

CINEMA RIBBON LOUDSPEAKERS (CRM-2, CRM-2C)

Looks can be deceiving... The Cinema Ribbons are far from being a “typical” small loudspeaker. In typical Sunfire fashion, they are able to play as loud, with the same low distortion and wide frequency range of the best big floor-standing loudspeakers. The magic comes from decades of research on speakers and the way humans perceive sound...

OVERVIEW

The Cinema Ribbons have a unique form factor, enormous high box pressure, High Back-emf drivers, and a specific and carefully controlled *wavelaunch*. They generate an acoustic space that envelopes the listener through the use of room acoustics as well as through an innate understanding of psychoacoustics and the *way* we hear *what* we hear. Their frequency response is flat as measured in *phons*, rather than *decibels*. More on this later...

THE CABINET

Years ago, a researcher at the RCA Research Laboratories did a series of converging experiments in order to determine the very best shape for a loudspeaker cabinet. He built models that were round... he built squares... truncated pyramids... egg-shapes... about 25 units in all! The specialized facets of the Cinema Ribbon have the appearance of a Stealth airplane, and result in a wavelaunch that is free of unwanted diffractions, refractions, and reflections. More on the importance of this later...

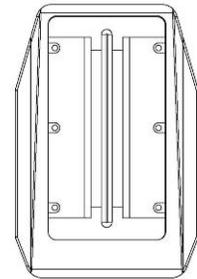


Figure 1

THE RIBBON – A LEGACY REFINED

The ribbon in this loudspeaker is a remarkable piece of engineering because it has the output capability, purity, and low distortion of a large 6-foot-tall ribbon. It can handle the output of a 400 watt amplifier without distortion when its output is 115 dB! Bob Carver's research into ribbons in the late 1970s led to Carver's award-winning Amazing Loudspeaker. Decades later, Bob and team armed themselves with Exacto® knives and cut that long 6-foot ribbon in to many thin strips that were then wrapped up and down, up and down, up and down, until the full 6-foot length was greatly reduced in size. Manufacturing took over from there and produced the 6" ribbon that you see today. Big Sound... meet Small Package.

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THE WOOFERS – A LEGACY REFINED

Sunfire created the category of small-box, high power subwoofers more than a decade ago with the original True Subwoofer. This design relies on high-pressure, High Back-emf technology which provides very high bass output from a very small box. When migrating this subwoofer technology into the midrange and high frequencies on the Cinema Ribbons, we find the same advantages: high output, small size, high efficiency, and low voice-coil heating.

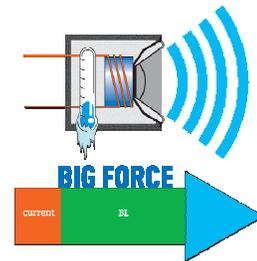


Figure 2

WAVELAUNCH AND “ACOUSTIC SPACE”

The design goal for the Cinema Ribbons was to generate a large, enveloping, Acoustic Space that is almost larger than life. This Space is generated in several ways by a pair of loudspeakers:

- (i) Acoustic Space is generated by a symbiotic relationship the loudspeaker has with the room and the room acoustics
- (ii) The Space is also formed in our minds by the detailed way sounds arrive at our two ears with space-generating differences in time, phase, and amplitude
- (iii) The details of the wavelaunch are important in generating the Space.

Years ago, a famous engineer taught the world that the sense of Acoustic Space for an orchestra or musical ensemble lives in what has become known as the “Henry Kloss psychoacoustic octave.” This critical part of the acoustic spectrum actually spans several octaves and is reproduced omni-directionally by the side-firing drivers of the Cinema Ribbon Loudspeakers. By bouncing sound off the walls and floors this introduces the room itself as part of the instrument of sound. The sound from the ribbon, on the other hand, is deliberately focused in the forward direction – with very little sound going up or down, or bouncing off the ceiling or floor. For the octaves in question, the combined result is an interaural (between ears) time delay between the sound that is launched directly by the ribbon in the forward direction, and indirectly by the side-firing driver. This causes our ear-brain processing system to produce a remarkable soundstage:

- 1) A large sense of space – *in all dimensions*
- 2) Precise imaging within that space. *“I can hear the piano right there!”*
- 3) A sense of front-to-back depth with layered textures of musical instruments playing and performing within that Acoustical Space.

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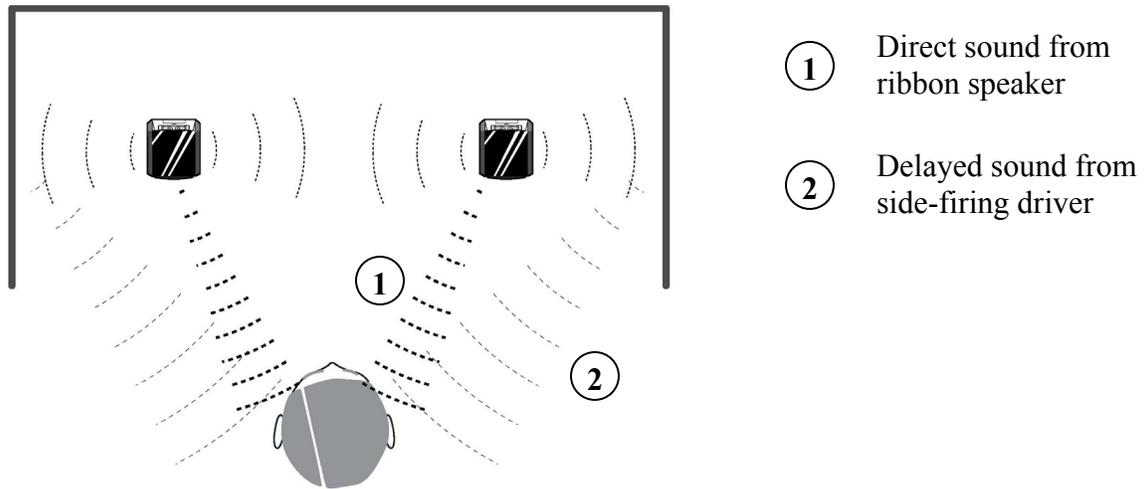


Figure 3: Sonic Hologram Imaging Creates Large Soundstage

If you think this sounds a little like our *Sonic Holography* circuit... you're right! The Cinema Ribbons create a similar effect but instead of doing it electrically, they do it acoustically. This remarkable effect is due to the specific interaction of the room acoustics, the carefully planned wavelaunch, and the interaural time delay associated with the ribbon and the drivers.

RELIABLE HIGH OUTPUT

A jackhammer heard from 3' away has a sound pressure level (SPL) of about 100 dB. A single Cinema Ribbon can play at 115 dB! With five of them, they are easily capable of delivering more than two acoustic watts into your listening environment without distortion. To put that in perspective, a full symphony orchestra playing at full-tilt produces approximately one acoustic watt.

That being said, the Cinema Ribbons do not sacrifice reliability for output power. These speakers employ a hyper-efficient, "High Back-emf" woofer that is inherently capable of delivering lots of output without damaging the speaker. With proper system calibration and pairing with an appropriate subwoofer, these speakers will provide years of trouble-free enjoyment.

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FREQUENCY RESPONSE

Several years ago, Bob Carver was invited to Germany by Bavarian Motor Works... That's right, BMW had asked Bob to help develop a subwoofer for the new Z3 roadster. When he arrived in Munich and walked into their acoustic laboratory for the first time, he knew he was in good company. There, sitting in the middle of an enormous white, perfectly clean room was a brand new black BMW sedan with the two front doors removed. In their place, was a pair of Apogee Scintilla ribbon loudspeakers! Edgar, the chief scientist exclaimed, "We must somehow get sound like this system produces in a more practical fashion. We must...we simply must!" That became the team's design goal for the Z3.

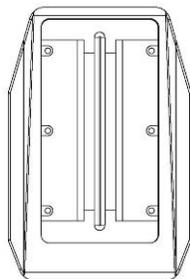
So where does the Cinema Ribbon come in? What Bob learned from Edgar and has since made his own, is the way in which the flat frequency response was measured, defined and developed.

THE PROBLEM... We hear with our ears, which are hooked to our brain, which responds in *phons*. A microphone is hooked to a chart recorder and calibrated in decibels. The two results are almost not comparable.

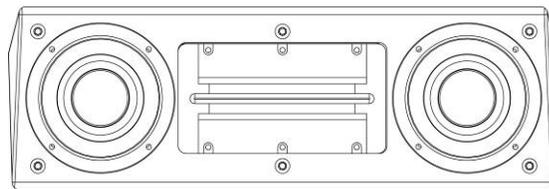
THE SOLUTION... Measure the frequency response of the loudspeaker in *phons*, instead of *decibels*; make it flat, at a comfortable listening level of 76 dB and voila!

THE FINAL RESULT

What we possess after all of this, is a speaker that is so different from any other that what we hear on first exposure can be astonishing in its musical presentation. It is almost shocking because the Space created is quite different from what we are used to hearing from loudspeakers. It makes use of the science of wavelaunch geometry, ruler-flat frequency response when measured how we actually interpret sound (*phons*), and it produces incredible output. It results in a believable and large Acoustic Space within which the musical performance emerges with full imaging inside that Space.



CRM-2 Cinema Ribbon



CRM-2C Center Channel