BEST PLACE FOR YOUR SPEAKERS

EXCLUSIVE INTERVIEW
PRESTIGE RECORDS'
BOB WEINSTOCK

THE EQUIPMENT AUTHORITY
AUGUST 1994

CLEAR WINNER!!!
AR LIMITED
MODEL 2 PREAMP

TESTED
EPoS SPEAKERS
ALPHA-CORE CABLES
TERK LEAPFROG

US $3.50
UK $1.95
CAN $3.95
NATURE'S ENCORE

LIGHTNING DOES STRIKE TWICE
Mobile Fidelity Sound Lab does it again — with The GAIN System™.

With a magnitude step forward in the potential of digital sound reproduction, Mobile Fidelity Sound Lab introduces The GAIN System™. A revolutionary new system in audio engineering, The GAIN System™ brings to the CD format what both critics and advocates have found lacking since its inception: warmth. Working from the original master tapes, Ultradisc II™ is now mastered through a network which includes a "no missing codes" analog to digital converter for audio — the only one of its kind in the world — delivering a full 16-bits, as well as redesigned repro amp electronics and a new, completely neutral interface module.*

The Results? Startling realism in the digital reproduction of recorded sound. Your favorite artists have been vindicated from the sterile digital box to a more spacious soundstage with improved detailing, more stable imaging and better frequency response.

Mobile Fidelity is committed to continually advancing our mastering technology to bring you as close to your favorite artists as technologically possible. Welcome to the next level in audio engineering: Ultradisc II™ — the original, limited edition 24-karat gold compact disc — mastered with The GAIN System™.

*If you would like a more technical explanation of The GAIN System™, call us toll-free at (800) 423-5759 or write to Mobile Fidelity Sound Lab, P.O. Box 1657, Sebastopol, CA, 95473-1657.

E-mail: mofi@mofi.com
When you pull up to a fast food drive-thru, the speaker outside your car shouldn't remind you of the ones in it. But if it does, it's time you retrofit your ride with some Pioneers. Our speakers are crafted from a unique blend of materials designed to give you lower distortion. Higher sensitivity. And plenty of pavement shaking bass. So give us a call at 1-800-Pioneer, ext. 301. We'll make sure you never have to listen to bad sound in your car again. Except, perhaps, when you're hungry.
There are three sorts of equipment you most want reviewed and you are pretty definite about their relative importance—speakers are by far the most important, with amps second, and preamps trailing.

Second on the list of editorial favorites was the “Audioclinic” column, which placed higher up than I had anticipated. Even though the “Auricles” column does cover equipment, its rank was essentially equaled by our letters column, “Signals & Noise”; Edward Tatnall Canby’s opinion column, “Audio ETC,” and our pop/rock record column.

On the survey, the popular types of feature articles were ones on new technologies, basic electronic and sound theory, hints and tips for better sound, listening room design, and the history of high fidelity. Some in the focus groups expressed an almost nostalgic desire to see us return to publishing big construction articles. While quality you-build-it articles have been tough to get, we are working on an amplifier construction piece that should run shortly. Let me know how you like it.

Herein is the first entry in Dr. Pitts’ Fractured Dictionary: Alternative Physics, that branch of non-science wherein magic is performed with much arm waving in front of lots of mirrors in the midst of many clouds of blown smoke for the satisfaction of the electronically disadvantaged from whom pieces of green paper are extracted; said to take place in other universes; no feat of alternative science in this universe.

I am happy with this is that I have long been convinced that our “Profiles” are the heart of this magazine and are the basic reason you buy Audio.
"Nothing less than a steal."
—Robert Harley, Stereophile

There’s something in this review of our GDA-600 digital-to-analog converter that the competition doesn’t want you to see. Maybe it’s the fact that the GDA-600 makes digital formats sound richer and more musical. Or that it has advanced 20 bit conversion architecture and a Class “A” analog output stage. But what they really don’t want you to see is that the GDA-600 costs much less than you might expect. For the full review see Stereophile, Volume 17, No. 3, (March '94). Or, if your copy has been stolen, give us a call.
More Reflections on Mr. Hi-Fi

Dear Editor:

I have always admired Leonard Feldman. My admiration only increased when he testified to Congress about the shortcomings of the CBS "notch" encoding technique for records. That took guts, especially since he was writing for Audio when it was owned by CBS.

I also admired the way he kept up on advances in technology and learned the nuances in such great depth. He was able to explain them in a way that was always very easy to understand.

Dear Editor:

I just heard, from Ken Pohlmann, the sad news of Len Feldman's recent death. It is a true loss to your fine publication and sad news of Len Feldman's recent death. It is a true loss to your fine publication.

I first met him while I was at Clarion and heard him speak with great passion on audio and video topics. His passion mirrored my own.

I met Len when I was at Clarion and came to appreciate his expertise and perspective. But most significantly, he gained my respect for the wonderful way in which he conducted himself.

The last time I saw him was the summer of 1989, when he represented Audio at the Lexus LS400 long-lead press conference held for audio publications. I felt a great deal of pride for the job we had done with the Nakamichi and Pioneer audio systems Len paid his very high complements.

Best wishes for your magazine. It is an interesting and valuable reference on all aspects of "enthusiast-level" audio. Also, we were very pleased with Ivan Berger's "Roadsigns" column (February 1994) on the new Lexus GS 300.

Fred M. Deutsch
Audio & Electronics Planning Mgr./Toyota
Torrance, Cal.

Dear Editor:

I read of Leonard Feldman's death with great sadness. I met him on two different occasions in Washington and heard him speak with great passion on digital audio. After lecturing and answering questions, he reached into his jacket pockets with a twinkle in his eye and produced what looked like a miniature video cassette. It was a DAT and pretty much took everyone by surprise since DAT was not on the front burner of the audio world at that time. Len was genuinely excited about the prospect of a new digital tape technology.

When it was time for the door prize, lo and behold, my name was called out, and I went up to receive my prize and shook Len's hand. It was a very enjoyable evening.

The second, and last time, I saw Len Feldman was at an audio show in a hotel in the Tysons Corner area of Virginia. The show was wonderful, but what really took the Tysons Corner area of Virginia. The show was wonderful, but what really took

When it was time for the door prize, lo and behold, my name was called out, and I went up to receive my prize and shook Len's hand. It was a very enjoyable evening.

My admiration only increased when he testified to Congress about the shortcomings of the CBS "notch" encoding technique for records. That took guts, especially since he was writing for Audio when it was owned by CBS.

I also admired the way he kept up on advances in technology and learned the nuances in such great depth. He was able to explain them in a way that was always very easy to understand.

Anyone who writes well soon realizes how difficult it is. To maintain a high level of integrity, honesty, and technical precision the way he did is truly amazing. I have read many technical articles in my life and have learned to interpret what is said and, even more important, what is not said. When I read Leonard Feldman's writing, I didn't strain to find out what I wanted to know. His writing was obviously not intended to be flashy or controversial, but to convey information. Most writers don't realize the constraints of editorial space limitations and therefore will never completely realize how much information he was able to pack into so few words.

I thank him for the wealth of information that I took from his writings.

Ed Long
Oakland, Cal.

Editor's Note: Mr. Long is a Contributing Editor to Audio.
The purpose of audio and video equipment is to reproduce a work of art. At AudioQuest we strongly believe that it is not our place to reinterpret any audio or video masterpiece. We believe in the highest possible fidelity to the original creation! Whether you are reproducing a Chopin sonata, Jimi Hendrix's guitar, or T2's audio and visual effects, they all deserve to be reproduced faithfully.

As the audio world moved from mono to stereo and now multi-channel stereo, the term Hi-Fidelity seems to have been forgotten. If you want to be trendy, you could now call it UltraFidelity - but whatever you call it, AudioQuest audio, video and digital cables will give you more of it!

P.O. Box 3060 San Clemente, CA 92674 Tel: 714 498 2770 Fax: 714 498 5112
Ageless and Priceless “Reality Lessens”

Dear Editor:

I just read Edward Tatnall Canby’s “Audio ETC” (December 1993) and want to share a couple of thoughts. In 1957 when I was a student newly bitten by the audio bug, I opened a hi-fi store that I operated part-time while in graduate school. It was the only hi-fi shop within a hundred mile radius of our town in the Missouri Ozarks.

At one point I wrote a letter to Mr. Canby who I imagined as an ancient, wizened Audio Master. I probably sought his opinion on the purity of my Marantz Model 9 amplifiers; whether I should get a second Capps condenser microphone to make stereo recordings on the Concertone tape recorder; did he think the new AR speakers beat the Bozaks; the Scott tuner, etc. I am embarrassed to remember the beseeching tone of all this but it was true.

Mr. Canby graciously answered my letter with no less than two pages of handwritten comments addressing my many questions. I was honored and re-read the letter many times. It was saved in an old trunk in the basement until destroyed by water from a leaking faucet some 10 years ago. The letter is gone but I remember Mr. Canby’s closing comment exactly: “Each man must search for his Holy Grail; for some of us, High Fidelity provides a vulgar substitute.”

You see, Mr. Canby was giving “Reality Lessens” back in 1957 too! It is marvelous that he continues to produce articles that inform, entertain, and instruct. And how is it that I have progressed from a callow youth to the edge of old farthood and Edward Tatnall Canby has apparently not aged?

Charless W. Fowlkes
Bozeman, Mont.

Coverlines or Coverlies?

Dear Editor:

On the cover of the December, 1993 issue, it says in quotes, “I’d sell my Mercedes to buy Quicksilver’s M135 tube amp.” Bascomb H. King did not say that.

A fellow reviewer said (as a suggestion to Mr. King) and I am taking the quote from page 64, “Sell the Mercedes and the wife’s mink coat... go out and buy yourself a pair of M135s, forget about amplifiers, and simply enjoy the music.”

Mr. Pitts, the quote you printed on the cover is not true. Besides, your editorial philosophy has been that all amps sound the same, or else so much alike that no one can pass a double blind listening test.

Not only have you been printing false information, but now you are printing untruths on the cover. What next? (You have my permission to print this letter if you have the courage.)

Tony Mauldin
Lewisville, Tex.
BELL'OGETTI™

THE HOME THEATER SYSTEMS

difference

Bell'Ogetti International Ltd.
711 Ginesi Dr
Morganville, NJ 07751-1250
Tel (908) 972-1333
Fax (908) 536-6482

DEALERS:
TWEETER, MA, CT, RI
STATE STREET DISCOUNT, PORTSMOUTH, NH
HARVEY ELECTRONICS, NY, NJ
J & R MUSIC WORLD, NY
6TH AVE ELECTRONICS, NY, NJ
SOUND CITY, KINNELEDON, NJ
STEREO EXCHANGE, NY
BYRN MAyer STEREO, PA, DE, MD, NJ
HI FI HOUSE, PA, DE, PRO VIDEO, MD, DC
HI TECH ELECTRONICS, ANNAPOLIS, MD
NEW IMAGE, CLEVELAND, OH
STEREO VISIONS, COLUMBUS, OH
ALAMO ELECTRONICS, CINCINNATI, OH
HI FI BUYS, GA
MUNDY'S A/V, GAINESVILLE, GA
SOUND ADVICE, FL
COLUMBIA A/V, HIGHLAND PARK, IL
ABI TV, MORTON GROVE, IL
O'BELLY'S LIBERTYVILLE, IL
MILLS A/V, CHICAGO, IL
MUSICRAFT, PALATINE, IL
DOUGLAS TV, CHICAGO, IL
GOOD VIBES, CHAMPAIGN, IL
HI FI FO FUM, ST. LOUIS, MO
KEE'S GRAMAPHONE, LAWRENCE, KA
SOUND CENTER, MINNETONKA, MN
MAURY'S TV, E. GRAND FORKS, MN
HOME ENTERTAINMENT, DALLAS, HOUSTON, TX
CONSUMER ELECTRONICS, ARLINGTON, TX
DON'S HI-FIDELITY, LUBBOCK, AMARILLO, TX
WRIGHT'S SOUND GALLERY, SHREVEPORT, LA
ALTERMAN AUDIO, NEW ORLEANS, LA
AUDIO DIMENSIONS, OKLAHOMA CITY, OK
HOLLIDAYS TV, HATTIESBURG, MS
GOOD GUYS, CA
HOLLYTRON, LOS ANGELES, CA
ANDERSON'S TV, REDWOOD CITY, CA
SOUND COMPANY, SAN DIEGO, CA
CEN TURY STEREO, SAN JOSE, CA
KN CRANES, SO CA
URNER'S, BAKERSFIELD, CA
EBER, NO CA
BONNIN, SANTURCE, PR
GRUPO K2, VALLEJO, MEXICO

Enter No. 2 on Reader Service Card
WHAT'S NEW

Audio Advancements Headphone Amp

This miniature headphone amp not only uses tubes but has a transformerless, Class-A output stage. The Audio Advancements EarMax runs on a 12-V rechargeable battery or from a car battery via an adaptor. The entire amp fits in a 3.35-inch cube, weighs 13 ounces, and comes in gray, blue/green, or purple. Price, including power supply: $489.

Chase Surround Decoder

Completely passive, the Chase HTS-1 decoder has no built-in amplifiers but redistributes the power from your system's amps. Its switching and inputs allow it to be used with systems having anywhere from two to five channels of amplification, and it can derive surround ambience from most surround formats. Price: $99.95

Koss Noise-Cancelling Headphones

Active noise-cancellation technologies in the Koss Quiet Zone headphones reduces the masking effect of noise below 1,400 Hz. The earphones, whose diaphragms are coated with titanium nitride for more upper-frequency detail, have a rated frequency response of 15 Hz to 20 kHz. Tiny microphones in the headset sense ambient low-frequency noise and transmit it to a pocket-sized controller; the controller feeds equivalent noise signals, in opposite phase, to the earphones, where the two noises cancel. A two-pin adapter is included for airline use. Price: $299.99.

B·I·C Home Theater Cabinet and Speakers

Spaces are provided in the B·I·C AV-2 cabinet for all the components of a home theater except the speakers—and most of those are built in. The built-in speakers include all three front channels plus two 10-inch subwoofers; two rear satellite speakers are supplied as well. The cabinet can hold up to a 35-inch TV plus four other A/V components; the side compartments can hold video or audio discs or tapes. Dimensions are 57% in. H x 52⅝ in. W x 19⅜ in. D. Price: $999.

B & O Compact Music System

So highly automated that its doors open when a hand approaches them, Bang & Olufsen's Beosound 2000 is only four inches thick and can be wall-mounted. Other automatic functions include synchronous recording from CDs, automatic record level, 30 AM and FM station presets, and a "Start/Go" button to rewind and play a tape in one action. All active buttons are illuminated in each operating mode. The system's handle doubles as an active FM antenna. The speakers are self-amplified, with electronic crossovers and Adaptive Bass Linearization; grilles are available in four colors. Prices: $1,595, including remote control and table stand; wall bracket, $25.

For literature, circle No. 104
No compromise in a GMC Truck. Industrial strength or handy take-home size, you get full strength. As it has been through nearly a century: GMC Truck, delivering the strengths of trucks.

What have we done for you lately? The 1994 GMC Sierra. It's got something you probably don't expect from a truck—refined road manners.

Skeptical? Understood. But put Sierra through its paces.

A vibration-eating balance shaft in Sierra's standard engine quiets your fears.

Independent front suspension smothers road shock before it can reach you. While a commanding view of the road makes Sierra decidedly uncar-like.

When you look into your next truck, look into luxurious, take-home-sized industrial strength. To learn more about GMC Sierra, call 1-800-GMC TRUCK.
AVON ClearSpeake

Avalon's Monitor two-way system has a front baffle 3 inches thick, to minimize vibration. The 1-inch tweeter has a titanium dome, while the 7-inch, long-throw woofer's cone is a Nomex/Kevlar composite. Rated anechoic response is 60 Hz to 24 kHz, ±1.5 dB; in rooms, its -3 dB point is below 48 Hz. The speaker is 18 inches tall (42 inches, with optional stand), 8 1/2 inches wide and 10 1/2 inches deep, and weighs 31 lbs. (53 lbs. with stand). Prices: Speakers, $2,695 per pair; stands, $340 per pair.

DCH Subwoofer

The DCM Sub-710 is a compact subwoofer with 50 watts of amplification built in. The drivers are two 6 1/2-inch woofers, and frequency range is rated as 32 to 80 Hz. Price: $399.

For literature, circle No. 107

Hoffman Classic Audio

This loudspeaker looks like a violin because it is one, transformed by Hoffman Classic Audio into the Violin Speaker. The 1-inch, fabric-dome tweeter and 4 1/2-inch, polymer-cone woofer give it a rated frequency response of 60 Hz to 20 kHz, ±2 dB. Sensitivity is 88 dB, and impedance is 6 ohms. Price: $1,800.

For literature, circle No. 109

RCA Video Acoustica

In-Wall Surround Speaker

The Video Acoustics VA-2200, from RCA, is one of the few in-wall speakers with the image diffraction recommended for surround channels. Each system's 5 1/2-inch woofer fires directly into the room, while its 3 1/2-inch midrange and 1-inch tweeter fire into an angled reflector. Power handling is 120 watts. The molded enclosure can be mounted to wall studs to reduce wall vibrations. Price: $549/pair.

For literature, circle No. 108
Ultimate Performance

Resolution, soundstage, and tonal balance approaching perfection.
Quality, visual appeal, and performance to satisfy the most demanding audiophile.

The most natural, musical path from digital bits to the human ear.

polyfusion audio

30 Ward Road, Lancaster, New York 14086
Phone: (716) 681-3040 Fax: (716) 681-2763

Enter No. 6 on Reader Service Card
What ever happened to the search for that elusive 1889 Edison cylinder of Johannes Brahms playing his own music and (perhaps) speaking his own name? Since the February issue, my last mention of it, a prodigious amount of information has indeed come my way concerning this minute bit of ancient audio. Progress has gone on apace—by which I mean, unfortunately, at a snail’s pace. We have been the victim of a common disease today called Anti-Communication, much like antimatter: Those noxious segments of the Information Superhighway that inspire near-total bottlenecks in rapid data transmission! A vast spate of letters, for instance, mailed to me after the February issue, reached me more than eight weeks later. Say no more. You get me. My snails have been unusually slow this year. Probably the weather.

And yet this little one-minute sonic episode, the oldest piano recording extant today and the only one by the famous composer, is of considerable historic importance, the more so because in its existing forms it is almost unintelligible. For that very reason its history, in this age of advanced digital restorations, is far from over.

It has been a fascinating exploration for me during these numerous months. The more information that comes in, the more astonishing are the ramifications, the contradictions, the unanswered questions, the "clamshell" silences (often understandable)—all of which mingle inextricably with the lil' snails. Seafood galore!

Remarkably, at this point the recording, after more than a hundred years, is actively "under development" via the latest state-of-the-art digital analysis, and this is not the first such treatment. Another was published in Vienna, in 1983, in the form of a 45-rpm EP disc. The 1994 treatment, as you may guess, is using the new approach of Yale math Prof. Ronald Coifman and other Yale University specialists. (See September 1993.) This enterprise is not yet definitive, and so I will be a clam myself until more news comes in.

I have also heard of assorted restorations on LP (always with other material, necessarily), but the outstanding U.S. source for most of the "sightings" and hearings reported to us was released in 1977, non-digital, by the International Piano Archive (IPA) in New York. This restoration—the sound still mostly unintelligible—is likely to be found in many archives, libraries, and radio stations and is surely our major source in this country.

All of these, alas, stem not from the original cylinder but from a set of archival acetate-disc copies made from the cylinder in 1935 in Berlin, including a long-missing limited pressing. There were evidently numerous trial attempts at that time, with considerable well-meant doctoring of the sound afterwards—hence, almost certainly, some of the distortions now heard by listeners.

There is astonishing confusion over the details of that 1935 operation. (There may or may not have been the broadcast often mentioned.) But it is known that the copies were produced by playing the cylinder on an old acoustic machine and then recording the resulting sound via microphone! Shades of a recent similar operation by an English CD label.

Then there are the London discs, apparently from the same source, discovered not far back in an English archive, wholly unidentified. (The English, I might observe, are well known for not cataloging their collections.) These were left in the

**This Sonic Episode Is of Considerable Importance, the More So Because It Is Almost Unintelligible.**

Illustration: Courtesy Cramer
You don't have time to brace yourself, much less think. Meanwhile, it's thought of everything.

It happens so fast. How can an airbag trigger so suddenly? Let's just say it's the moment our little black boxes have been waiting for all their lives. Delco Electronics
will of the man who put out the pressing from the 1935 copies—he was president of the company, Lindström, and probably was on hand for the actual Berlin procedure. He later moved to England; speculation says these might be trial runs for the Berlin copying, carried away by him at the time. Were they? Nobody knows.

All of today’s available versions of the recording come from one or another of these London discoveries, if I am right, and that includes specifically the 1983 Vienna 45 release. However, few of the other existing versions indicate a source, and here come the clams. The IPA LP made in New York says it is derived from “a tape.” Tape of what? This is an old clam; there are much newer ones too. (IPA is now relocated as IPAM at the University of Maryland.)

But what of the cylinder itself, the Edison original? It has never been lost. It is alive, though not well, in Berlin today, where it has remained since it arrived there in 1935—assuming it is indeed the same cylinder! More on that later.

Something went wrong at the actual recording session in 1889 at the home of the Fellingers, Viennese friends of Brahms. The composer, several accounts agree, was very nervous about the whole thing and the expert in charge. It was he who decided to use an old acoustic player rather than a modern pickup.

In all I have read so far, there is no clarification as to how the famous cylinder got to Berlin, though there may be information in a book (German) written by one of the Fellinger family. This is curious—anything could have happened, once the Fellingers relinquished what we might call control. It would have been easy enough for someone in possession of the cylinder, between Vienna and Berlin, to make a reasonably good copy and secrete the precious original for himself; who indeed would know the difference? Enough to say that I was wrong in my account (in February) of that so-called pantograph copying. The pantograph was not at all what I thought but, rather, a tight, tiny metal connector that tied an Edison player to another’s recording head to make a single real-time copy that closely matched the original. One of my correspondents has actually seen one of these in operation and heard the result, indistinguishable from the original, he says. I’ll take his word for it.

As for the present state of the cylinder in Berlin (the archive was in the East zone and thus out of touch with the West until the recent reuniﬁcation), it is in sad disrepair. At some time an operator evidently activated a cylinder scraper, probably by accident. This was attached to an Edison player to remove a layer of grooves to make a new recording, much as we erase a tape. The scraping was stopped in time, but the grooves are very shallow, which makes for immense difﬁculty in the copying. As I get it, this occurred after the 1935 copies were made—hence the repeated choice of those discs for later restorations, right up to the present. In addition (perhaps at the same time) a piece was broken off at the beginning, making it impossible to play all of the spoken introduction, though the name Brahms—Johannes Brahms—is clear enough, at least to my ears. Yes, I have heard the 1983 version—or, rather, a copy on tape, which I trust to be authentic. In the alternative “original” on this 45—that is, the unchanged sound of the 1935 disc—the name seems to be something like “Robert Brahms,” but in the restoration it is quite grandly “Johannes Brrrahms,” with a greatly rolled “r.”

Even worse, the cylinder’s structure is weakened and cracked. And the Austrian engineers in 1983, who made arrangements with Berlin to have the cylinder on loan for several days, had to wrap tight rubber banding around each end before they dared put it on a machine. This covered up a segment of the music, as well as the opening spoken words. They tried six times, using variable stylus and point pressures, all to no avail (it says in a 1984 article by the engineers, translated into English). So in the end they decided to use the 1935 disc copy. Better sound. Without a doubt, however, those six attempts still exist on 15-inch tape in Vienna, though never used. That’s a challenge! They may be the last copies ever to be made of this cylinder. Unless some ingenious soul fills it with reinforcing plastic or such to strengthen the structure enough to play, or at least turn at speed. A tracing of the grooves by laser? That is bound to come up sooner or later as well. It might make a crucial difference.

There is much, much more to tell, notably about events in this country (all of the above is strictly European). Note that I have omitted most names and sources of information in this month’s account. Give you the (relatively) big picture first. All those names will come forth eventually, clams and snails allowing. The best is yet to come!

**BRAHMS’ CYLINDER IS ALIVE, BUT NOT WELL, IN BERLIN, WHERE IT HAS BEEN SINCE 1935.**
In the fiercely competitive speaker market, one brand, Paradigm, has experienced stunning growth since it was founded in 1982. The reason for this rise to prominence is simply better product performance - Paradigm speakers sound more musically correct. And they do so because of better research.

Landmark research, conducted by the world-renowned National Research Council, has clearly identified what good sound is, and also identified the measurable characteristics that are common to all good sounding speakers. This highly acclaimed research is the foundation on which Paradigm speaker design is based.
B-Series Subwoofers are the perfect solution for adding bass to a variety of Paradigm speakers. They are elegant, efficient, powerful and provide deep, tight bass with excellent definition and solid impact!

Smaller Paradigm speakers (Micros, Atoms, Titans, Minis, etc.) integrate seamlessly with a single SB-80 or SB-100. Use the SB-120 with larger Paradigm speakers or for greater bass output. SB-Series Subwoofers create a variety of outstanding “3-piece” systems - all able to provide stunning performance!

Thinking about home theater? It’s simple. Take a Paradigm “3-piece” system, add two Paradigm speakers for the rear and a Paradigm center channel speaker and you have a superb sounding compact home theater speaker system! For higher output capability add a second SB-Series Subwoofer. Operate them with a dedicated amplifier for astonishing results! Then add two Paradigm speakers for the rear and a Paradigm center channel speaker and you have a sensational home theater speaker system... better than many costing several times as much!

For more than a decade Paradigm has earned a solid reputation for superb musical performance and unrivaled value! Built on this tradition, the SB-Series sets an entirely new value standard... until now this quality of bass performance was simply not available in this price class!

**SB-SERIES DESIGN FEATURES**

- Single driver, high velocity, low noise, bandpass systems with critically tuned resistive ports.
- Bass reflex port.
  - Multiple 3" ports with inner and outer radius allows for high all velocity with very low turbulence.
  - Ports "fire" down to further reduce unwanted midrange output.
- Enclosure.
  - Multiple-cavity design.
  - Inert high-density hardboard limits unwanted panel resonances.
- Highly flexible:
  - A single SB-Series Subwoofer can be configured to operate in stereo or in mono (when using two subwoofers).
- Convenient hook-up:
  - Main speakers can be connected to either the receiver/amplifier or to the SB-Series Subwoofer.
- All four sides and the top are finished allowing SB-Series Subwoofers to fit easily and elegantly anywhere in your room.

**PARADIGM built bass drive unit.**
- Dual, multi-layer 1½" voice-coils (2" on SB-120) with kapton formers ensure musical accuracy and long term reliability.
- Massive magnet structures with symmetrical field geometry optimize cone movement for maximum output and lowest distortion.
- Ultra-rigid high-density cone/surround assemblies maintain uniform piston motion even at high playing levels.
- Crossover.
  - Oversized power inductors roll off unwanted midrange output.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Design</th>
<th>Single driver, dual voice-coil, bandpass systems with critically tuned resistive ports.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossover</td>
<td>4th order electro/acoustic at 100Hz. Frequency- and phase-corrected.</td>
</tr>
<tr>
<td>SB-120</td>
<td>BASS/MIDRANGE DRIVER 300mm (12&quot;), 1½&quot; voice-coil, aluminum former</td>
</tr>
<tr>
<td></td>
<td>LOW FREQUENCY EXTENSION 26Hz (DIN)*</td>
</tr>
<tr>
<td></td>
<td>FREQUENCY RESPONSE ±2dB from 33Hz-100Hz</td>
</tr>
<tr>
<td></td>
<td>SENSITIVITY - ROOM/ANECHOIC 94dB/91dB</td>
</tr>
<tr>
<td></td>
<td>SUITABLE AMPLIFIER POWER RANGE 15-250 watts</td>
</tr>
<tr>
<td></td>
<td>MAXIMUM INPUT POWER 150 watts</td>
</tr>
<tr>
<td></td>
<td>NOMINAL/MINIMUM IMPEDANCE 8ohms/6ohms</td>
</tr>
<tr>
<td>INTERNAL VOLUME</td>
<td>103 liters/3.6cu ft</td>
</tr>
<tr>
<td>HEIGHT. WIDTH. DEPTH</td>
<td>43cm x 44cm x 72cm/16⅞in x 17 in x 28 in</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>26kg/57lbs each</td>
</tr>
<tr>
<td>SB-100</td>
<td>BASS/MIDRANGE DRIVER 250mm (10&quot;), 1½&quot; voice-coil, kapton former</td>
</tr>
<tr>
<td></td>
<td>LOW FREQUENCY EXTENSION 30Hz (DIN)*</td>
</tr>
<tr>
<td></td>
<td>FREQUENCY RESPONSE ±2dB from 40Hz-100Hz</td>
</tr>
<tr>
<td></td>
<td>SENSITIVITY - ROOM/ANECHOIC 94dB/91dB</td>
</tr>
<tr>
<td></td>
<td>SUITABLE AMPLIFIER POWER RANGE 15-200 watts</td>
</tr>
<tr>
<td></td>
<td>MAXIMUM INPUT POWER 100 watts</td>
</tr>
<tr>
<td></td>
<td>NOMINAL/MINIMUM IMPEDANCE 8ohms/6ohms</td>
</tr>
<tr>
<td>INTERNAL VOLUME</td>
<td>103 liters/3.6cu ft</td>
</tr>
<tr>
<td>HEIGHT. WIDTH. DEPTH</td>
<td>43cm x 44cm x 72cm/16⅞in x 17 in x 28 in</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>19kg/42lbs each</td>
</tr>
<tr>
<td>SB-80</td>
<td>BASS/MIDRANGE DRIVER 210mm (8&quot;), 1½&quot; voice-coil, kapton former</td>
</tr>
<tr>
<td></td>
<td>LOW FREQUENCY EXTENSION 40Hz (DIN)*</td>
</tr>
<tr>
<td></td>
<td>FREQUENCY RESPONSE ±2dB from 50Hz-100Hz</td>
</tr>
<tr>
<td></td>
<td>SENSITIVITY - ROOM/ANECHOIC 93dB/90dB</td>
</tr>
<tr>
<td></td>
<td>SUITABLE AMPLIFIER POWER RANGE 15-150 watts</td>
</tr>
<tr>
<td></td>
<td>MAXIMUM INPUT POWER 80 watts</td>
</tr>
<tr>
<td></td>
<td>NOMINAL/MINIMUM IMPEDANCE 8ohms/6ohms</td>
</tr>
<tr>
<td>INTERNAL VOLUME</td>
<td>103 liters/3.6cu ft</td>
</tr>
<tr>
<td>HEIGHT. WIDTH. DEPTH</td>
<td>43cm x 44cm x 72cm/16⅞in x 17 in x 28 in</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>15kg/33lbs each</td>
</tr>
</tbody>
</table>

**AVAILABLE FINISHES.**

- Black Ash (all models)
- Black Gloss (SB-100 & SB-120)
- Rosewood Gloss (SB-100 & SB-120)
ike the Compact Disc, the LaserDisc was designed primarily to deliver a continuous stream of serial data. In the case of CD, that data is digital, and the data rate was originally based on the requirements of two channels of 16-bit audio at a sampling rate of 44.1 kHz. With LaserDisc, the data is often a mixture of analog and digital, and the primary function is as a video storage medium. In their original intended applications, both media were normally asked to play continuously from beginning to end, but they have the added capability of directly accessing specific bands, tracks, or "chapters."

The CD and the LaserDisc have been adapted to alternative uses. The Compact Disc, for example, does duty as a read-only memory (ROM), as a storage medium for high-resolution photographs, and as the storage medium for a number of user-interactive systems. Both media have reasonable access times to any "address" on the disc, on the order of a handful of seconds. As long as the alternative use does not demand too rapid a movement from one point on the disc to another, the disc functions well as a read-only memory. (The real secret to programming for these alternative uses is to reduce the frustration of waiting during look-up period by having some relevant activity take place on the screen while the disc is being scanned for new data.)

The ability to work interactively is not built into conventional CD and LaserDisc players. Instead, it is provided by additional processing capability, which may be either external or internal. In some cases, the mechanical performance of the transports may be upgraded for the greater load that will be placed on them.

I recently tried out Pioneer's Model CLD-A100, a combination LaserDisc and CD player (with separate drawers for each) that accepts plug-in modules for LaserActive applications. As supplied, the standard unit will play only ordinary LaserDiscs and CDs; for interactive purposes it is necessary to plug in a "control pack," a small box that slides into the front of the chassis and has input jacks for handheld controllers. The control pack functions as a computer and generates on-screen menus, translating user input from the controller unit. Two control packs were included with the system I received, one for educational discs and for NEC Turbochip and TurboGrafX-16 software, the other for Sega Genesis cartridges and discs. (Only one control pack is included in the system price of about $1,000. The player costs $735 alone; additional control packs cost $485 each for games and $350 for karaoke.) I evaluated a variety of LaserDiscs, both standard and interactive, but did not evaluate any CDs or interactive movies.

Because it's also a CD player, the CLD-A100 can read digital as well as
A stereo system
doesn't have to
be complex.

A stereo system
can be simple
and approachable.

Uncomplicated
and true.

(The same
can be said
for relationships.)

Festival from
the legendary
Harman Kardon.

You'll know it
when you
hear it.

analog LaserDiscs soundtracks. Most recent music-oriented LaserDiscs, such as operas and concerts, now include digital sound, and the combination of crisp, stable color images and digital stereo is a joy to behold.

Those of you familiar with CD-based interactive programs may have, at least sometimes, been frustrated by sluggish performance and clumsy graphics. There is a limit to how quickly data can be taken from the CD to feed a hungry processor. With the LaserDisc as a source, the data rate is far more rapid, and programs can be updated more quickly. As a result, the system is often well ahead of the user; it is waiting for you to make an entry.

Programming for interactive video is still in its early stages, and, it would seem, so are some of its conceptual aspects. For example, a disc given over largely to a tour and study of the Egyptian pyramids lets you browse through a wide range of direct and peripheral topics related to pyramids and the Pharaohs. Then, in the midst of all this informative stuff, you come across a video game.

Still other programs are basically video games and, as such, are the most interactive of all; your own commands at the controller determine what happens directly on screen. Some of these games tax the system to the limit. Graphics may be jerky and of limited resolution, presumably because they are being generated on a real-time basis. The control unit itself may get in the way; obviously, a joystick would be a more natural way of trying to avoid an enemy missile than trying to coordinate your thumbs and the controls!

A further comment on the quality of the graphics is implied by the warning that appears on all interactive LaserDiscs. Summarized, it states that a very few individuals may be subject to seizures upon viewing interactive video and that care should be taken. The pronounced flicker in the display is apparently the cause.

For the most part, interactive LaserDiscs are handsomely packaged, with generous information on how to work each program. You are told which button on the control unit does what, and a detailed hierarchy of menus is given.

Overall, it is easy to walk away overwhelmed by the simple-mindedness of much of the programming. On the other hand, much progress is being made, especially in educational areas. Many concepts in physics and mathematics may be elucidated if a student can sit in front of a computer with the appropriate interactive videodisc, which is being done every day on college campuses.

Is this a good time to buy an interactive LaserDisc system? It depends on your, and your family’s, needs and tastes. The basic unit can function as a LaserDisc player and provide movie and music entertainment of the highest technical order. While discs are relatively expensive, they can be rented for next to nothing. The choice of a platform for the interactive portion is more complex and should be made only after you have surveyed the available software. All of these may be obsolete sometime in the relatively near future, but I would hazard a guess that any investment you might make in a LaserDisc library would still benefit from backward compatibility of any new playback hardware.

Music is in our soul.

Harman Kardon is one of the many worldwide companies which forms Harman International.

Our distinctive companies include Harman Kardon, JBL, Infinity, AKG, Lexicon and Soundcraft. They share a single, compelling passion. Music. It is the soul of each.

And each of our companies is equally passionate about making that music more available and more accurate. That’s why we’ve created high quality, intuitive sound systems — easy to set up — even easier to use.

Festival is one such product. SoundEffects by JBL and Epsilon by Infinity are other products which reflect the same perspective, although each does a different job.

Harman Kardon, JBL, Infinity, AKG, Lexicon and Soundcraft share the passion and share the fundamental objective of all Harman companies: to reproduce music flawlessly, to make the products easy to use and lovely to look at.

Music and the soul. A great way to make a living.

Intrigued? Then please call us at 1-800-422-8027.
IBM researcher Kurt Rubin holding two-layer optical discs that can be sandwiched together as shown below.

The guy wearing the gloves, Kurt Rubin of IBM's Almaden Research Center, seems to be holding five discs. But you could say he's holding 10—or one; it all depends on how you look at it.

Each of the discs in Mr. Rubin's hand is a two-layer optical recording, and these recordings are designed to be sandwiched together into a disc with up to 10 recording layers and a corresponding increase in information-storage capacity. Such a sandwich disc would be quite fat (about a half-inch thick, in IBM's initial mockup) because it would include not only the five two-layer data carriers but spacers between carrier discs and a rigid plastic substrate like that on today's CDs. In practice, says IBM, discs with four or more layers will be made of thinner materials.

The experimental disc system relies on optical disc equipment's extremely shallow depth of focus. Today's optical drives focus so finely, IBM says, that "light focused on any layer is 10,000 to 100,000 times more intense than that hitting any adjacent layer."

The reflective backings used on today's CDs and LaserDiscs cannot be used on a multi-layer disc, as they would block the passage of light to other layers. Instead, the system relies on a balance between transparency of the layers and reflectivity of the surfaces and requires higher powered lasers than today's CD players do. The number of surfaces in a disc stack is limited by laser power, layer transparency, and cost. Prerecorded discs could have more layers than recordable ones, since recordable discs must be able to absorb some of the laser light during recording. However, players built to handle multi-layer discs would still be able to play today's single-layer audio, video, and data discs.

This experimental IBM system is also compatible with systems that raise data capacity by using shorter wavelength (blue) lasers or lenses with high numerical apertures for more precise focus. Such systems are being worked on by 3M, Sony, IBM, and many others.

It's unlikely that 10-layer audio CDs will ever appear, for the same reason 10-CD albums aren't around now—too little material whose length would justify this. But CDs with two to four layers would make sense, and adapting today's player designs to handle them might not be difficult. (Retrofitting existing players might not be cost-effective, though.) Today's players already have movable lenses to maintain focus even on warped discs. The Almaden researchers have found that it took only "relatively minor modifications" to adapt an existing CD-ROM drive to play audio and video tracks on two-layer, read-only discs.

CD Wins—At Last?

If trends continue, 1994 will be the first year that CD became the world's most popular recorded sound carrier. In 1993, according to
WHERE DOES THE TWEETER OF A HIGH FIDELITY LOUDSPEAKER BELONG?

This question may confuse those who believe that the measure of a loudspeaker is the number of its drivers. It will also elude those who have never bothered to question conventional driver placement, which always separates the woofer from the tweeter.

In fact, the most acoustically correct location for the tweeter is precisely at the center of the woofer. This strategic placement creates a single sound source, allowing high and low frequencies to reach your ears at the proper time, regardless of where the speakers are placed or where you are sitting. (No wonder KEF's patented Uni-Q® is the technology of choice for advanced Home Theater applications.)

Perhaps the greatest benefit of the KEF Q Series speakers is that they sound as good in your home as they do in the showroom.
Not all British design is as traditional as Rolls-Royces (remember the Jaguar XKE?), as these three new British speakers show. All three use B & W drivers; two are from B & W itself.

The four dynamic drivers of the Nautilus have independent, exponentially tapered "lossy waveguide" (transmission-line) enclosures. The 12-inch woofer's enclosure is called like the shell of the sea creature from which the speaker gets its name. Billed as "B & W's test loudspeaker ever," the Nautilus has rated bandwidth of 20 Hz to 25 kHz, +0, -6 dB, with response flat within ±0.5 dB from 25 Hz to 20 kHz. The price is $55,000 per pair.

The trumpet-like B & W Emphasis is a two-way system with a 6½-inch woofer. Its fourth-order vented woofer enclosure uses quarter-wave bass loading and a faked reflex port. The tweeter is mounted on a stand for optimum dispersion. Frequency response is 45 Hz to 25 kHz, ±3 dB, and the price is $9,000 per pair.

The Blue Room House Pod uses similar B & W drivers. This is no surprise, as its designer, Simon Darwood Ghahary, first taught himself speaker design by making systems out of cast-off components from B & W's Steyning, Sussex, plant. (The plant's rubbish heaps are so well cleaned by local schoolboys, reports New Scientist magazine, that they need to be emptied only twice a year.) Like the Emphasis, the House Pod has a fourth-order vented cabinet. Response is rated at 45 Hz to 20 kHz, ±2 dB, and the systems cost $1,900 per pair.

While the swoopy, futuristic shapes of these three speakers make a design statement, they also add rigidity and reduce internal standing waves. The time may come when the term "speaker box" refers only to the package a system like one of these came in.

Cassettes continue to be the dominant medium in developing countries, but Compact Discs are the largest sellers in nine of the 10 countries that buy the most recorded music. And in the 10th such country, Mexico, cassette sales for 1993 dropped 19% while CD sales rose by 39.3%.
Enticed by the sweetness of separates for your home theater system?
But a nightmare image of a bazillion boxes and unruly wires has given you the heebie jeebies?

R-e-l-a-x.

Now you can obtain a powerful home theater command center, combining the musical brilliance of separates with the ease of a receiver, all in one versatile package: Carver's CT-27v Dolby Pro Logic™ A/V Preamplifier/Tuner.

The CT-27v pairs flawless sound with exceptional Dolby processing, including a generous selection of DSP effects (wait 'til you experience an old movie like Casablanca on our "Matrix" mode), yet without the extraneous gimmicks that undermine aural integrity.

When matched with a Carver amplifier (models from basic stereo to multi-channel), the CT-27v lets you direct power to any array of speaker combinations – a task for which a mere receiver is woefully undermanned. So you'll achieve wider frequency response and have the dynamic headroom necessary for those explosive moments in great movie soundtracks.

In sum: the CT-27v is the heart (and soul) of the most uncompromising home theater system. For more of the story, contact Carver today for a feature length brochure.

CARVER CORPORATION, P.O. BOX 1237 LYNNWOOD, WA 98046 • (206) 775-1202
© 1994 Carver Corporation
Distributed in Canada by Evolution Audio, Oakville, Ontario (416) 847-6888
Dolby Pro Logic™ is a registered trademark of Dolby Labs Licensing Corp.
But It Looked Okay on the Meter

Q I was doing a charity recording of a "live" rock-club date, featuring musicians who seldom are in a position to play together. The recording was a unique, never-to-be-repeated event. I decided to use my Tascam 38 half-inch eight-channel open-reel recorder. I meticulously aligned it for 3M 996 tape.

At the session I bridged into the vocal mike circuits, premixed stereo vocals to two tracks, and premixed stereo drums to two other tracks. The remaining four channels were used for two lead guitars, bass guitar, and, on the last channel, harmonica and acoustic guitar solos. This was intended to give me a chance to optimize the balance when the session was done.

At the sound check, all levels were adjusted for the proper mix and recording level was checked, using the VU meters on the Tascam. The rest of the night proceeded without a hitch. Three sets and seven reels of tape later, I came away with a certain euphoria from having captured this rare event for history.

A day later, I set up the deck for playback and mounted reel 3. Reel 3 was the first half of the second set—the best of the evening. I found that nothing was on the tape! A quick review of the other six reels confirmed my worst nightmare. Nothing on any of them either.

I immediately descended into analysis mode, fighting off anger as I did so. The deck must have broken down, I told myself. This excuse quickly evaporated as I confirmed with scratch tape and an FM tuner that the deck was fine and recorded perfectly.

I went over each detail of mixer and mike preamplifier connections, verifying nothing obvious. I went into hypothesis mode: Perhaps the reels of tape were wound such that the backing was against the heads. Nothing doing!

I quickly pulled out the maintenance manual and reviewed the wiring. The VU meter circuits in my deck are resistively coupled directly to the output jacks, with no intervening buffer amplifier! The mixer drove the meters directly, making for the perfect illusion of a "perfect recording."

Needless to say, I have burned into my mind a valuable and painfully learned lesson, which I share with any of you who may own similarly configured equipment.—T. Burkhard, New York, N.Y.

A I've owned at least two other makes of recorder wired like that Tascam—Magnecord and Ampex. The only reason I never made the same mistake was that the connectors for the output were different from those used at the inputs.

If it makes you feel any better, Mr. Burkhard, any of us who have been in the sound recording field for more than 40 years can tell his own horror stories. Here is one of my modern highlights of recording horror: I own a portable audio/video recorder that has the interesting ability to handle six (count 'em, six) stereo track pairs on a single tape. This is true only if the machine is switched to the "audio" mode.

Like you, I was making a recording that could not be made again. Sound was fine in my headphones. But when I got home, the playback was erratic. Worse, I lost my new recording as well as the other recordings on that tape. Leaving the machine in the "video" mode not only results in a recording made with no sync but also in the destruction of data on all of the stereo channels.

Welcome to the club!

Load vs. Tube and Solid-State Power

Q Many solid-state amplifiers' power output ratings almost double as the impedance of the load decreases by half. Yet tube amplifiers, even the best ones, seem to be rated at a more or less constant power regardless of the impedance connected to them. Please explain this difference and any impact it has on matching amplifiers to loudspeakers.—Tom MacGregor, Barre, Vt.

A The power output of a solid-state amplifier would not increase when the impedance of its load decreased, if we truly matched impedences between the amplifier and its load. But the solid-state amplifier's output impedance is far lower than the load impedance (the amplifier's damping factor is the ratio between these two impedences), so the lower the load impedance becomes, the closer it approaches an impedance match with the amp's output.

We can never obtain a true impedance match, and we don't even want to. If we managed to match these impedances, the output stage would be destroyed as it tried to supply a huge amount of current to the load. This is much like attempting to match the impedance of a home appliance to that of the power line—simply a practical impossibility.

Tube equipment behaves differently, because the load is not connected directly to the outputs devices as it is in solid-state equipment. Most tube amps have output transformers whose primary winding is connected to the tube plate. The secondary winding is tapped in various places, and the speaker is connected between one end of the secondary and one of the intermediate taps. The tap chosen depends upon the impedance of the load. The highest load impedance (typically 16 ohms) is usually connected to both ends of the secondary winding, with 8- and 4-ohm taps at intermediate points.

This maintains a constant load on the output tubes regardless of the load impedance being driven. Because the match to the tubes does not change, the amount of power delivered to the load will be more or less constant, regardless of the load. If the secondary of the output transformer was not tapped, all loads would be connected across the full winding. We would then observe a significant decrease in output for lower load impedances.
Put Us On The Stand And We'll Tell The Whole Truth.

Ask any other company what they're doing about loudspeaker distortion and they'll take the fifth. But we object.

That's why Velodyne's engineered the new DF-661, a remarkable loudspeaker that reduces distortion by a factor of ten.

So what's reproduced is purely music, with all the integrity and beauty the artists intended you to hear.

Check out the evidence. Audition a pair today. Call 800-VELODYNE for the location of a convenient Velodyne dealer.

Velodyne
1070 Commercial St., Suite 101 San Jose, CA 95112 (408) 436-7270

Enter No. 20 on Reader Service Card
**Weatherproof Music. Factory-Direct Prices.**

The smooth, natural sound of speakers by Henry Kloss (founder of AR, KLH, & Advent) can now be enjoyed outdoors: on the patio, by the pool, even on boats. The Outdoor is a compact, water-resistant speaker with accurate, wide-range sound. It comes in two versions: one free standing (shown above, $279 pr.); one for in-wall mounting ($329 pr.). Both versions are very well made, with stainless steel hardware and gold-plated connecting terminals. Use them in white, or paint them any color. Because we sell factory-direct, with no expensive middlemen, these speakers cost far less than they would in stores. Call for a free catalog and find out why Audio says we may have “the best value in the world.”

For a free catalog, or to order, call 1-800-FOR-HIFI (1-800-367-4434)
Suite 104AUG, 154 California Street
Newton, MA 02158 Fax 617-332-9229

**IT’S A DOG’S LIFE**

A few months ago, Tucker sat in a cage at the local humane society, his future far from bright. Today, he has a very bright future ahead of him as he learns to become a Certified Hearing Dog at Dogs For The Deaf, the only national Hearing Dog training and placement service.

For over 16 years, Dogs For The Deaf has been rescuing unwanted dogs from shelters and training them to become the ears for deaf and hearing impaired people across the country.

Please help us rescue dogs like Tucker and train them to become Hearing Dogs for the deaf. For more information, please call or write:

**Dogs for the Deaf**
10175 Wheeler Road
Central Point, OR 97502
1-800-990-DOGS

**Building and Equipping a Small Recording Studio**

Q What equipment would you recommend for use in a small recording studio intended mainly for recording vocals? The dimensions of the area I have to work with are about 5 feet x 5 feet. I need to eliminate any undesired sounds. What kinds of materials would be required to build this type of room?—George Marrow, Jr., Washington, D.C.

A It is difficult for a performer to work in a room as small as the one you are planning. I have to hope that the singers won't be sharing space with the recording equipment and the engineer. If nothing else, the equipment is bound to add some undesired noise that will be picked up by the microphones.

Although I understand that this room will be used for vocals, what about the music behind the singers? How is that to be generated? If it is supplied by synthesizers, MIDI sequencers, or multitrack tape overdubs, fine.

At the least, you must use very heavy carpeting on the floor and really good acoustic tile on the ceiling and probably the walls. Don't forget to line the door with the tile.

External sound often enters a room because the walls are set to vibrating. If this is your problem, you will have to make these walls as massive as you can. The stiffer they are, the less they will vibrate.

I have obtained excellent results by lining all walls and the ceiling with thick, dense fiberglass, held in place with chicken wire. (No, it is not pretty to look at, and some people feel very closed in when working in this environment. But if this can be overcome, it works well.) The boominess often associated with small spaces is very much reduced. You may find a need to add more highs because of the lack of reflection from room surfaces. You will also want to add reverb, because the sound is very dead.

In order to determine the equipment you will need, you must list what work you plan to do. Obviously you will need some kind of a mixer. It doesn't need to be an elaborate one, with “track solo” and “monitor sends” and the like. You may well want the opportunity to place some special-effects processors between each mixer.
Movie Theatre Performance with Flexibility
The Bryston 8B THX® Amplifier

Bryston is pleased to announce our new 8B THX four channel audio power amplifier. With today's interest in quality home theatre the 8B THX amplifier provides state-of-the-art performance with the unquestioned quality, value and reliability for which Bryston has gained an international reputation. All Lucasfilm Home THX certification parameters are easily met for its intended use within a multi-channel audio/video installation. The 8B THX is an extremely versatile and flexible amplifier designed for all your THX theatre installations. The amplifier can be instantly connected to provide 2 channel, (400 watt output), 3 channel, (two @ 120W plus 1 @ 400W), or 4 channels at 120 watts output. This provides extreme ease in integrating the power requirements for any THX Home Theatre system. The THX stipulation for separate center channel, left and right main speakers, decorrelated dipole surround channels and one or two subwoofers, is provided in a simple elegant package. Among the 8B's notable features is the use of four independent power supplies, one for each channel, to prevent any signal interaction among the individual channels. This provides a sonic soundstage with images locked in position with an almost holographic effect. Other features include both balanced XLR, 1/4" and unbalanced RCA input connectors to allow for flexibility in a wide variety of installations. All connectors throughout the amplifier are gold plated to provide freedom from corrosion, assuring perfect signal integrity for many years to come. Tri-colored LEDs glow green for power-on, yellow for short-term transient clipping and red to indicate continuous overload or any departure from linearity, including shortened-output or strong out-of-band information like RF or DC. Obviously, the goal of all this technology is to transport you to the scene of the movie. Experiencing all the drama, excitement and emotions as if you were right there in the show. We feel we have accomplished this with all the New Bryston THX amplifiers. Experience the movie as intended and audition the Bryston 8B THX today.

For more information contact:
57 Westmore Dr., Rexdale, Ontario, Canada M9V 3Y6
Tel: (416) 746-1800 Fax: (416) 746-0308
Enter No. 3 on Reader Service Card
Where Else Can You Find a $10,000 Speaker For Less than $2,500?

Since 1983, Legacy Loudspeakers have provided thousands of music lovers factory direct savings on the world's finest speaker systems.

By purchasing direct from the factory in Springfield, Illinois, you can take advantage of the latest advances in speaker technology long before it hits the dealer's showroom. You can select from more than a dozen models available in premium Rosewood, Walnut, Ribbon Mahogany, Oak or Black Lacquer.

Choose the world famous FOCUS (left) or the new Signature III Tower requiring only a single square foot of floor space. Our Home Theater Collection (below) debuts our kevlar Cinema Center Channel, an awesome 200 watt powered subwoofer with dual 12" drivers and the finest full range Dipolar ambience speakers.

Our unique in-home audition policy assures complete satisfaction. Our quality is backed by a ten year warranty. We provide free delivery on most purchases.

For a FREE color catalog, call 1-800-Audio-Hi
or write us at Reel to Real Designs
3021 Sangamon Ave.
Springfield, IL 62702
1-800-283-4644  217-544-5252
FAX: 217-744-7269

"Magnificent. The epitome of the full-range loudspeaker."  
BOUND FOR SOUND 10/92

"There are many loudspeakers in this price bracket, but none of them offer this level of hardware and craftsmanship. ... Very highly recommended."  
The High End Quarterly

"Convergence's low frequency capability exceeds that of any speaker or subwoofer that I have tested."  

"... A very good choice."  
AUDIO Magazine

"... FOCUS really caught me by surprise with a very transparent and effortless sound. This is a speaker that truly reveals the essence of a recording."  
Audio Observatory #5, 1993

"Laser-discs were delivered with stunning clarity, precision and realism. Handclaps sound like real applause, not like lead shot on a tin roof. Convergence is a very, very good speaker."  
The Sensible Sound Issue #47

Enter No. 17 on Reader Service Card
position and the mixer bus for that stereo channel. Chances are that you only need two outputs.

The recorder can be a very good cassette machine, although I would choose an open-reel, VHS Hi-Fi, or DAT recorder. Chances are that you will want to copy your masters onto cassettes, so the cassette recorder still has a place in your studio.

If you only plan to use a sequencer, you won't need a multitrack recorder. If, however, you need to sweeten the music with instruments not available in your sound modules, then you will need a multitrack tape recorder of some kind—digital or open-reel.

The choice of microphones is a very subjective one. Many sound technicians use dynamic mikes. They're great when a singer really shouts it out and runs the risk of overloading a condenser mike or overloading the input the mike is feeding. I personally use some ribbon mikes made just for vocals, because I like a natural-sounding voice, free from peaks. But many find such peaks exciting and enhancing to the performance.

Negative Feedback, Pro and Con

Negative feedback is considered to improve amplifier performance. Why, then, do some high-end audio equipment makers avoid using it?—Ray Segura, New Orleans, La.

Negative feedback definitely lowers distortion, but too much of it reduces sound quality. Years ago, a leading maker of audio gear introduced a high-quality line of preamps that used a tremendous amount of negative feedback, not only around the circuit as a whole but also around individual stages. To me, the preamps sounded mushy, as if the signal had to be pushed through them. When I removed some of the feedback from one of these units its sound improved remarkably.

However, preamps and power amps have different properties. Many power amplifiers, for example, employ Class-B output stages because Class-B circuits have good electrical efficiency and run cooler than other biasing arrangements would allow. This means lower costs for power supplies and cooling facilities.

However, Class-B circuits have inherently high distortion—especially at low power output levels, where they're operating in a more nonlinear portion of their input/output curve. Adding negative feedback to such a stage dramatically reduces the distortion. Class-B or even Class-AB circuits would be virtually unusable for high-fidelity applications without negative feedback.

A high-end manufacturer, less concerned with cost, can lower distortion in other ways. He can, for example, use an output stage with inherently lower distortion (such as one using triodes instead of pentodes) and can also bias it for Class-A operation, despite much lower electrical efficiency than Class B. Even at low power levels, the input/output curve is always linear.

Measures like these allow a manufacturer to eliminate feedback or drastically reduce it. (For example, some amplifiers have no overall loop feedback but do use local feedback on early stages.) Yet I can't help wondering if the sonic performance of amplifiers that used no negative feedback at all couldn't be improved by using at least a bit of it.

The battery with a thousand lives.

Imagine a battery that comes back to life over and over—up to 1000 times. Imagine a battery that saves you money because you can recharge it instead of throwing it away. Imagine a battery that can be charged in as little as an hour. Imagine a battery that can be recycled.

Imagine all this and you've just conjured up the GE/SANYO RechargAcell rechargeable battery. We'll even give you a dollar toward your next purchase. Imagine that.
without the Prestige label, the jazz record industry never would have achieved proper documentation of an art form based on the otherwise fleeting sounds of improvisation. Many hundreds of recording sessions, done by a virtual Who’s Who of American jazz, took place in the decades following founder/producer Bob Weinstock’s first record date in January of 1949. While Prestige’s subsidiaries of the 1960s dealt with such diverse art forms as international music, folklore, and the blues, Weinstock’s jazz vision as put to wax is his true claim to fame. Often compared to Blue Note Records, a company unquestionably responsible for further developing jazz with its encouragement of original compositions, Prestige differs by assuming the role of a veritable time capsule, capturing the standard repertoire of jazz’s finest as perfected night after night in the clubs of New York. J.R.
By the time the musicians had unpacked, Rudy Van Gelder was ready.

When people think of Prestige Records, names like Miles Davis, Sonny Rollins, Eric Dolphy, The Modern Jazz Quartet, and John Coltrane immediately come to mind, and yet you grew up during the big-band era. Do you recall your musical tastes making the transition from swing music to modern jazz?

I had a record store before I started recording, and I carried every jazz artist you could think of. One day, Alfred Lion, who ran Blue Note Records, came in and said, "I have something new: Thelonious Monk." I said, "What the hell's that?" Alfred said, "It's bebop." I listened and the more I listened, I realized it had a charm to it. It was interesting. I was strictly into swing at the time. Beboppers were calling people like us "moldy figs." The next thing I knew, I became obsessed with bebop. I was attracted like a magnet down to the Royal Roost and Birdland. This was something that was unbelievable. The only other time I was so moved by music was when I saw the Bunk Johnson band that came from New Orleans.

How did you decide which musicians to record at your first sessions?

My first choice, naturally, would have been Charlie Parker and Dizzy Gillespie, but they were under contract to various companies. In fact, Bird would record for both Savoy and Dial, and they were always having contract disputes. I just went one jump forward into music more modern than that.

You were still in your teens at the time. With your first session comprising seasoned musicians like Lennie Tristano and Lee Konitz, how did they take to your presence in the studio?

I got a very rude awakening about the recording industry when I did my first session. Tristano was the leader of this "cult," the Tristano school. It was supposed to be Lee Konitz's session, but the cult decided that Lennie should be leader because he had a bigger name. Anyway, there they were, and they played it right down, a song called "Subconscious-Lee." I said, "That's good. Boy, that's good." Tristano said, "No. We didn't get it right." So, over and over, the same shit, and it all sounded good, man! Konitz blew his ass off. Well, we finished and I put the first two sides out. I went to put the second two out, and I called Tristano on the phone. He said, "Don't put those sides out. They're not quite good enough." I said, "They're good; they're good!" He said, "If you put them out, I'll put a curse on you and that will be the end of your record company." I said the hell with it.

It's no secret that the jazz record industry had a number of tough, almost gangster types at that period. How did they react to your emergence on the scene?

This is funny. One day, I was walking up Broadway, away from the Roost, when a big Cadillac pulled up. The door swung open and Teddy Reig [of Savoy Records] yelled, "Get in!" I was a good athlete and afraid of no one, so I got in the car. Teddy was a huge, gruff man who must have weighed 400 pounds. He said to me, "You—you're upsetting the jazz world! You're paying too much money to these guys, and you need to start squeezing extra sides out of them." I had often wondered why Savoy would issue two different sessions on opposite sides of one record, and there was my answer.

You mentioned Alfred Lion of Blue Note Records. Many people see Prestige as being Blue Note's only serious competition of the day. How do you compare the two companies?
I loved those Blue Note records. Even before I was in the business, Alfred Lion was my hero. The man was a giant. He had integrity. He made a fine product and recorded everybody from Sidney Bechet right up to Ornette Coleman. But aside from us using the same engineer in Rudy Van Gelder, we handled things differently. Blue Note's sessions were always prefaced by rehearsals with written arrangements. I found charts and rehearsals were the kiss of death. I believe jazz should be free and loose, and should swing. That's the atmosphere I always wanted to create, not the stress and strain of trying to work out some chart. Why are charts necessary when the musicians are so creative?

Did the musicians appreciate the lack of structure in the studio? They liked it; they had a good time. They'd kid around and laugh it up. We had fun, but if it got rough, if I could see the guys were down, if they were up late or something, I'd say, "Okay, let's play some funky blues," and I'd let them go for 20 minutes. It must have made the studio a bit easier when you eventually hooked up with Rudy Van Gelder.

I was having terrible problems with my studios. I was very annoyed with them. Sometimes they would run sound tests for an hour. From the very first session, when Rudy used his parents' living room, to the very end, I never said a word about recording to Rudy. By the time the musicians had unpacked, he was ready. He did not have to take tests. That was the beauty of recording with Dr. Rudy Van Gelder. He was a genius at sound recording.

When did you record your first bona fide bop session? Looking at the discography, I see it was in May of my first year, 1949: Kenny Dorham, J.J. Johnson, Sonny Rollins, John Lewis, Léonard Gaskin, and Max Roach were on the session. Kenny Dorham was a very underrated player. Even when he was with Bird, he still didn't get enough recognition. J.J. was so far ahead, it was ridiculous. The way the man played...and he's one of the finest people you could ever meet, a wonderful person and a good family man. Sonny Rollins was too much! At that time, Sonny Rollins was a joke to all of the musicians. They loved him because he was a be-bopper and he knew everybody—played with everybody in the neighborhood group up in Harlem. But he hit so many clinkers that they would crack up when he played. They would tease him. But his ideas were so great. Despite the clinkers, they all knew, just like I knew—because I signed him to a contract—that he'd be a force someday. And sure enough, he was.

When do you feel Rollins came into his own as a player? Everyone wanted to see Sonny Rollins succeed, and the session when he really hit was the one that produced Saxophone Colossus. That day, the man showed a giant was emerging. I had known Sonny's playing for years prior to this date, but I sat there and couldn't believe what I was hearing. It was incredible! Sonny is a wonderful person, one of the most unpretentious, laid-back people you could ever meet.

Prestige had a great deal of commercial success with Stan Getz. When I recorded Stan Getz, I did not do it with commercialism in mind, but I had a tiger by the tail, as they say. I was confused, actually. He kept recording all these simple tunes, playing the melody, like a formula. I didn't understand it, but you don't argue with success. Symphony Sid was the one who started Getz selling. He had a jazz radio show that aired in 30 states east of
Miles Davis disappeared after his Capitol sides, but I tracked him down and recorded him.

Help us remember some of your other more commercially successful artists?

Our first real hit came in the form of "Moody's Mood for Love." It was originally an instrumental of saxophonist James Moody improvising over the changes of "I'm in the Mood for Love," but Eddie Jefferson put words to it. When King Pleasure recorded it for us, that tune took right off.

Most of our best-sellers were vocalists: H-Bomb Ferguson, King Pleasure, the Cabineers, Mose Allison, Etta Jones. Instrumental sellers were the "soul jazz." Miles Davis also sold very well.

Tenor saxophonist Gene Ammons must have had an impact on the soul jazz market.

Gene Ammons was the father of soul and funk. He started that music in 1950. I liked R&B. I heard a lot of bands play, and I knew there had to be room for an update, a modernization of rhythm and blues with a jazz flavor. The black people needed something to relate to besides all the singers and vocal groups. Everything we did had a good rhythm section and swung. Nothing was ever phony, just to make sales. Even when we got heavy into the funk, with organ groups and guitar and all of that, they were like the blowing sessions we did before, but with a different groove. They cooked.

Blue Note started producing soul jazz and funk as well.

Somewhere along the line, Alfred Lion got the taste for the big seller. Maybe it was The Sidewinder by Lee Morgan or a Jimmy Smith Record. I felt the main reason he would have rehearsals at that point in time was to be sure the guys would know funky blues tunes like those to record. See, I was willing to gamble on standards done in a commercial vein, as Lion was willing to go with arranged funk tunes. Gene Ammons did "Canadian Sunset"; Groove Holmes played "Misty." These were big hits for us. Miles even had a hit with Blue Haze. In the end, nobody ever knew if you were going to have a hit, but that was the prize. That's what paid the bills and paid for other projects.

What were the circumstances that led to your recording Miles Davis?

Miles had vanished after he did those Capitol sides with the [Birth of the Cool] nonet; nobody knew where he was. Somebody had said that he might be at home in East St. Louis, so while I was in Chicago on business, I tracked him down. His father was a dentist, so I knew that his number would be in the phone book. I had met Miles at a Dial session where he recorded with Bird, but he didn't remember me. Anyway, he said if I'd send him money to get to New York, he'd be happy to record. I said that I was interested in doing a series of recordings, and that I wanted to sign him to a contract. He said all right, just get him to New York and we'd talk about it then.

So, our basic idea was just to make records with different people, to record with the best people around. That's what we did until the end, when he had the quintet with John Coltrane, Red Garland, Paul Chambers, and Philly Joe Jones. But everything up to that point developed from where we would sit down and talk about it. Miles would mention who was in town, who he would like to record with. I'd say who I'd like to hear him record with. We'd kick ideas around.

Was Miles ever difficult to deal with?

No, not really. We'd get into these staring sessions. He'd ask for more money, and I wouldn't answer. Then I'd look at him and he'd look at me; we'd just stand there. We went through this a lot. I'd give him the money, but I'd always say, "Okay, that means we have to do another album." He'd say, "I don't want to do another album." I'd say, "And I want better people than the last!" So, that's how those sessions with Milt Jackson and Monk came about. Those were some of our best sessions, because before he'd get the money—this was part of the game—I'd make him think real hard about who he was going to get. Everybody wanted to play with Miles. One of the greatest compliments I ever received came from Miles. He never listened to a playback. He'd just ask me, "Do I want another take?" If I said, "No, it's good," he'd say, "Okay, let's do the next tune." He respected my judgment, as most of the musicians did.
Were you introduced to John Coltrane's playing prior to his sideman role with Miles?

No. In November of 1955, Miles brought his quintet into the studio, and that's when I first heard Coltrane. Bird had just died a few months earlier, but when I heard Coltrane, even though he played tenor, I couldn't help but think, "Here's the new Bird." His style and ideas were raw, but it was obvious that he was heading in an exciting, new direction. I approached him at that session to sign a contract. When he signed, I figured the usual three or four LPs a year, then take it from there, but two feelings about him surfaced the more I heard him play: First, I realized just how important he was and how quickly things were coming together for him, and second, I was taken by his demeanor. He was such a great person.

How did Coltrane end up on so many sessions?

The company was doing well, so for a certain period of time while I was supervising sessions, I had every Friday booked at Van Gelder's studio, often without anything in particular in mind. I had stopped going to clubs because I wasn't hearing what I wanted to hear. So, for my own gratification, I'd set up session personnel for the enjoyment of hearing certain musicians stretch out together. Most recordings were just loosely organized jam sessions. That's why most of the tunes are standards—and blues, which sold the records. Our profits from big sellers like Miles and Gene Ammons subsidized the recording of not-so-well-known people. That's how Coltrane was able to record so much, with everyone from Paul Quinichette to Idrees Sulieman to Ray Draper to his many sessions as a leader. But really, he was a beautiful person. That was the underlying thing—he was a beautiful person.

What led to the sale of Prestige to Fantasy in 1971?

It was obvious by that point that good records didn't mean anything. Good jazz just stopped selling. People lost interest in Monk and Miles and musicians like that. All that was selling was the soul jazz. We were selling more records than at any time in the history of the company, but it had become more of a merchandising business than anything. One of the main reasons I sold Prestige was in disgust at three-quarters of the records I was making at that time. I was pissed, man! We also had a problem with distribution. A lot of the independents were being consolidated into the bigger labels, which had their own distribution. Our distributors were going bankrupt left and right, and these people were the backbone of the industry for us.

Another thing that bugged me—really bugged me—was if Prestige or Blue Note discovered a musician and recorded him, bigger companies like Atlantic and CBS were waiting in the wings and would grab him away by offering more money than we ever could. I became totally disillusioned.

Fantasy has done a very nice job of keeping my product on the market. It makes me feel good to know that anybody who wants a Prestige record with half a merit will find it available through Fantasy.

How do you feel about current trends in digital recording and remastering?

Well, I think nice sound is good, but good performance is better. What did it matter that all of these old records had a horrible sound? Do you have to hear some fusion with tremendous sound, with all kinds of crap going on, and eight mikes on the drums? Just give me Max Roach, when you can hardly hear the drums, but you hear the cymbal going shhhhh. That other crap is all meaningless. Man, I don't care whether it's on sandpaper or toilet paper! The important question is, is the music really there at all? If it's there, dig it, listen to it, and be thankful it's been preserved.

Our first real hit came in the form of Moody's Mood for Love, originally an instrumental by saxophonist, James Moody.
ILLUSTRATION: ELLEN WEINSTEIN
ROY ALLISON

THE BEST PLACE FOR YOUR SPEAKERS?

A nyone who is familiar with my work knows that I've spent a lot of time on the problem of the ways speakers interact with room boundaries (walls, ceiling, floor) and how this affects sound. This work has led my current company, RDL Acoustics, to develop a simple, inexpensive ($5!) program, Bestplace, for Windows or Macintosh computers; it can tell you a great deal about how your speakers will interact with your listening room.

Bestplace can tell you just where to place your speakers in your room to achieve the optimal interaction with room boundaries. You only need to enter three simple measurements; the rest is pretty much a matter of clicking on an on-screen “button” or pressing your computer’s “Enter” key.

Let’s look briefly at why and how the interaction between speakers and room boundaries occurs. The movement of the cone in a direct-radiator loudspeaker is determined almost completely by its own internal construction and its enclosure, not by any external forces. However, the sound power the cone motion produces is very much dependent on the cone’s acoustic load—the radiation resistance, specifically. Throughout the lower half of the audible frequency range, nearly five octaves, a loudspeaker’s ability to radiate sound power is sensitive to its nearby environment. Therefore, its power response is affected by its location in a room. The changes in response with location can be large, both additions to and subtractions from the loudspeaker’s free-space power output. The variations with location are not intuitively obvious; they are calculable, but the math is quite tedious to perform without the aid of a computer. That is why we

have developed Bestplace, a computer program to calculate and plot a room’s augmentation to a speaker’s anechoic power response. The only data you must enter in the program are the distances from the center of the woofer cone to the three nearest room boundaries. These numbers determine how the speaker’s output will be changed by its environment.

**Theory**

Suspended centrally, equidistant from opposite pairs of boundaries in a room, a loudspeaker system’s power response is, for practical purposes, the same as it would be in an anechoic chamber. If it is moved down so that the woofer is very close to the center of the floor, low-frequency power output increases 3 dB because the reflected pressure, in phase with the direct output from the cone, doubles the radiation resistance. Moving the speaker again, so that the woofer is brought very close to the intersection of the floor and one wall, doubles the radiation resistance again, with another 3-dB increase in power output. If we next move the woofer very close to a three-boundary intersection—i.e., the floor and two walls—we would once again increase the output by 3 dB. Not bad: An eightfold increase in efficiency just by changing the location of the speaker!

But wait. You knew there had to be a catch, and there is. "Very close" in this case means at a very small fraction of a wavelength. This is easy to manage at low frequencies but rapidly gets more difficult as the frequency rises and the wavelength becomes shorter. The formula for wavelength (in inches) is 13,560 divided by the frequency; a 10th of a 30-Hz wavelength is 45 inches, but a 10th of a 300-Hz wavelength is only 4½ inches. It wouldn’t be easy to design an enclosure that would put the center of a 10-inch woofer just 4½ inches from each of three intersecting boundaries.

It is interesting to see the changing effects of boundary reflections on speaker output as the reproduced frequency rises. Waterhouse [1, 2] and Waterhouse and Cook [3] investigated the matter quantitatively, developing the formula described in the sidebar “The Waterhouse Equation.” I confirmed their findings experimentally [4, 5] as they apply to loudspeakers in listening room environments, and pointed out the design consequences. Ballagh [6] and Adams [7] have also made significant contributions.

Figure 1 shows what happens when the woofer is at the same distance from all three boundaries. At 0.1 wavelength, the power response has fallen nearly 2 dB from its maximum of 9 dB; at 0.2 wavelength, it reaches 0 dB, the free-space value, and at 0.28 wavelength, it has plummeted to 11.3 dB below its anechoic value! The power response then rises and ripples a dB or so above and below 0-dB augmentation. For perspective: If the woofer is 24 inches from each boundary, this distance is 0.1 wavelength of 56.5 Hz, 0.2 wavelength of 113 Hz, and 0.28 wavelength of the notch frequency, 160 Hz. The notch is created because the strong reflections combine at the woofer cone’s surface in phase opposition to the direct output, reducing the radiation resistance at that frequency far below its free-space value. Above 0.5 wavelength (282 Hz in our example), the perturbations are minor.

Figure 1 shows the worst-case condition—fortunately. Suppose we have a large distance from one boundary, effectively putting the woofer equidistant to only two intersecting boundaries. The resulting...
eight parts. The first part is the original free-space power, which is augmented (or diminished) by the sum of seven reflected impedances: Three from the individual boundary surfaces, another three from the two-boundary intersections, and a seventh one from the three-boundary intersection. The maximum possible output occurs when the source is at zero distance from the corner, in which case Waterhouse's formula has a value of 1 for each term. The total is then 8, for a gain of 9 dB. Of course, zero distance is not possible in the real world, and the gain drops rapidly as the distance between the source and the corner increases.

We can make that influence a good one, or at least a fairly neutral one, by taking advantage of the fact that the notch from a single boundary is mild. This can be done by making the woofer's distances to the three nearest boundaries as different as is practical, so that—rather than suffering the single cresvaiss in power output when all the distances are nearly the same—there are several much smaller dips and a smoother curve overall.

In most loudspeaker systems of medium to large size, the woofer is located not far from the center of the front panel, which limits the maximum value attainable for the distance ratio. If the woofer is on the top panel (or, in a floor-standing system, close to the bottom of the front or side panel), the minimum distance between the center of the woofer and one room surface can be as little as 6 or 7 inches. (Three of the four mid-size speakers I've recently designed are like this; the other is a bookshelf model.) Even with this advantage, however, performance should be optimized by evaluating the impact of the other room boundaries.

The Bestplace program (based on the Waterhouse formula) was developed to aid in this process, by allowing you to see in advance the effect of possible changes in speaker location. The program plots, in addition to the room augmentation curve for the distances entered, a power output curve for my company's speakers in that location. However, it is made more generally useful by a "Not an RDL speaker" option in the curve menu; only the augmentation curve is plotted with this selection. Figure 4 is a Bestplace augmentation curve corresponding to the curve in Fig. 1, obtained when 24 inches is entered for each of the three boundary distances. In Fig. 5, the distances are 10, 36, and 60 inches, yielding a much smoother curve.

If you know the anechoic power output of your speaker (not the on-axis anechoic frequency response), you can add it to the augmentation curve.
front panel becomes a half-space baffle. The region of the transition frequency depends on the size of the baffle, but if you gradually phase in the change in level from 300 to 600 Hz, you probably won't be grossly off. As a corollary, if you are making calculations based on flush-mounting your speaker, you can use a near-field woofer measurement directly and not have to make the conversion. Flush mounting (or bookshelf mounting with surrounding books) is essentially a half-space environment to start with, which is what a near-field measurement simulates.

**USING THE PROGRAM**

When *Bestplace* is loaded in Windows, the welcome screen offers two choices. One button generates a help menu; the other, labelled "OK", clears the screen except for a three-choice menu bar at the top. These choices are "File," "Run Program," and "Help." "Help" brings down the same menu as can be accessed from the welcome screen.

"Run Program" drops a single-item menu labelled "Create graph." Pressing that button brings up a screen headed "Input Graph Parameters." The first selection, "Select a speaker type," scrolls a list of RDL Acoustics models and then the choice of "Not an RDL speaker," the general-use selection. Following the window for speaker selection, there are boxes for entering distances from the center of the woofer to the three closest room boundaries. If you choose "Graph," a graph of boundary augmentation versus frequency will be displayed, based on the distances you have entered. (Figure 6 shows such a graph, from the Macintosh version of the program.)

When the graph has been plotted, you can plot a new one for a different combination of distances by clicking on the "Run Program" menu again. The menu bar remains on screen with the graph. You may also press "Help." Or, if you press "File," a drop-down menu offers three choices: "Copy to Clipboard," "Print," or "Exit."

**REFERENCES**

Imagine having a future that comes with a guarantee.

It can happen. Simply qualify for the Army’s Delayed Entry Program, and training in one of over 250 different skills will be waiting for you when you graduate from high school.

Best of all, that training is guaranteed in writing up to a year in advance.

So, whether your dream is to do police work or drive tanks, direct aircraft or work in a lab, the Army can help to make it a part of your future. And that’s not just a promise—it’s a guarantee. For additional information, please see your Army Recruiter or call 1-800-USA-ARMY. ARMY. BE ALL YOU CAN BE.
The Limited Model 2 preamplifier is one of several components designed by some of the audio industry’s top designers for Acoustic Research, a company best known for its pioneering development of acoustic-suspension speakers. An interesting discourse on the AR Limited engineering philosophy in the excellent and informative owner’s manual states: “It has long been recognized that hi-fi systems, even the very best, are somewhat lacking when compared to live music.” Despite improvements in source material, loudspeakers, and electronics, “Live music still reigns, and audio systems are still second.” (I’ll drink to that!) Although the Limited series designs were optimized to play music, AR admits that they do have some slight personality but feels that it isn’t imposed on the music.

In the numerous areas still open to audio designers, AR focused the development of the Limited series on two major points: signal equalization (which is handled in a very nice Limited series equalizer, the Model 6) and signal transmission. In order to optimize signal transmission, the Limited series’ engineers decided that balanced operation was to be used wherever possible. Accordingly, the Model 2 is basically a balanced design, from input to output. Two balanced and three unbalanced inputs are provided, but the unbalanced inputs are converted to balanced by an input op-amp. Each unbalanced input circuit’s gain can be adjusted in three steps by moving jumpers on the main board, yielding overall gain of 0, +6, or +14 dB. This feature helps to equalize the output levels of various unbalanced sources. With the balanced inputs, the overall gain is fixed at about 0 dB.

The four front-panel rotary controls are arranged in two pairs, one pair at the left of the front panel and the other at the right. The functions of these knobs, from left to right, are signal selection, output polarity and muting, balance, and volume. A small red LED at the top center of the panel tells when power is on. On the rear panel are the signal input and output connectors, a ground post, an IEC a.c. power-cord socket, and the a.c. power switch.

Within the Model 2, a large p.c. board takes up the whole internal area. All components—except the four-gang output-level attenuator, the a.c. power switch, and the RCA unbalanced input/output connectors—are mounted on the p.c. board. Power-supply components occupy about one-third of the board area, with the remainder devoted to signal circuitry. High-quality
parts are in abundant evidence here, and the build quality of this preamp is first-rate.

Circuit Description

I was unable to obtain a schematic diagram of the Model 2 from AR, so the following is not as complete as I would normally report.

Unbalanced inputs are converted to balanced by two PMI OP275 dual op-amps per input pair. With all input signals in high-level balanced form, they are then fed to the input selector. This is a four-section, fully enclosed, and environment-proof switch with silver-plated brass contacts. The selected input is routed to the polarity/muting switch and also to the tape-out buffer. (Another OP275, along with a pair of discrete TO-5 transistors as output devices, is used for each channel's tape output). Signal out of the polarity/muting switch is passed on to the balance and volume controls.

The volume-control attenuator in the Model 2 is something to drool over. It consists of a four-deck, 59-position switch. Each deck is a p.c. board, with Dale miniature metal-film attenuator resistors mounted on it. Each attenuator divider point is picked up by a wiper contact that is, in turn, connected to a circular track that takes the attenuated signal out to the wiper terminal of the deck. An elegant detent mechanism completes the picture. These attenuators look very much like my memory of units used in the Cello Audio Palette, a totally beautiful piece of gear if there ever was one. I would surely like to have a couple of these attenuators to put in some of my own preamp designs!

Output amplifier circuitry consists of four unity-gain buffers that present high impedance to the output of the volume-control sections and present low impedance and current-driving ability to the main signal outputs. A number of TO-5 metal-can discrete transistors, along with a complementary pair of TO-220 output transistors mounted on heat-sinks, are used in each of the four output sections. In my opinion, a topological flaw exists in the Model 2’s unbalanced output: The two input phases of a channel are not combined, as they would be in an amplifier with differential inputs and outputs; instead, each phase is passed straight on to the corresponding output phase. This means that both phases of a balanced input are not represented in each output phase. This matters because some signal sources (such as the Sonic Frontiers SFD-2 hybrid D/A converter, which I have heard but not reviewed) deliver better sound from their balanced outputs than from their unbalanced output.

Power-supply circuitry starts out with a generously sized toroidal transformer feeding full-wave-rectified secondary output into a pair of 8,200-μF, 44-V filter capacitors. A pair of high-current integrated-circuit regulators are used in an unusual configuration that employs an external low-noise reference voltage. Four power-supply isolation buffers follow the main voltage regulators. One pair supplies the single-ended input stages; the other pair supplies the four active output-stage circuits. Final delivered supply to the circuitry is +15 and −15 V.

Measurements

Gain and sensitivity data for the Model 2 is enumerated in Tables I and II, respectively.

Frequency response with unbalanced input and output is shown in Fig. 1 for instrument, IHF, and 600-ohm loads. Data shown is for S2 (single-ended input 2) configured for +14 dB gain. Output level was set at maximum. Response in the unbalanced mode was essentially the same for the three input-amplifier gain settings. Further, response in the balanced-in and balanced-out mode was essentially like that for 100 kHz with output polarity at zero (top) and at 180° (middle), and for 20 Hz (bottom).

Fig. 1—Frequency response with various volume-control settings.

Fig. 2—Frequency response at 100 kHz.

Fig. 3—Square-wave responses for 100 kHz, INSTR. LOAD (%) and for 20 Hz (bottom).

Fig. 4—THD + N vs. level and load. All curves are for 20 kHz except where noted.

AUDIO AUGUST 1994
shown in Fig. 1, except that the output drop with IHF and 600-ohm loads was twice as great because the balanced outputs' impedance is twice as high.

High-frequency response does vary with the setting of the volume control, as shown in Fig. 2 for unbalanced input/output. Worst-case roll-off looks to be about -2.5 dB at 200 kHz.

Square-wave response for unbalanced input and output in the left channel is shown in Fig. 3. As can be seen, this output amplifier is fast. The top and middle traces are for 100 kHz, and the bottom trace is for 20 Hz. The top trace is with output polarity set to “0°” and the middle trace was made at “180°”. The faster, larger traces are for volume at maximum; the smaller, slower traces are with volume attenuated 6 dB. Results shown are for my instrument load; IHF loading didn’t change much except to reduce the overshoot slightly. Slew, can be seen in the photo. At the higher output level, 10 V peak to peak, three edges are slewing at about 26 V/µS, and the positive-going edge for the “0°” polarity setting is slewing at a faster rate of 50 V/µS. At the reduced level, 2.5 V peak to peak, rise- and fall-times are close to 100 nS for the “0°” setting and more like 120 nS for “180°”.

Total harmonic distortion versus output level for a number of frequencies and load conditions is shown in Fig. 4. These conditions are: 1 kHz with instrument load and 20 kHz with instrument or IHF load (the two curves are identical), with the IHF load paralleled with 600 ohms, and finally, with a 100-ohm load. I’d say the Model 2 would drive about anything!

A spectrum of harmonic-distortion residue for a 1-kHz signal at 5 V out with unbalanced input/output, IHF load, and +14 dB gain is shown in Fig. 5.

I noticed in my pushing and poking about that the tape output buffers would oscillate on the positive peaks when driven into clipping. This also occurred with the input amplifiers when they were driven into clipping. Since the op-amps are the same for both functions, this would seem to be an attribute of the op-amps and/or the particular way they are used in the AR Limited Model 2.

Crosstalk between channels was measured in both balanced and unbalanced modes. In all measurements, the crosstalk was essentially a rising 6-dB/octave function, indicating capacitive coupling between the channels. Figure 6 shows the crosstalk in the poorer (left-to-right) direction, using the unbalanced output and unbalanced input S1 configured for unity gain, and with volume at maximum. The numbers on the curves indicate the balance control’s setting as the number of clicks to the right of center. As can be seen, all of the control’s positions to the right of center degrade the crosstalk except for the one at the extreme right (“5”), which infinitely attenuates output from the left channel. Results in the right-to-left direction were some 5 to 8 dB better than those in Fig. 6. Results in the balanced mode were similar to those shown for unbalanced signals.

Output noise for unbalanced and balanced modes, and the three unbalanced input-amplifier gains (1X, 2X, and 5X), are listed in Table III. As can be seen, the Model 2 has very low output noise and will likely have inaudible hum and hiss, even with high-gain power amplifiers and horn speaker systems. The IHF signal-to-noise ratios are listed in Table IV.

A few final measurements: The a.c. power-line draw was about 220 mA. Output

EVEN WITH HIGH-GAIN AMPS AND HORN SPEAKERS, HUM AND HISS WILL LIKELY BE INAUDIBLE.
THE RAVE OF AUDIO INSIDERS, NOW AT "INSIDER" PRICING.

"Considering their price and fine all-around performance, the Digital Phase AP-1s would be a good addition to any audiophile's system."

D.B. Keele, Jr.
AUDIO Magazine

"The best performance and value in the marketplace today, period."

Maurice Paulsen
Crown International

"After 15 years in the speaker industry, I've heard about a lot of 'major breakthroughs.' Digital Phase is truly innovative. I cannot imagine a system more accurate. The AP-2s are now in my home."

Woody Jackson
Audio Industry Consultant

Yes, the audio industry is raving about DIGITAL PHASE. And for good reason.

Thanks to the new, patented Acousta-Reed™ technology, DIGITAL PHASE brings bass depth and definition to a level never before realized.

Thanks to the special one-piece tweeter of spun titanium, DIGITAL PHASE delivers an uncommon freshness and sweetness to high frequencies.

And now, thanks to factory-direct pricing, DIGITAL PHASE makes true audiophile-quality sound affordable to virtually everyone. The DIGITAL PHASE AP-5, for example, is just $449 a pair in genuine oak cabinetry.

This is not a close-out of old technology. This is a factory-direct offer on the latest, patented technology. And with our 30-day return policy, you simply can't lose. So there's absolutely no reason to wait. Call us today with your order, or just to find out more.

1-800-554-7325
DIGITAL PHASE. The rave of audio insiders, now at "insider" pricing.

Digital Phase
ACOUSTA-REED™ TECHNOLOGY

Pictured, the AP-1, one of five DIGITAL PHASE systems with patented Acousta-Reed technology.

Send me info as indicated
Place my order as indicated

AP-5 bookshelf system, $449/pair  SM-1, $649/pair  AP-1, $899/pair
AP-2, $1199/pair  AP-4, $2199/pair

Name___________________________
Street Address_________________________
City/State/ZIP_________________________
Telephone (______)_________________________

[ ] VISA [ ] MC [ ] AMEX  Exp_________________________
Card No_________________________
Signature_________________________

Mail to: DIGITAL PHASE Insiders • 2841 Hickory Valley Rd. • Chattanooga, TN 37421
balanced XLR outputs. Input impedance for the balanced inputs was about 35 kilohms with volume set for about -20 dB. Input impedance for unbalanced inputs was about 50 kilohms and was constant with volume-control setting.

Use and Listening Tests

Equipment in my system during the review period included an Oracle turntable fitted with a Well Tempered Arm and Spectral Audio MCR-1 Select moving-coil pickup used with a Vendetta Research SCP-2C pre-amp. Krell MD-10 and PS Audio preamp. Krell MD-10 and PS Audio.

Table II - Sensitivity, in mV, with various inputs (S1, S2, and B1), volume-control positions (counterclockwise, worst case, and clockwise), and bandwidths.

| Table II - Sensitivity, in mV, with various inputs (S1, S2, and B1), volume-control positions (counterclockwise, worst case, and clockwise), and bandwidths. |
| S1, at 1X | S2, at 2X | S3, at 5X | S1, at 1X | S2, at 2X | S3, at 5X | CCW | CCW | CCW | CCW | CCW | CCW |
| Unbalanced In, Unbalanced Out | Balanced In, Balanced Out | CCW | LEFT | RIGHT | CCW | LEFT | RIGHT | CCW | LEFT | RIGHT | CCW | LEFT | RIGHT |
| Balanced In, Balanced Out | S1, at 1X | 507.4 | 507.4 | S2, at 2X | 254.6 | 254.8 | S3, at 5X | 101.6 | 101.9 | S1, at 1X | 277.6 | 277.8 | S2, at 2X | 139.2 | 139.5 | S3, at 5X | 55.6 | 55.8 |
| Balanced In | B1 to Balanced Main Out | 512.6 | 512.6 | B1 to Unbalanced Main Out | 895.1 | 895.1 | B1 to Tape Out | 558.8 | 559.3 |

As is frequently the case when I receive a new piece of gear, I loaned the Model 2 to a friend to try out for a while and get some hours on the unit. He reported favorably on the Limited Model 2's build quality and sound.

When I started formally evaluating the Model 2, I had been using the excellent Sonic Frontiers SFD-2 A-weighted line-stage preamp modified to have balanced inputs. This combination, driving either my Quicksilver M135s or the Crown Macro Reference, had been delivering extremely good sound with CDs. Best sound from the SFD-2 definitely comes from the balanced outputs, so when I started evaluating the Model 2, I used the balanced inputs for the SFD-2. Because I had determined during measurements that the Model 2 does not combine both input phases of a balanced input into the unbalanced outputs, I coupled the balanced outputs into the Macro Reference, with its inputs configured for balanced. Wow! This combination sounded exceedingly good. Definition and detail were of a high order, soundstaging was excellent, and there was an overall sense of musical believability. Although bass quality and definition were very good, bass extension and impact were not quite as good as when using the Fossell line unit driving the Crown in unbalanced input mode. All in all, the Model 2 is an excellent sonic performer. Operation was flawless, and there were no unexpected noises.

TABLE III - Output noise levels, in μV, with various inputs (S1, S2, S3, and B1), for IHF load.

| TABLE III - Output noise levels, in μV, with various inputs (S1, S2, S3, and B1), for IHF load. |
| S1, at 1X | S2, at 2X | S3, at 5X | S1, at 1X | S2, at 2X | S3, at 5X | CCW | CCW | CCW | CCW | CCW | CCW |
| Unbalanced In, Balanced Out | S1, at 1X | 507.4 | 507.4 | S2, at 2X | 254.6 | 254.8 | S3, at 5X | 101.6 | 101.9 | S1, at 1X | 277.6 | 277.8 | S2, at 2X | 139.2 | 139.5 | S3, at 5X | 55.6 | 55.8 |
| Balanced In | B1 to Balanced Main Out | 512.6 | 512.6 | B1 to Unbalanced Main Out | 895.1 | 895.1 | B1 to Tape Out | 558.8 | 559.3 |

I do have a few nits, however. First is the aforementioned lack of differential-amplifier action in the output amplifier. Second, in this sample, the otherwise incredible volume attenuator had more rotary-shaft backlash in the middle of its rotation than at the ends.

In conclusion, the AR Limited Model 2 line preamp is a clear winner. Do go out and audition this one.

Bascom H. King

AUDIO/AUGUST 1994 46
The new Standard
EPOS
ES11 SPEAKER

Epos Acoustics, a small loudspeaker company owned by the larger British firm Mordaunt-Short (which in turn is a member of the much larger TGI group of companies that includes Tannoy, Goodmans, and KEF), was founded by designer Robin Marshall in 1983. Epos (a Latin noun from the Greek, meaning an epic poem) currently has two speakers in its line, the compact ES11 and the larger, 8-inch two-way ES14, which has been the very successful, principal system of Epos since 1986. These two systems are to be joined shortly by the ES25, a full-range floor-standing model.

The ES11, which was added to the Epos line in 1990, is a small two-way vented system utilizing a 6½-inch woofer and a 1-inch dome tweeter. Both drivers are custom designed and manufactured by Epos, whose goals were to create an affordable, well-balanced design with high-end aspirations. Among the ES11's novel design features, the most novel is the bass driver's frame, which is an integral part of the loudspeaker's front panel. Other features include an unusual cabinet assembly, an extremely simple crossover network (two parts!), and a bass driver that has a phase plug instead of a dust cap.

The frame of the ES11 woofer is, as I've just noted, an integral part of the front panel and is injection-molded in one piece. According to Epos, “This insures that the coupling between the bass driver and the baffle is precisely and consistently defined, unlike conventional systems where the coupling is influenced by the varying tightness of fixing screws.” The molding is very stiff and inert, minimizing vibrations of the front panel. Presumably, replacing the woofer requires changing the whole front panel. The tweeter is separately mounted to the front panel. The rear panel, which contains the input terminals, crossover, and reflex port, is also an injection-molded part.

The front and rear panels are held in place by four long hex-head bolts, located near the cabinet's corners, which pass through the cabinet and engage the injection-molded panels.

**SPECIFICATIONS**

- **Type:** Two-way, vented-box, compact system.
- **Drivers:** 6½-in. cone woofer and 1-in. dome tweeter.
- **Frequency Response:** 60 Hz to 20 kHz (tolerance not stated).
- **Sensitivity:** 87 dB at 1 meter, 2.83 V rms applied.
- **Crossover:** 6-dB/octave high-pass on tweeter only (frequency not stated).
- **Impedance:** 8 ohms nominal.
- **Recommended Amplifier Power:** 25 to 75 watts per channel.
- **Dimensions:** 14¼ in. H x 8⅞ in. W x 9⅞ in. D (37.5 cm x 22 cm x 25 cm).
- **Weight:** 17.6 lbs. (8 kg) each.
- **Price:** $895 per pair; available in black ash, walnut, or mahogany; foam grilles for earlier models, $50 per pair; speaker stands, $200 per pair.
- **Company Address:** c/o Music Hall, 108 Station Rd., Great Neck, New York, 11023.

For literature, circle No. 91
through the front panel and engage threaded inserts in the rear panel. Wood bracing is used internally for added strength. When assembled, and all four bolts tightened, the cabinet's 1-inch-thick medium-density fiberboard walls are sandwiched between the front and rear panels, forming a very strong and vibration-free structure.

The woofer's cone is thermofomed from a polymer material and shaped to optimize on- and off-axis response. The surround is a synthetic high-loss rubber that minimizes mechanical travelling waves on the cone's surface. The ES11's woofer has a phase plug protruding from the center of the cone rather than the more usual dust cap. The phase plug is stationary and is attached to the woofer's pole piece. The voice-coil and attached cone move fore and aft around the plug. The bullet-shaped phase plug is said to provide better polar response than is possible with a dust cap. The roll-off of the woofer's upper frequency has been carefully tailored so that the use of a low-pass crossover filter is not required.

The ES11 tweeter dome is fabricated from an aluminum alloy and is suspended by a polyamide material. The dome is acoustically loaded by a separate rear air chamber, while the voice-coil utilizes a magnetic fluid said to improve reliability and reduce dynamic compression.

The crossover of the ES11 is a "minimalist" design. It contains only two components, a high-quality series capacitor and a parallel resistor, which form the high-pass filter driving the tweeter. The simplicity of the crossover is said to enhance the loudspeaker's ability to resolve fine detail, and the absence of a low-pass filter on the woofer allows better control of its motion by the power amplifier.

The ES11's input connections, which can be bi-wired, do not use the conventional double set of dual five-way binding posts with jumpers. The back panel contains only two sets of flush-mounted double-banana input holes. Single (i.e., not bi-wire) connections are accommodated by the inclusion of two short banana-plug adaptor links, one for positive and the other for negative. Each link has a single banana plug on each end, one plain and the other containing a piggyback banana socket. In either configuration, bare wire connection capability is not supported; banana plugs must be used! However, Epos does provide an extra set of double-banana plugs that can be attached to bare wires and then used to connect to the loudspeakers.

Measurements

The on-axis anechoic frequency response of the ES11 is shown in Fig. 1. Measurements were taken at 2 meters, halfway between the woofer and tweeter. With 5.66 V rms applied, the result was referenced back to 1 meter. A combination of elevated free-field and ground-plane measurements was used to derive the curve.

The overall curve in Fig. 1 is quite smooth, fitting a fairly tight 4.7-dB window (+1, -3.7 dB referenced to 1 kHz) from 100 Hz to 20 kHz. The bass response is down 3 dB (from the 100-Hz level) at 56 Hz and down 6 dB at 47 Hz. Below 50 Hz, the response rolls off at 24 dB/octave, as is typical of vented boxes. There is a mild but broad peak centered at 800 Hz and a slight, downward shelf at high frequencies. Except for slight irregularities, the curve is quite smooth. The speaker's foam grille does not affect the response much at all. This system is one of few that will not be sonically compromised if listened to with the grille on. Averaged over the range from 250 Hz to 4 kHz, the sensitivity of the EP11 was 85.5 dB, 1.5 dB below the 87-dB rating. The right and left speakers were matched within a close ±0.5 dB.
The phase and group-delay responses of the ES11, referenced to the tweeter's arrival time, are shown in Fig. 2. The phase curve is well behaved and rotates an additional 240° between 1 and 20 kHz. The group-delay curve shows a fairly low offset of about 0.15 mS between the midrange and treble. The deviations between 100 and 200 Hz are due to minimum-phase variations in the amplitude response and would disappear if the response were flat through this range.

The ES11's energy/time response is shown in Fig. 3. The test parameters accentuate the speaker's response between 1 and 10 kHz, which includes the crossover region. The main arrival, at 3 mS, is very compact but is followed by minor delayed responses, about 23 dB down from the main peak and extending 1.5 mS after the main arrival.

Figure 4 reveals the horizontal off-axis frequency responses; the bold curve at the rear of the graph is the on-axis response. The off-axis horizontal response is very uniform. In the primary (±15°) listening window, the response is extremely uniform, staying within ±1 dB of the on-axis curve all the way to 20 kHz.

The vertical off-axis frequency responses are displayed in Fig. 5; the bold curve in the center of the graph (front to rear) is on axis. The aberrations in the range from 5 to 7 kHz indicate that the crossover frequency is at a high 6 kHz. Because the woofer and tweeter are separated by 5% inches (center to center), a significant 2.3 wavelengths at crossover, the vertical off-axis response in the crossover range is quite rough and narrow. The curves in Fig. 5 verify the narrowness of the vertical response at crossover and show that the response is significantly irregular at angles of only ±5°.

In Fig. 6, the ES11's impedance magnitude, a high minimum impedance of 7.2 ohms occurs at 250 Hz and a high maximum of about 29 ohms occurs at 85 Hz. The curve's maximum-to-minimum variation is about 4 to 1 (28.6 divided by 7.2). Even though this variation is fairly large, the high minimum impedance of the ES11 ensures that the speaker will not be very sensitive to cable resistance. Cable series resistance should be limited to a maximum of about 0.11 ohm to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a typical run of about 10 feet, you can use low-inductance cable of 16 or 18 gauge.

The complex impedance, plotted from 5 Hz to 30 kHz in Fig. 7, is well behaved and exhibits no extraneous resonances. The impedance phase (not shown) reached a maximum angle of +45° (inductive) at 64 Hz and a minimum angle of -40° (capacitive) at 112 Hz. Even though these angles are fairly large, the ES11 will not be a problem for any amplifier (even for two in parallel), because the minimum impedance is quite high.

When subjected to a high-level sine-wave sweep, the cabinet of the ES11 was mostly vibration-free. There were some minor wall resonances of the top and side panels in the 370 to 390 Hz range, and slight activity of the rear panel from 460 to 480 Hz. The linear travel of the woofer was about 0.4 inch, peak to peak, with reasonable distortion; maximum travel was somewhat longer. The woofer overloaded quite gracefully. No dynamic offset was noted.

Minimum excursion occurred at 55 Hz, the frequency of the ES11's vented-box resonance. Cone displacement was reduced by about 50% after the port was closed. Vent noise at and near the box resonance was fairly low.

Figure 8 shows the three-meter room response, with both raw and sixth-octave smoothed data. The ES11 speaker was in
the right-hand stereo position, aimed toward the main listening position, and the test microphone was at ear height (36 inches), at the listener's spot on the sofa. The system was driven with a swept sine-wave signal of 2.83 V rms (corresponding to 1 watt into the rated 8-ohm impedance). The direct sound and 13 mS of the room's reverbitation are included. If you exclude room-effect dips at 325 and 425 Hz, the averaged curve fits a tight, 7.5-dB window. Above 2.1 kHz, it fits an even tighter window of about 4 dB.

Figure 9 shows the $E_1$ (41.2-Hz) bass harmonic distortion with input power ranging from 0.05 to 50 watts (note that 20 V rms generates 50 watts into the rated 8-ohm load). The second harmonic reaches a moderate level of 10.6%, while the third attains a very high 51%. Higher harmonics include an 8.1% fourth, a high 22% fifth, and a 3% sixth. With a 50-watt input, the ES11 reaches a marginally usable 1-meter SPL of 90 dB at 41.2 Hz.

Because the $E_1$ distortion was very high, a result of being significantly below the ES11's passband, the harmonic distortion of a higher frequency, $B_1$ (61.5 Hz), was measured and is shown in Fig. 10. As before, the third harmonic predominates but only reaches a moderate 7% at full power. Other harmonics are all low, 0.6% or less. The second harmonic, which reaches only 0.4%, is hidden behind the 61.5-Hz fundamental's bleed-through ridge at the left of the graph. With 50 watts in, the Epos reached a fairly usable 1-meter SPL of 98 dB at 61.5 Hz.

In Fig. 11, the bass harmonic distortion for $A_2$ (110 Hz), the predominant distortion is a low 1.9% second harmonic and 2.4% third. Higher harmonics are quite low, 0.7% or less.

The $A_2$ (440-Hz) distortion (not shown) rose only to the low level of 3% second harmonic. Higher harmonics were below the noise floor of my measuring gear.

Figure 12 displays the IM distortion versus power, created by tones of 440 Hz ($A_4$) and 41.2 Hz ($E_1$) of equal level. The IM distortion rises to the fairly high level of nearly 19% at full power. The woofer handles both tones of this IM test, which contributes to this speaker's high level of intermodulation.

The ES11's short-term peak-power input and output capabilities are shown in Fig. 13. The peak input power was calculated by assuming that the measured peak voltage was applied across the rated 8-ohm impedance.

The peak input power rises from 10 watts at 20 Hz and, after minor undulations at 80 and 120 Hz, reaches a local maximum of about 1,500 watts at 250 Hz. After falling to 830 watts at 400 Hz (where the woofer exhibited a harsh buzzing sound), the peak input power rises smoothly to a healthy 6,000 peak watts at frequencies above 1.6 kHz.

As can be seen in Fig. 13, the ES11's maximum peak output SPL with room gain rises very rapidly from an unusable 71 dB at 20 Hz to reach a very usable 107 to 110 dB between 65 and 160 Hz. After reaching a peak of 116.5 dB at 250 Hz and falling slightly to 115 dB at 400 Hz, the output rises into the healthy range of 120 to 123 dB above 600 Hz. A pair of ES11s, operating in unison in a typical listening room, can attain even higher levels in the bass range. The strong maximum output above 60 Hz suggests that these speakers can be used either by themselves or as satellite systems with a subwoofer.

Use and Listening Tests
After working with some large systems recently, it was nice to handle a pair of speakers that I could hold under each arm at the same time. The ES11s were supplied to me with sturdy metal stands, which are optional and

THE SOUND WAS SMOOTH AND WELL BALANCED, WITH A TOUCH OF FORWARDNESS.
ES11s closer to the rear wall than I usually do, about a foot in front of the bookshelves which line the rear of my listening room. I did most of my listening, however, with the speakers in my customary positions, well away from the rear walls.

My review systems were supplied in a very attractive walnut finish. Although Epos specifies that the finish is a veneer, it looked like solid wood; with the front panel removed, I could see what appeared to be unfinished walnut inside the cabinet. Construction and appearance were excellent. When first received, one system had a slight air leak at a point on the front panel’s periphery. Tightening the four long bolts that hold the front panel to the cabinet sealed the leak.

My listening equipment consisted of the Krell KRC preamp and KSA-250 amp driving the ES11s through Straight Wire Maestro cabling. My reference speakers were B & W 801 Matrix Series 3s, while Onkyo and Rotel CD players provided source material. Listening was done in the regular (not bi-wired) configuration. First listening revealed the ES11s to have a well-balanced, smooth sound, with a touch of forwardness, and significantly less bass than the reference B & Ws. Sensitivity was essentially the same as that of the references, and the two systems produced a similar overall balance and tone (excluding the low bass).

Female vocals, such as Clair Marlo on Let It Go (Sheffield Lab CD-29) and Trisha Yearwood on The Song Remembers When (MCA MCAD-10911), were very natural. There was no harshness, glare, or undue high-frequency emphasis. In fact, the overall high-frequency reproduction of the ES11 was quite similar to the 801’s in level, smoothness, and extension.

On more dynamic material such as Bob Mintzer’s jazz on One Music (dmp CD-488), the ES11s did quite well in handling high-level percussion transients and complex passages. The low-end kick and bass punch of the 801s was completely missing, however. Even though the low bass was quite attenuated, the ES11s still had enough bass to be satisfying. At very high levels on this disc, the ES11s did start sounding somewhat congested; some audible modulation of the mids could be heard when high-level bass was present.

I also did some listening using Velodyne’s F1500R subwoofer as an adjunct to the ES11s. (The F1500R replaced my F1500G; the “R” version includes a remote. Having remote control of level and of bass on/off is a super addition!) The ES11s worked extremely well as satellites. With low bass added, the overall sound competed quite well with the 801s.

On the pink-noise stand-up/sit-down test, the ES11s exhibited significant tonal changes in the upper midrange when I stood up. Their spectral balance on pink noise was quite good but sounded slightly more forward than the 801s did and had significantly less bass. Smoothness, although not quite up to the B & Ws’ standards, was nevertheless quite good. On third-octave band-limited pink noise, the ES11s did not have any usable output in the 20-, 25-, and 31.5-Hz bands. Although the output was just barely usable at 40 Hz, it was quite usable at 50 Hz. At 63 Hz and above, the ES11s could generate sufficient levels of clean bass.

On relatively sedate classical music, such as Boccherini’s Cello Concertos performed on period instruments (Sony Classical SK 53121), the ES11s were quite open sounding, albeit a shade forward in the presence range. Stereo focus and lateral imaging were exemplary. Coloration was quite low, maybe due in part to the rigidity of the enclosure.

In summary, the ES11s demonstrated quite good performance for their size and price. They should be seriously considered by anyone who desires small, high-performance loudspeakers that are also accurate, smooth, and good looking. D. B. Keele, Jr.
Air guitar a little flat?

REMEMBER WHEN YOU WORE BLUE JEANS, had long hair, and played the air guitar? Hi-Fi was fun and music was your passion. Then you became successful and had money to burn. You bought an amplifier that added warmth, a preamp with ambience, and speakers that gave you depth. Isn't it about time you got back to the music?

PEOPLE NEED MUSIC. Music is important. Exploring the world of music in the comfort of your own home is therapeutic. It will help you relax, stimulate your imagination, change your mood, and provide entertainment and pleasure for your whole family. A SOUND INVESTMENT. At our innovative factory in Scotland, we produce the most advanced and best sounding hi-fi. Skilled and dedicated people and our unique single-station-build philosophy ensure a standard of construction and reliability simply not possible on a production line. Our modular approach to system and product design allows you to improve or expand your system over time in affordable steps.

And, with your Linn retailer on hand to provide assistance long after your initial purchase, you can expect your hi-fi to last a lifetime. People who love music have built our business, so we look after them. MUSIC FOR YOUR LIFE. To learn more about Linn Hi-Fi and the many ways in which Linn can make music a more important part of your life, phone Audiophile Systems, Ltd., our U.S. distributor, at 1-800-546-6443.

1-800-LINN HI-FI
music for life™
Equalizers and analyzers are Audio-Control's stock in trade. The venerable C-101, now in its third (Series III) incarnation, combines both in a relatively small, tasteful package. More important, it offers exceptionally good performance for the genre, especially vis-à-vis noise and distortion, a graphic equalizer's twin Achilles' heels. Consider its competitive price, five-year warranty, and inclusion of an excellent infrasonic filter, and you'll find that the C-101 Series III is a big winner in the cost/performance derby.

The C-101 Series III integrates a 10-band graphic equalizer and a defeatable infrasonic (a.k.a. "subsonic") filter with a 10-band real-time analyzer and pink-noise generator. The system includes a "lab grade" microphone matched to the analyzer. (AudioControl advises that the microphone be used only with the C-101 and that no other microphone be substituted for it.) The mike is on a 20-foot cable that terminates in a phone plug and fits into a jack at the front panel's lower left corner. Above the jack is a "Display Level" control that adjusts the analyzer gain to utilize the display range to its fullest.

At the top left corner is a "Power" switch, but since the C-101 consumes only 10 watts, it can be left on and plugged into a switched outlet of an amplifier or receiver. An unswitched outlet (200-watt maximum rating) on the C-101's back panel replaces the switched outlet you've used for the equalizer and is then switched on and off by your amplifier or receiver.

Four pushbuttons to the left of the display operate the analyzer; a bank on the right controls the equalizer. The top left button ("Display") quenches the dancing lights when you tire of their antics. "Pink Noise" activates an internal pink-noise generator and automatically substitutes the test signal for the normal feed to your amp.

The "2dB/4dB" button controls the analyzer display range, 2 dB per LED for a 16-dB total range or 4 dB per LED for a 32-dB range. "Slow/Fast" adjusts the analyzer response time; "Slow" gives a time-averaged reading that's useful when equalizing loudspeaker response with the pink-noise signal, while "Fast" lets you watch the music's antics.

From top to bottom, on the right of the display, are the four pushbuttons for the equalizer. "Equalize" engages or bypasses the 10-band equalizer, "EQ Recording" routes equalized signals to the tape output jacks so the C-101 can be used to equalize a recording, "Tape Monitor" replicates the tape monitor function of the amplifier when the C-101 is installed in a tape monitor loop, and "Subsonic Filter" engages or bypasses the internal 18-dB/octave Chebyshev high-pass filter.

Twenty sliders occupy the right half of the panel. These are arranged in adjacent left/right pairs to facilitate controlling both channels equally (a good idea to avoid the image smearing that can occur when left and right response and phase are modified differently). AudioControl's arrangement provides the best of both worlds. If you
choose to equalize differently to correct different response anomalies in the two speakers, you can do so; if you want to control both in like manner, it's also easy to ensure that you do. The 10 equalizer and analyzer sections are spaced on octave centers from 32 Hz to 16 kHz, which, considering the effective range of both sections and of the characteristics of human hearing, is eminently sensible.

The back panel is simple: Main input/output pairs for connection in a tape monitor loop (or, if you prefer, between preamp and power amp), and tape input/output pairs to connect with the tape recorder you wish to pre-equalize (and/or to replace the tape monitor loop lost to the analyzer when it occupies that position in the main signal path). Between these sets of gold-plated RCA jacks is a small control that adjusts the pink-noise level. At the extreme right are the power cord, the line fuse, and the unswitched convenience outlet mentioned above.

Recommended hookups are given in AudioControl's "Operating & Enjoyment Manual," which is the finest audiophile operating manual I've seen. Its lighthearted style is easy to read, and it's packed with useful, accurate information on how to use an analyzer and equalizer for best results. It doesn't claim that the C-101 makes a silk purse from a sow's ear system (no equalizer/analyzer does that); it does encourage you to experiment with loudspeaker placement (and suggests guidelines) before resorting to equalization, and it warns against excessive boost. It's even honest enough to warn that you probably won't like the sound of your system after equalizing it for "flat" response. Refreshing!

Circuitry

The C-101 Series III contains two main circuit boards. One extends across the rear of the front panel and supports the main controls, and the other carries all active circuitry and the power supply except for the main transformer. The boards interconnect with four ribbon cables, soldered directly to the boards and affixed with adhesive. The boards are single-sided and use lots of jumpers but impressed me as being of good quality. With the exception of some flux residue, construction appeared to be good.

The equalizer is designed around five 4560 wideband dual op-amps for each channel. Each 4560 handles two non-adjacent control bands. The circuitry is in the front right corner, as far as possible from the power transformer (which is mounted near the rear of the left side wall). Solid-state switches control signal routing to minimize the length of the audio path.

**Measurements**

Although I measured both channels, I've based the curves and data exclusively on the left. Right-channel characteristics matched those of the left so closely that no purpose would be served by presenting both. Channel gains were close to unity (±0.02 dB) and extraordinarily well balanced (within ±0.02 dB).

The frequency response of the system is shown in Fig. 1 with the equalizer bypassed (±0.05 dB from 22 Hz to 105 kHz), with the equalizer engaged and the sliders at their detents (+0.00 dB, -0.35 dB from 10 Hz to 100 kHz), and with both the equalizer and the infrasonic filter engaged. (The filter is operational even with the equalizer bypassed.) Chebyshev alignment (specified by AudioControl) implies some degree of passband ripple, but I saw no evidence of it in the data. As far as I can tell, the filter is...
Butterworth-aligned, which is the "0-dB ripple" Chebyshev case. The -3 dB point occurs at 22 Hz with a slope of 18 dB/octave. Response is 5 dB down at 20 Hz and (not shown) -23.6 dB at 10 Hz.

Figure 2 is a composite of the response curves taken with each slider individually set for maximum boost and maximum cut, i.e., 20 curves in all. Band centers agree quite closely to the indicated markings, and, although the maximum boost and cut varies with the particular control that is exercised, each provides a range of at least ±12.5 dB and some provide as much as ±14.7 dB. Each control's boost and cut is usually symmetric, which testifies to good design.

I also plotted equalizer response with various combinations of slider settings: Each alternating between maximum and minimum, alternating in pairs (two up/two down, etc.), alternating in triplets (three up/three down), and so forth. Although the curves aren't shown, suffice it to say that the C-101 performed pretty much as you'd expect from the "graphic" position of the sliders. Of course, each equalizer section affects those adjacent to it so that, if three are raised, more boost is given to the center band than would be obtained had the adjacent ones not been boosted as well. But there were none of the anomalies I've seen with some "graphic" equalizers whose equalizer sections interact in such a way that the resultant frequency response doesn't correlate with equalizer positions when more than one band is used.

Figure 4 is a composite of 10 response curves taken with the 1-kHz slider set as close as possible to each marked setting: ±3, ±6, ±9, ±12, and ±15 dB. The actual boosts and cuts don't correspond precisely with the markings, and at least half the range comes between the "12" and "15" marks. However, I don't recall ever measuring an analog equalizer in which the markings really did correspond to the actual response modification, so I can't downgrade the C-101 against its competition in this regard. By limiting the change that occurs with the sliders slightly off center, you needn't be precisely on the detents to achieve "flat" response. Since the AudioControl detents are none too definite, this is arguably a benefit.

The C-101's THD + N versus output level (at 1 kHz, with all sliders at the detents) is shown in Fig. 5. The downward slope indicates that noise predominates at output levels from 50 mV to somewhat above 1 V and that the C-101 can produce 7 V output with negligible distortion (0.05%). Clipping (1% THD) occurs at 9.6 V. The THD + N at 2 V output (not shown) did not exceed 0.0062% at any frequency from 20 Hz to 20 kHz, and some of this, too, was noise.

I'm impressed by how little distortion and noise the C-101 generates. Each equalizer section requires its own operational amplifier and associated components, and each inevitably generates some THD and noise. Ultimately, these contaminants combine in the output stage so that when you design a 10-band equalizer, things can get pretty hairy. With distortion in the 0.005% range and an A-weighted noise of -93.2 dB referenced to 0.5 V (-99.2 dBV), the C-101 is outstanding in these regards. Referencing the A-weighted noise to maximum output level (9.65 V) yields a theoretical S/N of 118.9 dB! Clearly, the C-101 can be used in a variety of applications over a wide range of input levels without audible ill effects. Input and output impedances (100 kilohms and 110 ohms, respectively) and a generous input overload (9.9 V) further testify to universality of application.

A noise-spectrum analysis (not shown) revealed hum-related components at 60 Hz, 180 Hz, and 300 Hz of -90.1 dB, -91.8 dB, and -105.5 dB (re: 0.5 V), respectively. Since these occurred at odd harmonics of the power line, I suspect they were caused by magnetic coupling from the transformer. But the hum was negligible in level, and no other line structure was apparent in the analysis. Channel separation was 72 dB at 1 kHz and better than 51.5 dB from 20 Hz to 10 kHz.

Finally, I verified the "flatness" of the C-101 pink-noise generator by using the sweeping third-octave spectrum analyzer built into my Audio Precision System One and a real-time third-octave analyzer (operating in an Apple computer) that I developed for loudspeaker evaluation. Both measurements indicated that the pink noise the C-101 generates is more than sufficiently "flat" for its intended purpose on a third-octave basis, given the 2-dB per LED resolution of the C-101 analyzer. However, the Apple-based measurement was arguably more accurate, since I could use an averaging time sufficient to integrate the level fluctuations that naturally occur in pink noise at low frequencies.
Your ears have an amazing memory, which is why you seek a loudspeaker that's as unforgettable as live music.

Had nature intended sounds to travel only forward, acoustics would be a simple science.

Unlike conventional speakers, Mirage's M-si Series Bipolar loudspeakers set the music free over a full 360 degrees.

It's only natural.

Because what defines the sound of music is as much the physical space surrounding them as the instruments themselves. In reproducing music, a loudspeaker must place you, the audience, in that space.

Mirage's Bipolar speakers do just that.

But before you audition the M-si Series at your Mirage dealer, take in a live concert or two. Then you can experience for yourself just how unforgottably life-like the M-si's really are.
response curves of my loudspeaker as measured by the C-101 microphone/analyzer with a measurement made with my Apple-based setup and calibrated lab microphone. The two agreed within the limits of experimental error, which is to say, within the limits imposed by the C-101's resolution of 2 dB per LED.

While I was at it, I equalized my listening system for "flat" response. As AudioControl warned (and which I already knew from past experience), with most program material, the resulting sound was too harsh and strident. This is not to say that using the C-101 to analyze/equalize a system is fruitless. Once you've "flattened" the system and corrected gross bumps and dips in response, you can modify the tonal balance as you wish. (AudioControl offers advice in this regard.) You're likely to want to lower the high-frequency sliders progressively to impart a gradual high-frequency slope to the overall response, and you may also want to add a bit of bass boost.

One word of warning and one of advice. As an octave-based analyzer, the C-101 can only adjust octave-to-octave balance; it cannot correct response irregularities that occur over narrower bands. You will get optimum results if you start with a good pair of loudspeakers that have been placed in the room so as to minimize standing waves. The C-101 can help you find those ideal locations. Next, as AudioControl points out in its manual, you will find areas in which measured response seems to vary widely when you move the microphone slightly. These are not good listening positions vis-à-vis loudspeaker placement. Change one or the other until you get stable measurements over a reasonable area. I expect that the dissatisfaction that many express with analyzer/equalizers stems from not appreciating the importance of listening/microphone placement and not realizing that you are unlikely to want truly flat response.

A component like the AudioControl C-101 Series III is not limited to loudspeaker equalization, and many may not even use it for this purpose. Once it's in your system, you'll not be able to resist the temptation to do a little creative tinkering with the sound balance of your record collection. After you've gathered some experience using the equalizer, you can do quite a bit to spruce up the sound of inferior LPs and CDs. And if you duplicate tapes for your car, you'll find the C-101 extremely helpful in tailoring recordings so they sound almost as good on the road as the originals do at home.

If you are interested in a graphic equalizer/analyzer, the AudioControl C-101 Series III should be high on your list of candidates. It performs outstandingly well on the test bench and is clean and quiet in the listening room. Of course, you can't call any equalizer "transparent," since it's meant to alter tonal balance, but if you could, the AudioControl C-101 would get my vote. It does only what you ask of it.

Edward J. Foster
Give Your Music a Sound Foundation®

Performance with Style

Are you getting the most out of your speakers? Did you know that proper mounting and room placement dramatically improves sound quality? Most major speaker manufacturers recommend loudspeaker supports for optimum performance; many of the best known brands specifically recommend or use Sanus Foundations®. Demand the most from your audio dollar. Give your music a Sound Foundation!

Natural Foundations®

Natural Foundations are constructed of MDF and finished with three coats of hand sanded black lacquer. MDF is quieter and stronger than other wood products, and is the cabinet material used in the best loudspeakers. All models feature brass speaker isolation studs, adjustable floor spikes, neoprene isolation pads, and a concealed speaker wire path. Two models are available with solid oak or walnut pillars.

Designer Foundations®

Designer Foundations are a contemporary alternative to the utilitarian look of most steel loudspeaker supports. Performance is on par with the finest European and domestic designs, yet the price is affordable. Designer Foundations feature fillable steel pillars, adjustable floor spikes, HDF top plates, neoprene isolation pads, and brass speaker isolation studs.

1973 W. Cty. Rd. C2 Roseville MN 55113 (800) 359-5520 (612) 636-0367 FAX
Most of us associate Sonance with loudspeakers—in particular, with in-wall speakers. Arguably, Sonance was one of the first to elevate in-wall speakers from the P.A. dungeon to the high-fidelity stratum, and they've done quite well at their trade. Because speakers must be driven by power amps, it's not really surprising that Sonance has branched out of its niche into the electronics arena. But entering a new area is easier said than done; driver design and circuit design are quite different arts. I must confess to having approached the Sonamp 2120 power amplifier with somewhat of a "show me" attitude, but "show me" it did. The 2120 is really quite a nice piece.

Clearly, the Sonamp 2120 was designed with an eye toward the custom-installation market, the one Sonance is most familiar with. "Auto On" circuitry brings the system to life within 1.5 seconds after detecting the presence of an input, and powers the amp down about four minutes after the signal has disappeared. You can defeat "Auto On" with a recessed back-panel slide switch, in which case the 2120's front-panel "Power" switch functions as you'd expect it to. If you use "Auto On," the "Power" switch should be left depressed.

This can be a little confusing at first, because the red "A.C. On" LED illuminates whenever power is applied, independent of the position of the "Power" switch. If the amp is plugged into a live output, the red lamp is lit; if it isn't, the line fuse has blown. A green "Active" LED lights when the amplifier is really on, i.e., when it senses the presence of a signal in the "Auto On" mode or when the "Power" switch is depressed in the—what shall I call it?—"Non-Auto-On" mode. (The "Active" light will also come on when the 2120 is first plugged in or after power is interrupted and restored. In the "Auto On" mode, it'll turn off after a few minutes if no signal is present.)

"Auto On" simplifies operation in multiroom or home theater applications but is, on the one hand, neither unique to the Sonance 2120 amp nor, on the other hand, the only multiroom nicety that the Sonance offers.

On the back panel are stereo input and output jacks so that multiple
2120s can be daisy-chained ("looped") together without resorting to "Y" connectors. If you use many power amps in your system and are concerned about the power-line surge that may occur when all turn on at once, Sonance has available two line-protection sequential power switches (the AC1 and AC2) that will eliminate the problem.

Recessed screwdriver-adjustable level controls on the 2120's front panel permit you to adjust sound pressure level in each area independently and ensure that you needn't operate your preamp's volume control at such a low setting that channel balance is impaired and/or that the control is difficult to adjust. I like the idea of recessing the gain controls and "Auto On" slider; they're one-time setups that can potentially be misadjusted by accident.

Sonance claims to have designed the Sonamp 2120 with "numerous protection circuits"—including surge, overload, and thermal-protection systems—that automatically reset after a fault has been corrected. Should any of the protection circuits trigger, the green "Active" LED flashes and output may be interrupted by an internal relay. This is all well and good, but not every 2120 "protection device" resets automatically; three internal power fuses and one back-panel line fuse must be manually replaced if blown.

The 2120 uses a discrete output stage (parallel) pairs of Toshiba 2SC4029s and 2SA1553s in each channel) mounted to two reasonably generous heat-sinks, one per channel. The heat-sinks are apparently more than adequate, since the 2120 ran cooler both on the test bench and in the listening room. Thermal sensors, mounted to each sink between the complementary-symmetry pairs, track and compensate for output-stage temperature. The output-stage drivers are mounted on individual heat-sinks. Most of the audio circuitry is on one main board that uses fairly wide heat-sinks. Most of the audio circuitry is on one main board that uses fairly wide

The power supply is on a separate board, with a good-sized heat-sink used to cool the main bridge rectifier. A small independent bridge apparently is used to power the "Auto On" system. A rather large toroidal power transformer (rated at 600 volt amperes) mounts at the left rear of the chassis, near the line cord and fuse. The generously rated transformer should provide adequate current reserves, and the toroidal construction helps contain magnetic hum fields. But the filter bank used after the rectifier—a pair of 10,000-μF, 65-V conventional electrolytics—is rather modest for a power amplifier whose output is rated at 120 watts per channel.

Construction appears to be reasonably neat. Although parts quality seems adequate, it's by no means exotic. Input connectors are solder-wiped, not gold-plated, and the five-way output posts (one set, not two) are more functional than impressive. They are, however, mounted on ¼-inch centers so they will accommodate GR-type dual banana plugs.

Those who require exotic parts and esoteric circuitry to get their jollies will not find either in the Sonamp 2120. I doubt they'll find them in any $575 power amp ($590 for the rack-mounted version) that is rated at 120 watts/channel. The Sonamp 2120 makes no pretense to having "dual-mono" construction, and, although I was not provided with a schematic, I doubt there's anything particularly novel in the circuit design either. What you can expect from the Sonamp 2120 is an honest workhorse with remarkably conservative ratings.

For example, the 2120 is rated at 120 watts/channel into 8 ohms and 160 watts/channel into 4 ohms, at 0.05% and 0.10% THD respectively, from 20 Hz to 20 kHz. At rated output on my test bench, I measured a maximum THD of 0.035% on the poorer of the two channels (0.028% on the better one) when using 8-ohm loads and 0.056% (on each channel) with 4-ohm loads. That's only half to two-thirds as much distortion as Sonance claims. Moreover, the distortion didn't rise in the bass.
region (as might be expected, given the smallish filter caps). In practice, the worst case occurred at 20 kHz, and, from 20 Hz to 3 kHz, THD was no more than 0.010% with 8-ohm loads and 0.018% with 4-ohm terminations. Maximum output power at clipping (both channels driven) was 160 watts per channel into 8 ohms and reached a whopping 250 watts per channel into 4 ohms.

With both level controls fully advanced, channel balance was extraordinarily precise—within 0.01 dB, the limit of my test equipment. Frequency response (on the poorer of the two channels) was within +0.00, -0.15 dB from below 10 Hz to 20 kHz and down 0.5 dB at 55 kHz. The -3 dB point occurred at 170 kHz. Input/output phase linearity was within +4.5°, -7.9° from 20 Hz to 20 kHz. Channel separation was 80 dB or better from 20 Hz to 3 kHz and 70 dB or better out to 16 kHz. (Many dual-mono amps don’t do better, and some do worse!)

The A-weighted noise was -93.3 dBW, which implies a signal-to-noise ratio referenced to rated power (20.8 dBW) of 114.1 dB—more than 14 dB better than Sonance specifies! The noise figures are all the more impressive when viewed in conjunction with the 2120’s higher-than-typical gain. With 8-ohm loads, it delivered rated output with a 1-V input (88 mV for 1 watt) rather than the more usual 1.5 V. Of course, you can reduce gain by readjusting the input level controls, so the 2120’s extra amplification can only be considered an advantage.

Damping factor was 215 at 50 Hz and 190 at 1 kHz. Because the 2120 uses output protection coils, output impedance rises (damping factor drops) at higher frequencies. I measured an output impedance of about 100 milliohms at 5 kHz and 175 milliohms at 10 kHz.

Apparently someone at Sonance knows his way around circuit design, because the 2120 obviously did quite well on the test bench. It also did well in the listening room. I wouldn’t go so far as to say it’s the most pristine power amp I’ve ever heard, but I was surprised at how good it really did sound. It’s quiet, bass is tight, and there seems to be adequate current available. High treble is not its strong point; it’s a trifle brittle and somewhat alters the harmonic balance between fundamental and overtones in the violin’s upper register. However, the difference between the Sonamp 2120 and the best power amps on the market is relatively slight and certainly far narrower than is the corresponding price difference.

For its stated use as a power amp for custom installations, I think you’ll find the Sonamp 2120 hard to beat. The same applies for home theater applications. In fact, I’d have little hesitation employing the 2120 in almost any audio system, especially when budget is an issue. At this price, there’s no cause for complaint—only admiration.

Edward J. Foster
Welcome to SOUND & IMAGE Magazine!

Filled with late-breaking news and incisive reporting, each issue asks the questions you want to ask – and answers them clearly and expertly so you can make audio/video entertainment an integral part of your home. You'll find...

New Technologies: Discover what's just around the corner in home entertainment systems, from interactive music and cutting-edge speakers to movies on CD and satellite TV systems.

Comparison Tests: Experts pick the hottest product categories and line up over a dozen candidates in a head-to-head competition in a real-world living-room setting.

Equipment Reviews: Big-screen TVs... Home theater speaker packages... Voice programmable VCRs... Surround-sound processors... CD-ROM drives... A/V receivers. You'll know the options before you buy.

Hot Software: The movies, music, videos and multimedia that are really worth your time – and your money. Plus... Custom home installations... Interviews with industry leaders... and lots more!

Introductory Charter Subscription Offer

Now for the first time, Sound & Image is available for convenient home delivery. To enter your subscription, simply fill out the accompanying order card today.

YOUR SATISFACTION IS GUARANTEED. You may cancel your subscription for any reason and receive a full refund on all unmailed issues.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Year</td>
<td>$14.97</td>
</tr>
<tr>
<td>2 Years</td>
<td>$23.97</td>
</tr>
</tbody>
</table>

If the attached card is missing, write to Sound & Image, P.O. Box 59717, Boulder CO 80322-9717. Offer good in the US only. Please allow 30 to 90 days for delivery of first issue.
Goertz MI speaker cables from Alpha-Core have a substantially different geometry from the cables I examined in “Speaker Cables: Testing for Audibility” for the July 1993 issue. The Goertz MI cables consist of two, flat, insulated conductors bound together by an outer insulating jacket. Alpha-Core claims the benefits of its design include impedance matching and the elimination of distortion, high-frequency roll-off, crosstalk, skin effect, and emitted EMF effects. The cables are available with copper or silver conductors, and each version comes in two widths. Heavy, gold-plated connectors are available in banana plug, spade, and pin styles. Other accessories include mounting tape and clips. In 25-foot lengths, copper Goertz cables cost $4.95 per foot for MI 1 and $7.90 per foot for the heavier MI 2, while the silver cables, MI AG 1 and MI AG 2, respectively cost $49.80 and $88.70 per foot.

Goertz MI 1 cable is AWG #13, measures 0.4 inch wide and 0.05 inch thick, and has a resistance of about 4 milliohms per foot (both conductors). Goertz MI 2 cable, AWG #10, is twice as wide, with a resistance around 2 milliohms per foot. For 0.2 dBV of loss with 25 feet of cable, the minimum speaker impedance is about 4.3 ohms with MI 1 and 2.2 ohms with MI 2. Conductors in both cables are 0.01 inch thick, thus eliminating the over-rated skin effect at audio frequencies. The flat, thin conductors in close proximity serve to lower inductance while raising capacitance. Goertz MI 1 has about 480 pF per foot and MI 2 about 1,000 pF per foot. The inductance for the pair of conductors is quite low, measuring less than 0.1 µH for 25 feet of cable. These cables have sufficient capacitance to maintain a flat impedance, much as ribbon cables do (see my 1993 article). From 20 Hz to 20 kHz, the impedance of the Goertz cables increases about 21%. In comparison, the impedance of standard AWG #12 cable increases 583%, which causes a loss of about 0.5 dB for a 4-ohm load through 10 feet.

The name “MI” comes from “Matched Impedance,” a term more commonly associated with r.f. transmission lines. Like other cables around 15 years ago (from Polk, Mogami, Discwasher, and AudioSource), Goertz MI cables have a low characteristic impedance. Such cables are typically more dispersive, though not audibly so. Since the lengths of speaker cables are very small fractions of an audio signal’s wavelength, reflections will not be a problem.

The measured response with a loudspeaker load is generally flat; between 2 and 20 kHz, the loss increases to 0.2 dBV for MI 1 and to 0.1 dBV for MI 2, a result of the test speaker’s impedance minimum of about 4.5 ohms. This indicates essentially no high-frequency roll-off with the Goertz cables. In comparison, the loss for standard #12 AWG at 20 kHz is only about 0.8 dBV. Below 10 kHz, the Goertz MI cables perform virtually the same as standard #12 AWG. What frequency is necessary to get a substantial difference with 25 feet of cable and a 4-ohm load? It took 185 kHz to get 3 dBV of difference between MI 1 and #12 AWG.

One option when ordering the Alpha-Core cables is to have them cut to length and ready for termination. You may want to consider that option if you don’t have power tools or arms like Popeye’s. The thin layer of insulation bonded to each conductor is incredibly tenacious and requires substantial effort to remove. Once
the insulation is removed, attaching the terminals is quite simple. The bodies of these heavy, high-quality terminals are not insulated, so care must be taken to prevent shorts.

I found both cables to be quite stiff, especially MI 2, and routing them can be challenging. They can be folded and bent, although sharp twists and bends tended to buckle and occasionally split the outer jacket. The inner insulation remained intact, and no shorts were found after this abuse. The thin profile lends the cable to installation under a carpet (but be careful to avoid tacks!).

The silver-conductor versions, MI AG 1 and MI AG 2, were not tested. Except for slightly lower resistance, there should be little difference in their performance despite the substantial increase in cost.

Informal, blind listening tests compared 25 feet of MI 1, MI 2, and #12 AWG cable; no audible difference could be found. Younger ears were also employed to see if something in the top octave was being missed. The measured differences still eluded human detection.

Why weren’t the cable differences more audible? Our hearing becomes much less sensitive above 4 kHz, falling at about 10 dB per octave. Also, there isn’t a lot of musical energy above 10 kHz, and this is easily masked. The result is a lack of significant audible difference in the top octave, while below 10 kHz the cables are effectively the same.

These are distinctive, well-made cables and terminals. Their measured performance is excellent, and they should work well with nearly any speaker as a load. If long cable runs are necessary with a low load impedance, it is possible that Alpha-Core’s Goertz cables could make an audible difference. However, shorter runs and typical loads are unlikely to show much improvement over #12 AWG.

Fred E. Davis

---

**BLIND LISTENING TESTS WITH 25 FEET OF GOERTZ CABLES VERSUS #12 AWG LAMP CORD PRODUCED NO AUDIBLE DIFFERENCES.**

---

**T**erK Technologies’ Leapfrog acts as a radio bridge between your audio components and their remote controls. It lets you operate your preamp, tape deck, and CD equipment by their remote controls when you are not in sight of these components— even from another room. The Leapfrog should also be ideal for outdoor use, where sunlight can swamp an ordinary remote’s infrared beams. The Leapfrog system costs $69.95 for the IR-5 base station and one IR-4 transmitter. Extra transmitters cost $19.95 each.

The IR-4 is a tiny, battery-powered, infrared receiver and radio transmitter that mounts on any infrared remote control. The Leapfrog system costs $69.95 for the IR-5 base station and one IR-4 transmitter. Extra transmitters cost $19.95 each.

The IR-5 is a tiny, battery-powered, infrared receiver and radio transmitter that mounts on any infrared remote control. The Leapfrog system costs $69.95 for the IR-5 base station and one IR-4 transmitter. Extra transmitters cost $19.95 each.

Anthony H. Cordesman

---

**COMPANY ADDRESS: 65 EAST BETHPAGE RD., PLAINVIEW, N.Y. 11803; (800) 942-8375. FOR LITERATURE, CIRCLE NO. 95**

---

**AURICLE**

---

**TERK LEAPFROG REMOTE-CONTROL EXTENDER**

---

**The Leapfrog is ideal for people who keep their components in a cabinet or behind a door. No problem. The IR-5 base unit has a small jack that can be connected to a series of up to four small infrared Model IR-X repeaters ($14.95 each). An IR-X can then be placed in front of the infrared sensor on each component.**

---

**The Leapfrog is ideal for people who keep their components in different rooms. It makes it remarkably easy to set the exact balance for a given recording without moving your head, and to adjust volume levels to suit a given performance. The Leapfrog permits easy A/B testing, because components do not have to be visible and switching is so quick. And by attaching the Leapfrog to a universal remote control programmed for your equipment, you can use one Leapfrog transmitter to operate your entire system. (Such remotes are available for less than half the Leapfrog’s price.) Finally—a high-end accessory that is affordable and really works!**

---

**Anthony H. Cordesman**

---

**Company Address: 65 East Bethpage Rd., Plainview, N.Y. 11803; (800) 942-8375. For literature, circle No. 95**

---

**AUDIO/AUGUST 1994**

---

**65**
There are two excellent reasons for a CD such as this to exist. Neither, as I see it, has much to do with music—which doesn't really matter.

First, here is a bunch of percussion fiends having enormous fun, playing their strenuous thing: You never heard such whangs and bangs and rolls and whirs and all manner of other sounds—including a few discrete pitches out of such as a marimba. (Curious when that instrument has virtually no percussiveness at all and lots and lots of pitch!) Having spent their vigorous lifetimes learning the incredible art of percussion, these guys simply rejoice in their skills. BOOM—what a whack! Brrrrring—what a roll. Like kids gone berserk in a school playroom. But with such amazing expertise.

What astonishes me is that it all seems to be written down in millions of notes on paper. The sounds, five different pieces, are all "by" William Kraft. That is, they aren't just improvising. (Only once in a while.)

The second reason—and cause for review in this space—is that this is, as you may guess, what we used to call a Test Record. A whopper, par excellence, for those who want to show off their gear, system, fi or whatever. Now more than ever, as the ads say. Remember "Death and Transfiguration"? Forget it. This is what you need. Wow, what sounds! Just in time for the modest subwoofers I installed (NHT) with the thought of keeping myself somewhat up to date. (They are surprisingly unobtrusive in most classical music.)

Don't try the CD on a so-called boom box; the little speakers will probably pop right out of their frames. And check with family and neighbors before you start on your big gear.

Edward Tatnall Canby
This composer is an Italian "unknown," not yet made the big time on Broadway—he might as well, as far as we are concerned, be that well-known artist, Anon. For such reasons he caught my eye—then my ear. Good man, good listening!

You might call this proto-baroque. It is the early 17th century, here, the time of Monteverdi, Gesualdo, the young Schütz (who spent his learning years in Italy)—these being famous names. But Dario Castello? The notes tell us bravely that "his life is cloaked in mystery" and little is known of him. Which is to say, nothing at all. Except the music.

It is more than worthy of the famed Anon! The sound grew on me steadily as the hour-plus sequence of short pieces, "chamber works" a later age would say, unreeled on a twin pair of violins and a changing accompaniment texture of modest variety. A very gen-
tly dramatic composer, this, in whose works one hears nevertheless strong hints of the intense dramatic innovations of that musically explosive time.

Not in words. All of it is in the playing, minus any hint of "story" to explain what goes on. Pure musical drama: Sudden, startling changes from fast to slow, dramatic pauses, brief passionate bursts, rushing scales—very strange! For our ears, no apparent reason. But some audience, some group of players, must have been very startled and impressed in early performances.

The very early baroque had not yet discovered LENGTH—except as attached to words, sacred, in song or opera. No extended "move-

tments" here, allegro, adagio, and so on. Instead, each piece is made up of a series of short sections one after the other in dramatic contrasts, no more than a few moments apart. This at first is confusing. Play through, and then it becomes evident that within

Stravinsky: Ebony Concerto; Babin (arr. D. Nygren); Hillandale Waltzes; Morton Gould: Derivations for Clarinet and Band; Bernstein: Prelude, Fugue, and Riffs; Artie Shaw: Concerto for Clarinet John Bruce Yeh, clarinet; DePaul University Wind and Jazz Ensemble, Donald DeRoche and Robert Lark, conductors REFERENCE RECORDINGS RR 55CD, CD; 52:17

Serious audiophiles know Reference Recordings as modest in scope but at the top of the heap when it comes to sonics, and this CD, focused on the brilliant clarinetist John Bruce Yeh, reinforces that reputation. The Chicago Symphony signed Yeh at the age of 19; today he also teaches at DePaul University. The music on this CD runs quite a gamut, from the excell-

tein (Leonard Bernstein, Igor Stravinsky, Morton Gould) through the banal (Victor Babin) to the almost rubbishy (Artie Shaw), but performance quality redeems everything.

During the big-band era, Benny Goodman not only held the uncontested title as King of Swing, he also recorded a number of the most important chamber works involving clarinet; with the violinist Joseph Szigeti, he even commissioned Béla Bartók's "Contrasts," which they recorded with Bartók at the piano. Goodman's only serious pop rival, Woody Herman, who aptly called his band The Thundering Herd, struck back by commis-

sioning the greatest living compos-
er, Igor Stravinsky, to write the Ebony Concerto. The recording they made together found Herman and his men technically on top of the score, but audibly, not really at home with all those jagged, asymmetrical, rapidly shifting rhythms.

How times have changed in half a century. Everyone involved here seems to have no more problem with even the most diffi-
cult stretches of these works than they might have with a Sousa march. If from time to time one might wish for an even sharper microtome precision of attack or syncopa-
tion, in general the accompanying ensembles match the soloist's security and brilliance.

Inevitably, Stravinsky in spots sounds a bit square and alien to the jazz idiom, but Herman got his money's worth in an enduring score. The agreeable but incon-
sequential Babin waltz variations (for which Dennis Nygren orchestrated the piano part) serve their purpose largely by permit-

ting the solo clarinetist to shine. The main surprise comes with Gould's Derivations for Clarinet and Band, written for, and in collab-
oration with, Goodman: Solid, expertly crafted music, convincingly interpolating all sorts of authentic jazz elements, to strik-
ing effect.

Herman also commissioned the Bernstein work, but disbanded his last Herd before perform-
ing it; Goodman unveiled the piece with Bernstein conducting. The movements' subtitles tell the story: Prelude for the Brass, Fugue for the Saxes, and Riffs for Everyone—instantly recogniz-
able as Bernstein, especially evocative of his energy-packed theater music.

Artie Shaw also had higher musical aspirations: At one point, after his recording of "Be-
gin the Beguin" had made him world-famous and rich, he sought lessons from composer David Di-
amond. This flimsy non-concerto of his (contrived for the eminently forgettable film Second Chorus) bears no witness to that—but here again, as in all these works, the excellence of John Bruce Yeh, his colleagues, and Reference's engineering make this disc something out of the ordinary. Richard Freed's exceptionally good notes round off the package.

Paul Moor

AUDIO/AUGUST 1994

67
these, shall I say, spurts of music is much va-
1990 and was put with the rest of its musical
riety, out of tightly limited means.
The two violins are absolutely equal. There
is no favoritism. They share their ideas like
twins with their associates in the accompani-
ment. But there is a certain dreamy quality in
their playing, an occasional fading away—I
tend to think is due to simply a lack of experi-
ence with microphones. That's just a guess.
Do they swing and sway in place as they play,
in the old traditional fiddler's style? That
would do it. For the mikes, you have to stand
still. Edward Tatnall Canby

Mozart: Rondo and Horn Concertos
Ab Koster, natural horn;
Tafelmusik, Bruno Weil
SONY CLASSICAL SK 53369, CD; 63:30

Some fetchingly familiar horn music here
as well as some unknown, but there is more:
Old buglers, Boy Scouts, Marines, whatever,
please take note. Here, in real sound, is what
can be done, and was done, in the 18th cen-
tury, on a simple horn—I mean a "French
horn," entirely without valves. Just the lips
and breath, with hand held inside the bell of
the instrument all to control the instrument's
pitch and tone. Very much like a bugle.

Buglers today mostly play two well-known
tunes, the get-up one, reveille ("revalie") and
taps for me. I was the more impressed by the
four notes. On the natural horn recorded
here, much beloved as played by horns with
the usual standard modern valves. If you
know what they can do you will be astonished
at how easily this horn player, operating like a
bugler, can play all the scales, arpeggios, rapid
runs, graceful melodies, trills, just as well as
the regular hornists! Some earlier players of
this revived older horn were not entirely able
to smooth out the horn sound as between
natural tones and those altered by the hand-
in-bell technique. Not this player. The tech-
nique has advanced. Listen and you will hear.
The horn tone is now even smoother, more
like the human voice, than any produced by
the modern instrument. Indeed, there is a
controlled variety of tone, soft and gentle,
that I find especially impressive. Do we need
any more evidence? No—just more music,
please.
Edward Tatnall Canby

HENRY COWELL

Cowell: Persian Set; Hymn and Fuguing
Tune for String Orchestra; American
Melting Pot; Air for Solo Violin and
String Orchestra; Old American Country
Set; Adagio (from Ensemble for String
Orchestra)
Manhattan Chamber Orchestra,
Richard Auldon Clark
KOCH INTERNATIONAL CLASSICS
3-7220-2H1, CD; 64:07

Cowell: Piano Music: The Tides of
Manaunauna; Exultation; Harp of Life; Lilt
of the Reel; Advertisement; Antinomy;
Aeolian Harp and Sinister Resonance;
Anger Dance; The Banshee; Fabric;
What's This?; Amiable Conversation;
Fairy Answer; Jig; Snows of Fujiyama;
Voice of Ur; Dynamic Motion; The
Trumpet of Angus Og; Tiger
Henry Cowell, piano
SMITHSONIAN FOLKWAYS 9307-40801-2,
CD; 60:36

Henry Cowell's career followed a time-
honored pattern: In his early years, during
the '20s, he shocked the pants off the inter-
national musical world as a wild-eyed radi-
cal by the standards of that time, only to
wind up, well before his death in 1965,
sounding downright conservative. He went
down in musical history as the originator
of "tone-clusters" (played on the keyboard
with the fist or forearm), although Sorrel
Hayes points out in the Smithsonian reis-
ue of Folkwax's 1963 recordings that the
Czech composer Frantisek Koczwara used
them (in The Battle of Prague) as early as
1788. He also elicited sound from piano
strings by every conceivable direct means,
without keyboard and hammers as inter-
mediary. Cowell, born in Califor-
nia of Irish her-
itage, had a life full
of event but not
without tragedy;
Dana Paul Perna's (appallingly edited)
notes in the Koch set provide a slanted ac-
count of the four-year San Quentin peni-
tentiary term he served in the 1930s. Later,
as if to make restitution, Washington
proudly sent him around the world as a
convincing, highly
effective musical
ambassador.

For recordings 30
years old, Cowell's
own piano perfor-
mances (originally
produced by Peter
Bartók, Moses Asch, Marian Distler, and
his wife Sidney Cowell) sound amazingly
good, thanks to superior electronic rejuve-
nation. Cowell's informal recorded dis-
course (13:18) about the individual pieces
enhances this reissue's documentary value.
Koch's orchestral set shows another facet
of Cowell: His enthusiastic ventures into
musical ethnology. Rarely, if ever, does he
actually quote authentic folk material,
but in every instance—whether African-
American, Celtic, French, German, Iranian,
Latin, Slavic, or whatever—he had im-
mersed himself so thoroughly into that par-
ticular melos that his original composi-
tions sound ethnically authentic, in
convincing performances, excellently
recorded.

Paul Moor

SMITHSONIAN FOLKWAYS 9307-40801-2,
CD; 60:36

Henry Cowell, piano

SMITHSONIAN FOLKWAYS 9307-40801-2,
ONKYO INTRODUCES
THE WORLD'S FIRST
THX RECEIVER

New TX-SV919THX Takes Home Theater to the Next Level

JUNE 1994, RAMSEY NJ — In a development certain to change the Home Theater playing field, Onkyo Corporation began shipping the world’s first Home Theater THX Receiver, the Onkyo TX-SV919THX. The company also announced the release of a complete THX Speaker System designed to complement its new receiver, providing a total THX package at a cost well within reach of most enthusiasts.

Experts agree THX has become the new standard for a multi-channel sound experience, both in movie theaters and in the home. Until the Onkyo breakthrough, however, the only choice was very expensive separate components.

The Onkyo TX-SV919THX receiver features 100 watts across the three front channels including the center and 50 watts for each of the surround channels. Discrete output stages for all channels insure that the higher performance demands of movie soundtracks—everything from whispers to weapons—will be flawlessly reproduced. For decoding, the TX-SV919THX offers a digital THX decoder, a digital Dolby Pro Logic decoder and eight digital soundfield modes. Handling these critical functions entirely in the digital domain delivers a level of accuracy in movie dialogue and special effects that a sound editor would envy, plus a variety of concert hall ambiances sure to satisfy any music lover’s sense of adventure.

Convenient operation via a multi-colored on-screen menu and programmable remote further distinguish the TX-SV919THX.

And, while there are enough inputs (10 audio/6 video) to run a small studio today, Onkyo has looked ahead to tomorrow as well: the TX-SV919THX is Dolby AC3 ready.

The new Onkyo THX-SYSTEM 1 is a THX Certified speaker system with a powered dual subwoofer system. Onkyo has designed this speaker system to satisfy not only the stringent requirements of THX, but also the most discriminating audio listeners. In order to achieve both of these goals, Onkyo needed to develop all new drivers for the system. The Bio-Hybrid woofer cone material that Onkyo created provides the lightness of paper and the stiffness of synthetic materials, while the BRaDD titanium tweeter design utilizes a unique method to eliminate resonance in the audible range, a common problem with metal domes. By utilizing these new exclusive materials, Onkyo has designed the THX-SYSTEM 1 to be as exceptional for music as they are for movies.

Home Theater has reached the next level, and Onkyo has shown the way with its new TX-SV919THX receiver. Hear it now at your local Onkyo dealer.

ONKYO USA CORPORATION
200 Williams Drive, Ramsey NJ 07446

THX is a registered trademark of Lucasfilm, Ltd. Dolby Pro Logic is a trademark of Dolby Laboratories Licensing Corporation.

Enter No. 24 on Reader Service Card
ry to imagine Bette Davis doing an imitation of Ruth Brown paying homage to Billie Holiday. Or how about Bobby Short after a hit of helium? That’s about the best description I can offer for the eerily stylized, achingly sorrowful voice of the 68-year-old balladeer Jimmy Scott. On the surface, this might seem to have the kitsch appeal of Yma Sumac. But Scott’s dramatic delivery and intuitive genius at behind-the-beat phrasing make him one of the most expressive and unique interpreters of American song since the late, great Miles Davis.

An androgynous, diminutive presence, Scott’s uncannily high-pitched, piercing voice is the result of a hormone disorder that has affected him since birth. After getting his big break in 1948 as the featured vocalist in Lionel Hampton’s band, he went on to score triumphs through the ’50s as a solo artist for the Roost, Savoy, and King labels. But frustration over broken promises and bad business dealings caused Scott to turn his back on the music industry for 20 years, during which time he worked as a shipping and receiving clerk at a Sheraton hotel in his home town of Cleveland. After hearing him sing at the funeral of his old friend Doc Pomus, Sire Records founder Seymour Stein helped instigate Scott’s comeback in 1992 with the highly acclaimed All of Me, produced by Tommy LiPuma. Since then, he has had an avalanche of press and has garnered the attention of celebrities such as directors Jonathan Demme and David Lynch, rock ’n’ rollers Bruce Springsteen and Lou Reed, and movie stars Alec Baldwin and Kim Basinger. Clearly, it’s Jimmy’s time once again.

Like its predecessor, the aptly named Dream is awash in a romantic late-night ambience that can sweep the listener away. Nearly every track on this Mitchell Froom production is done at the kind of excruciatingly slow tempos that Scott likes to emote over, and nobody does it better. Using his heart-wrenching tones, dramatic use of space, and exaggerated vibrato to great effect, he puts his eerie stamp on a collection of mournful, hard-luck tunes about lost love, including late 1930s’ chestnuts like “I’m Through With Love” and “It’s the Talk of the Town.” But he saves his most impassioned reading...
for Lucky Thompson’s earthy blues number, “You Never Miss the Water.”

Peyton Crossley’s sensitive brushwork helps set a dreamy tone throughout while bassist Ron Carter and pianist Junior Mance follow along in an elegant, understated fashion. Modern Jazz Quartet vibist Milt Jackson swings his way through the album’s lone upbeat number, “I Cried for You,” and saxophonist Claston Patience offers some smokey tenor work on the bittersweet Ellington/Hodges ballad, “It Shouldn’t Happen to a Dream.”

Jimmy Scott is an acquired taste, much like cognac and caviar. And equally classy.

Bill Milkowski

Last Day on Earth
John Cale and Bob Neuwirth
MCA MCAD-11037, 68:45

On the surface, Last Day on Earth appears to be an odd collaboration, but somehow this disparate pair pull things off. On what must be his first recording since the Velvet Underground reunion disc, Welshman John Cale contributes his signature vocals and viola along with keyboard textures, while guitarist and singer/songwriter Bob Neuwirth, an old cronie of Bob Dylan, has a rapier wit and a knack for improvising songs. Last Day was originally a theater piece by the two, adapted here as a record. Part spoken (with all the necessary Foley effects), part instrumental, and part song, it is not a linearly plotted piece. But the songs are surprisingly sprightly, often haunting, and fun. This makes Last Day an interesting piece of listening that defies easy answers, but it is a most enjoyable conundrum, too. I suspect that The Hitchhiker’s Guide to the Galaxy is a key influence.

Michael Tearson

The Mask & Mirror
Loreena McKennitt
WARNER BROS. 9 45420-2, 52:49

Loreena McKennitt’s music on her previous album, The Visit, was primarily Celtic with her harp playing the key ingredient. Here, she filters her Celtic base through the Spanish moors, with Spanish and Arabic influences keenly felt. Hers is a timeless sounding music, resonant of ages past, yet inventive and new. Oddly, the harp makes only a cameo appearance, but the richness of textures and strong mysterioso of McKennitt’s music more than compensates for this absence. This is a gorgeous album that continues to unfold in unexpected ways with repeated listenings.

Michael Tearson

Through the Hill
Andy Partridge & Harold Budd
GYROSCOPE/CAROLINE 6608, 54:31

In this meeting between effervescent wit and sardonic somberness, somberness wins. Harold Budd is one of the original purveyors of ambient music, while Andy Partridge is the guitar-playing singer/writer with XTC. Here, Partridge leaves his hook-laden melodies and dense production behind, instead bringing an austere minimalism to this music, with themes played out in repetitious, occasionally off-center cycles.

The sound is one of improvisation; two musicians stuck in a room, tape constantly rolling while they pluck and plink on percussion, pianos, and synthesizers until they finally hit on a pattern that holds more than momentary interest. It’s those moments that make it to disc. Many of the songs have the feel of études and studies in static sound fields. Budd is renowned for his spartan yet textured themes, but Through the Hill makes albums like his Plateaux of Mirrors sound baroque by comparison.

These artists have clearly found a communion, and if the music doesn’t give that up,
Last of The Independents

Pretenders
SIRE/WARNER BROS.
9 45572-2, 49:17

Those first two Pretenders records are the result of an incredible rock 'n' roll quartet that can never be captured again. How many of us need to hear the late James Honeyman Scott's incredible guitar solo on "Kid" or Chrissie Hynde's stark confessionality on "Message of Love" on a weekly basis? I do, but as long as Chrissie—one of the most important women in rock 'n' roll history—keeps making records under the identity of "Pretenders," it's really tough not to at least think about that great band.

On Last of The Independents, this temptation is even more prevalent; the three poems do. Budd read his poetry on his previous album, By the Dawn's Early Light (Opal/Warner Bros.) but this time the surreal and erotic imagery comes from Andy Partridge. It's as if he and Budd have shared the same life, and that link is revealed in this interim album. It's as if he and Budd have shared the same life, and that link is revealed in this interim album. It's as if he and Budd have shared the same life, and that link is revealed in this interim album.

Christie reunites with original drummer Martin Chambers, reforms the band as a quartet, and hires a Honeyman Scott sound-alike (Adam Seymour) who, on one song, even cops vital elements of Jimmy's solo from "Tattooed Love Boys" with rife precision. But on this tune, "Money Talk," the spirit of vintage Pretenders' guitar energy is re-united with Christie's signature angst. This hasn't happened in quite some time and in fact, it happens throughout the entire record, yielding the revelation that her "new" band deserves to be accepted as genuine heirs to that long-gone original one. And to hear Chrissie balladeering "When I hear my baby cry" on the beautiful "977"—a John Lennon-inspired plea against domestic violence—reminds you of her greatness.

On Last of The Independents, this temptation is even more prevalent; the three poems do. Budd read his poetry on his previous album, By the Dawn's Early Light (Opal/Warner Bros.) but this time the surreal and erotic imagery comes from Andy Partridge. It's as if he and Budd have shared the same life, and that link is revealed in this interim album. It's as if he and Budd have shared the same life, and that link is revealed in this interim album. It's as if he and Budd have shared the same life, and that link is revealed in this interim album.

David Byrne
LUAKA BOP/SIRE/WARNER BROS.
9 45558-2, 51:13

Darkly intimate, intelligent, lyrically enigmatic, quirky, and powerful, David Byrne's self-titled solo album works on you in two ways. Haunting confessionalism like "A Long Time Ago" and "Self-Made Man" subtly insinuate themselves on your subconscious like some David Lynch-ian dream sequence, while tension-filled, big-beat numbers like "Back In The Box" and "Angels" (a kind of '90s sequel to "Life During Wartime") or the irresistible soca-flavored "You & Eye" help shake your spine loose and guide your feet to the dance floor.

After flitting with a Latin big-band sound on Re-Mondo, Byrne has stripped things down to a basic rock formula, emphasizing his catchy songwriting rather than elaborate arrangements. Bassist Paul Socolow and drummer Todd Turkisher are the heart of this new outfit. They kick with authority on the N'awlins shuffle-funk number "Lilites of the Valley" and burn down the house on "Strange Ritual," a dramatic number full of quintessential Byrne-ish observations about "people in a remote village wearing digital watches" or "a skyscraper made out of abandoned car parts" or "an ambulance driver who wakes up in a Dairy Queen."

Byrne also launts some easier guitar chops on a few numbers, including his brutal Sonny Sharrock-ish skronk solo on "Nothing At All." He sings with a wry passion on the sparse closer, "Buck Naked," and even maintains a hint of twisted, tongue-in-cheek glee in the midst of the cloying McCartney-esque ditty "My Love is You."

This is far and away the best album that David Byrne has been associated with since Talking Heads' Speaking in Tongues.

Bill Milkowski

---

Cotton Is King
Cotton Matther
ELM RECORDS ELM 9212-2, 47:46

Perhaps it's the lyrical wit and Biblical sarcasm of singer/guitarist Robert Harrison (a former advanced theology student) that make Cotton Matther's mutated, smart-ass pop (with guitar hooks galore) so appealing. From the wild opener, "Lost My Motto," to the end, they combine the Beatles' melodic sensibilities with the urgency of XTC and vintage Squeeze. And they're from Austin, Texas, of all places. All British influences aside, "Cross the Rubicon" settles neatly into a Booker T. and the MGs guitar groove. "The End of the Line" borrows styles from rock 'n' roll's first decade, and the monstrous metal riff of "Miss Information" builds into a squally ending. Despite occasional weak spots (first single "Payday" could easily be a jingle for the candy bar), Cotton Is King contains all the right ingredients to be amongst 1994's strongest debuts.

Tom Ferguson

---

Kickin and Screamin: Allgood (A&M 31 454 0229 2, 39:44). This Georgia quintet represents two distinct audiences: Fans of southern rock who acknowledge them as contemporary torch carriers, and the "jam band" worshipping tie-dyed frat boys who consider icons like Blues Traveler frontman John Popper their gurus. On that often overlooked question of musicality, however, Allgood succeeds in tapping the vibe of Southern folklore with a sound that moves Highway 61 right through the live room at Muscle Shoals. This live EP is a good introduction.

M.B.

---

After the Rain: Jack Tempchin and The Seclusions (Night River Records, 38:20). Jack Tempchin penned some of the better, more country-flavored Eagles songs (among them "Peaceful Easy Feeling"). And now, with the Eagles reunion tour in full tow, he's released his debut record—with an excellent band—which shows off his fine tunemanship; sort of in the Eagles vein but grittier and better. (Night River Records, 103 North Highway 101, No. 1013, Encinitas, Cal. 92024).

M.B.

---

Sweethart's Dance: Pam Tillis (Arista 18758-2, 32:57). A strong set, possibly Tillis' best yet, with sure-handed production of 10 excellent songs. Pam had a hand in writing only three of them, but all—especially the Tex-Mex flavored "Mi Vida Loca"—are aces. Terrific cover of Jackie De Shannon's "When You Walk in the Room."

M.T.
No Words, No Borders

Sampler '94
Windham Hill Records

The greatly anticipated new release in Windham Hill's yearly sampler series, Sampler '94 features the strongest musical program to date; balancing a lineup of emerging newcomers with some of the label's best selling, most beloved favorites.

Piano Sampler II
Windham Hill Records

The follow-up to one of Windham Hill's most popular and timeless compilations, Piano Sampler II is an expressive collection of original solo pieces featuring 14 of the genre's leading contemporary pianists. Included in this new volume are brand new compositions by Danny Wright, Liz Story, Oystein Sevåg, and a diverse cast of modern instrumental masters.

Nightnoise
Shadow of Time

Steeped in traditional Irish roots, this Celtic quartet counts Enya and Clannad among its growing legend of loyal followers. Shadow of Time passionately traces a diverse musical landscape with 12 new beautifully performed songs. Featuring Triona Ni Dhonhaill, Micheal O Domhnaill, Brian Dunning and Johnny Cunningham.

Jim Brickman
No Words

One person, one piano. Award-winning composer Jim Brickman makes his Windham Hill debut with an album of memorable, romantic melodies. They may have "No Words," but his lyrical pieces evoke intimate feelings and romantic images.

To order Direct, call J & R Music World 1-800-345-8502
pianist Fred Hersch released his *Dancing in the Dark* album (Chesky) in 1993, and it went on to earn a Grammy nomination. In that year he also released *Red Square Blue* (Angel/EMI), dubbed “jazz impressions of Russian composers.”

This year, to date, Hersch’s name and talents (which also include producer, composer, sideman, and benefit organizer) are associated with six releases; three benefit albums, one as a sideman, and two—*The Fred Hersch Trio Plays* and *Live at Maybeck*—as leader.

Such output would have us believe Hersch is a man on a mission, and he is. As an increasingly important voice in AIDS awareness (he was diagnosed HIV positive a few years ago) and gay issues, he’s an iconoclast relative to the heterosexual machismo of the jazz community. And being so out has, no doubt, fueled his creativity. But he’s also an artist with lots of brilliant music to share, enough to warrant abundant releases.

*Live at Maybeck*, Concord’s 31st in their ongoing solo piano series, is impressive from a number of standpoints. Hersch displays articulate prowess throughout, whether interpreting one of several popular standards here (notably Thelonious Monk’s “In Walked Bud”) or delivering his own introspective take on Herbie Hancock with “Sarabande.”

Meanwhile, *The Fred Hersch Trio Plays* is a superbly recorded disc that houses a series of quite divergent but always pleasing trio works. All but one of the dozen pieces is an interpretation of a work by a great jazz composer. Hersch, diligent, intelligent, and with consistent sensitivity and modernism, entertains while moving deftly and subtly through Miles Davis, Monk, Hancock, Ellington, Coltrane, Sonny Rollins, and others. The lone Hersch original, “Evanessence,” is strategically placed in the middle of the 12-pack.

Gliding easily over and through the different time signatures in each of these pieces, Hersch is capable of stopping, starting, and pausing by turns, without missing a beat. He remains delicate in his approach, but is unafraid to challenge himself or his bandmates.

Bassist Drew Gress is always where he should be in supporting Hersch, but it’s the pianist’s excellent rapport with drummer Tom Rainey that is most noticeable. The two seem to viscerally know where the other is, particularly during the album’s many moments of quiet. And Hersch’s ability to make his piano...
breathe in an almost Debussy-like manner is matched by Rainey’s tender embrace of the cymbals.

Perhaps the only shortcoming here may be in the programming and sequencing of selections, one too many ballads. But it’s really difficult to find any heavy fault with Hersch and this fine recording.

Jon W. Poses

**Turn On Your Love Light**

**Bobby Bland**

MCA MCAD2-10957, 2:16:35

Bobby “Blue” Bland has long had two strikes against him in winning over new blues fans; he doesn’t play guitar, and his urbane music is poles apart from the more popular Delta and Chicago blues styles. Yet, as an extraordinary singer with stature among his peers, and with record sales to back him up, Bland is a giant.

This second compilation of his ’60s Duke sides has more hits than the first (like the great gospel-flavored “You’re Worth It All” and others). His “Farther Up The Road” inspired Eric Clapton, while the horn charts from “Turn On Your Love Light” (yes, Bland did it first) were long a staple for dozens of lounge acts. Credit Joe Scott for timeless arrangements that threw the thundering momentum of a small orchestra behind this extraordinary singer.

If only today’s bands would study these sides with the same devotion brought to analyzing the latest guitar solo. They’d learn that musicians can punch out polished arrangements with drill-team precision without sacrificing a performance’s passion and spontaneity. All you need is a vocalist in the same league as Bobby Bland.

Roy Greenberg

**Up and Down**

**Milcho Leviev & Dave Holland**

MA RECORDINGS M002A, 66:16

These two veteran players are at turns challenging and comfortable. Dave Holland is the most gifted bassist of his generation, while Milcho Leviev is a Bulgarian-born journeyman pianist who’s been in this country since the early 1970s, playing with Don Ellis. Leviev brings a classical sense of phrasing to his jazz improvisations that often lends a chamber mood even when he’s crashing the keys or pounding out Charlie Parker’s “Billie’s Bounce.” The duo mostly perform self-penned tunes, such as Holland’s raucous “Jumpin’ In,” with Leviev moving from Cecil Taylor-ish sweeps to a splash of ragtime. But they also show a lyrical side, dipping into the underrated songbook of John Abercrombie.

John Dilberto

**Lunar Crush**

**David Fiuczynski John Medeski**

GRAMAVISION R2 79498, 57:02

Downtown N.Y.C. guitar hero Dave “Fuze” Fiuczynski and keyboardist John Medeski possess a more than ample supply of chops. As served up here, they’re covered for the most part by a messy but delicious layer of sonic cheese. But, as the album’s opener, “Vog,” bears out, this raucous outing is more satisfying—and more substantial—than any manner of store-bought junk food. With Fuze’s guitar alternating between angular precision and wobbly fuzz, Medeski skips from clavinet through power organ to Fender-Rhodes; the effect is equal parts of Edgar Winter and ’80s Miles Davis. Though vocals by Michelle Johnson and Gloria Tropp nudge the project toward art-rock pretense, the two principals bear more earthy inspirations (try “Slow Blues for Fuze’s Mama” as proof). As a result, the not inconsiderable pyrotechnics achieve a distinct brand of postmodern funk.

Larry Blumenfeld
Mistérios
Wallace Roney
WARNER BROS. 9 45641-2, 59:10

Trumpeter Wallace Roney will never fully sidestep the shadow of Miles Davis, yet his own bristling tone and sense of harmonic invention nonetheless assure that his own horn shines. On his debut for Warner Bros., Roney enjoys some Miles-like trappings—most obviously in the form of quirkily lush orchestral arrangements by a man named Gil (Goldstein, not Evans) and in the presence of producer Teo Macero. Surely, Roney shares more than just a lonely, piercing upper register with Davis: He employs notable restraint to create well-placed silences. Urged along here by a fine group featuring pianist Geri Allen and saxophonist Antoine Roney (Wallace's brother), Roney crafts a consistent structure over a wide range of compositions by people like Jaco Pastorius, Egberto Gismonti, Milton Nascimento, and others. He single-handedly revives John Lennon and Paul McCartney's "Michelle" from tired inconsequence, and rescues Dolly Parton's "I Will Always Love You" from Whitney Houston bombast.

Larry Blumenfeld

Catch Up With The Blues
Johnny Copeland
VERVE 314 521 239-2, 54:57

It's simply unfair to rival bluesmen. No one who plays guitar as well as Johnny Copeland should also be that wonderful a singer. Match Houston's favorite son with top-notch production, as on his latest Verve CD, and few contemporaries can touch him. Catch Up With The Blues might be his best album in a career distinguished by remarkable consistency. The songs are varied and strong, Copeland is in typically fine form, and he trades licks with fellow Gulf Coast guitarists Lonnie Brooks, Clarence “Gatemouth” Brown, and Joe Hughes. Although modern in outlook, Catch Up With The Blues is blues without apology, built on the horn-driven shuffles at the heart of the Texas sound. Yet Copeland is equally at home with "Every Dog's Got His..."
Here is the text from the image:

Low Price Guarantee  THIS IS NOT A MISPRINT!
31 Day No Lemon Guarantee
Full Manufacturers Warranty
No Grey Market or Bait and Switch
12 State-of-the-Art Soundrooms

LIMITED QUANTITIES

Hughes AK500 SRS Orig. $199 NOW $69
Hughes AK100 SRS Orig. $478 NOW $229

ACOUSTIC RESEARCH

M1 Orig. $279
M2 Orig. $299
M4.5 Orig. $499

Pinnacle CLOSEOUTS

PN2+ 2-Way bookshelf $79
PN5+ 2-Way bookshelf $99
PNSub Compact Subwoofer $159

INVENTORY LIQUIDATION

Terk Pi AF925
AM/FM amplified stereo antenna
$79

LIMITED QUANTITIES

Hafler MSE88
4-Channel Car Power Amp
Now $39

Below Original Dealer Cost

Technics RS-6010 Digital Compact Cassette Player
$199

Standard Audio Restoration System
- helps restore sparkle and clarity and add warm and natural musicality to digitally recorded material, old LPs and tapes.

BEE ARS Audio Restoration System
- helps restore sparkle and clarity and add warm and natural musicality to digitally recorded material, old LPs and tapes.

Low Price Guarantee  THIS IS NOT A MISPRINT!
31 Day No Lemon Guarantee
Full Manufacturers Warranty
No Grey Market or Bait and Switch
12 State-of-the-Art Soundrooms

ONE-OF-A-KIND  DEMO

Altec Lansing ALC111
120W/ch Reference amp
$499

Bazooka 1102 10" bass tube w/mesh grille
$49

Boston 780LF 8" subwoofer FOR THE CAR
$79

Carver MZ030 15W x 2 cap power amplifier
$69

Harrison MS120 6-Channel bridgable car amplifier
$229

Phase Linear PL1400 4" car speakers
$37

Phase Linear PL2650 6.5" car speakers
$49

Cerwin Vega SW12 12" passive home sub
$169

Celestion 3 Il Compact bookshelf speaker
$198

Jamo Full Line Of Speakers Available
CALL

Philips DAF1000 120W/ch Reference amp
$999

Philips AV1001 Surround sound preamp
$999

Philips CDC935 5-Disc remote CD changer
$479

Philips AV100 3-Disc remote CD changer
$219

Sherwood RV6010R Surround receiver
$249

JVC MX55M Multi-disc minisystem w/remote
$199

JBL PS120 100W 12" powered home sub
$399

JVC XLZ1050 Reference CD player w/remote
$849

Brand Name Turntable w/phono cartridge
$299

Audio Control 2-Way 6.5" 2-Way bookshelf
$159

Advent Graduate 2-Way 6.5" bookshelf
$99

Audio Control 3-Way tower dual 8" woofers
$159

HiFi Research P4M 5-Way tower dual 10" woofers
$299

Kenwood DCM9000 5-Disc remote CD changer
$499

Polk Audio TSi1000 5.1 surround sound system
$299

Sonatal Full Line Of Speakers Available
CALL

WHARFORD Full Line Of Speakers Available
CALL

JBL 4620 2-Way 6.5" bookshelf
$99

JBL PN2+ 2-Way bookshelf
$79

JBL PN2+ 2-Way bookshelf
$99

JBL PN2+ Subwoofer
$159

JBL PN2+ Subwoofer
$159

JBL PN2+ Subwoofer
$159

To Order By Phone:
CALL 800-542-7283
To Order By Fax:
CALL 201-838-2516
Or send check, cashiers check or money order

Mail Order Calls
Meadtown Shopping Center
RTE 23 • Kinnelon NJ 07405
CALL 201-539-3444
Mon-Fri 9-9 Sat-6

Mail Order Hours
Mon-Fri 9-9 Sat-9-6

The Original

We Accept

For Order Inquiry
1-800-233-4010
For Return or Claims
Monday-Friday 9-5

Enter No. 18 on Reader Service Card
Day,” a soul blues with the Memphis Horns recalling the heyday of Stax. All told, it’s state-of-the-art Texas blues that seems shorter than its running time even after a dozen plays.

Roy Greenberg

In the Evening Out There: Paul Bley/Gary Peacock/Tony Oxley/John Surman (ECM 78118-21488-2, 56:19). This album is deceptive since these four intuitive improvisors appear together on only one of the tracks. The rest are solos and duos that sound like they could be outtakes from a previous session, which, given the 1991 recording date, I suspect they were. There are some interesting moments but a lack of vitality to these leftovers. J.D.

My Guitar and Me: Hubert Sumlin (Evidence ECD 26045-2, 48:28). This 1975 album is deceptive since these four intuitions to this recording.

In the Evening Out There: Paul Bley/Gary Peacock/Tony Oxley/John Surman (ECM 78118-21488-2, 56:19). This album is deceptive since these four intuitive improvisors appear together on only one of the tracks. The rest are solos and duos that sound like they could be outtakes from a previous session, which, given the 1991 recording date, I suspect they were. There are some interesting moments but a lack of vitality to these leftovers.

J.D.

Storage Solutions

CD, Audio and Video Storage
- Fully Assembled!
- Made in U.S.A.
- 100% Solid Oak!
- Smoked Glass Doors
- 30 Day Money Back Guarantee!
- Adjustable Shelves
- No Hidden Costs

Just One Low Price!
Call or write for a free color brochure
AGM Woodworking
170 Capitolio Way #3
San Luis Obispo, Ca. 93401
(805) 544-8668
1-800-858-9005

The Ultimate STORAGE CABINET
306 CDs
or any combination of CD, VHS, Cassette, etc.
- Featuring our patented ALLSTOP STORAGE SYSTEM, no slide, no plastic mold, no wasted space. Fully extension drawer slides. From high quality oak, veneers and hardwood. Available in Light, Medium, Dark Oak Stain (5250) & Black (5230) - Plus shipping and handling.

The Cube by Lorenz Design
306 CDs or any combination of CD, VHS, Cassette, etc.
- Featuring our patented ALLSTOP STORAGE SYSTEM, no slide, no plastic mold, no wasted space. Fully extension drawer slides, from high quality oak, veneers and hardwood. Available in Light, Medium, Dark Oak Stain (5250) & Black (5230) - Plus shipping and handling.

To order or for free brochure
800-933-0403
Lorenz Design, Inc. • P.O. Box 277
209 Parkway Ave. H • Lanesboro, MN 55949
FAX 507-467-2468

STORADISC® - See why CD Review picked our Library Series as their "top choice". Fine-furniture quality in a variety of finishes and sizes. Call or write DAVIDSON-WHITEHALL, Stores

CD Storage Racks
- Turn Table Foundations
- Speaker Stands
- Big Screen Pedestals
- TV Recorder Tables
- Amp Stands
- Projector Tables
- Monitor Swivels
- Wall Brackets
- Tube Fita Kits
- Audio Dusters
- Custom Designs

Available

The Eye-So Stack Rack System

Call us today for your local dealer and a copy of our detailed Newsletter with product photos and specifications...

We Manufacture:
- Audio Racks
- Laser Disc Storage
- Audio Cables
- Projector Tables
- Monitor Swivels
- Wall Brackets
- Audio Dusters
- Tube Fita Kits
- Custom Designs

Available

1-800-933-0403
FAX 644-0434

BILLY BAGS
AUDIO/VIDEO SUPPORT DESIGN

Our component rack systems are the result of serious attention to detail and pride in the art of design and craftsmanship.

"We will even design a piece to your exact specifications!" Our custom design department is fast and affordable.

Audio Racks
$5000 $2300 and others.
Comes in 4 colors to choose from.

The I-Beam Component Center
T.V. Swivel Available.

The Audio Center
1-3 Bays Any Height Adjustable Glass Component Shelving.

Media-Rax
- All Sizes (adjustable)

Billy Bags
4147 TRANSPORT ST.
VENTURA, CA 93003
(805) 644-2185
FAX 644-0434
Disappointed with CD storage racks that are unattractive and poorly made? La Scala CD Storage System is your answer. La Scala designers have produced a storage system that is:

- wonderfully attractive
- uses an economy of space
- provides appealing visible access to each compact disc
- constructed of the highest quality, black aluminum, solid, heavy and strong.
- A conversation piece for your home music center.

Modular sections can be added on to increase capacity.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFS-11</td>
<td>Free Standing Unit 143 CDs</td>
<td>$159.98</td>
<td></td>
</tr>
<tr>
<td>LTS-4</td>
<td>Table Top - Steel Base 52 CDs</td>
<td>$59.98</td>
<td></td>
</tr>
<tr>
<td>LTF-4</td>
<td>Table Top Wood Base 52 CDs</td>
<td>$59.98</td>
<td></td>
</tr>
</tbody>
</table>

Ease assembly required.

FREE DELIVERY IN 48 STATES
30-DAY UNCONDITIONAL GUARANTEE

Call today 1-800-943-4499 or Fax Order (516)-759-3497

AMEX, VISA, MASTERCARD

Send check or MO to

LA SCALA DESIGN, INC.
33 Village Square
Glen Cove, NY 11542

P.S.: Not available in stores.

Soricz Systems include...

Video, Cassette, LP, Laserdisc and Component Storage Units.

- Our A300 Model stores 300 CD's.
- Irreproachably crafted in these Premium Solid Hardwoods: Oak, Walnut, Teak or Cherry.
- Adjustable Shelves store any combination of CD's, Videos & Cassettes - all in one cabinet.
- Adjustable Solid Brass Bookends keep Discs & Tapes upright and in place.
- Cabinets can be stacked, wall mounted or left free standing.
- Optional Wood or Glass Doors are available.
- Enclosed Back provides dust protection.
- Compact size: 39.5"H x 23.5"W x 71"D. Cabinet comes assembled.

Call: 1-800-432-8005
Fax: 1-201-667-8688

For FREE Color Literature & Prices on our Full Line of Quality Products.
MOVING? Please give us 8 weeks advance notice. Attach label with your old address, and write in new address below.

RENEWING? Check box below and attach label with corrections marked, if any.

SUBSCRIBING? Check box and fill in coupon. For gift subscriptions attach a separate sheet.

Send Audio for 1 year at $24.00

☐ New subscription  ☐ Renewal
☐ Payment enclosed  ☐ Bill me

Canadian orders add $8 per year. Foreign orders add $8 per year.

NAME ________________________________
ADDRESS ________________________________
CITY ________________________________ STATE ________________________________ ZIP ________

1(303) 447-9330

AUDIO
P.O. Box 52548
BOULDER, CO 80322

We don’t sell perfect systems.
After 15 years, we’ve learned
no perfect system exists. It has to be built-
to your specifications, within your budget.
To get started, call us today...
and ask us how.

REFERENCES
517-1700
310-517-1752 fax
18214 DALTON AVENUE, DEPT A
GARDENA, CA 90248

But have you heard them on the Velodynes?
Velodyne's DF661
The Distortion-Free speaker
that lets everything else tell the
truth. In our soundroom now.

Conrad Johnson
Krell
Treasurer
Denon

sound factor
2936 Wilshire BL Santa Monica, CA 90403 (310) 264-5457

But have you heard them on the Velodynes?
Velodyne's DF661
The Distortion-Free speaker
that lets everything else tell the
truth. In our soundroom now.

Krell
Conrad-Johnson
Yamaha

Illinois

Reel to Real Designs
Authorized Dealer:
• CODA
• Counterpoint
• Cary
• Sumo
• Soundcraftsmen
• Thorens
• Parasound
• Fogate
• Simply Physics
• Sumiko
• Quicksilver
• Room Tunes

New FOCUS Speaker
800-283-4644
call for literature
Visit our SPEAKER FACTORY SHOWROOM at 3021 Sangamon Ave., Springfield, IL 62702

MARK LEVINSON
ROTEL
Pioneer Elite
Lexicon

KANSAS

Audiolport Ltd.
Sales • Service • Information • Installations
7329 West 97th Street (97th & Metcalf) (913) 341-2222

Visit these specialty retailers for professional consultation
MICHIGAN

“But have you heard them on the Velodynes?”

Velodyne’s DF661
The Distortion-Free speaker that lets everything else tell the truth. In our showroom now:
- Bang & Olufsen
- Carver
- Denon
- Elite by Pioneer
- Hermon Kardon
- Lexicon
- Mark Levinson
- Parasound
- Vidikron
- Yamaha

1560 S. Woodward Ave.
Birmingham, MI 48009
(810) 642-9777

MINNESOTA

1 (800) 229-0644
RECORD PLAYER NEEDLES AND CARTRIDGES. World’s Largest Selection and Lowest Price!!

M-12.50
S-12.50
$124.99

Proud to promote Audio Technica, Audioquest, Bang & Olufsen, Goldring, Grado, Ortofon, Shure, Signet, Stanton, Nitty Gritty, Last, Discwasher and more.

JERRY RASKIN
Needle Doctor

114 th Ave SE
Minneapolis, MN 55414
(612) 378-0543 FAX: (612) 378-9024

NEW YORK

“But have you heard them on the Velodynes?”

Velodyne’s DF661
The Distortion-Free speaker that lets everything else tell the truth. In our showroom now:
- Audio Research
- Adam
- B&K
- Bang & Olufsen
- Elite by Pioneer
- Braviss
- Lexicon
- Proton Video
- Sharpevision
- Sony XBR
- Theta Digital

3604 Main St. Amherst, N.Y. 14226 (716) 837-1557

NEW JERSEY

Do expressions like THX, Dolby Pro Logic, DSP, Laser Disc, In-Wall, multi-zone, tweeter, and sub-woofer leave you confused?

We at Home Theatre Systems can help you!

From a single center channel to a multi-room multi-zone system, H.T.S. will provide the best advice and the best price to perfectly fit your needs.

Our professionals have installed home theater systems for some of the most recognized names in the music business. Our consultants will be more than happy to help you through the maze of components so you can get the system that does what you want it to do at the price you want to pay.

We carry most major brands of audio and video speaker, receiver, projector, T.V., VCR, laser disc, CD-player, pre-amp, power-amp, cassette deck, satellite dish and accessory. Even hard to find brands that most dealers don’t carry!

For Example The New VMPS FF-1
State of the Art Audiophile Surround Sound Speakers with
- 2-12 inch woofers
- 2-5 1/4 inch midranges
- 2-1 inch tweeters
- Frequency Response of 17-45 Hz
- Ribbon Array
- Reviewed in June issue of “Audio” magazine

50% OFF
EXTENDED WARRANTIES
COVERED BY OVER 90 SERVICE CENTERS NATIONWIDE

HOME THEATRE SYSTEMS
44 ROUTE 23 N., LITTLE FALLS, NJ 07424
1-800-978-7768

For Information Call 201-890-5999
For Fax Transmissions Call 201-890-9142

NEW JERSEY

A Banquet For Your Eyes & Ears

Acrotrc • Air Tangent
Analog Protections • Air Tight
Apex • Arcam • Arcrac • Athena
Atlantic Technologies • Audio Prism
Audiodlab • Audiostatic • Basis • Benz
Bitwise • Bright Star • Cardas • Chario
Chefsky • Clarify Audio • Clarify Recordings
Creek • CWD • Day Sequerra • Delos
Dorain • EAD • EKSC • Electron Kinetics
Eminent Technology • Ensemble • Epos
First Sound • Fosgate • Golden String
Goldmund • Gilding • Grado
Harman Video • Harmonia • Mundi
Kinergetics • Klyne • Last • Mapleshade
Merrill • Micromega • Mod Squad
Mogami • Moch • Nestorovic • Neutrik
Nimus • Opus 3 • Panamak • Paragon
Power Wedge • Presence Audio
Pro Ac • Proprius • QED • Rega
Reference Recordings • Revolver
Rockustics • Roksan • RoomTune
Sheffield Labs • Sims • Sound Anchors
Stax • System Line • Tara Labs
Target • Tice Audio • Water Lily
WBT • Wheaton • & More...

Savor these pleasures...
Call SAVANT.

SAVANT AUDIO

Custom Design & Installation
Consultation • Interior Design
800 628 0627 • 609 799 9664
FAX: 609 799 8480

Serving The World

NEW YORK

SHOP US LAST

WE WILL BEAT ANY PRICE

ADS • BOSE • CARVER • DENON •
INFINITY • KENWOOD • MTX • NILES
NHT • ONKYO • PIONEER • SONY ES
SONANCE • YAMAHA

AUTHORIZED DEALERS

The Sound Approach
3637 Jericho Tpke., Commack, NY 11725
800-368-2344
"But have you heard them on the Velodynes?"

**Velodyne's DF661**

The Distortion-Free speaker that lets everything else tell the truth. In our soundroom now.

- Yamaha
- McIntosh
- Bang & Olufsen
- Adcom
- Marantz
- Klipsch
- PS Audio
- Sonic Frontiers
- Ayre

**NICHOLSON'S STEREO**

115 19th Avenue South
Nashville, TN 37203
(615) 227-4312

**THE BEST IN HOME GROWN AUDIO.**

Hi-Fi Farm

**FEATURING:**

Quad, Alon, OCM, Magnum, Woodside, Roksan, Spendor, B&K, Kimber, VMPS, Cardas, Creek, Epos, Micro-Mega, Fosgate, and many more.

Also featuring high end used equipment, fully guaranteed!

2039 Electric Rd., Roanoke, VA 24018

Call for information
1-703-772-4434

Nationwide Toll Free:
1-800-752-4018

All major credit cards accepted

**HOME ENTERTAINMENT, INC.**

Where Music & Video Come Alive.

**5313 Kirby at Bissonnet**

- Sony Video
- Sony Audio ES/DT
- Yamaha
- Nakamichi
- Adcom
- Mitsubishi

**2039 Electric Rd., Roanoke, VA 24018**

(713) 756-4317

(713) 227-1013

(713) 230-0000

(214) 893-7717

(214) 893-8185

**WE DONT WASTE WIVIERS**

**SOUND INVESTMENTS**

59 South University Avenue
Margontown, VT 05650
(304) 296-HIFI (4434)
TIPS FOR MAIL ORDER PURCHASERS

It is impossible for us to verify all of the claims of advertisers, including product availability and existence of warranties. Therefore, the following information is provided for your protection.

1. Confirm price and merchandise information with the seller, including brand, model, color or finish, accessories and rebates included in the price.

2. Understand the seller's return and refund-policy, including the allowable return period, who pays the postage for returned merchandise, and whether there is any 'restocking' charge.

3. Understand the product's warranty. Is there a manufacturer's warranty, and if so, is it from a U.S. or foreign manufacturer? Note that many manufacturers assert that, even if the product comes with a U.S. manufacturers warranty card, if you purchase from an unauthorized dealer, you are not covered by the manufacturer's warranty. If in doubt, contact the manufacturer directly. In addition to, or instead of, the manufacturer's warranty, the seller may offer its own warranty. In either case, what is covered by warranty, how long is the warranty period, where will the product be serviced, what do you have to do, and will the product be repaired or replaced? You may want to receive a copy of the written warranty before placing your order.

4. Keep a copy of all transactions, including cancelled checks, receipts and correspondence. For phone orders, make a note of the delivery date and salesperson's name.

5. If the merchandise is not shipped within the promised time or if no time was promised, 30 days of receipt of the order, you generally have the right to cancel the order and get a refund.

6. Merchandise substitution without your express prior consent is not allowed.

7. If you have a problem with your order or the merchandise, write a letter to the seller with all the pertinent information and keep a copy.

8. If you are unable to obtain satisfaction from the seller, contact the consumer protection agency in the seller's state or your local Post Office.

If, after following the above guidelines, you experience a problem with a mail order advertiser that you are unable to resolve, please let us know. Write to the Associate Publisher of AUDIO Magazine, Tony Catalano. Be sure to include copies of all correspondence.


Carolina Audio & Video

Audio Cables & More

Don't pay exorbitant prices for top quality. We have years of experience in wire manufacturing and have simulated the high priced brands. High priced equivalents as low as 74%! We demystify wire technology, send for explanation literature which also includes all our audio products price list or call our literature request. (800) 321-2108. (24 hrs/day. Fax (609) 426-1832. L.A. International, Deport A. 317 Provine Street, Cherry Hill, NJ 08034.

Audio Solutions

Large inventory clearance on high end audio equipment 50% off regular retail. Call for listing 704-899-2623 or Fax 704-889-4540.

Audio Solutions is Atlanta's Hi-End source for Audio Research, Theta, McCormack, Wire World, Cary Audio, Vandersteen, CODA, Straightwire, Acusus, Snell, Sumiko, SOTA, NHT, Kimber Kable, Magnum Dynalab, Audible Illusions, Rotel, VPI, Paradigm, Dunlavy, Sony ES, Sony Video. 5576 Chambless Dunwoody Rd. (404) 804-8977.

Greencorp USA, Inc.

Premium quality cassettes at wholesale prices

Made in Australia

Call 1-800-972-0707

Speaker Catalog

Parts Express is a full-line distributor of electronic parts and accessories geared toward the consumer electronics industry and the technical hobbyist. We stock an extensive line of speaker drivers and accessories for home and car. Send for your FREE 188 page catalog today.

Speaker Catalog

Parts Express

249 N. Brand #701, Glendale, CA 91203

818/242-4535 or Fax 818/242-4415

Audio Cables & More

Don't pay exorbitant prices for top quality. We have years of experience in wire manufacturing and have simulated the high priced brands. High priced equivalents as low as 74%! We demystify wire technology, send for explanation literature which also includes all our audio products price list or call our literature request. (800) 321-2108. 24 hrs/day. Fax (609) 426-1832. L.A. International, Dept A. 317 Provine Street, Cherry Hill, NJ 08034.

Audio Solutions

Large inventory clearance on high end audio equipment 50% off regular retail. Call for listing 704-899-2623 or Fax 704-889-4540.

Audio Solutions is Atlanta's Hi-End source for Audio Research, Theta, McCormack, Wire World, Cary Audio, Vandersteen, CODA, Straightwire, Acusus, Snell, Sumiko, SOTA, NHT, Kimber Kable, Magnum Dynalab, Audible Illusions, Rotel, VPI, Paradigm, Dunlavy, Sony ES, Sony Video. 5576 Chambless Dunwoody Rd. (404) 804-8977.

Greencorp USA, Inc.

Premium quality cassettes at wholesale prices

Made in Australia

Call 1-800-972-0707

SOLEN SPEAKER COMPONENTS

CROSSOVER COMPONENTS

FAST CAPACITORS
Westinghouse Polypropylene High-Frequency
Value from 18-pF to 330-nF
Voltage Tolerance: 20% - 10% AC

Solen Inductors
To 2.5 kHz, High-Frequency, Air Core
Values from 0.2-pH to 0.01 mH
Wire Sizes from #28 AWG to #12 AWG

HEPTALITE INDUCTORS
Welded, String-Laminate, High-Current
Values from 10 mH to 50 mH
Wire Sizes from #16 AWG to #12 AWG

LOUDSPEAKER SALE! Acoustat 3300-$700; Acoustat 2.2-$650; Acoustat 1.1-$500; Apogee Center-850; B&W 640-$900; Boston Acoustics T130-$450; Canton Forum 60-$275; Canton Karat 920-$500; Celestion 100-$600; DCM Time Window 3-$700; Energy Ref. Con. 22-$600; Genesis 3-$2500; JBL L55-$550; Klipsch SW10-$500; Linn Isobaric-615; Infinity Ref. 6-$2450; Infinity Vid. SW10-$500; Linn isobaric -52150; infinity Ref. 6-$5550; 22-5600; Genesis 3-52500; JBL LX55-$550; Klipsch

REPAIR FOAM ROT FOR YOURSELF!
SAT will save you hundreds of dollars! All sizes including AR, Advent, BUSE, JBL Surrounds. Adhesive & instructions $27.95/pr BOSE 901's 567 95/pr (Ind Surroun, sizes including AR. Advent. BOSE. JBL. Fonum 604275; Canton Karat 920-5500; Celestion B&W 640-5900; Boston Acoustics T1030-$450; Canton 2.2-5650; Acoustat 1.1-$600; Apogee Center-850; B&W 640-$900; Boston Acoustics T130-$450; Canton Forum 60-$275; Canton Karat 920-$500; Celestion 100-$600; DCM Time Window 3-$700; Energy Ref. Con. 22-$600; Genesis 3-$2500; JBL L55-$550; Klipsch SW10-$500; Linn Isobaric-615; Infinity Ref. 6-$2450; Infinity Vid. SW10-$500; Linn isobaric -52150; infinity Ref. 6-$5550; 22-5600; Genesis 3-52500; JBL LX55-$550; Klipsch

TRUE SUBWOOFER

With phenomenal true deep bass extending below 20Hz with low distortion at a very affordable price.

The HRSW10s will extend the best of your stereo or video system for that "air shaking all around you" effect.

Here's what the experts are saying:

"Once you have heard what they can add to your system, you won't want to part with them. Absolutely recommended." — Gerald D. Butt, Sensible Sound, Issue No. 48, Fall 1993

"It's a room rocking 1250 dollar subwoofer, and it's very impressive. No crossover is needed as it's a mono channel. It certainly could be used as a center channel. I would think it would do a good job in a 3-way setup. I would also recommend it as an addition to a very good 2-way system in a stereo setting. I would recommend it to anyone who is looking for a mono subwoofer. It's a very impressive unit." — Dick Olsher, Stereo Review, Vol. 24 No. 3, April 1993

"If you really want to rock and roll, you need a subwoofer. The HRSW10 is a great choice. It's a very solid performer and will add a lot of fun to your system." — Don Keeler, Audio/Video

"Very effective subwoofer we have tested - Best Buy" — Julian Hirsch, Stereo Review, Fall 1993

"Excellent extension at low levels, extension below 20 Hz is very smooth and clean. This is a very good subwoofer for the money." — Harvey Levy, Audio, Vol. 16 No. 6, 1993

Send for complete Information and critics' review reprints.

HSU RESEARCH HRSW10

LOYDSPEAKERS

NEW 1994 CATALOG

VMPS AUDIO PRODUCTS

The VMPS Tower II Special Edition, the deluxe version of an Audio Magazine "Best Buy" system, is now available with exclusive handbuilt, phase-plugged woven carbon fiber "12" woofers, the finest dynamic drivers extant.

These high-tech cones are also now standard in our flagship FF-1 Focused Field Array ($8500-$12,000), four of which made up the VMPS 1994 WCES Surround Sound display. After auditioning every multichannel/Home Theater display at the Show, the editor of Widescreen Review judged the VMPS room best, and by a wide margin. Call or write for copies of the full editorial, or for brochures and test reports on all VMPS systems including our four Subwoofers ($289-$549ea), the $50826 and Dipole Surround A/V monitors ($289-$343ea). QS Series bookshelf systems, and more. Kit versions of most systems are available and prices include free shipping in 48 states.

A & S SPEAKERS Imports the world's finest speaker components, crossovers, & kits: Dynaudio, Scan Speak, VIFA, Cerelac, Focal, Morel, MB Electronics, Peerless, Polydias, SEAS, LPG, Eton, Versa-Tronics, VMPS systems & kits. See literature. 3170 23rd Street, San Francisco, CA 94110. (415) 641-4573; Fax (415) 648-5306.
LOUDSPEAKERS

SRD is dedicated to designing & building high performance, high quality speakers at affordable prices. We have a complete line of Audio Video speaker systems. We sell factory direct only! Speakers starting at $275/pair. 30 day trial period & 5yr warranty. We offer Pioneer products. Call for brochure & pricing. SRD SPEAKERS, Houston, TX. 1-800-353-9899. Visa/MC/AMEX.

DYN&AUDIO SPEAKER KITS

DISSCOVER THE SUPERIOR SOUNQ QUALITY OF 1994 DYN&AUDIO SPEAKER KITS. Catalog $2.00 (Refunded). ADVANCED AKUSTIC #7627 Woodside • Stockton • California • 95207. (664) 477-5045.

RECORDS


DYN&NOUS AUDIO SPEAKER KITS

PreSERVE + MAINTAIN + RESTORE " LP:78RPM-4CH • Picking • Stanton • Shure • Nitty Gritty • Vacuum Record Cleaners from $99.95 • Special Brushes & Fluids • 3-Speed Turntables • Signal Processors • Discounts • Free Catalog! KAB Electro-Acoustics, P.O. Box 25922, Plainfield, N.J. 07062-0522 (901)754-1479.

LPC's LP LIST NO. 2 LPC's LP's
List available from PrairieMusik! Thousands of new sealed records of all categories. Most are S or less. Call Ted. Free list. (815) 827-9378 24 voice/fax.

HALF MILE VINYL
Quality pre-owned LP's. Frictionstorm Catalog, SASE: Box 98, East Wareham, MA 02538. (508) 265-2506.

WANTED TO BUY

TOP PAYING FOR MCINTOSH, MARANTZ TUBE AMP
McIntosh Solid state, Western, JBL, Altec, Tannoy, EV, Jensen, Speakers & Horn, EMT Tuntable, Orïon Arm, Temma—(516) 942-1212, (516) 496-2973.

CLASSIC AUDIO DR-3. MINT CONDITION PREFERRED. USED SOAN BEAM PROJECTOR (VPQ 1000G). 718-969-1086. MR CHOI.

COLLECTING VINTAGE TUBE GEAR. Speakers, High-end, Estetica & Beating Competition for 2 Decades - Reputation. Honesty. N.Y.S.I. (718) 377-7282, 2-6PM., WEEKDAYS.

Since 1977 David Yo always buying: tube Marantz, McIntosh, ARC, Fisher, Dynaco, Quad, Leak, Western Electric equipments, others. Vintage speakers, raw units by Western Electric, Tannoy, Jensen, JBL, Altec, EV(PatricianL RCA, LCTA. Audio tubes(K76B788, 7591, 6550, etc.) by Telefunken, Genalas, Mullard, RCA, Tungsol, etc. P.O. Box 28092, Northridge, CA. 91328-0802. Tel: (818) 701-5633 10am-10pm PST.

WANTED: WESTERN ELECTRIC, JBL MARANTZ OLD EQUIPMENT. SUNLIGHT ENGINEERING COMPANY: 189 Jennings Road. Horseheads. Quality loudspeaker cabinets for custom builders and dealers. Premium and high-quality loudspeaker cabinets for custom builders and deal-

TOWER TRAP—New designer series—Pre-release special. Trap corners behind speakers for the best upgrade you've ever heard! Learn more! Satisfaction Guaranteed. 1-800-ASCTUBE; Fax: 503-343-9245, PST.

SOUND CONNECTIONS INTERNATIONAL INC.
203 Flagship Dr. - Lutt, FL USA 33549
Tel: 904-949-2707 Fax: 904-949-2907

LIMITED QUANTITIES OF OLD SURPLUS ELECTRON TUBES, TUBE SOCKETS, PAPER-RELI CAPS, BLACK BOXES, VIT-Q, WESTCAP, ETC. KURRIFACE ENTERPRISES, P.O. Box 2204, IRWINDALE, CA 91706. 818/444-7079, FAX: 818/444-6663.

TUBE TRAP FACTORY DIRECT SPECIAL
$228 Drawn wire
TREBLE DIFFUSOR
EXTRA BASS SECTION
PEDESTAL BASE

TUBE HI-FI COMMERCIAL AMPS, HORN SPEAKERS, McIntosh, Altec, RCA, Western Electric, Jensen, Marantz, Health, Dynaco, Craftsman, Etc. Sonny 405-737-3312.

MARANTZ 510M AMPLIFIER need unit in excellent condition, both functionally and conditionally. Steve (404)612-4932.

AUDIO CLASSICS BUYS-SELLS-TRADES-REPAIRS High End Audio Components: CALL for a quote. See our ad at the beginning of the classifieds. AUDIO CLASSICS LTD, POB 176W, Waton, NY 13856. 607-865-7200. 8-AM-5PM. MON-FRI.

COLLECTOR WILL TRAVEL, to pick-up, working or not, MONO/Stereo: tube MARANTZ, McIntosh, TANN0Y Spks, B&W, B.O. & SEQUARA Tuner, Krell, Levinson, etc. (718)387-7316 or (718)383-3205. NEW YORK.

SERVICES

ACCUPHASE
AUTHORIZED SERVICE AND PARTS for all Accuphase products. Contact: ACCUTECH, 206 E. Star of India Lane, Carsons, CA 90746. TEL: (310) 324-7406. FAX: (310) 324-7422. Hours: 9am-4pm Pacific Time.


Audio Equipment Built, Repaired, Modified and Restored by Richard Modafferi, independent consultant to Audio Classics, Ltd., inventor and former Senior Engineer at McIntosh. AUDIO CLASSICS LTD, 8AM-5PM EST Mon.-Fri., POB 176RTM, Walton, NY 13856. 607-865-7200.


PARTS AND ACCESSORIES

WANTED TO BUY

PARTS AND ACCESSORIES

TUBE TRAP—New designer series—Pre-release special. Trap corners behind speakers for the best upgrade you've ever heard! Learn more! Satisfaction Guaranteed. 1-800-ASCTUBE; Fax: 503-343-9245, PST.

TOWER TRAP—New designer series—Pre-release special. Trap corners behind speakers for the best upgrade you've ever heard! Learn more! Satisfaction Guaranteed. 1-800-ASCTUBE; Fax: 503-343-9245, PST.

ACHIEVE A proper balance.

ALPS
Noble Value and balance pots used by the best manufacturers.

To receive The Parts Connection 1994 Catalog and a $10 discount coupon good on your first order over $100, send $5 along with your mailing address or call with credit card information.

THE PARTS CONNECTION
2790 Brighton Rd, Oakville, Ontario, Canada L61 1ST
Toll Free Order Line 1-800-769-0747 (U.S. & Canada)
Telephone (905) 829-3588 Facsimile (905) 829-3588

MIT: Marantz® • Wonder Cap • Kimber Kable • Solen • Siemens • Howland Musa Cap. Wima • Helco • Rel-Cap Drainers • Vishay • Caddock • Mills • Manhasset • TKD Noble • Cardas • Kimber Kable • Discovery • AudioQuest • MIT • ClearAudio • Alps • Bourns • Shallen Attenuators • Elac • Electro-Acoustics • Nichicon • Gold Area • RAM Mallory • Ruby Tubes • Edison Price • Linear Technology Material • Analog Devices/FMI • International Rectifier • Magnavox • Sony • Frontiers • Paul • Tube Sockets • Western • Neutrino • Curtis Audio Engineering • Etc.

AUDI0/AUGUST 1994 87

CLASSIFIED ADVERTISING
NEW TUBE COMPONENTS — preamps (from $595), mono amps (from $399), FREE CATALOG. Factory-direct savings to 40% on world-class designs by Harry Klaus-former Dyna/Hafler Project Engineer. USA made. SATISFACTION GUARANTEED. Sound Values, Dept. AM01, 185 N. Yale Ave., Columbus, OH 43222-1146. (614) 279-2383, 10-4, Eastern.

COMPACT DISCS
Tired of your favorite CD's skipping? NEW CD Repair Kit. $10.95-Check or Money Order to: Audio Plus. 12951 Benson Avenue, Suite 125, Chino, CA 91710.
Now That You See How They Work, 
Hear How They Feel.

If you're using a digital music source, such as a CD, nature dictates that you transform the bits of information into analog waves.

Our Digital to Analog Converters make the transition so smooth, so elegant, any music sounds vastly superior. The high end sweetens. The low end strengthens. The soundstage deepens. And your living room comes far closer to capturing not only the sound, but the very soul of live music.

In fact, it's been said that our D/A Converters can even turn vinyl die-hards into digital converts.

Surprising? Not when you consider that our new D/AC-1500 comes with dual mono, dual differential balanced circuitry. You get four K-series Burr-Brown PCM63P DACs—the highest grade available. There are also three enormous power supplies, an ST input, XLR balanced outputs and premium Vishay resistors.

You'd have to pay three times as much to find features like these on other brands.

That's been the Parasound hallmark for over a decade. And that's why our components continue to astound the high-end audio community.

So if your music is locked up in a digital source, unlock it with one of our D/A Converters. You're bound to create waves. Just as nature intended.
THE STYLOS

UNTIL NOW, high resolution sound reproduction meant sacrificing space. Until now, placing a speaker near a wall meant sacrificing the quality of sound. Who else but MartinLogan could take electrostatic technology to a realm where music has never been before?

The standard wall-mounting kit includes brackets and a full-size poster of the Stylos that clearly marks the placement of the wall anchors (stud location is not necessary). A plumb alignment tool is integrated into the poster to ensure accurate installation.

AGAINST THE WALL

Using the optional base, the Stylos can stand against the wall, yet remain movable. This is ideal for apartment living and allows easy repositioning as new demands arise. The Stylos is also the perfect addition to a home theatre system.

IN THE WALL

The Stylos can be built into a wall requiring vertical space of approximately 5 feet and a width of 14 inches. The designer scrim, which is included in the optional installation package, can be painted to match your decor.