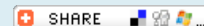


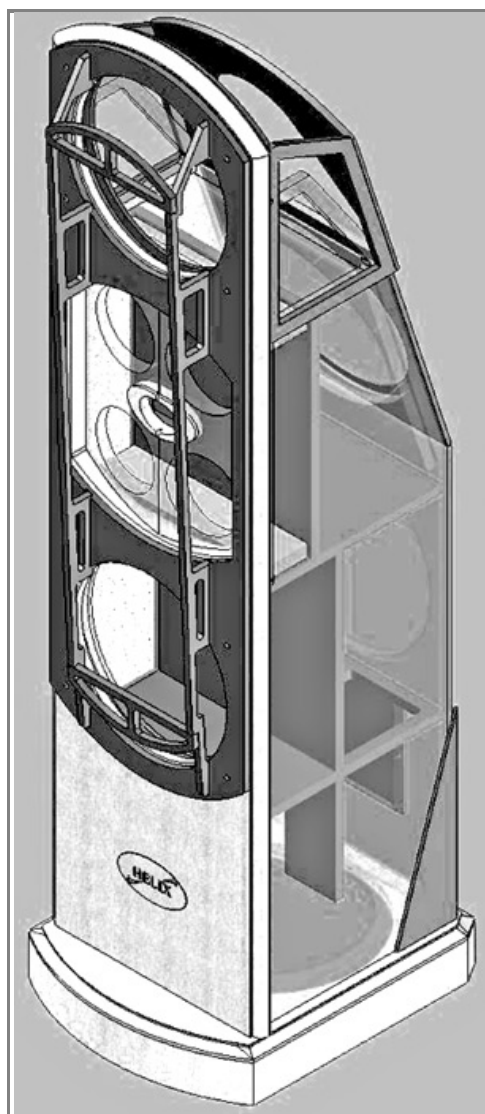


January 2009



Legacy Audio Helix loudspeaker system Super-review: TECHNICAL VERSION

Doug Schroeder



Specifications:

System type: 10 drivers, 5-way

Drivers: Neo-Quadra-Pole tweeter x 1,
6-inch Curvilinear midrange x 4,
15-inch Neodymium midwoofer x 3,
15-inch copper/aluminum subwoofer x 1

Frequency response: 16 ~ 25kHz +/- 2dB

Sensitivity: 100dB

Impedance: 4?

Recommended amplification: 3x300 watts

Crossover: 60, 200, 8k (Hz)

Dimensions: 15.875 W x 13 D x 55.5 H (inch)

Weight: 300lb each

MSRP: \$43,000

Manufacturer:

Legacy Audio
Tel. 217-544-3178

URL: www.legacyaudio.com
Email: info@legacyaudio.com

This version of the Helix review contains predominantly technical information related to the design and operation of the Helix Speaker system. In the [PHILOSOPHICAL VERSION](#), I discuss the topic of Origins. Readers wishing to enjoy that additional commentary are welcome to read that version. It contains all the technical information in this article. For those wishing to avoid



discussion of philosophy or Origins, the critical information in discussion of the Helix Speaker System is contained in this article.

I am thoroughly aware of how unusual this “dual format” is. I do not intend on replicating it, as it has been arduous and moves beyond the norm in reviewing. However, I wish to try new things in reviewing as opposed to merely rehashing tired formats. I appreciate the latitude our editor has afforded me to experiment as a reviewer.

This is the first installment of a “Super-review”, meaning that it is an assemblage of reviews about a system specifically put together for ultimate performance. Rather than starting with one component and seeing how well it can work with what is on hand, Super-review components are selected as they are deemed highly suitable for each other. The result is a cadre of reviews which

complement each other and lead the reader to understand not just the experience of an individual component, but its potential to be placed in a system in which it, and all the other attending pieces, can perform optimally together. It is a system-based approach in reviewing.

This particular article of the Super-review is long, but not nearly as long and intense as the PHILOSOPHICAL VERSION! If its expansiveness is onerous, feel free to select portions (as at a buffet) to digest.

Suggestion on reading this review:

This portion of the Helix speaker system review is distinct in format. In celebration of the theme of the Helix, I have adopted a more artistic format, one which physically applauds the wonder of the ubiquitous entwined strands of the DNA. You will find woven here two strands of thought. In normal type will be the main body of the review, containing the informational elements of my work.

The bold italicized type inserted between paragraphs of the text contains my emotional reactions to the Helix. I recommend that you read through the work, skipping the italicized insertions. Then, return to the beginning and follow the flow of the emotive content.

Enjoy!

The Helix

It takes painstaking design, along with the laws of nature in order to make a natural sounding speaker. One can see the excitement on his face when Bill Dudleston, owner and chief designer at Legacy Audio enthuses on the beauty and delicacy of the acoustic laws. How much effort has Bill put into understanding these acoustic laws? One draws a clue from the names of Legacy Audio speakers... Focus, Whisper, Helix. These names all hearken to an otherworldly complexity and precision underlying even the most "simple" experience of hearing. Bill has dedicated himself to creating devices which allow others to hear the impact of those acoustic laws.

"Turn it down! Turn it Down," my mind screamed! During set up, Bill

The Helix speaker is only half the story of Legacy Audio's technological prowess. I will be exploring the implementation of Legacy technology in the high-end audio marketplace. The other half is found in the world of professional audio via the "Double Helix", a speaker system which has been made by Bill for the largest recording company in the world, Universal Music Group. It is a larger expression of the Helix. Bill Dudleston makes speakers which bowl people over, whether for home or studio use. The years he has spent in product development, putting in thousands of hours on driver optimization, diaphragm material studies, acoustic studies and DSP applications are evident in his designs. I will let the reader explore the Legacy website for more about the Double Helix, a mega-speaker system:

http://legacyaudio.com/index.php?option=com_content&task=view&id=17&Itemid=33

A Word About the Super-Review Format

The Super-review concept was conceived in the wake of the invitation to review the Helix. I wanted top tier equipment for the review, and I knew that the selection of each component would be critical to the desired result. As each piece contributed to the beauty of the system, I felt it proper to conduct a thorough review of it with a description of how it contributed to the system.

Dudleston took the speaker to hideous levels - it was painful!
But

When considering matching components for the Helix I went with companies I was familiar with; I wanted experience and quality on my side when approaching these speakers. Bolstered by familiarity of their products, I approached Ayon Audio, Jeff Rowland Design Group, and Wire World Cables to contribute top designs for the project.

there was no distortion! ...The bass sent vibrations through my
cement

Here is what I sought from each of them:

Ayon Audio – Having worked with the enticing [CD-1](#), I wanted a Redbook source with both richness and depth. The signal needed to extend seemingly indefinitely. The sound could not be harsh or etched from improper signal treatment. The CD-3 has been superb at sending a signal that walks the line between an overly detailed/processed signal and one which is too murky or muddled from the influence of tubes.

floor, and the speakers didn't even seem taxed!



Jeff Rowland Design Group – I specifically designed this Super-review so that in discussing amplification the MC-606 multi-channel amp would be reviewed while I was pursuing multiple preamps. Part of this was due to pragmatism. I knew the project would be huge, and I had to limit it in some manner, lest it become unmanageable. The Super-review will not carry a focus on one preamp, but mention these three: Jeff Rowland Capri, Valve Amplification Company (VAC) Signature Preamp MkII, and Cambridge Audio Azur 840E.

(Listening to John Barry's score "Out of Africa")The incessant sound of

I spent considerable time with the JRDG 501 Mono Block amps, and I have been impressed by the gravitas of these IcePower wonders. While they were a touch "white" sounding, I knew that the addition of the Power Factor Correction devices in the MC-606 Multi-Channel Amp would likely add richness – an expectation which was met. I also knew that the selection of preamp would have a pervasive influence on the Helix. The JRDG Capri Preamp brought the MC-606 closer to tube-like sound.

the drum, the slap of a palm on a rude tribal drum's skin, returned me

I will be forthright; the JRDG Capri was not the perfect fit for the MC-606 and the Helix system. I have had exceptional results with the Capri in other rigs, including pairings with the Legacy Audio Focus HD. If I had an extended period and additional amplifiers, cables and sources I have no doubt that I could utilize the Capri in every bit as stunning a system behind the Helix speakers. However, with the review system I assembled, I sought additional preamps as I was not completely satisfied with the end result.

to my childhood. It was the same sound I had made with the ethnic

The economical Cambridge Audio Azur 840E was a pleasant surprise. It brought a clear, succinct signal to the MC-606 amp. Just as the Azur 840C player has an openness to its delivery, so did the preamp exhibit a wide open spatiality. The pairing of these two was suitable and I used them together a fair bit.

drums my father brought home for me from his world travels.

Valve Amplification Company (VAC) - I knew I needed an "Extreme End" preamplifier. I contacted Kevin Hays of the Valve Amplification Company (VAC) and discussed use of his Renaissance Signature Preamp MkII with the Super-review system. Though pressed with a six-week delay to fulfill outstanding orders, he was able to release a unit for my use.

The Signature Preamp ran away with the honors. If a comparison could be made to a foot race, others were just getting out of the blocks at the starting gun while the VAC was halfway to the finish line. Out of the box it had stunning performance, a nearly faultless fabric, a sonic

tapestry like a rich oriental rug. Once it was placed in the rig it never left its position of honor, right in front, controlling the show. It was one of those, "...over my dead body," components.

Wireworld Cables – I can garnish a wealth of information about any component when using Wireworld designs. The range of cables in their product line allows me to tune a rig to perfection, and I was extremely pleased with their performance. This particular pair of Helix speakers was wired with Wireworld internal cabling, which was a bonus for the review. I especially appreciate the fact that due to Wireworld's design, no power conditioning is necessary. The result is a super clean signal path and a marvelously unrestricted sound. I was completely satisfied with the performance.

"This is not listening to a system; this is listening to music!" -

Although building a high-end system to perfection is an art, I feel I have accomplished the task of putting together a rig which would impress even the most discriminating audiophile. There are many rigs which I assemble that have aspects of performance that are commendable. Would I recommend anyone searching for near ultimate performance purchase those entire systems? No. However, I do feel that the Super-review system is so good that I would recommend it in its entirety to those with the means. It has the attributes of the finest sounding systems available, and offers surprising flexibility in set up. In terms of overall performance, it is elite, and only the preamp would need to be chosen to match up with one's preferences.

Audiophile friend's comment upon hearing the Super-review system.

Expand and Shape, or Shape and Expand?

Increasingly, mankind is becoming aware that the slightest nuances of sound at various levels drastically affect life. As in critical facets of physical life, so it happens also in the realm of audio; the lowest, inaudible elements of complexity in the signal largely determine the resultant audio experience. For this reason, Bill has chosen to shape the "lowest levels" of sound through use of an active crossover prior to expansion of the signal. I will endeavor to show that an active crossover, when used before amplification, exerts a profound influence in attaining a sense of life in reproduced music.

I open the door to the listening room, turn on the light, fire up the rig

As audiophiles grow in maturity, they continue to place emphasis on the quality of the system's front-end. Those without the means, or inclination to believe, that the pristine nature of the source is fundamental to the highest sound quality are incredulous at the amount of money that can be spent on a CD player or turntable. Those with the highest-end rigs are not surprised at all, for they have heard the impact of a quality source upstream. However, the speaker crossover presents a repositionable variable, one which is not often considered. As the enthusiast can move up the audio "food chain" from receivers to integrations, and on to separates, so also one can move up the speaker chain from traditional dynamic speakers to passive speakers with active crossover solutions. The results can be much more gratifying than switching sources. But, what motivation would a listener have to do so? That is what I aimed to discover and will share with you.

and begin another listening event. Even experienced audiophiles would



The Non-Component Component

To a sizable number of audiophiles, the crossover is a "non-component", a device which is part of a speaker, sitting inside benignly doing its job as the drivers are observed (often obsessively) flexing.

The use of an active crossover moves it from the status as a part of a speaker to an independent component. In the mind of an engineer, the crossover already is an independent component (a passive one, not requiring a power source of its own) of the speaker system, nestled mostly inside cabinets. An audiophile may have a general awareness about the importance of crossovers, that their assemblage and tuning by the manufacturer dictate quite a bit of the performance of the speaker. What's less known is that, in Legacy's view, the performance of a crossover can be dramatically improved by making it an external active component and placing it before the amplification.

struggle to understand how thrilling this sounds.

For the uninitiated, the idea of jockeying around the crossover to place it prior (as an active device with its own power source) to amplification versus after (as a passive device within the speaker cabinet) might seem nit picking. It is not.

Just as Chaos Theorists have discovered that exquisitely tiny variations in Nature can have global consequences, so also can rearrangement of the crossover transform performance of the entire speaker. By manipulating (and I do mean manipulating – as the Helix crossover is actually an eight-channel, 24-bit digital processor) the signal in the most miniscule fashion pre-amplification, there is a mind-boggling array of possibilities opened for precision tuning. The ability to tailor each driver set's frequency curve in real time is the sonic equivalent of moving from a Model T to the Mars Lander. Control over the initial conditions, and hence the ending conditions, is so superb that one experiences auditory effect not unlike the improvement of a plasma TV over a conventional television.

This is a supercar - extreme skydiving - free solo climbing. With my

The active crossover-passive speaker format is so technically different, and can produce such dramatically different results in certain aspects of audio reproduction, that it is rightly categorized as a different genre of speaker.

Speaker manufacturers have known for some time that in certain applications, this technology can outperform comparable traditional speakers. Manufacturers, like Legacy, are now vying to prove that such performance will win over high-minded, high-end domestic listeners as well. One of the greatest barriers to selling an actively crossed speaker system has been the perception on the part of the public that an exceedingly high-level of technical prowess is required. Speaker designers, Legacy included, have been working overtime to eliminate that barrier and smooth the way for wider ownership.

finger on the volume button I feel I'm pushing the limits. And I LIKE it!

Extreme High-End

We audiophiles tend to desire supreme results with minimum effort. However, technology doesn't always work that way. The audiophile can achieve a modicum of success with minimal effort and expense. With diligence, and usually more expense, a person can overachieve by buying extremely high quality traditional components. Despite bearing a name such as "Legacy", the Helix is not a traditional speaker - nor does it perform like one.

Those looking for extreme performance should not be put off by the fear of complexity, as this type of speaker system has become much more manageable.

Is there anywhere upward left to go in terms of speakers? It's like I've

In the world of fashion, "Haute Couture" denotes the most personal and exquisite clothing. In one sense, the Helix is one-of-a-kind and approaches "Haute Technure" status by tailoring the best in speakers to one's personal preferences. The Helix is not designed to be everyman's speaker; rather they are an extreme speaker, the enthusiast's speaker, incorporating some of the best technology and design available. In some ways it is the model speaker.

climbed Everest, I'm past the last camp, and the summit is in sight.

From ample time spent with the Helix I confirm there definitely is something to the distribution and shaping of the frequency, prior to amplification, which serves the resultant sound well. I assess technological "improvements" on a real world basis using my Law of Efficacy. The law states that for any proffered improvement to be worthwhile it must be immediate and radically different. Especially in the case of a speaker system using alternative technological approach and costing in excess of \$40K, it had better sound radically better than average or else I would consider it a waste of money.

Where do I go from here? Sadly, I think, down.

Not only did the Helix pass the Law of Efficacy, but in one major sense it surpassed it. It so outperformed even larger floor standing traditional multi-way dynamic speakers that I consider it to be in a different class in many respects. Speaking of classes of speakers, I have had the pleasure of hearing many classy high-end models in the under \$100K range, and several beyond that price point. One of the things about the Helix that struck me with the force of an anvil was the way the Helix captured the best of "ultimate" speaker systems while eschewing the worst.

I have seldom been moved to tears by music; I am usually placid,

I couldn't help but contemplate where the Helix stood in terms of specifications in comparison with some of the best. I compiled a chart of speakers, most very well known, from what is considered the more extreme High-End. It gives a lot of room for some outstanding competition to the Helix's design. I gathered the specifications to produce an objective comparison. While numbers don't tell everything, they can tell a lot. As of August of 2008, these were the specifications of the speakers listed.



Speaker System	Price	Driver Configuration	Frequ.	Impedance	Sensitivity	Rec Watt
Dali Megaline	\$40k	6.5"x12; 3 Dipole Ribbon	35Hz - 22kHz	6 Ohm	89 dB	100+
Dynaudio Evidence Master	\$85K	8"x2; 6"x2; 1"x2	20Hz - 26kHz	?	92dB	?
Egglestonworks Ivy	\$97K	12"x9; 6"x12; 1"x2	13Hz - 24kHz*	7 Ohm	87dB	?
JM Labs Grande Utopia EM	\$180K	16"; 11"; 2x6.5"; 1"	18Hz-40kHz	8 Ohm	94dB	50+
Legacy Audio Helix	\$43K	15"sub; 15"x2; 6"x4; 1"x2	16Hz - 25kHz*	4 Ohm	100dB	50+, 10+
PBN Montana WAS	\$55K	15"x2; 9"x2; 5.25"x2; 1"	16Hz - 22kHz	?	94dB	?
Sonus Faber Stradivari Homage	\$42.5K	12"x2; 6"; 1"	22Hz - 40-kHz	4 Ohm	92dB	30+
Von Schweikert VR-11	\$150K	15"x2; 8.5"x4; 7"x2; 1.5"x2; 5" ribbon x2	15Hz - 35kHz*	8 Ohm	96dB	20+
Wilson Audio Alexandria X-2	\$135K	15"; 13"; 6.75"x2; 1"; 1"	19.5Hz - 22.5kHz	4 Ohm	95dB	7+
YG Acoustics Anat Reference	\$92K	8"x2; 5.25"x2; 1"	20Hz - 20kHz*	4 Ohm	82dB	?

* Eggleston Ivy frequency response 13Hz - 24kHz -4dB
Legacy Audio Helix frequency response 16Hz - 25kHz +/-2dB
Von Schweikert VR-11 frequency response 15Hz - 35kHz +/-1 dB
YG Acoustics Anat Reference frequency response 20Hz - 20kHz +/- 0.7 dB

The numbers, in this case, tell that the Helix has some outstanding specs, on par with several speakers under \$100,000. In several categories, including price, the Helix is rated number one or two, and it consistently scores high. It has wonderful frequency extension, superb sensitivity and size to establish grand scale in listening, incredible flexibility with its crossover – all at a price competitive with some very notable speakers.

unemotional. But these speakers make me laugh heartily at the

Physical Description

How has the Helix been designed to perform at that level? In terms of size, to call it “gargantuan” would be an overstatement, “large”, an understatement; huge is appropriate. I am 6’5” tall and have never worked with a speaker that made me feel petite until the Helix, which rises to 6’ 2”. At 320 lbs. each they are not an object one moves about the house on a whim; thankfully the pair I received rest on casters, making it possible to muscle them around on my thick carpeting, if need be. They are “giddy sized” in the sense that some items are so outrageously overwhelming that, when placed in one’s home, they elicit a guffaw of delight - giddiness.

audacity, the outrageousness of the experience!

Each pristine cabinet has 34 CNC milled components with thickness varying from 1.5” to 2” thick. The enclosure pieces are cut to the proper dimension and angle, then interlocked and braced to divide the enclosure into four separate chambers. Once glued and clamped, the interior is coated with a rubberized asphalt-like material which resembles truck bed liner. No wonder the thing is so heavy! Don’t laugh at the thought of truck bed liner-like glop inside the speaker. Stuff like that absolutely kills unwanted vibrations. It is not difficult for me to imagine how this alters the sound of the MDF cabinet. This step has largely eliminated the complaint of a “box” sound due to construction materials. No matter the intensity of the music, no matter the level, I could not make the Helix sound like a hollow, boxy speaker. More than most dynamic speakers I have used, the drivers sounded unencumbered by the cabinet.

LeAnn Rimes’ “How Do I Live”; I play it over, and over... It’s likely I will

The lavish craftsmanship of the cabinetry is worth a guffaw as well. For as technically oriented as the Helix is and as large its dimensions are, they serve the laws of acoustics, and sound rich and inviting. I relish the precision in matching of wood veneer on any speaker; the highly striated Rosewood on this particular pair is magnificent! Legacy has opted to make a diminutive name plate out of proportion to the speaker, which shows off the beauty of the cabinet without distractions.

not hear it this good in my room again for a long time.

The front grill protrudes from the speaker obviously; it appears as an oddity, with its structural form seen under the mesh. While acoustically transparent, it is not exactly attractive. If it was not determined as necessary sonically, I would recommend a

reduction to a slimmer grill. In fact, I had the grill removed from the get go and never put it back on. Unless the WAF dominates the listening room’s décor, I would urge the grills be stored away, making the full glory of the Helix observable.

Some music is so bad, so grotesque and dark, that I won’t even play it.

The Drivers and Inputs

The Helix is a ten-driver, 5-way speaker, which is not readily apparent since a casual analysis

shows only four sets of speakers requiring inputs. As one surveys the Helix, the obvious driver sets can be seen (per speaker):

-Rear firing 15" Rohacell reinforced Silver Graphite active subwoofer; powered by an internal 750W IcePower module. Each subwoofer requires an XLR lead from the processor, and a 15A IEC power cord.

-Twin forward firing 15" Carbon pulp bass drivers, the bottom one in the ported cabinet, and the top an open baffle design.

-"Quad Curvilinear" midrange consisting of four equidistant outwardly splayed 6" midrange drivers surrounding the tweeters.

-Dual tweeters comprising the "Neo-Quadra-Pole" array

But, I bet it would sound good on these speakers.

Looking a bit more closely at these drivers, the 4th generation, 15-inch subwoofer's diaphragm and spider, as well as the motor, are made by an unnamed specialist. The driver features a second coil for dynamic braking. The mid-bass drivers are made by B&C of Florence, Italy. The maximum excursion is 14mm with a sensitivity of 99.5 dB. Backing the bass drivers and subwoofer is a substance called "Rohacell", an extremely light Polymethacrylimide rigid foam used at the Fermi Laboratory as a structural material, as well as in aircraft construction. So I guess it works! In the Helix it works as a backing to keep these huge pulp drivers from deforming at high power.

I recall driving that ten ton dump truck. Size! Power! HUGENESS! A

The midrange drivers are custom built for Legacy by B&C. Both the bass and mid drivers are constructed of "natural pulp", which has long fibers of random lengths. The pulp is vacuum filtered and pressed into a diaphragm of uniform thickness. The mids have high extension of frequency response, being able to operate at 4 kHz, which makes them extremely suitable to be blended with the tweeters via the processor.

pickup truck? Phhhhaw! That's a toy! These big, full range, five-ways

The duet of soft-domed tweeters are housed in their own "flare". The diaphragms are splayed horizontally, while a "vertical dividing blade" prevents comb filtering off-axis at frequencies where wavelengths are less than an inch long.

let you know what full immersion sound is like!

There are two not-so-obvious drivers: Centered directly under the cabinet is a downward firing 15" passive radiator, the thrust of which is directed out the back of the speaker through a rectangular port in the speaker's apron. The most unexpected driver resides on the upper part of the sloped backside, underneath what appears as an aesthetically placed square grill, and well above the subwoofer.

Remove the sloped grill and the final 15" driver is seen – one which is not listed in the specifications (Note: the only grill which Legacy recommends removing for listening is in the front). It is called the "rear energy terminating driver"; Bill affectionately refers to it as the "Pac Man" driver, which is connected out of phase to the front drivers. Its purpose is to reduce the energy buildup in the 50Hz to 120Hz range due to a headwall, and its operating level is set proportional to the front radiation. Bill states, "If you put your ear to it, it sounds like it is radiating garbage. It is actually reducing garbage that would otherwise reach the listener."

At the right level every vocalist is "locked in". A phantom image like

At least one Legacy model, the Focus (I use the HD version), incorporates attenuation switches on the back. Such devices are unnecessary with the Helix as myriad parameters for the signal are treated by the crossover. The active subwoofer uses a balanced input, while the bass, midrange and treble require unbalanced spades or bananas. Legacy's own hefty, widely spaced binding posts will not accept a standard dual banana plug. There are three sets of those posts for the bass, midrange and treble inputs.

I've not heard from any other speaker I have used.



The Processor...



Apart from the speaker, but every bit as critical, is the “brain” of the Helix, the processor. This is a 24-bit digital processor, (Bill declined to publicize the manufacturer), providing to each stereo channel four bands of phase coherent Linkwitz-Riley filters, room contour adjustment and time adjustment. The unit has a 56-bit “accumulator”, which allows it to be adjusted by the dealer via a serial port. It also has a security lockout to protect settings. The take away point here is that you do not need to have technological skills to own the Helix. The processor comes with four “programs”; a program is a full setting for the speaker, you can pick whichever you like, or have your own made for you. If you want the program set up by Legacy, they can do so. If you futz with it and somehow erase it (not likely, since programs can be locked), Legacy can send it to your computer, and it can be transferred to the processor via an RS-232 connection on the back.

The Helix is kind to my ears, yet with devastating capabilities. Even at

One thing that must be made clear: The Legacy processor (as with all active crossovers) does the task of equalization, however they replace hard wired crossovers. In this case, you can't have your cake and eat it too. If you rid yourself of the passive crossover inside a multi-driver speaker, you must treat the signals for the drivers with an external crossover, in this case a processor.

That means more cables for you to buy, in this case, four pairs. Considering that you likely already own two sets of interconnects, the four additional pairs for functionality of the Helix are employed as follows; three sets of balanced (XLR) interconnects for the treble, midrange and bass signals traveling from processor to amp channels, and one set of much longer balanced interconnects, which take the signal from the processor unamplified directly to the subwoofer input on the back of the speaker. The Helix's internal IcePower amp uses that signal for the rear-firing sub. As might be assumed, three sets of speaker cables must attend the treble, midrange and bass outputs from the amp to the speakers.

I want to emphasize that the quality, or purity, of signal treatment from the Helix is quite improved over a traditional speaker. Not having an identical Helix speaker with an internal, passive crossover (Legacy has previously made such a special order version) for comparison, I cannot comment absolutely about any positive or negative contribution by the processor. I absolutely do not have a sense of diminishment in quality with the use of the active crossover. Quite the contrary, the result is so good that it makes me wonder why aren't more Hi-Fi speaker manufacturers working with active crossovers?

low levels it displays formidability. It has the presence of a Titan; no

Huge Speaker in a Smaller Room?



How large a speaker would you entertain placing in a room with dimensions of 23 x 13 x 7.5 feet? Many would default to good sized monitors on stands. If you were going to go over the top, you might consider a modest planar, or daresay a floor stander about four feet high. While that may be “pushing it” in the minds of some, I'll tell you what's pushing it – a nearly two-meter behemoth weighing 320 lbs! The Helix is so big that its hulking frame sits approximately one foot from both the sidewalls and the ceiling of my room! It is accurate to say it's been shoehorned into place.

matter where you are in relation to it, the shadow it casts sonically

So modest is my accommodation, and so gratuitous this speaker, that I checked with Bill twice on the feasibility of using them in such a space. In bringing in such a prodigious speaker into my room, I felt like I was violating a fundamental law of the universe: Never use a huge speaker in a small room. I had never seen such a law written indelibly, but I believed it to be true. It is not uncommon for an audiophile to suspect that limitations (set by room size, layout, etc.) exist and as a consequence rule out some permutations of gear a priori. Oh, what a joyous experience to find out how wrong I was! The Helix flat out works and works dazzlingly well in my room! This leads me to question other supposed “infallible rules” of audio.

encompasses you.

How can such a hulking speaker work in a diminutive space? Wouldn't its powerful projection ricochet off the walls and decimate any sense of correctness to the sound?

The smaller room actually plays to Bill's design very well; he wanted the Helix put to the test in a



modest space in order to reveal one of its great strengths: image focus. The Helix keeps the presentation locked onto the listener, and does not allow it to roam and interact detrimentally with the room.

Rosy Grier was a defensive lineman for the Giants and the Rams; and

There are two key elements to keeping the speaker less interactive with the boundaries. One aspect is the configuration of the forward-firing 15" bass drivers; one in an upper open baffle, and the other in a lower, sealed enclosure in the cabinet. The center of the array is coincident with the tweeter, and the bass drivers are time corrected to offset the typical, 5-millisecond lag of such large drivers. According to Bill, "The summation of the figure-of-eight and the spherical omni patterns results in a directional cardioid pattern well down into the room pressurization frequencies, where the sub takes over." In other words, the two drivers form a heart-shaped dispersion with a shallow back, which does not react as much with the head wall behind them. This makes for more clarity of bass in the front, where the listener is.

he did needlepoint. Like Rosey, these speakers can do delicate, but if

The other trick to keeping the radiation pattern of the drivers away from the side walls, ceiling, and floor is to put the narrower dispersion high frequency dual tweeters in the middle of the four splayed midrange drivers. Bill explains that these 6" drivers are spaced and angled to prevent sidewall and floor reflections, "summing maximally on axis and gradually

attenuating as you move off axis." The listener is in the sweet spot of the sum of the drivers, while they are angled so as not to bounce directly off the ceiling, floor or side walls.

you laugh, they'll break your bony behind in half!

These technologies seem to be both logical and effective. I cannot speak for how the Helix would sound in an environment with a preponderance of hard surfaces, but in a modest, tuned room with carpeting it conducts itself with aplomb that many a smaller speaker has not achieved. I had to work to control the bass of the much more diminutive [Wilson Benesch Curve](#) speakers. I struggled to contain the treble of the [Von Schweikert VR-4 SR MkII](#) and even the [Tannoy Glenair](#). I have had no operational issues to correct with the Helix, despite it having a twin tweeter set, eight mids and four 15" bass drivers!

Maybe it's not a curse that I can't afford these. I am succumbing to the

One reason I so enjoy the high frequency reproduction of the Helix is due to the tweeters having silk diaphragms. They are also loaded individually into a short flare, which lowers distortion by raising output in the forward plane. A vertical "dividing blade" prevents comb filtering off-axis at frequencies where the waves are less than one-inch long. All of the other drivers are not covered, except with the tweeters.

This is an interesting technique, which to my ear is preferable to many tweeter designs I have heard. I rather enjoy the open mid and lower drivers while the tweeter is behind a "veil". It sounds as though the tweeter is at the correct intensity level. So many times I want to tone down the output of tweeters, as I felt they could distract from the other drivers. With some speakers, I have tried homemade solutions to take the edge off their seemingly disproportionate output. To my ears, the tweeters of the Helix have an excellent physical arrangement to let the tweeter's electronic properties operate correctly.

ageless temptation to be at a concert every time I listen. I keep turning

What a Huge Speaker Brings to the Party

When I first entered high-end audio, it did not take me long to determine what is for me an Adage of Superb Sound: The size of the speaker determines much of the involvement in listening to music. Two times in the past I pursued monitor and subwoofer systems, neither time finding long-term satisfaction. Over the years, my fascination with floor standers of stunted height has waned; they all sound small and low to the floor to me. For that reason, they struggle to sound true to life. In many respects, they may sound similar to live music, but without the scale brought by a huge speaker they are diminished.

it up, to get that sense of being there. I could go deaf doing that!

Thinking back on the speaker systems I have heard or owned which most moved me, they have always been, unfailingly, larger ones. I think a significant reason audiophiles like planars is that they generate a scale disproportionate to competitively priced dynamic speakers. One of my motivations in pursuing a “stacked” Eminent Technology LFT-8A speaker system several years ago was for the same reason – scale. A factor in the purchase of the Legacy Audio Focus HD speakers I reviewed was their size; they can do “big” music well – they have wonderful scale for a moderately priced full-range speaker.

I like showing guests into the listening room. When they first see

And it Sounds Like...

My listening tastes run toward smooth jazz, solo instrumental, synthesized new age (western) and instrumental rock. I will share with you some of the listening experiences I have enjoyed with the Helix. When reviewing, I listen for critical aspects of speaker performance, which I find in certain recordings.

the Helix speakers, their eyes widen and they emit indistinct sounds.

I spent some time listening to the 1970's sensation, the O' Jays. They have a soul vibe with large groupings of strings in the background. I find this to be a very enjoyable mix. The Helix brought to life a wealth of information which was buried in the older tracks such as “Back Stabbers” and “Love Train”. It was delightful to hear a backing with body, strings that sounded like live people rather than flimsy keyboard filler so often heard today. While these older recordings were compromised by today's standards, the Helix was grand enough to enrich them so that the orchestration could be appreciated.

Instantly they know they are in the presence of something quite

Another unusual offering from my earlier listening days was Tomita's Snowflakes Are Dancing. In my youth, I was introduced to Tomita by a well-off young man who had a B&O (Bang and Olufsen) system. Back then, B&O gear was a very high class novelty. Let's say that Tomita's music is “novel” as well. As a teen I got my own copy of the album and played it tirelessly, fascinated by the intricate synthesized sound.

extraordinary.

I decided to put Tomita's version of the Firebird Suite up against the Encore's Greatest Hits version of Stravinsky's “The Firebird”. Tomita didn't fare too well. It wasn't the character of the sound – the Helix raced along with every tweak and torque of the synthesizer. It was the lack of significance that got to me. Putting on the orchestral version, it was full of sweeping grace and elegance; the piece became a living thing through the Helix. The illusion that I was actually in the audience at the symphony was easily conveyed. With about one minute left in the piece, the largest of drums break forth, a marvelous test of a speaker's lower limits. The Helix did not even break a sweat. Forceful finales are what the Helix is all about, as it can put an exclamation mark on the most demanding of classical pieces.

Is it possible to have too much driver size, too many total inches in

I shifted gears to hear how the Helix would handle Hugh Masekela's “Stimela” as recorded on Live at the Market Theater. I must say I had not listened too closely to the lyrics in the past. This is a serious piece of music, dramatizing the plight of the poor and dispossessed. However, I had to catch myself as Hugh dedicated the song to, “...those who lose their lives working in cheap labor,” then added, “If there's any here tonight, we are with you!” (The audience nervously laughs.) Hugh continues, explaining that some of the poor dig, “...vegetables with their bare hands and picking fruits in the most incontinent of weather...” (he meant inclement; I suppose if the sky lost its “bladder function”...). I really don't want to snicker at such serious thoughts.

cone surface working for you? Maybe, but when I hear how thorough

Once Hugh began blowing his horn, all frivolity vanished; it was raw with the mood of unrequited personhood. The Helix perfectly placed the bell being struck at the back of the stage, then tracked it as it was moved toward the microphone. Hugh's howling, an imitation of a train whistle, was impossible to ignore. Similarly, the power in the drums demanded attention.

One of the most beautiful qualities of the Helix was revealed in the rhythmic pounding of the drums and cowbell, symbolizing the train's movement. Puny speakers cannot scale up to “train size” but the Helix can! I viscerally connected with the lower rumble of the train as the drums beat out the engine's strokes. At times like that, when a forceful piece of music is playing at near live levels, the Helix makes the music live in a way that few speakers can.

these speakers are, I think the majority of speakers are operating with

These instances bring to mind a conversation that Bill and I had in which we strongly agreed that abundant driver surface area is indispensable to creating the impression of live sound. Just as there is a big difference between heat and temperature, so also there is a big difference between the level at which a driver is played and its acoustic output. Having used many speakers with moderately sized drivers, it is refreshing to hear the expansiveness and ease of the generously proportioned drivers of the Helix.

far too few inches of cone surface.

This translates into the heft necessary to capture the breadth of a piano case. It yields overpowering, staggering, voluminous, intense, seismic bass. How about virtually unlimited, uncompressed dynamics? The Helix is privy to that virtue as well.

The Helix is expansive in how it propagates waves and expands sources. When I hear Lee Ritenour's Countdown N.Y./L.A through the Helix, it is painted on an aural canvas no less than 6'h x 12'w. This is the sonic equivalent of watching a cinema screen, and not many speakers in the world can generate that size of performance. Who among us doesn't like a giant picture? Who would complain of the images being too large? Some of us may complain if the speakers are too large. I don't know that I would agree that it's an advantage to be hearing an orchestra or band through a single 8" driver at three feet elevation. The Helix sounds big and realistic to me.

(Fantasy letter) "Dear Mr. Dudleston, the speakers you gave me on

High Sensitivity, High Surface Area, High Power

One of the keys to the excellence of the Helix is the trio of extremely high sensitivity (102 dB!), high driver surface area, and high power (recall that I am using 5,000 total Watts). These three give the Helix a storm surge of power which carries a sonic force akin to a hurricane.

loan are wonderful! I regret to tell you that my stairs which we used to

At this past Rocky Mountain Audio Fest (2008), I spent time listening to Lesiem's Auracle via the Focal Grande Utopia EM, a prodigious speaker. I love the beginning of this disc, as it has one of the most cavernous, enveloping beginnings of any disc in recent memory. Only a world class speaker of immense size can do justice to that disc. When the track was over three people called out for the title, and I noted that the representative for Focal had written down the information, presumably for future demo use. Rightly so, because it made the speaker sound formidable.

carry them in have developed a strange 'weakness', and I'm sure that

I returned home with a sense of anticipation. Usually when I had spent time in the past with ultra-speaker systems, I would return home a bit deflated, as I knew that the grandeur of the experience would not be fulfilled by my own more modest rig. Not this time. I knew the Helix was in the same league. Within hours of returning, I was in the listening room firing up (you guessed it) Lesiem. I perfectly understand the need not to draw absolute conclusions about different systems at different locations, much less declare one set of speakers superior.

However, I will state without reservation that I heard the same sense of omnipotence, the same grandeur, the same sweeping command of the music. I was ebullient, thinking, "There are only a handful of speakers that can handle music in this fashion, and here before me is one of them!" I would find it most interesting to hear the Helix at a high-end show. I have been urging Bill to get them "out there" for people to hear – maybe this year.

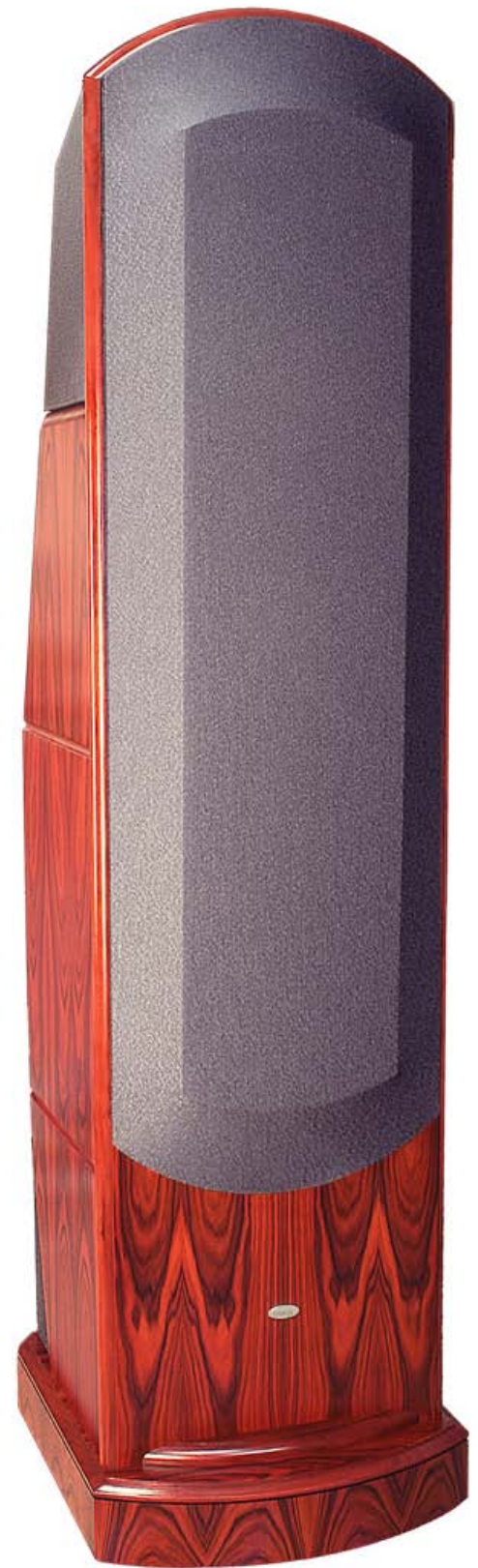
they won't support the weight of the speakers. I'm afraid they'll have

Issues and Weaknesses

There are exceptionally few weaknesses in the Helix design. Just as I found the Focus HD to be a well thought out and executed speaker, so the Helix is a top down design effort with not many caveats. The largest criticism I can level at it is not entirely its own fault. With a 102 dB sensitivity and massive power, the speaker emits a low-level hiss across its driver complement. This hiss was audible at the listening position. I am a stickler for perfection, and at first this was an irritant, as ideally a speaker will be nearly silent when there is no signal. However, as in use of other high-efficiency speakers, the reason for the slight noise is understandable.

to stay..."

I was not able to conduct a test of a lower-powered six-channel amp to assess whether the hiss would disappear with, say, 200 Wpc. I assume so, as I have seen similar effects in the past. When I used the Tannoy Glenair with the Jeff Rowland 501 Monos, it also hissed. But when the amps were switched out with the Pathos Classic One MkIII integrateds, or the Monarchy SM-70 Pro amps, both well under the 1,000-watt threshold of the Rowlands, the hiss subsided. Thus I conclude that this is not a damning feature of the Helix speaker and processor, but rather a consequence of pairing it with supercharged amplification. When I have used extreme power on speakers there has typically been a higher noise floor. When the power has been lowered the



noise has dissipated. I would expect the same with the Helix.

A speaker that can load a room? How about eight 15" and eight 6"

During my exploration of the speaker, I discovered that the 15" open baffle bass driver is wired via clip connections with a smaller gauge wire. I inquired and received Bill's response: "I am a big believer in solid, mechanical connections. The tension clips will not vibrate loose, nor do they require floating the input wires in molten solder, which typically has 1/7th the conductivity of a tensioned contact. The only thing as good is a silver solder connection which we use on the binding posts."

drivers! As the level rises it feels like diving deeper in water.

There are some things which seem counter-intuitive in high-end audio, one of which is a tensioned contact. I'm so used to seeing soldered joints that it's hard to file it under "acceptable technique". The aforementioned Emerald Physics CS2 speaker, which is a true overachiever, also uses tensioned connections. Can a solder joint versus a tensioned contact have such an influence on the sound that it can be heard? Possibly. Can it be isolated and shown to pass my Law of Efficacy? In other words, could it be demonstrated that the difference between the

tensioned contact and a soldered contact would have easily audible effects? I wasn't going to take a solder gun to the Helix to find out, but I have doubts about it.

Clint Eastwood has a cameo appearance whistling on his son, Kyle's

If the Helix were not a stellar performer with a solid spec sheet, I would question Bill's techniques. Alas, he has put together a speaker with world-class specs, and what I consider a to-die-for sound. So, I'm not about to give him grief over it. I have said before when encountering inexplicable design features that, if it sounds fantastic, I don't care if chicken wire was used in the construction. Now I can add truck bed liner-like glop! On the one hand this issue bothers me, I wonder what the wiring scheme is inside the speaker. On the other hand, I know that at whatever price point, a manufacturer must determine if and how much he will cut corners. Is the smaller gauge wire and tensioned connectors cutting corners? From what I can tell, yes.

disc Paris Blue. In his retirement years the man can't whistle to save

However, one must weigh the costs with the benefits. If Bill uses modest wiring internally, recalling that the review pair has all Wireworld Mini Eclipse wiring and I know David Salz's wires and have no reservations about their performance, he surely is not hogging all the savings and returning little of value to the buyer.

In fact, if I'm not blind, I see the Helix as providing to the buyer as much dollar-to-performance value as any proclaimed "Giant Killer" speaker. There are far less prospective buyers at this price point, but the ones insisting on superior value will be well rewarded with a close look, and a listen to the Helix. A trip to Legacy Audio or one of its approved demonstration sites could save tens of thousands spent on other speakers which may not have superior performance. Bill has not offered the public an egregiously priced flagship speaker, and I have the same reaction to the Helix as with the Focus HD – Wow! You get a lot of speaker for your money! The price point is high, but the performance level is much higher.

his life; I know, I'm hearing it too well! I'm trying to picture him

This speaker sounds like no corners were cut in its design. In fact, it sounds like the Legacy crew walked several more miles and took in several more corners to encompass the Helix. A designer is going to have his "warts" shown in the product he makes. Some products are a bit like frog's skin – a fair number of warts. The Helix? Its perceived flaws are more akin to a mole or beauty mark on the face of Marilyn Monroe or Cindy Crawford. You'll not be disappointed due to the overwhelming beauty, a beauty which goes way, way beyond skin deep.

squinting, trying to purse his lips. I'm thinking, "You gonna pull those

Conclusion



I would venture that most of us hard-boiled audiophiles have heard a piece of equipment that was so good, so profoundly superb that you didn't want to live without it. Many of us have been there, at the point of strain, knowing our budgetary limitations, yet yearning for the ultimate, the sound which would make us feel alive while listening. The Helix has been that product, vivifying my music every time I sit down in front of them. Ever since they were first entwined into my rig, they have been the major influence in my music having the characteristic of being alive.

pistols or whistle Dixie?"

I have struggled with personal economic tension for months as I was reviewing the Helix. I can't begin to afford the Legacy's, even though I don't want to live without them. I will survive either way, but one thing is for sure: their eventual departure will mean having the system's beating heart ripped from its chest. The departure of what Bill called, "that which is fundamental to life," will cause death, and it will be awfully difficult to resurrect.

?Bill Dudleston and one channel of the \$16,500 pair of Whisper

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