

Modification

The VR-4 speaker system was a classic in its day (1994), winning rave reviews in Positive Feedback (USA) and HiFi & Musik (Sweden). Both of these high-end magazines compared the VR-4 favorably to the Wilson Watt Puppy System. As a result, the VR-4 became a legend and sold in the thousands of pairs world-wide.

Many of our VR-4 owners have indicated that they are interested in upgrading their VR-4 systems to our current level of sound quality. For this reason, we have engineered a full upgrade to allow our loyal owners to enjoy the higher level of transparency and image focus available from the new VR-5 and VR-7 models. This upgrade consists of all-new drivers with better sound and measurements, new crossover boards with premium parts, and new wiring and binding posts. In addition, a new larger midrange/tweeter enclosure is fabricated and installed in the cage assembly after removal of the original M/T enclosure. To top off this complete system rebuild, new internal wiring by Analysis Plus is installed, greatly increasing clarity and focus. Last, but not least, a new fabric has been chosen; the new socks have a more open weave which eliminates the original fabric's tendency to "muffle" the sound. The complete effect of the rebuild is a world-class speaker system second to none.

New Technology Available in the VR-5/7 Series:

Our new VR-5/7 series utilize the latest in cone and motor technology in combination with advances in both crossover design and parts quality. In addition, one full year of research and listening tests have led to new discoveries and improvements in all areas of speaker performance. We sincerely believe that the VR-5/7 series is the most transparent speakers available, regardless of cost. Although our VR-6 speaker won "Component Of The Year" in 1998, awarded by AudioLand magazine, Hong Kong, (one of the most respected Asian magazines), we believe that our new VR-5/7 series is far better. Now you can have the opportunity to achieve better sound in your own home, using your VR-4 speakers as the platform.

New Technology:

New aluminum-coned woofers have been designed with patented low-distortion motors (voice coil, magnet, top plate, and pole piece), resulting in bass performance that is far superior to older systems. Each bass note is not only reproduced with more clarity, but there is less noise in between notes, leading to increased transparency. The bass punch is unbelievable!

Similarly, the new midrange and treble drivers have less distortion due to new materials and motor design, with increased transient accuracy. Overall, the newer driver designs simply sound more like live music and have less distortion and coloration.

In comparison with the VR-5 system, scored as a "10," the VR-4 would be rated at a 5 or 6. Yes, this is pretty alarming, but time marches ever onwards and the new technology is far advanced over what was available just five years ago.

Fortunately, since these advancements can be retrofitted to the existing VR-4 speakers, we have decided to offer a full system upgrade for those who value music over everything else in life!

VR-4 Woofer System Modification:

The VR-4's 1.5" thick woofer baffles are re-machined to accept a larger 8.5" cast frame woofer from Norway. This beautiful woofer has a silver aluminum cone (which can be seen through the grill cloth), a patented low-distortion motor, a phase plug to assist in flattening the response and allow cooling, and a long throw butyl edge for deeper bass. These state-of-the-art woofers have far greater clarity, punch, and dynamic range than the original woofers and can handle twice as much power.

To fully utilize their higher quality, an all-new crossover has been developed which retains the original design's legendary bass reproduction, but increases the efficiency, clarity, and overall bass quality by a wide margin. The new bass system is 2dB more efficient, increasing the dynamic range to near-frightening levels! If you have experienced frustration in attempting to get the "right" kind of bass from your system, order the VR-5 modification today.

Midrange Modification:

Audax, the fabricator of the original VR-4 midrange cone, has developed a new cone material with greatly increased transparency. This new cone material is termed Aerogel and consists of carbon fiber powder, Kevlar chop, and cellulose acetate pulp, all blended in a liquid matrix and formed into a cone. This combination of materials results in the lightest cone available for incredible transient accuracy, yet is totally coloration-free due to the high internal damping. We sat in awe during an A/B test against the most highly regarded electrostatic speaker, as the Aerogel cone completely destroyed the electrostatic in terms of absolute clarity and dynamic realism!

Although our previous woven fabric carbon-fiber cone was the best sounding cone in it's day, the new Aerogel cone is significantly better in clarity and transparency. In addition, Aerogel has far lower coloration and sounds incredibly more realistic on voices and midrange instruments. This new cast frame 5.5" driver uses an edge-wound ribbon voice coil and ventilated spider assembly for less distortion and greater power handling, and a large magnet to increase dynamic range. All of these engineering advances combine to make this new state-of-the-art midrange driver the best sounding unit of it's kind in the world. Due to lower distortion, faster transient speed, and better damping, this is the best measuring mid driver as well.

In addition, the frequency response of the raw unit is much flatter, reducing the quantity of crossover parts necessary to achieve ruler flat response in the completed system. Truly a fantastic driver.

New M/T Enclosure Design:

To ensure that this advanced midrange driver can reproduce its highest level of sound reproduction without any coloration, a larger, more complex enclosure has been designed with extremely thick walls (a combination of 1" MDF, .25" felt, and 1" foam rubber). These materials are bonded together to form the world's most inert and coloration-free enclosure, allowing an unprecedented level of midrange articulation. The combination of this reference driver and overbuilt enclosure exceeds the dynamics and clarity of any electrostatic or ribbon driver we know of, period. This includes dynamic

speakers costing up to \$75,000.

To complete this reference-level midrange transparency, edge-on acoustic foam filters and Dacron fluff completely fill the enclosure, eliminating cavity resonance and back wave coloration. This new midrange/tweeter enclosure adds another 15lbs to the weight of the M/T module, further increasing clarity and image focus over the original design by means of mass loading and damping.

In order to optimize image focus and widen the apparent sound stage, the M/T cabinet edges are machined to a one- inch radius, with felt applied to the bottom and upper edges of the cabinet to reduce diffraction which could occur at the cage surfaces.

Nothing has been overlooked, no compromises have been made; we are in search of perfection!

Tweeter Modification:

Since 1988 Von Schweikert has used metal-dome tweeters due to superior measurements and fast transient response. However, in the last few years, exotic and highly expensive fabric-dome tweeters have been developed in Europe using new materials and technology. This new generation of fabric-domes now exceeds any metal tweeter's measurements and more importantly, exceeds their sound quality by a wide margin! Even though these new fabric domed tweeters are extremely expensive, costing many times more than the original VR-4's metal tweeter, superior clarity combined with musicality and smoothness absolutely dictate their inclusion in the new VR speaker systems, including this modification.

The "VR-4 to 5 Modification" utilizes the new Excel T25 Sonotex-fabric dome, which uses a transmission-line rear chamber to eliminate lower midrange "honk", low distortion voice coil and motor system to increase clarity, and includes dual magnets for increased sensitivity. Sonotex is a patented coating/impregnation material that allows the fabric dome to take on some of the important qualities of the metal dome: integrity during high acceleration without deformation. However, we have found that there is no satisfactory method to eliminate the metal dome's ringing problems, and that is where Sonotex rules with complete authority. Although the Sonotex impregnation allows the fabric dome to move as a uniform piston without breakup, the Sonotex material behaves as a damping compound as well, allowing the fabric dome to eliminate the harshness and clinical aspects of all metal dome tweeters.

Ferrofluid is used for cooling the voice coil in the new Excel T25, greatly increasing power handling and allowing long excursion and high volume use with low mechanical scraping and noise generation. This tweeter is used in a highly regarded \$20,000 European speaker which has received rave reviews for it's treble response and we concur: this is an incredible tweeter, combining both very high detail with a musical smoothness that allows high listening levels with no listening fatigue! If you have had problems eliminating the electronic "glare" in your system, order the VR-5 Modification today.

Rear Ambience Modification:

In order to match the timber of the front and rear high frequency waves, a new fabric tweeter was

selected for Ambience Retrieval. This is a Vifa unit utilizing an acoustic wave-guide, acting much as a horn. This is actually an acoustic transformer and allows a very small input signal to be amplified acoustically; you will hear depth, concert-hall reverberation, and 3-D imaging as never before, without added treble hardness. In addition, this new ambience driver uses Ferrofluid to allow less distortion and a transmission-line loaded rear chamber to reduce coloration. The Dimension Control is retained in order to balance the ambience information to the room.

If you have ever wished to have more image clarity and focus from your VR-4, the VR-5 Modification will help you achieve the sound of your dreams.

Crossovers, Circuit Design and Parts:

As with the original VR-4 system, the new VR-5 modification utilizes two crossover boards to allow bi-amping and/or bi-wiring. The woofer crossover board is installed in the woofer module and uses three 1,500 watt inductors (one air core and two steel laminate-cored units with 16AWG wire), four capacitors, and one high power resistor. The slope is acoustic fourth order and is corrected for both transient response and phase response, using the driver parameters as the [target](#) alignment for a 200Hz crossover point. Although the original VR-4 used a lower crossover point to avoid coloration in the vocal range, this cross point was chosen based on the distortion of the original drivers. Since the newer drivers have far less coloration and distortion, the vocal range is greatly improved in the VR-5 and the VR-4 to 5 Modification. As a side benefit, power handling and dynamic range is increased by reducing the bass levels fed to the midrange driver in the newer VR-5 design.

A Zobel conjugate circuit is employed to correct for impedance variation caused by the vent tuning and the woofer's impedance curve. Since the overall system impedance has a very flat measurement after correction, (deviating from the 6 ohm nominal impedance by only a few ohms in either direction), amplifier stability is greatly enhanced, allowing any amplifier to drive the new VR-4 to 5 Modified system easily and musically.

The new midrange/treble crossover has been developed using the drivers' impedance and frequency response curves as measured in the new M/T enclosure. Both gliding tone gated analog and digital FFT measurement equipment was utilized, and all aspects of the new drivers' performance was tested, including frequency response, phase response, harmonic distortion, impulse response, step response, cumulative spectral decay (waterfall plots), and polar response (dispersion pattern off-axis).

Both the midrange and tweeter crossover slopes are acoustic fourth order and are implemented by a combination of first through third order electrical filter circuits. The drivers are connected in phase for correct transient response and have very fast response times due to our proprietary (critically damped) circuit designs. Impedance peaks caused by the cabinet loading are compensated by Zobel circuits, as is the phase shift between the woofers and midrange. Very little phase correction was necessary between the midrange and treble drivers since their voice coil offsets have less than one millisecond of delay difference due to the tweeter's recessed dome and the shallow midrange cone.

Time Alignment:

It can be readily noticed that the VR-5 enclosure has no stepped baffles and appears to lack Time Alignment. This is true, the new design does not use mechanical offset for phase alignment, it uses electrical delay instead. Since the delay between the midrange and tweeter are less than one millisecond (exactly 94microseconds), only a slight phase compensation was required, easily achieved with simple circuit design and passive parts. Image specificity has been improved to a remarkable degree, along with depth of field and 3-D focus. The imaging improvement has resulted from a more coherent wave launch due to the radiation of pressure from a single point source plane, eliminating the diffraction caused by the "steps" in the earlier VR-4 design.

All inductors in the midrange signal path are large air cores using the finest oxygen-free wire, and Solen polypropylene capacitors from France are used for their remarkable transparency. These are the finest sounding large-body capacitors in the world and are utterly transparent at the midrange wavelengths. Although far more expensive than the capacitors used in competing designs, we felt the Solens were necessary to achieve the remarkable transparency achieved in the VR-5.

In the tweeter's more critical signal path, we are using Hovland capacitors with a solid foil element instead of a vapor deposited element. Hovland capacitors allow the smallest musical detail to be reproduced with utter clarity; you will hear more "air" and "space" around each instrument as well as small details formerly buried in the background noise. Along with this increased detail and musical realism, the Hovland caps also have the smoothest, sweetest sound quality as well. You will hear detail without harshness, at any volume level. These extremely expensive capacitors combined with the Excel T25 tweeter allow the VR-4to5 Mod to have the finest treble reproduction in the world!

Internal Wire:

Analysis Plus, a manufacturer of medical equipment, has designed the best sounding (and measuring!) wire we have tested to date. Using high quality oxygen-free copper threads woven into a mesh, the wire is then formed into an oval tube and insulated with Teflon, the most expensive and least colored insulation available. The clarity and transparency of this wire is incredible, allowing the VR-5/7 series to be the most transparent in the world. We highly recommend using Analysis Plus interconnects and speaker cables to complete your system.

Binding Posts:

We have chosen the Cardas Solid Copper posts plated with gold and rhodium for the new VR-5/7 series, and naturally include them with this modification. Although expensive, they are the finest sounding posts available and completely annihilate any other brand of binding post made from inexpensive brass (the great majority of posts). There is no danger of stripping these posts no matter how hard you crank your nutdriver.

Price Of Full Modification:

This total system rebuild is moderately priced at \$2,500 plus return freight. This price includes a full five-year warranty starting from the day you receive your modified system.

Is this modification worth it? In the words of one customer who has just received his modified speakers, "there is not a speaker in the world under \$15,000 that can touch it!" It should be noted that this customer is a musician and was looking for a pair of VR-6's.

No other change you can do to your system will give you this much more sound improvement, we guarantee it. You will hear details on your treasured recordings that you've never heard before, and don't blame us if you skip work the day following the arrival of your new speaker system!

Estimated Completion Time:

Please allow two weeks for this complete system rebuild. In addition to testing and matching all of the drivers and crossover parts, which is time consuming, we also break the system in overnight in order to test for power handling and ageing effects, then re-measure the system before packing.

Due to the complexity and time consumption of this modification and rebuild, only a few customers can be accepted every month. To avoid disappointment, please make arrangements to have your VR-4 system upgraded today! As you will find, every listening session will become an event not soon forgotten!