warrants its products to be free of defects in material and workmanship for a period of 1 year from date of purchase. Exodus Audio and/or its designated representatives shall have all final determination about the validity of a warranty claim.

This warranty shall not apply to any product that has been subject to misuse, neglect, accident or abnormal conditions of operation. Improper installation is not covered under warranty.

This warranty is limited to Exodus Audio equipment only. It does not extend to any other equipment or product connected to or operated in conjunction with this product. We are not responsible for any damage to other equipment or product arising from the use of this product.

Exodus Audio's obligation under this warranty is limited to repairing or replacing or refunding the original purchase price (exclusive of shipping charges), at Exodus Audio's option, any product returned within 1 year of purchase date, provided that Exodus Audio determines the unit is defective and has been used in compliance with the terms of this warranty.

Subwoofer Returns – While we do not guarantee the suitability of a specific speaker to a specific application we provide a period of 30 days from the date of invoice in which the customer may return the product.

All refunds require at least 14 working days for processing. This does not include holidays or weekends. Do not contact customer service unless your return has taken longer than 21 working days from the date of it's arrival at DIYCable. The following conditions apply to full refunds:

- The speaker must be in the new condition. This **includes no mounting marks or scratches, no solder on the connectors, no sealing caulk, dirt, sawdust, or other debris.** Speakers showing mounting marks or other indications of use will be evaluated and a restocking fee, **starting at 25%,** deducted from the refund amount. In extreme cases, no refund or credit may be offered. Our intention is not to offend or punish people returning product. The bottom line is that if we cannot resell the product as new, we cannot offer you a full refund. If we have to sell the product as b-stock or determine that it doesn't meet our standards for resale even as a b-stock product, the customer will not receive a refund.

- Product must be returned in all original cartons, outer shipping cartons, and boxes. This packaging includes all internal plastic bags or printed manuals. The product must be in NEW condition returned in ORIGINAL packaging.

- Package the product to protect it from damage in route to DIYCable. Insure the package for the value of the product. In the event the returned package is damaged

in route to DIYCable due to insufficient packaging, the customer is responsible to file the claim with the shipper.

Damaged Product

Speaker Defects occur even in the most expensive of speakers from the most respected companies. Contact DIYCable immediately if you suspect you have received a defective product. Products that have obvious defects will be replaced at our cost or we will arrange for a credit based upon the customer's preference.

There are times when a customer may suspect a defect that is not obvious. Unless there is an obvious defect (broken part, missing components etc.) we reserve the right to inspect and test the transducer to confirm that it is in fact defective. Often, a mounting problem, or a system problem can appear like a defective transducer (clipping, popping or rubbing caused by obstruction hitting the cone or suspension components). If there is some doubt concerning the integrity of the product, we encourage the consumer to work with our technical support to troubleshoot the problem, avoiding costly shipping and replacement of parts that may not be defective**.** ***Customers are ultimately responsible*** for troubleshooting the problem. Our technical support will do the best they can to help but we are at a decided disadvantage by being at a remote location. Email and phone calls are not as effective as having the product in your hands to test. In the end, the customer is ***SOLELY*** responsible for system problems related to the use of the transducer or any damage caused to the system.

Parts returned will be tested for rub/buzz and T/S parameters to verify the integrity of the transducer. If the transducer is determined to be non-defective, the product will be treated as a returned new part with the same conditions outlined above in the Subwoofer Returns section, including restocking fees for cosmetic damage, non-payment of shipping charges and requirements for all original packaging.

All returned products require at least 14 working days for processing!

DAMAGED MERCHANDISE RETURNS

Contact DIYCable within 5 days of receipt. Carriers will not permit claims after 5 days. We will file a Damage Inspection Claim which results in a carrier follow-up to inspect your package. Retain all boxes, labels, and packing materials until the claim ha s been approved. We will proceed with a replacement shipment once the carrier notifies us of claim approval. Note: Truck freight shipment damage must be reported directly to freight carrier.

All Returns should be shipped pre-paid to:

DIYCable
175 South Bay View Ave. Unit 23

Port Angeles, WA 98362
360-452-9373