

SPECIFICATIONS

	Receiver Savers			LOUD. SPEAKER.	
	R-10	R-12	R-123	S-1	S-2
Frequency Response	38-20K ±4dB	38-20K ±4dB	38-20K ±4dB	28-20K ±4dB	28-17K ±3dB
Sensitivity	92dB/1Watt @1m	97dB/1Watt @1m	97dB/1Watt @1m	98dB/1Watt @1m	103dB/1Watt @1m
Acoustic Output *	108dB SPL @1m	114dB SPL @1m	114dB SPL @1m	121dB SPL @1m	127dB SPL @1m
Power Capacity	40 W. RMS 80W/Excavator	50 W. RMS 100W/Excavator	50 W. RMS 100W/Excavator	200 W. RMS	250 W. RMS
Crossover Points	1200Hz	2000Hz	500/5000Hz	300/4000Hz	200/4000Hz
L. F. Driver	10" Cast Al.	12" Cast Al.	12" Cast Al.	12" Cast Al.	15" Cast Al.
Mag. Structure	4 lb.	7 lb.	7 lb.	11 lb.	13 lb.
Flux Density	11,000 Gauss	13,000 Gauss	10,000 Gauss	13,500 Gauss	13,000 Gauss
Voice Coil	1.5"	2.1"	2.1"	2.1"	2.1"
M. F. Driver			6" Sealed	6" Sealed	6" Sealed
Mag. Structure			3.0 lb.	3 lb.	4 lb.
Flux Density			13,000 Gauss	13,000 Gauss	13,500 Gauss
Voice Coil			1.6"	1.6"	1.6"
H. F. Driver	1" Hard Dome	Dhorm	Dhorm	Dhorm	Horn
Mag. Structure	1.5 lb.	1.5 lb.	1.5 lb.	1.5 lb.	1.5 lb.
Flux Density	17,000 Gauss	17,000 Gauss	17,000 Gauss	18,000 Gauss	18,000 Gauss
Voice Coil	1"	1"	1"	1"	1"

	Hardrockers		
	212	312	417R
Frequency Response	35-17K ±4dB	35-17K ±4dB	30-17K ±4dB
Sensitivity	100dB/1Watt @1m	100dB/1Watt @1m	103dB/1Watt @1m
Acoustic Output *	120dB SPL @1m	120dB SPL @1m	123dB SPL @1m
Power Capacity	100 W. RMS 200W/Excavator	150 W. RMS 300W/Excavator	200 W. RMS 400W/Excavator
Crossover Points	2000Hz	300/3500Hz	300/3500/12000Hz
L. F. Driver	12" Cast Al.	12" Cast Al.	15" Cast Al.
Mag. Structure	7 lb.	7 lb.	13 lb.
Flux Density	13,000 Gauss	10,000 Gauss	10,000 Gauss
Voice Coil	2.1"	2.1"	2.1"
M. F. Driver		6" Sealed	6" Sealed
Mag. Structure		3 lb.	3 lb.
Flux Density		13,000 Gauss	13,000 Gauss
Voice Coil		1.6"	1.6"
H. F. Driver	Horn	Horn	Dhorm/Rear Horn
Mag. Structure	.6 lb.	.6 lb.	.6 lb.
Flux Density	10,000 Gauss	10,000 Gauss	10,000 Gauss
Voice Coil	1"	1"	1"

* @ maximum rated power

NOTE: All performance data taken in quarter space, swept 1/3 octave.

As part of our ongoing commitment to product improvement, Cerwin-Vega routinely introduces design refinements and improved materials and production methods into existing products. Since it would be impractical to publicize every change in every product, we reserve the right to make such changes without notice or obligation.

DIMENSIONS

	Height	Width	Depth
R 10	24"	13"	11½"
R 12	25"	14½"	11½"
R 123	25"	14½"	11½"
212	26"	15¾"	15¾"
312	26"	15¾"	15¾"
417 R	29¼"	18¼"	17¾"
S 1	25"	14½"	14"
S 2	29¼"	18¼"	17¾"



LOUD. SPEAKER.



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Cerwin-Vega!

Unconventional Cerwin-Vega

Conventional wisdom is at the same time the result of and the barrier to asking the unconventional question. It gives rise to an entire group of statements that begin with “*But everybody knows...*” For example, everybody knows that to gain extended low frequency response in a shelf speaker, one must sacrifice efficiency—that’s how acoustic suspension was born.

So how can we offer a bookshelf speaker that is 10 dB more efficient than an acoustic suspension design, and has a frequency response of 28-20 kHz $\pm$ 4 dB?

Well, we’re an unconventional company. We ask unconventional questions—and get answers. Unconventional answers.

But they *are* the truth. You can hear it today.

We’re not simply building up advertising images, or playing specsmanship. We’re reporting to you from the unknown area of perception: the bottom octaves of music. (We don’t claim to have conquered it. Or that we have perfectly expressed it in technological terms.) What we have done is simply to extend the scope of its expression beyond what was previously accepted.

Expanding the art of the possible.

There’s an emotional consequence for music in that extension. How important is that?

It’s *very* important. Music has changed since the era of the woodwind quintet and the pipe organ. The heart, the identifying element—literally, the *foundation* of contemporary music—is the dialogue between the electric bass and the kickdrum. They play together in such a way as to merge, dissolving into a single instrument. The bass lends pitch, and the drum lends even lower frequency *impact*. In a club or studio, one can literally *feel* this impact in one’s stomach. To appreciate the meaning of this, we have to combine music with acoustics, physiology and psychology.

As audio frequencies get lower and lower, the ear’s perception of them dwindles. Below about 60 Hz, low frequencies apparently stimulate the sensual centers of the brain rather than passing through the ear’s auditory system—because emotions in the human are related to body *sensations*. Low frequencies apparently don’t *define* the emotions; they just sort of turn up the volume.

All of this accounts, to a large extent, for the emotional content of contemporary music. And the more fully that bass/kickdrum dialogue is explored and reproduced, the more fully the emotional volume is turned up. And the more the listener is turned on.

The acoustical suspension speaker can’t do it, because it can’t reproduce the *impact* effectively. That requires efficiency and high acoustic output—the difference between being patted and slugged in the stomach. It does, indeed, do what it was designed for—but it wasn’t designed for that.

The standard bass reflex system can’t do it either, because it can’t reproduce those low pitches. Most bass reflex bookshelf systems capable of high efficiency and acoustic output roll off at 18 dB per octave below about 50-60 Hz—except for ours. A few years ago that didn’t matter, because records were rolled off

there as well. This allowed longer playing time, and made the record easier to cut.

But studio engineers are perfectionists, like many of us, and it was always dismaying to walk through that door from the control room (where the monitor speakers were) into the studio (where the music was). And a few years ago, they began installing huge monitors using two fifteen-inch woofers that extended the frequency response on down below 30 Hz. Then they began putting those frequencies on the master tape, and now on the records as well.

The times they are a-changing—changing standards in the recording process, new expectations concerning the listening level of music on the part of people who grew up attending rock clubs and concerts. The trend seems clear: a market shift in favor of dramatically increased acoustic output and bandwidth capability. As a result, records have gotten better, and loudspeakers for the home need the same combination.

We’ve done that and we’ve redone it. Many of the sounds engraved on discs or performed in concerts and studios are produced by our speakers. We know what it requires to reproduce them accurately at home as perhaps *no other manufacturer does*.

In the film “Earthquake,” Universal Studios utilized equipment manufactured by Cerwin-Vega to create subsonic audio signals to heighten the emotions produced by the visual cues and sensations. It was so effective that over 30 million people flocked to experience a motion picture which won a special sound technical Academy Award.

For expanding the art of the possible.

(Pretty unconventional, huh?)

In the spring of 1976, we were called by Burbank Studios to provide musical indoor and outdoor concert backgrounds for Barbra Streisand in “A Star is Born.” If you look closely you will see our 217R’s used as studio monitors and almost total C-V professional sound equipment in the dramatic concert scenes. It’s unheard of to give screen credits to loudspeaker manufacturers. Thanks.

(Unconventional again!)

Who’s Cerwin-Vega?

There are two loudspeaker companies in the U.S. who are committed by tradition and firm belief to high efficiency and wide dynamic range. Both make the loudspeakers found in their enclosures. Both were started 20-odd years ago by men working in their garages, making their products by hand.

We’re the other one.

Cerwin-Vega has quietly evolved over the years from our original small handful of versatile and dedicated music lovers to our present staff numbering in the hundreds, making us one of the larger speaker companies in the country. We took twenty years getting here, without hype, hysteria or large media budgets.

We did it slowly, paid our dues and paid attention, and learned much. Most of our business was done in the most demanding marketplace in the world: where people use our products for expression of both art and money. We still maintain factory touring sound systems and do concert tours each year. We don’t do this for profit, or to take business from those who do it for a living—

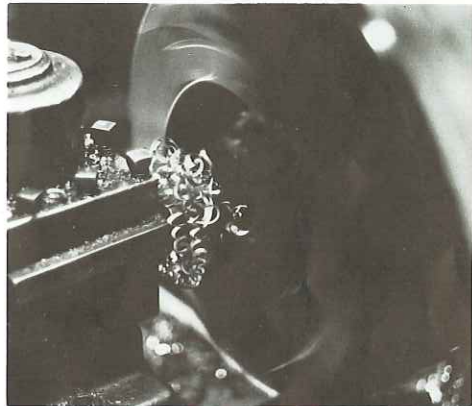
or even for publicity. We do it to keep our hand in, to keep close to the music, to continually improve what we do for a living.

Cerwin-Vega has been owned and operated by Gene Czerwinski for that entire time, and still is. And since we have no parent company, stockholders or board of directors to report to, the philosophy of what a product ought to be has remained consistent over those years. And we can choose to hold any values that are important to us personally—like really caring about what people think of our products and the pleasure they derive from them, not only whether they sell. And the *way* we conduct business, not only how much is done.

And we do choose. That and more. Like the basic philosophy of speaker designs



Various sizes of voice coils produced by Cerwin-Vega.



Precision machining of 6" front plate for magnet assembly.



M.I. and Professional Audio speakers manufactured by Cerwin-Vega.

to which we subscribe. Although we are a West Coast manufacturer, we do not impart a typical West Coast sonic thumb print. Our products are basically accurate but capable of an intimate, sensual, dynamic musical reality which transcends the usual regional oversimplifications.

East Coast-West Coast Humbug

Some of the most fruitless and prolonged arguments in audio can be laid to this oversimplification: A listener’s critical fidelity judgments can usually be traced to his first exciting experiences with live, real-time music. This then becomes his “musical reality”—a standard of future comparison. This early “musical reality” will, of course, depending on the tastes of the listener, vary considerably in musical sophistication from listener to listener. Unfortunately, *any* sound system will tend to detract from this standard.

An East Coast listener hearing his first music in Fisher Hall might forever be searching for hall “ambience” effects: reverberation, whispers, rustling programs, sneezing—all conspiring to mask the pianissimo passages. He will also hear, depending on his seat location, thundering fortissimo levels reaching 90 to 100 dB and, best of all, true binaural perception defining and localizing individual instruments—a very prized and elusive parameter in playback speakers. With the exception of organ and drums, the overall sound may seem weak in the bass and extreme treble and thick in midrange as modified by hall acoustics and seating position.

Now, contrast this to a West Coast listener in a control room of a composite mixdown for a large scoring orchestra playing in a small adjacent studio. He suddenly slides open the soundproof glass door and walks into the studio. This is *his* A-B test, *his* “musical reality.” He is no more than fifteen feet from any instrument. His binaural hearing sensation locates every instrument and isolates it. The 120 dB+ crescendos blow his socks off; the pianissimo passages are not merely perceptible but clearly audible. Indeed, what with an ambient noise level of perhaps 20 dB, he can hear the musicians breathing!

He is exposed to a dynamic range over 100 dB, and the tonal balance is all there: full, robust extended bass; clear, articulate midrange and extreme treble without the accompanying attenuation of long path distances. The blurring effects of reverberation on precise phase and localization information are absent. But it doesn’t sound like Fisher Hall or Tanglewood. Could it be better?

Many people think so. They also submit that a typical modern concert hall is a poor place to listen to music seriously. For hundreds of years orchestras performed in smaller parlors and salons for their wealthy and titled patrons who heard it like we do in a small studio today. (The large, absorbent concert hall as we know it is, after all, a 20th-century animal.) So, in a strict technical sense, perhaps today’s concertgoers are hearing an aesthetically distorted performance compared to what these early composers and their patrons experienced.

Today we have a wide range of listening environments and experiences. Favoring one particular environment over others as the “best” or most “real” listening experience

would therefore seem to be a somewhat arbitrary projection of that particular listener’s “musical reality” over all musical experiences—in short, like trying to prove that somehow apples are better than oranges, a very frustrating and pointless exercise.

It is possible to design and manufacture a speaker that sounds near perfect on many kinds of “musical reality”: however, it would be *very* large, *very* costly and very difficult to set up properly. Unique problems of interfacing the speaker system with the particular room acoustics would require many hours of careful engineering effort. The special ambience effects desired for “concert hall” reproduction of classical music alone demand special electrical and mechanical adjustments which may not be appropriate for popular music. The low coloration and distortion requirements in midrange alone dictate large diaphragm areas for low density sound radiation—i.e., low sound pressure per unit of radiating surface area. This usually prescribes large screens or dozens of dynamic drivers mounted in large area cabinets which tend to physically dominate the listening space. Furthermore, these speaker designs tend to be relatively inefficient, the net result of which is a speaker system requiring a several-thousand-dollar power amplifier to drive it effectively on some program material.

Cerwin-Vega has constructed large experimental low-density systems with electrostatic and thin-film magnetic (*Isophase*, *Magnetat*) drivers; however, the costs involved on a production basis are prohibitive. As of the time of this writing (April, 1977), there are no custom systems that can be assembled to reproduce *all* musical realities at a cost of less than \$10,000 per speaker and \$5,000 per amplifier—and this would still fall short of a “perfect” loudspeaker, even ignoring its imposing physical size and complexity.

It stands to reason, then, that any speaker system will necessarily entail significant cost versus performance tradeoffs in its design, regardless of some copywriter’s hype.

Advertising and Value

Another firm belief we hold is that no product should cost more than it has to for a given level of excellence—or, as a traditional craftsman would say, “You should get what you pay for.”

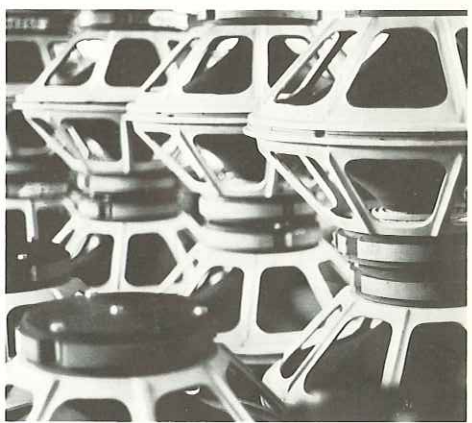
In modern business terms, this means not only the cost of the product itself but the amount of money the manufacturer deems to spend advertising and promoting it. Different companies have different attitudes toward the advertising budget, but they all have two things in common: The purchaser pays for it when he buys the product, and not *one cent* of this money makes the product a better product. When you buy a Cerwin-Vega product, you are paying for a better product, not an ambitious ad campaign.

Why haven’t you heard more about us? Well, we dropped out of competition in consumer products for many years because high-efficiency speakers just weren’t selling,

and we refused to build inferior low-efficiency speakers. Not wise, in economic terms. But as we said, we can make choices—and we do.

We spent all that time out there with the music. And finally, the music and the recording process is beginning to require our kind of product for its proper expression at home. Just look, and listen. And see if you don’t agree.

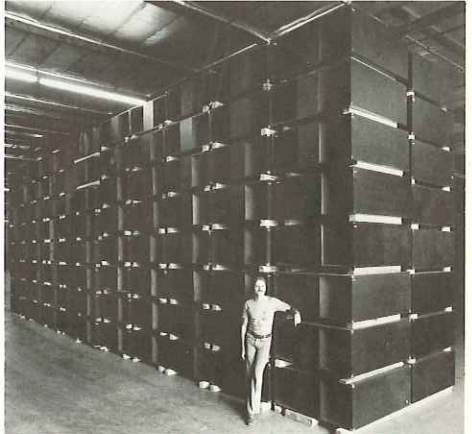
Our final statement of belief is more an article of faith that has served us well: Business can be both profitable *and* rewarding if it is built on a structure of cooperative rather than adversary relationships. So don’t expect from us what you expect from other companies. Expect more.



Massive cast frames for our woofers.



HiFi speaker assembly/inspection line.



Cerwin-Vega speakers ready for shipment for Universal’s “Sensurround.”

Bassmakers

We've developed a nifty little electronic gadget that does four enormously important things for a loudspeaker. We call it a Bass Excavator because it uncovers those low frequencies you didn't know were there.

First of all, it extends the low frequency response below 30 Hz. Secondly, it acts as a rumble filter to remove subsonic frequencies caused by warped records. Of course you can't hear this directly, but it causes doppler and IM distortion of the frequencies you *can* hear. So the third benefit is reduction of distortion. The fourth is an effective doubling of the power the speaker can safely handle.



We'll come back to this device later, but first we need to talk about vented cabinets, low frequencies and room acoustics.

It should now be blatantly obvious that a properly vented cabinet can out-perform a sealed or acoustic suspension system. Dozens of researchers and engineers such as Thiele, Small, Keele, Olson, Novak, Ashley, Lampton, Benson, Newman, Beranek, et al, have provided a body of evidence which is

overwhelming. They have shown quantitatively that, low frequency rolloff, size, efficiency transient response, are parameter tradeoffs. You can't win them all. The most important gain is achieved by making the box larger. However, in the real world of speaker manufacturing, the smaller the box the easier it sells in the marketplace.

All small cabinets are heavily compromised. Loudspeaker engineers spend many sleepless nights trying to bend the laws of physics in their favor. We have succeeded along with a few others to extend both low end and efficiency in small cabinets. The obvious wave of the future in small cabinets is optimal vented tuning combined with moderate active equalization adding 2 or 3 poles to give a modified 6th order tuning with rapid subsonic roll off. Bass equalization is not new, however, the way we employ it is a very significant improvement over previous efforts. Our bass excavator is so accurate that there is no trace of boominess, or excessive drain of amplifier power, just smooth extended deep bass which would require a box much larger to accomplish.

As we predict, you will see more complex vented cabinet active equalizer designs from many manufacturers because it optimizes bass fidelity from a small box. Well! This was an optimum concept until our nifty new Thermo Vapor Suspension was developed.

What's *THERMO VAPOR SUSPENSION*? It is an elegantly simple way of enlarging the cabinet volume, extending the bass response and controlling damping. We had to go back to basic gas laws for this one. In a small enclosure, the low frequency resonance is determined mostly by the mass of the cone and the stiffness of the compression of air within the cabinet. The misnamed acoustic suspension simply increases the mass of the already sluggish cone with a huge loss in efficiency and transient response. We simply looked for and found a softer more compressible gas than air to fill the cabinet with. By going back to basic physics and modern chemicals we found a family of inert, non-flammable, non toxic, gas-vapors whose specific heat (γ) was less than air. We call it TVS because the softer compression comes from a more isothermal characteristic. The gas is more like vapor because it's just above the boiling temperature and it comprises the main suspension compliance. Hence, *THERMO VAPOR SUSPENSION*.

The vapor is heavy and capable of damping and loading the cone motion because the acoustic impedance is greater than air. The vapor is contained in a quasi transparent membrane or bag. In that form it can be used in vented or horn cabinets as well as sealed enclosures. So, instead of mass loading the cone and losing efficiency and transient response, we increased the box compliance (compressibility), extend the low response, increase efficiency and transient response. Combine TVS, bass excavator, a properly vented cabinet and you have the truly optimum shelf speaker as embodied in the S-1.

Above 60 Hz, one can think of a loudspeaker as *playing into* the room. Below that, however, it must literally *energize* the room. And the room itself becomes part of the active reproduction system. For this reason, reflecting surfaces in

the room become critical. The surface treatment of these surfaces is not important, it's the geometry that counts.

For example, a loudspeaker suspended in space radiates low frequencies in all directions, spherically. Placing the speaker in the center of a wall is like cutting the sphere in half and putting all that energy into the remaining half. This is called, in acoustic terms, half-space. Now, moving it down against the floor is like cutting *that* in half, and putting all the energy into the remaining $\frac{1}{4}$ of the sphere; this is called quarter space. Then moving it into a corner produces—you got it. Eighth space.

This is true of all loudspeakers. It's a property of the long wavelength of low frequencies. Obviously, if you take the energy produced in a sphere and contain it in a smaller and smaller space, the energy density increases greatly—stated another way, the effective efficiency increases greatly. Particularly below about 60 Hz, and the lower the frequency, the more effective it is.

So, it would seem that moving a bookshelf speaker from the bookshelf to the floor would extend the deep bass response, and moving it into a corner would extend it still further.

Right, but there are some problems. For some reason, probably conventional wisdom, bookshelf speakers are designed to be used on *bookshelves*. That means they're designed to be used in half-space.

Inherent in the design principle of a bass reflex system is the fact that below system resonance the frequency response rolls off at 18dB per octave—a very steep mechanical filter below 50-60Hz.

If you move that into quarter or eighth space, all it does is boost the bass from about 120Hz to 50-60Hz making it boomy. It doesn't extend the frequency response, because of that filter.

We've taken a different approach. All of our systems are designed to radiate into quarter space or $\frac{1}{8}$ space.

If you insist on placing one of our speakers on a bookshelf, it will perform as well as any other.

Our vented design is tuned for maximum output capability to 30 Hz. To maintain flat response in $\frac{1}{2}$ space requires equalization ala-Bass excavator or equivalent. Corner or $\frac{1}{8}$ space response is full and robust in the 30 Hz region and what that does for the bass/kickdrum dialogue must be heard/felt to be appreciated.

Now, back to the excavator. Using this device on one of our speakers will let you extend the frequency response to 30Hz and still place the speaker on a bookshelf. It will allow a 30Hz flat with the speaker on the floor, and a small rise in a corner. While still providing a reduction of distortion and an increase in power capacity.

Be careful about using it on someone else's speaker, though, because those simply weren't designed to produce a large acoustic output at low frequencies.

So, you might say that our bookshelf loudspeakers were designed to be placed on the floor, and you'd be right. But then, how many bookshelf speakers do you know that actually *fit* on a bookshelf?

So why do we call them bookshelf speakers? We don't want to be *too* unconventional.

Receiver Savers.



Receiver Savers.

Just as an amplifier begins clipping music peaks long before audible distortion sets in—so, too, do loudspeakers. This begins to manifest itself as a subtle deadening of the sound, increasing with volume to audible breakup. The capacity of an amp or speaker to handle these peaks without clipping is called *headroom*. A speaker capable of great acoustic output is analogous to an amp of great power capacity.

A speaker of high efficiency permits you to have this capability with a small amp.

These are our least efficient, least powerful speakers—which is to say that they're the most efficient, most powerful you can buy in their price class. The smallest will produce 92dB at 1 meter with 1 watt input, and will handle 40 watts RMS. The largest will produce an acoustic output of 116dB from a 60 watt RMS receiver. To achieve that headroom with an acoustic suspension speaker would require a 600 watt amp!

And the frequency response of all three is 38-20KHz ± 4 dB, in the East Coast tradition of linear response over a wide bandwidth.

All that implies several things.

First of all, you can afford to put together a

first class system without mortgaging your future. Our speakers are not inexpensive, excellence rarely is. But they *don't* cost any more than they have to, and often will save enough cost in expensive electronics to pay for themselves.

Secondly, it implies excellent transient response, low distortion, low coloration and ruggedness.

Further, that the receiver savers should sound as good for classical music, jazz and Big Band as for Rock in all its forms.

And all that's true, but they're objective statements. And they don't really adequately convey the sense of airy freedom from restriction, the finely etched, almost tactile definition of each instrument, every one. The subtle interplay between those, back in the music, behind the vocalist or lead; the emotional foundation of bass and kickdrum.

These are *exciting* speakers. They have the ability to get you caught up in the music, involved to the point where you can forget that your equipment exists at all. And, as far as we're concerned, that's the only purpose it has in existing.

We didn't make them for the remote,

dissecting intellect, but rather for one who can let go into an esthetic experience. And the visual appearance reflects that attitude.

The enclosures seem to be carved from a single block of wood. Combining a sense of elegant simplicity with a feeling of massive substance. The speaker appears complete even without a grille cloth, but you can choose to complement it with crisp stretch cloth in three colors, or enrich it with acoustically transparent crushed velvet.

We've even finished the back of the enclosures with our own specially formulated lacquer.

In an age when MacDonald's has replaced Mom's apple pie, it's nice to see something better than it has to be. That's what craftsmanship is—or was, all about. We'd like to bring it back.



R-10



R-123

LOUD. SPEAKERS.



LOUD. SPEAKERS.

This is it, this is the one. Twenty years of single-minded commitment to efficiency, dynamic range, and extended bandwidth have all come together in our bookshelf LOUD. SPEAKER. With a deep sense of conviction, we present it to you as the best bookshelf speaker ever made.

If you know a lot about speakers, it will boggle your mind. If you know a lot about music, it will take you places you've never been before.

The visual appearance is cohesive, focussed—as befits a resolution, a culmination of effort and attitudes. But we're going to have to pass on trying to describe the sound, because it's a new order of sensory experience. Like trying to imagine a color you haven't seen, a flavor you've never tasted.

But we *can* describe it in objective terms, if we use the word "most" a lot.

For example it is the most efficient bookshelf speaker ever made. The LOUD. SPEAKER. will produce 97dB at 1 meter from 1 watt input. In a pinch, you can drive it with a transistor radio! That means that it has the transient response to *explode* that drumset out into the room. And

distortion simply dwindles to the vanishing point, leaving you with the music. Only that.

Right. But on the other end of the scale, LOUD. SPEAKER. will handle 200 watts RMS with a sense of ease, no hint of being pushed to the limit. As a matter of fact, the woofer will handle 200 watts RMS all day long, so you have some safety margin. This sort of defies conventional wisdom again, but we're the company who make 1000 watt RMS woofers and we're used to it.

Those factors combine to provide a staggering maximum acoustic output. 120dB, friend. Until now, the only speakers that could do that were gargantuan studio monitors. Even we don't suggest you play it that loud, but for sure you'll play clean.

We're not aware of any loudspeaker of any size or price available for home use that offers that combination of attributes. And that is, perhaps, the main attribute of the LOUD. SPEAKER. It is small enough to fit comfortably into your life, rather than the other way around, and it is affordable.

There are still other attributes that don't show up clearly in performance data. For example, there's a unique rear port concept that

allows you to place the LOUD. SPEAKER. flat against the wall.

The crossover design eliminates the most serious form of distortion that plagues all other bookshelf speakers—even our own to some extent. IM and Doppler distortion. That's the phenomenon we've all heard from a train whistle: as the train approaches, the whistle is higher in frequency than when it is moving away. The same thing happens when a woofer moves in and out. As it moves out, the higher frequencies are compressed upward; as it moves back in they are compressed downward. The greater the cone travels and the higher the crossover point, the worse the condition becomes.

All audio engineers know about this. Nobody talks about it because everyone has the same problem. We've reduced it to the vanishing point in the LOUD. SPEAKER. by designing a midrange driver that could meet our performance requirements while crossing over at 300 Hz. That keeps low frequencies out of the main music fundamentals, particularly vocals. And to hear a singer whose voice isn't being modulated by the kickdrum is a joy and a new experience.

That midrange speaker covers four octaves from 300 to 5Khz, which solves still another problem that nobody talks about—called time delay distortion. This happens when the voice coils of two speakers are not in the same plane. The group of frequencies produced by the speaker closest to your ear arrives just slightly sooner than those from the speaker farthest away. This causes a smearing effect—harmonics are out of phase with their fundamentals. In the LOUD. SPEAKER. the main fundamentals and lower harmonics are reproduced by one driver—and all that musical information remains phase coherent.

The combination of all those factors produces a realism you haven't heard before in a shelf speaker.

But LOUD. SPEAKER. is, after all, only a shelf speaker. And if you'd like to hear what more life can hold, ask to hear the grown-up version. The S-2 floor model, with a 15" woofer and...never mind. You'll just have to hear it.

The S-2 is the only loudspeaker that can make the LOUD. SPEAKER. feel inadequate.

The S-1 and S-2 are the first Cerwin-Vega speakers to embody Thermo Vapor Suspension to further optimize the 6th order synergistic tuning of a well vented cabinet and active equalizer. Thermo Vapor Suspension is described in the introduction in greater detail. Suffice it to say, it's a significant step forward.

Hardrockers

The *Hardrock* series is an excellent example of effective cost/value engineering. For instance, by enlarging the cabinet over bookshelf size (the *Receiver Saver* and *S1*), bass becomes deeper and more pronounced. This costs us very little because we lay-up our own cabinet veneers. This increased bass efficiency is put to good use by matching it with increased midrange and treble capability, resulting in more headroom, dynamic range and—the cornerstone of pop music—more Loud. As some pop music requires as much as 20 dB more level capability than most classical music, this



increased Loud should not be underrated in importance.

These speakers are our unabashed expression of pure no nonsense sound. While we agree that in theory a speaker should reproduce an acoustic facsimile of whatever signal went into it, that's in theory. In the real world, many years of staging rock concerts have taught us that the design parameters for reproducing rock are weighed differently than for classical music. The close-miked explosive transients of rock require the highest possible efficiency: the remotely-miked textures of classical music require the special ambience effects and contoured frequency response.

The Hardrock is designed to provide more efficiency than the LOUD SPEAKER, at a significantly lower cost. To do that, we had to allow a little more coloration at 120 dB than in the S1 frequency spectrum.

The net result is a speaker that has the frequency response of the best bass vented designs, with greater efficiency. One watt will produce an acoustic output of 100 dB at 1 meter. Frequency response is 35-17 kHz $\pm$ 4dB.

The 212 is the embodiment of the philosophy stated previously. The 212 is a 2-way, 12" system with the low coloration of the 211 and the punch and efficiency of the 214 which it replaces.

If the 212 is not loud or clear enough at 120 dB+, then the 3-way, 312 is a logical step up. With the addition of a 300 Hz crossover and a 6" sealed midrange driver, a significant reduction in bass to mid-frequency intermodulations is achieved. By not having to handle midrange, the woofer is tuned to extend the low bass response. This can be noticed by critical listeners at 110-125 dB levels. If you don't care to play this loud and clean, then save some money. The 212 is your best friend.

The 4-way, 417R is a louder, cleaner and extended range 312; for those who must play lower or fill larger rooms with adequate dramatic peaks. Keep in mind the fact that they don't just play louder but cleaner, and even a monster 18" 4-way system can sound anemic in a very absorbent room.

The Hardrockers represent the finest value in workmanship, materials and performance

for the reproduction of rock, pop, and jazz musical forms because of the enormous dynamic range, bandwidth and close-up intimacy. If you want distant hall ambience effects, pass this speaker by or add an electronic digital delay system.

If you can afford it, buy the LOUD SPEAKER, no matter what kind of music you listen to. But if you think loud rock and roll is the ultimate art form and your budget is limited, relax.

You've found a friend.

The ultimate choice of speaker depends on listening level preferences, room size, efficiency and available power, in roughly that order. *Trust your own ears, they're the only ones you will be listening through.*