



EX-PR15



Introduction

The EX-PR15 is a high performance passive radiator designed for use with the Exodus Audio Subwoofers. The PR series passive radiators offer lots of clean stroke, and a very flexible system for adding mass. The PR mass-kit consists of multiple 96g steel discs that can easily be added or removed from the passive radiator to optimize cabinet tuning frequencies.

Passive Radiator systems add output to a system, much like a ported box design. The passive radiators resonate at a frequency determined by the size of the enclosure, the area of the cone and the moving mass of the passive. As a result, a carefully designed system can extend the bandwidth of a subwoofer, without the negative aspects of a port.

In what ways are passive radiators superior to ports? For one, they don't require the enclosure volume of a port. Ports occupy volume inside the enclosure and large ones occupy a LOT of space. Ports for high output subwoofers also need to be LARGE in diameter. Large ports also have to be LONG in order to tune the subwoofer to a useful frequency. The more capable the active driver, the larger the port needs to be. As a result, the Exodus subwoofers require MASSIVE ports to achieve noise-free operation. We find passive radiators to get around these problems. They require minimal enclosure volume, they don't make noise out of bandwidth (port chuffing and resonant frequencies based upon port length) and they are easier to tune deep, without the tradeoffs a designer is forced to accept with large ports.

Do Passive Radiators have any negative attributes? Sure, there is no free lunch. For one, passive radiators are typically more expensive than a port (although high quality flared ports are not cheap either). Passive Radiators tend to have more losses than a well-designed port. The losses are fairly minimal though and the difference is usually not significant in the final design. Passive Radiators require different enclosure building requirements. They physically take up more space on the outside surface of the enclosure.

Much like a port, passive radiators come at a cost. Under the tuning frequency of the passive the active driver unloads, requiring careful attention be paid to electronic protection of the main driver. This is easily accomplished with the proper choice of amplifier and signal processing. We strongly recommend that you follow our application notes carefully when building a resonant system.

Parameters

Fp: Resonance frequency (in free-air with no added mass)	20.0 Hz
Qmp: Mechanical compliance loss	6.0
Mmp: Moving mass	200g
Cms: Suspension Compliance	0.28 mm/N
Vap: Stiffness of driver scaled by cone size	245L
Sd: Area of the cone	791 cm ²
Suspension Travel	32-35mm one way. Somewhere around 60-70mm peak-peak, depending on how far you stretch the suspension. The system will not bottom mechanically until 40mm (one way).

Mass Kit



The Mass Kit consists of a 120mm bolt, washers, lock washers and extra nuts to thread down the bolt, holding the mass disc in place. Each disc is approximately 96g. The bolt assembly is approximately 48g so you can add mass to the system by adding the appropriate number of steel disc. Remember to add your Mmp starting mass (200g) to the total.

Example:

The system design requires a total of 1400g of mass for each Passive Radiator. You have a 200g starting mass (cone, suspension etc.), the bolt is another 48g and you would need twelve 96g discs to get exactly 1400g.

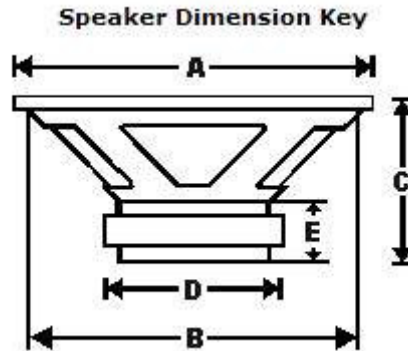
$$200g + 48g + (96g * 12) = 1400g$$

Obviously there are times when you need to round. Most times, 50g will make little difference in the final tuning. The room temperature, barometric pressure and other variables will often have a larger influence than small changes in mass.

The bolt can hold a maximum of sixteen discs, which gives the user the flexibility to have up to 1780g on the Passive Radiator. If you find yourself needing more, you are likely pushing the design limits of the passive. You can add more mass via other methods but it will put more stress on the suspension. We don't recommend it. Increase the size of the box instead, which will decrease the tuning frequency while not requiring more mass. See our design examples in the application notes of each driver for more information.



PHYSICAL SPECIFICATIONS



Exodus Audio PR15	
A: Overall Diameter	15 9/16" inches
B: Cutout Hole	14 1/16" inches
C: Mounting Depth	5" inches
Weight	5lbs raw 8lb shipping

Care

The Exodus Passive Radiators 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:

Exodus Audio Owner's Guide

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.

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.

Passive Radiator 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 has 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