



## Introduction

The SR-1 (Son of Rushmore) is the successor to the Rushmore loudspeaker system produced by Pass Labs between the years 2003 and 2008. The design goals are similar, but product is different.

The Rushmore aimed for high dynamic contrast and control with very low distortion. This was achieved with the finest quality “strong motor” drivers intimately coupled to single-ended Class A amplifiers. Each driver (deep bass, midbass, midrange, and high frequency ribbon) operated over a limited frequency band tailored to its strengths by a passive filter at the input of each of the four amplifier channels. The high efficiency (98+ dB/watt) cone drivers also had very high power handling (up to 400 watts), and the ribbon tweeter extended from the top octave and far beyond the audio range.

The result was a stunning display of clarity and dynamics. With each speaker driver enjoying its own amplifier and operated at small percentage of its capacity, the control was precise and the curtains of distortion parted to reveal phenomenally subtle inner detail. They were accurate and musical. They kept their detail and dynamics at loud and soft levels. Made from Gabro (a deep-sea granite) and piano-formed Cherry layers, they weighed just under 400 pounds each and cost a small fortune.

It's six years later and we no longer make the Rushmore – the cost of parts, material, processes and shipping have skyrocketed. In this time we have developed its successor, unimaginatively christened SR-1.

The SR-1 is also a four-way system, and the target is still high dynamic contrast, control and very low distortion. Realizing that most customers already have favorite amplifiers or want the opportunity to experience different electronics and cables, we designed it with an internal passive crossover.

Having a network mediate between the amplifier and driver is not without its problems. The loudspeaker drivers no longer have access to source with a high damping factor, and the variable impedance of

the driver itself makes non-ideal load for the crossover. To retain performance comparable to the Rushmore something has to give, and that something is the overall efficiency of the loudspeaker system.

First off, the drivers must be intrinsically lower distortion and more neutral in their character. For this purpose we chose the best pieces that SEAS has to offer, Nextel coated cones in staggered diameters, topped off with the Crescendo high frequency dome. The Nextel coating provides for improved internal damping of the radiating surface, and we made a point of operating each driver in the “piston region” below the cone’s modal frequencies. The SEAS drivers feature long linear excursion, overhung voice coils, and exceptionally linear magnet assemblies and pole pieces.

These are exceptional drivers, the best we could find, but they still appreciate being driven by a low impedance source to achieve the most precise transient quality, the instantaneous “stop-start” response necessary to impart musical realism. Unfortunately the very nature of a passive crossover introduces reactive impedances between the amplifier and drivers, degrading the transient characteristics and creating lingering artifacts. The result is that the sonic image is smeared and the little details are obscured.

We experienced these phenomena while comparing various prototype passive networks against an actively quad-amped version used as a reference, and the difference was enough to make us choose a brute force solution – resistively shunting most of the amplifier current around the driver.

This gives the amplifier a less reactive, lower impedance load. It also gives the crossover network a less reactive, lower impedance load. Finally it provides the driver with a less reactive, lower impedance source.

There is a price to pay for this – instead of a speaker whose audio band impedance varies from about 8 to 30 ohms, the SR-1 varies

from 3 to 5.5 ohms. This means that the power amplifier will need to be able to drive a 3 ohm load (we make amplifiers like that). On the plus side, the amplifier sees a relatively flat impedance, and much less of the reactance of the crossover and loudspeaker drivers.

After developing the initial versions of this crossover, we spent the next two years refining the details of the sound with our five in-house listeners and their individual environments. We established the closest “average” desired response, and created adjustments in mid-bass, midrange, and high end to accommodate a modest range of room characteristics and taste. The final circuit contains only the finest components – polypropylene capacitors from Kimber and Solen, Mills resistors, and high current Erse inductors, all mounted on thick heavily plated circuit boards. The wire is the same used in the output stages in Pass amplifiers.

**Caution: These boxes are heavy and require two people using proper lifting techniques and care when unpacking.**

Your SR-1 system comes double boxed with each cabinet in it's own double box. Within the double box, each speaker sits in rigid foam top and bottom trays. We do not suggest that you attempt to separate inner and outer boxes.

Starting with the two large boxes: Carefully cut the tape securing the top end-flap on the outer box. Repeat for the inner box. If you have done this correctly you will now be looking at the bottom of the speaker, the lower foam tray and a box of hardware containing 4 feet and a jumper cable. Remove and retain the foam tray for future use.

Once the bottom tray is removed, install the four leveling feet with the protective washers between the feet and cabinet. The "no-mar" washers are essential to protect the wood surfaces of the cabinet from the anodized surface of the leveling feet.

Once the feet are installed, unpack the large (bass) cabinet by tilting the packing on it's side first and then titling so the bass cabinet is resting on it's feet. At this time lift the outer and inner boxes straight up and off of the speaker. Retain these boxes as storage containers for all additional SR-1 packing materials. Remove and retain the top tray and foam sock. Now place the bass cabinet as close to the intended and final location. Once the smaller top cabinet is in place further movement other than minor positional changes of the large cabinet will not be convenient.

The top cabinet will be unpacked in a similar fashion. Carefully cut the tape securing the tops of the outer and inner boxes. Once the boxes are open you should again be viewing the bottom surface of the cabinet and a box of hardware.

The smaller top cabinets require that the user install several pieces of adjustment and dress hardware. All of these pieces will be installed

with common metric hardware on the underside of the upper cabinet. The hardware and required tools are supplied with each cabinet. Please retain the packing materials and supplied tools.

Customer will need to install the “Tilt Bar” and the “Nameplate” and 3 feet. Like the larger bottom cabinet the feet on the upper cabinet have “no-mar” washers between the aluminum hardware and the cabinet finish. To preserve the wood finish on the cabinet, please install these washers. Once this hardware has been installed you may invert the smaller box, such that the top cabinet is now setting upright on a secure surface. Once upright, lift and remove the outer and inner box, foam top tray and foam sock. You may now place the top cabinet upon the bass cabinet.

When stacking the small cabinet atop the large cabinet it is suggested that this be done with the assistance of a second person. One person should lift the upper cabinet and a second person should direct and guide the upper cabinet so that the feet of the small upper cabinet fit directly into the sockets on top of the large cabinet without damaging the finish on any of the pieces.

The Upper and Lower speaker cabinet each have input connectors and it is strongly suggested that the customer bi-wire the speakers with wire of their choice. Speaker wire is a very personal choice, please discuss cable options with your dealer if you do not already own cables that you favor. Pass Laboratories has included a set of jumper cables to allow temporary operation of the speakers with a single run of speaker cable. Extended listening sessions with SR-1 favor bi-wiring or bi-amping. For those so inclined you are also free to bi-amp with dedicated amplifiers allowing the freedom to select separate amplifiers for woofer and tweeter.

On the large, lower cabinets the two pairs of speaker binding posts are in parallel with one another. When wiring with a single pair of speaker cables the lower pair are intended for the run back to the power-amplifier and the upper pair are intended for the jumpers that will connect the power amplifier supplying the lower cabinet to the input connectors of the upper cabinet.

## Position and adjustment

If you are using the preferred method of bi-wiring with two pairs of speaker cables from the power amplifier, then you may connect the wire set from the amplifier to either pair of the lower cabinets binding posts. If you bi-wire the speaker then remove the supplied jumper wire. In either regard please keep in mind that the speaker cabinets are polarity sensitive. The positive speaker terminals on both pairs of speakers need to attach to the positive terminals of the power-amplifier. The negative speaker terminals on both pairs of speakers need to attach to the negative terminals of the amplifier. Maintaining proper signal polarity is critical with all bi-wired speakers. Failure to maintain consistent polarity between the speakers and amplifier will be cause all manner of ills from collapsed and diffuse soundstage to greatly marginalized frequency response.

It is difficult to provide absolute instructions for speaker placement; but we can give suggestion as to good starting points. Optimal results with the SR-1 as with most speakers are frequently achieved with subtle changes of physical location.

The first rule however, is that the room in which you listen is perhaps the most significant of all audio components in the reproduction chain. Speakers can be made to work satisfactorily in poor sounding rooms, but it is much easier to achieve success in an acoustically correct room.

The ideal room is neither overly reflective nor overly absorptive. In a good sounding room, the absorptive elements tend to be at reflection points of the sidewalls, floor, ceiling and space behind the speaker. High ceilings or at least absorptive ceilings lend themselves to more natural sounding spaces. Diffusion generally is a good thing and excellent listening rooms typically have diffusion in abundance. Great sounding rooms are either large enough or absorptive enough to discourage strong standing waves in the listening area. Good sounding rooms that present a proper spatial image tend to be very symmetrical in layout, left to right.

Under these idyllic room conditions speaker placement is frequently a simple task. In an idyllic world the speakers would be well out in the room, typically about 1/3 the distance of the rooms front to back dimension. The listener would be at mid point in the room or slightly to the rear of mid-point. The listener and the speakers would form an equilateral triangle, such that the distance speaker to speaker would be identical to the distance from either speaker to listener. The distance from speaker to sidewall would be unequal to the distance from the speaker to the back wall. To solidify the acoustic image placement in stereo or multi-channel recordings at the listening position the speakers will typically be toed in slightly toward the listening position, rather than square with the rear and sidewalls. The tweeter height of the speaker will be either at the same height as the listener's ear or in some way angled as to achieve equivalent result. The SR-1 cabinets have adjustable feet, front and rear to optimize apparent driver height.

Lucky are the very few listeners who have well placed equipment in a well-engineered dedicated listening space either by design or happenstance. For the rest of us we have the Pass Laboratories SR-1. The Pass Laboratories SR-1 Loudspeaker was built to address less than perfect rooms and less than perfect speaker placement. Of primary concern was a speaker that would be spectrally balanced throughout the room rather than only in a very narrow and defined "sweet spot". The SR-1 was specifically built to those parameters.

Once the speaker position and upper cabinet tilt is optimized the listener will need to adjust the level controls for optimal results. In a symmetrical room, the adjustments for left and right cabinet would be identical, asymmetrical rooms may require disparate settings of level controls or left and right speakers. Optimal level settings will be arrived at only by careful listening to a variety of source material.

On the rear of the SR-1 cabinets are 3 level controls. One level control on the woofer cabinet and two level controls on the tweeter / midrange cabinet. All controls are 3 position switches that select fixed values. Mid position is considered "Normal", UP increases the



level of the drivers associated with a control. DOWN decreases the level of the drivers associated with a control.

The level control on the woofer module controls the mid-bass level in the room. This control should be adjusted to optimize bass in room while minimizing undesirable bloom and boom of low frequencies.

The two level controls of the upper cabinet are somewhat unconventional, having been designed to address less than ideal speaker positions in less than ideal rooms, specifically the average domestic environment. The upper of the two level switches, selects one of three tweeter levels. Mid position typically for neutral rooms, up or counterclockwise for rooms which are otherwise lacking in high frequency and down or clockwise for rooms which tend to sound too bright.

The lower of the two level switches adjusts the spectral balance between the upper cabinet and the lower cabinet. This control affects both tweeter and midrange drivers equally, raising or lowering the overall level of the upper cabinet in relation to the lower cabinet.

If the listening room allows the listener to be directly on axis with the drivers and the room is neutral in character then the most likely setting of this control will be either the mid position or perhaps the clockwise or lower position. Rooms that require the listener to sit off axis to the speakers and rooms that have a surfeit of absorptive surfaces frequently require this control be in the up or counterclockwise position. Rooms that sound bright and those with a multitude of hard reflective surfaces typically require this control be set in the down or clockwise position.

The suggested settings are just that... suggestions. There is no substitute for listening and personal judgment. We encourage users of this product to experiment with level settings and fine movements of speaker position until the most accurate or pleasant combination of spectral balance and soundstage are achieved.

## Specifications:

Passive 4-way design, bi-amp enabled

Impedance: 3 to 5.5 ohms

Sensitivity: 86 dB @ 2.83 V @ 1 M

Floor space required: 16.5" X 25"

Overall height: 48"

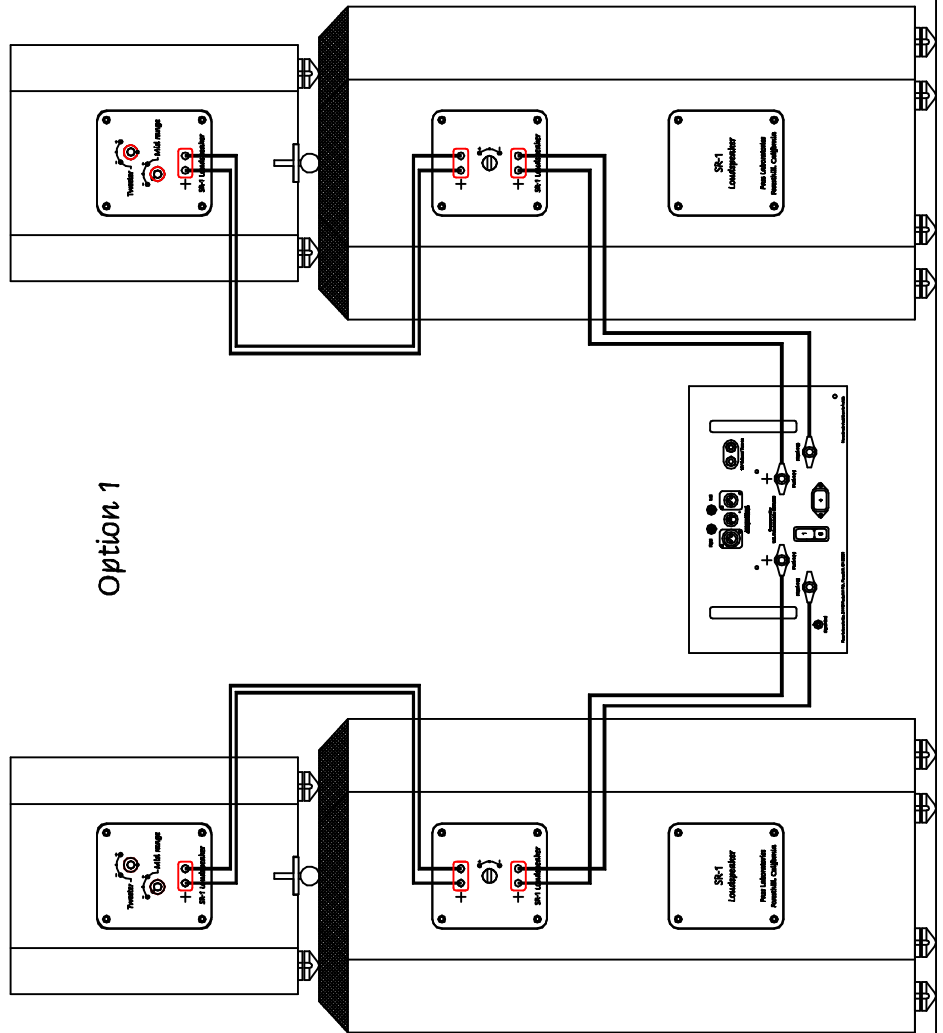
Bass Cabinet mass: 115 Lbs

Treble Cabinet mass: 40 Lbs

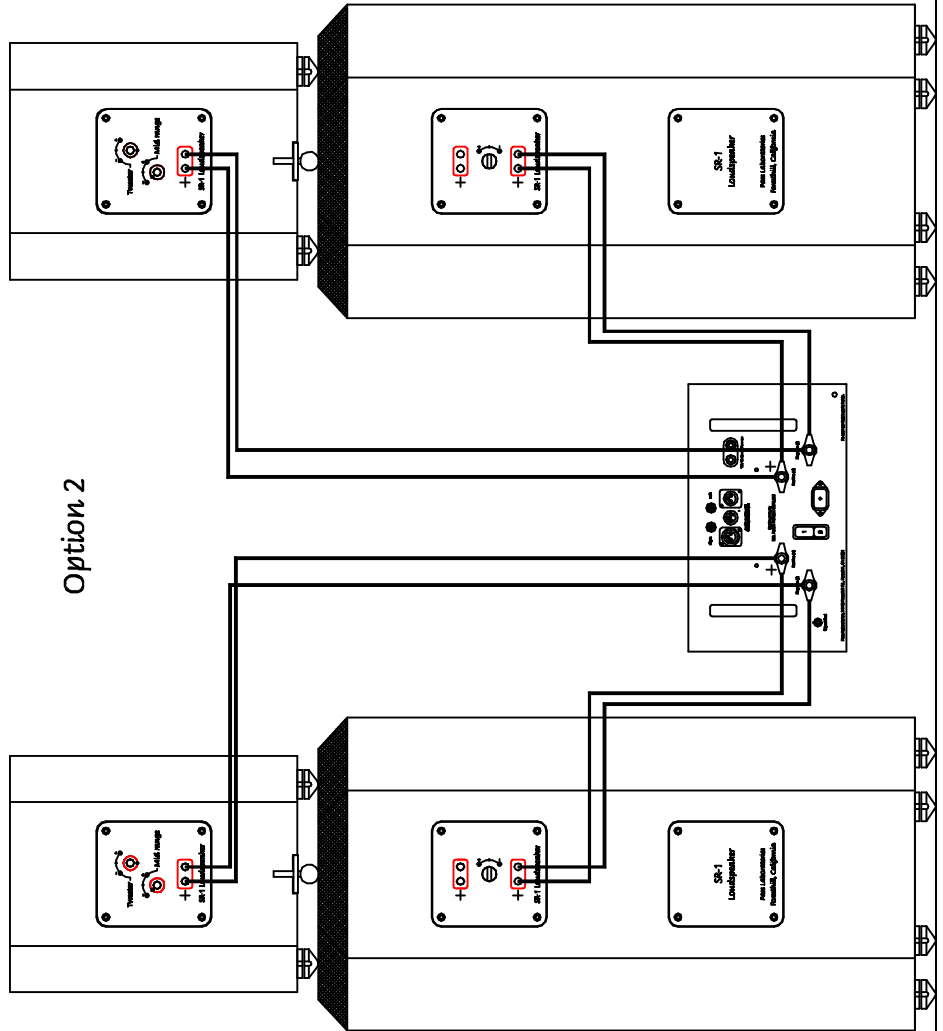
Shipping weight: 400 Lbs / pair

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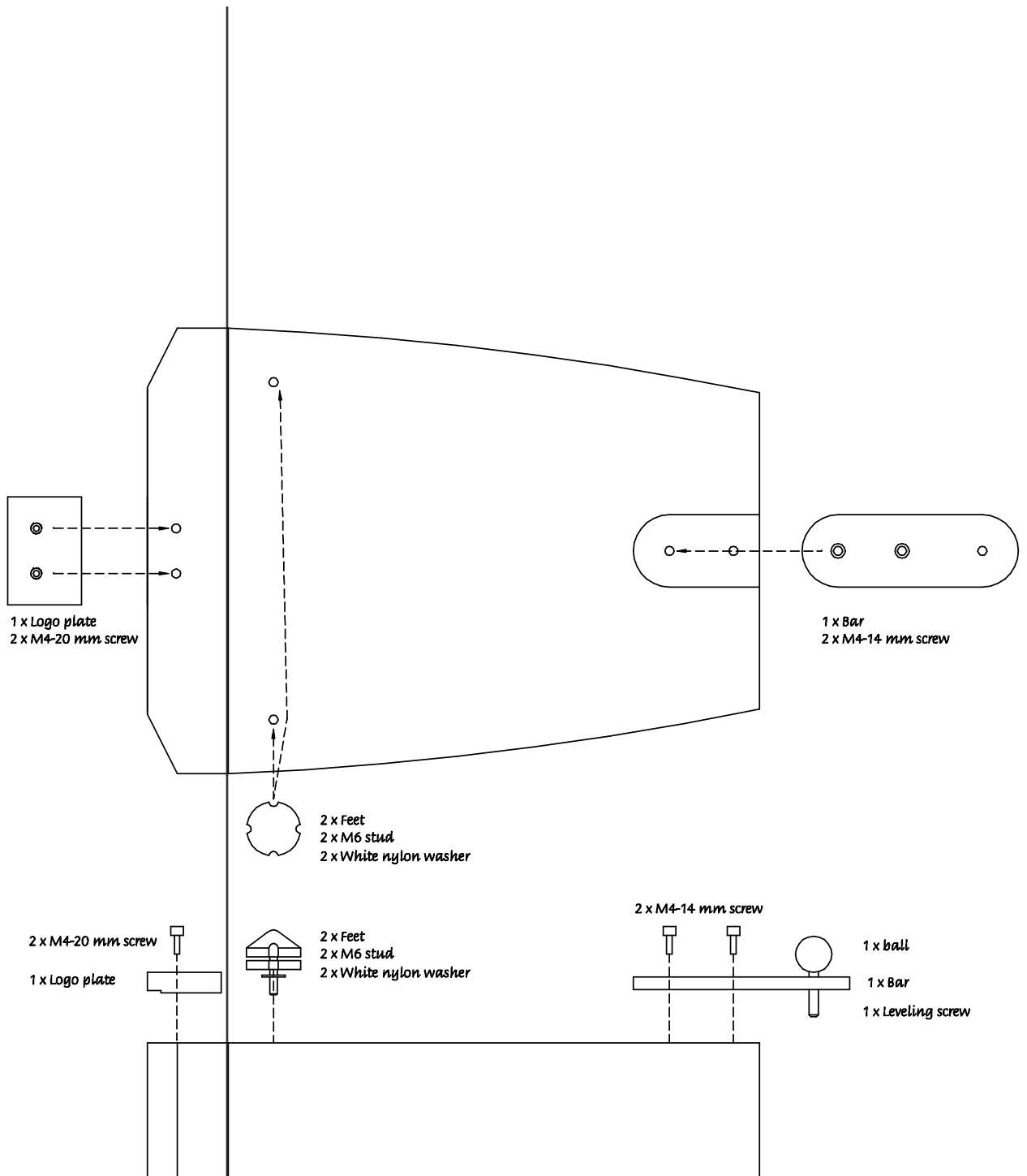
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How to connect SR-1 to your amplifier using single speaker cable and short jumper cable.



How to connect SR-1 to your amplifier for bi-wiring.



Assembly instructions for upper cabinet

## Warranty Information

Please note: Conditions of warranty service and customer rights for product purchased outside the United States may vary depending upon the distributor and local laws. Please check with your local distributor for specific rights and details.

All Pass Laboratories products purchased new from an authorized Pass Laboratories dealer in North America are covered by a transferable, limited 3-year warranty. This warranty includes all parts and labor charges incurred at the factory or factory specified repair facility, exclusive of any subsequent or consequential damages. Damage due to physical abuse is specifically excluded under this warranty.

For this warranty to apply the customer is responsible for returning the product unmodified to the factory within the specified warranty period. The customer assumes all responsibility for shipping and insurance to and from the factory or a factory specified repair facility. The conditions and stipulations of this Pass Laboratories warranty only applies to units originally sold new through an authorized dealer. Warranty on factory repair is 60 days and covers only the scope of the original repair.

Non-North America customers should consult with their original Pass Labs dealer or distributor for warranty repair instruction prior to contacting the factory or shipping product to the factory for repair. Non-North American product must be returned to the country of origin for warranty service. Foreign distributors are only required to offer warranty service on Pass Laboratories product that they have imported, verifiable by serial number.

Any modifications to Pass Laboratories products that have not received written factory approval nullify all claims and void all provisions of the warranty and liability by the maker or authorized distributor. Should a modified product be returned to the factory for repair the owner will be required to pay all necessary charges for the repair in addition to those charges required to return the product to its original configuration.

In the case of safety issues, no product shall be returned to the customer without those safety issues being corrected to the most recent accepted standards.

Removal or alteration of original Pass Labs serial numbers voids the factory warranty. Product with altered or missing serial numbers will be suspect as counterfeit or stolen product. Pass Laboratories will not repair or in any way indemnify any counterfeit or cloned product. Pass Laboratories does not offer products in voltages intended for international markets either to authorized Pass Labs dealers or to third parties located in the United States or Canada.

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