AUDIO REVIEWS
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Harmonic Resolution Systems M1R Equipment Isolation Rack

Reviewer: Jules Coleman
Sources: Well Tempered Reference/Reference Arm/Shiraz; *Redpoint Testa Rossa XS/Triplanar/Ortofon SPU Royal N* ([for review]; *Brinkmann Balance/Brinkmann Arm/Brinkmann modified EMT* ([for review]; *Reimyo CDP-777 player* [for review]; *Denon/ Exemplar DVD -2900 universal player* [for review]
Preamplifiers: Shindo Monbrison (all tube, full function); Shindo Catherine (all tube, full function, dual mono with output transformer); Counterpoint 5.0
Amplifiers: Shindo Sinhonia F2a monoblock; Shindo WE 300B Ltd monoblock; Cr Developments Artemis Gold monoblock; Mark Pearson built EL-34 monoblock
Speakers: Wilson Sophia; *Horning Agathon Ultimate* [for review]; Horning Alkibiades; *DeVore Fidelity Silverback Reference* [for review]
Cables and Interconnects: Stealth Indra, PGS, M-21, Hybrid MLT speaker cable; Audience Au24 phono [for review], analog and speaker cable, Extreme Phono phono cable, 'Tone' speaker cable; Audio Note Kondo copper speaker cable
Equipment Rack: Harmonic Resolution Systems M1R [for review]; M3 Isolation Bases for amplifiers
Power Conditioning: BPT 3.5 Signature
Assorted Tuning and Resonance Control Devices: Black Diamond Cones, HRS Nimbus Feet; Vibrapods; Harmonix feet
Review Component Retail: ca. $9,000

Exceptional Engineering, Sonic Performance & Aesthetics

A lot of equipment -- much of it good and a good deal of it better than that -- has graced my listening room since Mike Latvis, president, chief engineer and designer of Harmonic Resolution Systems came to my home several months ago to set up his M1R equipment rack. The vast majority of those components have brought me hours of listening pleasure. Still, at the end of the review cycle, almost all of them have gone back from whence they came. Not so the HRS equipment rack; it's not going anywhere. In fact, as soon as I can scrape together the money, I intend to purchase another. As long as I own audio components, I want them (speakers aside) resting comfortably, securely, and most importantly quietly, on an HRS isolation base within an HRS equipment rack.

The HRS rack is unrivalled in my experience as a means of securing an audio playback system against the deleterious consequences of the 'noisy' environment in which any system invariably resides. The sonic rewards of the 'homeland security' that the HRS rack provide are far-reaching, obvious and repeatable. The bonus is that the HRS provides state of the art resonance control in a package that my wife -- who is an artist, art historian and coordinator of the arts programs in our town of Hamden, Connecticut -- praised as the most attractive audio component to reside in our listening room bar none. On the day Mike set up the rack at my home with a handful of other folks from the audio business on hand -- reviewers, distributors and dealers -- my wife came home from a workout at the gym, walked into the room as we were listening and proclaimed the sound "pure" in a way she had not previously experienced.

She eyed the rack, sized it up and asked whether it was the only component we had changed while she was out. When we assured her that it was, she called me into the kitchen and offered to purchase it as an upcoming anniversary or birthday gift. She asked how much it cost and I put up nine fingers. She went looking for a checkbook, but I knew then that she thought I meant $900.00. In fact, I meant to indicate that the rack cost more than $9,000. The price may have altered her intentions but not her assessment of the rack's merits - aesthetic or sonic. And as usual, she's right on both counts. In the end, I happily took care of the purchase myself. I wouldn't want her to live without the rack she so admired, now would I? In my thirty years as an audiophile, I have had the great good fortune to hear and sometimes to own a number of wonderful products. I've owned my share of dogs as well, though on reflection I am inclined to think that some of the dogs were really the victims of poor system matching. Rare in my experience, however, has been a product that has redefined my understanding of what is possible in music playback or altered my approach to putting together an audio system. Two months ago, I came upon an amplifier that has completely changed my views about single-ended triodes in general and about 300B tube amplifiers in particular. This is the Shindo Laboratory WE300B Ltd. Music played through this amplifier not only sounds right; I experience it as complete. As a result, I no longer listen to music trying to determine if anything is missing. This is not a component you evaluate so much as you simply experience. The net effect has been to completely redirect my approach to putting a system together. Instead of searching for an amplifier to drive speakers of choice, I am in the throes of trying to identify a speaker that is not just a match for it, but worthy of it.

If the WE300B Ltd has altered my approach to putting an audio system together, then the HRS equipment rack has redefined my understanding of resonance control and its importance to music playback. The HRS rack realizes in practice the simple but insightful notion of 'addition by subtraction'. It reveals surprising truths, the most important and least obvious of which may well be that at the end of the day, the most cost-effective upgrade to any system is resonance control. A great power cord can improve the component to which it is connected. A great interconnect can enhance the performance of the two components it unites. A great digital front end can give you as good a source signal as you are likely to find - and so on. But a great component rack can improve not only the performance of every component you put in it but the performance of the system acting as an integrated whole.

The HRS, moreover, redirects one's attention from the importance of the components one purchases to the need to control or minimize the impact of the environment in which those components reside. For these reasons alone, the HRS represents for me a product of truly exceptional merit almost as much for its capacity to educate as for its aesthetic beauty and sonic splendor. It is one of the most important audio components I have come across in thirty years in the high end.

It is *not* my primary purpose, however, to sing the praises of the HRS equipment rack.
The share of the audio market that goes to equipment racks is ludicrously small. The major print magazines in the US have been reluctant to devote much space to equipment racks and resonance control in general. This simply encourages the unfortunate view that the differences among racks are relatively unimportant as compared to the differences among sources, electronics and speakers. The problem with reviewing racks is not that they don't make a substantial sonic difference to your system and are therefore unworthy of serious reviews. Surely they do make a difference and they are certainly worthy of review. Rather, it is that they are not 'sexy' and reviewing them is, if you are serious about it, hard work.

To his credit, Mike Latvis encouraged me to learn as much about resonance control as possible and to use this review as much to educate the audiophile community about the importance of resonance control in general as to focus on his product in particular. His sincere view is that everyone who makes a good product benefits when people understand the value of this segment of the audio playback chain. He's much more interested in making the 'pie larger' and opening the eyes of the public to an important aspect of playback, than he is at this point in grabbing a piece of the pie. His view is that nothing is to be gained by declaring one product 'the best'. Mike Latvis is simply one of the finest people I have met in this industry; fortunately, he is also one hell of an engineer with one hell of a good product to show for his efforts.

There's an engineer at the helm
Like many of the rest of us who end up in some or other part of the audio industry, Mike enjoyed a misspent youth playing with equipment, modifying electronics and speakers. Fortunately for him, he was able to mate his interests with his technical education and experience. After securing degrees in Mechanical Engineering and prior to forming HRS in the fall of 2000, Latvis enjoyed a varied and very successful career in mechanical engineering. Much of his prior work experience focused on vibration control.

Between 1986 and 1993, he was Senior Product Engineer for the Lord Corporation, a world leader in vibration isolation products where he was the primary engineer of the products being developed and manufactured for Sikorsky Aircraft and Hindustan Aeronautics Accounts. During that time, he completed design engineering of the elastomeric pitch rod ends for the Black Hawk helicopter's main rotor system, the elastomeric stabilator bearings for the Sikorsky-Boeing Comanche helicopter and roughly a hundred other projects in and around aircraft design. Between 1993 and 1997, he worked in the Engineering Department for Moog Incorporated (and Moog Controls) and in the Simulation and Specialty Products Group where he was lead designer on several products including the three-stage electrohydraulic high-pressure natural gas injector for natural gas locomotive research program (which was the first full size locomotive to run on natural gas). Between 1997 and 2001, he was the Engineering Manager of a Vibration Isolation Products Group in a company where he served as technical lead engineer and manager for a group of engineers working on hundreds of vibration isolation design projects for companies such as Boeing, Airbus and Lockheed Martin. Those programs included missile system isolation, commercial aircraft interior noise reduction, isolation of Naval Electronics Systems from ballistic shock and isolation of sensitive electronics in military vehicles and aircraft. He continues to be very much in demand as a consultant in his areas of expertise.

When Mike Latvis entered the field of vibration isolation in audio, he came prepared for the job with a love of music, an audiophile's neurotic attachment to gear and a successful career in the science of vibration control and noise reduction in a broad range of areas. All HRS products exhibit his love of music and his expertise at vibration and noise control.

Two Simple Facts
We begin then with two simple facts. First, the natural habitat of nearly all audio systems is extremely noisy. Second, whereas most music loving audiophiles are prepared to spend considerable sums on 'components' that they have reason to believe will improve music playback and their enjoyment of it, they are considerably more resistant to spending any appreciable sum to 'clean up the environment' or to minimize its impact on music playback. Taken together, these facts beg an obvious question: Why would individuals willing to spend small fortunes on interconnects, speaker cables, power cords and power conditioners -- to say nothing of the small fortunes that have been spent on preamplifiers, amplifiers, sources and speakers -- resist making an appropriate investment in resonance control? Most audiophiles have no way of determining what an appropriate investment in resonance control would be - and for several very good reasons. First, most of us don't fully appreciate the ways in which a noisy environment adversely affects sound reproduction. Nor are we confident that we would know what to listen for in order to determine the relative effectiveness of alternative resonance control devices. It doesn't help that precious few audiophiles know how resonance control devices work or what the magnitude of improvement is likely to be in absolute terms; and no one has a common metric to assess the relative improvement of resonance control in comparison to other sonic improvements obtainable in principle by other audio system purchases.

Lacking an appreciation of both the underlying science of resonance control and a mature culture for sorting out differences in performance subjectively, and with virtually no meaningful prospect of implementing A/B testing in any case, most audiophiles remain skeptical about the wisdom of making any but the most modest investments in resonance control. Even those who are not skeptical of the ultimate value of resonance control cannot proceed because they lack the confidence necessary to proceed rationally. The first order of business then is to help sort out snake oil from science, mere furniture from genuine audio components whose contribution to good sound is unmistakable.

The Harmonic Resolution Systems Approach

The HRS M1R rack does not represent the only credible approach to resonance control. Our publisher, among others, is particularly fond of racks from Gran Prix Audio. I can attest to the high performance one can obtain from Finite Elemente's equipment racks. In time, I hope to explore how other equipment racks fare at controlling unwanted vibrations and to understand the science involved in various approaches; and ultimately to pass both on to you. But I know the HRS rack best and reporting on how it works and how well it achieves its goals is the best way I know of explaining what broadband noise reduction can mean for your system.

The HRS rack that I have had in for review, and which is now a permanent fixture in my system, stands 44" h x 23" w x 19" d, weighs in at 337 lbs and is decoupled from the floor by four metal cones that can be adjusted to level the rack system. It has four shelves, three of which are occupied by 19" x 21" isolation bases. Currently HRS offers four racks: two of which are four shelf/three isolation base models; and two of which are three shelf/two isolation base models. Both the three and four shelf units come in two sizes: one size accommodates the 19" x21" isolation bases; the other accommodates the smaller 17" x 19" isolation platforms. The bottom shelf in all units is a bay into which an additional isolation platform can be fitted. The bay itself has a wood veneered floor under which is located a resonance control structure. No isolation platform is required for the bay, but HRS testing indicates that an isolation base placed in the bay has additional sonic benefits. The isolation platforms are connected to the rack structure by a system of brackets whose position in the frame can be altered easily in order to change the distance between the platforms or to increase the number of isolation bases on the rack. Each equipment rack is finished in furniture grade wood veneers. HRS also offers painted finishes and exotic wood finishes with custom orders. The one I reviewed came in mahogany and an enormous amount of attention was paid to matching grain on all exposed sides of the rack. The general appearance of the rack is that of a substantial piece of beautifully finished furniture. The aesthetic is modern American. It looks like it belongs in a room with substantial furnishings. The aesthetic was perfect for our home and would be a much more challenging fit in our apartment, which is what I would call European angular.

For almost all of my listening I had a turntable on the top (first the Well Tempered Reference, then the Redpoint Testa Rossa XS and finally the Brinkmann Balance). As it happens, both Peter Clark of Redpoint and Lawrence Blair of Brinkmann were themselves so taken by the performance of the HRS isolation platforms that they have entered into separate relationships with Mike Latvis to provide custom-made platforms for their particular tables. Peter and Lawrence swear by the HRS (as do apparently an ever increasing number of high end manufacturers) and so asked that I review their tables on the special isolation platforms that Mike had produced for them. I accommodated both of them and so their tables each sat on product-specific isolation platforms within the rack.

The second shelf was reserved for my digital front end. That meant the Reimyo CDP-777 for most of the review process. The Exemplar universal player spent some considerable time there as well, and soon the Audio Note CDT 2 will take up residence. The third shelf was reserved for the preamp, which meant either the Shindo Monbrison or the Shindo Catherine two-chassis dual mono design. The bay was reserved for power conditioners (BPT Signature, Reimyo ALS -777, Shindo Mr. T - very briefly) and power supplies for the turntables. Amplifiers were placed on separate isolation platforms acting as amp stands placed on the floor. There was never a single component during all this time whose performance did not improve noticeably by its presence in the HRS rack - and not just by a little bit either. To learn how I determined that, read on.

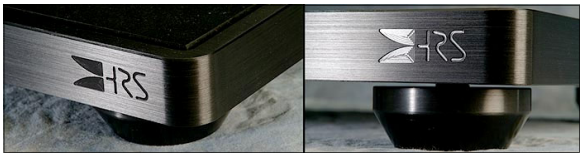
A three-part system

The HRS equipment rack is an integrated whole, but it will prove helpful for our purposes to distinguish among its three fundamental elements: the rack structure or frame; the brackets on which the platforms rest; and the platforms or isolation bases themselves. To say that the HRS rack represents the state of the art in terms of the application of advanced mechanical engineering principles to resonance control in a real-world product would be something of an understatement. I spent hours on the phone with Mike Latvis who shared an extraordinary amount of technical information about the design of the HRS rack. I understood my share of the design concepts and the HRS approach to implementing them but I did not understand it all certainly not at first. Fortunately for me, I have access to scientists -- in this case an engineer and a physicist -- at the two universities at which I work. I called on both to help me sort through the technical details of the HRS approach, from the choice of materials to the strategies for implementing theoretical findings in a real-world structure. My goal was to become sufficiently competent about the technical design in order to convey how the rack achieves broadband noise reduction to you, the potential end user, in a way that would help make products like the HRS rack credible without revealing anything like a trade secret. An unintended byproduct of my discussions was that I got at least one scientist so interested in Mike's design that he came by the house for a long and very admiring look and an even longer listen. Mike's design not only secured his seal of approval; the long listen may well have stimulated the loss of yet another otherwise productive life to audiophilia.

There's no such thing as good vibrations

The Beach Boys may have sung the praises of good vibrations but when it comes to audio playback systems, there may well be no such thing (except perhaps for those occurring between a phono stylus and an LP groove). We can distinguish between structure-borne and air-borne vibrations. The main differences between the two have to do with the manner in which they are transmitted to your audio system, and not the source of the vibration itself.

As I noted in my prior review of the HRS M3 Isolation Base, the sources of vibration are many: household appliances -- especially refrigerators, dishwashers, washers and dryers -- as well as video and audio components. The worst offenders are loudspeakers. Loudspeakers literally shake the room, which is the environment that the rest of your system is situated in. The vibrations created by the loudspeaker, including those internal to it, are fed back into the system through the room only to resurface as part of the output from the loudspeaker, and so on in a vicious cycle. Worse, given that most structure-borne vibrations in audio systems have broad frequency ranges, the prospect of finding matching natural frequencies with the rack system and audio components is high; the consequence is that non-musical energy can be significantly amplified.



The phrase 'air-borne vibration' refers to any source of vibration within the audible range of the playback system. Again, the greatest sources of air-borne vibrations are loudspeakers. These vibrations reach the outer skins of components and the equipment racks, floors and furnishings that support those components. Some of this energy is dissipated, some reflected and the rest is transformed into mechanical vibration that, like structure-borne vibrations, wind their ways through your system, often being amplified along the way. The main problem with vibrations is pretty simple. They constitute non-musical information degrading signal quality by loss, masking or through unnatural addition that can be spread broadly over the frequency range. In your playback system, the likelihood is great that you will end up damaging signal quality by amplifying essentially non-musical information e.g. distortion. The basic idea is simple to grasp. An audio or video signal from a source component exists in a noisy, vibrating environment; worse, the components in the chain are themselves, to varying degrees, noisy as well. The noise is transmitted and causes errors throughout the system and is likely to be amplified or inter-modulated along the way. Non-musical energy creates smearing which in turn obscures low-level detail. Musical attack and leading edge are blunted, harmonic structures inadequately resolved and decays truncated. Bass, which is hard enough to reproduce accurately under most conditions, will be less resolved and tuneful, and overall accuracy and musicality will be reduced. Timing suffers dramatically. High mass components in particular -- think many modern turntables -- that are inadequately isolated will sound sluggish. There is no part of music playback that is unlikely to not suffer at the hands of unwanted vibrations. In a word, music will be inaccurately portrayed. The return on the investment you have made in your audio system will be far less than it might otherwise be.

Broadband Noise Reduction

Any pretty good audio equipment rack will achieve some level of noise reduction at some frequencies. The problem, however, is that many rack systems reduce vibration at some frequency ranges only to amplify it at others. The key is broadband noise reduction. Broadband noise reduction is easy to achieve in theory, but very difficult to achieve in practice - especially with respect to mid and high frequencies. In general, the key is to create a large mismatch between any system's excitation frequency (Fe) and its natural frequency (Fn).

In principle, Fe should be greater than Fn. Theoretically, this should be no problem. In practice, however, the individual components that make up a system and the compliant elements themselves have their own vibration modes that get excited by mid and high frequency energy. So if you construct a system that is isolating at low frequencies and should be isolating at mid and high frequencies as well, it may actually be increasing output at those frequencies because of the vibrational modes of the components and their compliant elements.

This means that any way of achieving broadband reduction in practice has to begin with a much more complicated set of mathematical models that take into account all of the frequency modes of each component in the system and how they react individually and system-wide over a broad range of input frequencies. Not to put the point crudely, but there is literally no hope of achieving genuine broadband noise reduction through simple engineering solutions. The failure to achieve broadband reduction is sonically very easy to pick up, and may even be somewhat attractive to the ear at first. I have heard a much praised system isolate at low frequencies while actually amplifying mid and high frequency information. The initial sonic signature of such a system is an apparent increase in high-energy information and detail. What one is actually hearing is spot-lit and highlighted information of just the sort that sells equipment in high end stores, but which is in fact simply untrue to the music. Racks can trick just like cables and speakers can. The feature that most listeners are drawn to is a large soundstage, the sense of extraordinary high frequency information and detail. I just never hear live music in this way. In fact, I'm with Anthony Cordesman on this. In two recent reviews in The Absolute Sound, Cordesman quite rightly identifies these features of playback as artificial and bearing no relation to accurate musical reproduction. On the other hand, high-end systems tend in this direction and many purchasers feel that they get their money's worth only when they hear picked-out details that would otherwise be submerged in what they mistakenly think of as less 'revealing' systems.

A system that reduces noise broadband should have the following characteristics. There should be increased clarity throughout the frequency range. High frequency information should be naturally and fully resolved and should appear as part of the natural mix and not as if someone went in with a microscope and picked this or that 'detail' to highlight or draw attention to. Nothing in the playback should draw attention to itself. The overall sound should be relaxed yet dynamic, tuneful and well paced, but never unnaturally excited or energetic. The noise floor throughout the frequency range should drop precipitously and you should find yourself with two somewhat incompatible-seeming urges: the first being to turn down the volume control to secure the same level of volume from the system; the second being the urge to turn the volume up since the elimination of 'nasties' makes it considerably easier and more enjoyable to listen at louder volumes. There should finally be an increased sense of coherence through the entire range, a sense of immediacy and presence as yet another layer of artifacts is removed between you and the music.

I was able to experience a variety of particular instances in which the HRS system dazzled in these and other regards. When Mike first set up the rack, I had the Wilson Sophia loudspeaker with its inverted titanium tweeter. I quite liked the speaker; indeed it remains the only Wilson speaker I could personally live with long term and I did. In any case, I am no fan of any of their tweeters (though I do prefer them to the unfortunately ubiquitous beryllium tweeter of the day). While Mike was setting up the rack, a group of us were talking about the Wilson tweeter, with no one singing its praises. Mike took a contrary view. He asserted quite boldly that the ringing we often hear and associate with metal tweeters of any sort is largely an artifact of a failure to properly isolate associated equipment. Isolate the equipment, he alleged, and the ringing and harshness will disappear and in its place you will find a smooth, extended top end. The minions were skeptical to say the least.

In what has to be one of the great demonstration moments of all time, when the rack was set up completely and all the equipment back in place, lights off and the system fired up and music playing on TT and CD player alike, guess what happened? A transformed Wilson loudspeaker. While most of us sat with our jaws dropping and our mouths agape, Mike acted like this was a common occurrence. The HRS rack by the way sits in the super high-end room of New York's most prominent Audio Emporium where I have heard it work the exact same magic on the beryllium tweeter. How do I know the effect is real? Easy, I've heard the same tweeter in other rooms in the same store and not once did I find it a satisfying experience. On the other hand, I could listen to the top end in the back room all day; not only without fatigue but deriving real pleasure from doing so. I wouldn't want that confession spread though.

The Isolation Platform/Base

The shelves of each HRS rack are separate M-3 Isolation bases. Bases are specifically configured to work with the customer's equipment, in sizes that correspond to component size; within the size parameter, they can be constructed to handle components of different weight. Mine were 19" x 21". All three were designed to handle the components that were part of the reference system. Changing the weight that an isolation platform is optimal for is a piece of cake. If you purchase heavier equipment requiring a different isolation platform structure, all you need do is contact your dealer who will come to your home and replace the feet under the platform.

In effect this means that the HRS platform can last a lifetime. The only changes necessary are to the feet supporting the isolation platform. Mike Latvis estimates that normal changes in product purchases ('normal' by audiophile standards I imagine) should not amount to much more than another $300 in costs over the lifetime ownership of the rack. Speaking of which, each platform in designed to maintain its resonance control properties without deterioration indefinitely. There are two main structural elements in each isolation platform: a machined aluminum frame and a granite slab. Structural simplicity hides the engineering that lies just below the surface. The 0.75"-thick granite slab, which is placed inside the frame, is in fact decoupled from it and sits on a proprietary polymer substructure that has two purposes: 1) is to support the weight of the granite and the component, (2) is to decouple the granite from the frame and dissipate residual vibration energy and control structural resonances. The entire base rests on four custom billet-machined aluminum isolation feet precisely shaped to ensure minimum connection with the surface below. Each HRS Isolation Base foot is a six-degrees-of-freedom isolator. I will return to this feature of the footers when discussing the brackets. One of the secrets of the HRS rack is the manner in which the footers connect to the brackets which approaches a theoretical ideal that is yet another engineering feature designed to reduce the transfer of energy through the system.

The entire idea behind the HRS is to make sure that very little if any structural-borne vibrations get past the primary isolation stage. Any vibrations that penetrate the aluminum frame heading in the direction of your precious preamp, CD player or amplifier face a series of mechanical chokes and other energy reduction devices machined into the aluminum frame. The phrase 'mechanical choke' is used to describe a mechanism of mechanical constriction. A mechanical constriction occurs when you change a relatively large cross-sectional area into a relatively small cross-sectional area. The idea is to take mid and high frequency energy that is traveling through the frame and have it confront a mechanical constriction or barrier. Designed properly, such a constriction will reflect back to the source, thus reducing the amount that passes through. In toto, seven different materials are used within the aluminum frame. The materials chosen and their densities and locations within the frame are determined by their various anti-vibration properties. Final adjustments to materials and choke locations and material combinations are made by extensive listening tests.

Now imagine that some vibrations make their way beyond this point. If so, they will run into the proprietary polymer substructure that further reduces unwanted vibrations. In fact, the proprietary polymer substructure serves two purposes: first as I mentioned, to prevent vibrations that have come this far from proceeding further. This is accomplished by decoupling in ways that are not unfamiliar to those of you who have experience with Sorbothane feet. The HRS polymers are proprietary of course and their performance is said to exceed that of others. The more interesting feature of the proprietary polymer substructure that decouples the aluminum frame from the granite is that it is designed to control the resonances of the granite. Like all other materials, granite has a natural resonance frequency. Black granite is chosen for several reasons. A relatively small piece of granite goes a long way in being able to stably support components. In addition, granite ranks a 9 on the Mohr's hardness scale. Only diamond ranks higher (10). Among other things, this means that you can use metal cones of your choosing to further decouple your components from the isolation base without worrying about cutting, scratching or scraping the surface. One thing though, if you choose to further decouple your components from the granite, Mike is among those who would discourage you from making a three-point rather than a four (or more) point connection. Kiuchi-san of Harmonix, among others, also rejects three-point isolation. In any three-point approach, two corners of the component will be cantilevered. This creates an opportunity for the so-called 'diving board' effect, which may well significantly amplify any input vibrations that make it this far, including the air-borne vibrations that reach the skin of your components directly. The issue with three-point isolation may be more telling when such connections are used as way of fastening shelves to racks, especially if the shelves themselves have long horizontal cross braces. Shelves connected at three points are in principle very problematic (other things being equal) when components with four feet are placed upon them. This invites a more substantial impact of the diving board effect (cantilevered mass). I have no doubt that designers who rely upon three-point connections work hard to overcome the diving board effect and it would make interesting reading to learn more about how they do so.

There is no doubt that one could have chosen a material other than granite for the base of the platform: wood, acrylic and carbon fiber come to mind. In addition to having the properties I discussed above, granite adds a partial mass-damping element to the overall design. I have heard the HRS rack described as a mass-damping approach to resonance control. If I have succeeded at explaining how the isolation platforms work, one thing should be clear and that is that Mike Latvis employs a mixed approach with very little actual emphasis on mass damping. One has to be careful not to confuse the fact that while the HRS rack is heavy, that's different from claiming that it kills resonances through mass damping. Mike Latvis is quite explicit in suggesting that mass is a spectacularly inefficient way of controlling resonances. Whatever its virtues may be, Latvis is fully aware of the fact that granite has a sound of its own: that is, it has a natural resonance frequency of its own. The proprietary polymer substructure between the granite and the bracket is designed to control the untoward consequences of the granite's resonance properties.

Don’t expect many of the structure borne vibrations to make it to your platform: A brief look at the frame and bracket structures

My friend and fellow moonie John Potis asked a good question: how much of the rack's performance is owed to the rack structure or frame and how much is owed to the isolation platforms? Here's the only answer I would venture. I've owned the isolation platforms for nearly a year. I used them originally for my turntable and preamplifier, but now use them as amp stands. They work great on their own and the only way I know to get them to perform better is to put them in the M1R rack. The effect is clearly additive. We've discussed the isolation bases and now we can turn to the rack itself and the quite extraordinary brackets. In talking about the rack, let's focus on its frame or substructure. The frame itself is a relatively stiff structure with a relatively high resonance frequency, which is then tuned for optimal broadband isolation and noise reduction. This is accomplished in part by tuning the rack to a natural frequency that is significantly greater than the natural frequency of the decoupled isolation platforms. The process requires additional attention to material stiffness and damping.

Speaking of which, the frame is constructed of a variety of materials then covered by a stiff external 'skin'. The skin protects the internal energy absorption system and renders it independent of the finish the customer chooses for the rack. Thus, the resonance control system remains uncompromised by the finish to allow for furniture grade wood finishes, custom paint and exotic custom finishes. The HRS certainly belies the expression that beauty is only skin-deep. Now we come to the bracket. As we noted, it is important that the frame be tuned to a natural frequency that is significantly greater than that of the decoupled shelf system i.e. the M3 isolation bases. It is crucial to the rack's ability to maximize broadband noise reduction that each of the four custom isolators on the M3 Isolation Base contacts the M1R Rack system on a custom-machined ultra high-frequency billet-machined aluminum brackets (four per shelf). The only contact between each of the M3 Isolation Base custom footer system and the M1R Rack System brackets are four line elements at a near-zero total surface area. The near-zero contact area is also geometrically perpendicular to the primary mode shape of the M1R Rack System frame.

The near-zero surface area means that there is virtually no path for energy to pursue, from the structure of the rack to the aluminum frame of the isolation base. So not only do the footers of the base offer six degrees of freedom, they are connected to the brackets as a line element whose effective surface area approaches zero. While claims about six degrees of freedom are rampant in the industry, the more important characteristic is the footers' stability, and the need to insure that there is no path that vibrations can pursue through the connector to the shelf. The line-element, zero-surface area point of connection (combined with a broadband six-degree-of-freedom isolator) is to my knowledge unique to the HRS rack. The brackets have at least two other virtues as well: one practical, the other relating to the overall science of broadband noise reduction. The practical value is that it allows you to alter the number of shelves you use and the distance between them. The inside of the racks are fitted with holes into which the brackets can be placed. In effect you get adjustable shelves.

From the viewpoint of noise reduction, the other great virtue of the bracket system is that it eliminates the need for long horizontal bracing. Fewer and fewer good racks rely on long horizontal bracing, and the reason is pretty easy to understand. Using long horizontal cross members to support final shelf systems can provide an opportunity to create relatively low and mid-frequency resonance problems that will amplify input vibration. Just hit a crossbeam on many lower-priced rack systems and they will ring with relative large amplitude compared to input amplitude. Steel tubes, for example, will often amplify vibration by 100 times or more. As the distance from the vertical support structure to the contact point with the shelf increases, the amplification problems can worsen. The brackets allow the science of the frame to interact optimally with the engineering of the isolation platforms, each unit a tour de force of exceptional engineering in its own right. The bracket allows the system as a whole to work synergistically as designed. Nothing about this product suggests that it was rushed to market.

At the end of the day

Serguei Timachev claims for his Indra cable that it adds nothing and thus allows you to hear your components for better or worse. There is a difference between hearing what the designer had in mind and hearing what a design is capable of. More often than you might imagine, a designer does not really know what his designs are capable of. One can follow a path of trying to recreate the environment in which the original designer did his work. But one might miss -- just as the designer may have missed -- what the design is capable of. In the case of the Shindo electronics I use in my reference system, following Ken Shindo's approach would mean placing all my equipment on very heavy hardwood shelves. I toyed with the idea for a while. Alternatively, you can look for a rack that sounds good with the equipment you have: choose a good-sounding wood for example. Some folks like maple, some cherry. Choose between plywood and MDF and so on.

Such an approach does nothing in the end to control unwanted energy. It simply tries to find a sympathetic match between the characteristic sounds of the components and that of the rack. One is just amplifying pleasantries and not doing much to insure a clean or accurate environment. Change your equipment, change its character, and you may well have to change your rack as well. Instead of the rack functioning as a safe haven for your equipment, your rack becomes another piece of equipment with a distinctive sound of its own and your goal is to integrate that sound with the sound of your other products. There is nothing 'wrong' with pursuing this approach but it can prove maddening. It's hard enough to mate the tonal and other characteristics of components; why add the difficulty of matching the sonic characteristics of the components and the racks. At the end of the day, I chose to go the way of the safe haven.

And a safe haven is what the HRS products have proven to be. Periodically, I have taken some of my components off the shelves and placed them on other racks or on tuning feet on the floor. Doing so noticeably degrades the sound in obvious ways. A great example occurred about a month or so ago when two friends who are inclined to follow the Japanese approach -- which is to place electronics on hardwoods, then to tune if necessary by the use of Harmonix feet -- came by. They had been prodding me for some time to take the amps off the M-3 bases and place them on the floor. They came prepared with tuning feet for adjustments if necessary. They expected to hear deeper bass, experience greater warmth and an even greater emotional connection to the music. What are friends for? Why not? Each took hold of one amplifier and removed it from the shelf and placed it on the hardwood floor. Within a minute of turning the music on, they were putting the amps back onto their shelves/amp stands (M3 Isolation Bases). No point wasting time with the tuning feet.

It's almost always that noticeable. Music played through components on the HRS rack has a seductive ease. There is no brittle or non-musical character to it. Everything sounds unforced and natural. Notes come and go but never seem to be in a hurry. Nothing is ever truncated. It is easier to listen at low volumes and more enjoyable than ever to listen at louder volumes. Once you experience first-rate resonance control, you cannot go back. You hear artifacts everywhere, much the way I used to hear crossovers in speakers after spending so much time with crossover-less full range drivers. I am not urging you to rush right out and order an HRS rack. You might want to begin by ordering one of their isolation bases for a source component, though. If you are interested in a rack, get in line. One thing's for sure - I'm not about to give up my place in the production line for you. And there is a line, needless to say. Whether you purchase an HRS rack or not, the key point is that you begin to take seriously the impact of the sonic environment on your music playback system. If you cannot clean up the environment in which you listen to your music, you need to be attentive to minimizing its impact on your system. You owe it to yourself and to the system you have invested in.

My aim here has obviously been to review the HRS MIR rack. I think the world of it and wouldn't think of being without it at this point. But my main purpose is to illustrate that there is important science in real resonance control, and that the failure to be attentive to the consequences of unwanted noise in your system can be bad indeed. Not every approach to resonance control should be taken seriously, however. I once had someone who represents an excellent company that specializes in tuning feet try to explain to me how they work by saying that the feet are able to transform odd-order harmonic distortions into even-order distortions. Enough said. An equipment rack is not just a place where you put your components. If that's how you treat it, you will not merely get less out of your system than you can; you will likely hurt its performance. A good rack is the best homeland security you can purchase for your investment.

I have a large investment in my audio system and I use it not only for pleasure but also for reviewing, for making assessments of the performance of other components. With that in mind and in the war on unwanted resonances, I'm putting my money on high quality science and engineering, especially when the fellow leading the charge loves music like I do. I put my money on the HRS rack system. I would strongly encourage you to consider doing so as well. But even more than that, I encourage you to take seriously the importance of resonance control to the overall performance of your system. The rewards you reap will be large and if you choose well, be consistent from component to component. You have a lot invested in your system. Protect that investment.

Jules Coleman

Publisher's Comment:
Unlike my current evaluation of an equipment rack which compares it head-to-head against another one for context, the opportunity did not arise for Jules to arrange for an in-house comparator to the M1R. Hence this write-up is more general in nature and predominantly an exploration of the HRS design philosophy rather than an in-depth description of how it performs vis-à-vis other competing products in this still relatively young product segment. Should a future opportunity arise whereby one of our reviewers can revisit today's product while having another high-level stand in house, we'd be very interested in adding more specific comparative data to Jules' observations.

Srajan Ebaen