

# Acoustic Zen Crescendo MkII - Your Last Loudspeaker?

The world of high-end loudspeakers can be frustrating and confusing to understand.

Many audiophiles continuously search for a loudspeaker that will satisfy their needs, only to discover that over time, a speaker may become fatiguing, uninteresting, or simply intolerable. Unfortunately, some of these loudspeakers can come with a price tag up to six figures.

What if you could find a loudspeaker that actually fulfilled the high-end promise of:

- Smooth, full-range frequency response
- Time and phase alignment that creates superb images in space
- Vanishingly low distortion
- Gorgeous finishes
- A price that is within the reach of most music lovers?

## That loudspeaker is here today!

Audiophiles, reviewers, and highly regarded pundits have praised the Acoustic Zen Crescendo with incredible acclaim at shows around the world, at dealers, and in customers' homes. These accolades are even greater with the improved Crescendo MkII version.

How do we get such exceptional sound quality in the first place? By using solid technologies and design techniques that serve the musical waveform first and foremost. What makes the Crescendo different from the rest of the crowded field of high end loudspeakers?

The Crescendo was designed for the realistic reproduction of music using real live music as the reference. The reality is that most music lovers spend time listening to music, not sound effects.

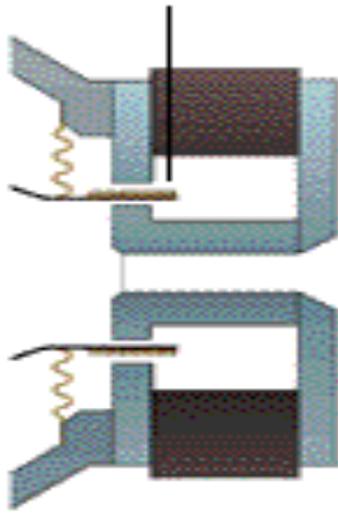
Musical signals are highly complex. Reproducing musical signals effectively is not as easy as it may seem. With proper technology, design techniques, several years of extensive testing, and refinement, we have created a loudspeaker that is faithful to the musical signal.

The Crescendo accomplishes full range response along with low distortion, dynamic impact, coherence, efficiency, accurate timbre, and realistic imaging.

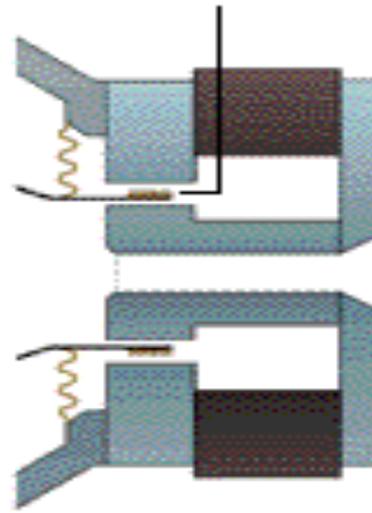
The drivers in a quality speaker design are the most important components. To ensure a solid foundation, we have consistently used "under-hung" driver technology in our loudspeakers.

The under-hung driver's voice-coil is narrower than most conventional drivers' voice coil. The voice coil never leaves the magnetic gap of the motor assembly.

overhung voice coil



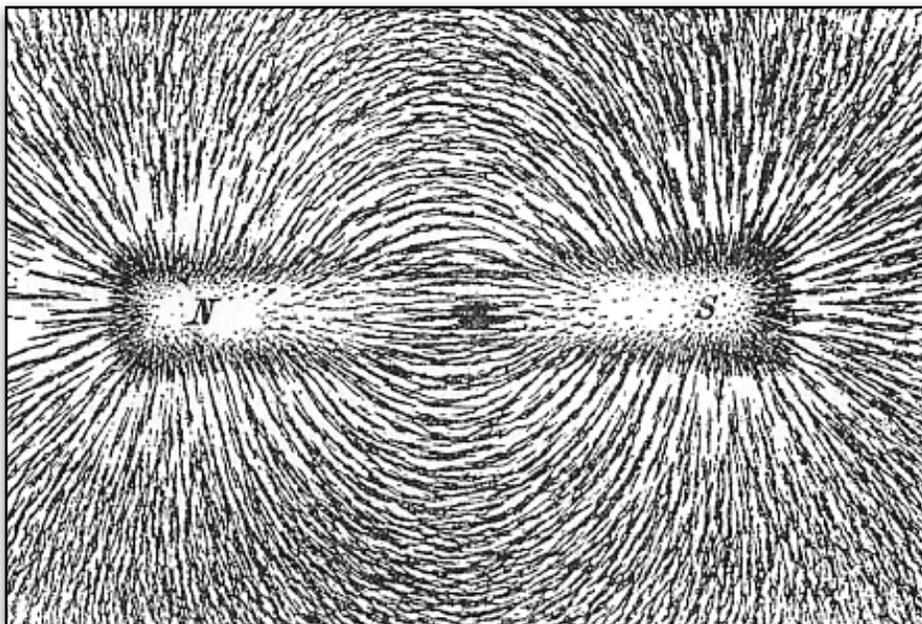
underhung voice coil



Basically, the voice-coil is shorter than the magnet's gap (i.e., under-hung).

The vast majority of loudspeakers use the opposite. Over-hung drivers. The voice coil in over-hung drivers easily travel beyond the magnetic gap of the magnet assembly because it is longer than the magnet's actual gap. This over-hang leads to distortion.

Remember experimenting with magnets in science classes? Specifically, the demonstration placed a bar magnet under a sheet of white paper and sprinkled some iron filings on top of the paper. When the filings were in close proximity to the magnet, they were more orderly and you could make out the magnetic lines of flux. The further away from the magnet the iron filings were the more disorderly they became.



The principle of an under-hung driver is much the same. Because the driver's coil is always inside the magnetic gap of the motor assembly, it's under tighter control of the magnet across its entire range. Its response has less distortion, similar to the bar magnet experiment. With over-hung drivers, the coil travels beyond the magnetic gap and introduces distortion by its movements, much like the iron filings that are too far away from the influence of a magnet.

The advantage with under-hung drivers is vastly lower distortion. This is because the voice coil is always under the control of the magnetic gap and the incoming signal driving it.

Why don't more manufacturers utilize under-hung driver technology to achieve lower distortion designs? Two reasons. One is expense and the other is they are harder to work with.

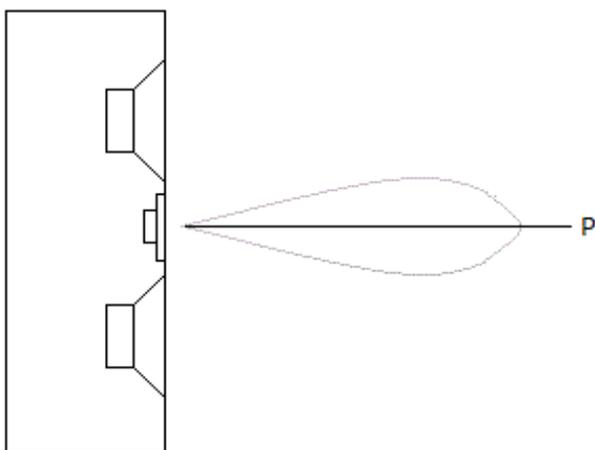
With conventional over-hung drivers, the tolerances and materials do not have to be as rigid. Any anomalies in the response and distortion properties are attempted to be addressed with crossover tweaks and cabinet construction techniques.

With under-hung drivers, the expense is greater and the need for very careful matching of components and materials is critical. The outcome more than compensates for the diligence required in their use. That's why the Crescendo's mid-bass and bass drivers are all under-hung designs to achieve the lowest possible levels of distortion.

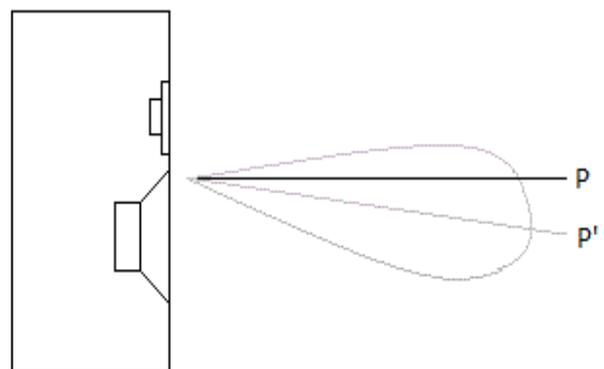
The improved Crescendo MkII drivers feature larger magnet assemblies and improved coil-to-gap ratios. This results in even lower distortion and greater fidelity!

The upper drivers are in a "D'Appolito MTM" configuration. This allows the best possible recreation of the original waveform by eliminating the "lobbing" effect common with other configurations.

The advantage to this is that the audio signal will reach the listener in proper phase and time relationships with no smearing due to the signal interactions inherent in conventional designs. Please refer to the images below:



Crescendo MTM design



Traditional driver design

## Tweeter Design

The Crescendo's tweeter is a horn-loaded ribbon design using an aluminum ribbon that covers over 95% of the vibrating area of the tweeter membrane. This unique feature creates a purely resistive impedance. This provides an incredible easy load for the amplifier. It also simplifies crossover design.

The vibrating element is nearly weightless compared to traditional dome-type tweeters. This allows immediate and precise high-end response to transients in the musical signal. It reveals the dynamics of instruments with high frequency spectral content like no other design.

The linear phase response provides time-coherent reproduction resulting in accurate frequency response, rhythmic drive, and outstanding imaging capability. Our tweeter is very quick, extremely low distortion, and without ringing.

Many modern "audiophile" speakers seem to have tilted-up or "bright" treble response. This may lend a bit of excitement to the sound, but long-term listening causes listener fatigue and dissatisfaction with the overall tonal balance of the loudspeaker.

## Mid Bass Design

The dual five inch mid bass drivers are unique magnesium alloy impregnated paper cone material specifically designed and manufactured for the Crescendo. This MTM array assures smooth frequency response with proper phase and time relationships intact.

The Crescendo's mid to high end response is very natural and non fatiguing.

## Woofers Design

To reproduce deep bass with resolution and authority, the Crescendo uses dual eight inch ceramic coated underhung drivers. These woofers are transmission line loaded to extend response to a true 20 Hz. Transmission line loading allows the low frequency drivers to vibrate freely. The woofers will not be adversely affected by, nor affect the other parts of the design.

The Crescendo's low end response is very low distortion.

There are three basic ways to load a low frequency driver:

- Ported designs
- Acoustic suspension designs
- Transmission line designs

## Ported Designs

Ported designs are ubiquitous because they are easier and cheaper to design. They usually have high 24dB/octave or more roll-off characteristics, They don't lower the resonant frequency optimally, consequently creating a very sharp drop in response.

Many ported speakers also have a problem with Doppler distortion. Doppler distortion is a product of phase and intermodulation distortion caused by a speaker cone not moving uniformly. This is usually caused by the voice coil traveling beyond the magnetic gap in the motor assembly.

## Acoustic Suspension Designs

Acoustic suspension designs better controls the frequency roll-off than ported designs. However, they can have issues with the build up of pressure behind the driver that restricts its motion. This causes distortion as the back wave of pressure builds up and directly acts on the woofer cone surface from behind.

Both ported and acoustical suspension designs can also suffer from sound waves bouncing off of the inner cabinet surfaces and radiating back through the woofer cone. This will smear the sound.

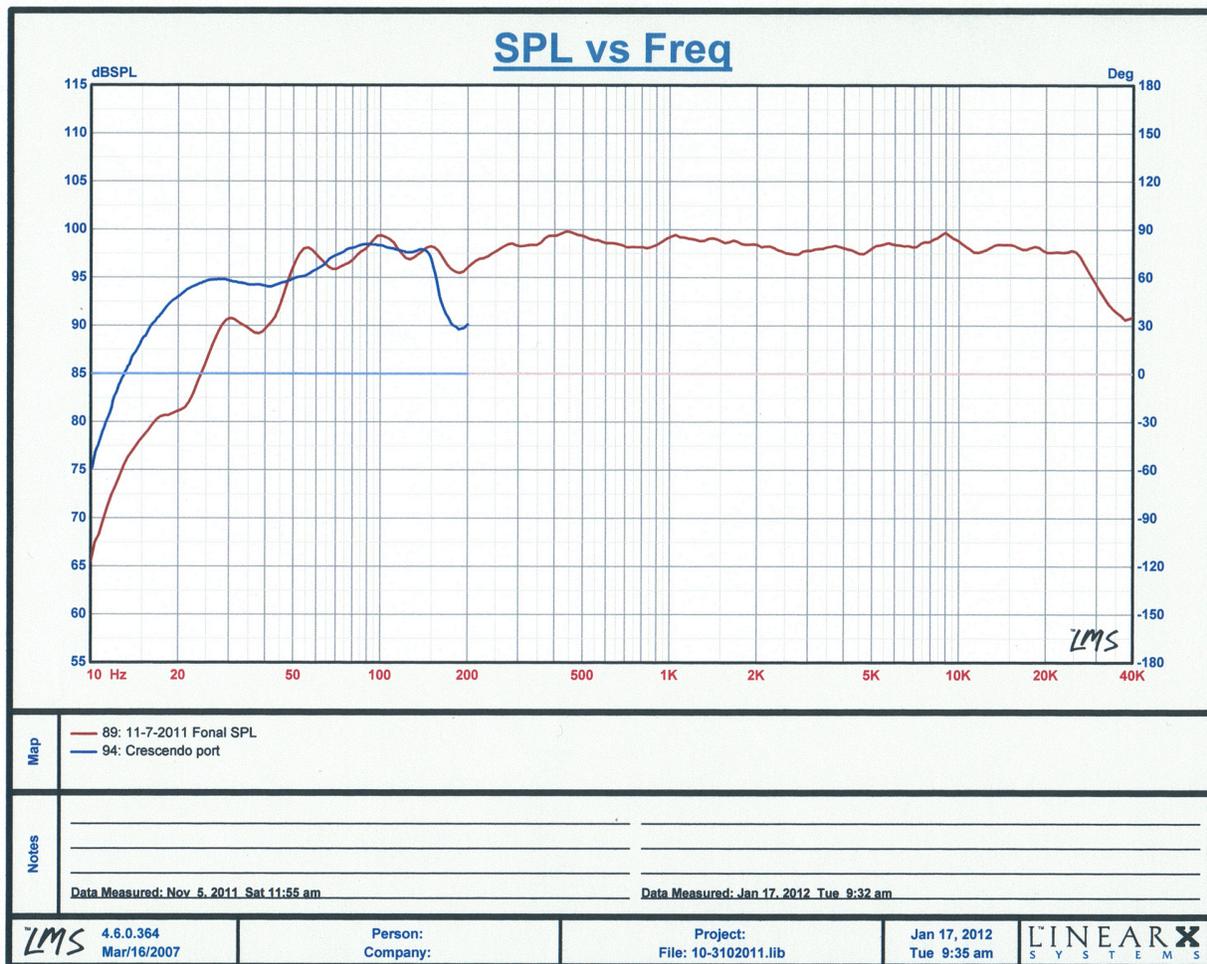
## Transmission Line Designs

A properly tuned and damped transmission line design has a 6dB/octave smoother roll that extends bass response. It also allows the back wave of the driver to be optimally controlled by giving the best loading of the driver. This greatly reduces the distortion. Transmission line designs extend bass response without making it "lumpy" or creating a "one-note" characteristic.

The Crescendo's exceptional bass response and vanishingly low distortion are due to its complex transmission line loading technique and underhung drivers. The Crescendos not only give tuneful, taut and deep bass response, but bass response that is in phase at the listening position. This complements the proper time and phase relationships inherit in the rest of the design.

The musical outcome is startling. It can be immediately discerned with fast, coherent, and powerful bass that lays a solid foundation for the music.

The frequency response sweep below shows the Crescendo's effective response is extremely linear and coherent across the audio passband. There is less than 3db of deviation from frequency to frequency, even at the acoustical crossover point between the transmission line vent and the other drivers.



Transmission line loading eliminates the “chuffing” and potential phase anomalies of ported designs as well as the power inefficiencies of acoustic suspension designs.

While transmission line loading is more complicated and costly, it provides the truest response to music. This makes the extra work and expense worthwhile.

Proper phase relationships are vitally important for speakers to optimally reproduce a uniform and musically correct output. To illustrate this concept, imagine dropping a few identical marbles on the floor with the intent of them all hitting at once to produce a single “crack”. Realistically, they would hit at different times and effectively “smear” the sounds your ears perceives. This is because the sounds from the marbles would be striking the floor at slightly different times. Essentially, they would hit the floor “out of phase” with each other.

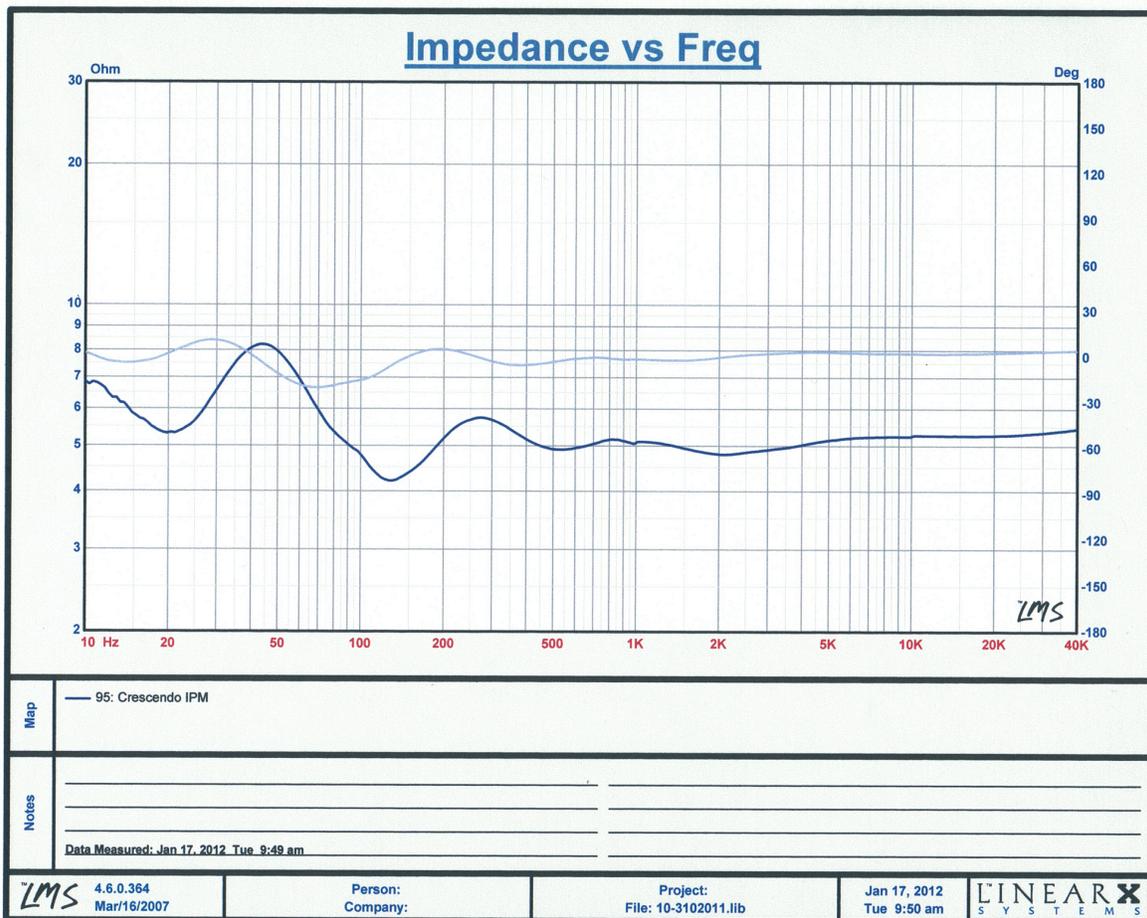
Now, imagine all the marbles hit the floor uniformly and in perfect unison. You would hear one coherent sound because they are in phase. This is a very simplistic example, but the end results are what’s important to understand. It’s the small difference between multiple incoherent sounds that smear one uniform coherent sound.

All loudspeakers have some level of deviation in phase as amplitude and frequency change. This also affects the speaker’s load presented to the amplifier. The design goal is to get the waveform to launch in phase with the signal at the input terminals to keep from smearing that signal.

We invite you to do some investigation of competitive products' phase response and amplitude curves to see the surprising differences in some designs. Surprisingly, some are in the upper echelon of popular high-end speakers.

The Crescendo's musical waveform is always produced in phase with the electrical input to the speaker with very little deviation and with a very stable impedance.

The result is an output that is true to the input signal. The Crescendos simply outperforms other loudspeakers in sheer musicality, listenability, coherence, and timbral accuracy.



The Crescendo uses a crossover network that is extremely refined. It yields a nominal efficiency of 89 dB sound pressure level (SPL) @1 meter with a nominal 6 ohms impedance with no drastic phase shifts. It is an easy load across the audio spectrum for any quality vacuum tube or solid state amplifiers.

The Crescendo will respond just as well with lower powered vacuum tube designs or high quality powerful solid state amplifiers. This is accomplished by maintaining unparalleled phase and time alignment, smooth frequency response, and the lowest possible levels of distortion from the ultra-linear under-hung drivers and transmission line loading.

**The importance of both proper phase response and smooth impedance cannot be stressed enough.** This is the downfall of many competing loudspeaker designs. The Crescendo ensures that both are high priorities.

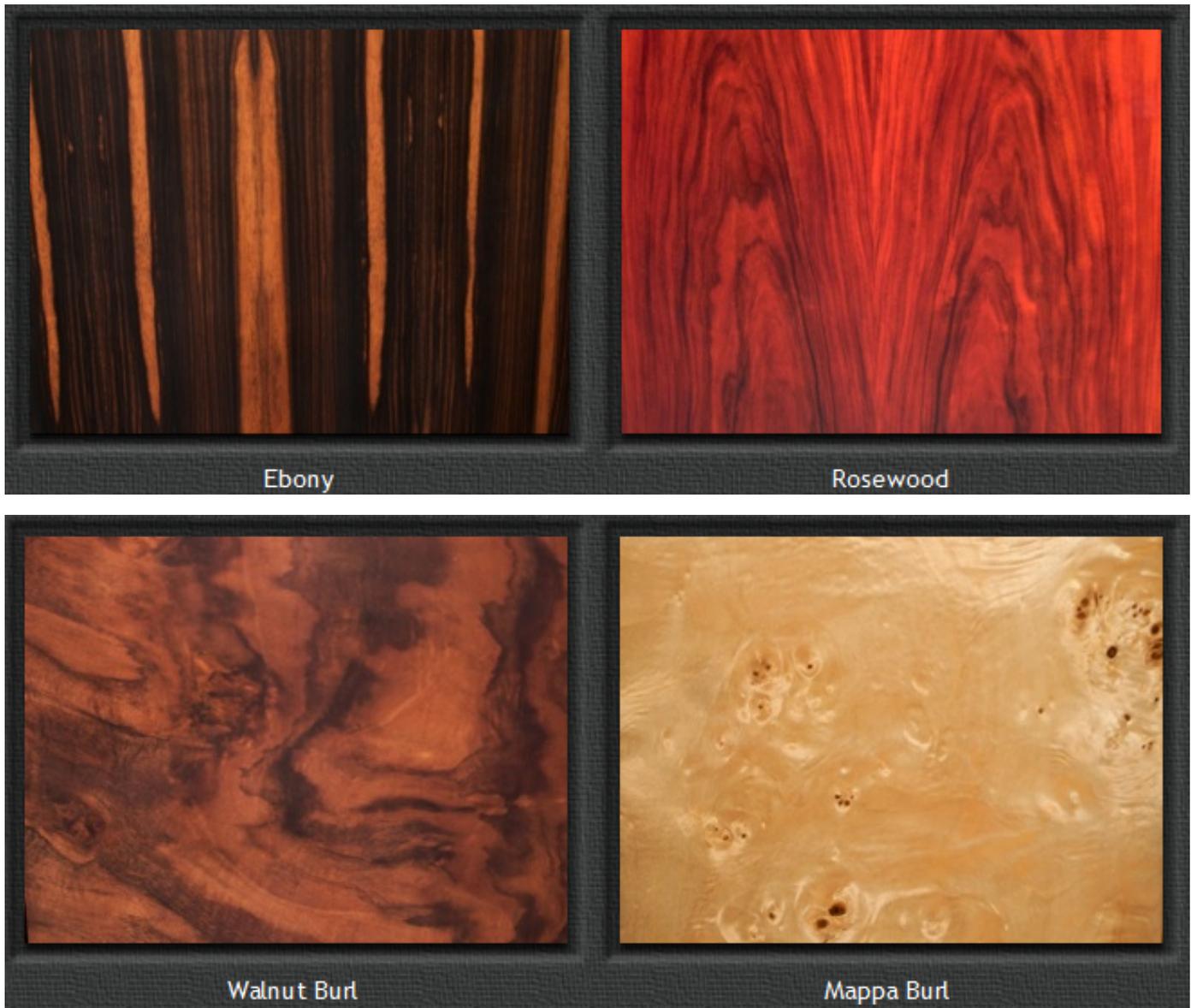
Proper phase relationships throughout the design ensure that music reaches you intact, as a whole and as it was originally recorded. An impedance that stays smooth and with no wild swings across the frequency spectrum means your amplifier doesn't have to struggle to reproduce the full spectrum of sound. Couple phase coherence and impedance stability with the ultra low distortion and linearity of the Crescendo's drivers, you have a loudspeaker that synergizes all of the science, engineering and technology that we've put into the design.

The Crescendos responds accurately to the signal driving them. They consistently provide a musical experience with:

- Extremely smooth response
- Natural bass fundamentals that are deep, truthful, and taunt
- Explosive dynamics
- Amazing truth of timber
- Outstanding imaging
- Extended fatigue free listening

In the improved MkII version, the cabinet bracing has been enhanced to lower resonances and distortion. All Acoustic Zen products have an unparalleled level of fit and finish with some of the most beautiful cabinet work in the industry. People marvel at the quality of finishes on the Crescendo, with its real wood veneers and deep, multi-coat clear finish. We ensure that the Crescendos are as beautiful to behold as it is to listen to them!

All Acoustic Zen loudspeakers come in a number of finishes to complement your décor.



### Crescendo Finishes

All of this comes at a price that you may not believe. Most would expect a loudspeaker with this level of refinement and technology to cost well into the five figure range. Instead, the Crescendo MkII gives all of this performance for only \$24,000.

Many music lovers and audiophiles have already discovered the tremendous value of the Crescendo and have replaced competing loudspeakers speaker costing much more. Most comment that they have searched for years for a loudspeaker with the musical performance of the Crescendo, only to be disappointed time after time. The Crescendos have become the final purchase for many listeners!

How are we able to sell this level of quality and execution at this price, especially in light of all the competition in the audio world? Let's just say that we believe in selling a great product that can improve people's enjoyment of music at a price that is honest and in line with that product's intrinsic value.

Does all of this technology and engineering deliver the goods? Considering our own testing and the comments of numerous reviewers and discerning audiophiles, the answer is a resounding, “Yes, and then some!”. The Crescendo’s design goal of faithfully reproducing the musical event has been completely realized. Musical integrity is kept intact with less distortion and greater fidelity across the audio passband than with competing designs.

The Crescendo creates a magnificent image with weight, authority, dynamics, warmth and coherence. Unlike most of the current full range, high-end loudspeaker designs on the market, the Crescendo is rationally priced.

Crescendo owners are commenting that the Crescendo is the loudspeaker that has ended their quest for the best in musical reproduction, even after spending thousands more over the years on other speakers. The Crescendo is the obvious choice for the music lover looking for the ultimate in performance and value and could very well be your last loudspeaker. There are few high-end loudspeaker designs today that consistently receive the reviews that the Crescendos do after real-life listening experiences.

When people visit our show displays or our dealers and listen, they sink into their chair and listen to music instead of a speaker. Most Crescendo customers continually exclaim that they have found what they have been seeking for years.

The Crescendos are designed to convey the music’s power, timbre, nuance, dynamics, and tone. They have the ability to reach into the heart and soul of the listener like no other loudspeaker. We invite you to listen for yourself and experience the difference.

Don’t believe us? Look at some of the accolades we’ve received in the audio press.

*“...The Best System at a Real World Price, was provided by the noble Robert Lee of Acoustic Zen. His voluptuous Crescendo Mark II speakers... simply disappeared, leaving an invisible vocalist in the room to caress the ears with velvet pleasure.”* Jim Saxon, **The Audio Beat**, February, 2014, CES “Jimmy Awards”

*“The Crescendo is eminently musical and supremely well-integrated from top to bottom and is currently my favorite box speaker under \$30k. Make no mistake about it: The Crescendo is a fantastic value at it's asking price. An enthusiastic five-star recommendation!”* Dick Olsher, **The Absolute Sound**, January, 2013

*“...The sound was exceedingly warm and inviting... when music was played at optimal levels, the sound was lovely.”* Jason Victor Serinus, **Stereophile**, T.H.E. Show Newport 2012

*“...The sound was simply spellbinding. I can't recall hearing imaging this good on any system using conventional speakers for less than \$100,000”* **Sound Stage**, CES 2012 Report

You’ll find more rave reviews on our website, <http://www.acousticzen.com>



**AV Showrooms**

Gold Show Award AXPONA  
Best Sound

**Acoustic Zen, Triode Corp.**

**Certificate of  
Accomplishment**



**Peter Breuninger**

By:

**CEO**

**April 2015**

Title:

Date:

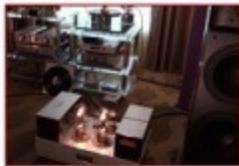


**AV Showrooms**

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Best Sound

**Acoustic Zen, Triode Corp. Triangle Art**

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**Peter Breuninger**

By:

**CEO**

**January 2015**

Title:

Date: