

THE INDUSTRY'S BIBLE

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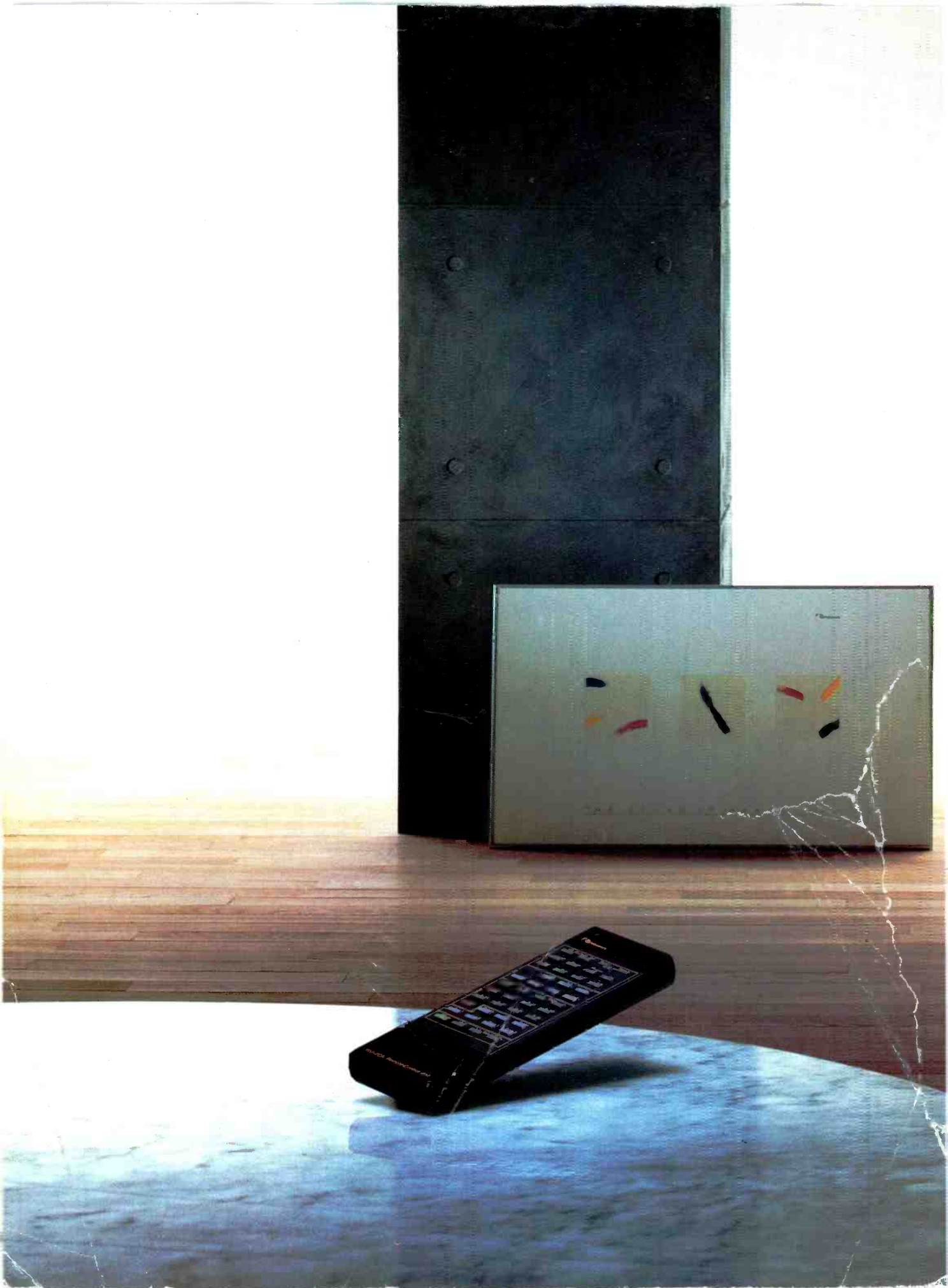
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The System...

by *N. Nakamichi*



The components you see were designed for the perfectionist. They are expensive. They are the finest we know how to make... which means they are the finest you can own. Each epitomizes its genre and offers maximum convenience and unequalled performance.

The PA-7 STASIS Power Amplifier has an uncanny ability to power exotic loudspeakers. The more exotic the speaker, the more it (and you) will appreciate the PA-7.


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Audio

OCTOBER 1987

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The Cover Equipment: Nakamichi Dragon turntable, Technics SV-D1000 DAT recorder, Accuphase DP-70 CD player, Yamaha CX-10000 preamplifier, McIntosh MC 2500 amplifier, and JBL Project Everest DD 55,000 loudspeaker. Furniture: Modern Age

The Cover Photographer: Robert Lewis

ANNUAL EQUIPMENT DIRECTORY

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There are some moments that only music can express.



Travelling with the sound of Nakamichi mobile audio products can be a magical experience.

Our company's commitment to quality and leading-edge technology has produced some of the finest audio components known to man.

But it's not the technology that provides the magic; it's the musical experience it creates.

After all, we know that nothing can make the spirit soar like music.



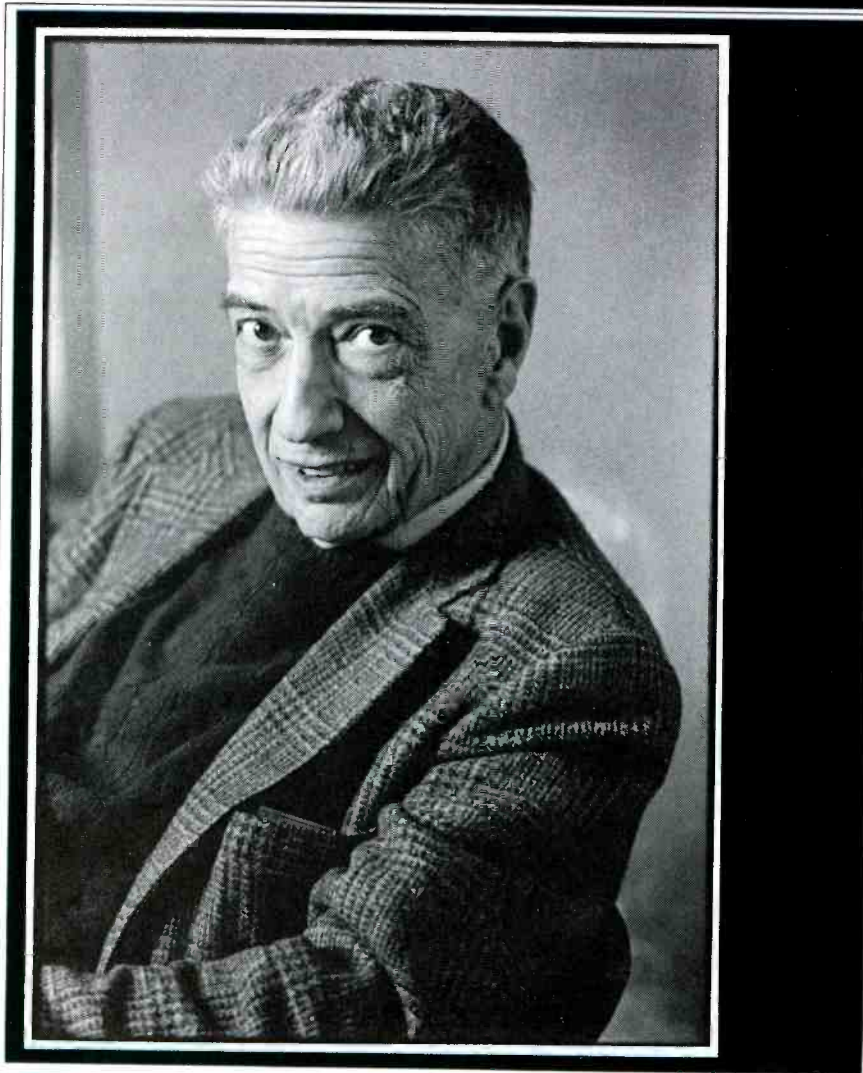
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Nakamichi produces a complete line of mobile tuner decks, amplifiers and speaker systems.

JOHN HAMMOND



Photograph: ©Elena Seibert

The record industry lost one of its founding fathers on July 10 of this year when legendary producer John Hammond died in New York at the age of 76.

Hammond was much more than a seminal figure in the development of the American record industry. His mother was a Vanderbilt, but he became a champion of the oppressed—both politically and musically. He rescued legendary black artists such as Fletcher Henderson and Bessie Smith from despair and decline. He “discovered” some of the most important stars in American popular music, including Billie Holiday, Charlie Christian, Count Basie, Bob Dylan, Aretha Franklin, George Benson, and Bruce Springsteen. More recently, he helped launch

the career of Stevie Ray Vaughan.

Since his days with Columbia Masterworks in the 1930s, Hammond was also a top producer of classical recordings. He was most closely associated with CBS and Columbia Records throughout his 50-year career, but he also helped shape the catalogs of Mercury and Vanguard. In addition, Hammond was a top jazz critic, one of the first to write seriously about black jazz.

On top of all of his personal accomplishments, Hammond, through his enthusiasm and encouragement, was a catalyst in the careers of many other important people in the music business. He was ever open to new sounds, and despite his age and ailments, he managed to have young ears until the end.

Ted Fox

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The Speaker Specialists[®]

“Matthew Polk Has a Passion for Perfection!”

**Experience the Awesome Sonic Superiority of
His Superb Loudspeakers for Home and Car.**



“Vastly Superior to the Competition”
Musician Magazine

■ SDA Series ■ Monitor Series ■ Mobile Monitor Series
Enter No. 82 on Reader Service Card



Polk Audio's dedication to quality is apparent in every detail of design, construction and performance.

"Polk's Dedication to Quality Results in Dramatically Better Sound"

State-of-the-Art Technology, Performance and Value

W

are The Speaker Specialists!

Polk speakers are designed better, built better and sound better! That should come as no surprise because high quality speakers are Polk's specialty. Appropriately Polk has been officially and exclusively authorized by the U.S. Government to call itself "The Speaker Specialists." It is common knowledge that if you want to do something better than anyone else you have to specialize. We specialize in speakers, so that we can build them better to sound better. Just ask the experts, like Musician Magazine, who said Polks are "Vastly superior to the competition."

Hear for Yourself Why Polk is #1

Last year, for the 3rd year in a row, Polk was selected as the #1 loudspeaker manufacturer (among a total of 74) in the Audio Video Grand Prix Award voting. This prestigious competition is voted on by the audio industry itself (much like the Academy Awards) to single out products that best exemplify the state-of-the-art in audio, combined with benefits and value for you, the listener. Polk builds a wide variety of superb sounding speakers to suit different needs and applications, however, the ultimate goal is always your total musical satisfaction. Musician Magazine said "Our advice is not to buy speakers until you hear the Polks." Do it soon. Hear for yourself why Polk is #1!

Polk's "You Are There" Musical Quality

At Polk we feel that the most important goal of loudspeaker performance is the ability to recreate the illusion and excitement of a live musical performance or sonic event. Objective performance tests are important, and innumerable lab tests document the outstanding measurable performance of the Polk loudspeakers. But more importantly Polk loudspeakers excel in their ability to make your music come alive. When you listen to a pair of Polks it seems like you are there at the live event. The loudspeakers disappear in a life-like, three-dimensional panorama of musicians performing in your room.

Polk's World Class Technology

You will find award winning state-of-the-art technology and performance in every Polk speaker system from the least to the most expensive. Polk Audio's many technological triumphs have been well documented by an unprecedented series of rave reviews around the world (copies are available). In addition, Polk loudspeakers have been honored by winning the Audio Video Grand Prix for the last 5 years and being selected for the prestigious CES Design and Engineering Exhibition for the last

Polk's Design Goals Give You Better Sounding Speakers

Polk Audio's design goals were all selected to achieve better sound in your home and give you the greatest listening pleasure and long term satisfaction from your music, records and hi fi.

Open, life-like, three dimensional imaging

recreates the spine tingling excitement of musicians actually playing in your room, with height, depth and placement across the sound stage.

Smooth, accurate frequency response

across the entire audible range provides you with natural, non-fatiguing, easy-to-listen-to sound.

Dynamic bass performance

Your speakers will rattle the windows when a kick drum or low organ pedal calls for it, but will also reproduce all the subtle delicacy of plucked or bowed string bass or cello.

Ultra wide sonic dispersion

ensures that you will receive optimal sound through your listening room.

Instantaneous transient response

means your music will be crisply reproduced with life-like clarity and detail.

High efficiency and power handling

Your Polk loudspeakers can be used with virtually any amplifier or receiver, large or small. They will play very loudly if desired, but also sound exceptionally clear at low volume levels.

Optimal performance in your room

Polk speakers are easy to position and are designed to provide superior performance in your listening room.

Unit to unit consistency and long-term sonic integrity

are assured by completely testing every loudspeaker. Your Polk speakers will sound as good as the laboratory prototypes.

Extended Lifecycle engineering

means your Polks will deliver optimum performance for many, many years.

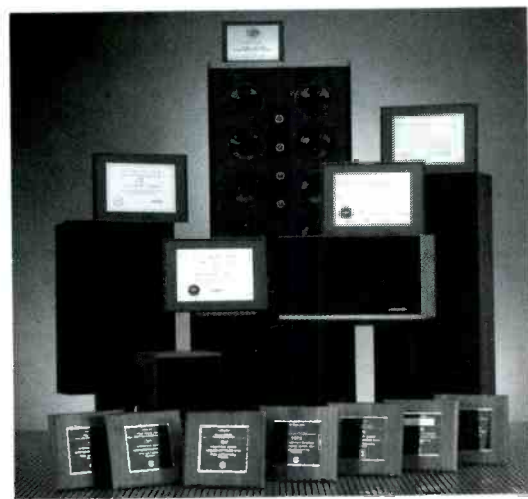
8 years in a row (an unprecedented accomplishment). What is the secret? Polk builds each and every loudspeaker with the same world class standards of construction quality and dedication to sonic performance accuracy.

Polk Delivers Unexcelled Value

There is one aspect of Polk products which is almost totally unique among high technology state-of-the-art loudspeaker systems, and that is the concept of value. In addition to superior performance and advanced technology, Polk loudspeakers also offer more uncompromised performance per dollar than any other speakers on the market. If you're looking for life-like musical quality, world class technology and unexcelled value, Polk loudspeakers are your obvious choice.

Polk Technology Serves Music and You

The ultimate goal of every Polk loudspeaker is your total musical satisfaction. Every detail is painstakingly attended to in order to achieve this. Human creativity and computer accuracy have been combined to design loudspeakers of unexcelled musical quality. The advance technology drivers and complex crossovers were all designed and are manufactured to meet exacting and rigid specifications. The beautiful cabinet work is a joy to behold. Each of the critical operations involved in constructing a Polk loudspeaker is carefully executed by skilled, highly trained technicians. Polk's unique Cidac computerized 100% quality control program checks every important performance parameter. Technology in the modern world serves many purposes. At Polk Audio, technology truly serves music, and you.



Sonic Superiority Has Made Polk Audio the Most Honored Name in Loudspeakers.

Where to buy Polk Speakers? For your nearest dealer, see page 26.

Enter No. 82 on Reader Service Card



SDA SRS
\$1495.00 ea.

SDA SRS 2
\$999.95 ea.

Digital Disc Ready

Matthew Polk's ultimate Dream Speakers, the Signature Reference Systems.

"The Genius of Matthew Polk Has Created Two Spectacular Sounding SDA SRSs!"

"Spectacular. It is quite an experience."

Stereo Review Magazine

For many years, Matthew Polk has been driven by an all consuming passion: to develop ultimate SDA loudspeakers which fully realized the sonic potential of his revolutionary SDA TRUE STEREO technology.* Thousands of man hours and hundreds of thousands of dollars have been spent in his single-minded pursuit of this goal. The extraordinary result of his quest is now available in handcrafted limited quantities, for those discerning listeners who seek the absolute state-of-the-art in musical and sonic reproduction.

The Joy of Owning the Ultimate Dream Speakers

The SDA Signature Reference Systems are Matthew Polk's own dream speakers. You too can share and experience his dream. He is so proud of the SRSs that each one bears his signature. The joy of owning an ultimate loudspeaker knows no bounds. Music lovers who are privileged to own a pair of SRSs will share Matthew Polk's pride every time they sit down and enjoy the unparalleled experience of listening to their favorite music through these extraordinary loudspeakers, or when they demonstrate them to their admiring friends.

A Significant Advance in State-of-the-Art Loudspeaker Technology and Sonic Performance

The SDA-SRSs are the extraordinary flagship models of Polk's critically acclaimed SDA Series which is comprised of the SDA-1C, SDA-2B, SDA-CRS +, SDA-SRS and SDA-SRS 2. These remarkable sounding, 3rd generation SDA speakers combine the latest refinements in Polk's exclusive and patented TRUE STEREO technology with time-compensated, phase-coherent multiple driver vertical line-source topology. The results are high efficiency systems of awesome and seemingly limitless dynamic range and bass capabilities which reproduce music with a precise, lifelike, three dimensional soundstage which is unequalled. The SRS contains 8 Polk 6½" trilaminate-polymer drivers, a planar 15" sub-bass radiator, 4 Polk 1" Silver Coil polyamide dome tweeters and an incredibly complex and sophisticated Isophase Crossover System. The SRS2 incorporates 4 Polk 6½" trilaminate-polymer drivers, a planar 15" sub-bass radiator, 2 Polk 1" Silver Coil polyamide dome tweeters and a similar Isophase Crossover system. One of the unique features of the crossover is the progressive variation of the high frequency high-pass circuitry which maintains virtual point source operation resulting in wide horizontal and vertical dispersion. Power handling is nominally rated at 1000 watts per channel for the SRS and 750 watts for the SRS2, although the

The Incomparable SDA Signature Reference Systems

"At the CES (Consumer Electronics Show) among the crop of new and often innovative speaker systems, probably the most impressive was the Polk SDA Signature Reference System, which shook the walls of the Americana Congress Hotel."

Stereo Review Magazine

A Unique Combination of Features and Benefits

Exclusive, Patented SDA TRUE STEREO Technology for unequalled three-dimensional imaging and a huge, lifelike soundstage which surrounds the listener.

Effective Bass Radiating Area Equivalent to a 40" Woofer for breathtakingly full, deep, tight, more well controlled bass and sub-bass response.

Multiple Driver Line-Source Topology for ideally focused wave propagation which minimizes floor and ceiling reflections combined with greater clarity, lower distortion, higher power handling and increased dynamic range.

Phase-Coherent, Time-Compensated Driver Alignment for better focus, lower coloration and a smoother, more coherent midrange.

Progressive Point-Source Tweeter Array for greater vertical high frequency dispersion, achieved by eliminating multiple tweeter high frequency cancellations.

Bi-Wire/Bi-Amp Capability (SRS) for greater clarity, greater dynamic range and lower I.M. distortion.

Hand Crafted Limited Production assures you that your pair of SRSs sounds and looks exactly like Matthew Polk's own.

Monocoque Cabinet Construction eliminates extraneous cabinet resonances and colorations.

high efficiency of the systems allows superb performance to be realized with a good quality receiver. Bass performance, is in a word, breathtaking. The use of small active drivers coupled to the large 15" sub-bass radiator results in extraordinarily tight, quick and three dimensional mid and upper bass combined with low and sub-bass capabilities which are staggering (clean output at 25Hz exceeds 100db!) Elaborate monocoque cabinet and bracing systems are employed resulting in remarkably rigid cabinets which virtually eliminates coloration due to panel resonances. Separate inputs for high and low frequency sections of the system (SRS only) allows bi-wire or bi-amp operation without the need for a separate electronic crossover. Both speakers are beautifully finished. They are elegant loudspeakers which look as good as they sound.

The Exquisite Experience of Listening to the SDA Signature Reference Systems

Listeners' reactions to the sonic performance of the SDA-SRSs have exceeded Matthew Polk's wildest expectations. Awesome is the word most often heard to describe the sound. One highly respected critic was totally enthralled by the absolutely effortless way with which the SRS handles the most dynamic musical passages. He was astounded by the unique combination of astonishingly deep bass and sub-bass response of almost unlimited dynamic range, combined with tight quick transient performance across the entire musical spectrum, which is capable of reproducing sonic nuances of the most subtle delicacy.

"...the best SDAs yet... impressive and worthy of Matt Polk's signature"

High Fidelity Magazine

The extraordinarily lifelike three-dimensional imaging capabilities of the SRSs demonstrate the full performance potential of Polk's exclusive and patented TRUE STEREO SDA technology. Music and ambience seem to surround the listener in an almost 360° panorama of sonic splendor which is, in the words of High Fidelity Magazine, "Mind boggling...Astounding...and Flabbergasting." The almost unimaginably exciting clarity of the Signatures allows you to hear every detail of the original musical performance; while the exceptionally smooth, natural, low distortion reproduction encourages you to totally indulge and immerse yourself in your favorite recordings for hours on end. Words alone can not express the experience of listening to these ultimate loudspeaker systems. You simply must hear them.

*Designed and manufactured in the U.S.A. by Polk Audio, Inc., Baltimore, Md. under one or more of the following patents: 4,569,074 U.S., 4,497,064 U.S., 4,489,432 U.S., 4,218,585 U.S., 2,128,059 Gr. Br., 2,122,459 Gr. Br., 1,198,683 Can., 1,195,933 Can. Other patents pending.



SDA SRS
\$1495.00 ea.

SDA SRS 2
\$999.95 ea.

SDA 2B
\$699.95 ea.

SDA CRS+
\$399.95 ea.

SDA 1C
\$799.95 ea.

Digital Disc Ready

Matthew Polk's revolutionary SDAs have been acclaimed around the world. Australian HiFi called them "A stunning achievement."

"Matthew Polk's Revolutionary True Stereo SDAs Sound Superior to Any Conventional Loudspeaker."

"Literally a New Dimension in the Sound"

Stereo Review Magazine

S

tereo Review confirmed the unqualified sonic superiority of Polk's revolutionary SDA technology when they wrote, "Superb... has the ability to make your previous favorite speakers sound almost second rate."

"They truly represent a breakthrough."

Rolling Stone Magazine

Polk's critically acclaimed, 5 time AudioVideo Grand Prix Award winning SDA technology is the most important fundamental advance in loudspeaker technology since stereo itself. Listeners are amazed when they hear the huge, lifelike, three-dimensional sonic image produced by Polk's SDA speakers. The nation's top audio experts agree that Polk SDA loudspeakers always sound better than conventional loudspeakers. Stereo Review said, "Spectacular... the result is always better than would be achieved by conventional speakers." High Fidelity said, "Astounding... We have yet to hear any stereo program that doesn't benefit." Now all 5 SDAs incorporate many of the 3rd generation advances in SDA technology pioneered in the Signature Edition SRS and SRS 2 including full complement sub-bass drive, time-compensated phase-coherent driver alignment and bandwidth-optimized dimensional signal.

SDAs — The First TRUE STEREO Speakers

Without exaggeration, the design principals embodied in the SDAs make them the world's first true stereo speakers. The basic concept of speaker design was never modified to take into account the fundamental difference between a mono and stereo signal. The fundamental and basic concept of mono is that you have one signal (and speaker) meant to be heard by both ears at once. However, the fundamental and basic concept of stereo is that a much more lifelike three-dimensional sound is achieved by having 2 different signals, each played back through a separate speaker and each meant to be heard by only one ear apiece (L or R). So quite simply, a mono loudspeaker is designed to be heard by two ears at once while true stereo loudspeakers should each be heard by only one ear apiece (like headphones). The revolutionary Polk SDAs are the first TRUE STEREO speakers engineered to accomplish this and fully realize the astonishingly lifelike three-dimensional imaging capabilities of the stereophonic sound medium.

How Polk SDAs Achieve True Stereo

Polk SDA Technology solves one of the greatest problems in

SDA Signature Reference System (SRS) — \$1495.00 ea.

AudioVideo Grand Prix Winner

The finest speaker that Polk manufactures. This limited production flagship model combines patented SDA TRUE STEREO technology with phase-coherent focused line-source multiple driver topology to achieve new levels of state-of-the-art imaging, detail, coherence, dynamic range and bass reproduction.

SDA SRS 2 — \$999.95 ea.

AudioVideo Grand Prix Winner

This new scaled down version of the SRS incorporates virtually all its innovations without significantly compromising its awesome sonic performance.

New SDA 1C — \$799.95 ea.

AudioVideo Grand Prix Winner

A beautifully styled, full size floor-standing system combining Polk's state-of-the-art components with exclusive 3rd generation TRUE STEREO technology for extraordinarily lifelike sound. High Fidelity said "the Polk SDA 1 Loudspeaker provides startling evidence of the audio industry's essential creative vitality."

New SDA 2B — \$599.95 ea.

Audio Video Grand Prix Winner

The new SDA 2B is a full size floor standing system which incorporates many of the latest refinements in SDA technology developed for the SRS models. It represents an extraordinary value which combines spectacular SDA performance with a remarkably affordable price. High Fidelity said listening to the SDA 2 is "an amazing experience."

SDA CRS + — \$399.95 ea.

AudioVideo Grand Prix Winner

The new SDA CRS + is the world's best sounding bookshelf loudspeaker and now incorporates many of the latest refinements in SDA technology developed for the SRS models. It combines the extraordinarily lifelike three-dimensional sonic performance of Polk's patented SDA technology with a handsome enclosure (stand or shelf mountable) of attractively modest proportions. Stereo Review said the CRS is "an impressive achievement."

stereo reproduction. When each ear hears both speakers and signals, as occurs when you use conventional (Mono) speakers to listen in stereo, full stereo separation is lost. The undesirable signal reaching each ear from the "wrong" speaker is a form of acoustic distortion called interaural crosstalk, which confuses your hearing.

The Polk SDA systems eliminate interaural crosstalk distortion and maintain full, True Stereo separation, by incorporating two completely separate sets of drivers (stereo and dimensional) into each speaker cabinet. The stereo drivers radiate the normal stereo signal, while the dimensional drivers radiate a difference signal that acoustically and effectively cancels the interaural crosstalk distortion and thereby restores the stereo separation, imaging and detail lost when you listen to normal "mono" speakers. The dramatic sonic benefits are immediately audible and remarkable.

"Mindboggling...Astounding...Flabbergasting"

High Fidelity Magazine

Words alone cannot fully describe how much more lifelike SDA TRUE STEREO reproduction is. Reviewers, critical listeners and novices alike are overwhelmed by the magnitude of the sonic improvement achieved by Polk's TRUE STEREO technology. You will hear a huge sound stage which extends not only beyond the speakers, but beyond the walls of your listening room itself. The lifelike ambience revealed by the SDAs makes it sound as though you have been transported to the acoustic environment of the original sonic event. Every instrument, vocalist and sound becomes tangible, distinct, alive and firmly placed in its own natural spatial position. You will hear instruments, ambience and subtle musical nuances (normally masked by conventional speakers), revealed for your enjoyment by the SDAs. This benefit is accurately described by Julian Hirsch in Stereo Review, "...the sense of discovery experienced when playing an old favorite stereo record and hearing, quite literally, a new dimension in the sound is a most attractive bonus..." Records, CDs, tapes, video and FM all benefit equally as dramatically.

"You owe it to yourself to audition them."

High Fidelity Magazine

SDAs allow you to experience the spine tingling excitement, majesty and pleasure of live music in your home. You must hear the remarkable sonic benefits of SDA technology for yourself. You too will agree with Stereo Review's dramatic conclusion: "the result is always better than would be achieved by conventional speakers... it does indeed add a new dimension to reproduced sound."

Where to buy Polk Speakers? For your nearest dealer, see page 26.

Enter No. 82 on Reader Service Card

“Polk Reinvents the Loudspeaker”

High Fidelity Magazine

*“The result is always better than would be achieved
by conventional speakers...”*

Stereo Review Magazine

Excerpts from the Experts’ Rave Reviews of the Polk SDAs

SDA SRS

*“Polk’s No Compromise
Flagship Loudspeaker”*

Stereo Review

*At the CES (Consumer Electronic Show) among the
crop of new and often innovative speakers proba-
bly the most impressive was the Polk SDA Signature
Reference System which shook the walls of the
Americana Congress Hotel...*

Polk’s no-compromise flagship loudspeaker offers new refinements on the Stereo Dimensional Array design... the SDA system works essentially as claimed... the effect can be quite spectacular... as good as the SDA feature is we were even more impressed by the overall quality of the SDA-SRS as a speaker system. The sound is superbly balanced and totally effortless... unusually open and integrated... the composite frequency response was exceptional no matter how you look at it... only at 10,000 Hz where presumably only one driver was in use, did we reach the limits of the speaker and the amplifier at the same time — 1,265 watts into 5 ohms... almost any amplifier can drive SRS to the highest listening levels most people would want... the phase compensation of the system was exceptional... we have never measured a low bass distortion level as low as the that of the SRS... we found that the passive radiator response varied only a total of 7 dB between 12 and 90 Hz. Polk calls the passive radiator a “sub-bass driver” with good reason... it is quite an experience. Furthermore, with the SRS it is not necessary to play the music loud to enjoy, the tactile qualities of deep bass... Spectacular”

SDA 1

*“Mind boggling powers
of sonic persuasion”*

High Fidelity Magazine

*Our first, all too brief, audition simply bowled us
over. The width, depth and precision of the stereo
image are astounding...*

after extended listening we were no less astonished... mind-
boggling powers of sonic persuasion... The SDA-1’s strong suit
(to put it mildly) is its imaging which ranges from very good to



flabbergasting, depending on the material...devastatingly dramatic... With good classical discs, the soundstage seems to open up, presenting a greater sense of depth and enveloping the listener more fully in the recorded ambiance...But it's on fancy rock recordings that the system can really strut its stuff...it really is great good fun. We find ourselves listening to unfamiliar recordings on other speakers and saying to each other, "I wonder what this would sound like on the Polks." Get an audition...It's worth the trouble just for the experience."

"Literally a new dimension in the sound"

Stereo Review Magazine

"Hirsch-Houk Lab's tests of the SDA-1 show that it does indeed add a new dimension to stereo sound. The result is always better than would be achieved by conventional speakers...spectacular..."

The sound of the Polk SDA-1 is beautifully balanced... The smoothed and averaged frequency response was quite uniform... The bass output was exceptionally strong down to the lowest frequencies... it reaches an octave or so deeper in the bass than many speakers of similar size... The Polk SDA-1 is an unusually sensitive (efficient) speaker, delivering a sound pressure level of 95db measured at 1 meter...

Polk's SDA-1 speakers produce a broad, precisely defined soundstage, not only between the speakers, but extending appreciably beyond them laterally as well... It will (and should) be bought primarily for its acoustic properties which are unique and completely without any undesirable side effect... Even the audio purist should not cavil over the means by which this speaker achieves its spatial properties. There is no added active circuitry introduced to the signal path and the speakers sound superb in their own right... the sense of discovery experienced when playing an old favorite stereo record and hearing, quite literally, a new dimension in the sound is a most attractive bonus for the owner of the SDA-1 system."

SDA 2
"Super Stereo from Polk Audio"

High Fidelity Magazine

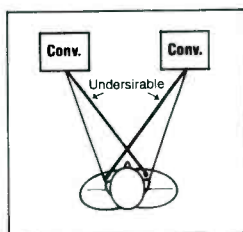
An amazing experience, and quite startling the first few times you realize it's happening...we have yet to hear any stereo program that doesn't benefit...these are very fine and utterly fascinating loudspeakers...you owe it to yourself to audition them, just to see what they can do."

"When we reviewed Polk's first Stereo Dimensional Array we commented on what an exciting and interesting loudspeaker it was to listen to...it was capable of some extraordinary feats of stereo

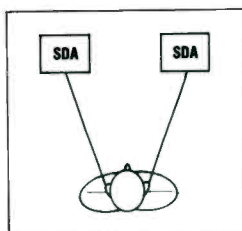
Where to buy Polk Speakers? For your nearest dealer, see page 26.

"An amazing experience"
High Fidelity Magazine

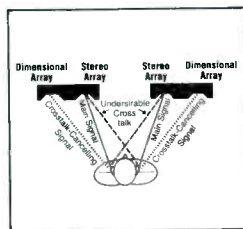
"The result is always better than would be achieved by conventional speakers..."
Stereo Review Magazine



Conventional Speakers Reproducing Stereo
When conventional speakers reproduce stereo, both speakers are heard by both ears which reduces stereo separation, obscures detail and interferes with proper imaging.



Polk's Revolutionary SDAs Reproduce True Stereo
Only Polk SDAs reproduce True Stereo by allowing each speaker and signal (L or R) to be heard by only the correct ear like headphones, which results in dramatically improved stereo separation, detail and three-dimensional imaging.



How Polk SDAs Achieve True Stereo Reproduction
Each Polk SDA incorporates a special extra set of drivers which radiates a difference signal which cancels the undesirable signal going from the wrong speaker to the wrong ear, (Interaural crosstalk distortion) resulting in True Stereo reproduction.

imaging... Matthew Polk set out to make a less costly version without giving up much in sound quality. He succeeded.

With its grill on, the SDA-2 looks exactly like the SDA-1, only a little smaller... a more convincing illusion than is possible with ordinary stereo... With the SDA's the left ear hears the left speaker and the right ear hears the right... impedance is notably constant... this is beneficial in that it makes the system easier for an amplifier to drive, and we would not expect any problems in this regard... the SDA-2 accepted the full output of the labs amplifiers or 500 watts into, 8 ohms, for a calculated peak sound pressure level of 118db. Plenty loud enough for anyone we would say... Harmonic distortion is quite low. We found them quite satisfactory (and not much different) both against the back wall and out into the room... the balance of the SDA-2 is exceptionally smooth and natural. What does remain unchanged is the remarkable stereo imaging that set the first SDA's apart from the crowd.

SDA CRS
"An Impressive Achievement..."

Stereo Review Magazine

"It was easy to forget that we were hearing speakers at all. Just the music remained, and it seems to us that this is what hi-fi is all about..."

The SDA-CRS is designed to compensate for the fact that in normal stereo playback each ear hears the sound from both speakers, which inevitably affects apparent channel separation and the stereo image... we drove the speakers as hard as our ears would tolerate, with a 350-watt-per-channel amplifier, and they never showed any signs of distress... Our measurements confirm that the Polk SDA-CRS is a very good speaker system — with a host of desirable qualities — when it is judged by the same standards one would apply to conventional speakers. But it is not a conventional system, and it deserves to be examined for the special sonic qualities that are claimed for it.

We recall the impression that the original Polk SDA-1 made on us: The system could provide a dramatic expansion of the sound stage... we found listening to it both intriguing and enjoyable... The new SDA-CRS is capable of doing much the same thing. The SDA system presents the listener with a broad sound stage, which usually extends beyond the space between the speaker cabinets and it also seems to have an added sense of depth. These qualities were apparent from any part of the listening room... The fact that the SDA-CRS will fit in any room, works as well on pedestals as against a wall (we tried them both ways), and costs less than half as much as the revised SDA-1A says something about its intrinsic merits. It is definitely not just another speaker."

Monitor 10B
\$329.95 ea.



RTA 12C
\$479.95 ea.



Monitor 7C
\$259.95 ea.



Monitor 4.5
\$109.95 ea.



Monitor 4A
\$84.95 ea.



Monitor 5jr.
\$149.95 ea.



Monitor 5B
\$199.95 ea.



Digital Disc Ready

Polk's remarkable Monitor Series Loudspeakers have received worldwide acclaim by offering state of the art technology and performance usually found only in systems which sell for many times their modest cost. (stands optional)

"All Polk's Remarkable Monitors Deliver Incredible Sound/Affordable Price."

"At their price, they're simply a steal"

Audiogram Magazine

P

olk Audio was founded in 1972 by three Johns Hopkins University graduates who were fanatic audiophiles with a common dream and vision.

Polk's Dream of Super Sound for Everyone

They believed that it was possible to design and manufacture loudspeakers of uncompromising quality which performed as well as the most expensive and exotic loudspeakers available, but in a price range which would make them affordable to virtually every music lover. The original Monitor 7 was the first product of their efforts and it was so successful that when it was shown at the Consumer Electronics Show, dealers and experts alike could not believe its superb performance and affordable price. Audiogram Magazine said, "when we heard the Polk speakers at the CES Show we were so impressed we could not believe the prices." The entire Polk Monitor Series was designed in this tradition of incredible, state-of-the-art sound and affordable prices. In large part due to the quality and value of the Monitors, Polk Audio has developed from its humble beginnings in a garage, to become one of the world's premier loudspeaker manufacturers.

Polk Audio has worked hard over the ensuing years to maintain the Monitor Series' preeminent position as *the* standard for quality and value in the audio industry. The Monitors have been continually improved and refined as a result of Polk's never ending search for better sound quality. There have been literally thousands of improvements made to the Monitors and the result is that today, as in the past, the Polk Monitors are absolutely the best sounding loudspeakers for the money available on the market. Musician Magazine said, "If you're shopping for stereo, our advice is not to buy speakers until you've heard the Polks." You owe it to yourself.

The Latest Generation of Polk Monitors Utilize the Same Components as the SDAs.

A new generation of Polk Monitors is now available which incorporate the same high definition silver coil dome tweeter and Optimized Flux Density drivers developed for the SDAs. Polk Monitor Series loudspeakers have always had a well deserved reputation for offering state-of-the-art performance and technology usually found only in systems which sell for many times their modest cost. In fact, many knowledgeable listeners consider that outside of the SDAs, the Polk Monitors are the finest imaging conventional speakers in the world, regardless of price. They have been compared in performance with loudspeakers which sell for up to \$10,000 a pair and are absolutely the best sounding loudspeakers for the money available on the market.

Where to buy Polk Speakers? For your nearest dealer, see page 26.

The RTA 12C — \$479.95 ea. utilizes phase-coherent open air driver mounting in a mirror imaged, fullsize floorstanding configuration for superior sonic imaging and clarity. In addition to receiving many rave reviews, the RTA 12C has won the AudioVideo Grand Prix Speaker of the Year Award.

The Monitor 10B — \$329.95 ea.

is considered one of the world's best sounding loudspeakers and in the words of Audiogram Magazine, "At the price they are simply a steal." The 10B offers sonic performance almost equal to the 12 at a lower cost in a more compact enclosure. The 10 utilizes dual Polk trilaminate-polymer bass midrange drivers coupled to a built-in subwoofer for an outstanding bass response and dynamic range.

The Monitor 7C — \$259.95 ea.

is basically a smaller, less expensive version of the Monitor 10: It can be either shelf or stand mounted with excellent results. How good? Audio Alternative Magazine said, "It is Amazing."

The Monitor 5B — \$199.95 ea.

similar in design and performance to the Monitor 7, however, it utilizes an 8" subwoofer (rather than 10") and is more compact.

The Monitor 5jr + — \$149.95 ea.

has been called the best sounding speaker of its price in the world (regardless of size). It achieves lifelike three-dimensional musical imaging which 10 years ago was not available in any bookshelf speaker at any price!

The Monitor 4.5 — \$109.95 ea.

shares many of the same high technology components and the rewarding musical performance of the more expensive Polks. It's extraordinary sound quality, dynamic range and bass response are superior to competitor's loudspeakers selling for twice the price.

The Monitor 4A — \$84.95 ea.

The Monitor 4A is Polk's least expensive home speaker. However, it is a superb speaker in its own right. Audio Critic Lawrence Johnson called it, "an all around star of great magnitude." The 4A's uniquely affordable price means that no matter how small your budget, you can afford the incredible sound of Polk!

Polk's Uncompromising Standard of Superior Sonic Performance

All the Polk Monitors regardless of price offer consistently superb construction and sonic performance. They achieve open, boxless, three-dimensional imaging surpassed only by the SDAs. The Monitors' silky smooth frequency response assures natural, non-fatiguing, easy to listen to sound; while their instantaneous transient response results in music that is crisply reproduced with lifelike clarity and detail. In addition dynamic bass performance, ultra wide dispersion, high efficiency and high power handling are all much appreciated hallmarks of Monitor Series performance.

"The best high performance speaker value on the market today"

Off the Record

The consistently superb performance of the Polk Monitors is in large part due to the fact that they all utilize very similar components and design features. However, more importantly, it is the elegant integration of concepts and components which results in the superior sonic performance and value which sets the Monitor Series apart. Audiogram magazine said, "How does Polk do it? We think it is mostly execution. They hear very well and they care." Audiogram is absolutely right. At Polk we take the same care with each and every product we build, whether it is our most or least expensive. We lavish the same lengthy amount of critical listening and tuning on every single Polk speaker because we know that having a limited budget does not necessarily indicate that you have a limited ability to appreciate true musical quality.

There's a Polk Monitor Perfect for You

There are seven Polk Monitor Series loudspeakers. As you move up the Monitor Series the speakers get larger, more efficient, handle higher power, have greater dynamic range and better bass response. They are designed so that a smaller Polk played in a small room will sound nearly identical to a larger Polk in a large room. And, of course, a larger Polk in a smaller room will play that much louder and have even more bass. The RTA 12C also incorporates unique technology which results in improved imaging and clarity. There is a Polk Monitor which is perfect to fulfill your sonic dreams, at a price you can afford.

Enter No. 82 on Reader Service Card

Excerpts from the Experts Rave Reviews of the Polk Monitor

THE MONITOR SERIES

*“Open, uncolored,
perfectly imaged sound”*

Musician Magazine

We at Musician have found the Polk Audio Monitor speakers so vastly superior to the competition in their price range we felt we had to pass the information along... The design produces a remarkably well integrated and coherent sound that adapts itself ideally to all kinds of music... the kind of open, uncolored, perfectly imaged sound we thought began at twice the price and required huge amounts of amplification... will benefit from state-of-the-art electronics, but sound quite magnificent with a good mid powered popular brand receiver... they make the other popular speakers in their price range seem dim, colored, boxy and just plain insufficient. If you're shopping for stereo, our advice is not to buy speakers until you've heard the Polks."

*“Outstanding...highly
recommended”*

Complete Buyer's Guide to Stereo/Hi Fi Equipment

“Sound beyond what would be expected... highly recommended... Polk Audio Monitor Series speakers enjoy an enviable reputation among audiophiles who don't have the golden wallet to match their golden ears... designed to appeal to the most critical audiophiles and those audiophiles have embraced them warmly... outstanding loudspeakers... deciding high end sonic characteristics... unusually pure sound. It's clear that Polk came by their excellent reputation honestly.”

MONITOR RTA 12

“The affordable dream”

Off the Record

“It is an outstanding example of how advanced technology can be employed in the service of music... The sonic presentation of the 12's was very impressive... The 12's easily handled the dynamic passages without strain while preserving detail and depth over the entire musical spectrum... Large orchestral works were particularly impressive... Choral works were also well produced with great consistency and frequently uncanny imaging... High level rock was produced with impact and incisive quality... A remarkable quality of the 12's is their ability to



"Vastly Superior To the Competition"

Musician Magazine

"Other comparably priced speakers simply do not come close"

Audiogram Magazine

preserve excellent depth imaging while maintaining a very forward sound stage when the music calls for it. This quality helps to carry the emotional impact of great performances closer to the listener. On an absolute basis it would be difficult to criticize the RTA-12. The RTA-12 is the affordable dream; a well made exotic speaker with performance to match.... Polk's RTA-12 may well be the best high performance speaker value on the market today!"

MONITOR 10

"Superior sound"

Stereo Review Magazine

"Polk offers an uncommon amount of superior sound at a moderate price...Open, boxless, three dimensional quality... We probably would have chosen these adjectives ourselves to describe the sound of the Model 10, but Polk has spared us the chore...the combination of good "sound sense" and a high degree of technical expertise and sophistication has resulted in some truly noteworthy products...It is easy to appreciate the advantages of using a pair of small diameter (but long throw) woofers that can radiate much of the midrange as well as the upper and mid-bass frequencies. Avoiding a crossover in the midrange (the most audibly important part of the musical spectrum) is the best way to eliminate or minimize many of the colorations that have been attributed to crossover networks. The dispersion of the one inch tweeter is exceptional...The tone burst response of the Model 10 is exceptional...the transient response of the Model 10 is absolutely first-rate, and the hemispherical dispersion is superb (we cannot recall measuring better dispersion on any forward radiating speaker)...the speaker sensitivity is adequate for use with a 10-watt amplifier, yet it could absorb the full output of a 200-watt amplifier without damage...exceptionally pleasing sonic balance."

"At their price, they are simply a steal"

Audiogram Magazine

"When we heard the Polk Speakers at the CES Show we were so impressed we could not believe the prices. The sound coming forth from the Model 10 Monitors is something really special. It is a sound that is open, well defined and very low in coloration. One does not generally expect such low coloration in a modestly priced box speaker, and certainly not anything like the definition exhibited by these speakers. How does Polk do it? We think it is mostly execution. They hear very

Where to buy Polk Speakers? For your nearest dealer, see page 26.

"The best high performance speaker value on the market today"

Off the Record

"Truly noteworthy products"

Stereo Review Magazine

"Our advice is not to buy speakers until you've heard the Polks"

Musician Magazine

"Remarkably well integrated and coherent sound that adapts itself ideally to all kinds of music..."

Musician Magazine

well and they care...Other comparably priced speakers simply do not come close to the standards set by the Model 10...at their price they are simply a steal."

MONITOR 7

"It is amazing"

Audio Alternatives

We have found something very special. The Polk 7. It is amazing...Hundreds of manufacturers build loudspeakers but only a few in this price range really perform. The Polk 7's perform!... The bottom end of the Polk 7's is tight, fast and can actually reproduce a cello without making it sound like an electric bass...It is sturdily built and attractive. Technically the Polk 7 is a superior loudspeaker in its class. Frequency response is exceptionally flat...Horizontal dispersion is so good that you can stand in front of one 7 and hear the other!...Vertical dispersion is also excellent...It is apparent that this speaker is a real find."

MONITOR 4

"Star of great magnitude"

Milwaukee Sentinel

"The Polk 4 creates a startling illusion of an elevated stage...the stronger and better quality the signal we fed them the more spectacular the image that blazed up...All of that would be remarkable enough if we were discussing loudspeakers in the \$1000 range. The Polk 4 carries a retail price of under \$200 a pair. In actual use the Polk 4 is an all around star of great magnitude. Not only do high frequency shine to the farthest reaches of hearing, but musical textures and colors in that stratosphere come through finely controlled and proportioned. And don't be misled by Polk's modest claim for bass response...its low register shows ample depth and clarity. At high listening levels, these pixie Polks deliver the massive brass sonorities of Mahler's Third Symphony with incredible energy, textured pliancy and, most significant, transparency. Factors of presence and stereo imaging proved just as amazing. Yet the Model 4 doesn't have to be whipped to excel...Late one night, we sat down to a quiet hour of folk music...and experienced the same thrilling detail and immediacy."



MM 6500
\$99.95 ea.



MMXa (7)
\$84.95



MM 8902
\$124.90 ea.



MMIV 14
\$109.95



MM IIIa (3)
\$62.45 ea.



MM 5502
\$114.90 ea.



MM Ia (14)
\$39.95 ea.



MM 5502
\$99.90 ea.



MM 1001
\$49.95 ea.

"Polk's Extraordinary Mobile Monitors Sound Like the Finest Home Speaker Systems"

They Turn Your Car Into A Concert Hall

H

Home Quality Sound for the Road

Polk Mobile Monitors are true, home quality loudspeakers for automotive, boat and other installations calling for compact, flush mount systems of the highest musical performance. They are built to the same uncompromising quality standards and are specifically engineered to achieve the same high level of sonic performance as the critically acclaimed, Grand Prix Award winning Polk home speaker systems. The combination of many design features borrowed from the Polk home systems plus Polk's unwavering dedication to achieving better, more musical sound assures a new level of sonic performance for automotive loudspeaker systems. The Mobile Monitor's rich, full dynamic bass response, high definition clarity, crisp, silky smooth high frequency response, lifelike three dimensional imaging and natural uncolored mid-range will turn your car into a mobile concert hall.

Choose From Six Discrete Systems and Limitless Exciting Combinations

The Polk Mobile Monitor Series are all sonically and functionally compatible with each other and may be utilized individually or in any combination to realize your dream sound system. Authorized Polk Mobile Monitor dealers will be able to assist you in selecting the best combination to suit your own particular needs. Whatever you choose, you are assured of the clear, smooth, thrilling life-like musical sound that Polk is famous for.

Mobile Monitors are also Ideal for Custom in Home Wall and Ceiling Installations

The Polk Mobile Monitors were also designed to be easily and inconspicuously mounted in walls and ceilings. The Polks are perfect when you want inconspicuous built-in decorator styling and high sonic performance in any room of your home, office or commercial facility. Just paint them to match your walls or ceilings.

Design Features and Performance Benefits

Natural home quality sound
Turns your car into a concert hall.

Deep, detailed and dynamic bass response
For satisfying car filling bass performance on all types of program material which is capable of both subtle delicacy and profoundly powerful impact.

High efficiency and power-handling
Enables your Polk Mobile Monitors to deliver superior sonic performance with a wide range of head-units and amplifiers for tremendous dynamic range and high volume listening.

Smooth, accurate frequency response
Across the entire audible range provides you with natural, non-fatiguing, easy-to-listen-to sound.

Instantaneous transient response
Means your music will be crisply reproduced with life-like clarity and detail.

Butyl rubber surrounds
The Polk Mobile Monitors (except the MM1a) utilize costly butyl rubber surrounds, rather than the foam used in virtually all other car speakers. This results in better sound quality and more importantly it doesn't disintegrate in the harsh automotive environment.

Moisture resistant, polymer technology drivers
For life-like high definition sound and total performance reliability.

Excellent imaging and spatial fidelity
Fills your car with sound.

Easy to install flush mount design
Assures simple and convenient installation for superb performance in your vehicle, home or office.

Full sonic compatibility between all systems
You can create the ideal combination to satisfy your needs.

MM5502, 6502, and 6902 — \$99.90 ea., \$114.90 ea., \$124.90 ea.

Three Way, Two Piece 5¼", 6½" and 6" × 9" Systems — all combine a polymer cone/butyl surround high power woofer with a unique 2 way satellite midrange high frequency module and built-in crossover. The versatile MM 1001 midrange-high frequency module is designed for easy mounting in virtually any position in the car as either an angled surface mount, flush mount, or behind a panel mount. Because it is a true two way mid-high frequency satellite it can be crossed in lower than other simple tweeter modules on the market with the advantages of better dispersion, better imaging and higher power handling.

The MM 6900 — \$99.95 ea.

Three way 6" × 9" System — incorporates the same 2" high definition polymer midrange, ¾" polymer dome tweeter, polymer laminate woofer and butyl rubber surround found in the MM 6902 two piece system. It is the finest 6 × 9 on the market and the first to offer truly natural audiophile sound quality.

MM Xa — \$84.95 ea.

The Audio Video Grand Prix award winning MM Xa utilizes the same basic 6½" driver used in all Polk's world renowned home speakers combined with a ¾" polymer dome tweeter and precision crossover.

The MMIV — \$109.95 ea.

Two-way plate system — consists of a polymer laminate cone 5¼" driver, ¾" wide dispersion high frequency radiator and sophisticated crossover network, all elegantly combined in one compact and easy to install flush mount unit measuring 8¼ × 6" with mounting depth of only 1¼". The attractive housing is molded of incredibly tough, space-age Lexan to assure long-term performance and design integrity.

The MM IIIa — \$62.45 ea.

5¼" Coaxial System — is a unique and remarkable speaker that achieves sonic performance almost equal to the MM IV but in a smaller package at a lower cost. The drivers used are similar to those of the MM IV, but the more compact package makes it easier to mount in more locations in the car. Try combining them with a pair of MMXIV's for a spectacular sounding 4 piece system at an incredibly affordable price.

The MM Ia — \$39.95 ea.

4" Dual Cone Full Range System — is a versatile polymer-treated, full range 4" system. It can be used by itself in economical high quality systems or combined with any of the other Mobile Monitor systems and located in the door or kick panels of a car for fuller sound or better sonic fill.



Polk IsoPhase Crossover System



Polk Silver Coil Dome Radiator



Polk Fluid Coupled Subwoofer



Polk Trilaminate Polymer Driver

“Polk Builds State-of-the-Art Components For High Definition Musical Sound Quality”

Consistently Superior Technology Results In Better Sound

H

igh Definition Reproduction

Polk loudspeakers are true high definition systems which reproduce sonic images with life-like clarity and detail, much like a high resolution camera captures a visual image with all the subtle detail and focus intact. When you listen to a pair of Polks, notice how you can hear each and every individual instrument clearly and distinctly, even when there are many instruments playing at the same time. This high resolution capability is in large part due to the consistently excellent transient response of all the drivers as well as the seamless blending achieved by the Isophase Crossover systems.

The Polk Trilaminare Polymer Drivers

These superb drivers are specifically engineered to cover the entire fundamental musical range with life-like clarity and minimal coloration. Polk's exclusive trilaminare (3 layer) polymer cone technology is responsible for a purity and naturalness of reproduction unapproachable by conventional drivers which utilize paper, or simple vacuum formed plastic cones. Polk's unique trilaminare polymer cone is made of three complimentary materials, each of which has unique performance advantages all its own. One material is very light and structurally strong, one is very stiff with a high speed of sonic wave transmission, and one very effectively removes sonic colorations by effectively damping the cone structure. The exceptional performance gained when all three are combined together could never be equalled by a simple layer cone of any single material. Polk drivers utilize costly butyl rubber surrounds for more accurate cone movement and deeper, better bass response. They incorporate high-temperature aluminum voice coils which allow high power operation without burnout. Optimized Flux Density magnet structures are used for perfectly balanced operation assuring clearer, more highly defined, more musical sonic performance.

The Polk Isophase Crossover Systems

The crossover network is the most important component in a high quality loudspeaker system. It is responsible for properly blending the sound of the individual drivers together into the homogeneous sounds of individual instruments and voices. The crossover acts like the “musical conductor” of the loudspeaker, telling each driver just when to come in and exactly how loud to play. The elaborate Polk Isophase Crossover Systems utilize huge copper coils and precision capacitors and resistors to assure the lowest possible harmonic, IM, and transient distortion with

High Performance Components Deliver Sonic Benefits to You

High Definition Reproduction allows you to clearly hear every subtle nuance and all the inner detail of the musical performance.

The Polk Trilaminare Polymer Drivers deliver many performance benefits including smoother more extended frequency response, greater clarity, wider dispersion, higher efficiency, improved phase linearity and lower distortion.

The Polk Isophase Crossover Systems are responsible for the beautifully blended, seamlessly smooth and coherent sound of the Polks.

The Polk Silver Coil Dome Tweeter achieves a unique combination of sparkling, life-like clarity and silky smooth, easy to listen to, high frequency performance.

Polk's Safety Guard Tweeter Protection Device is a distortionless, self resetting device which protects the costly tweeters from accidental damage.

The Polk Fluid Coupled Subwoofers achieve uniquely musical and dynamically awe inspiring bass performance while at the same time raising efficiency and dramatically improving depth reproduction and three-dimensionality.

Butyl Rubber Surrounds are used on all Polk drivers (except the MM1a). These extremely costly surrounds in contrast to foam rubber surrounds used by many manufacturers are more supple, allow deeper bass, terminate and damp waves transmitted through the cones and don't degenerate over time.

Air Core Coil Chokes are used in all Polk Isophase Crossover networks. Air core chokes, unlike iron core chokes used by many manufacturers, don't saturate at high power levels or change their critical performance characteristics at different power levels. The result is clearer, low distortion and more dynamic musical reproduction.

complex high level musical signals. Close tolerance, extremely costly mylar and silver mica capacitors are used in many models to achieve even higher sonic definition. In addition, driver equalization is optimized by the sophisticated and complex circuitry, while isophase (phase coherent) operation is maintained by careful control of the various phase relationships in the system. Many loudspeaker manufacturers skip on this critically important component because it is usually hidden from sight, but Polk builds crossovers correctly so that our speakers will sound better for you.

The Polk Silver Coil Dome Tweeters

This state-of-the-art transducer is the only tweeter in the world which utilizes a voice coil wound with costly silver coated wire for more extended frequency response. The extremely light polyamide dome allows exceptionally quick transient response while the inherently well damped material eliminates annoying resonances. The small diameter diaphragm assures wide dispersion of high frequencies throughout your listening room. In addition, the huge magnet structure combined with the low mass moving system results in vanishingly low distortion, superb wave form accuracy and high efficiency. A specially contoured non-resonant faceplate improves dispersion, lowers diffraction and helps eliminate resonant distortion.

Polk's Safety Guard Tweeter Protection Device

This elegant device is far superior to the circuits used by many other manufacturers, because it is totally distortionless and does not alter or degrade the sound in any way. In addition it is much more accurate and consistent in its operation than a fuse.

The Polk Fluid Coupled Subwoofers

Most Polk home speakers utilize a fluid-coupled subwoofer system for tight, quick, deep, powerful and room-filling bass response. This system realizes the performance advantages of both large and small diameter woofers at the same time. Small diameter woofers have faster transient response, better midrange and dispersion. Large diameter bass drivers couple better to your room and produce more bass. The Polk Fluid Coupled Subwoofer System excels in all these areas. It utilizes the low frequency energy produced within the enclosure by the small bass/midrange drivers to hydraulically energize the large diameter low resonance subwoofer below approximately 60 Hz. The result is remarkably clear, well-defined low frequency reproduction, exhibiting exceptional upper bass detail which extends smoothly and seamlessly down through the sub-bass and cleanly up into the midrange.



A skilled Polk quality assurance engineer checks every speaker.

"Polk's Quality Assurance Program Guarantees Sonic Excellence and Total Satisfaction"

One Uncompromising Standard of the highest quality

P

Polk Completely Tests Every Loudspeaker We Build

There is much more involved in manufacturing a high technology product like a Polk loudspeaker than just developing a state-of-the-art design concept. This is just the beginning. Meticulous workmanship, the use of the highest quality components and effective comprehensive quality control are all necessary to make certain that every pair of Polk loudspeakers delivers all the satisfaction that they are capable of. Polk is committed to assuring you that the Polk speakers that you buy sound as good as they were designed to sound and are made as well as they were intended to be made. To achieve this we have developed a uniquely exhaustive, thorough and effective quality assurance program. Our engineers insist that designing superior sounding loudspeakers systems isn't enough. The quality of the design is meaningless unless there is a foolproof quality assurance program to make certain that your loudspeakers will deliver their full performance potential. Unlike most manufacturers Polk completely tests each and every loudspeaker we produce. In fact Polk tests each and every sub assembly and component before it is assembled into the final product.

One Standard of Quality For Every Polk Speaker

Another unusual aspect of Polk's exhaustive quality assurance program is that the same elaborate procedures are followed not only for each example of a particular model, but also for every single Polk loudspeaker, regardless of cost. In other words, a Polk 4A goes through basically the same elaborate and exhaustive quality assurance program as the top of the line SDA-SRS. Polk engineers insist on this, just as they insist on using the same quality components and putting the same care into the design and refinement of every Polk speaker regardless of cost. Why? To give you total satisfaction.

Experienced Human Judgement Plus Unfailing Computer Accuracy

Polk's comprehensive quality assurance program involves both computer testing and tests performed by trained quality control engineers. No effort is spared to assure you of total satisfaction with your new Polk Audio loudspeakers for many years to come.

Polk engineers spent many years developing the CIDAC computer program which is used in Polk's quality assurance procedure. A detailed analysis of the importance of closely held tolerances and their relationship to audible performance resulted in

Polk completely and exhaustively tests each and every loudspeaker we produce.

Polk engineers know that designing superior sounding loudspeakers isn't enough. The finest design is meaningless unless the quality is guaranteed by a foolproof quality assurance program. Polk completely tests every loudspeaker we build to assure you that your own pair of Polk speakers will be perfect in every way.

One Standard of Quality For Every Polk Speaker

means that regardless of their cost, there is never any compromise in the consistent quality of any Polk speaker. Experienced Human Judgement Plus Unfailing Computer Accuracy achieves unexcelled quality assurance in all aspects of construction and performance.

The Human Element is essential, because there are some critical quality assurance tasks for which there is no substitute for trained human judgement.

Exactly Close Tolerances are rigidly adhered to in order to realize the full performance potential of all materials, components and technologies.

Total Testing of Every Sub-assembly before it is assembled into a finished product eliminates any possible chance of a bad component slipping through final quality control.

Total Testing of Every Finished Product assures you that your Polk speakers sound as good as the engineering prototypes, and will perform superbly out of the box and for many years to come.

The Pride of Polk Ownership that comes with every Polk loudspeaker is a very special bonus that is uniquely fulfilling.

the specification of the proper critical test comparisons essential to total sound quality performance and long term satisfaction. This effective computer procedure is used for those critical objective tests where there is no margin available for human error.

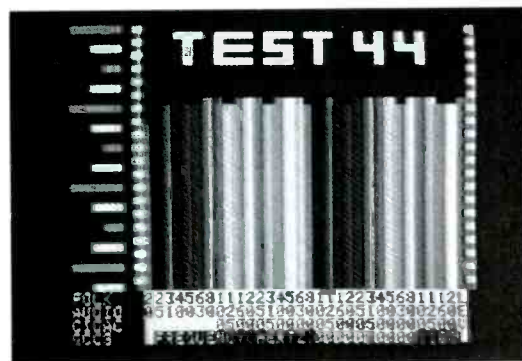
The CIDAC quality control system utilizes a high-speed dual-state parallel binary interface between a state-of-the-art control processor and a group of sophisticated data acquisition and analysis subsystems. The CIDAC master control program serves as the central control for the system, supported by a library of tightly-written machine language routines, which provide high-speed execution in the demanding signal-processing environment. This combination of powerful hardware and sophisticated software allows the system to perform high-accuracy measurements covering all relevant parameters of loudspeaker performance.

Sometimes There Is No Substitute for a Human Being

No machine can ultimately tell you how a loudspeaker sounds reproducing music and only a human being can properly inspect the myriad of small details in order to ensure that each Polk loudspeaker is cosmetically perfect and structurally correct. That is why, at Polk, we utilize a synergistic combination of unfailing computer accuracy and experienced human judgment to fully assure you of the quality of each and every pair of Polk speakers.

The Pride of Polk Ownership

Like a fine watch, camera, or outstanding motorcar; a Polk loudspeaker is meticulously constructed to perform and to last. Its intended goal and purpose is fulfilling your musical pleasure. However, like any finely crafted object, the many and varied delights of owning Polk loudspeakers transcend Polk's original design goals.



Polk's exclusive CIDAC computer system precisely and accurately checks every Polk speaker in the critical areas of loudspeaker performance.

Where to buy Polk Speakers? For your nearest dealer, see page 26.

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RTA 11t
\$424.95 ea.

The new Polk RTA 11t is the extraordinary result of a joint collaboration between Matthew Polk and a world famous industrial designer which combines state-of-the-art Polk technology, superb musical performance and breathtaking designer styling.

HX Pro: What It Isn't

A number of readers apparently misunderstand the nature of Dolby HX Pro, for they put it in the category of a noise-reduction device.

HX Pro is not a noise-reduction system. Its purpose is to increase headroom (i.e., to maximize record level before substantial treble loss occurs) by reducing the amount of oscillator bias fed to the record head when there is substantial treble content in the program. Such treble content acts as bias, and excessive bias causes treble loss. HX Pro can tie in with Dolby noise reduction by using the same circuit to sense the amount of high-frequency content. However, HX Pro is used only in recording, and does not affect the tape's playback compatibility. Dolby noise reduction is applied in both recording and playback, and tapes made with either Dolby B or C NR should be played back with the same NR system.

Cleaning-Fluid Warning

The "Audioclinic" column in the November 1986 issue suggested the use of WD-40 to clean dirty electrical contacts in tape decks and other audio equipment. The advice is good; any lubricant of the WD-40 type makes a fine cleaner and anti-oxidant. One word of warning, though: WD-40 is flammable. Spray-happy consumers sometimes find themselves amazed at what can happen if WD-40 gets into high-current electrical contacts such as power switches or nearby motor brushes. So be careful!—Greg Clugston, Orange, Cal.

Reading Meters

Q. I have found that recordings I've made based on true (average-reading) VU meters have been better than those using peak-reading meters. The latter are noticeably noisier. Perhaps in making them I was relying too much on seeing that the music didn't peak over 0 dB. Using the various types of noise reduction, how much over 0 dB can the music peak without producing appreciable distortion?—George James Jew, Corvallis, Ore.

A. I am surprised to learn that you have obtained better results with a true VU meter than with a peak-reading meter. Most audiophiles have the oppo-

site experience. Is it possible that your peak-reading device was miscalibrated, causing you to record at too low a level and therefore to not realize the signal-to-noise potential of your tape deck?

On many or most decks, 0 dB on a peak-reading record level meter denotes DIN level (250 nanowebers per meter). This is several dB below the maximum permissible recording level, customarily taken to be that which, at 315 Hz, produces 3% harmonic distortion on the tape. The difference would typically be about 2 to 5 dB; in other words, one can usually record safely at a level about 2 to 5 dB above 0 dB. However, tapes differ in the amount of signal they can accept before reaching 3% distortion. They also differ in their sensitivity, that is, in the amount of signal output they deliver for a given signal input. Accordingly, the amount that one can go over 0 dB in recording will vary with tape type and brand.

Sometimes the meter's 0-dB point corresponds to Dolby level, which is about 2 dB below DIN level. This increases the extent to which one can exceed 0 dB in recording. Or, as previously suggested, the meter may be calibrated so that 0 dB corresponds to a still lower level.

When using dbx noise reduction, one can usually go a greater distance above 0 dB than when using Dolby B or C—to +10 VU or so.

All in all, one is well advised to experimentally determine how high a recording level one can safely employ, depending on the particular tape one chooses and on whether dbx or Dolby NR is used.

Cleaning Misadventure

Q. I have a Sony Walkman WM-800. The manual says to clean the heads with denatured alcohol. With the deck in play mode, I cleaned the playback head with 70% isopropyl alcohol. Following the cleaning, the deck exhibited very poor sound quality. After much trouble-shooting by technicians in a service shop, it was determined that the head was permanently ruined. No one seems able to explain the cause, however. Is isopropyl alcohol too strong for such application? Could the magnetic properties of the head be altered if it is cleaned while current is

passing through it?—Tom Whang, Glendora, Cal.

A. It is a rare occurrence for a head to be harmed by application of isopropyl alcohol. Normally, the stronger, 91% isopropyl alcohol is recommended; therefore, the strength of the solution you employed doesn't seem to be at fault. I doubt, too, that cleaning the head with power on would cause your problem.

The head gap has a filler, and this may have been affected by the alcohol. Try cleaning the head once more, but this time allow at least five minutes of drying time before putting the deck into operation.

You should report your problem to the manufacturer. Possibly your unit had a defective head to begin with. In any event, have the manufacturer advise you as to what cleaning fluid to use in the future.

Microseconds

Q. Every time I buy a tape I see the term " μ S." What does this mean?—Varick Williams, Hartford, Conn.

A. The term μ S is an abbreviation for microseconds (millionths of a second) and applies to the types of equalization used in tape recording and playback. Ferric-oxide (Type I) cassette tapes use 120- μ S equalization; the newer, high-bias (Type II) and metal (Type IV) cassette tapes use 70- μ S equalization.

This is a rather roundabout notation, since μ S is an abbreviation for a unit of time and we think of equalization more in terms of frequency than time. What it refers to is the time characteristics of the playback equalizer circuits.

Cassette playback equalization curves are fairly flat at both ends, with a long slope in the middle. This slope can be considered either a treble cut or a bass boost, since it extends through both frequency regions. Considering it as a treble cut, it commences (3 dB below maximum) at 50 Hz and levels off (3 dB above minimum) at a "turnover" frequency specified by industry standards. This turn-

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 1515 Broadway, New York, N.Y. 10036. All letters are answered. Please enclose a stamped, self-addressed envelope.

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AL Birmingham: Auditor • Coatsden:
 Sound Performance • Huntsville: Campbell's
 Sound Distributors • Mobile: Sound Advice •
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 loosa: Kinzard Stereo & TV

AR Little Rock: Leisure Electronics
AZ Flagstaff: Sound Pro • Mesa: Hi Fi Sales
 Phoenix Stereo • Tucson: Audio Emporium • Yuma: Ware-
 house Stereo

CA Arcata: Arcata Audio • Berkeley:
 Sounding Board • Campbell: Sound Goods •
 Canoga Park: Shelby's • Davis: World Elec-
 tronics • Los Angeles: Audio Stereo • Mill
 Valley: World of Sound • Mountain View:
 Sound Goods • Napa: Futurvision • Orange:
 Absolute Audio • Penngrove: California Stereo
Redondo: Systems Design • Sacramento:
 World Electronics • Santa Cruz: Sound Wave •
 San Diego: Sound Company • San Fran-
 cisco: Stereo Store • World of Sound • San
 Gabriel: Audio Concepts • Santa Barbara:
 Creative Stereo • Santa Maria: Creative Stereo
 • Santa Monica: Shelley's Stereo • Stockton:
 Gluskins Garcia • Thousand Oaks: Creative
 Stereo • Ukiah: Music • Ukiah: Creative
 Stereo • Walnut Creek: High Fidelity Shoppe
CO Boulder: Soundtrack • Wavelength Stereo •
 Colorado Springs: Sunshine Audio • Denver &
 Suburbs: Soundtrack • Pueblo: Sunshine
 Audio

CT Avon: Hi Fi Stereo House • Danbury:
 Carlson's • Fairfield: Audio Design • Green-
 wich: Ai Franklin's • Groton: Robert's
 Hartford: Ai Franklin's • New Haven: Audio
 Etc. • Newington: Hi Fi Stereo House • New
 London: Robert's • Norwalk: Audiotronics
DE Wilmington: Bryn Mawr Stereo
 DC Myer Enrico

FL Daytona Beach: Stereodyes • Ft. Myers:
 Stereo Garage • Ft. Lauderdale: Sound
 Advice • Ft. Pierce: Stereo Shack • Ft.
 Walton Beach: Audio International • Jack-
 sonville & Suburbs: Audio Tech • Key
 West: Audio International • Lakeland: Sound
 Factory • Merritt Island: Southern Audio •
 Miami: Electronic Equipment Co. • South
 Florida • Naples: Stereo Garage • Orlando &
 Suburbs: Audio Spectrum • Pensacola:
 Fidler Hi Fi • St. Petersburg: Coeur D'Alene
 Stereo • Sound Advice • Tallahassee: Stereo
 Store • Tampa: Audio Vision • Sound Advice •
W. Palm Beach: Electronic Department
GA Atlanta & Suburbs: Hi Fi Buys • Aug-
 usta: Stereo City • Macon: Georgia Music •
 Savannah: Audio Warehouse • Valdosta:
 Stereo Connection

HI Honolulu: Audio Video
IA Davenport: Gregg Music • Des Moines:
 Audio Labs • Dodge City: Sound World •
 Iowa City: Hankley Audio • Mason City:
 Sound World • Waterloo: Icarus
ID Boise: Stereo Shoppe • Coeur D'Alene:
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IL Aurora: Stereo Systems • Bloomingdale:
 Alan's Creative Stereo • Buffalo Grove:
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KS Junction City: Audio Junction • Over-
 land Park: Audio Electronics • Wichita:
 Audio Vision • Topeka: Nelson's

KY Bowling Green: Audio Center • Camp-
 bellville: Coppola's Home Entertainment •
 Lexington: Stereo Shoppe • Odell: Audio •
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 Owensboro: Paducah: Risley's

LA Alexandria: Simpkins Electronics •
 Lafayette: Sound Electronics • Lake Charles:
 Classic Audio Systems • Opelousas: Sound
 Electronics • West Monroe: Audio West

MA Boston: Wallham Camera & Stereo •
 Fitchburg: Fitchburg Music • N. Dartmouth:
 Creative Sound Systems • Worcester:
 CD's Inc.

MD Bangor: Sound Source • Camden:
 Harbor Audio

MD Annapolis: Spaceways • Baltimore:
 Soundstage • Frederick: Evergreen •
 Rockville: Moe's

MI Ann Arbor: Absolute Sound • Birming-
 ham: Almas Hi Fi • Dearborn: Almas
 Hi Fi • East Lansing: Stereo Shoppe •
 Farmington Hills: Almas Hi Fi • Flint: Stereo
 Center • Grand Rapids: Classic Stereo • Iron
 Mountain: Sound North • Kalamazoo: Clas-
 sic Stereo • Lansing: Stereo Shoppe • Royal
 Oak: Absolute Sound • Saginaw: Audio
 Shoppe • Court St. Listening Room • Traverse
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MN Duluth: Me'l's • Audio • Mankato:
 Audio King • Minneapolis & Suburbs:
 Audio King • Minnetonka: Audio King •
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 King

MO Cape Girardeau: Stereo One • Jeffers-
 on City: Joplin, Springfield: Stereo Bull •
 St. Louis: Sound Central

MS Columbus: Audio Advantage • Gulfport:
 MS Columbus: Stereo Sound • Jackson:
 Sound • Walters • Pascagoula: Empress •
 Tupelo: Audio Advantage

MT Bozeman: Thrifty Ear • Great Falls:
 Rocky Mountain Hi Fi • Missoula: Aspen
 Sound

NC Asheville: Mr. Toads Stereo Video •
 Boone: Hinton's • Chapel Hill: Stereo Sound •
 Greensboro: Stereo Sound • Jacksonville:
 Southeastern Electronics • Kinston: Stereo
 Concepts • Moorehead City: Anderson Audio

ND Bismarck: Pacific Sound • Grand Forks:
 Stereo • Pleville:
 Stereo • Fargo: Raleigh: Audio Buys • Stereo
 Sound • Rocky Mount: Microwave Audio •
 Willington: Atlantic Audio • Winston-
 Salem: Stereo Sound

ND Bismarck: Pacific Sound

NE Lincoln: Stereo West • Norfolk: Mid City
 Stereo • Omaha: Stereo West

NH Concord: Audio of New England • Exeter:
 AutoSound & Soundboxes • Laconia: Audio
 of New England • Salem: Duomo's

NJ East Brunswick: Atlantic Stereo • Frank-
 lin Lakes: Audio Concepts • Gladstone:
 Shade • Bryn Mawr Stereo • Montclair: Per-
 due Radio • Raritan: AC Audio • Ridgewood:
 Sounding Board • Shrewsbury: Monmouth
 Stereo • Toms River: Rand's Camera • West
 Caldwell: Prode Radio

NM Alamogordo: D&K Electronics • Carls-
 bad: Beason's
Salem: Vegas: Upper Ear • Reno: The Audio
 Authority

NY Albany: Clark Music • Batavia: Unicorn
 Audio • Buffalo: Speaker Shop • Corning:
 Chemung • Fredonia: Audio Concepts •
 Studio One • Glens Falls: Audio Genesis •
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 Chemung • Jamestown: Studio One • Man-
 hasset: Audio Breakthroughs • Massena:
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 Clark Music • Vestal: Hi Fi Electronics

OH Akron: Audio Craft • Cleveland & Sub-
 urbs: Audio Craft • Cincinnati: Stereo Lab •
 Columbus: Stereo Lab • Dayton: Stereo
 Showcase • Findlay: Audio Craft • Lima:
 Classic Stereo • Toledo: Audio Craft

OK Lawton: Hi Fi Shop • Oklahoma City:
 Audio Dimensions • Shawnee: Five Sounds •
 Tulsa: Audio Advice

OR Beaverton: Stereo Superstudies • Bend:
 Audio Video Lab • Eugene: Bradford's High
 Fidelity • Grants Pass: Shoppe • Medford:
 Stueckel's • Portland: Stereo Superstudies

PA Allentown: Bryn Mawr Stereo • Altoona:
 Stereo • Erie: Erie: Hart Electronics •
 Columbus: Stereo Lab • Dayton: Stereo
 Showcase • Bryn Mawr Stereo • Camp Hill:
 Bryn Mawr Stereo • Erie: Studio One •
 Johnstown: Gany's Entertainment • Kingston:
 Sound Concepts • Lehigh: G.N.T. Stereo •
 Lehigh Valley: G.N.T. Stereo •
Montgomeryville: Bryn Mawr Stereo •
Natrona Heights: Stereo Land • Phila-
 delphia & Suburbs: Bryn Mawr Stereo •
Pittsburgh: Audio Junction • Quakertown:
 Bryn Mawr Stereo • Reading: G.N.T. Stereo •
 Selingsgrove: Stereo Shoppe • Williams-
 port: Robert M. Sides

PR San Juan: Hi Fi Stereo: Precision Audio

RI N. Providence: Eastern Audio

SC Anderson: John Brookshire's •
 Charleston: Audio Warehouse • Greenville:
 Myer Enrico • Spartanburg: Stereo Shoppe •
 Rock Hill: Tans • Spartansburg: Stereo
 Shop

SD Rapid City: Team Electronics • Sioux
 Falls: Audio Warehouse

TN Chattanooga: College Hi Fi •
 Cookeville: Lindsay Ward • Jackson: New
 Wave Electronics • Johnson City: Mr. Toads
 Stereo • Knoxville: Lindsay Ward • McMin-
 nville: Lindsay Ward • Memphis: Opus II •
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TX Afton: Sound Effects • Arlington:
 Sound Idea • Austin: Audio Video • College
 Station: Audio Video • Corpus Christi: Tape
 Town • El Paso: Soundquest • Ft. Worth:
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 • Laredo: Melex International • Lubbock:
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 doches: Spinel Music • Odessa: Harold's
 Electronics • San Antonio: Bill Case Sound •
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 man: Worldwide Stereo • Temple: Audio Tech
 • Texarkana: Sound Tower • Waco: Audio
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UT Logan store only: Stokes Brothers •
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VA Bristol: Mr. Toads Stereo Video • Char-
 lottesville: Sound Machine • Falls Church:
 Myer Enrico • Franklin: Audio Concepts •
 Leesburg: Evergreen Audio • Richmond:
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 Virginia Beach: Digital Sound

VT Essex Junction: Stereo • Burlington:
WA Bellingham: DC Stereo • Chelan: Music
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WI Appleton: Sound World • Eau Claire:
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WY Cheyenne: Electronics Unlimited •
 Sheridan: Star Video

The pilot tone in an FM signal may interfere with a deck's Dolby circuitry. If so, a multiplex filter should be used.

over frequency, f , can be obtained from the relationship $f = 159,155/\mu\text{S}$. Thus, if a tape employs 70- μS playback equalization, $f = 159,155/70 = 2,274 \text{ Hz}$, for 120- μS playback equalization, $f = 1,326 \text{ Hz}$.

Dashed Hopes?

Q. I plan to install a stereo system in my car, but the only available place for an in-dash unit is a vertical slot instead of the regular horizontal one. The tape deck that I want to buy calls for horizontal mounting. Can I mount it vertically without developing problems with the tape transport system?—Edwin F. Marciano, Joseph, Ore.

A. Often one invites trouble by mounting a tape deck in other than the intended position. But this is not an absolute certainty. Some manufacturers design their decks so they can operate satisfactorily in either a vertical or a horizontal position. The best approach is to query the deck manufacturer or, perhaps, an authorized service agency for the deck in question.

Filter Facts

Q. What is the purpose of a multiplex filter?—Tom Ritchey, Carroll, Ohio

A. A stereo FM signal contains a 19-kHz pilot tone which enables the FM tuner to recover stereo information. However, this pilot tone may cause improper action of the Dolby circuits in a tape deck, resulting in incorrect treble response; this is called mistracking. Therefore, FM tuners frequently incorporate a filter to remove the pilot tone from the tuner's output. Cassette decks too usually incorporate a multiplex filter, in case the tuner doesn't have one or doesn't perform adequately. If Dolby noise reduction appears to be misbehaving, or if your deck emits chirps or birdies or the like, the multiplex filter should be engaged, although this means that response will not extend to 20 kHz but will drop rapidly beyond 17 kHz or so.

Bulk-Eraser Insufficiency

Q. What would cause a bulk eraser to fail to erase cassettes completely? Mine does about an 80% job.—Ward G. Erwin, Kissimmee, Fla.

A. One factor would be an insufficiently strong magnetic field produced by the eraser. A second would be the

manner in which the eraser is used: It should be brought into contact with the cassette and moved in a circular fashion all about the cassette. A third factor is the type of tape. Metal tapes are the hardest to erase, some brands more so than others, and it is an unfortunate fact that some bulk erasers simply cannot adequately erase a signal on a metal tape.

Copying CD onto Tape

Q. I have a cassette deck with Dolby B, Dolby C, and dbx noise reduction. I also have an expander and a graphic equalizer. If I use the deck to copy from Compact Disc, which NR system should I use? Should I use the graphic equalizer or bypass it? And how about the expander?—Gines A. Martinez-Zayas, Caguas, P.R.

A. The choice is really between Dolby C and dbx NR. Ascertain, by listening, whether extreme low-frequency response and extreme high-frequency response are audibly better with Dolby C NR, as is sometimes the case. Determine whether noise is audibly lower with dbx, as may be the case, depending on how loud you like your reproduced music. And see whether side effects—such as sudden bursts of hiss and sudden volume changes—are noticeably different between Dolby C and dbx NR. Based on these three considerations, you can decide for yourself which noise-reduction system gives you best net results.

Assuming that the program material on the CD has reasonably satisfactory frequency response, it is best to use the graphic equalizer only in playback. This would be particularly true if the reason for using the equalizer were a frequency abnormality elsewhere in your system, for example a sizzling high end in your speakers. However, if there are major deviations from flat response in the program material itself, then you should use the equalizer during recording.

The expander is best used in playback. Considering the great dynamic range of most CDs, you would hardly want to use it in recording. In fact, one may often want to use a compressor in order to hear low passages when playing at moderate level. A compressor could be used either in recording or playback.

Technology Perfected.

Every home audio component company has their own area of expertise. Some manufacturers concentrate on new inventions and patents. Others focus their efforts on reducing costs and producing lower priced components.

More important than being the first or the cheapest, Luxman components are designed to achieve their sonic best. The engineers at Luxman have dedicated a lifetime to perfecting existing technology for sonic superiority.

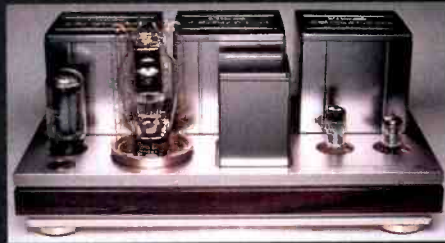
In the beginning.

Lux Corporation of Japan, as Luxman was originally named, was established in 1925 to design and manufacture high quality radio tuners for a fledgling home radio industry. The word "lux" is a scientific measure of illumination and was immediately applicable to a company that was seeking to build a "bright" future.

From this modest beginning, the Lux engineers continued to design and develop the internal parts for audio components, and in 1934 assembled a unique vacuum tube amplifier that highlighted our state-of-the-art transformers. Our transformers delivered wider bandwidth and lower distortion than the competition, earning Lux an immediate reputation for quality and performance.

In the 1950's, unique tube technology and the use of high quality transformers became the trademark of our quest for audio excellence.

In subsequent years, Lux began exporting to the European market and received numerous



Amplifier technology refined to an art form. The MB-300 is considered by many to be the most beautiful tube amplifier ever produced.

accolades for amplifier designs. In 1961, the introduction of negative feedback tone control circuitry contributed to the sonic superiority of the SQ-5B: the industry reference standard for integrated amplifiers.

The transistor revolution.

In the mid-60's transistor technology revolutionized the audio industry, and virtually every audio component could now benefit from the increased efficiency, cost economy and higher power output of transistors compared to vacuum tubes. To audio enthusiasts, however, this new technology clearly lost the warm, sonic purity of tube components.

The long and detailed study of transformers and tube configurations enabled Lux to design transistor components that retained true "musicality".

Then in 1975, Lux adopted the family name of Luxman and, with their debut at the Consumer Electronics Show in the United States, received immediate critical acclaim for design and performance.

The continued development of innovative circuit designs, such as DC amplification (1975), Duo-Beta circuitry (1980) and Computer Analyzed Tuning (1982), were examples of technology perfected for performance.

Luxman's reputation was rapidly spreading: transistor amplifiers with the warm, musical sound of previous tube designs.

The tradition continues.

Maintaining that "tube-like" musicality while using today's technology has become Luxman's forte. In 1985, Luxman introduced the world's first hybrid integrated amplifier: BRID... a unique combination of tubes and FETs that epitomizes the musicality of live performances. Internationally recognized as a sonic milestone for moderately priced amplifiers, this "BRID" design became the catalyst of a whole new level of public awareness of the sonic integrity of Luxman components.



The most recent developments by the Luxman engineering group redefine the industry standards in three distinct categories:

1. **ULTIMATE POWER.** Luxman has perfected sonic reproduction with amplifiers that capture the warm musicality associated with vacuum tube amplifiers, plus the high power needed for today's digital source material.
2. **DIGITAL DIRECT.** Luxman engineers have perfected the musical reproduction of digital source material by transferring the information in its digital form and converting it to analog in the integrated amplifier.
3. **SYSTEM REMOTE.** Luxman engineers have perfected the convenience of remote control by allowing full system operation from anywhere in the house.

Luxman is... technology perfected.

LUXMAN

Ultimate



R-117 AM/FM Stereo Remote-Control Receiver.

Luxman has perfected sonic reproduction with amplifiers that capture the best of both worlds: the warm musicality associated with vacuum tube amplifiers, plus the high power needed for today's digital source material. In other words, "quality plus quantity."

For over 60 years, Luxman components have earned the highest accolades for their musical warmth and transparency. In the past, however, Luxman's amplifiers were designed to deliver optimum results with analog source material and conventional loudspeaker designs. Now, the increased popularity of the compact disc format has created a new demand for higher power output.

The digital era.

Compact discs have a dynamic range that far exceeds that of phonograph records and cassette tapes. This requires amplifiers with greater reserve power to smoothly handle the dramatic changes in dynamic impact.

In addition, the clarity and wider dynamics of CDs have encouraged speaker manufacturers to introduce new designs with

improved sonic performance. However, several of these new speaker designs expose amplifiers to extremely low impedance loads that demand higher current output.

Plus, the CD's remarkable sonic realism has also ignited a whole new interest in listening to music that, in many households, has resulted in multiple speaker arrangements and multiple-room speaker installations. These combined loads pose additional threats to the stability and clarity of an amplifier with insufficient reserve power.

The new Luxman amplifiers.

To ensure the sonic integrity of CDs into a variety of speaker loads, an amplifier must be able to deliver high dynamic power. In answer to this, Luxman has incorporated massive power supplies with high energy reserves to ensure distortion-free transients. High-current, bipolar transistors are then carefully selected in matched pairs to preserve total sonic integrity at high dynamic levels.

This rugged design technique accommodates the high demands of both digital software and low

impedance loads. But high power is only half the story. . .

Ultimate fidelity.

The heart of Luxman amplifiers is still the warm, musical feeling that has resulted from decades of research on how vacuum tube amplifiers reproduce music so faithfully.

To achieve this same type of "tube-like" transparency and naturalness, Luxman transistor amplifiers employ voltage driven amplification configurations that perform the main current conversion only at the output.

In addition, sophisticated circuit designs, including Duo-Beta circuitry, STAR circuit patterns and LED bias circuitry, are utilized to obtain that extra degree of musical purity that conventional amplifiers ignore.

Ultimate power.

The best of both worlds. It's the purity and musical warmth of the original source plus the high dynamic power output that combine to ensure total sonic integrity at all volume levels. In today's Luxman amplifiers, we call it "Ultimate Power".

Power.

"Ultimate Power" Receivers.

The new R-117, R-115 and R-113 receivers are excellent examples of Luxman's "Ultimate Power" amplifier designs.

The R-117, rated at 160 watts per channel, is capable of supplying up to 600 watts of dynamic power into 4-ohm loads, and 700 dynamic watts into 2 ohms. The amplifier section is backed by a massive triple-shielded high-energy power transformer and fast-recovery rectifier diodes to maintain high energy reserves under all load conditions.

Similarly, the R-115, rated at 70 watts, can provide up to 200 dynamic watts into 4 ohms, and 270 watts into 2-ohm loads. And, with its heavy, double-shielded power transformer and high efficiency, it provides a full 3dB of dynamic headroom.

Both incorporate a new 5-gang varactor, dual-gate MOSFET FM front end, with automatic hi-blend circuitry, that ensures clean, distortion-free FM performance.

The R-113, the most affordable model in Luxman's new line of receivers, includes a high-speed dynamic amplifier that delivers up to 100 dynamic watts into a 2-ohm load. And a high-efficiency toroidal power transformer is coupled with high-energy storage capacitors to provide the dynamics and steady-state reserves necessary for the most demanding music transients.

All three receivers employ voltage amplification circuitry that ensures the "tube-like", musical warmth of traditional Luxman amplifiers. In addition, CD Straight circuitry routes CD input signals past all signal processor and switching functions to provide



R-115 AM/FM Stereo Remote-Control Receiver.



R-113 AM/FM Stereo Receiver.

optimum accuracy, imaging and impact.

Complementing this performance are an array of advanced features that lend versatility and precise control over a wide range of functions. Both the R-117 and R-115 even include a hand-held remote that can operate a complete system of components.



The ultimate upgrade.

All three Luxman receivers include pre-out connections for upgrading in power output to the awesome M-117 power amplifier.



Rated at 200 watts continuous power into 8-ohms, the M-117 is ideal for multi-speaker and multi-room applications as well as conventional systems. And the sonic accuracy of the M-117 sets new standards in terms of total amplifier performance.

Power Output Ratings

Specifications	R-113	R-115	R-117
Rated continuous power, per channel (20Hz to 20kHz, 8 ohms)	35W	70W	160W
THD at rated continuous power	0.06%	0.03%	0.03%
Dynamic power, per channel, 8 ohms	50W	140W	440W
Dynamic power, per channel, 4 ohms	84W	200W	600W
Dynamic power, per channel, 2 ohms	100W	270W	700W
Dynamic headroom, per channel, 8 ohms	1.5dB	3dB	4.4dB

Additional Features

Features	R-113	R-115	R-117
20 AM/FM random access memories	X	X	X
Auto seek tuning	X	X	X
AM/FM memory scan	X	X	X
Cable-ready FM fine-tuning	X	X	X
FM muting	X	X	X
FM IF bandwidth switch		X	X
Multipath detection circuit & indicator			X
CD straight switches	X	X	X
Tone defeat switch		X	X
MC/MM cartridge switches			X
Tape monitor switch	X	X	
Record-out selector switch			X
Three-position loudness switch			X
Multi-function remote control		X	X
Unified remote DIN jacks		X	X
Unified remote serial output jack		X	X
Remote eye connection (DIN)		X	X
Signal processor jacks/switch	X	X	X
Pre-out jacks	1 pair	1 pair	2 pairs
Main-in jacks			1 pair
Speaker terminals accept single banana	3-way	3-way	3-way

LUXMAN

Digital

Luxman engineers have perfected the musical reproduction of digital source material by transferring the information in its digital form and converting it to analog in the integrated amplifier.

Less is better.

The fewer circuits an audio signal must pass through, the less chance there is of it being altered along the way. And, therefore, the higher the sonic integrity of the signal.

This truism has been adhered to by virtually every manufacturer of analog components. For example, many amplifiers, including Luxman's, even offer switchable features such as tone defeat and phono straight to bypass circuit paths for optimum musical reproduction. Since the introduction of the compact disc, though, it's tempting to ignore these "fine-tune" options. After all, even the least perfected CD players still sound noticeably better than conventional records and tapes.

However, Luxman continued to study the transfer of CD signals through amplifiers and have developed a "CD straight" circuit that bypasses several switching functions to maintain optimum sonic integrity. And this was just the first step.

Luxman's research also revealed several shortcomings in converting the digital signal to analog inside the disc machine. First, the digital control signals that drive the focus and tracking servos inside the chassis create electrical interference that requires undesirably steep analog filtering. Second, the conventional approach (using duplicate analog circuitry in the CD player and the amplifier) provides too long a signal path to ensure musical fidelity.



LV-109 Integrated Amplifier.



D-109 Compact Disc Player.

Digital direct.

The solution was a whole new concept; convert the digital signal to analog in the integrated amplifier instead of the CD player, thereby improving the analog reproduction of the digital source.



Transmitting the audio signal digitally from the CD player to the integrated amplifier eliminates the inherent problems of analog transmission.

This new amplifier design incorporates a D/A converter and sophisticated microprocessor that analyzes the incoming signals and automatically selects the proper sampling rate: 44.1 kHz for CD, and 32 and 48 kHz for future



Luxman's direct digital amplifiers incorporate automatic sampling frequency selection.

sources, such as digital tape recorders and satellite broadcasts. Therefore, a variety of digital

components can interconnect with this system in the future to ensure optimum signal transfer and total sonic integrity.

A world's first.

Luxman's LV-109 integrated amplifier and D-109 compact disc player are the world's first digital-direct combination. For sheer performance and craftsmanship, these components represent the state-of-the-art in sonic reproduction.

The D-109 utilizes a high-precision laser pickup that is isolated from external vibrations by unique multiple-tension mechanical dampers. And internally, independent, strategically shielded sections eliminate analog contamination.

The LV-109 is a carefully selected combination of MOSFET and bipolar devices that measures 150 watts per channel, continuous into 8 ohms. This "Ultimate Power" component typifies the "tube-like" musical warmth and distortion-free volume of all Luxman amplifiers. With a comprehensive selection of features and switching capability, the LV-109 is in a superb class by itself.

Direct.



LV-117 Integrated Amplifier.



D-117 Compact Disc Player.

Digital perfection.

The second generation of digital-direct technology is the LV-117 series: the LV-117 integrated amplifier and the D-117 CD player.

In addition to the direct coaxial connection, this new digital-direct pair of components also offers the benefit of today's fiber optic technology. Signal transmission via a modulated light stream ensures complete isolation from any electrical contamination.



Transmitting the digital direct signal via fiber optics eliminates any possibility of externally induced electrical interference.

Both the LV-117 and D-117 incorporate a quadruple over-sampling digital filter and a Butterworth, linear-phase, low-pass filter to virtually eliminate phase and transient distortion effects for exceptionally clean reproduction. The D/A converter itself is an advanced ladder-network type—one of the most sophisticated designs available—for unparalleled stability and sound quality.

Rated at 110 watts continuous per channel into 8 ohms, the LV-117 continues the "Ultimate Power" tradition of delicate musical warmth plus distortion-free dynamic power.

Analog at its best.

In order to eliminate all design compromises common to amplifiers with built-in phono pre-amps, the Luxman engineers have created a separate phono pre-amplifier, the LE-109.



LE-109 Phono Pre-amplifier.

Independent left and right power transformers and bipolar power supplies, plus STAR circuitry and the latest FET devices, place the LE-109 at the forefront of high performance phono pre-amplifier designs.

Digital-Direct CD Players

Specifications/Features	D-117	D-109
Quantization-16 bit linear system	X	X
Digital filter, oversampling frequency	176.4kHz	88.2kHz
Output voltage (@ 0dB)	2V	2V
THD (@ 2V output, 0dB @ 1kHz)	0.004%	0.003%
Frequency response, 5Hz to 20kHz	0.3dB	-0.5dB
Dynamic range	95dB	100dB
S/N ratio (1HF A, emphasis on)	98dB	100dB
Channel separation (@1kHz)	86dB	88dB
Digital direct output level (p-p/TTL)	0.5V	0.5V
Digital direct output impedance	75 ohms	75 ohms
10-key numeric input (direct entry)	X	X
Programmable memory selection capacity	16	20
Memory check	X	X
Skip (up/down) & fast forward/back.	X	X
Repeat & A-B repeat	X	X
Auto (A)-scan & index scan	X	X
Pause	X	X
Touch-sensor loading tray	X	X
Track elapsed time readout	X	X
Track remaining time readout	X	X
Total elapsed time readout	X	X
Total remaining time readout	X	X
Timer play switch	X	X
Stereo headphones level control	X	X
Digital output	X	X
Digital output-optical	X	X
Remote control	X	X
Remote control functions	17	17
Unified remote serial in/out jacks	X	X
Heavy-duty metal chassis	X	X
Compartmentalized, shielded section	X	X

Digital-Direct Amplifiers

Specifications/Features	LV-117	LV-109
Rated continuous power, per channel (20 Hz to 20 kHz, 8-ohms)	110W	150W
THD at rated continuous power	0.05%	0.09%
Dynamic power, per channel, 8-ohms	160W	240W
Dynamic power, per channel, 4-ohms	250W	400W
Dynamic power, per channel, 2-ohms	300W	600W
Peak short-circuit output current	70A	120A
High current, low impedance amplifier	X	X
Voltage driven amplification	X	X
High energy power supply	X	X
Built-in precision 16 bit D/A converter	X	X
Auto. sampling freq. selector/indicators	X	X
Digital filter, oversampling	4X	2X
Digital direct inputs	2	2
Digital direct output	X	X
Digital direct input-optical	X	X
Line straight switch	X	X
NFB tone controls	X	X
Video amplification and switching	X	X
Audio and video tape monitoring	X	X
Audio and video tape dubbing	X	X
Front panel A/V input jacks	X	X
Signal processor in/out jacks & switch	X	X
Pre-out jacks	X	X

LUXMAN

System

Luxman engineers have perfected the convenience of remote control by allowing full system operation from anywhere in the house.

Conventional remote.

In the early years of audio component development, all efforts were focused on improving musical reproduction. However, as the popularity increased for home audio enjoyment, a strong demand for the convenience of remote control operation was evident. Today, virtually every type of audio component can be operated by a hand-held remote. But this, in fact, has created a new problem . . . too many remote units to keep track of!

In response to the latest demand for a unified remote concept where several components can be operated by the same hand-held unit, several manufacturers, including Luxman, have developed a single system interconnect. Luxman, however, has taken this concept many steps further. . .

The remote eye.

In real life applications, the hand-held remote must point directly at the desired component for reliable operation. To eliminate



F-105 Surround Sound System Control Center.

this inconvenience, Luxman developed the RC-101 remote eye extension. Simply stated, this box connects to the main system and can be placed anywhere in the room where



RC-101 Remote Eye.

remote operation is desired. In effect, your entire system can be concealed in a furniture cabinet and you can still control the functions from your couch (Diagram A).

Add another room.

To take this concept one step further, this "eye" can be mounted in another part of the house, allowing you to run speaker wires to an extra pair of speakers and operate the entire system in that room (Diagram B). Obviously, this eliminates the need for another complete audio system in this listening area.

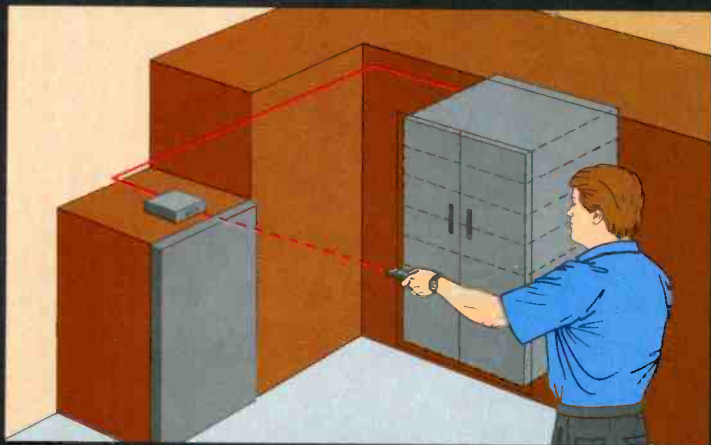
Multiple room capability.

In addition, Luxman engineers have also developed a

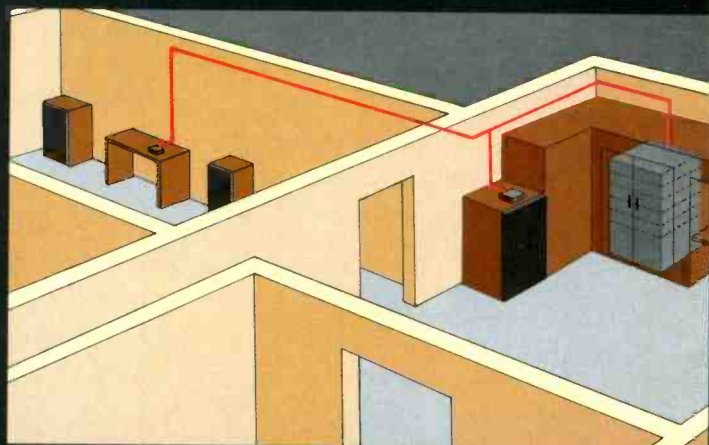
series of accessories (the RC adapters) to enable complete hookup to as many rooms as desired (Diagram C). With a relatively simple procedure for running cable through the house, you can then carry your hand-held remote into any room and turn the main system on and off, adjust volume, change radio stations, fast forward a compact disc, and more.

Add on video.

With the proper selection of "RC" adapters, the TV signal can travel down the same cable and interconnect with remote televisions thereby expanding the number of different custom installations made possible with Luxman components (Diagram D). Included in the group of accessories is a remote command repeater (RC-403) that enables complete operation of other components (such as a VCR) through the same multi-room system.



(A) Luxman's RC-101 remote eye allows easy remote control operation even when the system is concealed behind cabinet doors.



(B) By locating a remote eye in another room, the main system can be controlled from that room without the need to purchase additional components.

Remote.



U-100 A/V System Control Center.



T-107 Stereo TV Tuner/Video Remote Control Center.

Master control units.

Luxman's system control centers (allowing remote operation from anywhere in the house) can be separated into the following three categories.

1. AUDIO RECEIVERS.

Both the new Luxman R-117 and R-115 receivers include a single remote control that can operate a complete Luxman system. Each remote can operate not only the volume, source selection and tuning functions of the receiver, but the transport functions of a compact disc player, cassette deck and turntable, as well. And each receiver has the remote eye interconnect that allows full system operation from remote areas.

With their musical warmth and high dynamic power, either model would be the ideal starting

point in building a high performance, multi-room expandable audio system.

2. SYSTEM CONTROL CENTERS.

The U-100 and F-105 system control centers are designed to adapt an existing integrated amplifier or non-remote receiver to the capabilities of full-function and multi-room remote.

The U-100 provides remote capability by accepting the inputs from a variety of sources and feeding the selected signals to the amplifier. The U-100 includes a hand-held remote that operates the volume and source select, as well as the transport functions of other Luxman system components.

The F-105 takes the system add-on concept of the U-100 one step further by including surround sound processing. This master control unit also can feed rear-

channel speakers with any of four choices of surround sound decoded information.

Like the Luxman receivers, these remote control centers can accommodate a wide variety of multiple-room installations with complete system remote operation.

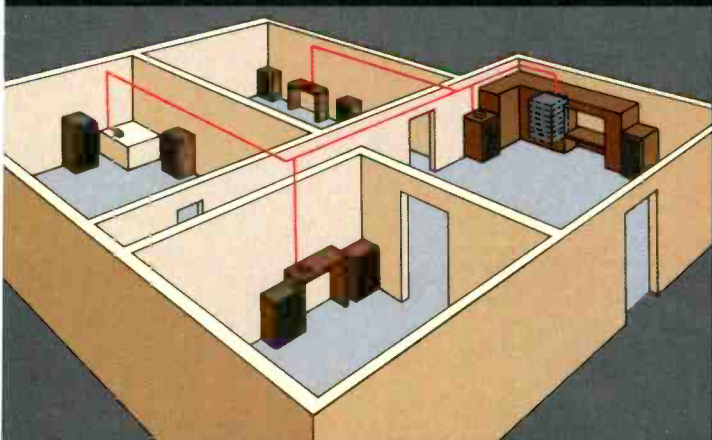
3. VIDEO CONTROL CENTER.

The T-107 is a sophisticated video control center designed to integrate a variety of video components with an audio system.

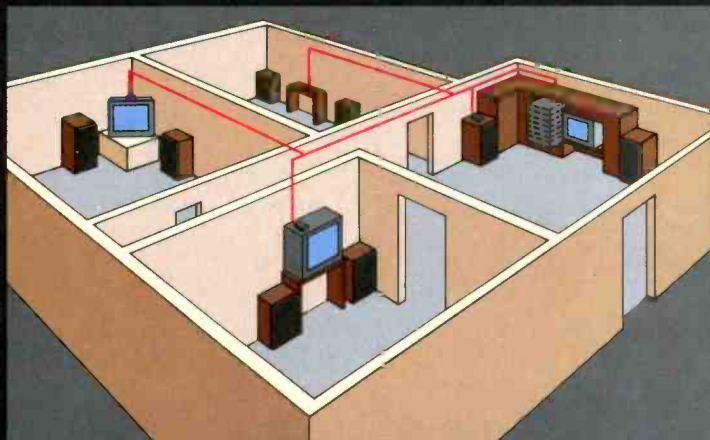
Complete with an M.T.S. stereo tuner, the T-107 delivers the stereo sound of each video component to your audio system with superb sonic accuracy. Plus, the professional grade switching circuitry allows you to control the volume, select sources and change TV stations with one hand-held remote. And, in the Luxman tradition of perfection, the quality of the video circuitry in the T-107 is unsurpassed on the market today.

Of course, this remote control center can interface with a variety of "RC" adapters to accommodate virtually any type of remote installation.

LUXMAN



(C) Installing remote eyes in additional rooms allows you to carry the remote control from room to room and still maintain full system control.



(D) Using additional Luxman accessories enables you to include video in your multi-room remote control system.

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LUXMAN

Concealed Speaker Wiring

Q. I am in the process of remodeling my den. As part of the project, I plan to install speaker wiring in the walls. What is the best wiring for me to install? My system is 150 watts per channel and I wish to accommodate any reasonable future upgrades. The longest wiring run between amplifier and loudspeaker is about 50 feet.

Also, I wish to install some type of jacks on a wall plate. What type should I choose? Where can I purchase them?—David Michael Hudson, Dallas, Tex.

A. I would use 12-gauge wire, which can be of solid copper, the kind used for house wiring. (I would not recommend this wire if a wall plate were not to be used.)

As for the jacks, I would use Hubbell twist sockets, whose mating plugs would be used to attach the speakers to the new wiring. These twist-socket/plug sets are similar to the three-prong plugs used for common household wiring, except that the prongs are all curved rather than flat, making it impossible to plug a loudspeaker into the power line. The contact surfaces between socket and plug are very large, minimizing d.c. resistance and consequent loss of damping.

The boxes on which the sockets are mounted could be standard electrical boxes recessed into the walls. If appearance is not a problem, it is perhaps easier to use a surface-mounted box. Be sure to obtain cover plates that will fit the boxes you select and accommodate the sockets you use.

All of the materials I have discussed here can be obtained from a good electrical supply house.

This arrangement is great for loudspeakers wired in parallel. A series hookup, however, could present a challenge as to how to arrange the wiring. (Such a hookup would be required only if you planned to use multiple loudspeakers for each channel and if the loudspeakers would represent too low an impedance when connected in parallel.)

No matter what you plan, there is always the likelihood that you will want to make changes. Because of the semi-permanent nature of concealed wiring, be sure to plan now for several sockets located in various parts of the

room, with a similar number allocated for each channel. Use colored wires in order to keep track of phasing. To make addition or retrieval of wires easier, you might wish to consider using a conduit of some sort which can guide the wires. If you use no conduit, be sure to leave your "messenger" (the string or wire used to pull your wiring along) in the wall for later use. Leave the ends in a couple of the boxes.

Amp/Preamp Mismatch

Q. My preamplifier is designed to feed a minimum load of 47 kilohms. The impedance of my power amplifier is 22 kilohms. Will this mismatch affect the performance of the overall system? If so, can I compensate for the problem?—Jeff Samich, Malverne, N.Y.

A. The only possible problem that I can see is a slight loss of the extreme low bass. If this does not take place or isn't noticeable, don't worry about the mismatch.

If you wish to correct the situation, double the value of each of the output coupling capacitors in the preamplifier. If there are input coupling capacitors in the power amplifier, you may wish to jump them out of the circuit. All should be fine. If your power amplifier is solid-state, be sure not to short the input to ground once you have bypassed the capacitors.

CDs and Stepped Waveforms

Q. I know that CDs can have signals 90 dB below zero level. Such a signal is made up of just four bits and has a step-like look to it. Even with noise added, signals at this level still don't look like sine waves. How can a CD produce good sound with such step-like waveforms? What is the lowest signal level which would produce good sound?—Name withheld

A. All digital recording/reproducing systems that I can imagine consist of stepped waveforms, but those steps are smoothed by the filter which removes the reproducer's sampling frequency from the analog output waveform. It's true that, since fewer bits are used to encode low-amplitude signals, the smoothed-out waveform will be a less accurate model of the original when the signal amplitude is low than when it's high and more bits are available. This is why noise and distortion,

our main measures of signal inaccuracy, are higher in digital systems at low signal amplitudes.

If you could listen to a sine wave that's been recorded onto CD at a very low level, the playback would not quite sound like the original. In order to notice this difference, however, one would have to advance the volume control to a point where the loud passages would be deafening. The only way I discovered this was to listen, at rather high volume, to a test tone meant for virtual inaudibility. Certainly at most signal levels, the departure from a sine wave would not be audible. Even at its worst, I don't believe the departure from linearity on CD is any worse than on some open-reel tape machines I have checked. I have not heard any instances in which the perceived distortion increased with decreasing signal level, especially with real program material.

Novel Approach to Record Cleaning

Here is a suggestion that your readers might appreciate: Use Teflon tape to clean your records! This tape is sold at plumbing supply outlets and at do-it-yourself stores. Teflon is inert and extrudes; thus it is an ideal pipe-thread lube and sealer. It is also slippery.

Rubbed on the surface of a spinning phonograph record, the tape apparently leaves a trace of material in the grooves which acts as a lubricant. It works very well; there is a definite, audible difference in noise before and after cleaning with this tape.

A fresh piece of tape will clean both sides of a record. With the turntable moving at 45 rpm and the tape wound onto a stiff, stubby brush, I slowly move the tape across the record and then, just as slowly, move it back. Mild to slightly firm pressure is sufficient. That's all there is to it. Although I find the use of a brush best, I have had some success with the tape wrapped around a finger. Of course, I don't permit the finger itself to touch the surface of the record.—O. O. Callaway, Carlsbad, Cal. ▲

If you have a problem or question about audio, write to Mr. Joseph Giovanelli at AUDIO Magazine, 1515 Broadway, New York, N.Y. 10036. All letters are answered. Please enclose a stamped, self-addressed envelope.

A Special Test Report

CARVER'S AMAZING LOUDSPEAKER

by *Julian Hirsch*

A PRODUCT with a name like "The Amazing Loudspeaker" would be difficult to take seriously if it came from anyone with a less distinguished track record than Bob Carver. It *does* come from him, however, and it *is* something to be taken seriously! Carver has long considered the unique sound quality of a planar loudspeaker to be unequalled, and rarely approached, by any form of enclosed speaker. The acoustic radiation from a large area produces a sonic image that seems to float in the air and usually cannot be localized to a specific point of origin. Planar speakers, with drivers on or in the form of a freestanding panel, are typically dipole radiators, emitting sound equally from their front and rear surfaces. The rear radiation bounces off the wall before reaching the listener, and the resulting directional scattering and time delay of a few milliseconds add additional airiness and a sense of space to the sound.

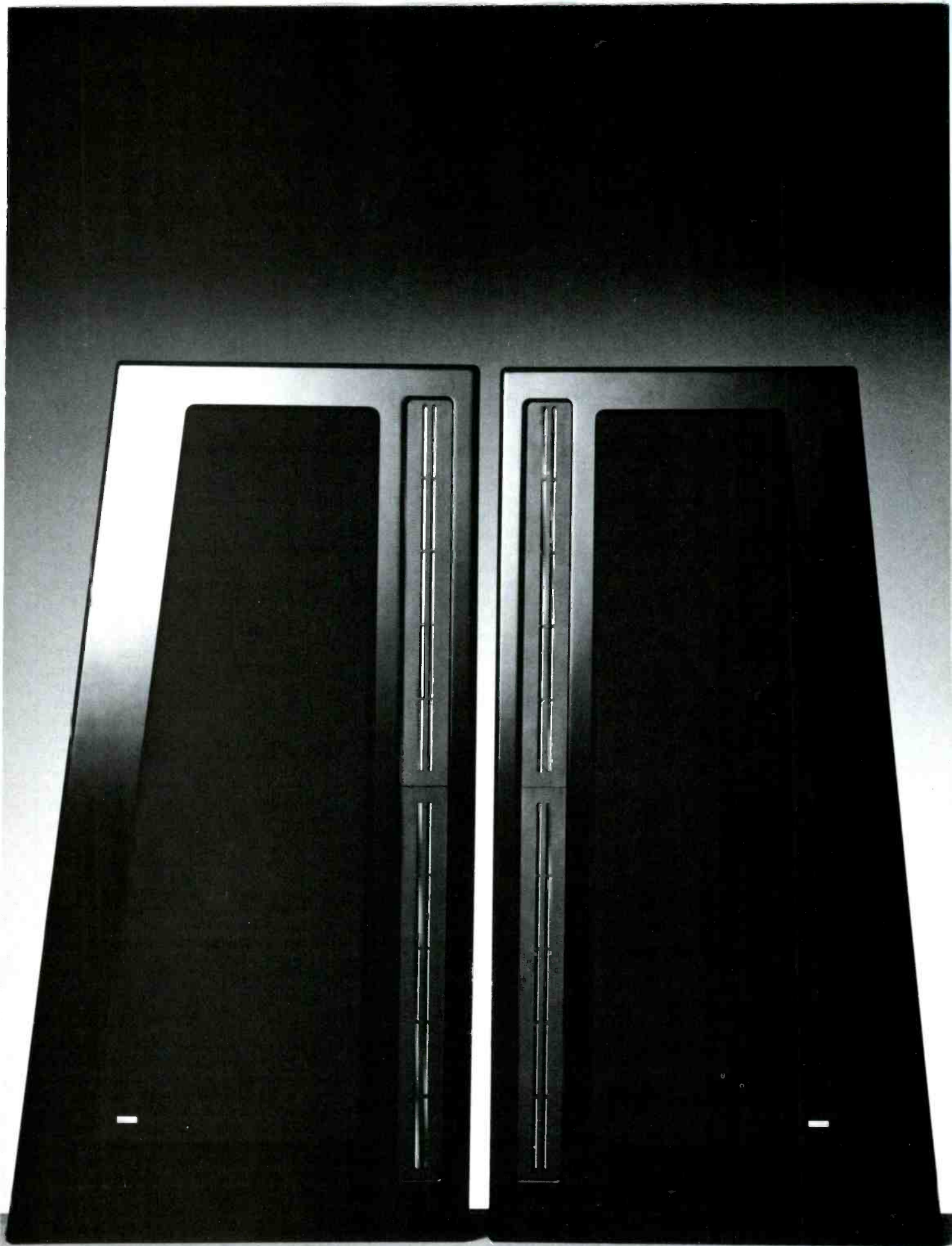
Planar radiators can be either electrostatic or electromagnetic in their operation. Carver based the Amazing Loudspeaker on a driver that he calls a "direct-drive large-area full-range ribbon." It is a type of magnetic driver whose "voice coil" consists of a long foil conductor suspended vertically in a magnetic field. "Direct drive" refers to the absence of any matching transformer to couple the very low impedance of the ribbon to the driving amplifier. Instead, a resistor connected in series with the ribbon is used to present an acceptable load to the amplifier (although it wastes some of the available power).

Adequate sensitivity is obtained by using a large number of magnets along the full 60-inch length of the dual ribbon, which is about 1/2 inch wide. The ribbon's considerable length and 30-square-inch area, as well as its placement in free air, enable it to dissipate the heat from large power inputs, unlike the fragile voice coil of a dynamic tweeter. Being vertical, it also has excellent horizontal dispersion. And the large area of the ribbon—effectively even larger than 30 square inches at low frequencies

PHOTO BY ROBERTO BROSAN

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Despite being a one-piece planar speaker system, the Amazing Loudspeaker had to be able to generate the lowest bass frequencies. Using magnets only a third as powerful as in conventional woofers, Carver's "uniform drive planar subwoofer" extends bass response to 25 Hz.



because of its Kapton plastic-film support—gives it the ability to radiate very low frequencies with near-ideal phase characteristics. Space-age plastics such as Kapton have the physical qualities needed to support the ribbon conductors of the Amazing Loudspeaker, and they remain dimensionally stable at extremely high temperatures.

Although Carver's ribbon is a superb radiator for the middle and high frequencies, aided by the absence of a crossover network in this major part of the audible frequency range, it lacks the area and linear excursion range needed to generate high acoustic levels in the low-bass region. Carver's goal was to create a two-way speaker that could deliver large amounts of undistorted power to all audible frequencies without requiring unrealistic drive levels from the amplifier. Despite being a one-piece planar speaker system, the Amazing Loudspeaker had to be able to generate the lowest bass frequencies without the aid of an external subwoofer. Carver's solution is called the "uniform drive planar subwoofer system," which, by using magnets only one-third as powerful as those of conventional woofers, extends the bass response down to 25 Hz with only a minimum loss of efficiency.

DESPITE the novelties of the bass drivers, the ribbon radiator is the heart of the Amazing Loudspeaker. Operating from 100 Hz to far above audibility, it supplies most of the audible sound from the system. It consists of a pair of series-connected aluminum-foil ribbons bonded to a sheet of Kapton plastic film. Four rows of bar magnets mounted on the speaker's wooden frame extend along its entire length—on either side of the ribbon, in front of it, and behind it. The magnetic field of these magnets is parallel to the front of the speaker. Signal currents flowing in the ribbon cause it to move and to generate acoustic waves that radiate to the front and rear of the speaker.

The ribbon is surprisingly rugged, thanks to the strength of its Kapton base, and its resonance frequency of about 25 Hz allows it to radiate over almost the entire audio frequency range. To keep the ribbon's maximum excursion at safe levels, the system's crossover is set for a low-frequency limit of 100 Hz. With the crossover removed, we were surprised (and impressed) to find that the ribbon alone could generate a

solid deep bass, though only at background-music levels.

A CONCERT SLOPE switch on the back of the speaker inserts a small response dip in the vicinity of 3,000 Hz. This adjustment shifts the normal perspective of the sound stage so that the music appears to come from a point behind the speakers. With the switch off, the sound is slightly more forward and nearer to the plane of the speakers.

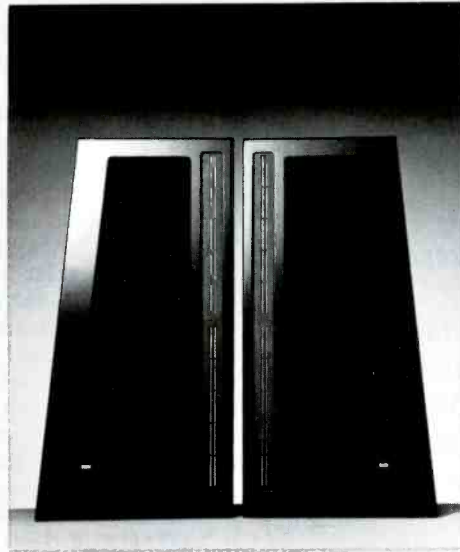
The Carver Amazing Loudspeaker, finished in a glossy black lacquer, measures 66 inches high and 34 inches wide at the base, tapering to 27 inches wide at the top. The ribbon driver is visible as a golden stripe near the inner edge of the speaker (the system is designed in mirror-image pairs). A dark gray cloth grille (not normally removable) covers the four woofers, which are aligned vertically and occupy most of the height of the panel. The rear of the woofer array is protected by a cloth-covered box. The speaker panel is supported on a low metal base that angles it backward a few degrees. Each speaker weighs about 150 pounds. Suggested retail price is \$1,536 a pair.

The Measurements

For our measurements, we positioned the two Carver Amazing Loudspeakers with their ribbon elements about 6 feet apart and their backs about 4½ feet in front of a room wall. Any speaker whose directional properties differ markedly from one using front-radiating cone drivers is difficult to measure because no single response curve is adequate to describe its performance in a meaningful way. Therefore, we were prepared to find the measured response of the Amazing Loudspeaker to be quite irregular, especially in quasi-anechoic FFT measurements, which respond to the sound arriving at the microphone along a specific line from the speaker.

Measured at a distance of 1 or 2 meters from the speaker, the FFT response revealed a strong bass, a dip at about 3,000 Hz, a broad maximum from 5,000 to 12,000 Hz, and a falling output from 12,000 Hz to beyond 20,000 Hz. There was evidence of comb-filtering, which showed up as a periodic fluctuation of output over the middle and upper frequency range. Further investigation, including close-miked measurements of the ribbon response, confirmed that this fluctuation was caused by interference be-

AMAZING BASS



tween signal components arriving at slightly different times from different parts of the ribbon, an inevitable result with any line or planar radiator.

THE fluctuations averaged out in the room-response measurements, and when the room response was spliced to the close-miked woofer response, the composite curve was flat within ± 4 dB from 65 Hz to beyond 20,000 Hz. The low-frequency output increased smoothly below about 300 Hz and leveled off between 20 and 40 Hz at about 10 dB above the average midrange level. This composite response curve corresponded closely to the frequency balance that we heard from the speakers.

We measured the woofer response with the microphone close to one driver. The FFT response rose at 6 dB per octave from above 100 Hz down to its maximum at about 26 Hz, and it decreased at 12 dB per octave below that frequency. The initial rise exactly compensates for the normal low-frequency loss of a planar speaker, making the system's actual bass response flat down to the maximum point, 26 Hz, of the woofer-response curve, dropping off at 18 dB per octave below that point. Since our test speakers (including the drivers) were hand-made prototypes, we measured the actual lower limit for each of the speaker's four woofers. The limit frequencies varied between 24.3 and 26.7 Hz, with the average being 26.4 Hz. The average response below 26.4 Hz dropped off to -3 dB at 21 Hz and -6 dB at 18 Hz.

The measured impedance of the Amazing Loudspeaker was relatively constant over the entire audio range. From a minimum of 4 ohms at 35 to 40 Hz, it rose to 12 ohms at 220 Hz, remained between 7 and 12 ohms from there to 5,000 Hz, and decreased to 4 ohms at 20,000 Hz. The average impedance was close to 8 ohms. The system's sensitivity was 82 dB sound-pressure level (SPL) at 1 meter with an input of 2.83 volts. Our bass distortion measurements are made at a drive level corresponding to a 90-dB SPL output, which in this case was 7.1 volts. We measured the distortion of each woofer individually, averaging the results at each frequency to account for possible variations among the drivers—which turned out to be remarkably alike in their distortion characteristics. The distortion was less than 1 percent from 100 Hz

Bob Carver's solution to the problem of generating the lowest bass frequencies from a planar speaker system without the benefit of an external subwoofer is what he terms a "uniform drive planar subwoofer system." The inherent relationship of the low-frequency cutoff, the enclosure volume, and the efficiency of a sealed-box speaker system normally requires a trade-off between volume, efficiency, and cutoff frequency. Since efficiency varies with the cube of the cutoff frequency, the penalty in lost efficiency for even a modest extension of bass response is huge. To reduce a sealed speaker's lower limit from 40 to 25 Hz, for example, would require a fourfold reduction in efficiency (equivalent to a 6-dB loss of sensitivity) and therefore four times as much driving power to achieve the same acoustic output level.

It had always been thought that planar speakers suffer from a similar limitation—that in order to have a useful low-bass output, the radiating panel must be large (comparable to the wavelength of the lowest frequency to be radiated). Carver, however, realized that while the efficiency equations for a planar speaker resemble those for a box speaker, there is a vital difference. The box's volume is replaced by the ratio of the woofer's cone area to its suspension stiffness (which is a function of the driver design and not related to the size of the speaker panel), and the relationship between the low-frequency cutoff and the efficiency becomes linear instead of cubic. Therefore, the response of a planar speaker could be extended from 40 to 25 Hz with a loss of efficiency, and consequent power penalty, of only 60 percent (a 2-dB reduction in sensitivity) instead of the 400 percent efficiency loss in a box speaker.

This bonus in the equations was not the complete answer to the problem,

however. Carver intended the Amazing Loudspeaker to generate frequencies not only equal to but well below the usual limits of box speakers, to say nothing of other planar types. Although its panels are rather large for many listening rooms, if the system used conventional bass drivers having a Q of 0.7 (the measure of the damping of the drivers' resonance), the system's response would be down 3 dB at 100 Hz and fall at 6 dB per octave below that frequency. Carver's design solution to this problem was characteristically both ingenious and simple.

By making the woofers' Q much higher, 2.5 instead of 0.7, and by placing their resonance at the desired lower frequency limit of the system, bass response (including the contribution of the crossover inductor) could be made to rise at 6 dB per octave with decreasing frequency. When the woofers' response is combined with the falling panel response, the result is a flat system response down to the woofers' resonance frequency, with a sharp cutoff at 18 dB per octave below that point (which happens to provide a superlative rumble filter).

It is noteworthy that the necessary high woofer Q was obtained by using magnets only about one-third as powerful as those of conventional woofers! The economy of this approach is considerable, since each speaker panel uses four 12-inch woofers and the magnet is a major part of the cost of any dynamic driver. The flat, rigid, low-mass radiating surfaces of the woofers are driven by conventional cones and voice coils. Since the woofers' moving mass must be very low to obtain the desired efficiency, a low resonance frequency (about 25 Hz) was achieved by using a very compliant cone suspension, which also allows a large linear excursion (about 1½ inches).

The overall sonic effect of the Amazing Loudspeaker was remarkably three-dimensional, with a very wide sound stage. Moreover, these were probably the most unstrained speakers we have ever used, with a seemingly limitless capacity to absorb electrical power and deliver clean audio output.

down to 50 Hz, rising to 1.73 percent at 40 Hz, 4.6 percent at 30 Hz, and 9 percent at 25 Hz.

The power-handling ability of the Amazing Loudspeaker was as impressive as its frequency response. At 100 Hz the woofers' output waveform remained an excellent sine wave until the input was raised to 555 watts, where it showed a slight sign of "rounding" from second-harmonic distortion. The output began changing to a straight-sided triangular waveform, representing third-harmonic distortion, at higher inputs, although the drivers never reached the endpoints of their linear excursions. The amplifier finally clipped at 960 watts. At higher frequencies, the amplifier clipped before the ribbon output showed any signs of distortion. The maximum inputs were 875 watts at 1,000 Hz (into 7.9 ohms) and 1,350 watts at 10,000 Hz (4.7 ohms).

Listening

In our listening tests, the Carver Amazing Loudspeaker had the essential spatial properties of a true planar speaker. The sound intensity hardly changed at all throughout the listening room, even when we stood quite close to the speakers themselves. The wall behind the two speakers became part of the sound stage, with the apparent sources distributed across and behind it as well as in front. The overall effect was remarkably three-dimensional. Moreover, these were probably the most unstrained speakers we have ever used, with a seemingly limitless capacity to absorb electrical power and deliver clean audio output. It would be safe to say that no home amplifier will tax the capabilities of the Amazing Loudspeaker.

THE sonic balance of the speakers was somewhat warm, with a noticeable bass emphasis. In the ribbon's middle- to high-frequency range, the sound was audibly smooth, well dispersed, extended, and effortless. Since the bass emphasis was largely below 100 Hz, it added little boominess to voices, although some of this effect could be heard. When the program contained really deep bass (under 50 Hz), the speakers began to show their unique qualities. Even at the lowest listening volume, we could feel their bass output, and at the highest levels it became positively tactile. The Amazing Loudspeaker is one of the very few speakers whose frequency response can hon-

estly be said to extend from below 20 Hz to above 20,000 Hz.

THE perspective adjustment afforded by the CONCERT SLOPE switch was quite subtle. We often had difficulty hearing its effect with music, although the frequency-response change was plainly audible with random-noise inputs. Whichever way the switch was set, there was a striking stability of the sound stage and of the imaging within it.

An unusually large sound stage is a clear advantage of a dipole radiator, and the Carver speakers possess a very wide one. For example, we heard the cannon shots on the Telarc CD of the *1812 Overture* coming from three distinct directions (left, center, and right), whereas with other speakers they all appeared to originate fairly close to the middle of the stage. As might be expected from their bass response, the speakers deliver an enormous impact from recorded cannon and bass-drum sounds, especially if the amplifier can deliver a few hundred watts per channel (at least 100 watts per channel is recommended).

It must be emphasized that the samples of the Amazing Loudspeaker that we tested were handmade prototypes and thus not necessarily fully representative of future production models. Judging from our tests and past experience, however, we would expect production models to be substantially improved, both cosmetically and in their listening performance. For one thing, Carver plans to reduce the original bass emphasis (which was established when the speakers were in a much larger room and could be placed further from the side walls) by changing the balance between the ribbon driver and the woofers. This should also increase the system's sensitivity by about 2 dB.

As with other Carver products, the nomenclature of these speakers is unconventional, but they do deliver the special performance that is claimed for them—and they offer unusual value for the money. We must admit that "amazing" does not seem entirely out of place applied to the Carver loudspeaker. Its overall sound is spectacular, its bass performance surpasses that of almost any other speaker one might name, its stereo imaging is outstanding, it appears to be indestructible by excessive power input, and its price is ridiculously low for what it does and considering what comparable products cost. □

A BIT (OR TWO) BETTER

Early (and some continuing) critics of digital audio focused their concerns on the two fundamentals of that technology: Sampling rate and quantization. They claimed that more of each was required to provide true high fidelity, whatever that is.

Instead of the 44.1-kHz sampling rate and 16-bit samples built into the CD standard, skeptics claimed that, for example, 100 kHz and 20 bits would be much more satisfactory. While there is a certain logic in that argument (in the same sense that instead of \$100 in my checking account, \$250 would be better), the facts argued slightly otherwise. Now, out of the blue, one major manufacturer has introduced technology which seems to vindicate the claims of the critics.

True, a higher sampling rate provides a higher frequency response. Instead of flat response to 20 kHz, you would find your player flat to 50 kHz. Unfortunately, while everyone hates to admit it, human ears really aren't that good, and even the SPCA would admit that there's no sense in wasting all that data on dogs. The only advantage to a higher sampling rate is the decrease in demands on the anti-aliasing filter preceding a digital audio system and the anti-imaging filter following it. The need to sharply limit audio energy at frequencies higher than half the sampling rate dictates the use of brick-wall filters to preserve our 20-kHz audio bandwidth with a 44.1-kHz sampling rate. And analog brick-wall filters introduce phase nonlinearities.

However, CD players can easily avoid the problem by using oversampling and digital anti-imaging filters; their phase nonlinearities are then negligible. And even the problem of brick-wall filters on the input of professional recorders may soon be eased with the development of oversampling anti-aliasing filters. In short, an increased sampling rate doesn't buy you much.

Increasing the quantization word length by a few bits may make more sense. A 16-bit word represents 65,536 amplitude increments, an 18-bit word represents 262,144 increments, and a 20-bit word yields no fewer than 1,048,576 choices. What having more increments buys you, primarily, is an increase in S/N ratio. Simultaneously, any quantization arti-



facts are diminished. Now, frankly, a properly dithered 16-bit system has a plenty good S/N ratio, and quantization artifacts are handled in such a way that resolution may be obtained at levels even below that of the least significant bit. What's more, the cost of true 18-bit A/D and D/A converters is shocking, and 20-bit converters—well, don't ask. There would seem to be little sense, then, in increasing the word length.

Thus the Compact Disc standards of 44.1 kHz and 16 bits were seemingly carved in stone, never to be tampered with. Until, of course, someone saw a way to improve on perfection. That "someone" is Yamaha: They have introduced a new line of CD players with 18-bit technology. "What?" you ask, "an 18-bit CD player for my 16-bit CDs? Is that kosher? Is it a gimmick, a whole new ball game, or what?" The answer, as usual, lies in a better understanding of exactly what technology has wrought.

Yamaha's intent with the 18-bit technology of their "Hi-Bit" converter is not to somehow improve the data from the disc, but rather to make better use of that data. In other words, the Hi-Bit technology attempts to overcome

problems in 16-bit converters which may limit their decoding of the information coming from the disc. An analogy may be made to oversampling: While the sampling rate per se is increased, the method doesn't create new information; it merely attempts to make better use of the existing information.

Not coincidentally, oversampling is what makes an 18-bit conversion possible, by solving the rather obvious problem of how to come up with 18 bits when the output from the disc is only 16. When the 44.1-kHz, 16-bit signal from the CD is oversampled, both the sampling frequency and the number of bits are increased, the former because of oversampling and the latter because of the multiplication which oversampling entails. For example, the output of an oversampling filter may be 176.4 kHz and 28 bits. Normally, only the 16 most significant bits are used, for conversion by a 16-bit D/A converter, and the rest are discarded (though in some CD player designs they are used for noise shaping).

The Yamaha Hi-Bit converter uses 18 of the bits from the output of an oversampling circuit, instead of just 16. Those two extra bits do indeed convey

The idea behind 18-bit players for 16-bit CDs is not to improve the data on the disc, but to make better use of that data.

useful amplitude information, albeit at levels below the first 16 bits. The problem is that using these two extra bits nominally requires an 18-bit D/A converter, which would be prohibitively expensive for the mass market. Yamaha's trick is that their Hi-Bit system does not really use an 18-bit D/A converter at all. Rather, it uses a 16-bit converter hooked up in an extremely clever way.

Here's the secret: The 18 bits from the oversampling filter's output are wired through switches to the inputs of a 16-bit D/A converter. When the signal's amplitude is high enough so that all 16 bits are being used to convey it, the upper 16 bits are applied to the 16-bit converter, as usual (Fig. 1A). However, when the signal's amplitude drops to a point where the two upper bits from the oversampling filter are not conveying any information, the 18 bits are shifted downward so that the unused bits are ignored, and the 16 lower bits are utilized instead (Fig. 1B). This adaptive scheme makes sense because in music recording, the two upper bits are rarely used, and then often for only a brief period of time. Through bit shifting, a 16-bit converter may thus handle an 18-bit input.

Of course, you have to compensate for the resulting shifts in amplitude caused by shifting bits. Therefore, the gain of the signal is reduced by three-fourths whenever the lower bits are shifted in; an analog gain block downstream of the D/A handles this chore. Why three-fourths? Because every time you shift the digits of a binary number one place to the left, you double its value. (In the decimal system, shifting the digits one place to the left multiplies a number's value by 10.) A shift of two places (two bits) quadruples the value. Hence, when the lower bits are shifted up, the signal amplitude becomes four times too large, relative to the unshifted portions of the signal, and the output must be attenuated by three-fourths back to its original value.

This adaptive 18-bit conversion system may be considered a noise-reduction scheme, in that the signal is being expanded at the D/A converter. The benefits result from the fact that the residual noise of the converter, as well as its conversion nonlinearities, will be

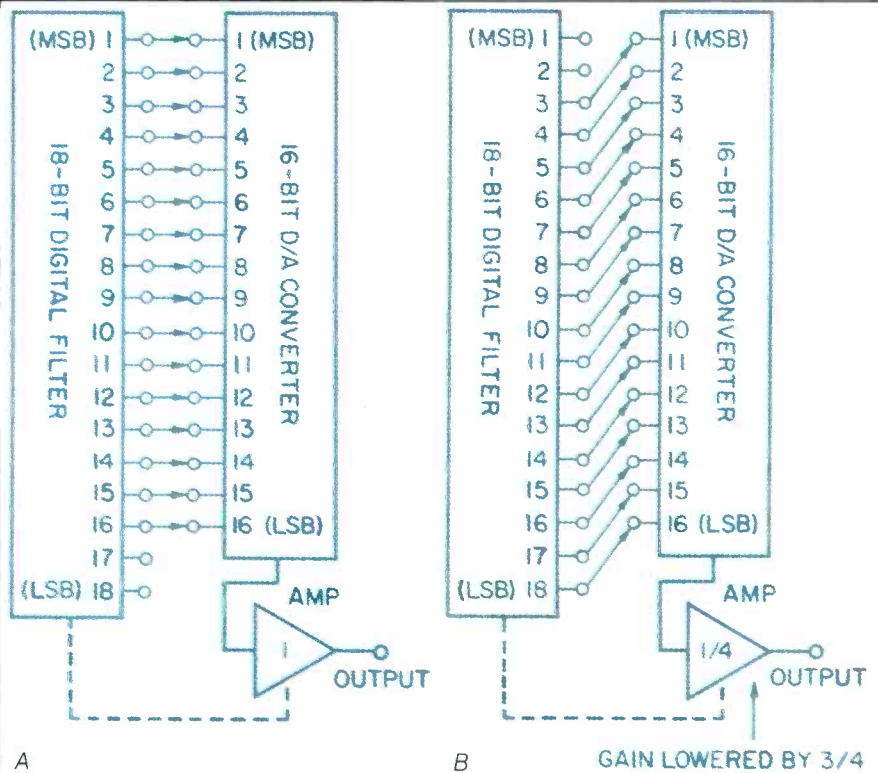


Fig. 1—In a quasi-18-bit system, when the signal level is high enough to use the first two bits (A), the first 16 bits of the 18-bit signal go directly to a 16-bit D/A converter and the last

two bits are ignored. At lower signal levels (B), only the last 16 bits of the signal go to the D/A; to compensate, the output gain is reduced to one-fourth normal.

proportionally reduced. Looked at another way, a four-times (12-dB) higher analog output will be achieved without increasing the D/A's residual noise and conversion error. When the gain is reduced by three-fourths to bring things back to normal, the noise and conversion errors are reduced to one-fourth their original levels. You get 12 dB more S/N and only one-fourth as much distortion, both equivalent to what you'd get from using an 18-bit converter. Pretty neat, eh?

Of course, as with any clever scheme (and in holding with the general law of the universe stating that there's no free lunch), there is a price to be paid for the benefit accrued. Specifically, as one might guess, it just ain't easy to get the benefits of an 18-bit converter with a 16-bit converter, no

matter how tricky your 16-bit converter is. The problem is this: When the bits are shifted, it is difficult to immediately and simultaneously shift the gain of the analog output to compensate. Furthermore, any static offset will become apparent when the switching takes place.

Until the first 14 bits are occupied, the output is four times its nominal amplitude, so the three-fourths attenuator is used to compensate. When all 14 bits are occupied, the output voltage is at its maximum. What happens when the 15th bit flickers on depends on the design. In a simple quasi-18-bit system, the bits would be shifted over by two places and the attenuator kicked out; output would then increase at normal gain until full 16-bit voltage is reached. Alternatively, there could be a 1-bit shift when the 15th bit goes on

The problem is to avoid sonic glitches when the attenuator is switched in and out. Precision and a tricky S/H can solve that.

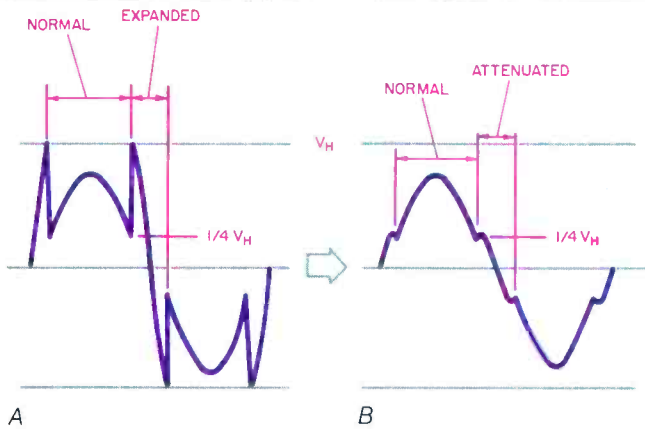


Fig. 2—The waveform from a quasi-18-bit D/A (A) has normal and expanded sections. When expanded sections are attenuated back to normal (B), imperfections in the attenuator will show up as mismatches between normal and attenuated portions of each waveform.

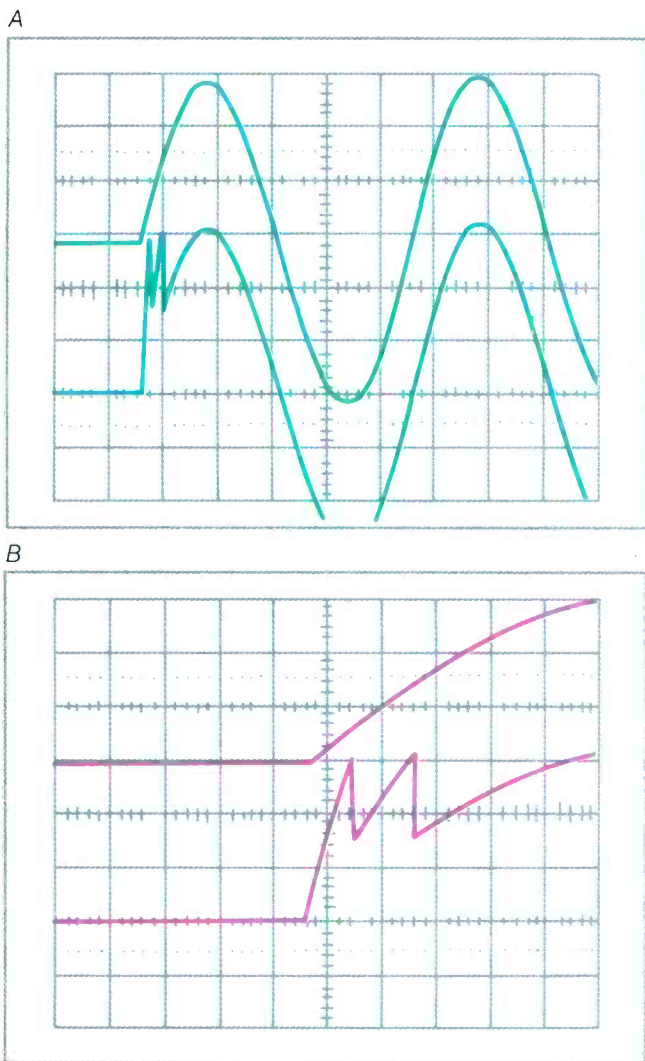


Fig. 3—Normal (A) and expanded (B) 'scope traces, showing attenuation-switching and deglitching. Lower trace of each pair shows smoothed output of D/A converter, without attenuation-switching action of sample-and-hold circuit. The upper trace of each pair shows final output, after the sample-and-hold circuit. Scales: Vertical, 1 V/div.; horizontal, (A) 500 μ S/div., (B) 100 μ S/div.

and another 1-bit shift when the 16th bit does; in that case, half the attenuation would be kicked out at the first shift, and the rest dropped at the second. Yamaha's Hi-Bit D/A converter, the only quasi-18-bit unit in production that I know of, uses the second technique.

Here is where the luncheon bill is presented. If, due to component tolerances, the attenuator can't reduce the output to precisely one-fourth (or one-half) its shifted value, there will be a glitch in the waveform where the attenuated and nonattenuated signals are joined (Fig. 2).

Yamaha had to face that problem when they produced their Hi-Bit D/A converter. Their solution was to combine the attenuator with their player's sample-and-hold (S/H) chip. (The S/H chip transforms the isolated pulses from the D/A into a continuous, stair-step waveform, which is then filtered to produce the audio signal.) The resistors in this attenuator (actually a gain switch) are laser trimmed for the highest possible precision, so the gain errors when the attenuator is switched in and out will be as small as the resistance errors in the D/A chip.

The S/H chip also keeps track of where the attenuator switching occurs and skips the samples which coincide with those transitions. It samples the value before the transition, holds that value until the switching is over, and then picks up with the sample that follows. Thanks to oversampling, which gives us four D/A output samples for every sample in the original recording, no data is lost this way. Judging by oscilloscope traces (Fig. 3) and by reports from those who've heard the system, glitches are not apparent.

This is only a transitional system, as even Yamaha admits. When true 18-bit D/A chips become widely available, we'll probably see them in high-end CD players; when such chips become affordable, we'll probably see them in less expensive players too.

Which brings us back to the golden-ear critics who complained in the first place. Will the new Hi-Bit system vindicate, at least in spirit, those who contended that 16 bits just weren't enough, or will it just be two bits of upmanship? That will have to be decided by, naturally, the critics. **A**

Soundcraftsmen S-E-P-A-R-A-T-E-S.



**THE NEW PRO-POWER FOUR
MOSFET AMPLIFIER IS A
"BEST-BUY" POWER STEP-UP
FOR ANY FINE SYSTEM...**

HERE ARE A FEW REASONS WHY!

REASON #1: it is guaranteed to improve and enhance your present receiver or integrated Amplifier, with our \$39.00 Pwer Coupler, the PC1. It enables you to plug in any Soundcraftsmen Amplifier to your existing stereo system, whether Receiver, or Integrated Amplifier.

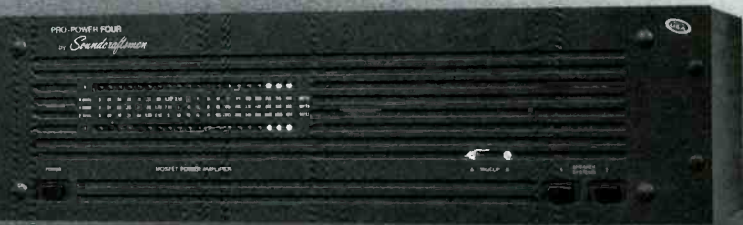
REASON #2: High Current where it's really needed. 50 Amps per channel available for instantaneous peak output capability of 2500 watts per channel.

REASON #3: Pure tube-like sound...smooth, clean, no "edginess," through the superb—and costly—MOSFET fully-complementary power output stages. So pure it out-performs even the "esoteric," "price-no-object" amplifiers!

REASON #4: The Pro-Power Four is an ideal "main component" for up-grading—or starting—a High Powered stereo system. It is capable of fully reproducing, with distortion-free, spine-chilling sonic clarity, all of the demanding high dynamic peaks inherent in the new Compact Discs and Hi-Fi VCR's.

REASON #5: Distortion-free performance, typically <0.02% THD and IMD, with TIM unmeasurable. Continuous FTC total power of 410 watts at 8 ohms, 20Hz to 20kHz, 205 watts channel.

REASON #6: Speaker System switching, 1, 2, or both...plus the High Current low impedance power required to drive Multiple Speaker Hookups in addition to Systems 1 and 2.



FOR A DEMONSTRATION, VISIT NEAREST DEALER LISTED BELOW

However, many additional Dealers—too numerous to list here—are located throughout the U.S. with many models on display. If no dealer is shown near you, or you encounter any difficulty, please phone us at 714-556-6191, ask for our "Dealer Locator Operator."

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YOU MUST SEE AND HEAR THE NEW *Soundcraftsmen*

DIGITAL C-MOS CONTROL CENTER PREAMPLIFIER



OUR 19-INCH RACK-MOUNT professional quality separates offer you many choices of the finest American quality separate components, to add to your present system, or to start a new system. From our 410-watt amplifiers at \$499, to our \$1,399 Pro Power Eight, incredibly powerful at 900 watts RMS per channel into 2 ohms, and over 3,000 watts of instantaneous peak reserve power into 2 ohms!

Plus a selection of 4 Preamp Control Centers, 5 Signal Processors, and a 16-station preset AM-FM Tuner.



STEP UP to a new "HIGH" in Audio Reproduction...

Soundcraftsmen introduces the all new **PRO-CONTROL FOUR**, featuring digital **CMOS** switching. Soundcraftsmen's new switching technique provides the utmost in versatility plus the least distortion and noise. This **NEW** digital electronic switching completely eliminates the signal distortion and noise that is caused by mechanical switching. The **PRO-CONTROL FOUR** is the most flexible, simple to operate, control center/preamplifier ever designed.

A special "direct" mode bypasses both tone controls, as well as all signal processing circuitry, to create the ultimate pure signal path, a "straight wire with gain." Our exclusive "Auto-Bridging" circuit provides all the necessary processing for mono-bridging of two stereo amplifiers, tripling the output power.

Five tape monitor circuits for audio tape decks and/or VCR's provide the highest degree of recording/dubbing flexibility to be found anywhere. Three additional inputs are provided for compact disc player, tuner and phonograph. Two more loops are provided for signal processors, (such as equalizer, noise reduction, range expander, etc.) and may be individually switched into the signal monitoring path and/or recording path.

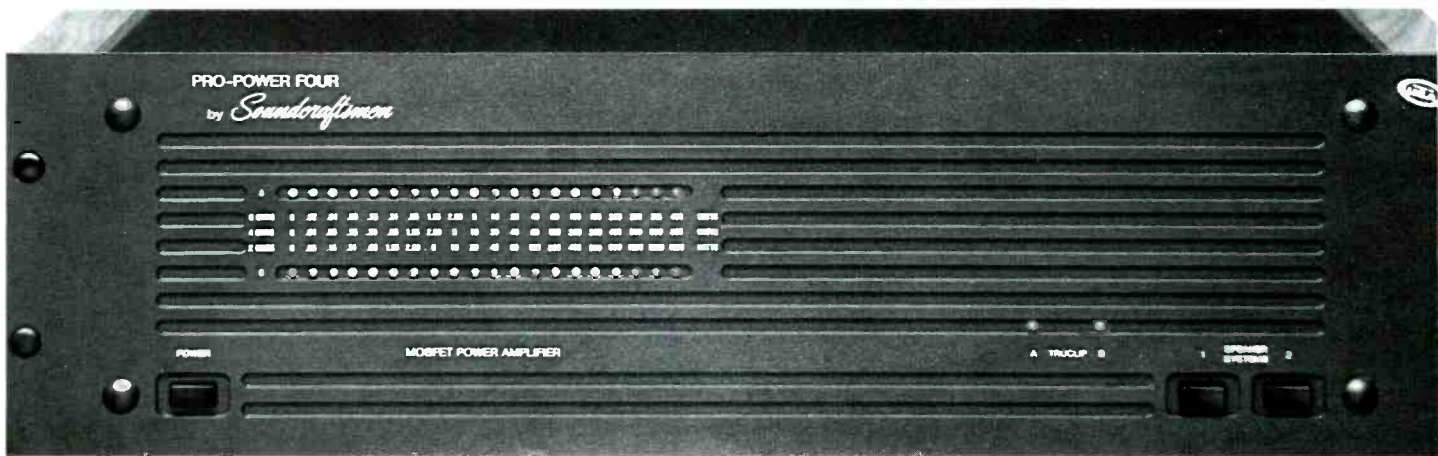
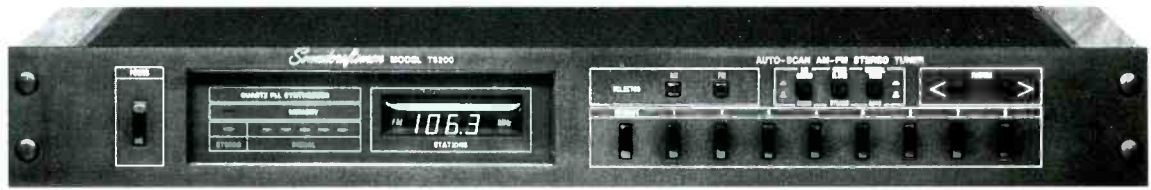
STEP UP to a new "high" in audio reproduction with the **PRO-CONTROL FOUR**, our technologically advanced digital CMOS control center and discrete phono preamplifier!

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“EXPLOSIVE” MOSFET POWER... CLEARLY A BEST BUY

THE NEW *Soundcraftsmen* ^{MADE IN U.S.A.} “PRO-POWER FOUR”
MOSFET AMPLIFIER IS YOUR BEST BUY, AND HERE ARE
A FEW REASONS “WHY”:

REASON #1: Dynamic Power to spare, up to 550 watts into 2 ohms.

REASON #2: High Current where it's really needed. 50 Amps per channel available for instantaneous peak output capability of 2500 watts per channel.

REASON #3: Pure tube-like sound... smooth, clean, no “edginess,” through the superb—and costly—MOSFET fully-complementary power output stages. You MUST hear this rib-cage-rattling superb new Audio Amplifier... hear the MOSFET difference, so pure it outperforms even the “esoteric,” “price-no-object” amplifiers!

REASON #4: Distortion-free performance, typically 0.02% THD and IMD, with TIM unmeasurable. Continuous FTC total power of 410 watts at 8 ohms, 20Hz to 20kHz, 205 watts channel, <0.05% THD.

REASON #5: Precision-Calibrated 40-LED Power Meters, allowing continuous and accurate monitoring of each channel's performance at 2 ohms, 4 ohms, and 8 ohms.

REASON #6: It is guaranteed to improve and enhance your present receiver or Integrated Amplifier, with our \$39.00 Power Coupler, the PC1. It enables you to plug in any Soundcraftsmen Amplifier to your existing stereo system, whether Receiver, or Integrated Amplifier.

REASON #7: The Pro-Power Four is an ideal “main component” for up-grading—or starting—a High Powered stereo system. It is capable of fully reproducing, with distortion-free, spine-chilling sonic clarity, all of the demanding high dynamic peaks inherent in the new Compact Discs and Hi-Fi VCR's.

REASON #8: Full-size 19” Rackmount panel with dark charcoal off-black finish, is a standard feature, as shown, with optional hardwood side panels available.

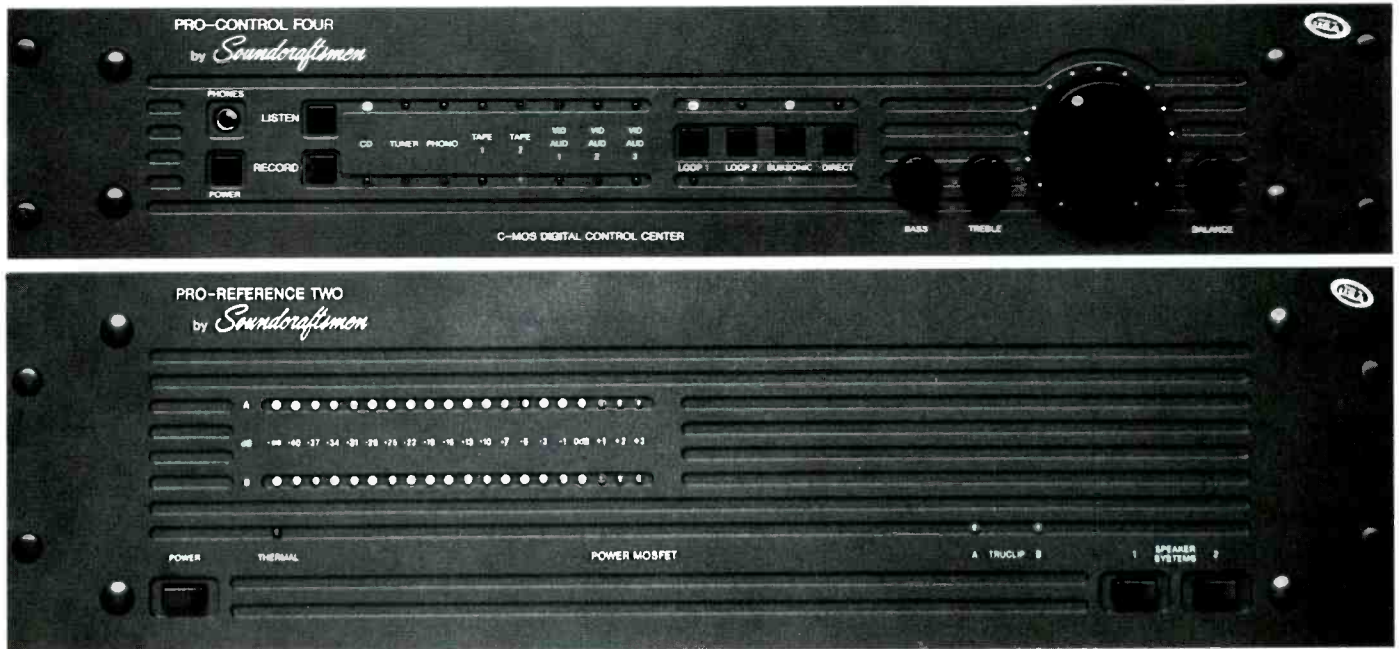
REASON #9: Speaker System switching, 1, 2, or both... plus the High Current low impedance power to drive Multiple Speaker Hookups in addition to Systems 1 and 2.

REASON #10: It shares the outstanding Performance/Value rating of all 16 Soundcraftsmen Professional and Hi-Fi amplifiers, ALL designed AND manufactured right here in Santa Ana, California. Our 410-watt total FTC continuous power Basic Amplifiers start as low as \$449.00, and a complete 410-watt system, including our AM-FM Tuner and Control Center Preamplifier, at just over \$1,000.00.

NEW! PRO-CONTROL FOUR



DIGITAL C·MOS CONTROL CENTER/PREAMPLIFIER



The new **PRO-CONTROL FOUR** from Soundcraftsmen provides **C·MOS** digital-control electronic switching for noise-free and distortion-free recording and listening enjoyment. All signal routing is accomplished with Soundcraftsmen's new **MOS-TROL®** high-performance electronic circuitry. This method allows all Signal Paths to be optimized and located near the input and output pc-board mounted jacks, which measurably lowers noise and cross-talk. The integration of buffered inputs with **C·MOS** and proprietary circuitry completely eliminates the distortion and degradation caused by other presently available, but now outmoded, electronic switching techniques.

The **PRO-CONTROL FOUR** has the capability for handling up to **EIGHT** input sources: CD/DAT, Phono, Tuner, Tape 1, Tape 2, Vid/Aud 1, Vid/Aud 2 and Vid/Aud 3. The sources selected for Line Out or Tape Out (or both) are indicated by sequentially selected LED illumination. Automatic muting insures elimination of noise and transients during source selection and all operational switching.

FEATURES

- Preamplifier/Control Center with MOS-TROL® Digital C·MOS Switching
- Five Video/Audio Tape Monitors with 5-Way Dubbing
- **DIRECT MODE** bypasses all processing, unnecessary circuitry & switches
- Two Signal Processor Loops
- Sub-Sonic Filter
- **AUTO-BRIDGE®** Circuit—Triples Amplifier Power
- Illuminated Volume Control pointer
- Recording circuits independent of Listen circuits
- Illuminated function operations
- Universal impedance-matching for all inputs and outputs
- Discrete Phono Preamps
- Stereo Headphone Jack

Totally **independent** Line and Tape sections allow for the ultimate in **Control-Center flexibility**—for example, a user can record a Phono source to any or all Tape and Vid/Aud outputs while at the same time be listening to the CD input.

EIGHT outputs are available: Normal A & B Line Outputs, "**AUTO-BRIDGE®**" circuitry that electronically inverts A & B Line Outputs for tripling the power by bridging, an independently amplified Headphone Output, and 5 Tape Outputs: Tape 1, Tape 2, Vid/Aud 1, 2, and 3. Two additional inputs and outputs—External Loops—are provided for processing of **either** Line **or** Tape signals, plus Switchable Sub-sonic Filters for both Line **and** Tape signals, as well as Bass and Treble Controls.

There is also a "**DIRECT MODE**" (**STRAIGHT LINE**) to bypass the External Loops, Sub-sonic Filter, and Tone Controls, creating the ultimate pure signal path, a true "**straight wire with gain.**" The "**DIRECT MODE**" selection eliminates all signal processing and unnecessary signal paths to allow for the utilization of the full capabilities of CD players, and Soundcraftsmen's **DISCRETE** Phono Preamps provide the ideal means for superb LP reproduction.

SPECIFICATIONS

- THD: <0.005%
- IM: <0.005%
- Frequency Response: 20Hz–20kHz ±0.1dB
- Maximum Output: 10 volts
- Phono Overload: 150 millivolts
- S/N Ratio: Phono: 97dB, High Level: 116 dB
- Input Sensitivity (.5v out): Phono: 2.5 millivolts, High Level: 125 millivolts
- Output Impedance: 180 ohms
- Tone Controls: Bass (100Hz): 10dB, Treble (10kHz): 10dB
- 19" x 3.5" x 10.5"

men **MADE IN U.S.A.** **STEP UP** TO *Soundcraftsmen* **MADE IN U.S.A.** **STEP UP** TO



the *Soundcraftsmen* STORY

Soundcraftsmen Celebrates Its 19th Year of Manufacturing Audio Components for the Discriminating Audiophile...Right Here in Santa Ana, California

From the introduction of our first Equalizer in 1969, through to our present-day product line of 26 models of U.S. Made Amplifiers, Pre-amps, Equalizers, and Analyzers, all made right here in Santa Ana, our goal has been to Design and Manufacture very affordable State-of-the Art "SEPARATES," with all of the unique and necessary features that audiophiles demand...and to assure the highest level of performance, 35% of Soundcraftsmen's Production Staff is involved in Quality Control procedures...100% Quality Control is seen on EVERY unit manufactured, and EVERY transistor and EVERY circuit board is put through an individual test.

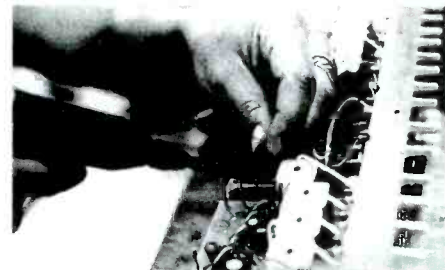
More Importantly, EVERY completed unit is final Q-C Tested 3 TIMES!...First, EVERY unit is electronically tested for specification accuracy...and Second, EVERY unit is connected to a High Fidelity system and listened to—just like you would at home...and Third, if your unit meets or exceeds the critical standards set forth on these tests, it is then hooked up and tested again on the final packing line, before it is packaged for shipment. EVERY unit, absolutely no exceptions, is FINAL-TESTED 3 SEPARATE TIMES, in 3 SEPARATE DEPARTMENTS, to assure you unsurpassed Reliability as well as superb Performance.



PRODUCTION AREA, MAIN PLANT



PRECISION COIL-WINDING



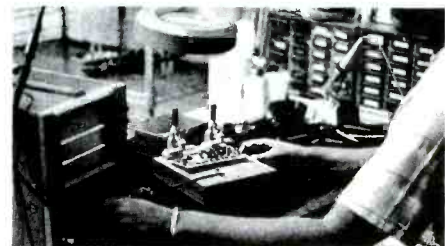
HAND-CRAFTED COMPONENTS



CIRCUIT BOARD LAYOUT



ENGINEERING AND DESIGN



QUALITY CONTROL #1



Meet Paul Rolfes, Chief Engineer, V.P., and inventor of Soundcraftsmen's many "FIRSTS" in amplifier technology

His inventions in electronic power circuitry have resulted in more than a dozen original patents, plus all the following Audio industry "FIRSTS":

- FIRST**—with signal-tracking multiple-rail power supplies.
- FIRST**—with fully electronic automatic resetting crowbar circuitry.
- FIRST**—with Phase-Control-Regulation power supplies.
- FIRST**—with automatic low-impedance power supply selection.

The Audio Industry's Most Complete line of Power Amplifiers— 16 Models of Power Mosfet and Class H Amplifiers, from 125 Watts p/c to 375 Watts p/c @ 8 ohms, 20-20kHz, <0.05% THD.

Yes, rush me the name of my nearest dealer, 1986 Buyer's Guide, and info on FREE 16-page color Brochure and 12" LP Test Record System Evaluation Kit. Mail to Soundcraftsmen, 2200 S. Ritchey, Santa Ana, CA 92705.

Name _____
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16-PAGE FULL COLOR BROCHURE, AND \$19.95 SYSTEM EVALUATION KIT: 1-12" LP Spectrum Analysis Test Record, 2-sets of Computone Charts, 1-Connector Cable for comparison test, 1-instruction folder for use with your present stereo system. Send coupon for FREE SPECIAL OFFER DETAILS.



1988 BUYERS' GUIDE to SEPARATES

19" RACK-MOUNT AUDIO COMPONENTS FOR THE SERIOUS AUDIOPHILE

**A CONDENSED GUIDE
LISTING FEATURES,
SPECIFICATIONS,
SIZES AND PRICES...**

Power Amplifiers



PRO-POWER FOUR, MOSFET stereo power amp **300** Continuous RMS Watts per channel @ 4 ohms, 205 Continuous RMS Watts per channel @ 8 ohms, 20-20kHz, **450** Watts RMS @ 2 ohms, **900** Watts RMS @ 4 ohms Bridged. THD < 0.05%, Hum and Noise: -105 dB, Front Panel switching for 2 pair of speaker systems. 40-LED 0-1600 Watt Power Meters. 19"W x 5 1/4"H x 11"D, 30 lbs. **\$749**

PRO-POWER THREE MOSFET stereo power amplifier, same as Pro-Power Four, except no 40-LED power meters. 30 lbs. **\$649**



PRO-POWER EIGHT MOSFET stereo power amp. **600** watts per channel continuous RMS power into 4 ohms; 375 watts per channel continuous RMS power into 8 ohms, 20-20,000 Hz with no more than 0.05% THD; 900 watts per channel RMS into 2 ohms; Freq. resp. 20-20,000 Hz ±0.1dB; S/N -105dB; slew rate 50V/m.sec; TIM unmeasurable; IM 0.05%. 19"W x 5 1/4"H x 16 1/2"D; 67 lbs. **\$1,399**

PM840 Power Amplifier, MOSFET stereo, features no-current-limiting power supply, **300** w/p/c RMS into 4 ohms; 450 w/p/c RMS into 2 ohms; 205 w/p/c into 8 ohms @ <0.05% THD; Freq. resp. 20 to 20,000 Hz ±0.1dB; S/N >105dB; slew rate 50 V/microsec; TIM unmeasurable; damping factor 200. 8 1/2"W x 5"H x 12"D; 22 lbs. **\$549**

PCX-2 19" Rack Mounting kit for two PCR800 or PM840's, 2 lbs. **\$49**



PCR800 Power Amplifier, MOSFET stereo, 205 watts per channel continuous RMS 20-20,000 Hz into 8 ohms <0.05% THD; TIM unmeasurable; S/N -105dB; 8 1/2"W x 5"H x 12"D; 22 lbs. **\$499**



A5002 Power Amplifier, Class-H Vari-Proportional circuitry and Autobuffer for continuous operation into 2 ohms Features auto crowbar protection circuit for output protection without current limiting; 40-LED 0-1,000 Watt power output Meters; Front-Panel switching for 2 pairs of speakers; True Clipping indicators; Input Level controls. Output power 250 W/ch into 8 ohms, **375 W** into 4 ohms continuous RMS, 20-20,000 Hz at <0.09% THD; S/N >105 dB; slew rate >50 V/microsec; TIM <0.02%. 19"W x 7"H x 12"D, 50 lbs. **\$899**

A5001 Power Amplifier, Same as A5002 except no Meters and no Input Level controls. 50 lbs. **\$749**



PRO-REFERENCE TWO, Studio Monitor quality MOSFET Stereo Amplifier. LED Meters monitor output of each channel in dB from -40dB to +3dB (200 Watts per channel into 8 ohms). True Clipping indicators, switching for two pairs of speakers. **Power Output:** 100 W/ch into 8 ohms, 190 W/ch into 4 ohms continuous RMS, 20-20kHz at <0.05% THD. S/N >105dB. 19"W x 5 1/4" H x 10 1/2" D, 30 lbs. **\$699**

PRO-REFERENCE ONE, Same as above except no meters and no speaker switching, 28 lbs. **\$599**

Signal Processors



AE2000 Real Time Analyzer/Equalizer, World's most accurate (**0.1dB**) Real-Time Analyzer/Equalizer. The first and only analyzer with: Two independent real-time analysis systems, (a Direct **100-LED** display with **2dB** readout and a **0.1dB** readout Differential/Comparator) Pink-noise generator, 10-octave Real-Time Display with Adjustable Decay rate, Mic. preamp, input for analysis for any Signal Processor, Autocan mode. Center frequencies 32, 64, 125, 250, 500, 1k, 2000, 4,000, 8,000, 16,000 Hz; display accuracy 0.1dB; Auto-Scan sweep rate 0.1-10 secs/octave; Mic. preamp input impedance 2K ohms; Frequency response 20-20,000 Hz ±0.1dB; includes 20-Band all-Passive-Coil Equalizer, with boost/cut range ±15db, max. 22db, 0.1dB Differential/Comparator readout accuracy LED's for instantaneous and precise in/out signal ballancing, THD <0.01%, TIM unmeasurable, Hum and Noise -114dB at full output. EQ Bypass/Defeat, Monitor and Record selectors on front panel. 19"W x 5 1/4"H x 11"D, 21 lbs. **\$799**



DC4415 Third-Octave Equalizer, stereo with 21 controls/channel. Center frequencies 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1,000, 1,600, 2,500, 4,000, 6,300, 10,000, 16,000 Hz: Features EQ defeat; Infrasonic filter; Tape Monitor and Tape Record;

Differential/Comparator® circuitry for Unity Gain setting to within **0.1dB** accuracy for highest Dynamic Range capability. THD and IMD 0.01% at 2 V; S/N 114dB at full output; input imp 47,000 ohms. 19"W x 5 1/4"H x 11"D, 16 lbs. **\$599**

DC2215 Differential/Comparator® Equalizer, Stereo 10-band, with Differential/Comparator® True-Unity-Gain circuitry for Input-to-Output balancing accuracy to within **0.1dB**. Equalizer filter circuits use precision wire-wound Passive-Coil inductors for high gain, low noise and distortion. Front panel controls include Tape monitor, LED defeat/EQ defeat and EQ Tape Record. THD and IMD <0.01% at 2 V; S/N ratio 144 db at 10V; boost/cut range ±15 dB, max 22dB. Includes Frequency Spectrum Analyzer Test Record, Computone Charts, Cables 19"W x 5 1/4"H x 11"D, 17 lbs. **\$399**

DC2214 Differential Comparator Equalizer. Same as DC 2215 except equalizer filter circuits have op-amp synthesized inductors. THD and IMD <0.01% at 2 V; S/N ratio 106 dB at 10 V; boost/cut range ±12 dB, max 18 dB. 19"W x 3 1/2"H x 9"D, 13 lbs. **\$299**

Preamplifiers



PRO-CONTROL FOUR Preamplifier, with digital CMOS switching. Ten total inputs, 5 tape monitors, 2 signal processing loops. Direct mode, Auto-Bridge circuitry, Bass and Treble Controls. 19" W x 3 1/2" H x 11" D. **\$699**



DX4200 Preamplifier/Equalizer, with Compact Disc Player and Video/Audio inputs. Phono preamp has Variable Cartridge Loading (50-800 pF, 100/47,000 ohm); phono level controls for adjustable ±20 dB gain; MC variable reluctance or MM cartridge inputs; 3-way Tape Dubbing; 2 external Signal-Processor Loops; conventional line outputs plus separate Autobridge Line Outputs for Mono Bridging of Most Amps; EQ S/N 114 dB; Passive-Coil filters with 15 dB boost or cut for each octave, max 22 dB; Differential Comparator circuitry for True **0.1 dB** Unity-Gain EQ balancing; includes Frequency Spectrum Analyzer test record and instant reset Computone Charts. 19"W x 5 1/4"H x 11"D, 20 lbs. **\$699**

DX4000 Preamplifier. Same as DX4200 without phono cartridge matching controls and Equalizer, but with 3 external loops. 19"W x 3 1/2"H x 11"D, 15 lbs. **\$439.00**



DX3000 Preamplifier, Inputs for CD player, Video/Audio, Tuner, Phono, Two Tape Decks with dubbing, Bass and Treble controls, and signal processor loop. THD -0.01%, S/N 95 dB. 19"W x 2 3/4"H x 10"D, 10 lbs. **\$329**

Tuners



T6200 AM/FM Stereo Digital Tuner Digital quartz PLL tuner with 16 Station presets, 5-digit Station Read-out, Auto-Scan tuning, active High Blend filter. Broad-Band AM switch, 19" rack-mount front panel. IHF sens 1.6 µV; S/N 75 dB; distortion 0.08%. 19"W x 2 3/4"H x 12"D, 10 lbs. **\$299**

FREE!

16-PAGE, FULL-LINE, FULL-COLOR BROCHURE, AND \$19.95 SYSTEM-EVALUATION KIT: 1-12" LP Spectrum Analysis Test Record, 2-sets of Computone Charts, 1-Connector Cable for comparison test, 1-instruction folder for use with your present stereo system. JUST WRITE TO US OR CIRCLE READER SERVICE CARD for FREE SPECIAL OFFER DETAILS. Enter No. 30 on Reader Service Card

PRE-AMPLIFIERS

by

MADE IN U.S.A.
Soundcraftsmen



DX4200 DESCRIPTION

The new DX4200 Preamp/Equalizer is the most versatile preamplifier available. It was designed for the most demanding audiophile who takes a "hands-on" approach to his or her music system. The preamp section includes specially-designed "overload-protect" inputs for the latest CD players, with their potential for unsurpassed wide dynamic range. The phono preamp utilizes fully-discrete circuitry instead of the more common IC "chips," eliminating coloration and making it exceptionally quiet. It accommodates most moving-coil cartridges and the exclusive Cartri-Match® circuitry even permits adjustment in capacitance loading from 50 picofarads to 800 picofarads, in 50 picofarad steps, for exact matching of virtually any phono cartridge. Soundcraftsmen's exclusive AutoBridge® circuitry permits the user to start with one stereo amplifier, and then to add a matching amplifier at a later date, operating both amplifiers in "bridged mono mode," thereby TRIPILING per-channel power output with no loss in performance. Ideal for meeting the power demands of digital audio. Only the finest available parts, such as the legendary Noble 31-position resistance-loaded volume control, are used in Soundcraftsmen preamps. Three-way tape dubbing and two external signal-processor loops add to the DX4200's versatility.

The Equalizer Section is the finest high-fidelity graphic equalizer available today. Nineteen years of designing and manufacturing equalizers have given us significant performance advantages over other manufacturers, with revolutionary technology like the Differential/Comparator® 0.1dB True Unity Gain circuitry, essential for reproduction of the new digital audio discs and wide-dynamic-range recordings without severe limitation of needed "headroom," and for ultra-low noise and distortion. Our Wire-Wound Coil Filter circuitry makes possible 15dB boost or cut on each individual octave and an incredible Signal-to-Noise Ratio of 114dB!

DX4200 SPECIFICATIONS

PREAMP SECTION: FREQUENCY RESPONSE: Hi-level $\pm 1/4$ db, 5 Hz to 100 kHz • Phono $\pm 1/2$ db, 20 Hz to 20 kHz • TOTAL HARMONIC DISTORTION: 0.1% at 1 Volt • IM DISTORTION: Less than 0.1% at 1 Volt • PHONO IMPEDANCE: 47K or 100 Ohms • PHONO SIGNAL-TO-NOISE: 97 dB • PHONO CARTRIDGE SENSITIVITY: Any High Fidelity cartridge 0.28 millivolts or greater output • PHONO PREAMP DESIGN: Two separate mono preamp circuits • PHONO LEVEL ADJUSTMENT: Individual ± 20 db gain controls • HEADPHONE LEVEL: Capable of driving 8 Ohms to 2000 Ohms

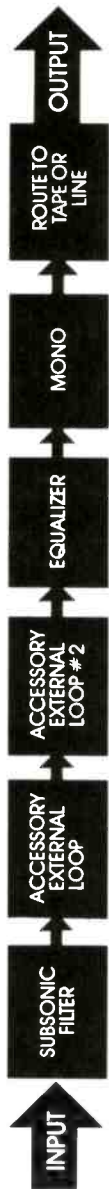
EQUALIZER SECTION: IN-OUT MONITORING: Differential/Comparator® circuit with LED's, for 0.1dB accuracy • HARMONIC DISTORTION: Less than 0.1% at 2 V • IM DISTORTION: Less than 0.1% at 2 V • SIGNAL-TO-NOISE: 114 db at 10 v output • OCTAVE CONTROLS: ± 22 db boost or cut-each octave (all other octaves set at maximum) • ± 15 db boost or cut-each octave (all other octaves set at zero) • GAIN CUT CAPABILITY: ± 32 db -all controls maximum • UNITY GAIN CONTROLS: 18 db range • FILTER TYPE: Precision tuned passive wire-wound coil inductors

FEATURES

- Dual 10-Band ± 15 dB equalization

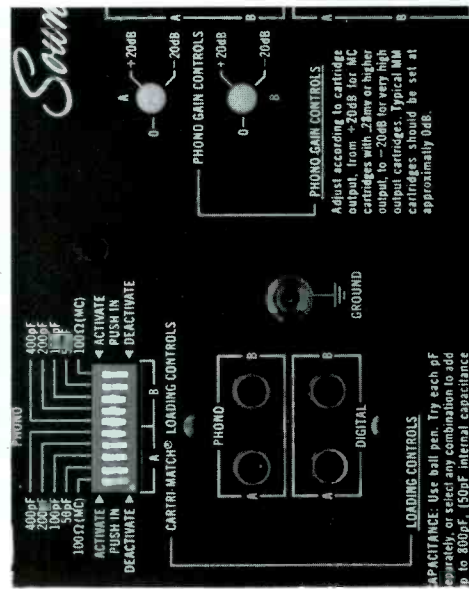
DX3000
 DX4100
 DX4000
 DX4200

SIGNAL PROCESSING



Four useful and individually costly components are combined in each Soundcraftsman Preamp/Equalizer: a Ten-Band Stereo Equalizer, a superb Phono Preamplifier, a versatile Patch-Bay Switching Box and a stereo amplifier Bridging Adaptor. With the growing number of excellent signal-processing devices available, it has become extremely difficult to connect these components to a stereo system and then be

able to route any desired combination to loudspeakers and/or tape recorders. With Soundcraftsman preamps it is as simple as pushing a button! No more cable-switching; add-on devices are permanently connected to the patch-bay section of the preamp. For the serious tape recordist, this one feature can eliminate hours of frustration associated with the interconnecting of add-on specialty components.



CARRI-MATCH®

Every magnetic phono cartridge is designed to operate optimally only when it "sees" the correct capacitance and impedance loads at the phono preamp. Improper loading results in degraded frequency response and inaccurate reproduction of recorded material. The Soundcraftsman DX4200 Carri-Match® permits proper loading of virtually any magnetic phono cartridge, in 50 picofarad increments up to 800 picofarads. We know of no other preamplifier which makes this crucial matching possible. Carri-Match® also accommodates any moving-coil-type phono cartridge whose output level is at least .28 millivolts, and independent input level controls are included for precise balancing of left and right phono cartridge channels, and to match the phono level to the other program sources.

AutoBridge®

The new Digital Audio Discs have, for the first time, the capability of recreating the dynamic range of a live musical performance. A stereo system's ability to reproduce this tremendous dynamic range ultimately depends upon one thing: the availability of adequate amplifier power. Even if one listens to music at an average listening level requiring only *one watt* of power, *over 300 watts* may be needed to reproduce dynamic "peaks" in the music! Soundcraftsman has developed an active circuit called AutoBridge® to deal with this

problem. AutoBridge® allows the normal connection of a stereo amplifier to a Soundcraftsman DX-series preamp, with the option of adding a second, identical amplifier at a later date, and operating both stereo amplifiers in "bridged mono mode," one for each channel. Bridged operation *triples* the 8-ohm power per channel of Soundcraftsman stereo amplifiers with absolutely *no* degradation of any aspect of performance. AutoBridge® assures non-obsolence no matter how elaborate your music system becomes in the future.

FREE!

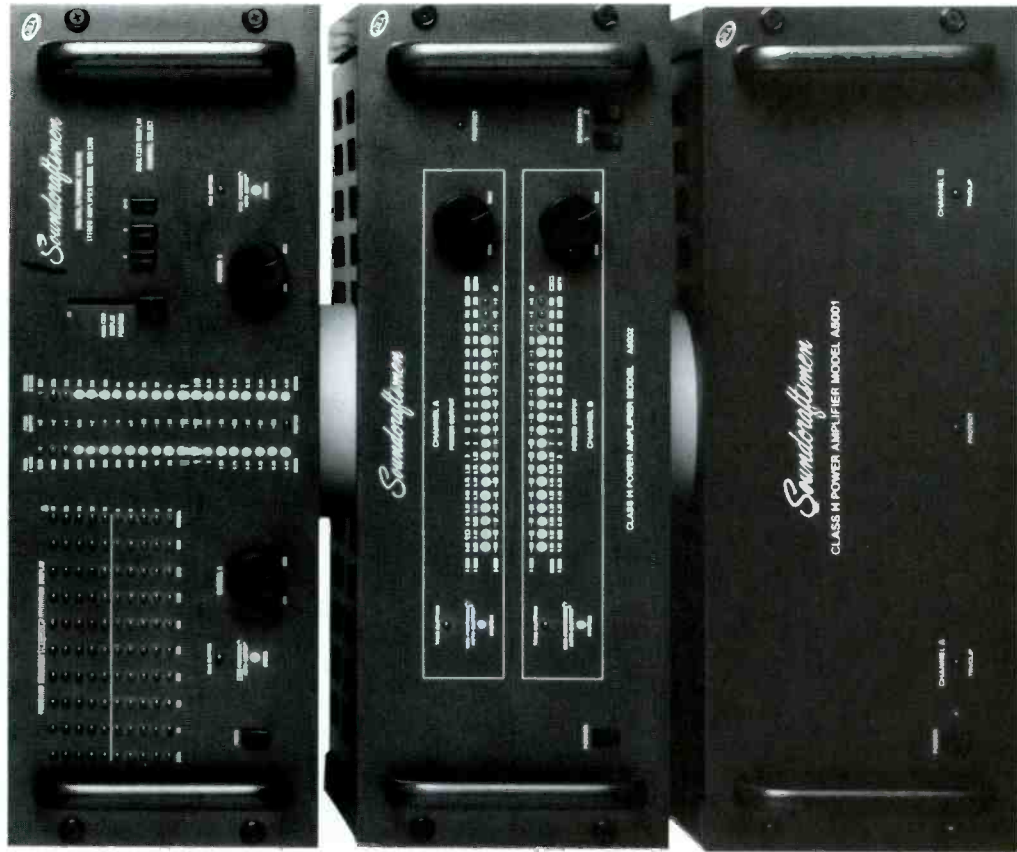
16-PAGE FULL-COLOR BROCHURE, AND \$19.95 SYSTEM-EVALUATION KIT: 1-12" LP Spectrum Analysis Test Record, 2-sets of Computone Charts, 1-Connector Cable for comparison test, 1-instruction folder for use with your present stereo system. JUST WRITE TO US OR CIRCLE READER SERVICE CARD FOR FREE SPECIAL OFFER DETAILS.



STEP UP TO Soundcraftsman

MADE IN U.S.A.

AMPLIFIERS by Soundcraftsmen

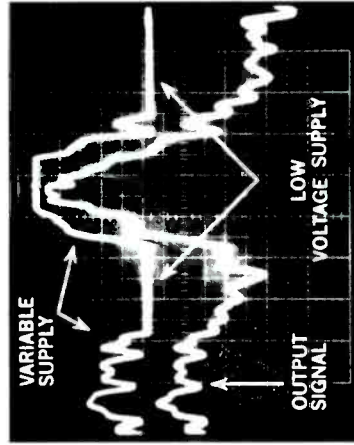


CLASS H

Soundcraftsmen's exclusive CLASS H amplifier circuitry establishes a new standard for high-power stereo amplifier technology. Several integral design elements make up CLASS H: the Vari-Portional® dual signal-tracking power supply, Auto-Buffer®, and Auto-Crowbar. The Soundcraftsmen DDR1200, A5002 and A5001 amplifiers are CLASS H designs. Here is a brief explanation of CLASS H and its benefits.

VARI-PORCIONAL® SYSTEM: Conventional amplifiers utilize a single power supply which supplies whatever level of voltage is necessary at any given moment to produce the required power output, up to the supply's maximum. This design is inherently inefficient since most of the time the supply is operating at only a small percentage of its potential. This operating condition causes high heat buildup with its related increase in distortion, as well as high wear and tear on amplifier components. The Soundcraftsmen Vari-Portional® system utilizes a low-power supply which operates very efficiently continuously, and a second, "signal-tracking" supply which operates only when actually needed, and only to the degree needed. In this design, no power is wasted in heat dissipation. The amplifier runs cool, distortion is reduced to almost unmeasurable levels, and reliability is dramatically improved. Please see scope photo showing Vari-Portional circuit in action.

AUTO-CROWBAR: The Soundcraftsmen Auto-Crowbar protection circuit is unique among amplifiers. It uses no fuses, relays or circuit breakers. Auto-Crowbar detects any condition which might be harmful to the amplifier or loudspeakers and instantly disconnects all A.C. power to the amplifier. Every few seconds Auto-Crowbar samples the output. If the problem which triggered the Auto-Crowbar has been resolved,



the amplifier resumes its normal operation. Conventional current-limiting is *not* used as part of the protective circuitry, as it is in most amplifiers, because current limiting can seriously degrade sound and even damage loudspeakers.

AUTO-BUFFER® SYSTEM: Provides automatic sensing and control of low impedance (2+ ohms) operation. Enables continuous *non-current-limited-output*, without switches or protection-circuit turn off, when driving parallelized speakers and/or low-impedance loads.

CLASS H amplifiers are particularly suitable for playback of Digital program sources because of their unique ability to produce very high power continuously, with huge power reserves available for musical "peaks."

FEATURES

CLASS H CIRCUITRY (all models): Amp runs cooler, no fan needed, through increased efficiency of Vari-Portional® circuitry...**PROGRAM INPUT SPECTRUM ANALYZER DISPLAY** (DDR1200): Graphically displays input program material frequency response, in real-time, for critical adjustments to phono cartridge, tape deck/ tape matching, component amplification...**BRIDGED MODE OPERATION** (DDR1200) Rear-panel switch converts to 750-watts @ 8 ohms mono amplifier. All other Soundcraftsmen amplifiers bridgeable with external adaptor...**CALIBRATED 20-LED POWER OUTPUT METERS** (DDR1200, A5002)...**INPUT LEVEL CONTROLS** (DDR1200, A5002)...**TRUE CLIPPING INDICATORS** (all models): Indicate actual onset of waveform distortion...**POWER TURN-ON SURGE DELAY** (all models): Eliminates loudspeaker turn-on "thump"...**MODULAR CONSTRUCTION** (all models): 1/6-gauge triple-braced steel chassis with plug-in circuit boards for ease of servicing...**TEST DATA CERTIFICATE** (all models): Individually serialized, signed by final inspector.

GUARANTEED SPECIFICATIONS

POWER Output:
 250 watts per channel @ 8 ohms (20Hz/20kHz, Less than .05% THD)
 375 watts per channel @ 4 ohms (20Hz/20kHz, Less than .05% THD)
 1200 watts total Dynamic RESERVE

THD and NOISE: Less than .09% (Typically less than .02%)
FREQUENCY RESPONSE: ±0.1dB, 20Hz to 20kHz
SIGNAL-TO-NOISE RATIO: 110dB (a-weighted)
SLEW RATE: 50V per microsecond
STABILITY: Any load 2 ohms or greater
IM DISTORTION: Less than .05%
THD DISTORTION: Unmeasurable

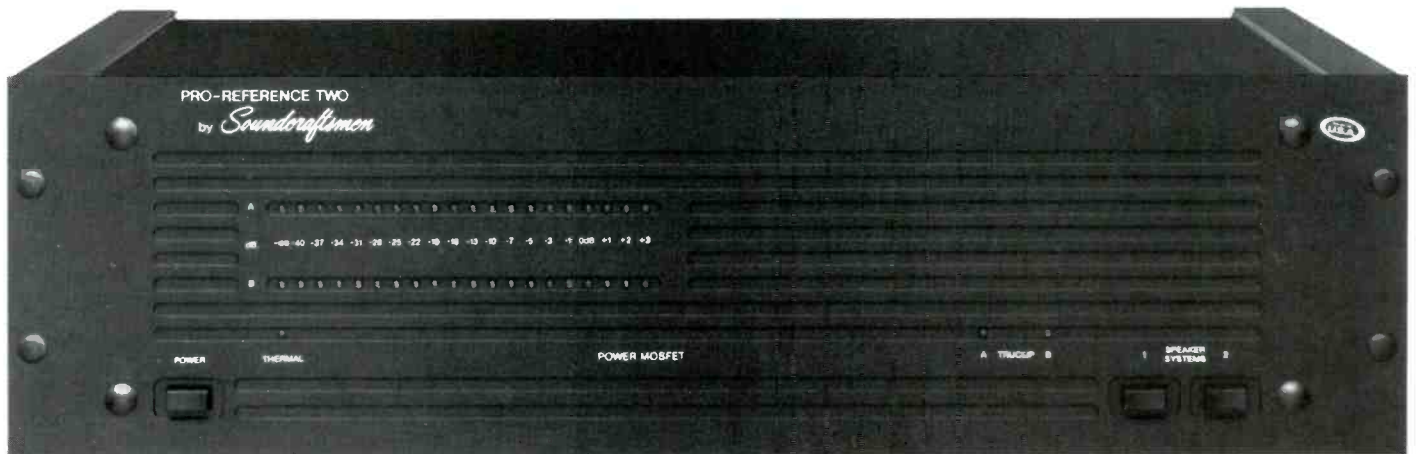
PHYSICAL: OUTPUTS: Five-way binding posts (banana type)...**SIZE:** 7" x 19" x 15" deep...**SHIPPING WEIGHT:** 55 pounds...**LINE CORD:** Heavy-duty 3-wire grounded plug...**WARRANTY:** Two years limited warranty, parts and labor...**SIDE PANELS:** Genuine Oak or Walnut, Optional.

Soundcraftsmen

AMERICA'S PERFORMANCE/VALUE LEADER
IN ADVANCED AUDIO TECHNOLOGY...



PRO-REFERENCE TWO STUDIO MONITOR MOSFET POWER AMPLIFIER



The new **PRO-REFERENCE TWO** Studio Monitor Amplifier was designed for those applications where sonic accuracy is the utmost goal. **MOSFET** output stages provide Ultra-High Current capability for effortless handling of low impedance loads.

As with all Soundcraftsmen amplifiers, the new **PRO-REFERENCE TWO** uses circuits designed with absolutely no current-limiting, thus eliminating the harsh clipping characteristics associated with current-limited amplifiers. The advantage of **non-current-limited** circuitry is sonically obvious when reproducing peaks at, near or over the onset of clipping.

Ordinary Recordings—even so-called "**audiophile discs**"—are often so limited in their dynamic range that even small, lightweight, low-powered, amplifiers and receivers can reproduce their musical information without serious problems.

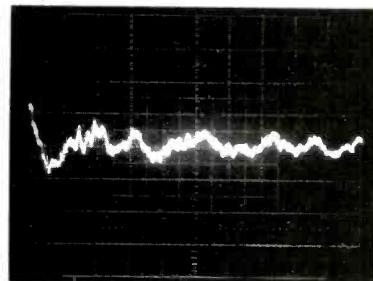
However, **COMPACT DISCS** and the newer **DIGITAL FORMATS** have changed all that. Where 20 to 40 watts once was acceptable, not even double that power is enough to reproduce these new recordings without severe "clipping" distortion!

Designed specifically for this new technology, the **PRO-REFERENCE TWO** produces 100 watts per channel continuously with 8-ohm loads and 190 watts per channel continuously with 4-ohm loads and huge power reserves of more than 700 watts are always available to reproduce the tremendous digitally-generated dynamic "peaks" with absolutely effortless clarity. More than enough power is available for these new wide-range Program Sources.

Featuring the latest **POWER MOSFET** circuitry, the **PRO-REFERENCE TWO** offers power, unmatched reliability and the sonic purity of true "tube-like" mosfet amplification.

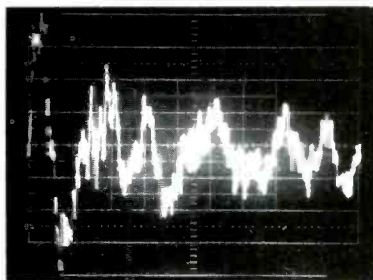
FEATURES

- Output Devices: **POWER MOSFET** fully complementary circuitry • LED Output Display: Calibrated in dB ($-\infty$ to +3) for each channel
- Indicators: True clipping, each channel •



CONVENTIONAL RECORD

Oscilloscope photo shows music playing at normal listening level. Only 1 watt of power is required for average level, but 16 watts are needed to produce "peaks."



DIGITAL AUDIO DISC

Oscilloscope photo shows same music playing at same normal listening level. Again only 1 watt is required for average level, but 500 watts are needed to produce the... "digital/dynamic peaks" without distortion!

SPECIFICATIONS

- Impedance: 22K Ohms • Outputs: 5-way binding posts • Continuous RMS Power, (per channel) 20Hz • 20kHz: 100 watts at 8 Ohms at/less than 0.05% THD, (typ. <0.01%), 190 watts at 4 Ohms at less than 0.05% THD • Freq. Response: 20Hz to 20kHz ± 0.1 dB • Hum and Noise: -105 dB • Rise Time: 2.2 microseconds • Slew Rate: 40 volts/microsecond • IMD: From 250 Milliwatts to rated output (60Hz-70kHz, 4:1) SMPTE • THD: Less than 0.05% • Size: 5 1/4" H x 19" W x 10 1/2" D • Weight: 25 pounds •

Enter No. 30 on Reader Service Card

MODEL 450X2 MOSFET POWER AMPLIFIER



This NEW amplifier has MORE power, MORE features, MORE pure performance per dollar... PLUS the reliability and sonic perfection of MOSFETS!

This new series of power amplifiers was designed for the utmost in reliability and performance even under the most demanding conditions and installations. It is well recognized that the load impedance in many commercial sound applications can be as low as **2 ohms**, and the 450X2 can handle it!

This new **ULTRA-HIGH-CURRENT** design allows the amplifier to perform effortlessly under these most demanding conditions. **MOSFET** output stages offer the utmost in audio clarity and distortion-free reproduction. **315 watts per channel @ 4 ohms.**

FEATURES AND SPECIFICATIONS

Output Devices	POWER MOSFET fully complementary circuit design.	Sensitivity	1.0 v (Level Controls = +6dB) 2.0 v (Level Controls = 0dB)	Frequency Response	20Hz to 20kHz, ± 0.1 dB
Mono Bridging	Rear panel switchable.	Impedance	22K Ohms Balanced 32K Ohms Unbalanced	Hum & Noise	-105 dB
Distributed Lines (mono)	Will drive 70 volt lines with no transformer required.	Outputs	5-way binding posts.	Rise Time	2.2 microseconds
Protection	Anti-Surge turn on delay Multi-Sensor PCR Thermal protection. Front Panel mounted circuit breaker	Controls	Rear Panel Gain Controls—∞ to +6dB 0dB Ref = 26dB (20X) Voltage gain	Slew Rate	50 volts/microsecond
Cooling	Forced air, rear to front, utilizing thermal controlled 2-speed fan.	Indicators	True clipping, each channel.	IMD	From 250 Milliwatts to rated output (60Hz-70kHz, 4:1) SMPTE
Inputs	XLR, ¼" phone, and 5-terminal barrier strip.	Continuous RMS Power Output (per channel) at 1kHz	2 ohms stereo: 450 watts 4 ohms stereo: 315 watts 8 ohms stereo: 210 watts	THD	Less than 0.05%
				Size	5¼" H x 19" W x 11¾" D,
				Weight	30 pounds

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

The power amplifier shall be solid-state with **POWER MOSFET** output stages. Each channel shall be capable of producing at least **205 watts** into **8 ohms** or **300 watts** into **4 ohms**, with both channels driven. The amplifier shall be bridgeable into mono mode through a secure switching device located on the rear panel. The amplifier shall produce at least **600 watts** into an **8 ohm** load in the mono mode. (Total Harmonic Distortion and I.M. Distortion shall not exceed **0.05%** over a bandwidth of **20Hz to 20kHz** at these power ratings). The amplifier shall have internal protection against possible shorted, mismatched and open circuits. Thermal protection shall be provided by Multi-Sensor Phase Control regulation as well as two-speed fan forced air cooling. Air flow shall be from rear to front. Input sensitivity shall be 1.0V for rated output with adjustable gain capability of 26dB per channel (0dB REF = 20X voltage gain, stereo). Noise level shall be -105dB relative to full output. Rise time shall be 2.2 microseconds and slew rate shall be 50V per microsecond with an 8 ohm load. Damping factor shall be greater than 200 in stereo mode and greater than 100 in mono mode. The amplifier shall be designed to operate continuously at load impedances as low as **2 ohms**.

Input configuration shall be XLR, Barrier Strip and ¼" phone, balanced or unbalanced. Internal construction shall be semi-modular to ease field serviceability. The amplifier shall be fitted with a heavy-duty front panel containing AC power switch/circuit breaker, true-clipping indicators for each channel, and carrying handles. Main chassis shall be **14 gage** welded steel. The dimensions shall allow for standard **19" EIA** Rack mounting. It shall be **5¼"** high and **11¾"** deep including input/output connectors. It shall weigh **30 pounds** net. Output connectors shall be dual 5-way binding posts. Power requirements shall be **105-125VAC** (**210-250VAC** for export models), **50/60 Hz**, and the amplifier shall be fitted with a 3-wire ground plug. The power amplifier shall be a **Soundcraftsmen 450X2**.

MODEL 450X2M has the same specifications and features as above with the addition of a **40 LED Power Output Display**.



1988 BUYER'S GUIDE TO PRO MODELS

Available for Purchase or Rental only at Pro Audio and Musical Instrument Dealers

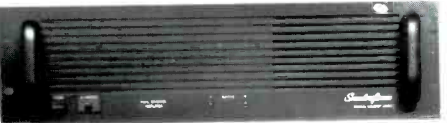
A CONDENSED GUIDE LISTING FEATURES, SPECIFICATIONS, SIZES AND PRICES...

Power Amplifiers



200X2 Studio Monitor Amplifier, MOSFET Dual Channel, 210 Continuous RMS Watts per channel at 4 ohms, 145 continuous RMS watts per channel at 8 ohms (1 kHz). THD<0.05%, Hum and Noise: -105dB, LED meters monitor output in dB (-40 to +3), True Clipping indicators for each channel. Front panel mounted circuit breaker. Rear panel mounted Level Controls and Mono bridge switch. XLR, 1/4" phone and barrier strip inputs.
19" W x 5 1/4" H x 10 1/2" D, 30 lbs **\$799**

200X2 Studio Monitor Amplifier, same as above without LED meters, 28 lbs **\$699**



450X2 Power Amplifier, MOSFET Dual Channel, 315 Continuous RMS Watts per channel @ 4 ohms, 210 Continuous RMS Watts per channel @ 8 ohms (1kHz), 450 Watts RMS @ 2 ohms, 900 Watts RMS @ 4 ohms Bridged. THD < 0.05%, Hum and Noise: -105 dB, Rear Panel Level Controls, Bridging Switch. XLR, 1/4" Phone and Barrier Strip inputs, Balanced or Unbalanced, Front Panel circuit breaker, True Clipping indicators. Will drive 70-volt lines when bridged, no transformer needed.
19"W X 5 1/4" H X 11"D, 30 lbs..... **\$749.00**

450X2M Power Amplifier, same as 450X2, 315 w/ p/c @ 4 ohms, plus 40-LED Dual Channel 2, 4, and 8 ohm Precision-Calibrated Power Meters, 31 lbs..... **\$849.00**



PM860 Power Amplifier, MOSFET Dual Channel, 315 Continuous RMS Watts per channel @ 4 ohms, 210 Continuous RMS Watts per channel @ 8 ohms (1kHz), 450 Watts RMS @ 2 ohms. THD < 0.05%, Hum and Noise: -105 dB, True Clipping indicators. Will drive 70 volt lines when bridged, no transformer needed.
8 1/2" W X 5 1/4" H X 14"D, 23 lbs..... **\$599.00**



PCX-1, 5 1/4" X 19" Rack Mount/Cabinet kit, for PM860, shown installed. 11 lbs. **\$49.00**



RA6501 Power Amplifier, Class H Signal-Tracking Dual Channel, 420 Continuous RMS Watts per channel @ 4 ohms, 275 Continuous RMS Watts (1kHz) per channel @ 8 ohms. True Clipping indicators, THD < 0.09%, Hum and Noise: -110dB. 19"W X 7"H X 13"D, 50 lbs. **\$799.00**



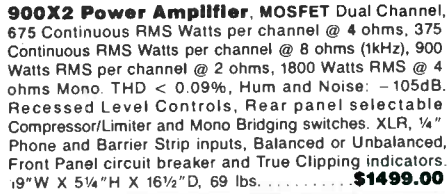
RA7502 Power Amplifier, same as RA6501, 420 w/p/c, plus 40-LED Dual Channel 2, 4 and 8 ohms Precision-Calibrated Power Meters, True Clipping indicators, Level Controls, Selectable Bridging, Bal. or Unbal. inputs. 19"W X 7"H X 13"D. 52 lbs. **\$999.00**



RA7501 Power Amplifier, same as RA7502, 420 w/p/c, without 1 LED power meters. 51 lbs. **\$899.00**



900X2 Power Amplifier, MOSFET Dual Channel, 675 Continuous RMS Watts per channel @ 4 ohms, 375 Continuous RMS Watts per channel @ 8 ohms (1kHz), 900 Watts RMS per channel @ 2 ohms, 1800 Watts RMS @ 4 ohms Mono. THD < 0.09%, Hum and Noise: -105dB. Compressor/Limiter and Mono Bridging switches. XLR, 1/4" Phone and Barrier Strip inputs, Balanced or Unbalanced, Front Panel circuit breaker and True Clipping indicators.
19"W X 5 1/4" H X 16 1/2" D, 69 lbs. **\$1499.00**



PCX-2, 19" Rack Mounting kit for two PM860's, shown installed. 2 lbs. **\$49.00**



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Signal Processors



AE2000P Real Time Analyzer/Equalizer, World's most accurate (0.1dB) Real-Time Analyzer/Equalizer. The first and only analyzer with: Two independent real-time analysis systems, (a Direct 100-LED display with 2dB readout and a 0.1dB readout Differential/Comparator) Pink-noise generator, 10-octave Real-Time Display with Adjustable Decay rate, Mic. preamp, input for analysis of any Signal Processor, Auto-scan mode. Center frequencies 32, 64, 125, 250, 500, 1k, 2000, 4,000, 8,000, 16,000 Hz: display accuracy 0.1dB; Auto-Scan sweep rate 0.1-10 secs/octave; Mic. preamp input impedance 2K ohms; Frequency response 20-20,000 Hz ± 0.1dB; Includes 20-Band all-Passive-Coil Equalizer, with boost/cut range ± 16dB, 0.1dB Differential/Comparator readout accuracy LED's for instantaneous and precise in/out signal balancing, THD < 0.01%, T/M Unmeasurable, Hum and Noise—114dB at full output. EQ Bypass/Defeat, Monitor and Record selectors on front panel.
19"W X 5 1/4" H X 11"D: 18 lbs. **\$799.00**



G2241 20-Band Graphic Equalizer, Dual channel 20-band with exclusive 0.1dB accuracy Differential/Comparator® true-unity-gain circuitry for precise in/out balancing. Features EQ defeat, Pre-EQ Loop, External Loop. Filter circuits use precision solid-state inductors for high gain, low noise and distortion. Bandwidths one octave on standard ISO centers. THD and IMD < 0.01% at 1V; S/N ratio 114dB at 10V; max boost/cut ± 16dB.
19"W X 3 1/2" H X 9"D; 13 lbs. **\$299.00**



TG3044C Third Octave EQ, Two channel, 42 band (21 per channel). Bandwidths are 1/3 octave below 1kHz, 2/3 octave above 1kHz, Center frequencies 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1,000, 1,600, 2,500, 4,000, 6,300, 10,000, 16,000 Hz, Separate switching for each channel: Sub-Sonic Filter, EQ defeat, Pre-EQ Loop, External Loop input. Exclusive 0.1dB Differential/Comparator balancing circuits with LED's for instantaneous and precise in/out signal balancing. Balanced or Unbalanced inputs and outputs.
19"W X 5 1/4" H X 11"D. 16 lbs. **\$689.00**

Tuners



T6200 AM/FM Stereo Digital Tuner, Digital quartz PLL tuner with 16 station presets (8 AM and 8 FM), Broad-Band AM switch, 5-digit station readout, Auto Scan tuning and active high blend filter. 19" Rack Mount front panel. IHF Sens 1.6 µV; S/N 75 dB; THD < 0.08%.
19"W X 2 3/8" H X 12"D, 12 lbs. **\$299.00**

SUMMER SUMMARY



Denon DAP-5500 digital preamplifier and POA-6600 amplifiers

Although what I call "glamortronics"—R-DAT, CD-V, and Super VHS machines—grabbed the spotlight at the 1987 Summer Consumer Electronics Show, there were many interesting new products reflecting advances in current technology.

There was plenty of activity in the preamp/amplifier category. A new product that caused quite a stir was Denon's DAP-5500 digital preamplifier. This unit has coaxial and fiber-optic digital inputs, as well as normal line-level analog inputs with RCA pin jacks. With the digital inputs, CD players and DAT recorders equipped with digital output ports, and future equipment such as digital equalizers and surround-sound processors, can be directly connected. Furthermore, the DAP-5500 automatically adjusts to the 32-, 44.1-, or 48-kHz sampling rates of the various digital formats. With quadruple oversampling, the DAP-5500 uses two Denon "Super Linear" 16-bit D/A converters per channel in a "push-pull" configuration; one circuit processes the direct digital signal while the other processes an inverted-phase signal. Distortion in one converter tends to be cancelled out by equal but

opposite distortion in the other. The resulting output signal is said to be of extremely high purity and precision.

The converted analog signals are passed through proprietary seventh-order analog filters to remove residual ultrasonics. The resulting frequency response is specified as 2 Hz to 20 kHz, ± 0.2 dB. THD is said to be below 0.002%. The claimed S/N ratio is 110 dB, with channel separation greater than 100 dB.

The DAP-5500 features a balanced output with a very low (10-ohm) impedance, via XLR connectors. This enables long cable runs to balanced-input monoblock power amplifiers, if one wishes to place the amps near one's loudspeakers. Conventional unbalanced RCA jack outputs are also provided. No phono preamplifier inputs are included on this unit.

The DAP-5500 uses separate toroidal power transformers, and there is fiber-optic connection of analog and digital stages to ensure that no common ground exists between these sections. Much attention has been paid to special construction for low-noise performance. Extensive aluminum shielding is used between circuit boards,

and the circuit boards are of high-resistance substrates. The chassis features heavy anti-resonant construction using Denon's laminated visco-elastic "silent steel." The DAP-5500 should be available around now at a price of \$1,400.

Denon's matching POA-6600 monoblock power amplifiers have balanced XLR inputs and are rated at 250 watts into 8 ohms. The units have no negative feedback circuitry and have a slew rate of ± 500 V/ μ S. The amplifier is said to be stable with speaker impedances as low as 1 ohm. The POA-6600 should be available now at a price of \$700 per monoblock.

Perreux introduced a real brute of an amplifier, the \$4,295 PMF-5550, rated at 500 watts per channel into 8 ohms. This massive unit has a rise-time of 1 μ S. Its THD is said to be less than 0.03% at rated output and is claimed to be mostly even-order harmonics. This amplifier is said to be capable of a continuous current output of 30 amperes, with phase shift of less than 2° at 20 Hz and 30 kHz. Frequency response is rated as flat within 0.5 dB from 10 Hz to 100 kHz.

Spurred by the success of their XL-280 amplifier, Hafler introduced the much more powerful Excelinear XL-600. With the same type of MOS-FET output circuitry as the XL-280, this new amplifier has an output of 305 watts per channel into 8 ohms and can handle loads as low as 1 ohm with an output of 900 watts per channel. Frequency response is rated at ± 0.1 dB from 10 Hz to 50 kHz. Claimed phase shift is very impressive: Less than 0.25° from 20 Hz to 20 kHz. The XL-600 can be bridged for a mono output of 900 watts into 8 ohms. At \$995 each, two XL-600 amps can provide a helluva lot of power at a reasonable price.

Spectral made a big splash at the SCES by demonstrating their long-awaited 200-watt-per-channel Class-A amplifier, the DMA-200. The amplifier is a dual-mono design on a single chassis. It is surprisingly compact, at 6¾ inches high, 19 inches wide, and 21 inches deep, but it weighs a hefty 92 pounds. The amplifier is beautifully crafted, reflecting Spectral's high-tech philosophy. The DMA-200 operates in pure Class A, with 200 watts per channel into 8 ohms and 380 watts into 4

ohms. Output current is rated at 32 amperes. Bandwidth is ultra-wide, extending from d.c. to 2 MHz. Distortion is said to be typically less than 0.006% at 200 watts per channel. Rise-time is very fast, at less than 300 nS. Slew rate is claimed to be 1,000 V/mS.

Spectral was using Duntech Sovereign loudspeakers to demonstrate the DMA-200. This was the first exposure of these speakers at a CES, and these very revealing units superbly showed off the clean overall sound of Spectral's top amplifier. The immediacy of the transient response was startling. Instrumental definition was exemplary, as were the well-focused image and depth perspective. Bass response extended to the sub-basement and was very clean and controlled. Particularly impressive was the combination's reproduction of the mighty 32-foot organ pedals on a Bainbridge CD, and of the smooth, high strings of a 30-ips master tape played on a Stellavox. No doubt about it, the Spectral DMA-200/Duntech Sovereign combination was a very convincing one, producing what many thought was the best sound at this CES. At \$5,495, the DMA-200 is obviously an expensive amplifier, but I think the quality of its parts and construction and its splendid performance make it a good value.

CD players continue to proliferate, and the number of models in the low and mid-price category is truly staggering. As I have pointed out before, most of these CD players are the products of a relative few giant OEM suppliers and differ mainly in appearance, rather than in performance. Nonetheless, in this wildly competitive market segment, such features as quadruple oversampling, digital filtering, and elaborate programming facilities are becoming commonplace.

Yamaha plunged into the high-end CD market with their \$2,200 CDX-5000. Yamaha is claiming superior performance for this player because of a newly developed 18-bit D/A converter and a quadruple-oversampling 18-bit digital filter. Yamaha states that although the CD format uses 16 bits with a 44.1-kHz sampling rate, processing a 16-bit medium in a 16-bit format results in performance limitations such as quantization noise and phase problems. Yamaha claims that increasing

the bit rate to 18 in the filter and D/A converters improves the accuracy of reading 16 fold and improves the S/N ratio by 12 dB. (*Editor's Note:* For a more detailed discussion of Yamaha's new system, see this issue's "Digital Domain." We plan to publish a review of this unit before the end of the year.)

Needless to say, with Yamaha banging the drums about their 18-bit system, some of their competitors issued



Yamaha CDX-5000 CD player

"white paper" technical bulletins challenging the worth of the higher bit rate, with much learned discussion about "floating points" and "parity bits." The general opinion in these tracts is that the extra bits are much ado about nothing. Nevertheless, Yamaha claims such impressive specifications as 100 dB of dynamic range and an S/N ratio of 115 dB.

Yamaha stresses such features on the CDX-5000 as a dual-layer anti-resonant chassis, a high-precision, virtually noiseless CD drawer, and direct access of 24 tracks with an access time of 0.7 S. The unit has a wireless remote control which, in addition to the usual functions, can adjust the player's 20-bit digital volume control. Deliveries of the CDX-5000 are slated to begin about now.

McIntosh was showing their new MCD7005 CD player, which features full 16-bit D/A converters for each channel and quadruple oversampling. The unit has very fast track access and volume control via a wireless remote, with volume level displayed in the unit's "message center." The volume control is McIntosh's newly developed "Electronic Precision Ladder" attenuator. The MCD7005 can correct errors up to 8 bits longer than could be handled by the earlier MCD7000. The extremely rigid chassis, the extensive use of heavy machined parts (instead of stamped parts), and the precision CD drawer and drive system of the

MCD7000 have been retained in this new player, which is available as you read this at a price of \$1,599.

Technics showed their upscale SL-P1000 CD player. This \$1,000 unit has some unique features, including a fiber-optic digital output port as well as an electrical digital output port, evidently provided with a view toward interlinking future outboard digital equipment. Other features include a three-layer damped chassis, two separate power transformers, and dual D/A converters with 96th-order filters. Volume can be remotely controlled, with a readout on the display panel. There is also a search dial affording precise backward or forward cueing with 0.04-S increments in the slow mode. The SL-P1000 is currently available.

A recent survey indicated that 19 million CD players were in use throughout the world, and the CD juggernaut rolls inexorably on. Be that as it may, there are still a lot of folks out there who like the venerable vinyl disc. For the most dedicated (and well-heeled) aficionados of the LP, Ortofon has introduced their MC 3000, a no-holds-barred moving-coil cartridge employing such new technology as a sintered ceramic aluminum-oxide cartridge body of extreme hardness, a carbon-fiber cantilever and armature, a neodymium magnet, and a new stylus shape that is almost an analog of a cutting stylus. Recommended tracking force is 2.2 grams, and the claimed frequency range is 5 Hz to 90 kHz. In spite of the increased output of this cartridge, Ortofon recommends using it with their companion T 3000 step-up transformer. This unit is wound with linear-crystal, oxygen-free silver wire. The MC 3000 is currently available at a price of \$1,500, and the T 3000 is priced at \$1,250.

Magneplanar made its devotees happy with its new MG 2.5R loudspeaker. Its design is in line with that of other recent Magneplanars, but new advances have managed to extend bass response to below 40 Hz. This was evident on a number of recordings I auditioned on a pair of MG 2.5Rs. Overall response was smooth and clean, with a nice, natural quality that I found appealing in listening to Previn's CD of Debussy's "Iberia." This speaker is priced at \$1,550 per pair. ▲

ATHENA. The preamplifier is in many ways the most telling component in the audio chain. All too often technical absolutism results in sound quality that is sterile, unappealing, or aggressive. Yet bad lab performance almost always indicates poor sonic integrity. With Athena, Sumo demonstrates a new balance. A preamplifier that is both a stunning performer in the areas of quickness, linearity, and freedom from overload. Yet a warm, faithful, and exciting reproducer of music.

Athena represents the culmination of a major effort at Sumo. As such, it sets new standards for dynamic headroom and freedom from overload. Utilizing high voltage power supply rails, passively linearized circuitry, and a high current toroidal transformer, Athena can faithfully reproduce music at levels far in excess of the peak output of signal sources. As a result, compact discs display dynamic range without high end pain. And complex passages come through intact and unstrained.

Sonic purity in Athena is enhanced both by careful component selection and the exclusive use of pure Class A circuitry. Low noise 1% metal film resistors and metalized polypropylene capacitors are used throughout. Components are mounted on a military grade glass epoxy printed circuit board. And all external connections are made via gold plated input and output jacks. Further, a bypass function allows the user to totally remove the high level section of the preamp from the signal path. When selected, this provides both direct line-drive for high level sources (such as a CD player), as well as direct phono out.

At various times and for various products, we hear the words powerful, impactful, detailed, delicate, accurate, transparent, smooth, natural and a variety of other flattering adjectives. But one word is repeated more frequently than all the rest, and it is that for which we have strived above all. Musical. Athena is above all gloriously musical.

As with all Sumo products, Athena is designed and manufactured in the United States. Among those select dealers stocking our products are:

AUDIO EXCHANGE
28 West 8th St.
New York, NY 10011
212/982-7191

C&M's STEREO UNLIMITED
2020 N. Texas St.
Fairfield, CA 94553
707/422-3340

THE NEW BALANCE.

SUMO

SUMO PRODUCTS GROUP, 21300 Superior St., Chatsworth, CA 91311 818/407-2427
SUMO CORP CANADA, 1305 Odium Dr., Vancouver, B.C. V5L 3M1 604/254-5148



ANDROMEDA. The need for power is undeniable. But raw power is not a measure of a great amplifier. At Sumo, we recognized the need but approached the problem in new ways. Andromeda, for example, is a differential amplifier employing a unique full wave balanced bridge output circuit. This provides impressive statistics as well as awesome performance.

The power is 200 watts RMS per channel into 8 ohms at less than 0.05% THD. There is no current limiting. As a consequence Andromeda is capable of delivering 80 amp peaks at 1 ohm instantaneously.

Music has definition and detail. Sonic texture is smooth and transparent. Bass is tight, mid-range natural, and highs clean. Instrumental timbre is accurate through the top two octaves. Soundstage is wide, instrument placement consistent. The reviews are consistent too. Your Sumo dealer will show them to you.

POLARIS. The promise of delicate tube-like performance is part of the allure of MOSFET amplifiers. But the promise remained largely unfulfilled, until now, because of transconductance error. In Polaris, Sumo employs proprietary active bias output circuitry to correct the problem. Dedicated servo circuitry also reduces crossover notch distortion to levels found in the very best Class A amplifiers. And the elimination of protection circuitry ensures the purest possible reproduction of music.

The power is 100 watts RMS per channel into 8 ohms at 0.05% THD. there is no current limiting. Polaris is a conservatively rated amplifier capable of driving 4 ohm, even 2 ohm, loads comfortably.

Audiophile analog pressings reveal new nuances of sound. Compact Digital discs display dynamic range without high end pain. Loudspeakers are driven to new highs. Subwoofers to new lows. There is finesse for the subtlest shading and power for the most explosive rock-and-roll.

Sumo products are manufactured in the USA. Among the select group of dealers stocking them are:

AUDIO PLUS
6214 So. Dixie Hwy.
Miami, FL 33143
305/662-4971

PREFERRED SOUND
309 Water St.
Charlottesville, VA 22901
804/296-5696

THE BALANCE OF POWER.

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ANDROMEDA

CLASS AB

DIFFERENTIAL POWER AMPLIFIER

ELITE

POLARIS

CLASS AB

ELITE

SAMSON. Reproduction of music's bottom-most frequencies is often a moving experience. It can also be the difference between passively listening to music and emotional involvement. But the reproduction of sub 50 Hz fundamentals is a difficult proposition. And as a result most speakers are more shadow than substance at these frequencies.

Sumo's Samson is a groundbreaking product. It is a subwoofer whose development reflects a genuine understanding of the question. It is built around a 15 inch woofer and a massive 18½ pound magnet assembly. As a result it has the mechanical driving force to be both hair trigger quick and flat to 25 Hz. It also has unparalleled amplifier power. Built in is a dedicated ONE THOUSAND WATT PWM switching amplifier, a revolutionary design that sets new standards for headroom, linearity, efficiency, and speed.

Music, as a result, is reproduced with a new authority. Electrostatic panels add thunder to their air. And emotion is communicated with an immediacy that is surpassed only by the live experience.

DELILAH. The question becomes one of blend. Of integrating a subwoofer smoothly and unobtrusively into a range of acoustic environments. And of doing so in combination with any number of audio components. To this end Sumo introduces Delilah, a 2-way electronic crossover, and a natural complement to Samson.

Delilah is an expression of both sonic purity and extreme flexibility. It offers a summed mono, as well as stereo bass outputs. It has bridging circuits at each low frequency terminal. And it allows the selection of any of five crossover frequencies.

The result is deep bass without disorientation. More system headroom. Less strain. And the opportunity for emotional involvement in the musical experience.

Sumo products are manufactured in the USA. Among the select group of dealers stocking them are:

JEMSTONE AUDIO
325 Grove St.
East Lansing, MI 48823
517/332-1230

ATLANTIC STEREO
636 Route 18
E. Brunswick, NJ 08816
201/390-0780

A QUESTION OF BALANCE.

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SUMO PRODUCTS GROUP, 21300 Superior St., Chatsworth, CA 91311 818/407-2427
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SINGULAR IRONIES



Singles Swing Again

Just as the 12-cm CD is replacing the 12-inch LP record, the 8-cm (3 1/8-inch) CD, shown here with its larger relative, may replace the 7-inch vinyl single.

The single record seems to be on its way out (and with it, most likely, the 45-rpm speed). There are fewer and fewer jukeboxes to play them, and more and more home listeners are switching to CD and cassette. As a result, record dealers and distributors are reluctant to stock 45s, and record companies have begun to drop them.

There's still a need for short, low-cost recordings, though. Some listeners want them for economy, others because they want only the songs on the single, and not the entire album from which that single comes. Record companies prefer singles when sending promotional

recordings to radio stations: Singles are cheaper, and they give the company some control over which songs from the album the station plays.

To fill the gap, some record companies propose "cassette singles," holding just enough tape for a few songs. Stiff Records released such a single in 1983, Australia's Festival Records has released more than 100 two- and four-song tapes, and several major U.S. companies began releasing them on a trial basis this past summer.

Meanwhile, companies in Europe and Japan have been releasing CD singles in several formats. PolyGram West Germany has issued 16-minute discs on standard CD blanks; the disc area outside a small playing diameter is frosted. These sell for about two-thirds the price of regular CDs and only one-third more than

"maxisingle" vinyl records of equivalent length. Denon has announced plans to release similar discs in Japan, for the yen equivalent of about \$10, while Toshiba EMI has proposed a 20-minute, \$13.33 disc.

Early this year, however, Philips N.V. (which owns PolyGram) and Sony agreed on the 8-cm disc, and Sony's Digital Audio Disc Corp. plant in Terre Haute, Ind. has already begun producing small quantities of them. The 8-cm disc is designed to hold as many as four songs, or up to about 20 minutes of music (the DMP sampler shown here plays for 17 minutes). It should sell for about \$3 to \$3.50. Telarc has also announced plans for the little CDs.

These discs should be playable at once on top-loading CD players (including portables) and on a few drawer-loading models (such as the Magnavox CDB650). Soon, all drawer-loading CD players should be able to play them—that would require only the addition of 3 1/8-inch centering grooves to the disc trays. Drawer-loading players, and earlier machines with swing-out disc hoppers, will require a simple adaptor, probably a disc the size of a normal CD, with a 3 1/8-inch center hole that the CD single can snap into. Ironically, adaptors were also needed to play 45-rpm singles on many turntables—only in that case, it was the adaptor, not the record, that went into the center hole.

Another irony: The 8-cm CD single is just about the same size as the audio-only inner portion of Philips' CDV-Single, which has also been promoted as a way to fill the singles gap. With its lower price, smaller size, and ability to be used with existing players, the CD single seems certain to crowd its video sibling out of that particular market niche.

CD's Gilded Age

If you look closely at a CDV-Single, you'll notice a change in the spiral pit pattern about 3 inches out from the center of the disc. But there's an easier way to differentiate it from most audio-only CDs: The CDV-Single has a gold color, due to a special yellow dye in the plastic it's made from. (The

dye is a type that does not absorb the laser's wavelength.)

There are some golden audio-only CDs too—literally gold, since they use a gold reflective coating instead of the usual aluminum. So far, the only such gold discs I've seen are Mobile Fidelity's Ultradiscs. The company claims that the gold layer has fewer

nonreflective gaps than aluminum, and that its noncorrosive nature should extend the disc's life. The first Ultradisc was a jazz sampler; since then, the company has announced a sampler of classical works from Russia's Melodia label and *Will Power* by Joe Jackson. Prices are about \$30 each—but then, gold is gold.



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C•1 A/V Preamplifier

The Soundstream C•1 Audio/Video Control Preamplifier is a dual-mono Class A design that provides extraordinary musicality, extensive A/V switching and the most comprehensive remote control system engineered to date.

- Audio circuitry is fully discrete and operates in Class A from input to output to insure absolute sonic integrity • Bass and treble controls are outside the normal signal path • Left and right channels are on separate double copper-plated glass-epoxy military-grade circuit boards to ensure maximum channel separation, low noise, excellent shielding and high current handling capability • Volume is established by a motorized control that can be set from the front panel or adjusted via the R•1 remote control • Outputs are buffered to prevent interaction with subsequent components • All input and output terminals are gold-plated.



The C•1 provides a complete home-entertainment control center. • A/V source selection - two VCR's, a videodisc player, two audio tape decks, CD player, tuner, and phono cartridge (MM or MC) • Two pair for each audio and video monitor outputs are provided for multi-room operation • Separate RECORD and LISTEN Circuitry permit, for example, recording from videodisc to VCR 1 while listening to a CD or watching TV. • Every major control function - source selection, volume, balance, audio mute, tone defeat, system on/off - can be remotely controlled by the R•1 remote provided.

DA•1 Dual Mono Amplifier

The DA•1 can serve up almost unlimited power to meet the needs of the most demanding system.

- Conservatively rated at 400 watts (200 watts RMS continuous per channel) • High current dual monaural design provides exceptional performance vis-a-vis output-current capacity, frequency response, noise, distortion and channel separation • The conservatively designed, fully discrete transistor circuitry eliminates the need for current limiting. This permits the DA•1 to tap the full resources of its



massive power supplies and drive the most complex loudspeakers with remarkable musicality. • Dual front-panel overload indicators.

T•1 Stereo Tuner

The tuner is precision-engineered to complement the performance, convenience and aesthetic design of other Soundstream SYSTEM • 1 Components.

- Digitally synthesized "front end" for absolute tuning accuracy • Convenient station search and preset tuning (8 AM/8 FM) • Flywheel-stabilized rotary knob manual tuning in precise 50kHz steps • A unique full frequency blend circuit (defeatable) provides a 9dB reduction in stereo background noise for dramatically improved weak station listening • Stereo/mono button and defeatable FM mute are provided • Major functions are accessible by Soundstream R•1 remote control via the serial interface with the C•1 Control Preamplifier.



R•1 Programmable Remote

The R•1, provided with the C•1 Control Preamplifier is a universal infrared transmitter which allows extensive remote operation of Soundstream with non-Soundstream components such as TV, VCR, compact disc players, etcetera.

- Programmable to control up to 11 components of virtually any brand, over 350 functions • Easy, "Single-Finger Programming" and unusually logical ergonomic layout • 8 Kbyte memory allows operation of analog disc player, tuner, compact disc player, 2 audio tape decks, 2 VCR's, a videodisc player, and surround-sound processor, as well as TV or monitor • Functions controllable for the system include: individual component power on/off (as well as Master Power on/off); volume; 4-way balance (for surround-sound systems); audio mute; tone control bypass; TV and AM/FM search and direct station access; record, play, pause, fast forward and rewind for the audio tape decks; the same functions including slow motion for the VCR's, and, with the exception of record, a similar array for the CD and videodisc players. • 6 additional "unassigned functions" are available for each component and can be used for remote speaker selection, home security, or any other function that may become available in the future • High power multi-directional beam allows usage virtually anywhere in the room • Powered by 4 AAA batteries with a long-life lithium battery for memory backup.



The Living Room and Beyond

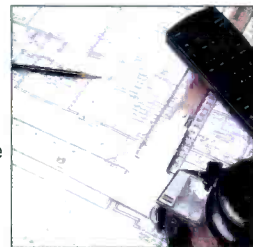
The discerning eye will appreciate Soundstream's unusual approach to aesthetic design which, not being dependent on mere cosmetics, is a study in the interaction of function and ease of operation. As a result, the SYSTEM • 1 exhibits a simple elegance which, while distinctive, will harmonize with any listening room environment.

The versatility of the SYSTEM • 1 allows you to design your music and video system to operate throughout your home via multi-room remote control options.

Available options will include remote eye receivers that allow you to control your Soundstream components from virtually anywhere in your home with your R•1 remote transmitter; "Simulsource," which permits different sources to be monitored in different rooms simultaneously; and "Universal Remote Interlink," which allows non-Soundstream components to be controlled from another room.

The Final Component

Authorized Soundstream SYSTEM • 1 Dealers are uniquely qualified to provide the proper installation and knowledgeable component matching necessary for completing your music and video system. Contact us for the name and location of your nearest dealer.



2907 West 182nd Street • Redondo Beach
tel (213) 214-4652 • fax (213) 214-5416

Technical Specifications for the SYSTEM • 1
are available upon request

Enter No. 95 on Reader Service Card

References Available

Soundstream Car Audio...
Qualified as the Industry's
Reference Standard

TC308 Removable Stereo Tuner/Auto-Reverse Cassette Deck

• Selected as one of the outstanding new products of the 1986 International Consumer Electronics Show, Design and Engineering Exhibition.

• "... excellent (tape) playback response in both directions of play... In FM performance, the TC308 ran circles around my reference unit... As easy to use as it is to look at."

Audio Magazine - September 1986

"Soundstream's a class act, make no mistake... Not just another pretty face. We're very impressed."

High Fidelity Magazine - May 1986

"The TC308 is an elegant, beautifully laid out head unit... very high quality sound..."

Stereo Review - July 1986

"Someone finally designed a car radio that makes sense..."

ID Magazine
1987 Annual Design Review



200 Watt Dual Monaural Power Amplifier D200

"The Soundstream (D200) was clearly the best sounding of the group (ADS PQ10, Carver M240, Hafler MA-1, Harmon/Kardon CA260, Infinity MRA-150, Linear Power 1002, Proton D275), given good enough speakers it slings."

8 Car Amps Tested,
Audio Magazine - May 1987

• Selected by the world's most prestigious loudspeaker manufacturers (B&W, KEF, Boston Acoustics and Polk Audio) as their exclusive automotive demo amplifiers during the 1987 Winter and Summer Int'l Consumer Electronics Shows.

• 1987 Auto Sound Grand Prix Award winner - voted by retailers for fidelity of sound reproduction, design engineering, reliability, craftsmanship, product integrity and cost/performance.

Audio Video International - March 1987

• Designed & Manufactured in USA

TC303 Removable Cassette/Receiver

TC301 Cassette/Receiver



• Built-in Power:
TC301 - 11 watts x 2'
TC303 - 11 watts x 2'
or 4.5 watts x 4'
(*30Hz-20kHz, ≤0.8%THD)
Additional power may be added via RCA preamp outputs

• Auto-Reverse Tape Convenience with Superior Performance - 30Hz-17kHz, ±3dB both directions any tape, Dolby (B/C TC303), Servo-controlled DC motor, Key-off Pause, Music Search.

• Urban & Rural Optimized AM-FM Stereo Tuner with Multiple Presets, Station Search, and Stereo/Mono Button.

• Low Noise Preamp with CD Input, Bass, Treble, and Auto Loudness Compensation.

Built-In Power and Convenience - Introducing Two Remarkably Affordable Soundstream Performers

Dubbing and Deterioration

Analog tape copies are never as good as the originals they're dubbed from, and most of us have heard the problem with our own ears. But David Carlstrom, of the Southern Michigan Woofer and Tweeter Marching Society (SMWTMS), has measured just how much deterioration occurs in tape copying. His specific results apply only to the 15-ips Otari MTR-10 recorders he used, but the outlines of what he learned probably apply even to home cassette decks.

After just one copy generation, a difference could be heard on double-blind subjective tests. By the 12th generation, writes Carlstrom in *LC—The SMWTMS Network*, "it sounded awful."

The first change to show up was an increase in noise. It jumped from -59 dB to -55.5 dB on the first copy generation, but went up only 0.9 dB for each additional copy step.

Frequency response errors accumulated quickly too. "An insignificant 0.5-dB rise in the master at 3 kHz" built up with each generation, reaching +2 dB in the third generation and saturating the tape at +9 dB by the 12th generation. Using the same two decks for every dub, as Carlstrom did, exaggerates this effect; the same frequencies are re-emphasized in each generation. Distortion stayed below 2% until the sixth generation.

Though both recorders' heads were aligned before Carlstrom's test, two different alignment tapes had been used, so there were slight azimuth differences between the two decks. As a result, a 9- μ S interchannel delay was introduced with each generation. "By the 12th generation, 10 kHz had rotated a full 360°." This caused no audible high-frequency loss in stereo, but by the fifth generation there was a loss of 6 dB at 5 kHz, and by the 10th the tracks sounded out of step.

Carlstrom's conclusion? "Even one generation can be detected by a sensitive listener. The third generation is tolerable for industrial work, but more than that is likely to be noticed . . . For perspective, the typical black-vinyl release has three to five tape generations; the typical cassette tape has one more generation."

On All Cylinders

If you're running out of records to play on your Edison cylinder phonograph (or any compatible two-minute player), take heart. Cylinders are back.

They're not back in any big way, understand. The maker, Electrophone Cylinder Record Co. (32 South Tyson Ave., Floral Park, N.Y. 11001), molds them in batches of only 100 or so at a time, and their catalog recently ran down to fewer than a dozen titles. When a batch runs out, however, they can mold more.

This wasn't always true. Like Edison, Electrophone started out selling individually cut wax cylinders (they still sell wax recording blanks). Individual cutting is an inefficient way to make recordings. Moreover, wax wears out and sometimes is attacked by mold or heat. (The wax used for cylinders, Electrophone reports, did not melt like candle wax when heated; rather, heat melted out some of its oils, rendering it brittle.)

Electrophone next tried to replicate cylinders by molding, using modern vinyl instead of the inflammable celluloid from which Edison had molded cylinders. The problem with vinyl is that it can shrink, making the pitch of the cylinder's grooves a bit tighter than the pitch of the lead screw which drives the playback stylus along the cylinder's axis. This sometimes causes grooves to repeat and can conceivably damage them.

Now the company molds the cylinders from polypropylene. They anticipate no shrinkage and feel the cylinders should "last indefinitely when played on Edison or similar equipment," says Peter Dilg, a

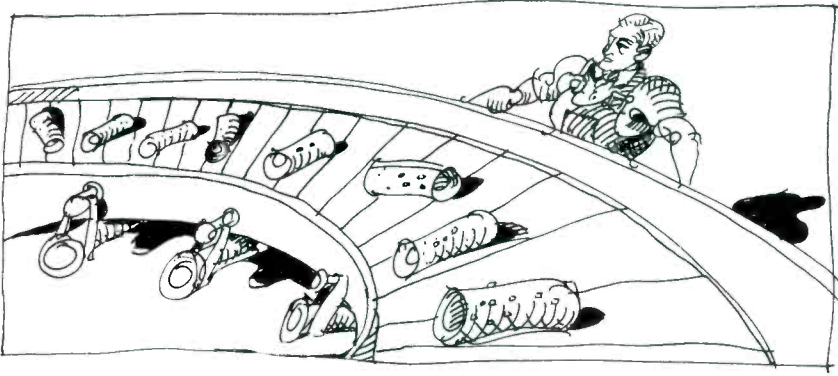
partner in the company. "What we now have," Dilg adds, "is, for the first time, a practical cylinder record."

Mr. Dilg and his partner, Dennis Valente, make their electrically cut masters with a lathe and cutting head they built themselves. The diamond cutting stylus, says Dilg, is the only Edison part.

As of this writing, the company's catalog is divided pretty evenly between contemporary recordings made on modern equipment and old Edison originals. The modern titles include selections by Don Neely's Royal Society Jazz Orchestra, Vince Giordano's Nighthawks, Professor Blanding (a British ragtime player), and a duo composed of Ron Dilg (Peter's brother) and Jared Lee. The Edison originals include Billie Murray singing "Yankee Doodle Boy," Byron G. Harlan singing "Wait Till the Sun Shines, Nellie," an old advertising record ("I Am the Edison Phonograph . . .") by Len Spencer, and "The Edison Liver Story," a joke told by Thomas A. Edison himself. Coming up are old Christmas records, Al Jolson singing "Swanee," and more.

All but one of these recordings are black and sell for \$8.95 apiece (plus postage). The "Edison Liver Story" is a picture record, made of transparent plastic with a picture of Edison inside; it sells for \$15. The company also makes custom recordings.

How big is the market? Dilg estimates that two million players are still around. "Most of them don't get used much," says Patty Valente (Dennis' wife). "The old recordings wear out, and they haven't been made since 1929. Now they're being made again."



You may be listening to the Beethoven Satellite Network without realizing it; the syndicated service is heard in 26 states.



A Seven-Dollar Steal

Rykodisc calls their new sampler CD *Steal This Disc*, but there's not much reason to—it's priced at only \$6.98. For that, you get 72 minutes of music, 21 tracks by such artists as Devo, Richie Havens, Doc & Merle Watson, and Frank Zappa. This does not, alas, presage a drastic drop in CD prices. The disc is strictly a promotional item, for which each artist donated one track royalty-free, and the company is taking no profit. The timing is significant too; the release comes at a time when the young company has just enough albums out to fill a CD with one sample from each. "The sampler is our catalog," says company spokesman Noah Herschman. The only Rykodiscs not represented are an album of Christmas carols and several of nature sounds.

Not-So-Neologism

Audiophiles now commonly refer to monophonic power amplifiers as "monoblocks." The usage is new (arising, perhaps, within the past three years), but the word is not. Back when my father was a tot, the term was applied to automotive engines whose cylinders were all part of the same casting as the crankcase (like today's car engines), rather than cast and fastened to the crankcase individually (like most motorcycle engines, until recently). So originally, it meant many units in one block, not one block per unit.

Missing Goods

We recently received this notice from James Anderson Audio and have been asked to pass it along:

On June 23, 1987 at Philadelphia's Academy of Music, several professional microphones and related accessories were stolen from the Effanel Recording truck; there is a \$500 reward for information leading to its return. The equipment includes:

- One Beyer M500 ribbon microphone, serial number 21465, in box with clip;
- two Brüel & Kjaer 4007 microphones, serial numbers 973232 and 1040002, in KE0215 wooden boxes with clips;
- one Neumann KMR 82 shotgun microphone, gray, with windscreen (notched for Rycote mounting) and black leather sheath;
- four Radio Shack PZMs, two with XLR plugs on cable ends, two new in boxes;
- two Sennheiser MD 421 microphones, serial numbers 19817

and 19825, in one box, initials JA inscribed on bottom, one exterior repaired;

- two Sony ECM-50 microphones, serial numbers 22458 and 22459, in individual boxes with complete clips, initials JA on preamps;
- one C-Ducer transducer pickup, mono, in case, with power supply;
- six AKG stereo bars;
- one Shure A27M stereo bar;
- one Rowi microphone clamp, and
- six windscreens (for Sennheiser MD 421s, Shure SM81s, and Neumann KM 84s).

All equipment was in a suitcase-size case with silver metal exterior and light blue felt interior.

A report was filed with the 9th District of the Philadelphia Police on June 24, 1987.

If you have any information about the above equipment, please call either (212) 807-1100 (Effanel Recording) or (718) 643-1675 (James Anderson Audio).



Beethoven Booms

Classical broadcasters don't have it easy. They need extensive record libraries, knowledgeable program directors, and announcers who can pronounce foreign names, and they need to support all this on lower incomes than those enjoyed by their pop music counterparts. So Chicago's famous classical station, WFMT, started its Beethoven Satellite Network (BSN) in 1986, to feed low-cost overnight classical programming to stations elsewhere. So far, this hasn't brought classical music to cities where it wasn't already on the air, but it has allowed many stations to expand their classical programming.

"In many markets," says BSN's director of development, David Levin, "there's only one classical music source, often for just a few hours a day. But we make it easy to expand those hours, because we make nighttime programming cheap. Depending on the size of the station's market, our service costs only about 75 cents to a dollar per hour; you can't find an announcer to work at that price, let alone build a library of 40,000 records."

The Beethoven network is now on the air from 10:00 p.m. to 9:00 a.m., Eastern time, allowing West Coast stations to begin carrying it as early as 7:00 p.m. Some stations tape certain program segments to play during the day. Less than a year after BSN began, the service was being carried by more than 60 radio stations, reaching about 25 million listeners in 26 states, coast to coast. You may be hearing BSN without even realizing it—the service carries little identification. "You have to listen closely to tell it's us," says Levin. "As far as listeners are concerned, we become the local station's product."

Illustrations: Yvonne Buchanan

They work
the way they do
because
we worked
the way we did.



R 4



a/d/s/

After four years at Hewlett-Packard, we w

In 1983, Dr. Godehard Guenther, President of *a/d/s/*, issued an injunction to our engineers and designers. "Guys," he said, "somebody's got to come up with a new loudspeaker standard. Let's make sure it's us."

Understand: he wasn't suggesting our existing loudspeakers weren't good. Rather, he was challenging us to address the shortcomings present even in the very best speakers, ours included. Shortcomings made all the more apparent by the sonic demands of the compact disc.

What we sought to build were speakers that didn't sound like a set of drivers stuffed in a box. Our goal was to create speakers characterized by a stable sound stage, pinpoint imaging and sound that seemed to emanate from free space.

It was a tall order. But the technology that has resulted—Unison™ . . . of one voice—is the kind other speaker makers will be emulating for years to come.



At *a/d/s/*, we make our own drivers. Our high definition woofers feature new cones, magnets, baskets and voice coil assemblies—painstakingly crafted to eliminate coloration.

We finally had the tools to be as critical as we were inclined to be.

Our first task was to take a long, hard look at the limitations inherent in loudspeaker drivers. That required a powerful "microscope." And, fortunately, we had one—a high-resolution, super-fast computer from Hewlett-Packard, supported by a sophisticated mathematical program of our own devise.

Housed in a specially designed *a/d/s/* acoustics laboratory, the computer gave us the ability to generate and analyze driver performance data with an accuracy, thoroughness and detail never attainable before.

High technology enclosure materials enable us to make the new CM7 (left) and CM5 extremely compact without sacrificing interior volume. How compact? Consider that the CM5 measures a mere 9⁵/₈" x 5³/₄" x 6⁷/₈".

In this veritable mountain of information, acoustic truths resided.



The CM7's 4th-order, 24dB/octave crossover network. Complex, sophisticated and expensive to manufacture, it's a major reason why the speaker produces such a stable image.

If the drivers aren't flawless, no amount of camouflaging will hide the flaws.

One fact was obvious: the traditional materials used to construct woofers, tweeters and midranges—polypropylene, metal, cellulose compounds—were simply inadequate. So we set about to discover new ones ideally suited *at the molecular level* to the jobs they're required to do.

For the domes of our tweeters, we selected a proprietary copolymer that's exceedingly rigid, yet has superb internal damping and freedom from ringing. For the voice coil formers in our midranges, we adopted stainless

the keyboard of a are ready for a Steinway.

steel. Strong and non-magnetic, it enabled us to produce a motor quick enough to resolve the finest detail, even at the highest volume level. And so our research went, until our drivers were as perfect as the laws of physics allow.

The crossover network. You don't see it. You shouldn't hear it, either.

When most speaker makers design crossover networks, their primary concern is the interaction of the drivers. We were more ambitious. We sought crossovers that optimize the relationship between the drivers and their

enclosure, even with the room in which the system is played.

And we had an advantage: the excellence of our drivers allowed us to use *ideal* crossover points. Using these points, all the fundamental tones of the human voice can be reproduced by a single driver. With the computer, we evaluated countless prototypes of crossovers. A 4th-order network of the Linkwitz-Riley type proved the most appropriate. This type alone yields the response that satisfied our requirements for neutrality and realistic imaging. On a frequency response plot, the crossover points aren't even detectable.

How good it ultimately sounds depends on the box you put it in.

That's why we employed a polymer material filled with an



With its stainless steel coil former and copolymer cone, the Unisōn midrange does something a cone midrange has never done before: span the fundamental range of the human voice—from 200 to 2,000 Hz.



Our tweeters' domes are made of yet another proprietary copolymer, giving them the unique ability to provide smooth, detailed, high frequency response at even the highest levels.

extremely high mass compound to produce the rigid, aurally "invisible" enclosures of our Compact Monitor Series. You'll be amazed by the weight of these little beauties—they're heavy. You'll be floored by the sound.

To our ears, our new speakers—the M Series and compact CM Series—offer convincing proof that Unisōn technology does indeed define a new era in speaker performance. All that remains is for you to take ears of your own to one of the dealers listed on the back page of this ad.



The M12 is the instrument on the right.

a/d/s/

There are two tests for of a system

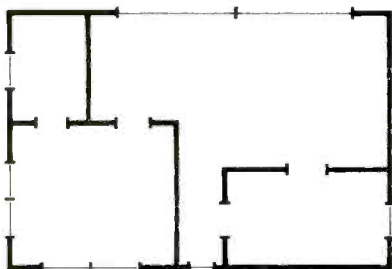


As you know, a/d/s/ began life as a speaker company. But it was only a matter of time before our interest in accurate musical reproduction led us to think seriously about the electronic portion of a sound system.



As you can plainly see, the R4's displays are extremely legible and easy-to-read from anywhere within a wide viewing angle. The unit provides you with full information about its operating status, so you know what you're doing and not flying blind.

What we wondered was whether we could improve upon that which was available at the time. The results appeared first in this country in 1983.



The R4 gives you true multi-room capabilities, while the RC1 provides the means to control the system no matter what room you're in.

Lean, spare and understated, the Atelier Series was an articulation of our belief that high-grade electronic components needn't look like laboratory instruments. Nor

require an engineering degree to coax into operation. Nor surrender to the indignities of planned obsolescence.

That philosophy today finds its expression in the Atelier R4 and its perfectly matched family of components.

A new class of component, as a look under the hood will attest.

At first glance, the R4 may appear to be a receiver. And it's true that the unit functionally incorporates the classic elements of that category of product. But beyond the impressive amplifier, pre-amplifier and tuner sections, the R4 bears about as much resemblance to a receiver as a BMW 735 does to a motor scooter. A look inside will illustrate the point.

We draw your attention first to what you'd least expect to find in a high fidelity product—a computer. Specifically, a microprocessor designed by a/d/s/ to provide a level of functionality never available before. For example, you can program the R4 to automatically turn on any combination of sources within your Atelier system for listening and recording, whether you're at home or off on an extended vacation.

When you are at home, you'll appreciate the fact that the R4 can give you access to any source from any room in your house—

The R4. Its slim, spare design gives little hint of the technological sophistication and sonic power that reside inside.

all by remote control. And when we say control, we mean control. With the RC1, you can control the nuances of every remote-ready Atelier component in your system—the compact disk player, the cassette deck, the tuner, even Atelier components which have yet to leave the drawingboards at a/d/s/.

If you're a computer buff, you'll be pleased to know you have the option of controlling Atelier functions by connecting your pc to the RS-232 port in the R4.



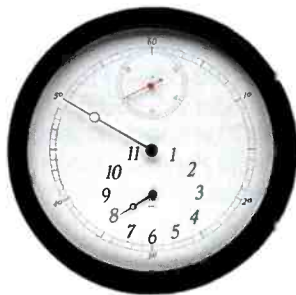
With the RC1 remote control unit, you can control every important function of every remote-ready Atelier component. You can do it standing up, sitting down or lying on your back. It issues more than 200 different commands.

the electronic heart Music and time.

Pertinent to the subject of control is the large scale integrated chip that's embedded within the R4's control circuit. This chip makes it possible for you to control volume, bass and treble settings in precise, digital increments—channel to channel, and with none of the variation in levels that are typical of "twirl-knob" systems.

The sonic purity is uncommon because the design is uncommon.

The R4's preamp signal paths are unusually noise free. That's because all circuits have been painstakingly protected from stray radiation by ample amounts of shielding—one of just many steps we've taken to preserve the extremely low distortion of the amplification stages.



As audio purists, we also feel compelled to tell you that the R4's microprocessor exists entirely outside the path of the audio signal. In other words, it keeps to itself, which is as it should be.

The FM portion of the R4 is as impressive as everything else about the unit. Finetuning is done in small, digital increments, which results in superb signal acquisition—the best possible, in fact—and eliminates distortion and "fuzzy" reception. Working down the signal chain, we come to the IF amps. Their bandwidth has been carefully designed to yield exceptional selectivity. Finally, stereo decoding is, in a word, impeccable. The result: optimum stereo separation.

As for the prodigious amount of power the R4 produces for its size, that was accomplished thanks to our use of a proprietary rail-switching technology that automatically and instantaneously increases power for high-energy music transients—well beyond its rated 75 watts per channel.



A glimpse inside reveals how carefully thought-out the R4 is. No space is wasted. Electronic circuitry, heat sinks, transformers, etc., are all contained within a box that stands only 2³/₄" high.

When you need more power, we have more amplifier. Our PA4 amp provides 150 watts per channel, and nearly double that amount when bridged. Whether you use one or two PA4's in tandem with the R4, operation remains completely automatic. Moreover, you don't surrender any of your remote control capabilities—a fact that nicely differentiates Atelier from its competitors:

One final point deserves to be repeated. When we entered the electronics arena in 1983, our stated goal was to produce superb audio equipment that never became outdated. The R4 is the product of that vision, and it won't.

The Atelier system of electronic components. From top to bottom, the R4, the CD4 compact disk player, the C4 cassette deck and the PA4 power amp. That's even an Atelier storage module they're sitting on.



a/d/s/

Test them for yourself.

Shimek & Co.	Anchorage	AK	The Sound Shop	Manhattan	KS	The Music Box	Harrisburg	PA
Great Alaska Sound	Anchorage	AK	SOHO Electric Co.	Overland Park	KS	Summit Audio	Kingston	PA
Alaska Audio/Video	Juneau	AK	The Stereo Shoppe	Lexington	KY	Glick's Audio, Inc.	Lancaster	PA
New Lawrence Stereo	Birmingham	AL	Art Colley's Audio Specialties	Baton Rouge	LA	David Mann Audio	Philadelphia	PA
Sound Distributors	Huntsville	AL	Wilson Audio	New Orleans	LA	Soundworks	Springfield	PA
Sound Advice	Mobile	AL	Trolley Stereo	Belmont	MA	Hi Fi House of State College	State College	PA
Leisure Electronics Inc.	Little Rock	AR	Tweeter Etc.	All Stores	MA	DS Audio, Inc.	West Reading	PA
Casa Moore Stereo	Bakersfield	CA	Sound Trak Audio	Brockton	MA	Soundings	Middletown	RI
Contact Stereo	Beverly Hills	CA	Natural Sound, Inc.	Framingham	MA	Audio Warehouse	Charleston	SC
Sound Center	All Stores	CA	The Music Store, Inc.	Greenfield	MA	Upstairs Audio	All Stores	SC
Kustom Hi Fi	Burlingame	CA	Tripod Audio Inc.	Northampton	MA	Southland Sound	Hilton Head	SC
Paris Audio	All Stores	CA	New England Car & Home			Audio King	Sioux Falls	SD
Serra Stereo	All Stores	CA	Stereo	Springfield	MA	Hi Fi House, Inc.	Knoxville	TN
Pacific Coast Audio-Video	Corona Del Mar	CA	Spaceways Sound	All Stores	MD	Lindsey Ward, Inc.	Knoxville	TN
Audio Video City	Culver City	CA	Hunt Audio & Associates	All Stores	MD	Modern Music Inc.	Memphis	TN
Genesis Audio, Inc.	El Toro	CA	Audio Associates	All Stores	MD	New Wave Electronics	Memphis	TN
North County Stereo	Encinitas	CA	Gramophone, Ltd.	Lutherville	MD	Audio Systems, Inc.	Nashville	TN
Sound Factor	All Stores	CA	Audio Associates	Rockville	MD	Don's Hi-Fidelity, Inc.	Amarillo	TX
The Record Roost	Ft. Bragg	CA	The Great Northern			High Fidelity Inc.	Austin	TX
Radio Lab	Glendale	CA	Sound Co.	S. Portland	ME	Brook Audio, Inc.	Beaumont	TX
House of Audio	Goleta	CA	Hi Fi Buys	All Stores	MI	Marvin Electronics Co.	Fort Worth	TX
Mad Jack's	All Stores	CA	Gramophone Co., Inc.	Birmingham	MI	Home Entertainment, Inc.	Houston	TX
Audio Concepts	All Stores	CA	Pecar Electronics	Detroit	MI	Audio Systems, Inc.	Laredo	TX
Bel-Air Camera & Hi Fi	Los Angeles	CA	Audio Concepts, Inc.	Grand Rapids	MI	Hi-Fidelity of Lubbock	Lubbock	TX
Henry Radio	Los Angeles	CA	Kurtz Music & Sound, Inc.	All Stores	MI	San Antonio Audio		
World of Sound	All Stores	CA	Audio King	All Stores	MN	Concepts	San Antonio	TX
Newport Audio	Newport Beach	CA	Hi Fi Sound Electronics	Minneapolis	MN	Bjorn's Stereo Designs	San Antonio	TX
Stereo By Design	North Hollywood	CA	Audio Group	Minneapolis	MN	Road Sounds #1, Inc.	Temple	TX
Fidelity Sound	Orange	CA	In Concert!	St. Paul	MN	Audio Tech	Wichita Falls	TX
Desert Stereo	Palm Desert	CA	The Sound Room	Chesterfield	MO	Lynn's Audio & Video	Logan	UT
Western Audio Imports	Palo Alto	CA	Best Sound Company	St. Louis	MO	Audioworks Inc.	Salt Lake City	UT
Paradyne Consumer			Sound Advice	Guilford	MS	Arrow Audio	St. George	UT
Electronics	Sacramento	CA	Ideal Acoustics	Starkville	MS	Audio Associates	All Stores	VA
Stereo Showcase	All Stores	CA	Avitel-Bozeman	Bozeman	MT	Stereo Types	Charlottesville	VA
Burdick Sales Co.	All Stores	CA	Sound Systems, Inc.	All Stores	NC	Contemporary Sounds	Fredericksburg	VA
Hermery's	San Carlos	CA	Soundhaus	All Stores	NC	Sound Approach, Inc.	Newport News	VA
Breier Sound Center	San Diego	CA	Dacia Audio/Video	Hickory	NC	Audiotronics, Inc.	Richmond	VA
Stereo Plus	San Francisco	CA	Electronics Marketing, Inc.	Grand Forks	ND	Ear Food Find Audio	Winchester	VA
Century Stereo	All Stores	CA	Tweeter Etc.	All Stores	NH	City Stereo	Burlington	VT
Gluskin's Camera Corner	Stockton	CA	Soundworks	Cherry Hill	NJ	Sound Directions	Rutland	VT
Soundtrack	All Stores	CO	Atlantic Stereo	E. Brunswick	NJ	Magnolia Hi Fi	All Stores	WA
Main Street Music	Aspen	CO	Hi Tech Stereo & Video	Eatonville	NJ	Stereocraft	All Stores	WA
The Sound Shop	Colorado Springs	CO	UltraTech By House of Audio	Little Falls	NJ	Huppins Hi Fi and Photo	Spokane	WA
Soundings	Denver	CO	Sound Incorporated	Northfield	NJ	Paulson's Inc.	Tacoma	WA
Gramophone Audio	Durango	CO	Leonard Radio, Inc.	Paramus	NJ	EME Audio Systems	Eau Claire	WI
Players Guitars & Stereos	Frisco	CO	Rand's Camera & HiFi, Inc.	Toms River	NJ	Hi-Fi Heaven, Inc.	Green Bay	WI
U.S. Tech	Ft. Collins	CO	Hal's Stereo Sound Center	Trenton	NJ	Sound World	Madison	WI
Yampa Valley Sound Co., Inc.	Steamboat Springs	CO	Samm Sound Distributors	West Caldwell	NJ	Happy Medium, Inc.	Madison	WI
Carston Stereo	Danbury	CT	Hudson's Audio Center, Inc.	Albuquerque	NM	Audio Elite	Menasha	WI
Audio Design	Fairfield	CT	Trend Tech	Farmington	NM	Flanner & Hafsoos Music		
The Stereo Shop Inc.	Hartford	CT	Music World	Hobbs	NM	Ltd.	Milwaukee	WI
Take 5 Audio	New Haven	CT	The Sound Room	Las Cruces	NM	Murphy Sight & Sound	Gillette	WY
The Stereo Lab Inc.	New London	CT	Import Audio	Las Vegas	NV	The New Music Box	Laramie	WY
Audiotronics	Norwalk	CT	Sound Experience	Las Vegas	NV	Bay Bloor Radio	Toronto	Canada
Audiocom	Old Greenwich	CT	Audio Authority	Reno	NV			
Tweeter Etc.	Waterford	CT	Vinyl Jungle, Inc.	Batavia	NY			
Audio Spectrum, Inc.	Altamonte Springs	FL	Adirondack Music, Inc.	Boonville	NY			
Sound Plus Wood, Inc.	Boca Raton	FL	Video International, Inc.	Brooklyn	NY			
Kuban's	Bradenton	FL	Sound Approach	Commack	NY			
Rising Sounds, Inc.	Clearwater	FL	Sound Stage Audio	All Stores	NY			
Audio Insight, Inc.	Fort Lauderdale	FL	Rabson's	All Stores	NY			
Audio Tech Inc.	Jacksonville	FL	Longplayer Stereo	Goshen	NY			
Audio Trend, Inc.	Melbourne	FL	Auto Sound Systems, Inc.	All Stores	NY			
Stereo By Design, Inc.	Miami	FL	Rosner Custom Sound	Long Island City	NY			
World Electronics Dist., Inc.	Miami	FL	Performance Audio Video, Ltd.	Merrick	NY			
House of High Fidelity	Naples	FL	The Sound Mill, Inc.	Mt. Kisco	NY			
Fox Audio, Inc.	Stuart	FL	Borger's Audio/Video	New York	NY			
The Sound Center	Tallahassee	FL	Cosmophon Sound Inc.	New York	NY			
Sensuous Sound Systems	Tampa	FL	Grand Central Radio	New York	NY			
Consumer Center	Tequesta	FL	Leonard Radio, Inc.	New York	NY			
TV & Audio Center	Vero Beach	FL	Park Avenue Audio, Inc.	New York	NY			
The Audiohouse	W. Palm Beach	FL	Stereo Exchange	New York	NY			
Electronic Connection	Atlanta	GA	Square Deal Radio & TV, Inc.	Patchogue	NY			
Stereo Designs, Inc.	Atlanta	GA	J.B. Sound Systems, Inc.	Rochester	NY			
Macy's	Savannah	GA	Audio Command Systems, Inc.	Rockville Center	NY			
Audio Warehouse	Savannah	GA	Sound Concepts, Inc.	Roslyn	NY			
Southland Sound	Hilo	HI	Le Sounde	Saratoga Springs	NY			
Hilo Audio, Inc.	Honolulu	HI	Gordon Electronics	All Stores	NY			
Chroma Electronics	Honolulu	HI	Stereo Plus	Tonawanda	NY			
Comfort ACR Inc.	Honolulu	HI	Sound Odyssey Inc.	Wappinger Falls	NY			
Electronic Station	Honolulu	HI	Front Row Sound	White Plains	NY			
Honolulu Audio Video			Adirondack Music, Inc.	Whitesboro	NY			
Co., Inc.	Honolulu	HI	Leonard Radio, Inc.	Woodside	NY			
Sound Specialties of Kona	Kailua-Kona	HI	Audio Craft Co., Inc.	All Stores	OH			
Spencer Sound Systems	Coralville	IA	Stereo Lab	All Stores	OH			
Golden Ears Audio Video	Fairfield	IA	Carlin Audio	Kettering	OH			
Electronics Cave	Iowa City	IA	Audio Tech	Lawton	OK			
Jamison's Music West	Nampa	ID	Gramophone Audio & Car					
Team Electronics	Algonquin	IL	Systems	Norman	OK			
Columbia Audio/Video	All Stores	IL	Contemporary Sounds	Oklahoma City	OK			
Good Vibes Sound	Champaign	IL	Chelsea Audio Video	All Stores	OR			
Audio Enterprises, Inc.	Chicago Hts.	IL	The Stereo Plant	Bend	OR			
JR Lloyd	Decatur	IL	Oregon Typewriter &					
Audio Consultants, Inc.	All Stores	IN	Recorder	Eugene	OR			
The King's Stereo	Springfield	IL	Lutz Enterprises	The Dalles	OR			
Alan Audio, Inc.	Bloomington	IN	Canien Audio, Inc.	Bethlehem	PA			
Soundpro	Carmel	IN	Sassafras Records & Audio	All Stores	PA			
Good Vibes Sound	All Stores	IN	The Audio Den	Erie	PA			
Audio Specialis	South Bend	IN	Listening Post, Inc.	All Stores	PA			
Stereo Crafters	Terre Haute	IN						
Kief's Gramophone Shop	Lawrence	KS						

For more information about the audio components described on the preceding pages, we invite you to phone us, toll-free, at 1-800-345-8112. (In PA, the number is 1-800-662-2444.) We'll be happy to send you a White Paper on the new a/d/s/ speakers, Atelier literature or both.

Analog and Digital Systems, Inc.
One Progress Way
Wilmington, MA 01887

a/d/s/

THE SOUNDS OF MUSIC

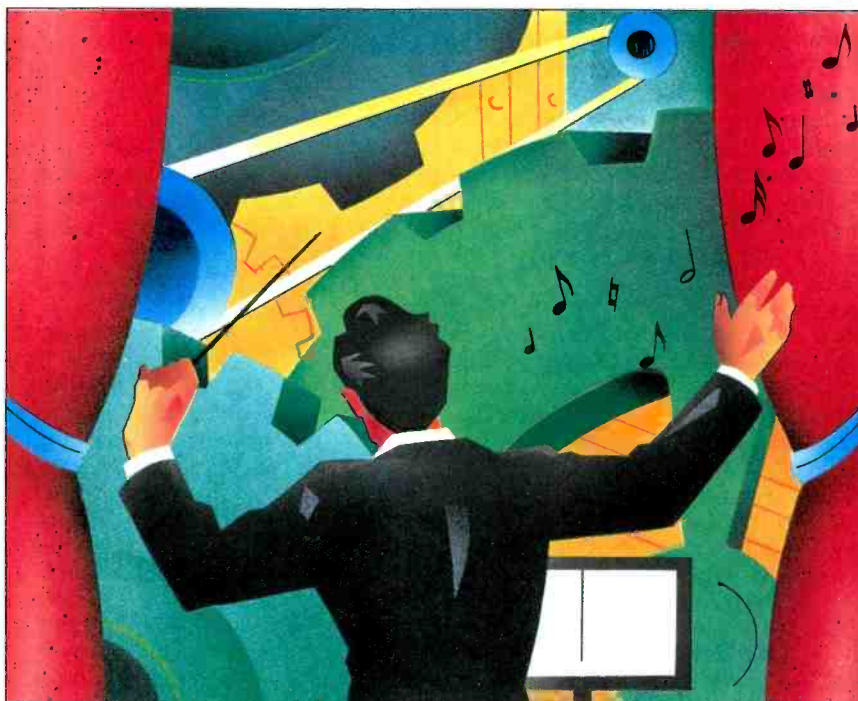
I used to have a sort of slogan for this column which went, "The business of audio is music." If we are talking about entertainment for the everlasting consumer, who keeps us in business, music is surely still the king of audio. True, we have entertainment sidelines that are not strictly music—the "songs" of whales in water, birds in air, steam locomotives in clouds of smoke. Also, of course, the spoken word, with or without music attached. But all these are a sonic trickle; music in all its familiar aspects obviously dominates us.

This is curious, because we are seldom able to agree as to what *is* music. In his radical works of the 1920s and onwards, Edgard Varèse neatly dodged this issue by referring to his creations as "organized sound." Audio engineers, veering onto a side track, distinguish merely between "signal" and "noise," an entirely practical approach to the basic audio problem, which is to make output reproduce input. Paradoxically, an excellent source of audio *signal* is *noise*, sometimes white, sometimes pink. No properly trained engineer would be fazed by that contradiction! But to decide what is music is another story.

As a matter of fact, or at least of probability, the audio that really dominates the world today is that of the electronic voice in communication. In terms of what I like to call "amplitude"—amplitude, or maybe sheer power, versus time elapsed—the practical spoken word in audio would measure as man's principal audible noise and our main business. But is this really audio, as most of us think of it?

Not really. Our business is based on entertainment. And the nature of that depends for us on such subtleties as sonic color, pitch, and rhythm, not to mention transients, phasing, mood production, personality projection, and other non-engineering factors. Almost any kind of sound, organized or no, may be music to at least some audio ears. But not an airport plane announcement.

The great Edgard Varèse is now revered as a pioneer in electronic music, even though most of his works are strictly "live" and only his last output originates, at least in performance, from tape. To my mind, Varèse omitted



a lot in his term "organized sound" because he took for granted in his live sonics the very thing that occupies us the most, the shape and color and clarity of the sound involved. It is a paradox that in his big "Déserts," alternating taped and "live" segments, the recorded parts, which were made before noise reduction and too often copied in the editing, could not at all match the colorful live sounds of the orchestra. And this even though the two sounds were ideally very much alike, the orchestra made to sound astonishingly like the tape—given the right "fi." Reworking of the "Déserts" tapes has already improved the sonic clarity of the prerecorded parts, and the most recent digital enhancement techniques should eventually do even better. Nevertheless, the "fi" that is so much our concern was, in Varèse's ear, strictly out of live sound. He was no audio buff. Yet, astonishingly, he understood the very nature of sound as few of us do, propelling music—or whatever—into far wider sonic areas.

One of the most exciting events in my early leanings toward audio was the modest assistance (and the willing audience) I gave Varèse in the first productions of this very same "Déserts," with a considerable live orches-

tra for half the sound and a two-track Ampex plus two absolutely enormous Altec Voice of the Theatre speaker systems as the sound emitters for the taped segments. This was in early 1956, when these systems were the brand of choice for just about any entertainment involving enormous public sounds. They may be a far cry from today's monstrous sound-producing equipment. But I can assure you, a few seconds standing in front of one of those Altecs going full blast could put a quick end to your hearing.

I never got to see the amplifiers for this speaker array; perhaps their rating was nothing much, even by today's audio equipment standards for cars (the smallest conceivable audio space outside of headphones!). Nevertheless, the Altec volume, out of an efficient horn-type configuration, as I remember, was easily lethal.

Varèse was the most genial, kindly, unassuming Frenchman ever to migrate to America—until you got yourself in the way of his sound. His live music, as you may know, is the most horrendously dissonant, the most fiendishly cutting and slicing and blasting live sound you will ever hear. Do you think, then, that the amiable Varèse would think twice about his listen-

The enormous Altecs of 1956 may be a far cry from today's equipment, but a full blast from one could quickly end your hearing.

ers' precious ears when it came to sonic reproductions from tape? (And remember, these were factory noises!)

When I came on the scene at the first performance, in a large space in Bennington, Vt. as part of some species of contemporary music festival (the equally dissonant Roger Sessions, once my unwilling teacher, was also there), the speaker systems were somehow mercifully set back from nearby ears, probably through some irrelevant circumstance, not intention. The music, even so, was loud enough to assault, but nobody was mowed down, or maybe only momentarily. Varèse was blissfully unaware of all that, as he would be. His task was twofold—to whip the live musicians into producing their utmost in controlled dissonance (a thing that most performers still do not enjoy unless there is mayhem in their souls) and to cue in the most incredible, impossible cues for an agreeable young lady named Ann McMillan, who had been his editing assistant in Paris and knew all his tricks. At a certain precise point in the orchestral sound (which was as precisely "organized" as any work by Debussy or Ravel in Varèse's early years), Ann was supposed to kick the Ampex "Play" button. I watched, fascinated, as the orchestra went over and over its music while Ann's face, screwed up in utter concentration, showed every detail of the sound's progress as she listened, Ampex waiting. For the life of me, I could not remember even an inkling of the cue music. But she got it. Needless to say, Varèse was much too busy with his orchestra to send out a hand signal like a good audio or TV producer. Ann was on her own.

Soon after, the Varèse "Déserts" was produced in New York and I was there, this time in a more active role, if merely in the sonic setup. Was it Town Hall? I think so. With utter insouciance in that relatively cramped space, Varèse had his big speakers set up, in his easygoing fashion, where they would do the most good—right at the front edge of the elevated concert stage, one on each side and, of course, facing forward. The nearest audience would be about five feet away, right in the middle of the sonic beams. I was ranging around the hall during that rehearsal and happened to park myself

near those lethal sound beams, or one of them, when the music on tape began. In seconds I was on my feet practically screaming and waving for a stop. "You can't! You can't put those speakers out there!!" Whole rows of agonized listeners, swathes of casualties, would be inevitable. As I remember, Varèse was mildly surprised, but accommodating, as ever. In perfect good humor, he asked me what I suggested he do.

Well, for a moment I was, so to speak, floored, down there on the floor of the hall. But this was still in the days, out of mono, when the best sound dispersion for living rooms and other musical places with loudspeakers was reflection, from varied sources, the more varied the better. So, I almost stutted, why not turn those speakers around and face each to the rear?

Fortunately, the hall was a good one for music, with a useful stage that had semi-smooth panelling angled forward on each side, with decorative irregularities of a helpful sort. So the two Aitec Voice of the Theatre units were back-aimed at a partial diagonal in the general direction of those side panels, to give a fairly precise but adequately diffused reflection for each channel, quite widely separated. There was room for the orchestra in between and the conductor in the middle. That, I hold, was my contribution to the aural health of the Varèse audience.

After this and many another experience with audio over the years, you may guess that my personal interest in sound *per se* is pretty much on the lines of Varèse's thinking. Yes, I know in detail what seems to me to be music and what doesn't, but I can be quite objective in the comparison. Beethoven has more organization than bird song, if not more color, but I still can find the songs of some birds really fascinating, on their own plane. Also the music of the old steam-engine whistle, the subject of folklore for a century, and even the less vivid sounds of the modern diesel locomotive. Without a second's thought, when I first heard an Amtrak train go by, I said, "Of course! That's 'Frankie and Johnny,' all the notes played at once." Listen and you will hear. I am bemused, horrified, and sometimes delighted by the extraordinary cheeps

and twirps and whoops of New York City's electronic sirens, at unbearable volume levels. The same goes for the dismal, out-of-tune decay of the "hee-haw" two-note signal built into many such sirens and derived from the acoustic air-horn signals of emergency vehicles throughout Europe and much of the rest of the pre-electronic world. (The two notes are traditionally a fourth apart, a ratio of 3:4. In New York they sometimes are no more than a squeak and a squawk, dismally out of any sort of tune. Who cares? I do.)

At a recent lecture and concert at the annual Oregon Bach Festival, the big cheese himself, German conductor and teacher Helmut Rilling, was going over Bach's Fourth Brandenburg Concerto with short illustrations from the music played by the orchestra. At one point the players finished on a chord—G major, I think. Rilling was about to continue speaking when it became apparent that one of the notes of the chord—I figure it as the middle note, B—was still being sounded, while all the other musicians had stopped on time. An absent-minded player, or one in a trance? Rilling looked up in surprise, then his face turned quizzical as it dawned on all of us that the note came from outside, not from the orchestra. After a considerable pause, the note sounding away quite loudly, Rilling remarked, "Right in tune, eh!" Whereupon there was a clunk and it stopped. Sixty cps, no doubt some kind of electronic machine, accidentally set off.

The moral is clear enough. More and more 20th-century sounds are being integrated into, or are approaching, the realm of strictly official "organized sound" that we call music. More and more, too, we all listen to such sounds for their *intrinsic* interest, whatever they may be—which is, of course, the way all music began. Human interest. Organization. Shapes and patterns. So in a much more real way than you might imagine, the business of audio continues to be music, and what we might call proto-music. There is no dividing line! From the engineering point of view there is no distinction at all.

One might say that even those familiar words, "testing, testing" are a form of music, neatly organized and very useful. A

THE END OF THE RECEIVER.



Enter No. 2 on Reader Service Card

THE DAWN OF A NEW ERA.

The Adcom[®] GTP-500 Tuner/Preamplifier.

**A new level of
sonic quality and convenience
that obsoletes the receiver.**

Adcom is well known as a manufacturer of quality separate components—tuners, preamplifiers and amplifiers—all highly regarded for their exceptional performance *and* their rational prices.

Demonstrably superior quality along with flexibility and affordability is what we now offer in a significantly new type of component. The GTP-500 combines an exceptional tuner and preamplifier on a single chassis, conceived and designed for use with a wide choice of separate power amplifiers.

Avoiding the receiver's inherent problems.

Receivers are not equipped with the heavy-duty, high current, high voltage power supplies available in the best separate power amplifiers. First of all, there just isn't enough space. More importantly, there are technical limitations. In a receiver, such supplies would generate unacceptable levels of heat and hum. And the high signal levels found in the power output stages create a source of noise, crosstalk and preamplifier instability.

Obviously, heat and noise-generating elements shouldn't be operating in close proximity to tuner and preamplifier circuits. However, this is exactly where such elements—scaled down, to be sure—are found in receivers.

That's why the over-all performance of receivers (and integrated amplifiers, for that matter) is seriously compromised for the seeming advantage of all-in-one convenience.

Our new tuner/preamplifier totally eliminates all such compromises, and avoids any degradation in tuner and preamplifier performance typically introduced by the presence of incompatible power-amplifier components.

Simply stated, we've kept the low-current, low-voltage elements totally isolated from the high-current, high-voltage elements—as they should be, and may always be from now on in quality components.

60 to 600 watts per channel!

At the same time, we've achieved something else that you can appreciate even without a technical background.

You can now have all the low-distortion power you are ever likely to need or want—from a conservative 60 watts per channel to an awesome 600 watts per channel, continuous, at any time you need it, not just for milliseconds! All with a matching high-performance tuner/preamplifier to control and apply the power.

THE ADCOM TUNER/PREAMPLIFIER AND 60 WATTS PER CHANNEL.

There's a lot more to the GTP-500 tuner/preamplifier than meets the eye.

The tuner section is quartz-referenced and digitally synthesized, with a tuning accuracy of 0.000025 percent. Since tuner accuracy translates into lower distortion, our superb rating is audibly significant.

If you're in an urban area troubled by excessively strong stereo-FM signals and multipath distortion—or in a rural area where distance is a problem—you'll appreciate how well this tuner brings alive the musical aspects of the received signal.

The specially-designed IF stage offers distortion-free listening from high-quality broadcasts. And sensitivity and selectivity are optimized for a balance of performance characteristics that can be appreciated every time you listen to a radio signal.

When especially difficult reception conditions cause excessive noise, a switchable high-blend circuit can be used.

Sixteen stations—eight each, FM and AM—can be programmed for instant retrieval at the touch of a button. Once a station is tuned in, it's locked in. No drift. No error. And a touch of another button scans up or down from any point.

We've added even more remote-control convenience and flexibility than you've been enjoying with your VCRs and TV sets.

An integral part of this new system component is a full-function wireless remote control that lets you command the GTP-500.

Every bit of this high level of performance is yours to control from the comfort of your favorite chair, and—with optional extension remote sensor—from other rooms in your home, as well as patio and pool.

Remote control from any chair, any room.

Most useful functions of the GTP-500 can be operated by remote control:

- Power on/off
- Selection of pre-programmed FM and AM stations
- FM scan
- Volume level
- Source selection

Remote sensors, wired to the system, can be installed in other rooms, and activated in the same manner. Thus, the superb performance of your Adcom system can be enjoyed whenever and wherever you like at minimal additional cost.



RC-500



GTP-500 and GFA-535

THE ADCOM TUNER/PREAMPLIFIER AND 100 WATTS PER CHANNEL.

The preamplifier section.

The preamplifier section provides optimum signal-to-noise ratios at both the phono and high-level inputs. That's very important for playing compact discs and the new wide-range HiFi video systems, as well as your treasured LPs.

The phono and high-level amplifiers (which are at the heart of the preamplifier) use custom-designed linear gain stages that provide low distortion, low noise and high speed.

High accuracy in the RIAA phono equalization circuit assures superb performance from any high-output moving-coil or moving-magnet cartridge.

The separate recording selector allows listening to one source while recording from another.

Tone controls and contouring circuits can be switched in when needed, and are more useful and musically accurate than any you're likely to have encountered.

As for convenience...

Those lights you see on various buttons and controls all have a useful function. They indicate the program source you've selected—phono, tape, CD, tuner, etc.—either manually or with the wireless remote control. The motorized level control also has an LED that rotates with it and can be observed from across the room. Note: Unlike electronic remote control circuits, this one is infinitely adjustable and distortion-free.

As for power...

You've already noted the most obvious advantage of having the tuner and amplifier on one chassis and power amplifier on another: the virtually unlimited choice of output power.

If at this time, 60 watts per channel meets your needs, that's what you can have with the matching GFA-535 power stage. If you need more power—because of your new CD library, or less efficient



GTP-500 and GFA-545

THE ADCOM TUNER/PREAMPLIFIER AND 200 WATTS PER CHANNEL.

speakers in a larger room—you might want our 100-watt/channel GFA-545 or our 200-watt/channel GFA-555.

And if you should ever need extraordinarily high power, that's also available, even at a later date. Just add a second GFA-555, with each amplifier bridged to its mono mode. You'll then have 600 watts per channel.

The quality of power.

Here is where we've made our strongest impact on music lovers who demand the best sonic performance regardless of price.

All our power amplifiers are based on the same sophisticated circuitry as our flagship GFA-555, which received a rare tribute from *Stereophile* magazine (Volume 8, no. 4). A pertinent quote:

"It is so clearly superior to past amplifiers in the low-to-mid-priced range—not to mention most amplifiers two to three times its price—that I can unhesitatingly recommend it for even the most demanding high end system."*

It's now decision-making time.

If you've been thinking about just another receiver, or something really extravagant, you now have a significantly new and different choice. For the first time, you can have a superb level of sound quality together with convenience and flexibility. And all at a remarkably affordable price.

Anything less will be another compromise.

*A reprint of the complete report is yours for the asking. It also includes the approximate retail prices—up to \$6,000!—of all the amplifiers mentioned in the report.



GTP-500 and GFA-555

Remote control of your GTP-500 throughout your home!



XR-500

With one or more XR-500 remote sensors (optional) connected to the GTP-500 Tuner/Preamplifier, you can use the RC-500 wireless remote control to operate your Adcom system from as many rooms as you like.

Speaker selectors.



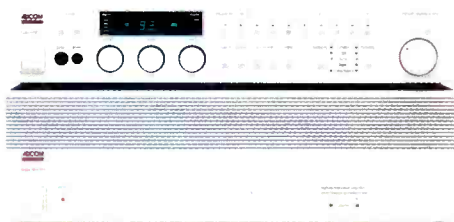
GFS-3



GFS-6

These heavy-duty speaker selectors can be used with amplifiers rated up to 200 watts/channel. The GFS-3 switches up to three speaker pairs; the GFS-6, up to six pairs. Each speaker selector contains special-circuitry to protect your amplifier from reduced impedance when multiple speakers are operating at the same time.

Components also available with white or silver front panels.



All components shown in this brochure (except the GFS-3) are available on special order with white or silver front panels. The GTP-500 Tuner/Preamplifier and GFA-545 Power Amplifier are shown here with white front panels.

Rack Mount Adaptors.

Optional adaptors for 19" rack mount are available for all models except GFS-3.

SPECIFICATIONS GTP-500

FM TUNER SECTION

IHF sensitivity, mono: 9.5 dBf
 Signal strength for 50dB quieting:
 mono/stereo: 12.5/36.5 dBf
 Capture ratio: 1.5 dB
 AM suppression: 65 dB
 Alternate channel selectivity: 80 dB
 Separation at 1kHz: 52 dB
 THD/stereo: at 1kHz: 0.09%
 Maximum signal-to-noise ratio,
 mono/stereo: 85/75 dB
 Frequency response: 30Hz-15kHz
 Antenna impedance: 75 or 300 ohms

PREAMPLIFIER SECTION

Total harmonic distortion: 0.01%
 IM distortion: 0.005%
 Frequency response: 20 Hz —
 20 kHz \pm 0.1 dB
 Maximum output level: 8 volts
 Input sensitivity for .5V output:
 Phono: 4mV
 High level: 40 mV
 Signal-to-noise ratio:
 For .5V output: Phono: 82 dB
 For 2V output: High level: >100 dB
 Tone controls:
 Bass (40 Hz) \pm 9.0 dB
 Treble (15 kHz) \pm 9.0 dB
 Output impedance: 470 ohms
 High filter: -2 dB at 20 kHz
 Low filter: -5.0 dB at 20 Hz
 Voltage: 117V/60 Hz (Available in
 220V/50Hz on special order)
 Dimensions: 17 x 3 1/4 x 12 3/4"
 Weight: 15 lbs.
 Optional accessory for GTP-500:
 RM-3 rack mount adaptor

AMPLIFIERS

Power output, watts/channel,
 continuous, both channels,
 20 Hz-20 kHz, <0.09% THD:

8 ohms

200

100

60

4 ohms

325

150

100

Bridged, mono, 8 ohms,
 20 Hz-20kHz, <0.25% THD:

600

n/a

n/a

Bridged, mono, 4 ohms,
 20 Hz-20kHz, <0.25% THD:

850

n/a

n/a

Signal-to-noise ratio
 A-weighted, full output:

> 106 dB

Input impedance:

22 kOhms

Input sensitivity:

for rated output:

for 1 watt:

1.85 volts

1.3 volts

1.0 volt

130 mV

Damping factor
 (20 Hz-20 kHz):

130

Dynamic headroom
 (at 4 ohms):

2.3 dB

2.6 dB

3 dB

Voltage:

117V/60 Hz

(Available in 220V/50Hz on special order)

Dimensions:

17x7 3/8

17x5 1/2

17x3 1/4

x11 1/2"

x12 1/2"

x12 1/2"

Shipping weight:

35 lbs.

27 lbs.

22 lbs.

Optional rack
 mount adaptors:

Black:

RM-7

RM-5

*RM-3

White:

RM-7W

RM-5W

*RM-3W

Silver:

RM-7S

RM-5S

*RM-3S

* Also for GTP-500



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Two Sides of a Coin

Dear Editor:

What has happened to *Audio*? Upon picking up the July 1987 issue, I was expecting to see informative interviews, articles and advertising in all of the realms of true high-end audio. What I found upon actually reading the magazine was much less than that.

Advertisements for mid-fi equipment, tires, cars, and car stereos are not the sort of things I used to read *Audio* for. The reason I say "used to" is because, although I don't enjoy paying the high prices for such, I am now forced to subscribe to so-called underground journals for information about top-flight equipment. I'm sure that your marketing analysts have worked very hard to come up with this new image for *Audio*, but they forgot one key thing: *Stereo Review* and *High Fidelity* already take up the market niches for those who are less knowledgeable or appreciative of the best of today's high-quality audio equipment.

One final thing that I should mention: I am not someone who wistfully remembers the "good old tube days" or 78-rpm records. I am a young person with a modern perception and interest in the future of audio—but not if it is epitomized by a combination CD, CD-V, CD-I, and videodisc player going into an A/V receiver (with interface compatibility for dishwashing machines and food processors), which feeds a DAT player/recorder to make tapes for a combination car stereo and cruise-control system. Ugh!

Please bring back the old *Audio*. It is sorely missed.

Jason Paskowitz
Bayside, N.Y.

Editor's Note: We'd like to think otherwise, but maybe it's true that one can't please all of the people all of the time. Consider the following letter.—E.M.

Dear Editor:

I would like to comment on the equipment reviews I read in the August 1987 issue of *Audio*, evaluating the Mark Levinson No. 20 mono amp and the Mission PCM-7000 Compact Disc player. Although both units may be very good, I question what good, if any, will the majority of your readers get out of a review of a \$9,600 pair of

amplifiers or a \$1,000 CD player. I myself find it hard to believe that most of your readers would even consider such expensive units. If you continue to spend so much time covering these kinds of products and forget that most people spend a bit less money in pursuit of high-quality audio, you need not send a renewal card to me in December. I don't need another magazine that doesn't address items that concern me.

Jerry Bufka
Grand Rapids, Mich.

Profile Praise

Dear Editor:

The "Equipment Profile" of the Yamaha DSP-1 by Howard Roberson (June 1987) is one of the best I have ever read. I have a DSP-1, and thanks to Mr. Roberson, I am really enjoying and getting the most out of the unit. *Audio* is a great magazine.

C. W. Sullivan
Columbus, Ohio

Where's the Real Thing?

Dear Editor:

I'm writing this letter to warn your readers not to fall into the same trap that I fell into, if they haven't already. I, like many others, waited through four years of legal hype for The Beatles to be issued on CD. Finally they released them, and in the less distorted British version. I plopped down my \$15 apiece for the first four CDs (\$60) and took them home, thinking I was going to get great sound. I got home, loaded them into my machine, and found something missing—*stereo*! What a rip-off! Nowhere on the packaging does it say these are in mono. Once opened (when you can't return them), the labels on three of the CDs say mono; the fourth has no indication. All of these masters are available in stereo; I know, I have the imported British LPs. There is no excuse for this travesty! What is Capitol trying to do? I will never buy another Capitol reissue on CD! At the very minimum, they should have labelled them mono on the packaging.

It doesn't stop with The Beatles. I also purchased *Made in America* by The Beach Boys (again on Capitol), and all but the last two songs are in mono with no package warning—and

most of these songs are available in stereo.

Why has Capitol dumped these dinosaurs on an unsuspecting public? The best thing about both The Beatles and The Beach Boys was their stereo separation, and now Capitol has robbed us of that.

I suggest Capitol recall these CDs and give refunds to everyone and get out the real thing! Here we are in an age when quadraphonics is being reborn (via surround sound) and black-and-white movies are being colorized, and what does Capitol do? Why go back to 1940s-style mono? CD-buying public, *beware!*

J. R. Thomas
Reisterstown, Md.

No Magic Button

Dear Editor:

I read with interest your interview with George Martin and the review of the first four Beatles CDs in your June 1987 issue. The interview was supposed to answer the question of why they were released in mono. Mr. Martin states that *Please Please Me* and *With The Beatles* were recorded with a two-track recorder. The instruments are all on one channel and all of the voices are on the other, except for an occasional odd instrument. He states that the two-track tapes were not intended to be released in stereo.

But Martin does not address the question of why *A Hard Day's Night* and *Beatles for Sale* were released in mono. These albums were recorded on four-track recorders, as were *Help!*, *Rubber Soul*, *Revolver*, and *Sgt. Pepper*. These albums have a good stereo mix, with some instruments on the left and others on the right. Vocals come either from the center or from both channels. Why weren't these released in stereo?

According to *Rolling Stone*, Martin wanted only the first two albums released in mono, but EMI mistakenly thought that he meant that all four albums should be in mono. *Rolling Stone* quotes a March 1 interview in *The New York Times* as the source, but I was unable to find their source. At any rate, that makes sense to me.

By any reasonable criteria, it is absurd for *A Hard Day's Night* and *Beatles for Sale* to be in mono. I can see

Martin's point about *Please Please Me* and *With The Beatles*. But even in that case, the argument doesn't quite hold water. If they were released in stereo, anyone who preferred mono could simply press the "mono" button, which almost all amplifiers have. Unfortunately, there is no magic button for the vast majority of us who want to transform the mono CDs into stereo. If they were released in stereo, everyone could be satisfied.

Jud McCranie
Valdosta, Ga.

All You Need Is Stereo

Dear Editor:

Susan Borey's interview with The Beatles' producer, George Martin (June 1987), left me quite frustrated. I greatly respect Mr. Martin's opinion on such important matters as how The Beatles' recordings should be issued, but the interview indicated that his disgust with the "ghastly fake stereo" versions of those early records was limited to the first two, *Please Please Me* and *With The Beatles*. Both were recorded in twin-track mono, and I can understand and appreciate his resistance to issuing them in stereo. However, as Mr. Martin points out in his excellent autobiography, *All You Need Is Ears*, The Beatles began recording on four-track machines by the end of 1963, which means that *A Hard Day's Night* and *Beatles for Sale* were recorded in stereo.

The full stereo versions of those two LPs are wonderful as issued by Mobile Fidelity Sound Lab—Lennon's rhythm guitar is on one track, Harrison's lead is on another, and the vocals are mixed to the center. These two LPs are truly incredible in true stereo and are ghastly (to borrow one of Mr. Martin's adjectives) in mono, by comparison. Although *A Hard Day's Night* has been the best seller of the first four CDs, it is probably because of the quality of the songs more than anything else. Now that *Rubber Soul*, *Revolver*, and *Sgt. Pepper* have been released in stereo, CD buyers will shun the first four CDs as sounding hopelessly one-dimensional.

It is my hope that Bhaskar Menon will reconsider issuing *A Hard Day's Night* and *Beatles for Sale* in stereo on CD in the near future so that admirers

of these two superb albums will be able to hear them as they were meant to be heard—in stereo. How Mr. Martin could speak otherwise confounds me.

Brad Rovnpera
Oakley, Cal.

Deceptive Discs

Dear Editor:

I am writing in relation to the first four Beatles CDs. I bought *Beatles for Sale*, and I was very dismayed at Capitol Records' deception.

First, the discs are only available in mono, and nowhere on the packaging is this indicated. Second, these are not "Original Master Recordings" as stated. If they were, they'd be in stereo. They're probably third- or fourth-generation tapes. Finally, the sound quality is not even as good as the stereo record. It's good, but my 22-year-old copy stands better still.

These discs are cheap rip-offs. Your readers should not buy them. They'll just be throwing away \$17. I've written to Capitol Records, and I hope others will too. With enough letters, maybe they'll use some of their Duran Duran and Little River Band disc money to release some good Beatles discs.

George N. Dussault II
Cumberland, R.I.

Thanks but No Thanks

Dear Editor:

It does matter to be accurate. George Martin's comment in the June 1987 issue of *Audio* that "those first [Beatles] LPs were never intended to be issued in that ghastly fake stereo" appears to me to be partially incorrect. Sorry, George, and thanks for all those great records you produced, but *A Hard Day's Night* and especially *Beatles for Sale* are albums where the stereo effect is legitimate. If the CD issues of these two albums are in mono, shame, shame. I won't buy them.

By the way, I listen to these two albums using a Grado Signature 8MX cartridge. If your readers really love these records, as I still do, then I suggest that they buy a good front end, as I did. Some good listening is in store for them if they do so, again especially on *Beatles for Sale*. I know everyone concerned wishes to sell a lot of CDs, but really, records are easily as good, and sometimes better.

One more thing: Mr. Martin, why did you double-track John on the intro to "If I Fell," and ditto for Paul on "And I Love Her," *only* on the stereo records, not the mono versions? It's ruined the soliloquy of their vocal presentations. I thought this was Capitol Records' doing, but the effect is there on the Parlophone records, and it stinks.

R. A. Rocco
Copiague Harbor, N.Y.

Editor's Note: Shame on you, gentlemen, for your mistaken comments. The four-track mono tapes of *Day's Night* and *Sale* do not mix down to stereo simply because the Parlophone and MFSL LPs had different left and right channels. Multi-track does not necessarily signify stereo! In fact, multi-track—as ordinarily used in pop recording—isn't stereo, but is just a simple technique that results in two different mono mix-downs, which are played at the same time. 'Tisn't stereo, no matter how much you (or I, for that matter) might like the resulting music.—E.P.

Producer's Postscript

Dear Editor:

We were delighted to see Ed Canby's perceptive and (as usual) informed review of Richard Shirk's Mozart piano album in the July 1987 issue. Readers trying to find the album might like to have a couple of additional pieces of information.

Though Mr. Canby mentioned the CD, its number was not given. It is CMCD-1005. Classic Masters CDs and some LPs are distributed by Harmonia Mundi USA (3364 South Robertson Blvd., Los Angeles, Cal. 90034), so most stores can order them quite simply. What no one knew when the LP and CD went out for review was that there would also be a digital audio tape (DAT) release of the same album—perhaps the first such full-length classical DAT album in the country. Initially distributed only in Japan, CMDT-1005 will be available in this country in very limited quantities at about the time the first DAT decks are available here. (And there's no darned notch in the tape, either.)

Classic Masters is a bit off the beat-en track in two ways Mr. Canby did not know about and which have heretofore

Continued on page 95

A LETTER FROM THE PRESIDENT

Bryston was incorporated in February 1962. Our original concept was the manufacture of specialty electronics with emphasis on quality of components and with extreme care in assembly. In other words, we wanted to be the best. This "ultimate-quality" commitment has only strengthened with time. Our policy is constantly to improve our products, our service, and our accessibility. Our warranty coverage, a full Five Years, reflects the excellent reliability record our products have shown, and our confidence in them.

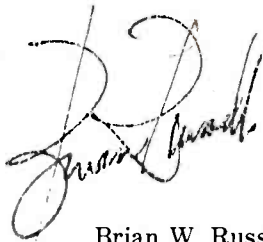
In the field of sound reproduction, Bryston maintains as its goal the achievement of complete musical accuracy. Since music is a very complex process, the technology required in its reproduction is often very involved and rich with challenge. Our continuous research into the art and science of electronic amplification of musical signals has yielded many original solutions to what seemed insurmountable obstacles.

We are proud to have been among the first "Audiophile" companies, and even more proud to remain at the forefront of excellence in audio. This book will provide some insight into the techniques and philosophies we employ.

At Bryston, the term "best" applies to the way we conduct our business as well as to the performance of our products. Bryston's integrity is and will remain uppermost in our business dealings. You will find us courteous, helpful, and fully interested in your satisfaction indefinitely.

Time has proven our original concept a valid one. Our reputation and our market strength have continuously improved. Your Bryston system will retain its musical accuracy and its value for many years to come.

sincerely,



Brian W. Russell,
President.

PRE AMPS

MODEL 12B



Bryston preamplifiers, as with all Bryston components, are designed with one purpose: absolute musical accuracy. This means that distortion of the original waveform must be held to the minimum possible with presently available technology. The noise is as low as you have ever experienced from a preamp. The distortion, of any type, is so close to nonexistent as to be nearly immeasurable. The equalization accuracy is not measured in decibels (1/10 Bel) but in millibels (1/1000 Bel). Bryston preamplifiers cannot be overloaded by any input signal available from any commercial material. They do not add "euphonic" colorations, nor do they alter the clarity of even the most beautifully lucid recordings.

The Model 12B and the Model .5B are full-function preamplifiers. They are intended as control centers for the finest sound systems. They do not, however, contain controls which are not useful, such as "bass" and "treble". (The systems in which they will be used will hardly require such broadband tailoring.) The controls are all useful and convenient; switching among

various sources, low filter for record warps, tape monitoring facilities, mute, balance and volume.

The Bryston 12B is an elaborate and flexible center for the most complete sound systems. It features two phono inputs, one of which is equipped with Bryston's superb moving-coil step-up stage. It allows for the connection of two tape decks, with full dubbing facilities in either direction. There is a dedicated C/D input, as well as tuner, and auxiliary inputs, for a total of seven separate sources. (All sources are available at any time from the tape outputs, regardless of what is being fed to the amplifier). In addition, the 12B contains a headphone jack for private listening, (with automatic speaker disconnect), and a special line-level output for the connection of other amplifiers allowing independent volume control at remote locations. The 12B preamplifier is equipped for the true audio enthusiast, with enough flexibility and expansion potential to adapt to the most complex sound systems.

The Bryston .5B is a preamplifier for the simpler sound system, with 4 inputs,

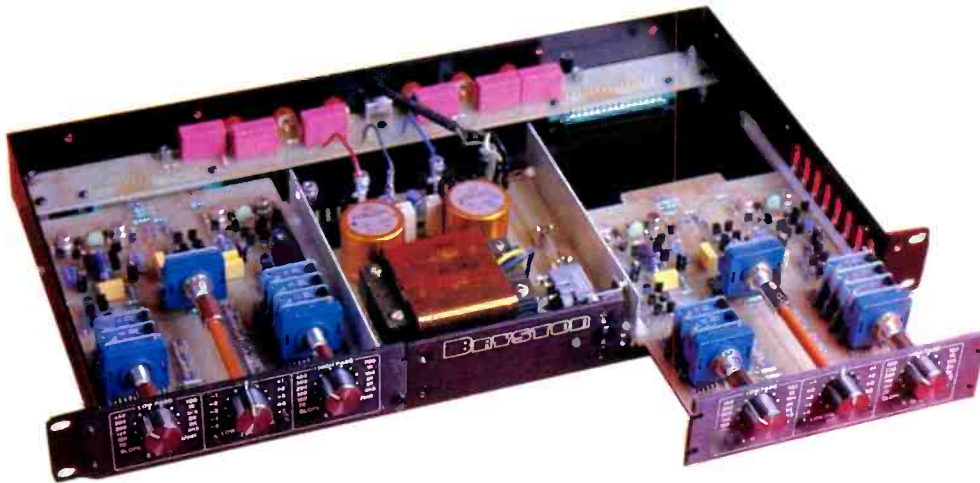
including one phono. The tape monitoring facility is less elaborate, consisting of a single pushbutton, but like the 12B, the Point Five-B is intended to be used with the finest signal sources.

Regardless of which Bryston preamplifier you choose, they all employ the same electronics, (including Bryston's novel and fundamentally correct phono section). Thus they all enjoy the same superb specifications, and the same exceedingly musical sound quality. They all employ ultra quality components, including precision volume controls with 1/4dB tracking, metal film resistors, polystyrene capacitors and heavily gold plated connectors. They use the most careful and exacting assembly and test procedures, with transistors hand-selected and matched to better than 1%. Whatever the size and complexity of your sound system, a Bryston preamplifier is a "final purchase", with performance that establishes a standard which is unlikely to be improved upon in the near future.

MODEL .5B



10B CROSSOVER



The search for the ultimate sound system inevitably leads to speaker systems employing electronic crossover systems ahead of the amplifiers. There are a number of reasons for this. Most obviously, it places the individual drivers under much more direct control of the amplifiers. This technique also eliminates the increased distortion in the crossover region caused by high signal current flowing in the reactive crossover components. Apart from the high distortion they cause, the electrolytic capacitors, iron core chokes and large resistors normally used in speaker's internal crossovers simply don't lend themselves to close tolerance manufacture. The components in an electronic crossover allow much closer control of the actual crossover frequencies, which can improve imaging.

Thus, more than ever today, the finest speakers have provisions for 2-way or multi-way amplification, with electronic crossovers required, and instructions included as to how the crossover must be set for optimal performance. The only difficulty, in the past, has been the task of obtaining a crossover unit with sufficient flexibility to follow these instructions precisely.

Bryston's Model 10B Electronic Crossover combines ideal signal-handling with an enormously flexible control

function. Simple, direct front-panel switches allow any crossover curve to be set instantly, and the signal purity is always maintained.

The Model 10B features independently selectable crossover points for high-pass and low-pass, in case the speaker installation requires slightly overlapped, (or slightly staggered), response curves for the drivers. You can also independently select crossover slope, from 6, 12, or 18 dB/Oct., where one driver requires a faster cutoff than another in the same system.

The crossover may be used in any of three internal connections: 2-way stereo, 3-way mono, and a special configuration, 2-way mono. This last cascades the low-pass and the high-pass sections and allows the selection of unusual crossover curves, including, "dual-slopes", where the crossover point is effected at a shallow rolloff, and the stop-band is rolled off rapidly thereafter. It also permits the increasingly popular Linkwitz-Riley alignment with steep rolloff curves, 12, 24, or 36 dB/Oct.

All crossover selections are extremely accurate and repeatable, being implemented with 1% selected metal-film resistors and polystyrene capacitors. All switches are heavily gold-plated, for lifetime protection from corrosion. The level-controls are precise 1 dB

increments, also derived from gold-plated switches and 1% metal-film resistors. Most important, however, is that the Bryston 10B Crossover uses NO integrated circuits in the signal path. All internal buffer and amplification stages are Bryston's exceedingly linear and superbly quiet discrete op-amp circuitry. This means the signal is always maintained as "Audiophile Quality", with stability and freedom from noise and distortion unapproached in normal equipment.

In addition to the flexibility and sound-quality built into the Bryston 10B crossover, individual channels are built as front-removable modules, as is the power-supply. This incidentally allows the easy implementation of special modules in the future, such as subwoofer drivers, preamplifiers, switching subsystems, etc. It also means the crossover may be purchased without its power-supply, for connection to the power-supply of another Bryston product, such as a second crossover, or the model 11B/12B Preamplifier, via a convenient rear-panel receptacle.

From the point of view of adaptability, flexibility and signal integrity, the Bryston 10B Electronic Crossover system is the ideal choice for the widest possible range of multi-way speaker installations.

POWER AMPS

MODEL 2B LP



Bryston's first exploration into audio, over a decade ago, was a power amplifier intended to prove our theory that amplification which was free of cost-cutting compromises, which displayed excellent open-loop linearity, would be audibly superior to amplification which obtained good numerical specifications from a compromised circuit by virtue of large amounts of feedback. This was, at that time, an almost heretical idea. Long term comparison tests were run at a large recording studio, using the biggest and best known amplifiers of the day. The result was that the studio ordered Bryston amplifiers for its monitor systems, although they were hardly more than breadboard prototypes at the time. Even in this rough form, Bryston's linearity proved audibly cleaner and more musical than the most respected products on the market. Clearly here was the

beginning of a trend. Bryston has expanded on this theme ever since.

Included in our original theory were a number of design factors; independent power-supplies, very high output current capability, voltage-gain in the output section, and several other approaches intended specifically to linearize the open-loop gain, including complementary output circuitry. (Complementary means employing opposite polarities of transistor on opposing halves of the waveform. Quasi-complementary employs the same polarity of output device on each half, and requires a signal phase reversal to drive one side, compromising linearity). These advances are still in use in all Bryston amplifiers. In addition, we have expanded our concept of full complementarity to include all stages, and have adopted a

novel output section which is actually quad-complementary. This new output section, which employs both polarities of transistor on each half of the output drive circuit, yields a dramatic improvement in linearity and musical accuracy. This is reflected in extremely low distortion figures, obtained without massive amounts of feedback. I.M. distortion, which we feel is an excellent indicator of an amplifier's steady-state accuracy, is so low as to be nearly impossible to measure.

Further solidifying Bryston's low-open-loop distortion philosophy, we select and match all input transistors to less than 1% tolerance, employ only metal-film resistors, use polystyrene capacitors in signal-path circuitry. Finally, we hand adjust each and every amplifier to the absolute optimum performance.

MODEL 3B



POWER AMPS

MODEL 6B



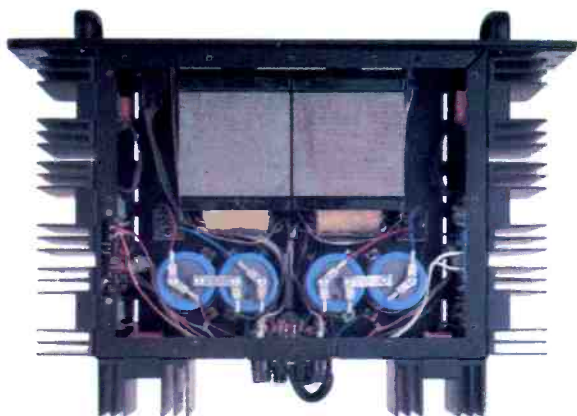
Of course, the proof is in the listening. Bryston sells over half of its production to professionals. We find that professionals are first attracted to Bryston by its reputation for reliability, but they are convinced by its sonic quality. The recording and broadcast industries, motivated by recent developments in low-distortion, wide range source material, have become very sophisticated, even audiophile-oriented. Bryston products have become so popular among these groups that there is an excellent chance that your favorite recording was monitored on

Bryston equipment at the studio and later transmitted from stations using the same Bryston components on their monitors. Our reliability is so well-known that many touring bands use Brystons on the road as well. In fact, you could be listening to a Bryston chain all the way back to the amplified instruments themselves.

The reliability to which we referred above is not a matter of luck. It is our scientific application of proven methods. We use statistical mean-time-before-failure analysis, studies of stress on component longevity, vibration-resistance in

attachment methods, even the metallurgy of, and oxygen-exclusion in, electrical connections. We know how to make a product fool-proof, and we know how to test for potential problems. Every amplifier Bryston makes is connected to a very high-stress combination of load and signal, which engages the protection mechanisms continuously. They are "burned-in" this way for more than 4 days: 100 hours. Although nearly all pass this test without incident, the point is, we don't want you to receive the one which might not have.

MODEL 4B



DUAL POWER SUPPLIES

All Bryston amplifiers, from our 50-watt per channel 2B, to the blockbuster 6B at 800 watts into 1 or 4 ohms, employ separate power supplies for each channel. Each supply could be capable of powering both channels to their full 8 ohm specifications. Keeping the power separate, however, yields a worthwhile, even dramatic improvement in image firmness and overall clarity. This is because the channels cannot develop any cross-talk or intermodulation through the power-supply.

ACCESSORIES

Bryston believes that equipment which sounds cleaner will measure better, and vice versa. That's why we build all our components with the best materials and the most performance-effective technology. We feel it is important to retain this level of quality in all aspects of the signal chain. Bryston accessories maintain this link without compromise.

Moving coil cartridges display several sonic advantages over moving magnet type cartridges. The primary reason is that the magnet structure is many times larger, since the magnet is stationary, not a part of the tiny cantilever which traces the groove. A larger magnet allows more signal power to be generated, at lower electrical distortion, but since the coil is on the cantilever, and thus tiny, the voltage is lower. (The current, of course, is much higher).

Since current can be transformed into voltage, a transformer is the ideal way to capture the improved signal-to-noise ratio this high signal-power allows. The Bryston TF-1 transformer will deliver a signal from your moving coil cartridge to your phono pre-amplifier with lower noise and lower overall distortion at these small signal levels, than any active step-up device. The TF-1 is available in two gain configurations, (16.5 or 22.5dB), and is internally restrappable.

It is identical to the internal moving-coil stage in the Bryston 12B, and is an ideal match to the .5B, or to any preamp which requires a flawless moving-coil interface.



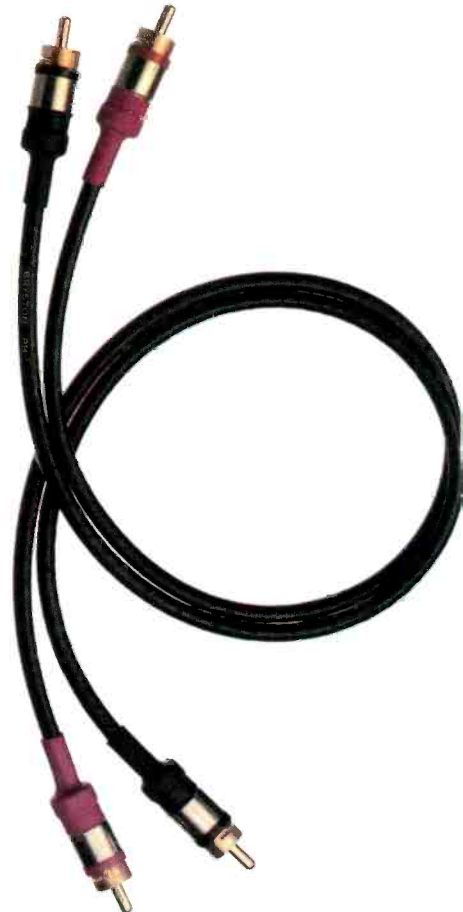
The Bryston line of speaker switchboxes uses massive switch assemblies, which stand up to the high current capabilities of Bryston amplifiers. High pressure contacts maintain ultimately low contact resistance, and gold-plated input and output connectors assure a distortion-

free interface between amplifier and loudspeaker. Separate grounds between channels allow the use of bridged amplifiers. Models are available for 2 speakers plus headphone, 3 speakers plus headphone, and 4 speakers. If you require speaker switching, don't use just "any" switchbox; use a Bryston to maintain the clarity and musical accuracy of your system.

In cable interconnects there are 4 basic parameters which can affect waveform accuracy; contact linearity, cable resistance, capacitance, and inductance. Contact linearity is a function of corrosion in the connection, which can be completely prevented by the heavy gold plating used in all Bryston connectors, since gold is an inert metal.

The cable resistance and inductance of normal interconnect wires are negligibly low in relation to the source and input resistances they

contact, but capacitance can affect performance since it acts as an increasing load at high frequencies. Bryston cables have extremely low capacitance (about 15pf per foot), and in addition, the dielectric is a foamed polymer, which is largely air, (the only "perfect" dielectric). A Bryston pre-amplifier can feed up to a quarter mile of Bryston cable without changing its bandwidth or distortion specifications. Using Bryston cables will assure you of maintaining all the performance built into your Bryston system.



Specifications: 2B-LP, 3B, 4B and 6B power amplifiers

DISTORTION:

Harmonic:
Less than 0.01% (for 6B 0.02%)
from 20 to 20kHz at rated
power.

IM:

Less than 0.01% from 10 milli-
watts to full rated power.

Noise:

100 db below full output.

Crosstalk:

Below noise 20 to 20kHz.

SLEWING RATE:

Greater than 60 volts per
microsecond.

POWER BANDWIDTH:

Less than 1 Hz to over 100kHz.

DAMPING FACTOR:

Over 500 at 20 Hz, ref. 8 ohms.

INPUT SENSITIVITY AND IMPEDANCE FOR 2B-LP, 3B, 4B RESPECTIVELY:

.75 volt in for full output 50 k
ohms.

1 volt in for full output, 50k
ohms.

1.25 volts in for full output,
50 k ohms.

FEATURES:

1. Bridging switch.
2. Regulated power supplies.
3. Each channel separated back
to the linecord.
4. Dual-colour LED pilotlights
and clipping indicators;
green changing to red at
clipping.
5. Will deliver full output to
any phase angle at 4 ohms
or higher.
6. Warranty: 5 years parts and
labour, shipping one way.

BRYSTON 2B-LP

Basic Stereo Power Amplifier
50 watts per channel, 8 ohms.
100 watts per channel, 4 ohms.
200 watts, bridged, 8 ohms.
Over 1600 cm² of heat-sinking;
(over 3200 cm² with chassis).
19" x 1.75" x 10", wt. 18 lbs.
48.25 cm x 4.44 cm x 25.4 cm,
wt. 8 kg.

BRYSTON 3B

Basic Stereo Power Amplifier
100 watts per channel, 8 ohms.
200 watts per channel, 4 ohms.
400 watts, bridged, 8 ohms.
Over 3200 cm² of heat-sinking;
(over 6400 cm² with chassis).
19" x 5.25" x 9", wt. 35 lbs.
48.25 cm x 13.33 cm x 22.85 cm,
wt. 16 kg.

BRYSTON 4B

Basic Stereo Power Amplifier
250 watts per channel, 8 ohms.
400 watts per channel, 4 ohms.
800 watts, bridged, 8 ohms.
(More than 1 horsepower).
Over 6400 cm² of heat-sinking;
(over 9600 cm² with chassis).
19" x 5.25" x 13.5", wt. 50 lbs.
48.25 cm x 13.33 cm x 34.3 cm,
wt. 23 kg.

BRYSTON 6B

Basic Mono Power Amplifier
Rated Distortion: Less than
.02% I.M. or THD from 20-20
KHz at rated power or below.
Rated Power: 500 watts 8 ohms
800 watts 4 ohms
500 watts 2 ohms
800 watts 1 ohm

6400 cm² of heat sinking, etc.
19" x 5.25" x 13.5", wt. 50 lbs.
48.25 cm x 13.33 cm x 34.3 cm,
23 kg.

Specifications: .5B, 11B* and 12B preamplifiers

DISTORTION:

(Any Input, to any Output);
Less than .005%, IM or THD,
any Frequency from 20-20KHz,
at rated output or below.

Rated Output:

10 volts RMS minimum, from
Tape or Main Output.
(Typically 14 volts RMS
available).

Rated Noise: (input shorted)

Phono; -80 dBA Referred to
an input of 5 millivolts RMS @
1KHz. High Level inputs; -95
dBA referred to an input level
of 500 mv at 1 KHz.

RIAA Accuracy:

Within less than ± 50 mB (.05
dB) from 20-20KHz inclusive.

Frequency Response:

High Level Section; within less
than ± 50 mB from 20-20 KHz
inclusive.

*without MC Transformer.

12B MC Transformer Section

DISTORTION:

Less than .005% 20-20 kHz
with preamplifier driven to full
rated output.

Noise:

Equivalent to approximately
1000 ohm metal film resistor
(Thermal noise greater than
-85 dB below 0.6 mv input,
unweighted).

Gain:

16.5 or 22.5 dB (internally
restrappable).

Frequency Response:

Below 5 Hz to above 30 kHz,
within less than ± 0.5 dB.

DEALER LIST

WORLD DISTRIBUTORS

AUSTRALIA

Syntec International Pty. Ltd.
60 Gibbes Street
Chatswood, N.S.W.
Australia

CANADA

Bryston Marketing Ltd.
57 Westmore Drive
Rexdale, Ontario
Canada M9V 3Y6

ENGLAND

Roksan Engineering Ltd.
The Turnmill
63 Clerkenwell Road
London, England EC1R 5BH

FRANCE

Audio Quartet SA
Centre Nice Etoile
30 avenue Jean Medecin
06000 Nice, France

GERMANY, AUSTRIA & SWITZERLAND

Amptown Electroacoustic GmbH
Wandsbeker Strasse 26
2000 Hamburg 71
West Germany

HOLLAND

Audiac BV
Ankermonde 1
3434 GA Nieuwegein
Holland

HONG KONG

Craft Co.
Unit C, 2nd Floor
Unison Ind. Centre
27-31 au Pui Wan Street
Fotan, Shatin
N.T., Hong Kong

INDONESIA

P.T. Adab Alam Electronic
Complex Glodok Plaza A9
Jakarta, Indonesia

JAPAN

Sanyo Electric Trading Co.
33 Hiyoshi-Cho, 2-Chome
Moriguchi-shi, Osaka-fu
570 Japan

KOREA

Cremyth Ass. Corp.
C.P.O. Box 3732
Seoul, Korea

NORWAY

Pro Technics A.S.
Lyder Sagens G.T. 19
0358 Oslo 3
Norway

SPAIN

Craftsmen S.A.
Juan Gamper 22-24
Barcelona 14
Spain

TAIWAN

Comin Trading Co. Ltd.
#221 Sec 3 Chung Hsiao E
Taipei 10643
Taiwan R.O.C

U.S.A.

Brystonvermont
R.F.D. #4, Berlin
Montpelier, Vermont
U.S.A. 05602

U.S. DEALERS

CALIFORNIA

Audible Difference
805 El Camino Real
Palo Alto, CA 94301

Audio Excellence

425 Washington St.
San Francisco, CA 94111
Christopher Hansen Ltd.
646 N. Robertson Blvd.
Los Angeles, CA 90069

Keith Yates Audio
3019 D Street
Sacramento, CA 95816
Newport Audio
1000 Bristol St. N.
Newport Beach, CA 92660

Sound Distinctions
1919 Mount Diablo Blvd.
Walnut Creek, CA 94596

Sound Distinctions
1975 Diamond Blvd., Ste E70
Concord, CA 94520

COLORADO

Listen Up
685 S. Pearl St.
Denver, CO 80209

Listen Up
2034 E. Arapahoe Rd.
Boulder, CO 80203

CONNECTICUT

Take Five Audio
105 Whitney Street
New Haven, CT 08511

FLORIDA

Sound Components
1536 South Dixie Highway
Coral Gables, FL 33146

GEORGIA

Lee Kramer's Hi Fi SSS
322 E. Paces Ferry Rd. NE
Atlanta, GA 30305

ILLINOIS

Audio Consultants
1014 Davis Street
Evanston, IL 60201

Audio Consultants
757 N. Milwaukee
Libertyville, IL 60048

Audio Consultants
110 East Ogden Avenue
Hinsdale, IL 60521

Paul Heath Audio
2036 N. Clark Street
Chicago, IL 60614

IDAHO

Stereo Shoppe
5105 Overland Road
Boise, IDAHO 83705

IOWA

Audio Odyssey
730 E. Kimberly Road
Davenport, IA 52807

Audio Odyssey
409 Kirkwood Avenue
Iowa City, IA 52240

LOUISIANA

Wilson Audio
8001 Maple Street
New Orleans, LA 70118

MAINE

Hi Fi Exchange
Forside Mall
Falmouth, ME 04105

MASSACHUSETTS

Goodwin's
16 Eliot Street
Cambridge, MA 02138

Waltham Stereo
361-369 Moody Street
Waltham, MA 02154

MICHIGAN

Classic Stereo
4428 South Westnedge
Kalamazoo, MI 49008

Classic Stereo

2968 28th St. S.E.
Grand Rapids, MI 49508

MINNESOTA

Audio Perfection
7401 Lyndale Avenue S.
Minneapolis, MN 55423

NEW HAMPSHIRE

Campus Hi Fi
345 S. Willow St.
Manchester, NH 03103

NEW JERSEY

Sounding Board
75 Franklin St.
Ridgewood, NJ 07450

Woodbridge Stereo
751 Amboy Avenue
Woodbridge, NJ 07095

Woodbridge Stereo
Paddock Plaza, Rt. 36
W. Long Branch, NJ 07764

NEW YORK

Audio Visions
1067 Montauk Hwy
West Babylon, NY 11704

Gala Sound
3122 Monroe Street
Rochester, NY 14618

Lyric Hi Fi
1221 Lexington Avenue
New York, NY 10028

Lyric Hi Fi, West
2005 Broadway
New York, NY 10023

Lyric Hi Fi
146 East Post Road
White Plains, NY 10601

The Speaker Shop
3604 Main Street
Amherst, NY 14226

OHIO

Hoffman's Stereo
Emery Green Plaza
23031 Emery Rd
Warrensville Hts. OH 44128

Audible Elegance
9464 Montgomery Rd
Cincinnati, OH 45242

Audio Encounters
4271 W. Dbln-Granvle Rd
Dublin, OH 43017

PENNSYLVANIA

David Mann Audio
Newmarket 59, Hdhse Sq.
Philadelphia, PA 19147

Summit AudioVideo
569 Pierce St.
Kingston, PA 18704

PUERTO RICO

On Top Audio
1840 Glasgow Street
Rio Piedras, PR 00927

VERMONT

Sound Directions
56 12 Merchants Row
Rutland, VT 05701

VIRGINIA

High C Stereo
212 E Market St.
Leesburg, VA 22075

WASHINGTON

Definitive Audio
6017 Roosevelt N.E.
Seattle, WA 98115

WISCONSIN

Specialized Sound
621 S. Gammon Road
Madison, WI 53719

CANADIAN DEALERS

ALBERTA

Penny Lane Colour & Sound
513 8th Ave., S.W.
Calgary, Alta. T2P 1G3
(403) 262-0092

Stereo City Limited
8055 Argyll Rd.,
Edmonton, Alta. T2C 4B2
(403) 466-7385

Audio Ark
10746-124th St.,
Edmonton, Alta. T5M 3H1
(403) 453-6624

QUEBEC

C.O.R.A. Incorporated
131-18th St.,
Quebec City, Que. G1L 2C6
(418) 522-1397

Le Domaine Du Son
1100 Boul. des Recollets
Trois Rivieres, Que. G8Z 3X2
(819) 373-1218

Le Palais de la Musique
484 Boul. du Semaire
St. Jean, Que. J3B 5L3
(514) 348-3000

Opus Audio Limited
5181 DeCarie Boulevard
Montreal, Que. H3W 3C2
(514) 481-0363

Projecson Incorporated
31 rue Terminus West,
Rouyn, Que. J9X 3B5
(819) 762-1404

St. Gelais Electronique
1526 Boul. Talbot
Chicoutimi, Que. G7H 4C2
(418) 545-2828

R.S.V.P. Electronique
1960 Mellon St.,
Jonquiere, Que. G7S 3H2

Sound Ideas
1409 Bishop St.,
Montreal, Que. H3G 2E4
(514) 842-9596

Studio 1006
1006 Fleury
Montreal, Que. H2C 1P7
(514) 384-2215

B.C.

Commercial Electronics Ltd.
1305 Burrard St.,
Vancouver, B.C. V6Z 1Z9
(604) 669-5525

Harmony Sound Limited
777 Victoria St.,
Prince George, B.C. V2L 2K5
(604) 564-2227

NOVA SCOTIA

Stereo Shop Ltd.
6065 Cunard St.,
Halifax, N.S. B3K 1E6
(902) 422-6571

P.E.I.

Hirtle's Stereo Inc.
100 Trans Canada Hwy.,
W. Royalty, P.E.I. C1E 1E7
(902) 894-7666

NEW BRUNSWICK

Magic Forest Music Store
546 Queen St.
Fredericton, N.B. E3B 1B9
(506) 459-1112

SASKATCHEWAN

Harry's Hi-Fi Ltd.
1239 Albert St.,
Regina, Sask. S4R 2R5
(306) 522-2668

Continued from page 86

CANADIAN DEALERS (cont'd)

Advance Audio
1415 Albert St.,
Regina, Sask. S4R 2R8
Custom Stereo
260-2600, 8th St. E.,
Saskatoon, Sask.
(306) 373-8777

N.W.T.

Yellowknife Radio Ltd.
P.O. Box 1169,
Yellowknife, N.W.T. X1A 2N5
(403) 873-4829

ONTARIO

Audio Appointment Ltd.
132 Mississauga St. E.,
Orillia, Ont. L3V 1V7
(705) 325-4040

Audio Gallery Ltd.
730 Yonge St.,
Toronto, Ont. M4Y 2B7
(416) 961-6788

Brack Electronics Ltd.
129 Jarvis St.,
Toronto, Ont. M5C 2H6
(416) 366-3636

Decibel Audio Ltd.
6 North Front St.,
Belleville, Ont. K8P 3A7
(613) 962-4300

Electronic Supermarket
28 Dunkirk Rd.,
St. Catharines, Ont. L2R 1A1
(416) 684-2388

J.L. Sound Systems
250 King St. E.,
Hamilton, Ont. L8K 1T1
(416) 527-6863

London Audio Ltd.,
716 York St.,
London, Ont. N5W 2S8
(519) 673-1780

Ottawa Studio Sound
722 Bank St.,
Ottawa, Ont. K1S 3V2
(613) 236-1097

Pro Sound & Acoustics
78 Cedar St.,
Sudbury, Ont. P3E 1A5
(705) 674-8478

Solid Sound Ltd.
156 Pembroke St. W.,
Pembroke, Ont. K8A 5M8
(613) 732-3855

Stereo Land Ltd.
1251 Ottawa St.,
Windsor, Ont. N8X 2E5
(519) 253-7636

Whitby Audio Ltd.,
400 Dundas St. W.,
Whitby, Ont. L1N 2M7
(416) 668-0787

Wizard Stereo Ltd.
264 Red River Rd.,
Thunder Bay, Ont. P7B 1A8
(807) 344-4544

Linear Sound
10176 Young St.,
Richmond Hill, Ont. L4C 1T6

been of interest only to my artists: First, all releases to date are from analog masters, even though we have been running digital tape at all sessions for some time. This is not a pro or con stance about digital, merely a case-by-case choice as to which sounds better. We anticipate DDD releases as the technology matures. Second, we are the only label whose artists own the masters and actual released albums (we stand ready to be corrected on this, but anticipate no surprises in that way). Classic Masters produces, markets, and, to a limited extent, distributes albums, but the ownership and profits from them are reserved for the artists. We take an agreed per-unit fee, a sum smaller than many labels might believe and yet larger than typical royalty payments, and plow the money back into promotion and equipment. We are unique in this approach, and our artists love it.

Thanks for that gratifying review!

Christopher Greenleaf
Producer
Classic Masters
Brooklyn, N.Y.

Counting Millionaires

Dear Editor:

Amen to the letter from David Lansdown (February 1987) concerning the reviews of high-priced equipment. I think that a \$6,000 amplifier, a \$3,000 turntable, and a \$3,000 preamp are obscenities. How many of your readers are millionaires?

Lester F. Keene
Abilene, Tex.

A "Pirate" Protests

Dear Editor:

The furor over Digital Audio Tape has opened my eyes! It seems obvious that the recording industry's long-term desire is to ultimately make consumer recording equipment extinct. Let us imagine that they get their way. Then what? The elimination of loudspeakers? After all, I might invite a friend to my abode for a "free" listen to my latest CD. Okay! No more loudspeakers. Then what? Headphones only? Uh-oh! Two sets of headphones, one pair for my friend and one pair for me, using a "Y" connector (we "pirates" are a resourceful lot). It seems that the powers of Congress had better be enacted,

making a death sentence the punishment for possession or use of "Y" connectors. *That* will teach us! Then what? Well, I really don't know, but I am certain that the recording industry's greed is without bounds, and that they hold the answer.

David W. Young
Bernalillo, N.M.

Nix the Notch

Dear Editor:

Perhaps a new symbol should be added to the AAD/ADD/DDD code for Compact Discs: DUD, for those with the new copy-protected scheme promoted by CBS. While it may be too much to expect that record companies will label their products as distorted, I do have a serious proposal: Any record company rejecting this copy-guard technique should announce that fact in the media and on their labels. That is the only way they will keep my business if frequency-response notching becomes widespread.

Don DeGeorge
Falls Church, Va.

Harmful Side Effects

Dear Editor:

Copy protection increases the cost of products and compromises their quality. The best defense against the copying of anything is to price it at a level that makes the purchase of the original the more practical thing to do. Making a copy requires the purchase of blank media, acquisition and configuration of the necessary hardware, and a time commitment on the part of the copier, not to mention getting hold of something to copy. There has to be some motivation to go through all of that. I used to make cassette copies of my albums for use in the car—my motivation was that the copies I produced were superior to those that could be purchased. If the quality of the prerecorded tapes had been equal to that of those that I produced, I probably would not have made copies but purchased prerecorded tapes, provided their cost was not so high as to make my own time investment a better alternative.

Copy protection will probably lead to more copying as a result of its side effects. The cost of copy protection will push up the price of prerecorded ma-

terial and make copying a more attractive option. The presence of an anti-copy signal will degrade the quality of an original, reducing its desirability when compared to a copy.

Copying is a fact of life that the recording industry can beat only by competing with it. Make copying impractical and it will go away. Fighting it by tariff and technology will just make audio entertainment less appealing in general. In fact, if that is the way things end up, I may just dump all the stuff that occupies so much space in my living room.

Al Pfalzgraf
Steamwood, Ill.

A Poem for Congress

Dear Editor:

Regarding DAT (Digital Audio Tape), I have a message for the gentlemen and gentlewomen of the 100th Congress:

Let the debate begin.
Let the parties meet,
industry and consumer.
Let the merits of each be heard.
Let the debate begin.

Gary A. Rhule
Tacoma, Wash.

Fond Memory

Dear Editor:

Each of us has his own reasons to revere the memory of Dick Heyser. I met him several times when he was trying to promote interest in his signal-biased amplifier system. Twenty years later, we passed in a hallway at the CES in Las Vegas. He not only remembered me, but asked about members of my family by name. How many deep thinkers have room in their brains for such details? That takes more than genius.

Thank you again for *Audio's* tribute to Richard C. Heyser.

Richard Simonton
Orlando, Fla.

Service with a Smile

Dear Editor:

This is to commend and congratulate the Sony Corporation of America—in particular its Burbank, Cal. Factory Service Center and staff—for their remarkable cooperation, courtesy, and utmost professionalism in dealing with a delicate circumstance.

I had a few problems with a Sony Compact Disc player. After a service evaluation, it was promptly replaced with a working model accompanied by an incredible amount of concern on Sony's part. I was treated with respect as a consumer, phone calls were returned, and problems were addressed and resolved.

My thanks to P. J. Montrone, Alan Austin, and others I had the pleasure of dealing with. I can highly recommend Sony products to others, knowing that the company *truly* stands behind them.

Victor Bisio
Encino, Cal.

Anniversary Accolades

Dear Editor:

Your May 1987 anniversary issue prompts me to join all audiophiles—professional and amateur—who congratulate you on your years of success.

Our own magazine, *Hi-Fi News* proper, began in 1956, following a merger with *Record News* and *Stereo Disc Review* (1953), incorporating previous papers such as *Audio Record Review* and *The Gramophone Record*. These latter date back to the late 1930s, preceding World War II, and I was associated with those early launchings.

I remember the trouble we had in getting those 1947 copies of *Audio Engineering* in 1947–48, but their impact was worth it.

Good wishes for many more years in our world of hi-fi and musical pleasure.

Donald Aldous
Consultant Technical Editor
Hi-Fi News
Plymouth, England

A Review of Reviews

Dear Editor:

What is the real value of record reviews? After reading a review, the question remains: Will I like the music?

Once again I bought a disc that was given a rave review and once again I got burned. My collection of dud CDs is growing and, with the high cost of discs, I find this investment in unlistenable music unacceptable. I have found that another person's opinion about a record or disc—good or bad—certainly may not coincide with mine. I wish I could make the record critics buy back

all the records and discs they've talked me into buying that turned out to be trash. For this reason I will no longer pay attention to record reviews in their present format.

Instead of one long review by one person, why don't you run *short* reviews by several different people? In this manner, a reader could compare and contrast the different opinions and, I feel, gain a greater insight as to whether or not he might like the music. This would not solve the problem, but it would help to some degree.

Robert Mallory
Sedalia, Mo.

Editor's Note: Certainly, one man's meat is another man's poison, and what's "trash" to you might be treasure to another. But a diversity of taste is good, isn't it? Without it, we might need only a handful of recording artists, or just one radio station. Why not identify one or two of our reviewers whose taste seems to coincide with yours and be guided only by them? As for running multiple reviews of the same disc, it would be a good idea—if we had a limited number of discs and an unlimited amount of editorial space. But given the avalanche of new CDs that come out every month, it's a challenge just to keep up; giving our readers a broad view of what's out there has to take precedence over becoming a forum for "duelling reviewers."—*E.M.*

Upgrades for All

Dear Editor:

Walter Jung's piece on the Magnavox CD player upgrade (June 1987) was a fine article, very useful to music lovers. However, one gets the impression that only that player will benefit from modifications. Owners of other brands of CD players, such as Sony, Harman/Kardon, and Kinergetics, just to name a few, will also hear sonic improvements over their stock units. Analog Devices' quad op-amp, the AD712, is a "drop-in" part that just about anybody can use. In addition, upgrades of capacitors and resistors can also be performed. But, as Mr. Jung suggests to your readers, "Proceed with caution!"

Edward A. Yapchian
Old Colony Sound Lab
Peterborough, N.H.

Distinction in Sound
ONKYO

Compact Disc Players

Integra Series

DX-530 • DX-330 DX-230 • DX-130 • DX-C600



OPTO-COUPLING

Enter No. 75 on Reader Service Card

An Enlightening Experience. Listen to Onkyo's New Line of CD Players with Opto-Coupling*.

The technology behind the great sound of CD is optical technology, but there's no reason to limit it to the laser pickup. Onkyo realized that something more was needed to obtain the best possible sound from compact disc, so they invented Opto-Coupling. It separates the CD player's digital and analog blocks of circuitry electrically to eliminate DSI (digital signal interference) and bring you CD sound free of digital pulse noise. Just as important as what happens to the digital data signal midway between the laser pickup and the output terminals, however, is the integrity of its source — the laser pickup itself. Onkyo's special vibration damping system helps prevent tracking errors and the inevitable deterioration in signal quality that occurs when the error correction circuitry must operate excessively.

This introduction to Onkyo's new CD player lineup ends, as it began, with light — infrared light, that is. All of Onkyo's CD players (with the exception of the DX-130) include remote control units for extra convenience. In addition, the displays have been upgraded to give you more information in an even easier-to-read format.

In the dark about which CD player is for you? Just audition one of these brilliant performers. You're sure to be enlightened.



Light Bridges the Gap between Digital and Analog

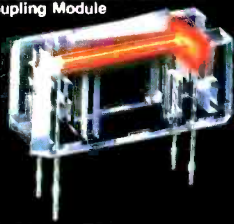
Onkyo's Opto-Coupling* with the Exclusive Opto-Coupling Module
All CD players contain both digital and analog blocks of circuitry. If stray digital pulses from the digital circuit block find their way into the analog block, however, they can interfere with the music signal and cause your CDs to sound edgy and unnatural. Opto-Coupling keeps digital pulse noise out of the analog circuitry by electrically isolating the digital block.

The music signal must nevertheless be transferred to the analog section somehow, and this is where the "opto" of Opto-Coupling comes in. Beams of light, not electricity, transmit the necessary signals via a "bridge" composed of photocouplers and Onkyo's revolutionary "Opto-Coupling Modules." These modules, an Onkyo exclusive, each use an 11mm strand of optical fiber to link the emitting and receiving photodiodes. This design reduces high-frequency signal leakage by approximately 13dB compared with conventional photocouplers. Since there is no electrical contact at all between the digital and analog blocks, DSI (digital signal interference) doesn't even have a chance to develop. The resulting sound is clear and lifelike, without the harshness sometimes associated with the CD format.

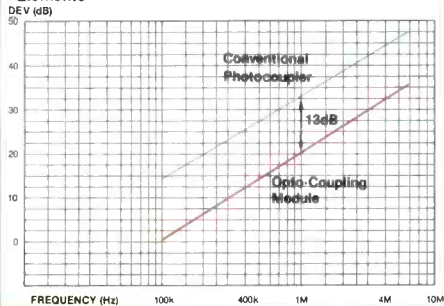
Ladder-Network Type Integra Linear Converter

Conventional integrated D/A conversion systems require a quartz oscillator — yet another possible source of extraneous pulse noise. Onkyo overcame this problem by eliminating its root: the quartz oscillator in the analog block. The ladder-network type D/A converter in the DX-530 and DX-330 was developed specially for systems like Onkyo's which employ serial optical transmission. This "Integra Linear Converter" doesn't need a quartz oscillator in the analog circuit block in order to operate, so it generates no pulse noise.

The Opto-Coupling Module



Leak Frequency Characteristics of Optical-Coupling Elements

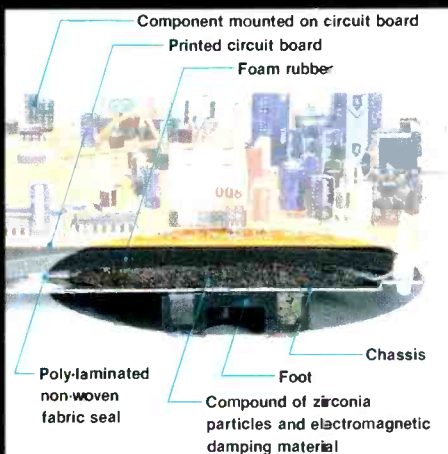


Light that Never Wavers

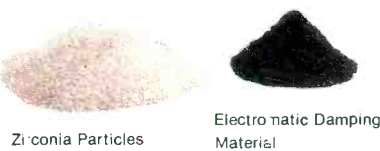
Special Vibration Damping

While any CD player's correction circuitry can protect you from data read errors so that you aren't exposed to the constant clicks and pops that plague analog records, it can't fully make up for the absence of the correct signals. The result is that you lose some of the detail you would have been able to hear if the correction circuitry had not had to operate in the first place. Clearly, the less correction needed, the better.

Onkyo's IFS (Isolated Floating Suspension) system separates the disc drive section from the chassis and suspends it on springs and four rings made of special vibration-absorbing material. The cover, which is the part of the unit with the largest surface area, is also specially damped by a protective layer of mica particles, bitumen and resin which kill vibrations by converting them into heat energy and thereby stop outside vibrations from being transmitted to any sensitive systems. Finally, the underside of the analog block's printed circuit board is protected by a specially designed insulation packet containing a compound consisting of zirconia particles (a new, high-tech material) and electromagnetic damping material. In addition to fighting vibrations in the same way as the cover's protective layer, it also absorbs stray electromagnetic flux from the components mounted on the circuit board — another possible cause of interference and distortion.



Insulation packet containing a compound consisting of zirconia particles and electromagnetic damping material (Packets are triple-sealed against leakage.)



Light Controls All Major Functions

Infrared Remote Puts You in Full Command of The World's Only Random Music Calendar.

Onkyo's light connection extends as far as your listening chair: all our CD players with Opto-Coupling come complete with infrared remote controls that give you full mastery over all major functions. The DX-530's remote control even lets you adjust the volume of the output signal. In addition, the displays have been upgraded to make it even easier to keep track of what's going on. Onkyo felt that the standard indications of current track, playing time, etc. weren't enough. So they set out to make their new displays even easier to read and even more informative.

Random Music Calendar

The Random Music Calendar Display is another Onkyo innovation. Unlike some "fixed digit" displays that simply show the numbers of the tracks in memory, the Music Calendar shows you the track numbers in their playing order. It can display up to 19 track numbers at once. As soon as one track finishes, it vanishes and the following tracks each move up one notch. Best of all, the Random Music Calendar works in all play modes: normal play, memory play and even random (shuffle) memory play. In addition to the Random Calendar, the DX-530's display also shows the number of the track in play, index number, sequential memory indication (a track's position in the memory sequence) and elapsed/remaining time for both the track in play and the disc (or memory play sequence).

Random Music Calendar Display Functions



Patent pending

SPECIFICATIONS

	DX-530	DX-330	DX-230
D-A Conversion	16 bit with two-times oversampling	16 bit with two-times oversampling	16 bit with two-times oversampling
Signal Readout System	Optical non-contact	Optical non-contact	Optical non-contact
Reading Rotation	About 500 — 200 r.p.m. (Constant linear velocity)	About 500 — 200 r.p.m. (Constant linear velocity)	About 500 — 200 r.p.m. (Constant linear velocity)
Linear Velocity	1.2 — 1.4 m/s	1.2 — 1.4 m/s	1.2 — 1.4 m/s
Error Correction System	Cross interleave readsolomon code	Cross interleave readsolomon code	Cross interleave readsolomon code
Decoded Bits	16-bits linear	16-bits linear	16-bits linear
Sampling Frequency	88.2kHz two-times oversampling	88.2kHz two-times oversampling	88.2kHz two-times oversampling
Number of Channels	2 (stereo)	2 (stereo)	2 (stereo)
Frequency Response	2 — 20,000Hz	5 — 20,000Hz	5 — 20,000Hz
Harmonic Distortion	0.003% (at 1kHz)	0.003% (at 1kHz)	0.03% (at 1kHz)
Dynamic Range	93dB	93dB	93dB
Signal to Noise Ratio	96dB	96dB	96dB
Channel Separation	90dB (at 1kHz)	90dB (at 1kHz)	87dB (at 1kHz)
Wow and Flutter	Below threshold of measurability	Below threshold of measurability	Below threshold of measurability
Output Level	2 volts r.m.s.	2 volts r.m.s.	2 volts r.m.s.
Power Supply Rating (4-types)	<ul style="list-style-type: none"> ● AC 120V, 60Hz ● AC 220V, 50Hz ● AC 240V, 50Hz ● AC 110/120/220/240V switchable, 50/60Hz 	<ul style="list-style-type: none"> ● AC 120V, 60Hz ● AC 220V, 50Hz ● AC 240V, 50Hz ● AC 110/120/220/240V switchable, 50/60Hz 	<ul style="list-style-type: none"> ● AC 120V, 60Hz ● AC 220V, 50Hz ● AC 240V, 50Hz ● AC 110/120/220/240V switchable, 50/60Hz
Dimensions (W x H x D)	435 x 92 x 364 mm 17-1/8" x 3-5/8" x 14-5/16"	435 x 92 x 359 mm 17-1/8" x 3-5/8" x 14-1/8"	435 x 88 x 357 mm 17-1/8" x 3-7/16" x 14-1/16"
Weight	5.6kg 12.3 lbs.	4.8kg 10.6 lbs.	4.8kg 10.6 lbs.

	DX-130	DX-C600
D-A Conversion	16 bit with two-times oversampling	16 bit with two-times oversampling
Signal Readout System	Optical non-contact	Optical non-contact
Reading Rotation	About 500 — 200 r.p.m. (Constant linear velocity)	About 500 — 200 r.p.m. (Constant linear velocity)
Linear Velocity	1.2 — 1.4 m/s	1.2 — 1.4 m/s
Error Correction System	Cross interleave readsolomon code	Cross interleave readsolomon code
Decoded Bits	16-bits linear	16-bits linear
Sampling Frequency	88.2kHz two-times oversampling	88.2kHz two-times oversampling
Number of Channels	2 (stereo)	2 (stereo)
Frequency Response	5 — 20,000Hz	5 — 20,000Hz
Harmonic Distortion	0.03% (at 1kHz)	0.03% (at 1kHz)
Dynamic Range	93dB	93dB
Signal to Noise Ratio	96dB	96dB
Channel Separation	87dB (at 1kHz)	87dB (at 1kHz)
Wow and Flutter	Below threshold of measurability	Below threshold of measurability
Output Level	2 volts r.m.s.	2 volts r.m.s.
Power Supply Rating (4-types)	<ul style="list-style-type: none"> ● AC 120V, 60Hz ● AC 220V, 50Hz ● AC 240V, 50Hz ● AC 110/120/220/240V switchable, 50/60Hz 	<ul style="list-style-type: none"> ● AC 120V, 60Hz ● AC 110/120/220/240V switchable, 50/60Hz
Dimensions (W x H x D)	435 x 88 x 359 mm 17-1/8" x 3-7/16" x 14-1/8"	435 x 115 x 330 mm 17-1/8" x 4-1/2" x 13"
Weight	4.8kg 10.6 lbs.	6.0kg 13.2 lbs.

Onkyo System Remote Control Compatibility Chart

	Compact Disc Players					Turntables				
	DX-330	DX-320	DX-230	DX-200	DX-130	CP-1057F	CP-1055FII	CP-1046F	CP-1044F	
TX-108	▲	▲	▲	▲	▲	▲	▲	▲	▲	
TX-88	▲	▲	▲	▲	▲	▲	▲	▲	▲	
TX-84/TX-84M	▲	▲	▲	▲	▲	▲	▲	▲	▲	
TX-82/TX-82M	▲	▲	▲	▲	▲					
P-3150V/M-5150	▲	▲	▲	▲	▲					

	Cassette Tape Decks										
	TA-2140	TA-2130	TA-2090	TA-2058	TA-2056	TA-2048	TA-2036	TA-2028	TA-W460 (1-2)	TA-R280	TA-R240
TX-108	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
TX-88	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
TX-84/TX-84M	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
TX-82/TX-82M	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
P-3150V/M-5150	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

▲ Remote control compatible
 ▲ Only U.S. and Canadian models are compatible.

ONKYO CORPORATION

International Division, No. 24 Mori Bldg., 23-5,
 Nishi-Shimbashi 3-chome, Minato-ku, TOKYO 105, JAPAN
 Tel: 03-432-6987 Fax: 03-436-6979 TLX: 242-3551 ONKYO J
ONKYO U.S.A. CORPORATION
 200 Williams Drive, Ramsey, N.J. 07446, U.S.A.
 Tel: 201-825-7950 Fax: 201-825-8150

● Specifications and design are subject to change with or without notice.
 ● Consult your ONKYO dealer for the power supply in your area.

A FEW FOR THE SEESAW

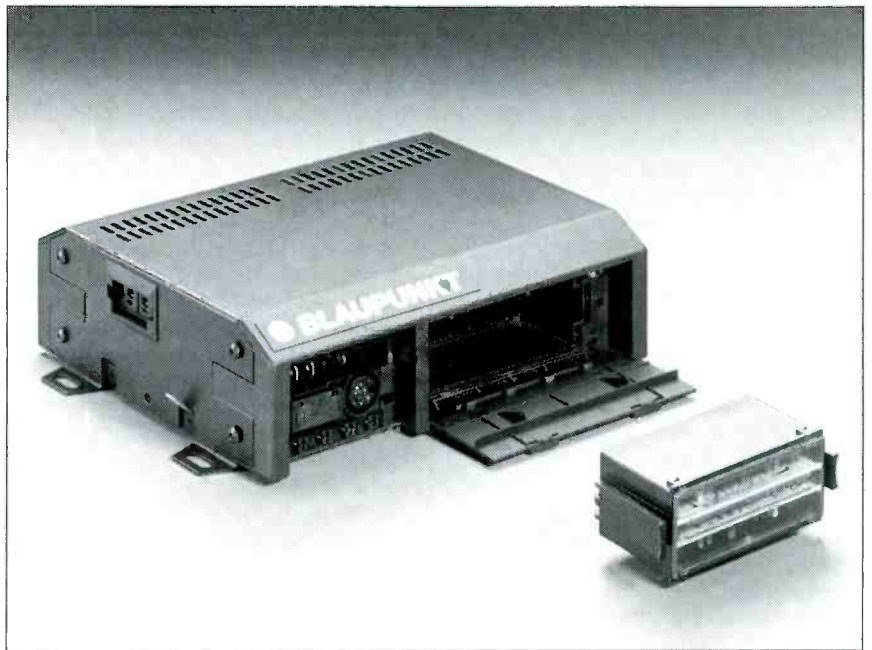
Car makers and independent electronics companies have long been seesawing in the battle for dominance of the in-car entertainment market. At the moment, the car makers are on the upswing, and their success is shaping the latest trends in aftermarket equipment.

The seesaw has been in motion for decades. Back when I was a small boy, if I remember right, people would usually buy a car without a radio and put in a Motorola or Bendix of their own. By the time I was actively interested in cars, however, the seesaw had swung the other way. Most of the people I knew bought cars with factory-installed radios; they looked better, could be financed along with the car, and performed superbly. (As I've said before, it took me 30 years to find a car sound system whose AM performance clearly surpassed that of our '54 Pontiac's AM-only Delco.) The only people I knew who bought aftermarket radios were the ones who didn't want to pay the car makers' high radio prices. (Our Delco, as I recall, cost about \$100, while the Pontiac itself probably cost only about \$2,500.)

In the 1960s, however, things began to shift again. The electronics companies first edged into the lead by bringing tape to the car, in the form of 8-track cartridges. Then, as Detroit finally adopted 8-track, the aftermarket specialists began to phase it out in favor of the compact cassette, just as their more critical customers were doing in their home systems.

In the 1970s, companies like Sanyo and Pioneer gave those critical customers something else they'd been used to at home but hadn't been able to get from car stereo—performance specs. Just as in home hi-fi, specs gave the car stereo buyer a chance to compare how models performed without having to buy and try each one. By that point, the aftermarket specialist companies had the technological lead. Because electronics were their main business, not a sideline, these companies could sense changes in consumers' tastes and needs, and respond to those changes, more quickly than the car companies could.

By the beginning of the '80s, the car stereo market had grown to about \$2 billion annually (versus a \$2.1-billion



Plugging the custom equalizer module (foreground) into Blaupunkt's PSA 108 amplifier changes the amp's frequency response to complement the acoustics of the car. Modules are available for 38 car models so far.

market for home stereo), and the car manufacturers were looking for ways to recapture more of that market for themselves. One of the less creditable ways has been to build the cost of a radio into the basic price of the car, making the buyer disinclined to look elsewhere. The standard sound system that comes with the car is "free"—and optional upgrades look comparatively cheap because the cost of the "free" system is subtracted from them. There are no painful decisions to make about what to buy or who should install it. Buyers who want to install systems of their own can often get a refund if they remember to request the "delete option." However, the refund may be far less than a comparable aftermarket radio would cost. For many cars, there may not even be a refund; this has been the subject of legal action by the Car Audio Specialists Association (CASA).

Car companies have also put roadblocks in front of the aftermarket, by building radio slots in strange shapes that won't accommodate anything but their own stereo units. Using one panel for both the radio and some unrelated function, such as control of an air con-

ditioner, also makes life harder for aftermarket makers and installers.

Legitimate technical advances sometimes raise other roadblocks. It's harder to build radios for cars whose all-electronic dashboards incorporate the radio dial or whose electronic subsystems communicate via data buses. (Blaupunkt has an advantage, here, in that they may be supplying such dashes and data buses to Europe's car makers.)

To their credit, the car companies have also chosen to compete by exploiting their areas of technical superiority, not just their power to control car purchase terms and the installation environment. This approach has resulted in the Delco-GM/Bose system (1982), the Ford/JBL system ('85), the Chrysler-Infinity system ('86), and the new Acura-Bose system ('87).

In each case, the car maker went to an outside company for its audio expertise and its ability to produce premium speakers and other audio components in small (by car-industry standards) quantities. What the car companies contributed was their marketing strength, their intimate advance knowledge of the cars' characteristics

Aftermarket companies are not sitting still; they're making installation easier and optimizing equipment for specific cars.

(which makes custom equalization possible), and their ability to adapt the cars' interior design to meet acoustical requirements (ensuring decent speaker placement and building scientifically designed enclosures into the cars, among other things).

There's still work to be done. Car design and manufacturing cycles are long, and there's fierce competition for every inch of panel and behind-panel space, so the speaker placement in these collaborative cars is not always optimal, as yet. The systems still lack subwoofers, which would deepen their bass response a bit and considerably increase bass impact, and some of them need tweeters or supertweeters too. Nonetheless, these super-systems offer good value and good sound, and they save a lot of shopping. They pose serious, legitimate competition to the aftermarket.

Meanwhile, the aftermarket companies aren't sitting still. They're using the speaker locations that the car makers have built in, they're redesigning their equipment to make installation easier, and they're making equipment that's optimized for specific cars. At the same time, they're hanging on to their traditional strengths by offering the widest choice of equipment and continuing to be the first with new features.

Combining multiple components on one chassis is one way equipment is being redesigned for easier installation. This means fewer cables, fewer mounting holes, and less severe ground-loop problems; it also saves space. Almost immediately after the Delco-GM/Bose introduction, AudioMobile introduced their K40 system, whose electronics package combined four amplifier channels and a crossover. This idea has since caught on with such companies as Canton, Clarion, Craig, Denon, Fultron, Monolithic, Precision Power, Rockford Fosgate, Royal Sound, Sentrek, and Yamaha. Linear Power, Monolithic, and Zapco have three-channel amp/crossovers for stereo use with monophonic subwoofers. Denon has a five-channel amp with crossover, which can be bridged for three-channel operation; ADS has two six-channel amps without crossovers, which can be bridged for five-, four-, or three-channel use.

Alpine's way of simplifying installa-

tion and selection is to offer Alpine Reference Systems, prepackaged systems for the cars Alpine's customers like most. The cars include four two-seat sports cars (Corvette, Mazda RX-7, Porsche 944, and Toyota Supra), three sport coupes (BMW 325i, Camaro IROC-Z, and Mustang GT), and two trucks (Ford Ranger and Nissan Hardbody). Three systems are offered for each car. These systems range in complexity from a self-amplified head unit driving four speakers (level 1 for Porsche, BMW, Camaro, Ford Ranger, and Nissan Hardbody) to a head unit, CD player, equalizer, three amplifiers, four speakers, and two subwoofers (level 3 for Mazda).

At least three companies have come up with ways to duplicate the custom equalization that makes car manufacturers' super-systems special. Both ADS and Blaupunkt have announced equalizers whose frequency curves are determined by plug-in modules, each preset to match the acoustics of a particular car. Both systems equalize the front and rear speakers separately. The ADS equalizer is a stand-alone unit, the EQ1 (about \$200); Blaupunkt's PSA (Parametric Sound Amplifier) system is built into an amplifier with four channels of 20 watts apiece.

Both the ADS and Blaupunkt equalizers are fixed parametric types, with center frequencies and bandwidths adjustable at the factory for each filter. Blaupunkt's PSA has three filters per channel, and ADS's EQ1 has up to

eight. So far, ADS has not announced what cars their EQ modules will be available for, except for the Porsche 911 Turbo Slant Nose, for which ADS will be supplying a \$10,000 factory-installed sound system. Blaupunkt, on the other hand, has announced an initial list of 38 cars for which the PSA system will be available. The list includes cars from Audi, Buick, BMW, Cadillac, Chevrolet, Chrysler, Dodge, Ford, Honda, Jaguar, Lincoln, Mazda, Mercedes-Benz, Mercury, Merkur, Oldsmobile, Plymouth, Pontiac, Porsche, Saab, Toyota, Volkswagen, and Volvo, some of them going back as far as 1972.

Both ADS and Blaupunkt configure their EQ curves for systems using their own speakers. But according to a company engineer I spoke to, these equalizers should work nearly as well with good speakers from other companies, since the problems they address are caused more by the car's acoustics than by any peculiarities of the speakers used.

Audio Control's approach is a bit different. Instead of a parametric equalizer with factory-preset curves, they use a graphic equalizer, relying on the installer to get the EQ right and the purchaser to leave it alone thereafter. (To encourage this, the equalizer is designed to be mounted in the trunk, and the installer can bolt a gloat-but-don't-touch plastic cover over the screwdriver-set controls.) This approach will work with any speakers, in any car—



Like the Blaupunkt PSA system, the ADS EQ1 equalizer will accept custom modules for specific cars' acoustical requirements.



AT PHASE LINEAR, WE BELIEVE THIS END OF THE DIAL DOESN'T HAVE TO BE THE END OF THE ROAD.

It's that section of your volume control where most car speakers begin to lose their composure. And some come completely unglued. We call it Phase Linear territory — and for good reason.



Once you reach a certain volume level, the cones of ordinary car speakers start to "break up," causing distortion of your music (a generally unpleasant experience). It's a situation that can make you want to avoid the upper reaches of your car stereo system at all costs. Fortunately, Phase Linear has a simple (yet sophisticated) solution.

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delivers 250 watts of peak power handling. And other Phase Linear speakers have comparably high ratings. Add to that mix polycarbonate midranges, ferrofluid-filled tweeters and long-throw woofers — and you've got all the power-handling ability you'll ever need.

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Phase Linear carries this high level of excellence right down to our sleek and handsome appearance, too. No matter what kind of car you drive, our equipment will look, fit and sound top-notch. And we have models that can upgrade the sound of any dashboard, door or deck, too!

So, before you decide to travel with a pair of ordinary car speakers, climb up to Phase Linear territory. You'll discover music like you've never heard it before.

At any level.

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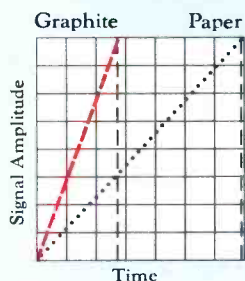
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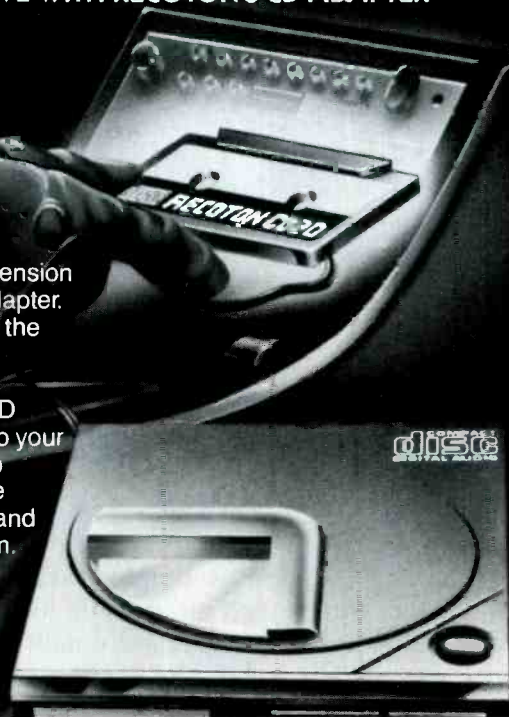
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Speakers could be made to complement the acoustics of a particular car, but I've never seen any that make such a claim.

but not with just any old installer. To properly adjust a complex equalization curve takes both good ears and the ability to measure what you're doing. Audio Control can't supply the ears, but they at least offer a comparatively low-priced 1/3-octave analyzer for installers to use.

Similar flexibility could probably be obtained with an adjustable parametric equalizer such as the three-band Hifonics Ceres or Precision Power's four-band PAR-224. However, these units seem designed to be left in full view, where passengers may be tempted to fiddle with their settings.

Speaker systems could be made (or passively equalized) to complement a car's acoustics, but the ones I've seen so far make no such claims. Instead, they're aimed at simplifying the installation process. Philips makes systems to fit the Saab 900 dashboard; Boston Acoustics' Model 707e is designed to fit metric mounting holes of German cars; Hirschmann's Model 7300 is designed for the limited mounting depth of the rear-deck speaker cutouts on BMWs and Mercedes. Enclosures designed to mount behind the seats of popular pickup trucks, or on the rear decks of hatchbacks, have long been available. (One maker, Stillwater Designs, has even adapted this idea for a home speaker that fits behind a sofa—perhaps for rear-channel use in surround systems.) The Sabre Sound CF 150 speaker, for GM F-body Camaros, Firebirds, and Trans-Ams, claims to have its Thiele/Small parameters aligned specifically for the acoustics of these cars.

Classic Research has long made Z-Box enclosures designed to fit specific models of BMW, Corvette, Ferrari, Firebird, Camaro, Mazda, Mercedes, Porsche, and Rolls-Royce cars, each upholstered to match the car it will be installed in. Similar upholstery matching is standard with Blaupunkt's new line of replacement rear decks, for several Audi, BMW, Honda, Mercedes, Porsche, Saab, and Volkswagen models; these "Sound Boards" are three-way speakers with 8-inch woofers.

Finally, on the premise that if you can't lick 'em, join 'em, Scosche makes an adapter that permits an aftermarket CD player to be hooked up with the Delco head units.

A personal stereo with remote possibilities.



Now you don't have to get so close to your personal stereo. Thanks to Toshiba's KT-4377. It's got a wired remote control you can clip on anywhere. So you can rewind, fast forward, and adjust the volume without ever touching the deck. There's also a built-in AM/FM stereo tuner, auto-reverse, and IC logic controls. Toshiba's wired remote. It'll give you more control over your personal stereo.

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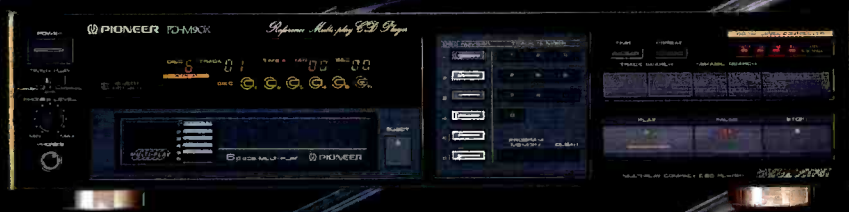
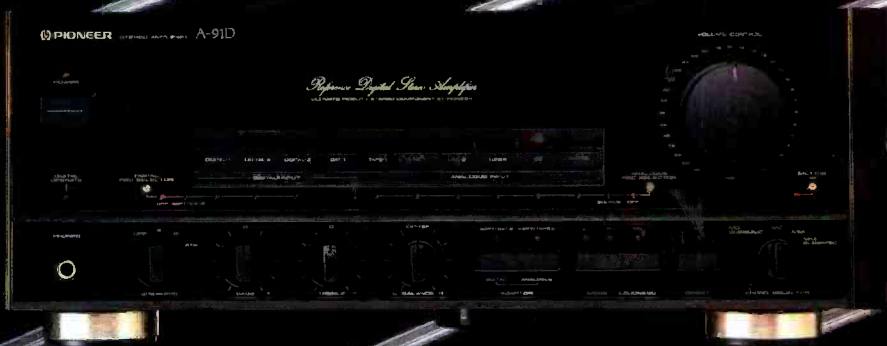
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ELITE HI-FI COMPONENTS

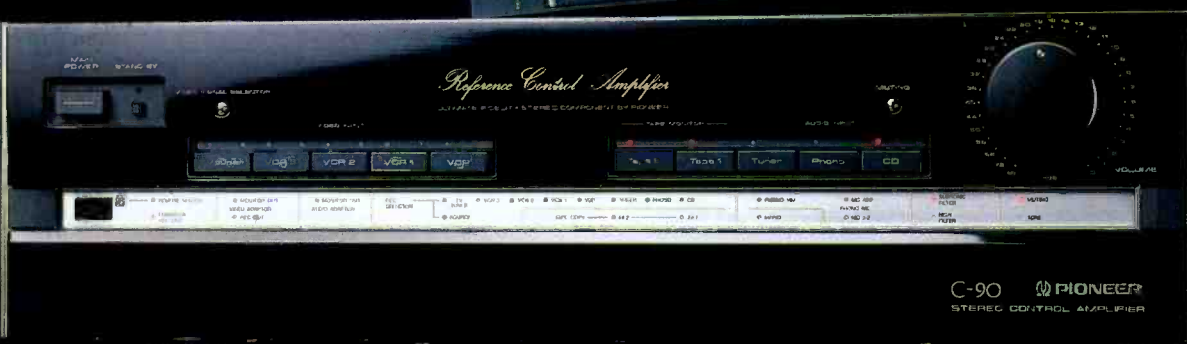
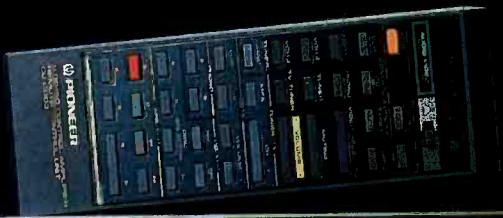
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REFERENCE AMPLIFIERS

C-90

Reference Control Amplifier

We've given the C-90 a twin-mono amp construction which features separate power supplies and chassis layouts for the left and right channels. This elaborate construction shuts out mutual interference between channels, thus dramatically reducing intermodulation distortion. There's also an independent power supply that uses an exclusive transformer for video circuits, displays, relays, microcomputers and electronic switches.

We've also isolated the circuits in the C-90 from the external world because we know that a preamplifier is as susceptible to external disturbances and vibration as any other component. Preamps handle very delicate signals measured in microvolts and millivolts. When subjected to vibration, parts vibrate in sympathy, resulting in a type of distortion called "microphonics." Though subtle, this effect is discernable, especially with the tremendously wide dynamic range possible with digital programs. So we constructed feet from polycarbonate (for optimum shock absorbing response), anchored circuit boards to the chassis with rubber dampers, used flexible copper screws to cushion shocks, and employed a massive solid-aluminum volume control knob.

In order to retain higher purity and integrity, we shortened signal paths as much as possible through the use of relays, electronic switches and other means of electronic control wherever applicable. This has resulted in a drastic reduction of signal loss and deterioration (noise, distortion, crosstalk, etc.).

To boost the delicate signals from moving-coil cartridges, Pioneer's exclusive "hybrid" booster combines a quality transformer and an optimum-gain phono equalizer. With one-half the normal number of turns of coil, the transformer's thicker wire reduces DC resistance and stray wire capacitance for better high-frequency response. The reduced gain in the transformer is compensated for by an equalizer specially designed for low-noise performance. All this ensures that our "hybrid" booster provides a flat response from lows to highs and well-damped sound, making your "analog" records sound better than ever.

Pioneer's policy of using only quality parts is expressed throughout the amplifier, from circuit boards to wiring, from capacitors to semiconductors. Copper plating is used for the chassis and screws, for instance, to reduce subtle magnetic distortion.

In addition to high-quality sound, the C-90 also provides tremendous convenience: it connects, switches and controls six video components — two play-only units (LD players, TV tuners, etc.), three record/playback VCRs, and one processor unit. Besides, it provides two monitor outputs, and a 5-pin RF converter output that accepts an optional RF modulator (JA-RF5) for connecting a conventional TV. Using the sharpness, detail and noise reduction controls, you can even enhance the video as you watch or dub.

And for added convenience, the C-90 comes with a remote control that lets you control volume and input selection, as well as handle other Pioneer audio/video equipment with the "SR" mark. Adding a touch of class to the amplifier is an aluminum front panel finished with a lacquer-like shine.



M-90

Reference Power Amplifier

NON SWITCHING AMP*

The demand for a reliable and high-output power amplifier has never been greater now with the wide dynamic range made possible by the Compact Disc. The M-90 Reference Power Amplifier was designed especially for this digital age.

Speaker systems can have rated impedances of, say, 6 or 8 ohms, but when they play music with wide dynamic variations, the actual impedance can go much lower, especially at low frequencies. With dynamic digital sound, an amplifier must be equipped with a power supply that performs reliably even under the heaviest load. And that's why we've created the M-90: its power supply features two outsize transformers, large electrolytic capacitors (for a total capacitance of 48,000 μ F) and four bridged rectifier circuits with fast-recovery diodes. And in the power amplifier, 16 high-power transistors (8 per channel) are used in an elaborate "four-in-parallel" configuration.

What this means is that the M-90 is ready to deliver a **continuous average power output of 200 watts* per channel, min., at 8 ohms from 20Hz to 20,000Hz with no more than 0.003% total harmonic distortion.** What's even more amazing is its dynamic power: 300 watts at 8 ohms, 550 watts at 4 ohms and 800 watts at 2 ohms (with EIA dynamic test signal).

We also have made signal paths as short as possible to ensure signal integrity. The volume control for CD input is located on the front panel, of course, but actual level adjustment is performed by a potentiometer located behind the input terminals and linked by a long shaft.

In addition to the input for a control amp, the M-90 has an input, with volume control, for direct connection of a Compact Disc player to allow you to enjoy purer-than-ever digital sound. Another line-level direct input is also provided that permits you to add other digital equipment in the future. The M-90 also has an output to allow you to return the signals to the preamp for equalization or recording on a tape deck.

We used our exclusive Non-Switching Circuit Type II for the power output stage, thus ending switching distortion. And we have elaborated on this design to reduce distortion further across a wide power output range. Thermal distortion is also drastically reduced by stabilizing the idling current supplied to power transistors from the moment power is turned on. Moreover, we've reduced non-linear distortion of power transistors to 1/30 that of our class-B amps.

To ensure quality sound, we used quality parts, such as gold-plated in/output jacks, OFC (Oxygen-Free Copper) wiring, and 70 μ m-thick copper-plated circuit boards. To reduce magnetic distortion, the entire chassis is copper-plated, and so are screws used throughout.

Sophisticated craftsmanship is evident from the exterior: the power amp's aluminum panel front glows with a traditional lacquer-like luster. The front panel also contains large fluorescent power output indicators.

*Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifiers.

PIONEER

FM/AM DIGITAL SYNTHESIZER TUNER F-91

FM 100.5 MHz 24ch

Active Real-Time Tracing System

Reference Digital Synthesizer Tuner

STATION CALL

1/13	2/18	3/18	4/10	5/17	6/18
7/18	8/20	9/21	10/22	11/23	12/26

TUNING DOWN UP

1-12/13-84 MEMORY FM-BAND-AM

TUNING MUTE MPR REC LEVEL

MODE MODE CHECK

PIONEER

STEREO AMPLIFIER A-91D

Reference Digital Stereo Amplifier

ULTIMATE HIGH-FIDELITY STEREO COMPONENT BY PIONEER

VOLUME CONTROL

20 18 16 14 12 10 8 6 4 2 0

MUTING

DIGITAL-1 DIGITAL-2 DIGITAL-3 DAT-1 TAPE-1 LINE-1 LINE-2 TUNER CD PHONO

DIGITAL INPUT ANALOGUE INPUT

DIGITAL REC SELECTOR ANALOGUE REC SELECTOR

PHONES OFF A/B CENTER ADPT/DAT 1 ADPT/TAPE 2 L R ON OFF ON NO SUBBONIC NO MM

BREAKERS BASS TREBLE L BALANCE R ADAPTOR MODE LOUDNESS DIRECT PHONO SELECTOR

REFERENCE DIGITAL AMPLIFIER AND TUNER

A-91D

NON SWITCHING AMP*

Reference Digital Non-Switching Integrated Amplifier

Here's an amazing amplifier that's ready for digital reproduction: the A-91D. It even comes with a digital circuit for Compact Discs.

With the A-91D, program signals go through the shortest direct path from circuit to circuit, to minimize chances of noise pickup and to maintain musical purity. We've made this possible by having actual switching and control occur near circuits or input terminals. A "LINE DIRECT" switch lets you further trim the signal route; it runs the input selector direct to the power amp, bypassing all intervening circuits (except volume control) physically as well as electrically. It lets you enjoy unusually clear and clean reproduction from *any* program source.

Subtle vibrations can cause subtle sound degradation by microscopically moving parts and devices. So we've shut them out using a non-resonating frame chassis, insulators and a heat sink, all with a honeycomb construction. They also add to the rigidity of the entire chassis. Using separate circuit blocks contributes to clarity by keeping interference to a minimum.

Our new Non-Switching Circuit Type III features excellent low-impedance driving capability combined with low distortion. Our exclusive power-amp design offers more advantages. One, it puts an end to switching distortion to add clarity to the sound you hear. Two, it fully stabilizes idling current, so that distortion due to thermal fluctuation is reduced to zero. Three, distortion created by power transistors is reduced to 1/50th the original value. Four, load variations are suppressed, and dynamic response is improved when large currents are drawn at low impedances, thanks to separation of the voltage- and current-amplifying stages.

The A-91D is designed to drive low impedances of 6 or even 4 ohms with low distortion over a wide frequency range. Backing it up are two high-capacity power transformers. They are contained in finned die-cast iron cases, filled with a damping agent, which dissipate heat to prevent the increased resistance and impedance that high temperatures can cause. They are also solid and non-resonating, and magnetically shielded to prevent magnetic radiation from affecting delicate signals.

In the A-91D, we've extended the digital advantages by including independent digital conversion circuitry. There are two glitch-free D/A (Digital-to-Analog) converters (one for each channel), a digital filter which uses four times the normal sampling frequency (176.4kHz), and an analog low-pass filter built from quality discrete parts. Use the A-91D with a CD player with digital output such as the Pioneer PD-M90X, and you'll get digital sound in its purest form. There are six digital inputs and three digital outputs, of which two inputs and one output have optical interfaces to permit electrical isolation. An Optical Transfer Distortion Canceller is added to eliminate jitter for accurate optical transmission.

The A-91D delivers a **continuous average power output of 120 watts* per channel, min., at 8 ohms, from 20Hz to 20,000Hz with no more than 0.003% total harmonic distortion.**

*Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifiers.

F-91

SR

Reference Digital Synthesizer Tuner

We've pushed the level of FM sound quality to record highs with the addition of two Pioneer exclusives to the F-91.

The first is the ARTS (Active Real-Time Tracing System) included in the IF section of the tuner. With some tuners, especially expensive ones, you have the choice of using a narrow or wide IF bandwidth. The first lets you avoid interference, but you have to settle for an increase in distortion. The second provides lower distortion and better sound, but interference may get in the way. Pioneer ARTS — it's simply the best of both worlds: its IF filter *actively* follows the desired signal while rejecting interference. Now you can enjoy both the low distortion of a wide bandpass *and* the high selectivity of a narrow bandpass. Sensitivity is improved, too.

The second Pioneer feature is the Digital Direct Decoder Type III. It takes the output from the ARTS IF circuitry and converts it into digital form before directly turning it into stereo analog signals. Thanks to digital operation, our DDD Type III is less prone to signal degradation. Moreover, in the Type III, we've simplified the circuitry using a new PLL detector, which has reduced noise even further.

Improvements extend to other circuits of the tuner as well. The front end, for instance, features an ID MOS FET to improve reception. Indeed, the front end is as highly sensitive and selective as an elaborate 4-ganged tuning capacitor.

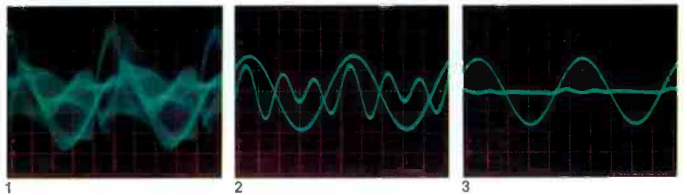
The F-91, like our amps and CD players, is designed based on our anti-vibration concept to damp harmful resonance and vibration for improved sound. We've turned circuits into modules and filled them with epoxy resin. And we've added honeycomb ribs to the chassis and used large insulators to shut out external vibration.

Then, of course, there are a wealth of features designed to improve convenience. You can preset up to 24 FM and AM stations in any combination. Up to three different stations can be programmed so that, when controlled by an optional timer, they are tuned in sequence — a convenient way to make unattended recording.

More features for convenience are an auto tuning mode, selectable muting level, recording level calibrator, and a fluorescent display.

Pioneer ARTS (Active Real-Time Tracing System)

A conventional wideband filter permits low-distortion reception but suffers when undesirable signals interfere (Photo 1). An alternate narrowband filter may cut interference, but can add distortion because of the limited bandwidth (Photo 2). Photo 3 shows the response of the F-91 with ARTS. As you can see, it delivers a low-distortion signal even when there's interference. The Pioneer ARTS simply combines the low-distortion performance of a wide bandwidth and the high selectivity of a narrow bandwidth.





REFERENCE MULTI-PLAY COMPACT DISC PLAYER

PD-M90X

Six-disc multi-play convenience

Class and convenience happily coexist in the PD-M90X, which combines classical elegance with computer-age features.

Our top-of-the-line multi-play CD player, the PD-M90X lets you enjoy beautiful, dynamic digital sound for hours and hours, uninterrupted. It accepts up to six CDs mounted inside a special magazine and plays the discs just the way you want them played. You can play each song on all six discs one by one, or jump to the song or disc you want instantly, using DISC NUMBER and TRACK NUMBER buttons provided both on the remote control and on the unit itself. For added convenience, you can also select up to 32 tracks from the six discs and program them for playback in any order! A single-disc loader is also standard for single-play convenience.

Remote control with "one-touch" program loading

The PD-M90X comes provided with a full-function "SR" remote control. It offers three extra conveniences: a numeric keypad, a multi-function LCD (Liquid Crystal Display) panel and the MPSS* (Magazine Program Selection System). The keypad gives you instant access to any track, a feature you'll also find useful when programming tracks. The LCD panel serves as a guide to programming, letting you preset tracks and the order away from the player while referring to labels of the discs.

The Magazine Program Selection System permits you to store up to 80 programmed "steps" (songs and pauses) from eight six-disc magazines. Using MPSS, you are saved from reprogramming tracks each time you mount a magazine: all you have to do is press the memory button for that specific magazine and the "transfer" button. The programmed songs are then automatically "loaded" from the remote into the player. Now loading programmed tracks has become as simple as touching a button.

4-way repeat, random play, fluorescent panel and other conveniences

The PD-M90X offers four-way repeat, including a single track, a single disc, all six discs and programmed tracks. The random play feature lets you leave track selection up to the player — touch the RANDOM PLAY button, and a built-in microcomputer randomly selects the songs for you from among the six loaded discs, without repeating tracks! ** Or, press this key in the programmed play mode, and the computer randomly selects songs from among those programmed. Programmable pauses, 2-speed manual search, track search, and timer start function with options of normal and random play — these are other conveniences of our multi-play CD player.

A multi-function 7-digit fluorescent display is provided to show you the operating status of the player. It shows the elapsed time and remaining time of a track in play, as well as the remaining time of an entire disc. In addition, the display shows the accumulated total time each time you program a track. A graphic indicator shows which disc is being played at any moment.

Anti-vibration concept

When it comes to hi-tech features for better digital sound, the PD-M90X has plenty. To damp vibration and resonance, which can cause muddy sound, we use a copper-plated honeycomb chassis; a Disc Stabilizer to firmly clamp the rotating disc; and large aluminum-ringed insulators made of vibration-absorbing polycarbonate.

Oversampling digital filter

An oversampling digital filter using twice the normal sampling frequency — 88.2kHz — ensures low noise and minimal phase distortion for extra clarity and razor-sharp sound definition.

Digital level control

A digital level control lets you attenuate the playback level from the remote. Since it adjusts the signal while still in digital form, our digital volume control adds a minimum of noise and distortion.

Digital output

There is a digital output for connection to an outboard DAC (Digital-to-Analog Converter) unit or an amplifier featuring a built-in DAC like the Pioneer A-91D, so that you'll enjoy better yet, purer yet digital sound.



* MPSS is a trademark of Pioneer Electronic Corporation.

**Some tracks may repeat when a disc contains more than 100 tracks.

Note: The PD-M90X comes with both a 6-disc magazine and a single-disc loader. Additional magazines (JD-M100) are available as options.



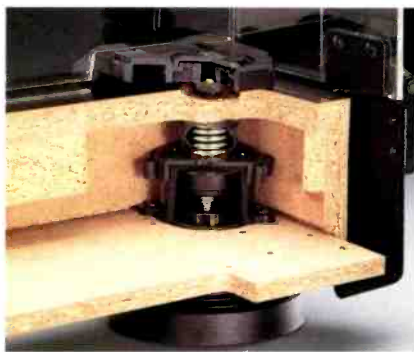
REFERENCE QUARTZ-PLL DIRECT-DRIVE TURNTABLE

PL-90

Think of it as the most advanced form in turntable technology. The PL-90 is designed to let you enjoy the maximum dynamic range and low distortion that today's best analog recordings can deliver.

To get the best performance out of today's sophisticated phono cartridges, we've fashioned its straight tone arm out of light yet rigid alumina-ceramics. Then we've fitted on it a Pioneer DRA (Dynamic Resonance Absorber), a combination of a viscous damper and weight, to eliminate resonance.

To ensure that your records are played with extremely low noise and wow and flutter, we use a coreless direct-drive DC-servo motor controlled



by a precise quartz-PLL servo system to provide cog-free and ripple-free smooth torque generation. The motor is fitted with a Stable Hanging Rotor to improve stability. The platter is large (14-3/16 inches across), heavy (7 lbs. 4 oz.) and has a high moment of inertia (655 kilograms per square centimeter), to smooth out rotation.

The important tone arm and motor are fully insulated from external influences through a Double Insulation System that shuts out vibration in both horizontal and vertical planes. The cabinet is made of high-density material to suppress resonance.

Ease of use is enhanced with the addition of automatic arm lift-up at the end of record play.



DIGITAL STANDARD SPEAKER SYSTEMS

DSS-E10/DSS-E6

Here's a pair of speaker systems specifically designed to serve as standards for accurate digital reproduction. A number of Pioneer exclusive designs has contributed to the making of our reference speaker systems.

One is the LDMC (Linear-Drive Magnetic Circuit) in the woofer. It creates a uniform magnetic field over a wide range within the voice coil gap. As a result, the voice coil is driven by the same uniform force, whether it is being pushed far outward to create very loud sounds, or is hardly moving to produce the faintest notes. The LDMC makes the sound you hear refreshingly transparent, powerful and exceptionally lifelike.

Our woofers also feature the EBD (Electronic Bass Drive). This design uses two voice coils wound on the bobbin, one on top of the other. Driven by two frequency-divided voice coils, the woofer pro-

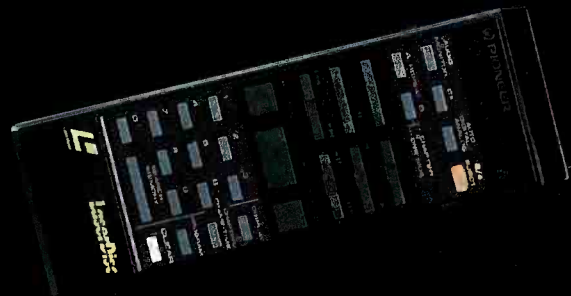
duces double the amount of usable bass sound, extending the low-frequency response substantially.

Our DRS (Dynamic Response Suspension) improves the linearity of the damper and surround of the woofer, so that the driver responds accurately to a wide range of inputs from the loudest to softest sounds. This adds to a wider dynamic range.

The diaphragm of the woofer is made of Pioneer's PG or Polymer Graphite* that's light and firm. It combines low distortion, smooth response and low coloration. The midranges are made of hard boron to improve sensitivity and assure natural response. Tweeters are lightweight and responsive beryllium ribbons combining better transient response and low distortion.

**Polymer Graphite is a trademark of Pioneer Electronic Corporation.*





REFERENCE LD PLAYER

LD-S1

The best in picture and sound

Here's the finest LD player available to consumers anywhere in the world. Designed and engineered specifically for the videophile with an ear for excellent sound. Take a look at some of the LD-S1's standout specifications: 420-line horizontal resolution, 48dB video signal-to-noise ratio, 105dB audio signal-to-noise ratio and 97dB audio dynamic range.

Full-floating drive system

Subjected to vibration, the pickup of an LD player can cause jitter, patchy colors and streaks in solid colors. And vibrating PC boards can muddy the sound. So we've isolated the motor disc drive from the rest of the chassis, to reduce the amount of vibration passed from the motor to other parts of the player. The result is a drastic reduction of jitter and streaks. Specifically: Our new Dynamic Pressure Bearing has lessened the load applied to the metal bearing. As the shaft starts to rotate, liquid silicone collects under the shaft, cushioning it and supporting it to prevent direct contact with the bearing. Transmission of motor vibration is lessened and friction reduced for smoother motor rotation.

Our magnetic disc clumper uses a powerful magnet to hold the disc. The moment a disc is in place, the clumper arm is removed from the clumper, thus ending the transmission of the motor vibration to other parts of the player.

Accu-Focus System

The tracking beams reflected from the disc are added by the quadrant photodetector inside the pickup assembly. But there is a slight phase difference between the outputs from leading and trailing beams. In the LD-S1, however, the outputs from the leading beam are delayed so that they can be added to those from the trailing beam in time. This reduces distortion and improves frequency response, especially the highs, of the RF output. Both audio and video benefit.

4X oversampling digital filter and twin D/A converters

We've incorporated a digital filter using a sampling frequency 4 times higher than that used in conventional filters. Working with an analog low-pass filter, it reduces phase delay as well as distortion. To eliminate phase difference between channels, we use two independent glitch-free D/A (Digital-to-Analog) converters. LDs with digital sound have never sounded better.

Digital memory

Eight-bit digital memory brings you versatile and clean special effects — the LD-S1 is the first player ever to be equipped with this innovative feature. You can freeze and store a picture in memory for viewing anytime. You can enjoy still and multi-speed play even from CLV (Extended-Play) discs, not to mention CAV (Standard-Play) discs. You'll also enjoy "strobe motion" and still with sound, two exciting new additions. Pictures are exceptionally stable and free of noise. Scanned pictures are also free of noise bars.

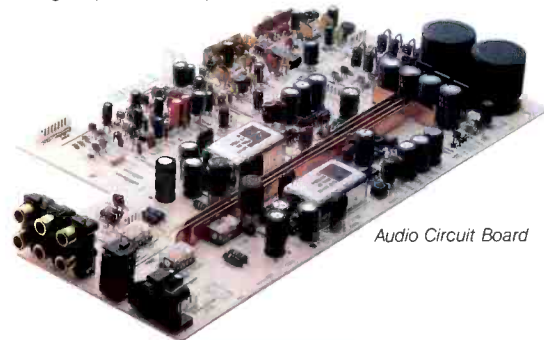
Elaborate power supply and quality parts

The LD-S1's power supply is elaborate, using two transformers, one for servo and digital circuits, and another for audio and video circuits. And to shut out interference between audio and video circuits, each has a separate power supply (independent coil windings on the transformer) and is laid out so that it is separated from the other. Quality parts are used for improved sound and picture, including a 1mm-thick OFC (Oxygen-Free Copper) ground bus plate, gold-plated terminals, copper-plated chassis, and OFC AC power cable.

Superb operating conveniences

The LD-S1 is equipped with a number of features to make operations superbly easy. Any part of a disc can be accessed in one-half the normal time of conventional players. A large fluorescent panel serves as your guide to operation. A new addition is the "Last Memory" feature: press the "LAST MEMORY" button before shutting off the power, and at the next viewing play resumes with a scene a few seconds back from where you left off. The front panel has all the controls you need for operation. And the remote control is ergonomically designed for ease of use.

Available functions include Still/Step, Dual-Speed Scan, Frame/Time Search, Chapter Search, 9-Step Multi-Speed Play, 4-Mode Repeat, Chapter-Skip Search and Chapter Program. Other features include on-screen display, picture tone control, two video outputs, I/O port for computer interface, gold-plated headphone output, and an SR terminal.



Audio Circuit Board



Full-Floating Drive System

SR

SPECIFICATIONS

C-90

AUDIO SECTION

Rated Output:	8V (20 — 20,000Hz, 10k ohms, T.H.D. 0.001%)
Input Sensitivity/Impedance	
PHONO (MM):	2.5mV/50k ohms
PHONO (MC):	0.25mV/40 ohms or 0.125mV/3 ohms
CD, TUNER, AUX, TAPE:	150mV/50k ohms
Output Level/Impedance	
PRE OUT:	1V/600 ohms
TAPE REC:	150mV/1k ohms
Total Harmonic Distortion:	0.002% (20 — 20,000Hz, 10k ohms, output 1V)
Intermodulation Distortion:	0.002% (output 1V)
(50Hz: 7,000Hz = 4:1, 8 ohms)	
Frequency Response	
PHONO (RIAA Equalization):	20 — 20,000Hz ± 0.2dB
CD, TUNER, AUX, TAPE:	20 — 20,000Hz 0dB, — 1dB
Tone Control	
BASS:	± 9dB (100Hz)
TREBLE:	± 9dB (10kHz)
Muting:	— 20dB
Signal-to-Noise Ratio (IHF, A-network)	
PHONO:	96dB (MM), 86dB (MC)
CD, TUNER, AUX, TAPE:	109dB

VIDEO SECTION

Input Sensitivity/Impedance	
VDP, VCR, TV Tuner, Adaptor:	1Vp-p/75 ohms
Output Level/Impedance	
Monitor, Adaptor, REC Monitor:	1Vp-p/75 ohms
Frequency Range:	10Hz — 10MHz 0dB, — 3dB
MISCELLANEOUS	
Power Requirements:	120V 60Hz
Power Consumption:	40W
Dimensions (W x H x D):	18 x 4-15/16 x 15-15/16 inches
(without package)	457 x 125 x 405 mm
Weight (without package):	21 lbs. 6 oz./9.7kg

M-90

POWER AMPLIFIER SECTION

Continuous average power output of 200 watts* per channel, min., at 8 ohms, from 20Hz to 20,000Hz with no more than 0.003% total harmonic distortion.

Total Harmonic Distortion:	0.003% (20 — 20,000Hz, 8 ohms, continuous rated power output)
Intermodulation Distortion:	0.002% (continuous rated power output)
(50Hz: 7,000Hz = 4:1, 8 ohms)	
Input Sensitivity/Impedance	
CONTROL AMP:	1V/50k ohms (fixed)
CD DIRECT, LINE DIRECT:	1V/50k ohms (variable)
Output	
SPEAKERS:	A, B, A+B, OFF
HEADPHONES:	Low impedance
Frequency Response (CD):	20 — 20,000Hz 0dB, — 0.1dB
Signal-to-Noise Ratio:	125dB (IHF, A-network)
MISCELLANEOUS	
Power Requirements:	120V 60Hz
Power Consumption:	430W (UL)
Dimensions (W x H x D):	18 x 6-1/16 x 16-15/16 inches
(without package)	457 x 154 x 430 mm
Weight (without package):	49 lbs. 13 oz./22.6kg

A-91D

AMPLIFIER SECTION

Continuous average power output of 120 watts* per channel, min., at 8 ohms from 20Hz to 20,000Hz with no more than 0.003% total harmonic distortion

Total Harmonic Distortion:	0.003% (20 — 20,000Hz, 8 ohms, continuous rated power output)
Input Sensitivity/Impedance	
PHONO (MM):	2.5mV/50k ohms
PHONO (MC):	0.25mV/40 ohms
CD, TUNER, AUX, TAPE:	150mV/50k ohms
PHONO Overload Level (1kHz)	
MM/MC:	200mV/20mV (T.H.D. 0.008%)
Output Level/Impedance	
TAPE REC:	150mV/0.8k ohms
SPEAKERS:	A, B, A+B, OFF
HEADPHONES:	Low impedance
Frequency Response	
PHONO (RIAA Equalization)	
MM:	20 — 20,000Hz ± 0.2dB
MC:	20 — 20,000Hz ± 0.3dB
CD, TUNER, AUX, TAPE:	1 — 150,000Hz 0dB, — 3dB
Tone Control	
BASS:	± 8dB (100Hz)
TREBLE:	± 8dB (10kHz)
Filter (Subsonic):	17Hz (— 12dB/oct.)
Loudness Contour:	+5dB (100Hz), +3dB (10kHz)
(Volume at — 40dB position)	
Signal-to-Noise Ratio (IHF, short-circuited A-network)	
PHONO (MM/MC):	95dB/83dB
CD, TUNER, AUX, TAPE:	109dB
MISCELLANEOUS	
Power Requirements:	120V 60Hz
Power Consumption:	670W (UL)
Dimensions (W x H x D):	18 x 6-13/16 x 18-11/16 inches
(without package)	457 x 173 x 475 mm
Weight (without package):	65 lbs. 15 oz./29.9kg

F-91

FM TUNER SECTION

Usable Sensitivity (mono):	9.8dBf (0.85µV, 75 ohms)
50dB Quieting Sensitivity	
Mono:	12.8dBf (1.2µV, 75 ohms)
Stereo:	34.8dBf (15µV, 75 ohms)
Signal-to-Noise Ratio	
Mono/Stereo (IHF):	95dB/87dB
Distortion (at 80dBf)	
100Hz (mono/stereo):	0.015%/0.02%
1kHz (mono/stereo):	0.009%/0.02%
6kHz (mono/stereo):	0.02%/0.07%
Frequency Response:	20 — 15,000Hz +0.2dB, — 0.8dB
Capture Ratio:	0.8dB
Alternate Channel Selectivity:	85dB (400kHz)
Spurious Response Ratio:	80dB
Image Response Ratio:	70dB
IF Response Ratio:	100dB
AM Suppression Ratio:	70dB
Subcarrier Product Ratio:	60dB
Muting Threshold:	25.2dBf (5µV, 75 ohms)
Stereo Separation	
1kHz:	65dB
20 — 10,000Hz:	55dB
Antenna Input:	75 ohms unbalanced

AM TUNER SECTION

Sensitivity	
IHF, Loop Antenna:	150µV/m
Selectivity:	18dB
Signal-to-Noise Ratio:	50dB
Image Response Ratio:	40dB
IF Response Ratio:	60dB
Antenna:	Loop antenna

AUDIO SECTION

Output (Level/Impedance)	
FM (100% Mod, Fixed):	650mV/900 ohms
AM (30% Mod, Fixed):	150mV/900 ohms

MISCELLANEOUS

Power Requirements:	120V 60Hz
Power Consumption:	25W
Dimensions (W x H x D):	18 x 3-5/16 x 12-7/16 inches
(without package)	457 x 84 x 316 mm
Weight (without package):	11 lbs. 7 oz./5.2kg

*Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifiers.

PD-M90X

System:	Compact disc digital audio system
Frequency Response:	4 — 20,000Hz \pm 0.5dB
Signal-to-Noise Ratio (EIAJ):	100dB
Dynamic Range (EIAJ):	96dB
Channel Separation (EIAJ):	93dB
Wow and Flutter (EIAJ):	Unmeasurable (\pm 0.001%, weighted peak)
Distortion(EIAJ):	0.0035%
Output Voltage (EIAJ):	2V \pm 0.5V
Power Requirements:	120V 60Hz
Power Consumption:	23W
Dimensions (W x H x D):	18 x 4-1/8 x 12-3/8 inches
(without package)	457 x 104 x 315 mm
Weight (without package):	15 lbs./6.8kg

PL-90**MOTOR AND TURNTABLE**

Drive System:	Direct Drive
Motor:	Coreless, Quartz-PLL DC-servo motor with Stable Hanging Rotor™
Turntable Platter:	14-3/16 inches (36cm)
Inertial Mass:	655kg/cm ²
Speed:	33-1/3 and 45 rpm
Wow and Flutter (WRMS):	0.018% (0.008%*)
Signal-to-Noise Ratio:	85dB (DIN B)

TONE ARM

Type:	Statically balanced, alumina-ceramics straight tone arm with DRA
Effective Arm Length:	11-1/8 inches (282mm)
Overhang:	9/16 inch (13.5mm)
Usable Cartridge Weight:	2.4g — 12g

MISCELLANEOUS

Power Requirements:	120V 60Hz
Power Consumption:	14W
Dimensions (W x H x D):	23-7/16 x 8-7/16 x 17-1/16 inches
(without package)	596 x 215 x 434 mm
Weight (without package):	38 lbs. 2 oz./17.3kg

*Measured directly from FG output.

DSS-E10

Enclosure:	Bass-reflex bookshelf type
Unit Layout:	Symmetrical
Speakers	
Woofer:	12-inch (30cm) PG™ cone type
Midrange:	4-3/4-inch (12cm) boron cone type
Tweeter:	Beryllium ribbon type
Impedance:	6 ohms
Frequency Range:	30 — 50,000Hz
Sensitivity:	91dB/W (1m)
Maximum Music Power:	240W
Rated Power:	80W
Crossover Frequencies:	650Hz (Low/Mid) 4,000Hz (Mid/High)
Dimensions (W x H x D):	15-3/8 x 26-3/4 x 13-7/8 inches
(without package)	390 x 680 x 353 mm
Weight (without package):	57 lbs. 5 oz./26kg

DSS-E6

Enclosure:	Bass-reflex bookshelf type
Unit Layout:	Symmetrical
Speakers	
Woofer:	8-inch (20cm) PG™ cone type
Midrange:	2-1/2-inch (6.6cm) boron cone type
Tweeter:	Beryllium ribbon type
Impedance:	6 ohms
Frequency Range:	40 — 50,000Hz
Sensitivity:	90dB/W (1m)
Maximum Music Power:	120W
Rated Power:	40W
Crossover Frequencies:	1,000Hz (Low/Mid) 5,000Hz (Mid/High)
Dimensions (W x H x D):	10-5/8 x 18-1/2 x 9-9/16 inches
(without package)	270 x 470 x 243 mm
Weight (without package):	23 lbs. 2 oz./10.5kg

LD-S1

TYPE:	LaserVision videodisc system
OUTPUTS	
VHF Output (NTSC)	
Channel:	Channel 3 or 4 (switchable)
Terminal:	F-type jack (75 ohms, unbalanced)
Video Output	
Output Level:	1Vp-p (75 ohms, sync. negative)
Output Terminals:	RCA jack (75 ohms, unbalanced)
Audio Output	
Channels:	Discrete 2 channels (1/L, 2/R, 1/L+2/R, switchable)
Output Level:	Digital sound: 200mV rms (1kHz, -20dB) Analog sound: 200mV rms (1kHz, 40%) RCA jacks
Output Terminals:	

DIGITAL AUDIO CHARACTERISTICS

Frequency Response:	4 — 20,000Hz (+0.5dB)
Signal-to-Noise Ratio:	105dB
Dynamic Range:	97dB
Channel Separation:	100dB
Total Harmonic Distortion:	0.0035%

ANALOG AUDIO CHARACTERISTICS

Frequency Response:	20 — 20,000Hz
Signal-to-Noise Ratio:	70dB (CX on)
Dynamic Range:	70dB (CX on)

MISCELLANEOUS

Power Requirements:	120V 60Hz
Power Consumption:	55W
Dimensions (W x H x D):	18 x 5-3/8 x 18-7/16 inches
(without package)	457 x 136 x 468 mm
Weight (without package):	36 lbs. 15 oz./16.8kg

LaserDisc™

LaserDisc is a trademark of Pioneer Electronic Corporation.



The LaserVision mark certifies compatibility with other laser optical video products bearing the mark.



This mark indicates the compatibility for the Pioneer system remote control.

Note: Specifications and design subject to modification without notice.

CIRCLE NO. 70 ON READER SERVICE CARD



PIONEER ELECTRONICS (USA) INC.

P.O. Box 1540, Long Beach, California 90801

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NOT A MINOR MAJOR

In the July 1986 "Audio ETC" column, I reminisced about the introduction of high-fidelity audio to the general public by the A.T.&T. Co. about 50 years ago. I suspected that it was to create a demand for broad-band (50 Hz to 8 kHz) radio lines, which would have overstepped the legal limit of 5 kHz. The effort was successful, and a short time later, with the advent of frequency modulation (FM), even higher quality lines were in demand. But what were the roots of FM?

Major Edwin H. Armstrong was a prolific inventor, and his innovations in the art of radio transmission and reception were numerous. (If I remember rightly, it was he who invented the superheterodyne method of reception.) In 1936, Armstrong proposed the use of frequency modulation to reduce disturbances in radio signals. His paper, titled "A Method of Reducing Disturbances in Radio Signalling by a System of Frequency Modulation," was published in the May 1936 *Proceedings of the I.R.E.* I attended a meeting where the subject was presented to the members. I don't know whether Armstrong had experimented with the process before he published his paper, but when I first became acquainted with him a couple of years later, in connection with my duties for the telephone company, he was deeply involved in its development.

Until frequency modulation was authorized, radio broadcasts were by amplitude modulation (AM). The highest frequency that could be reproduced from these broadcasts was limited by law to 5 kHz. (It is now 15 kHz per channel, and interference from the "spillover" is controlled by several factors related to signal strengths at the fringes of the coverage areas of adjacent-channel stations.)

AM has many disadvantages, particularly the proclivity of an AM receiver to reproduce the audio portion of electrical noise in its vicinity. This can



sometimes be so loud as to destroy the audio produced from the radio signal. Another disadvantage (because of the particular radio frequency allocation) is the extensiveness of the ground wave, which, when mixed with the sky wave, will produce periodic fading of the signal when the sky wave is reflected by the ionosphere and arrives at a strength comparable to that of the ground wave. This is caused by the sky wave path being longer than that for the ground wave. Likewise, because sky waves travel farther at night, some broadcasters are required to reduce the strength of their signal at sundown, thus reducing the size of their audience.

Major Armstrong had been searching for a solution to these problems and had been authorized to operate W2XMN, an experimental station at Alpine, N.J., in conjunction with another station at Paxton, Mass. Both were on high elevations, and their locations were ideal for the type of propagation measurements being made. They were a little more than 100 miles apart and

just within line of sight of each other, which was a necessary requirement for the radio frequencies that were involved.

At the time Armstrong was experimenting, very little was known about the propagation characteristics of VHF signals (30 to 300 MHz). Various experiments in the region of 100 MHz had shown the feasibility of using such frequencies for aircraft guidance during landings, but not much progress had been made in examining the long-distance capabilities for communicating between ground stations. Likewise, there was very little in the way of transmitting tubes for frequencies much above 60 MHz. The only one I can remember was the G.E. ZP-2, which would produce about 100 watts at 90 to 100 MHz. I believe it was used by the Bureau of Standards at College Park, Md. in the early '30s for experiments in producing glide-slope guidance signals at 93.7 MHz.

In 1936, when Armstrong was conducting his experiments, the F.C.C. allocated frequencies only as high as 60 MHz, and even at that there were no allocations between 30 and 56 MHz. The 56-to-60-MHz band was set aside for experimentation and for use by amateurs. It must have been that band in which Armstrong's experiments were conducted. Although I had many conversations with Paul DeMars, the W2XMN station manager, during my frequent visits to try to improve the noise figure of the 15-kHz lines, I cannot remember any specific frequency being mentioned. I do remember that Armstrong pleaded for assignments above 60 MHz and was very disappointed when the F.C.C. assigned the band 42 to 50 MHz for FM. (There were five assignments from 42.1 to 42.9 MHz for educational purposes and 35 channels from 43.1 to 49.9 MHz for commercial use. Each channel was 200 kHz wide.)

In Armstrong's experimental trans-

Armstrong contended that FM transmitters located 120 miles apart could use the same carrier frequency without interference.

missions between Alpine and Paxton, he had undoubtedly discovered that the Kennelly-Heaviside layer (which we now call the ionosphere) had little effect at the frequencies he was using. Furthermore, I think he had experimented with enough frequencies to realize that the higher he went the less effect was obtained from ionospheric reflections. In fact, we now know that frequencies above 60 MHz penetrate the ionosphere and are not subject to "skip." It was unfortunate that FM had to suffer reflections from the sporadic E layer for the next decade.

It wasn't until the results were in from the experience of World War II that justification for Armstrong's contentions were obtained. According to Paul DeMars and others I have talked to, Ed Armstrong had a running debate going with Kenneth Norton, who was then chief engineer of the F.C.C. but who later moved to the Bureau of Standards and became known as an authority on radio wave propagation through the many papers he wrote on the subject. It was Armstrong's contention that FM transmitters located 120 miles apart could operate on the same carrier frequency without interfering with one another. Even a fringe-area listener who was able to hear either signal would hear only the stronger signal because of the capture-effect peculiarity of the detector.




In 1947, the International Telecommunications Conference held in Atlantic City, N.J. resulted in the world being divided into three distinct areas for the allocation of radio frequencies from 10 kHz to 10,500 MHz. That convention reassigned the frequency-modulation broadcast band, making it 88 to 108 MHz instead of 42 to 50 MHz, and increased the number of channels to 100. The prime result of the reallocation was to improve the long-distance reception quality of FM, but it introduced a different difficulty that we now call multipath, produced by buildings and other ground obstructions. One of the nice things that accrued from the higher frequencies of 88 to 108 MHz was the folded dipole that could be tacked inside tuner cabinets by manufacturers. This made it unnecessary to acquire a special aerial, which could have been a deterrent to the sales of AM/FM/phono consoles at that time.

In the early days of FM, some hobbyists discovered that a low-Q resonant tank circuit could be used as a slope detector to demodulate the signal. However, these were not very satisfactory, and other, more sophisticated methods were needed. The first FM tuner by G.E. used a Foster-Seeley discriminator, consisting of two diodes operated in push-pull. Limiters ahead of the detector controlled the variations in signal amplitude, and the tuner gave excellent results. I obtained one of these before they were released for sale by joining a group of WOR engineers in a testing program. Charles Singer, the station manager at WOR's transmitter, invited me to join the group

because I was working on one of their radio lines at the time. If I remember rightly, that tuner cost me \$27. G.E. later furnished a new discriminator transformer and a couple of condensers to overcome a minor fault.

The tuner was quite bulky compared to things of today. It looked like one of the early table radios, but it had no speaker. To the best of my memory, its dimensions were 6 inches high by 6 inches wide by 12 inches deep, and it was housed in a nice walnut (or was it rosewood?) cabinet. Its tuning dial was straight line and its antenna was provided by the line cord. It had one stage of amplification and was connected to the AM receiver at the Aux jack. The mode switch on the receiver controlled its output, but a separate switch turned it on.

R.C.A. developed a discriminator that was not affected by carrier amplitude variations. It was called a "Ratio Detector," and it too used diodes in push-pull, but it responded only to the changes in the ratio of the voltages across the two diodes, whereas the output of the Foster-Seeley discriminator in the G.E. tuner consisted of the difference in the voltages across them.

Mention of R.C.A. brings to mind the court battles that consumed most of Major Armstrong's later life. Many manufacturers infringed on his patents, and he was in court frequently. In all cases except one he was vindicated, even besting Western Electric. The one case that dragged on and on was that which involved R.C.A., although I understand that was finally settled with his estate, out of court. 

ADCOM[®] GFP-555 PREAMPLIFIER



A remarkable combination of exceptional performance, flexibility and value.

The traditional audiophile has typically had the choice of two opposing designs in pre-amplifiers. One offered flexibility, with the (assumed) sacrifice in musical accuracy. The other took the purist route, with no features beyond a volume control and on/off switch.

The Adcom GFP-555 preamplifier was designed to face this dilemma head-on, and resolves it in ways that will satisfy the most diehard of purists.

Outstanding performance—affordable price.

The GFP-555's musical performance is outstanding—by any measurement or listening criterion—and at the same time it offers a full array of meaningful controls and features.

What's more, the GFP-555 does it all at a surprisingly affordable price. Surprising, that is, only to those who aren't yet familiar with the Adcom approach to design and performance. Musical performance, in particular.

Getting down to basics: Sound quality is paramount.

Gain path—simple and direct.

The GFP-555's gain path is simple and direct from input to output. The use of a minimum number of components—each of the highest quality—means low waveform distortion and less phase shift.

The gain stages employ the most innovative state-of-the-art linear amplifiers ever used in high fidelity components. These individually selected instrument-grade devices are in a class by themselves.

THE ADCOM

The speed of the gain stages is extraordinarily high—almost fifty times faster than the speed of CD or LP signals. And along with this speed, there's the lowest noise and lowest offset voltage currently available.

The almost nonexistent offset voltage eliminates the need for blocking capacitors used by others, and allows the GFP-555 to be direct coupled for exceedingly wide frequency response—from DC to beyond 400,000 Hz.

Noise is exceptionally low throughout all inputs, with a typical noise floor of four billionths of a volt-per-square-root-hertz—more than 115 dB below a 10mV input at 1kHz!

The power transformer and associated power supply components are of very sophisticated design. Dispersion of radiated noise and hum fields is eliminated by the use of layers of mu-metal shielding on the power transformer. In addition, the use of large filter capacitors permits excellent regulation of power supply, providing consistently high performance regardless of fluctuations in signal or AC line voltage.

Those concerned about preamps with tone-control circuitry should be aware that although the GFP-555 has it, the "normal" position keeps this circuitry out of the signal path as thoroughly as if it weren't there at all. When wanted, it can be switched in.

The high- and low-cut filters are passive. Their gentle slope has very low phase shift, and prevents ringing and significant changes in sound quality.

The output impedance is 470 ohms, low enough to avoid high-frequency loss when long lengths of cable are used between the preamplifier and power amplifier.

CD and phono input jacks, and all output jacks, are gold plated for minimum signal loss.

And speaking of flexibility.

There are times you may want to listen to one input (phono, tuner, CD, tape, etc.) while taping from another. That's precisely what you can do with this preamplifier.

The headphone jack has its own amplifier, both to prevent loading of the preamp output circuit and to provide sufficient gain to drive virtually any headphone.

Two sets of output jacks are provided: one pair for amplifiers, such as Adcom's, which are direct-coupled; the other pair for amplifiers which require coupling capacitors.

For optimized performance of any magnetic phono cartridge, adjustable capacitance loading is provided.

There's an unusual number of inputs: five for high level inputs (tuner, CD, tape 1, tape 2, video/AUX); and one phono input that can be switched for low- or high-output moving-coil and moving-magnet cartridges.

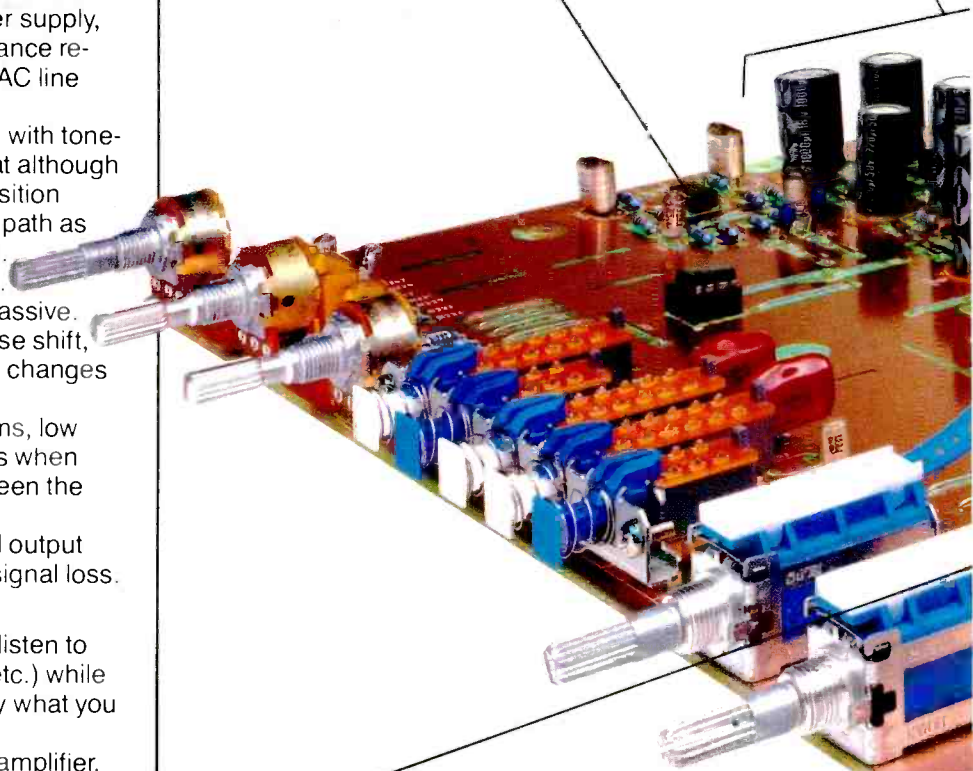
Contour circuits for enhancing bass response at low listening levels have been around for some time, of course. Ours are considerably

Headphone amplifier.

A separate high quality audio amplifier section is provided for use with headphones.

Tightly-regulated power supply

Maintains outstanding performance and consistency, regardless of fluctuations in signal level or AC line voltage.



On-chassis selector switching.

By avoiding long signal traces and wires, this feature minimizes crosstalk by switching audio signals close to their input source.

Volume control.

This high quality precision potentiometer maintains ideal balance between channels throughout its rotation.

GFP-555 PREAMPLIFIER

Glass epoxy circuit board, copper plated on both sides.

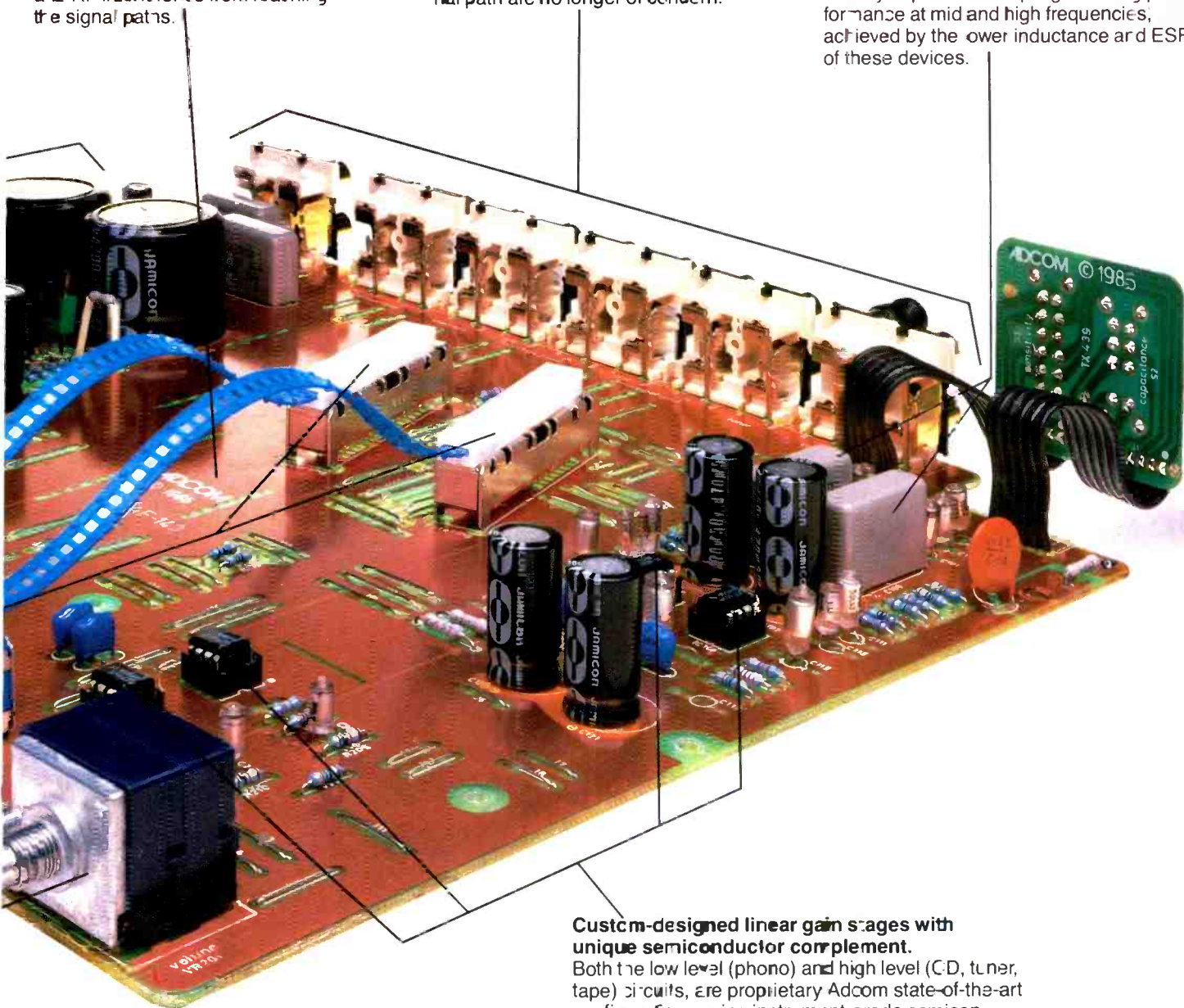
This allows one side of the circuit board to be used as a shielding/ground plane, thus preventing hum and RF interference from reaching the signal paths.

Direct on-chassis input/output jacks.

This design technique outmodes point-to-point wiring. Induced hum, noise and unreliability in the signal path are no longer of concern.

Bypass capacitors.

Where electrolytic capacitors are necessary in the signal path, all are shunted by high quality polystyrene, silver mica, or polypropylene capacitors. The result is audibly superior decoupling/isolating performance at mid and high frequencies, achieved by the lower inductance and ESR of these devices.



Custom-designed linear gain stages with unique semiconductor complement.

Both the low level (phono) and high level (C.D., tuner, tape) circuits, are proprietary Adcom state-of-the-art configurations using instrument-grade semiconductor devices. They have extremely low noise and distortion, and their speed of operation is many times faster than the frequency components found in musical signals.

more sophisticated, more useful and more musically accurate over a wider range of listening conditions than any you are likely to have encountered.

Considering the opportunities offered by the new breed of signal processors, you'll welcome the separate processor loop that leaves both tape loops available for use.

Final word.

What all this adds up to with respect to music is very simple. There is less phase shift between channels, dead quiet background (essential for CDs), total transparency and clarity of detail. The music truly comes alive, with no sense of "electronic presence" in the reproductive chain.

Of course, we hope that this information reaches you at a time when you're interested in a new preamplifier, or should be—whether your first or an upgrade—and that what interests you above all is a demonstrably superior combination of sonic performance, flexibility and value.

SPECIFICATIONS.

Total harmonic distortion: 0.005%

IM distortion: 0.005%

Signal-to-noise ratio:

Phono (re 0.5 V output): >85 dB

Tuner, CD, tape (re 2 V output): >100 dB

Tone controls:

Bass (40 Hz) \pm 9.5 dB

Treble (15 kHz) \pm 9.5 dB

Contour (switchable): +6 dB at 50 Hz

Frequency response: 1 Hz - 100 kHz \pm 0.1 dB

High filter (switchable): -2.5 dB at 20 kHz (6 dB/octave)

Low filter (switchable): -5 dB at 20 Hz (6 dB/octave)

Input sensitivity for 0.5V output:

Phono High MC/MM: 0.4 mV

Phono Low MC: 0.13 mV

High: 40 mV

Maximum output level: 10 volts

Input impedance:

High MC/MM: 47 kohms

Low MC: 100 ohms

Output impedance: 470 ohms

Phono overload at 1 kHz High MC/MM: 140 mV

Phono input capacitance: Adjustable; 100 pF, 175 pF, 275 pF

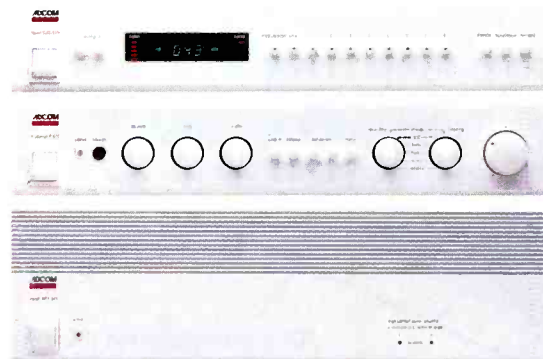
Line voltage: 120V/60 Hz (Available in 230V/50 Hz

on special order)

Dimensions: 17" \times 3 1/4" \times 12 3/4" D (432mm \times 83mm \times 324mm D)

Weight: 14 lbs. (6.4 kg)

Optional accessory: Model RM-3, rack mount adapters.



Adcom products are available with white or silver front panels on special order. Shown: GFP-555 preamplifier, GFT-555 AM/FM-stereo tuner and GFA-545 power amplifier with white front panels.

ADCOM®

11 Elkins Road, East Brunswick, NJ 08816 USA
Telephone: 201-390-1130

Distributed in Canada by PRO ACOUSTICS INC.
Pointe Claire, Quebec H9R 4X5

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Enter No. 3 on Reader Service Card

FM stereo radio broadcasting is about to get its first major upgrade since the service was authorized in 1961—a system with significantly reduced noise and more than double the currently available reception area. Final specifications for the FMX Extended Range Stereo System, described by its developers as “every bit as weighty” as the Broadcast TV Sound Committee project that established stereo sound for television, are now completed. Broadcasters and receiver manufacturers would have to hustle to pull it off, but we could be hearing the first over-the-air FMX-based FM stereo by early 1988. At least one automobile maker has all but committed to rolling FMX-equipped 1989 models off the line in the fall of '88.

The system was first described in *Audio* last year (“FMX: Long Distance Stereo, Clean as Mono,” May 1986), at a time when many of its technical details were still in limbo. A final spec seemed to be all that was needed to get broadcast equipment manufacturers and receiver makers to adopt the new system.

A joint invention of Emil Torick, formerly vice president of the CBS Technology Center, and Thomas Keller, senior vice president for science and technology of the National Association of Broadcasters, FMX overcomes the noise penalty inherent in stereo relative to monophonic reception; it reduces the noise and distortion due to multipath reception in moving vehicles, and it permits improved stereo separation in outlying reception areas. Recently, Torick says, 14-dB improvements in signal-to-noise ratio were measured, yielding the equivalent to mono S/Ns over most reception conditions.

Development of FMX was threatened when CBS closed down its Technology Center in Stamford, Conn. in September 1986. Field tests at nearby FM public radio station WPKT in Meriden, Conn. had already been completed, but a demonstration during the 1986 Summer Consumer Electronics Show at WFMT in Chicago was “extremely disappointing,” according to Gordon Carter, the station’s assistant chief engineer, who recalls that there were enough problems with the system that he questioned the design concept. Torick doesn’t disagree with that assessment, but now calls it “old, old

FMX: TECH- NOLOGY UPDATE

Illustration: Philip Anderson



FMX: TECH- NOLOGY UPDATE

history," noting that the WFMT demo was conducted with "inadequate technology, in the throes of the closing of CBS Labs." Torick and his technical staff continued to tweak the system under CBS auspices while a suitable buyer was being sought.

The new FMX development group, Broadcast Technology Partners, which acquired all rights to the FMX technology, will license receiver and broadcast equipment manufacturers for a nominal fee and then reap royalties on hardware sold. The partnership includes CBS, the NAB, the inventors, and an investor group, FMX Associates, headquartered in Bloomfield Hills, Mich. FMX Associates, which has controlling interest, and FMX Inc., the managing partner, are led by broadcast consulting engineer John F. X. Brown. To help develop and promote FMX, the NAB in May created a for-profit subsidiary called NAB Technologies Inc.

Meanwhile, two semiconductor manufacturers—Sanyo Semiconductor Corp. and Sprague Electric Co.—have announced plans to make available later this year the integrated circuits required to equip FM receivers with the new FMX technology. Sanyo might beat Sprague to market with its FMX chip samples, but Sprague is equally high on the system. "We anticipate quick acceptance of FMX by FM broadcasters and the receiver manufacturing industry," says Robert F. Milewski, manager of Sprague's linear products operation.

So do others. Approximately 45 equipment producers have already signed non-disclosure agreements with BTP, and at least one automobile manufacturer has said (privately, to BTP) that it intends to begin selling FMX-based stereo receivers as standard equipment in its top-of-the-line 1989 models, which are scheduled for introduction in the fall of 1988. Torick got another indication of manufacturer interest while on a trip to Japan in late June to attend the Audio Engineering Society's regional convention: Sanyo Semiconductor arranged a half-day seminar for him to describe and promote FMX, and 26 receiver manufacturers attended.

The strong interest isn't surprising. About 30 million FM stereo receivers are sold annually in the U.S., and all are considered candidates for FMX. Car stereo receivers account for about



half that market. Given their obvious problems with FM stereo reception, the car stereo receiver manufacturers, in particular, are looking forward to adding FMX to their products.

Actually, the receiver people liked FMX the first time they heard it demonstrated, early last year. "We're all waiting," says Paul Foschino, national product manager for Technics. In fact, several car stereo makers are considering adding an FMX-enable switch and indicator light to their FMX stereo models, even though it isn't necessary (an FMX receiver will automatically switch to the noise-reduction mode when tuned to an FMX station). One manufacturer calls it a "salesman's switch."

But the receiver makers insist that broadcast equipment manufacturers and broadcasters make the first move, and there is every indication that they will. Four manufacturers of broadcast generators—Aphex, Circuit Research Laboratories, Inovonics, and Orban Associates—have developed and tested prototype FMX equipment. "We're ready to go into production. We're just waiting for the final specifications from BTP," says Chuck Adams, systems engineer for CRL, which demonstrated a stereo generator with a blank space labelled "FMX Encoder" at the NAB's annual meeting earlier this year. Torick believes that a few, if not all, equipment producers will demonstrate FMX encoders at two trade shows, Radio '87 and the Society of Broadcast Engineers Conference, both scheduled for the fall. FMX's chances of success were enhanced further by a survey conducted early in 1987 by the NAB, revealing that nearly 45% of FM sta-

tions are prepared to adopt FMX to improve the clarity of their stereo signals in outlying areas.

Transmitter modification is fairly straightforward and can be accomplished by broadcasters for only a few thousand dollars. FMX requires no more base-band spectrum so there is no impact on FMX subcarriers, and no modifications are needed to the broadcast studio or audio processing equipment. Additionally, it requires almost no additional modulation of the main carrier.

Receiver makers like FMX because it gives obvious added value to the product for only a few additional dollars in manufacturing cost. Most of that will be in the new FMX ICs from Sprague and Sanyo, estimated to cost approximately \$2 initially, but likely to quickly drop to about 50 cents each as production and sales ramp up. To date, only NAD Electronics has introduced an FMX home receiver, which they first demonstrated at the Winter Consumer Electronics Show last year, and they build it with discrete components. More than 1,000 of these FMX Model 4300s have been sold, including several to BTP for testing purposes.

Other receiver makers have heard NAD's FMX system and are admittedly impressed. "We are really enthusiastic from the standpoint of car stereo," says Technics' Foschino. "But we don't want to build any carts before they come up with the horses." Pressing the point, he says Technics "wouldn't have units available in January on the broadcasters' word that they'll be on the air with FMX by that time. We wouldn't push our manufacturing until a lot of radio stations were broadcasting in FMX."

Others agree. "When there are enough (radio) stations with a vested interest, we would hope to have an FMX model, or incorporate it into the line," says Chuck Wendt, marketing manager of Blaupunkt. "I have very high expectations for it," adds Gary Weissberg, director of product development at Sanyo Electric. "I saw a demonstration at the Consumer Electronics Show and was very impressed, not only by the extended coverage, but by the performance. It's a much quieter signal. It's going to be very quickly perceived as a new and desirable feature by the consumer. Everyone is just kind of waiting for the broadcasters to make the first move." A



**How to carry a 100-Watt* MOS FET Receiver,
a Dolby HX Pro Cassette Deck,
and an anti-resonant Compact Disc Player
around the house.**

Enter No. 57 on Reader Service Card

AmericanRadioHistory.Com



KYOCERA

Kyocera innovation puts one high-end audio system in many rooms.

The finer your audio system, the more you should enjoy it. So why confine your listening pleasure to just one room?

Imagine having beautiful music throughout your house. In the bedroom as you get dressed. In the family room as you relax. In the living room as you entertain. Now imagine all this music coming from a single audio system of consummate fidelity.

Not long ago, this kind of flexibility was just a dream. It would have taken several separate hi-fi systems to accomplish this feat — with tremendous expense and duplication of components. But the tiny remote sensor of Kyocera's new Full System Remote Control network has changed all that. For the cost of separate systems of marginal quality, you can assemble a single Kyocera system of audiophile quality — and enjoy that system in several rooms.



THIS IS HOW IT'S DONE.

The heart of Kyocera Full System Remote Control is the RC-101 Infrared Remote Control Center. It receives commands from the RT-102 Infrared Hand-Held Remote Controller. And it sends remote commands to the Receiver, Cassette Deck and Compact Disc Player. Just take a look at what you can do by remote control:

RECEIVER: Volume Up/Down; input selection — Phono, Tuner, and CD/Aux; Tape Monitor; FM/AM selection; Memory Preset stations; and Tuning Up/Down plus a special Audio Mute function.

CASSETTE DECK: Play, Stop, Fast Forward, Rewind, Pause and Record.

COMPACT DISC PLAYER: Play, Stop, Pause, Skip Forward and Skip Back.

Perhaps more important, the Control Center features inputs for Kyocera's tiny RS-103 Table-Top Sensor and inconspicuous RS-203 Wall-Mount Sensor. They enable you to control the system from the next room, from upstairs, from anywhere in the house. By adding speakers, you can bring music into several rooms. While most remote systems operate in only one room, Kyocera's multi-room network is far more advanced.

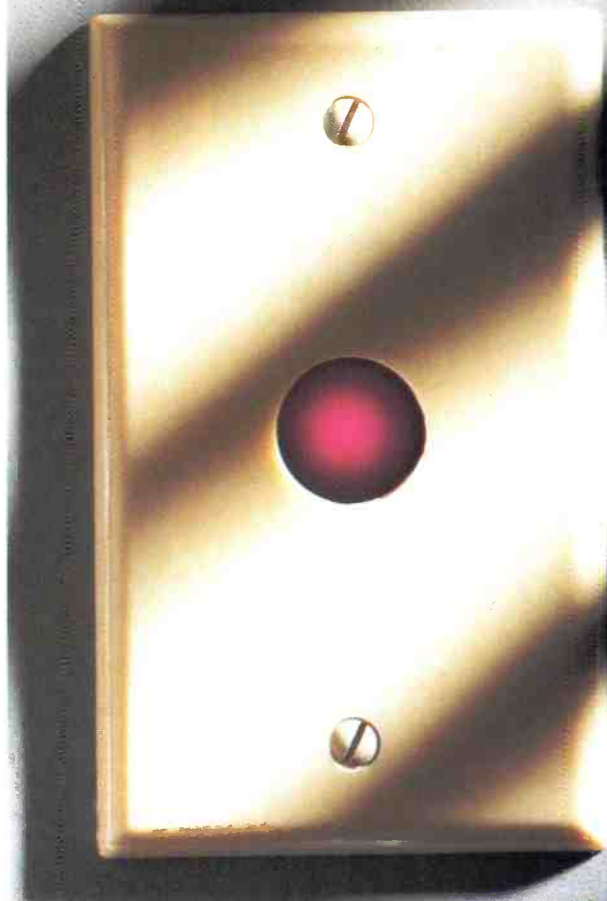
THE FIRST REMOTE CONTROL SYSTEM WITH AUDIOPHILE CREDENTIALS.

If you've been around, you know that remote control audio is nothing new. Almost all the major audio companies have at least some remote components. And total-remote systems are gaining in popularity. But even as the field gets crowded, Kyocera stands apart with three critical advantages:

1) This Kyocera system is the world's first remote-controlled audio system with performance to please even the most ardent audiophile. Because it's built on the Receivers, Cassette Decks, and Compact Disc Players that have earned Kyocera high praise from audio critics all over the world. No other offering of remote components can match Kyocera in terms of sheer performance.

2) Kyocera uses a building-block approach so you're not locked into buying a completely new system all at once. All the Kyocera components in this brochure form interchangeable, compatible parts of the Kyocera Full System Remote Control network.

3) Unlike other systems, the Kyocera network can be operated and enjoyed in multiple rooms throughout the house. For the first time, you can carry a 100 Watt* MOS FET Receiver, a Dolby HX Pro Cassette Deck, and an anti-resonant Compact Disc player with you when you go from room to room!



Actual size of the RS-203.



Actual size of the RS-103.

CD PLAYERS: Kyocera presents the features they'll be copying next.



In May of 1983, Kyocera introduced a CD player with true 16-bit digital filters. Today, the competition's calling this circuit "the latest thing." Years ago we had four-times oversampling. This year every high-end player worth mentioning has a similar design. In September, 1984 Kyocera raised some eyebrows with the world's first Fine Ceramics anti-resonant CD chassis. Now the stores are full of flimsy imitations.

How did all these innovations happen to come from Kyocera, and not some household name? Perhaps because Kyocera's knowledge of digital circuitry comes from years of building computers for some of the best-known names in electronics. Perhaps because Kyocera is a world leader in Fine Ceramics, the technology used to house circuitry in aerospace, computers and other advanced systems. Or perhaps because some top-rated CD players from other brands were actually built by Kyocera.

Now Kyocera has four world-beating Compact Disc Players. Each boasts technology so advanced, it's a preview of what the competition will be selling in 1989. After all, history does repeat itself.

SOLVING THE PROBLEM OF RESONANCE.

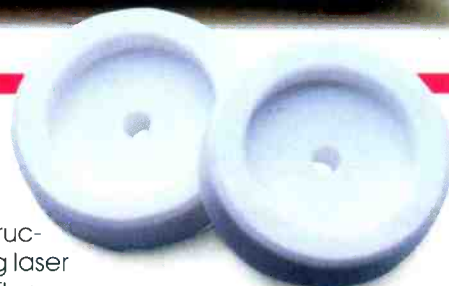
Because the CD's track of pits is microscopically narrow, vibration can cause mistracking and its consequent data errors. In fact, controlled tests performed for Kyocera by an independent research laboratory confirm that a non-resonant Fine Ceramics chassis incurred significantly fewer data errors than a conventional chassis of similar design.

That's why three of these new CD players feature Fine Ceramics spacers strategically located in the chassis. They isolate the laser transport and printed circuit boards from external vibration. In addition, dual zirconia-ceramic guide shafts, developed by the Kyocera Gamou Works, assure smoother travel of the laser transport for superior tracking stability.

THE KYOCERA DA-310CX.

Compatible with the Kyocera Full System Remote Control network ■ Zirconia-ceramic laser guide shafts for smoother laser travel, longer life ■ 16-bit double oversampling digital filters for maximum noise suppression ■ 3rd-order Bessel-derived analog filters

for minimum phase shift
 ■ Rigid metal chassis construction
 ■ Floating laser subchassis
 ■ Three-beam laser tracking for superior tracking stability



Fine Ceramics chassis spacers dramatically reduce internal resonance.

■ Gold-plated output jacks ■ Skip forward and Back ■ Two-way repeat (disc and track) ■ 16-selection programmability
 ■ "Dedicated" wireless remote control supplied
 ■ Multi-function fluorescent display ■ Headphone output with volume control ■ Wood side panels.

THE KYOCERA DA-410CX.

ALL THE FEATURES OF THE DA-310CX, PLUS: Anti-resonant construction with Fine Ceramics chassis spacers for fewer data errors, lower distortion ■ DC analog amplifier with left/right phase compensation for improved stereo imaging ■ Direct random track selection with 10-key pad ■ Timer playback capability.

THE KYOCERA DA-510CX.

ALL THE FEATURES OF THE DA-410CX, PLUS: Digital filtering with four-times oversampling at 176.4 kHz to minimize aliasing noise ■ Dual digital-to-analog converters eliminate interchannel phase delay
 ■ Optically coupled digital signal routing to eliminate internal interference ■ Direct digital output for connection to other digital components ■ Digital Subcode Output port for disc information output
 ■ Three way repeat: disc, track and phrase ■ Direct random track selection with 20-key pad ■ Intro Scan plays a ten-second sample of each track on the disc
 ■ Background Music function plays songs on the disc in random sequence.

THE KYOCERA DA-710CX.

ALL THE FEATURES OF THE DA-510CX, PLUS: ■ Separate digital and analog power supplies minimize interference ■ Dual monaural audio circuit maintains high separation ■ 100% discrete components in the analog output stage for minimum distortion
 ■ Low-noise LC-OFC wiring ■ 99-track direct access.

CASSETTE DECKS: Two heads can be better than three.



For years, cassette deck manufacturers have touted the three-head feature. Again and again, we are told that three heads are the only way to achieve frequency response to 20 kHz. So many brands have devoted so much attention to this argument that it seems heretical to suggest there's a better way. In fact, doing three heads properly is an extremely expensive proposition. And doing it poorly is a sure way to sacrifice performance.

Proponents of three-head design like to gloss over the fact that any three-head deck with pretensions to high performance must come to grips with the problem of azimuth error.

Azimuth error occurs when the playback head gap does not line up precisely with the signals laid down by the record head gap. This kind of error can never occur on two-head decks, where the record and playback gaps are exactly the same. Less than one degree of azimuth error can cause significant loss of response above 15 kHz. And that's ironic, because extended highs were supposed to be the strength of the three-head design in the first place.

Some manufacturers try to reduce azimuth error by placing the record and playback heads close together—often squeezing them through the cassette's central window. Others try to conquer azimuth error through elaborate mechanics and electronics. To be fair, the more elaborate systems do work, but only at incredible cost to the consumer. And the simpler systems? If the response falls short of 20 kHz on Type II tape, then the azimuth error correction is not completely successful.

Kyocera has a fresh approach. We maintain that a properly designed two-head deck can give you exemplary frequency response. And our decks prove it. Instead of spending money on elaborate azimuth-error correction, we consciously spent the money on reducing wow & flutter.

A TRANSPORT OF DELIGHT.

The most audible shortcoming of today's decks

is wow & flutter. That's why Kyocera concentrated on improving the transport. On the D-811, we used two capstans, isolated by a closed-loop belt, for minimum modulation noise. We gave the take-up capstan direct drive. We supplied a separate high-torque motor to drive the reel hubs. And we even used a third motor to insert the heads into the cassette gently and precisely. The result is sound without the veil of modulation noise, wow & flutter that plagues lesser cassette decks.



THE KYOCERA D-611.

Compatible with the Kyocera Full System Remote Control network ■ Three-motor transport ■ Direct-drive FG servo motor turns the capstan without gears or pulleys—wow & flutter only 0.035% (WRMS) ■ High-torque motor drives reel hubs ■ Third motor gently inserts heads into cassette ■ Sendust-core record/play head achieves response to 20 kHz with Type I and Type II tape, to 22 kHz with metal tape ■ Dolby[®] B and C noise reduction ■ Switchable MPX filter ■ Fine Bias control ■ Timer recording and play ■ Automatic Program Mute Recording adds four-second blanks between songs ■ Auto Play and Repeat ■ Memory Stop and Memory Play.

THE KYOCERA D-811.

ALL THE FEATURES OF THE D-611, PLUS: Dolby HX Pro Bias Compensation for extended recording range ■ 400 Hz calibration tone for record balance ■ Closed-loop dual-capstan tape drive minimizes modulation noise ■ Wow & flutter reduced to only 0.02% (WRMS) ■ Fluorescent readout of tape time in minutes and seconds ■ LED peak level indicators with peak-hold.

RECEIVERS: We take them seriously.



If receivers have something of a bad reputation among serious audiophiles, there's a good reason. In Japan, where everybody owns component high fidelity, nobody owns one-piece receivers. In fact, North America may be the only place where receivers represent a majority of the market.

For most Japanese audio engineers, receivers are strictly for export. They're not serious components at all. So receivers are designed by the second-string engineers. This explains why even companies with decent separates tend to load their receivers up with meaningless knobs, buttons, and displays.

The irony here is that there's no reason why receivers must be second-class components. There's nothing to prevent a company from using the same common sense and judgement in receiver design as they exercise with separates. This is the guiding philosophy behind Kyocera receivers.

MOS FETS IN THE DRIVER STAGE.

A rarity in receivers, Metal-Oxide-Semiconductor Field Effect Transistors (MOS FETs) are used in the driver stages of all Kyocera receivers for their superior transient response and isolation characteristics.

PRE-OUT/MAIN-IN JACKS.

While it is hard to find a receiver with preamp-output/main amp input jacks nowadays, all Kyocera receivers have them. So you can connect outboard signal processors, use higher-powered amps, or use your receiver as part of an elaborate multi-amp system. That's particularly important considering the multi-room capability of the Kyocera Full-System Remote Control network.

THE KYOCERA R-461.

50 Watts per channel (continuous RMS, both channels driven into 8 Ohms from 20 Hz to 20 kHz with no more than 0.02% THD) ■ Compatible with Kyocera Full System Remote Control network ■ Manual/electronic volume control ■ Subsonic filter at 20 Hz with 12 dB/octave slope ■ High filter ■ Two tape

monitors with dubbing

■ Preamp Output/Main

Amp Input jacks ■

MOS FETs in the amplifier driver stage for better dynamic performance ■ Low-feedback

design for reduced transient intermodulation distortion ■ Female banana jacks

bypass speaker switching for straight-wire-with-gain circuit ■ Quartz frequency synthesis tuning ■ FM front end with MOS FETs and High-Q varicaps for minimum interference ■ Ceramic IF filters for high selectivity, low distortion ■ 6 AM + 6 FM station presets.

THE KYOCERA R-661.

70 Watts per channel (continuous RMS, both channels driven into 8 Ohms from 20 Hz to 20 kHz with no more than 0.02% THD) ■ ALL THE FEATURES OF THE R-461, PLUS: Toroidal transformer ■ Oxygen-Free Copper (OFC) wiring for reduced noise ■ Moving Magnet/Moving Coil phono input stage ■ Parametric bass and treble controls with continuously variable turnover frequency for sensitive and precise tonal adjustment ■ Wide/Narrow IF bandwidth switch adapts to your reception conditions ■ High-frequency FM comparator for reduced noise ■ FM quadrature detector for low distortion ■ Chopper-type FM stereo demodulator for improved stereo separation ■ High blend switch for better sound on weak FM stations ■ 7 AM + 7 FM station presets.

THE KYOCERA R-861.

*100 Watts per channel (continuous RMS, both channels driven into 8 Ohms from 20 Hz to 20 kHz with no more than 0.02% THD) ■ ALL THE FEATURES OF THE R-661, PLUS: Parametric bass, midrange, and treble controls ■ Automated IF bandwidth switching (Wide/Narrow) adapts to your reception conditions ■ Switchable de-emphasis for Dolby[®] FM broadcasts.



SPECIFICATIONS

CD PLAYERS	DA-710CX	DA-510CX
Total harmonic distortion, 1 kHz, with 20 kHz LPF	0.005%	0.005%
Frequency response (5 Hz — 20 kHz)	+/- 0.5 dB	+/- 0.5 dB
Signal-to-noise ratio, with 20 kHz LPF and IHF-A filter	over 95 dB	over 95 dB
Separation, 1 kHz with 20 kHz LPF	over 90 dB	over 90 dB
Dynamic range	over 90 dB	over 90 dB
Output level	2.0 V	2.0 V
Dimensions		
Width	18-1/8" (460 mm)	18-1/8" (460 mm)
Height	3-9/16" (90 mm)	3-9/16" (90 mm)
Depth	12-1/8" (308 mm)	12-1/8" (308 mm)
Weight	14.5 lbs. (7 kg)	13 lbs (5.9 kg)

CD PLAYERS	DA-410CX	DA-310CX
Total harmonic distortion, 1 kHz, with 20 kHz LPF	0.005%	0.006%
Frequency response (5 Hz — 20 kHz)	+/- 0.5 dB	+/- 1.0 dB
Signal-to-noise ratio, with 20 kHz LPF and IHF-A filter	over 95 dB	over 94 dB
Separation, 1 kHz with 20 kHz LPF	over 90 dB	over 90 dB
Dynamic range	over 90 dB	over 90 dB
Output level	2.0 V	2.0 V
Dimensions		
Width	18-1/8" (460 mm)	18-1/8" (460 mm)
Height	3-9/16" (90 mm)	3-9/16" (90 mm)
Depth	12-1/8" (308 mm)	12-1/8" (308 mm)
Weight	11 lbs. (5 kg)	10.5 lbs. (4.8 kg)

CASSETTE DECKS	D-811	D-611
Heads: Record/Playback Erasure	Sendust Ferrite	Sendust Ferrite
Frequency Response, ± 3 dB		
Metal	20 Hz — 22 kHz	20 Hz — 22 kHz
CrO ₂	20 Hz — 20 kHz	20 Hz — 20 kHz
Normal	20 Hz — 20 kHz	20 Hz — 20 kHz
Signal-to-noise ratio, DIN 45500, Metal tape NR out (A-weighted)	58 dB	58 dB
Dolby B NR effect (CCIR weighted)	10 dB	10 dB
Dolby C NR effect (CCIR weighted)	20 dB	20 dB
Input sensitivity: Mic 10 kohms	0.5 mV	0.5 mV
Line, 50 kohms	70 mV	70 mV
Harmonic distortion, 1 kHz, 0 VU, line	1.5%	1.5%
Separation, bandpass filter, 1 kHz, line	40 dB	40 dB
Erasure effect, bandpass filter, 1 kHz, +10 dB VU level	70 dB	70 dB
Bias adjustment range	+/- 15%	+/- 15%
APMR time	4 sec	4 sec
Motors: Capstan drive	Brushless FG servo	Brushless FG servo
Reel drive	Governorless DC motor	Governorless DC motor
Head drive	Governorless DC motor	Governorless DC motor
Wow & flutter (MIT-III JIS WRMS)	0.02%	0.035%
Speed accuracy (MIT-III)	+/- 0.5%	+/- 0.5%
Rewind/fast-forward time (C-60)	75 sec	75 sec
Capstans	Dual capstan	Dual capstan
Dimensions		
Width	18-1/8" (460 mm)	18-1/8" (460 mm)
Height	5-3/16" (132 mm)	4-1/2" (114 mm)
Depth	12-1/8" (308 mm)	12-3/16" (310 mm)
Weight	18 lbs., 1 oz (8.2 kg)	15 lbs., 7 oz (7 kg)

RECEIVERS	R-861	R-661	R-461
Power output RMS (both ch. driven into 8 ohms with no more than 0.02% THD, 20 Hz — 20 kHz)	100 W/ch	70 W/ch	50 W/ch
Dynamic short-term power (at 1 kHz)			
8 ohms	120 W/ch	80 W/ch	80 W/ch
4 ohms	180 W/ch	110 W/ch	110 W/ch
2 ohms	230 W/ch	140 W/ch	125 W/ch
Total harmonic distortion (at rated power)	0.02%	0.02%	0.02%
Power bandwidth (-3 dB re rated power)	10 Hz — 60 kHz	10 Hz — 60 kHz	10 Hz — 60 kHz
Intermodulation distortion, at rated output, SMPTE	0.02%	0.02%	0.02%
Slew rate	50 V/usec	50 V/usec	40 V/usec
Rise time	1.0 usec	1.0 usec	1.5 usec
Dynamic headroom, 8 ohms	1.0 dB	1.0 dB	2.1 dB
Input sensitivity			
Phono MC (100 ohms)	125 µV	125 µV	—
Phono MM (47 kohms/100 pF)	2.5 mV	2.5 mV	2.5 mV
Others (30 kohms)	150 mV	150 mV	150 mV
Phono input overload, 1 kHz, 0.5% THD			
Phono MC	8 mV	8 mV	—
Phono MM	150 mV	150 mV	150 mV
Signal-to-noise ratio (IHF short circuited, A-weighted, rated output)			
Phono MC	68 dB	64 dB	—
Phono MM	88 dB	82 dB	80 dB
Others	100 dB	100 dB	95 dB
Turnover frequencies			
Bass control	100 — 500 Hz	100 — 500 Hz	200 Hz
Midrange control	0.5 — 2 kHz	—	—
Treble control	2 — 10 kHz	2 — 10 kHz	5 kHz
High filter (6 dB/oct.) at 10 kHz	-6 dB	-6 dB	-6 dB
Subsonic filter (12 dB/oct.) at 18 Hz	-3 dB	-3 dB	-3 dB
FM usable sensitivity (Mono)	9.8 dBf	10.1 dBf	10.3 dBf
FM 50 dB quieting sensitivity			
Mono	14.8 dBf	15.5 dBf	17.0 dBf
Stereo	35.8 dBf	36.5 dBf	37.2 dBf
FM capture ratio (normal IF)	1.0 dB	1.0 dB	1.2 dB
FM distortion, 1 kHz, normal IF			
Mono	0.06%	0.07%	0.08%
Stereo	0.07%	0.10%	0.12%
FM stereo separation, normal IF, 1 kHz	58 dB	55 dB	48 dB
FM frequency response (30 Hz — 15 kHz)	+0/-0.5 dB	+0/-0.5 dB	+0/-1.0 dB
FM signal-to-noise ratio, A-weighted			
Mono	82 dB	80 dB	77 dB
Stereo	76 dB	74 dB	72 dB
FM alternate channel selectivity			
Normal IF	40 dB	40 dB	55 dB
Narrow IF	81 dB	75 dB	—
FM spurious rejection	95 dB	88 dB	86 dB
FM IF rejection	120 dB	110 dB	100 dB
FM image rejection	85 dB	68 dB	68 dB
FM subcarrier product ratio	65 dB	65 dB	58 dB
Power consumption	320 W	210 W	175 W
Dimensions			
Width	18-1/8" (460 mm)	18-1/8" (460 mm)	18-1/8" (460 mm)
Height	5-3/16" (132 mm)	5-3/16" (132 mm)	4-5/16" (110 mm)
Depth	14-3/16" (360 mm)	14-3/16" (360 mm)	13-3/8" (340 mm)
Weight	27 lbs (12.3 kg)	25 lbs (11.7 kg)	18 lbs (8.2 kg)



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A PLETHORA OF PLANETS



Illustration: Debra White

JOHN EAGLE

With at least 10 entries in the CD catalog (and more on the way), Gustav Holst's suite for large orchestra, "The Planets," must surely be reckoned one of the all-time orchestral favorites. But it was not always so. The work was completed in 1915 but not given its first full performance until 1920. Even during the burgeoning of the mono LP catalog in the early '50s, there was little representation of "The Planets" on records. I remember from those days only a 78-rpm English recording with, I believe, Adrian Boult conducting.

During the '60s, a number of stereo recordings began to appear, and the work was on its way to becoming a

recording favorite, if not a concert-hall favorite. With the advent of digital technology, more recordings appeared, presumably spurred on by the capability of that medium to capture the immense range of the music.

The CD format seems tailor-made for "The Planets"—there are no side breaks, and, to handle the work's sonic demands, the CD has all the dynamic range and power bandwidth capability that one could wish for.

From the conductor's point of view, the work requires much musical planning. A lot of the orchestral writing is turgid, and textures must be kept clean. Some of the movements are just too long and must be kept taut. Finally, there are so many resources involved, including organ, women's chorus, and extra wind and percussion instruments, that normal orchestral routines must be changed.

From the producer's and engineer's point of view, the difficulties are awesome. Two four-hour recording sessions, the normal time allotment for a full CD, are barely enough—with luck. More time than anticipated may be required to get acceptable orchestral balances, and this is often time taken away from productive recording. Balancing the organ and chorus with the orchestra will invariably take away from recording time, and the demands for absolute quiet in the softer sections are not always met. However, when all the right ingredients (or just most of them) come together in a recording, the effect over a wide-range playback system is both exciting and gratifying.

I recently auditioned 10 versions of "The Planets" on CD, and all are reviewed here, more or less in the order in which they were recorded. After addressing each, I will pick what I consider to be the best of the batch.

Sir Adrian Boult, *London Philharmonic Orchestra (Precision PVCD 8381)*. Watch this one carefully! The performance is a classic, but the re-

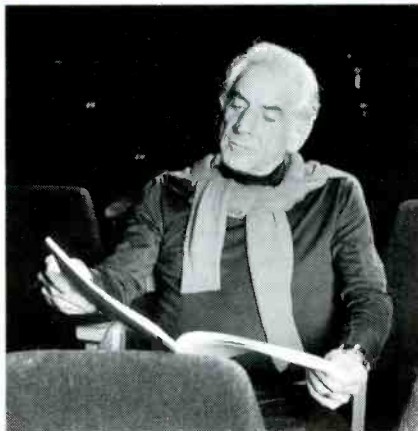
For producer and engineer the difficulties of this piece are awesome. Eight hours of recording will be barely enough—with luck.

cording was made in mono in 1954 (probably an EMI original). The present reissue is obviously under license. There are no notes whatever, and that is a shame. The remastering of the recording includes added stereo reverberation, and that really gets in the way of the original recording. I would not have minded an intelligent remake into artificial stereo, via Lauridsen's comb-filtering technique, inasmuch as mono playback of Lauridsen pseudo-stereo restores the original mono source. But here, the overlay of artificial reverberation is too much.

Leonard Bernstein, *New York Philharmonic* (CBS MYK-37226). The recording was made in 1973, and the present version has apparently been remixed from the original multi-track sources. CBS is to be congratulated for going to the effort to do this, rather than simply working with the existing two-track analog tapes. Bernstein's performance emphasizes the drama in the score, but some of that drama seems to be compromised by tempos that are exaggerated—both slow and fast. There are some ensemble problems, and I am left with the feeling that the overall production is a little bit perfunctory.

Sonically, the remix is quite good. There are a few moments of old analog hiss and roughness of texture, but it's not bad, considering the era of the recording. There are lots of microphones used, but a pretty good feeling of natural fore/aft perspective has been retained in the remix.

LEONARD BERNSTEIN



Walter Susskind, *St. Louis Symphony Orchestra* (Moss Music Group MCD 10038). This recording dates from 1974 and was originally made in four-channel analog. The original two-channel mixdown was via matrix quad. Apparently, the present version takes us back to the original tapes, with no matrix compromise. Susskind was a superb conductor whose star has set, one hopes, only temporarily. The performance is intelligent; the music is paced beautifully, and the orchestra handles it all in stride.

The recording perspective is a little distant by today's standards, requiring some getting used to, especially the big ambience of the hall. However, all the orchestral details seem to be there. This is clearly the best of the "old" recordings of "The Planets," both musically and technically.

SIR GEORG SOLTI



Sir Georg Solti, *London Philharmonic Orchestra* (London 414 567-2). This production dates from 1978. The sound may put you off, but the fault is not in the recording. Anyone who has heard a live Solti performance will know what I mean. For all his musical excitement, Solti pushes the orchestra to such a feverish pitch that the brass take on an uncomfortable edge and the strings become coarse. The sound, which is analog original, is what many anti-digital people used to accuse digital recordings of. About the only really pleasant thing in the sonic texture is the Kingsway Hall pipe organ (most of the other performances on CD make use of electronic instruments). The re-

cording used London's usual technique: A main pickup array plus many accent microphones operated at reduced level. The only problem is the hard-driven performance.

SIR ALEXANDER GIBSON



Sir Alexander Gibson, *Scottish National Orchestra* (Chandos CD 8302). This is a fairly early digital recording, dating from 1979. Gibson understands the Holst idiom very well and turns in a superb performance. His "Neptune" movement has all the excitement one could want, and he takes that usually earthbound scherzo to heights which most other conductors in this survey can't quite muster.

The recording approach of Chandos borrows from English Decca (London in the U.S.) traditions, except that Chandos favors closer-in microphone positions. The result is a lot of "tizz" around the sound when heard over wide-range loudspeakers. Over the radio, or over lesser systems, the sound may be okay. Some of this may be the fault of early digital, but I doubt it.

Simon Rattle, *The Philharmonia Orchestra* (EMI CC38 3028, *Japanese import*). This digital recording dates from 1980. Again, we have an English conductor who understands the Holst idiom and gives us readings that are satisfactory overall. The sound is good but not distinguished. There also appears to be some kind of digital problem at the beginning of "Venus," where the opening horn figure is distorted with a funny buzzing; it sounds to me like some kind of gross quantization error in the digital encoding. Actually,

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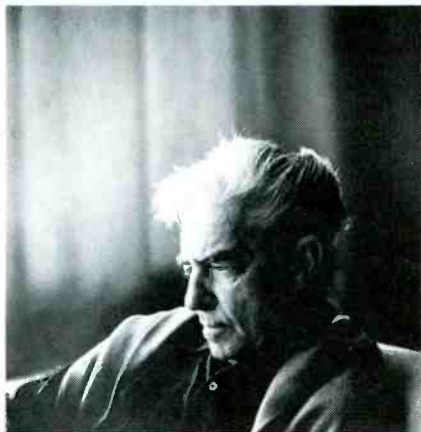
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The versions by Davis and Previn walk away with the honors, about equally, in both recording and performance.

the signal level is not low enough for this to be the case, but that is certainly what it sounds like. This is, however, a minor objection, and the recording is quite good overall.

Herbert von Karajan, *Berlin Philharmonic* (Deutsche Grammophon 400 028-2). On this digital recording dating from 1981, von Karajan turns in a hard-driven performance that reminds one of Solti, except that the slow movements convey more repose. Von Karajan's conception of the score is almost completely subverted by the grotesque recording approach, in which accent microphones completely dissect the orchestral ensemble. Fore/aft perspectives are so out of proportion that the front row of strings across the stereo stage can almost be counted! In

HERBERT VON KARAJAN



addition, the low end, under 50 Hz, has been attenuated, and the sound made gutless.

Lorin Maazel, *Orchestre National de France* (CBS MK 37249). This digital recording of 1982 is an example of the wrong venue and the wrong recording approach. It was done in a large studio, but not one large enough to get along without artificial reverberation. What has been added in the artificial reverberation department is not natural; one hears "jangling" ring-outs where there should be natural decays. On top of all this, there are digital problems. Typical here is the fade-out at the end of "Venus," where we hear the obvious effects of missing digital data. Under the circumstances of the re-

LORIN MAAZEL



recording, and against such formidable competition, it seems almost pointless to comment on Maazel's interpretation of the score.

Andrew Davis, *The Toronto Symphony* (Angel CDC 47417). This CD was digitally recorded in 1986. Davis turns in a stunning performance, and the orchestra is up to all his demands. The recording is remarkable in another way as well. One person, Anton Kwiatkowski, was responsible for both recording and producing. This is most unusual in an age of specialization. There are a number of people who can handle either job, but doing them both at the same time is a problem, considering the pressures of commercial orchestral recording sessions.

In any event, Kwiatkowski does a beautiful job for Davis and the orchestra. With subtle use of accent microphones supplementing a main pickup array, he gets back-of-the-orchestra detail without destroying natural perspectives. The notes state that this recording was made on a 24-track Sony recorder, presumably allowing the producer/engineer to be unconcerned with details of balance during the session and to concentrate on matters of performance and covering the score. Subsequent mixdown was made to two-track. I am impressed with all aspects of the recording, as unorthodox as the basic approach was.

André Previn, *Royal Philharmonic Orchestra* (Telarc CD-80133). Previn's identification with English music is well

established, and he understands it to the core. This performance, digitally recorded in 1986, demonstrates his affinity for the score, just as did his earlier 1970s recording for EMI (not yet available on CD, but coming soon, I understand).

The recording approach is as orthodox as Andrew Davis' was not. Here we have typical Telarc minimal spaced-omni miking, with the expected natural perspectives. As with many Telarcs, it helps to raise the volume a bit to make up for the fact that there has been little, if any, manipulation of dynamic range during the recording. I am impressed with all aspects of this Compact Disc.

ANDRÉ PREVIN



Now for my conclusions. Curiously, the "big three" conductors, Bernstein, von Karajan, and Solti, do not rank high in these comparisons. The problems are basically on the recording side, and it would be good if these conductors could somehow reap the benefits of natural, uncluttered production techniques.

Of the older recordings, I judge Susskind's to be the best in the group, in both performance and recording. While Gibson's performance is superb, it is done in by questionable recording practice.

This pretty much leaves us with the Davis and Previn versions, which really walk away with the honors, about equally, in both performance and recording areas. Technologically, I lean more toward the Previn, but I am thoroughly impressed with the Davis as well. A

AUDIO RECORDING IN THE DIGITAL ERA

A TDK Special Supplement

LONG LIVE ANALOG!

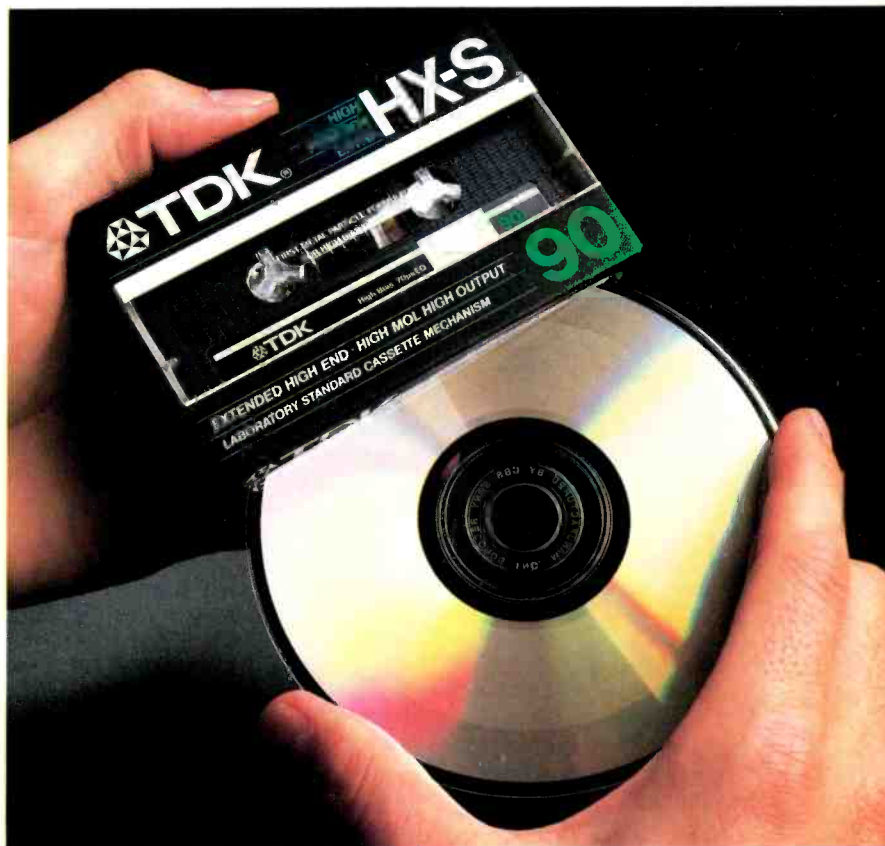
There can be little doubt that we are living in a digital era. We are surrounded by personal computers, electronic bank tellers, microprocessor-controlled cars, appliances, and toys. In the world of audio, the increasing popularity of the Compact Disc (CD) and the dawn of Digital Audio Tape (DAT) signifies that we are truly moving into a new age of sound reproduction. Far more than just an industry "buzzword" now, *digital* is having a profound effect on the music we enjoy.

So, where does all this leave our beloved and convenient analog audio cassette? Is it time to put our cassette decks out to pasture? The answer is, of course, "hardly." You wouldn't throw out your cassette deck any sooner than you'd send your turntable to LP heaven.

Audio history tells us the cassette, as we know it today, will continue to live a productive life for many years to come. It's true that CDs offer great sound and playback convenience, and today you can take CDs out-of-doors and play them in cars and portable players, just like you can with cassettes. But, let's face it, the CD is not the carefree medium the cassette is. At highway speeds, there's no question the cassette is the easier medium to handle, unless you take the time to pre-load your CDs into magazines, something you never have to worry about with cassettes. And besides, history shows that people want to be able to *record* their own music program. So that leaves the CD as a welcome new medium, but far from being an instant replacement for the audio cassette.

For recording enthusiasts, the issue is more likely to be "To DAT or not to DAT." DAT's future is unquestionably bright. It brings the sound quality of CDs to a super-compact, easy-to-handle, record/playback medium. Still, when you finally do bring home a DAT deck, you won't be packing your trusty old analog audio cassette deck in mothballs.

The reasons go beyond the inevitable high cost of a new technology and the



The digital audio era has resulted in vastly improved music source quality. And TDK understands the importance of the analog audio cassette.

time it takes for software companies to embrace a new format. The venerable analog audio cassette enjoys a large "installed user base." It is a powerful force that has thwarted many overthrow attempts, such as the ill-fated 1/4-inch Elcaset and a proposed hi-fi microcassette that, luckily, never made it off the drawing board. For the foreseeable future, a musician leaving a recording session with a "demo" of the day's work will walk out with an analog audio cassette because *it can be played just about anywhere by just about anybody.*

Just where does TDK stand on all this? That question brings us to the subject of this special supplement.

TDK's primary specialty is magnetic media. We manufacture components for tape hardware and other finished consumer electronic products. For over 50 years, TDK has worked closely with hardware manufacturers, who have depended on TDK to match their innovations

with complementing breakthroughs in magnetic media and component parts. Today, TDK products are available for virtually every popular professional and consumer format in audio, video, and data processing. That includes future formats, too, like DAT and Super VHS. This leadership puts us, we believe, in a unique position to discuss the past, present, and future of tape recording.

If nothing else, the digital audio era has resulted in vastly improved music source quality. Because TDK understands the importance of the analog audio cassette in your present and future recording needs, we've put together this special supplement, *Audio Recording in the Digital Era*, to let you know what we're doing to meet those needs. We'll also touch on some interesting historical aspects of cassette recording, take a brief side-trip into the world of video, and even glimpse into the future of audio recording, i.e., DAT.

Today's state-of-the-art audio cassettes and decks live up to the toughest demands.

THE AUDIO CASSETTE JUST KEEPS GETTING BETTER.

With all the impressive figures being thrown around for digital audio these days—flat amplitude response to 20,000Hz, signal-to-noise ratio better than 90dB, immeasurably low wow, flutter, and modulation noise—it's easy to forget just how good modern analog audio cassette recording can be. The fact is, with today's state-of-the-art cassette decks and tapes, you can make recordings of the toughest program sources that are difficult for even "golden-eared" listeners to distinguish from the original.

Let's focus, for the moment, on those traditional measurements by which we gauge the performance of a tape formulation: MOL (Maximum Output Level), bias noise, and the resultant dynamic range, which is the numerical difference between



TDK's SA-XG and MA-XG (shown here) as well as SA-X and MA-X, and a good cassette deck, let you make recordings with sound quality that makes no apologies to digital audio reproduction.

the first two. (We'll be discussing modulation noise, wow-and-flutter, and other areas related to tape travel in a later section on cassette shell design.) TDK's SA-X and SA-XG Type II (high bias) cassettes and MA-X and MA-XG cassettes represent two of the finest tape formulations of their kind on the market today.

Figures 1 and 2 show the frequency response and MOL/noise characteristics for SA-XG and MA-XG, respectively. The MOL at mid frequencies is defined as the playback output level for 3% THD. The MOL for high frequencies is defined as the level at which saturation occurs (because harmonic distortion at such high frequencies cannot be reliably measured). Bias noise is calculated by taking

the full band noise figure measured during playback of a tape which was recorded with no signal and applying the IEC A-weighting curve.

At 315Hz, TDK SA-XG has an MOL of +4.0dB, using a 0dB reference of 250 nWb/m. The bias noise is -63.5dB, which, incidentally, happens to be the lowest figure among all cassette tapes available today. The total dynamic range at 315Hz is, therefore, 67.5dB. Using the same method of calculation, SA-XG's dynamic range at 10kHz is 56.0dB. TDK's metal formulation MA-XG, by comparison, has a 315Hz dynamic range of 68.0dB and a 10kHz dynamic range of 60.5dB.

Keep in mind that these figures do not include the use of any noise reduction system. When you add the improvement in dynamic range gained through the use of state-of-the-art noise reduction circuitry, such as the Dolby C system, you really start coming up with some impressive figures. Remember that Dolby C noise reduction can yield improvements in the neighborhood of 20dB at higher frequencies. Looking at full-band noise figures, it is thus not unusual these days to find top-notch cassette decks delivering signal-to-noise ratios between 75dB and 80dB using Dolby C noise reduction and a high-quality Type IV tape, like TDK MA-XG. Those same cassette decks usually also exhibit smooth, extended frequency response, and inaudibly low wow-and-flutter.

The moral of all this is that by carefully setting your record levels, using the finest tapes, such as TDK SA-X, SA-XG, MA-X, and MA-XG, and a good cassette deck, you can indeed make recordings with sound quality that needs make no apologies to digital audio reproduction.

• FREQUENCY RESPONSE/
MOL/NOISE SPECTRUM

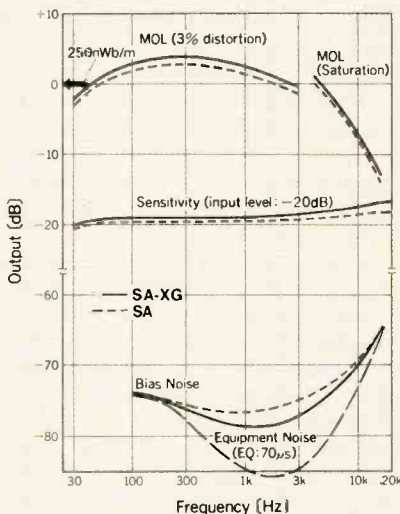


Figure 1

• FREQUENCY RESPONSE/
MOL/NOISE SPECTRUM

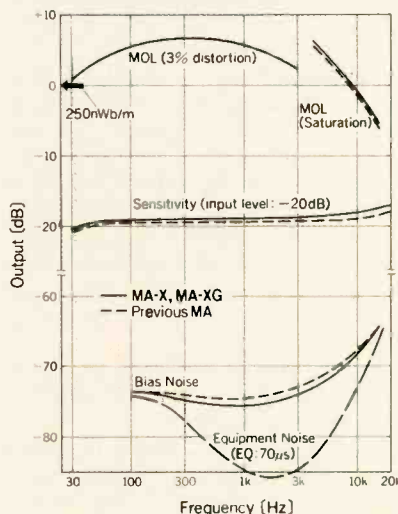


Figure 2

CHOOSING THE RIGHT TAPE

While we're on the subject of MOL and bias noise figures, it might be interesting to look at the broad range of the high-quality cassette tapes on the market today. The discussions in this supplement will center around state-of-the-art tapes, such as TDK SA-X/SA-XG and MA-X/MA-XG, but with so many tapes available to the recordist, the question of which tape to use for what purpose often becomes a confusing issue. This is where a comparison of MOL and bias noise can help.

Figure 3 is a bar graph charting the differences in performance among members of TDK's cassette tape family—a lineup, incidentally, that is unmatched in the industry, providing an answer for virtu-

ally every conceivable application. For each tape, the graph shows bias noise level, MOL at 315Hz, and MOL at 10kHz. You can see, for example, that it would be wasteful to use a tape like MA-X to record baby's first utterances—an application for which a tape like TDK D would be more properly suited.

For high-quality music reproduction the differences in a Type II tape, like TDK SA-X/SA-XG, and a Type IV tape, like TDK MA-X/MA-XG are quite telling. TDK SA-X or SA-XG would be ideal for recording music with many quiet passages, e.g., classical music, because of the formulation's exceedingly low inherent (bias) noise. On the other hand, you would be wise to take advantage of TDK MA-X's or MA-XG's superior high-frequency MOL to record sources rich in highs, such as synthesized music or recordings of percussion instruments.

The differences between the "X" and "XG" designations, by the way, are primarily those of cassette shell design and will become apparent a bit later.

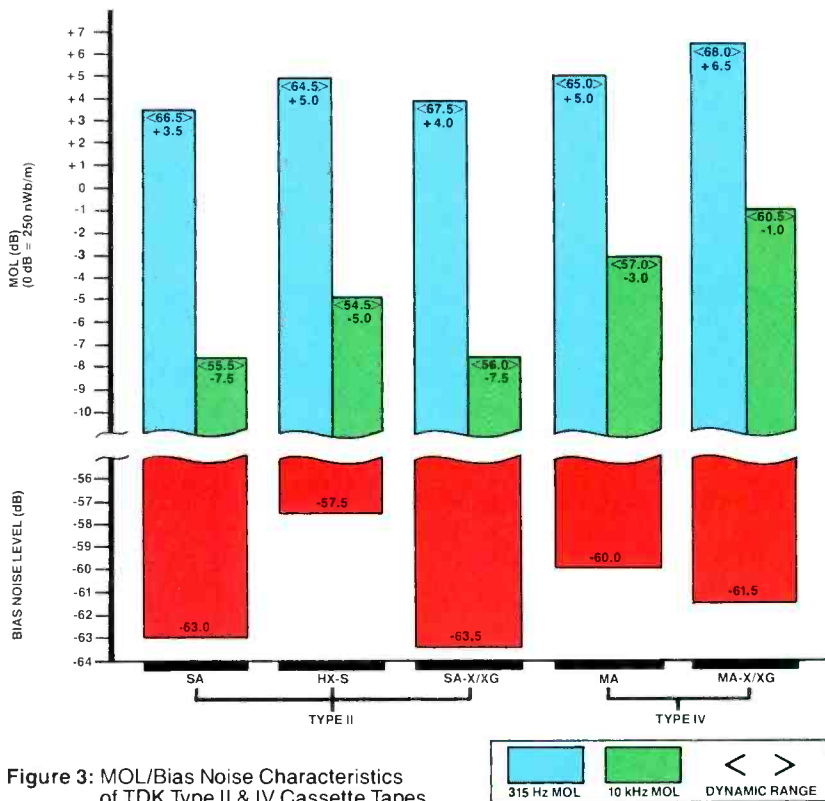


Figure 3: MOL/Bias Noise Characteristics of TDK Type II & IV Cassette Tapes

MOL & BIAS NOISE ARE HARDLY THE WHOLE STORY.

At TDK, we subject not just our own tapes, but also those of our competitors, to rigorous examination. Of course, we measure MOL and bias noise. But we also run a series of tests designed to expose weaknesses in other critical areas. Figures 4 and 5 show some sample results. The closer the outlined figure is to a perfect octagon, the better balanced the tape is in terms of the requirements that must be met for true high-quality performance.

Figure 4 compares the test results of TDK SA-X 90 with those of a well-known competitive brand. Figure 5 is a comparison of TDK MA-X 90 and yet another highly-reputed brand. In each case, the dotted line over the other brand's plot shows the relative performance of the TDK cassette. As you can see, tape testing is serious business at TDK because only through such exhaustive examination can we assure uniformly high quality and reliability.

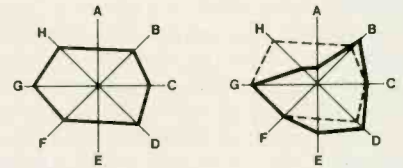


Figure 4: TDK SA-X vs. Competitor A

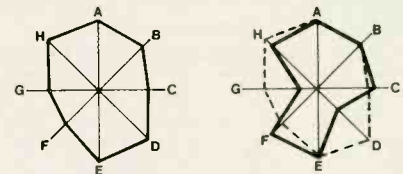


Figure 5: TDK MA-X vs. Competitor B

A: high temp./humidity performance; B: low temp. particle shedding; C: 10kHz output uniformity; D: magnetic coating adhesion; E: electrical resistance (static build-up); F: tape travel stability; G: sensitivity to transport variation; H: abrasivity (head wear).

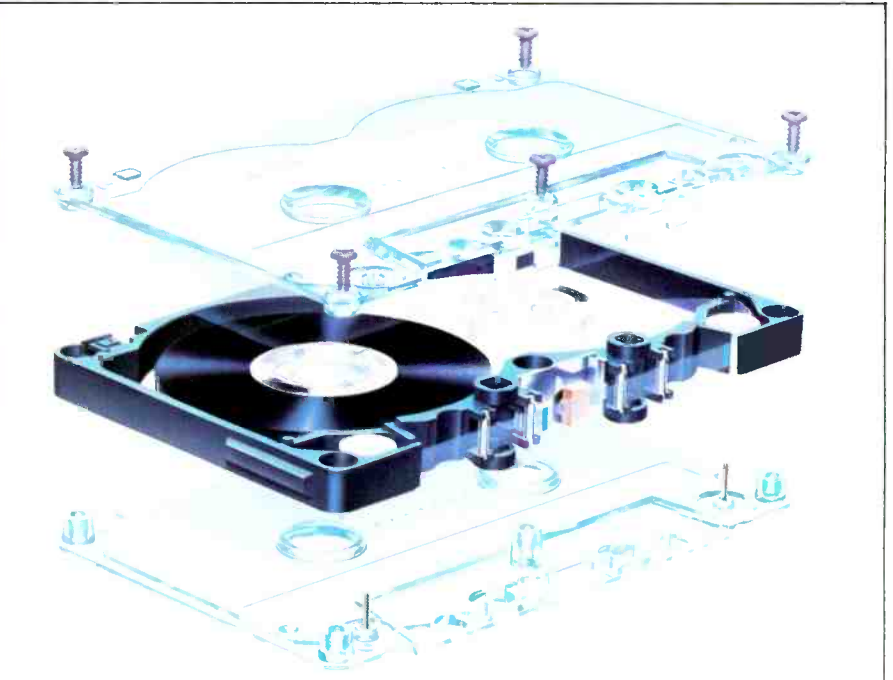
TDK has brought new levels of shell performance to cassette recording.

THE CASSETTE SHELL: NOT JUST A HOUSING.

Early in the audio cassette's existence, when tape deck manufacturers began to realize the tremendous potential of the format as a high-fidelity medium, the cassette shell itself proved to be something of a stumbling block. Engineers would labor to develop a smooth-running tape transport only to be horrified the moment they inserted a different cassette, or even flipped the cassette over from side A to side B. What had been entirely under their control with open reel tape transports was being cruelly wrenched from them. Many of the components that affect tape travel, such as guide rollers, pins, and pressure pads, were now integral elements of the tape housing and no longer parts of the deck.

Over the years tape deck manufacturers have gone to great lengths to wrest back some of that control. The double-capstan transport, for example, was an attempt to better isolate the stretch of tape that contacts the heads. Other schemes have involved the use of multiple motors and elaborate mechanisms to control tape tension via the reel hubs. There is no question that all of these mechanical innovations have resulted in substantial improvement in tape travel characteristics. But the fact remains: even the best cassette deck transport cannot compensate for a poorly designed cassette shell.

There are numerous factors to be con-



The above shows there is more to cassette shell design than ensuring steady tape travel.

sidered when evaluating cassette shell design. Today, as long as you stay with reputable tape brands, obvious defects, such as those that cause tape jamming and "eating," are things of the past. Most of the well-known cassette tape manufacturers offer shells that are precisely constructed to ensure steady tape travel. But there are significant differences even among today's best cassette shell designs. Advanced measurements of cassette performance, such as phase jitter, mechanical noise, and system resonance show that there's more to cassette shell design than ensuring steady tape travel.

One of the chief criticisms of analog recording is modulation noise. This phenomenon is best observed by recording a sine wave signal at a single frequency and examining the playback with a real-time

spectrum analyzer. The single "spike" that represents the input signal is invariably accompanied by some noise on both sides, which is the residual noise of the medium modulated by the recorded signal. In cassette recording, much of this modulation noise is caused by resonances and minute "glitches" in the tape travel mechanism that are eventually transmitted as microscopic vibrations to the recording head.

TDK's SA-X and MA-X cassettes feature a unique Dual Layer Mechanism (DLM). Each half of the DLM cassette shell is constructed of two precision-molded plastic layers with specific rigidity and thickness characteristics to minimize sympathetic vibrations. It is the first cassette mechanism in the world to so successfully dampen vibrations. The resultant decrease in

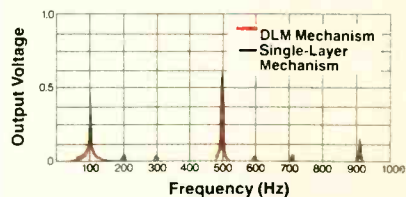


Figure 6: Resonances caused by 100 Hz mechanical stimulus

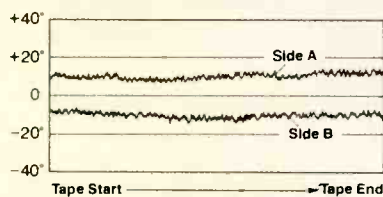


Figure 7: L/R phase jitter at 10 kHz, SA-X cassette

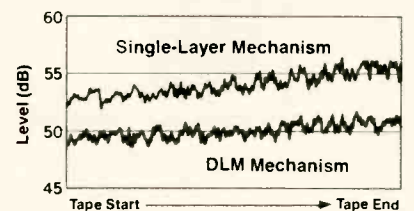


Figure 8: Fast-wind mechanical noise

modulation noise yields purer sound reproduction.

Figure 6 demonstrates how well the DLM shell controls vibrations in comparison to our own excellent single-layered shell. The graph shows a spectral analysis of resonance effects that result when an external 100Hz mechanical stimulus is applied to the cassette during playback.

The superior rigidity of the DLM mechanism also pays dividends in the form of reduced phase jitter. **Figure 7** is a measurement of left/right channel phase jitter with a 10kHz signal for both sides A and B of a TDK SA-X cassette. This kind of uniformity is exceptional by any standard.

The anti-resonant characteristics of the DLM shell is especially apparent during fast-winding. **Figure 8** is a comparison of mechanical fast-wind noise between the new DLM and our single-layered shell.

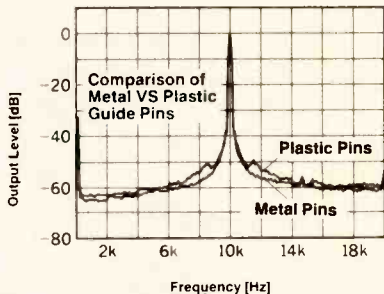


Figure 9

TDK could have stopped there, but we didn't. For the most exacting recording applications, we offer our three-layer RS-II cassette shell mechanism. Used in the SA-XG and MA-XG cassettes, the RS-II shell incorporates a die-cast frame and precision-molded tape guide block. The frame and guide block are held in position by transparent upper and lower plates made of a special hard plastic. The inherently non-resonant character of this design is enhanced by four metal guide pins that further reduce modulation noise. **Figure 9** shows the difference in modulation noise between cassette shells with steel and plastic guide pins.

Cassette shell design can make a difference in sound quality. And the better your cassette deck, the more you'll appreciate advanced cassette shell design, such as the sophisticated vibration-dampening mechanisms found in TDK's top-of-the-line cassettes.

A LITTLE HELP WITH BIAS

"Bias," as the term applies to magnetic recording, continues to be a subject shrouded in mystery and a source of confusion. Nobody really understands exactly how bias works at a molecular level, but work it does. And without it, we wouldn't have the sophisticated recording capabilities we enjoy today.

If we applied the audio signal directly to the record head "as is," the results would be totally unacceptable. We would be recording on highly non-linear regions of the tape's magnetization curves, and we'd suffer gross distortions of the signal. The solution is to mix the audio signal with a high-frequency AC bias signal, which shifts our point of operation up to a much more linear region. The rule of thumb with bias is to select a frequency that is at least 5 times the highest audio frequency to be recorded. This assures the bias signal will not "beat" with high-frequency audio signals to produce interference within the audible spectrum. Thus, a cassette deck that has a frequency response to 20kHz will typically use a bias signal of 105kHz.

You can see the effect of bias current on a number of tape performance parameters in **Figure 10**, which is a family of curves for TDK MA-X. In general, there is a critical point after which an increase in bias current causes several effects: an increase in mid-band MOL, a decrease in high-frequency MOL, a loss of high-frequency response, and a reduction in distortion. A tape deck manufacturer must take these characteristics into account and use the appropriate amount of bias current to deliver the best overall performance. Notice, also, that a properly designed tape like TDK MA-X exhibits smooth bias characteristics. A tape with "peaky" bias curves would suffer dramatic shifts in performance from the slightest misadjustment of bias.

To help cut through the confusion caused by many tape brands and types, the IEC developed a system of classifying tapes by their bias requirements and established a set of standards to assure a degree of compatibility among different brands of the same tape type. Type I refers

to what, for lack of a better term, has been known as "normal" bias tapes. All ferric oxide tape formulations generally fall into this category. Type II refers to so-called "high" bias tapes, such as TDK SA, SA-X and SA-XG. It is interesting to note that although Chromium Dioxide tapes were once the reference for Type II tapes (indeed, "high" bias used to be called "chrome" bias), modern cobalt-treated ferrics, like the TDK SA family, are now the IEC standard for this category. Type IV refers to "metal" bias tapes, like TDK MA, MA-X and MA-XG. These are, without exception, pure metal particle formulations. The IEC has adopted TDK MA as its reference standard for the Type IV category. See **Figure 11** for a quick summary of the different IEC categories.

What happened to Type III? Type III refers to dual-layered ferrichrome tapes that are all but non-existent today. The vast majority of cassette deck manufacturers do not bother providing a Type III position on their machines today. It was a noble experiment, and one that looked a lot better on paper than it did on the test bench.

Part of the blame for the tape type confusion rests squarely with hardware manufacturers. They don't help when they

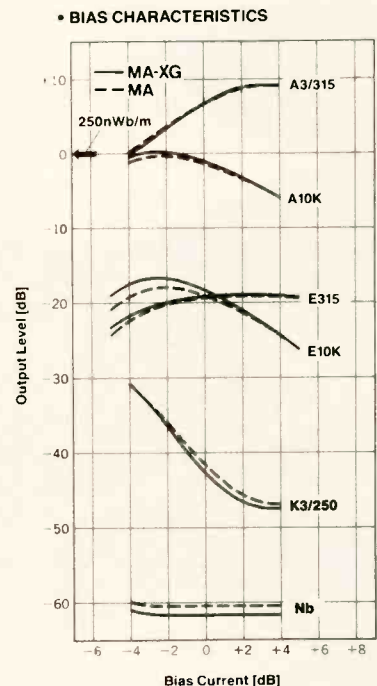


Figure 10

make portable and car cassette players featuring a "metal" playback position. Bias applies only to the recording process. There is thus no special position required to *play* Type IV tapes. What those manufacturers are referring to, of course, is equalization, which is another story in itself. Suffice it to say that Type I tapes should be recorded and played with the 120 microsecond (μ s) equalization; and Type II and Type IV tapes should be recorded and played with the 70 μ s equalization. Most decks today automatically select the proper equalization for each cassette type, so you needn't be overly concerned. If you're shopping for a portable or car cassette player, don't worry about finding one with "metal playback capability." If it can play Type II tapes, it can play Type IV tapes.

HOW DID WE GET HERE?

If you had told the inventors of the audio cassette (Philips, of the Netherlands, whose official name for the format is the "Compact Cassette") back in the early 'sixties that their brainchild would, in slightly over two decades, evolve into a pure metal particle formulation with a precision housing mechanism, capable of faithfully capturing the full dynamic and frequency range of live music, they would probably have laughed. That's because the original audio cassette was developed with more convenience than true high-fidelity in mind.

But a couple of things happened in the late 'sixties that permanently changed the course of audio cassette history. The first was the introduction of TDK's SD (Super Dynamic) cassette. With significantly higher magnetic remanence and coercivity than other cassette tapes of its day, it was the first tape formulation to bring the audio cassette into the realm of high-fidelity performance.

The next major development was the appearance of high-coercivity (i.e., high bias) tapes and the establishment of a 70 μ s record/play equalization that would take better advantage of the new formulations' improved high-frequency capability. Chromium Dioxide was the first of these new tapes. TDK's search for a non-chrome high-coercivity tape, however, led to the next significant breakthrough.

In 1975, TDK began to market its SA—Super Avilyn—cassette. This exceptional formulation made use of a newly developed magnetic particle, the Super Avilyn particle, which consists of a gamma ferric oxide core with an outer layer of adsorbed cobalt ions. The historic significance of this development is evidenced by the existence today, more than twenty years later, of state-of-the-art TDK audio and

IEC DESIGNATION	BIAS	EQ	TDK CASSETTES
Type I	"NORMAL"	120 μ s	D, AD, AD-X
Type II	"HIGH"	70 μ s	SA, HX-S, SA-X, SA-XG
Type IV	"METAL"	70 μ s	MA, MA-X, MA-XG

Figure 11: AN IEC tape-type translation table



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video cassette tapes based on the original Super Avilyn technology. Today's Super Avilyn, of course, has been highly refined through successive generations of improvement. But it wouldn't be an overstatement to say that much of the superb performance of modern audio cassette decks and VCRs would not have been possible without the contribution of TDK's Super Avilyn and other similar cobalt-modified ferric formulations. TDK's current SA-X and SA-XG Super Avilyn cassettes stand out as examples of the ex-

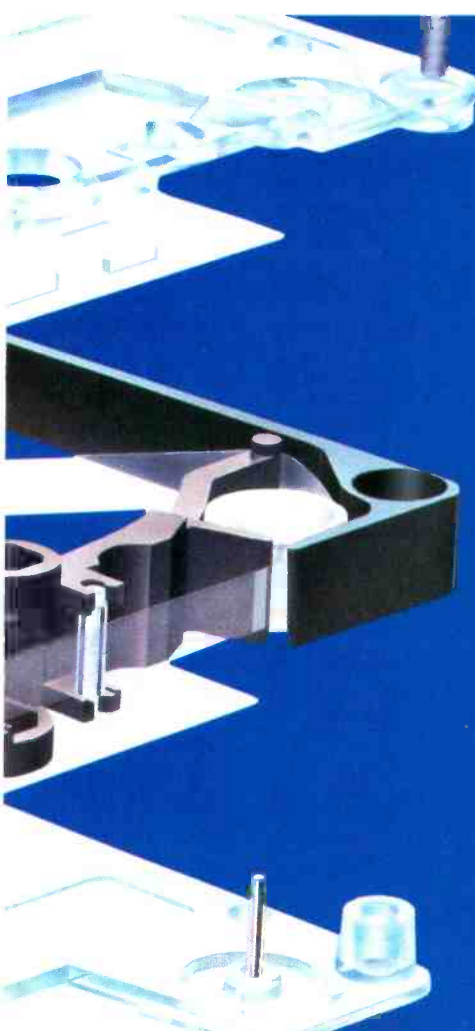
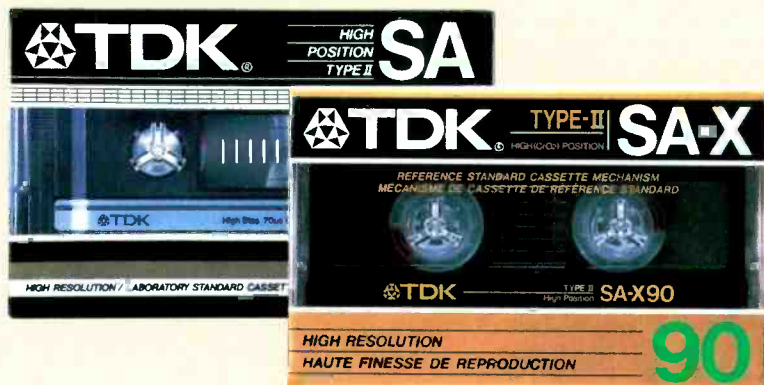
tremely refined performance you can expect from today's finest Type II tapes.

It was in 1979, with the promise of digital audio reproduction looming on the horizon, that TDK introduced the MA cassette, a metal particle formulation that would eventually become an industry standard for Type IV tape. Today's MA-X and MA-XG cassettes, when used with the finest decks, make it possible for analog audio cassette recording to do justice to the most demanding digitally produced program sources.

A VIDEO EXCURSION

Audio recording enthusiasts have varying degrees of interest in video taping. Some are content with the basic time-shifting and movie-viewing conveniences that a VCR affords. Others are certifiable videophiles, putting as much time, money, and care into their choice of video equipment as they do with their audio gear. Still others have gotten a headstart on digital audio taping by using the PCM processor/VCR combination. Wherever in the spectrum you may exist, you should know that TDK offers an impressive lineup of video cassette tapes, manufactured to the same high standards of quality as our audio tapes. You'd want to know this because the rules for video taping are the same as for audio: for the best results, you must choose the right tape for each application.

When comparing the performance of various video cassette tape formulations, it is useful to examine their BET values. The BET value, expressed in square meters per gram (m²/g), is a measure of the



PERFECT MARRIAGE

New SA-XG is TDK's exclusive SA-X formulation—the world's quietest tape—technomomously joined together with TDK's most sophisticated mechanism ever—the RS-II.

Our unique 3-layer RS-II mechanism is specifically designed to suppress the generation of modulation noise. A precision die-cast alloy frame and molded tape guide block are sandwiched between two transparent precision-molded shell halves made of a special hard plastic, which also incorporate 4 precisely machined metal guide pins. The RS-II's rigidity of construction, accuracy of fit and superior thermal resistance assure unerring tape travel, optimum tape-to-head contact and reduced modulation noise. The result is virtually true-to-source sound quality.

So whether you choose the outstanding SA-XG, or SA-X, with its new vibration-dampening Dual Layer Mechanism (DLM), you can be assured of one thing: An everlasting high bias honeymoon—till decibels do you part.



TDK. THE ART OF PERFORMANCE.

total amount of magnetic particle surface area for a given weight of that particle. The larger the value, generally speaking, the smaller the magnetic particle and higher the density of the magnetic coating. In video terms, a tape with a higher BET value should yield a clearer picture with less noise.

For everyday recording, e.g., time-shifting, TDK offers the reliable, durable HS video cassette (BET value $25\text{m}^2/\text{g}$), available in both VHS and Beta formats. For better picture quality at slower taping speeds, and for long-term storage, we recommend our E-HG formulation (BET value $35\text{m}^2/\text{g}$)—in VHS, VHS-C, and Beta. For high-definition performance and improved audio fidelity with "hi-fi" VCRs, use TDK's VHS and Beta HD video cassettes (BET value $45\text{m}^2/\text{g}$). For professional-quality mastering and camcorder applications, TDK offers its top-of-the-line HD-X Pro formulation (BET value $50\text{m}^2/\text{g}$), available in VHS, VHS-C, and Beta formats. And 8mm video users will be impressed with the performance of our state-of-the-art MP video cassettes (BET value $55\text{m}^2/\text{g}$).

8mm video and the recently announced S-VHS formats are examples of recording advances that simply would not have been possible without innovative, new magnetic tape technology. The Super Finavinx metal particle developed for

8mm video was a logical outgrowth of TDK's extensive experience in metal tape. And when the developers of the new Super-VHS system needed a non-metal high-energy formulation, TDK answered with XP. The XP S-VHS cassette is a Super Avilyn formulation that delivers a coercivity of 900 Oersteds, an unprecedented figure in a non-metal tape.

TDK's expertise in advanced formulations and ultra-high-precision cassette mechanisms for video applications will play an important role in the development of the DAT cassette, as we shall next see.

WHEN YOU'RE READY FOR DAT...

The specifications for DAT are awesome. In order to achieve full 16-bit PCM recording with a sampling rate of 48,000Hz and include advanced error correction, subcode, and tracking data, an incredibly high recording density of 3,000,000 bits per second is required. And it's all done with a tape only 3.81mm wide, recorded with an extremely narrow track width of 13.6 microns! DAT's error correction and interpolation schemes are very sophisticated, but it stands to reason that an inherently low error rate is highly desirable. This puts incredible demands on the performance of the DAT cassette.

TDK has more than answered these demands with the new DA cassette. DA incorporates the very latest generation of magnetic media technologies, made possible by TDK's unparalleled knowledge of audio and video tape and cassette mechanisms. The fine-grain Super Finavinx metal particle, the three-dimensional binder system, the smooth-running backcoat, and the high-precision/high-reliability cassette mechanism are just some of TDK's innovations developed exclusively for the DAT.

Through exhaustive examination of the factors that affect DAT performance, TDK



has successfully produced a DAT cassette that dramatically reduces dependence on the deck's error correction and interpolation circuits. And that pays dividends in day-to-day reliability and long-term media durability.

So, when you're ready to step into the world of DAT, you can do so confident in the knowledge that TDK will be there to back you with the quality you've come to expect of us.

SOME THINGS NEVER CHANGE.

At TDK, we're constantly pushing the limits of tape technology to make sure the product you put in your recording machine is the most advanced and capable of its kind. But we're also committed to keeping you supplied with tapes of the highest quality and reliability, no matter what your applications might be. Our advanced tape production technology includes automation engineering and multi-level quality assurance techniques that are unrivaled in the industry.

So, keep those heads cleaned, watch those recording levels, and, whether you're moving up in analog or digital, count on TDK to help you make most of your recording time.



For further information on TDK audio and video cassettes, please contact: TDK Electronics Corp., Customer Service Dept. A-1, 12 Harbor Park Drive, Port Washington, NY 11050.



Lab Products Cleaning Spray

Designed to remove dust, dirt, oil, and oxides from electronic contacts and controls, Lab Products' Total Electronic Cleaner (TEC) is a nonconductive, nontoxic, residue-free solvent. It is available in an 8-oz. aerosol spray can. Price: \$8.

For literature, circle No. 100



Cerwin-Vega Bass Enhancers

Cerwin-Vega's Bass Turbochargers combine a narrow-band bass equalization boost with an infrasonic filter. Two versions are available: The DB-10B (shown here), for home systems, and the DB-10C, for car use. Both provide switchable boost of

5 or 10 dB in the range from 30 to 45 Hz, combined with a filter which rolls off bass output below 20 Hz for cleaner sound and more efficient use of amplifier power. The home version also incorporates a tape monitor circuit and switch. Price: DB-10B, \$59.95; DB-10C, \$54.95. For literature, circle No. 103



Discwasher CD Cases

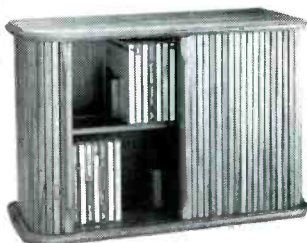
Transparent panels in the flip-top covers of these two CD cases make it possible to see which discs are inside even when the covers are closed. With the cover open, the front panel tips forward for easy

browsing. The smaller of the two cases holds five CDs or a portable CD player; the larger holds either 10 CDs or five CDs and a portable player. Price: Small case, \$8.95; large case, \$12.95.

For literature, circle No. 101

Eppco CD Cabinet

The Eppco 8160 CD cabinet holds up to 60 CDs, including multi-disc albums, behind sliding tambour doors. Available in teak or beech, the cabinets can stand free or be hung on a wall. Price: \$49.95. For literature, circle No. 102



Signet A/V Cable

Signet's Maximum Transfer audio/video interconnect cables are now available in a lower priced version. The new VK212 uses oxygen-free copper and gold-plated

plugs. The cables are said to have low capacitance and resistance and high conductivity. Three lengths are available. Price: 1 meter, \$19.95; 2 meters, \$24.95; 3 meters, \$29.95. For literature, circle No. 104

Buff Stuff CD Saver

Scuffs and scratches on CDs can cause audible mistracking problems such as clicks, dropouts, or sputtering; according to Buff Stuff, Inc., even slight disc damage can affect a CD's sound by triggering the player's error-concealment circuits. A few drops of CD Saver, says the company, can cure problems caused by light scuffs and scratches and can significantly improve severely damaged discs. A 30-ml bottle is said to be good for hundreds of applications. Price: \$9.95. For literature, circle No. 105



Fineline A/V Cabinet

Supplied ready to assemble, the Fineline Audio + Video Cabinet comes with one fixed video shelf, one fixed audio shelf, two adjustable audio shelves, and dividers. Thanks to a hardwood composite core beneath the veneer, the shelves are

rated to hold up to 125 pounds. Base rails allow cabinets to be stacked. Doors of wood or tempered glass are available as options, as are tape/CD storage drawers, finished back panels, slide-out shelves, and casters. Price: \$370.

For literature, circle No. 106



Trackmate Record Cleaner

The TM 451 record and stylus cleaner set is part of the Trackmate line of cleaning products from W.E.S.T. Ltd. of Ireland. The record cleaner is a dual-brush design that pivots about the turntable's center spindle. The first brush spreads the record's static charge evenly and

distributes cleaning solution, and the second brush picks up the solution and dissolved contaminants. The stylus cleaner uses a tangle of textured fibers, a design which the company says does a more thorough job than straight-fiber designs. Price: \$14.95.

For literature, circle No. 107



Onkyo Universal Remote Control

Named the Unifier, Onkyo's RC-AV1 remote control can be used with audio and video equipment from any manufacturer. The unit comes preprogrammed with commands for Onkyo's own remote-controllable equipment and can also "learn" the command repertoire of any other infrared remote control. Price: \$119.95.

For literature, circle No. 108

Artistry in Sound

ONKYO[®]

Amps / Tuners

Integra Series

A-8190 • A-8170 • T-4150 • EQ-35 A-8150 • T-4130



REAL PHASE

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Designed and Built by Perfectionists for

Onkyo Amplifiers Feature Innovative Electronics and Power Supply Design, Rugged Construction and Top-Quality Parts.

Demanding unwavering power and the highest degree of quality, digital sources pose the ultimate challenge to an amplifier — faithful amplification of the music signal with no added sonic colorations. When amplifiers are judged, these basic goals have once again assumed their rightful place as the top criteria. That's why at Onkyo we went back to the basics when we designed our new line of integrated amps. Not just the amplification circuitry, but the power supply, construction and component parts are all of uncompromising quality. Since an amplifier is more than just the sum of its parts, we took the same care with the design as with the selection of materials. Onkyo amplifiers — for the perfectionist in you.



Perfectionists —

The Total Elimination of Distortion is Our Ultimate Goal — Electronics and Power Supply Design.

Real Phase* (A-8190)

Conventional amplifier designs often assume a simple resistive load of fixed impedance. Unfortunately, the load presented by a real hi-fi speaker is reactive in nature — not simply resistive. In addition, it varies with changes in frequency. Recently, some amplifiers have been designed to operate into a wider range of load impedances, recognizing that as the frequency changes, so does the actual impedance. However, the power supply design of these amplifiers still treats the loudspeaker load in a simple resistive fashion.

Why worry about the reactance of the speaker load when nobody else seems to bother? Because this reactive speaker load causes an inevitable shift in phase between the voltage and current in the amp-to-speaker signal path. That's why Onkyo invented Real Phase. The secret of this innovative configuration is an additional "In-Phase" transformer located between the main power transformer and rectifier diodes in the power supply block. It smooths the current by cancelling out positive and negative "spikes."

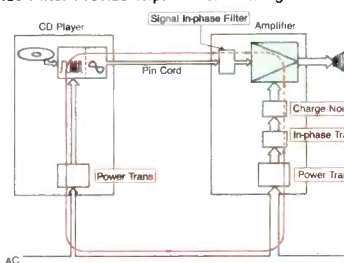
This effectively prevents phase modulation of the storage capacitor charging current caused by frequency dependent speaker impedance and reactive loud-speaker loads. The result is more usable output for effortless reproduction of even wide dynamic range material. In sonic terms, the difference is apparent in the precise focusing of the stereo image on the audio "soundstage" and clear, tightly defined bass.

Eliminating Noise and Distortion from External Sources

In tandem with the above-mentioned In-Phase transformer in the power supply, a "Signal In-Phase Filter" upstream of the input jacks prevents digital noise generated in your CD player's digital circuit block from looping back into the amplifier circuitry.

As an added precaution, a "Charge Noise Filter" ensures that low level signals aren't masked by low frequency phase modulation of the charging current waveform in the power supply.

In-Phase Transformer, In-Phase Filter and Charging Noise Filter Provide Triple Protection Against Noise.



Rugged, Well Laid-Out Construction Puts Everything in Its Proper Place

"Direct In" Circuit Design for All Inputs

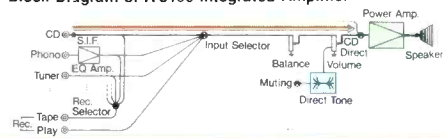
In conventional amplifier circuit designs, the input signal must traverse numerous switches and tone control circuits before it even reaches the power amp block. Such complicated signal paths inevitably have a deleterious effect on the quality of the music signal, imparting unwanted sonic colorations. The Onkyo solution? — our "direct in" design which aims at making all the signal paths as uncluttered as possible while at the same time allowing you to manipulate the frequency characteristics of the signal if you wish.

Our Direct Tone system completely bypasses the tone control circuitry when the level controls are set to the center "defeat" position. The muting switch is connected to the direct tone circuitry, separate from the regular signal path. This means that all the inputs signals, not only CD, have as simple and straightforward a signal path as possible.

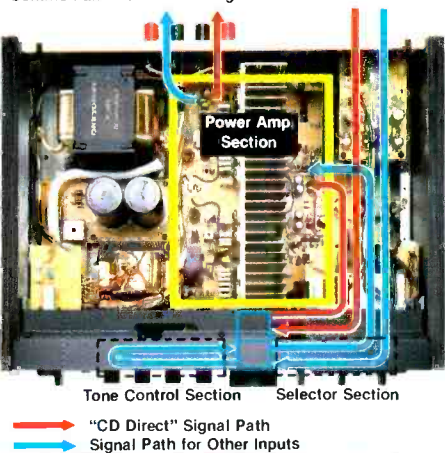
"CD Direct" Switch

Though the signal paths for all the input sources are already free of unnecessary complications, the A-8190 and A-8170 allow you to make the CD signal path even more so simply by pressing the "CD DIRECT" switch. The CD signal passes straight from the input terminals to the power amp block without encountering any superfluous switches or tone control circuitry on the way. Even the common volume control is bypassed; the four-gang volume control is divided in half giving the direct signal path its own two-gang volume control. The result is completely natural CD sound free of spurious sonic colorations.

Block Diagram of A-8190 Integrated Amplifier



Common and "CD Direct" Signal Paths

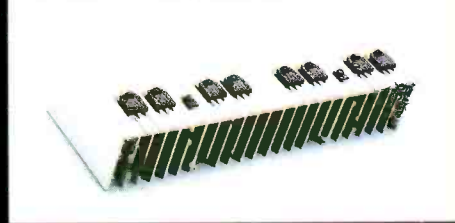


All Top Quality Parts — You Can Hear the Difference

When designing new hi-fi components, Onkyo engineering adamantly insists on highest quality parts throughout. One example of this unwillingness to compromise on quality is the low-noise Hi-fi power transistors which also give a wider frequency range; and it is especially obvious in the power supply. Both the A-8190 and A-8170 power supplies feature high-speed switching diodes to reduce switching distortion to levels on a par with class A amplification. The power transformer itself has a small chemical capacitor attached to its secondary winding — an Onkyo innovation that improves the overall sound quality of the output signal. What's more, we put a "barrier" of special damping materials between the power transformer and the chassis to keep harmful vibrations out and prevent electromagnetic flux from leaking from the transformer into the surrounding circuitry where it could contaminate the music signal.

In addition, special low-impedance chemical capacitors in which the positive and negative plates are each split in two are used instead of conventional capacitors. One of these "split" chemical capacitors works like two connected in parallel, resulting in lower (AC) impedance.

Low Noise Hi-Fi Power Transistors



Magnetic Shielding between Chassis and Power Transformers



Onkyo Amplifiers Employ Only Top Quality Parts



Patent pending

SPECIFICATIONS

Integrated Amplifiers

	A-8190	A-8170	A-8150
Continuous Power Output:	100 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.008% THD 150 watts per channel 4Ω, 1kHz (DIN)	80 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.008% THD 120 watts per channel 4Ω, 1kHz (DIN)	60 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.06% THD 90 watts per channel 4Ω, 1kHz (DIN)
Dynamic Power*:	303 watts per channel 2Ω, 1kHz 235 watts per channel 4Ω, 1kHz 150 watts per channel 8Ω, 1kHz	224 watts per channel 2Ω, 1kHz 170 watts per channel 4Ω, 1kHz 115 watts per channel 8Ω, 1kHz	135 watts per channel 2Ω, 1kHz 110 watts per channel 4Ω, 1kHz 78 watts per channel 8Ω, 1kHz
THD at Rated Power:	0.008%	0.008%	0.06%
IM Distortion at Rated Power:	0.005%	0.005%	0.06%
Damping Factor:	50 at 8Ω	50 at 8Ω	40 at 8Ω
Sensitivity and Impedance:	2.5mV, 50kΩ PHONO (MM) 160μV, 220Ω! PHONO (MC) 150mV, 50kΩ! CD Direct/TUNER/TAPE PLAY VCR/VDP 150mV, 50kΩ! TAPE REC 150mV, 1.5kΩ! (PHONO)	2.5mV, 50kΩ 160μV/220Ω! 150mV, 50kΩ! 150mV, 50kΩ! 150mV, 1.5Ω (PHONO)	2.5mV, 50kΩ 350μV/330Ω! 150mV, 50kΩ! — 150mV, 4.5kΩ (PHONO)
Phono Overload:	200mV RMS at 1kHz, 0.012% THD	200mV RMS at 1kHz, 0.015% THD	150mV RMS at 1kHz, 0.06% THD
Tone Controls:			
CONTRABASS	+10/+20dB (Muting: ON/OFF) at 20Hz	+10dB at 20Hz	—
BASS	±10dB at 70Hz	±10dB at 70Hz	±10dB at 100Hz
TREBLE	±8dB at 20kHz	±8dB at 20kHz	±10dB at 10kHz
Selective Tone Control	—	—	±15dB at 50Hz/±6dB at 10kHz
Loudness:	—	—	+7dB at 70Hz, +5dB at 10kHz
Frequency Response:	2Hz — 50kHz (+0, -1dB)	2Hz — 50kHz (+0, -1dB)	1.5Hz — 30kHz (±1dB)
Signal to Noise Ratio: (IHF A)			
PHONO (MM)	94dB (5mV input)	93dB (5mV input)	83dB (5mV input)
PHONO (MC)	75dB (0.5mV input)	74dB (0.5mV input)	70dB (0.5mV input)
CD DIRECT	107dB	107dB	95dB
Muting:	-15dB (Vol -20dB)	-20dB	-20dB
Power Supply Rating (4 types):	● AC 120V 60Hz ● AC 220V 50Hz ● AC 240V 50Hz ● AC 120/220V switchable, 50/60Hz	● AC 120V 60Hz ● AC 220V 50Hz ● AC 240V 50Hz ● 120/220V switchable, 50/60Hz	● AC 120V 60Hz ● AC 220V 50Hz ● AC 240V 50Hz ● AC 120/220V switchable, 50/60Hz
Dimensions (W x H x D):	435 x 157 x 396mm 17-1/8" x 6-3/16" x 15-9/16"	435 x 147 x 388mm 17-1/8" x 5-13/16" x 15-5/16"	435 x 110 x 272mm 17-1/8" x 4-5/16" x 10-11/16"
Weight:	13.2kg, 29.1 lbs.	11.2kg, 24.7 lbs.	7.0kg, 15.4 lbs.

*Calculated on basis of IHF Dynamic Headroom

Quartz Synthesized Tuners

	T-4150	T-4130
Tuning Range:		
U.S. & Canada:	FM: 87.9 — 107.9MHz (200kHz steps)	FM: 87.9 — 107.9MHz (200kHz steps)
All other models:	87.5 — 108.0MHz (50kHz steps)	87.5 — 108.0MHz (50kHz steps)
U.S. & Canada:	AM: 530 — 1620kHz (10kHz steps)	AM: 530 — 1620kHz (10kHz steps)
European models:	522 — 1611kHz (9kHz steps)	522 — 1611kHz (9kHz steps)
Worldwide models:	531 — 1602kHz (9kHz steps)	531 — 1602kHz (9kHz steps)
Usable Sensitivity:		
FM mono:	10.3dBf, 0.9μV IHF (75Ω) 0.8μV 75Ω DIN	11.2dBf, 2.0μV IHF (75Ω) 0.9μV 75Ω DIN
FM stereo:	17.2dBf, 2.0μV IHF (75Ω) 2.0μV 75Ω DIN	17.2dBf, 4.0μV IHF (75Ω) 2.0μV, 75Ω DIN
AM:	25μV	25μV
50dB Quieting Sensitivity:		
FM mono:	16.1dBf, 17μV (75Ω)	16.1dBf, 3.5μV 1.7μV (75Ω)
FM stereo:	36.1dBf, 17μV (75Ω)	36.1dBf, 35μV 17μV (75Ω)
Capture Ratio (FM):	1.3dB (Wide)	1.5dB (Wide)
Image Rejection Ratio:	70dB	40dB
IF Rejection Ratio:	90dB	90dB
Signal to Noise Ratio:		
FM mono:	75dB IHF	73dB IHF
FM stereo:	73dB IHF	66dB IHF
AM:	40dB	40dB
Alternate Channel Attenuation (FM):	80dB IHF (±400kHz) (Narrow)	50dB IHF (±400kHz) (Narrow)
Selectivity	60dB DIN (±300kHz, 40kHz dev.) (Narrow)	55dB DIN (±300kHz, 40kHz dev.) (Narrow)
Harmonic Distortion:		
FM mono:	0.1% (Wide)	0.1% (Wide)
FM stereo:	0.2% (Wide)	0.2% (Wide)
AM:	0.8%	0.8%
Frequency Response (FM):	30 — 15,000Hz + 0.5dB (-1.0dB)	30 — 15,000Hz (±1.5dB)
FM Stereo Separation:	45dB at 1kHz (Wide) 30dB at 70 — 10,000Hz (Wide)	40dB at 1kHz (Wide) 30dB at 70 — 10,000Hz (Wide)
FM Muting Level:	17.2dBf, 2.0μV (75Ω)	17.2dBf, 4.0μV (75Ω)
Power Supply Rating (4 types):	● AC 120V 60Hz ● AC 220V 50Hz ● AC 240V 50Hz ● AC 120/220V switchable, 50/60Hz	● 120V 60Hz ● AC 220V 50Hz ● AC 240V 50Hz ● AC 120/220V switchable, 50/60Hz
Dimensions (W x H x D):	435 x 72 x 368mm 17-1/8" x 2-3/4" x 14-1/2"	435 x 71 x 268mm 17-1/8" x 2-13/16" x 10-9/16"
Weight:	3.7kg 8.2 lbs	2.7kg 6.0 lbs

ONKYO CORPORATION

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Nishi-Shimbashi 3-chome, Minato-ku, TOKYO 105, JAPAN
Tel: 03-432-6987 Fax: 03-436-6979 TLX: 242-3551 ONKYO J
ONKYO U.S.A. CORPORATION
200 Williams Drive, Ramsey, N.J. 07446, U.S.A.
Tel: 201-825-7950 Fax: 201-825-8150

● Specifications and design are subject to change with or without notice.
● Consult your ONKYO dealer for the power supply in your area.



Koss Infrared Listening Station

Hook the transmitter of Koss' JCK/100 Kordless Remote Listening Station to a stereo system and it will send stereo signals, via infrared light beams, to the system's receiver anywhere in the room. The receiver has its own volume control

plus switches for power, mono/stereo selection, and noise reduction. A lightweight headphone (such as the 3-oz. JCK/100S supplied with the system) plugs into the receiver. Price: \$129.95; additional transmitter, \$75. For literature, circle No. 109



Wittner CD Rack

The CD Carousel 80 holds 80 Compact Discs in four "towers" that are mounted on a revolving base. Additional 20-disc towers can be added to the top or sides of the system. Price: \$69.95; additional towers, \$9.95 each. For literature, circle No. 110

Bang & Olufsen Music Center

The Beocenter 9000 combines, in a single sleek unit, a digitally filtered CD player, an auto-reverse cassette deck, and an AM/FM receiver. A remote control is provided; the Beocenter can also be used with B & O's optional Master Control Link system for multi-room listening. The cassette section, like the CD player, features

programmable track selection; it also has Dolby B and C noise reduction and HX Pro headroom extension, an azimuth control system for the auto-reverse transport, and an automatic digital recording-level control system. The 30-watt-per-channel AM/FM receiver has manual and auto tuning plus 20 station memories. A 24-hour digital control timer is also built in. Price: \$2,999.

For literature, circle No. 111



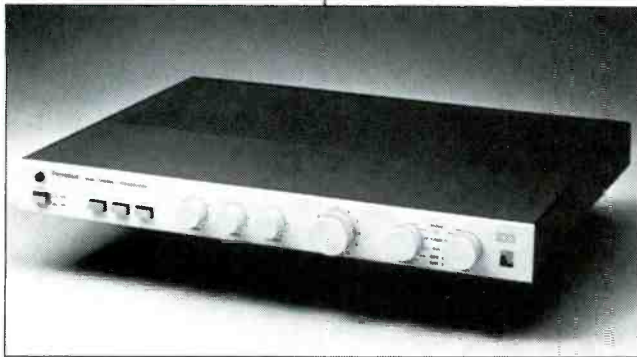
Audio Control Real-Time Analyzer

This 30-band, 1/3-octave analyzer, the SA-3050A, comes complete with a calibrated microphone. It features peak hold, and its six memories, which hold frequency curves even when the unit is turned off, can be averaged together. The unit also displays sound-pressure levels digitally. The display can be set to resolve in steps of 1, 2, 3, or 4 dB with fast, medium, or slow integration. Total display

range is -56 to +36 dBm. Inputs include a phantom-powered XLR input for the microphone; a BNC jack for connection to other instruments, and a stereo phone jack for balanced or unbalanced bridging, line-level input. Options include an internal rechargeable battery pack, a parallel printer output, a rack-mount frame, and a soft carrying case. Price: \$965; battery system, \$195; printer interface, \$110; rack mount, \$55; carrying case, \$59.

For literature, circle No. 112





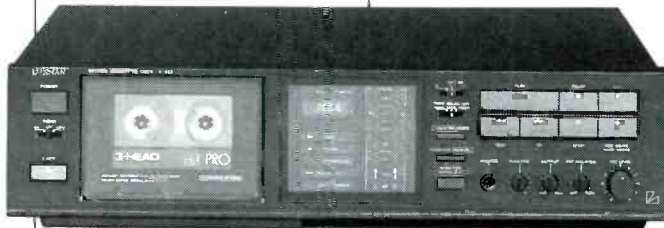
Perreux Preamplifier

The Perreux SX-1 preamplifier, a pure Class-A design, includes some features not found on the company's more expensive preamplifiers—tone controls, front-panel filter switches, provision for two tape decks, and a switchable record output. All signal paths have been

kept as short as possible, with mechanical linkages between front-panel control knobs and internal controls or switches. The RIAA phono section has passive equalization and enough gain to allow the use of low-output MC cartridges. Price: \$795. For literature, circle No. 113

Luxman Cassette Deck

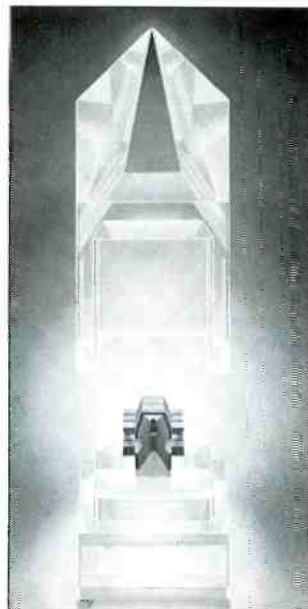
The K-112 cassette deck is a two-motor, three-head unit with Dolby HX Pro headroom-extension circuitry and Dolby B and C noise reduction. The head



Ortofon Phono Cartridge

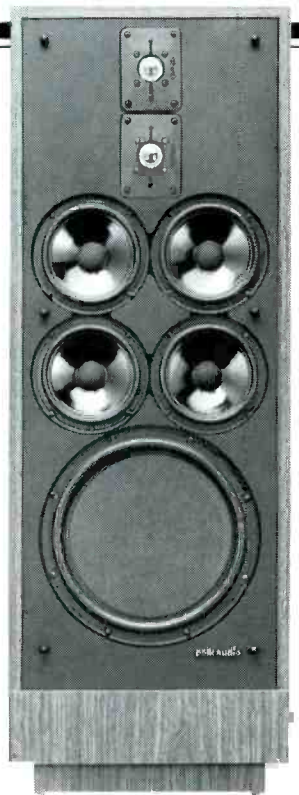
The shape of the Ortofon MC 3000's package reflects the shape of its Fritz Gyger Replicant 100 stylus. With a flat front facet and three angled rear facets, the stylus is said to combine maximum strength with the closest possible match to the shape of cutting styli. The cartridge was designed to provide the phase linearity of the MC 2000, but with higher signal output. This required the use of an ultra-light carbon-fiber cantilever and armature, a neodymium magnet, and a more focused flux field. Price: \$1,500.

For literature, circle No. 114



coils and Dolby circuits use oxygen-free copper wire. Bias is controllable by a front-panel fine-adjustment knob. The unit can be used with Luxman's unified and multi-room control systems. Frequency response is rated at 20 Hz to 21 kHz (± 3 dB) and S/N with Dolby C is 73 dB, both using metal tape. Price: \$500.

For literature, circle No. 115



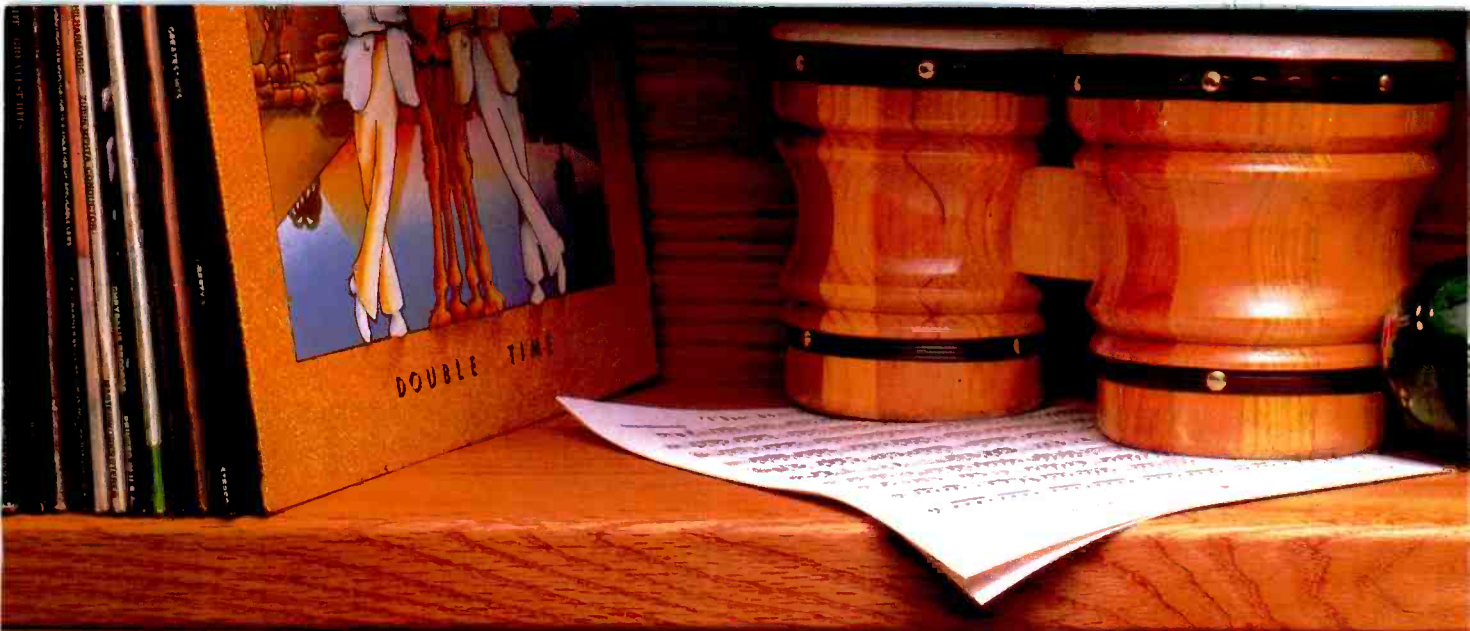
Polk Loudspeaker

An improved version of Polk's SDA 1 speaker, the SDA 1B uses two 1-inch polyamide dome tweeters with silver-coated voice-coils, four 6½-inch trilaminate polymer mid/bass drivers, and a 12-inch planar passive sub-bass radiator. In this model, Polk's SDA dimensional signals are restricted to the midrange above 150 Hz. The tweeters use "progressive point-source" technology, with one tweeter handling the high treble and both tweeters handling lower treble frequencies, for more consistent dispersion. Frequency response is rated at 14 Hz to 26 kHz and the impedance is 4 ohms. The speakers measure 43½ inches high, 16 inches wide, and 12 inches deep. Price: \$799 each.

For literature, circle No. 116

A new Shure cartridge or stylus helps improve
your sound while protecting valuable records.

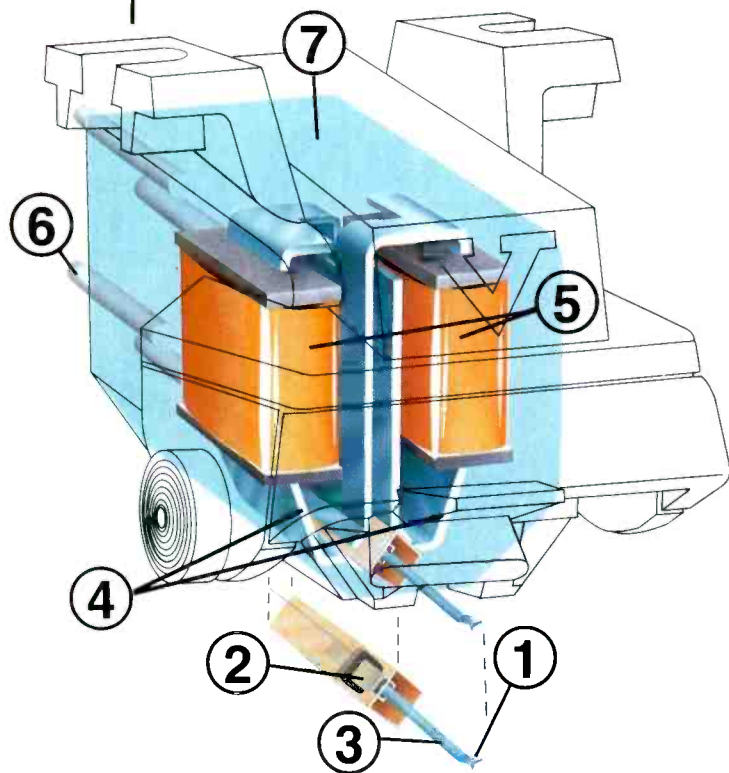




Do you know how important a cartridge and stylus are?

True high fidelity sound reproduction begins with the phono cartridge. It is the only point at which the recording is linked to the rest of your stereo system. Your system could have the most sophisticated turntable, receiver, and speakers but reproduce poor quality sound if the cartridge is not functioning correctly and accurately.

A top quality Shure cartridge or stylus also reduces record wear. With regular replacement, it can extend the life of your collection.



What goes on inside a cartridge?

The diagram on the left illustrates the basic structure of a Shure moving magnet cartridge. (1) Sound actually starts when the diamond stylus tip (needle) rides in the record groove. The motion of this tip moves a (2) magnet. The magnet and tip are connected by the (3) stylus shank. Inside the cartridge body, (4) magnetic conductors surround the magnet. (5) A coil of pure copper wire wraps around one leg of each conductor. As the magnet moves, it distributes the magnetic field among these magnetic conductors. Energy flows through the center of the copper coil and produces the electrical signal. This signal corresponds to the original motion of the tip and is electrically transmitted to the other components of your stereo system by terminal pins (6) bonded to the ends of the coils.

What shouldn't go on inside a cartridge?

The internal components of many cartridges are held in place with glue. Over time, they can loosen and movement can cause resonances that color or blur the signal and lessen the stereo effect. To eliminate this problem, all Shure cartridges feature (7) DURA-BODY ENCAPSULATE™ construction (see diagram to left). This unique encapsulation technique holds all components tightly in place. It ensures performance uniformity and cartridge longevity, eliminating the possibility of short or open circuits in the electrical components that could render the cartridge inoperative.



Stylus tips—which one is right for you?

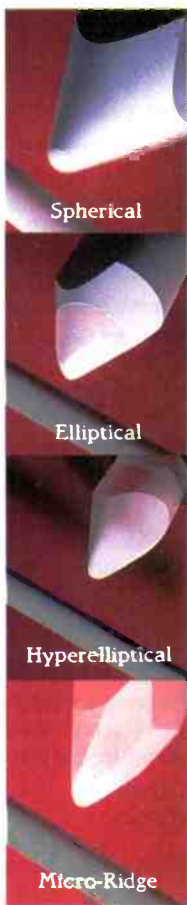
The shape of the diamond tip is the single most differentiating factor among styli. Certain shapes work better with one type of high fidelity equipment and for different musical preferences than others.

The **Spherical** or “conical” Tip has a simple, rounded tip. It was particularly well-suited to early LP recordings and pre-stereo records, although it is compatible with modern stereo recordings.

The **Elliptical** Tip works better with the newer, more lightweight tonearms. It is elongated, like an oval, and fits the record groove undulations better than the spherical tip, especially at higher frequency ranges.

The **Hyperelliptical (HE)** Tip is an improvement over the spherical and elliptical designs. The area of the tip that actually touches the record groove wall is longer and narrower to allow it to faithfully reproduce the highest frequency ranges with less distortion.

The **Micro-Ridge** Tip represents the ultimate in low-distortion sound reproduction due to its flawless tracing ability. The smaller contact radius dimension of the Micro-Ridge reduces distortion to an absolute minimum. It is today’s state-of-the-art design.



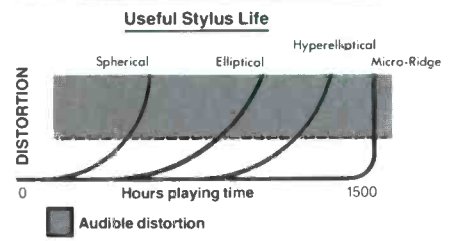
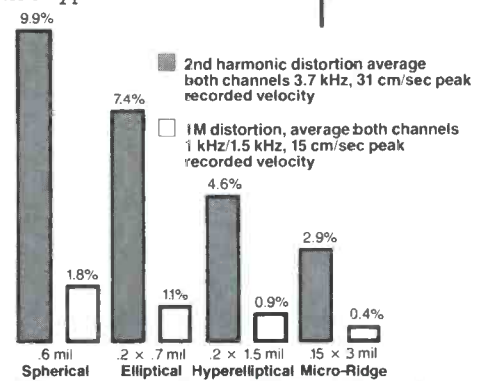
Which tip provides the least amount of distortion?

Distortion resulting from the tip shape is due to the inability of the tip to trace high frequency and complex signals. Spherical tips introduce the greatest amount of this type of distortion. The exclusive Shure Micro Ridge Tip reduces these effects to a minimum.

How long does a stylus tip last?

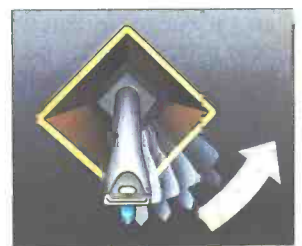
Stylus life varies by tip shape.* The patented Shure Micro Ridge Tip is designed to provide as much as 1500 hours of playing time before requiring replacement. This is twice as much as ordinary elliptical designs.

*Many other factors affect stylus life (tracking force, condition of your record collection, variations in stylus diameter and quality, etc.) so a prediction of usable stylus life is always an estimate.

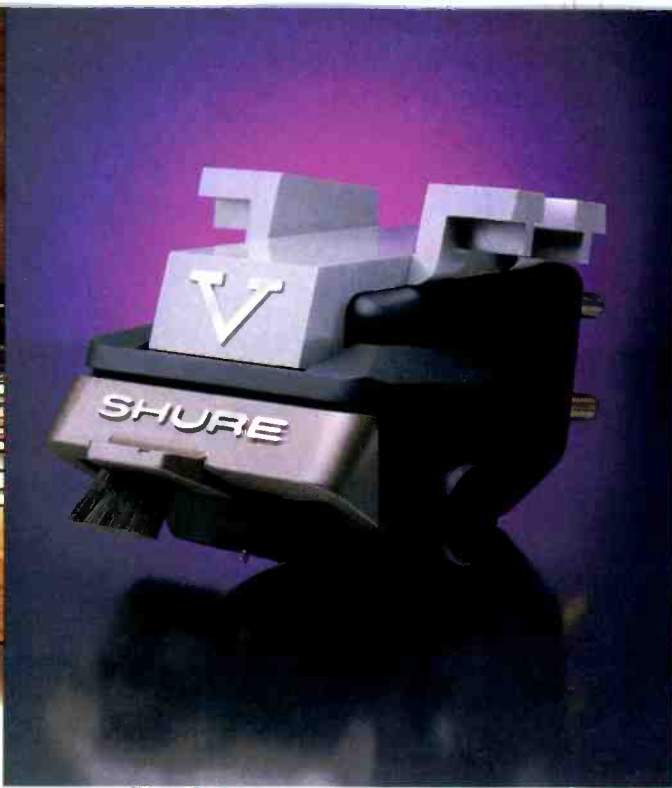


How can a stylus be protected from damage?

Shure’s patented Side-Guard Stylus Protection System protects your stylus from damage by guiding it into a protected area in the stylus grip when it is accidentally bumped against a record or the edge of the turntable platter.



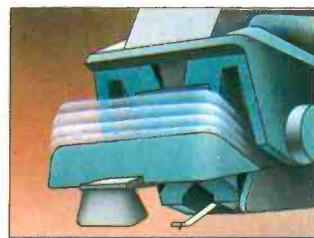
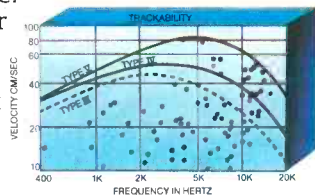
Side Guard



The finest achievement in sound reproduction. The V15 Type V-MR.

Shure's V15-Type V-MR features the revolutionary Micro Ridge Stylus Tip for unsurpassed tracing, particularly in the essential high frequency range. It provides an incredible 60cm/sec.; enough to handle the hottest signals of today's superdiscs. The patented MR Tip is also MASAR™-polished to further reduce record wall friction and prevent groove wall damage to extend record life.

A patented Dynamic Stabilizer functions like a miniature shock absorber to compensate for record warps which might result in groove skipping, cartridge bottoming and signal wow. The stabilizer's 10,000 electrically conductive fibers also simultane-

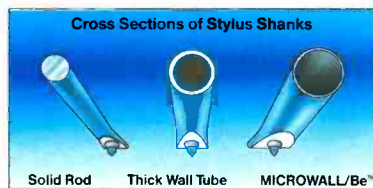


Dynamic Stabilizer

ously discharge static electricity from the record surface and sweep microscopic dust from record grooves. The Beryllium MICRO-WALL/Be™ Stylus Shank delivers incredibly accurate, high-frequency trackability with the lowest effective stylus mass of any shank yet measured. This reduced mass results in a truer, more refined sound with significantly less record and stylus wear. You'll also hear crisper highs and more forceful bass with a rich audio depth you've never heard before.

ously discharge static electricity from the record surface and sweep microscopic dust from record grooves.

The Beryllium MICRO-WALL/Be™ Stylus Shank delivers incredibly accurate, high-frequency trackability with the lowest effective stylus mass of any shank yet



*Shank performance ratio stiffness/effective mass, relative to a 10 mil solid rod.

SPECIFICATIONS

Stylus Tip: Micro-Ridge

Tracking Force:

Force At The Stylus Tip

Total Tone Arm Setting With Dynamic Stabilizer Operating

Optimum: 10 mN (1.0 gram)

15 mN (1.5 grams)

Maximum: 12.5 mN (1.25 grams)

17.5 mN (1.75 grams)

Force Exerted by Dynamic Stabilizer:

5 mN (0.5 grams)

Trackability at 10 mN (1 gram) Tracking Force (Typical in cm/sec peak velocity):

400 Hz: 30 cm/sec

5 kHz: 80 cm/sec

1 kHz: 46 cm/sec

10 kHz: 60 cm/sec

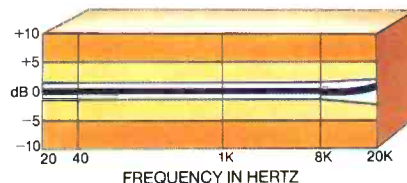
Channel Balance: Within 1.5 dB

Channel Separation: 1kHz: 25 dB or greater, 10 kHz: 18 dB or greater

Output Voltage (Typical):

3.2 mV RMS at 1 kHz at 5 cm/sec peak velocity

Frequency Response Limits:



Recommended Load: Capacitance loading from 100 pF to 400 pF will cause negligible change from the recommended 250 pF loading.

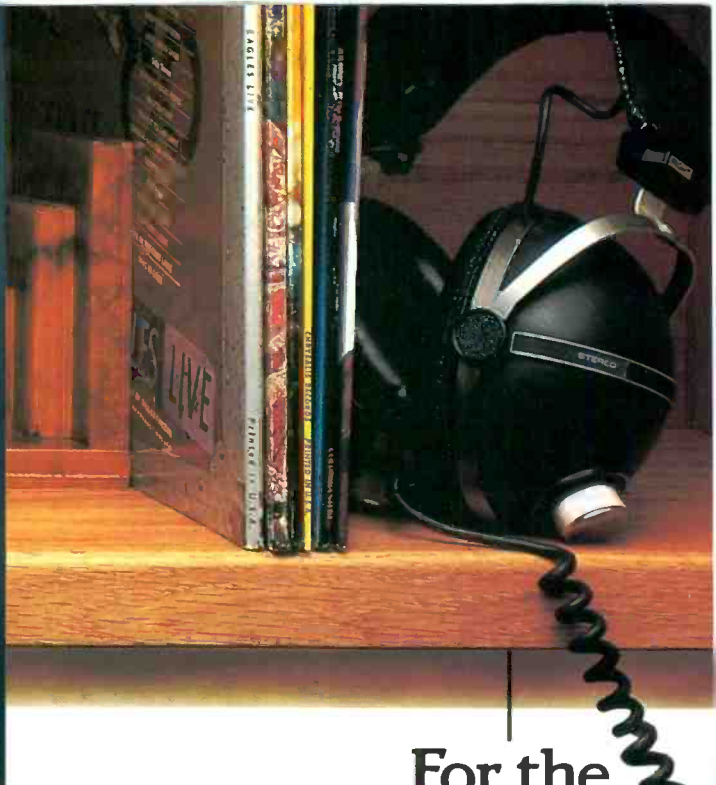
Cartridge Weight:

V15 Type V-MR: 6.6 grams

V15 Type V-B: 6.6 grams

V15 Type V-P: 5.9 grams

Stylus Replacement: VN5MR, VN5HE, VN5P, VN578E



For the sophisticated listener. The M111HE and M110HE

SPECIFICATIONS

Stylus Tip: Hyperelliptical

Tracking force at the stylus tip:

Optimum: 12.5 mN (1.25 grams)

Maximum: 15.0 mN (1.5 grams)

Force Exerted by Dynamic Stabilizer (M111HE):

5 mN (0.5 grams)

Trackability at 12.5 mN (1.25 grams) Tracking Force (Typical in cm/sec peak velocity):

400 Hz: 30 cm/sec

1 kHz: 44 cm/sec

10 kHz: 31 cm/sec

Frequency Response: Essentially flat 20-20,000 Hz

Channel Balance: Within 2.0 dB

Channel Separation: 1 kHz: 25 dB typical

Output Voltage (Typical): 4.0 mV RMS at 1 kHz at 5 cm/sec. peak velocity

Net Weight (with mounting adapter, screw and nut):

M111HE 8.3 grams; also P-mount compatible

M110HE 7.3 grams; also P-mount compatible

Stylus Replacement: N111HE, N110HE

Relax and enjoy your favorite music at its best. The M111HE and M110HE offer you brilliant clarity in sound for outstanding listening enjoyment. They include design technology and performance that are superior to comparably priced cartridges from other manufacturers.

These cartridges accurately reproduce even the most difficult music passages. Their critically accurate tracking is the result of Shure's uniquely constructed heat-treated telescoped stylus shank and exclusive precision-crafted Hyperelliptical Diamond Tip.

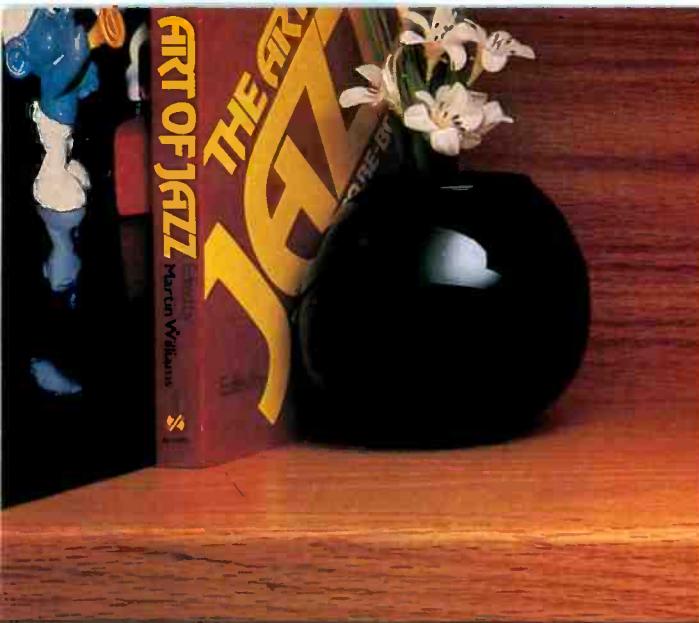
The M111HE also has Shure's exclusive Dynamic Stabilizer shock absorber. Both models contain a built-in Side-Guard Stylus Protection System to protect your stylus from accidental damage. The M110HE also features a slide-on stylus guard.

These cartridges can be used with the standard 1/2" mount tone arm or most P-mount tone arm systems.

Accessories include a stylus cleaning brush plus a screwdriver and mounting hardware.

Whether you choose the M111HE or M110HE, you'll find either is a modest price to pay for big sound.

*Note: The M111HE is not recommended for use in non-adjustable P-mount tonearms. For these tonearms we recommend the M110HE.



Outstanding cartridges for the basic system.

The M105E and M104E

The M105E and M104E capture and recreate sound with an elliptical shaped diamond stylus tip and an aluminum alloy shank to faithfully reproduce your favorite music.

The M105E features a Destaticizer brush to clean dust from record grooves and remove static electricity from the record surface. Plus built-in Side-Guard Stylus Protection.

SPECIFICATIONS

Stylus Tip: .2 x .7 Elliptical

Tracking Force at the Stylus Tip:

Optimum: 12.5 mN (1.25 grams)
Maximum: 15.0 mN (1.5 grams)

Force Exerted by Destaticizer (M105E):

5 mN (0.5 grams)

Trackability at 12.5 mN (1.25 grams) Tracking Force (Typical in cm/sec peak velocity):

M105E: 400 Hz: 25 cm/sec
1 kHz: 35 cm/sec 10 kHz: 23 cm/sec
M104E: 400 Hz: 24 cm/sec

Frequency Response: Essentially flat 20-20,000 Hz

Channel Balance: Within 2.0 dB

Channel Separation: 1 kHz: 25 dB typical

Output Voltage (Typical): M105E: 4.7 mV RMS at 1 kHz at 5 cm/sec. peak velocity

M104E: 5.0 mV RMS at 1 kHz at 5 cm/sec. peak velocity

Net Weight (with mounting adapter, screw and nut):

M105E: 7.8 grams; also P-mount compatible
M104E: 7.3 grams; also P-mount compatible

Stylus Replacement: N105E, N104E

The M99E and M92E

The M99E and M92E offer excellent sound performance within their price range. Why gamble on other budget priced cartridges when Shure quality is still within your grasp?

The elliptical shaped stylus tip teamed with an aluminum alloy stylus shank traces the groove of your records for a difference you can hear.

Both cartridges feature a slide-on stylus guard and fit on P-mount tone arm systems or on 1/2" mount tone arms when you use the adapter provided.

Accessories include all the necessary mounting hardware.

SPECIFICATIONS

Stylus Tip: .4 x .7 elliptical

Tracking Force at the Stylus Tip:

Optimum: 12.5 mN (1.25 grams)
Maximum: 15.0 mN (1.5 grams)

Trackability at 12.5 mN (1.25 grams) Tracking Force (Typical in cm/sec peak velocity):

400 Hz: 24 cm/sec

Frequency Response: M99E: 20-20,000 Hz

M92E: 20-18,000 Hz

Channel Balance: Within 2.0 dB

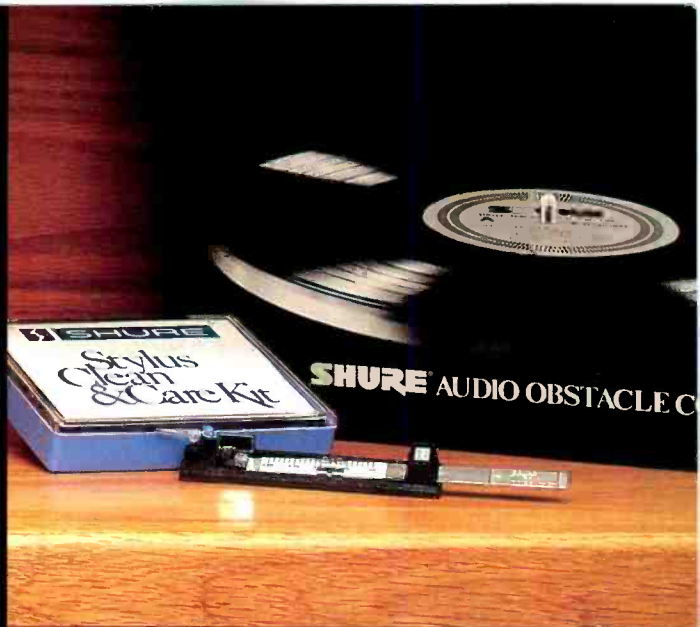
Channel Separation: 1 kHz: 20 dB typical

Output Voltage (Typical): 5.0 mV RMS at 1 kHz at 5 cm/sec. peak velocity

Net Weight (with mounting adapter, screw and nut):

7.3 grams; also P-mount compatible

Stylus Replacement: N99E, N92E



Genuine Shure replacement styli.

Laboratory tests prove it: a genuine Shure replacement stylus brings your cartridge right back up to original specifications. No fly-by-night imitation can be trusted to do this. And

no substitute offers Shure one-year warranty on craftsmanship and materials. Insist on the real thing—because a cheap imitation could be the most expensive “bargain” you’ll ever buy.

SPECIFICATIONS

MODEL NUMBER	DIAMOND STYLUS TIP SIZE (MILS)	TYPE	TRACKING FORCE
N3D	0.7	Spherical	3 to 6 grams
N11	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N12	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N14	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N15	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
N16	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
N21D	0.7	Spherical	1 1/2 to 2 1/2 grams
N44C	0.7	Spherical	3 to 5 grams
N44E	0.4 x 0.7	Elliptical	1 3/4 to 4 grams
N44G	0.6	Spherical	3/4 to 1 1/2 grams
N44-1	1.0	Spherical	1 1/2 to 3 grams
N44-3	2.5	Spherical	1 1/2 to 3 grams
N44-7	0.7	Spherical	1 1/2 to 3 grams
N55E	0.2 x 0.7	Elliptical	3/4 to 2 grams
N70B	0.6	Spherical	1 1/2 to 3 grams
N70EJ	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N72B	0.6	Spherical	1 1/2 to 3 grams
N72EJ	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N74C	0.7	Spherical	2 to 4 grams
N75B Type 2	0.6	Spherical	1 1/2 to 3 grams
N75C	0.6	Spherical	3 to 5 grams
N75EC	0.4 x 0.7	Elliptical	2 to 4 grams
N75ED Type 2	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N75EJ Type 2	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N75G Type 2	0.6	Spherical	3/4 to 1 1/2 grams
N75HE Type 2	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
N75HEJ-T2	0.6 x 1.5	Hyperelliptical	1 1/4 to 2 1/2 grams
N75-3	2.5	Spherical	1 1/2 to 3 grams
N75-6	0.6	Spherical	1 1/2 to 3 grams
N77	0.7	Spherical	3 to 6 grams
N78E	.5 x 2.5	Elliptical	3/4 to 1 1/2 grams
N91E	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N91ED	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N91G	0.6	Spherical	3/4 to 1 1/2 grams
N91GD	0.6	Spherical	3/4 to 1 1/2 grams
N91-3	2.5	Spherical	1 1/2 to 3 grams
N92E	0.4 x 0.7	Elliptical	1 1/4 grams
N93E	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N94LT	0.4 x 0.7	Elliptical	1 1/4 grams
N95ED	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N95ED/D	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N95EJ	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N95G	0.6	Spherical	3/4 to 1 1/2 grams
N95HE	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
N95HE/D	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
N95-3	2.5	Spherical	1 1/2 to 3 grams
N96LT	0.2 x 0.7	Elliptical	1 1/4 grams

MODEL NUMBER	DIAMOND STYLUS TIP SIZE (MILS)	TYPE	TRACKING FORCE
N97B	0.6	Spherical	1 1/2 to 3 grams
N97ED	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
N97EJ	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
N97GD	0.6	Spherical	3/4 to 1 1/2 grams
N97HE	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
N97LT	0.2 x 1.5	Hyperelliptical	1 1/4 grams
N978E	0.5 x 2.5	Elliptical	1 1/2 to 3 grams
N99	0.7	Elliptical	1 1/2 to 3 grams
N99E	0.2 x 0.7	Elliptical	1 1/4 grams
N104E	0.2 x 0.7	Elliptical	1 1/4 grams
N105E	0.2 x 0.7	Elliptical	1 1/4 grams
N110HE	0.2 x 1.5	Hyperelliptical	1 1/4 grams
N111HE	0.2 x 1.5	Hyperelliptical	1 1/4 grams
N120HE	0.2 x 1.5	Hyperelliptical	1 to 1 1/2 grams
N140HE	0.2 x 1.5	Hyperelliptical	1 to 1 1/4 grams
NDC-ED	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
NDC-EJ	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
NDC-HE	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
NE95ED*	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
NE97HE**	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/2 grams
NV30HE	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/4 grams
N380E	0.4 x 0.7	Elliptical	1 7/20 to 1 13/20 grams
N390E	0.2 x 0.7	Elliptical	9/10 to 1 1/10 grams
SS35C	0.6	Spherical	4 to 5 grams
SS39B	0.7	Spherical	1 1/2 to 3 grams
SS39ED	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
SS39EJ	0.4 x 0.7	Elliptical	1 1/2 to 3 grams
SS78E	0.5 x 2.5	Elliptical	4 to 5 grams
VN15E	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
VN2E	0.2 x 0.7	Elliptical	3/4 to 1 1/2 grams
VN3G	0.6	Spherical	3/4 to 1 1/4 grams
VN35E	0.2 x 0.7	Elliptical	3/4 to 1 1/4 grams
VN35HE	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/4 grams
VN35MR	.15 x 3.0	Micro-Ridge	3/4 to 1 1/4 grams
VN78E	0.5 x 2.5	Elliptical	1 1/2 to 3 grams
VN4G	0.6	Spherical	3/4 to 1 1/4 grams
VN45HE	0.2 x 1.5	Hyperelliptical	3/4 to 1 1/4 grams
VN45MR	.15 x 3.0	Micro-Ridge	3/4 to 1 1/4 grams
VN45LT	0.2 x 1.5	Hyperelliptical	1 1/4 grams
VN478E	0.5 x 2.5	Elliptical	3/4 to 1 1/4 grams
VN5G	0.6	Spherical	1 to 1 1/4 grams
VN5HE	0.2 x 1.5	Hyperelliptical	1 to 1 1/4 grams
VN5MR	.15 x 3.0	Micro-Ridge	1 to 1 1/4 grams
VN5P	0.2 x 1.5	Hyperelliptical	1 1/4 grams
VN578E	0.5 x 2.5	Elliptical	3/4 to 1 1/4 grams

*Replacement stylus for ME95ED only.

**Replacement stylus for ME97HE only.

Protect valuable records by replacing your Shure cartridge or stylus at least once a year.

Even a precision-crafted diamond stylus will eventually become worn and degrade your hi-fi system's sound quality. This may actually ruin precious records in just a single play! Have your stylus checked at least once a year by your Shure dealer and, if worn, replace it with a genuine Shure stylus. It's the least expensive insurance for your valuable record collection.

Anyone can replace a Shure stylus...
it's as easy as A, B, C:



A. Grasp the stylus grip between thumb and forefinger.



B. Gently withdraw the stylus assembly from cartridge.



C. Push the new stylus into position in the cartridge until the stylus grip touches the cartridge body.

Cartridge/Stylus Cross Reference Guide

Note: Red numbers indicate discontinued model.

CARTRIDGE MODEL	DIRECT REPLACEMENT STYLUS	PERFORMANCE UPGRADE STYLUS	CARTRIDGE MODEL	DIRECT REPLACEMENT STYLUS	PERFORMANCE UPGRADE STYLUS	CARTRIDGE MODEL	DIRECT REPLACEMENT STYLUS	PERFORMANCE UPGRADE STYLUS	CARTRIDGE MODEL	DIRECT REPLACEMENT STYLUS	PERFORMANCE UPGRADE STYLUS
2214	N75EC		M71EMB		N75EJ-T2	M95G	N95G	N95ED	R47EDT		N75ED-T2
2215	N93E	N75EJ-T2	M71MB	N75-6	N75B-T2	M95HE	N95HE		R47XT	NDCEJ	NDCCD
24-000/3	N3D		M71MC	N75C		M95HE-D	N95HE-D	N95HE	R700E		N75ED-T2
24-004	N44E		M72B	N72B		M96LT	N96LT		R7C		N75C
42-236	N3D		M72EJ	N72EJ		M97 series 78	N97 series 78		R9000E	N95ED	N95HE
DC CART ED	NDC-ED	NDC-HE	M73G		N75G-T2	M97B	N97B	N97HE	R9000E-LWS	N95ED	N95HE
DC CART EJ	NDC-EJ		M73MG		N75G-T2	M97ED	N97ED	N97HE	RM900E	N91E	N91ED
DC CART HE	NDC-HE		M73PE	N31E		M97EJ	N97EJ	N97HE	RM910E		N75EJ-T2
DT10E		N75EJ-T2	M73PED			M97GD	N97GD	N97HE	RM910ED	N91ED	
DT15P		N75G-T2	M73SG		N75ED-T2	M97HE	N97HE		RM930C	N75C	
DT20E		N75ED-T2	M74CSM	N74C		M97HE-AH	N97HE		RM950ED	N95ED	N95HE
DT25P		N94LT	M74CSZ		N75C	M97LT	N97LT		RS100	N3D	
DT35P		N96LT	M75 Type D	N75-6	N75B-T2	M98ED-T2	N98ED	N95HE	RS120E		N32E
DT35P Hyper-Ridge		N97LT	M75 series 78	N75-3		M991E	N991E	N75HE-T2	RS220E		N31E
DT50HE	N97HE		M75-6	N75-6	N75B-T2	M992E	N992E	N75EJ-T2	RXP3	N104E	N105E
DU10-M75E-T2		N75ED-T2	M75-6 Type 2	N75-6	N75B-T2	M993ED	N993ED		RXT4		N97HE
HE50S		N92E	M75-6S	N75-6	N75B-T2	M995ED	N995ED	N75ED-T2	RXT5		N111HE
HE100E	N92E		M75-T2	N75-6	N75ED-T2	M99A	N44-7	N95HE	RXT6		N111HE
HE150		N99E	M75CS	N75C		M99E	N99E	N104E	SC35C	SS35C	
HE200	N104E	N105E	M75E		N75ED-T2	ME70B	N70B		SC35C "78"	SS78E	
HE250	N105E	N111HE	M75E-T2		N75ED-T2	ME75-6	N75-6	N75B-T2	SC39B	SS39B	SS39EJ
JB Series-Red	N92E	N99E	M75EC	N75EC		ME75P	N92E		SC39ED	SS39ED	
JB Series-Blue	N99E	N104E	M75ED-T2	N75ED-T2		ME75EJ	N75EJ-T2		SC39EJ	SS39EJ	
JB Series-Yellow	N104E	N105E	M75EJ-T2	N75EJ-T2		ME75ED	N75ED-T2		SPS-Brown	N11(NPS 1)	N14
JB Series-White	N110HE	N111HE	M75G		N75G-T2	ME94P	N99E		SPS-Orange	N12(NPS 2)	N14
LTP-2		N94LT	M75G-T2	N75G-T2		ME95ED	WE95ED	N105E	SPS-Tan	N13(NPS 3)	N14
M104E	N104E	N105E	M75HE-T2	N75HE-T2		ME96P	ME96P		SPS-Blue	N14(NPS 4)	
M105E	N105E	N111HE	M75HEJ-T2	N75HEJ-T2		ME97HE	ME97HE		SPS-Green	N15(NPS 5)	N14
M110E	N70EJ	N72EJ	M75MB	N75-6	N75B-T2	MT100E		N75EJ-T2	SPS-Black	N16(NPS 6)	
M110HE	N110HE	N111HE	M75MB-T2	N75B-T2	N75EJ-T2	MT105P		N94LT	T40-1		N75ED-T2
M111HE	N111HE		M75MG	N75G-T2	N75G-T2	MT200E		N75ED-T2	T40-2	N70EJ	N72EJ
M112EJ	N75EJ-T2		M75MG-D	N75G-T2	N75ED-T2	MT205P		N94LT	T40-3		N75C
M115ED	N95ED	N95HE	M75MG-T2	N75G-T2	N75ED-T2	MT305P		N96LT	T40-4	N92E	
M120HE	N120HE	N140HE	M77	N77		MT305HE		N97HE	T40-5	N75-6	N75EJ-T2
M140HE	N140HE		M77D	N77		MV30HE	NV30HE		TAE1	N75EJ-T2	N75ED-T2
M17C-M	N17C		M77MD	N77					TAE2	N75-6	N75EJ-T2
M21	N21D		M78ED-T2	N78ED-T2	N70EJ				TAE3	N75EJ-T2	N75ED-T2
M22	N22D		M78EJ-T2	N78EJ-T2	N72EJ	Premier Series			TKS-380E	N380E	NV30HE
M24H	N24H		M79D	N79D		Black			TKS-390E	N390E	NV30HE
M3-21D	N21D		M80E series	N55E		.J. Green	N75ED-T2	N75HE-T2			
M3D	N3D		M81CS	N75C		.J. Green yellow	N75EJ-T2		TM1E		N75EC
M31E	N31E		M81ECS	N75EC		3eige	N95ED	N95HE	TM1S		N75EC
M32E	N32E		M81MC	N75C		.J. Green	N70B	N72B	TM2E		N75ED-T2
M44 series-sonoc	N44-1		M91 series 78	N91-3		Presence 1	N75EJ-T2	N95EJ-T2	TM3E		N75ED-T2
M44 series-78	N44-3		M911E	N91ED		Presence 2	N94LT	N94LT	Tracer 1	N97HE	
M44-1P	N44-1P		M912ED	N91ED		Presence 3	N75ED-T2	N75ED-T2	Tracer 2		N55ED
M44-5		N44G	M919ED	N91ED		Presence 4	N94LT	N94LT	Tracer 3		N95ED
M44-7	N44-7		M91 series	N91E	N91ED	Presence 5	N97HE	N97HE	Tracer 4		N95EJ
M44-MR	N44-MR		M91E series	N91E		Presence 6	N97LT	N97LT	Tracer 5		
M44C	N44C		M91ED series	N91ED		Presence 8 (Hyper-elliptical)	N97LT	N97LT	TXE-SR	N41E	
M44G	N44G		M91G	N91G	N91ED	Pro-4 (Pro Track 4)	N92E	N92E	V15 series	N15E	
M44MA	N44-7		M91GD	N91GD	N91ED	Pro-6 (Pro Track 6)	N99E	N99E	V15II series	N15E	NV35MR
M44MB	N44-7		M91MGD	N91MGD	N91ED	Pro-8 (Pro Track 8)	N904E	N904E	V15III-G	N13G	NV35MR
M44MC	N44C					Pro-10 (Pro Track 10)	N905E	N905E	V15III-HE	N135HE	NV35MR
M44MF	N44G		M92E	N92E	N99E	F1000E	N1ED		V15III series 78	N78E	
M44MG	N44G		M92E pre 1975	N92E	N91E	F1000ED	N75ED-T2		V15IV series	N45HE	NV45MR
M55E	N55E		M92G	N92G	N91G	F1000EDT	N75ED-T2		V15IV-G	N44G	NV45MR
M55EM	N55E		M92LT-EP	N92LT	N94LT	F1000XT	N75ED-T2		V15IV-MR	N445MR	
M705EX	N75ED-T2	N75HE-T2	M93E	N93E	N93E	F25EC	N75EC		V15IV series 78	N447E	
M70B	N70B		M93E	N93E		F25ED	N75EC		V15HR-P	N445LT	
M70EJ	N70EJ		M94LT	N94LT		F25EDT	N75EC		V15LT	N445LT	
M71-6	N75B-T2		M95 series	N95-3		F25XT	NDCEJ		V15V series 78	N457E	
M71C	N75C		M95ED	N95ED	N95HE	F27E		N75ED-T2	V15V-G	N45G	NV5MR
M71EB	N75EJ-T2		M95ED D	N95ED	N95HE	R17EB		N75ED-T2	V15V-MR	N45MR	
			M95EJ	N95EJ	N95HE	R47ED		N75ED-T2	V15V-P	N45P	

SHURE

ANNUAL EQUIPMENT DIRECTORY 1 9 8 7

This year we are publishing our 30th Annual Equipment Directory, and—again—it is bigger than last year's Directory. However, it is only *just* bigger, up 143 models over the 20 categories of equipment. This works out to 3.3% of the 4,342 total models we list this year. I must again emphasize that the specifications are not the result of tests in our laboratories. Rather, the data comes in on forms which we send to a large number of firms. These forms are also sent to a fairly sizable number of public relations and advertising agencies, which at times are more strongly aware of the importance of submitting information to us. Our essential rule is that a form must be returned if a piece of equipment is to be listed.

One other interesting question is the sanctity of the answers given us by the manufacturers. Each year we look at every question on the forms and ask ourselves whether we actually want to ask the makers that question—or is it really something else we're interested in? We try, as well, to be exactly specific with the questions, referring to international standards of measurement where we can. Naturally, each year some company or other gives us answers in furlongs per fortnight when a hundred others have given us a forthright "Yes" or "No"! The situation, then, becomes interesting when we try to explain basic engineering to a Chief Engineer over the telephone, in order to elicit

usable information. Worse, yet, is trying to explain basic engineering to someone who tells you, proudly, "My title is Least Secretary and I've worked here two weeks." (Sigh!)

Last year, I examined the rise and fall of the number of models in the various categories,





COMPACT DISC PLAYERS
DIGITAL RECORDERS / PROCESSORS



AMPLIFIERS
PREAMPLIFIERS



TUNERS
RECEIVERS



TURNTABLES
TONEARMS
PHONO CARTRIDGES



CASSETTE DECKS
OPEN-REEL TAPE DECKS
BLANK TAPE



MICROPHONES



HEADPHONES



EQUALIZERS / AMBIENCE &
SURROUND-SOUND PROCESSORS /
SIGNAL PROCESSORS / CROSSOVERS



HI-FI VCRs



LOUDSPEAKERS



and I would like to do that again this year, adding some data on the changing number of makers in individual categories. In the digital field, recorders and digital processors are virtually unchanged, though the number of CD players is up by 27 models (about 14%) with only 1 more maker. Amps is up 32 models, to 446, from almost the same number of makers; tuners shows 16 new models and 10 additional brands. Receivers, too, is up, with 21 more models but only 2 new makers. Turntable models is down 19, but brands listed is up by 3; tonearms is plus 2 models, plus 1 brand; phono cartridges is minus 4 models, minus 5 brands. All of the tape recording categories have been apparently hit by the CD invasion. Open-reel machines is down 6 models and 2 makers; cassette decks is down a whopping 30 models (about 14%), though only 2 makers dropped out; blank tape shows 9 fewer formulations in 3 fewer brands, with makers apparently ready to bring DAT tapes to market, if possible. Both mikes and headphones are up—plus 40 and 33, respectively. Equalizers has dropped 11 units, while ambience and surround-sound units has gained 16 models and 13 makers. The big gainer is speakers; the category is up 52 models and 14 manufacturers to 262 brands.

While these trends do say something about where hi-fi buff interest is moving—or at least where the manufacturers think it is moving—it doesn't truly say much about the strengths of the market. We get lots of telephone calls about this latter question, but unfortunately we don't have any special organs of perception and so can only guess about such things as, say, rank order by market share of speaker makers. I've had a particularly hard time in a couple of cases this past year getting that notion across to Sub-Junior Assistant Media Planners. The conversations went something like this: "But you *have* to know who the top 100 speaker makers are! I've called everyone else!" "Okay, let's try it this way. Does Macy's tell Gimbel's? Of course not! And the companies don't tell us either."

Other business: Special thanks to Bill Kirkpatrick, our ex officio Directory Editor, who sacrificed a great deal of his summer that we might have another Big D. Finally, it is a false rumor that I own stock in a firm that makes magnifying glasses.—**E.P.**

A DECADE OF EXCELLENCE



Spectral introduces a new reference amplifier for the discriminating music enthusiast. The DMA-200 culminates many years of effort at Spectral to perfect the high resolution amplifier. Utilizing design features from the instrumentation and microwave fields, the DMA-200 introduces new technical sophistication and refinement to amplifier design.

The result is a 200 watt Class A circuit with dramatically reduced non-linearities yielding purity and musical realism.

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The only people capable of showing

The ES Series: The next step in digital audio, from the creator of the compact disc.



Sony has been the leader in both professional and home digital audio for over a decade. With such breakthroughs as PCM processors, Compact Disc Players, and Digital Audio Tape recorders.

Now, the Sony ES engineers, a dedicated group who are above the compromise between technology, convenience and price, have created the ES Series.

Each component in the ES Series represents an ES engineer's dream. Once you've heard them, you'll want to own them.

The CDP-705ESD: A new benchmark in a series of reference standard Compact Disc Players.

Like all the new Sony ES Series CD players, the 705ESD offers 4X oversampling and full 16-bit, dual D/A converters.

But as an ES Digital component, the 705ESD must provide even more. Such as special waveform shift circuits that avoid crossover and notch distortion at low voltage levels for superb linearity. Or an advanced digital-to-analog converter deglitcher that improves music resolution at all listening levels.



The Sony 705ESD CD Player: 4X oversampling digital filter; 16-bit dual D/A converters; deglitcher stage; Unilinear Converter 'master clock'; linear phase filters; Error Prediction Logic; aspheric optical lens; Linear Motor tracking; low-resonance G-Chassis; dual power transformers; Optical Transfer stage; digital output.

Most important of all, the 705ESD has a direct digital output stage for the digital needs of tomorrow.

Direct Digital Output: A Sony first that connects the present to the future.

In 1985, Sony pioneered the concept of processing data through an outboard D/A converter, to avoid the



normal restrictions imposed by chassis size, signal path integration and heat degradation.

Now, any digital music source can be reproduced with more depth, detail and imaging than ever before.

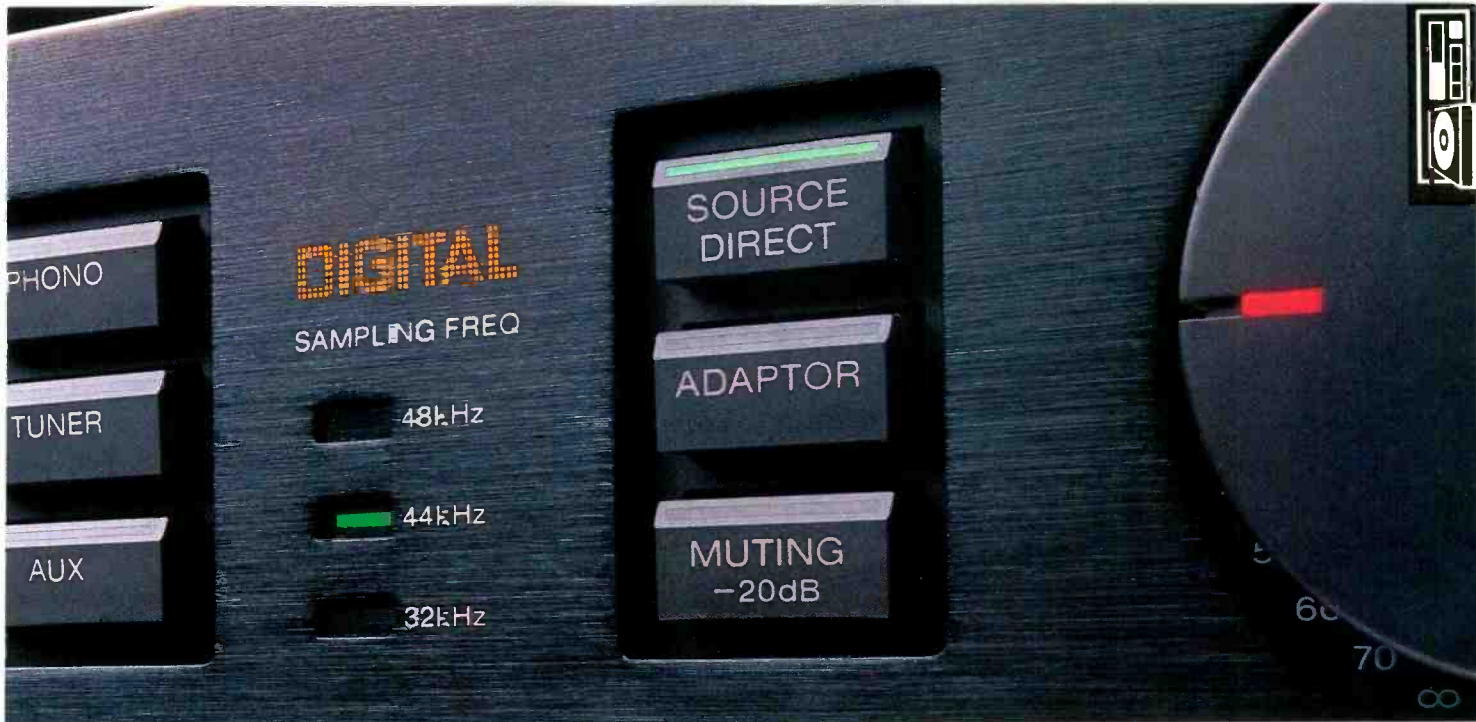
The TA-E77ESD: The future of digital signal processing.

The TA-E77ESD Preamplifier provides three digital inputs for direct interfacing with both current and future digital components, plus decoding at three different sampling rates. It also has a digital processing loop for high-quality recording.

The 4X oversampling, 16-bit, dual D/A converters are totally shielded in a copper subchassis that prevents spurious noise from



Now until December 31, 1987, buy any Sony ES CD player and get a special Telarc/Sony CD sampler free. See your Sony ES dealer for details.



you the future of digital audio just did.

affecting the analog circuits. Direct coupling of the D/A converter simplifies the signal path and minimizes internal interference.

The TA-E77ESD includes many features that are difficult to find on other preamplifiers at any price. Even a programmable infrared Remote Commander[®] that controls any brand of audio and video component with infrared operation.

The TA-N77ES: A power amplifier worthy of the Sony ES name.

Even the most advanced components require superior amplifier performance. The TA-N77ES delivers 200 watts of continuous power per channel into 8 ohms and has the operating stability to deliver 660 watts of dynamic power into a 1 ohm load.

A Spontaneous Twin Drive design with separate voltage and current stages helps reduce cross-interference. And the oversized power transformer and high-current non-switching discrete output



The Sony TA-E77ESD Preamplifier: Decodes 32kHz/44.1kHz/48kHz sampling rates; 3 digital inputs; digital output stage; digital processing loop; 4X oversampling digital filter; 16-bit dual D/A converters; copper-shielded subchassis; direct-coupled D/A stage; low-resonance G-Chassis; separate audio/video signal paths; high-resolution (S-video) input/output terminals; REC OUT selector.



The Sony TA-N77ES Amplifier: 200 watts per channel, both channels driven into 8 ohms; 270 watts per channel, into 4 ohms; Spontaneous Twin Drive (STD) design; 520 VA power transformer; non-conductive, low-resonance G-Chassis; high-current, non-switching discrete output stage.

stage provide additional power on demand.

The ES Series: Proof positive that Sony is still the leader in digital audio.

When the ES engineers created the ES Series, they had permanence in mind. These components will please their owners for years to come.

All ES components, including our integrated amplifiers, tuners, cassette decks and digital processors, are designed with meticulous detail and built with extreme care. That's why Sony backs each ES component with a three-year parts and labor limited warranty.

The ES Series components are now available at exclusive, authorized Sony ES dealerships nationwide. So visit one today.

To find your nearest dealer, call 1-201-930-7156 (M-F, 8-5, EST).

Once you've seen ES, you'll know

you've seen the components of the future.

ES Series **SONY**[®]

THE LEADER IN DIGITAL AUDIO[™]

COMPACT DISC PLAYERS



ADS CD3



ACCUPHASE DP-70



REVOX B226

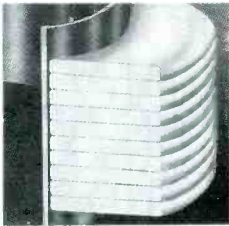
MANUFACTURER	Model (RI) = Remote Included, (RD) = Remote Optional	Loading: Single Disc = A, Single-Disc Magazine = B, Multi-Disc = C	Decoding System: Number of Bits	Filtration: Analog Only = A, Digital Plus Analog = D	Line Outputs: Fixed = F, Variable = V, Both = B	Digital Outputs: Headphone = H, Headphone with Level Control = HL, Subcode Only = S, Digital = D, Fiber Optic = F	Frequency Response, Hz to kHz, ±dB	S/N Ratio, "A" Wtd., -dB	THD, %	Elapsed Time Display: From Disc Start = D, From Track Start = T, Both = B	Remaining Time Display: To Disc End = D, To Track End = T, Both = B	Number of Programmable Selections	Repeat Functions: Entire Disc = D, Track = T, A-B Phrase = P, Entire Program = E	Weight, Lbs.	Price, \$	Notes
ACCUPHASE	DP-80/DC-81(RI) DP-70(RI)	A	16-2X 16-4X	D D	B B	F F	4-20 ± 0.03 4-20 ± 0.03	106 115	0.002 0.002	B B	0 0	D/T/P D/T/P	78.4 46.4	8000.00 5000.00		
ADC	16-2R(RI)	A	16-1X	A	F		20-20 ± 0.8	105	0.005	D	D	16	D/T/E	15	250.00	
ADS	CD3(RD) CD4(RD)	A	16-2X 16-2X	D D	B B	HL HL	5-20 ± 0.5 5-20 ± 0.5	102 102	0.004 0.004	T T	D D	30 16	D/T/P/E D/T/P/E	22 22	1399.00 999.00	
AIWA	XC-001(RI) DX-1500(RI) DX-550	A A A	16-4X 16-1X 16-1X	D D A		F F F	4-20 ± 0.3 2-20 ± 1 20-20	103 90	.0035 0.004	B B B	B B B	20 16	D/T/E D/T/E	9 1/2 7 1/2	500.00 295.00 195.00	
AKAI	CD-A305-B(RI) CD-A70-B(RI)	A A	16-2X 16-2X	D D	F F	H HL/S	4-20 + 0.5, -1 5-20 ± 0.5	94 95	0.004 0.003	B B	B B	36	D/T/P/E D/T/P/E	7.3 8.6	329.00 399.00	
ANALOGIC DESIGN GROUP	Vacuum Tube Hybrid(RI) MDSFET Hybrid(RD)	A	16-4X	D	F		10-19 ± 1	99	0.03	T		20	D/T/E	14	1395.00	Tube hybrid output stage.
		A	16-4X	D	F		5-19 ± 0.5	105	0.01	T		20	D/T/E	10	695.00	MOS-FET hybrid output stage.
AR	CD-06(RI)	A	16-4X	D	F	H	4-20 ± 5	105	0.01	B	B	20	D/T/P/E	15	499.95	
ARCAM	Delta 70(RD)	A	16-4X	D	B	HL/D	20-20 ± 0.6	105	0.008	T		20	D/E	10	1199.00	Remote control, \$100.00.
AUDIO CONCEPTS	Brasfield 560(RI) Brasfield 650(RI)	A A	16-4X 16-4X	D D	F F	D HL/D	2-20 ± 0.3 2-20 ± 0.3	110 110	0.003 0.003	T T	T T	20 750	D/T D/T	8 9	649.00 779.00	
AUDIOQUEST	AQ CD-1(RD) AQ CD-1X(RD)	A A	16-4X 16-4X	D D	F F					B B			E E		795.00 995.00	
A.V.A.	FET Three(RD) FET Three Plus(RD) Transcendence(RD)	A A A	16-4X 16-4X 16-4X	D D D	F F D	D D D	20-20 ± 0.1 10-20 ± 0.1 10-20 ± 0.1	100 100 100	0.001 0.001 0.001	T T T	D D D	20 20 20	D/T/E D/T/E D/T/E	8 9 11	295.00 495.00 870.00	Hybrid output circuits.
BANG & OLUFSEN	Beogram CD 5500(RD) Beogram CD 3300(RD) CDX	A	14-4X	D	F		3-20 ± 0.3	96	0.003	B		40	D/T/E	13.4	999.00 699.00 699.00	
CALIFORNIA AUDIO LABS	Tempest II(RI) Aria(RI) Tercet(RD)	A A A	16-4X 16-4X 16-4X	D D D	F F F	D D D	5-20 + 0, -2 5-20 + 0.2, -0.5	105 100	0.03 0.08	T T		20 20	D/T/E D/T/E	27 14	2595.00 1495.00	Tube analog stage; digital wave shaping. Hybrid analog stage; digital wave shaping. Digital wave shaping.
		A	16-4X	D	F	D				T		20	D/T/E	11	995.00	
CARVER	DTL-200mkII(RI) DTL-50(RI)	A A	16-4X 16-2X	D D	F F		5-20 ± 0.1 5-20 ± 0.5	100 94	0.007 0.008	B B	B D	16 16	E P	13 10	699.00 549.00	Digital Time Lens time-domain correction circuitry. As above.
CONRAD-JOHNSON	DF-1(RI)	A	14-4X	D	B		5-18 ± 0.25	94	0.05	T		20	D/E	14	138.00	
DBX	DX5(RI)	A	16-4X	D	F	HL	20-20 ± 0.2	Var.	0.003	B	B	16	D/T/P/E	12	699.00	Includes Impact Restoration and ambience circuitry; variable compressor.

Magnat Speaker Technology vs. The Rest Of The World.

While most companies have been content using decades-old technology, Magnat of West Germany has consistently developed radical new designs in their pursuit of the perfect loudspeaker.

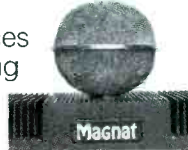
Over the past 14 years, Magnat® of West Germany has been involved in more loudspeaker innovations than any other company. Some have resulted in incremental improvements in sonic accuracy. Others have proven to be *major* breakthroughs in loudspeaker technology. A brief history...

1974 Magnat designs woofer voice coils using exclusive rectangularly-shaped computer-wound wire. These "Ribbon Wire" coils provide greatly improved transient response and much lower distortion.



1976 Magnat introduces the world's first speaker system with all drivers incorporating Ribbon Wire technology.

1979 Magnat develops and patents a revolutionary omni-directional plasma high-frequency driver. This mass-less tweeter produces sound by modulating a small, controlled cloud of ionized air.



1982 Magnat plasma speakers win Europe's two most coveted audio awards, Germany's "Hi Fi Preis" and France's "Decibel D'Honneur."

1983 Magnat develops a tweeter whose patented soft-metal dome is far more rigid than those made with soft plastic or textiles, but doesn't suffer from the resonance peaks associated with domes made of other metals.



1984 Magnat creates and patents Magnasphere® omni-directional drivers. These ball-shaped, baffle-

free transducers radiate sound in *all* directions, just like musical instruments. Magnasphere speakers re-define world standards for dispersion, accuracy and lifelike stereo imaging.



1985 Magnasphere speakers become the first products in history to win *three* "Decibel D'Honneurs," the prestigious French audio award.

Of course these new technologies are only a means to an end. The real point is that Magnat's research results in speakers that sound *audibly* better, with less distortion and a more natural, open sound, than what you're accustomed to hearing from conventional designs. Magnat and Magnasphere speakers are priced from \$300 to \$3,000 per pair.* If you'd like to know more about Europe's most honored loudspeakers, send us the coupon for a brochure and a dealer referral.

*Suggested retail prices



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COMPACT DISC PLAYERS

MANUFACTURER	Model (RI) = Remote Included (RD) = Remote Optional	Loading: Single Disc = A, Single-Disc Magazine = B, Multi-Disc = C		Decoding System: Number of Bits = A, Single-Disc Magazine = B, Filtration: Analog Only = A, Digital Plus Analog = D		Line Outputs: Fixed = F, Variable = V, Both = B		Other Outputs: Headphone = H, Headphone with Low Cut = HL, Subdisc Only = S, Digital = D, Fiber Optic = F		Frequency Response, Hz to kHz, ±dB		S/N Ratio, "A" Wtd., ±dB		THD, %		Engaged Time Display From Disc Start = D, From Track Start = T, Both = B		Remaining Time Display To Disc End = D, To Track End = T, Both = B		Number of Programmable Selections		Repeat Functions: Entire Disc = D, Track = T, A/B Phrase = P, Entire Program = E		Weight, Lbs.	Price, \$	Notes
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B					
DENDN	DCD-3300(RI)	A	16-4X	D	B	HL/D/F	2-20 ± 0.2	100	0.025	B	B	20	T	26½	1700.00	Dual D/A converters. As above. As above.										
	DCD-1700(RI)	A	16-4X	D	B	HL/D	2-20 ± 0.3	98	0.025	B	B	20	T	19	900.00											
	DCD-1500(RI)	A	16-4X	D	F	HL/D/F	2-20 ± 0.3	103	0.003	B	B	20	D/T/P	20½	675.00											
	DCD-900(RI)	A	16-2X	D	F	HL	4-20 ± 0.5	96	0.004	B	B	20	T/P	10	480.00											
	DCD-800(RI)	A	16-4X	D	F	HL	4-20 ± 0.5	96	0.004	B	B	20	T		380.00											
DCD-600(RI)	A	16-2X	D	F	H	4-20 ± 0.5	96	0.004	B	B	15	T		299.95												
DIMENSIONAL OPTICS	Silicon Laser Matrix(RI)	A	16-4X	D	V		20-20 ± 0.3	100	0.003	B	B	20	D/T/E	18	1200.00											
DISTECH	LSI MKIII	A	14-4X	D	B		5-20 ± 0.3	103	0.004	T		20	D	16½	1195.00	External power supply. As above.										
	LSI MKIV(RI)	A	16-4X	D	B		2-20	110	0.015	B	B	750	D/T/P/E	16	2500.00											
	LSI MKV(RI)	A	16-4X	D	B	HL	2-20	110	0.015	B	B	20	D	34	3000.00											
EMERSON	CD165	A	16-1X	D	F		10-20	85	0.008	T		15	D/P	8½	299.95											
	CD175R(RI)	A	16-1X	D	F		10-20	85	0.008	T		15	D/P	8½	349.95											
EUPHONIC TECHNOLOGY	ET650PX(RI)	A	16-4X	D	F	HL/D	20-20 ± 0.01	110	0.002	T	D	20	D/T/P/E	12	995.00	External power supply.										
FISHER	AD-924B	A	16-2X	D	F	H	20-20	90				16	D/T		†Five-disc changer. Random play.											
	AD-815B(RI)	A	16-2X	D	F	H	20-20	90				16	D/T													
	AD-923RB(RI)	A	16-2X	D	F	H	20-20	90				16	D/T													
	DAC-205B(RI)	A/C†	16-2X	D	F	HL	20-20	90				32	D/T													
GOLDSTAR	GCD-613	A	16-2X	D	F		5-20 ± 1.5	85	0.03	T	D	9	D/E	6.2	249.95											
	GCD-626R(RI)	A	16-2X	D	F	HL	5-20 ± 1.5	85	0.05	T	D	15	D/E	8.3	299.95											
HARMAN/KARDON	HD300(RI)	A	16-2X	D	F		4-20 ± 0.5	96	0.01			15	D/T/P/E	12¾	525.00	Three-beam laser. As above.										
	HD100(RI)	A	14-2X	D	F		4-20 ± 0.8	96	0.03	T		36	D/T/P/E	8½	375.00											
HITACHI	DA7000	A	16-1X	A	F	None	5-20	90	0.005			24	D/T/P/E	5½	199.95	Remote has volume control.										
	DA400	A	16-1X	A	F	None	5-20	95	0.003	T		15	D/T/P/E	7¼	229.95											
	DA405(RI)	A	16-1X	A	F	H	5-20	95	0.003	T		15	D/T/P/E	7¼	299.95											
	DA007SW(RI)	A	16-2X	D	F	HL	5-20	95	0.003	T		15	D/T/P/E	7½	479.95											
	DA009(RI)	A	16-2X	D	F	HL	5-20	95	0.003	B	B	24	D/T/P/E	8	349.95											
	DA005(RI)	A	16-2X	D	F	HL	5-20	97	0.025	B	B	15	D/T/P/E	11	599.95											
	DAC60(RI)	C	16-2X	D	F	HL/S	4-20	98	0.004	B	B	32	D/T/P/E	15¼	479.95											
JVC	XLV250(RD)	A	16-2X	D	F	H	5-20	98	0.004	T	D	15	D/E	8.6	260.00	Separate analog and digital chassis. †Six-disc magazine and one-disc drawer.										
	XLV450(RI)	A	16-2X	D	F	HL	5-20	98	0.004	T	D	32	D/T/P/E	8.8	315.00											
	XLV550(RI)	A	16-2X	D	B	HL/F	2-20	100	0.035	T	D	32	D/T/P/E	12.1	450.00											
	XLV1100(RI)	A	16-4X	D	B	HL	2-20	100	0.025	T	D	15	D/T/P/E	18.8	1000.00											
	XLM500(RI)	A/C†	16-2X	D	F	H	5-20	98	0.004	T	D	32	D/E	15.5	550.00											
XLM700(RI)	A/C†	16-2X	D	F	HL	5-20	98	0.004	T	D	32	D/E	16.5	600.00												
KENWOOD	DP-3300D(RI)	A	16-4X	D	B	HL/D/F	1-20 ± 0.3	105	0.001	B	B	20	D/T/P/E	22.1	850.00											
	DP-990D(RI)	A	16-2X	D	F	HL	3-20 ± 0.3	98	0.002	B	B	20	D/T/P/E	11	460.00											
	DP-860(RI)	A	16-2X	D	F	H	5-20 ± 1	96	0.007	D		20	D/T/E	8.4	280.00											
	DP-560(RD)	A	16-2X	D	F	H	5-20 ± 1	96	0.007	D		20	D/T/E	8.4	240.00											
KINERGETICS	KCD-20A(RD)	A	14-4X	D	V		20-20 ± 0.5	100	0.007	T		16	D/T/E	14	895.00	Stores up to 226 disc memories.										
	KCD-20AR(RI)	A	14-4X	D	V		20-20 ± 0.5	100	0.007	T		16	D/T/E	15	995.00											
	KCD-30(RI)	A	16-4X	D	V		20-20	101	0.005	B	B	225	D/T/P/E	15	1495.00											
KYOCERA	DA610CX(RI)	A	16-1X	A	F	HL	5-20 ± 0.5	90	0.005	B	B	16	D/T/E	13¼	550.00											
	DA710CX(RI)	A	16-4X	D	F	HL/D	5-20 ± 0.5	95	0.005	B	B	24	D/T/P/E	14½	800.00											
	DA310CX(RI)	A	16-2X	D	F	HL	5-20 ± 1	90	0.006	B	B	16	D/T/E	10¾	350.00											
	DA410CX(RI)	A	16-2X	D	F	HL	5-20 ± 0.5	90	0.006	B	B	16	D/T/E	13¼	500.00											
	DA510CX(RI)	A	16-4X	D	F	HL/D	5-20 ± 0.5	95	0.005	B	B	24	D/T/P/E	14	650.00											
LUXMAN	D-90(RI)	A	16-1X	A	F	H	5-20 + 0, -0.5	93	0.005	T	T	16	D/T/E		450.00											
	D-102(RI)	A	16-1X	A	F	H	5-20 + 0, -0.5	93	0.004	D	T	16	D/T/E		550.00											
	D-113(RI)	A	16-2X	D	F	H/D	5-20 + 0, -0.5	93	0.005	D	B	20	D/T/E		650.00											
	D-109(RI)	A	16-2X	D	F	H/D	5-20 + 0, -0.5	93	0.003	B	B	20	D/T/E		1500.00											
	D-03(RI)	A	16-1X	A	F	H	5-20 + 0, -0.5	93	0.003	B	B	20	D/T/E	13.3	1500.00											
MAGNAVDX	CDB471	A	16-4X	D	F	H	2-20 ± 0.02	101	0.003	B	B	20	D/P/E	6¾	199.00	Favorite Track Selection system. As above. CD/wideodisc player.										
	CDB472(RI)	A	16-4X	D	F	H	2-20 ± 0.02	101	0.003	B	B	20	D/P/E	6¾	229.00											
	CDB473(RI)	A	16-4X	D	V	HL	2-20 ± 0.02	101	0.003	B	B	20	D/P/E	6¾	289.00											
	CDB570	C	16-1X	A	F	HL	4-20 + 0.5, -1	98	0.005	B	B				479.00											
	CDB650(RI)	A	16-4X	D	F	HL	2-20 ± 0.01	101	0.003	B	B	20	D/T/P/E	8½	429.00											
CDV474	A	14-4X	A	F	D	3-20	97	0.003	T		8	D/T/P/E	22	749.00												
MARANTZ	CD-84(RI)	A	16-4X	D	F	HL/D	2-20	96	0.003	T	B	†	D/T/P/E	22.7	1410.00	†1000 via Favorite Track Selection system. Gold front panel; black version, \$1730.00. External D/A converter with fiber-optic connection. Model CDA-94, \$1800.00 with gold panel or \$1730.00 in black.										
	CD-94(RI)	A	16-4X	D	F	HL/D/F	2-20	96	0.003	T	B	†	D/T/P/E	22.7	1800.00											

Digital Discrimination.

BECAUSE ALL CD'S ARE NOT CREATED EQUAL, THE NEW CARVER DTL-200 MK II COMPACT DISC PLAYER IS INTRIGUINGLY DIFFERENT.

The Carver DTL-200 MK II answers the audiophile's demand for a CD Player which provides not only the greater dynamic range and richer bass expected from compact disc technology, but also the musicality, spectral balance and spatial qualities of well executed analog high fidelity recordings.

The new remote control Carver DTL-200 MK II represents the next logical evolutionary step towards marrying the awesome technology of digital playback with Bob Carver's commitment to the re-creation of the live performance. It embodies the latest digital/analog conversion circuitry with oversampling, sophisticated laser system and a wealth of operating features. And it possesses unique Carver circuitry that solves real-world sonic problems associated with commercial CDs.

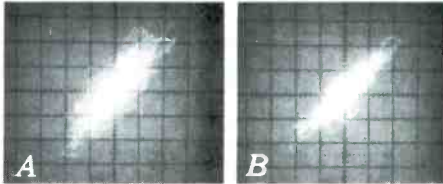
TIME DOMAIN CORRECTION. The Carver DTL-200 MK II incorporates an important new computer logic innovation that monitors the incoming digital signal for imperfections and "glitches" caused in recording and production. Such errors are immune to conventional error-correction processes because they are actually data anomalies. Yet they can add overall harmonic distortion and cause audible changes in sound quality.

The DTL-200 MK II's Time Domain Correction circuit constantly performs a complex, 25-bit digital calculation on passing data. This high-speed error correction algorithm, in conjunction with a 121-pole digital filter, terminates distortion-causing high harmonics as they occur in the bit stream. The result is frequency response within 1/1000 of a dB of the original, with significant reduction of distortion to less than 0.007%.

PLUS THE DIGITAL TIME LENS. On top of this unerring ability to produce natural, real-sounding music from the CD's digital bits, the Carver DTL-200 MK II has the remarkable Digital Time Lens circuit to insure your listening enjoyment.

When Bob Carver obtained his first compact disc player, he was surprised at the sound derived from most of the compact discs he purchased. The three-dimensional musical perspective which his analog system provided in lush abundance on phono discs evaporated into a flat, brittle wasteland. After exten-

sive testing, Bob uncovered two fundamental flaws in almost all compact discs: 1) An unpleasant, harsh spectral energy balance. The overall octave-to-octave energy balance was shifted on the CD towards more midrange above 400Hz; 2) The amount of L-R signal (which carries the spacial detail of the music) on the CD was inexplicably, but substantially, reduced when compared with the amount of L-R signal found on the corresponding analog disc. The difference is obvious in these two oscilloscope photos.



- A. Lissajous pattern showing spatial detail (L-R) (L+R) ratio from an LP record.
B. The same instant of music but taken from the CD version. Note the decreased (L-R) content, as shown by the narrowed trace.

Carver's circuitry corrects the ratio of L-R to L+R by performing one extra, but important mathematical operation on the signal stream that all other CD players fail to perform. This final operation makes all the difference.

The result is a natural sound with more of the three-dimensional information that places us in the same space with performers. You won't need the Digital Time Lens on all CDs. But it is there when you need it.

In the beginning, Carver hoped, indeed he expected, that once recording artists and engineers became more experienced with CD technology

fewer and fewer CDs would require the Digital Time Lens. But both laboratory and listening tests reveal that the majority of even the most recently released CDs benefit significantly from the Digital Time Lens.

PACKED WITH USEFUL FEATURES. The Carver DTL-200 MK II makes enjoying Compact Discs a simple exercise in button pushing from your favorite listening chair. You can program any combination of up to twelve tracks from a single CD, repeat a specific track or a whole Compact Disc for uninterrupted enjoyment.

Along with the ability to skip forward or backwards song-by-song, a touch of a key allows you to audibly review a disc backwards or forwards at many times normal speed. An A-B Specific Phrase Repeat lets you carefully analyze one section of a performance or simply provide a point of reference in a long, un-indexed symphonic movement.

All functions are displayed on an easy-to-read but subtle LCD display including programming sequence, current selection number, individual and total playing times plus indexing cues.

HEAR THE CARVER DIGITAL DIFFERENCE.

Just as all CD's are not created equal, neither are Compact Disc Players. Of all the models currently available, only the new DTL-200 MK II (and DTL-50) have the innovative and exacting Bob Carver touches that can substantially enhance your enjoyment of the digital medium.

Audition the new DTL-200 MK II today at your Carver dealer, using a variety of discs. You will be surprised at how audibly it can improve on what is already the best playback medium ever offered.

SPECIFICATIONS. Frequency Response, 5Hz-20kHz @ 0dB, ± 0.2 dB. Total Harmonic Distortion, 0.007%. S/N, -100dB. channel Separation, 90dB \cdot 1KHz. Dynamic Range, 96dB. Wow & Flutter, unmeasurable. Programming, 12-track remote and manual.



CARVER P.O. Box 1237, Lynnwood, WA 98046

POWERFUL

MUSICAL

ACCURATE

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For your nearest dealer, see pages 384 & 385.

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COMPACT DISC PLAYERS

MANUFACTURER	Model (R) = Remote Included, (RD) = Remote Optional	Loading	Single Disc = A, Multi-Disc = C	Discing System: Number of Bits = C	Filtration: Analog Only = A, Single-Disc Magazine = B	Line Outputs: Over-sampling Rate	Other Outputs: Fixed = F, Digital Plus Analog = D, Headphone With Level Control = HL, Subcode Only = S, Digital = O, Fiber Optic = F	Frequency Response, Hz to kHz, ±dB	S/N Ratio, "A" Wtd., ±dB	THD, %	Elapsed Time Display: From Track Start = D, From Disc Start = O, Repeating Time Display: To Disc End = B, To Track End = A, Both = B	Number of Programmable Selections	Repeat Functions: Entire Disc = D, Track = T, A-B Phrase = F, Entire Program = E	Weight, Lbs.	Price, \$	Notes
MARANTZ (Continued)	CD-40	A	16-2X	A	F		5-20	90	0.07	B	16	D	7.7	300.00		
	CD-50(RI)	A	16-2X	D	F		5-20	96	0.005	B	32	D/T	7.7	350.00		
	CD-65DX(RI)	A	16-4X	D	V	HL/D	2-20	96	0.003	B	20	D/T/E	8.8			
	CD-75DX(RI)	A	16-4X	D	V	HL/D	2-20	96	0.003	B	20	D/T/E	8.8			
McINTOSH	MCD 7000(RI)	A	14-4X	D	B	HL	2-20 ± 0.3	96	0.003	B	No	D/T/E	22	1399.00		
	MCD 7005(RI)	A	16-4X	D	B	HL/D	2-20 ± 0.3	96	0.003	B	D	D/T/P/E	20	1599.00		
MEITNER AUDIO	CD-3(RI)	A	16-4X	D	F	D				B	B	D/T/P/E		2195.00		
MELOS AUDIO	CD-T(RI)	A	16-4X	D	F		20-20 ± 0.2	85	0.07	T		D/T	15	995.00	Tube analog section; separate power supply. With line preamp, two chassis, Model CD-T Preamp, \$1595.00.	
MERIDIAN	207(RD)	A	14-4X	D	B	D		90	0.004	B	B	D/T/E	18	1795.00		
MICRO SEIKI	CD-M2(RI)	A	16-4X	O	F	D/F	2-20 ± 0.1	110	0.001	O	D	D/T/P	50	3995.00	Balanced outputs.	
MISSION	PCM 4000	A	16-4X	D	F	S	20-20	96	0.003	B	B	D/T/E	11	699.00		
	PCM 7000(RI)	A	16-4X	D	V	S	20-20	96	0.003	B	B	D/T/E	11	999.00		
MITSUBISHI	DP-110	A	16-2X	D	F	HL	4-20 ± 0.5	94	0.004	B	T	D/T/E	11	250.00	Dual D/A converters; polarity switch.	
	DP-211R(RI)	A	16-2X	D	F	HL	4-20 ± 0.5	94	0.004	B	T	D/T/E	11	350.00		
	DP-311R(RI)	A	16-4X	D	F		4-20 ± 0.3	105	0.003	B	T	D/T/E	13 1/4	740.00		
	DP-411R(RI)	C	16-1X	A	F		5-20 ± 0.5	98	0.003	D	T	D/T/P/E	16 3/4	495.00		
THE MOD SQUAD	650(RI)	A	16-4X	D	F	HL/D	0.1-20 ± 0.05	110	0.003	T	D	D/T/P/E	8	1100.00	Separate power transformer.	
	565(RI)	A	16-4X	D	F	D	2-20 ± 0.05	110	0.003	T		D/T/E	7 1/2	650.00		
	465	A	16-4X	D	F	D	2-20 ± 0.05	110	0.003	T		D/T/E	7 1/2	600.00		
NAD	5220	A	16-1X	A	F		5-20 ± 0.5	94	0.005	T	D	D/T/E	11	348.00		
	5240(RI)	A	16-1X	A	B		5-20 ± 0.5	94	0.005	T	D	D/T/E	11	448.00		
	5300(RI)	A	16-4X	D	B	H/D	5-20 ± 0.5	107	0.002	T	D	D/T	11 1/2	898.00		
NAKAMICHI	DMS-7AII(RI)	A	16-4X	D	F	H	5-20 ± 0.5	104	.0025		24	D/E	16 1/4			
	OMS-5AII(RD)	A	16-4X	D	F	H	5-20 ± 0.5	104	.0025			D	16			
	DMS-4A(RI)	A	16-4X	D	F	H	5-20 ± 0.5	100	0.004			D/E	15 3/4			
	OMS-3A(RI)	A	16-4X	D	F	H	5-20 ± 0.5	97	0.006			D/E	14 1/2			
	OMS-2A	A	16-4X	D	F	H	5-20 ± 0.5	96	0.006	B		D/E	11 1/4			
NEC	CD-410(RI)	A	16-2X	D	F	HL	5-20 + 0.1	90	0.01	T	T	D/T/P/E	9.9	299.00	Intro scan. As above; auto/manual edit. Auto/manual edit; dual D/A converters; polarity switch; independent power supplies.	
	CD-510(RI)	A	16-1X	A	F	HL	5-20 ± 0.5	90	0.007	T	D	D/T/P/E	9.2	359.00		
	CD-610(RI)	A	16-1X	A	B	HL	5-20 ± 0.5	90	0.005	B	B	D/T/P/E	11.7	459.00		
	CD-810(RI)	A	16-2X	D	F	HL	5-20 ± 0.5	90	0.004	B	B	D/T/P/E	19.4	629.00		
NIKKO	CD-500R(RI)	A	16-2X	D	F	HL	5-20 + 0.5, -1	100	0.009	B	B	D/T/P	10 1/2	650.00		
	CD-300R(RI)	A	16-2X	D	F	HL	4-20 + 0.5, -1	90	0.07	B	B	D/T/P	8	350.00		
ONKYO	DX-C600(RI)	C†	16-2X	D	F		5-20	96	0.03	B	D	D/T/E	13.2	599.95	†Six-disc magazine.	
	DX-530(RI)	A	16-2X	D	B	HL/D	2-20	96	0.003	B	D	D/T/P/E	12.3	599.95		
	DX-330(RI)	A	16-2X	D	F	HL	5-20	96	0.003	B	D	D/T/E	10.6	479.95		
	DX-230(RI)	A	16-2X	D	F	HL	5-20	96	0.03	B	D	D/T/E	10.6	355.00		
	DX-130(RD)	A	16-2X	D	F		5-20	96	0.03	B	D	D/T/E	10.6	279.95		
PIONEER	PD-M40	C	16-2X	O	F	None	4-20 + 5, -1	94	0.009	B		D/T/P/E	10.3	375.00	CD/CD-V videodisc combi player.	
	PD-6050(RI)	A	16-2X	D	F	HL	4-20 + 5, -1	95	0.005	T	D	D/T/E	8.6	330.00		
	PD-M50(RI)	C	16-2X	D	F	HL	4-20	95	0.005	B		D/T/E	10.1	425.00		
	PD-7050(RI)	A	16-2X	D	F	HL	4-20 ± 5	95	0.003	B	B	D/T/E	9.8	425.00		
	PD-M60(RI)	C	16-2X	D	F	HL	4-20 + 0.5, -0.1	98	0.004	T	B	D/T/P/E	13.4	500.00		
	PD-4050	A	16-2X	D	F		4-20	94	0.009			D/T/E	8.6	200.00		
	CLD-1010(RI)	A	16-2X	D	F		4-20	98				D/T/P/E	10	800.00		
	PD-M70(RI)	C	16-2X	D	F	HL	4-20	100	.0035	B	B	D/T/P/E	13.4	600.00		
PD-M90X(RI)	C	16-2X	D	F	HL	4-20	100	.0035	B	B	D/T/P/E	15	800.00			
PROTON	830R(RI)	A	14-4X	D	B	HL	10-20 ± 0.3	100	0.003	B	B	D/T/P/E	8	349.00		
QUASAR	CD8947	A	16-2X	D	F		2-20 ± 0.5	96	0.004	B	B	D/T/E	6 3/4	199.95	Portable.	
	CD8966	A	16-2X	D	F	HL	4-20 ± 0.5	90	0.006	B	D	D/T/E	1 1/2	269.95		
RCA	Dimensia MCD245(RD)	A	16-1X	A	F		20-20 ± 1	95	0.005	T		D/E	6 7/8	299.00		
REALISTIC	CD-3100 (42-5008)	A	16-2X	A	F	HL	5-20 + 0.5, -1.5	90	0.05	T	D	D/T/E	1 1/4	279.95	Portable.	
	CD-1500(RI) (42-5007)	A	16-2X	A	F		5-20 + 0.5, -1.0	90	0.005	T		D/T/E	6 1/2	259.95		
	CD-2300 (42-5006)	A	16-2X	A	F		5-20 + 0.5, -1.0	90	0.008	T		D/T/E	6	219.95		

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COMPACT DISC PLAYERS

MANUFACTURER	Model (RI) = Remote Included, (RD) = Remote Optional	Loading: Single Disc = A, Single Disc Magazine = B, Multi Disc = C		Decoding System: Number of Bits		Filtering: Analog Only = A, Digital Plus Analog = D		Line Outputs: Fixed = F, Variable = V, Both = B		Other Outputs: Headphone = H, Headphone with Level Control = HL, Subcode Only = S, Digital = D, Fiber Optic = F		Frequency Response, Hz to KHz, ±dB		S/N Ratio, "A" Wtd., ±dB		THD, %		Elapsed Time Display: For Disc Start = 0, From Track Start = T, Both = B		Remaining Time Display: For Disc End = 0, To Track End = T, Both = B		Number of Programmable Selections		Repeat Functions: Entire Disc = D, Track = T, A-B Phrase = P, Entire Program = E		Weight, Lbs.		Price, \$		Notes	
		A	B	D	F	H	S	Hz	dB	%	0	T	B	0	T	B	Lbs.	\$													
REVOX	B226(RD)	A	16-4X	D	B	HL/S/D	20-20 ± 0.1	100	0.005	B	B	19	D/T/P/E	18½	1295.00																
ROTEL	RCD850	A	14-4X	D	F	S	5-20 + 0.5, -1.0	96	0.004	T		9	D/T/E	7½	379.95																
	RCD8208X(RI)	A	16-4X	D	F	S	20-20 ± 0.08	100	.0025	T		20	D/T/E	7	799.95																
SAE	D102(RI)	A	16-4X	D	B	HL	2-20 ± 0.3	96	0.003	T		20	D/T/P/E	20	549.00															Remote has volume control.	
SANSUI	Vintage	A	16-4X	D	F	HL	4-20	108	.0025	B	B	20	D/T/P/E	23.1	1400.00															Balanced outputs.	
	CD-X901(RI)	A	16-2X	D	F	HL	4-20	105	0.002	B	B	20	D/T/P/E	19.4	800.00															As above.	
	CD-X701(RI)	A	16-2X	D	F	HL	5-20	100	0.003	B	B	16	D/T/E	8.8	375.00																
	CD-V550R(RI) CD-V1000	A	16-2X	D	F	HL	5-20	100	0.003	B	B	24	D/T/P/E		325.00																
SANYO	CP840	A	16-1X	A	F	S	5-20	90	0.03	T		16	T/E	7½	179.99																
	CP850(RI)	A	16-1X	A	F	S	5-20	90	0.03	T	T	16	T/E	7½	199.99																
	CPM1000(RI)	B/C†	16-1X	A	F	HL	5-20	96	0.03	B	D	32	D/T/E	11½	449.99														†Ten-disc magazine and one-disc tray.		
SCOTT	DA952	A	16-1X	D	F	None	5-20 ± 0.5	95	0.03	B		15	D/T/P/E	9	200.00																
	DA963(RI)	A	16-1X	D	F	H	5-20 ± 0.5	95	0.03	B	B	15	D/T/P/E	10	300.00																
	DA990(RI)	A	16-2X	D	F	HL	4-20 ± 0.5	96	0.01	B	B	20	D/T/P/E	15	450.00															Extra analog filter, switchable from front panel.	
SHARP	DX-650	A	16-2X	D	F		5-20	90		T		20	D/E	11½	199.95																
	DX-R750(RI)	A	16-2X	D	F		5-20	90		T		20	D/E	12	279.95																
	DX-C5000(RI)	C	16-2X	D	F	H	5-20	93	0.005	B	D	32	D/E	17½	499.95																
	SA-C0800(RI)	C	16-2X	D	F	H	5-20	93	0.005	T		32	D/E	26½	899.95																
SHERWOOD	CDP-300R(RD)	A	16-4X	A	F		2-20 ± 0.3	96	0.003					11	399.00																
	CDP-310R(RI)	A	16-4X	A	F		2-20 ± 0.3	96	0.003					11	499.00																
	CDP-250(RD)	A	16-4X	A	F		2-20 ± 0.3	96	0.003						249.95																
SHURE	D6000(RI)	A	16-2X	D	B	HL	5-20 ± 0.25	102	0.005	T		15	P	11	599.00																
	SV40(RI)	A	16-1X	A	B	HL	5-20 ± 0.3	100	0.006	T		15	O/T	9½	399.00																
SONOGRAPHE	SD-1(RD)	A	14-4X	D	F	H	5-15 ± 0.25	94	0.05	T		20	D/E	8½	695.00														Remote control, \$79.95.		
SONY	CDP-110	A	16-2X	D	F	H	2-20 ± 0.5	95	0.005	T	D	16	D/T/E	10	260.00																
	CDP-21	A	16-2X	D	F	H	2-20 ± 0.5	95	0.005	T	D	16	D/T/E	10	270.00																
	CDP-310(RI)	A	16-2X	D	F	H	2-20 ± 0.5	95	0.005	T	D	16	D/T/E	10	300.00																
	CDP-31(RI)	A	16-2X	D	F	H	2-20 ± 0.5	95	0.005	T	D	16	D/T/E	10	320.00																
	CDP-510(RI)	A	16-2X	D	F	HL	2-20 ± 0.5	96	0.005	T	B	20	D/T/E	10½	370.00																
	CDP-710(RI)	A	16-2X	D	F	HL	2-20 ± 0.3	98	0.004	T	B	20	D/T/E	10¾	420.00																
	CDP-910(RI)	A	16-4X	D	F	HL	2-20 ± 0.3	102	0.003	B	B	20	D/T/P/E	11¼	500.00																
	CDP-C5F(RI)	C†	16-2X	D	F	HL	2-20 ± 0.5	95	0.005	T	D	32	D/T/E	16½	450.00																†Five-disc carousel/changer.
	CDP-C10(RI)	B†	16-2X	D	B	HL	2-20 ± 0.5	98	0.003	T	D	20	D/E	16½	800.00																†Ten-disc magazine compatible with Sony car DiscJockey.
	CDP-505ESD(RI)	A	16-4X	D	F	HL/D	2-20 ± 0.3	102	0.003	B	B	20	D/T/P/E	11¼	600.00																
	CDP-605ESD(RI)	A	16-4X	D	F	HL/D	2-20 ± 0.3	106	.0025	B	B	20	D/T/P/E	18	1000.00																
	CDP-705ESD(RI)	A	16-4X	D	B	HL/D	2-20 ± 0.3	106	.0025	B	B	20	O/T/P/E	28¼	1500.00																Portable.
	D-3	A	16-2X	O	B	HL	20-20 ± 0.5	85	0.008	T	D	D	D	1	250.00																As above; includes AM/FM tuner.
D-T3	A	16-2X	D	B	HL	20-20 ± 0.5	85	0.008	T	D	D	D	0	300.00																Portable.	
D-10(RD)	A	16-2X	D	B	HL	20-20 ± 0.5	85	0.008	T	D	21	O/T/P	7½	350.00																As above; includes AM/FM tuner.	
D-T10(RD)	A	16-2X	D	B	HL	20-20 ± 0.5	85	0.008	T	D	21	D/T/P	19¾	430.00																Portable.	
D-160(RD)	A	16-2X	D	B	HL	20-20 ± 0.5	85	0.008	T	D				1¼	250.00																
SOUND ENGINEERING	PFM-1(RD)	A	16-4X	D	F	D	0-20 + 0.2	104	0.003	T		20	D/T/E	16	1100.00																
STAX	CDP-Quattro(RI)	A	16-4X	D	F	HL/S	0.7-20 ± 0.5	104	0.002	B	B	16	D/T/P/E	17.6	2499.95																
TANDBERG	3015A(RD)	A	16-4X	D	F	HL	20-20 ± 0.3	96	0.005	B	B	20	D/T/P/E	12½	1895.00																
TEAC	PD-135	A	16-2X	D	F	F	5-20 ± 1	90	0.007		B	16	D/E	7½	259.00																
	PD-450(RI)	A	16-2X	D	F	H	2-20 ± 1	95	0.005	B	B	20	D/T/P	7¼	349.00																
	ZD-880(RI)	A	16-2X	D	F	HL/D	0-20 ± 0.5	95	0.003	B	B	20	D/T/P/E	15½	665.00																Dual D/A converters; optical coupling.
	PD-600M(RI)	C		D	F	H	5-20	98	0.02	B	B	32	D/T		499.00															Combination CD player/cassette deck; see also "Cassette Decks."	
	AD-4(RI)	A		F	F	H	5-20	94	0.02	B	B	16	D	12¾	599.00																As above.
AD-5 AD-7(RI)	A	16-1X	A	F	HL	5-20 ± 0.5	95	0.004	T	B	15	D	16	799.00																As above.	
	A	16-1X	A	F	HL	5-20 ± 0.5	95	0.004	T	B	15	D	16	949.00																As above.	
TECHNICS	SL-P1200(RI)	A	16-2X	D	F	HL/S	4-20 ± 0.1	106	.0025	B	B	20	D/T/P/E	32	1400.00														Pro use; auto cueing; search dial and rocker switch. With balanced outputs and wired remote. Model SL-P1200X, \$1495.00.		

For the music listener, evaluating loudspeakers is one part science and nine parts art. The difference in measured response between two speakers may be slight, yet one will sound superb, the other merely adequate.

The only test instruments which can accurately and reliably distinguish good from bad--or great from merely good--are your ears. And even they have to be used with knowledge and care.

A loudspeaker has a difficult job. It must reproduce sounds ranging from the quietest whisper of a human voice to the full thunder of a symphony orchestra. That's a ratio of about one to a billion. It's beyond the range of any loudspeaker made today --but this need not concern us, as it is also beyond the range of any recording medium. However, within its range, a good loudspeaker will reproduce the most

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actually do this is an unforgettable experience. Once you've

heard it, it's unlikely that you'll ever settle for less.

For these characteristics are essential to the suspension of disbelief vital to the appreciation of recorded music.

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COMPACT DISC PLAYERS

MANUFACTURER	Model (RI) = Remote Included (RO) = Remote Optional	Loading Single Disc = A Multi-Disc = C	Decoding System	Filtration: Analog Only = A Digital Plus Analog = D	Line Outputs: Fixed = F Variable = V	Other Outputs: Headphone = H Headphone with Level Control = HL Subs only = S, Digital = D, Fiber Optic = F	Frequency Response, Hz to kHz, ±dB	S/N Ratio, "A" Wtd., ±dB	THD, %	Elapsed Time Display, From Disc Start = D, From Track Start = T, Both = B	Remaining Time Display to Disc End = D, to Track End = T, Both = B	Number of Programmable Selections	Repeat Functions: Entire Disc = D, Track = T, A-B Phrase = P, Entire Program = E	Weight, Lbs.	Price, \$	Notes
TECHNICS (Continued)	SL-P1000(RI)	A	16-2X	D	F	HL/S/D/F	2-20 ± 0.3	108	.0025	B	B	20	D/T/P/E	20	1100.00	Electrical and optical digital outputs. Search dial cueing. As above. Remote has volume control. As above.
	SL-P720(RI)	A	16-2X	D	F	HL/S	4-20 ± 0.2	102	.0025	B	B	20	D/T/P/E	11.5	650.00	As above.
	SL-P520(RI)	A	16-2X	D	F	HL/S	4-20 ± 0.3	100	0.003	B	B	20	D/T/P/E	9.7	500.00	As above.
	SL-P420(RI)	A	16-2X	D	F	HL/S	2-20	99	0.004	B	B	20	D/T/P/E	9.7	450.00	As above.
	SL-P320(RI)	A	16-2X	D	F	HL/S	2-20	96	0.004	B	B	20	D/T/E	6.8	325.00	As above.
	SL-P220(RI)	A	16-2X	D	F	HL/S	2-20	96	0.006	B	B	20	D/T/E	6.8	295.00	As above.
	SL-P120	A	16-2X	D	F	HL/S	2-20	96	0.006	B	B	20	D/T/E	6.8	265.00	As above.
	SL-P600C(RI)	C†	16-2X	D	F	HL/S	5-20	95	0.006	B	B	36	D/E	450.00	450.00	†Six-disc magazine. Portable; includes headphones, battery, case, a.c. adaptor, and interconnects.
SL-XP5	A	16-2X	D	B	HL	4-20 ± 0.5	90	0.006	B	B	18	D/T/E	1.1	374.00	As above.	
TOSHIBA	XR-9437	A	15-1X	A	F	HL	5-20 + 0.5, -1.5	84	0.01	T	D	16	D/T/E	1.8	429.95	Portable; three-beam laser. As above, wired or wireless remote.
	XR-9457(RI)	A	15-1X	A	F	HL	5-20 + 0.5, -1.5	84	0.01	T	D	16	D/T/E	1.2	449.95	As above.
	XR-9127(RI)	A	16-2X	D	B	HL	5-20 ± 0.5	97	0.004	T	D	16	D/T/E	7	329.95	Three-beam laser. As above.
	XR-9037(RI)	A	16-2X	D	B	HL	4-20 ± 0.5	98	0.003	T	B	20	D/T/P/E	9.7	449.95	As above.
	XR-9057(RI)	A/C†	16-2X	D	B	HL	5-20 ± 0.5	98	0.003	T	B	32	D/T/P/E	9.7	499.95	†Six-disc magazine and one-disc drawer.
VECTOR RESEARCH	VCD-770	A	16-4X	D	F	HL	10-20 ± 0.5	95	0.005	T	D	15	D/T/E	15	349.00	
	VCD-900(RI)	A	16-2X	D	B	HL	5-20 ± 0.5	100	0.005	T	D	15	D/P/E	15	449.00	
VTL	Series 500(RI)	A	16-4X	D	V	D				T	B	10	D/T	12	1190.00	Modified Magnavox Model 560.
	Series 1000(RI)	A	16-4X	D	V	HL/D/F	20-20 ± 0.1			B	B	16	D/T	21	3050.00	Modified Philips Model 960.
YAMAHA	CDX-5000(RI)	A	18-4X	D	B	HL/D	0-20 + 0, -0.2	115	0.002	B	B	24	D/T/P/E	46.2	2200.00	Dual D/A converters. As above.
	CDX-1100U(RI)	A	18-4X	D	B	HL/D	0-20 + 0, -0.2	115	0.002	B	B	24	D/T/P/E	31.7	1099.00	As above.
	CDX-900U(RI)	A	18-4X	D	F	HL	0-20 ± 0.3	110	0.003	B	B	24	D/T/P/E	14.3	649.00	As above.
	CDX-700U(RI)	A	18-4X	D	F	HL	0-20 ± 0.3	100	0.004	B	B	24	D/T/P/E	9.2	449.00	As above.
	CDX-500U(RI)	A	16-2X	D	F	HL	5-20 ± 0.5	100	0.004	B	B	16	D/T/P/E	9.2	329.00	As above.
	CDX-400U	A	16-2X	D	F	HL	5-20 ± 0.5	100	0.004	B	B	16	D/T/P/E	9.2	299.00	As above.
	CDX-305(RI)	A	16-2X	D	F	H	5-20 + 0.5, -1	100	0.004	B	B	16	D/T/P/E	6.7	299.00	As above.
	CD-X5	A	16-2X	D	F	H	5-20 + 0.5, -1	100	0.004	B	B	16	D/T/P/E	6.7	249.00	As above.

Audio

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Revox B226: Digital at the Vanishing Point

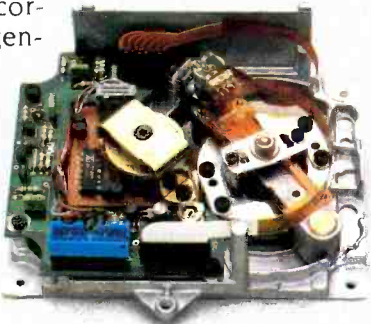
Connect a new Revox B226 CD player to a very high quality home audio system. Load it with a superbly recorded disc. Sit back, press "play" on the IR remote control . . . and something peculiar happens.

The B226 virtually disappears.

What you hear is pure music. Nothing added, nothing taken away. No harshness, no grittiness, no coloration, no shrinking, no softening, no etching. Nothing except all the depth, dynamics, and subtle nuances of a live musical performance.

This "vanishing act" does not come easily. For example, the B226 transport chassis is made from solid die-cast aluminum alloy to provide long-term stability. The entire mechanism is suspended on damped isolation mounts to minimize potential problems from vibration or resonance.

Also, the B226 incorporates the newest generation of European-developed LSI chips for D-A conversion, interpolation, error correction, and digital filtering. Resolution is full 16-bit, with quadruple oversampling and dual D-A converters for precise phase linearity. New adaptive error correction selects



the best error correction strategy (from 60 possibilities) to greatly improve performance on dirty or damaged discs.

In the crucial analog output stages, Revox uses strictly professional grade components. B226 circuit boards meet the same performance and reliability standards as boards made for our Studer professional mastering recorders. Little wonder, since both come from the same plant in the Black Forest of West Germany.

Essentially, then, the B226 delivers a purity and transparency of sound that challenges "custom conversion" units. But without sacrificing convenience and flexibility.

With Revox you still get full programmability of virtually every imaginable function, plus digital outputs for audio and CD-I/CD-ROM, fixed and adjustable audio outputs with ample voltage for directly driving power amps, and the convenience of infrared remote control with multi-room capability.

For a convincing demonstration, visit your nearest authorized Revox dealer. Slip your favorite CD into a B226, sit back, and listen to digital audio at the vanishing point.

STUDER REVOX

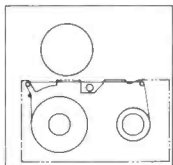
1425 Elm Hill Pike, Nashville, TN 37210
615-254-5651

Why it took a to build a bet

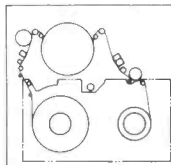


AKAI'S QUICK START: THE MOST SIGNIFICANT ADVANCEMENT IN TAPE HANDLING SINCE THE VHS CASSETTE.

Today's VHS cassettes may give you eight hours of programs. But today's VHS decks make locating those programs a real bore. That's because conventional decks must slowly thread the tape around the head drum every time you go from Fast Forward or Rewind into Play. And slowly pull the tape back into the cassette whenever you return to Fast Forward or Rewind.



Unloading for conventional VCR



Full-loading for Quick Start

Of course, most VCRs have visible scan. But can you imagine scanning through a two-hour movie? Pass the aspirin.

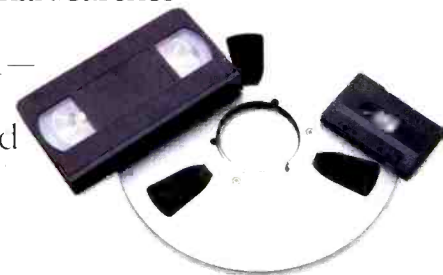
Akai's exclusive Quick Start system gives you fast, fast, fast relief. For the first time, the VHS tape remains fully threaded—even during Fast Forward and Rewind. So switching between functions is more than *five times faster* than conventional VHS decks.

There's more. To make locating programs even easier, Akai searches and scans recorded segments automatically. Best of all, this revolution in tape handling is found not just on our top model—but on every new Akai VCR.

Sound great? Seem simple? Wonder why no one ever did it before?

WHY IT TOOK AKAI TO PERFECT VHS TAPE HANDLING.

Simply stated, Akai has been building tape recorders for over 35 years. And what is a VCR if not a tape recorder? People may forget that it



Akai has over
35 years of experience building
tape recorders of all kinds.

hi-fi company er VCR.



VS-M930U-B

was Akai that built the first home video tape recorder in 1965 and the first lightweight helical-scan portable video tape recorder in 1969. Compared to Akai, even the biggest names in video recording seem like "Johnnies-come-lately."

To invent Quick Start, Akai invented a completely new tape transport with better tape tension control, more precise guide poles and specially conductive fine ceramic tape guides. The entire transport is under the intelligent control of a micro-processor that only years of tape deck experience could develop. The Akai Quick Start Transport. Sure it's simple... when you know how.

AT AKAI, SOPHISTICATION MEANS SIMPLICITY.

Akai, a leader in on-screen programming, now takes ease-of-operation one step further. On our new decks, most programming functions require no more than one touch. Nothing *could* be simpler.

Or more sophisticated. Take Akai's new top-of-the-line VS-M930U-B. It offers digital special effects with memory; VHS Hi-Fi stereo; four heads; HQ circuitry with CCD noise reduction; editing; universal wireless remote control with LCD readout; on-screen programming and naturally, Akai's Quick Start system with Index and Address Search, as well as Intro Scan. Not just bells and whistles, but features any serious recordist would deem essential.

Akai. Original thinking from a true original.



Universal Wireless Remote is programmable independently of the VCR. You can "download" programmed information.

AKAI

Where audio and video are one.

DIGITAL RECORDERS/PROCESSORS



DBX 700



COMPUSONICS DSP 1000



SONY PCM-501ES



MARANTZ DT84

MANUFACTURER	Model	Remote Included, (RI) Remote Optional, (RO)		Type: Recorder, R; Processor, P; Both, RP	Coding Format	Quantization: No. of Bits: Linear=L; Floating Point=F	Maximum Recording Time, Minutes	VCR Speed Capability—See Code	Frequency Response, Hz to kHz, ±dB			S/N Ratio, A ¹ W/Fid., -dB	THD at 0 dB, %	Inputs: Mike=M; Line=L; Direct Digital=D; Fiber Optic=F; Video Composite=V	Outputs: Headphone=H; Line=L; Direct Digital=D; Fiber Optic=F; Video Composite=V	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes	
		Model	Remote Included, (RI) Remote Optional, (RO)						Frequency Response, Hz to kHz, ±dB	S/N Ratio, A ¹ W/Fid., -dB	THD at 0 dB, %									
CALIFORNIA AUDIO LABS	Felix	R	R-DAT	R-DAT	16L	120														Hybrid circuitry; digital wave shaping.
COMPUSONICS	DSP 1000	RP	†	CSX	16L	480	20-20 ± 1	88	0.007	LD	LD	20 x 17 x 5	25	7000.00						†Optical disc. Records 44.1-kHz sampling rate; editing capability.
	DSP 1500	RP	†	CSX	16L	30	20-15 ± 3	88	0.007	LD	LD	20 x 17 x 5	25	6000.00						†Magnetic floppy disk. Records 32-kHz sampling rate.
DBX	700	P		dbx CPDM	†	A/B	10-20 ± 0.5		0.005	MLDV	HLV	17 x 5½ x 12	40	4600.00						†Companded Predictive Delta Modulation. Optional mike preamps and disc-mastering delay.
MARANTZ	DT-84	R	R-DAT	R-DAT	16L	120	2-22	93	0.005	LDF	HLDF	18¼ x 4 x 13		1900.00						No anti-copy chip.
SONY	PCM-601ESD	P		EIAJ	14L, 16L	480	A/B	10-20 ± 0.5	90	0.005	LDV	HLD	17 x 4 x 14½	18	1400.00					
	PCM-501ES	P		EIAJ	14L, 16L	480	A/B	10-20 ± 0.5	90	0.005	LV	HL	17 x 4 x 14	15	1000.00					

How a 77-year-old became the first name in digital audio.

Denon's been involved in every phase of music reproduction since the days of wind-up record players. So after seven decades of breakthroughs in studio recording, disc pressing, home high fidelity and professional equipment, we were uniquely prepared to take the next step. A tape



EVERY DENON COMPONENT REFLECTS LESSONS LEARNED IN THE RECORDING STUDIO.

recorder so fundamentally different, it would obsolete every previously accepted notion of how good recorded sound could be.

In 1972, Denon researchers achieved their goal. The world's first digital recorder worthy of commercial record



WHAT OTHER AUDIO COMPANY HAS THESE CREDENTIALS?

production, the legendary Denon DN-023R. We quickly put our digital innovation to use, producing digital processors, digital editors, digital mixers, and the world's first digitally-recorded LPs.

Today, Compact Disc players, regardless of brand, reflect the influence of the original Denon DN-023R. But this heritage runs strongest in CD players from Denon. Because

“One of the most finely engineered pieces of audio gear on the planet.”

Ken Pohlmann,
Digital Audio, on the DCD-3300

the same engineers who design Denon pro machines design



as “a winner on every count,” “the player I recommend most highly,” “superlatives have to be used,” and “in several respects, the best I’ve ever heard.”

Reactions which simply demonstrate one point. It’s a lot



THE NEW DCD-1500H. ITS SUPER LINEAR CONVERTER COMES STRAIGHT OUT OF DENON STUDIO RECORDERS.

Denon home audio. And the same ears that guide Denon recording sessions evaluate the sound of Denon playback components.

Perhaps that’s why each succeeding generation of Denon CD players is eagerly anticipated by the world’s audio critics. And why they’ve variously hailed our CD players

“A look into the interior of this player reveals that Denon engineers were not taking any shortcuts whatsoever.”

Germany’s Hi-Fi Vision,
on the DCD-1500

easier to make audio sound like music when you really know what music sounds like.

DENON

DESIGN INTEGRITY

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Denon Canada, Inc., 17 Denison Street, Markham, Ont. L3R 1B5 Canada

AMPLIFIERS

MANUFACTURER	Model (M) = Remote Included, (R) = Remote Optional	Type	POWER AMP										PREAMP			Notes														
			Rated THD, %	Rated SMPTE IM, %	Rated Stew Rate, V/US	High-Level Sensitivity, mV	Does Unit Invert Polarity?	Cont. Avg. Watts/Channel into 8 Ohms	Cont. Avg. Watts/Channel into 4 Ohms	Rated Power Bandwidth, Hz to kHz	Class of Output Operation	Dynamic Headroom, dB	Meters = M, Peak/Clip Indicators = I	MM Phono S/N, dB - A, We. re. 5 mV	MM Phono Sensitivity, mV		Moving Coil Input?	Weight, Lbs.	Price, \$											
ACCUHASE	M100	B/M	0.01	0.003		260	No	500		20-20	AB												5750.00							
	P600	B	0.01	0.003		200	No	300		20-20	AB												6725.00							
	P500	B	0.01	0.003		178	No	250		20-20	AB												5750.00							
	P300V	B	0.01	0.003		150	No	180		20-20	AB												4000.00							
	P102	B	0.01	0.003		80	No	50	80	20-20	A												3000.00							
	E205	I	0.01	0.01		10	No	80	110	20-20	AB												1600.00							
	E302	I	0.01	0.01		76	No	120	180	20-20	AB												2575.00							
	E303X	I	0.01	0.005		140	No	150	200	20-20	AB												3300.00							
ACUSTAT	TNT-200	B	0.1	0.1	165	1.4V	No	200	325	2-400	AB											40	1249.00							
	TNT-120	B	0.1	0.1	165	1V	No	120	120	2-500	AB											28	799.00							
ACUSTIC ELECTRONICS	AIR 2.2	B	0.008	0.008	75	1.3V	Yes	110	208	20-20	AB		3	I									43	2145.00						
	AIR 3.3	B/M	0.008	0.008	150	1.3V	No	330	500	20-20	AB		3	I									45	2145.00						
	Photon 3000	B	0.002	0.002	85	1.3V	No	120	210	20-20	AB		3	I									45	2995.00						
	Photon 6000	B/M	0.002	0.002	170	1.3V	No	350	500	20-20	AB		3	I									45	2995.00						
ADCOM	GFA-555	B	0.09				No	200	325		AB		2.3	†									34	699.95	†Distortion indicators. Bridgeable.					
	GFA-545	B	0.09				No	100	150		AB		2.6	†									27	479.95	Switching for two pairs of speakers.					
	GFA-535	B	0.09				No	60	100		AB		3.0	†									22	299.95						
ADS	PA4(R0)	B	0.02	0.02	70	91	No	150	150	20-20	AB		1.3	I									30	999.00	Bridgeable; switching for two pairs of speakers.					
	A2	I	0.05	0.03	30	35	Var.	80	100	20-20	AB		2.0	M, I	80	0.26	120	Yes				21	699.00							
AKAI	AM-A202-B	I	0.3			150		50		40-20	B				72	2.5	120	No					12.8	199.00	Includes five-band EQ. As above.					
	AM-A402-B	I	0.9			150		100		20-20	B				72	2.5	120	No					16.1	329.00						
APT	A1	B	0.01	0.01	60	900	No	125	250	20-20 ± 0.2	AB		3	I									26	748.00	Speaker impedance selector; bridges to 500 watts.					
AR	A-04	I	0.03	0.03	25	150	No	40	70	20-20	AB		2		80	2.5	180	Yes					20½	349.95						
	A-06	I	0.03	0.03	25	150	No	60	100	20-20	AB		2		80	2.5	180	Yes					24½	449.95						
	P-10	B	0.03	0.03	40	1V	No	120	240	20-20	AB		6										40	829.95						
ARAGON	2004	B	0.06	0.06	250		No	100	200	20-100	AB												35	995.00	Dual mono. As above.					
	4004	B	0.06	0.06	250		No	200	400	20-100	AB												50	1495.00						
ARCAM	Delta 90	I	0.02		40	100	No	60	110	20-20	AB		2.6		79	2.0	170	Yes					14½	699.95	Toroidal transformer. As above.					
	H 60 +	I	0.03		20	100	Yes	35	55	20-20	AB		2.8		76	2.0	170	Yes					9	449.95	As above.					
	Alpha +	I	0.02		20	200		25	45	20-20	AB		2.5		78	2.5	200						8½	299.95	As above.					
AUDIBLE ILLUSIONS	S-120	B	0.01	0.01	100		No	120	240	5-150	AB1												45	1195.00						
AUDIO DESIGN ASSOCIATES	PT-50	B	0.09	0.04	10	687	Yes	25	35	20-20 ± 3	AB														895.00					
	PT-200	B	0.4	0.15	12	500	No	60	100	20-20 ± 3	AB															2195.00	200 watts into 1 ohm.			
	PF-200	B	0.09	0.07	12	687	No	60	90	20-20 ± 3	AB															995.00	Drives 0.5-ohm loads.			
	PF-300	B	0.09	0.07	15	687	No	100	160	20-20 ± 3	AB																1495.00	Dual mono.		
	PF-500	B	0.09	0.07	10	687	No	200	300	20-20 ± 3	AB																3995.00			
	PBA-150	B/M	0.02	0.07	12	687	Var.	200	325	20-20 ± 3	AB																1295.00	†Response, 20 to 200 Hz, ± 3 dB. Amp/over for subwoofers. †1200 watts. ††All as above.		
	PBA-500	B/M	0.05	0.08	10	687	Var.	800	†	††	AB															4295.00				
	DCA-40	I	0.06	0.04	10	687	No	40	50	20-20 ± 3	AB																950.00			
MRA-808(RI)	I	0.03	0.02	10	687	No	40	60	20-20 ± 3	AB																9927.00	Multi-room amp.			
AUDIDYNAMICS	B200	B	0.05	0.05		1V	No	250	300	20-20	AB		1.5	M												999.00	Strappable.			
AUDIOLAB	8000A	I	0.05	0.05		100	No	50	100	2-65	AB		2.9	No	76	2.0	175	Yes								695.00	Dual mono.			
8000P	B	0.05	0.05		1V	No	100	200	3-75	AB		2.9	No													895.00				
AUDIO RESEARCH	D70MKII	B/T	1		10	850	No	60	60	15-30	AB1															49	1995.00			
	D115MKII	B/T	1		15	600	No	115	115	12-60	AB1																68	2995.00		
	D120	B	0.25		40	1.5V	No	120	200	0.6-150	AB1																43	1995.00		
	D250MKIIS	B/T	0.5		25	800	No	250	250	12-60	AB1																138	6900.00		
	M100	B/T/M	1		15	700	No	100	100	12-60	AB1																53	2495.00	Front-panel bias adjustment.	
	M300	B/H/M	0.8		25	900	No	300	300	10-60	AB1																110	4900.00		
AUDIRE	Parlando	B	0.02	0.003	50	1.2V	No	100	200	2-50	A																90	2950.00	Dual mono.	
	Otez	B	0.015	0.015	50	1.5V	No	250	500	2-50	AB																30	2900.00	Semi-dual mono.	
	Noble I	B/M	0.01	0.003	50	1.3V	No	75	150	2-50	A																30	1050.00		
	Noble II	B/M	0.01	0.015	50	1.5V	No	200	400	2-50	AB																	30	1100.00	
	Forte II	B	0.025	0.008	50	1V	No	25	50	2-50	A																	45	1110.00	Dual mono; 190 watts into 1 ohm. Dual mono.
	Forte	B	0.025	0.008	50	1.4V	No	125	250	2-50	AB																	45	1050.00	
	Crescendo	B	0.05	0.01	45	1.3V	No	75	130	2-50	AB																	25	475.00	

An unusual hybrid design
with greater output
efficiency from patented
Audio Research circuitry.



Recently, Audio Research Corporation developed and patented (pending) new circuitry allowing hybrid utilization of Field Effect Transistors (FETs) with vacuum tubes in ways which can bring out the best in both devices. This circuitry is used in the relatively new, but already widely-acclaimed SP11 Preamplifier. Drawing from this technology, Audio Research has designed a new hybrid power amplifier, designated the M300 — a monaural unit rated at 300 watts.

M300 HYBRID MONAURAL POWER AMPLIFIER

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HYBRID MONAURAL POWER AMPLIFIER

Most hybrid power amplifier designs use small signal-input vacuum tubes, then rely on FETs for the output stage. Audio Research has chosen instead to eliminate these low-level input tubes — tubes which can be prone to problems with hum, noise, microphonics, drift and, of course, require periodic replacement. The new FET "front end" is combined with Audio Research's long-famous, patented cross-coupled circuit to provide a design offering exemplary stability, reliability (low maintenance), and superior performance.

These design advances have been coupled with yet another Audio Research patent: an output stage utilizing vacuum tubes, and partially cathode-coupled (as all previous Audio Research vacuum tube amplifiers have been), but with the screen (or accelerating) grids operating with a signal voltage precisely in phase with the cathode voltage. True "pentode" operation and efficiency is thereby achieved; however, all the advantages of partial cathode coupling are maintained. Advantages include:

Efficiency up to 60% and above. (Class "A" designs achieve 25% to 50%, typically 30% to 35%.)

Inherently better cross-coupling.

Output transformer with lower "turns" and "impedance" ratios, resulting in greater bandwidth.

Partial cancellation of saturation effects of the "DC" in the output transformer's core.

Switching transients essentially eliminated, rendering the question of class of operation ("A," "AB," etc.) irrelevant. The virtues of Class "A" operation without the usual drawbacks.

Bias adjustment is essentially non-critical.

Output tubes need not be matched, although slightly better performance will result if they are.

Lower internal impedance improves handling of complex speaker loads.

To audition the M300 Monaural Power Amplifiers, visit your authorized Audio Research dealer. Black front panels available at additional cost. Call or write for literature on the complete line of Audio Research products.



Operational Features

Front-panel replaceable line and screen voltage fuses, with LED indicators.

Two integral, low-noise fans for cooler operation, longer tube life. Front-panel switch allows "Hi" and "Lo" speeds.

"Standby" switch for lower power consumption and less heat during warm-up periods or telephone interruptions.

Automatic muting circuit provides silent shutdown upon power shut-off or interruption. No "thump" from speakers.

Gold-plated input connectors connect "ground" before "hot".

1, 2, 4, and 8-ohm output taps.

Front and rear handles for easier handling.

M300 Preliminary Specifications

(Power line stabilized at 120V.)

POWER OUTPUT: 300 watts minimum continuous at 8 ohms from 16Hz to 25kHz with less than 0.5% total harmonic distortion (typically below .005% at 1 watt).

Approximate actual power available at "clipping": 330W watts (1kHz). (Note that actual power output is dependent upon both line voltage and "condition," i.e. if power line has high distortion, maximum power will be affected adversely, although from a listening standpoint this is not very critical.)

POWER BANDWIDTH: (-3dB Points) 10Hz to 60kHz.

INPUT SENSITIVITY: 1.5V RMS for rated output.

INPUT IMPEDANCE: 60K ohms, nominal.

OUTPUT REGULATION: Approximately 0.3dB, 8 ohm load to open circuit (Damping factor approximately 30)

NEGATIVE FEEDBACK: 20dB.

SLEW RATE: 25 volts/microsecond.

RISE TIME: 3 microseconds.

HUM & NOISE: Less than 2mV RMS 90dB below rated output (broad-bandwidth unweighted, inputs shorted).

POWER SUPPLY ENERGY STORAGE: Approximately 350 joules.

POWER REQUIREMENTS: 105-125VAC 60Hz (210-250VAC 50Hz) 900 watts at rated output. 450 watts at "idle" — 130 watts at "standby".

DIMENSIONS: 19" (48 cm) W (standard rack panel) x 10.5" (27 cm) H x 16" (41 cm) D (front panel back). Handles extend 1 5/8" (4.1 cm) forward of the front panel. Output connectors extend 1" behind rear panel.

WEIGHT: 110 lbs. (50 kg) Net; 126 lbs. (57 kg) Shipping.

TUBES REQUIRED: 8 — 6550 Power Output (Matched pairs will yield marginally better performance.)

**audio research
corporation**

6801 Shingle Creek Parkway
Minneapolis, Minnesota 55430
Area Code 612/566-7570
Telex: 290-583

AMPLIFIERS

MANUFACTURER	Model (RD) = Remote Included, (RO) = Remote Optional	Type Integrated Tube = I, Hybrid = H, Mono = M	Rated THD, %	Rated SMPTE, M. %	Rated Slew Rate, V/μs	High-Level Sensitivity, mV	Does Unit Invert Polarity?	Cont. Avg. Watts/Channel into 8 Ohms	Cont. Avg. Watts/Channel into 4 Ohms	POWER AMP				PREAMP				Price, \$	Notes
										Class of Output Operation	Dynamic Headroom, dB	Meters = M, Peak Clip Indicators = I	MM Mono S/N, -ab, -A Wtd. re: 5 mV	MM Mono Sensitivity, mV	MM Mono Sensitivity, mV	Moving Coil Input?	Weight, lbs.		
A. V. A.	CA-50	I	0.2	0.1	90	50	No	40	65	20-20	AB	1.8	75	0.5	150	No	18	595.00	No high-frequency feedback. Toroidal transformer.
	CA-50 Plus	I	0.2	0.2	90	50	No	40	65	20-20	AB	1.8	80	0.5	150	No	18	695.00	
	MOS-FET 150C	B	0.2	0.1	90	No	No	40	75	20-20	AB	2.0					25	500.00	
	MOS-FET 250C	B	0.2	0.1	90	No	No	140	200	20-20	AB	1.8					30	745.00	
	Transcendence 250	B	0.07	0.07	100	No	No	140	200	10-30	AB	2.0					30	1250.00	
Transcendence 500	B	0.07	0.07	100	No	No	300	450	10-30	AB	1.5					50	1640.00		
BEARD AUDIO	P-101	B/T	1	1		775	No	100	100	20-20	A/B						80	3600.00	Operates in Class A to 50 watts; bridgeable; dual mono. Dual mono.
	P-35 M-70	B/T B/T/M	1 1	1 1		775 775	No No	35 70	35 70	20-20 20-20	A A						45 45	1900.00 4800.00	
BEDINI AMPLIFIERS	100/100 MKII	B	0.1	0.1		500	No	100	200	1-150	A						38	1995.95	†Status fault indicators Bridges to 200 watts; rack-mount version, \$1549.00. 400 watts x 1 into 1 ohm.
	150/150 MKII	B	0.1	0.1		500	No	145	290	1-100	AB						42	999.95	
	250/250 MKII	B	0.1	0.25		1.5V	No	248	495	10-150	A						22	2495.95	
	100/100 1 MEG	B	0.015	0.025		500	No	100	200	1-100	A						68	3995.95	
BEL	2002 1001	B B					No	100 50	200 100	3-250 5-200	A A	0 0	†				50 28	3395.00 1395.00	
	1001P	B/M					No			5-200	A	0					28	1395.00	
BELLES RESEARCH	250	B	0.05	0.05	200	1.2V	No	125	250	20-20	AB	1.8					35	995.00	
	400A	B	0.05	0.05	200	1.5V	No	200	400	20-20	AB	2.0					56	1495.00	
DAVID BERNING CO.	EA-2100	B/T	2			1V	No	100	100	20-50	AB	2					40	2695.00	Strappable. As above.
	EA-230	B/T	2			1V	No	30	30	20-80	AB	1					30	895.00	
BIAMP SYSTEMS	XA 100	B	0.05	0.05	30	1.7V	No	35	50	20-20	AB						13½	499.00	300 watts into 2 ohms. 680 watts into 2 ohms.
	XA 300	B	0.07	0.1	30	1.9V	No	100	150	20-20	AB						21	599.00	
	XA 600	B	0.07	0.1	30	2.7V	No	200	300	20-20	AB						24	779.00	
	XA 1000	B	0.10	0.1	30	2.5V	No	300	500	20-20	AB						35	1099.00	
	T-500	B	0.05	0.05	32	1.4V	No	150	240	20-20	AB						35	1129.00	
	T-1000	B	0.04	0.04	40	2V	No	310	480	20-20	AB		M				48	1499.00	
B & K	ST-140	B	0.09	0.09	11		No	105	105	5-45	AB	1.4					25	440.00	Bridgeable. 28 amps peak to peak. For high-impedance loads. Dual mono. Can drive 1-ohm loads
	ST-202	B	0.09	0.09	11		No	140	180	5-45	AB	1.5					30	595.00	
	ST-202 +	B	0.09	0.09	12		No	200	150	5-45	AB	1.6					32	649.00	
	EX-442	B	0.09	0.09	14		No	200	300	5-45	AB	1.8					35	895.00	
	PRD-600	B	0.09	0.09	24		No	250	400	5-45	AB	1.1					38	1295.00	
BOULDER AMPLIFIERS	500	B	0.005		35	1.8V	No	150	250	20-100	AB	0	M,I				51	2875.00	Bridges to 500 watts; balanced and unbalanced inputs. Inputs as above.
	160	B	0.005		18	1.1V	No	60	80	20-80	AB	0	M,I				40	1190.00	
BRITISH FIDELITY	A-1	I						20			A					Yes	15	350.00	Bridgeable.
	A-100	I						50			A					Yes	19	750.00	
	B-200	I						70			AB					Yes	17	550.00	
	P-140	B						70			AB						22	550.00	
	P-170	B						85			AB						27	750.00	
	P-270	B						135			A						56	1750.00	
	A-370	B						185			A						90	3750.00	
BRYSTON	2B-LP	B	0.01	0.01	60		No	50	100	0.5-100	AB		I				20	550.00	Bridgeable; ground-lift switch. As above. As above. †1000 watts. Ground- lift switch; will drive loads greater than 1 ohm.
	3B	B	0.01	0.01	60		No	100	200	0.5-100	AB		I				35	975.00	
	4B	B	0.01	0.01	60		No	250	400	0.5-100	AB		I				50	1500.00	
	6B	B/M	0.01	0.01	Sel.		No	500	†	0.5-100	AB		I				100 Pair	3400.00 Pair	
CARVER	M1.5t	B	0.5	0.1	200		No	350	550	3-60	AB	3	I				16	899.00	Magnetic Field Amp. As above; bridges to 1000 watts. Magnetic Field Amp. As above. As above.
	M1.0t	B	0.1	0.1	190		No	200	400	3-60	AB	3	I				20	599.00	
	M500t	B	0.15	0.1	176		Yes	250	350	3-60	AB		M				23	629.00	
	M400t	B	0.5	0.1	135		Yes	201	300	3-60	AB		I				9	550.00	
	M200t	B	0.15	0.1	100		Yes	120	200	3-60	AB		I				10¼	440.00	
CELLO	Performance (RD)	B					No				AB	No						12,500. Sys.	Dual mono; four chassis; high-voltage, high-current design.
CLASSE AUDIO	DR-3B	B	0.1	0.1	800		No	25	50	0.1-80	A	7					72	2895.00	Bridges to 200 watts into 4 ohms. Bridges to 450 watts into 2 ohms.
	DR-3-VHC	B	0.1	0.1	800		No	45	85	0.1-80	A	5					102	3995.00	
CONRAD-JOHNSON	MV50	B/T	1.0	1.0			No	45	45	20-15	AB						33	1485.00	
	Premier 4	B/T	1.0	1.0			No	100	100	20-15	AB						80	2950.00	
	Premier 1b	B/T	1.0	1.0			No	150	150	20-15	AB						140	4850.00	
	Premier 5	B/T/M	1.0	1.0			No	200	200	20-15	AB						80	3000.00	
	MF80	B	0.5	0.5			No	80		20-20	AB						28		

CHALLENGING DESIGN.

HOW BOB CARVER CREATED A NEW MAGNETIC FIELD AMPLIFIER WITH THE SOUND CHARACTERISTICS OF A \$3000 MODEL, SATISFIED SOME OF THE WORLD'S MOST HIGHLY TRAINED AUDIO EARS... AND HOW YOU CAN OWN HIS DESIGN FOR UNDER \$600.

Bob Carver's newest Magnetic Field Amplifier is sending shock waves through the staid audiophile world. Because it won a challenge that no other amplifier designer could even consider.

The M-1.0t was judged, in extensive listening tests by one of America's most respected audiophile publications, to be the sonic equivalent of a pair of legendary, esoteric mono amplifiers which retail for over five times as much.

A DESIGN FOR THE CHALLENGE OF MODERN MUSIC REPRODUCTION.

Before you learn the fascinating details of Bob Carver's unprecedented feat, let's consider the final product of that challenge. An amplifier design which stands on its own merits in any case, with astonishingly high voltage/high current output and exclusive operation features. An amplifier for the demands of compact digital discs, VHS Hi-fi and other wide dynamic range playback media.

THE M-1.0t:

- ◇ Has a continuous FTC sine-wave output conservatively rated at 200 watts RMS per channel into 8 ohms from 20Hz to 20kHz with no more than 0.15% THD.
- ◇ Produces 350-500 watts per channel of RMS power and 800-1100 watts peak power for transients. (8 ohms and 4 ohms respectively).
- ◇ Delivers 1000 watts continuous sine wave output at 8 ohms in bridging mode without switching or modification.
- ◇ Employs Bass Phase Inversion circuitry that can essentially double current output at low frequencies.

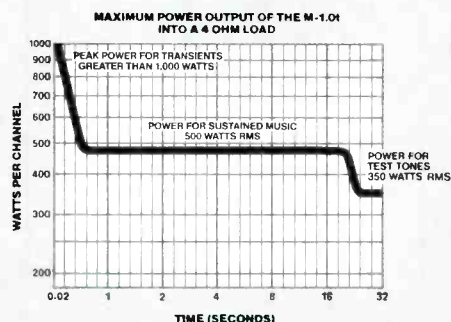
- ◇ Has a -110dB signal-to-noise ratio and no need for noisy external fan, making it exceptionally quiet.
- ◇ Includes elaborate safeguards including DC Offset and Short Circuit Power Interrupt protection.
- ◇ Is capable of handling unintended 1-ohm speaker loads without shutting down.
- ◇ Uses a power display capable of 1 millisecond peak response time and instant warning of clipping.



Accurate to as little as 1dB, the M-1.0t's 2-color power meters respond within a millisecond of a transient impulse, identify momentary clipping and serve notice of protection circuit activation.

POWER FOR THE CHALLENGES OF MUSICAL WAVEFORMS.

The rating differences between the M-1.0t's FTC and Carver's continuous



The Carver M-1.0t delivers massive power at all important output levels.

RMS power reserves represent Bob's insistence that electronic designs should address real world problems. He reasoned that the M-1.0t must excel at

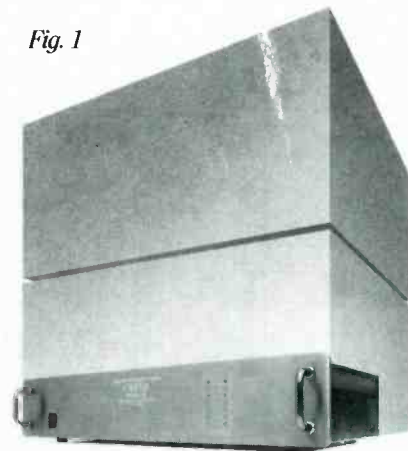
reproducing those types of power waveforms that are most essential to music's stunning impact and realism.

First there are the instantaneous peak transients—the sudden individual attacks of each musical note which demand a tremendous amount of amplifier power. While these waveforms last less than 1/100 of a second, they form the keen edge of musical reality.

Next come combinant musical crests of demand from multiple instruments and their harmonics. These longer-term power demands usually come and go in less than a second, yet can tax all but the most powerful amplifier.

Thus, even at 8 ohms and at extremely high output current levels, the Carver M-1.0t not only delivers over 800 watts of peak power for momentary musical transients, but can provide over 350 watts RMS of long-term power for demands lasting up to 20 seconds. More power, more current and more voltage than any other comparably-priced amplifier.

Fig. 1



Two distinctly different approaches to sonic excellence.

THE MAGNETIC FIELD AMPLIFIER VS. CONVENTION.

Audiophiles, critics and ultimately other manufacturers have accepted

the wisdom of Bob Carver's innovative approach to delivering power in musical terms. Yet only Carver has so elegantly translated theory into practice.

Figure 1 shows the new Carver M-1.0t Magnetic Field amplifier. It weighs 20 pounds and runs cool to the touch. Behind it is the outline of the pair of legendary mono amplifiers you'll read more about below. Even individually, they can hardly be lifted and demand stringent ventilation requirements. And yet, according to some of the most discriminating audiophiles in the world, Bob's new design is their sonic equal.

The ultimate secret lies in the patented Magnetic Field Coil (figure 2) employed in the Carver M-1.0t. Instead of increasing cost, size and heat output with huge storage circuits, Magnetic Field Amplification delivers its awesome output from this small but powerful component. The result

Fig. 2



A single Magnetic Field Coil supplants traditional heavy power supplies.

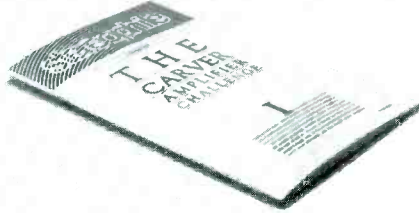
is a design capable of simultaneous high current and high voltage. A compact cooling design that fills your room with sound, not bulk.

CARVER'S GREAT AMPLIFIER CHALLENGE.

On the merits of its enviable specifications and features alone, the M-1.0t could easily have become another industry benchmark of power, accuracy and economy.

But Bob is never satisfied. He felt that his fifth Magnetic Field Amplifier design should be even more remarkable.

So last year, he made a bold offer to the editors of *Stereophile Magazine*, one of America's most respected audiophile publications. He claimed that he could make special modifications to his new amplifier design which would enable it to sound EXACTLY like any high-priced, esoteric, perfectionist amplifier (or amplifiers) the editors could choose.



Moreover, his design work would not happen in his Lynnwood, Washington laboratory, but in a motel room near *Stereophile's* offices in New Mexico. And would match the M-1.0t's final sound to any contender in 48 hours!

As the magazine put it, "If it were possible, wouldn't it already have been done? Bob's claim was something we just couldn't pass up unchallenged."

Out of respect, ethics (and even a little bit of awe), neither *Stereophile Magazine* nor Carver will divulge the name of the legendary "world class" mono vacuum tube amplifiers that were selected as the M-1.0t's contender.

Suffice to say that what transpired in the next 48 hours is high fidelity history. It makes great reading in *Stereophile*, Vol. 8, No. 6, or in the reprint we'll send you on request.

MUSIC IS THE FINAL PROOF.

The *Stereophile* evaluation team was admittedly skeptical ("We wanted Bob to fail. We wanted to hear a difference").

They drove both amplifiers with some of the finest components in the world. Through reference speakers that are nothing short of awesome.

But it was their ears and carefully selected music ranging from chamber to symphonic to high-impact pop that led them to write, "... each time we'd put the other amplifier in and listen to the same musical passage again, and hear exactly the same thing. On the second day of listening to his final design, we threw in the towel and conceded Bob the bout. According to the rules... Bob had won."

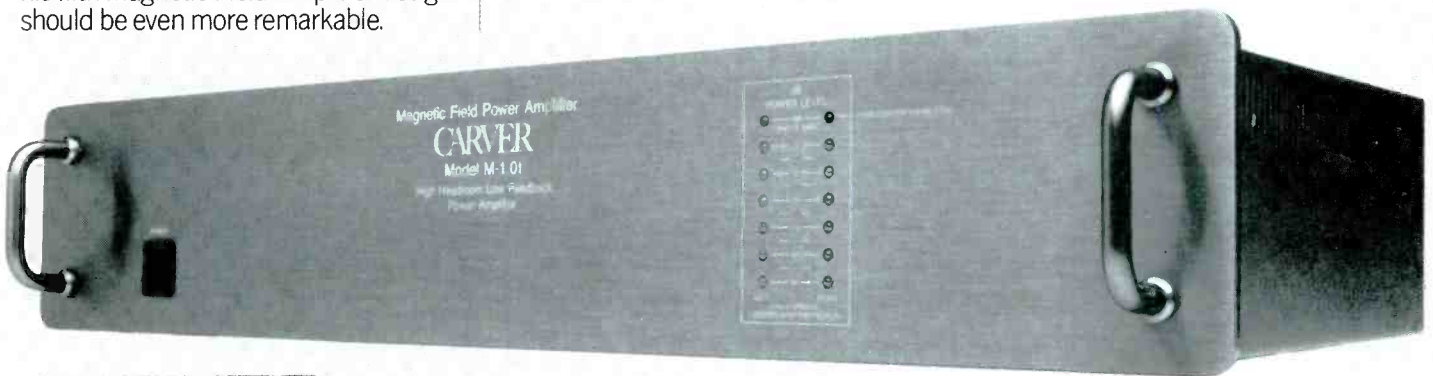
The inquiring audiophile can't help but wonder if M-1.0t production models will sound as good. Ask the man who designed it. "I promise they will sound exactly the same. And just as good. In fact, I stake my reputation and that of our company on it."

SHARE THE CHALLENGE AND THE VICTORY.

The real winner is you. Because you can own world class, superlative electronics at reasonable prices by visiting your nearest Carver dealer. Compare the new M-1.0t against any and all competition. Including the very expensive amplifiers that have been deemed the M-1.0t's sonic equivalent. But even if you can't make that comparison, you won't be surprised when the M-1.0t lives up to every other claim made in this ad.

What you will be surprised at is just how affordable this much power, musicality and accuracy can be.

SPECIFICATIONS: Power, 200 watts/channel into 8 ohms 20Hz to 20KHz, both channels driven with no more than 0.15% THD. Long term, sustained RMS power, 500 watts into 4 ohms, 350 watts into 8 ohms. Bridged Mono RMS power, 1000 watts into 8 ohms. Noise, -110dB IHF A-Weighted. Frequency Response, +0-3dB 10Hz-100KHz. Slew Factor, greater than 200. Weight, 20 lbs. Finish, light brushed anthracite, anodized.



CARVER Corporation, PO Box 1237, Lynnwood, WA 98046

POWERFUL

MUSICAL

ACCURATE

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For your nearest dealer, see pages 384 & 385.

Distributed in Canada by Evolution Technology

AMPLIFIERS

MANUFACTURER	Model (RD) = Remote Included. (RD) = Remote Optional	Type: Integrated = Basic B Hybrid = H. Mono = M	Rated THD, %	Rated SMPTE IM, %	Rated Slow Rate, V/μS	High-Level Sensitivity, mV	Doses Unit Invert Polarity?	Cont. Avg. Watts Channel into 8 Ohms	Cont. Avg. Watts Channel into 4 Ohms	POWER AMP				PREAMP				Price, \$	Notes		
										AB	AB	AB	AB	Meters = M	Peak/Clip Indicators = I	MM Phono Sensitivity, mV	MM Phono Sensitivity, mV			Moving Coil Input?	Weight, Lbs.
COUNTERPOINT	SA-12	B/H	0.8			No	85	140	5-100	AB	3						38	995.00	Bridgeable. Output transformerless; d.c. coupled.		
	SA-20	B/H	0.5			No	220	420	1.2-200	AB							69	1995.00			
	SA-20/20	B/H/M	0.5			No	600	700	1.2-200	AB							69	3990.00			
	SA-4	B/T/M	0.2			No	140	96	1-100	AB Var.	2	M					60	5225.00 Pair			
CREEK	4040	I	0.01	0.05	150	250	No	35	40	20-20	AB	1		75	2.5	350	No	10	350.00	100-μV sensitivity and 1-kilohm loading for MC input.	
	4140	I	0.01	0.05	150	250	No	40	50	20-20	AB	1		75	2.5	500	Yes	11	450.00		
	5050	I	0.01	0.05	150	250	No	50	70	20-20	AB	1		75	2.0	2V	Yes	18	800.00		
CREST AUDIO	8001	B	0.006	0.06	70	1.8V	No	750	↑	20-20 ±0.1	AB	2	I					82	2800.00	↑1200 watts. Bridges to 2800 watts. Bridgeable; balanced inputs. As above.	
	4000	B	0.003	0.01	70	Set.	No	325	550	1-50 ±0.1	AB	1.5	M, I					58	2279.00		
	4001	B	0.003	0.01	70	Set.	No	325	550	1-50 ±0.1	AB	1.5	I					58	2079.00		
	3000	B	0.003	0.01	60	Set.	No	240	430	1-50 ±0.1	AB	1.5	M, I					46	1789.00		
	3001	B	0.003	0.01	60	Set.	No	240	430	1-50 ±0.1	AB	1.5	I					46	1589.00		
	2501A	B	0.005	0.01	40	1V	No	200	360	1-50 ±0.1	AB	1.5	I					38	1279.00		
	2001A	B	0.005	0.01	33	790	No	125	200	1-50 +0.2	AB	1.5	I					32	1059.00		
	1501A	B	0.005	0.01	25	610	No	80	130	1-50 +0.2	AB	1.5	I					17	839.00		
	1001A	B	0.005	0.01	20	420	No	40	75	1-50 +0.2	AB	1.5	I					17	679.00		
	Powerline 400	B	0.01	0.01	70	1.2V	No	290	450	1-50 +0.2	AB	1.5	I					38	1239.00		
	Powerline 300	B	0.01	0.01	40	1V	No	220	325	1-50 +0.2	AB	1.5	I					32	939.00		
	FA800	B	0.01	0.01	40	1V	No	240	400	1-50 +0.2	AB	1.5	I					31	792.00		
CROWN INTERNATIONAL	O-75	B	0.001	0.05	6	812	No	40	55	20-20	AB/B							10	524.00	Bridgeable.	
	D-150A-2	B	0.001	0.05	6	1.2V	No	80	125	1-20	AB/B							24	749.00		
	DC-300A-2	B	0.001	0.05	8	1.8V	No	155	250	1-20	AB/B							45	1049.00		
	PS-200	B	0.001	0.05	16	1.3V	No	90	135	1-20	AB/B							25	819.00		
	PS-400	B	0.001	0.05	16	1.8V	No	165	260	1-20	AB/B							55	1259.00		
	PSA-2X	B	0.002	0.01	30	2.1V	No	220	350	1-20	AB							57	1795.00		
	PSA-2DX	B	0.002	0.01	30	2.1V	No	220	350	1-20	AB							57	1995.00		
	Micro-Tech 600	B	0.1	0.05	13	2.1V	No	220	275	20-20	AB/B							39 1/4	949.00		
	Micro-Tech 1200	B	0.1	0.05	13	2.5V	No	320	470	20-20	AB/B							44 1/4	1169.00		
	Macro-Tech 600	B	0.1	0.05	13	2.1V	No	220	275	20-20	AB/B							39 1/4	1169.00		
	Macro-Tech 1200	B	0.1	0.05	13	2.5V	No	320	470	20-20	AB/B							44 1/4	1369.00		
	Macro-Tech 2400	B	0.1	0.05	17	3.2V	No	525	800	20-20	AB/B							51	1899.00		
	Delta-Omega 2000	B/M	0.05	0.05	32	Set.	No	730	↑	0-45	AB/B							92	3395.00		
	Power Base 1	B	0.1	0.05	13	2V	No	200	200	20-20	AB/B								32		769.00
Power Base 2	B	0.1	0.05	13	2.5V	No	320	320	20-20	AB/B								32	1049.00		
CYRUS	One	I/T	0.004	0.005	65	No	30	40	20-20	AB	1.4						Yes	8.8	399.00	External power supply, Model PSX, \$449.00.	
	Two	I/T	0.004	0.004	50	No	60	80	20-20	AB	1.7			82	0.40		Yes	11	599.00		
DB SYSTEMS	DB-6A	B	0.003	0.002	15	1V	No	40	60	20-40	AB	3	I					18	750.00	Three-times power-supply capacitance optional. Per pair, \$1450.00.	
	DB-6A-M	B/M	0.008	0.004	30	1V	No	140	225	20-40	AB	3	I					18	750.00		
DBX	BX1	B	0.025	0.025	200	1V	No	400	650	10-50	AB	1.5	I					9 1/2	2500.00	Strappable; 2-, 3-, or 4-channel operation; load-invariant response.	
DENON	PDA-3000Z	B	0.002	0.002	500	1V		250	450	5-80	A		M					66	2400.00	Nonswitching. As above.	
	PDA-6600	B/M	0.002	0.002	500	1V		250	450	5-80	A		I					35	700.00		
	PDA-2200	B	0.002	0.002	500	1V		200	300	5-80	A		I					38	675.00		
	PMA-900V	I	0.002	0.003	350	150		120	200	5-80					95	2.5	160	Yes	26		700.00
	PMA-700V	I	0.004	0.003	350	150		100	150	5-80					94	2.5	160	Yes	23		530.00
	PMA-500V	I	0.007	0.003	150	150		80	130	5-80					88	2.5	160	Yes	21		370.00
	PMA-300V	I	0.008	0.005	150	150		60	80	5-40					88	2.5	160	Yes	13		250.00
	PMA-250	I	0.05	0.03	150	150		25	25	10-40					72	2.5	160	Yes	11		200.00
DIMENSIONAL OPTICS	Silicon Laser Matrix Stereo	B	0.05	0.05	100	600	No	150	285	5-100	AB	3						25	2000.00	Optical output devices.	
	Silicon Laser Matrix Mono	B/M	0.05	0.05	100	600	No	150	285	5-100	AB	3						30	3000.00	As above.	
	Silicon Laser Matrix Tesla	B/M	0.01	0.01	100	500	No	250	475	5-100	AB	4						40	5000.00	As above.	
																			Pair		
DISTECH	LS II	B	0.05	0.09	45	1.1V	No	100	200	3-100	AB	3, 2						25	950.00	Dual mono.	
	LS III	B	0.03	0.05	75	1.1V	No	100	200	3-100	AB	6						35	1850.00		
	LS IV	B/M	0.01	0.03		1.1V	No	200	400	3-100	AB	6						50	2200.00		

WINNER, AGAIN?



COUNTERPOINT builds the best amplifiers and pre-amplifiers you can find at any price, anywhere. Our products deliver superb sound with unsurpassed stereo imaging. Each of our amplifiers—from the inexpensive (\$595) SA-7 on up—is the best in the world in its price range.

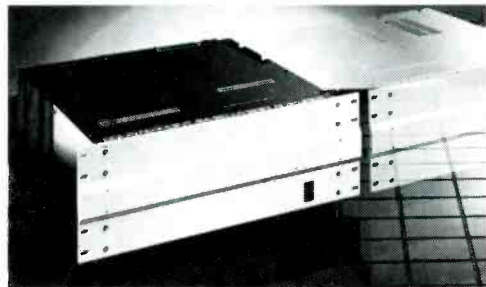
Says who?

In the audio world, it seems most everyone claims ultimate quality. Luckily, there are three proven ways to sort the wheat from the chaff:

1. Ask the experts

For the past 3 years, each new Counterpoint product has won a prestigious award—both at home and abroad. For instance, our SA-20 Power Amplifier just won Japan's Component of the Year Award (not too had these days, for a designed-and-made in the USA product!)

SA-20 Power Amplifier... hybrid technology at its best



SA-4 Power Amplifier... Golden Sound Award, Stereophile, 1986 Class A Rating



*Recent Counterpoint Awards — (clockwise from bottom)
Golden Sound Award, SA-4. Class 1A Rating, IAR, SA-2. Class 1A Rating, IAR, SA-12. Component of the Year, SA-5. Component of the Year, SA-3. Component of the Year, SA-20. Design & Engineering, SA-1. Design & Engineering, SA-4. Innovations '86, SA-9/11.*

2. Ask any audiophile

Ask your friends who treasure the magnificence of high-end sound. Ask them what makes Counterpoint products better, and why.

3. Ask yourself

Learning about high-end audio electronics starts with *hearing* Counterpoint products. Our dealers are intelligent, friendly, and eager to demonstrate Counterpoint amplifiers at any time.

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COUNTERPOINT

Dept. C., P.O. Box 12294, La Jolla, CA 92037

CANADA: Pro Acoustics, Inc., 227G Brunswick Blvd., Point Claire, Que. H9R 4X5 (514) 694-4790

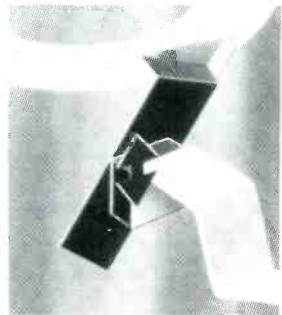
AMPLIFIERS

MANUFACTURER	Model (RM) = Remote Included, (RO) = Remote Optional	Type Integrated = I, Base = B, Face = F, Hybrid = H, Mono = M	Rated THD, %	Rated SMPT, %	Rated Stew Rate, V/us	High-Level Sensitivity, mV	Dues Unit Invert Polarity?	Cont. Avg. Watts/Channel	Cont. Avg. Watts/Channel into 8 Ohms	POWER AMP				PREAMP				Price, \$	Notes	
										Rated Power Hz to KHz	Class of Output Operation	Dynamic Headroom, dB	Meters = M, Peak/Clip Indicators = I	MM Phono SN, dB : A, We. re. 5 mV	MM Phono Sensitivity, mV	Moving Coil Input?	Weight, Lbs.			
DNM DESIGN	GEM	B	0.1	0.1	75	750	No	30	50	20-20	AB							26		
DUAL	PA-5060 PA-5030	I I	0.01 0.01	0.02 0.02		200 200		60 30		6-95 6-90			78 78	2.5 2.5	140 140	Yes Yes	21 17	399.00 299.00		
ELECTRO-COMPANET	AW-65 AW-100 AW-250 Monowire 400	B B B B/M	0.2 0.2 0.2 0.2				No No No No	75 100 250 400	135 180 480 750		AB AB AB AB							33 36 61	1295.00 1995.00	
ELECTRON KINETICS	Eagle 2a Eagle 3	B B/M	0.10 0.10	0.10 0.10	120 600	1.3V 1V	No No	120 200	240 400	0-100 0-200	AB AB	1.0 1.5						37 49	999.00 1500.00	
FENTON AUDIO	Stereobate	B/M	0.025	0.025	500		No	300	600	20-100	AB +							50	2300.00	Qual mono; MOS-FET; water-cooled.
FM ACOUSTICS	FM300 FM600	B B	0.009 0.008		25	1V 900	No No	100 150	150 250	5-100 5-300	A/AB	I I						28 44	3768.00 5830.00	Rack-mountable; low-impedance (2-ohm) version, Model FM600LI, \$5350.00; with ultra-low impedance (400 watts into 2 ohms), Model FM600LI, \$5648.00. Rack-mountable; low-impedance (2-ohm) version, Model FM800LI, \$9400.00; with ultra-low impedance (850 watts into 2 ohms), Model FM800LI, \$9960.00.
FM800	B	0.007		25	800	No	300	400	5-300		I							66	8820.00	
FORTE AUDIO	1	B	0.1	0.1	30		No	40	70	20-20	A								950.00	30 amps per channel, peak.
FOSGATE	M-60	B/M	0.05	0.05	15	Var.	No	45	60	20-20	AB	I						5	159.95	
GOLDMUND	Mimesis 3	B						100										30	5290.00	
GROMMES PRECISION	G 252HF	B	0.05	0.05	30	750	No	90	125	20-20	AB	1.5	M					31	627.00	Bridges to 250 watts.
GSI	A-1 A-2 A-3 A-4	B/H B/H/M B/H B/H	0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	100 50	900 900	No No	125 400	250 800	0.5-100 0.5-80	AB AB							28 32	1295.00 2495.00	D.c. coupled. As above.
								50	100	0.5-100	AB							22	795.00	As above.
								80	900	0.5-100	AB							40	1995.00	As above.
DAVID HAFLE CO.	XL600 XL280 DH-500 DH-220 DH-120	B B B B B	0.05 0.05 0.025 0.02 0.009	0.04 0.04 0.007 0.005 0.005	100 75	133 133	No No No No No	305 145 255 115 62	450 200 400 175 75	10-100 10-100 20-20 20-20 20-20	AB AB AB AB AB	1.4 1.4 1.5 1.4 1.8						51 27 45 26 18	995.00 600.00 850.00 500.00 375.00	Bridgeable. As above; kit, \$525.00. Kit, \$725.00. Kit, \$400.00. Bridgeable; ambience recovery circuit; input level controls; kit, \$325.00.
HARMAN/KARDON	PM665 Vxi PM655 Vxi PM645 Vxi PM640 Vxi PM635 Citation 22 Citation 24	I I I I I B B	0.08 0.08 0.09 0.09 0.09 0.08 0.08		180 180 90 90 90 160	135 135 135 135 135 1V	No No No No No No	150 90 60 45 30 200	150 90 60 45 30 200	10-100 10-100 10-100 10-100 10-100 10-100	AB AB AB AB AB AB	1.8 M,I	80 80 80 80 80 78	2.2 2.2 2.2 2.2 2.2	220 220 130 120 130	Yes Yes Yes No No	33 22½ 14½ 13½ 12¾ 45	925.00 625.00 425.00 325.00 215.00 895.00	80 amps. 45 amps. 30 amps. 18 amps. 15 amps. Bridges to 400 watts; 120 amps. Bridges to 200 watts; 60 amps.	
HEYBROOK	P-2	B	0.01	0.01				80		20-50								22	998.00	
HITACHI	HA6 HA007SW HMA120AVSW	I I B	0.005 0.05 0.08	0.008 0.05 0.08			No No No	100 65 120		20-20 20-20 20-20	B B B		90 86	2.5 2.8		No No	26½ 18½ 17½	299.95 399.95 249.95		
JADIS	JA200 JA80 JA30	B/T/M B/T/M B/T/M						160 60 30			A A A								12,750. 8300.00 4300.00	Pair Pair Pair
JRM	Power Tower Power Tower/ B Pro	B/M B/M	0.02 0.02	0.02 0.02	100 100	† †	No No	†† ††	††† †††	0.6-75 0.6-75	AB AB	2.0 1.5	M,I M,I					70 90	2500.00 3100.00	†(2)2.0 and (2)1.1 V. ††(2)180 and (2)60 watts. †††(2)600 and (2)200 watts into 2 ohms. All-cascade design. †(2)2.0 and (2)1.1 V. ††(2)600 and (2)150 watts. †††(2)900 and (2)300 watts into 2 ohms. All-cascade design; bridged outputs.

Canton announces significant engineering advances in the science of music reproduction.



Enlarged detail from center of photo: the rigid aluminum ring with obliquely positioned permanent magnets. In front of it, the semiconductor sensor which is linked via a supporting plate with the diaphragm and moves to and from with it.



Motion Feedback:

All loudspeaker systems have an inherent problem. A driver's diaphragm is burdened by mass and reacts to sound impulses with a certain amount of inertia. A time delay exists between the instantaneous sonic impulse and the acceleration and deceleration of the diaphragm. This delay translates into coloration of the source material.

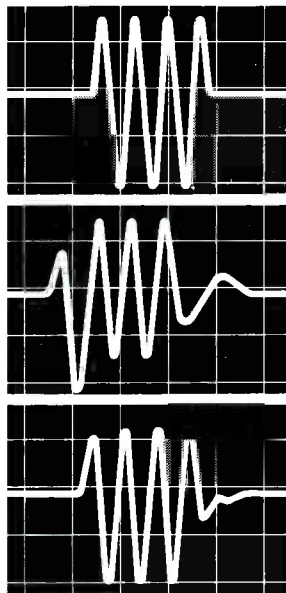
Canton's new CA series, in addition to their advanced power amplifiers, are equipped with a built-in electronic signal correction system which monitors each speaker diaphragm, checking whether its motion corresponds exactly with the impulses of the musical signal at all times. Instantly—within a fraction of a

A "sound burst" (upper curve) as seen on the oscilloscope: fast attack and equally rapid decay of sonic impulses. Here's

what an uncorrected speaker makes of the signal (center curve): there are distinct discrepancies on both incursion and excursion. And here's how the Canton system corrects diaphragm motion (lower curve): to the exact image of the original sound burst, in all but infinitesimal "afterflash."

millisecond—any discrepancies are registered, fed back and corrected via counteraction of the built-in power amplifiers.

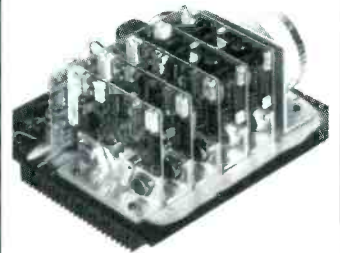
Canton employs a number of new patented processes for driver correction. In the woofer illustrated here, the "Hall Effect" is used. A semiconductor element serving as sensor cuts across the field of a fixed magnet. This creates an electrical voltage related to depth of insertion. Inversely, this "Hall Voltage" is an indicator for the position of the sensor, e.g. the diaphragm. By comparing this actual value with the target value of the musical signal, the control circuitry acquires the impulse needed for any amplifier counteraction. The diaphragm is accelerated or braked accordingly.



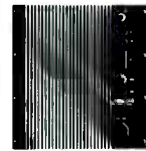
The top-of-the line CA 3D active speaker is a 4-way system powered by 7 internal amplifiers (one for each driver). The woofers are powered by 4x120 Watt amplifiers, the midranges by 2x100 Watt amplifiers and the titanium tweeter by 1x100 Watt amplifier. A total of 780 Watts per CA 3D speaker.

In addition, problems normally associated with passive crossover networks are non-existent due to Canton's advanced MOS-FET electronic crossovers.

Each amplifier is meticulously fine tuned to achieve optimal performance with its associated, companion driver.



With these high standards, all components—not just the signal correction circuitry—incorporate the most sophisticated technical advances. The entire system reflects the design approach customary in industrial electronics like using thick film modules with SMD's (Surface Mounted Devices), bus interface connections, and plug-in card technology for high reliability and performance capability.



Connecting and control elements on rear panel of a CA series active speaker. Each frequency range can be independently boosted or attenuated to compensate for listening room idiosyncrasies.



Since active speakers incorporate their own built-in power amplifiers, all that's needed to drive them is a pre-amp like the new EC-P1 from Canton (pictured above).

Find out more about the entire Canton product line by visiting an Authorized Canton Dealer and picking up Canton's 1986/1987 40-page Loudspeaker Journal.

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from

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AMPLIFIERS

MANUFACTURER	Model (R) = Remote Included. (RD) = Remote Optional	Type: Integrated = I, Basic B, Tubes = Hybrid = H, Mono = M	Rated THD, %	Rated SMPTE IM, %	Rated Slow Rate, V/μS	High-Level Sensitivity, mv	Does Unit Invert Polarity?	Cont. Avg. Watts	Cont. Avg. Watts Channel into 8 Ohms	Rated Power Bandwidth, Hz to kHz	Class of Output Operation	POWER AMP				PREAMP				Notes	
												Meters = M, Peak/Clip Indicators = I	MM Photo S.N. = dB, "A" = Wdr re 5 mv	MM Photo Sensitivity, mv	Moving Coil Input?	Weight, Lbs.	Price, \$				
JVC	AX70	I	0.007	0.007		190	No	70		20-20	Dyn. Sup. A			85	2.5		Yes	17.2	400.00	Includes spectrum analyzer and seven-band EQ. Includes spectrum analyzer.	
	AX90V(RI)	I	0.007	0.007		230	No	120		20-20	Dyn. Sup. A			85	2.5		Yes	22.1	600.00		
	AX1100	I	0.005	0.001		200	No	120		20-20	Dyn. Sup. A			86	2.5		Yes	33.1	720.00		
KENWOOD	KA-3300D	I	0.004	0.003		150	No	150		5-50				87	2.5	210	Yes	39 1/4	1199.00	Includes dual D/A converters; fiber-optic digital input; 4X oversampling.	
	Basic-M2A	B	0.004	0.004		1V	No	220		5-100		M		86	2.5	200	Yes	34 1/2	650.00		
	Basic-M1D	B	0.008	0.008		1V	No	125		5-75		M		86	2.5	200	Yes	21 1/2	410.00		
	KA-880D	I	0.008	0.008		150	No	100		10-45				86	2.5	200	Yes	22	410.00		
	KA-770D	I	0.008	0.008		150	No	80		5-90				86	2.5	200	Yes	20	360.00		
	KA-76	I	0.05	0.03		150	No	100		10-100				81	2.5	170	Yes	15	300.00		
	KM-206	B	0.03	0.002		1V	No	150		10-50				81	2.5	170	No	11	350.00		
KM-106	B	0.03	0.002		1V	No	125		10-50								11	300.00			
KINERGETICS	KBA-75	B	0.05	0.05	65	2.5V	No	75	150	1-300	A	6						45	1395.00	Constant current Class A. Dual mono; toroidal transformer.	
	KBA-202	B	0.05	0.05	100	2.7V	No	200	400	1-400	AB	3						59	1795.00		
KLIMO	Kent	B/T	0.3				No	35	35		AB							38	1950.00	Dual mono. Output transformerless.	
	DK-OPTL	B/T/M	0.25				No	115	80		AB							42	6995.00		
KRELL	KSA 50	B	0.05	0.05	250	680	No	50	100	20-20	A	3						66	2550.00	1600 watts into 1 ohm. 2000 watts into 0.1 ohm. 10 kW peak into 0.1 ohm. Balanced input; 400 watts into 2 ohms. Balanced input; 800 watts into 2 ohms.	
	KSA 100	B	0.05	0.05	400	1V	No	100	200	20-20	A	1.5						110	3650.00		
	KSA 200	B	0.05	0.05	500	1V	No	200	400	20-20	A	1.5						140	4500.00		
	KMA 100	B/M	0.05	0.05	500	1V	No	100	200	20-20	A	3						73	3000.00		
	KMA 200	B/M	0.05	0.05	800	1V	No	200	400	20-20	A	1.5						120	4400.00		
	KRS 100	B/M				1V	Var.	100	200		A	0							160		6000.00
	KRS 200	B/M				1V	Var.	200	400		A	0							220		8000.00
KYOCERA	A-710	I	0.03	0.03	60	200	No	100	140	20-20	AB	0.7	I	85	2.2	190	Yes	44	800.00		
	A-910	I	0.03	0.03	90	250	No	150	200	20-20	AB	1.2	I	85	2.2	180	Yes	50	1500.00		
LAZARUS	H-1	B/H				600	Yes	†	†	6-50	A/AB	3	No					35	1599.00	†Class A. 50 watts into 8 ohms and 100 watts into 4 ohms; Class AB. 100 watts into 8 ohms and 175 watts into 4 ohms. Bridgeable.	
MARK LEVINSON	ML-2	B/M	0.1	0.1			Sel.	25	50	20-20	A							65	10,200.00	Pair	
	No. 20	B/M	0.2	0.2			Sel.	100	200	20-20	AB2							90	10,200.00		
	ML-3	B	0.2	0.2			No	200	400	20-20	AB2							116	6750.00		
	ML-9	B	0.2	0.2			No	100	200	20-20	AB2							56	3500.00		
	No. 23		0.2	0.2			Sel.	200	400	20-20	AB2							83	4400.00		
ML-11		0.3	0.5			No	50	100	20-20	AB2							25	2100.00			
LINEAGE	PA200	B	0.1	0.1	100	150	No	100		5-100	AB1	I							1650.00	All FET; fully complementary; MOS-FET outputs.	
LINN HI-FI	LK2	B						75		20-20								20	855.00		
LSR&D	The Leach Amp	B	0.05	0.05	70	1.8V	No	160	300	.37-220	AB	2.2	I					36	970.00	Twin toroidal power supply; kit, \$580.00. As above.	
	The Leach Super-Amp	B/M	0.05	0.05	80	2.4V	No	300	500	0.3-200	AB	2.2	I					36	970.00		
LUXMAN	LV-100	I	0.05	0.015		150	No	35		20-20	AB			88	2.5	160	No	13.2	300.00	D/A converter included. Bridgeable. As above.	
	LV-101	I	0.03	0.005		150	No	45		20-20	AB			88	2.5	160	Yes	18.7	420.00		
	LV-102	I	0.03	0.005		150	No	65		20-20	AB			90	2.5	160	Yes	19.8	550.00		
	LV-103	I/H	0.3	0.03		150	No	50		20-20	AB			90	2.5	160	Yes	22.4	650.00		
	LV-105U	I/H	0.25	0.03		150	No	80		20-20	AB			90	2.0	160	Yes	25.3	900.00		
	LV-109	I	0.09	0.09		150	No	150		20-20	AB							42.1	1500.00		
	M-02	B	0.025	0.025		1.2V	No	140		20-20	AB							31.9	800.00		
	M-05	B	0.025	0.025		750	No	105		20-20	A							88.4	3300.00		
MADISON FIELDING	PA900	B	0.01	0.01	20	100	No	150	220	20-20	AB	2	No					29	1250.00	Includes two-channel, seven-band EQ; multi-room remote system. Includes four-channel, three-band EQ; multi-room remote system.	
	CA700(RD)	I	0.01	0.01	20	100	No	60	100	20-20	AB	2	No					20	1400.00		
	CA300(RD)	I	0.02	0.015	15	100	No	40	60	20-20	AB	1.5	No					20	1500.00		
MAN	Triality	B/T/M					No	70	70	4-80	AB		No					50	4990.00	Pair	

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AMPLIFIERS

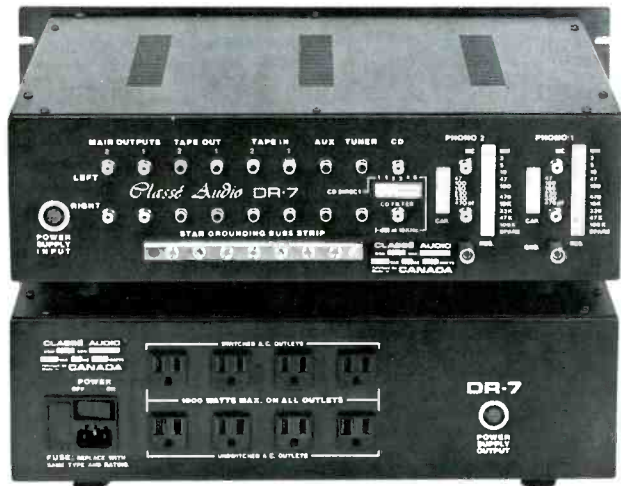
MANUFACTURER	Model = Remote Included, (RI) = Remote Optional	Type: Integ. amp. = I, Base = B, Tone = T, Hybrid = H, Mono = M	Rated THD, %	Rated SMPTF IM, %	Rated Slew Rate, V/μs	High-Level Sensitivity, mv	Does Unit Invert Polarity?	Cont. Avg. Watts/Channel into 8 Ohms	Cont. Avg. Watts/Channel into 4 Ohms	Rated Power Bandwidth, Hz to kHz	Class of Output Operation	POWER AMP				PREAMP				Price, \$	Notes
												Dynamic Headroom	Meters = M, Peak/Clip Indicators = I	MM Phono S/N, -dB	MM Phono S/N, -dB	MM Phono Sensitivity, mv	MM Phono Sensitivity, mv	Moving Coil Input?	Weight, Lbs.		
MARANTZ	PM-94G	I	0.01	0.01	70	150		140	220	10-30	†	92	2.5	180	Yes	55.1	3000.00	†Quarter A. Anodized gold front panel; black version, \$2770.00.			
	PM-84 PM-74	I I	0.015 0.02	0.015 0.02	30 30	150 150		100 100	125 105	20-25 20-20	† †	90 86	2.5 2.5	140 120	Yes Yes	39.7 27.6	1700.00 890.00				
McINTOSH	MA 6200	I	0.02	0.02	15	250	No	75	100	20-20	AB	1.3	I	80	2.0	95	No	30	1795.00		
	MC 2500	B	0.02	0.02	35	Var.	No	500	500	20-20	AB	1.3	M, I					129	3495.00		
	MC 7270	B	0.02	0.02	17	Var.	No	270	270	20-20	AB	1.6	M, I					82	2295.00		
	MC 2002	B	0.01	0.01	25	Sel.	No	200	300	20-20	AB	1.7	M, I					50	1850.00		
	MC 2155	B	0.02	0.02	15	Var.	No	150	150	20-20	AB	1.4	M, I					65	2295.00		
	MC 2150	B	0.02	0.02	15	Var.	No	150	150	20-20	AB	1.4	I					58	1925.00		
	MC 752	B	0.02	0.02	15	Var.	No	75	100	20-20	AB	1.3	I					21	895.00		
	MC 502	B	0.02	0.02	15	Var.	No	50	75	20-20	AB	1.8	I					27	1200.00		
McLAREN AUDIO	702	B	0.005				No	100	160	10-50								28.6	1195.00		
	902	B/M	0.005				No	250	400	10-50								29.7	1195.00		
MEITNER AUDIO	STR-50	B	0.25		75	650	No	50	100	0.1-100	AB							18	1450.00		
	MTR-100	B/M	0.25		75	900	No	100	200	0.1-100	AB							21	3000.00 Pair		
MELOS AUDIO	TM-90ST	B/T	0.5				No	80	80	20-20	AB	3						50	1395.00		
	TBA-2	B/T/M	0.2				No	200	200	20-20	AB	3						46	2895.00 Pair		
MERIDIAN	205	B/M																	775.00		
MFA SYSTEMS	M-75A	B/T/M	0.4	0.5	25	900	No	75	75	16-80	A/AB	1.2						35	1660.00 Pair		
	M-120	B/T/M	0.15	0.25	35	950	No	120	120	18-60	A/AB	1.2						60	2660.00 Pair		
	M-200B	B/T/M	0.5	0.6	35	1V	No	180	200	12-50	A/AB	1.2	M					80	4740.00 Pair		
MIRROR IMAGE	1.1S	B				1.6V	No	200	400		AB	1	I					50	2995.00		
	1.9S	B				2V	No	325	650		AB	1	I					50	3695.00		
MOTIF	MS50	B	0.5	0.5			No	50	100	5-100	AB							34	2350.00		
	MS100	B	0.5	0.5			No	100	200	5-100	AB							46	3250.00		
	MS200	B	0.5	0.5			No	200	400	5-100	AB							68	4950.00		
MUSIC REFERENCE	RM-9	B/T	0.2	0.2		Var.	No	100	100	20-40	A/AB	1.5	I					55	2150.00		
NAD	3240	I	0.03	0.03	15	26	No	40		20-20	AB	6		76	0.55			14.8	378.00		
	3220	I	0.02	0.02	15	33	No	20		20-20	AB	4.4		75	0.55			11.8	248.00		
	3300	I	0.03	0.03	30	25	No	60		20-20	AB	6		80	0.4		Yes	22	598.00		
	2200	B	0.03	0.03	35	70	No	100		20-20	AB	6	I					27.6	598.00		
	2600	B	0.03	0.03	35	90	No	100		20-20	AB	4	I					28.5	748.00		
NAIM AUDIO	NAIT	I	0.1				No	15		5-20	B			2.5	120	No	11	575.00			
	NAP 90	B	0.1			700	No	30	45	5-40	B						12	625.00			
	NAP 140	B	0.1			700	No	45	70	5-40	B						14	925.00			
	NAP 250	B	0.1			900	No	70	125	5-40	B						30	2150.00			
NAP 135	B/M	0.1			900	No	75	135	5-40	B						33	2150.00				
NAKAMICHI	PA-5	B	0.1	0.1			No	100	160	5-50	Stasis		I					35½	1095.00		
	PA-7	B	0.1	0.1			No	200	330	5-50	Stasis		I					59¼	1750.00		
NEC	A-610(RI)	I	0.006		100	150		60	80	20-20	AB	2.0	M	90	2.5	150	Yes	26½	469.00		
	A-910(RI)	I	0.006		100	150		100	130	20-20	AB	2.0	M	90	2.5	220	Yes	36¾	649.00		
	M-50	B/M	0.004		100	Sel.		50	100	20-20	AB	2.0	M					18½	375.00		
NESTOROVIC LABS	NA-1	B/T/M	0.5	0.2		2V	Var.	150	150	20-20	AB							65	2200.00		
NIKKO	Alpha-650	B	0.008	0.008	100	1V	Var.	300	340	5-100	AB	2.0	I					60	1700.00		
	Alpha-450	B	0.008	0.008	100	1V	Var.	220	240	5-100	AB	2.0	I					47	900.00		
	Alpha-230	B	0.008	0.008	100	1V	Var.	120	130	5-100	AB	2.0	I					30	450.00		
	Alpha-130	B	0.03	0.03	100	1V	Var.	100	150	5-100	AB	2.0	I					28	350.00		
	JA-120	I	0.008	0.008	100	Var.		120	200	0-100	A/AB	3.0		87	2.5	200	Yes	28	480.00		
	NA-2000	I	0.03	0.03	100	Var.		100	120	10-50	AB	1.5	I	87	2.5	150	Yes	26	330.00		
	NA-1050	I	0.03	0.03	100	Var.		105	120	10-50	AB	1.5	I	87	2.5	150	Yes	25	500.00		
NOVA ELECTRO-ACOUSTICS	DMA-300	B	0.02	0.01	40	1V	No	150	275	20-20	Lin. AB	2						45	1695.00		
OCTAVE RESEARCH	OR-1	B	0.9	0.9			No	85	170	20-20	A/AB	0	No					66	3650.00		
ONIX AUDIO	OA21	I	0.01	0.009	150	250	No	50	70	20-20	AB	1.3		75	2.0	500	Opt.	11	675.00		



DR-7 PREAMPLIFIER

Features:

- 5 Toroidal power supplies: fully regulated, 120 Volt unit will function perfectly from 90 to 135 Volts; 159,500uF composite filtering.
- Custom made wire and Swiss Lemo connectors for the power supply umbilical cord.
- 2 Phono inputs: each has selectable gain, impedance, and capacitive loading; combination FET/bipolar circuitry with passive RIAA and zero feedback.
- High level inputs: CD-selectable filters or "CD DIRECT" (preamp bypass), tuner, auxiliary, 2 tape loops.
- Dual Level Controls: 36-position rotary control with discrete resistor network for each channel; 1.25 dB steps.
- Aerospace analogue relays: superior to solid state or photo-switching, these relays are used for remote switching of delicate signals and the muting circuits.
- Complete auto-warmup and auto/manual muting; foolproof for pulses, AC line loss, accidental removal of line cord or umbilical cord.
- Gold-on-Silver (no nickel) plating for all connectors, phono ground posts, and star-grounding buss strip.
- Custom-milled knobs, handles, and faceplates; faceplates entirely hand engraved.



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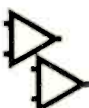
AMPLIFIERS

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	Type Tape Integrated = I Tube = T	Rated THD, %	Rated SWMPT, IM, %	Rated Slew Rate, V/μs	High-Level Sensitivity, mV	Cont. Avg. Watts/Channel into 8 Ohms	Cont. Avg. Watts/Channel into 4 Ohms	Class of Output Operation	POWER AMP				PREAMP				Price, \$	Notes		
										MM Phone Spt.	Meters = M, Peak/Clip Indicators = I	MM Phono Sensitivity, mV	MM Phono Overload, mV	MM Phono Spt.	Meters = M, Peak/Clip Indicators = I	MM Phono Sensitivity, mV	MM Phono Overload, mV				
ONKYO	M-510	B	0.005	0.003	45	No	300	500	20-20	AB	1.3	M					138.6	4400.00			
	M-508	B	0.003	0.003		No	200		20-20	AB		M					55	1150.00			
	M-504	B	0.003	0.003		No	165		20-20	AB		M					49.5	799.95			
	A-8190	I	0.008	0.005	32	No	100		20-20	AB		M					29.1	499.95			
	A-8170	I	0.008	0.005	30	No	80		20-20	AB		M					24.7	399.95			
A-8150	I	0.06	0.06	20	No	60		20-20	AB		M					15.4	259.95				
PARASOUND	D/AS-1000	B	0.02	0.05	85	300	No	130	200	20-20	A/AB	5	I					34	650.00	Bridgeable; rack-mountable.	
	HCA-800	B	0.02	0.05	70	300	No	80	130	20-20	A/AB	2						23	320.00	Bridges to 250 watts; rack-mountable.	
	CA-220	I	0.5	0.03	18	160	No	20	25	30-20	AB	1		82	2	120		14	155.00		
PERREUX	PMF 1050	B	0.03	0.03	60	60	No	100	160	10-3M	A/AB	2							27	1050.00	
	PMF 2350	B	0.01	0.01	60	60	No	200	330	10-3M	A/AB	2							45	1895.00	
	PMF 3150	B	0.03	0.03	60	60	No	300	500	10-3M	A/AB	2							57	2395.00	
	PMF 5550	B	0.03	0.03	60	60	No	500			A/AB	2						115	4295.00		
PIONEER	A-717	I	0.003	0.003				95		20-20				88	2.5	150	Yes	22	700.00		
	VSA-910(RI)	I	0.005		150			↑		20-20				83	2.5	140		22	800.00	↑Front, 70 watts; rear, 30 watts.	
	SA-900D	I	0.003	0.003	150			120		20-20				89	2.5	250	Yes	22	700.00		
	Elite A-91D	I	0.003					120		20-20				94	2.5	250	Yes	67	1600.00	Includes dual D/A converters; fiber-optic connectors; 4X over-sampling.	
	Elite A-88X	I	0.003	0.003	150			120		20-20				89	2.5	250	Yes	39	770.00		
Elite A-77X	I	0.003	0.003	150			100		20-20				88	2.5	200	Yes	33	550.00			
Elite M-90	B	0.003	0.002				200		20-20		M							49	1000.00		
PROTON	Q1200	B	0.01	0.02	100			100	200	20-20		6	M, I						33	599.00	
	AA-1150	B						50				6	M, I							429.00	
	D540	I	0.02	0.008	150			40		20-20	AB	6	M, I	92	2.5		Yes	19	299.00		
AM-300	I	0.01	0.01	150			30		20-20		6	M, I	90	2.5		Yes	15.4	249.00			
PS AUDIO	200-C	B	0.06	0.06	120		No	200	400	20-20	AB								70	1850.00	
PSE	Studio II	B	0.01		100		No	100	200	0-100	AB									790.00	Mono version, \$710.00; high-current mono version, \$900.00.
QED	A230S	I	0.1		300			30	50	10-30	AB			No					10	295.00	
	A240CD	I	0.1		300			40	65	5-30	AB			No					11	375.00	
	A240SA	I	0.1		300			40	65	5-30	AB			No			Yes	11	475.00		
QUAD	606	B	0.03		375			↑		20-20	↑↑								10	1195.00	↑Power curves available on request. ↑↑Current Dumping.
	306	B	0.03		500			↑		20-20	↑↑								26	595.00	
QUICKSILVER AUDIO	Mono Amp	B/T/M			10		No	60	60	13-55	AB								30	720.00	
RANE	MA 6	B	0.2	0.1	20	750	No	100	150	20-20	AB	1.5	I						44	1349.00	Six channels.
	MPA 100	B	0.015	0.015	93	No	100		20-20	AB	1.5								17.7	299.00	
MPA 120	B	0.015	0.015	93	No	120		20-20	AB	1.5	I								17.7	349.00	
REVOX	B251(RO)	I	0.01	0.01	80	160	No	100	140	20-20	AB		M	75	1.6	23	Opl.	19	1700.00		
B242	B	0.01	0.01	80	Adj.	No	200	300	20-20	AB		I						37½	3000.00		
RHOADES	TA-450	B						5		20-20										129.95	
	TA-300	B						5		20-20										79.95	
ROBERTSON AUDIO	Forty Ten	B	0.1	0.05	159		No	60	120	0.5-330	AB								25	995.00	
	Sixty Ten	B	0.1	0.023	256		No	200	400	0.5-250	AB								65	2700.00	
ROTEL	RA820BX2	I	0.05	0.08	150			30	40	20-20	AB			75	3.0	140	No	12	249.95		
	RA840BX2	I	0.05	0.08	150			60	60	20-20	AB			78	2.5	140	No	16	349.95		
	RA870BX	I	0.03	0.05	150			80	100	20-20	AB			80	2.8	180	Yes	19	599.95		
	RB850	B	0.03	0.05				50	80	20-20	AB									299.95	Bridgeable. As above.
	RB870BX	B	0.03	0.03				100	130	20-20	AB									499.95	As above.
	RB890	B	0.03	0.03				160	225	20-20	AB									699.95	As above.
ROWLAND RESEARCH	7	B/M	0.08	0.08	50	115	Sel.	350	700	0.2-160	A/AB								135	4400.00	Balanced inputs; selectable input impedance. As above.
	5	B	0.12	0.12	75	115	Sel.	150	300	0.2-250	A/AB								103	4600.00	As above.
	3	B/M	0.05	0.05	40	115	Sel.	100	200	0.1-150	A/AB								46	1975.00	As above.
SAE	I-102	I	0.02	0.02	150		No	60	90	20-20	AB	1.0	M	82		150	Yes	26	499.00	Programmable tone memories; external processing loop. Adjustable LED display response. Auto bridging to 600 watts. Bridges to 375 watts. Auto bridging to 300 watts; level attenuators. Auto bridging to 1500 watts.	
	A202	B	0.02	0.02			No	100	150	20-20	AB	1.2	M						31	449.00	
	H502	B	0.02	0.02			No	200	300	20-20	AB	1.2	M						45	699.00	
	X10A	B	0.02	0.02			No	100	150	20-20	A	1.5	M							600.00	
	P50	B	0.05	0.017			No	70	115	20-20	AB	3.0	I						21	600.00	
P500	B	0.05	0.025			No	500	750	20-20	AB	1.0	M							80	1700.00	

R E V E A L I N G .



Model 3 Mono Power Amplifier

ROWLAND  RESEARCH

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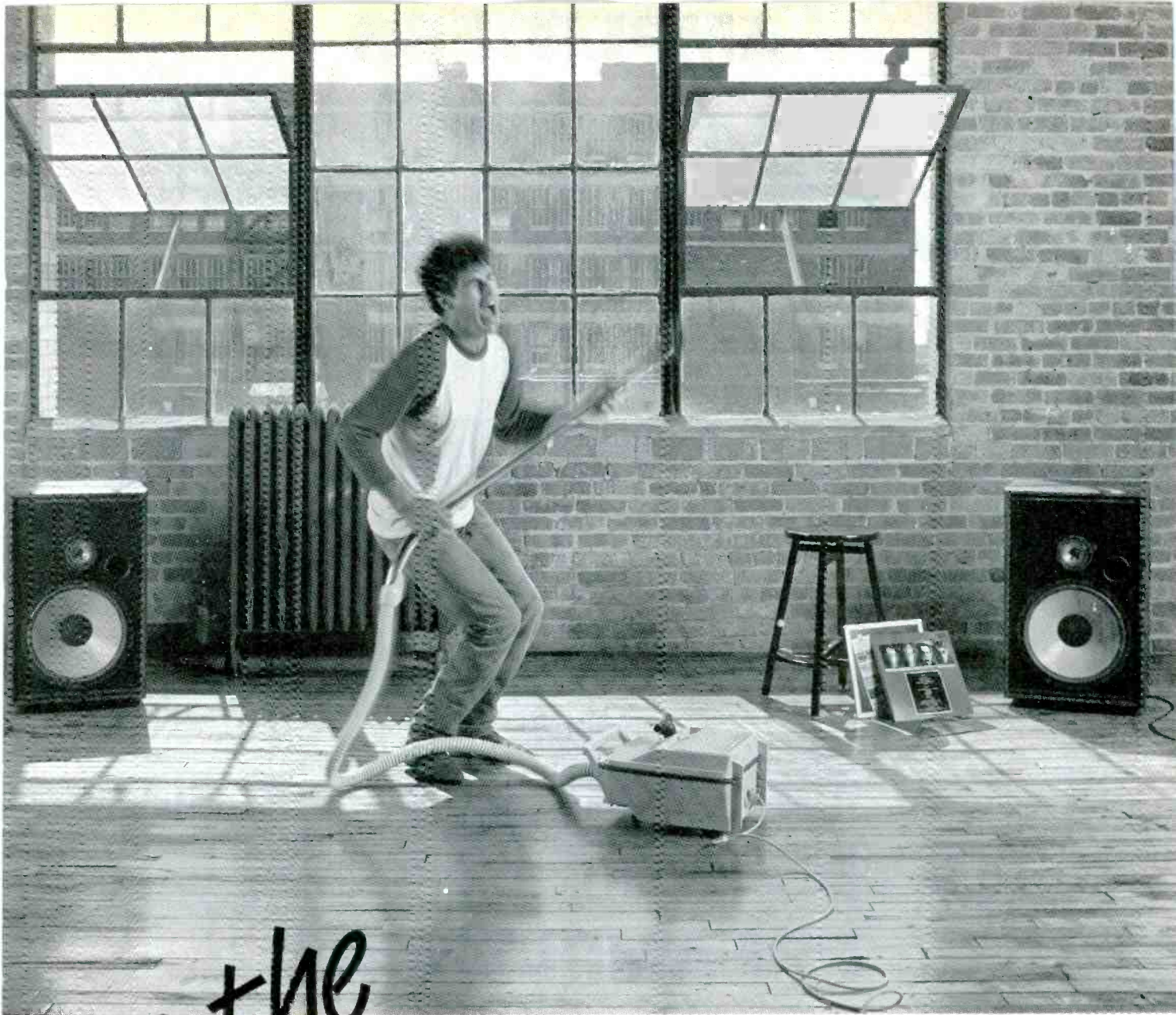
20-C Mountview Lane

Colorado Springs, Colorado 80907

303-528-8388

AMPLIFIERS

MANUFACTURER	Model (M) = Remote Included, (R) = Remote Optional	Type Integrated = I, Basic = B, Hybrid = H, Mono = M	Rated THD, %	Rated SMPT, %	Rated Slew Rate, V/μs	High-Level Sensitivity, mV	Dues Unit Invert Polarity?	Cont. Avg. Watts/Channel, mV	Cont. Avg. Watts/Channel into 8 Ohms, Hz to kHz	Class of Output Operation	POWER AMP				PREAMP		Notes		
											Dynamic Headroom, dB	Meters = M, Peak Clip Indicators = I	MM Phono S/N, -dB, 1k wa. re. 5 mV	MM Phono Sensitivity, mV	Moving Coil Input?	Weight, Lbs.		Price, \$	
SANSUI	Vintage B-2301	B	0.003	0.003	400	2V		300	20-20		M					81.6	2600.00		
	Vintage B-2102	B	0.003	0.003	350	1V		200	20-20		M					39	1100.00		
	B-3000	B	0.05	0.01				120	20-20		M					21.2	380.00		
	B-1000	B	0.05	0.01				75	20-20		M					15.4	270.00		
	Vintage AU-X901	I	0.005	0.005	200	150	Yes	130	20-20		M	88	2.5	210	Yes	39.9	1100.00		
	AU-G99X	I	0.003	0.003	350	150		160	20-20		M	88	2.5	200	Yes	38	1000.00		
	Vintage AU-X701	I	0.005	0.005	180	150	Yes	100	20-20		M	88	2.5	210	Yes	37.7	750.00		
	AU-G77XII	I	0.008	0.01		150		110	20-20		M	87	2.5	150	Yes	31.5	680.00		
	Vintage AU-X501	I	0.005	0.005		150	Yes	80	20-20		M	83	2.5	210	Yes	23.8	550.00		
	AU-X301	I	0.05	0.05		200	Yes	65	20-20		M	80	3.5	150	Yes	20.9	440.00		
SESCOM	PD-3	B	0.01	0.01		150	No	2	3	40-20						1/2	54.00	Requires PD-1 power supply.	
	PD-4	B	0.01	0.01		775	No	4	5	50-15						1/2	39.00	As above; balanced input.	
	PD-5	I	0.01	0.01		150	No	2	3	40-20		70	1.85	225		1/2	90.00	Requires PD-1 power supply.	
SIMA ELECTRONIQUE	W-2003	B	0.05	0.05	60	1.3V	No	225	425	20-20	AB					45	1449.00	Bridgeable.	
	W-2002	B	0.05	0.05	60	1V	No	125	200	20-20	AB					25	849.00	As above.	
	W-2050	B	0.05	0.05	60	750	No	50	90	20-20	AB					15	549.00	As above.	
	PW-3000	I	0.09	0.09	60	200	No	50	85	20-20	AB		2	160	Yes	15	649.00		
SONOGRAPHE	SA120	B	0.5	0.5			No	120		20-20	AB					28	895.00		
SONY	TA-F500ES	I	0.006	0.006	125	150	No	80	100	10-100						29	500.00	Nonswitching.	
	TA-F700ES	I	0.004	0.004	125	150	No	105	140	10-100	B		86	2.5	250	Yes	40 1/2	700.00	As above.
	TA-N77ES	B	0.004	0.004	150		No	200	270	10-100	B		87	2.5	250	Yes	55	1100.00	As above; bridges to 580 watts.
SOUND-CRAFTSMEN	Pro-Power Eight	B	0.05	0.05	50	120	No	375	600	20-20	AB	1.5	I			65	1499.00	Bridges to 1200 watts into 8 ohms.	
	Pro-Power Four	B	0.05	0.05	50	120	No	205	300	20-20	AB	1.7	M,I			30	749.00		
	Pro-Power Three	B	0.05	0.05	50	120	No	205	300	20-20	AB	1.7	I			30	649.00		
	Pro-Reference Two	B	0.05	0.05	50	120	No	100	190	20-20	AB	3.0	M,I			30	649.00		
	A5002	B	0.05	0.05	50	120	No	250	375	20-20	H	2.1	M,I			52	899.00		
	A5001	B	0.05	0.05	50	120	No	250	375	20-20	H	2.1	I			52	749.00		
	PM840	B	0.05	0.05	40	120	No	205	300	20-20	AB	1.5	I			23	549.00	450 watts into 2 ohms.	
PCR800	B	0.05	0.05	40	120	No	205	300	20-20	AB	1.5	I			22	499.00			
SOUNDSTREAM	DA-1	B	0.05	0.05	35	1V	No	200	300	20-20	AB	2	I			45	995.00	Bridgeable.	
SPECTRAL	DMA-200	B	0.01	0.01	1000	200	No	200	380	0-2M	A	2				87	5495.00	Balanced input; d.c. coupled.	
	DMA-100	B	0.01	0.01	1000	200	No	100	200	0-2M	A	3				66	3995.00	As above.	
	DMA-50	B	0.01	0.01	1000	200	No	80	160	0-2M	AB	6				19	2495.00	Bridgeable; d.c. coupled.	
SPECTRASCAN	BPA-101B	B	0.07	0.07	40	1V	No	100	175	2-100	AB	†	I			40	1195.00	†Regulated power supply.	
STRELIOFF	DC1	B	0.25	0.15	45			420	730	10-30	AB	1.5				62	2000.00	Special order.	
	400 400	B/M	0.10	0.10	65			†	††	10-30	AB	1.5				87	2500.00	†1150 watts. ††1500 watts. As above.	
	SC1 1000	B/M	0.10	0.10	25			115	150	10-30	AB	1.5				22	850.00	Special order.	
SUMO	Polaris	B	0.05	0.05	40		No	100	175	20-20	AB	1.5				25	649.00	MOS-FET with error correction.	
	Andromeda	B	0.05	0.05	20		No	200	375	20-20	AB	1.5				35	999.00	Differential topology.	
	Nine	B	0.25	0.05	15		No	60	120	20-20	A	1				35	799.00		
Nine Plus	B	0.10	0.05	15		No	65	120	20-20	A	1				35	1099.00			
SUPERPHON	DM220	B	0.1	0.05	28		No	100	170	20-20	AB	0	No			34	899.00		
TANDBERG	3036A	B	0.05	0.05	200	100		100	120	20-20	B	0.5	I			23 1/2	1095.00	No negative feedback.	
	3026A	B	0.02	0.02	300	100		150	210	20-20	B	0.5	I			31 1/2	1995.00	As above.	
	3016A	B	0.02	0.02	300	100		220	320	20-20	B	0.5	I			62	3595.00	As above.	
	3012A	I	0.02	0.02	200	100		100	150	20-20	B	0.4	I			22	1495.00		
TEAC	A-X35	I	0.05					35	64	20-20						68	189.00	Variable loudness control.	
	A-X55	I	0.05					55	110	20-20						75	259.00	As above; CD direct input.	
	A-X75	I	0.05					75	160	20-20						75	329.00		
TECHNICS	SE-A3MK2	B	0.002	0.002		55		300	300	20-20	New A	1.0	M			86	2500.00		
	SE-A100	B	0.007			75		170	240	20-20	AA	1.0	M			69	2100.00		
	SE-A5MK2	B	0.002	0.002		90		150	150	20-20	New A	1.5	M			40.6	1000.00		
	SU-V10X	I	0.003	0.003		15		120	120	20-20	New A	No	No			29.8	800.00		
	SU-V7X	I	0.003	0.003		15		100	100	20-20	New A	No	No			24.3	600.00		
	SU-V60	I	0.002	0.005		150		90	90	20-20	AA	No	No			18.8	400.00		
	SU-V40	I	0.003	0.007		150		50	50	20-20	AA	No	No			13.9	300.00		
THRESHOLD	SA/1	B/M	0.05	0.05	50		No	160		20-20	Stasis, Class A		M			78 1/2	3950.00	40 amps continuous, 200 amps peak to peak.	
	SA/2	B/M	0.05	0.05	50		No	100		20-20	Stasis, Class A		M			56	2650.00	As above but 30 and 150.	



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Winslow, IL 61089
815-367-3000
FAX: 815-367-3851
TELEX: 989 790 MTX INC UD

Enter No. 67 on Reader Service Card

AMPLIFIERS

MANUFACTURER	Model (RM) = Remote Included, (RO) = Remote Optional	Type	POWER AMP										PREAMP			Notes				
			Rated THD, %	Rated SMPTE IM, %	Rated Stew Rate, V/uS	High-Level Sensitivity, mV	Does Unit Invert, Polarity?	Com. Avg. Watts Channel into 8 Ohms	Com. Avg. Watts Channel into 4 Ohms	Class of Output Operation	Dynamic Headroom, dB	MM Phono S.N. - ab - k Wdr. re 5 mV	MM Phono S.N. - ab - k Wdr. re 5 mV	MM Phono S.N. - ab - k Wdr. re 5 mV	Moving Coil Input?		Weight, Lbs.	Price, \$		
THRESHOLD (Continued)	SA 3	B	0.05	0.05	50		No	50		20-20	Stasis, Class A						56	2650.00	As above but 16 and 100.	
	S/500	B	0.1	0.1	50		No	250		20-20	Stasis, Class A/AB						78½	3500.00	As above but 12 and 150.	
	S/300	B	0.1	0.1	50		No	150		20-20	Stasis, Class A/AB						56	2550.00	As above but 10 and 100.	
	S/200	B	0.1	0.1	50		No	100		20-20	Stasis, Class A/AB						44	1700.00	As above but 8 and 80.	
TRUE IMAGE RESEARCH	CM-2500	B	0.02	0.02	110	1.2V	No	125	240	10-50	AB						68	1950.00	MOS-FET.	
VECTOR RESEARCH	VA-1400	I	0.03	0.03		150	No Sel.	60	100	20-20	AB	2.5	M, I	80	2.5		Yes	20	349.95	Bridgeable.
	VA-1450	B	0.03	0.03		150	No Sel.	60	100	20-20	AB	2.5	M, I	80	2.5		Yes	20	349.95	
VTL	30/30 Stereo	B/T			600	No	30	10-30	A1/AB1		No						19	990.00	Rack-mount version, \$2650.00 per pair.	
	50/50 Stereo	B/T			600	No	50	10-30	A1/AB1		No						30	1390.00		
	50 W Monoblock	B/T/M			600	No	50	10-30	A1/AB1		No						26	1650.00		
	100 W Compact Monoblock	B/T/M			600	No	100	10-30	A1/AB1		No						35	2300.00		
	100 W Deluxe Monoblock	B/T/M			600	No	100	10-30	A1/AB1		No						41	2950.00		
	225 W Deluxe Monoblock	B/T/M			600	No	225	10-30	A1/AB1		No						52	3750.00		
WINGATE AUDIO	2000A	B			100	350	No	100	200	0.1-250	A	1.2					67	3700.00	MOS-FET; no negative feedback; dual mono; 64 amps peak to peak.	
	2000M	B/M			100	350	No	200	400	0.1-250	A	1.2					70	8000.00		
YAMAHA	M-85	B	0.003	0.003	1.6V	No	260	330	10-60	A/AB	2.2	M					50	999.00	20 watts x 4 into 8 ohms, 28 watts x 4 into 4 ohms.	
	M-65	B	0.003	0.003	1.3V	No	170	230	10-60	A, AB	1.8	M					33	729.00		
	M-45	B	0.003	0.003	1.1V	No	125	180	10-60	A, AB	1.3	M					27	449.00		
	M-35	B	0.05	0.055	940	No	40	60	10-50	AB							11	249.00		
	AX-900U	I	0.005	0.002	150	No	130		10-50	AB			93	2.50	160	Yes	37	649.00		
	AX-700U	I	0.005	0.002	150	No	110		10-50	AB			92	2.50	160	Yes	27	519.00		
	AX-500	I	0.01	0.01	150	No	85		10-50	AB			92	2.50	150	Yes	17	349.00		
	AX-400U	I	0.015	0.015	150	No	55		10-50	AB			92	2.50	155	Yes	14	249.00		
	MX-10000	B	0.001				250		20-20	A		M					94%	7000.00		

PREAMPLIFIERS

MANUFACTURER	Model (RM) = Remote Included, (RO) = Remote Optional	Type	PHONO STAGE										Notes						
			Frequency Response, Hz to kHz, ±dB	Maximum Output, V	THD, %	SMPTE IM, %	High-Level Sensitivity, mV	Number of Tone Controls	Does Unit Invert, Polarity?	MM Phono Sensitivity, mV for 0.5 V Output at 1 kHz	MM Phono Overload, mV	MM Phono Input Impedance, pF		MC Phono S.N. - ab - k Wdr. re 5 mV	Moving Coil Input?	Price, \$			
ACCPHASE	C280L	MC	1-500 +0, -0.3	10	0.005		126	2	0	No	2	300	47k	85	No	7625.00	No phono stage.		
	C270		1-500 +0, -0.3	4	0.005		200	2	0	No					Yes	5480.00			
ADCOM	GFP-555		1-100 ±0.1	10	0.005	0.005	40	3	2	No	0.4	140	Var.	47k	85	70	499.95	Two main outputs; external processor loop. Tuner/preamp; see also "Tuners"; optional remote sensor, \$90.00.	
	GTP-500(RI)		20-20 ±0.1	8	0.01	0.005	40	2	2	No	0.4			47k	82	No	549.95		
ADS	CC4(RO)		5-100 +0, -1.0	7	0.03	0.02	75	2	3	Var.	1.1	150	200	47k	80	77	999.00	Tuner/preamp; see also "Tuners"; microprocessor-based digital controls; RS232 port.	
APT	HP	P	20-20 ±0.5	10	0.006	0.006	320	3	4	No	1.25	180	Sel.	Sel.	76	85	Dpt.	680.00	Infrasonic filter; dedicated phono balance; discrete phono section.
	P2		20-20 ±0.5	10	0.006	0.006	320	1	2	No	1.25	180	Sel.	47k	76	85	Yes	450.00	Dedicated phono balance; discrete phono section.
	P205		30-15 ±0.2	24	0.006	0.006			2	No	1.25	180	Sel.	Sel.	76	85	Opt.	450.00	Balanced output; separate L & R level and high-frequency controls; infrasonic filter defeat; discrete phono section.

At last, high-performance audio comes down to earth.

High-performance audio by Rotel has arrived. With remarkable sonic quality you've previously associated only with esoteric equipment selling at other-worldly prices. Now, however, at prices you'll find very down-to-earth.

At Rotel, our engineers avoid gimmicks and flashing lights. Instead, they concentrate on audible performance. All critical parts are carefully hand selected on the basis of how they sound when producing music. Direct signal paths – from inputs to outputs – assure highest accuracy and resolution. And our renowned amplifiers, for example, use massive power supplies, along with discrete output transistors rated many times their actual load. As a result, they can produce high-current output *continuously* – not just for a few milliseconds. Our 50-watt amplifier actually plays louder and sounds better than many with 100-watt specs – and 100-watt prices.

This pursuit of affordable sonic perfection may explain why Rotel outsells most other specialty hi-fi brands in Great Britain. And why hard-to-please British audio critics consistently give Rotel components rave reviews.

For reprints of these reviews, and a brochure on our receivers, Compact Disc players, tuners, integrated amplifiers, power amplifiers, preamps, cassette decks and turntables, just send your name and address to Rotel of America Department A, P.O. Box 653, Buffalo, NY 14240. Or call us at (416) 297-0599.

ROTEL®

High performance. Down to earth.



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PREAMPLIFIERS

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	Type: Tube = H, Hbr = K, Mono = M, Moving Coil Stage Only = MC, Phono Stage Only = P	Frequency Response, Hz to KHz, ±dB	Maximum Output, V	THD, %	SMPTE IM, %	High-Level Sensitivity, mV	Number of Taps & Processor Loops	Number of Tone Controls	Does Unit Invert Polarity?	MM Phono Sensitivity, mV for 0.5 V Output at 1 kHz	MM Phono Overload, mV	PHONO STAGE										Price, \$	Notes
													MM Phono Input Capacitance, pF	MC Phono SN, dB: A: Wid. re: 5 mV	MC Phono SN, dB: A: Wid. re: 0.5 mV	Moving Coil Input?	MM Phono Input Impedance, Ohms	MM Phono SN, dB: A: Wid. re: 5 mV	MM Phono SN, dB: A: Wid. re: 0.5 mV	MM Phono SN, dB: A: Wid. re: 5 mV	MM Phono SN, dB: A: Wid. re: 0.5 mV	MM Phono SN, dB: A: Wid. re: 5 mV		
AR	C-06(RO)		20-20 +0,-5	5	0.004	0.004	50	2	3	No	0.8	180	Sel.	47k	83	72	Yes	369.95						
ARAGON	24K		1.5-125	10	0.02	0.02	100	2	0	No	1.0	200	125	47k	100	70	Yes							
AUDIBLE ILLUSIONS	Modulus 2C Saturn 1	T H	10-100 ±3 5-200 ±3	80 80	0.02 0.02	0.02 0.02	40 40	1 2		Yes Sel.		1.2V 600	40 Sel.	47k Sel.	75 85		Yes	795.00 2795.00						
AUDIO DESIGN ASSOCIATES	DSP-8(RO) CPC-8(RI) DCA-40P		5-30 ±3 5-30 ±3 5-30 ±3	7.5 5	0.007 0.007 0.007	0.05 0.05 0.05		4 3	No No No									1300.00 14,431. 850.00	Optional phono stage, pre-settable source turn-on. 8 x 8 multi-room switcher.					
AUDIO DYNAMICS	C200		20-20 ±0.2	8	0.01	0.03	80	†	3	No	1		150	47k	87	66	Yes	599.00	†Two audio-only loops, three A/V loops. Dolby Surround and ambience circuits.					
AUDIOLAB	8000C		20-20 ±0.5	7.7	0.01	0.01	100	2	2	No	2.0	175	85	47k	79	75	Yes	595.00	Class A; defeatable tone controls.					
AUDIO RESEARCH	SP7 SP8 SP9 SP10 SP11 MCP2 MCP33	T H T H MC T/MC	0.1-400 +0,-3 1-100 +0,-3 1-200 +0,-3 1-100 +0,-3 0.1-200 +0,-3 0-400 +0,-3 10-250 +0,-3	14 60 50 60 80 1.5 10	0.002 0.01 0.005 0.01 0.002 0.005 0.005		25 25 50 25 18	1 1 2 1 2	0 0 0 0 Sel.		0.5 0.5 0.25 0.13	500 900 200 300	30 40 100 40	50k 50k 47k 50k	74 74 92 85	No No Yes Yes Yes Yes Yes	995.00 1995.00 1695.00 3700.00 4900.00 1395.00 1395.00	Auto and manual muting. As above. Selectable MC impedance; bypass switch. Gain and level controls; bypass switch. Selectable MC gain and impedance. As above.						
AUDIURE	Andante Diflet 2 Legato		5-100 +0,-0.2 5-100 +0,-0.25 5-100 +0,-0.25	12 15 10	0.005 0.005 0.005	0.001 0.001 0.001	100 100 100	2 2 2	2 † No	1.00 1.00 1.00	175 250 150	220 100 180	47k 47k 47k	90 86 75	80 72 No	Yes Yes No	1750.00 855.00 440.00	†Inverts phase only in MC stage. Dual mono.						
A.V.A.	Super PAS Three FET Three FET Three Plus Transcendence	T	20-20 ±0.1 20-20 ±0.05 20-20 ±0.02 20-20 ±0.01	7 12 10 12	0.1 0.005 0.001 0.001	0.1 0.005 0.001 0.001	50 50 50 50	1 2 2 2	0 4 4 4	No No No No	0.5 0.5 0.5 0.5	150 150 150 150	20 10 10 10	47k 47k 47k 47k	70 75 78 80	No No No No	550.00 515.00 615.00 815.00	Optional mono bridging board, \$100.00. As above. As above. As above.						
BEARD AUDIO	CA-506	T	10-100 +0,-1	80	0.05	0.05	40	1	0	Sel.	0.4	900		47k	70†	70†	Yes	2900.00	†Unweighted. Switchable to passive line-level direct.					
BEDINI AMPLIFIERS	66SPA		5-35	11.5	0.015	0.015		1	0	No		500					No	699.95						
BELLES RESEARCH	XLM XL		20-20 ±0.25 20-20 ±0.1	9 9	0.05 0.05		40 48	2 1	2 0	No No	0.8 1.05	180 200	250 100	47k 47k	85 85	76	No Yes	495.00 1249.00						
DAVID BERNING CO.	TF-12(RI)	T	5-100 +0,-1	5	0.5		50	1	0	No	0.2	200	100	47k	80	60	Yes	3000.00						
B & K	PRO-5 PRO-10 PRO-10mc		1-100 ±1 1-100 ±1 1-100 ±1	7 7 7	0.03 0.01 0.01	0.02 0.01 0.01	630 450 450	2 1 1	2 0 0	No No No	0.7 0.5 0.5	120 100 100	75 75 75	47.5k 47.5k 47.5k	86 89 89		Yes	349.00 550.00 595.00	Two tape inputs; tone defeat. Bypass switch. As above.					
BOULDER AMPLIFIERS	Modular		20-20 ±0.1	14	0.005		175	2	Dpt.	No	2.5	700		47k			Dpt.	2744.00 Sys.	Includes four modules.					
BOZAK/TAI	CMA-10-2DLA CMA-10-2DLS		20-20 ±0.25 20-20 ±0.25	13 13	0.01 0.01	0.01 0.01		1 1	4 4	No No				47k 47k			No No	1099.00 1149.00						
BRITISH FIDELITY	Pre Amp 3 P-172 MVT							1 2 2	0 2 0					47k 47k 47k			Yes Yes Yes	550.00 750.00 1600.00						
BRYSTON	5B 11B 12B TF-1		20-20 ±0.1 20-20 ±0.1 20-20 ±0.1 5-30 ±0.5	15 15 15	0.005 0.005 0.005 0.005	0.005 0.005 0.005 0.005	50 50 50	1 2 2	0 0 0	Yes Yes No	0.5 0.5 0.5	200 200 200	Sel. Sel. Sel.	50k 50k 50k	84 84 84	83 83	No No Yes Yes	600.00 1100.00 1500.00 450.00	Five high-level inputs; headphone jack; remote out. As above.					
CALIFORNIA AUDIO LABS	SLC			10				1	0	No							No	995.00	Line level only.					
CANTON	EC-P1		7-2M	12	0.002	0.002	200	2	0	No	2.0			Var.	98	84	Yes	2000.00						
CARVER	4000I C-1 C-2		1-60 +0,-3 1-60 +0,-3 1-60 +0,-3	7 7 7	0.05 0.04 0.05	0.003 0.04 0.04		3 3 3	4 4 2	No No No	1.5 1.5 1.5	100 100 100	Sel. Sel. Sel.	47k 47k 47k	89 82 83	89 86 77	Yes Yes Yes	1199.00 599.00 440.00	Includes Sonic Hologram Generator and surround-sound circuitry. Includes Sonic Hologram Generator.					

The affordable
new hybrid from
Audio Research.



SP9 STEREO PREAMPLIFIER

The SP9 Hybrid Stereo Preamplifier represents a further evolution of the innovative electronic design first embodied in the widely acclaimed Audio Research SP11 Stereo Preamplifier. The

SP9 is not a "stripped-down" version of the SP11, but rather represents an adaptation of some of the SP11's patented hybrid technology to a simpler, more economical single-chassis format.

Using just two 6DJ8 vacuum tubes (one in the phono section and one in the high-level stage) in intermediary gain stages, the SP9 expresses the musicality and natural "rightness" vacuum-tube preamplifiers have been noted for, yet it does so with the quickness and dynamic vigor of the best solid-state designs.

HIGH DEFINITION® MUSIC REPRODUCTION EQUIPMENT

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Operational Features

Automatic muting circuit for warmup, powerline voltage drop or interruption; plus manual (switchable) muting of main preamplifier outputs.

Full tape functions: two inputs, two outputs, plus two-position tape monitor switching.

Gold-plated input/output jacks selected for sonic purity. These connect "ground" before "hot," disconnect "hot" before "ground" for protection of other components.

Shielded, toroidal power transformer for minimal mechanical noise and "hum."

Phono section impedance internally adjustable for precise matching to moving-coil or moving-magnet phono cartridges.

Tube complement: two 6DJ8 vacuum tubes (one in phono stage, one in line stage).

Low noise (78dB below 1V RMS input phono, more than 100dB below 1V RMS input high-level) plus substantial overall gain (66dB) makes the SP9 usable with a wide range of popular moving-coil phono cartridges.

SP9 Specifications

FREQUENCY RESPONSE:

High level section:

± .5dB, 5Hz to 50kHz/ - 3dB points

below 1Hz and above 200kHz.

Phono: ± .3dB of RIAA, 30Hz to 40kHz

DISTORTION: Less than .01% at 2V RMS output. (typically less than .005% in midband)

GAIN: Phono input to tape output: 46dB

High level inputs to tape output: 0dB

Phono input to main output: 66dB

High level inputs to main output: 20dB

INPUT IMPEDANCE: 50K ohms Line

Inputs; 47K Phono (Phono provisions for any value below 47K ohms or added input capacitance for matching certain magnetic cartridges.)

OUTPUT IMPEDANCE: 500 ohms

main output, 850 ohms recorder output.

Recommended load 60K ohms and

100pF (20K ohms minimum and 1000pF maximum)

MAXIMUM INPUTS: Phono, 200mV at

1kHz (1000mV RMS, 10kHz). High level

inputs essentially overload-proof.

RATED OUTPUTS: 2V RMS 5Hz to

50kHz, all outputs; 60K ohm load (main

output capability is 50V RMS output at

½% THD at 1kHz into a 100K ohm load

with 5V RMS high level input)

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POWER SUPPLIES:

Electronically-regulated low and high

voltage supplies and electronic

decoupling. Shielded toroid transformer.

Line regulation better than .01%

NOISE:

High Level:

(1) 70uV RMS maximum residual unweighted wideband noise at main output with gain control minimum (98dB below 5V RMS output)

(2) More than 100dB below 1V RMS input (less than 7uV equivalent input noise)

Phono: 0.12uV equivalent input noise,

IHF weighted, shorted input (78dB below

1mV input)

TUBE COMPLEMENT:

2 - 6DJ8/ECC88 dual triodes

(Hybrid FET/Tube audio circuit,

solid-state power supply)

POWER REQUIREMENTS:

100-135VAC 60Hz (200-270VAC

50/60Hz) 50 Watts

DIMENSIONS: 19" (48 cm) W x 5 ½"

(13.4 cm) H (standard rack panel) x

10 ¼" (26cm) D. Handles extend 1 ½"

(4.1 cm) forward of front panel. Rear

chassis fittings extend ¾" (2.3 cm)

WEIGHT: 13 lbs. (5.9 kg) Net; 22 lbs.

(10 kg) Shipping

STEREO PREAMPLIFIER

Because its two vacuum tubes are used so conservatively, the SP9 will undoubtedly prove to be one of the most reliable and low-maintenance Audio Research preamps ever — up to 10,000 hours of service life are possible before replacement of these tubes might be necessary. And, replacement tubes are not required to be select, low-noise (and expensive) types. Audio Research brand vacuum tubes obtained from your authorized dealer will provide the best performance and reliability.

Although the SP9 contains an on-board power supply (as opposed to the SP11's isolated supply), it is a highly advanced, tightly regulated design employing a shielded toroidal power transformer to minimize any potential problems of mechanical noise or hum. Location of this transformer in relation to special low-hum input circuitry has been optimized within the SP9 chassis layout to virtually eliminate transformer-related noise. (Note that while outboard power supplies have become a popular design trend among high-end audio manufacturers, simply isolating the power supply from the main chassis has little benefit if the basic design of the supply itself is second-rate. In such cases, outboard isolation may be little more than a cosmetic cure for more serious deficiencies.)

While the SP9 is designed to provide superb playback from phono records, its high-level circuits have also been optimized for other popular input sources, including compact discs. In this respect, the SP9 is virtually overload-proof, insuring maximum enjoyment of today's most dynamic program material. And, with two tape monitor loops, the SP9 offers the tape-dubbing flexibility so many listeners want but seldom find in an audiophile-grade preamplifier.

Of course, all controls and switches used in the SP9 have been carefully specified and selected to insure minimal sonic degradation — as have the other active and passive components used in the construction of the SP9. While the SP9 is more affordable than some other Audio Research preamplifiers, its more modest price was not achieved at the sacrifice of component quality. Careful, elegant design, structural simplicity and efficient manufacturing techniques have all contributed to a standard of physical integrity and musical accuracy never before achieved in this price class.

To audition the SP9 Stereo Preamplifier, visit your authorized Audio Research dealer. Black front panel available at additional cost. Call or write for literature on the complete line of Audio Research products.



PREAMPLIFIERS

MANUFACTURER	Model (RD) = Remote Included, (RDO) = Remote Optional	Type: Tube = T, Hybrid = H, Mono = M, Moving Coil Stage Only = MC, Phono Stage Only = P	Frequency Response, Hz to kHz, ±dB	Maximum Output, V	THD, %	SMPTE IM, %	High-Level Sensitivity, mV	Number of Tape & Processor Loops	Number of Tone Controls	Does Unit Invert Polarity?	MM Phono Sensitivity, mV for 0.5 V Output at 1 kHz	MM Phono Overload, mV	MM Phono Input Impedance, Ω	MM Phono S.N. - 80	MM Phono S.N. - 88	MM Phono S.N. - 98	MM Phono S.N. - 99	Moving Coil Input?	PHONO STAGE		Notes			
																			Price, \$	Gain				
CASCADE AUDIO SYSTEMS	SNP-2A	MC	2-120 ±0.6	†	0.007	.0045				No									81	Yes	355.00	†6.3 mV. With selectable input loading. Model SNP-2B, \$395.00.		
CELLO	Audio Suite						†	0	No											Yes	From 6650.00	†Up to 12 loops. Dual mono, mainframe chassis; accepts up to ten plug-in modules.		
CLASSE AUDIO	OR-7 NIL-2	MC	0.1-80 +0.0-0.25 0.1-80 +0.0-0.25	8	0.1 0.1	0.1 0.1	250 2	0	No No	0.5		Var. Var.	84 82	82 Yes	Yes	4150.00 1195.00								External power supply; selectable MC gain. Selectable gain; auto impedance matching.
CLEARAUDIO/SOUTHER	Harmony	MC	0-1M +0.3	8	0.01	0.01	1V	1	0	No										70	Yes	2000.00	Two pieces: Phono stage mounts directly onto cartridge and weighs 7 grams; control box has volume control.	
CONRAD-JOHNSON	PV7 PV5 Premier 3 Premier 7 Premier 6	T T T T T/MC	20-100 +0.1 20-100 +0.1 20-100 +0.1 20-100 +0.1 20-100 +0.1	25 25 25 25 10	0.1 0.05 0.05 0.05 0.05	0.1 0.05 0.05 0.05 0.05		2 2 2 2		Yes No No Yes	0.65 0.15 0.20 0.12	500 500 500 500	150 150 150 120	47k 47k 47k 47k	72 72 72 80					64 Yes Yes	695.00 1485.00 2950.00 6000.00 985.00	Dual mono; four chassis.		
CONVERGENT AUDIO TECHNOLOGY	SL1 Reference	T	0.1-600 +0.3	50	.0005	.0005	25	1	0	No	0.12	250	Adj.	Adj.	92	72	Yes					3750.00	External power supply; switched-resistor balance and volume.	
COUNTERPOINT	SA-2 SA-3.1 SA-5.1 SA-7.1 SA-9 SA-11(RI)	T/MC T T T T/P T			0.18 0.08 0.25 0.1 0.009	0.18 0.08 0.3 0.12				Yes Yes Yes No Sel.	2.5 0.5 0.8 2.5				80 86					Yes	995.00 995.00 1795.00 595.00 2495.00 4995.00	External transformer. As above; auto mute. External power supply; auto mute. Auto mute. External power supply. Motor-driven potentiometers.		
CROWN INTERNATIONAL	PSL-2		10-50 ±0.25	2.5	0.009	.0025	250	2	2	No	6.6	330	50	47k	87					No		595.00		
OB SYSTEMS	DB-1B/ OB-2A OBR-15B/ OB-2A DB-1A/ DB-2A OB-4B OB-1A-HL/ DB-2A DB-1B-HL/ DB-2A	MC	20-20 ±0.04 20-20 ±0.04 20-20 ±0.04 10-100 ±0.1 10-50 ±0.1 10-50 ±0.1	9 10 9 2 9 9	.0008 .0008 .0008 .0008 .0006 .0006	0.001 0.001 0.001 0.001 .0008 .0008	120 120 120 120 120 120	1 6 1 1 1		Var. Var. Var. No Var.	0.9 0.9 0.9	150 150 150	100 100 100	47k 47k 47k	77 77 77					80	Yes	700.00 1085.00 495.00 375.00 580.00	External power supply. As above; without oak cabinet, \$935.00. External power supply. Model OB-2A power supply or DBP-1 cable required. Five high-level inputs; no phono stage. As above.	
DBX	CX1		20-20 ±0.09	10	0.003	0.003	60	4	2†	No	1	150	Sel.	47k	90	82	Yes					1500.00	†Selectable bass and treble curves. Dolby Pro-Logic Surround and digital ambience delay circuits; buffered tape loops; three video inputs and two video outputs.	
DENNESEN	Sirius JC-80	M			0.01 0.005	0.01 0.005	125 100			No Yes	2 2	200 500			80 100					No Yes	489.00 4500.00 Pair	External power supply.		
DENON	PRA-2000Z OAP-5500 PRA-1100		1-300 +0.3 1-300 +0.3 1-300 +0.2,3	12 30 10	.0015 0.002 0.003		150 150 150	2 2 2		2.5 2.5	500 160		47k	90 96	80 79	Yes Yes						1600.00 1400.00 425.00	Digital inputs and outputs; includes D/A converters.	
DISTECH	LS V LS VI LS VI MKII LS VI MKIII		1-150 +0.1 0-100 0-100 0-100	7 8 8 8	0.005 0.001 0.001 0.001	0.005 0.001 0.001 0.001	63	2 1 1	2 No No No	0.7	120 350 350	75 100 100	47.5k 47k 47k	86 100 100						94 Yes	950.00 1800.00 2400.00 3000.00	Switchable to passive line-level direct. No phono stage. Adjustable MC impedance.		
DNM DESIGN	Series 3	MC	20-20	15	0.01	0.01	300	1	0	No										68	Yes	3000.00	Optional MM input; with Model 6-3 power supply, \$4000.00.	
EIOOLON RESEARCH	Julia Mental Salesia	T T T	0.1-200 +0.1.5 0.5-150 +0.1.5 0.5-150 +0.1.5	85 85 70	0.01 0.01 0.01	0.01 0.01 0.01	Sel. Sel. Sel.	2 2 2	0 0 0	Var. Var. Yes	1.45 1.45 1.45	500 550 550	Adj. Adj. Adj.	Adj. Adj. Adj.	79 78 78	65 65 No	Yes Yes No					3600.00 2400.00 1200.00	Dual mono. External power supply. Passive and active RIAA.	
ELECTRO-COMPANET	MC-2 PRE-1IA EC-1	MC	0-100 50-100 ±0.05 50-100 ±0.05	15 15	.0015 .0004 .0002		100 100	2 2		Yes †	1.5 1.5	200 250	150 150	47k 47k	84 84	80	Yes No Yes					450.00 1395.00 1995.00	†Inverts phase only in MC stage.	



PREAMPLIFIERS

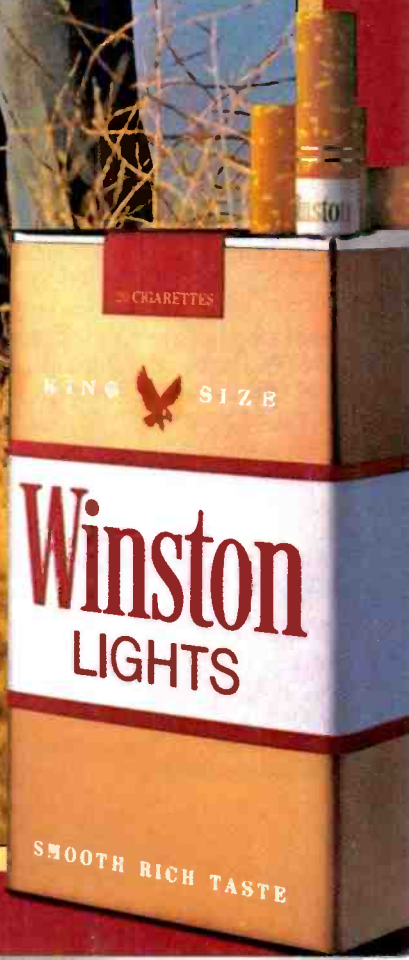
MANUFACTURER	Model (RI) = Remote Included (RO) = Remote Optional	Type: T = Tuning Moving Coil Stage Only = P	Frequency Response Hz to kHz, ±dB	Maximum Output, V	THD, %	SMPTE IM, %	High-Level Sensitivity, mV	Number of Tape & Processor Loops	Does Unit Invert Polarity?	MM Phono Sensitivity, mV for 0.5 V Output at 1 kHz	MM Phono Overload, mV	PHONO STAGE									
												MM Phono Input Impedance, Ohms	MM Phono S.N. - db: A: Wdg. re: 5 mV Moving Coil Input?	Price, \$	Notes						
ELECTRON KINETICS	Eagle 2000		0-200	52	0.001	0.001	100	1	0	No	0.5	200	47	47k	93	93	Yes	2500.00			
FM ACOUSTICS	FM212A FM240	MC	2-1M +0,-3		0.018		75		0	No	2			47k			Yes No	998.00 6395.00	Selectable impedance. Includes above model.		
FORTÉ AUDIO	2		2.5-50	4	0.01	0.01		1	0	No		Var.	Var.			90	Yes	750.00			
GOLMUNDO	Mimesis 2PH Mimesis PH01	P						2	0	Sel.							Yes Yes	6950.00 1550.00	Without phono stage, Model Mimesis 2MP, \$5550.00. For use with above model.		
GORDON INSTRUMENTS	Gordon(RI)		20-20 ±0.1	5			100†	1†	0	No							Yes	2400.00	†Optional input/output. \$520.00.		
GSI	3TP 5TP DM10 6TP	T T H H	10-50 5-100 1-150 5-100	30 50 70 70	0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01	750 750 750 750	1 1 2 2	0 0 0 0	Yes No No No		600 750 750 750	100 100 100 100	47k 47k 47k 47k	77 80 82 80	Yes Yes Yes Yes	795.00 1195.00 2295.00 1795.00	Auto mute; 66-dB gain. Auto mute; 74-dB gain. Dual mono; 80-dB gain. 80-dB gain.			
DAVID HAFLER CO.	OH-110 OH-100		20-20 +0,-0.1 20-20 ±0.25	14 8	0.001 0.005		50 50	3 1	2 2	No No	1.25 1.2	300 180	Adj. 130	47k 47k	87 82		Opt. No	450.00 250.00	Kit, \$375.00. Optional MC input kit, Model OH-112, \$75.00. Kit, \$200.00.		
HARMAN/KAROOON	Citation Twenty-One		0.25-250 +0,-3	10	0.001		135	2	2	No	1.1	160	125	47k	83	78	Yes	495.00	CD direct switching.		
HEYBROOK	C-2		20-50	10	0.01	0.01		1	0								Yes	698.00			
HITACHI	HPT120- AVSW(RI)	H	20-20	7	0.005			2	5	No	2.7	150		47k	72			349.95			
JADIS	JP80	T																7600.00			
JANIS	CPA-100A PPA-202	MC	1-200 +0,-3 0.05-1.5M +0,-3	12 1	0.01 0.01	0.01 0.01	98	1		Sel. No	2.5	300	40	44k	75	73	Opt. Yes	1995.00 300.00	Plug-in for above model.		
JRM	Preamp		0-50 +0,-1	10	0.01	0.01	Sel.	2	Opt.	No	1.25		Sel.	Sel.	81	78	Yes	450.00	Includes 10-watt/channel headphone amp; video inputs; subsonic filter.		
KENWOOD	Basic-C2 Basic-C1 KC-206(RI)		1-350 ±3 1-250 ±3 10-70 ±3	1 1 1	0.001 0.004 0.004		150 150 150	2 2 2	2 2 7	No No No	2.5 2.5 2.5	200 200 150		47k 47k 47k	88 87 79	Yes Yes No	310.00 240.00 230.00				
KINERGETICS	KPA-1		1-300 +0,-0.3	7.5	0.05	0.05	150	2	0	Sel.	0.3	150	Var.	Var.	77	73	Yes	795.00	Dual mono.		
KLIMO	Argo Merlin	T/MC T	10-450 +0,-3 3-450 +0,-3	10 25	0.2 0.07			1	0	No	1.0	600	20	47k	76		Yes Yes	1350.00 3495.00	External power supply; adjustable input impedance.		
KLYNE AUDIO ARTS	SK-2A SK-3 SK-4A SK-5A SK-6	MC P		7 10 10 10 10						No No No Sel. No			Sel. Sel. Sel. Sel. Sel.	Sel. Sel. Sel. Sel. Sel.			Yes Yes Yes Yes Opt.	750.00 950.00 2450.00 3250.00 1750.00	Switchable high-frequency contour and input impedance. External power supply. Dual mono; with line amps, \$2695.00. Model above with line amps and additional switching and processing. Optional phono stage.		
KRELL	PAM 5 PAM 3 KRS-2 KRS-1A KRS Balanced	M M	0.05-1M 0.05-1M 0-1.5M	10 10 10	0.001 0.001 0.001	0.001 0.001 0.001	100 100 90 90 90	1 2 2 2 2	0 0 0 0 0	No No No No Sel.	1 1 1 1 1	300 500 500	100 100 100	47k 47k 47k	107 110 115	70 75 80	Yes Yes Yes Yes Yes	1550.00 2850.00 4500.00 4125.00 5000.00	External power supply. Dual mono; two external power supplies. Dual mono. Full mono construction. Fully balanced, input to output.		
KYOCERA	C-910		0-200 +0,-3	25	0.003	0.003	125	2	2	No	0.55	300	100	47k	85	76	Yes	1200.00			
LAZARUS	Cascade Basic MC-1	T T/MC	20-20 +0,-0.5 20-100 +0,-0.5	50 30			100	1	0	Yes Yes	1.5	600	10	47.5k			No Yes	650.00 650.00	External power supply.		
MARK LEVINSON	ML-6B ML-7A ML-10A ML-12A		20-20 ±0.1 20-20 ±0.1 20-20 ±0.1 20-20 ±0.1	6 6 6 6	0.01 0.01 0.02 0.05	0.01 0.01 0.02 0.05		0 2 2 1	0 0 0 0	No No No No			Sel. Sel. Sel. Sel.	Sel. Sel. Sel. Sel.			Yes Yes Yes Yes	7780.00 6050.00 3325.00 1600.00	Optional power supply, Model PLS 124, \$455.00.		
LINEAGE	CP100		2-200 +0,-1	15	0.01	0.01	300	2	2	Sel.				47k			Yes	1995.00	External power supply.		
LINN HI-FI	LK1(RO)						200	4	0	Yes	5						Yes	845.00	Microprocessor controlled.		



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When Bob Carver set out to redefine the stereo listening experience through Sonic Holography, he was really rebelling against the limitations of the stereo phonograph record. At the time his remarkable invention first started astounding audio critics and music lovers, vinyl discs were the musical standard.

If Sonic Holography can breathe life into even your oldest records, imagine what it will do for CD's, VHS Hi-Fi and other exciting new stereo sources.

Now there are at least five major audio/video breakthroughs which further expand Sonic Holography's potential to bring more excitement and realism into your life.

These innovations include the Compact Audio Disc, noise-free stereo FM, AM Stereo, Stereo television broadcasts and stereo Hi-Fi video formats.

Each provides the Sonic Hologram Generator in selected Carver preamplifiers and receivers with a chance to redefine the width, breadth and depth of the traditional stereo sound field — while using your existing speakers.

WHAT SONIC HOLOGRAPHY DOES.

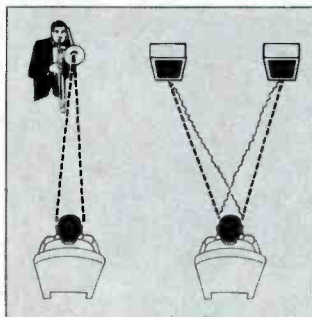
Watch a 13" black and white TV. Now see a movie in 70 millimeter.

Listen to your favorite musicians on a transistor radio. Now sit three rows back from the stage at a live concert.

These are not exaggerations of how much more dimensional and realistic Sonic Holography is than conventional stereo. The most experienced and knowledgeable experts in the audio industry have concurred. Julian Hirsch wrote in **Stereo Review**. "The effect strains credibility—had I not experienced it, I probably would not believe it." **High Fidelity** magazine noted that "... it seems to open a curtain and reveal a deployment of musical forces extending behind, between and beyond the speakers." According to Larry Klein of **Stereo Review**, "It brings the listener substantially closer to that elusive sonic illusion of being in the presence of a live performance."

HOW SONIC HOLOGRAPHY WORKS.

When a musician plays a note, the sound occurrence arrives separately at your left and right ears. Your brain analyzes the difference in these sound arrivals and tells you exactly where the sound is.



L. Real-life sonic event results in two sound arrivals: one at your left ear, one at your right ear.
R. Stereo playback of that sonic event results in four sound arrivals. Two per speaker per ear = four.

Conventional stereo tries to duplicate this process by using two speakers to send a different version of the same sound occurrence to each ear. In theory, this should "trick" your brain's psychoacoustic center into placing the musician on a limited sound stage between your speakers. If — and only if — each speaker can be only heard by one ear.



Conventional stereo: The sound is heard, more or less, on a flat curtain of sound between the two speakers. Volume differences only. The timing cues are gone.



Sonic Holography: With SONIC HOLOGRAPHY, the sound is reproduced much like that of a concert performance, complete with timing, phase and amplitude cues. Three dimensional!

The problem is, these different versions of the same sound also cross in the middle of your listening room, so left and right ears get both left and right sound arrivals a split second apart. Stereo imaging and separation are reduced because both speakers are heard by both ears, confusing your spatial perception.

The Sonic Hologram Generator in the Carver 4000t, C-9, C-1 and Carver Receiver 2000

solve this muddling of sound arrivals by actually creating another "sound." This special impulse cancels the objectionable second sound arrival, leaving only the original sound from each loudspeaker.

The result is a vast sound field extending not only wider than your speakers, but higher than your speakers as well. Sounds will occasionally even seem to come from behind you! It is as if a dense fog has lifted and you suddenly find yourself in the midst of the musical experience. Or, as the Senior Editor of a major electronics magazine put it, "When the lights were turned out, we could almost have sworn we were in the presence of a live orchestra."

CARVER CD AND TUNER INNOVATIONS EXTEND THE POSSIBILITIES.

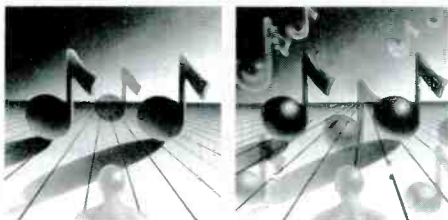
Any stereo source can be transformed from monochromatic flatness into vibrant three-dimensional reality with Sonic Holography.

Compact discs afford vastly increased dynamics, frequency response and freedom from background noise. Yet their potential is trapped in the 2-dimensionality of conventional stereo. Sonic Holography can surround you with the drama and impact of digital. (And the Carver Compact Disc Player with Digital Time Lens sound correction circuitry can enhance your listening experience even further).

Thanks to the Carver Asymmetrical Charge-Coupled FM Stereo Detector, FM stereo broadcasts can be received with vastly increased fidelity. Hiss and interference-free, any signal, from chamber music to live rock concerts,

can take on an astonishing presence and dimension through Sonic Holography.

The new Carver TX-11a AM/FM tuner delivers AM stereo broadcasts with the same dynamics and fidelity as FM. A perfect source for the Sonic Hologram Generator. Think of it: AM can actually become a three-dimensional phenomenon through Carver Technology!



SONIC HOLOGRAPHY PUTS YOU INSIDE THE VIDEO EXPERIENCE.

More and more people are discovering what theaters discovered some time ago: Audio makes a huge contribution to the realism of video. Still, it has taken the incredible, near-digital quality of VHS and Beta Hi-Fi to make the marriage of audio and video truly rewarding. Now even rental movies fairly explode with wide frequency range, dynamic impact and conventional stereo imaging.

Add the steady emergence of stereo TV broadcasts by all three major networks of prime time programming and special broadcasts, and you have fertile ground for the added realism that only Sonic Holography can deliver.

Unlike so-called "surround sound" a Sonic Hologram Generator puts you into the middle of any stereo soundtrack, (stereo, Hi-Fi stereo, broadcast stereo or even simulcasts). It psychoacoustically expands the visual experience with life-like sound that envelops you in the action.

Once you've heard Sonic Holography with a good video tape or LaserDisc, you'll never go back to mere stereo again.

ENHANCE YOUR SPACIAL AWARENESS WITH FOUR CARVER COMPONENTS.

The patented Carver Sonic Hologram generator circuit is available on two preamplifiers, our largest receiver and as an add-on component. Each can transcend the limits of your listening (and viewing) room. Each can add the breathtaking, spine-fingling excitement that comes from being transported directly into the midst of the musical experience.

Before you purchase any component, consider just how much more Carver can enrich your audio and video enjoyment. And then visit your nearest Carver dealer soon.



The Carver Sonic Holography quartet. Pictured from left to right is the 4000t Preamplifier, the C-9 sonic Hologram Generator, the Receiver 2000 with remote control and the C-1 Preamplifier.

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PREAMPLIFIERS

MANUFACTURER	Model (RO) = Remote Included; (R) = Remote Optional		Type: Tube = T, Hybrid = H, Mono MC, Stereo MC, Phono Stage Only = P		Frequency Response, Hz to kHz, ±dB		Maximum Output, V		THD, %		SMPTE IM, %		High-Level Sensitivity, mV		Number of Tape & Processor Loops		Does Unit Level Polarity?		MM Phono Sensitivity, mV, for 0.5 V Output at 1 kHz		MM Phono Overload, mV		MM Phono Input Capacitance, pF		MC Phono S/N, -dB, "K" Wdr. re 5 mV		Moving Coil Input?		Price, \$		Notes		
	Model (RO)	Model (R)	Type	Response	Output	THD	SMPTE	High-Level	Loops	Level	Sensitivity	Overload	Capacitance	S/N	Wdr.	Input	Price	Price															
LOGAN LABS	PA-10B	HLE-1010T	T/P	1-3M ± 1.5	160	0.2																								External power supply. As above; for use with above model. Separate transformer.			
	PA-101		H	1-1M ± 1.5	120	0.2																											
LSR&D	The Leach Pre-Preamp		MC	0.2-200 + 0, -3	4	0.005	0.005																							Kit, \$100.00; selectable input impedance.			
LUXMAN	C-02			10-100 + 0, -1	18	0.005	0.007	150	1	2	No	2.5	270	100	47k	90	77	Yes												600.00			
	C-05		P	2-100 + 0, -0.5	18	0.005	0.006	150	1	0	No	2.5	280	100	47k	90	80	Yes												2200.00			
	LE-109			20-20 + 0, -0.3	2	0.005	0.007				No	2.5	300	100	47k	101	88	Yes												500.00			
MADISON FIELDING	CA700P(RO)			20-50	5	0.005	0.005	100		7	No																			1275.00	Part of multi-room system.		
MAN	MPA-1			1-1.5M + 0, -3	15																									2990.00	Dual mono.		
MAVRICK	Spatial-essence Reference		H	2-200 ± 0.5	10																									7000.00	Dual mono; external power supply.		
	Spatial-essence Reference PRO		H	2-200 ± 0.5	20																										10,000.	As above.	
MAYWARE	T-24-2			5-60	Var.	0.03																								395.00	Transformer; automatic multi ratio; no tapping changes required.		
McINTOSH	C 34V			20-20 + 0, -0.5	10	0.01	0.01	250	5	5	No	0.4	91	65	47k	84															2195.00		
	C 31V(RI)			20-20 + 0, -0.5	10	0.007	0.007	200	4	5	No	0.6	91	65	47k	84															1895.00		
	C 30			20-20 + 0, -0.5	10	0.007	0.007	200	4	5	No	0.4	115	65	47k	84															1649.00		
	C 504			20-20 + 0, -0.5	10	0.02	0.02	250	2	3	Yes	0.4	91	50	47k	84															1090.00		
McLAREN AUDIO	602			5-100	16	0.015		100	2	0	Var. Sel.	1.0	150		Sel.	Sel.															1195.00		
	402			5-100	16	0.015		100	2	2	Sel.	1.0	150		Sel.	Sel.	Adj.	Adj.	Yes											1495.00			
MEITNER AUDIO	P.A.-6(RI)			1-100 + 0, -3	8	0.01	0.01		1	0	Sel.	Sel.																			†	†With infrared remote, \$2195.00; with wired remote, \$1995.00. Floating charge power supply.	
MELOS AUDIO	GK-1 + 1		T	2-300 ± 1	50	0.07		250	1		Yes	1.0	500	180	47k	80	70	Yes													1295.00	External power supply.	
MERIDIAN	201(RO)					0.01	0.01	150	2	0	No	1.5			47k																975.00		
MFA SYSTEMS	Magus A1		T	3-100 ± 1	48	0.03	0.03	50	1	0	Yes	0.16	300	200	47k	82	62	Yes													895.00		
	Mantra		T	3-150 ± 1	65	0.02	0.02	50	1	0	No	0.11	380	200	47k	88	68	Yes													1995.00		
	Lumin-essence A3		T	3-200 ± 1	70	0.015	0.015	50	1	0	No	0.13	400	200	47k	90	70	Yes													3250.00		
MIRROR IMAGE	.2P Phono		P						2	0	Sel.																				1500.00 500.00	Plug-in for above model.	
THE MOD SQUAD	Line Drive			0-1M					2	0	No																				400.00	Passive line-level direct only.	
	Phono Drive		P	1-100 + 0, -3	6	0.01	0.005		0	0	No	2.5	250	100	47k	88	82	Yes													700.00	Front-panel MC impedance adjustment.	
MONARCHY ENGINEERING	Bain 2		MC	10-25 ± 0.2	0.15	0.003	0.004		0	0	No																				99.00	Subminiature; mounts directly on headshell; balanced input; phantom power.	
MONSTER CABLE	Alpha Plus		P	0-3M																												Dual mono; battery operated; 26-dB gain.	
MORRISON AUDIO	PRE-2			0-250 + 0, -3	12	0.01	0.01	Adj.	2	0	No	Adj.	Adj.	Adj.	Adj.	76	68	Yes													1595.00	Van den Hul wiring.	
MOTIF	MC7			10-100 + 0, -1	10	0.1	0.1		1		Var.	0.4	150	150	47k	76	62	Yes													3500.00		
	MC8			10-100 + 0, -1	10	0.1	0.1		2		Var.	0.4	150	150	47k	76	62	Yes														2250.00	
	MC9			10-100 + 0, -1	10	0.1	0.1		2		Yes																					1295.00	
MUSIC REFERENCE	RM-1 MK II		T	0.01-200 + 0, -1	30	0.005	0.005	25	2	0	No	0.12	1V	200	47k	80	60	Yes														4000.00	External power supply; auto mute and off; adjustable line and phono gain.
	RM-4 C		T	2-200 + 0, -1	20	0.01	0.01				Yes																					750.00	
	RM-5 MK II		T	2-100 + 0, -0.2	30	0.05	0.05	25	2	0	Yes	0.25	1V	200	47k	81	61	Yes														1050.00	Auto mute; adjustable gain. As above.
NAD	1130			20-20	8	0.04	0.04	90	2	2	No	1.4	180		47k	76	76	Yes														198.00	
	1240			20-20		0.04	0.04	90	2	2	No	1.4	180		47k	76	76	Yes														278.00	
	1300			20-20	12	0.02	0.04	80	3	2	No	1.3	200		47k	76	78	Yes														498.00	
NAIM AUDIO	NAC 62			20-20 ± 0.5	7.5	0.1		75	1	0	No	1	200		47k																	650.00	One input, choice of MM phono, MC phono, or line level.
	NAC 32-5			20-20 ± 0.5	7.5	0.1		75	2	0	No	2	200		47k																	950.00	Two inputs, choices as above.

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Ravel, Daphnis et Chloé (Complete) Montreal Symphony/Dutoit. London DIGITAL 115520

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Bach, Goldberg Variations Trevor Pinnock, harpsichord. "Definitive."—Stereo Review Archiv 105318

Barry Douglas: Tchaikovsky, Piano Concerto No. 1 London Symphony/Slatkin. RCA DIGITAL 164293

Prokofiev, Sym. No. 5 St. Louis Sym./Slatkin. RCA DIGITAL 154580

Handel, Messiah (Highlights) Musica Sacra/Westenburg. Hallelujah Chorus, more. RCA DIGITAL 153586

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PREAMPLIFIERS

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	Type: MC = Moving Coil, MM = Moving Magnet, MC = MC, Phono Stage Only = P	Frequency Response, Hz to kHz, ±dB	Maximum Output, V	THD, %	SMPYE IM, %	High-Level Sensitivity, mV	Number of Tape & Processor Loops	Does Unit Invert Polarity?	MM Phono Sensitivity, mV, for 0.5 V Output at 1 kHz	MM Phono Overload, mV	MM Phono Input Impedance, pF	MC Phono S.W. = dB, *k = Wid. re: 5 mV	Moving Coil Input?	Price, \$	Notes				
																	1.5-100 +0,-3	10	0.002	
NAKAMICHI	CA-5 CA-7A(RI)		1.5-100 +0,-3 1.0-100 +0,-3	16 7	0.002 0.002					0 3	No No	0.6 0.625	170 320	Sel. Sel.	47k 50k	81 88	78 87	Yes Yes	750.00 2395.00	
NIKKO	Beta-50II Beta-30		20-20 ± 0.5 20-20 ± 0.5	10 10	0.004 0.004	0.004 0.004	150 150	5 3	2 2						47k 47k	88 88	70 70	Yes Yes	420.00 280.00	Record-out selector; dual-input monitor mixer. Record-out selector.
NOVA ELECTRO-ACOUSTICS	CPA-100A PPA-202	MC	1-200 +0,-3 0.05-1.5M +0,-3	12 1	0.01 0.01	0.01 0.01	98	1	0	Sel. No		2.5	250	40	44k	75		Opt. Yes	1995.00 300.00	Selectable gain. Plug-in for above model.
ONKYO	P-308 P-304		0.8-170 +0,-3 0.8-170 +0,-3	6 6	.0005 .0005	0.003 0.003	150 150	3 2	3 2	No No		8	210 210		47k 47k	92 92	81 81	Yes Yes	630.00 499.95	
PAC	Pro-Reference IIA C.P.R. III C.P.R. II C.P.R. I C.P.R. MC Amp	T MC	10-100 +0,-1 0-100 0-100 0-100 0-100	28 10 10 10 10	0.01 0.01 0.01 0.01 0.01	0.01 0.01 0.01 0.01 0.01	30 30 30 30	1 1 1 1	0 0 0 0	No No No No		0.3 0.3 0.3	350 300 300	100 75 100	47k 47k 47k			Yes Yes No No Yes	3700.00 1925.00 1575.00 1175.00 695.00	Selectable MC gain and impedance. Line level only. Selectable gain and impedance.
PARASOUND	PR200		10-100 ± 1	†	0.01	0.01	150	2	2	No		2	160	180	47k	88			285.00	†12.5 V. Variable loudness control.
PERREAUX	SX1 SA3 SM3		20-50 ± 0.25 20-50 ± 0.25 20-50 ± 0.25	9 25 27	0.009 0.009 .0009	0.009 0.009 .0009	285 350 350	1 1 1	2 0 0	No No No		2.5 2 1.8	300 350 900	100 100 100	Sel. Adj. Adj.	86 86 86	66 66 72	Yes Yes Yes	795.00 1195.00 1795.00	Class A. As above. As above.
PHOENIX	P-100-MM	P	20-100	8	0.005				0			6.4	100	100	47.5k	80		No	149.95	
PIONEER	Elite C-90(RI)		20-20 ± 0.2		0.002							2.5	180		50k			Yes	1000.00	Five A/V inputs; motor-driven volume control.
PLEXUS AUDIO SYSTEMS	Photon Phonon	MC	10-85 +0,-0.3 10-100	2 6	0.02 0.02	0.02 0.02	125	1	0	No No		5	100				90 94	Yes No	195.00 895.00	
PROTON	1100 AP-1000		20-20 ± 0.2 20-20 ± 0.2	18 20	0.003 0.003	0.003 0.003	150	2 2	3 4			2.5	290	Sel.	47k	94 94	79 80	Yes Yes	249.00 399.00	
PS AUDIO	PS 4.5 PS 5.0		10-20 ± 0.1 10-20 ± 0.1	18 18	0.05 0.05	0.05 0.05		1 1	0 0	No No			180 180	150 150	Var. Var.	88 88	80 80	Yes Yes	599.00 995.00	Switchable to passive line-level direct. As above.
PSE	Studio IF Studio SL		5-100 +0,-0.5 5-100 +0,-0.5	12 12	0.005 0.005	0.005 0.005	250 250	2 1	2 0	Sel. Sel.		9 Sel.	200 200	120 120	47k 47k	80 80	78 78	Opt. Sel.	760.00 680.00	With MC Input, \$880.00.
QUAD	34 44		30-20 ± 0.3 30-20 ± 0.3	0.5 5	0.05 0.05		Sel. Sel.	1 †	2 2				Sel. Sel.	220 180	47k 47k	Sel. Sel.	Sel. Sel.	Opt. Opt.	695.00 995.00	Optional inputs. †Modular inputs.
QUICKSILVER AUDIO	M.C. Transformer	MC								No								Yes	295.00	23-dB fixed gain.
RANE	MP 24		15-30 +0,-3	10	0.01	0.01	50	2	4	No		8	180	200	47.5k	91		No	1099.00	Preamp/mixer with six stereo line inputs and three stereo phono inputs.
RCA	MPT 200(RI)		20-20 +0,-0.8		0.04	0.08	75	2	2	No		1.25	150	100	47k	72		No	349.00	
REVOX	B252(RO) B286(RO)		20-20 +0,-0.2 20-20 +0,-0.2	12 6	0.01 0.005	0.01 0.01	160 160	2 2	2 2	No No		Adj. Adj.	23 50	Adj. Sel.	47k 47k	75 80	75 76	Opt. Opt.	1600.00 2300.00	Tuner/preamp; for tuner specs, see Model B286 receiver.
ROBERTSON AUDIO	Twenty Twenty MC Forty Twenty Forty Sixty EK-1		0.2-400 +0,-3 2-400 2-400 +0,-3 0.1-400	† 19	0.009 .0176 0.013 0.01	0.005 0.007 0.007 0.01		1 1 1 1		No No No No		2.6 2.6 2.6	127 220 216	100 130 130	47k 47k 56k	88 80 81	72	Yes No No No	1495.00 795.00 1250.00 2000.00	†14.5 V. External power supply. With strain gauge cartridge.
ROTEL	RC850 RC8708X		4-100 +0.5,-3 4-100 +0.5,-3	10 10	0.004 0.004	0.004 0.004	150 150	2 2	2 0	No No		2.5 2.5	180 180		47k 47k	80 80	70 70	Yes Yes	249.95 399.95	
ROWLAND RESEARCH	Coherence One		0.2-500 +0,-3	15	0.015	0.01	125	1	0	Sel.		5	200	Sel.	Sel.	87	85	Yes	3950.00	External power supply; balanced inputs.
SAE	P102 X1P		20-20 +0,-0.5 20-20 +0,-0.2	7.5 17	0.01 0.01	0.01 0.01	150 230	3 1	2 0	No No		1.3 0.07	120 250	200 Sel.	47k Sel.	82 74	75 80	Yes Yes	399.00 1200.00	Two pairs of main outputs; programmable tone memories. External power supply.
SANSUI	C-2301 C-2102 C-1000(RI)		0-500 +0,-3 0-300 +0,-3 10-100	1.2 1.0 10	0.003 0.003 0.03		150 150 150	4 3 4	0 † 2			2.0 2.5 2.5	350 300 120		47k 47k 47k	90 88 75	80 70	Yes Yes	2400.00 700.00 235.00	†Two-band parametric EQ.
SHURE	M64A	P	40-15 ± 2	6	1			0	0	No		9.4	100	160	50k	65†		No	99.00	†Unweighted. Equalization switchable for tape head or mike.



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The difference between a cassette and a CD is obvious to the eye. But it's not always so obvious to the ear. To fully appreciate the excitement of today's digital recordings, you need a great pair of stereophones. That's why Koss created the SST's, a line of four stereophones that deserve to be called digital-ready. By

using their exclusive Super Sonic Technology, Koss was able to invent a new element capable of faithfully reproducing the wider dynamic range of CD's. So if you own a Compact Disc player, or are thinking about buying one, remember: It's the stereophones that make the difference. And with a pair of Koss SST's that

difference will be crystal clear.
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stereophones

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PREAMPLIFIERS

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	Type: MC = Moving Coil Stage Only = MC, Phono Stage Only = P	Frequency Response, Hz to kHz, -dB	Maximum Output, V	THD, %	SMPTE IM, %	High-Level Sensitivity, mV	Number of Tape & Processor Loops	Number of Tone Controls	Does Unit Invert Polarity?	MM Phono Sensitivity, mV, for 0.5 V Output at 1 kHz	MM Phono Overload, mV	MM Phono Input Capacitance, pF	PHONO STAGE				Price, \$	Notes	
														MM Phono Input Impedance, Ω	MC Phono S/N, -dB, *A Wtd. re 5 mV	Moving Coil Input?	Price, \$			
SIMA ELECTRONIQUE	P-2001			†	0.05	0.05	100	1	0	No	1	215	100	47k	75	62	Yes	549.00	†10.5 V.	
SONDGRAPHE	SC1		20-100 +0,-1	10	0.1	0.1		2		No	0.2	100	150	47k	80		Yes	595.00		
SONTEC	PPP-102		2-400 +0,-1	15	0.003	0.003		0	0	No	Adj.	Adj.	Adj.	Adj.	88	68	Sel.	825.00	Input stage gain-adjustable to match MM or MC cartridges.	
SONY	TA-E77ESD (RI)		3-300 +0,-3		0.001	0.001	150	2	2	No	2.5	150			95	83	Yes	1100.00	Digital signal processing (44.1, 48, and 32 kHz); video processing.	
SOTA	Head Amp II	MC	1-500 +0,-3	2	0.03	0.03				No						90	Yes	500.00	Dual mono; selectable impedance.	
SOUND-CRAFTSMEN	Pro-Control Four OX4200		5-100 +0,-0.25	10	0.005	0.005	125	7	2	No	2.5	200	100	47k	97		No	699.00		
	DX4000		5-100 +0,-0.25	10	0.01	0.01	90	4	†	No	Adj.	300	Adj.	47k	97	97	Yes	699.00	†Dual 10-band EQ. Includes test record.	
	DX3000		5-100 +0,-0.25	10	0.01	0.01	90	5	0	No	2.8	200	100	47k	97		No	439.00		
	DX3000		5-60 +0,-1		0.01	0.01	90	3	2	No		150	100	47k	85		No	329.00		
SOUNO ENGINEERING	PFM-0	MC	5-100 +0,-0.1	3	0.06	0.06				No							Yes	650.00		
SOUNOSTREAM	C-1(RI)		20-20 +0,-2	10	0.01	0.01	100	4	2	No	1	160	100	47k	85	82	Yes	1250.00	Dual mono; parallel A/V switching; 350-function programmable remote with optional sensors.	
SPECTRAL	OMC-10 Series Delta		0-1M ±0.1	40	0.01	0.01	100	1		No	1.5	1.2V	Sel.	Sel.	95	78	Yes	3195.00	External power supply.	
	OMC-6		0-1M ±0.1	40	0.01	0.01	100	1		No	1.5	1.2V	Sel.	Sel.	95	76	Yes	2495.00	As above.	
	DMC-5A		0-1M ±0.1	40	0.01	0.01	100	1		No	1.5	1.2V	Sel.	Sel.	95	75	Yes	1795.00		
SPECTRASCAN	LCA-10		5-100	15	0.05	0.05	100	2	0	No	1.0	300	Sel.	47k	85	78	Yes	1095.00	With tone controls, Model LCA-20.	
STANTON	310B	P	20-20	15	0.05						0.5	120	Adj.	47k	74		No	280.00		
STRELIDFF	PA/RS II		10-60 ±1.5	25	0.01	0.01	100	3	0	No	1.0	250	100	Sel.	97	90	Yes	2000.00	Dual mono; special order.	
	PA/RS I		10-60 ±1.5	25	0.01	0.01	100	3	0	No	1.0	250	100	Sel.	92	85	Yes	1500.00	Special order.	
	PB 1		10-60 ±1.5	25	0.01	0.01	100	3	0	No							No	850.00	As above; line level only.	
SUMO	Athena		5-100 ±0.5	20	0.005	0.005	300	2	0	No	0.37	160	100	47k	85	80	Yes	649.00	High-level bypass.	
SUPERPHON	Revelation II		2-150 +0,-2	12	0.003	0.05		2	0	No		170	100	47k	80		No	699.00		
TANDBERG	3038A(RO)		1.6-150 +0,-3	6	0.04	0.04	70	2	2		0.5	70	120	47k	75	70	Yes	995.00	No negative feedback.	
	3018A		20-150 +0,-3	10	0.006	0.006	80	2	0		1	290	120	47k	78	74	Yes	2195.00	As above; dual power supply.	
TECHNICS	SU-A4MK2	MC	0-100 +0,-3	8	0.006		150	2	4		1.0			47k	92	82	Yes	1400.00	Class AA; video switching. Video switching. Transformer.	
	SU-A200		0.5-180 +0,-3	8	0.001		36	4	0		0.63	150		47k	80	77	Yes	1300.00		
	SU-A6MK2		0.5-200 +0,-3	8	0.002		36	3	4		0.63	150		47k	80	77	Yes	800.00		
	SH-305MC		3-300 ±0.2		.0001													Yes		400.00
THRESHOLO	FET ten/pc	P	5-80	10	0.01	0.01		0	0	No			Var.	Var.		90	Yes	1100.00	Provides RIAA-equalized high-level output.	
	FET ten/hl		5-80	10	0.01	0.01		2	0	No								Yes	1800.00	High-level inputs only.
	FET nine		5-80	10	0.01	0.01		2	0	No			Var.	Var.		87	Yes	1600.00		
TRUE IMAGE RESEARCH	CM-1A		1-100 ±0.2	10	0.003	0.01	250	2	2	No	2.5	300	100	47k	82		No	2950.00	Includes external dual-mono power supply.	
VANDERSTEEN AUDIO	OL-1	MC	0.5-500 +0,-3	1	0.01	0.01				No					80	Yes	285.00	Variable loading; no negative feedback.		
VENETTA RESEARCH	SCP-1	MC	0.1-1M	0.3	0.01	0.01				Yes					90	Yes	895.00			
	SCP-2	MC	0.1-1M	3	0.01	0.01				Yes					90	Yes	1795.00			
VTL	Moving Coil Pre-Pre	T/MC						0	0	No							Yes	690.00		
	Minimal	T						0	0	No			150	47k			No	550.00		
	De Luxe	T						0	0	No			150	47k			No	1050.00		
	Super De Luxe	T						0	0	No			150	47k			Opt.	1950.00		
	Ultimate	T						0	0	No			150	47k			Opt.	3050.00		
WINGATE AUDIO	1000(RO)		2-250 +0,-0.1	25	0.05	0.05	150	2	0	Sel.	1.75	500	250	47k	85	80	Yes	2200.00	All FET; no negative feedback; separate audio and video switching; with remote control, \$2600.00.	
YAMAHA	C-85	M	20-20 +0,-0.2	8.5	0.001	0.002	150	2	2†	No	2.50	500	Sel.	47k	95	91	Yes	795.00	†Parametric.	
	C-65	M	20-20 +0,-0.2	8.5	0.001	0.002	150	2	2	No	2.50	500	Sel.	47k	95	90	Yes	595.00		
	C-45	H	20-20 +0,-0.2	11	0.002	0.002	150	2	3	No	2.50	170		47k	94	84	Yes	389.00	Digital inputs with D/A converters; digital EQ; digital sound-field synthesis; optional phono stage, \$2500.00.	
	CX-10000 (RI)		15-100	3	0.003		150	2		No	2.50						Yes	7500.00		

NEUTRALITY CLARITY PRECISE FOCUS

Exclusively In Audio Cable From **MIT**

In less than a decade, high-performance cable has emerged as a critical component in any quality audio system. Since the early-1980s, MIT has been the acknowledged leader in superior audio cable. This audible superiority results directly from leading-edge computer design capability, rigorous testing and a unique understanding of the physics of cable performance.

MIT cable delivers *neutrality, clarity* and *precise focus* because it is designed to virtually eliminate "phase noise". Phase noise includes all forms of frequency and phase instability, and is an inevitable by-product of audio cable that is not phase correct. In fact, all other audio cables suffer significantly from phase noise. Only MIT cable is designed to be truly time aligned, phase coherent and thus, noise free. The result: MIT cable does not alter the sound as do other audio cables.

In a dramatic comparison of MIT's superiority, MIT ran head-to-head tests of one-meter lengths of MIT MI-330 vs. solid-core straight wire, employing a sequence of music tone bursts. Despite past regard for straight wire, and some observers actually recommending its direct application in audio cable, comparable lengths of straight wire simply cannot compete with MIT cable on crucial phase noise performance.

These test graphs, which illustrate only one of a series of music tone bursts, provide visual proof of MI-330's overwhelming phase noise superiority. From the instant each music tone is retriggered, MI-330's defined transmission is obvious. Equally important is what occurs *before* each succeeding music tone is retriggered—a time segment which is supposed to be absolutely quiet (note exploded view of the pre-trigger time segment).

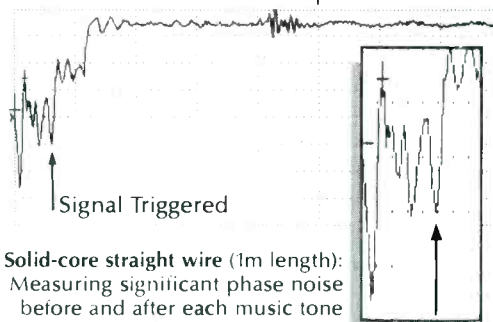
MI-330 is essentially quiet before each music tone is retriggered, as audio cable must be

for sonic accuracy. The length of straight wire, like other cables which are not phase correct, is noisy when it should be quiet. It is victimized by phase noise—stored energy residue which is being released at the wrong time! By comparison, MI-330's *quiet passages* and *clearly defined step waveform* mean that the music starts and stops when it is supposed to, yielding a more holographic sound stage, intertransient silence and minimal distortion.

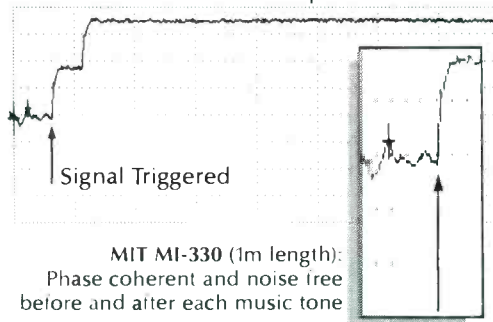
MIT now offers unequalled neutrality, clarity and precise focus in two cable families: MIT and PC-SQUARED. MIT is the finest audio cable money can buy, and includes the top-rated **MI-330** interconnects and **MH-750 Music Hose** speaker cable, **MH-650 Junior Hose** and the remarkable limited edition **MI-330 Shotgun** and **MH-750 Shotgun** cable series. PC-SQUARED provides exceptional performance, approaching MIT, but at a reduced cost in **PC-2** interconnects and **PC-18** speaker cable.

Minimal phase noise is but one significant advantage of all MIT products. For more information on MIT and PC-SQUARED product lines, and a more technical discussion of phase noise, please write for data to: **Transparent Audio Marketing, P.O. Box 117, Route 202, Hollis, ME 04042.**

A=10 mV dA=62 mV T=0 ps dT=34.132 ns



A=-8 mV dA=18 mV T=0 ps dT=46.746 ns



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THE SILENT TREATMENT.

WHY BOB CARVER'S MINIATURE RADIO STATION LEFT THE AUDIO PRESS SPEECHLESS AND HOW IT LED TO THE MOST COMPLETE STEREO TUNER EVER OFFERED.

The new Carver TX-11a Stereo AM-FM Tuner is a technical four-de-force which further distances Bob Carver's unique products from traditional electronic components — and which can vastly enhance your musical enjoyment.

TWO TECHNOLOGICAL INNOVATIONS.

The performance of the legendary TX-11 Asymmetrical Charge Coupled FM Stereo Detector Tuner is increased by the addition of Ultra High Frequency Wide Band AM Stereo circuitry. With the new TX-11a, AM stereo sounds as good as FM.

Yes, contrary to popular belief, most AM stereo stations have frequency response (20Hz-15kHz), separation (35dB) and signal-to-noise ratios (70dB) audibly indistinguishable from FM stations of equal strength. It's just that **only** Carver offers the technology to appreciate this hidden performance.

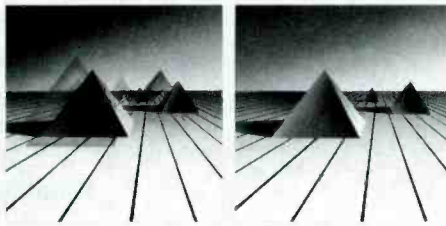
As for FM stereo, the TX-11a virtually eliminates multipath and distant station noise while providing fully-separated stereo reception with space, depth and ambience!

Bob Carver's Asymmetrical Charge Coupled FM Stereo Detector removes (without affecting stereo imaging, frequency response or dynamic range) the hiss, clicks, pops, "picket fencing" and the myriad other unpredictable noises which all too often disturb FM listening.

(Still interested in the story of the miniature radio station and how it impressed hard-to-impress audio critics? Read on. We'll get to it

after we explain why the quartz-synthesized TX-11a Stereo AM-FM Tuner will impress you in your own listening environment).

A CLEANER, WIDER FM WINDOW ON THE WORLD.



Because of the TX-11a's Charge-Coupling and Leading Edge Detection technology, ownership may very well change your listening habits. Right now, you probably confine your FM listening to those stations which are strong and relatively interference-free, avoiding weak stations and those filled with distortion. Your options are therefore limited. The TX-11a can significantly expand your choices by recovering stations previously buried in hiss or prone to sudden tantrums of noise.

Ovation Magazine observed that the circuit, "...may well mean the difference between marginal reception of the station signals you've been yearning to hear and truly noise-free reception of those same signals, permitting you to enjoy the music and forget about noise and distortion."

In **Audio Magazine**, Len Feldman said "The significance of its design can only be fully appreciated by setting up the unit, tuning to the weakest, most unacceptable stereo signals you can find, then pushing those two magic buttons."

"Separation was still there; only the background noise had been diminished, and with it, much of the sibilance and hissy edginess so characteristic of multi-path interference."

WHY THE ASYMMETRICAL CHARGE-COUPLED FM STEREO DETECTOR GIVES NOISE THE SILENT TREATMENT.

Thirty years ago, the FCC turned clear mono FM into a substandard stereo medium (with fifteen times poorer signal-to-noise ratio) by approving a broadcast system that is extraordinarily prone to multipath and distant-station-noise.

This system separates stereo into two different bands. Unfortunately, the bands aren't pure Left and Right. Instead, one band is comprised of those parts of a stereo signal that are common to both channels, (L+R, or mono). The other signal, far more fragile and prone to interference, is the difference between the left and right signal (L-R). It bounces off buildings, hills and other objects, and wreaks havoc when



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Carver Corporation
P.O. Box 1237 Lynnwood, WA 98046

recombined with the strong mono signal.

Bob Carver's Charge-Coupling circuit takes advantage of the fact that almost all noise and distortion is exactly 180 degrees out of phase with the signal it's part of. The TX-11a Stereo AM-FM Tuner cancels these "dirty mirror" images before they can reach your ears. That eliminates up to 85% of the potential noise found in distant or noisy stations.

But Bob wasn't satisfied and knew you wouldn't be either. So another circuit, the Leading Edge Detector, goes a step further by taking advantage of a little-appreciated FM phenomenon: Just 5% of the L-R signal actually contributes to the stereo experience. The rest simply gets in the way of skyscrapers and mountains.

The Carver leading Edge Detector operates only on this critical 5% of the L-R signal, filtering out noise and restoring just that part of the signal needed by our ears and brain to construct stereo imaging.

Blended back into the mono (L+R) signal matrix, a net reduction of 93% — or better than 20dB of noise reduction — is achieved. All ambient and localizing information is recovered. Only hiss and distortion are left behind. Or, as **High Fidelity Magazine** put it, "... clean, noise-free sound out of weak or multi-path-ridden signals that would have you lunging for the mono switch on any other tuner."



THE LITTLEST AM RADIO STATION.

Before we describe the remarkable attributes of the TX-11a, we owe you the story that proves just how far performance can be extended when a component comes from Carver.

At a recent press conference, Bob Carver unveiled a small antenna connected to a very low powered AM stereo broadcast transmitter (C-QUAM format). Dubbed "Station CRVR," it sat next to a Carver Compact Disc Player and the same TX-11a that's on your dealer's shelves right now.

Bob Carver routed the Compact Disc's signal to the antenna for reception by the TX-11a, and also directly to a preamplifier.

In front of America's top stereo writers, Bob switched back and forth between the transmitted signal (as received by the TX-11a) and the direct CD signal. All listeners had difficulty distinguishing between the outputs of the CD player and the TX-11a Stereo AM-FM Tuner!

Most could tell no difference at all!

HOW AM STEREO GETS THE SILENT TREATMENT WITH THE TX-11a.

- * *Unique de-emphasis curve*
- * *Whistle Stop cancelling circuit*
- * *Pilot Signal cancelling circuit*
- * *Ultra-low noise balanced station detector*
- * *Very wide band, minimum phase intermediate frequency amplifiers.*

Think of it. Compact Disc frequency response and freedom from noise with AM stereo and the TX-11a. Only Carver could pull it off. But then only Carver could do the same for FM, too.

HUMAN-ENGINEERED FEATURES AND CONVENIENCE.

Many tuners with far less exclusive circuitry than the TX-11a have far more complicated exteriors. Bob Carver wanted to make tuning stations easy, not impress you with flashing lights or complex programming.

So thirteen presets, wide/narrow band selectors, automatic/manual scanning and the buttons which activate the remarkable Charge-Coupled circuits (Multipath and Noise Reduction) are all tastefully inset into the burnished anthracite metal face. Full instrumentation including digital station frequency readout, 6-step 10dB-interval signal strength LED's and other monitor functions is recessed behind a panel, visible but not garish.

The result is performance without theatricality. Access without complication.

A tuner **High Fidelity Magazine** called, "By far the best tuner we have tested..."

CLEAR THE AIR BY VISITING YOUR NEAREST CARVER DEALER.

Ask to hear the most expensive tuner they sell. (It won't be the Carver TX-11a). Now tune a multi-path-ravaged, hiss-filled FM station. Tune the same station on the TX-11a Stereo AM-FM Tuner and press the Multipath and Noise Reduction buttons. You'll see why no other FM tuner can approach it. And why no other AM stereo tuner this good exists anywhere!



MUSICAL

ACCURATE

For your nearest dealer, see pages 384 & 385.

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Distributed in Canada by Evolution Technology

TUNERS

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	FM Only = F, AM Stereo Capable? See Code	AM Stereo = S, Digitally Synthesized = D	IHF (Usable) Sensitivity, dbi, Mono/Stereo	Signal Strength for 50-dB Quieting, dbi, Mono/Stereo	Capture Ratio, db, Mono/Stereo	AM Suppression, db, Wide/Narrow	Alternate Channel Selectivity, db, Wide/Narrow	Total Number of Stations Presets	Separation at 1 kHz, db	THD at 1 kHz, % Mono/Stereo, 100% Modulation	THD at 6 kHz, % Mono/Stereo, 100% Modulation	Maximum S/N, -db, Mono/Stereo	Weight, lbs.	Price, \$
ACCPHASE	T106 T107	D D	No No	11/29 11/29	17/37 17/37	1.5/ 1.5/	80 80	70/100 70/100	14 12	50 50	0.04/0.04 0.04/0.04	0.04/0.08 0.04/0.08	83/79 90/85	19.8 12.8	1850.00 1200.00
AOCOM	GFT-555 GTP-500(RI) Tuner/Preamplifier	D D	No No	9.5/ 9.5/	12.5/36.5 12.5/36.5	1.5 1.5	70 65	80 80	16 16	52 52	/0.05 /0.09	/0.09	85/75 85/75	14 15	299.95 549.95
ADS	CC4(RO) Tuner/Preamplifier T2	D D	No No	11/26 11/26	16/35 16/35	1.5 1.8	55 55	65 75	30 16	47 38	0.1/0.15 0.15/0.2	0.1/0.2 0.2/0.3	75/70 70/65	18 15	999.00 539.00
AKAI	AT-A102-B(RO)	D	No	12.7/		2.0			16	40	0.2/0.4		70/60	4.4	159.00
AR	T-04(RI)	D	No	11.2/	14.6/37.2	1.0	58	60	16	48	0.08/0.2	0.08/0.3	80/75	15½	389.95
ARCAM	Delta 80 Alpha	No No	No No	14.2/ 14.2/	29/49 29/49	1.5 1.5	50 50	60 60	12 40	40 40	0.25/0.20 0.25/0.20		74/70 70/68	6.6 4.4	599.00 299.00
AUDIO DESIGN ASSOCIATES	FM-600	F	No	8/14.5	13/34	1.4	55	80	6	47	0.15/0.2		74/69	12	2395.00
AUDIO DYNAMICS	T200	D	No	9.3/	11.2/34	1.75	65	70	16	45	0.08/0.09		83/77	10	399.00
AUDIOLAB	8000T	D	No												
A. V. A.	FET Three FET Three Plus Transcendence	F/D F/D F/D		11.3/ 11.3/ 11.3/	17.2/37.2 17.2/37.2 17.2/37.2	1.5 1.5 1.5	60 60 60	80 80 80	5 5 5	45 45 45	0.1/0.18 0.1/0.18 0.1/0.18		72/68 72/68 72/68	10 10½ 11	490.00 590.00 790.00
CARVER	TX-11a TX-2	D D	M	11.3/16.3 16.1/23.5	11.3/16.3 16.1/23.5	/1.0 1.6	75 72	35/110 58	13 8	45 42	/0.05 /0.2	/0.05 /0.2	82 74	11 9	699.00 440.00
CREEK	3140	F	No	10/17	9.0/32	0.4/3	50	30/100	35	0.2/0.3	0.3/0.4	80/70	4	375.00	
CROWN INTERNATIONAL	PFM-3	D	No	9.31/	14.2/30.3	1.5	80	75	12	60	0.05/0.05		80/75		795.00
CYRUS	T	D	No	26/46			52	58	28	36	0.15/0.4		73/71	4½	449.00
DAVIDSON ROTH	Day Sequerra FM Broadcast Monitor	F	No	5.0/15.0	12.0/34.0	0.75	80	100	50	0.08/0.1	0.15/0.19	75/75	52	8500.00	
DBX	TX1	D		9.3/	11.2/38.5	1.5	70	75	12	56	0.07/0.08		85/79		600.00
DENON	TU-800 TU-600 TU-450	D D D	No No No	10.2/ 10.2/ 11.2/	15.3/37.2 15.3/37.2 21.2/38.5	1.2/ 1.5/ 1.5	70 65 50	50/80 50/70 60	30 20 16	55 55 40	0.02/0.04 0.03/0.04 0.08/0.15		96/86 92/86 80/76	9 8 7	475.00 350.00 200.00
DUAL	CT5040		No	11.0/17.2	16.5/36.0	2	70	65	36	35	0.05/0.15	0.05/0.15	70/		
DAVID HAFNER CO.	DH-330	F/D	No	11.3/	17.2/37.2	1.5	60	70	5	45	0.15/0.18		72/68	9	385.00; Kit, 325.00
HARMAN/KARDON	Citation Twenty-Three (RI) TU920 TU911	D D D	No No No	10.8/ 10.8/ 10.8/	15.2/36.5 /37.3 /37	0.75/ 1.75/	70 55 55	65/75 60/75 50	16 16 16	55 50 40	0.06/0.08 0.1/0.12 0.2/0.3		84/75 82/74 82/74	15 10 10	595.00 365.00 235.00
HITACHI	FT007SW	D	No	10.8/	18.2/36.2	1.0/	65	35/80	16	65	0.03/0.02	0.05/0.05	88/82	7½	349.95
JVC	FX33(RO) FX50(RO) FX1100(RO)	D D D	No No No	10.8/ 10.3/ 10.3/	16.3/38.3 14.8/38.3 14.8/38.1	1.5 1.5 1.2	60 60 65	60 70 25/75	32 32 40	40 50 60	0.15/0.2 0.08/0.08 0.009/0.02		80/73 84/78 94/88	4.7 7.5 8.2	125.00 270.00 470.00
KENWOOD	KT-3300D KT-880D KT-76(RO) KT-56(RO)	F No No No	No No No No	10.8/ 10.8/ 10.8/ 10.8/	16.2/38.8 16.2/38.8 14.7/39 14.7/39	1.0/2.5 1.0/2.5 1.2 1.2	70 65 70 70	70/100 60/90 50 50	16 20 32 16	70 63 40 40	0.004/0.008 0.02/0.03 0.3/0.3 0.3/0.3	0.009/0.04 0.1/0.12 0.5/0.7 0.5/0.7	92/86 88/83 78/75 77/74	12 7.7 6.2 6.2	525.00 260.00 200.00 140.00
KINERGETICS	KBT-1	D	No	9.0/11.2	13.5/36.0	1.5/1.5	60	50/70	10	40	0.02/0.05	0.02/0.05	75/73	14	690.00
KLIMD	Ertanax (Tube Unit)	F					45				0.2/0.3		23	9500.00	
KYDCERA	T-910	D	No	9.8/	14.8/	1.0/	65	40/85	16	58	0.06/0.07	0.06/0.07	88/76	26½	590.00
LUXMAN	T-100 T-102 T-02	D D D	No No No	10.8/ 10.3/ 10.3/	19.0/39 16/37 15.8/36.8	1.5 1.0/1.75 1.3/2.5	70 70 65	65 45/80 66/100	16 20 24	50 60 55	0.1/0.15 0.05/0.06 0.05/0.06	0.2/0.3 0.1/0.15 0.06/0.08	75/70 85/75 81/77	5.1 5.5 10.6	250.00 330.00 500.00
MADISON FIELDING	DT100(RO)	F/D	No	10.2/11.2	13.2/34.0	1.5/1.5	60	50/83	8	60	0.10/0.20	0.10/0.20	75/73	10	990.00
MAGNUM/DYNALAB	FT-101(RO) FT-11	F F	No No	10.3/11.2 12.1/	13.2/34.0 /35.3	1.5/ 1.5	70 70	55/75 50	6 3	60 50	0.1/0.18 0.13/0.30		75/ 70/	12 10	629.00 398.00
MARANTZ	ST-54	D	No	10.3/	21.6/	2.0/	50	30/65	24	43	0.16/0.35	0.3/0.4	80/71	7½	430.00
McINTOSH	MR 708Z(RO) MR 510(RO)	D F/D	Syn. No	13/13 13/13	18/36 18/36	1.5 1.5	60 60	55 70	14 6	50 55	0.08/0.08 0.08/0.12	0.08/0.12 0.08/0.2	80/75 78/73	15 18	1499.00 1699.00
McLAREN AUDIO	1002	F	No	10.3/11.2	13.5/34.0	1.5/	60	55/75	10	60	0.10/0.15		75/73	14.1	995.00
MERIDIAN	204	F/D	No			1.5	55		18	40	0.2/0.4				900.00

Now...from the people
who brought you the GFA-555
high-current, high-power amplifier
and the remarkable GFP-555
preamplifier...an affordable tuner
for the real world of
FM broadcast conditions.



ADCOM[®] GFT-555

FM Stereo/AM Tuner

Unlike all other components, a tuner's performance depends to a great extent on where it happens to be installed – that is, with respect to the nearest FM stations.

If you live in a close-in suburban area where a station's signal strength is reasonable and where there are few tall buildings, almost any tuner may do an adequate job. But in a major metropolitan area with tall buildings and many strong stations crowding the FM dial, your tuner must contend with such problems as multipath distortion and front-end overload. And it should have the ability to separate stations contending for limited dial space.

In rural areas where stations are distant and weak, and where signals sometimes arrive at an adjacent or same broadcast frequency from different directions, a tuner requires high sensitivity for adequate signal boost and good capture ratios and selectivity to keep stations from interfering with each other.

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AmericanRadioHistory.Com

High performance and affordability.

The ability to cope well with conditions in both metropolitan and fringe areas requires sophisticated, expensive circuitry. Unless the ultimate selling price is no object, some compromise in design is usually necessary. The Adcom tuner is a clear exception to this rule. Through the use of recently developed component parts and innovative circuitry, Adcom has produced an excellent and eminently affordable tuner.

In order to create a perfect balance of sensitivity, selectivity, and low distortion – performance characteristics which can be appreciated every time you tune across the dial – we selected four specially designed, low-distortion IF filters with critically-defined bandpass capabilities. For excellent signal-to-noise ratios and superb sensitivity throughout the FM band, there is a two-stage dual MOSFET RF input amplifier.

For outstanding stereo separation and frequency response, the stereo multiplex decoding circuits operate at 456 kHz instead of the more conventional 76 kHz. To assure that the selected station will be heard without drift or error, the quartz-referenced digital synthesis tuning system is designed for a tuning accuracy of 0.00025%.

The primary objective: musicality.

But tuning ease and accuracy under adverse reception conditions were only part of the design considerations. Even though the technical aspects of tuner design are certainly important, we consider optimum musical quality most important of all. We never forget that all high fidelity components are primarily a means to musical enjoyment.

Our main design objective – to optimize sonic performance – is reflected only partially by the measured specifications. For example, the frequency-generating circuitry associated with digital synthesis tuning tends to raise the background noise and distortion level of a tuner. To avoid this problem, we adopted computer shielding techniques – including ribbon

wire – to prevent the synthesized digital pulses from leaking into the high-gain front end of the tuner.

Many operating and convenience features:

In our concern for providing you with the best possible stereo reception, we haven't lost sight of ease and convenience.

You can program up to sixteen stations into memory – eight each, FM and AM – for instant retrieval at the touch of a button. And the large, clear fluorescent frequency display can be read from across the room. (A built-in lithium battery preserves station memory during lengthy power outages.)

A five-stage LED signal-strength display enables you to orient your antenna for optimum reception. If the signal from a favorite station is just too weak to be entirely noise-free, the switchable "high blend" circuit reduces high frequency noise to preserve listenability.

And under extreme conditions where noise-free stereo signals can't be received at all, you have a stereo/mono switch for a practical compromise.

Finally, as you can see at a glance, we've also taken care to present all this simply and attractively. And like most of our components, you have a choice of either all black, or a white or silver front panel. Please write for literature and reviews of other fine Adcom products. We will reply promptly.

SPECIFICATIONS.

FM Section:

IHF sensitivity, mono: 9.5 dBf (1.6 μ V)

Signal strength for – 50 dB quieting:

Mono: 12.5 dBf

Stereo: 36.5 dBf

Capture ratio: 1.5 dB

AM suppression: 70 dB

Alternate channel selectivity: 80dB

Separation at 1kHz: 52 dB

Total harmonic distortion – stereo:

1 kHz: 0.05%

6 kHz: 0.09%

Intermodulation distortion (SMPTE 4:1 ratio):

< 0.08% up to 100% modulation

Maximum signal-to-noise ratio:

Mono: 85 dB

Stereo: 75 dB

Frequency response: 30 Hz-15 kHz

Antenna impedance: 75 or 300 ohms

Line voltage: 120V/60Hz (available in 220V/50Hz on special order)

Dimensions: 17" x 3 1/4" x 13" D (432mm x 83mm x 330mm D)

Weight: 14 lbs. (6.4 kg)

Optional accessory: Model RM-3 rack mount adapters.

Available on special order with white front panel with white buttons, or silver panel with black buttons.

ADCOM[®]

11 Elkins Road, East Brunswick, NJ 08816 USA

Telephone: 201-390-1130

Distributed in Canada by PRO ACOUSTICS INC.
Pointe Claire, Quebec H9R 4X5

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TUNERS

MANUFACTURER	Model (RO) = Remote Included (R) = Remote Optional	FM Only = F, Digitally Synthesized = D	AM Stereo Capable? See Code	HF (Usable) Sensitivity, dbi, Mono/Stereo	Signal Strength for 50- μ b Quieting, dbi, Mono/Stereo	Capture Ratio, db, Mono/Stereo	AM Suppression, db	Alternate Channel Selectivity, db, Wide/Narrow	Total Number of Station Presets	Separation at 1 kHz, db	THD at 1 kHz, % Mono/Stereo, 100% Modulation	THD at 6 kHz, % Mono/Stereo, 100% Modulation	Maximum S/N, -db, Mono/Stereo	Weight, Lbs.	Price, \$
NAD	4130	D	No	13/36	13.2/36.1	1.5	60	65	5	50	0.09/0.09	0.2/0.3	80/75	7 1/4	228.00
	4300	D	No	12/34	12.0/34.1	1.5	70	80	8	50	0.07/0.07	0.15/0.20	85/80	10 3/8	548.00
NAIM AUDIO	NAT 01	F	No						0					24	2395.00
	NAT 101	F	No						0					9	925.00
NAKAMICHI	ST7(RO)	D	No	10/17	14/28	1.9	60	60	16	55	0.06/0.08		80/76	10 1/2	725.00
NEC	T-601(RO)	D	No	13.2/18.8	15.8/38.3	1.4	55	60	16	40	0.15/0.3	0.15/0.3	75/70	7	199.00
	T-710(RO)	D	No	10.8/17.4	15.9/36.8	1.4	60	50/85	16	55	0.05/0.05	0.1/0.1	85/78	8 7/8	299.00
NIKKO	Gamma 30	D		11.2	14/20	1.5	50	60	14	45	0.15/0.20		70/67	9	340.00
	T-120	D		11.2	14.4/43.2	1.5	65	45	20	72	0.007/0.02		86/76	10	440.00
	NT-950	D		11.2	17.2/39.2	1.5/2.0	60	50/80	20	50	0.06/0.08		75/70	7	260.00
ONIX AUDIO	BWD1	F	No	7.5	9.1/32.3	0.5/2.9	65	30/100		70	0.03/0.04	0.03/0.1	94/91	6	775.00
DNKYO	T-9090	F/D	No	12.8/18.0	15.8/37.2	2.0	52	35/80	20	55	0.009/0.02	0.03/0.5	95/85	14.5	699.95
	T-4087	D	No	10.3/17.2	16.0/36.0	2.0/4.0	50	40/80	20	45	0.03/0.07	0.15/0.5	85/77	11.2	398.95
	T-4150	D	No	10.3/17.2	16.1/36.1	1.3			20	45	0.1/0.2		75/73	8.2	279.95
	T-4130	D	No	11.2/17.2	16.1/36.1	1.5			16	40	0.1/0.2		73/66	6	179.95
PARASOUND	T-QS-260	D	No	9.7/16.8	14.3/37.7	2.0	80	75	16	40	0.1/0.2	0.15/0.25	77/74	13	295.00
PERREAUX	TU1	F/D	No	12.8	17.3/36.8	1.5	50	45	7	50	0.12/0.14		70/68	12	650.00
	TU3	F/D	No	10.3	15.3/35.8	1.5	50	45	7	50	0.12/0.14		70/68	13 1/2	795.00
PIONEER	Elite F-91(RO)	D	No	9.3/1		2.5		90	24		0.005/0.008		100/92	13.7	600.00
	Elite F-99	D	No	10.8	12.8/34.8	0.8	70	85	16	65	0.02		94/87	9.2	375.00
	F-717	D	No	10.8	14.2/35.9	1.0	65	56	16	60	0.05/0.08		86/81	5.2	300.00
	F-515	D	No	11.2	13.6/2	1.5		65	24	40	0.4		75/72	5.8	170.00
PROTON	440	D	No	10.3	15.3/33.2	1.5	60	65	12	45	0.2		75/70	15	249.00
	AT-300(RO)	D	No			1.5	65	37	20	50	0.6/0.1		82/75	15.4	219.00
PSE	Studio III	F		17/40		1	70		6	55	0.1/0.2		75/70	9	595.00
QED	T237	F	No				55		4	45			72	9	375.00
QUAD	FM4	F		10/29		1.5	60	53	7	40	0.15/0.15		76/70	7	595.00
RCA	MPT200(RI)	D	No	12.2	21/38.7	1.5	50	60	20	40	0.13/0.4		73/69	8 3/4	349.00
REALISTIC	TM-150 Compact (31-1956)	F	Yes	20.8	26.8	2	45	42	0	35	0.5		60		60.00
REVOX	B261(RD)	F/D	No	10.8/34.8	13.2/34.8	2	72	78	20	43	0.03/0.07	0.01/0.01	79/75	18 3/4	1800.00
ROTEL	RT830		No	10.8	16/39.4	1.5	55	60		40	0.08		80/73	6	179.95
	RT850		No	10.8	15.2/37.2	1.0	58	65	16	40	0.07		80/75	8	279.95
SAE	T102	D	No	10.3/17.0	14.0/34.0	1.5	55	30/80	16	45	0.10/0.15	0.15/0.20	75/70	17	349.00
	T101	D	No	10.3/17.0	14.0/35.3	1.2/2.2	60	40/100	16	55	0.05/0.08	0.10/0.15	75/70	20	650.00
SANSUI	Vintage TU-X701	O	No	10.8	16.2/37.0	1.0		60/75	30	60	0.009/0.02		98/91	11.2	540.00
	Vintage TU-X301	O	No	10.8	16.0/36.0	1.0		60	12	40	0.08/0.12		78/72	5.1	280.00
	TU-O33X	O	No	10.8	16.0/36.0	1.0		60	12	40	0.08/0.12		50/75	5.1	260.00
	T-1000	D	No	10.8	16.5	1.5		55	16	40	0.2			6	200.00
SONY	ST-S500ES	D	No	10.3	16.8/37.9	1.0	65	90	10	60	0.06/0.08		88/84	9 1/2	300.00
	ST-S700ES	D	No	10.3	16.8/37.9	1.0	65	60/65	10	65	0.005/0.0095		96/91	10	400.00
SOUNDCRAFTSMEN	T6200	O	No	9.5/30	12/36	1.0	65	70	16	50	0.08/0.1		80/75	12	299.00
SOUNDSTREAM	T-1	D		9.3	14.8	1.5	60	65	16	50	0.1/0.1	0.12/0.15	82/79	17	450.00
SUMO	Aurora		No	13.5/17.5	16.5/37	1.0/1.0	60	75/100	8	50	0.04/0.05	0.05/0.08	80/74	10	599.00
TANDBERG	3001 A	F	No	6.8	10.3/32.1	0.4/1.0	70	30/100	8	70	0.03/0.04	0.03/0.1	95/92	15.3	1995.00
	3031 A(RO)	F/D	No	11.2	17.2/45.4	0.9	70	70	16	45	0.09/0.2	0.1/0.3	78/75	10.5	895.00
TEAC	T-X150	D	No	11.2		1.0			20		0.02/0.1		75/71	7	229.00
TECHNICS	ST-G7	D	No	12.8		1.0	70	55/25	16	65				9	550.00
	ST-G67	D	No	12.8	20.2/40.2	1.0	55	45/25	16	55			80/73	5.1	350.00
	ST-G50	D	No	10.8	18.1/38.1	1.0	55	45/25	39	60			80/73	4.8	275.00
	ST-G40	D	No	10.8	18.1/38.1	1.0	55	60	16	50			80/73	4.8	200.00
VECTOR RESEARCH	VU-1500	D	No	11.2	14.6/37	1.0	58	60	16	50	0.08/0.2	0.2/0.3	75/73	8 1/2	199.95
YAMAHA	T-85(RO)	D	No		15.3/37.2	1.2	70	60/90	20	68	0.02/0.03		95/87	11	469.00
	TX-900U(RO)	D	No	10.3	15.1/37.7	1.2	70	58/85	20	60	0.02/0.03		96/90	7.3	379.00
	TX-500U(RO)	D	No	9.3	15.1/37.7	1.5	55	58/85	20	50	0.05/0.07		82/76	6.8	269.00
	TX-400U(RO)	D	No	9.3	15.3/37.7	1.5	55	58/85	16	40	0.1/0.2		82/76	5.1	219.00



RECEIVERS



ADS R4



SANSUI S-X1200



PIONEER VSX-5000

MANUFACTURER	Model (R) = Remote Included, (RD) = Remote Optional	FM Only = F, Dually Synthesized = D, AM Stereo Capable = A	AMPLIFIER SECTION										TUNER SECTION									
			Average Watts per Channel, & Dimms & Dimms	THD, %	SMPTE IM, %	Rated Power, Bandwidth, Hz to KHz	MM Phono S/N, dB	MM Phono Overload, mV	Dynamic Headroom, dB	Video Inputs?	Subround Delay/Ambience Circuits?	Total Number of Station Presets	Mono HF (Useable) Sensitivity, dBf	Signal Strength for 50 dB Capture, dBf	Capture Ratio, dB	THD @ 1 KHz, % Mono Stereo, 100% Modulation	Alternate Channel Selectivity, dB	Maximum S.N., dB Mono Stereo	Separation at 1 KHz, dB	Weight, Lbs.	Price, \$	
ADS	R4(RD)	D	65/65	0.03	0.03	20-20	80	150	1.3	No	No	30	11	16/35	1.5	0.1/0.15	65	75/70	47	27	1100.00	
AKAI	AA-V205-B(RI)	D	60/	0.05		5-70	75			Yes	Yes	16	11.2	16.2/37.2	1.5	0.1/0.3		75/65	45	16.3	399.00	
	AA-V305-B(RI)	D	80/	0.05		5-70	75			Yes	Yes	16	11.2	16.2/37.2	1.5	0.1/0.3		75/65	45	22	529.00	
	AA-V405-B(RI)	D	100/	0.05		5-70	75			Yes	Yes	16	11.2	16.2/37.2	1.5	0.1/0.3		75/65	45	23.1	599.00	
AR	X-04	D	40/	0.05	0.05	20-20	75	180	2	Yes	No	16	11.2	13.2/33.2	1.5	0.2/0.3	65	78/74	70	22	409.95	
	X-06(RI)	D	60/	0.03	0.03	20-20	80	180	2	Yes	No	16	11.2	17.2/37.2	1	0.2/0.3	70	80/75	70	29	619.95	
	X-10(RI)	D	100/	0.03	0.03	20-20	80	150	2	Yes	No	16	11.2	14.6/33.2	1	0.2/0.3	75	80/75	70	31	829.95	
BANG & OLUFSEN	8M 5500(RI)	D	50/	0.09	0.1	20-20	78	110	1.5	No	No	20	14	19/40	1.7	0.16/0.2	70	75/70	45	19.2	1950.00	
	BM 3300(RI)	D	25/	0.1	0.1	20-20	75	50	1.6	No	No	5	17	23/43	1.7	0.3/0.35	60	72/67	36	15.4	799.00	
CARVER	2000(RI)	D/A	200/	0.15	0.1	1-30	85	100		Yes	Yes	6	16.1	16.1/23.5	1.0	0.2	42	78	65	33	1595.00	
	"The Receiver" 150	D	150/	0.05	0.05	1-30	85	100		Yes	No	6	16.1	16.1/23.5	1.0	0.2	40	76	60	28	799.00	
	90	D	100/	0.15	0.1	1-30	85	100		Yes	No	8	16.1	16.1/23.5	1.0	0.2	38	74	60	26	635.00	
	AVR-100(RI)	D	150/	0.15	0.1	1-30	85	100		Yes	Yes	6	16.1	16.1/23.5	1.0	0.2	40	76	60	28	1199.00	
DENON	DRA-95VR(RI)	D	85/135	0.008	0.005	5-40	92	150		Yes		16	9.3	14.7/37.3	1.2	0.1/0.3	70	85/81	40	21	650.00	
	DRA-75VR(RI)	D	65/100	0.0095	0.025	5-40	88	150		Yes		16	9.3	14.7/37.3	1.2	0.1/0.3	70	82/80	40	20	500.00	
	DRA-55V	D	55/	0.01	0.025	5-40	86	150		Yes		16	9.3	16.4/38.5	1.2	0.1/0.3	55	82/78	40	17	400.00	
	DRA-35V	D	40/	0.03	0.03	5-40	86	150		Yes		16	9.3	16.4/38.5	1.2	0.1/0.3	65	82/78	40	15	320.00	
	DRA-25	D	30/	0.05	0.03	10-40	86	150		Yes		16	10.3	15.3/38.5	1.5	0.1/0.3	55	82/78	40	11	280.00	
FISHER	RS 6108(RI)	D		0.5	0.5	20-20				Yes	No	24	14.73	19.19/42.10	1.5		55	70/65	40	13.9	300.00	
	RS 6208(RI)	D		0.5	0.5	20-20				Yes	No	24	14.73	19.19/42.10	1.5		55	70/65	40	19.6		
HARMAN/KAROOD	hk795i	D	70/	0.08		10-100	78	250		No	No	16	10.8	/36	1.0	0.06/0.08	70	82/75	50	24%	750.00	
	hk495i	D	45/	0.09		10-60	78	180		No	No	16	10.8	/37	1.2	0.08/0.12	65	82/75	50	15 1/2	435.00	
	hk395i	D	30/	0.09		10-60	78	180		No	No	10	10.8	/37	1.2	0.08/0.12	65	82/75	50	14	325.00	
	hk385i	D	30/	0.09		10-60	78	180		No	No	10	11.2	/37	1.5	0.08/0.12	60	82/74	45	14	275.00	
HITACHI	HTA35F8	D	35/	0.05	0.05	20-20	72	140		Yes	No	8	13.2	20.2/38.2	1.0	0.15/0.25	53	74/70	40	12	199.95	
	HTA50AVSW (RI)	D	50/	0.05	0.05	20-20	72	150		Yes	Yes	20	13.2	21.2/39.2	1.0	0.4/0.5	50	74/70	45	13 1/2	449.95	
JVC	RX150	D	25/	0.5		40-20	70			No		16	10.8	16.3/38.3	1.5	0.15/0.3	60	80/73	40	8.4	185.00	
	RX250(RI)	D	35/	0.08		40-20	70			No		32	10.8	16.3/38.3	1.5	0.15/0.3	60	80/73	40	10	260.00	
	RX350(RI)	D	45/	0.08		40-20	70			No	Yes	32	10.8	16.3/38.3	1.5	0.15/0.2	60	80/73	40	10.4	315.00	
	RX450(RI)	D	50/	0.03	0.03	20-20	71			No	Yes	32	10.8	16.3/38.3	1.5	0.15/0.2	60	82/73	40	16.3	350.00	
	RX550V(RI)	D	60/	0.007	0.007	20-20	71			Yes	Yes	32	10.8	16.3/38.3	1.5	0.15/0.2	60	82/73	40	17.2	475.00	
	RX750V(RI)	D	100/	0.007	0.007	20-20	71			Yes	Yes	32	10.3	14.8/38.3	1.5	0.08/0.08	70	84/78	50	23	635.00	
	RX950V(RI)	D	120/	0.007	0.007	20-20	80			Yes	Yes	32	10.3	14.8/38.3	1.5	0.08/0.08	70	84/78	50	23	800.00	
	RX8V(RI)	D	100/	0.007	0.007	20-20	71			Yes	Yes	32	10.3	14.8/38.3	1.5	0.08/0.08	70	84/78	50	23	600.00	
	RX9V(RI)	D	120/	0.007	0.007	20-20	80			Yes	Yes	32	10.3	14.8/38.3	1.5	0.08/0.08	70	84/78	50	23	720.00	
KENWOOD	KR-V126R(RI)	D	125/	0.008	0.008		82			Yes	Yes	20	10.8	14.2/37.2	1.0	0.07/0.1	55	80/74	50	23	650.00	
	KR-V106R(RI)	D	100/	0.008	0.008		82			Yes	Yes	20	10.8	14.2/37.2	1.0	0.07/0.1	55	80/74	50	22	560.00	
	KR-V86R(RI)	D	80/	0.008	0.008		73			Yes	Yes	20	10.8	14.2/37.2	1.0	0.07/0.1	55	80/74	50	21	460.00	
	KR-V76R(RI)	D	70/	0.03	0.03		73			Yes	Yes	36	10.8	14.2/37.1	1.2	0.09/0.12	55	78/72	45	16	350.00	
	KR-A56R(RI)	D	55/	0.08	0.08		73			Yes	Yes	16	11.2	17.2/38.2	1.2	0.2/0.3	53	76/72	40	12	295.00	
	KR-A46	D	40/	0.09	0.09		72			Yes	Yes	16	11.2	17.2/38.2	1.2	0.2/0.3	53	76/72	40	10	205.00	
KYOCERA	R-861(RD)	D	100/	0.02	0.02	20-20	85	150	1.0	Yes	No	14	9.8	14.8/35	1.0	0.06/0.07	40	82/76	58	27		
	R-661(RD)	D	70/	0.02	0.02	20-20	82	150	1.0	Yes	No	14	10.1	15.5/36.5	1.0	0.07/0.1	40	80/74	55	25		
	R-461(RD)	D	50/	0.02	0.02	20-20	82	150	2.1	Yes	No	12	10.3	17.0/37.2	1.2	0.09/0.15	55	77/72	48	18 1/2		
LUXMAN	R-113	D	35/	0.03	0.08	20-20	88	200		No	No	20	10.8	14.0/38.0	1.5	0.1/0.18	60	80/74	45	13.4	400.00	
	R-115(RI)	D	70/	0.03	0.03	20-20	88	150	3.5	No	No	20	10.3	13.2/36.6	1.5	0.08/0.10	60	80/75	50	50	750.00	
	R-117(RI)	D	160/	0.03	0.03	20-20	88	150	4.6	Yes	No	20	10.3	13.2/36.6	1.5	0.08/0.10	60	80/75	50	50	1200.00	

Pure Artistry.

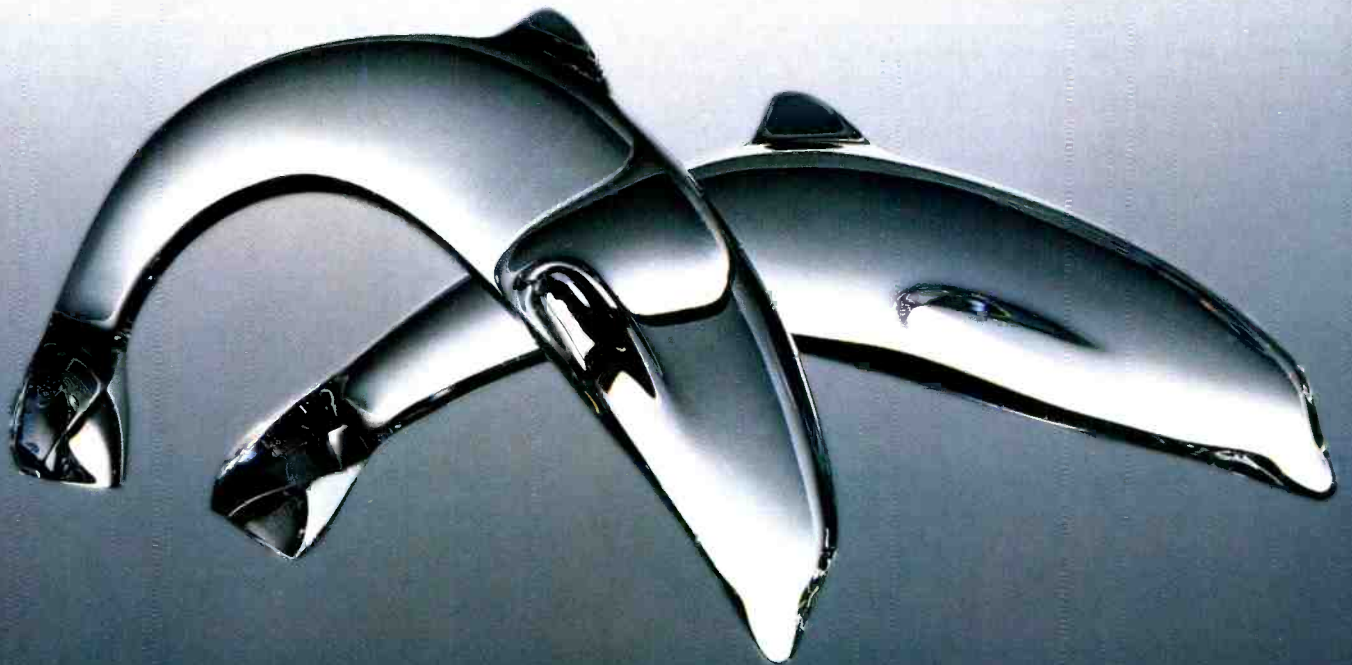
Sansui makes music an art form with finely crafted receivers that deliver crystal clear sound. Our S-X1200 produces 120 watts* of pure power, with a toroidal transformer to provide low-impedance driving capability. A transient enhancer adds dynamic impact to everything you hear.

Other quality features include station scan, continuously variable loudness control, connections for 2 cassette decks and 2 VCRs with bidirectional dubbing, and binding posts for heavy speaker cables. A black mirror finish makes this receiver as pleasing to your eyes as it is to your ears.

You'll find many of the same qualities in three other models: S-X900, S-X700, and S-X500. So select the Sansui receiver to fit your lifestyle and experience pure artistry in sound.

Sansui Electronics Corp., P.O. Box 625, Lyndhurst, NJ 07071 (2C1) 4E0-9710

 **SANSUI**



*20 watts per channel, min. RMS, both channels driven into 8 ohms from 20 to 20,000 Hz with no more than 0.018% THD

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Strap yourself in. Turn it on—and tingle with excitement. Sansui's GT-X7000 car audio bumps your pulse like no other. When powered by one of our dynamic new X-balanced amplifiers, it handles sound peaks like a Porsche handles corners. Tight. Precise. With uncompromising stability—even when playing digitally-sourced materials.

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Additionally, Twin-azimuth heads allow for pure sonic acceleration. Their automated adjustment provides optimum tape-to-head contact—delivering full power in every decibel of sound.

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 **SANSUI**

Sansui Electronics Corp., Lyndhurst, NJ 07071, Carson, CA 90746

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RECEIVERS

MANUFACTURER	Model (RI) = Remote Included (RO) = Remote Optional	FM Only = F. Digital Synthesizer - D. AM Stereo Capable - A	AMPLIFIER SECTION										TUNER SECTION										
			Average Watts per Channel, 8 Ohms & Ohms		THD, %	SMPTE IM, %	Rated Power Bandwidth, Hz to kHz	MM Phone S/N, -dB "A" with r. 3 mV	MM Phone Overload, mV	Dynamic Headroom, dB	Video Inputs?	Surround Delay/Ambience Circuitry?	Total Number of Station Presets	Mono IIF (Usable) Sensitivity, dB	Signal Strength for 30-dB Quieting, dB	Mono Stereo	Capture Ratio, dB	THD at 1 kHz, 100% Modulation	Alternate Channel Selectivity	Maximum S/N, -dB	Separation at 1 kHz, dB	Weight, Lbs.	Price, \$
			8 Ohms	4 Ohms																			
MARANTZ	TA170AV	D	165/	0.05		20-20	80	120		Yes		16	10.8	15/37	1	0.15/0.3	50	76/68	42	34.2	650.00		
	TA135AV	D	130/	0.05		20-20	80	120		Yes		16	10.8	15/37	1	0.15/0.3	50	76/68	42	29.8	570.00		
	TA100	D	100/	0.1		20-20				Yes		16	11.8	16.8/39.2	1.2	0.2/0.3	50	75/68	40	23.7	500.00		
	TA60	D	60/	0.1		20-20	75	100				24	11.8	16.8/39.2	1.2	0.2/0.3	50	75/68	40	20.9	350.00		
	SR360	D	25/	0.25		40-20						16		11.2/						9.7	200.00		
SR560	D	45/	0.15		40-20				Yes		16		11.2/						11.9	250.00			
McINTOSH	MAC 4200	D	75/100	0.02	0.02	20-20	80	220	1.4	No	No	12	13	18/36	1.5	0.08/0.12	70	75/70	50	40	2890.00		
	MAC 4300V(RI)	D	100/100	0.02	0.02	20-20	80	220	1.3	Yes	No	12	13	18/36	1.5	0.08/0.08	55	78/73	50	41			
NAD	7220 PE	D	20/	0.04	0.04	20-20	75	200	4.4	Yes	No	5	10.8	14.4/37	1.5	0.1/0.1	58	80/74	45	12	298.00		
	7240 PE	D	40/	0.03	0.03	20-20	76	180	6	Yes	No	5	10.3	14.2/36	1.5	0.09/0.09	65	80/75	50	16 1/2	478.00		
	7250 PE	D	50/	0.03	0.03	20-20	76	170	6	Yes	No	5	10.3	14.2/36	1.5	0.08/0.08	70	82/76	50	20 1/2	598.00		
	7175 PE	D	75/	0.03	0.03	20-20	76	170	6	Yes	No	5	10.3	14.2/36	1.5	0.08/0.08	80	82/76	50	20 1/2	798.00		
	7600(RI)	D	160/	0.03	0.03	20-20	80		4	Yes	No	8	10	11/33	1.5	0.07/0.07	80/90	83/80	50		1498.00		
NAKAMICHI	SR-2A	D	30/	0.1	0.1	20-20	89	150		No	No	10	11	14.7/37.5	1.5	0.07/0.09	60	79/74	52	18 3/4	449.00		
	SR-3A	D	45/	0.1	0.1	20-20	89	150		Yes	No	10	11	14.7/37.5	1.5	0.07/0.09	60	79/74	52	19	650.00		
	SR-4A(RI)	D	60/	0.1	0.1	20-20	89	150		Yes	No	10	11	14.7/37.5	1.5	0.07/0.09	60	79/74	52	22 1/4	895.00		
NEC	AVR-1700(RI)	D	70/100, 35/	0.02, 0.05	0.02	20-20	73	150	2.0	Yes	Yes	16	13.2	15.9/38.1	1.5	0.2/0.5	60	78/72	40	30 7/8	649.00		
	AVR-1000(RI)	D	100/150, 50/	0.02, 0.05	0.02	20-20	80	150	2.0	Yes	Yes	16	10.8	15.9/36.8	1.5	0.06/0.08	55/80	83/74	55	36 3/8	869.00		
	R-510(RI)	D	50/65	0.02		20-20	73	150	2.0	Yes		16	13.2	15.9/38.1	1.5	0.2/0.5	60	78/70	40	24 1/4	499.00		
NIKKO	AVR-65(RI)	D	65/80	0.05	0.05	20-20	86	200	1.5	Yes		20		14.7	1.75	0.2	60		45	23	900.00		
	NR-1050(RI)	D	100/110	0.03	0.03	20-20	86	200	1.5	Yes		20		14.7	1.75	0.2	60		45	20	700.00		
	NR-850(RI)	D	65/80	0.03	0.03	20-20	86	200	1.5			20		14.7	1.75	0.2	60		45	20	500.00		
	NR-750	D	48/60	0.04	0.04	20-20	75					14		14.7	1.75	0.2	60		45	16	300.00		
	NR-650	D	38/50	0.05	0.05	20-20	75					14		14.7	1.75	0.2	50		45	13	250.00		
	R-25	D	25/30	0.05	0.05	20-20	75					14		15	1.75	0.2	50		35	12	200.00		
ONKYO	TX-108(RI)	D	100/130	0.02	0.02	20-20	93	180		Yes	Yes	16	10.3	14.7/37.2	1.3	0.10/0.18	55	76/70	45	33	849.95		
	TX-88(RI)	D	80/	0.025	0.025	20-20	93	180		Yes	Yes	16	10.8	17.2/37.2	1.5	0.10/0.20	55	73/67	45	27.5	679.95		
	TX-84(M)(RI)	D	60/	0.04	0.04	20-20	85	120		Yes	Yes	16	10.8	17.2/37.2	1.5	0.15/0.25	55	73/67	45	18.8	529.95		
	TX-84(RI)	D	60/	0.04	0.04	20-20	85	120		Yes	Yes	16	10.8	17.2/37.2	1.5	0.15/0.25	55	73/67	45	18.8	449.95		
	TX-82(M)(RI)	D	45/	0.08	0.08	20-20	85	120		Yes	No	16	11.2	17.2/37.2	1.5	0.15/0.30	55	72/66	45	16.5	429.95		
	TX-82(RI)	D	45/	0.08	0.08	20-20	85	120		Yes	No	16	11.2	17.2/37.2	1.5	0.15/0.30	55	72/66	45	16.5	349.95		
	TX-RV47(RI)	D	55/	0.08	0.08	20-20	83	150		Yes	Yes	16	11.2	17.2/37.2	1.5	0.15/0.30	55	71/66	40	20.9	499.95		
	TX-80	D	33/	0.1	0.1	40-20	85	150		No	No	16	12.4	18.2/38.2	1.5	0.15/0.30	55	70/65	40	12.6	229.95		
	TX-SV7M	D	100/			20-20				Yes	Yes	16			1.5		55				999.95		
	PARASOUND	DR65(RI)	D	65/85	0.04	0.03	20-20	88	150	2			12	9.3	15.8/37.2	1.4	0.15/0.25	68	76/72	44	24	495.00	
DR40	D	40/55	0.04	0.03	20-20	88	150	2			12	9.8	15.8/38.1	1.6	0.15/0.25	66	74/71	42	17	325.00			
DR25	D	25/30	0.04	0.03	20-20	88	150	2			12	9.8	15.8/39.2	1.8	0.2/0.3	65	73/70	40	14	240.00			
PIONEER	VSX-5000(RI)	D	60/	0.005		20-20	83	140		Yes	Yes	20	10.8	15.3/37.1	1.0		65	80/75	50	22	620.00		
	VSX-4000(RI)	D	60/	0.007		20-20	73	140		Yes	Yes	20	10.8	15.3/37.1	1.0		65	80/75	50	18	470.00		
	VSX-3000(RI)	D	60/	0.05		20-20	73	120		Yes	Yes	20	10.8	15.3/37.1	1.5		65	80/75	40	15 1/8	350.00		
	VSX-2000(RI)	D	50/	0.1		20-20	73	120		Yes	Yes	20	10.8	15.3/37.1	1.5		65	80/75	40	15	310.00		
	SX-1600	D	50/	0.3		20-20	72	130				20	11.2	15.3/38.3	1.5		55	78/75	35	10 5/8	240.00		
	SX-1100	D	25/	0.3		20-20	72	130				20	11.2	15.3/38.3	1.5		55	78/75	35	7 1/8	200.00		
PROTON	D940	D	40/80	0.02	0.008		92	220	6	Yes	No	16	10.3	15.3/33.2	1.5	0.5/0.1		83/75	45	18 3/4	449.00		
	AV-300(RO)	D	30/62	0.01	0.01		90	165	6		No	20			1.5	0.6/0.1		82/75	50	18	399.00		
RCA	MSR 250(RI)	D	50/	0.08	0.05	20-20	72	150		No	No	20	12.2	21/38.7	1.5	0.13/0.4	60	73/69	40	13 1/4	429.00		
REALISTIC	STA-2280 (31-3006)		60/	0.01		20-20	84			No	Yes	12	13.2		1.0	0.01/0.02	45	70/			399.95		
	AV-900 (16-1285)		40/	0.05		20-20				Yes	No	8	12			0.1/0.2	65	70/			599.95		
	STA-2700 (31-3016)		100/	0.01		20-20	80			No	No	12	10			0.1/0.3	65	70/			499.95		
	STA-116 (31-2012)	D	30/	0.08		20-20	83			No	No	12	10.3			0.01/	50	70/			259.95		
	STA-125 (31-2064)	D	22/	0.08		15-25	84			No	No	12	13.2			0.03/0.06		72/			219.95		
	STA-460 (31-2100)	D	22/	0.08		20-20	85			No	No		14.1			0.03/0.06	50	68/			179.95		
REVOX	B285(RO)	D	70/90	0.03	0.03	20-20	80	50	3	No	No	29	12.8	15.2/36.8	2	0.15/0.3		84/80	43	33 1/2	2300.00		
ROTEL	RX 830		20/	0.08	0.08		80	90		Yes	No		10.8	17.2/40.7	2.0	0.3/0.5	60	70/65	40	11	219.95		
	RX 850		30/	0.05	0.05		80	150		Yes	No	16	10.8	17.2/40.7	1.5	0.15/0.4	65	72/65	40	16	329.95		
	RX 855		50/	0.03	0.05		80	300		Yes	No	16	10.8	15.2/37.2	1.0	0.07/0.25	65	80/75	40	25	499.95		
	RX 875		70/	0.03	0.05		80	300		Yes	No	16	10.8	15.2/37.2	1.0	0.07/0.25	65	80/75	40	29	599.95		
SAE	R102	D	50/75	0.025	0.025	20-20	82	150	1.0	No	No	16	11.2	14.4/35.8	1.5	0.10/0.15	45	75/70	50	26	499.00		
SANSUI	S-X1200	D	120/	0.018	0.018	20-20	73			Yes	No	16	10.8	16.5/	1.5	0.15/	70	78/70	40	30.9	1000.00		
	S-X900	D	80/	0.025	0.025	20-20	73			Yes	No	16	10.8	16.5/	1.5	0.15/	55	78/70	40	28.7	725.00		

RECEIVERS

MANUFACTURER	Model (RI) = Remote Included, (RD) = Remote Optional	FM Dsp = F, Digitally Synthesized = D, MM Stereo Capable = X	AMPLIFIER SECTION										TUNER SECTION									
			Average Watts per Channel, 8 Chims + 4 Ohms	TRD, %	SMPTE IM, %	Rated Power Bandwidth, Hz to KHz	MM Phono S/N, dB	MM Phono Overload, mV	Dynamic Headroom, dB	Video Inputs?	Surround Display Ambience Circuits?	Total Number of Station Presets	Mono IFF (Usable) Sensitivity, dBf	Signal Strength for Mono Stereo, dBf	Capture Ratio, dB	TRD at 1 kHz, 100% Modulation	Alternate Channel Selectivity, dB	Maximum S/N, dB, Mono Stereo	Separation at 1 kHz, dB	Weight, Lbs.	Price, \$	
SHARP	SAX50AV(BK) SAX35(BK)	D	20/10	0.08 0.10	0.10 0.20	40-20 40-20	72 70	100 100	1.75 1.75	Yes Yes	Yes No	12 10	10.8 10.8	25.2/35.2 25.2/35.2	1.5 1.5	0.25/0.50 0.25/0.50	60 60	72/66 72/66	32 32	14.3 14	249.95 199.95	
SHERWOOD	S-2770RCP(RI) S-2750CP S-2730CP	D D D	74/55/35	0.3 0.2 0.2		20-20 20-20 40-20	85 73 73	120 120 120		Yes No Yes	Yes Yes Yes	16 16 16	19.8 11.2 11.2	14.8/36.1 19.2/39.2 19.2/39.2	1.5 2 2	0.1/0.5 0.21/0.5 0.21/0.5	70 65 65				469.95 269.95 219.95	
SDNY	STR-AV950(RI) STR-AV850(RI) STR-AV650(RI) STR-AV550(RI) STR-AV450(RI) STR-AV250	D D D D D D	115/80/65/55/35/35	0.006 0.006 0.008 0.03 0.8 0.8	0.006 0.006 0.008 0.03 0.8 0.8	5-100 5-100 10-70 10-70 10-70 10-70	37 87 77 77 77 77	200 200 150 150 150 150	1.8 1.8 1.5 1.5	Yes Yes Yes Yes No Yes	Yes Yes Yes Yes No No	10 10 10 10 10 10	10.3 10.3 11.2 11.2 11.2 11.2	16.1/38.3 16.1/38.3 17.3/38.3 17.3/38.3 17.3/38.3 17.3/38.3	1 1 1 1 1 1	0.05/0.1 0.05/0.1 0.15/0.25 0.15/0.25 0.15/0.3 0.15/0.3	65 65 60 60 60 60	82/76 82/76 80/74 80/74 76/70 76/70	50 50 45 45 45 45	21 1/4 18 16 1/2 15 3/4 11 3/4 11 1/4	750.00 600.00 500.00 370.00 300.00 200.00	
TANDBERG	3080A(RD)	F/D	80/100	0.09	0.09	20-20	72	70	0.5	Yes	No	16	11.2	17.2/45.4	0.9	0.09/0.2	100	78/75	45	26	1795.00	
TEAC	AG-55		55/								No	8									379.00	
TECHNICS	SA-130 SA-180 SA-290 SA-210(RI) SA-R310(RI) SA-R410(RI) SA-R510(RI)	D D D D D D D	35/35/50/40/55/100/100	0.5 0.5 0.3 0.09 0.09 0.007 0.007	0.5 0.5 0.3 0.09 0.09 0.007 0.007	40-20 40-20 20-20 20-20 20-20 20-20 20-20	73 74 74 70 70 70 70	120 150 150 150 150 150 150	1.0 1.2 1.2 1.2 1.2 1.2 1.2		Yes Yes Yes Yes	16 16 16 24 24 24 24	10.8 11.2 11.2 11.2 11.2 11.2 11.2	16.1/38.3 20.2/40.2 20.2/40.2 20.2/40.2 20.2/40.2 20.2/40.2 20.2/40.2	1.0 1.0 1.0 1.0 1.0 1.0 1.0	0.15/0.3 0.2/0.3 0.2/0.3 0.2/0.3 0.2/0.3 0.15/0.2 0.15/0.2	60 65 65 65 65 65 65	76/70 75/71 75/71 75/71 75/71 75/71 75/71	40 40 40 40 40 40 40	11 10 12 11 12 17 17	165.00 200.00 245.00 300.00 400.00 600.00 750.00	
VECTOR RESEARCH	VR-2300 VRX-3500B VRX-4200 VRX-6200R(RI) VRX-8200R(RI) VRX-9200R(RI)	D D D D D D	25/30/35/45/40/50/65/75/110/125/120/135	0.30 0.09 0.05 0.05 0.05 0.05	0.30 0.09 0.05 0.05 0.05 0.05	40-20 24-20 20-20 20-20 20-20 20-20	70 80 80 80 80 80	130 140 150 150 160 160	1.75 1.75 2.0 2.0 2.0 2.0	No No Yes Yes Yes Yes	No No Yes Yes Yes Yes	0 16 16 16 20 20	17.2 10.8 10.8 10.8 10.8 10.8	25.5/41.5 16.2/36.2 16.2/36.2 16.2/36.2 16.2/36.2 16.2/36.2	2.0 1.5 1.5 1.5 1.5 1.5	0.3/0.5 0.15/0.35 0.12/0.25 0.12/0.25 0.10/0.20 0.10/0.20	50 55 60 60 60 60	72/65 75/70 75/70 75/70 75/70 75/70	42 45 48 48 25 1/2 26 1/2	12 1/2 15 16 16 659.00 849.00		
YAMAHA	RX-1100U(RI) RX-900U(RI) RX-700U(RI) RX-500U(RI) RX-300U	D D D D D	125/85/65/50/37	0.015 0.015 0.015 0.015 0.04	0.01 0.01 0.01 0.01 0.04	10-50 10-50 10-50 10-50 10-50	92 92 88 88 88	160 160 160 160 160	1.58 1.84 1.75 2.1 2.31	Yes Yes Yes No No	Yes Yes No No No	16 16 16 16 16	8.8 8.8 9.3 9.3 9.3	14.8/37.3 14.8/37.3 15.1/37.7 15.1/37.7 15.1/37.7	1.2 1.2 1.3 1.5 1.5	0.05/0.07 0.05/0.07 0.07/0.07 0.1/0.2 0.1/0.2	85 85 85 85 85	85/81 85/81 81/76 81/76 70/76	54 54 52 50 50	26.5 24.2 13.9 12.4 11.5	949.00 699.00 549.00 379.00 269.00	



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TURNTABLES

MANUFACTURER	Model (R) = Remote Included, (RO) = Remote Optional	Speeds - See Code	Wow & Flutter DIN 45-501	Rumble - dB, DIN 45-539-B	Drive System	Speed Inaccuracy, ± %		Speed Adjustment Range, ± %	Controls Outside Dustcover?	Multi-Play? Number of Discs	Tape Pivoted? P Line? L Screw? S, Au-Bearing? A	Pivot Stylus Distance, Inches	Auto Cue - C, Auto Return = R, Programmable Play = P	Recommended Tracking Force Range, Grams	Anti-Skating Adjustment?	Cartridge Weight Range, Grams	Total Cable Capacitance, pF	Cat Mount Fixed? F, Removable Shell = R, P-Mount? P, Changeable Wand = W	Dimensions, Inches, Including Dustcover	Price, \$	
						Yes	No														Yes
ADC	LT-60 LT-34 RC-1	B B B			Belt Belt Belt			Yes Yes No	No 4	L L P		C/R C/R C/R						P P P	14 x 19 x 4 13 x 13 x 4 15 x 17 x 5	140.00 100.00 100.00	
ADS	P4(RO)	B	0.035	77	Direct	0.05	3	Yes	No	P	8 5/8	C/R	0-2	Yes	4-11	150	R		17 1/2 x 4 1/2 x 14 7/8	649.00	
AKAI	AP-A305C-B	B	0.09	60	Belt			Yes	No	P	8 1/2	R	1.25	No	5.9		P		16.7 x 4.1 x 13.6	99.00	
ALPHASON	Sonata	B			Belt			Yes	No											1500.00	
AR	ETL-1 ES-1	B B	0.03 0.04	81 78	Belt Belt			No No	No No	P P	8.4			Yes	3-9	200	F		20 x 18 x 8 18 x 15 1/4 x 7	700.00; 375.00; w Arm. 500.00 425.00	
ARISTON ACOUSTICS	Q Deck	B	0.08	75	Belt			No	No	P			1.5-2.0	Yes			F		16 1/8 x 13 x 5 1/8	260.00	
	RD 50	B	0.08	75	Belt			No	No	P				Yes			F		17 1/4 x 11 3/4 x 6 1/4	375.00	
	RD 60	B	0.08	75	Belt			No	No	P				Yes			F		17 1/4 x 11 3/4 x 6 1/4	475.00	
	RD 40	B	0.06	75	Belt			No	No	P				Yes			F		17 1/4 x 13 3/8 x 6 3/8	850.00	
	RD 90	B	0.055	80	Belt			Yes	No	P				Yes			F		17 1/2 x 14 1/4 x 6 1/2	950.00	
RD 90 Sup	B	0.055	80	Belt			Yes	No	P				Yes			F		17 1/2 x 14 1/2 x 6 1/2	1200.00		
AUDIOMECA/ LURNE	J1	B			Belt		5	No												2700.00	
BANG & OLUFSEN	Beogram 5500	B	0.03	80	Belt	0.2		Yes	No	L	4 3/4	C/R	1-1.5			100	F		16 1/2 x 3 x 12 3/4	450.00	
	Beogram 3300	B	0.03	80	Belt	0.2		Yes	No	L	4 3/4	C/R	1-1.5			100	F		16 1/2 x 3 x 12 3/4	399.00	
	Beogram TX-2	B	0.03	80	Belt	0.2		Yes	No	L	4 3/4	C/R	1-1.5			100	F		16 1/2 x 3 x 12 3/4	329.00	
	Beogram RX-2	B	0.035	75	Belt	0.2		Yes	No	P	9 1/4	C/R	1-1.5	Yes		100	F		16 1/2 x 2 1/2 x 17 7/8	229.00	
CELLO	Zarathustra	B			Belt			Yes	No	P				Yes			F		19 1/2 x 16 1/4 x 7 1/4	5000.00	
DENON	DP-59L	B	0.006	82	Direct	0.002	9.9	No	No	P/S	9 3/8	C/R	0-3	Yes	3-14		R		19 1/4 x 8 5/8 x 16 1/8	650.00	
	DP-47F	B	0.01	78	Direct	0.002		Yes	No	P/S	8 3/8	C/R	0-3	Yes	3-12		R		17 x 7 x 16 1/8	425.00	
	DP-35F	B	0.012	78	Direct	0.002		Yes	No	P/S	8 3/8	C/R	0-3	Yes	4-9		R		17 x 5 3/8 x 16 1/4	320.00	
	DP-23F	B	0.02	75	Direct	0.002		Yes	No	P/S	8 3/8	C/R	0-3	Yes	4-9		R		17 x 4 1/8 x 14 1/4	260.00	
	DP-7F	B	0.018	75	Direct	0.01		Yes	No	P/S	8 3/8	C/R	1.25	Yes	6		P		14 3/8 x 3 3/4 x 14 1/4	180.00	
DUAL	CS 5000	C	0.025	80	Belt			No	No	P		C	1-4	Yes	2-12	150	R			450.00	
	CS 505-3	B	0.06	75	Belt		6	No	No	P		R	1-4	Yes	2-10	150	R			350.00	
	CS 505-2	B	0.06	75	Belt		6	No	No	P		R	1-4	Yes	2-10	170	R			290.00	
	CS 503-1	B	0.07	70	Belt		6	No	No	P		C/R	1-4	Yes	2-10	150	R			250.00	
	CS 2215	B	0.07	70	Belt			Yes	No	P		R	1-4	Yes	2-10	125	R			250.00	
CS 2110	B	0.09	68	Belt			Yes	No	P		R	1-4	Yes	2-9	150	F			180.00		
EMT	938	C	0.075	70	Direct	0.01	10	Yes	No	P	9 3/4		2.0-9.0	Yes			R		19 1/2 x 17 1/2 x 7 1/2	3395.00	
GOLDMUND	Studiotto MK II	B			Direct			Yes												2195.00	
	ST4	B			Direct			Yes		LS								R		20 x 20 x 8 3/8	4495.00
	Studio Reference	B			Direct Belt		4	Yes											20 x 20 x 8 3/8 23 3/8 x 21 1/4 x 29 1/2	3290.00 17,900.	
HARMAN/ KAROON	T65C	B	0.025	70	Belt		3	Yes	No	P	8 1/2	C	1-3	Yes	4.5-13	Sel.	R		17 3/8 x 15 1/8 x 5 3/4	575.00	
HEYBROOK	TT-2	B	0.08	79	Belt	0.01		No												17 1/2 x 14 1/4 x 6 1/4	549.95
HITACHI	HTMD46(RO)	B	0.045		Belt			Yes	No	L	5 1/2	C/R	2	No			R		14 1/2 x 14 1/8 x 3 1/2	179.95	
JVC	ALA1	B	0.07	65	Belt			Yes	No	P	8 3/8	C/R	1.25	No			P			17 1/2 x 4 1/4 x 14 1/2	105.00
	ALF3	B	0.055	78	Direct			Yes	No	P	8 3/8	R	1.25	Yes			P			17 1/2 x 4 1/4 x 14 1/2	145.00
	ALF350(RD)	B	0.05	78	Belt			Yes	No	P	8 3/8	C/R	1.25	Yes			P			17 1/2 x 4 1/4 x 14 1/2	165.00
	ALF05	B	0.045	78	Direct	0.005		Yes	No	P	8 3/8	C/R	1.25	Yes			P			17 1/2 x 4 1/2 x 14 1/2	180.00
	QLA75	B	0.03	80	Direct	.0015		No	No	P	10		0-3	Yes	4-21		W		19 1/2 x 8 1/4 x 16 1/2	650.00	
KENWOOD	KD-76FC(RD)	B	0.05	75	Direct			Yes	Yes	L		C/R/P	2.2				F		16 5/8 x 4 x 14 1/8	240.00	
	KD-86F(RD)	B	0.05	75	Direct			Yes	Yes	P		C/R					F		16 5/8 x 4 1/2 x 14 1/8	200.00	
	KD-56R	B	0.05	74	Direct			Yes	Yes	P	8 7/8	R					F		16 5/8 x 4 1/2 x 14 1/8	130.00	
	KD-36R	B	0.07	70	Belt			Yes	Yes	P	8 7/8	R					F		16 5/8 x 4 1/2 x 14 1/8	120.00	
KYOCERA	PL-701	B	0.03	70	Belt		3	Yes	Yes	P	8 1/2	C/R	0-3	Yes	3-10	190	R		18 1/8 x 6 x 15 3/8	450.00	
	PL-601	B	0.035	68	Belt		3	Yes	Yes	P	8 1/2	C	0-3	Yes	3-10	190	R		18 1/8 x 6 x 15 3/8	350.00	
	PL-910	B	0.025	78	Belt			Yes	Yes										18 x 7 1/2 x 15 1/4	2000.00	
LINN HI-FI	Linn Sondek LP12	A	0.04	75	Belt	0.1		No	No											17 1/2 x 14 x 5 1/2	945.00
	Linn Axis	B	0.05	75	Belt	0.1		No	No	P	9		0.75-3	Yes	2-10	100	F			17 1/2 x 13 3/4 x 5 1/2	595.00
LOGIC	C-1	B			Belt			No	No	P	9 3/8		1.3-2.5	Yes	4-12		F			16 1/2 x 13 x 5	398.00
	Tempo	B			Belt			No	No	P	9 3/8		1.3-2.5	Yes	4-12		F			18 x 14 x 6	498.00
LUXMAN	P-100	B	0.06	70	Belt		3	Yes	No	P		C/R	0.5-3.0	Yes	6		R			16 3/8 x 4 3/4 x 14 7/8	250.00
	P-102	B	0.04	72	Belt		3	Yes	No	L		C/R	1.25	No	3-8.5		R			16 3/8 x 4 1/2 x 14 1/8	350.00



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The SG3 Turntable:

This award winning design utilizes space-age materials to minimize vibration and dampen resonances. The SG3 is a finely balanced system resting on a tuned three-point suspension housed in an elegant solid-oak frame. The SG3 with its companion SONOGRAPHE LMT tonearm constitutes a sensibly priced phono-playback system capable of preserving the purity of recorded music on disc.



The SD1 Compact Disc Player:

This remarkable cd player has acquired an international reputation for excellence at an affordable price. Critics have uniformly concluded that its musical performance demands comparison with machines which sell at more than twice (and up to ten times) the price. It features fet analogue filters, and discrete regulated power supplies. The SD1 offers the most useful convenience features, with infra-red remote available as an option.



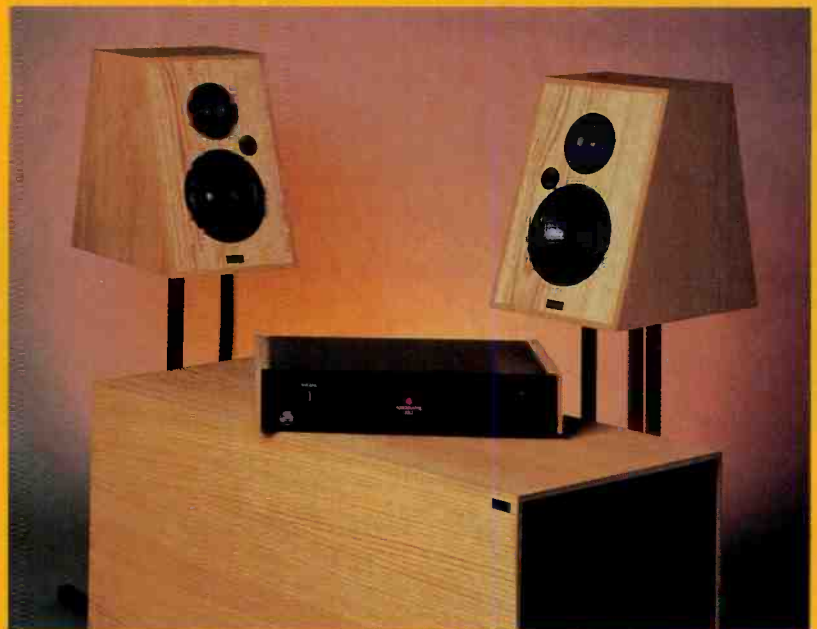
The SCI Preamplifier and SAI20 Amplifier:

These instruments incorporate circuits derived from conrad-johnson's highly regarded Motif® components. The SCI is a flexible all-fet preamplifier with facilities for a full range of inputs, including low-output (mc) cartridges. Its companion, the SAI20, is a high current 120 watt* MOSFET power amplifier designed to deliver its power into the reactive loads presented by most loudspeaker systems.

*SAI20 is rated at 120 watts per channel with less than 1% THD or IMD from 20Hz to 20kHz both channels driven into 8 ohm loads.

THE SL21 Monitors, SW1000 and SW500 Sub-Woofers, and SX1 crossover:

A time-aligned two-way system, optimally tuned for tight, extended bass, the SL21 is a satisfying full-range speaker system. Its high efficiency design yields startling dynamics and allows excellent results even with low power amplifiers. For those who wish to extend the musicality of the system to the bottom octave, there is the SW1000 stereo subwoofer (two channels in one segmented cabinet). The SW1000 is tuned for fast, accurate bass response down to 25 Hz, adding power, weight, and visceral impact. The SW500 is a monaural version of the same design. The SONOGRAPHE SX1 electronic crossover is available pre-configured for the SL21/SW1000 system, or may be special ordered with custom designed crossover frequencies and slopes.



the conrad-johnson group
2800R Dorr Ave • Fairfax, VA 22031 • 703-698-8581

TURNTABLES

MANUFACTURER	Model (RD) = Remote Included, (RO) = Remote Optional	Speeds - See Code	Wow & Flutter, % DIN 45-507	Rumble, -dB DIN 45-539-B	Drive System	Speed Inaccuracy, ±%	Speed Adjustment Range, ±%	Controls Outside Dustcover?	Multi-Play? Number of Discs Type: P=Direct, P=Linear, S=Servo, S=5, A=Anti-beating, A	Pivot Stylus Distance, Inches	Auto Cue - C, Auto Return - R, Programmable Play = P	Recommended Tracking Force Range, Grams	Anti-Skating Adjustment?	Cartridge Weight Range, Grams	Total Cable Capacitance, pF	Cap. Mount. Freq. F, Removable Shell = R, P = Semi-P, Changeable Wand = W	Dimensions, Inches Including Dustcover	Price, \$
MARANTZ	TT451 TT170	B B	0.05 0.08	70 55	Belt Belt		Yes Yes		P P		C R						16 1/2 x 3 3/4 x 13 1/2 16 1/2 x 4 x 13 1/4	230.00 100.00
MERRILL AUDIO	Heirloom	B	0.02	89	Belt	0.05		Opt.									19 x 15 x 8	981.00
J. A. MICHELL	SyncroDec SyncroDec w/Rega RB-250 Arm GyroDec GyroDec Limited Edition	B B B B	0.05 0.05 0.04 0.04	76 76 78 78	Belt Belt Belt Belt	0.1 0.1 0.1 0.1	0 0 0 0	No No No No	No No No No	P 9 3/8	No	0-3.5	Yes	3-18		F	17 1/4 x 14 3/4 x 5 1/4 17 1/4 x 14 3/4 x 5 1/4 21 1/4 x 16 3/4 x 7 1/2 21 1/4 x 16 3/4 x 7 1/2	750.00 925.00 1295.00 1495.00
MICRO SEIKI	BL-10X BL-99V BL-99VW SX-555FVW SX-111FV DDX-1500 RX-1500 Basic RX-1500 VG RX-1500 FVG SX-500MKII SX-800MKII SZ-1TVG SZ-1TS/S SZ-1T Ultimate	B B B B B B B B B B B B B B B B B B	0.025 0.025 0.025 0.025 0.025 0.03 0.03 0.025 0.025 0.025 0.025 0.023 0.023 0.023 0.023	75 75 75 78 84 60 65 78 84 84 84 88 88 88	Belt Belt Belt Belt Belt Direct Belt Belt Belt Belt Belt Belt Belt Belt Belt Belt Belt Belt	0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	No No No No No No No No No No No No No No No No No No	No No No No No No No No No No No No No No No No No No	P P P P P P P P P P P P P P P P P P P	8 3/4 9 3/8	0-2 0-2.5	Yes Yes	4-9 9-17		W R	17 3/4 x 13 7/8 x 6 3/8 21 1/2 x 17 1/2 x 7 1/2 21 1/2 x 17 1/2 x 7 1/2 21 1/2 x 17 1/2 x 7 1/2 21 1/2 x 16 x 9 13 x 13 x 5 1/2 13 x 13 x 5 1/2 13 x 13 x 5 1/2 12 1/2 x 12 1/2 x 6 12 1/2 x 12 1/2 x 5 1/2 19 1/2 x 17 1/2 x 7 3/4 19 1/2 x 17 1/2 x 7 3/4 19 1/2 x 17 1/2 x 7 3/4 20,000.	995.00 1895.00 2295.00 2995.00 3995.00 995.00 1495.00 2995.00 3995.00 11,000. 14,000. 14,000. 16,000. 20,000.
MUSEATEX AUDIO	AT-2	C			Belt		6	No	P			1-3	Yes	3-13		W	13 x 12 1/2 x 8	1000.00; w/Arm, 1500.00
NIKKO	P-5 P-3	B B	0.08 0.055	83 86	Direct Belt		3 Yes	Yes Yes	P/L P/L		C/R C/R	1.25-2.5 1.25-2.5	Yes Yes	2.5-10 2.5-10		P P	16 x 4 1/2 x 14 16 1/4 x 3 1/2 x 13	200.00 100.00
ONKYO	CP-1057 F CP-1046 F CP-1036 F CP-1116 F	B B B B	0.023 0.025 0.025 0.045	80 75 70 66	Direct Direct Direct Belt	0.1 0.1 0.1 1.0	0 0 0 0	Yes Yes Yes Yes	No Yes No No	P/S P/S P/S P	8 7/8 8 7/8 8 7/8 8 7/8	R R R R	1.7 1.5 1.5 1.5	Yes Yes Yes Yes	4-9 5-9 5-9 5-9	R R R R	17 3/8 x 6 3/8 x 16 1/4 16 1/2 x 5 1/8 x 14 3/4 16 1/2 x 5 1/8 x 14 3/4 16 1/2 x 5 1/8 x 14 3/4	349.95 229.95 179.95 109.95
ORACLE	New Oracle Alexandria MkIII Delphi MkIII Premiere MkIII Premiere Collection	B B B B B			Belt Belt Belt Belt Belt			3 3 3 3 3									20 x 15 x 6 20 x 15 x 6 19 x 14 1/2 x 6 20 x 15 x 6 1/2	500.00 895.00 From 1395.00 From 2350.00
PARASOUND	T/F/S-880 TTb720 PST-1200	B B B	0.03 0.025 0.025	72 65 65	Belt Belt Direct	0.03 0.04	3 3 8	Yes Yes Yes	P P P	8 3/4 8 3/4 9	R R	1-3 1-4 1-12	Yes Yes Yes	2-10 6 1-10	265 265 265	P P R	17 1/2 x 14 x 3 1/2 17 x 13 3/4 x 3 1/2 18 x 14 1/2 x 5	200.00 100.00 300.00
PIONEER	PL-910 PL-670 PL-570 PL-L550	B B B B	0.06 0.25 0.05 0.025		Belt Direct Belt Direct			Yes Yes Yes Yes	No Yes No No	L P C/R L	C/R/P C/R C/R C/R					F P P P	16 3/4 x 4 1/8 x 13 3/4 16 3/4 x 4 5/8 x 14 3/8 16 3/4 x 3 7/8 x 14 3/4 16 3/4 x 4 1/4 x 14 3/4	400.00 150.00 120.00 250.00
QED	R232EN	B	0.1	68	Belt		0	Yes	No	P		No	Yes	2.5		F	15 3/4 x 13 3/4 x 4	495.00
RCA	Dimensia MTT230(RD)	B	0.06 JIS	65	Belt			Yes	No	L	3 3/4	P	2.0	No	300	F	14 5/8 x 3 1/2 x 14 1/4	249.00
REALISTIC	LAB-2200 (42-2916) LAB-330 (42-2917) LAB-450 (42-2918) LAB-89 (42-2986)	B B B B	0.065 0.1 0.065 0.15	62 55 55 55	Direct Belt Direct Belt		3 3 3 No	Yes Yes No No	No No No 3	L P P P	C/R R C/R C/R	1-1.5 1-1.5 1.75- 2.25 3.0		Direct No No		P P P F	13 1/2 x 13 3/4 x 4 13 3/4 x 13 3/8 x 3 5/8 15 x 14 3/4 x 4 3/4 15 x 13 x 5 7/8	149.95 89.95 129.95 79.95
REGA RESEARCH	Planar 2 Planar 3 Planar 78	B B †			Belt Belt Belt					P P P	9 3/8 9 3/8 9 3/8		Yes Yes Yes	3-18 3-18 3-18		F F F	17 1/2 x 14 3/8 x 4 7/8 17 1/2 x 14 3/8 x 4 7/8 17 1/2 x 14 3/8 x 4 7/8	399.00 499.00 399.00; †78 rpm only
REVOLVER	Revolver w/Revolver Arm & Audio- Technica AT70 Cart.	B	0.08	65	Belt	0.02		No	No	P	9		Yes	2-10	45	F	16 1/2 x 14 1/2 x 4 1/4	From 425.00
REVOX	B291(RD)	B	0.05	77	Direct	0.01	9.9	Yes	No	L/S	1 1/2	C/R	0.8-2.0		220	F/P	17 1/2 x 15 1/2 x 5 1/2	1000.00
ROKSAN	Xexes	B	0.03	83	Belt		0.5	Yes	No								15 x 6 x 19	1450.00





IMAGINE A ROOM THAT'S BATHED IN SOUND. AN ENVIRONMENT
YOU CONTROL WITH THE TOUCH OF A BUTTON. NOW IMAGINE A
SINGULAR, SOPHISTICATED MACHINE THAT CREATES THIS THEATER
ENVIRONMENT. FOR MAXIMUM INTEGRATION OF SOUND AND IMAGE,
IT'S THE NEC AVR-1000 DOLBY SURROUND SOUND RECEIVER.
CERTAIN THINGS IN LIFE SIMPLY CANNOT BE COMPROMISED.

NEC

TONEARMS

MANUFACTURER	Model	Type: Air-Bearing = A, Pivoted = P, Laser = L, Servo = S					Cartridge Mount: Fixed = F, Removable Shell = R, P-Mount = P.		Cueing?	Anti-Scaling Adjustment?	Adjustable Vertical Tracking Angle?	Pivot-Stylus Distance, Inches	Overall Length, Inches	Maximum Tracking Error, Degrees per Inch Range, Grams	Recommended Tracking Force Range, Grams	Cartridge Weight Range, Grams	Total Cable Capacitance, pF	Mounting Hole Diameter, Inches	Price, \$	Notes
		P	F	Yes	Yes	Yes	Yes	Yes												
ALPHASON	HR100S MCS	P	F	Yes	Yes	Yes	Yes	8 3/8	11 3/4		0-3	3-20	90	1/4	895.00					
	HR100S	P	F	Yes	Yes	Yes	Yes	9	11 3/4		0-3	3-20	90		795.00					
	Xenon MCS	P	F	Yes	Yes	Yes	Yes	9	11 3/4		0-3		90		625.00					
	Xenon	P	F	Yes	Yes	Yes	Yes	9	11 3/4		3		90		525.00					
	Delta	P	F	Yes	Yes	Yes	Yes	9	11 3/4		3		90		410.00					
Opal	P	F	Yes	Yes	Yes	Yes	9	11 3/4		3		90		310.00						
AUDIOQUEST	AQ 317	P	R	Yes	Yes	Yes	Yes	8 3/4	12 3/4		0-3.0	1-15		1 1/8	695.00			Azimuth adjustable.		
CELLO	Pluto	P	F	Yes	Yes	Yes									4000.00			Solid titanium.		
DENNESEN	ABLT-1	A	W	Yes		Yes	Adj.	12	0	Adj.	Any	Any	100		2000.00					
EMINENT TECHNOLOGY	ET-II	A/L	W	Yes		†	7 3/8	9 1/2	0	0-5	0-15	16	1/4	850.00				†Calibrated VTA adjustment. Includes air pump; van den Hul silver wiring.		
FIDELITY RESEARCH	FR 64	P	R	Yes	Yes	Yes	Yes	9 3/8	12 1/4	2	0-3.0	0-20	80	1/4	800.00			Dynamically balanced.		
GOLDMUND	T5	L/S	R	Yes	Yes	Yes	Yes								1900.00					
	T3F	L/S	R	Yes	Yes	Yes	Yes								4450.00			Fully automatic; computer controlled; includes PL8 servo unit. Brings Model T3B up to T3F.		
	T3F Update	L/S	R	Yes		Yes	Yes								2250.00					
GOLDRING	G.202	P	R	Yes	Yes	Yes	Yes	9 1/8	11 3/4	1.5	0-4.0	3-11	100	7/8	240.00			Cast armtube; gold-plated plugs; 12-gram effective mass.		
GRACE	G747	P	R	Yes	Yes	Yes	Yes	9 3/8	11 3/4	0.3	0-3	4-10	86	3/4	280.00					
	G707-III	P	F	Yes	Yes	Yes	Yes	9 3/8	11 3/4	0.3	0-3	4-10	84	3/4	365.00			Azimuth adjustable.		
HEYBROOK	Heybrook Tonearm	P	F	Yes	Yes	Yes	Yes	9 1/4			0.75-3	4-12			398.00			Titanium armtube.		
LINN HI-FI	Iffok LVII	P	F	Yes	Yes	Yes	Yes	9	11 1/4		0.75-3.0	3-9	100	1/4	750.00					
	Basik Plus	P	F	Yes	Yes	Yes	Yes	9	11 1/4		0.75-3.0	2-10	100	1/4	250.00					
	Basik LVX	P	R	Yes	Yes	Yes	Yes	9	11 1/4		0.75-3.0	2-10	100	1/4	225.00					
LOGIC	Datum II	P	F	Yes	Yes	Yes	Yes	9 3/8	11 1/2		1.3-2.5	4-12		1/4	250.00					
	Datum S	P	F	Yes	Yes	Yes	Yes	9 3/8	11 1/2		1.3-2.5	4-12		1/4	500.00					
MAYWARE	Formula V	P	F/R	Yes	Yes	No	Yes	9	11 1/2		0.75-3.0	3-11	100	3/4	475.00			Variable mass; viscous damping.		
MICRO SEIKI	MA-500	P	F	Yes	Yes	Yes	Yes	9.3	12.4	1.5	0.75-2.5	4-12		1.4	195.00					
	CF-1	P	F	Yes	Yes	Yes	Yes	9.3	12.4	1.5	0.75-2.5	4-12		1.4	395.00					
	MAX 505III	P	R/W	Yes	Yes	Yes	Yes	9.3	12.7	1.5	0.75-2.5	4-12		1.4	395.00					
	MAX 237	P	R/W	Yes	Yes	Yes	Yes	9.3	12.7	1.5	0.75-2.5	4-12		1.7	1100.00					
	MAX 282	P	R/W	Yes	Yes	Yes	Yes	15	11.1	1.5	0.75-2.5	4-12		1.7	1200.00					
MISSION	Mechanic	P	F	Yes	Yes	Yes	Yes	8.33	9.5			4-14	220		1500.00					
	774 LC	P	F	Yes	Yes	Yes	Yes	8.33	9.5			3-10								
MUSEATEX AUDIO	TA-2	P	†	Yes	Yes	Yes	Yes				1-3	3-13			500.00			†Changeable arm.		
ORACLE	I														350.00					
PREMIER	FT-3	P	F	Yes	Yes	Yes	Yes	9 1/2	12	0.2	0-3	4-14			475.00			Azimuth adjustable; damped tube; LCOFC wiring; VTA lift base; RCA connectors on interface box.		
	FT-3 K MMT	P	F	Yes	Yes	Yes	Yes	9 1/2	12	0.2	0-3	4-14	86	3/4	395.00			As above but without VTA lift base. Azimuth adjustable.		
		P	R	Yes	Yes	Yes	Yes	9 1/2	12	0.2	0-3	4-14		3/4	290.00					
REGA RESEARCH	RB300	P	F	Yes	Yes		Yes	9 3/8	11 5/8		0.5-3.0	3-18		1	240.00			Cast armtube; dynamically balanced.		
REVOLVER	Revolver	P	F	Yes	Yes	Yes	Yes	9	11.2		0.75-3.0	2-10	45	1.2	175.00					
SAEC	WE-308N	P	R	Yes	Yes	Yes	Yes	9 1/4	13 3/8		0-2	7.3-13.3		1.1	395.00					
	WE-308L	P	R	Yes	Yes	Yes	Yes	10 1/2	14 3/4		0-2	7.8-14.8		1.1	495.00					
	WE-317S	P	R	Yes	Yes	Yes	Yes	8 3/4	12 3/4		0-2.5	9.5-15.5		1.1	595.00					
	WE-407/23	P	R	Yes	Yes	Yes	Yes	8 3/4	12 3/4		0-2.5	5.5-15.5		1.1	795.00					
	WE-407EX	P	R	Yes	Yes	Yes	Yes	8 3/4	12 3/4	1.5	0-2.5	3.5-15.5		1.1	795.00					
	WE-308SX	P	R	Yes	Yes	Yes	Yes	9 1/4	13 3/4		0-2	5.5-15.5		1.1	795.00					
	WE-506.30	P	R	Yes	Yes	Yes	Yes	11 1/4	16 1/2		0-2	5.5-15.5		1.4	1500.00					
	WE-8000ST	P	R	Yes	Yes	Yes	Yes	11 1/2	16 3/4		0-2	8-16.5		1.1	1500.00					
			P	R	Yes	Yes	Yes	Yes	9 1/4	13 3/8		0-2	7.3-13.3		1.1	395.00				
			P	R	Yes	Yes	Yes	Yes	10 1/2	14 3/4		0-2	7.8-14.8		1.1	495.00				



Model 2.5Fi (above)
automatic record cleaner
and CC-1 motorized CD cleaner

“Thanks to Nitty Gritty, every music lover can get the best sound from his records” (and compact discs, too)

So says James Jarvis of the SENSIBLE SOUND. And Bert Whyte of AUDIO, Tony Cordesman of STEREOPHILE, Julian Hirsch of STEREO REVIEW, Enid Lumley of INTERNATIONAL AUDIO REVIEW, Michel Prin of SON HI FI, Al Fasoldt of FANFARE, and Jack Philpot of AUDIO AMATEUR all agree: there is no other record or compact disc cleaning system that is equal to those made by Nitty Gritty Record Care Products of California.

Why do these independent audio critics feel so strongly? Because cleaning systems made by Nitty Gritty get records and compact discs 100% clean. Free of dust, grease and static electricity. Microscopically clean. *Perfectly* clean.

Have you ever listened to a clean record?

Records that have been cleaned by a Nitty Gritty sound more like *live* music. They have extended high frequency response, improved imaging, more acoustical space, and less noise.

There is no secret. The effectiveness of

the Nitty Gritty record cleaning system is due to its superior design. The record cleaning system employs a powerful vacuum and a pure cleaning fluid. The Nitty Gritty cleaning fluid dissolves dust, and grease, neutralizes static charge, and then is suctioned immediately off, leaving a purified record. Perfectly prepared for play.

“Any record in one’s collection, old or new, audiophile or not, will benefit *greatly* with a (Nitty Gritty) cleaning.” Jarvis says, “I believe that anyone considering upgrading his system in any way should *first* obtain one of these record cleaning machines. Only then will he be aware of what he might be missing in the music, or of what his current system is really capable of in terms of music reproduction.”

Digital gets a wash, too.

The Nitty Gritty compact disc cleaning system is also regarded as state-of-the-art. The CD-1 is the first *motorized* CD cleaner. It uses bi-directional rotation to safely and surely clean a compact disc. Bert Whyte said, “Nitty Gritty has come up
Enter No. 74 on Reader Service Card

with a CD cleaning machine that is unquestionably the *easiest* to use as well as the most efficient and *effective* method of ensuring pristine CD playing surfaces.” The CD-1 also protects the CD with a clear coat that resists scratches. Perfectly protected from the elements.

And now, Nitty Gritty has accomplished yet another first: the first motorized cleaner for the 12 inch video laser disc. The DD3 (not shown) is designed to operate like the CD-1, but on a grander scale. It also has the ability to clean the other two sizes (10 inch and CD) of the digital discs. Perfectly clean.

Brochures, full reprints of test reports, and a list of dealers are available to you. Send your name and address for an immediate packet of ear-opening information.

Nitty Gritty Record Care Products
4650 Arrow Highway
Unit F4, Info Dept.
Montclair, California 91763
(714) 625-5525

Phono Cartridges

	Price	Replacement
AQ M-1, Induced Magnet Cartridge.	95.00	40.00 stylus only
AQ MC-3, High Output (3.0mV) Moving Coil.	150.00	90.00 with trade
AQ MC-4, High Output (2.5mV) Moving Coil.	225.00	150.00 with trade
AQ MC-5, High Output (2.5mV) Moving Coil.	275.00	175.00 with trade
AQ 404B-MH (1.6mV) or AQ 404B-L (.5mV), Boron Cantilever.	395.00	260.00 with trade
AQ B-100MH (1.6mV) or AQ B-200L (.5mV), Machined Body.	795.00	520.00 with trade

If you trade-up, you will be allowed the same credit as if you traded-in the model one step above yours.

Tonearms

	Price
AQ PT -1, damped, superior internal wire, fixed headshell. Includes LiveWire tonearm set.	325.00
AQ 317, chatter-proof double knife edge bearings, choice of AQ-16 or AQ-10, no cable.	695.00

Compact Disc Players

	Price
AQ CD-1X, 16 bit- 4X, double power supplies, de-emphasis, 4 AQ Sorbo Feet, AQ CD Stabilizers.	995.00
Infra-red remote control, plug in sensor and hand held unit, for all Philips players.	59.00

LiveWire Speaker Cable

	Price
LiveWire BC-1, twisted pair.	.39/ft
LiveWire BC-2, twisted pair, OFHC copper.	.50/ft
LiveWire BC-3, twisted 4 conductor.	.75/ft
LiveWire BC-4, spiraled 4 conductor, OFHC copper.	.95/ft
LiveWire Type 6, spiraled 6 conductor, polypropylene insulation, OFHC.	1.75/ft (+ \$30/pr. prep)
LiveWire Type 12, spiraled 12 conductor, polypropylene insulation, OFHC.	3.25/ft (+ \$40/pr. prep)
LiveWire Black, surface only conductors, field balancing array, OFHC.	6.00/ft (+ \$40/pr. prep)
FMS Grey 3, teflon core tubular conductors, field balancing array, OFHC.	10.00/ft (+ \$45/pr. prep)

LiveWire Interconnecting Cable (other sizes are available)

	Price
LiveWire Basic, gold RCAs, polypropylene, 100% shield, OFHC copper.	33.00 per 3 ft. pair 67.00 per 20 ft. pair
LiveWire Reference 3, tubular conductors, polypropylene, OFHC.	55.00 per 3 ft. pair 140.00 per 20 ft. pair
LiveWire Quartz, multiple single strand geometry, PC OCC copper.	95.00 per 3 ft. pair 299.00 per 20 ft. pair
FMS Blue 3, all teflon dielectric, tubular conductors.	135.00 per 3 ft. pair 543.00 per 20 ft. pair
Tonearm sets with teflon plug, 4 feet : Reference 3 - 75.00 Quartz -122.00 FMS Blue 3 -174.00	

AQ Damping Accessories

	Price
Sample Kit AQ CD Disc Stabilizers, 5 rings with "locator".	9.95
Starter Kit AQ CD Disc Stabilizers, set of 35 rings with "locator".	45.00
Refill Set AQ CD Disc Stabilizers, 50 rings.	60.00
AQ Superclamp, solid Delrin reflex clamp/damper, holds down grooved area of record, not just label.	45.00
AQ Superclamp Plus, reflex record clamp/damper machined from solid Delrin.	75.00
AQ Sorbothane Record Damper, damps both record and spindle, very easy to use.	15.00
AQ Sorbothane Record Mat, 1/8" thick, damps record and platter.	35.00
AQ Sorbothane Isolation Feet, for CDs, turntables, tube electronics, etc. (set of 4)	40.00
AQ Sorbothane Vacuum Tube Dampers, reduced hysteresis distortion. (set of 4).	12.00
AQ Sorbothane Self-Stick Sheet, self adhesive backing lets you damp anything.	15.00
AudioQuiet Sound Paneling, any size up to 5ft x 10ft, choice of 45 fabrics.	80.00/panel + 8.00/sq.ft.

Accessories

	Price
AQ Record Brush, over 1,000,000 carbon fibers clean and control static.	15.00
AQ Electro Stylus Cleaner, vibrating stylus cleaner.	45.00
TRT's Wonder Solder, this solder really does sound better (15 ft).	15.00
AQ-16 or AQ 16 Headshell, LiveWire headshell leads.	45.00
Profile Pro-Lift, puts end-of-record-lift-off on any turntable.	45.00
LiveWire Headshell Leads, pure copper litz, no other insulation.	7.95

TO NEARMS

MANUFACTURER	Model	Type: Air-Bearing = A, Pivoted = P, Linear = L, Servo = S		Carriage Mount: Fixed = F, Removable Shell = R, P-Mount = P		Cueing?	Anti-Skating Adjustment?	Adjustable Vertical Tracking Angle?	Pivot-Stylus Distance, Inches	Overall Length, Inches	Maximum Tracking Error, Degrees per Inch Range, Grams	Recommended Tracking Force Range, Grams	Cartridge Weight Range, Grams	Total Cable Capacitance, pF	Mounting Hole Diameter, Inches	Price, \$	Notes
		Linear = L	Servo = S	Fixed = F	Removable Shell = R												
SIGNET	XK35	P	F	Yes	Yes	Yes	9½	11½	1	0-2.0	2-9	75	1	300.00			
SME	Series V	P	F	Yes	Yes	Yes	9½	11½	0.2	0-3	4-18	140	1½ x 2¾	2025.00	Damped magnesium casting; ABEC-7 bearings; van den Hul silver wiring; adjustable dynamic and static tracking; fluid damping; VTA lift. Casting as above; ABEC-3 bearings; LCOFC wiring; adjustable static tracking; optional fluid damping and VTA lift.		
	Series IV	P	F	Yes	Yes	Yes	9½	11½	0.2	0-3	4-18	140	1½ x 2¾	1210.00			
SONOGRAPHE	LMT	P	F	Yes	Yes	Yes	9½	11¾		0-3	4-14	100	¾	185.00			
SOUTHER ENGINEERING	Junior	L	W	Yes		Yes	2.0	10	0	0.5-3.0	1-20	†	(2)¼	550.00	†User-supplied. For 12-inch records; stainless steel. For 16-inch records; stainless steel.		
	Triquartz	L	W	Yes		Yes	2.0	10	0	0.5-3.0	1-20	†	(2)¼	850.00			
	Tribeam 12S	L	W	Yes		Yes	2.0	10	0	0.5-3.0	1-20	†					
	Tribeam 16S	L	W	Yes		Yes	2.0	12	0	0.5-3.0	1-20	†					
STAX	UA-9N	P	W	Yes	Yes	Yes	9½	13¾	0.04	0.1-3	3-22		5/8	999.95			
SYSTEMDEK	TA-1	P	F	Yes	Yes	Yes	10	11¾		1-3	3-10	300	1½	160.00			
TECHNICS	EPA-250	P	R/W	Yes	Yes	Yes	10	12½	2	0-2	3-12.5	41.2	2½	550.00			
WELL TEMPERED LAB	Well Tempered Arm	P	F		Yes	Yes	9	11½					½	645.00	Variable viscous damping.		
WHEATON MUSIC	Triplanar II	P	F	Yes	Yes	Yes	9¾	12½	0.03	0.05-3.0	4-22			1795.00	Azimuth adjustable.		
WIN RESEARCH	Pentagraph	P	F	Yes	Yes	Yes	12	14	0	1-5	0-6	80		1500.00			
ZETA	Standard	P	F	Yes	Yes	Yes	9	11½		0.75-4	4-12	90	1¼	925.00	Linear crystal wire with Tiffany connectors.		
	Van den Hul	P	F	Yes	Yes	Yes	9	11½		0.75-4	4-12	90	1¼	1180.00			



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Audiophiles have long recognized that the best sounding turntables are belt driven, suspended sub-chassis designs. However these have usually been simple manual designs without the features most users desire. With the CS5000, the Black Forest craftsmen from Dual have bridged the gap between performance and convenience. Designed and built entirely in W. Germany, the CS5000 combines a four-point floating chassis with a micro-processor belt drive system, resulting in a turntable that is simple to set up and operate yet able to produce superb sound quality. The CS5000 also features an entirely new tonearm design called OPS (Optimum Pivot System). A refinement of the legendary Dual Ultra Low Mass Design, it eliminates distortion produced by warped or eccentric records. And a unique VTA headshell is standard, for adjusting the Vertical Tracking Angle for any pick-up cartridge. This German crafted high technology and performance, with elegant wood base in walnut or satin black finish, is surprisingly affordable. To find out more about the turntable no one thought possible visit your authorized Dual dealer or write:

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PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response, Hz to kHz, ±dB	Stylus Type	Principle Moving Iron, MI, Moving Magnet, MM	Individual Response	Channel Separation: 1 kHz, dB	Channel Separation: 10 kHz, dB	Output, mV, 1 kHz, 5 cm/sec, rms Lateral Velocity	Recommended Tracking Force Range, Grams	Recommended Load Capacitance, pF	Stylus Radius (Radius), Milis	Dynamic Compliance (Vertical/Lateral)	Stylus Compliance, µm/mN, User = U, Factory = F	Mounting, Integral Shell = I, P-Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$
ACUPHASE	AC-2 AC-3		MC MC													750.00 610.00	500.00 400.00
ADCDM	HC-E II HP-E II HC-vdH II XC-LT II XC-MR II SXC-vdH	20-20 +2.5,-1 20-20 +2.5,-1 20-20 +2.5,-1 20-20 ±1 20-20 ±1 20-20 +3,-1	MC MC MC MC MC MC	No No No No No No	22 22 22 25 25 25	22 22 22 23 23 23	2.3 1.25 2.3 1.6-2.0 1.6-2.0 1.8	1.6-2.0 1.25 1.6-2.0 1.6-2.0 1.6-2.0 1.8		E E V X M V	0.3 x 0.7 0.3 x 0.7 0.2 x 2.8 0.15 x 1.5 0.15 x 3.0 0.15 x 3.3		F F F F F F	S P S S S S	4.7 4.7 4.7 4.7 4.7 4.7	160.00 160.00 250.00 290.00 360.00 500.00	88.00 88.00 138.00 160.00 198.00 275.00
AKG	P-4 P-40P P-5ED P-8ES Super Nova P-10S P-10 Studio P-15S P-25S P100LE P100LE VDH	20-20 20-20 20-20 10-28 20-20 20-20 10-25 10-28 20-20 20-20 10-28	MI MI MI MI MI MI MI MI MI MI MI	No No No Yes Yes Yes Yes Yes Yes Yes Yes	20 20 25 30 25 25 30 30 30 30 30	15 15 15 25 15 22 25 25 25 25 25	1 1 1.65 0.95 1.65 1.3 0.95 0.95 1.35 1.35	1-2 1-2 1.25-2 1.2-1.6 1.25-2 1.5-4 1.2-1.6 1.2-1.6 1.35 1.35	470 470 470 470 470 470 470 475 475	E E E V E E E X V V	0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.2 x 0.7 0.2 x 0.7 0.2 x 0.7	15/ 20/20 30/30	U U U U U U U U U U U	S P S S S S S S S S S	5.5 5.5 4.8 4.8 4.8 4.8 4.8 4.8 4.8 3.5 3.5	50.00 50.00 80.00 450.00 115.00 120.00 165.00 250.00 1000.00 1000.00	25.00 25.00 40.00 270.00 57.50 60.00 82.50 150.00 1000.00 1000.00
ANDANTE	HSP H P-76 P-36	18-25 18-25 8-45 10-35	MM MM MM MM	No No No No	27 27 30 28	22 22 25 23	6.0 5.5 2.5 2.5	1.8 2.0 1.5 1.5	100 100 100 100	E S X E	0.2 x 0.7 0.5 0.3 x 0.8 0.3 x 0.8	18 18 15 15 18 18 20 20	U U U U	S S P P	6 6 5.9 5.9	34.00 27.00 59.00 50.00	20.00 16.00 35.00 30.00
APATURE	Koce Maui Panama	15-40 15-40 20-20	MC MC MM	No No No	25 20 20	22 15 15	3.2 3.0 4.0	2.0 2.0 1.25	200-500	E E E	0.3 x 0.7 0.3 x 0.7 0.4 x 0.7	10 10 8 8 25 25	U/F U/F U	S S P/S	4.2 4.2 6	200.00 100.00 60.00	
ARCAM	C77 C77Mg E77 E77Mg P77 P77Mg	20-20 ±3 20-20 ±3 20-20 ±2.5 20-20 ±2.5 20-20 ±2.5 20-20 ±2.5	MM MM MM MM MM MM	No No No No No No	20 20 20 20 20 20	15 15 15 15 15 15	4 4 4 4 4 4	1.6-2.2 1.6-2.2 1.6-2.0 1.6-2.0 1.6-2.2 1.6-2.2	200-400 200-400 200-400 200-400 200-400 200-400	S S E E X X	0.6 0.6 0.3 x 0.7 0.3 x 0.7 0.3 x 2.0 0.3 x 2.0	20 20 20 20 20 20 20 20 20 20 20 20	U U U U U U	S S S S S S	6 6.2 6 6.2 6 6.2	59.95 79.95 99.95 119.95 129.95 149.95	24.95 24.95 59.95 59.95 89.95 89.95
ARGENT	Diamond MC-110 MC-300 MC-310 MC-500H MC-500HS MC-500HR	10-50 10-50 10-40 10-40 10-40 10-50 10-50	MC MC MC MC MC MC MC	Yes Yes Yes Yes Yes Yes Yes	30 30 25 25 25 25 25	25 25 0.1 0.1 1.9 1.9 1.9	0.2 0.2 1.8-2.2 1.8-2.2 1.8-2.2 1.8-2.2 1.8-2.2	100 100 100 100 100 100 100	X X X E X X X	0.3 x 0.6 0.3 x 0.6 0.3 x 0.6 0.3 x 0.7 0.3 x 0.6 0.3 x 0.6 0.3 x 0.6	8/8 8/8 8/8 8/8 8/8 8/8 8/8	F F F F F F F	S S S S S S S	8 8 7 7 7 7 7	1200.00 300.00 150.00 100.00 200.00 260.00 300.00	600.00 120.00 60.00 40.00 100.00 130.00 150.00	
ASTATIC	MF-100-MR MF-100 MF-200 MF-300 MF-400 IM10 IM10E	20-20 10-20 ±1 10-20 ±2 10-20 ±2.5 10-18 ±3 10-15 ±3 10-15 ±2.5	Moving Flux MF MF MF MF IM IM	Yes No No No No No No	25 30 28 25 22 20 22	3.5 25 20 18 18 12 15	3.5 3.5 4.2 4.2 4.2 4.2 4.2	1-1.5 1-1.5 1.5-2 1.5-2 1.5-2.5 2.0-2.5 2.0-2.5	100 100 100 100 100 47 47	M X X S S S S	0.3 x 0.7 Parabolic Parabolic 0.3 x 0.7 0.5 0.5 0.3 x 0.7	/50 /50 /45 /35 /35 /30 /30	U U U U U U U	S S S S S S S	5.5 5.5 5.5 5.5 5.5 7.5 7.5	100.00 80.00 60.00 50.00 40.00	
AUDIOQUEST	AQ M-1 AQ MC-3 AQ MC-4 AQ MC-5 AQ 404B-MH AQ 404B-L AQ B-100MH AQ B-100L	15-30 15-35 10-40 10-40 10-50 10-50 10-50 10-50	IM MC MC MC MC MC MC MC	No No No No Yes Yes Yes Yes	25 25 25 25 25 25 25 25	20 20 2.5 2.5 1.6 1.6 0.5 1.6	3.0 2.5 2.5 2.5 2.0 2.0 2.0 2.0	1.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0	E E E X X X M M	0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.3 x 1.6 0.3 x 1.6 0.3 x 1.6 0.3 x 1.6 0.3 x 1.6	15/15 8/8 10/10 10/10 10/10 10/10 10/10 10/10	U U F F F F F F	S S S S S S S S	5.5 3.5 5.5 5.5 8.3 8.3 9.2 9.2	95.00 150.00 225.00 275.00 375.00 375.00 750.00 750.00	40.00 90.00 150.00 175.00 245.00 245.00 490.00 490.00	
AUDIO-TECHNICA	AT120E AT125LC AT130E AT140ML AT155LC AT160ML AT105 AT110E AT132EP AT152MLP AT201P AT201EP AT211EP AT216EP AT221EP AT231LP AT30HE AT30E AT31E AT35E AT312EP	15-25 ±1 10-28 ±1 10-30 ±1 5-32 ±1 5-35 ±1 5-35 ±1 20-20 ±1 20-22 ±1 10-30 ±1 5-35 ±1 20-22 ±1 20-25 ±1 15-25 ±1 15-27 ±1 10-28 ±1 10-30 ±1 15-25 ±1 15-25 ±1 15-28 ±1 15-30 ±1 15-25 ±1	MM MM MM MM MM MM MM MM MM MM MM MM MM MM MM MM MM MC MC MC MC MC	No No No Yes Yes Yes No No No Yes No No No No No No No No No No No No	29 29 30 30 31 31 26 26 30 31 26 26 29 29 31 31 31 29 29 29 29 30	20 20 20 5.0 5.0 5.0 4.5 4.5 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 2.0 1.5 1.5 0.4 0.4 0.4	5.0 5.0 5.0 0.8-1.6 0.8-1.6 0.8-1.6 0.8-1.8 1.5-2.5 1.0-2.0 1.0-2.0 1.0-2.0 1.0-1.5 1.0-1.5 1.0-1.5 1.0-1.5 1.0-1.5 1.4-1.8 1.4-2.0 1.2-1.8 1.2-1.8 1.0-1.5	100-200 100-200	E X E E X M S S S M S S E E E E E E E E E	0.3 x 0.7 0.2 x 0.7 0.2 x 0.7 0.4 x 0.7 0.2 x 0.7 0.6 0.4 x 0.7 0.2 x 0.7 0.6 0.4 x 0.7 0.4 x 0.7 0.3 x 0.7 0.2 x 0.7 0.2 x 0.7 0.3 x 0.7 0.3 x 0.7 0.3 x 0.7 0.2 x 0.7 0.2 x 0.7 0.3 x 0.7		U U	S S S S S S S S S P P/S P/S P/S P/S P/S P/S S S S S P/S	6.4 6.4 6.4 6.5 6.4 8.1 7 7 7 7 7 7 7 7 7 7 5 5 4.8 4.3 6	95.00 150.00 135.00 195.00 250.00 295.00 55.00 70.00 150.00 250.00 55.00 65.00 75.00 100.00 135.00 145.00 150.00 150.00 195.00 295.00 175.00	45.00 60.00 50.00 75.00 100.00 125.00 30.00 35.00 40.00 50.00 25.00 30.00 35.00 45.00 65.00 60.00 65.00 65.00 80.00 100.00 65.00	
A.V.A.	Longhorn	20-30 ±1	IM	No	35	30	4	1.3-1.8	200	E	0.2 x 0.5		U	S	8	99.00	45.00

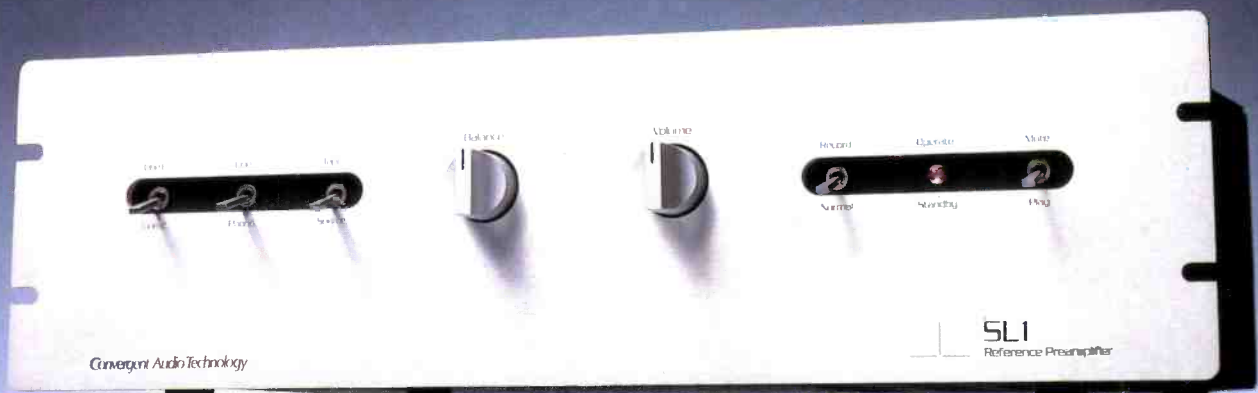
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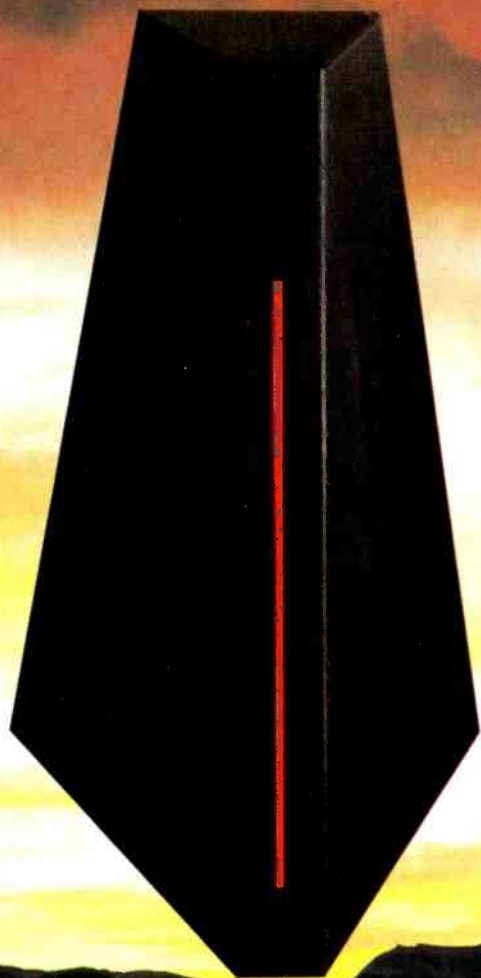
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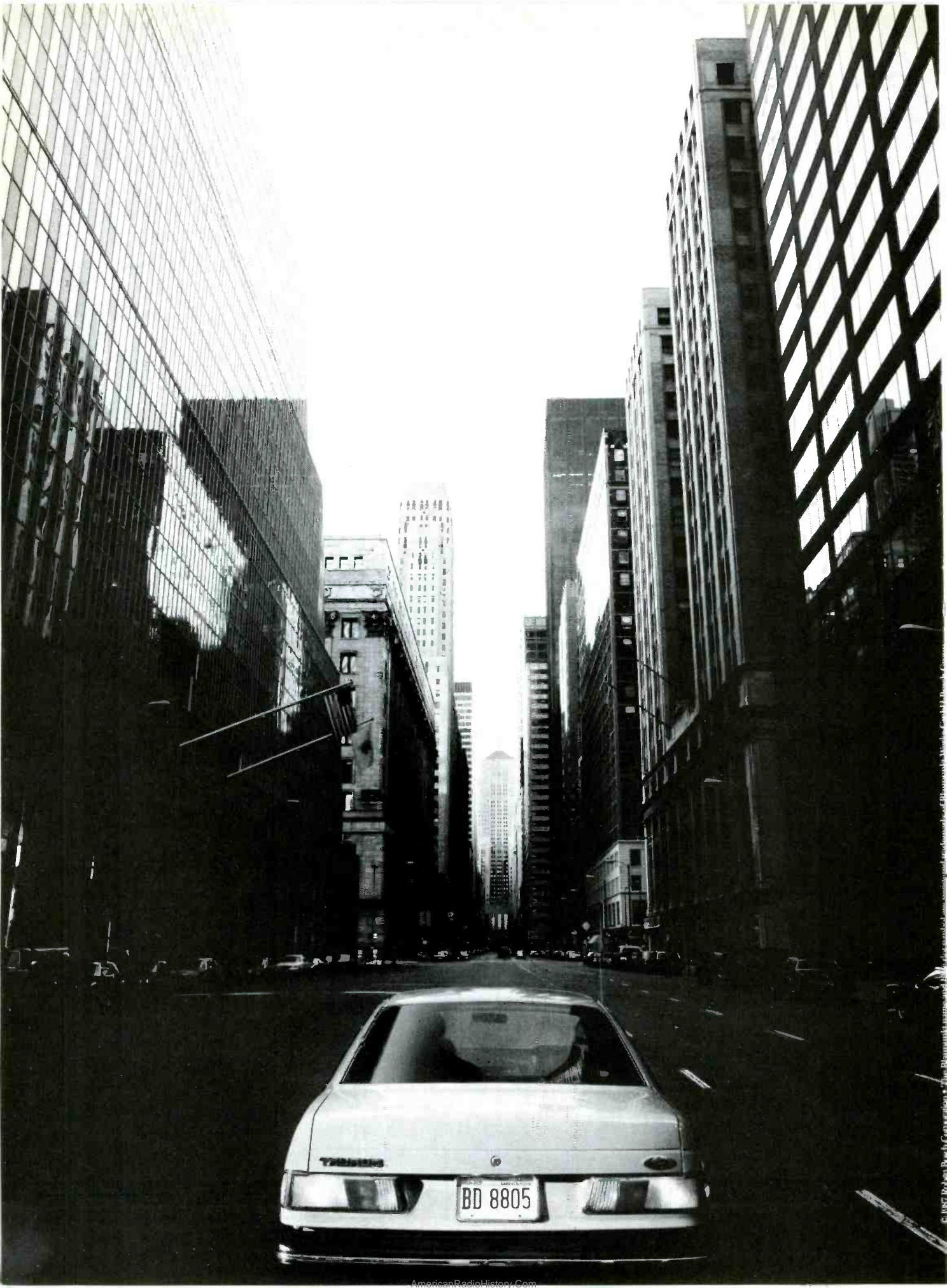
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PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response, Hz to kHz, ±dB	STYLUS TYPE C—Conical S—Spherical E—Elliptical M—MicroLine, MicroRidge, or similar V—Van den Hul X—Hyper-Elliptical, Stereohedron, Fine Line, Line Contact, Long Line, Line Trace, or similar	Principal Moving Iron—MI Moving Magnet—MM	Individual Response Curve Supplied?	Channel Separation, 1 kHz, dB	Channel Separation, 10 kHz, dB	Output, mV, 1 kHz, 5 cm Sec. rms Lateral Velocity	Recommended Tracking Force Range, Grams	Recommended Load Capacitance, pF	Stylus Type—See Code	Stylus Radius (Radii), Mils	Dynamic Compliance, Vertical/Lateral	Stylus Replacement: User = U, Factory = F	Mounting: Integral Shell = I, P-Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$	
																			Price, \$
AZDEN	GM-PSL	10-60	MC	Yes	30	28	2	1-1.5	100-300	X		17/10	F	P/S	5.9 or 8.8	250.00	125.00		
	GM-1E	10-22	MC	Yes	28	20	2	1.5-2.5	100-300	E	0.3 x 0.7	10/10	U	S	2.7	125.00	65.00		
	YM-P50VL	10-24	MM		30	25	4	1-1.5	100-300	X		17/10	U	P/S	5.9	150.00	75.00		
	YM-P50E	10-22	MM		28	22	4	1-1.5	100-300	E	0.3 x 0.7	17/10	U	P/S	5.9	90.00	45.00		
	YM-P20E	10-22	MM		24	20	4	1-1.5	100-300	E	0.3 x 0.7	17/10	U	P/S	5.9	70.00	35.00		
	YM-P50C	10-22	MM		26	20	4	1-1.5	100-300	C	0.65	17/10	U	P/S	5.9	60.00	30.00		
	YM-10VE	10-24	MM		26	20	4.5	1.5-2.5	100-300	X	0.3 x 0.7	17/10	U	S	4.5	90.00	45.00		
	YM-10E	10-22	MM		24	18	4.5	1.5-2.5	100-300	E	0.3 x 0.7	10/10	U	S	4.5	70.00	35.00		
	YM-10C	10-22	MM		22	16	4.5	1.5-2.5	100-300	C	0.65	10/10	U	S	4.5	60.00	30.00		
	BANG & OLUFSEN	MMC 1	20-20 ±1	MI	Yes	30	22	2.12	1	200-400	X	0.1 x 0.1	30/30	No	P	1.6	445.00		
MMC 2		20-20 ±1.5	MI	Yes	25	20	2.12	1	200-400	X	0.12 x 0.12	30/30	No	P	1.6	295.00		215.00	
MMC 3		20-20 ±2	MI	Yes	25	20	2.12	1.2	200-400	E	0.15 x 0.15	25/25	No	P	1.6	195.00		130.00	
MMC 4		20-20 ±2.5	MI	Yes	22	17	2.12	1.2	200-400	E	0.2	25/25	No	P	1.6	115.00		80.00	
MMC 5		20-20 ±3	MI	Yes	20	15	2.12	1.5	200-400	E	0.25	20/20	No	P	1.6	65.00			
CELLO	Chorale		MC	No				2.0-2.5		X			F	S		800.00			
CLEARAUDIO/ GOLDMUND	Clearaudio Goldmund	10-50	MC	Yes	35			2.0-2.2		X		7.7	F	S	4.4	995.00	597.00		
	Clearaudio Goldmund Gold	10-50	MC	Yes	35			2.0-2.2		X			F	S	6.4	1795.00	1077.00		
CLEARAUDIO/ SOUTHER	Veritas Integrated	10-50 ±0.5	MC	Yes	35		0.6	2.0-2.4		X		15 15	F	I	17	850.00	450.00		
	Veritas Standard	10-50 ±0.5	MC	Yes	35		0.6	2.0-2.4		X		15 15	F	S	4.4	800.00	450.00		
	Delta	10-50 ±0.5	MC	Yes	30		0.6	2.0-2.4		X		15 15	F	S		650.00	425.00		
	Gamma	10-50 ±0.5	MC	Yes	25		0.6	2.0-2.4		X		15 15	F	S		450.00			
CLEARAUDIO/ VPI	PMC-1	20-50 ±1.5	MC	Yes	35	35	0.6	1.8-2.2		X		18 22	F	S	6	740.00			
	PMC-2	10-60 ±1.5	MC	Yes	40	40	0.6	1.8-2.2		X		18 22	F	S	10	1100.00			
DENON	DL-1000	20-110	MC		30		0.12	0.7-0.9		E	0.06	50/50	F	S	6	859.00			
	DL-305	20-75	MC		28		0.20	1.0-1.4		E	0.05 x 0.1	35/35	F	S	5.8	559.00			
	DL-304	20-75	MC		28		0.18	1.0-1.4		E	0.05 x 0.1	14/14	F	S	7	395.00			
	DL-302	20-70	MC		28		0.25	1.2-1.6		E	0.05 x 0.1	14/14	F	S	6	260.00			
	DL-301	20-60	MC		28		0.30	1.2-1.6		E	0.07 x 0.14	35/35	F	S	4.7	160.00			
	DL-160	20-50	MC		28		1.60	1.3-1.9		E	0.07 x 0.14	10/10	F	S	4.8	115.00			
	DL-110	20-45	MC		25		1.60	1.5-2.1		E	0.1 x 0.2	8/8	F	S	4.8	85.00			
	DL-80	20-45	MC		20		1.60	1.5-2.1		E	0.1 x 0.2	8/8	U	S	4.5	60.00			
	DIGITRAC	300 SE	20-30 ±3	MI		24		4	1.0-1.5	200-500	X		35 35	U	P/S	6	200.00	75.00	
		200 NE	20-25 ±3	MI		22		4	1.25-1.75	200-500	E		30 30	U	P/S	6	140.00	45.00	
100 E		20-20 ±3	MI		20		4	1.25-1.75	200-500	E		25 25	U	P/S	6	100.00	35.00		
190 S		20-18 ±3	MI		20		4	1.25-1.75	200-500	S		20 20	U	P/S	6	60.00	25.00		
EMT	XSD-15FL	20-30	MC	Yes	25		1.05	2.0-3.0	800	X		15 15	F	I	21	535.00	195.00		
ENTRÉ	MC-1	20-30 ±1.5	MC	Yes	22		0.5	2.0		E	0.3 x 0.8	7/7	F	S	5.9	195.00	155.00		
	MC-5	20-30 ±1.5	MC	Yes	26		0.25	1.8		E	0.3 x 0.8	7/7	F	S	5.9	295.00	235.00		
	MC-9	20-30 ±1.5	MC	Yes	26		0.25	1.8		E	0.3 x 0.8	7/7	F	S	5.9	395.00	315.00		
EPOCH	HZ9S	10-30	MM	Yes	35	22	4.0	0.75-1.5	275	X	0.3 x 2.8	25/25	U	S	4	250.00	90.00		
	LZ9E	10-50	MM	Yes	35	22	0.2	0.75-1.5		X	0.3 x 2.8	25/25	U	S	3.8	250.00	90.00		
	LZ8S	10-40	MM	No	35	22	0.2	0.75-1.5		X	0.3 x 2.8	20/20	U	S	3.8	190.00	75.00		
	HZ8S	10-30	MM	No	35	22	4.0	0.75-1.5	275	X	0.3 x 2.8	20/20	U	S	4	190.00	75.00		
	HZ7S	10-25	MM	No	32	20	4.0	0.75-1.5	275	X	0.3 x 2.8	17/17	U	S	4	120.00	50.00		
	HZ6E	10-22	MM	No	32	15	4.0	0.75-1.5	275	E	0.2 x 0.7	15/15	U	S	4	95.00	40.00		
	FIDELITY RESEARCH	MC-44	20-20 +3,-1	MC	No	26	20	0.2	1.15-1.4		X		20 20	F	S	6.2	259.00	195.00	
MC-45		20-20 +3,-1	MC	No	26	20	0.2	1.15-1.4		X		20 20	F	S	6.2	359.00	265.00		
GOLDRING	Epic G-1010	20-18 ±3	MM	No	20		5.5	1.25-1.75		E	0.3 x 0.7	16/16	U	S	6.5	70.00	40.00		
	G-78rpm	20-20 ±2	MM	No	25		6.5	1.5-2.5	200	E	0.3 x 0.7	24/24	U	S	6.3	99.00	60.00		
	G-1020	20-20 ±2	MM	No	25		6.5	1.5-2.5	200	C	2.5		U	S	6.3	99.00	60.00		
	G-1040	20-22 ±2	MM	No	25		6.5	1.5-2.5	200	V	VDH II	16/24	U	S	6.3	125.00	70.00		
	Eroica	20-22 ±3	MC	Yes	25		2.5	1.5-2.0	100-500	V	VDH I	16/24	U	S	6.3	199.00	120.00		
	Eroica L	20-22 ±3	MC	Yes	25		0.25	1.5-2.0	100-500	V	VDH II	18/18	F	S	5.5	199.00	133.00		
									200-1000	V	VDH II	18/18	F	S	5.5	199.00	133.00		
	Electro II (high)	20-22 ±3	MC	Yes	25		2.5	1.6-2.2	100-500	V	VDH I	18/18	F	S	9	299.00	199.00		
	Electro II	20-22 ±3	MC	Yes	25		0.25	1.6-2.2	100-500	V	VDH I	18/18	F	S	9	399.00	266.00		
	Gerard Louis	20-22 ±3	MC	Yes	25		0.25	1.6-2.2	100-500	V	VDH I	18/18	F	S	9	899.00	599.00		
GRACE	F-9 Ruby	10-50 ±2	MM	No	30	25	2.6	1.3-1.7	400	E		20 20	U	S	6	495.00	355.00		
	F-9E Gold	10-50 ±2	MM	No	30	25	3.75	1.4-1.8	200	E		20 20	U	S	6	395.00	195.00		
	F-9E Super	10-47 ±2	MM	No	30	25	3.75	1.4-1.8	200	E		20 20	U	S	6	345.00	195.00		
	F-9L	10-40	MM	No	30	25	5.5	1.6-2.0	350	X		18 18	U	S	6	295.00	180.00		
	F-8L	20-20	MM	No	25	20	5.5	1.6-2.0	100	X		18 18	U	S	6	250.00	135.00		
GRADO	XTE + 1	10-50	MI	No	20		5	1.5		E			U	P/S	6	19.95	15.50		
	XCE + 1	10-50	MI	No	20		5	1.5		E			U	P/S	6	52.00	28.50		
	XTE +	10-50	MI	No	20		5	2		E			U	S	6	27.50	18.75		
	XCE +	10-50	MI	No	20		5	2		E			U	S	6	40.00	26.50		
	XF3E +	10-55	MI	No	25		5	1.5		E			U	P/S	6	66.00	30.80		
	XF1 +	10-55	MI	No	25		5	1.5		E			U	P/S	6	99.00	42.00		
	X +	10-60	MI	No	25		5	1.5		E			U	P/S	6	120.00	47.50		
	X1 +	10-60	MI	No	25		5	1.5		E			U	P/S	6	180.00	69.00		
	X2 +	10-60	MI	No	25		5	1.5		E			U	P/S	6	265.00	100.00		

PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response, Hz to kHz, ± dB	Stylus Type	Principal Moving Iron = MI, Indirect Magnets = IM, Moving Magnet = MM	No.	Individual Response Curve Supplied?	Channel Separation, 1 kHz, dB	Channel Separation, 10 kHz, dB	Distort, mV, 1 kHz, 5 cm/sec rms Lateral Velocity Range, Grams	Recommended Tracking Force	Stylus Type—See Code	Stylus Radius (Radius), Mills	Dynamic Compliance, Vertical/Lateral	Stylus Replacement: User = U, Factory = F	Mounting: Integral Shell = I, P Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$
ORTOFON (Continued)	OMP-10	20-22 +3,-1.5	VMS	No	22		4.0	1.25	200-500	E		30/30	U	P	6	95.00	40.00	
	OM-5E	20-20 +3,-1.5	VMS	No	22		4.0	1.25-2.0	200-500	E		25/25	U	S	2.5	65.00	30.00	
	OMP-5E	20-20 +3,-1.5	VMS	No	22		4.0	1.25-1.5	200-500	E			U	P	6	65.00	30.00	
	FF15XEMKII	20-20	VMS	No	20		6.0	1.5-3.0	400	E		20/20	U	S	5	50.00	20.00	
	TM20U	20-20 + 3,-1	VMS	No	25		3.5	1.0-1.5	400	X		35/35	U	P/S	6	129.00	75.00	
	TM14U	20-20	VMS	No	20		4.5	1.0-1.5	400	E		30/30	U	P/S	6	89.00	30.00	
	TM7U	20-20	VMS	No	20		5	1.0-1.5	400	E		30/30	U	P/S	6	60.00	25.00	
	VMS30MKII	20-20	VMS	No	27		5.0	1.0-1.6	400	X		22/22	U	S	5	185.00	90.00	
	VMS20EMKII	20-20	VMS	No	25		5.0	1.0-1.2	400	E		25/25	U	S	5	155.00	70.00	
	VMS10EMKII	20-20	VMS	No	25		5.0	1.7-2.3	400	E		20/20	U	S	5	130.00	50.00	
	VMS5EMKII	20-20	VMS	No	20		6.0	1.7-2.3	400	E		20/20	U	S	5	80.00	30.00	
VMS3EMKII	20-20	VMS	No	20		6.0	1.7-2.3	400	E		15/15	U	S	5	60.00	20.00		
PARASOUND	PCe77	20-25 ± 0.8	IM		30	24	4.0	1.25	360	E	0.4 x 0.7		U	P	5.9	75.00		
	IM-1700	20-20 ± 1	IM		28	22	5	1.25	360	C	0.6		U	P	5.9	50.00		
	PCs95	20-20 ± 1	IM		28	22	5	1.25-2.0	360	C	0.6		U	P	3.8	50.00		
PICKERING	XLZ/7500S	10-50	MM	No	35		0.33	0.75-1.5		X	0.3 x 2.8	30/	U	S	5	250.00	90.00	
	XSV/5000	10-50	MM	No	35		3.8	0.75-1.5	275	X	0.3 x 2.8		U	S	5.6	250.00	80.00	
	XSV/4000	10-36	MM	No	35		3.8	0.75-1.5	275	X	0.3 x 2.8	30/	U	S	5.6	180.00	56.00	
	XSV/3000	10-30	MM	No	35		3.8	0.75-1.5	275	X	0.3 x 2.8	30/	U	S	5.6	120.00	49.95	
	TLZ/7500S	10-50	MM	No	35		0.33	0.75-1.5		X	0.3 x 2.8		U	P/S	5.9	250.00	90.00	
	XSP/4004	10-36	MM	No	35		3.8	0.75-1.5	275	X	0.3 x 2.8	30/30	U	P/S	5.9	180.00	56.00	
	XSP/3003	10-30	MM	No	35		5.0	0.75-1.5	275	X	0.3 x 2.8	30/30	U	P/S	5.9	120.00	49.95	
	TL-4 Super	10-25	IM	No	35		4.4	0.75-1.5	275	X	0.3 x 2.8	15/15	U	P/S	5.9	150.00	45.00	
	TL-3S	10-25	IM	No	35		4.4	0.75-1.5	275	X	0.3 x 2.8		U	P/S	5.9	125.00	40.00	
	TL-2S	10-22	IM	No	35		4.4	0.75-1.5	275	X	0.3 x 2.8		U	P/S	5.9	100.00	36.00	
	TL-2E	10-22	IM	No	35		4.4	0.75-1.5	275	E	0.3 x 0.7		U	P/S	5.9	85.00	29.50	
	TL-1	10-20	IM	No	32		4.4	0.75-1.5	275	E	0.3 x 0.7		U	P/S	6	75.00	24.50	
	TLE-Type 2	10-20	MM	No	28		3.0	1-1.5	275	E	0.3 x 0.7		U	P/S	6	55.00	22.50	
	TLE	10-20	MM	No	28		4.4	1-1.5	275	E	0.3 x 0.7		U	P/S	6	50.00	20.00	
	XV-15/625E	10-25	IM	No	35		4.4	0.75-1.5	275	E	0.3 x 0.7	15/	U	S	6.3	100.00	30.00	
	XV-15/400E	10-25	IM	No	35		4.4	1-2	275	E	0.4 x 0.7	12/	U	S	6.3	85.00	28.50	
	V-15 IIE	10-18	IM	No	22		3.5	1-2	275	E	0.3 x 0.7		U	S	5.5	45.00	16.50	
	XV-15/625DJ	20-20	IM	No	30		4.4	1-4	275	E	0.4 x 0.7		U	S	5.5	75.00	30.00	
	TL 625DJ	20-20	IM	No	30		4.4	3.5-4	275	E	0.4 x 0.7		U	P/S	8.5	75.00	30.00	
V-15 DJ	20-20	MM	No	28		4.4	3-7	275	S	0.7		U	S	5.5	39.95	12.85		
V-15 DJ-P	20-20	MM	No	28		4.4	3-7	275	S	0.7		U	S	5.5	76.95	81.00		
PREMIER	LMX Boron	10-45	MC	Yes	30	25	0.35	1.8-2.2		V		18/18	F	S	4.75	284.00	156.00	
	LME Improved	10-40	MC	Yes	30	25	0.35	1.6-2.0		E	0.3 x 0.8	18/18	F	S	4.75	180.00	99.00	
	LMS Improved	10-35	MC	Yes	27	22	0.35	1.6-2.0		S	0.6	18/18	F	S	4.75	152.00	84.00	
RATA	RP20	20-20 ± 3	MM	No	25		4.5	1.5-1.75	150	E		16/	U	I	7.1	50.00	35.00	
	RP40	20-20 ± 3	MM	No	26		4.5	1.5-1.75	150	E		16/	U	I	7.1	100.00	70.00	
	RP70	20-20 ± 3	MM	No	26		4.5	1.5-1.75	150	X		16/	U	I	7.1	200.00	150.00	
	RP70V	20-20 ± 3	MM	No	26		4.5	1.5-1.75	150	V		16/	U	I	7.1	300.00	225.00	
REGA RESEARCH	RB100		MM	No				1.5-1.9		E			F	S	6	99.00	60.00	
SAEC	C-1	10-50	MC	No	30		0.4	1.25-1.75		X		10/	F	S	9	495.00	396.00	
	C-2	10-30	MC	No	25		2.5	1.55-2.05		X		8/	F	S	9.5	395.00	315.00	
	C-102	20-30	MC	No	25		0.6	1.45-1.95		X		10/	F	S	7	250.00	200.00	
SHINON	Titan	20-40	MC	No			0.4	1.25-1.5								239.00	119.00	
	mV2.5	20-40	MC	No			2.5	1.75-2.25								359.00	179.00	
	Saphic	20-40	MC	No			0.28	1.75-2.25								499.00	249.00	
	Red Boron	20-40	MC	No			1.2	1.6-1.8								719.00	359.00	
	Red Boron Signature	20-50	MC	No			1.0	1.6-1.8								999.00	499.00	
SHURE	Ultra 500	10-35 ± 0.5	MM	No	27	20	3.2	1-1.25	250	M	0.15 x 3.0		U	S	9.3	400.00	145.00	
	Ultra 400	10-30 ± 0.5	MM	No	27	17	4.0	1-1.25	250	M	0.15 x 3.0		U	S	4.5	250.00	110.00	
	Ultra 300	10-22 ± 0.5	MM	No	25	17	4.0	1-1.25	250	M	0.15 x 3.0		U	S	4.5	160.00	84.00	
	V15 Type V-MR	20-28 ± 1.5	MM	Yes	25	18	3.2	0.75-1.5	250	M	0.15 x 3.0		U	S	6.6	297.00	136.00	
	V15 Type V-B	20-28 ± 1.5	MM	Yes	25	18	3.2	0.75-1.5	250	X	0.2 x 1.5		U	S	6.6	237.50	120.00	
	V15 Type V-P	20-28 ± 1.5	MM	Yes	25	18	3.2	1.25	250	X	0.2 x 1.5		U	P	5.9	202.50	109.00	
	ML140HE	20-22	MM	No	25	15	4.0	1.0-1.25	250	X	0.2 x 1.5		U	S	4.5	214.95	108.95	
	ML120HE	20-22	MM	No	25	15	3.5	1.0-1.25	250	X	0.2 x 1.5		U	S	4.5	166.95	83.95	
	M111HE	20-20	MM	No	25	4	4.0	1.25	250	X	0.2 x 1.5		U	P/S	8.3	145.95	63.95	
	M110HE	20-20	MM	No	25	4	4.0	1.25	250	X	0.2 x 1.5		U	P/S	7.3	118.95	53.95	
	M105E	20-20	MM	No	25	4	4.7	1.25	250	E	0.2 x 0.7		U	P/S	7.8	107.95	44.95	
	M104E	20-20	MM	No	21	5	5.0	1.25	250	E	0.2 x 0.7		U	P/S	7.3	75.95	34.95	
	M99E	20-20	MM	No	21	5	5.0	1.25	250	E	0.2 x 0.7		U	P/S	7.3	53.95	24.95	
	M92E	20-18	MM	No	21	5	5.0	1.25	250	E	0.2 x 0.7		U	P/S	7.3	32.95	19.95	
	M44E	20-20	MM	No	20	9	9.5	1.75-4.0	450	E	0.4 x 0.7		U	S	6.7	61.95	27.95	
	M44C	20-20	MM	No	20	9	9.5	3.0-5.0	450	S	0.7		U	S	6.7	54.95	24.95	
	M44G	20-20	MM	No	20	9	6.2	0.75-1.5	450	S	0.6		U	S	6.7	56.95	25.95	
	M44-7	20-20	MM	No	20	9	9.5	1.5-3	450	S	0.7		U	S	6.7	54.95	24.95	
	M55E	20-20	MM	No	20	9	6.2	0.75-2	450	E	0.2 x 0.7		U	S	6.7	70.95	29.95	
	SC35C	20-20	MM	No	20	10	5.0	4-5	450	S	0.6		U	S	6.2	48.50	18.50	
	SC39B	20-20	MM	No	20	10	4.0	1.5-3	250	S	0.7		U	S	6.3	68.00	27.80	
	SC39EJ	20-20	MM	No	20	10	4.0	1.5-3	250	E	0.4 x 0.7		U	S	6.3	76.00	34.90	
	DC40	20-20	MM	No	20	10	5.0	2.5-3.5	570	S	0.7		U	S	5.2	76.00	17.00	
	DC50	20-20	MM	No	20	10	5.0	1.0-1.5	570	E	0.4 x 0.7		U	P	5.8	106.00	24.00	
	DC60	20-20	MM	No	20	10												



After the mountains of Europe, the canyons of North America pose no problem for a Blaupunkt.

For a Blaupunkt car stereo, the radio reception difficulties created by big city buildings are no big deal.

Because ever since the first



Blaupunkt was introduced in 1932, our tuners have had to overcome much bigger obstacles.

The Alps.

The Pyrenees.

The Apennines.

These European mountain ranges make even the towering headquarters of modern mega-corporations appear puny by contrast.

Yet thanks to the ingenuity of our 326 car audio engineers in Hildesheim, West Germany, Blaupunkt car stereos are superbly equipped to handle even the most extreme FM reception problems.

You see, a car stereo's ability to capture an FM radio signal is determined by five factors: FM sensitivity. Selectivity. Multi-path distortion. Signal attenuation. And RF intermodulation.

Most car stereo systems do a reasonably good job with two—perhaps three—of these factors.

But due to the persistence of our engineers—and the dozens of patents we've earned in this area alone—Blaupunkt's CODEM III and ORC II dynamic tuning systems do exceptionally well in all five areas.

Which helps explain why Blaupunkt has earned a reputation for engineering the world's finest tuners.

We even take the trouble to design our own antennas.

Something not one of our competitors bothers with.

So if you're an urban motorist frustrated by all those buildings wreaking havoc with the signals of all your favorite stations, pay a visit to your independent Blaupunkt car stereo specialist. (For the one nearest you, please call us at 1-800-237-7999.)

What you hear will be music to your ears.

Without all the static you've been accustomed to.

● BLAUPUNKT
Designed for people with ears.
And something between them.

PHONO CARTRIDGES

STYLUS TYPE C—Conical S—Spherical E—Elliptical M—MicroLine, MicroRidge, or similar V—Van den Hul X—Hyper-Elliptical, Stereohedron, Fine Line, Line Contact, Long Line, Line Trace, or similar	Model	Frequency Response, Hz to kHz, ±dB	Principal Moving Parts: Incl. Magnet IM, Moving Coil—MC	Individual Response Curve Supplied?	Channel Separation, 1 kHz, dB	Channel Separation, 10 kHz, dB	Output, mV, 1 kHz, 5 cm/sec. rms Lateral Velocity	Recommended Tracking Force Range, Grams	Stylus Type—See Code	Stylus Radius (Radius), Mills	Dynamic Compliance, Vertical/Lateral, μm/mN	Stylus Replacement: User = U, Factory = F	Mounting: Integral Shell = I, P Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$		
SIGNET (Continued)	MRS-0ml	5-37	MM	No	33	25	5.0	0.8-1.6	100-200	M		U	S	6	350.00	175.00		
	TK10ml/II	6-35	MM	No	35	26	2.2	1.0-1.5	100-200	M		U	S	7.5	450.00	225.00		
	MK55e	20-28	MC	No	25	18	0.5	1.2-1.8		E	0.3 x 0.7	U	S	4.2	150.00	75.00		
	MK66e	15-30	MC	No	25	18	0.5	1.2-1.8		E	0.2 x 0.7	U	S	4.2	200.00	100.00		
	MK120He	15-30	MC	No	25	18	2.0	1.2-1.8		E	0.2 x 0.7	U	S	5	200.09	100.00		
	MK220e	5-50	MC	No	25	18	0.4	1.0-2.0		E	0.2 x 0.7	F	S	4.8	400.00			
	MK440ml	5-50	MC	Yes	25	18	0.1	1.0-1.6		M		F	S	7	600.00			
	101	20-20	MM	No	24	15	5.0	1.0-1.5	100-200	C	0.7	U	P	S	6	60.00	30.00	
	103	15-25	MM	No	25	17	5.0	1.0-1.5	100-200	E	0.4 x 0.7	U	P	S	6	90.00	45.00	
	105	15-27	MM	No	29	18	5.0	1.0-1.5	100-200	E	0.3 x 0.7	U	P	S	6	110.00	55.00	
	107	10-30	MM	No	31	21	5.0	1.0-1.5	100-200	X		U	P	S	6	150.00	75.00	
	H12a	20-22	MM	No	26	17	2.0	1.5-2.5	100-200	E	0.4 x 0.7	U	S	4.8	90.00	45.00		
	TK2Ep	15-25	MM	No	26	17	5.0	1.0-1.5	100-200	E	0.4 x 0.7	U	P	S	6	65.00	32.50	
	TK4Ep	15-28	MM	No	28	19	5.0	1.0-1.5	100-200	E	0.3 x 0.7	U	P	S	6	95.00	45.00	
	TK6Ep	10-30	MM	No	29	20	5.0	1.0-1.5	100-200	E	0.2 x 0.7	U	P	S	6	150.00	75.00	
	TK&LCP	5-35	MM	No	33	23	5.0	1.0-1.5	100-200	X		U	P	S	6	250.00	125.00	
	SONUS	D-5	10-20 ± 1	MI	Yes	30	25	4	1-1.25	340	X		F	S	5.5	250.00	125.00	
		SB-11	20-20	MI	No	30	25	4	1-1.5	340	X		F	S	5.5	195.00	98.00	
		CG-12	10-30	MI	No	30	25	4	1-1.5	340	X		U	S	5.5	165.00	87.00	
		CS-22	10-38	MI	No	30	25	5	1-1.5	340	X		U	S	5.5	100.00	45.00	
CS-23		20-22	MI	No	30	25	5	1-1.5	340	E		U	S	5.5	95.00	45.00		
CB-23		20-22	MI	No	30	25	5	1.5-2.0	340	E		U	S	5.5	80.00	40.00		
SR-202		10-20	MI	No	30	25	5	1.5-2.5	340	X		U	S	5.5	60.00	25.00		
SPM-5		20-20	MI	No	30	25	5	1.25	340	E		U	P	S	5.5	160.00		
SPM-4		20-20	MI	No	30	25	4	1.25	340	X		U	P	S	5.5	135.00		
SPM-3		20-20	MI	No	30	25	4	1.25	340	E		U	P	S	5.5	135.00		
SPM-2		20-20	MI	No	30	25	4	1.25	340	E		U	P	S	5.5	90.00		
SPM-1		20-20	MI	No	30	25	4	1.25	340	E		U	P	S	5.5	90.00		
STANTON		981Z MKIIS	10-50	MM	Yes	35	25	0.3	0.75-1.5		X	0.3 x 2.8	30/	U	S	5.5	250.00	90.00
	981H MKIIS	10-50	MM	Yes	35	25	3.5	0.75-1.5	275	X	0.3 x 2.8	30/	U	S	5.5	250.00	90.00	
	981 MKIIS	10-25	MM	Yes	35	25	3.5	0.75-1.5	275	X	0.3 x 2.8	30/	U	S	5.5	180.00	75.00	
	681EEE MKIIS	10-22	IM	Yes	35	25	3.5	0.75-1.5	275	X	0.3 x 2.8	25/	U	S	6.3	120.00	45.00	
	L847S	10-36	MM	No	35	25	2.5	0.75-1.5	275	X	0.3 x 2.8		U	P	S	5.9	180.00	60.00
	L837S	10-30	MM	No	35	3.0	0.75-1.5	275	X	0.3 x 2.8		U	P	S	5.9	140.00	55.00	
	L747S	10-25	MM	No	35	4.4	0.75-1.5	275	X	0.3 x 2.8		U	P	S	5.7	125.00	40.00	
	L737S	10-22	MM	No	35	4.4	0.75-1.5	275	X	0.3 x 2.8		U	P	S	5.7	100.00	36.00	
	L737E	10-22	MM	No	35	4.4	0.75-1.5	275	E	0.3 x 0.7		U	P	S	5.7	85.00	29.50	
	L727E	10-20	MM	No	32	4.4	0.75-1.5	275	E	0.3 x 0.7		U	P	S	5.7	75.00	24.50	
	L725E	10-22	MM	No	28	3.0	0.75-1.5	275	E	0.4 x 0.7		U	P	S	5.7	55.00	22.00	
	L720EE	10-20	MM	No	28	3.2	0.75-1.5	275	E	0.4 x 0.7		U	P	S	5.7	50.00	20.00	
	L680EL	20-18	IM	No	30	4.5	3.5-4	275	X	0.4 x 0.7		U	P	S	8.4	106.00	30.00	
	680EL	20-18	IM	No	30	4.5	2-5	275	E	0.4 x 0.7		U	S	5.5	106.00	30.00		
	681SE	10-10	IM	Yes	35	4.5	2-4	275	E	0.4 x 0.7	13.5/	U	S	6.3	110.00	39.00		
	680AL	20-18	IM	No	30	4.5	2-5	275	S	0.7	13/13	U	S	5.5	90.00	25.00		
	500AL	20-17	MM	No	28	4.0	2-5	275	S	0.7	10/	U	S	5	53.00	12.00		
	L500AL	20-17	MM	No	28	4.0	3.5-4	275	S	0.7		U	P	S	8.4	53.00	12.00	
	500AL-DP	20-17	MM	No	28	4.0	3.5-4	275	S	0.7		U	S	8.4	65.00	12.00		
	680EE(S)	10-20	IM	No	35	3.5	0.75-1.5	275	E	0.3 x 2.8	18/18	U	S	6.3	95.00	43.75		
680EE	20-20	IM	No	35	3.5	0.75-1.5	275	X	0.3 x 0.7	18/18	U	S	6.3	75.00	31.25			
600EE(S)	20-20	MM	No	35	3.5	1-2	275	E	0.3 x 0.7		U	S	5.5	66.00	27.50			
600E	20-20	MM	No	35	4.5	1.5-3	275	E	0.4 x 0.7	11/	U	S	5.5	56.50	25.00			
500EE MKII	10-22	MM	No	35	4.5	0.75-1.5	275	E	0.3 x 0.7	16/	U	S	5.5	50.00	25.00			
500E MKII	10-22	MM	No	35	4.5	0.75-1.5	275	E	0.4 x 0.7	14/	U	S	5.5	45.00	20.00			
SUPEX	SDX-3300 Boron	10-30 ± 1	MC	Yes	32	25	0.2	1.6-2.0		E	0.3 x 0.7	14/14	F	S	5.3	1009.00	555.00	
	SD-901 IV	10-42 ± 2	MC	Yes	30	25	1.7	1.6-2.0		E	0.3 x 0.8	15/15	F	S	9.1	380.00	209.00	
	SD-900 IV	10-50 ± 2	MC	Yes	30	25	0.2	1.6-2.0		E	0.3 x 0.8	15/15	F	S	8.3	360.00	198.00	
	SD-900 E + Super	10-50 ± 2	MC	Yes	30	25		1.6-2.0		E	0.3 x 0.8	20/20	F	S	8	324.00	178.00	
	SD-330	20-30 ± 2	MC	Yes	30	25	0.15	1.5-1.9		E	0.3 x 0.7	15/15	F	S	3	240.00	132.00	
TALISMAN	Virtuoso DTi	15-32 + 2, -0.5	MC	Yes	35	30	1.8	1.8-2.2		V		15/15	F	S	7.5	1200.00	660.00	
	Virtuoso Boron	15-32 + 2, -0.5	MC	Yes	35	30	1.8	1.8-2.2		V		15/15	F	S	7.5	856.00	471.00	
	Alchemist IIB	15-32 + 2, -0.5	MC	Yes	35	30	1.8	1.8-2.2		X		15/15	F	S	6.7	473.00	260.00	
	Alchemist IIS	10-60	MC	Yes	30	25	1.8	1.8-2.2		X		18/18	F	S	6.7	462.00	254.00	
	Alchemist IA	20-40	MC	Yes	25	20	1.8	1.5-2.1		E	0.3 x 0.7	15/15	F	S	6.7	323.00	178.00	
	S	10-60	MC	Yes	30	25	0.26	1.8-2.2		X	0.2 x 1.2	18/18	F	S	6.3	395.00	217.00	
	B	10-50	MC	Yes	30	25	0.26	1.5-2.1		X	0.2 x 1.2	15/15	F	S	6.3	345.00	190.00	
	A	20-40	MC	Yes	25	20	0.20	1.5-2.1		E	0.3 x 0.7	15/15	F	S	6.3	253.00	139.00	
TECHNICS	EPC-305MCII	5-100	MC									I			350.00			
	EPC-205CMK4	20-15 ± 0.5	MM	Yes	25	20	2.5	1.0-1.5		E	0.2 x 0.7	U	S	15.5	290.00			
	EPC-P205CMK4	20-15 ± 0.5	MM	Yes	25	20	1.25	1.25		E	0.2 x 0.7	U	P	6	275.00			
	EPC-P310MC2	20-15 ± 0.5	MC	Yes	25	20	0.22	1.25		E	0.2 x 0.7	F	P	6	220.00			
	EPC-P550	20-35 ± 3	MM	No	25	25	2.5	1.25		E	0.3 x 0.7	U	P	6	125.00			
	EPC-P540	20-35 ± 3	MM	No	25	25	2.5	1.25		E	0.3 x 0.7	U	P	6	80.00			
	EPC-P530	20-30 ± 3	MM	No	25	25	2.5	1.25		E	0.3 x 0.7	U	P	6	60.00			
VAN DEN HUL	MC-10	20-20 ± 0.75	MC	Yes	40	40	0.35	1.3-1.5		V		20/35	F	S	7.3	695.00	200.00	
	MC-One	20-20 ± 0.75	MC	Yes	40	40	0.4	1.3-1.5		V		20/35	F	S	7.3	975.00	200.00	
WIN RESEARCH	FET-10 & Source Module	0-50 ± 0.5	FET	Yes	35	28	1V	0.75-2.0		X	0.03 x 0.3	20/20	F	S	6	1850.00	250.00	
YAMAHA	MC-100	10-20 ± 1.5	MC	No	28		0.2	1.2-1.6		E	0.3 x 1.6	16/12	F	S	9.6	300.00		
	MC-505	10-20 ± 1.5	MC	No	28		0.35	0.3-1.5		E	0.14 x 0.07	14/16	F	S				

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“It is so clearly superior to past amplifiers in the low- to mid-priced range—not to mention most amplifiers two to three times its price—that I can unhesitatingly recommend it for even the most demanding high end system.”

Anthony Cordesman

stereophile

vol. 8, no. 4



**ADCOM GFA-555
POWER AMPLIFIER
HIGH POWER, HIGH CURRENT**

“..it rivals any transistor power amplifier in its power class that I have heard—including high-powered receivers or amps with trick power supplies—at any price.”

The complete review:

A BEST-BUY BREAKTHROUGH OR THE START OF A NEW WAVE?

I am reluctant to call any given transistor power amp a “best buy” or breakthrough. From my talks with designers and other audiophiles, it is clear that the state of the art in power amplifiers is about to change. From where I stand, the Adcom GFA-555 is the first sample of this new wave. It is so clearly superior to past amplifiers in the low- to mid-priced range—not to mention most amplifiers two to three times its price—that I can unhesitatingly recommend it for even the most demanding high end system.

The GFA-555 does everything well, and most things exceptionally well. It provides superb, well-controlled bass with far better speaker load tolerance than most amps. Its midrange and treble are remarkably low in coloration. There is no hint of hardness, and none of the loss of inner detail common to transistor amplifiers.

“The Adcom’s soundstage is sufficiently superior that even those who claim all power amplifiers sound alike might hear the difference.”

With the exception of the Krells, I have never heard a more detailed, natural, and extended upper four octaves in a transistor amp. The Adcom may even be a legitimate rival to the Krell; it’s brighter and more dynamic, and somewhat more open. And, like the Krell, it gives the impression, on really good material, that the amplifier simply isn’t there, on really good material. Nor is the Adcom romantic or sweet, like New York Audio’s new Moscodes. Rather, it offers natural upper octave detail that the latter miss. Other amplifiers have similar upper octave performance, but I unhesitatingly recommend the Adcom over the very stiff competition from Tandberg and Threshold.

The Adcoms’ soundstage is sufficiently superior that even those who claim all power amplifiers sound alike might hear the difference. It comes very close to the better tube power amplifiers in providing detailed, stable, realistic imaging with natural depth. It is not an Audio Research D-250, but is extraordinarily holographic—I suspect almost embarrassingly so. This kind of soundstage has previously cost at least \$2000.

I am also highly impressed with this amplifier’s dynamics. Once again, it is not going to survive a one-on-one with the Audio Research D-250 or Conrad Johnson Premier Fives, but it rivals any transistor power amplifier in its power class that I have heard—including high-powered receivers or amps with trick power supplies—at any price. It provides these dynamics into virtually any load without bloat, restriction of sound, or change in timbre. For all the nonsense published by most manufacturers about driving complex loads, this amplifier actually delivers.

The Adcom does not lose sweetness and detail as its power goes up. I am normally leery of transistor amplifiers rated much above 100 watts; they too often blur detail and harmonic information, and this sonic price tag is far more costly than the added power is worth. This does not happen with the Adcom unless the distortion lights are blinking, and they only blink when the amp is delivering well over its rated 200 watts per channel (8 ohms) or 325 watts (4 ohms). By comparison, once-outstanding high power amplifiers like the Hafler DH-500 now sound annoyingly veiled.

With a minor dealer modification, you can even drive 1 ohm loads like the Scintilla. I can’t measure whether the Adcom delivers its rated 800 watts per channel into 2 ohms, or 20 amps peak, but I *can* tell you that it does a superb job of driving this superb speaker. Anything in its price range (or even close) generally changes timbre and degenerates when driving the Scintilla at 1 ohm.

“For all the nonsense published by most manufacturers about driving complex loads, this amplifier actually delivers.”

I’m going to have to say a few words about its technology before I give Adcom a swelled head. You’ll be happy to note that the manufacturer claims for the GFA-555 a simple gain path, a 700 watt toroidal transformer, a well-regulated high current power supply, new ultra-stable bias circuitry, direct coupling, no current limiting, and no output inductor. More substantively, its harmonic shape mixes suitable yinyang while avoiding the curse of pyramidology. This, of course, means that it weighs 34 pounds, has simple rack-mount black styling, pilot lights, warning lights (to indicate distortion levels above 1%), and measures exactly 7 $\frac{3}{16}$ ” by 12 $\frac{1}{4}$ ” by 19”.

More pragmatically, the technical specifications are significant in that they represent reasonable bandwidth (4-150,000 Hz), damping (150-200), gain (27 dB), and noise (-106 dB). Of these, only the noise specification is outstanding. No attempt is made to beat distortion records: .09% THD at rated power into 8 ohms, and .25% into 4. I have heard so many power amplifiers with infinitely (well, an order of magnitude) better specifications sound so much worse; this may be the amplifier whose sound could convince *Stereo Review*, *High Fidelity*, etc. that their present measurements are virtually worthless.

I suspect that the Adcom is going to force many designers in the \$1000-1500 range to either make radical improvements in their products over the next six months, or look at the possibility of retiring from competition. This is a “must” amplifier to audition before you spring for anything close in

“I suspect that the Adcom is going to force many designers in the \$1000-1500 range to either make radical improvements in their products...or look at the possibility of retiring from competition.”

price. If the Adcom is simply the first of a whole wave of good amplifiers, it will help revitalize the high end for the average audiophile, and force most manufacturers into more reasonable pricing. Now, Adcom, if you can only come up with a preamp as good!

AHC

ADCOM®

11 Elkins Road, East Brunswick, NJ 08816 U.S.A.
Distributed in Canada by: PRO ACOUSTICS INC.
Pointe Claire, Quebec 49R4X5

Manufacturer’s note: Approximate retail prices listed in order of mention in review:

Adcom GFA-555	\$ 700
Krell	2300-7500
N.Y. Audio Moscode	900-1600
Tandberg	1000-2000
Threshold	1490-3150
Audio Research D-250 (MK II)	6000
Conrad Johnson Premier 5 (pair)	6000
“high powered receivers”	?
“amps with trick power supplies”	?
Hafler DH-500	850

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CASSETTE DECKS

MANUFACTURER	Model (RO) - Remote Included, (R) - Remote Optional	Frequency Response with C-90 Tape (Type III), Hz to kHz, ±dB		Number of Heads	Wow & Flutter, Wtd. Peak, %	S/N without Noise Reduction, 'A' Wtd., -dB	S/N with Noise Reduction, 'A' Wtd., -dB	Noise Reduction Circuit, Dolby B - B, C - C, dbx - D, X - Pro - H, Other = 0	Bias Adjustment Auto - A, Manual = M	Number of Preset Bias EQ Positions	Program Search?	Level Indicator, Average = A, Peak = P, Peak-Hold = PH	Count Indication, Number of Turns = T, Biasing Time = E, Remaining Time = R	Auto Reverse?	Number of Milke Inputs	Dual Wells?	Weight, Lbs.	Price, \$	Notes
		20-20 ± 2	3																
ADS	C4(RO)	20-20 ± 2	3	0.04	58	74	B/C	M	3	Yes	No	P	T/E/R	No	2	No	25	1400.00	
	C3(RO)	20-20 ± 2	3	0.04	58	74	B/C	M	4	No	No	P	T	No	2	No	23	969.00	Two speeds.
AIWA	AD-WX909	10-19	3	0.055		80	B/C/H	M	2	Yes	Yes	PH	T	Yes	0	Yes	13.7	750.00	
	AD-WX808	20-19	2	0.055		78	B/C	M	2	Yes	No	P	T	Yes	0	Yes	11	350.00	
	AD-WX707	20-17	2	0.055		78	B/C	M	2	No	No	P	T	No	0	Yes	11	250.00	
	AD-WX180	20-16	2	0.06		78	B/C	M	2	No	No	P	T	No	0	Yes	7.7	450.00	
	AD-WX220	20-17	2	0.038		78	B/C	M	3	Yes	No	P	T	Yes	0	Yes	12.3	550.00	
	AD-W20	20-15	2	0.06		76	B/C	M	2	No	No	P	T	No	0	Yes	12.3	550.00	
	AD-F770	20-18	3	0.025		80	B/C/H	A	3	Yes	No	P/PH	T/R	No	2	No	12.1	550.00	
	AD-S40	20-17	3	0.028		78	B/C/H	A	3	No	No	P	T	No	0	No	10.4	350.00	
	AD-R30	20-16	2	0.065		78	B/C	M	3	Yes	No	P	T	Yes	0	No	8.8	180.00	
AD-S15	20-16	2	0.065		78	B/C	M	3	Yes	No	P	T	Yes	0	No	8.8	150.00		
AKAI	GX-R99-B (RO)	20-19 ± 3	3	0.026	60		B/C	A	3	Yes	Yes	PH	E/R	Yes	0	No	19.1	649.00	Direct drive. Computer-based record level.
	GX-8-B	20-20 ± 3	3	0.025	60		B/C/D	M	3	Yes	Yes	PH	E/R	No	0	No	14.3	629.00	
	GX-6-B	20-20 ± 3	3	0.025	60		B/C	M	3	Yes	Yes	PH	E/R	No	0	No	14.3	549.00	
	GX-R70EX-B(RO)	20-18 ± 3	2	0.05	60		B/C/D	No	3	Yes	No	PH	T	Yes	0	No	11.5	549.00	Random dubbing.
	GX-R60EX-B(RO)	20-18 ± 3	2	0.05	60		B/C/D	No	3	Yes	No	PH	T	Yes	0	No	11	439.00	
	HX-A451W-B(RO)	30-15 ± 3	2	0.09	57		B/C	No	3	Yes	Yes	P	T	No	0	Yes	9.7	379.00	
HX-A305W-B	40-14 ± 3	2	0.3	58		B	No	2	No	No	P	T	No	0	Yes	8	229.00		
BANG & OLUFSEN	Beocord 5500	30-18 ± 3	2	0.09	55	74	B/C/H	A	3	Yes	No	P/PH	T	Yes	1	No	18.4	999.00	Auto Dolby NR; auto record.
	Beocord 3300	25-18 ± 3	2	0.07	56	65	B/H	A	3	Yes	No	P	T	No	0	No	8.3	499.00	
BENJAMIN INT. L.	ACC-15	30-16 ± 3	1	0.07	58	65	B	M	2	No	No			Yes			13	499.50	Ten-cassette changer; playback only.
DENON	DR-M44HX (RO)	25-20 ± 3	3	0.035		75	B/C/H	A	3			P	E		0		13	650.00	Responses measured with Type IV tape.
	DR-M30HX (RI)	25-20 ± 3	3	0.045		73	B/C/H	M	3			P	T		0		12	500.00	
	DR-M20	25-19 ± 3	3	0.045		73	B/C	M	3			P	T		0		12	400.00	
	DR-M14HX (RI)	25-18 ± 3	2	0.045		72	B/C/H	M	3	Yes		P	T		0		10	400.00	
	DR-M12HX	25-18 ± 3	2	0.045		72	B/C/H	M	3	Yes		P	T		0		10	340.00	
	DR-M10HX	25-18 ± 3	2	0.05		72	B/C/H	M	3	Yes		P	T		0		10	280.00	
DR-M07	40-16 ± 3	2	0.057		73	B/C	M	3	Yes		P	T		0		8	210.00		
DUAL	CC5050	25-17	3	0.06		64	B/C	A	3	Yes	No	P	T	No	2			300.00	Auto fade in/out.
FISHER	CR-W56B	40-14 ± 3	2	0.08	51	61	B	M	3	No		A	T	No	0	Yes	8 1/2	150.00	Switchable MPX filter. As above.
	CR-W85	40-15 ± 3	2	0.06	51	61	B	M	3	No		A	T	Yes	0	Yes		250.00	
	CR-W86B	40-15 ± 3	2	0.06	51	61	B	M	3	No		A	T	Yes	0	Yes	9 3/8	250.00	
	CR-W96B	40-15 ± 3	2	0.06	51	71	B/C	M	3	Yes		A	T	Yes	0	Yes	13	300.00	
	CR-W98B (RI)	40-17 ± 3	2	0.06	52	72	B/C	M	3	Yes		A	T	Yes	0	Yes	12	400.00	
FOSTEX	X-30	40-18	2	0.1		70	B/C	†	1	Yes	No	P	E	No	2	No	5	495.00	†Fixed high bias. Four-track record; variable speed; EQ punch in/out.
	160	40-18	2	0.1		70	C	†	1	Yes	No	P	E	No	4	No	7.7	795.00	Four-track record; 3 3/4 ips. As above; 2-band EQ; 4-channel mixer.
	260	40-18	2	0.1		70	C	†	1	Yes	No	P	E	No	4	No	13.6	1095.00	
	460	40-18	2	0.1		70	B/C	†	1	Yes	No	P	E	No	8	No	24	2495.00	
	250AV	40-18	2	0.1		70	C	†	1	Yes	No	P	E	No	4	No	13.6	1300.00	Two speeds; 4-track record; B-channel board; syncs with video time code. For slide-show work; 4-track record.
HARMAN/KARDON	CD491	20-24 ± 3	3	0.025	58	75	B/C/H	M	3	Yes	No	P/PH	T	No	2	No	14 3/8	900.00	Dual capstan.
	T0392	20-22 ± 3	3	0.05	57	73	B/C/H	M	3	No	No	P	T	No	0	No	12 7/8	645.00	
	T0302	20-18 ± 3	2	0.05	57	73	B/C/H	M	3	No	No	P	T	No	0	No	12 7/8	435.00	
	T0202	20-18 ± 3	2	0.05	57	73	B/C	M	3	No	No	P	T	No	0	No	12 1/4	315.00	
	TD102	20-18 ± 3	2	0.05	57	65	B	M	3	No	No	P	T	No	0	No	12 1/4	275.00	
HITACHI	DW33SW	20-15	2	0.08	57	65	B	No	3	Yes	Yes	P	T	Yes	0	Yes	8 1/2	229.95	
	DW77SW (RO)	20-16	2	0.04	58	72	B/C	No	3	Yes	Yes	P	T	Yes	0	Yes	10 1/2	399.95	
	DW99(RO)	20-16	2	0.04	58	72	B/C	No	3	Yes	Yes	P/PH	T	Yes	0	Yes	15	499.95	
JVC	TDW110	40-15 ± 3	2	0.08	58		B	No		No	No	P	T	No	0	Yes	8.2	†Auto reverse in one well.	
	TDW220	40-15 ± 3	2	0.08 wrms	58		B/C	No		No	No	P	T	†	2	Yes	8.4		
	TDW330 (RO)	40-15 ± 3	2	0.08 wrms	58		B/C	No		No	No	P	T	No	0	Yes	9.9		
	TDW550 (RO)	30-16 ± 3	2	0.08 wrms	58		B/C	No		Yes	No	P	T	No	0	Yes	10.6		
	TDW60(RO)	30-16 ± 3	2	0.08 wrms	58		B/C	No		Yes	No	P	T	Yes	0	Yes	10.6		
	TDW660 (RO)	30-16 ± 3	2	0.08 wrms	58		B/C	No		Yes	No	P	T	Yes	0	Yes	10.6		
	TDX201(RO)	40-15 ± 3	2	0.08 wrms	58		B/C	No		No	No	P	T	No	2	No	7.7		
	TDX301(RO)	30-15 ± 3	2	0.08 wrms	58		B/C	No		No	No	P	T	Yes	2	No	8.4		



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CASSETTE DECKS

MANUFACTURER	Model (R) = Remote Included, (RO) = Remote Optional	Frequency Response with CR2 Tape (Type II), Hz to kHz, ±dB	Number of Heads	Wow & Flutter	S/N without Noise Reduction	S/N with Noise Reduction	None-Reduction Circuit: D, B, B Dolby: C, C, abs, D, HX Pro = H, Other = O	Bias Adjustment: Auto = A, Manual = M	Number of Preset Bias/EQ Positions	Program Search?	Program Scan?	Level Indicators: Average = A Peak = P, Peak-hold = PH	Counter Indications: Number of Turns = T Elapsed Time = E, Remaining Time = R	Auto Reverse?	Number of Mike Inputs	Dual Wells?	Weight, Lbs.	Price, \$	Notes
JVC (Continued)	TDV66(RD)	20-19 ±3	3	0.038 wrms	58		B/C	No		Yes	Yes	P/PH	T/E/R	No	0	No	10.6		
	DDVR77 (RD)	20-17 ±3		0.035 wrms	58		B/C	No		Yes	Yes	P/PH	T/E	Yes	0	No	11.4		
KENWOOD	KX-660HX	20-70 ±3	2	0.06	59	74	B/C/H	M	3	Yes	Yes	P	E	No	2	No	11	300.00	
	KX-96W(RD)	30-15 ±3	2	0.1	57	72	B/C		3	Yes	Yes	P	T	Yes	2	No	11.4	380.00	
	KX-76R(RD)	30-15 ±3	2	0.1	57	72	B/C		3	Yes	Yes	P	T	Yes	2	No	11.2	250.00	
	KX-66CW (RD)	30-15 ±3	2	0.15	56	72	B/C		3	Yes	Yes	P	T	Yes	0	Yes	8.8	280.00	
	KX-56CW KX-46C	30-15 ±3	2	0.06 0.09	56 56	73 72	B/C B/C		3 3			P P	T T		0 0	Yes No	8.4 8.4	200.00 175.00	
KYOCERA	D-811(RD)	20-20 ±3	2	0.02	58	78	B/C/H	A/M	3	Yes	No	PH	T/E/R	No	2	Yes	17½	625.00	
	D-611	20-20 ±3	2	0.035	58	78	B/C	M	3	No	No	P	T	No	2	No	16	485.00	
LUXMAN	K-105(RD)	30-18 ±3	2	0.06	60	71	B/C/D		3	Yes	Yes	P	T	Yes	0	No	9.9	480.00	
	K-112(RD)	20-21 ±3	3	0.05	56	73	B/C/H	M	3	No	No	P	T	No	0	No	9.5	500.00	
	K-106(RD)	20-19 ±3	2	0.05	60	71	B/C	M	3	Yes	Yes	P	E	Yes	0	No	9.9	580.00	
	K-03(RD)	20-20 ±3	3	0.022	60	73	D/H B/C	M	3	Yes	No	P	E/R	No	0	No	24.6	1200.00	
MARANTZ	SD160	40-14	2	0.08	54	64	B		3			P	T		1	Yes	8.4	170.00	
	SD565	35-16.5	2	0.05	55	72	B/C		3			P	T	Yes	1	Yes	11.9	450.00	
	SD55	20-19	3	0.05	59	74	B/C/H	A	3	Yes		P	T			Yes	10.9	800.00	
MITSUBISHI	DT-160	30-17	2	0.12	58	68	B	A	3	Yes	No	P	T	Yes	0	Yes		385.00	Seven-cassette changer.
NAD	6155	30-20 ±3	2	0.10	59	77	B/C/H		3	No	No	P	T	No	0	No	11	448.00	
	6240	30-19 ±3	2	0.10	59	77	B/C		3	No	No	P	T	No	0	No	8½	298.00	Dyneq.
	6300(RI)	30-19 ±3	3	0.05	59	78	B/C/H	M	3	No	No	P	T/E	No	0	No	13½	898.00	As above.
NAKAMICHI	BX-100	20-20	2	0.11		62	B		3			P	T			No	11	349.00	
	BX-125	20-20	2	0.11		68	B/C		3			P	T			No	11	475.00	
	RX-202(RD)	20-20	2	0.11		68	B/C		3			P	T	Yes		No	19½	695.00	
	BX-300(RD)	20-20 ±3	3	0.048		70	B/C	M	3			P	T			No	12¾	750.00	
	CR-5A(RD)	20-20 ±3	3	0.048		72	B/C	M	3			P	T			No	18¾	995.00	
	RX-505	20-20 ±3	3	0.08		70	B/C	M	3	Yes		P	T	Yes		No	22	1295.00	
	CR-7A(RI)	18-21 ±3	3	0.048		72	B/C	A	3			P/PH	T/E/R			No	19½	1495.00	
	Dragon	20-21 ±3	3	0.04		72	B/C	M	3			P	T	Yes		No	21	1995.00	
NEC	K-510	30-16	3	0.06	58	75	B/C		3			P	T	No	2	Yes	11¼	249.00	High-speed dubbing; continuous play.
	K-700(RD)	20-17	3	0.06	56	75	B/C		3	Yes	Yes	P	T	No	2	Yes	11½	349.00	As above; full logic mechanism.
NIKKO	O-100(RD)	20-20 ±3	3	0.03	60	92	B/C/D	A/M	3	Yes	Yes	A	T/E/R		2		11	700.00	
	D-80	20-18 ±3	2	0.05	59	90	B/C/D	A/M		Yes	Yes	A	T/E/R		2		10	470.00	
	O-60W	25-20 ±3	2	0.03	59	78	B/C	M		Yes	Yes	A	T			Yes	12	420.00	Random program dubbing. Full logic control.
	ND-850W	25-18 ±3	2	0.05	59	70	B/C			Yes	Yes	A	T	Yes	2	Yes	10	430.00	
	D-30W	30-17 ±3	2	0.06	59	70	B/C			Yes	Yes	A	T		2	Yes	10	290.00	
ONKYO	TA-2090(RD)	25-19 ±3	3	0.02	60	80	B/C/ O/H	A	3	Yes	Yes	P/PH	E/R	No	0	No	19.8	899.95	
	TA-2058(RD)	30-17 ±3	3	0.045	60	80	B/C/H	A	3	Yes	Yes	P	E/R	No	2	No	13.4	499.95	
	TA-2048(RD)	30-17 ±3	3	0.045	60	80	B/C	A	3	Yes	Yes	P	T	No	2	No	12.7	379.95	
	TA-2140(RD)	30-15 ±3	2	0.06	58	78	B/C/H	A	3	Yes	Yes	P	E/R	No	2	No	9.1	309.95	
	TA-2130(RD)	30-15 ±3	2	0.06	58	78	B/C	A	3	Yes	Yes	P	T	No	2	No	9.1	239.95	
	TA-R260(RD)	30-15 ±3	2	0.07	58	78	B/C/H	A	3	Yes	Yes	P	E/R	Yes	2	No	9.3	329.95	
	TA-R240(RD)	30-15 ±3	2	0.07	58	78	B/C	A	3	Yes	Yes	P	T	Yes	2	No	9.3	259.95	
	TA-RW490 (RD)	30-16 ±3	2	0.05	60	80	B/C/H	A	3	Yes	Yes	P	E/R	Yes	1	Yes	15	599.95	Two speeds.
	TA-W460 (RD)	30-15 ±3	2	0.07	58	78	B/C	A	3	Yes	Yes	P	T	No	1	Yes	10.1	329.95	
TA-RW44 (RD)	30-15 ±3	2	0.07	58	68	B	M	3	No	No	P	T	Yes	0	Yes	11.7	259.95		
PARASOUNO	D/HX-600	20-18 ±3	2	0.04	58	75	B/C/H		3			P/PH	T				16	335.00	"Playtrim" adjustment.
PIONEER	CT-980W	35-16	2	0.13	56		B/C	M	3	No	No	P	T	No	0	Yes	8.6	180.00	
	CT-1080R	30-16.5	2	0.07	58		B/C	M	3	Yes	Yes	P	T	Yes	0	No	7.8		
	CT-1380WR (RI)	20-17	2	0.06	57		B/C	M	3	Yes		P	T	Yes	0	Yes	12.1	500.00	
	CT-1280WR	25-16	2	0.075	56		B/C	M	3	Yes		P	T	Yes	0	Yes	9.1	300.00	
PROTON	740	25-16 ±3	2			78	B/C/D	M	3	Yes	No	A/P	T		2		11½	329.00	Responses measured with Type I tape.
	AO-300(RD)	40-16 ±3	2	0.08	53		B/C	A	3	Yes	Yes	P		Yes			11	299.00	
RCA	Dimensia MTR 225(RD)	40-17 ±3	2	0.07	50	60	B			Yes	Yes	A	T	Yes	0	Yes	10½	399.00	
REVOX	B215(RD)	30-20 +2, -3	3	0.1	58	72	B/C/H	A	6	Yes	No	P	E	No	0	No	20¼	1880.00	
ROTEL	RD850	30-17 ±3	2	0.08	55	64	B/C		3	No	No	A	T	No	2	No	9	229.95	
	RD870	30-19 ±3	2	0.035	55	64	B/C/H	M	0	No	No	A	E	No	0	No	11½	499.95	
SAE	C102	20-20 ±3	2	0.06		72	B/C	A	3	Yes	No	A/PH	T/E/R	No	0	No	24	429.00	Drawer-load transport. Auto repeat, stop, and play.
	C101(RD)	20-20 ±3	3	0.04		74	B/C	M	4	No	No	A/PH	T/E/R	No	0	No	22	650.00	
SANSUI	D-W11	20-18	2	0.05	58	66	B/C	A	3	Yes	Yes	P	T	Yes	1	Yes	13.4	650.00	
	D-705	20-21	3	0.035	60	68	B/C	A/M	3	Yes	Yes	P	T	No	0	No	13	475.00	
	D-3000W	20-17	2	0.09	54	72	B/C	A	3	Yes	Yes	P	T	Yes	0	Yes	9.9	450.00	
	D-1000W	20-17	2	0.09	54	72	B/C	A	3	Yes	Yes	P	T	Yes	0	No	9.7	350.00	



CASSETTE DECKS

MANUFACTURER	Model (RI) = Remote Included. (RO) = Remote Optional	Frequency Response with CrO ₂ Tape (Type II), Hz to kHz, ±dB		Number of Heads	Wow & Flutter, Wtd. Peak, %	S/N without Noise Reduction, "A" Wtd., -0B	S/N with Noise Reduction, "A" Wtd., -0B	Noise-Reduction Circuit, Dolby B, C, D	Bias Adjustment, Auto=A, Manual=M	Number of Preset Bias/EQ Positions	Program Search?	Program Scan?	Level Indicators, Average A, Peak=B, Peak-Hold=FH	Counter Indications, Number of Tapes, Elapsed Time = E, Remaining Time = R	Auto Reverse?	Number of Mike Inputs	Dual Wells?	Weight, Lbs.	Price, \$	Notes
		40-14	±3																	
SANYO	RDS29	40-14	±3	2	0.1	54	62	B	M	3	No	No	A	T	No	1	No	6.7	69.99	
	RDW41	40-13	±3	2	0.08	55	66	B	M	3	No	No	A	T	No	0	Yes	7.3	79.99	
	RDW59	40-15	±3	2	0.08	55	66	B	M	3	No	No	A	T	No	0	Yes	10	89.99	
	RDW89	40-16	±3	3	0.1	57	65	B	M	3	No	No	A	T	Yes	0	Yes	10.6	189.99	
SCOTT	DD656	40-14	±3	2	0.15	52	61	B		2	No	No	P	E	No	0	Yes	9	149.00	
	DD677	40-14	±3	2	0.15	52	70	B		3	No	No	P	E	No	0	Yes	9	199.00	
	DD688	40-14	±3	2	0.15	52	70	B/C		3	Yes	No	P	E	No	0	Yes	9 1/2	249.00	
	DD696(RI)	30-16	±3	2	0.06	52	80	B/C/D	M	3	Yes	No	P	E	Yes	0	Yes	13	549.00	
SHARP	RT-115BK	50-12	±3	2	0.1	52	58	B			No	No	P	T	No	2		5.7	79.95	
	RTW-500BK	50-12	±3	3	0.1	52	58	B			No	No	P	T	No	2		7.3	119.95	
	RTW-800BK	40-14	±3	3	0.08	52	58	B			Yes	No	P	T	Yes	2		8.6	219.95	
SHERWOOD	S-270DD	30-16	±3	3	0.1	56	65	B	M	3	No	No	A	T	No	2	Yes	14	249.95	
	S-260R	25-16.5	±3	2	0.08	56	73	B/C	M	3	Yes	Yes	A	T	Yes	2	No	14	279.95	
	S-160	30-16	±3	2	0.08	56	73	B/C	M	3	Yes	Yes	A	T	No	2	No	12	199.95	
	S-289RDR (RD)	30-16	±3	2	0.08	56	73	B/C	M	3	Yes	Yes	A	T	Yes	0	Yes		329.95	
SONY	TC-K700ES (RO)	20-20	±3	3	0.025	60	73	B/C	M	3	No	No	PH	E	No		No	18 1/2	700.00	
	TC-WR950 (RO)	30-17	±3	2	0.05	59	72	B/C		3	Yes		P	E/R	Yes		Yes	13	700.00	
	TC-WR750 (RO)	30-15	±3	3	0.07	58	71	B/C		3	Yes		P	T	Yes		Yes	11	400.00	
	TC-W550 (RO)	30-15	±3	3	0.07	58	71	B/C		3	Yes		P	T	No		Yes	10 3/4	300.00	
	TC-W250 (RO)	30-15	±3	3	0.012	58	70	B/C		3	Yes	Yes	P	T	No		Yes	7 3/4	210.00	
	TC-R503 (RO)	30-17	±3	2	0.05	59	72	B/C/H	M	3	Yes	Yes	P	E	Yes		No	10 1/2	300.00	
	TC-R303 (RO)	30-15	±3	2	0.07	58	71	B/C		3	Yes		P	T	Yes	2	No	8 3/4	240.00	
TANBERG	3014A	18-23 ±2.5		3	0.1	55	74	C/D	M	3	Yes	Yes	P	E	No	0		21.6	1995.00	Dyneq.
TEAC	V-200	30-15	±3	2	0.095	55	65	B		3	No	No	P	T	No	0	No	6 3/4	119.00	
	V-210C	30-15	±3	2	0.095	55	70	B/C	M	3	No	No	P	T	No	0	No	6 3/4	129.00	
	W-300	30-15	±3	†	0.095	55	65	B		3	No	No	P	T	No	0	Yes	7 1/4	159.00	†One head for Well A, two heads for Well B.
	W-310C	30-15	±3	†	0.095	55	70	B/C	M	3	No	No	P	T	No	0	Yes	7 1/4	179.00	
	R-616X	25-20 ±3		†	0.05	59	90	B/C/D/H	M	3	Yes	Yes	P	T/E	Yes	0	No	11	479.00	
	V-770	25-19	±3	3	0.03	60	80	B/C/H	M	3	Yes	Yes	P	T/E	No	0	No	10 3/4	469.00	
	V-970X(RI)	25-20 ±3		3	0.028	60	92	B/C/D/H	M	3	Yes	Yes	P	T/E	No	0	No	12 3/4	699.00	Discrete heads.
	R-919X(RI)	25-20		3	0.029	60	92	B/C/D/H	M	3	Yes	Yes	P	T/E	Yes	0	No	13 3/4	749.00	
	W-990RX(RI)	30-19	±3	†	0.045	59	91	B/C/D		3	Yes	Yes	P	T/E	Yes	0	Yes	13 1/4	759.00	
	W-660R	30-19	±3	†	0.05	59	78	B/C		3	Yes	Yes	P	T	Yes	0	Yes	12 1/2	499.00	Programmable. As above.
	W-460C	30-19	±3	†	0.05	59	78	B/C		3	Yes	Yes	P	T	No	0	Yes	12 1/2	429.00	
V-550X	25-19 ±3		2	0.05	59	90	B/C/D	M	3	Yes	Yes	P	T	No	2	No	10 3/4	429.00		
AD-4(RI)	25-16		2	0.05	59	78	B/C		3	No	No	P	T/E	Yes	0	No	12 3/4	599.00	CD player/cassette deck; see "Compact Disc Players."	
AD-5	30-17 ±3		2	0.05	59	78	B/C		3	Yes	No	P	E/R	Yes	0	No	16	799.00	As above.	
AD-7(RI)	30-17 ±3		2	0.05	59	90	B/C/D	M	3	Yes	Yes	P	E/R	Yes	0	No	16	949.00	As above.	
TECHNICS	RS-B105	20-15		2	0.08	56	66	B	M	3	No	No	P	T		2		6.6	145.00	
	RS-B107	20-15		2	0.08	57	74	B/C	M	3	No	No	P	T		2		7.5	190.00	
	RS-B207	20-15		2	0.08	57	92	B/C/D	M	3	No	No	P	T		2		7.5	225.00	
	RS-B29R	20-17		2	0.08	57	75	B/C	M	3	Yes	No	P	T	Yes	2		7.9	270.00	
	RS-T11	20-15		2	0.08	56	66	B	A	3	No	No	P	T			Yes	8.4	145.00	
	RS-T22	20-15		2	0.08	56	74	B/C	A	3	No	No	P	T			Yes	8.4	225.00	
	RS-T33R	20-16		2	0.07	56	74	B/C	A	3	Yes	No	P	T	†		Yes	11.5	350.00	†Auto reverse for one well.
	RS-T55R	20-16		2	0.07	56	92	B/C/D	A	3	Yes	No	P	T	Yes		Yes	11.5	420.00	
	RS-T80R	30-17		2	0.08	57	92	B/C/D	A	3	Yes	No	PH	T	Yes		Yes	11.7	600.00	
	RS-B905	30-19 ±3		3	0.04	57	92	B/C/D/H	A/M	3	Yes	No	PH	E/R			Yes	11	600.00	
UHER	CR 160AV	30-16 ±1		2	0.2	55	64	B/C	M	3	No	No	P	T	No	1	No	7	899.00	Sync. sound dubbing; portable. As above; eight-hour record time; two speeds.
	CR 1600	30-16 ±1		3	0.2	55	64	B	M	3	No	No	P	T	Yes	2	No	7		Eight-hour record time; three speeds; portable.
	CR 1601	20-19 ±1		3	0.2	50					Yes	Yes	P	T	No	1	No	7	1699.00	
VECTOR RESEARCH	VCX-325	40-14 ±3		2	0.08	52	63	B		3	No	No	P	T	No	2	Yes	10	149.95	
	VCX-345	40-16 ±3		2	0.06	55	73	B/C		3	No	No	P	T	No	2	Yes	9	249.95	
	VCX-250	30-18 ±2		2	0.05	56	74	B/C		3	Yes	No	P	T	No	2	No	9	199.00	Manual dubbing level.
	VCX-450	30-18 ±2		2	0.04	56	75	B/C		3	Yes	No	P	T	Yes	2	No	16	349.00	
YAMAHA	KX-1200U (RI)	20-20 ±3		3	0.06	61	95	B/C/D/H	M	3	Yes	Yes	P	E/R	No	0	No	17.4	699.00	
	K-540U(RD)	25-19 ±3		2	0.08	59	74	B/C/H		3	Yes	Yes	P	E/R	No	0	No	9.8	339.00	
	K-340B	30-19 ±3		2	0.08	59	74	B/C/H		3	Yes	Yes	P	T	No	0	No	9.2	259.00	
	KX-200U (RD)	30-16 ±3		2	0.15	58	74	B/C/H		3	Yes	Yes	P	T	No	0	No	9.2	209.00	
	K-720B	30-19 ±3		2	0.08	59	90	B/C/D/H		3	Yes	Yes	P	E/R	Yes	0	No	12.5	499.00	Rotating heads.
	K-640B(RD)	20-19 ±3		2	0.08	59	75	B/C/H		3	Yes	Yes	P	E/R	Yes	0	No	11.3	419.00	
	KX-400U (RD)	20-18 ±3		2	0.1	58	74	B/C/H		3	Yes	Yes	P	T	Yes	0	No	9.3	299.00	
	KX-W500U (RD)	20-16 ±3		2	0.15	58	74	B/C		3	Yes	No	P	T	Yes	0	Yes	11	389.00	
	K-222B(RD)	30-15 ±3		2	0.15	58	74	B		3	Yes	No	P	T	No	0	Yes	10.6	319.00	
	K-142B	30-15 ±3		2	0.15	58	66	B		3	No	No	P	T	No	0	Yes	8.8	239.00	



MAXELL. THE TAPE THAT LASTS AS LONG AS THE LEGEND.

She's traveled the highway from gospel singing sister to the reigning Queen of Soul. Fueled by a big powerful voice and a big joyous heart. Maxell audio tapes are created so that you can have a permanent record of that long journey, now and in the years to come. At Maxell every tape is manufactured to standards 60% higher than the industry calls for. So even after 500 plays the genius that is Aretha will still thrill you just like it did when you first heard it, tooling down your very own freeway of love.



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Enter No. 65 on Reader Service Card

EVEN A DRAGON NEEDS A CLEAN HEAD!



Even the world's most sophisticated cassette recorder, The Nakamichi DRAGON, requires regular cleaning of the tape head to maintain its state of the art performance. It was no wonder that S-711 INTRACLEAN® was chosen for use in Nakamichi's own service department. S-711 was scientifically designed to clean the vital components along the tape path. S-711's formulation of halogenated hydrocarbons exhibits extra special effectiveness in removing heavy oxide deposits from tape heads and capstans. In addition, S-711's remarkable rejuvenation properties restores lost texture and prolongs the life of the pinch roller.

Even if you do not own a Nakamichi DRAGON, you can still improve the performance of your cassette recorder . . . with S-711 INTRACLEAN®. S-711 and the entire INTRACLEAN® Recorder Care Systems are available through fine audio stores everywhere. For the nearest AUTHORIZED INTRACLEAN® DEALER call 800-782-6911 or in California 800-624-0918.



C-911 Cassette Cleaner



O-501 Cassette Demagnetizer



D-511 Wand Demagnetizer



K-151 Autosound Care Kit



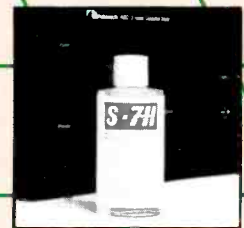
CD-101 Compact Disc Cleaner



V-311 VHS and V-321 Beta and VCR Cleaner



V-331 3mm Cleaner



S-711 Professional Tape Head Cleaner

INTRACLEAN®

RECORDER CARE SYSTEMS

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AMERICAN RECORDER TECHNOLOGIES, INC. • P. O. Box 3592, • Simi Valley, CA. 93063

Enter No. 49 on Reader Service Card

OPEN-REEL TAPE DECKS

MANUFACTURER	Model	SPEED CODE A—7½, 3¾ B—7½, 3¾, 17/8 C—7½, 3¾, 17/8, 15/16 D—15, 7½ E—15, 7½, 3¾	Speeds—See Letter Code			Maximum Reel Size, Inches			Number of Heads			Number of Tracks			Number of Channels, Record/Play			Drive to Cassette			Frequency Response, Hz to kHz, ±dB, with Best Tape at Highest Machine Speed			Wow & Flutter, Wtd. Peak, %			S/N, "A" Wtd., -dB			Output Level at 0 VU, mV			Mike Mixing?			Mike Input Impedance, Ohms, Balanced—B			Record Level Indicator(s), Number and Type			EE Tape Capable?			Dimensions, Inches			Weight, Lbs.			Price, \$			Notes		
			10 1/2	3	2	2	3	Direct	25-22 ±2	0.04	†	Sel.	Yes	10k,B	2 VU Mtrs. & 2 Peak LEDs	Yes	21.5 x 16.9 x 9	60	2795.00	†68 dB, unweighted.																																				
OTARI	MX5050B-II	A/D	10 1/2	3	2	2	3	Direct	25-22 ±2	0.04	†	Sel.	Yes	10k,B	2 VU Mtrs. & 2 Peak LEDs	Yes	21.5 x 16.9 x 9	60	2795.00	†68 dB, unweighted.																																				
	MX5050BQ-II	D	10 1/2	4	4	4	3	Direct	30-20 ±2	0.06	†	Sel.	Yes	50k	2 VU Mtrs. & 2 Peak LEDs	Yes	21.5 x 16.9 x 9	60	3795.00	†66 dB, unweighted.																																				
	MX5050 Mk III-2	A/D	10 1/2	3	2	2	3	Direct	30-20 ±2	0.06	†	Sel.	Yes	10k,B	2 VU Mtrs. & 2 Peak LEDs	Yes	17.3 x 16.9 x 27.5	77	3495.00	†72 dB, unweighted.																																				
REVOX	B77 MKII	†	10 1/2	3	2/4	2	3	Direct	30-22 +2,-3	0.06	67	775	Yes	22k, 110k	2 Mtrs. & 2 Peak LEDs	No	16 1/2 x 17 3/4 x 8 1/4	37 1/2	2450.00	†Any two adjacent speeds from 15/16 to 15 ips. ††22k, 110k, balanced opt. Balanced line in/out; self-sync.																																				
	PR99 MKII	A/D	10 1/2	3	2	2	3	Direct	30-22 +2,-3	0.06	67	775	Yes	†	2 Mtrs. & 2 Peak LEDs	No	17 3/4 x 19 x 8	40 1/2	2799.00																																					
TEAC	X-300	A	7	3	2/4	2/4	3	Belt	40-30 ±3	0.04	65	317	Yes	2 VU Mtrs.	Yes	16 x 13 x 9	30 3/4	850.00																																						
	X-300R	A	7	3	2/4	2/4	3	Belt	40-30 ±3	0.04	65	317	Yes	2 VU Mtrs.	Yes	16 x 13 x 9	33	960.00	Bidirectional play.																																					
	X-2000	A	10 1/2	3	2/4	2/4	3	Belt	40-33 ±3	0.03	†	317	Yes	2 VU Mtrs.	Yes	17 x 18 x 10 1/2	46 1/4	1400.00	†65 dB; with dbx NR, 100 dB. Spooling mode.																																					
	X-2000R	A	10 1/2	6	2/4	2/4	3	Belt	40-33 ±3	0.03	†	317	Yes	2 VU Mtrs.	Yes	17 x 18 x 10 1/2	46 1/4	††	††Silver finish, \$1500.00; black, \$1600.00. Auto reverse record/play.																																					
UHER	4000	C	5	3	2	1	1	Belt	20-25 ±2	0.2	64	775	Yes	200	1 VU Mtr.	Yes	11 x 3 1/2 x 9	8	1499.00																																					
	4200	C	5	3	2	2	1	Belt	20-25 ±2	0.2	64	775	Yes	200B	2 VU Mtrs.	Yes	11 x 3 1/2 x 9	8	1599.00																																					
	4400	C	5	3	4	2	1	Belt	20-25 ±2	0.2	62	775	Yes	200B	2 VU Mtrs.	Yes	11 x 3 1/2 x 9	8	1599.00																																					
	5000	C	5 1/2	2	2	1	1	Idler	40-16 ±3	0.2	60	900	Yes	220	1 Peak Mtr.	Yes	13 x 6 x 13	18	1499.00																																					
	6000	†	5	3	2	1	3	Belt	20-22 ±3	0.2	62	775	Yes	220	1 VU Mtr.	Yes	11 x 3 1/2 x 9	8	1749.00	†"C" speeds plus 15/32 ips.																																				
	1200	A	5	3	†	1	1	Belt	40-16 ±2	0.15	62	600	Yes	200	1 VU Mtr.	Yes	11 x 3 1/2 x 9	8	4900.00	†Full.																																				

BLANK TAPE

MANUFACTURER	CASSETTE TAPE TYPE CODE I — Normal Ferric II — Chrome/Chrome Equivalent IV — Metal Particle	Brand	CASSETTES						OPEN-REEL				Notes	
			Tape Type—See Code	C-30	C-45 or C-46	C-60	C-90	C-120	1200 Feet	1800 Feet	2400 Feet	3600 Feet		
BASF	Metal IV Chromdioxid Maxima II Chromdioxid Extra II LH Maxima I LH Extra I DAT	IV II II I I			2.24	2.99	5.99							DAT: D-120, \$10.99.
CERTRON	High Density UX	I I	1.19	1.29	1.39 2.99†	1.79 3.99†	2.49							†Two-pack.
DENON	HDM HD8 HD7 HD6 DX4 DX3 DX1	IV II II II I I I			5.00 3.75 3.00 2.50 3.00 2.50 1.75	6.50 4.75 4.00 3.25 4.00 3.00 2.25								Metal/ferric hybrid.
FUJI	FR Metal FR-II Super FR-II FR-I Super FR DR GT-II GT-I DAT	IV II II I I I II II I		5.79 4.39 3.99 3.79 2.69 2.39 4.39 3.79	6.39 4.89 4.49 4.19 2.99 2.59 4.89 4.19	8.49 6.49 5.99 5.49 3.99 3.49 6.49 5.49	4.99							Cobalt-modified. As above. DAT lengths: R-46, R-60, R-90, and R-120.

BLANK TAPE

CASSETTE TAPE TYPE CODE I — Normal Ferric II — Chrome/Chrome Equivalent IV — Metal Particle		CASSETTES										OPEN-REEL										
MANUFACTURER	Brand	Tape Type—See Code	C-30		C-45 or C-46		C-60		C-90		C-120		1200 Feet		1800 Feet		2400 Feet		3600 Feet		Notes	
GOLDSTAR	AHD-9011	I							.99													
	AHR-9011	I							1.29													
	AHZ-9011	I							1.99													
	CRX-9011	II							2.49													
	MTX-9011	IV							4.99													
JVC	ME-PRDII	IV							3.90													
	UFII	II				1.50			1.75													
	UFI	I				1.20			1.65													
	GI	I				.85			1.00													
LDRAN	ESQ	II							4.99													
	High Bias	II			2.99			3.49	3.99													
	Normal Bias	I			2.79			3.29	3.79													
MAXELL	UR	I			1.45			1.56	1.80	2.71												
	UDS I	I			2.30			2.50	3.24													
	UDS II	II			2.30			2.50	3.24													
	XL II	II			3.14			3.24	3.87													
	XLII-S	II						3.77	4.82													
	XLII-S	II						3.77	4.82													
	MX	IV			3.98			4.61	6.18													
	XL II																					
	XL I										8.70			16.68				45.56				
	UD													12.59				35.16				
DAT													9.02				27.92				DAT: D-120, \$14.99; also in D-46, D-60, and D-90 lengths.	
MEMOREX	dBS	I			1.39			1.49	1.79	2.39												
	MRX I	I						2.19	2.69													
	HB II	II						2.29	2.79													
	HBX II	II						2.59	3.49													
	CDX II	II							4.49													
NAKAMICHI	ZX	IV						7.25	10.00													
	SXII	II						6.50	8.90													
	SX	II						4.50	6.50													
	EXII	I						4.25	6.00													
REALISTIC	Premium Formula	IV						5.99	6.99													
	Metal Type II	II						4.89	5.69													
	High Definition	II						3.49	4.29													
	Extended Range	I		1.99	2.59			2.79	3.79	4.99												
	Low Noise	I						2.59	3.59	4.39												
	Premium	I									5.99			6.99				12.99				
Premium Low Noise													5.99				7.99					
SKC	ZX	IV			3.59			4.09	5.59													
	QX	II			2.29			2.39	2.79													
	AX	I			1.99			2.09	2.49													
	GX	I						1.29	1.59													
	DX	I								2.39												
	DAT																					DAT: D-60, \$7.99; D-90, \$8.99; D-120, \$10.99.
SONY	HF	I			2.05			2.25	3.15	4.05												
	HF-S	I						3.10	4.25													
	UX	II						4.10	5.50													
	UX-S	II						4.75	6.95													
	UX-ES	II						5.25	7.95													
	UX-PRO	II						7.95	9.95													
Metal-ES	IV							11.95														
SWIRE MAGNETICS	Laser XL	I			1.39			1.49	1.89	2.49												
	Laser UHD-I	I						1.99	2.59													
	Laser UHD-II	II						1.99	2.59													
TDK	MA-XG	IV						7.00	9.25													Three-layer tape.
	MA-X	IV						4.25	5.00													Two-layer tape.
	MA	IV						3.50	4.00													Type II metal tape.
	HX-S	II						3.75	4.50													Two-layer tape.
	SA-XG	II						7.00	9.25													
	SA-X	II						3.00	3.50													
	SA	II						2.50	3.00													
	AD-X	I						2.50	3.00													
	AD-S	I							2.50													
	AD	I							2.25	2.50												
	D	I							1.75	2.00												
	DAT	I			1.50	1.60																
TRIAD	F-X	I							3.99													
	EM-X	II							4.99													
	MG-X	IV							5.99													Type II metal tape.
VISA	High Performance I	I						1.59	1.99													
	Extra Performance II	II						1.99	2.49													
	FDX I	I						1.99	2.79													
	CX II	II						2.49	3.49													
	UFX I	I						2.99	3.99													
	UCX-II	II						2.99	3.99													
	UCX-II-S	II						3.49	4.99													



THIS LINE-UP LOVES THE TDK LINE-UP.



TYPE I (Normal Position)

AD-X You'll get exceptional sound throughout the entire frequency range with the first normal-bias Avilyn formulation designed for wider dynamic range with superior MOL. Record on home components.

AD-S For cleaner, sharper sound AD-S delivers wider dynamic range with lower tape noise. A special rigid plastic C-Thru™ mechanism provides resonance control for clear undistorted recordings. Record on home component systems, integrated systems.

AD Hot high-end performance is the earmark of AD. Linear ferric oxide particles for smooth, natural reproduction provide for extreme sensitivity and wider dynamic range. For use with rack systems and auto decks.

D When you want premium performance at an economical price, TDK D cassettes deliver. Available in the widest assortment of lengths. Record on home tape deck systems or battery powered portables.

TYPE II (High Position)

SA-XG This is the ultimate Type II performer that meets or exceeds professional recording standards. A superior RS-II three-layer mechanism, plus TDK's exclusive dual coated Super Avilyn formulation make it the world's quietest tape, in any class. Perfect for all professional and high-end home equipment recording.

HX-S When you want extended dynamic range and digital capability, HX-S is the premier metal particle tape to use. Record on home component systems.

SA-X The world's quietest tape formulation—a dual coating of Super Avilyn—plus a unique DLM (Dual Layer Mechanism) delivers improved frequency response with virtually no noise. Record on home component systems, high-end portables.

SA Greater dynamic range and high energy sound have made SA the world's most popular high bias cassette. Record on home component systems, boom boxes and other portables.

TYPE IV (Metal Position)

MA-XG Capture the full dynamics of digitally-sourced material on MA-XG. The ultimate metal tape features TDK's new three-layer RS-II vibration dampening mechanism, which virtually eliminates vibration—delivering the purest, clearest sound. Record on high-end metal compatible decks.

MA-X Our Super Finavinx metal tape formulation and new DLM (Dual Layer Mechanism), which virtually eliminates vibration, allows MA-X to deliver a richer, wider dynamic range with clearer sound. Record on all metal compatible decks.

MA Superior sound reproduction with super-wide dynamic range are the characteristics of MA. It delivers true metal tape performance at an affordable price. Great for digitally sourced music, too. Record on all metal compatible decks.

TDK.
THE ART OF PERFORMANCE.

TDK is the world's leading manufacturer of audio & video cassettes and floppy disk products.

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THIS LINE-UP LOVES THE TDK LINE-UP.



HD-X PRO Unquestionably the world's finest video tape, HD-X PRO features the ultimate in technology with a unique 7-layer tape construction. It provides a super-high definition picture with virtually no dropouts. Perfect for your most demanding recordings, HD-X PRO is visible proof of the quality which extends throughout the TDK line-up.

HD TDK establishes a new standard in video cassette technology with a breakthrough Super Avilyn formulation ideal for Hi-Fi stereo applications. Its high definition qualities assure brighter, sharper pictures, and sound clarity that makes your viewing experience come alive.

E-HG When you want that extra level of quality other high grade tapes can't offer, choose TDK E-HG: 'The Enhancer'. It packs more performance into 2, 4 or 6 hours than any other tape in its class. Perfect for TV specials, concerts and movies, E-HG offers a higher level of viewing enjoyment you'll also want for your treasured video library.

Also available in Beta format.

TDK is the world's leading manufacturer of audio & video cassettes and floppy disk products.

HS Nobody has higher standards than TDK. And our HS: 'The Eliminator,' video cassette puts the proof right before your eyes. An improved level of picture clarity and color fidelity make it the ideal cassette for time-shifting.

VHS-C For an extra measure of performance in this format, TDK offers you 2 great tapes. Our E-HG cassette has a high resolution formulation that delivers brighter, sharper pictures and crisper, clearer sound. For your most demanding in-camera needs, our HD-X PRO cassette provides the ultimate in color, picture and sound detail.

8mm Superior 8mm recording becomes a reality with TDK MP cassettes. They deliver the most dramatic and enjoyable color pictures available in this format.

TDK THE ART OF PERFORMANCE.

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MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = X2, Quad = X4, M-S = M-S	Operating Principle	Case Material	Most Common Use	Actual Impedance Balanced - B	Operating Range, Hz to kHz	Open Circuit Sensitivity, 1 kHz. - dB re. 1 volt/1 bar	Mike Connector Type	Cable Length, Feet	Connector Type on Equipment End of Cable	Weight, Ounces w/ing Screen = W, On Off Switch = S, Switched Low or Proximity Filter = F	Price, \$	Notes
AIWA	CM-30A	x2	Electret Condenser	Alum.	Vocal				Mini			55.00	One-point stereo.	
	CM-23			Alum.	Vocal Zoom				Mini			50.00		
	CM-66		Dynamic Dynamic	Plastic	Vocal		100-10	69	2.6	Mini	0.6	43.00	Nondirectional or directional. One-point stereo. Tie-bar. Surface pick-up. Includes headphone.	
	CM-59	x2		Alum.	Vocal	Lo-Z	100-10	70	2.6	Mini	0.6	15.00		
	CM-77	x2		Alum.	Vocal	600	80-15	72	3.3	Mini	1.6	52.00		
	DM-90			Alum.	Vocal	600	50-17	75		Mini	8.7	55.00		
	DM-H5			Alum.	Vocal	600	70-14	75		Mini	6.4	65.00		
DM-H1	Binaural		Plastic	Vocal	Lo-Z	100-15		9.8	Mini	1.4	40.00			
HM-7			Plastic	Vocal	Lo-Z	100-15		4.9	Mini	1.4	75.00			
AKG	D-58E	Card.	Dynamic	Nckl./ Brass	Noisy Envrn.	240B	70-12	83	XLR		1 1/2	115.00	Noise cancelling.	
	D-70M	Card.	Dynamic	Plastic	Record	600	50-18	77		15	Phone	6 3/4	70.00	
	D-70ME	Card.	Dynamic	Plastic	Record	620B	50-18	77	XLR		Phone	6 3/4	80.00	
	D-80	Card.	Dynamic	Brass	Record	210B	60-15	76	XLR	15	Phone	7 3/8	125.00	
	D-80E	Card.	Dynamic	Brass	Record	210B	60-15	76	XLR			7 3/8	130.00	
	D-109	Dmni	Dynamic	Brass	Voice	240B	70-12	79		30	None	5 3/8	115.00	Lavaliar.
	D-112	Card.	Dynamic	Plastic	Bass	200B	20-17	75	XLR			13 3/8	200.00	
	D-125E	Card.	Dynamic	Zinc	Instr.	210B	100-18	74	XLR			8	150.00	
	D-130E	Dmni	Dynamic	Alloy	ENG	220B	50-13	75	XLR			9	120.00	
	D-130NR	Dmni	Dynamic	Zinc	ENG	220B	50-13	75	XLR			9	135.00	
	D-190E	Card.	Dynamic	Alloy	General	280B	30-15	73	XLR			6 1/2	125.00	
	D-190ES	Card.	Dynamic	Zinc	General	280B	30-15	73	XLR			6 1/2	145.00	
	D-202E1	Card.	Dynamic	Alloy	Strings	300B	20-20	76	XLR			12	385.00	Two-way system.
	D-222EB	Card.	Dynamic	Zinc/ Plastic	Podium	320B	20-16	77	XLR			9	320.00	
	D-224E	Card.	Dynamic	Zinc	Acoust. Instr.	260B	20-20	78	XLR			10	550.00	
	D-310	Card.	Dynamic	Alloy	Instr. Vocal	270B	80-18	78	XLR			9	145.00	
	D-310NR	Card.	Dynamic	Zinc	Vocal	270B	80-18	78	XLR			9	150.00	
	D-310S	Card.	Dynamic	Alloy	Instr./ Vocal	270B	80-18	78	XLR			9	160.00	
	D320B	Hyper Card.	Dynamic	Zinc	Vocal	290B	80-18	77	XLR			12	200.00	
	D-321	Hyper Card.	Dynamic	Alloy	Vocal	300B	40-20	77	XLR			13 3/8	190.00	
	D-321S	Hyper Card.	Dynamic	Zinc	Vocal	300B	40-20	77	XLR			11 1/2	205.00	
	D-330BT	Hyper Card.	Dynamic	Alloy	Vocal	370B	50-20	78	XLR			12	230.00	
	D-330NR	Hyper Card.	Dynamic	Zinc	Vocal	370B	50-20	78	XLR			12	260.00	
	D-510B	Omni	Dynamic	Alloy	Voice	230B		79	Attached	3/4	None	11 1/2	130.00	Gooseneck.
	D-541	Card.	Dynamic	Nckl./ Brass	Vocal	720B	120-16	73	Attached	3/4	None	12 1/2	105.00	As above.
	D-558B	Card.	Dynamic	Nckl./ Brass	Voice	200B	70-15	83	Attached	3/4	None	11 1/2	145.00	
	D-590	Card.	Dynamic	Nckl./ Brass	Vocal	230B	150-17	78	Attached	3/4	None	10	155.00	As above.
	D900E	Super Card.	Dynamic	Lacq. Nickel	ENG	240B	60-12	70	XLR			18	385.00	Long shotgun.
	D1200E	Card.	Dynamic	Zinc	General	200B	25-17	73	XLR		None	8 1/2	195.00	
	C-34	Multiple x2	Condenser	Alloy	Orch.	200B	20-20	67	12-Pin	60	XLR	10	1995.00	Remote pattern control.
	C-422	Multiple x2	Condenser	Zinc	Orch.	200B	20-20	65	12-Pin	60	XLR	15	2895.00	As above.
	AKG Tube	Multiple	Condenser	Alloy	Studio	200B	20-20	60	12-Pin	60	XLR	24	1995.00	As above.
	C-414B/ULS	Multiple	Condenser	Zinc	Studio	200B	20-20	58	XLR			11	995.00	Transformerless version, Model C-414B TL, \$1195.00. Modular system.
	C-451E	Card.	Condenser	Alloy	Studio	200B	20-20	60.5	XLR			3 3/8	400.00	
	C-451EB	Card.	Condenser	Zinc	Studio	200B	20-20	60.5	XLR			3 3/4	470.00	As above.
	C-460B/ CK-61ULS	Card.	Condenser	Alloy	Studio	500B	20-20	62	XLR			5 1/2	530.00	As above.
	C-460B/ CK-62ULS	Omni	Condenser	Zinc	Studio	500B	20-20	62	XLR			5 1/2	530.00	As above.
	C-460B/ CK-63ULS	Hyper Card.	Condenser	Alloy	Studio	500B	20-20	62	XLR			5 1/2	530.00	As above.
	C-460B/ CK-1X	Card.	Condenser	Zinc	Studio	500B	20-20	62	LEMO	10	XLR	5 1/2	715.00	As above.
	C-451EB/ CK-9	Super Card.	Condenser	Alloy	Studio	200B	20-20	59	XLR			4	960.00	Long shotgun.
	C-451EB Preamp		Condenser	Zinc	Studio	200B	20-20		XLR			3	320.00	Modular preamp.
	C-460B Preamp		Condenser	Alloy	Studio	500B	20-20		XLR			4 1/2	380.00	As above.
	CK-1	Card.	Condenser	Zinc	Studio		20-20	60				1	140.00	
CK-1S	Card.	Condenser	Alloy	Studio		20-20	60				1	140.00		
CK-1X	Card.	Condenser	Zinc	Studio		20-20	62	LEMO	10		1 1/8	190.00		

(Continued)



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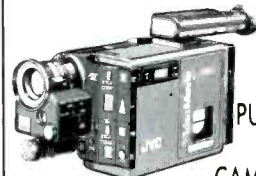
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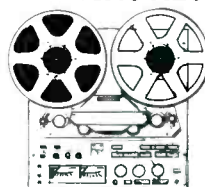
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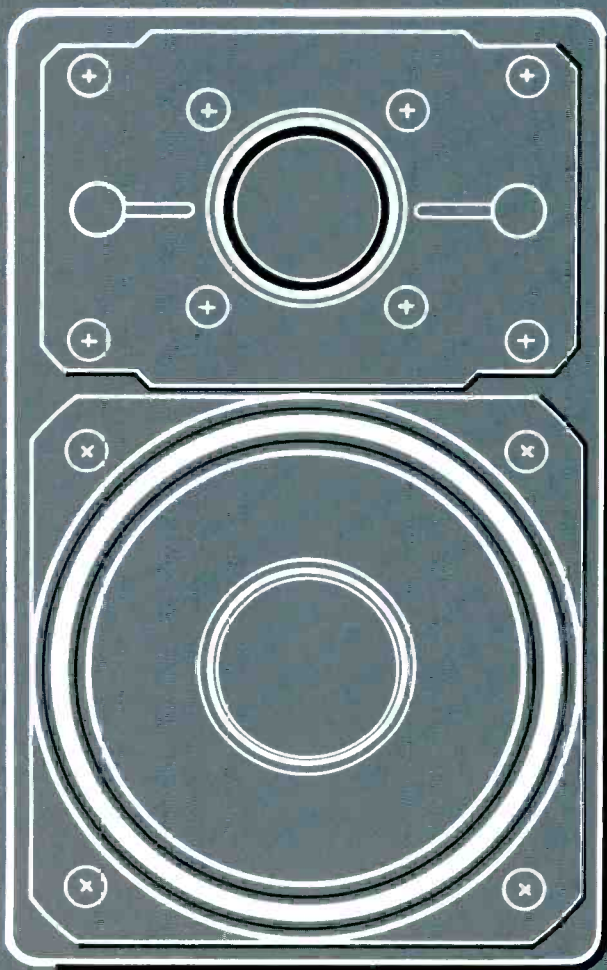
MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = x2, Quad = x4, M.S. = M.S.	Operating Principle	Case Material	Most Common Use	Actual Impedance, 1 kHz, Ohms: Balanced = B	Operating Range, Hz to kHz	Open-Circuit Sensitivity 1 kHz, dB, re: 1 Volt/1 bar	Mike Connector Type	Cable Length, Feet	Connector Type on Equipment End of Cable	Weight, Ounces	Wind Screen = W, On/off Switch = S, Switched Low or Proximity Filter = F	Price, \$	Notes
AKG (Continued)	CK-2X	Omni	Condenser	Zinc Alloy	Studio	20-20	62	LEMO	10		1/8		190.00		
	CK-3	Hyper Card.	Condenser	Zinc Alloy	Studio	20-20	61				1		140.00		
	CK-3X	Hyper Card.	Condenser	Zinc Alloy	Studio	20-20	61	LEMD	10		1/8		190.00		
	CK-5	Card.	Condenser	Zinc Alloy	Studio	20-20	60				4		260.00		
	CK-8	Super Card.	Condenser	Zinc Alloy	Studio	20-20	54				2 1/2	W	250.00	Short shotgun.	
	CK-8X	Super Card.	Condenser	Zinc Alloy	ENG	30-18	59	LEMO	10	XLR	4 1/4	W	350.00	As above.	
	CK-9	Super Card.	Condenser	Zinc Alloy	Studio	20-20	59				12	W	300.00	Long shotgun.	
	CK-22	Omni	Condenser	Zinc Alloy	Studio	20-20	62				1 1/2		140.00		
	CK-61ULS	Card.	Condenser	Zinc Alloy	Studio	20-20	62				1		160.00		
	CK-62ULS	Omni	Condenser	Zinc Alloy	Studio	20-20	62				1		160.00		
	CK-63ULS	Hyper Card.	Condenser	Zinc Alloy	Studio	20-20	62				5 1/2	F	160.00		
	C-410	Card.	Electret Condenser		Vocal	300	20-20	70.5	XLR	11 3/4		4 3/8		195.00	
	C-522	Card. x2	Electret Condenser	Zinc Alloy	Stereo	300B	20-20	60	5-Pin XLR	6	3-Pin XLR	10	W	950.00	
	C-535EB	Card.	Electret Condenser	Zinc Alloy	Vocal	200B	20-20	61	XLR			10	F	325.00	
	C-562	Hemi.	Electret Condenser	Zinc Alloy	General	600B	20-20	54	XLR	10		33 3/8	W	395.00	
	C-567E	Omni	Electret Condenser	Zinc Alloy	Voice	200	20-20	64	XLR	9		3 1/2	W	250.00	
	CK-67.3	Omni	Electret Condenser	Zinc Alloy	Voice			55				3/8		145.00	Lavalier.
	C-568EB	Super Card.	Electret Condenser	Zinc Alloy	ENG	200B	20-20	62	XLR			6	WF	325.00	Short shotgun.
	O-12E	Card.	Dynamic	Zinc Alloy	Bass Drum	290B	30-15	73	XLR			17		350.00	
	C-410WL	Hyper Card.	Electret Condenser	Zinc Alloy	Vocal		40-20	64		0			W	175.00	Wireless headset mike.
	C-535WL	Card.	Electret Condenser	Brass	Vocal		40-20	63		0				250.00	Wireless mike head.
	CK-67WL	Omni	Electret Condenser	Zinc Alloy			40-20	64		0				160.00	Lavalier; with tie-tac and tie-bar; wireless.
	D-321WL	Hyper Card.	Dynamic	Zinc Alloy	Vocal		40-20	77		0				160.00	Wireless mike head.
	D-330WL	Hyper Card.	Dynamic	Zinc Alloy	Vocal		50-20	77		0				160.00	As above.
	A-85 Module System 185 C-410ND	Card.	Condenser		†	60B 200B	40-20	70.5		0 0	XLR XLR	4 3/8	W	2575.00	Allows use of any dynamic mike. Wireless. †Headset vocal. Wireless.
	C-4100	Card.	Condenser	Brass	†	200B	40-20	70.5		0	XLR	4 3/8	W	3550.00	Wireless.
	C-535ND	Card.	Condenser	Brass	Vocal	200B	40-20	63		0	XLR	13 3/8		2575.00	As above.
C-535D	Card.	Condenser	Brass	Vocal	200B	40-20	63		0	XLR	13 3/8		3550.00	As above.	
C-567ND	Omni	Condenser	Zinc Alloy	Voice	200B	40-20	64		0	XLR		W	2575.00	As above; lavalier.	
C-567D	Omni	Condenser	Zinc Alloy	Voice	200B	40-20	64		0	XLR		W	3550.00	As above.	
D-321ND	Hyper Card.	Dynamic	Zinc Alloy	Vocal	200B	40-20	77		0	XLR	13 3/8		2495.00	Wireless.	
D-321D	Hyper Card.	Dynamic	Zinc Alloy	Vocal	200B	40-20	77		0	XLR	13 3/8		3450.00	As above.	
D-330ND	Hyper Card.	Dynamic	Zinc Alloy	Vocal	200B	50-20	77		0	XLR	13 3/8		2495.00	As above.	
D-330D	Hyper Card.	Dynamic	Zinc Alloy	Vocal	200B	50-20	77		0	XLR	13 3/8		3450.00	As above.	
AMBICO	V-0623	Uni	Electret Condenser	Alum.	P.A./Record	75B	50-15	40	Attached	0	Mini/Phone	6	SF	99.95	Wireless; includes transmitter and receiver.
	V-0625	Uni	Electret Condenser	Alum./Plastic	Record	75B	50-15	40	Attached	0	Mini/Phone	5	SF	89.95	As above; lavalier.
AUDIO-TECHNICA	ATR20	Card.	Dynamic	Plastic	Vocal	500	80-12	64	Attached	10	Mini/Phone	4.7	WS	22.95	
	ATR25	Card. x2	Condenser	Plastic	Video Record	600	70-18	60	Mini	0.6	Mini/Phone	2.8	S	59.95	
	ATR30	Card.	Dynamic	Metal	Vocal	500	60-15	58	XLR	20	Mini/Phone	8	WS	49.95	
	ATR35	Omni	Condenser	Metal	Vocal	1k	50-18	54	Attached	20	Mini/Phone	0.2	W	33.95	Subminiature lavalier.
	ATR45	Card. x2	Condenser	Metal	Conf./Video Record	700	50-18	58	Attached	10	Mini/Phone	4.9	WS	53.95	
	ATR55	Card./Super Card.	Condenser	Metal	Video Record	600/2.5k	70-18	50/40	Attached	3	Mini/Phone	4	WS	89.95	
AUDIX (Continued)	ML-10	Omni	Electret Condenser	Alum.	Vocal	1k	40-20	69	Attached	10	XLR	1/2	WS	165.00	Includes power supply.
	ML-5	Omni	Electret Condenser	Alum.	Vocal	2.7k	40-20	69	Attached	25	Phone	1/2	W	125.00	
	ST-1	Card. x2	Electret Condenser		Vocal/Instr.	600	20-20	64	Attached	3	Mini	6	W	125.00	
	C-18	Super Card.	Electret Condenser	Alum.	Vocal/Instr.	2.2k	40-16	58	Attached	5	Mini	8	W	95.00	





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Although compact speakers are readily available from many manufacturers, Visonik continues to be ahead of the imitators. Sound quality and technical innovation has always been the first priority,

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Consider our AA-V405 Receiver. Instead of a paltry 35 or 40 watts per channel, the AA-V405 produces 100 watts per channel (continuous, 0.05% THD, 20 Hz — 20 kHz into 8 ohms). To add life even to mono signals, we've designed a special Surround Sound stereo circuit. To correct the faults of so many video sound tracks, we've built in a seven-band graphic equalizer. And a full function remote control lets you operate the entire system from your listening/viewing position.

The Akai AA-V405 has all the connections you'll need to integrate your video system perfectly. Three TV antenna inputs plus a cable converter output handle your RF needs.



No modern video component should come without remote control.

Audio for video.



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Three direct-line video inputs and three video outputs accommodate a pair of VCRs, a video disc player, and video monitor. If you're impressed, you're not alone. The judges of the CES Design & Engineering competition have already cited the AA-V405.

To round out your Akai Audio/Video system you can choose from a variety of components built to stand on their own, not as an adjunct to someone's marketing program. Akai Digital Oversampling CD Players, Twin-Field Super GX Head Cassette Decks, and P-Mount Turntables consistently earn praise from reviewers throughout the world. They are the



Akai's CD-A305-B Compact Disc Player boasts digital oversampling and 36-track programmability.

tangible results of Akai's master plan to develop audio and video components of such high caliber that audio and video truly become one.

AKAI

Where audio and video are one.

MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = 2, Quad = 4, M-S = M-S	Operating Principle	Case Material	Most Common Use	Actual Impedance Balanced - Ω	Operating Range, 1 kHz, Ohms	Open-Circuit Sensitivity 1 kHz, - dB, re: 1 μV/1 μbar	Mike Connector Type	Cable Length, Feet	Connector Type on Equipment End of Cable	Weight, Ounces	Wire Screen = W, On Off Switch = S, Switched Low or Proximity Filter = F	Price, \$	Notes
AUDIX (Continued)	CD-7	Card.	Pressure Gradient	Zinc	Vocal	600	80-12	75	Cannon XLR-F	None	8 3/8		62.50	Hi-Z version available.	
	UD360	Card.	Pressure Gradient	Zinc	Vocal/Instr.	200	50-18	73	Cannon XLR-F	None	11		159.00		
	DM1	Hyper Card.	Pressure Gradient	Brass	Vocal/Instr.	200	50-18	78.5	Cannon XLR-F	None	11		225.00		
	DM2	Hyper Card.	Pressure Gradient	Zinc	Vocal/Instr.	200	40-20	78.5	Cannon XLR-F	None	10 3/8		189.00		
AZDEN	DX-431	Uni	Dynamic	Alum.	Vocal	600	50-15	76	Cannon	20	Phone	S	69.95		
	DX-750	Uni	Dynamic	Alum.	Vocal	600	70-12	76		15	Phone		39.95		
	DX-580	Uni	Dynamic	Alum.	Music	600	100-12	76		10	Phone/Mini		29.95		
	WMS-10		Electret Condenser	Plastic	Vocal	300				0	Mini	WS	150.00	Wireless.	
	WMS-20		Electret Condenser	Plastic	Vocal	300				0	Mini	WS	175.00	As above.	
WMS-30		Electret Condenser	Plastic	Vocal	300				0	Mini	WS	200.00	As above.		
BEYERDYNAMIC	M69	Hyper Card.	Dynamic	Brass	Instr.	200B	50-16	145†	A3M		11.3		199.00	†dBm.	
	M69S	Hyper Card.	Dynamic	Brass	Instr.	200B	50-16	145†	A3M		11.3	F	245.00		
	M88	Hyper Card.	Dynamic	Brass	Instr.	200B	30-20	145†	A3M		11.3		370.00		
	M101	Omni	Dynamic	Brass	Instr.	200B	40-20	149†	A3M		5.7		230.00		
	M130	Bi-D	Double Ribbon	Brass	Studio	200B	40-18	152†	A3M		5.3		500.00		
	M160	Hyper Card.	Double Ribbon	Brass	Studio	200B	40-18	152†	A3M		5.5		460.00		
	M200	Card.	Dynamic	Alum.	Vocal	600B	50-15	151†	A3M		4.8		125.00		
	M200S	Card.	Dynamic	Alum.	Vocal	600B	50-15	151†	A3M		4.8	S	140.00		
	M260	Hyper Card.	Ribbon	Brass	Studio	200B	50-18	150†	A3M		10.6		260.00		
	M260S	Hyper Card.	Ribbon	Brass	Studio	200B	50-18	150†	A3M		10.6	S	275.00		
	M300	Card.	Dynamic	Alum.	Vocal	250B	50-15	150†	A3M		8.6		165.00		
	M300S	Card.	Dynamic	Alum.	Vocal	250B	50-15	150†	A3M		8.6	S	180.00		
	M380	Bi-D	Dynamic	Zinc	Instr.	600B	15-20				13		280.00		
	M400	Super Card.	Dynamic	Alum.	Vocal	200B	40-16	146†	A3M		9		199.00		
	M400S	Super Card.	Dynamic	Alum.	Vocal	200B	40-16	146†	A3M		9	S	214.00		
	M500	Hyper Card.	Ribbon	Alum.	Vocal	200B	40-18	150†	A3M		8.5		300.00		
	M500S	Hyper Card.	Ribbon	Alum.	Vocal	200B	40-18	150†	A3M		8.5	S	315.00		
	M600	Hyper Card.	Dynamic	Alum.	Vocal	250B	40-16	149†	A3M		8.6	F	325.00		
	M600S	Hyper Card.	Dynamic	Alum.	Vocal	250B	40-16	149†	A3M		8.6	SF	340.00		
	M700	Hyper Card.	Dynamic	Alum.	Vocal	250B	40-16	149†	A3M		9		260.00		
	M700S	Hyper Card.	Dynamic	Alum.	Vocal	250B	40-16	149†	A3M		9	S	275.00		
	M201	Hyper Card.	Dynamic	Brass	Instr.	200B	40-18	150†	A3M		7.8		250.00		
	M420	Hyper Card.	Dynamic	Brass	Instr.	200B	100-12	152†	A3M		5.3		195.00		
	M422	Super Card.	Dynamic	Alum.	Instr.	200B	100-12	152†	A3M		2.5		125.00		
	CV710P48		Condenser	Brass		200B			A3M			F	280.00	Modular preamp for use with "CK" models.	
	Preamp CV720PV		Condenser	Brass		200B			A3M			F	320.00	As above.	
	Preamp CV750/AV750		Condenser	Brass		150B			A3M		6	F	500.00	As above.	
	Preamp CK701	Omni	Condenser	Brass			40-20	134†			4		240.00		
	CK702	Omni	Condenser	Brass			40-20	134†			4		295.00		
	CK703	Card.	Condenser	Brass			40-20	132†			4.4		295.00		
	CK704	Card.	Condenser	Brass			40-20	132†			4.4		310.00		
	CK706	Card./Lobe	Condenser	Brass			40-20	132†			6.5		510.00		
	CK707	Lobe	Condenser	Brass			40-20	132†			12		610.00		
	CK708	Figure 8	Condenser	Brass			40-20	132†			7.5		570.00		
	MCE80	Super Card.	Condenser	Brass	Vocal	190B	50-18		A3M		8.1	S	395.00	48-V phantom or 4.5-V battery powered.	
	MCE81	Card.	Condenser	Brass	Instr.	190B	50-18		A3M		8		325.00		
	MC734P48	Card.	Condenser	Alum.	Vocal	150B	20-20	138†	A3M		9.5	F	775.00		
	MC734PA	Card.	Condenser	Alum.	Vocal	150B	20-20	138†	A3M		9.5	F	800.00		
	MC736P48	Card./Lobe	Condenser	Brass		150B	40-20	100†	A3M		8.4	F	820.00	48-V phantom powered.	
	MC736PV	Card./Lobe	Condenser	Alum.		150B	40-20	110†	A3M		6.8	F	800.00	12 to 52-V phantom powered.	
	MC737P48	Lobe	Condenser	Brass		150B	40-20	100†	A3M		15.4	F	920.00		
	MC737PV	Lobe	Condenser	Alum.		150B	40-20	110†	A3M		8.8	F	900.00		
	MC740N(C)	5-Pattern	Condenser	Alum.	Studio	150B	40-20	133†	A3M		13.8	F	1150.00	Omni-wide card./card./figure 8/super card. Remote controlled version. Model MC740N(C/S), \$1250.00. High SPL version, Model MCE6, \$195.00.	
	MCE5	Omni	Electret Condenser	Brass		800	20-20	141†		4	6-Pin DIN	0.2	195.00		
	MCE5.9	Omni	Electret Condenser	Brass		800	20-20	141†		10		0.2	170.00		
MCE5.11	Omni	Electret Condenser	Brass		200B	20-20	129†		10	A3M	0.2	350.00	Phantom or battery powered.		
MCE6.9	Omni	Electret Condenser	Brass	Instr.	800	20-20			10		0.2	170.00			
MCE6.11	Omni	Electret Condenser	Brass	Instr.	200B	20-20			10	A3M	0.2	350.00			
MCE10	Hyper Card.	Electret Condenser	Brass		700	40-20	140†		4	6-Pin DIN	0.3	270.00			
MCE10.9	Hyper Card.	Electret Condenser	Brass		2k	40-20	146†		10		0.3	230.00			
MCE10.11	Hyper Card.	Electret Condenser	Brass		200B	40-20	128†		10	A3M	0.3	395.00			
MPC50	Hemi.	Electret Condenser	Wood		200B	20-20					17.5	700.00	As above.		
MPC40	Hemi.	Electret Condenser	Alum.		1k	25-20					3	295.00	Used with Model MES40VN(C).1 (\$230.00) for unbalanced input.		



MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = 2, Quad = 4, M.S. = M.S.	Operating Principle	Case Material	Most Common Use	Actual Impedance Balanced = B	Operating Range, Hz to KHz	Open Circuit Sensitivity, 1 KHz. - 0B, re. 1 Volt/1 μ bar	Mike Connector Type	Cable Length, Feet	Connector Type on Equipment End of Cable	Weight, Ounces	Wind Screen = W, On Off Switch = S, Switched Low or Priority Filter = L	Price, \$	Notes
BOZAK/TAI	TMBO-1		Electret Condenser	Alum.	Voice	200B	10-20				None	22	W	250.00	Flush-mount for ceilings.
CROWN INTERNATIONAL	PZM-30R	Hemi.	Electret Condenser	Alum.	Studio	240B	20-15	65	XLR			6½	W	349.00	Pressure Zone Mike.
	PZM-30FS	Hemi.	Electret Condenser	Alum.	Studio	240B	20-15	67	XLR			6½	W	349.00	As above.
	PZM-6R	Hemi.	Electret Condenser	Alum.	Conf.	240B	20-15	65		15	XLR	5	W	349.00	As above.
	PZM-6FS	Hemi.	Electret Condenser	Alum.	Orch.	240B	20-15	67		15	XLR	5	W	349.00	As above.
	PZM-20RG	Hemi.	Electret Condenser	Alum.	Conf.	240B	20-15	65	Screw			6½		319.00	As above.
	PZM-180	Hemi.	Electret Condenser	Nylon	General	150B	50-18	70	XLR			2	W	189.00	As above.
	Sound Grabber	Hemi.	Electret Condenser	Nylon	General	1.6k	50-15	55		10	Mini/Phone	2	W	99.00	As above.
	GLM-100	Omni	Electret Condenser	PVC	Close Instr.	240B	20-20	73		8	XLR	2½	W	199.00	Lavalier.
	GLM-100/E	Omni	Electret Condenser	PVC		3.5k	20-20	62		8	None	1		98.00	Capsule and cable only.
	GLM-200	Hyper Card.	Electret Condenser	PVC	Close Instr.	100B	60-20	68		8	XLR	3¾	W	229.00	Miniature.
	GLM-200/E	Hyper Card.	Electret Condenser	PVC		3.5k	60-20	62		8	None	1	W	110.00	Capsule and cable only.
	GLM-100/ENG	Omni	Electret Condenser	PVC	ENG/Instr.	240B	80-20	73.5	Swcft. TA3F	5	XLR	7½	W	239.00	Battery or phantom powered.
	PCC-160	Half Super Card.	Electret Condenser	Steel	†	150B	50-18	53	Swcft. TA3M	15	Swcft. A3M	11½	W	275.00	†Stage floor/lectern. Boundary mike.
	CM-100	Omni	Electret Condenser	Alum./Brass	Vocal	240B	20-20	72	XLR			7½	W	189.00	Pressure Zone Mike at high frequencies.
CM-200	Card.	Electret Condenser	Alum.	Vocal	200B	80-15	73	XLR			7	W	209.00		
CM-300	Card.	Electret Condenser	Alum.	Vocal	150B	60-18	71	XLR			7½	W	249.00	Differential.	
ELECTRO-VOICE	N/D 757	Super Card.	Dynamic	Steel & Alum.	Vocal	150B	25-22	50†	A3M			7.7	WF	297.00	†0 dB = 1 mW/Pa.
	N/D 457	Hyper Card.	Dynamic	Steel & Alum.	Vocal	150B	25-21	50†	A3M			7.1	W	222.00	
	N/D 357	Super Card.	Dynamic	Steel & Alum.	Vocal	150B	25-20	53†	A3M			7.1	W	174.00	
	N/D 257	Card.	Dynamic	Steel & Alum.	Vocal	150B	35-19	53†	A3M			7.1	W	126.00	
	N/D 408	Super Card.	Dynamic	Steel & Alum.	Instr.	150B	30-22	50†	A3M			6.7	W	228.00	Positionable yoke mount.
	N/D 308	Card.	Dynamic	Steel & Alum.	Instr.	150B	40-20	53†	A3M			6.7	W	186.00	As above.
	RE20	Card.	Dynamic	Steel	Music Vocal	50B/150B/250B	40-18	57†	A3M	15	None	26	WF	545.00	Variable-D.
	RE18	Super Card.	Dynamic	Steel	Music Vocal	150B	80-15	57†	A3M	15	None	8	W	308.00	As above; integral shock mount.
	RE16	Super Card.	Dynamic	Steel	Vocal	150B	80-15	56†	A3M	15	None	8	W	296.00	Variable-D.
	RE15	Super Card.	Dynamic	Steel	Vocal	150B	80-15	56†	A3M	15	None	6	W	286.00	As above.
	RE10	Super Card.	Dynamic	Steel	Vocal	150B	90-13	56†	A3M	15	None	6	W	201.00	As above.
	DS35	Card.	Dynamic	Steel	Music Vocal	150B	60-17	60†	A3M	15	None	9.2	W	189.00	As above.
	RE98	Omni	Condenser	Brass & Alum.	Music Vocal	150B	80-15	45†		10	A3M	0.7†	W	218.00	†Capsule only. Battery or phantom powered.
	CO15P	Omni	Condenser	Steel	Music Vocal	150B	20-18	49†	A3M	15	None	7.5	W	315.00	
	RE50	Omni	Dynamic	Alum.	Vocal	150B	80-13	55†	A3M	15	None	9.5	W	165.00	Integral shock mount.
	RE55	Omni	Dynamic	Steel	Music Vocal	150B	40-20	57†	A3M	15	None	8.5	W	274.00	
	DO54	Omni	Dynamic	Steel	Music Vocal	150B	50-18	58†	A3M	15	None	6.5	W	164.00	
	DO56	Omni	Dynamic	Steel & Alum.	Music Vocal	150B	80-18	61†	A3M	15	None	6.5	W	137.00	As above; with longer handle, Model DO56L, \$156.00.
	CO90	Omni	Condenser	Brass & Alum.	Music Vocal	150B	40-15	57†	Threaded	6	None	0.7	W	159.00	Lavalier; battery powered.
	PL80	Super Card.	Dynamic	Zinc & Alum.	Vocal	150B	60-17	56†	A3M	0	None	12.3	W	219.00	
	PL78	Card.	Condenser	Zinc & Alum.	Vocal	150B	50-18	49†	A3M	0	None	10.2	WS	203.00	Battery or phantom powered.
	PL95A	Card.	Dynamic	Steel	Vocal	150B	60-17	60†	A3M	0	None	9.2	W	186.00	Internal shock mount.
	BK-1	Card.	Condenser	Zinc & Alum.	Vocal	150B	50-18	50†	A3M	0	None	12	WS	199.00	Battery or phantom powered.
	PL91A	Card.	Dynamic	Zinc	Vocal	150B	60-15	59†	A3M	0	None	8	WS	135.00	
	PL88H	Card.	Dynamic	Zinc	Vocal	25k B	60-13	57†	A3M	0	None	10.4	WS	95.00	
	PL88L	Card.	Dynamic	Zinc	Vocal	150B	60-13	58†	A3M	0	None	10.4	WS	95.00	
	PL20	Card.	Dynamic	Steel	Music Vocal	50B/150B/1250B	45-18	57†	A3M	0	None	26	WF	584.00	Variable-D.
	PL10	Card.	Dynamic	Steel	Music Vocal	150B	75-15	56†	A3F	0	None	11	W	354.00	As above.
	PL4	Omni	Condenser	Brass & Alum.	Music Vocal	150B	80-15	45†	TA3F	8	A3M	0.8	WS	290.00	Miniature lavalier.
	PL11	Super Card.	Dynamic	Steel	Music	150B	90-13	56†	A3M	0	None	6	W	215.00	Variable-D.
PL9	Omni	Dynamic	Steel	Music	150B	50-18	58†	A3M	0	None	6.5	W	174.00		
PL6	Super Card.	Dynamic	Zinc	Music	150B	90-13	56†	A3M	0	None	10.5	W	132.00	As above.	
PL5	Omni	Dynamic	Steel	Music	150B	80-13	55†	A3M	0	None	6	W	119.00		
681	Card.	Dynamic	Zinc	Vocal	150B/Hi-Z	60-14	60†	A3F	15	None	8	WS	143.00		



SILENT RUNNING.



**INTRODUCING THE ONLY AM/FM TUNER/
CASSETTE DECKS CAPABLE OF CUTTING
MULTIPATH INTERFERENCE UP TO 92.9%!
FROM CARVER, NATURALLY.**

The new TX-Seven and TX-Nine auto-reverse AM/FM tuner/cassette audiophile decks represent yet another example of Carver's ability to solve previously insoluble audio problems and deliver you more musical enjoyment.

**CARVER TUNER TECHNOLOGY
TAKES TO THE ROAD.**

Each deck employs the same Asymmetrical Charge-Coupled FM Detection circuitry as Carver's revolutionary TX-11a home tuner, along with an ingenious automatic computer logic-controlled antenna switching system that further vanquishes multipath distortion.

In point of fact, no other autosound tuner/cassette decks in the world — regardless of price — even begin to approach the TX-Seven and TX-Nine's ability to maintain a hiss-free,

glitch-free, interference-free FM listening environment in your car.

Both also possess a multitude of other useful, state-of-the-art features which will recommend them to the most discriminating autosound audiophile.

COLLIDING WITH MULTIPATH DISTORTION.

By its very definition as a moving reception point, a car's FM tuner constantly falls prey to signal reflections from hills, skyscrapers, bridges and even other vehicles. These extra phase modulating signals trick conventional tuners into producing audible sounds we call multipath.

Startling outbursts of clicks, pops, "picket fencing" and other rude and indescribable sounds.

The trouble is, by its very nature, multipath distortion cannot be cured by conventional circuit "improvements." In fact, the better an autotuner is, the more faithfully it is deceived into converting phase modulation into ghastly-sounding interruptions in your favorite station.

COMPUTER LOGIC-CONTROLLED DIVERSITY ANTENNA SWITCHING DRIVES AROUND MULTIPATH.

One way to get temporary relief from interference at home is to move the antenna around slightly. That is in effect what the Carver TX-Seven and TX-Nine do with sophisticated circuitry in your car. Instead of physically moving one antenna, they turn your rear defroster into a second *separate antenna*, 180 degrees out of phase with the first. When multipath occurs, a special smart circuit automatically switches (at the speed of light) to the other antenna, automatically correcting phase and eliminating the multipath before you ever hear it. In serious cases, the circuit actually uses both antenna inputs at once, deriving a signal through sum and difference principles.

ASYMMETRICAL CHARGE-COUPLED FM DETECTION CIRCUITRY BRINGS IT ON HOME.

What little multipath distortion gets through the TX-Seven and TX-Nine's unique smart antenna system runs headlong into the remarkable tuner innovation *High Fidelity Magazine* described as "distinguished (by) its ability to pull clean, noise-free sound out of weak or multipath-ridden signals."

It specially treats the critical, multipath-prone left-minus-right (L-R) signal with a Charge-Coupled circuit that detects "dirty mirror image" signals and cancels them before they can reach your ears. Then the Leading Edge Detector circuit processes the final 5% of the L-R and interleaves it with the tuner's receiver matrix.

Alone, without antenna diversity switching, the TX-Seven and TX-Nine's Asymmetrical Charge-Coupled FM Detection Circuit

delivers a *net noise and distortion reduction of 92.9%*. Together, they set a new standard for clear, clean FM autotuner reproduction.

THE MULTIPATH MARATHON: REAL WORLD CONFIRMATION IN THE MISTS OF THE NORTHWEST.

Bob Carver is both a theorist and a practical inventor. Circuits that work on paper get exhaustively tested in the field before release.

So he assigned a hapless engineer to map out the ultimate multipath-ridden route for confirmation of the TX-Seven and TX-Nine's special circuitry. With mountains, hills, huge evergreen trees, skyscrapers, large steel bridges, good robust traffic jams and a few assorted six-story-tall Boeing hangars, it didn't take long to map out a 6-mile course that could regularly deliver at least *287 separate multipath occurrences*.

Engaging the Asymmetrical Charge-Coupled FM Detection circuit and automatic antenna switching reduced occurrences to an average of *two* during the same 6-mile course while listening to the same stations!

Although results may vary in your locale, the same 90+% reduction in multipath has been confirmed in other widely diverse portions of the U.S.: The TX-Seven and TX-Nine work, and work well.

OTHER REMARKABLE TUNING FEATURES, TOO.

First, the TX-Seven and TX-Nine also receive Long Wave and Short Wave stations. And of course, both tuner/cassette decks have plenty of random presets... you can tune any fifteen AM, FM, SW or LW stations quickly for instant recall. Plus auto-scan and manual tuning.

But they also have a system that makes setting up all fifteen presets virtually instantaneous. Just press the button marked BEST and the tuner's logic circuitry will *automatically select* the fifteen cleanest, strongest signals and lock them in on the presets!

And that's *in addition* to your fifteen individual random presets.

As with all Carver products, the TX-Seven and TX-Nine do not sacrifice ease of use for useless, complicated frills. Instead, they answer every possible need without resorting to elf-sized buttons or glitzy flashing light displays.

Their metal-compatible, Dolby® NR, auto-reverse cassette sections rival any in the world. Both the TX-Seven and TX-Nine have separate bass, treble, balance and loudness

controls and a full-function LCD display with night illumination.

All operations are signaled with a gentle "beep" that keeps your eyes on the road, not on the compact, ergonomically-styled deck.

There's even a security code system that renders the TX-Seven or TX-Nine inoperable to anyone but you (and a window sticker to impart this discouraging information to others).

Or, if you prefer, use the quick removal system that slips out your TX-Seven or TX-Nine in seconds for storage in trunk or house.

THE BEGINNING OF THE PERFECT AUTOSOUND LISTENING ENVIRONMENT.

Out of the hundreds of tuner/cassette models currently available, only the TX-Seven and TX-Nine deliver home-stereo quality FM in your car. They achieve it with unique technology. And they are built to outlast your car, no matter what kind of climate you live in.

Coupled with a clean amplifier, such as The Carver M-240 Car Amplifier and state-of-the-art speakers, your ability to transform your car into a concert hall is almost unlimited.

We urge you to audition the TX-Seven and TX-Nine at your Carver dealer soon. They can put you in the driver's seat of a unique, interference-free musical experience.



THE TX-SEVEN AND TX-NINE

Dolby is a registered trademark of Dolby Laboratories.

CARVER

Corporation, PO Box 1237, Lynnwood, WA 98046

POWERFUL

MUSICAL

ACCURATE

MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = x2, Quad = x4, M-S = M-S	Operating Principle	Case Material	Most Common Use	Actual Impedance, 1 kHz, Ohms, Balanced = B	Operating Range, Hz to kHz	Open Circuit Sensitivity, 1 kHz, -60 db, re: 1 Volt/1 μ bar	Mike Connector Type	Cable Length, Feet	Connector Type on Equipment	Weight, Ounces	Wind Screen Switched Low or Proximity Filter = F	Price, \$	Notes	
FOSTEX	M22RP	M-S	Ribbon	Alum.	Vocal/Record	250	40-18	55 \uparrow	Attached	5	3-Way XLR	25.7	W	1095.00	+10 dB = 1 V/Pa. 1.7 mV/Pa. 1.6 mV/Pa; three-way bass roll-off. 1.7 mV/Pa; roll-off as above. 1.6 mV/Pa; three-way presence selector. 1.4 mV/Pa.	
	M88RP	Bi-D	Ribbon	Alum.	Vocal/Record Vocal/Strings Vocal	250	40-18	56 \uparrow	Attached	5	XLR	11.6		650.00		
	M11RP	Card.	Ribbon	Alum.	Vocal	250	40-18	55 \uparrow	Attached	5	XLR	20.4		595.00		
	M77RP	Card.	Ribbon	Alum.	Vocal/ Instr. Vocal	250	40-18	56 \uparrow	A3F		XLR	12.7		460.00		
	M51RP	Card.	Ribbon	Alum.	Vocal	250	70-20	57 \uparrow	A3F		XLR	8.8		250.00		
GC-THORSEN	30-2374	Card.	Dynamic	Alum.	Vocal	500/50k	80-15	\uparrow		20	Phone	8	WSF	25.95	\uparrow -72 dB at 500 ohms, -52 dB at 50 kilohms.	
	30-2378	Card.	Electret Condenser	Alum.	Vocal	600	30-16	68		20	Phone	6	WSF	35.95		
	30-2382	Card. x2	Electret Condenser	Alum.	Vocal	600	50-16	68	Attached	10	Phone	8	WSF	44.95		
JVC	M201	Card. x2	Electret Condenser Dynamic	Zinc Alloy Plastic	Vocal	600	40-18	71		10	Phone	13 $\frac{1}{4}$	F	59.95		
	M101	Card. x2	Dynamic		Vocal	500	150-15	76		10	Phone	4 $\frac{3}{8}$		34.95		
MARANTZ	EC-1	Omni	Electret Condenser			2.0k	60-13	52		10	Mini	3 $\frac{1}{2}$	W	24.00		
	EC-1S	Omni	Electret Condenser			2.0k	60-13	52		10	Mini	3 $\frac{1}{2}$	WS	30.00		
	EC-3	Card.	Electret Condenser			1.5k	50-15	52		10	Mini	8 $\frac{7}{8}$	W	36.00		
	EC-3S	Card.	Electret Condenser			1.5k	50-15	52		6	Mini	8 $\frac{7}{8}$	WS	40.00		
	EC-5	Card.	Electret Condenser			2.2k	40-15	52		10	Mini	4 $\frac{1}{8}$	W	50.00		
	EC-7	Card.	Electret Condenser			250B	40-16	52		10	Phone	10 $\frac{3}{8}$	WF	76.00		
	EC-9P	Card.	Electret Condenser			250B	30-17	56	XLR	10	XLR	13 $\frac{7}{8}$	W	130.00		
	EC-12B	Omni	Electret Condenser			250B	100-15	52		10	Mini	2 $\frac{3}{8}$	W	72.00	Telescoping wand.	
	EC-15P	Omni	Electret Condenser		Voice	250B	70-16	52		15	XLR	1 $\frac{1}{8}$		100.00	Lavalier.	
EC-33S	Card. x2	Electret Condenser			1.0k	50-15	46		10	Mini	6 $\frac{1}{4}$	WS	70.00			
NAKAMICHI	CM-300	Card. Omni	Electret Condenser	Alum.		200	30-18	76	XLR	16 $\frac{1}{2}$	Phone		WSF	210.00	Both capsules supplied.	
	CM-100	Card. Omni	Electret Condenser	Alum.		200	30-18	76	XLR	16 $\frac{1}{2}$	Phone		WSF	135.00	As above.	
	DM-500	Card.	Dynamic	Alum.		200	50-15	73	XLR	16 $\frac{1}{2}$	Phone		W	130.00		
NEUMANN	KM83	Omni	Condenser	Brass		200B	40-20	\uparrow	A3M			3	W	449.00	\uparrow 7 mV/Pa. (1 Pa = 94 dB SPL.)	
	KM84	Card.	Condenser	Brass		200B	40-20	\uparrow	A3M			3	W	449.00	\uparrow 10 mV/Pa.	
	KM65	Card.	Condenser	Brass		200B	40-20	\uparrow	A3M			3	W	449.00	\uparrow 9 mV/Pa.	
	KMS84	Card.	Condenser	Brass	Vocal/ Perf Studio	150B	40-18	\uparrow	A3M	25	A3M	7 $\frac{1}{2}$	WF	1000.00	\uparrow 5 mV/Pa.	
	U87A	Omni/Card./ Figure 8	Condenser	Brass		200B	40-16	\uparrow	A3M	25	A3M	17 $\frac{1}{2}$	WF	1600.00	\uparrow 20 mV/Pa.	
	U89	5-Pattern	Condenser	Brass	Studio	150B	40-18	\uparrow	A3M	25	A3M	14	WF	1475.00	\uparrow 8 mV/Pa.	
	TLM170	5-Pattern	Condenser	Brass	Studio	150B	40-18	\uparrow	A3M	25	A3M	22	WF	1500.00	\uparrow 8 mV/Pa.	
	KU81	Binaural	Condenser	Rubber		150B	40-16	\uparrow	A3M	25	A3M	95			3370.00	\uparrow 10 mV/Pa. "Dummy" head included.
	KMF4	Card.	Condenser	Brass		150B	40-20	\uparrow	A3M	25	A3M	3 $\frac{1}{4}$	W	850.00	\uparrow 12 mV/Pa.	
	KMR81	Lobe	Condenser	Brass	Film/ Brdcst.	150B	40-18	\uparrow	A3M	25	A3M	5	WF	885.00	\uparrow 18 mV/Pa. Short shotgun.	
	KMR82	Lobe	Condenser	Brass	Film/ Brdcst.	150B	40-20	\uparrow	A3M	25	A3M	8 $\frac{3}{4}$	WF	985.00	\uparrow 21 mV/Pa. Shotgun.	
	RSM190	M-S	Condenser	Brass	Film/ Brdcst.	50B	40-18	\uparrow	Spez.	16 $\frac{1}{2}$	A3M	10 $\frac{1}{2}$	W	1995.00	\uparrow 23 mV/Pa. Stereo shotgun, mono compatible.	
PASO SOUND	SM69fet	M-S X-Y	Condenser	Brass	Concert Hall Studio	200B	40-16	\uparrow	Spez.	33	A3M	16 $\frac{1}{2}$		3650.00	\uparrow 19 mV/Pa.	
	USM69	M-S X-Y	Condenser	Brass		150B	40-16	\uparrow	A5M	25	A3M	18		3300.00	\uparrow 10 mV/Pa.	
	M501	Card.	Dynamic	Zinc	Vocal	250B	50-15		A3F	15	\uparrow	32	WS	101.20	\uparrow A3F or A3M.	
	M601	Card.	Dynamic	Zinc	Vocal	250B	50-15		A3F	15	\uparrow	32	WS	124.30		
	M701	Card.	Dynamic	Zinc	Vocal/ Instr.	250B	40-16		A3F	15	\uparrow	48	WS	156.20	Anti-shock mount.	
PIONEER	M800	Card.	Dynamic	Zinc	Vocal/ Instr.	250B	40-18		A3F	15	\uparrow	48	W	201.30	As above.	
	M50	Card.	Dynamic	Plastic	Vocal/ Instr.	250B	50-15		A3F	15	\uparrow	22	W	89.00		
	DM-61		Dynamic		Vocal	600	80-12	75	Cannon	16.4	Phone	8.6	S	130.00		
	DM-51		Dynamic		Vocal	600	80-14	72	Cannon	16.4	Phone	5.4	S	100.00		
DM-21		Dynamic		Vocal	500	100-15	75		16.4	Phone	5.6	S	31.00			
REALISTIC	Dual Pattern (33-2012)	Mono/Stereo		Alum.	Vocal		30-15			10				34.95		
	Dual Head (33-1065)	\uparrow		Alum.	Vocal	600	50-15			6 $\frac{1}{2}$				23.95	\uparrow Head adjusts 90°.	
	PZM (33-1090)	Omni		Alum.	Vocal	600	20-18			18				44.95		
(Continued)	Highball (33-984)	Uni		Alum.	P.A.		80-15			16				54.95		



TECHNICS CD PLAYERS. FOR DISC JOCKEYS, RADIO STATIONS AND JUST PLAIN MUSIC FREAKS.

Designed with Class AA circuitry, precision search cueing
and anti-vibration construction.

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When you hear the fidelity and accuracy of the AKG K 240DF Studio Monitor Headphones, you'll know why it's become a standard for Digital Compact Disc recording engineers and professional musicians around the world.

The K 240DF establishes a uniform sound quality, free from environmental variables. It has been created to meet a recently proposed IRT (Institute for Broadcast Technology) international standard. It's so smooth and flat that AKG engineers use the K 240DF as a reference headphone in developing digital products for recording studios.

Each K 240DF is tested in a diffused sound field to arrive at a headphone design with a flat frequency response ($\pm 2dB$) and matched sensitivity. This professional headphone is close to perfection — without coloration or distortion — allowing you to enjoy all the advantages of the latest in CD technology. The self-adjusting headband supports circumaural ear cups. Each contains hand selected, large dynamic moving-coil transducers and acoustic filters yielding the ultimate in Digital CD reproduction. Minimum weight is well distributed for maximum comfort over longtime wear.

The AKG K 240DF Studio Monitor Headphone is a total design concept, just right for you to hear what you've been missing!



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DIFFUSED ENTERTAINMENT
HIGH
IRT
K 240DF
2 x 600 OHMS
MADE IN AUSTRIA
Studio-Monitor

MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = X2, Quad = X4, M-S = M-S		Operating Principle	Case Material	Most Common Use	Actual Impedance, Ω Balanced = B	Operating Range, Hz to kHz	Open-Circuit Sensitivity 1 kHz, - dB, re 1 Volt/1 bar	Mike Connector Type	Cable Length, Feet	Connector Type on Equipment End of Cable	Weight, Ounces	Wind Screen = W, On or Switch = S, Switched Low or Proximity Filter = F	Price, \$	Notes
		Alum.	Vocal													
REALISTIC (Continued)	Super-Omni-directional 33-1071	Omni		Alum.	Vocal		40-17			16					44.95	
	Card.			Die-Cast Chrm.	Vocal		50-15			12					29.95	
	Highball-2	Omni			Vocal	600	50-13			6					21.95	
	Highball-7	Uni			Vocal	600	80-15			10					15.95	
RECOTON	MM100	Card.	Dynamic	Plastic Alum.	Voice Music/Voice	50k	80-15	†		5	Mini Phone	S			15.99	†-72 dB at 500 ohms, -52 dB at 50 kilohms.
	MM330A	Card.	Dynamic	Plastic	Voice Music/Voice	500				10	Mini	S			37.99	
	MM400	Card.	Dynamic	Plastic	Voice Music/Voice	500				3	Mini	S			29.99	
	DM100	Card.	Dynamic	Plastic	Voice Music/Voice	500				5	Mini	S			8.99	
SCHDEPS	CMC 52S	Omni	Condenser	Nickel	ORTF	35B	20-20	58	XLR-3M		None	3¼			840.00	48-V phantom power. As above.
	CMC 54	Card.	Condenser	Nickel	Spaced Array	35B	40-20	58	XLR-3M		None	3¼			800.00	
	CMC 521	Sub Card.	Condenser	Nickel	Video General	35B	20-20	58	XLR-3M		None	3¼			900.00	
	CMC 541	Super Card.	Condenser	Nickel	Video General	35B	40-20	57	XLR-3M		None	3¼			930.00	
	CMC 56	Omni/Card./Figure 8	Condenser	Nickel	M-S/BlumIn	35B	40-20	60	XLR-3M		None	3¼			1370.00	
	CMC 58	Figure 8	Condenser	Nickel	Stage/Piano	35B	40-16	59	XLR-3M		None	3¼			1020.00	
	BLM 53	Hemi.	Condenser	Nickel	Vocal	35B	20-20	54	XLR-3M		None	2			1045.00	
	CMH 541	Super Card.	Condenser	Alum. Nickel	Vocal	35B	60-20	57	XLR-3M		None	6½			1105.00	
SENNHEISER	MD 409	Card.	Dynamic		Vocal/Perc.	200B	50-15	†	A3M	0		6½			249.00	†1.2 mV/Pa.
	MD 421	Card.	Dynamic	Plastic	Vocal/Perc.	200B	30-17	†	A3M	0		13¾	F		369.00	†2 mV/Pa.
	MD 441	Super Card.	Dynamic	Nckl./Vinyl	Vocal/Strings	200B	30-20	†	A3M	0		16	F		499.00	†1.8 mV/Pa.
	ME 20/K3U	Omni	Electret Condenser	Nickel	Outdoor	130B	50-15	†	A3M	0		4¾	F		288.00	†3 mV/Pa.
	ME 40/K3U	Card.	Electret Condenser	Nickel	Outdoor	130B	50-15	†	A3M	0		4¾	F		338.00	†3 mV/Pa.
	ME 80/K3U	Super Card.	Electret Condenser	Nickel	Outdoor	130B	50-15	†	A3M	0		6½	F		409.00	†5 mV/Pa. Shotgun.
	MKH 30	Omni	Condenser	Nickel	Studio/Orch.	150B	20-20	†	A3M	0		3½			796.00	†25 mV/Pa.
	MKH 20	Figure 8	Condenser	Nickel	Studio/Orch.	150B	40-20	†	A3M	0		4			849.00	†25 mV/Pa.
SHURE	Prologue 8L	Card.	Dynamic	Die-Cast Alum.	Home Record	600	80-10	76.5	Attached	15	Mini/Phone	9.7	S		50.50	
	Prologue 16L	Card.	Electret Condenser	Alum.	Instr./Record	600B	50-15	69.5	A3M	0	None	4.7	S		107.00	
	SM57-CN	Card.	Dynamic	Die-Cast Steel/Alum.	Instr./Record	310B	40-15	75.5	A3M	25	A3F	10			156.00	
	849-LC	Card.	Dynamic	Steel/Alum.	Instr.	600B	40-16	70.0	A3M	0	None	8.8	S		168.00	
	869-LC	Card.	Dynamic	Steel/Alum.	Vocal	600B	70-16	76	A3M	0	None	9.2	S		168.00	
	SM58-CN	Card.	Dynamic	Die-Cast Steel/Alum.	Vocal	310B	50-15	75.5	A3M	25	A3F	10.5			196.00	
	SM94-LC	Card.	Condenser	Die-Cast Steel/Brass	Instr.	200B	40-16	69	A3M	0	None	8.8			250.00	
	SM96-LC	Card.	Condenser	Steel/Alum.	Vocal	200B	70-16	74	A3M	0	None	9.2			250.00	
	SM81-LC	Card.	Condenser	Steel	Studio Record	85B	20-20	65	A3M	0	None	8	WF		367.00	
	SM87-LC	Super Card.	Condenser	Alum.	Vocal	85B	50-18	74	A3M	0	None	6.3			329.00	
SIGNET	RK 101	Card.	Dynamic	ABS Plastic Alum.	Music/Vocal/Vocal	600	50-14.5	70	Attached	16½	Phone	8	S		60.00	
	RK 201	Card.	Electret Condenser	Alum.	Music/Vocal/Vocal	600	45-17.5	64	Attached	16½	Phone	6½	S		90.00	
SONY	ECM-155T	Omni	Electret Condenser	Alum.	Voice		50-15	75	Attached	15	Mini/Phone	0.2	W		79.95	Tie-tac.
	ECM-23FM	Card.	Electret Condenser	Alum.	Instr.		20-20		XLR	15		15	W		115.00	
SOUND-CRAFTSMEN	SAM-II	Omni	Electret Condenser	Alum.	†	600	20-15.5	††		15	Phone	3½			69.00	†Real-time analyzer. ††65 dBm.
TECHNICS	RP-3545E	Card.	Electret Condenser	Alum.	Music		40-14					11	W		75.00	
	RP-3215E	Card. x2	Electret Condenser	Alum.	Music		50-10					12	W		65.00	
	RP-V370	Card.	Electret Condenser	Alum.	Music/Vocal/Music		40-12					12	W		45.00	
	RP-V340	Card.	Dynamic	Alum.	General Vocal/Music		100-10					9	W		29.00	

HEADPHONES

MANUFACTURER	Model	Operating Principle	Frequency Range, Hz to kHz	Impedance, Ohms	Sensitivity, dB SPL for 1 mW Input	Maximum Input, mV	THD at 95 dB SPL, %	Cord Length, Feet	Cord Style: Flat = F, Coiled = C	Plug Type: 3.5-mm Mini = M, Phone = P, Adaptor Ind. = A	Individual Volume Controls?	Construction: C, Supra-Aural = S, Headband: None (Fits in Ear) = N, Adjustable = A, Folding = F	Cover Material on Ear Cup	Weight, Ounces	Price, \$	Notes	
AIWA	HP-A606	Dynamic	7-22	40	104	200	8.2	F	A	No	D	A	Foam	3.1	40.00		
	HP-A202	Dynamic	10-20	40	104	200	8.2	F	A	No	D	A	Foam	2.8	30.00		
	HP-A101	Dynamic	15-22	32	97	100	6.6	F	A	No	D	A	Foam	1.7	30.00		
	HP-V11	Dynamic	15-22	15	104	40		F	A	No	N	N		0.4	50.00		
	HP-V9	Dynamic	15-40	16	105	40	4.3	F	A	No	N	N	Foam	0.2	60.00		
	HP-X10	Dynamic	5-25	40	104	200	8.2	F	A	No	D	N	Foam	3.6	95.00		
	HP-A505	Dynamic	15-24	32	97	100	8.2	F	A	No	D	A	Foam	1.6	40.00		
AKG	K-2	Dynamic	30-18	200	92	6.3V	0.9	8	F	M/A	No	S	A	Plastic	3.2	40.00	
	K-45	Dynamic	30-18	200	92.5	6.3V	0.9	10	F	P	No	S	A	Plastic	4.5	55.00	
	K-130	Dynamic	20-20	200	93.5	9V	0.7	9	F	P	No	S	A	Plastic	4.4	65.00	
	K-135	Dynamic	25-18	150	92	8.9V	0.7	10	F	P	No	S	A	Plastic	5.6	75.00	
	K-141	Dynamic	20-20	600	97.5	11V	0.5	10	F	P	No	S	A	Metal & Plastic	6.9	85.00	
	K-145	ES/Dyn.	20-24	200	89	8.9V	0.5	10	F	P	No	S	A	Metal & Plastic	6	95.00	
	K-240M	Dynamic	15-20	600	88	11V	0.3	10	F	P	No	C	A	Metal & Plastic	8.5	110.00	
	K-240DF	Dynamic	15-20	600	88	11V	0.3	8.5	F	P	No	C	A	Metal & Plastic	8.5	135.00	
	K-260	Dynamic	10-20	600	88	11V	0.2	10	F	P	No	C	A	Plastic	9.2	160.00	
	K-340	ES/Dyn.	15-25	400	88	10V	0.1	10	F	C	No	C	A	Metal & Plastic	13.5	215.00	
AUDIOTECHNICA	AP1200	Dynamic	20-20	4-16	90		6	F	P	No	S	A	Fabric	3.3	39.95		
	AP1300	Dynamic	20-20	4-16	108		10	F	P	No	S	A	Plastic	5.4	49.95		
	AP1400	Dynamic	20-22	4-16	105		10	F	P	No	C	A	Fabric	5.5	59.95		
AZDEN	DSR-50	Dynamic	15-24	40	101	200	8	F	A		S	A	Cloth	7	79.95		
	DSR-48	Dynamic	15-24	40	97	100	8	F	A		O	A	Foam	2	69.95		
	DSR-88	Dynamic	18-22	40	104	30	4	F	A		O	N	Foam	2	44.95		
	DSR-12	Dynamic	20-20	200	105	100	8	F	P		D	A	Cloth	4	69.95		
	DSR-69	Dynamic	40-20	32	92	100	4	F	M		D	A	Foam	2	14.95	With mute button, Model DSR-70.	
	DSR-V78	Dynamic	30-20	20	102	50	4	F	M	Yes	D	N	Foam	2	39.95	Includes tone controls.	
	DSR-V80	Dynamic	20-20	20	105	30	4	F	M	Yes	D	N	Foam	2	49.95		
BANG & OLUFSEN	Form 1	Dynamic	20-20	35	94		10	C	M/P/A	No	D	A	Foam	6	110.00		
	Form 2	Dynamic	40-20	30	94		10	C	M/P/A	No	D	A	Foam	2 1/2	55.00		
BEYERDYNAMIC	DT48A	Dynamic	16-20	5		1V	9	F		No	S	A	Rubber	15	320.00	For audiometric use.	
	DT48K	Dynamic	16-20	200†		4.4V	9	F	P	No	C	A	Vinyl	15	300.00	†Other impedances available.	
	DT48WK	Dynamic	16-20	200†		4.4V	9	F	P	No	C	A	Vinyl	15	315.00		
	DT100K	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	12 1/4	150.00		
	DT100WK	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	12 1/4	160.00		
	DT102K	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	8 3/4	105.00		
	DT102WK	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	8 3/4	115.00		
	DT108K	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	10 1/2	170.00	Includes 200-ohm boom mike.	
	DT108WK	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	10 1/2	180.00	As above.	
	DT109K	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	14 3/8	200.00	As above.	
	DT109WK	Dynamic	30-20	400†		20V	3	F	P	No	C	A	Vinyl	14 3/8	210.00	As above.	
	DT209	Dynamic	20-20	400†		5V		3	F	P	No	C	A	Vinyl	9 1/4	150.00	As above.
	DT220	Dynamic	20-20	400		6.4V			F	P	No	C	A	Vinyl	9 1/4	120.00	
	DT320	Dynamic	20-20	600		7.75V			F	P	No	C	A	Vinyl	3 3/4	65.00	
	DT330MKII	Dynamic	15-18	40		2V			F	P	No	A	A	Vinyl	7	80.00	
	DT550	Dynamic	10-22	600		7.75V			C	P	No	A	A	Vinyl	7	125.00	
	DT770	Dynamic	5-35	600		7.75V			C	P	No	A	A	Vinyl	9 1/4	175.00	
DT880	Dynamic	5-25	600		7.75V			C	P	No	A	A	Vinyl	7	170.00		
DT880 Studio	Dynamic	5-35	600		7.75V			C	P	No	A	A	Vinyl	7	210.00		
	DT990	Dynamic	5-35	600		7.75V		C	P	No	C	A	Cloth	8	185.00		
DENON	AH-D6	Dynamic	15-22 ±3	32	98	200mW	8	F	M/P	No	D	A	Foam	5	100.00		
	AH-D4	Dynamic	15-22 ±3	32	96	200mW	8	F	M/P	No	D	A	Foam	5	80.00		
	AH-D3	Dynamic	17-22 ±3	40	100	200mW	8	F	M/P	No	D	A	Foam	5	60.00		
	AH-D1	Dynamic	20-22 ±3	40	103	200mW	8	F	M/P	No	D	A	Foam	5	50.00		
FOSTEX	T10	Dynamic Ribbon	20-35	50	91	200mW	0.01	10	F	P	No	C	A	Vinyl	9 3/8	65.00	
	T20	Dynamic Ribbon	20-30	50	96	200mW	0.01	10	F	P	No	C	A	Vinyl	10 1/2	89.00	
	T30	Dynamic Ribbon	20-35	50	96	200mW	0.01	10	F	P	No	C	A	Vinyl	11 1/2	125.00	
GC-THORSEN	90-102	Dynamic	30-18	8	90	2V	10	F	M/P	No	C	A	Vinyl	12	15.99		
	90-115	Dynamic	20-20	32	95	1.3V	3 1/2	F	M/P	No	D	N	Foam	0.2	7.89		
	90-125	Dynamic	20-20	32	98	2V	6	F	M/P	No	D	A	Plastic	1.1	11.79		
	90-135	Dynamic	20-20	32	98	2V	6	F	M/P	No	D	A	Foam	1.7	7.99		
	90-150	Dynamic	20-25	100	100	5.5V	6	F	M/P	No	C	A	Leather	4.6	26.99		
	90-130	Dynamic	50-18	32	90	2V	6	F	M/P	No	D	A	Foam	1.7	5.29		
JECKLIN	JJ One	Dynamic	35-20	200			10	F	P	No	D	F	Plastic	14	99.00		
	JJ Two	Dynamic	30-20	200			10	F	P	No	D	F	Plastic	14	169.00		
	ESC	ES	20-20	4/16			14	F	P	No	D	F	Plastic	21	650.00		



Still don't see it? That's the whole idea behind Koss' revolutionary infrared stereophone system. The Koss Kordless™ Stereophone. Now, you can enjoy all the benefits of stereophone listening with no strings attached. And while the cord may be missing, the great Sound of Koss isn't. The Kordless system is so advanced it provides a full 20-20KHz frequency response at less than 1% distortion. Plus enough signal to fill a large room. Yet it's as easy to use as conventional stereophones. Just plug the Kordless transmitter into virtually any receiver or amplifier and turn it

CAN YOU FIND THE STEREOPHONE CORD IN THIS PICTURE?

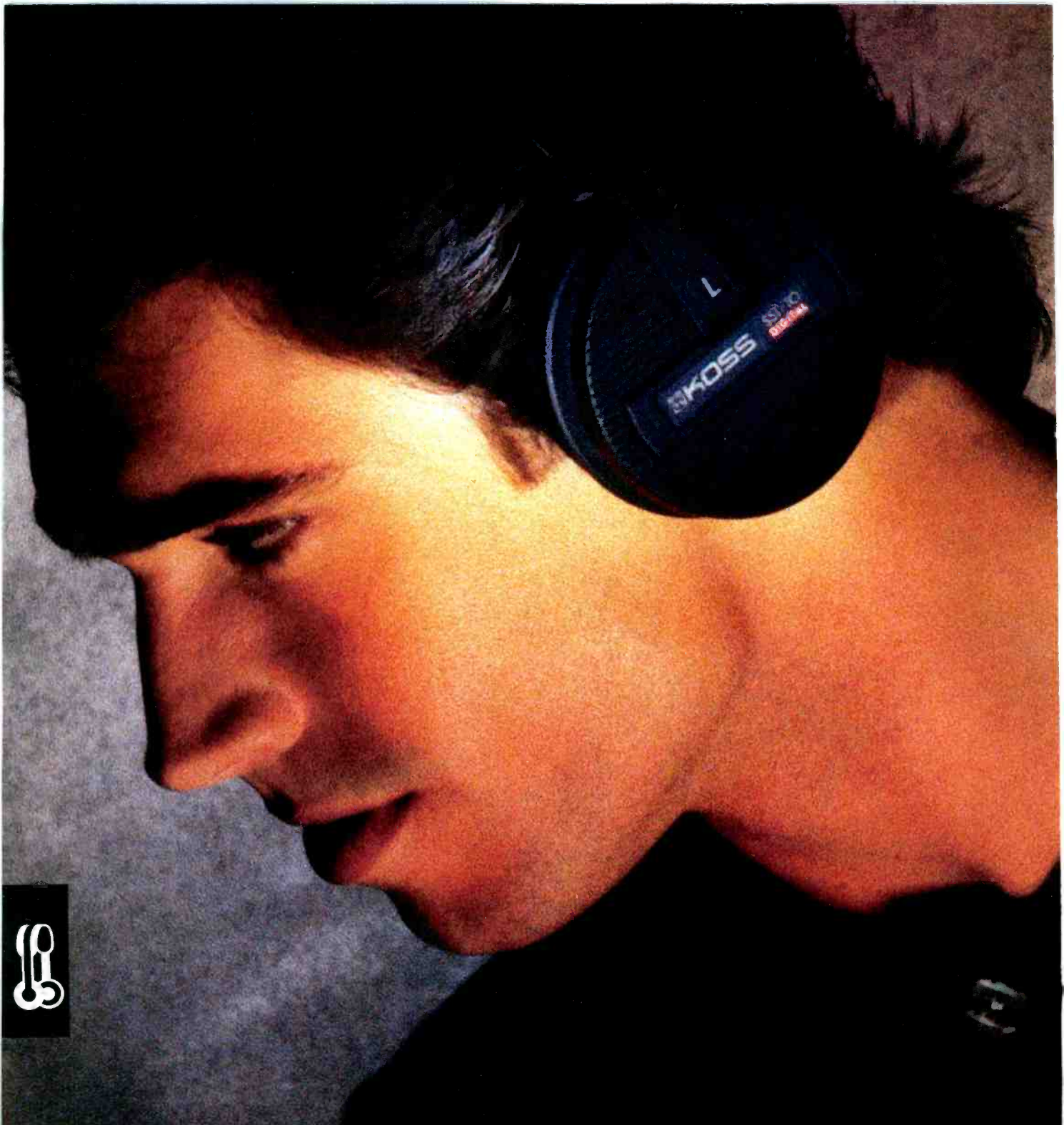
on. Roam around the room listening to a record. Dance to a CD. Enjoy stereo or mono TV broadcasts and videos in bed. Or whatever else moves you. Sound impressive? You bet it does. And the best way to appreciate this major advance in technology is to visit your nearest Koss Kordless™ Stereophone dealer. One listen, and you'll never sit still for ordinary headphones again.

• Koss Stereophones, 4129 N. Port Washington Rd., Milwaukee, WI 53212. Koss Limited, 4112 S. Service Rd., Burlington, Ontario L7L4X5. Koss-Europe: CH-6855, Stabio-Switzerland.

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Presenting the Koss SST-10, the new flagship of the Super Sonic Technology line of stereophones. It has all the characteristics necessary to fully realize the advantages of today's digital recordings: Full frequency response, ultra-low distortion, outstanding dynamic range and optimal sensitivity. One size fits all, so try them yourself. And discover why all the smartest heads will be wearing a pair. • Koss Stereophones, 4129 N. Port Washington Rd., Milwaukee, WI 53212. Koss Limited, 4112 So. Service Road, Burlington, Ontario L7L 4X5. Koss-Europe: CH-6855, Stabio-Switzerland. *Included: The Koss Hold-A-Fone/2 Storage Hook.*

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HEADPHONES

MANUFACTURER	Model	Operating Principle	Frequency Range, Hz to kHz	Impedance, Ohms	Sensitivity, dB SPL for 1 mW input	Maximum Input, mW	THD at 95 dB SPL, %	Cord Length, Feet	Cord Style: Flat = F, Coiled = C	Plug Type: 3.5-mm Mini = M, 1/4" Phone = P, Adaptor Incl. = A	Individual Volume Controls?	Circumaural = C, supra-aural = S, over-ear = O	Headband: None (fits in Ear) = N, Adjustable = A, Folding = F	Cover Material on Ear Cup	Weight, Ounces	Price, \$	Notes
RECOTON	ST82	Dynamic	20-20	32	90	100mW	4	F	M	No	O	A	Foam	1.4	8.99		
	ST92	Dynamic	20-20	32	90	100mW	4	F	M	No	O	A	Foam	1.4	8.99		
	ST77	Dynamic	20-25	25	96	300mW	10	F	M/A	No	O	A	Foam	1.2	19.99		
	ST93	Dynamic	20-22	32	100	100mW	5	F	M/A	No	O	A	Foam	1	11.99		
	ST97	Dynamic	20-23	35	100	300mW	6	F	M/A	No	D	A	Foam	2.8	39.95		
	ST98A	Dynamic	50-22	32	102	100mW	4	F	M	No	S	A	Foam	0.8	14.99		
	ST100	Dynamic	20-20	38	98	300mW	4	F	M	No	S	N	Foam	0.5	22.99		
	ST101	Dynamic	20-20	32	98	100mW	6	F	M/A	Yes	O	A	Foam	1.3	26.99		
	ST102	Dynamic	50-20	32	109	300mW	4	F	M/A	No	S	A	Plastic	0.5	19.99		
	ST103	Dynamic	30-20	32	98	100mW	6	F	M/A	No	D	A	Foam	0.9	15.99		
	ST104	Dynamic	20-22	32	98	100mW	25	F	M/A	Yes	S	A/F	Foam	1.5	26.99		
	ST105	Dynamic	20-20	32	100	300mW	4	F	M/A	No	D	A/F	Foam	1.5	26.99		
	ST106	Dynamic	20-22	32	100	100mW	6	F	M	No	O	A/F	Foam	1	12.49		
	ST107	Dynamic	20-23	40	102	300mW	6	F	M/A	No	C	A	Foam	3.9	32.99		
REVOX	RH3100	Dynamic	5-25	600	94	7.75V	9.9	C	P	No	S	A	Vinyl	8	150.00		
SENNHEISER	HD 412	Dynamic	20-20	600			10	F	P	No	S/O	N	Vinyl		102.00		
	PD 100	Dynamic	20-18	50	94		3	F	M/A	Opt.	S/D	A	Foam	1.4	58.00		
	HD 40	Dynamic	20-18	32	90	100mW	4	F	M/A	No	S/O	A	Foam	2	49.00		
	HD 50	Dynamic	20-18	42	92		1	4	F	M/A	Opt.	S/D	A	Foam	1.4	75.00	
	HD 410SL	Dynamic	20-18	600	94	100mW	1	10	F	P	Opt.	S/O	A	Foam	2.7	65.00	
	HD 414SL	Dynamic	20-20	600	94	100mW	1	10	F	P	Opt.	S/O	A	Foam	4	89.00	
	HD 420SL	Dynamic	18-20	600	94	100mW	1	10	F	P	Opt.	S/O	A	Cloth	4.6	99.00	
	HD 425	Dynamic	18-20	600	94	100mW	1	10	F	P	Opt.	C/O	A	Vinyl	5.5	135.00	
	HD 430	Dynamic	16-20	600	94	100mW	0.5	10	F	P	Opt.	C/O	A	Vinyl	6.8	155.00	
	HD 540	Dynamic	16-25	600	94		0.4	10	F	P	Opt.	C/O	A	Vinyl	8.8	179.00	
	Reference																
	HD 222	Dynamic	16-20	600	94	200mW	1	10	F	P	Opt.	C	A	Vinyl	8.8	115.00	
	HD 230	Dynamic	10-30	600	94	200mW	0.1	10	F	P	Opt.	C	A	Vinyl	9.2	199.00	
	HD 250	Dynamic	16-25	600	94		0.5	10	F	P	Opt.	C	A	Vinyl	6.8	199.00	
Linear						0											
SI 234/	Dynamic	20-20				1	0			Yes	C	A	Vinyl	13.5	514.00	Infrared, wireless.	
HDI 234																	
SI 2/HDI 2	Dynamic	30-12				1†	0			Yes	N	Latex	2.8	294.00	†At 102 dB. As above.		
SIGNET	TK11	Dynamic	30-20	4-16	93		0.6†	4.9	F	A	No	D	A	Plastic	1.9	45.00	†At 110 dB.
	TK20	Dynamic	25-20	4-16	100		0.5†	4.9	F	A	No	D	A/F	Plastic	1.6	65.00	
	TK21	Dynamic	20-20	4-16	98		0.5†	8.2	F	A	No	S	A	Plastic	3.5	100.00	
	TK22	Dynamic	20-20	4-16	96		0.4†	11.5	F	P	No	S	A	Plastic	7.2	140.00	
	TK44	Electret Cond.	10-25	4-32	††		0.3†	10.5	F		No	S	A	Plastic	7.9	300.00	††98 dB for 1.5 V rms input.
	EP200	Dynamic	20-20	4-16				6	F	A	No	S	A	Alum. Plastic	4.1	65.00	
EP300	Dynamic	20-25	4-16				10	F	P	No	S	A	Plastic	5.4	100.00		
SDNY	MDR-CD6	Dynamic	2-25	45	110	500mW	10	F	M/P/A	No	S	A	Foam		119.95		
	MDR-V6	Dynamic	5-30	63	106	1W	8	F	M/P/A	No	C	A	Foam	7/8	99.95		
	MDR-M33A	Dynamic	15-24	25	100	100mW	10	F	M/P/A	No	O	A	Foam	1 3/4	59.95		
	MDR-A60	Dynamic	10-25	18	108	50mW	4	F	M/P/A	No	O	F	Plastic	3/4	69.95		
	MDR-E272	Dynamic	18-22	13.5	104			3 1/4	F	M	No	O	N	Foam/Plastic	1 1/4	39.95	
STANTON	ST-1	Dynamic	25-20	32	110	100mW	0.5†	7.5	F	M/P	No	O	A	Vinyl	3.2	24.95	†At 110 dB.
	ST-2	Dynamic	20-20	32	100	100mW	0.5†	7.5	F	M/P	No	O	A	Fabric	5	29.95	†At 100 dB.
	ST-3	Dynamic	20-20	32	112	100mW	0.5†	7.5	F	M/P	No	O	A	Vinyl	5	39.95	†At 112 dB.
	ST-4	Dynamic	20-20	60	96	250mW	0.25†	7	C	P	No	O	A	Vinyl	5.6	49.95	†At 1 mW.
	ST-PRO	Dynamic	20-20	100	100	250mW	0.25†	7	C	P	No	O	A	Vinyl	5.9	55.00	†At 1 mW.
	LS-1	Dynamic	20-20	32	92			5	F	M	No	D	A			14.95	
	LS-2	Dynamic	20-20	32	100			5	F	M	No	O	A			24.95	
	LS-3 Turbo	Dynamic	20-20	32	105			5	F	M	No	D	A			29.95	
	Microwater 2	Dynamic	20-18	32	95	10mW		4	F	M/A	No	O	A		1	14.95	
	30M/SR	Dynamic	20-22	100	110	250mW	0.25†	10	C	P	No	D	N		3.8	49.95	†At 110 dB.
	35M/SR	Dynamic	20-22	100	110	250mW	0.25†	12	C	P	No	D	A	Vinyl	3.8	55.00	†At 110 dB.
	SRS-215	Dynamic	20-20	50	98	100mW	0.5	10	F	M/P	No	D	A	Vinyl	2.1	65.00	
	SRS-225	Dynamic	10-22	100	94	100mW	0.5	10	F	P	No	D	A	Vinyl	8.5	75.00	
	SRS-245	Dynamic	10-22	100	94	100mW	0.5	10	C	P	No	D	A	Vinyl	8.5	100.00	
SRS-265	Dynamic	5-22	100	96	100mW	0.5	10	C	P	No	C	A	Vinyl	8.6	125.00		
STAX	SR-34	ES	20-25	8	95		0.02	7	F	A	No	C/O	A	Vinyl	8	159.95	
	SR-84	ES	20-25	8	95		0.02	7	F	A	No	C/O	A	Vinyl	7.5	229.95	
	SR-5N8	ES	15-25	8	97		0.05	7	F	A	No	C/O	A	Vinyl	13.9	299.95	
	SR-Gamma	ES	10-35	8	97		0.05	7	F	A	No	C/O	A	Vinyl	7.5	399.95	
	SR-Lambda	ES	6-35	8	102		0.05	7	F	A	No	C/O	A	Vinyl	15.1	499.95	Includes Model SRD-6SB adaptor.
	SR-Sigma	ES	20-35	8	94		0.05	7	F	A	No	C/O	A	Vinyl	16.4	749.95	
	SR-Lambda Pro #1	ES	8-50	8	102		0.005	7	F	A	No	C/O	A	Vinyl	15.1	749.95	Includes Model SRD-7 Pro adaptor.
	SR-Lambda Pro #2	ES	8-50	12.5k	102		0.005	7	F	A	Yes	C/O	A	Vinyl	15.1	799.95	Includes Model SRD-P Pro adaptor.
	SR-Lambda Pro #3	ES	8-50	50k	102		0.005	7	F	A	Yes	C/O	A	Vinyl	15.1	1199.95	Includes Model SRM-1 Mk2 Pro Class-A amp.
TECHNICS	EAH-X15	Dynamic	15-20	40	105	400	0.01	6%	F	M/A	No	S	A	Foam		95.00	
	EAH-T10	Dynamic	15-20	32	100	300	0.2	6%	F	M/A	No	O	A	Foam	2 3/4	65.00	
	EAH-T6	Dynamic	20-20	40	98	100		4 1/2	F	M/A	No	O	A	Foam	1 1/4	40.00	
YAMAHA	YHD-1	Drthodyn.	20-20	125	100	1W	8	F	P/A	No	O	A/F	Screen	5.9	75.00		
	YHD-2	Drthodyn.	20-20	125	97	700mW	8	F	P/A	No	O	A/F	Screen	5.5	55.00		
	YHD-3	Drthodyn.	20-20	125	98	500mW	8	F	P/A	No	D	A	Screen	5	30.00		
	YHL-003	Dynamic	20-20	45	103	200mW	8	F	P/A	No	C	A	Screen	3.6	50.00		



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and wider dynamic range; linear crystal, oxygen-free copper wiring for less signal path resistance, and gold-plated contacts for the finest possible conductivity.

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EQUALIZERS

MANUFACTURER	Model (R) = Remote included (RO) = Remote Optional	Number of Channels		Bandwidth, Octaves	Switched Tape EQ?	Unity Gain Control?	Rated Output, rms V	THD at Rated Output, %	S/N, -dB, at Rated Output, %	Variable Center Frequencies?	Variable Filter "Q"?	Booster/Cut Range, ±dB	Real-Time or Spectrum Analyzer?	Yes/Generator?	Peak Noise = P, Warble Tone = W	With Calibrated Mikes?	Number of Memories	Number of Tape Monitors	Subsonic Filter?	Video Inputs?	Price, \$	Notes
		Number of Channels	Number of Bands per Channel																			
ACCPHASE	G-18	2	33	1/3	Yes	Yes			No	No			No	No	No	0	1	No	No	No	3650.00	
ADC	SS-117EX	2	10	1	Yes	Yes	5	0.1	95	No	Yes	15		Yes	Yes	Yes	4	2	No	No	250.00	Includes spatial expander. With remote and auto room/speaker EQ, Model SS-525X, \$600.00.
	SS-412X	2	10	1	Yes	Yes	5	0.1	95	No	Yes	15		Yes	Yes	Yes	2	2	Yes	Yes	430.00	
	SS-425X	2	12	1, 3/3	Yes	Yes	5	0.1	95	No	Yes	12		Yes	Yes	Yes	4	2	Yes	Yes	500.00	
	SS-100SL	2	10	1	Yes	Yes	5	0.1	100	No	Yes	15		Yes	No	No	1	1	Yes	Yes	200.00	200.00 240.00 400.00
	SS-300SL	2	10	1	Yes	Yes	2	0.1	95	No	Yes	15		Yes	Yes	Yes	2	2	Yes	No	240.00	
	SS-325X	2	12	1, 3/3	Yes	Yes	2	0.1	95	No	Yes	12		Yes	Yes	Yes	5	2	Yes	No	400.00	
AUDIO CONTROL	Octave	2	10	1	Yes		7.5	0.008	118	No	No	12		No			1	Yes			149.00	Infinite-sweep warble generator. Bridging adaptor. Stepped warble; 0-dB indicator. SPL display; rumble reducer.
	Octave Plus	2	10	1	No		7.0	0.008	118	No	No	12		Yes	W	Yes	1	Yes			239.00	
	Richter Scale III	2	6	1/2	Yes		8.0	0.005	120	No	No	12		Yes	W	Yes	1	Yes			349.00	
	Ten	2	10	1	Yes		7.5	0.005	120	No	No	15		No			1	Yes	Yes		229.00	
	Ten Plus	2	10	1	Yes		7.5	0.005	120	No	No	15		Yes	W	Yes	1	Yes			329.00	
C-101	2	10	1	Yes		7.0	0.008	116	No	No	15		Yes	P	Yes	1	Yes			429.00		
AUDIO DESIGN ASSOCIATES	EQ5	2	5	1 2/3	No	Yes	5	0.05	85	No	No	30		No	No	No	0	0	No	No	650.00	Center frequencies at 37, 109, and 675 Hz and 1.3 and 15.9 kHz; switchable bypass.
AUDIOSOURCE	EQ-One/II	2	10	1/3	Yes	Yes	6.8	0.014	92	No	No	12		Yes	P	Yes	1	Yes			369.95	2 or 4 dB scale. Stereo and surround-sound synthesizer; see "Ambience & Surround-Sound Processors."
	EQ-Eight	2	10	1/2	Yes	Yes	5	0.03	80	No	No	12		Yes			1	Yes	Yes		159.95	
	AV-Four	2	7	1/3	No	Yes	5	0.03	80	No	No	12		Yes			1	Yes	Yes		199.95	
AZDEN	GX-36	2	10	1	Yes	Yes	6	0.005	100	No	No	15		No			2	No	No	No	125.00	For studio use.
	GX-45	2	10	1	Yes	Yes	6	0.005	90	No	No	15		Yes			2	No	No	No	225.00	
	GX-50	2	10	1	Yes	Yes	6	0.005	90	No	No	15		Yes	P	Yes	2	No	No	No	300.00	
	GX-500	1	33	1/3	Yes	Yes	6	0.005	106	No	No	15		No			2	No	No	No	495.00	
BIAMP SYSTEMS	EQ 220	2	10	1	No	Yes	6.15	0.01	108	No	No	15		No	No	No	0	0	No	No	329.00	
	EQ 230	2	15	2/3	Yes	Yes	6.15	0.01	108	No	No	12		No	No	No	0	1	No	No	559.00	
	EQ 290	1	29	1/3	No	Yes	6.15	0.01	108	No	No	12		No	No	No	0	0	Yes	No	559.00	
	EQ 140	1	4		No	Yes	6.15	0.008	98	Yes	Yes	16		No	No	No	0	0	Yes	No	399.00	
CELLO	Palette	2	6	1		Yes				No	No			No	No	No	0	0	No	No	8900.00	
CERWIN-VEGA	DB-10B	2	1				2	0.025				10					1	Yes			59.95	Operates at 30 Hz with subsonic filter below 20 Hz.
DB SYSTEMS	DB-5	2	6			Yes	3	.0008	96	Yes		15									380.00	DB-2A power supply or DBP-1 cable required; with oak cabinet and gold-plated jacks, \$465.00.
DBX	14:10	2	14	1/2, 1	Yes	No	2	0.03	103	No	No	12		Yes	(2) P	Yes	10	1	Yes	No	1300.00	Automatic room/speaker EQ with constant Q.
DENON	DE-70B	2	12	1/3	Yes	Yes	1	0.003		No	No	12		No	No	No	0	2	No	No	470.00	Built-in dynamic processor.
ESDTERIC SOUND	Re-Equalizer	2	2	10	No	No	3.5	0.02	85	No	No	16		No	No	No	16	0	No	No	225.00	For replay of early LPs, 78s, and transcriptions.
FISHER	EQ610B	2	7		No	No	5	0.02	100			12		No	No	No	0	1	No		100.00	
	EQ620B	2	7		Yes	No	5	0.02	100			12		No	No	No	0	1	No		150.00	
	EQ630B	2	7		No	No	5	0.02	100			12		Yes	No	No	0	1	No		200.00	
	EQ640B	2	9		Yes	No	5	0.02	100			12		Yes	No	No	0	1	No		250.00	
FOSTEX	3030	2	10	1/3	Yes	Yes	0.3	0.03	80	No	No	12		No	No	No	0	0	No	No	250.00	Overload and sensitivity indicators.
GROMMES PRECISION	G4EQ	1	28	1/3	No	Yes	1	0.01	80	No	No	12		No	No	No	0	0	Yes	No	450.00	
HARMAN/KARDON	EQ8	2	10	1	Yes	Yes	2	0.02	105	No	No	12		No	No	No	0	1	Yes	No	265.00	
HITACHI	HGE77SW	2	10	1/3	Yes	No	0.2	0.05	96	No	No	10		Yes	No	No	0	1	No	No	199.95	
JRM	Remote Unit	2	6	1	Yes	Yes	7	0.01	112	No	No	8		No	No	No			Yes	Yes	350.00	JRM preamp or 3PBP crossover required; continuously variable loudness.
JVC	SEAM770(RI)	2	7	1 1/3	Yes	Yes	1	0.008	100	No	No	12		Yes	No	No	0	1	No	No	400.00	
	SEA12	2	7	1 1/3	Yes	Yes	1	0.03	110	No	No	10		No	No	No	0	12	1	No	100.00	
KENWOOD	GE-76	2	9		Yes	Yes	9	0.01	120			10, 5		Yes			1	1			240.00	
	GE-56	2	12		Yes	Yes	5	0.01	110			10					1	1			160.00	
	GE-46	2	7		No	No	4	0.01	96			10					1	1			100.00	
	GE-1100	2	12		Yes	No	9	0.005	105			12		Yes			2	2			430.00	

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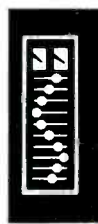
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EQUALIZERS

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	Number of Channels	Number of Bands per Channel	Bandwidth, Octaves	Switched Tap EQ?	Unity Gain Control?	Rated Output, rms V	THD at Rated Output, %	S.W. - dB, at Rated Output	Variable Center Frequencies?	Variable Filter "Q"?	Booster/Cool Range, ± dB	Real Time or Spectrum Analyzer?	Test Generator?	Peak Sense - P, Variable Tone - W	With Calibrated Mikes?	Number of Memories	Subsonic Filter?	Video Inputs?	Price, \$	Notes	
KLARK-TEKNIK	DN300	1	30	1/3	No	Yes	8	0.01	90†			12								Yes	995.00	†Unweighted. Optional transformer. As above. As above. As above. As above. Model RT60 reverb/decay time interface optional; plotter interface optional.
	DN301	1	30	1/3		Yes	8	0.01	90†			15									995.00	
	DN332	2	30	1/3		Yes	8	0.01	90†			12									1095.00	
	DN360	2	30	1/3		Yes	8	0.01	90†			6, 12									1625.00	
	DN27A	1	27	1/3		Yes	8	0.01	90†			12									1050.00	
DN60	1	30	1/3		Yes															No	3550.00	
LUXMAN	G100	2	10	1	Yes	Yes	9	0.003	110	No	No	12	No	No	No	0	1	No	No		250.00	
MARANTZ	EQ130	2	10	1	Yes	Yes	1.0	0.005	110			12	Yes	P	Yes		1				130.00	
	EQ551	2	10	1	Yes	Yes	7.0	0.035	80			10					1				250.00	
McINTOSH	MQ107	2	7	1/3, 1	No	Yes	2.5	0.02	95	Yes	Yes	12, 15	No	No	No	0	0	Yes	No		650.00	
	MQ104	2	4	1/3, 1	No	Yes	2.5	0.1	95	Yes	Yes	12, 15	No	No	No	0	0	Yes	No		500.00	
NIKKO	EQ-540	2	9	1/2	Yes	Yes	7	0.03	100			12	Yes	P	Yes						200.00	Mono EQ.
	EQ-950	2	10	1/2	Yes	Yes	7	0.01	100			12	Yes								295.00	
	EQ-25	2	12	1/2	Yes	Yes	7	0.004	100			12	Yes								270.00	
	EQ-30	1	32	1/2	Yes	Yes	7	0.004	100			12	Yes								350.00	
ONKYO	EQ-35	2	12	1	Yes	Yes		0.01	100	No	Yes	12, 6	No	W	No	0	1	No	No		319.95	Two oscillator test generator types.
	EQ-240	2	7	1	Yes	No		0.01	100	No	Yes	12	Yes	No	No	0	1	No	No		209.95	
	EQ-18	2	7	1	Yes	No		0.01	100	No	Yes	12	Yes	No	No	0	1	No	No		134.95	
PARASOUND	EQS-1	2	10	1	Yes	Yes	6	0.01	100			12	Yes	P	Yes		2	Yes	Yes		325.00	Bands centered at 16 and 90 Hz; cut only at 16 Hz.
	EQ300	2	12	1	Yes	Yes	6	0.01	100			12	Yes				1	Yes			235.00	
	EQ225	2	10	1	Yes	Yes	5	0.01	100			12	Yes					2	Yes		165.00	
PIONEER	SG-60	2	12	1	Yes	Yes		0.003	120	No	No	12	No	No	No	0	2	No	Yes		300.00	
	GR-470	2	7		No	No		0.03	106	No	No	10	No	No	No	0	1	No	Yes		100.00	
	GR-551	2	7		No	No		0.03	106	No	No	10	Yes	No	No	0	1	No	No		200.00	
PLEXUS AUDIO SYSTEMS	Active Bass Equalizer	2					1	0.02	80			+ 8, + 12	No	No	No	0	0	Yes	No		125.00	
RANE	GE 30	1	30	1/3	No	Yes	7.75	0.01	110	No	No	+ 12, -15	No	No	No	0	0	Yes	No		749.00	Switchable cut-only or boost/cut modes; constant Q. Constant Q. As above. As above. Window-type RTA. As above. For studio use. For sound reinforcement.
	GE 27	1	27	1/3	No	Yes	7.75	0.009	107	No	No	+ 12, -15	No	No	No	0	0	Yes	No		499.00	
	GE 14	2	14	2/3	No	Yes	7.75	0.009	105	No	No	+ 12, -15	No	No	No	0	0	Yes	No		499.00	
	ME 30	1	30	1/3	No	Yes	7.75	0.009	108	No	No	12	No	No	No	0	0	Yes	No		359.00	
	ME 15	2	15	2/3	No	Yes	7.75	0.009	108	No	No	12	No	No	No	0	0	Yes	No		369.00	
	RE 27	1	27	1/3	No	Yes	7.75	0.009	106	No	No	+ 12, -15	Yes	P	Yes	0	0	Yes	No		849.00	
	RE 14	2	14	2/3	No	Yes	7.75	0.009	104	No	No	+ 12, -15	Yes	P	Yes	0	0	Yes	No		749.00	
SP 15	1	5	Var.	No	Yes	7.75	0.005	118	Yes	Yes	+ 12, -15	No	No	No	0	0	Yes	No		599.00		
PE 15	1	5	Var.	No	Yes	7.75	0.02	108	Yes	Yes	+ 15, -20	No	No	No	0	0	Yes	No		399.00		
RCA	MGE 260	2	10	1	No	No	1	0.005	104	No	No	10	Yes	No	No	0	0	No	No		219.00	
REALISTIC	31-2020	2	10		Yes	Yes	1	0.015	95	No	No	12	Yes	No	No	0	2	No	No		130.00	
	31-2018	2	10		Yes	Yes	1.0	0.32	95	No	No	12	No	No	No	0	1	No	No		80.00	
	31-1989	2	7		Yes	Yes	1.0	0.32	90	No	No	12	No	No	No	0	1	No	No		30.00	
RHOAOS	RP-94	2	2		Yes					Yes	Yes	20									199.00	
SAE	E101	2	2	Var.	Yes	Yes	2.5	0.02	100	Yes	Yes	16	No	No	No	20	1	Yes	No		650.00	Thirty-two selectable center frequencies.
SANSUI	SE-99(RI)	2	12		Yes	Yes		0.003	120	No	No	12	Yes	P	Yes	6	1	No	No		725.00	
	SE-88(RI)	2	7		Yes	Yes		0.008	110	No	No	10	Yes	No	No	5	1	No	No		500.00	
	SE-3000	2	10		Yes	Yes		0.008	110	No	No	12	Yes	No	No	0	1	No	No		300.00	
	SE-1000	2	7		Yes	Yes		0.03	75	No	No	12	No	No	No	0	1	No	No		100.00	
SCOTT	EQ400	2	10	1/3	Yes	No	5	0.009	85	No	No	10	Yes	No	No		2	No	No		279.95	
SENTREK	SHQ 2200B	2	10	1/3	No	Yes		†	††	No	No	12	No	No	No		1	No	No		109.95	†0.05% for 1 V input at center. ††80 dB for 2.5 V input.
	SHQ 4210B	2	10	1/3	No	Yes		†	††	No	No	12	Yes	No	No		1	No	No		119.95	
	SHQ 4220BL	2	10	1/3	No	Yes		†	††	No	No	12	Yes	No	No		2	No	No		149.95	
SESCOM	PO-40	1	5	1/4	No	No	7	0.1	80	No	No	12	No	No	No	0	0	No	No		54.00	
	PO-16	1	1	1	No	No	7	0.1	80	Yes	No	15	No	No	No	0	0	No	No		42.00	
SOLOIST AUDIO	Passive One Gold Edition	2			No	No			Yes	No	+ 7	No	No	No	0	0	No	No			369.00	Passive bass EQ.
	Passive One	2			No	No			Yes	No	+ 7	No	No	No	0	0	No	No			259.00	As above.
	Passive Jr.	2			No	No			No	No	+ 5	No	No	No	0	0	No	No			109.00	As above.



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The \$100 we are going to give you really won't mean a thing in comparison to the hours of enjoyment, entertainment, and personal satisfaction in store for you now.

Have you ever heard people talk about 'Lambda Pro' Earspeakers? Don't believe them, because there just aren't the words to accurately describe the ultimate in sound reproduction. There is only one way for you to experience perfection. Try them!

Look at the list below for the address of the most convenient Lambda Dealer near you. Now go there, ask to try a pair, and leave the rest to your sense of good taste.

When you buy yourself a pair of Lambda Earspeakers from one of the dealers listed below, you will receive a five meter extension cord free. (The SRE 16 extension cord is designed to set the standards required by the pros.) This offer is valid until December 31, 1987.

ST.	DEALER	CITY	ST.	DEALER	CITY
AL	Audition	Birmingham	MI	Court Street Listening Room	Saginaw
AZ	Wilson Audio	Tucson		Hi Fi Buys	Ann Arbor, E. Lansing, Lansing, Midland
CA	Absolute Audio	Orange	MN	The Gramophone	Birmingham
	Audible Difference	Palo Alto		Audio Perfection	Minneapolis
	Audio Ecstasy	San Luis Obispo	MO	Best Sound	St. Louis
	Audio Vision	Santa Barbara		Sound Room	St. Louis
	Beverly Stereo	Los Angeles	NE	Custom Electronics	Omaha
	db Audio	Berkeley	NH	RE Sound	Nashua
	Century Stereo	San Jose, Palo Alto	NJ	Harvey Electronics	Paramus
	Christopher Hansen, Ltd.	Los Angeles		Leonard Radio	Paramus
	Dimensions In Stereo	Torrance		Pro Audio Consultants	Millburn
	Genesis Audio	El Toro		Woodbridge Stereo	Woodbridge
	Havens & Hardesty	Huntington Beach	NM	Sound Ideas	Aberquerque
	Jonas Miller Sound	Santa Monica	NY	Audio Den	Lake Grove
	Monterey Stereo	Monterey		Clark Music	Latham, Syracuse
	Music By The Sea	Leucadia		Electronic Workshop	New York
	North County Stereo	Encinitas, La Jolla		Ears Nova	Great Neck
	Paris Audio	Los Angeles, Torrance, Woodland Hills		Grand Central Radio	New York
	Sound Distinction	Concord		Harvey Electronics	New York, White Plains
	Sounding Board	Berkeley		Innovative Audio	Brooklyn
	Stereo Plus	Dublin, San Francisco		J.B. Stereo	Rochester
	Stereo Showcase	Sacramento, Vallejo		JSG Audio	Binghamton
	Stereo Store	San Francisco		Leonard Radio	New York, Woodside
	Systems Design Group	Redondo Beach, Sherman Oaks		Long Player Stereo	Goshin
	Upscale Audio	Canoga Park		Sound By Singer	New York
	Western Audio Imports	Palo Alto		Sound Stage Audio	New York, Fresh Meadows
CO	Listen Up	Denver		Stereo Exchange	New York
CT	Audio Com	Greenwich	NC	Audio Advice	Raleigh
	Carston Stereo	Danbury	OH	Hoffmans Stereo	Warrensville
	Take 5 Audio	New Haven		Custom Stereo	Columbus
	Stereo Shop	Hartford	OK	Contemporary Sound	Oklahoma City
FL	Audio by Caruso	Miami	OR	Hawthorne Stereo	Portland
	Audio Encounters	Hollywood	PA	Audiolab Stereo Center	Fairless Hills
	Sound Components	Miami		Bryn-Mawr Stereo	All Locations
IL	Audio Consultants	Evanston, Hinesdale, Libertyville		Soundex of Willow Grove	Willow Grove
IN	Audio Specialists	Indianapolis	RI	Soundings	Middletown
	Ovation Audio	Indianapolis	SC	Operation Audio	Greenville
LA	Wilson Audio	New Orleans	TN	Underground Sound	Memphis
ME	Hi Fi Exchange	Falmouth		Dallas Audio Concepts	Dallas
MD	Absolutely Sound	Rockville	TX	Hillcrest Hi Fi	Dallas
	Gramophone	Lutherville		Houston Audio Concepts	Houston
MA	Audio Studio Lab	Brookline	UT	Standard Audio	Salt Lake City
	Audio Vision	Arlington	VT	Audio Den	S. Burlington
	Goodwin's	Cambridge	VA	Audio Art	Richmond
	Music Box	Wellesley		Digital Sound	Virginia Beach
	Natural Sound	Framingham	WA	Definitive Audio	Seattle
	Sound & Music	Northampton	WI	Flanner & Hafsoos	Mequon, Milwaukee
	Sounds II	N. Dartmouth		Hi Fi Heaven	Green Bay
	Tweeter Etc.	All locations		Sound Seller	Marinette
MI	Almas Hi Fi	Birmingham, Dearborn, Farmington Hills		Specialized Sound	Madison
	Classic Stereo Ltd.	Grand Rapids, Kalamazoo			

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EQUALIZERS

MANUFACTURER	Model (R) = Remote Included, (RO) = Remote Optional	Number of Channels	Number of Bands per Channel	Bandwidth, Octaves	Switched Taps	Detaves	Unity Gain EQ?	Rated Output?	THD at Rated Output, %	S/N, -dB, at Rated Output, "A" Wtd.	Variable Center Frequencies?	Variable Filter "Q"?	Booster/Cut Range, ±dB	Real-Time or Spectrum Analyzer?	Test Generator Pink Noise = P, Wobble Tone = W	With Calibrated Mikes?	Number of Memories	Number of Tape Monitors	Subsonic Filter?	Video Inputs?	Price, \$	Notes
SONY	SEQ-333ES	2	10	1	Yes	Yes	7.75	.0015	116	Yes	No	12	Yes	P	Yes	8	2	No	No	No	600.00	
SOUNDCRAFTSMEN	AE2000	2	10	1	Yes	Yes	10	0.01	114	No	No	15	Yes	P	No	0	1	No	No	No	799.00	Differential comparator system; auto-scan. Differential comparator system; with test record. As above. As above.
	DC4415	2	21	1/3-2/3	Yes	Yes	10	0.01	114	No	No	15	No	No	No	0	1	Yes	No	No	599.00	
	DC2215	2	10	1	Yes	Yes	10	0.01	114	No	No	15	No	No	No	0	1	No	No	No	399.00	
	DC2214	2	10	1	Yes	Yes	10	0.01	106	No	No	12	No	No	No	0	0	No	No	No	299.00	
TECHNICS	SH-8065	2	33	1/3	Yes	No	†	0.002	110	No	No	3, 12	No	No	No	0	1	No	No	No	750.00	†Switchable output, 0.15/1 V.
	SA-8066	2	12	1	Yes	No	1	0.003	107	No	No	12	Yes	P	Yes	8	2	No	No	No	650.00	
	SH-8046	2	7	1 1/3	Yes	No	1	0.003	107	No	No	12	No	No	No	4	1	No	No	No	350.00	
	SH-8028	2	7	1 1/3	Yes	No	1	0.005	110	No	No	12	No	No	No	0	1	No	No	No	140.00	
VECTOR RESEARCH	VO-115	2	10	1	Yes	Yes	1	0.009	109	No	No	12	No	No	No	0	1	No	Yes	No	119.95	
	VO-120	2	10	1	Yes	Yes	1	0.009	109	No	No	12	Yes	Yes	No	0	1	No	Yes	Yes	199.95	
	VO-125	2	10	1	Yes	Yes	1	0.009	109	No	No	12	Yes	Yes	Opt.	0	2	Yes	Yes	Yes	229.95	
YAMAHA	EQ-1100U(RI)	2	10	1	Yes	No	1	0.006	107	No	No	12	Yes	P	Yes	†	2	Yes	Yes	Yes	599.00	†Three curves factory-set, four curves user-set. Digital, automatic room EQ.
	EQ-500U	2	10	1	Yes	Yes	1	0.005	105	No	No	12	Yes	P	Yes	0	1	Yes	No	No	349.00	
	EQ-32	2	10	1	Yes	Yes	1	0.005	105	No	No	12	Yes	No	No	0	1	Yes	No	No	299.00	
	GE-308	2	10	1	Yes	No	1	0.005	105	No	No	12	No	No	No	0	1	No	No	No	159.00	
	GE-208	2	10	1	Yes	No	1	0.005	105	No	No	12	No	No	No	0	1	No	No	No	139.00	

The Home Theater

Where were you the last time a movie overwhelmed you? At your favorite theater, right? You felt transported to another place and time. The sound drew you into the story with an almost magical realism. You simply couldn't experience it at home—until now. Shure Home Theater Sound™ decoders using patented Acra-Vector™ logic accurately recreate the exciting multi-channel sound of today's *very best* theaters. Over 1000 discrete components and 60 integrated circuits combine to precisely decode special signals already on video tapes, discs and broadcasts. It's a must for the ultimate theater experience. **Reference Brochure Available** - Write us or see your Audio/Video specialist.



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Never before has so much clean power, pure sound and unique technology been available at the touch of a remote control button.

The Carver Receiver 2000, at your service. In a single, exquisitely-styled component, we've engineered three of the most significant contributions ever made to audio technology.

A 200 watt RMS per channel Magnetic Field Power Amplifier.

A Sonic Hologram Generator for a three-dimensional sound experience.

An Asymmetrical Charge-Coupled FM Stereo Detector in the tuner section for the cleanest, most noise-free reception possible... plus AM STEREO.

Plus a low-noise high definition preamplifier.

Everything necessary for music enjoyment. Settle back in your chair and pick up the compact Receiver 2000 wireless remote control.

Touch the POWER button. Two hundred watts RMS per channel spring to life. More than any other receiver offered today. The kind of power needed to deliver Compact Discs' incredible dynamic range with the impact and clarity it deserves.

But you're in the mood for a record. Touch one of the four source buttons to select PHONO. As the record comes to life, you realize that it would be a superb candidate for Sonic Holography. Another touch of the



Car Power Base.

remote control and you're suddenly in the midst of the performers, a part of the musical experience.

Suddenly, the phone rings. You reduce the volume easily without leaving your chair and take the call. Later on, you select a favorite FM station from the twelve presets while you catch up on your reading. The sound is hiss-free, even when the station is far away. A great oldie comes on and you use the Receiver 2000's remote to turn it up and rattle the windows for a moment the way you always wished you could when that song first came out.

In the evening, it's movie time. The Receiver 2000 becomes your gateway to Sonic Holography to rival any Dolby-equipped theater. Starships cruise through your living room. Aliens prowl behind the couch. Laser battles erupt over your coffee table.

All controlled from the comfort of your chair.

A wealth of useful features. From the silky feel of the large, easy-to-use knobs, to the switched and unswitched power sockets on the Receiver 2000's back, you'll find that no detail has been overlooked. Even if it didn't have three of Bob Carver's major innovations tucked inside it, the Receiver 2000 would be one of the finest receivers you could own.

It has inputs for phono, Compact Disc player and even video sound sources. It allows 2-1 and 1-2 dubbing through dual tape deck inputs and outputs, and selection of two sets of speakers or a combination.

Precision, defeatable tone controls are provided for bass, treble and midrange, as well as a preset "loudness" equalization curve for acoustic compensation during low level listening.

The bright digital readout and signal strength LEDs are only a hint of the high quality quartz synthesized FM section and AM stereo circuitry within. Choose from six FM and six AM station presets, tune manually or use the Receiver 2000's automatic station search feature.

Ample Power for Digital. Even before Compact Disc players, clipping distortion caused by lack of amplifier power has been the critical listener's enemy. Speakers create music by generating magnetic fields inside their voice coils. A drum beat sounds on a record; energy flows to your speakers; the speakers push the air. In the case of low bass notes, this means having enough power to resonate the entire cubic volume of your listening room thirty times per second!

The sad fact is, few receivers have the technical capabilities to provide the amount of power needed to complete instantaneous music transient waveforms.

Before Bob Carver invented the Magnetic Field Power Amplifier, the only way to get enough power to completely eliminate clipping distortion was to give up owning a receiver and buy a traditional power amplifier and put up with its bulk, heat and expense. The Carver Receiver 2000 uses a better way. An affordable method of delivering the power speakers need without thermal waste, bulk and distortion. Our Magnetic Field Power Amplifier design is elegant, effective and fully described in the 32-page brochure we'll be glad to send you.

The finest receiver FM section. The Carver FM Stereo Receiver 2000 employs Asymmetrical Charge-Coupled Detector technology which makes FM sound as good as other stereo sound sources. Free of background hiss, click and pops, picket fencing and other multipath interference annoyances which disturb FM enjoyment.

Or, in the words of Audio Magazine's Len Feldman, "The significance of its design can only be fully appreciated by tuning the weakest, most unaccept-

able stereo signal you can find, then pushing those two magic buttons. Separation is still there; only the background noise has been diminished, and with it, much of the sibilance and hissy edginess so characteristic of multipath interference."

True realism with Sonic Holography.

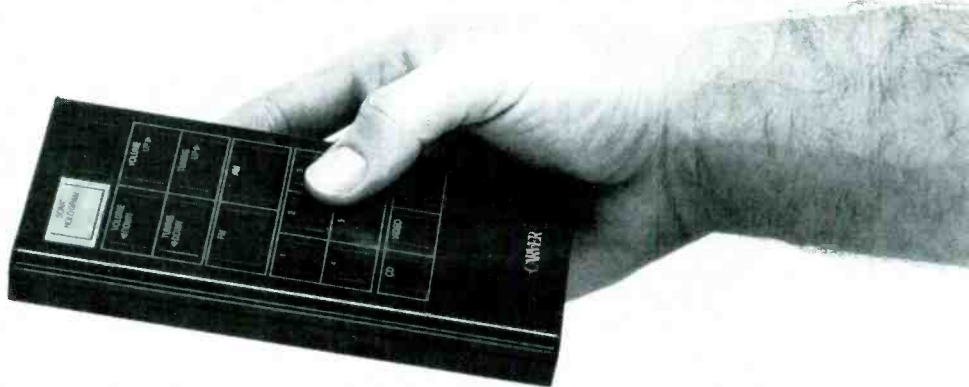
In a live setting, sound approaches from all sides, not just head on the way it does from stereo speakers. Sonic Holography uncovers critical timing and phase information that exists in your and CD's records, but has been inaudible with normal stereo components. Through the Carver 2000, this information emerges in three-dimensional space around you, pinpointing the precise location of instruments and vocals.

You don't need a trained ear to notice the difference. Suddenly the listening field extends wider, higher and deeper than your speakers, literally immersing you in the performance.

The best of everything in one compact component.

There has never been a more complete method of enjoying music than the Carver Receiver 2000. Occupying just over two square feet of shelf space, it gives you the power, the tuning ability and the miracle of Sonic Holography that can bring any music or video source to vibrant life. Audition it at your Carver dealer. And then shift the balance of power to your stereo system soon.

Power: 200 watts RMS per channel into 8 ohms. 20-20kHz with no more than 0.15% THD.



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AMBIENCE & SURROUND-SOUND PROCESSORS



SONY SDP-505ES



FOSGATE DSM-3602



YAMAHA DSP-1



NEC AVD-700

MANUFACTURER	Model (RI) = Remote Included, (RO) = Remote Optional	Matrix—See Code	UNIT TYPE				DELAY FUNCTIONS										Price, \$	Notes
			Time Manipulation: Delay = D, Reverb = R	Other Manipulation examples: Frequency Shaping = F, Comp. Filter = C, Phase Manipulation = P, Choc = O	Number and Use of Outputs—See Code	Delay Time, ms	Number of Hall/Room Simulations	Hall/Room Adjustments: Volume = V, Shape (High/Low Ratio) = S	Continuous Amp Power, Watts	THD, %	S/N Ratio, "A" Wtd., -dB	Channel Separation, dB	Stereo Simulation?	Number of Tape Monitors	Video Inputs?			
AKAI	AS-P302-B(RI)	D/O	D	P	2F, 2B	15-30		25 x 2	0.3	90	60	No	3	Yes	299.00	Audio and video dubbing.		
APHEX SYSTEMS	ESP-7000(RI)	O†		O	3F, 3B, SW				0.03	95	50	No	1	No	995.00	†Dolby compatible.		
ARCHER	15-1279	D	D		2F, 2B	20		5 x 4	0.1	80	60	Yes	1	Yes	129.95	Amp bridges to 10 watts.		
AUDIONICS	SD-3(RI)	D/D†	D	O	3F, 2B, SW	15-32		40 x 2	0.15	85	35	Yes	1	No	795.00	†Dolby Pro-Logic.		
AUDIOSURCE	SS-One	D	D	F/C/P	2B	10-50		15 x 2				Yes			299.95	Front-to-rear separation controls; 100-Hz and 10-kHz boost; with two Model LS-Ten speakers, \$369.95. Five in three out A/V switcher with r.f. modulator; includes EQ, see "Equalizers."		
	AV-Four	H		F	2B			15 x 2				Yes	5		199.95			
BDZAK/TAI	E-902A	D	D/R	D	2F	30-130		35 x 2	0.01				2	No	899.50	Reverb times to 250 ms; without amp, Model E-901A, \$649.50.		
CANDN	SP-10	O	O	P	2F, 2B				0.003	82		Yes	2	3	369.00			
DENDN	AVC-500II	D/O	D	F/C/P	2F, 2B			30 x 2	0.2	90		Yes	3	Yes	375.00			
FISHER	ASR875B(RI)	D/O	D/R		2F, 2B, 2S	10-50		30 x 2	0.5			No	1	Yes	400.00	Includes two speakers.		
FOSGATE	DSM-3602 Type AG(RI)	D/O	D	O	3F, 2B, 2S, SW	15-32		40 x 2	0.05	85	35	Yes	1	Yes	1195.00	Class-A low-level operation; without amp, Model DSM-3602, \$995.00. Without time delay, NR, and remote, Model DSM-3603, \$495.00. †Dolby compatible. For portable or mobile use (operates on 12 V d.c.).		
	DSM-3604(RI)	D/O	D	D	3F, 2B, SW	15-32		40 x 2	0.05	85	35	Yes	1	No	795.00			
	Gavotte	O†		O	3F, 2B, SW				0.05	90	35	No	0	No	349.00			
FOSTEX	3180	None	D/R		2†	24			††	†††		Yes	0	No	400.00	†Outputs duplicated on front panel. ††0.02% without reverb. †††60 dB with reverb, 82 dB without. Pre-delay simulates first reflection.		
GC-THORSEN	30-8700	D/O	D	C/P	2F, 1B	10-30		12 x 1	†	††	43	Yes			159.95	†Front, 0.08%; rear, 0.5%. ††Front, 70 dB; rear, 60 dB.		

OUTPUT CODE
 2F—Left & Right Front
 3F—Left, Center, & Right Front
 2B—Left & Right Back
 3B—Left, Center, & Right Back
 2S—Left & Right Sides
 SW—Subwoofer



**“Martin-Logan
makes the
speakers that
Mozart and
Beethoven
would have
used . . .”**

“ . . . and I wouldn't think of listening to any other loudspeaker.”

*LEONARD SLATKIN**

When most audio manufacturers speak of “technology,” it's usually to discuss the amount of distortion their product produces. When Martin-Logan uses the term, it's to expound on the musical experience of listening to a symphony played through “Monolith's.” Or perhaps a concerto as rendered by a pair of “CLS.”

It is an experience that transcends cartridges, electronics, and speakerwire. It avoids the anxiety of slew rate and damping factor. It's an experience that amazes the world-class conductor to the extent that he would give this unqualified endorsement.

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When Martin-Logan employs the term “technology,” it's to amplify a philosophy of electrostatic loudspeaker design. A design far beyond the capabilities of any other speaker company.



**Mr. Slatkin is the conductor of the St. Louis Symphony*

It's a design that employs electrostatic diaphragms whose mass is so light, it equals that of a cubic inch of air. A design so advanced that it is both acoustically AND physically transparent. A design so revolutionary that it's only requirements are better than average quality amplification and an unremitting zeal for musical performance.

A New Standard of Performance

Mr. Slatkin also stated, “The Martin-Logans are extraordinary speakers that decisively establish new standards of loudspeaker performance.” The creation of which was more than the handiwork of technocrats.

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We are often asked "what cable is best for my equipment?" It really doesn't matter what equipment you own. The objective for any cable is to let the signal through without changing it! And remember, the difference in sound between various cables stays the same regardless of length. Better is always better, shorter length only makes the best more affordable.

All the **LIVE WIRE** cables are high value products that have been carefully engineered to let your music through as cleanly as possible.



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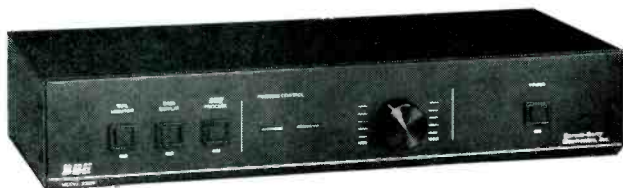
AMBIENCE & SURROUND-SOUND PROCESSORS

MANUFACTURER	MATRIX CODE Model (RI) = Remote Included, (RO) = Remote Optional Matrix—See Code	UNIT TYPE					DELAY FUNCTIONS										Notes
		Time Manipulation: Delay = D, Reverb = R	Other Manipulation Techniques: F = Comb Filter = C, Frequency Shaping = P, Other = O	Number and Use of Outputs—See Code	Delay Time, ms	Number of Hall/Room Simulations Shape (Height Width Ratio) = S	Hall/Room Simulations Volume = V, Shape (Height Width Ratio) = S	Continuous Amp Power, Watts	THD, %	S/N Ratio, "A" Wtd., -dB	Channel Separation, dB	Stereo Simulation?	Number of Tape Monitors	Video Inputs?	Price, \$		
INSTANT REPLAY	6HF	O	D	P	2F, 2B				0.003	90		Yes	2	3	399.00	For Model 615 or 618 VCR.	
JVC	SU-A30	D/O	D	C/P/O	2F, 2B	15-30		10 x 2	0.5	85	60	Yes		No	235.00	Headphone jack.	
KENWOOD	SS-96(RI) SC-75	D D	D D		2B 2B	10-30 10-30		15 x 2 5 x 2	0.5 0.9	80 80			1	3	350.00 250.00		
LUXMAN	F-105(RI)	D/O	D		3F, 2B	10-35		25 x 2	0.05	80		Yes	2	Yes	550.00		
MARANTZ	AVS 351	D	D		3F, 2B			17 x 2	0.1			Yes	1		300.00	Includes pair of minispeakers.	
MEMOREX	DS-10	D	D		2F, 2B	20		6 x 4	0.5	70	50	Yes	1	No	129.95	Amp bridges to 12 watts.	
NEC	AV-250(RI) AV-350(RI) AVD-700(RI) AVR-700(RI) AVR-1000(RI) A-1300(RI)	D/O D/O D/O D/O D/O D/O	D D D D D D	F/P F/P F/P F/P F/P F/P	3F, 2B, SW 3F, 2B, SW 3F, 2B, SW 2F, 2B 2F, 2B 2F, 2B	20 Sel. 1-92 20 20 20		30 x 2 30 x 4 70 x 2, 35 x 2 100 x 2, 50 x 2 50 x 4	0.3 0.045 0.005 0.05 0.05 0.05	100 100 100 90 90 90	60 60 60 60 60 60	No Yes No No No Yes	1 1 1 Yes Yes Yes	Yes Yes Yes Yes Yes Yes	299.00 579.00 729.00 649.00 869.00 699.00	Digital delay; amp bridges to 60 watts. Digital delay. Amp bridges to 130 watts.	
PIONEER	SP-X707(RI)	D	D		†	Sel.		††	3.0			Yes	1	No	320.00	†Front outputs, two fixed and two variable; two back outputs. ††30 watts x 2 on rear only.	
RCA	MSP400(RI)	D	D		3F, 2B	Sel.		†	3.0	80	60	Yes	1	No	349.00	†30 watts x 2 on rear only.	
RHOADES	RP-250DL TA-1001	D SQ	D	C/P P	3F, 2B 2B	5-50		5 x 2	0.1			Yes	2	No	249.95 129.95		
SANSUI	DS-77 AV-C10 RA-1000	QS QS O	D D D/R	O O	3F 2B 2F	†	3 3	10 x 3 15 x 2	0.09 0.02 0.025			Yes Yes No	1 3 2	Yes No	400.00 220.00 300.00	Transient-peak enhancement circuit. Five-band EQ; video input on front panel. †0 to 4.5 S. Mixing mike input has delay of 30 to 200 ms.	
SANYO	SAV200	D/O	D		2F, 2B	15-30		20 x 2	0.9	80		Yes		No	149.99		
SHURE	AVC20(RI)	D/O	†	F/C/P	3F, 2B, SW	20		30 x 4	0.1	††	60	Yes	3	3	599.00	†Delay and variable-decay reverb. ††Front, 90 dB; rear, 60 dB. Amp bridges to 60 watts.	
SHURE HTS	HTS 5200(RI)	D	D	O	3F, 2B, SW	16-36			0.1	90	65	Yes	1	No	1000.00	Logic decoding; extra remote sensor optional. With wired remote for set-up, Model HTS 5000, \$749.00.	
SONY	SDP-505ES	D/O	D/R	D	2F, 2B, SW	0-90	4	14 x 2	0.008	90		Yes	1		700.00	16-bit, 44.1-kHz digital delay processing.	
SOUND CONCEPTS	SSD550	D	D/R	F	2F, 2B	5-100			0.1	90	50	No	0	No	789.00		
SSI SURROUND SOUND	SSI-720(RI) SSI-360 MkII	D D	D D		3F, 2S, SW 3F, 2S, SW	10-50 10-25		25 x 2	0.015 0.05	110 105	60 51	Yes Yes	1 1	No No	599.95 379.95		
SYNERGEX	ESP-7R(RI)	O†		O	2F, 2B, 2S							No	1	No	675.00	†Dolby compatible. Logic steering in all channels.	
TEAC	AV-550D	D/O	D		3F, 2B	5-30	1	12 x 2		80		Yes	3	4	449.00	Video enhancer; audio/video fader; audio insert.	
TECHNICS	SH-AV44	D/O	D/R	P	3F, 2B	15-30		25 x 2	0.3	90		Yes	1	4	295.00		
3D ACDUSTICS	10B	O	D	P	3F, 2B, SW										325.00	Passive; built into subwoofer; also available as part of Models 610 System and 610 Surround speakers.	
UNIVERSAL SECURITY INSTRUMENTS	V-9100	O†	D	F/C	2F, 2B	10-30	4	5 x 3	0.5	60	40	Yes	0	No	299.99	†Dolby compatible. DNR noise reduction; includes four speakers.	
YAMAHA	DSP-1(RI) AVC-50(RI) AVC-30(RI) SR-50	D/O D/O D/O D/O	D/R D D D	F/C/P C/P C/P C/P	3F, 2B, 2S, SW 2F, 2B 2F, 2B 2B	† 10-30 10-30 10-30	48 V/S	45 x 2 100 x 2, 20 x 2 25 x 2	0.002 0.005 0.05 0.03	94 103 100 103	65 60 60	Yes Yes Yes Yes	1 4 2 1	No 4 2 No	899.00 499.00 429.00 299.00	†1 ms to 4 S. Digital delay processing.	

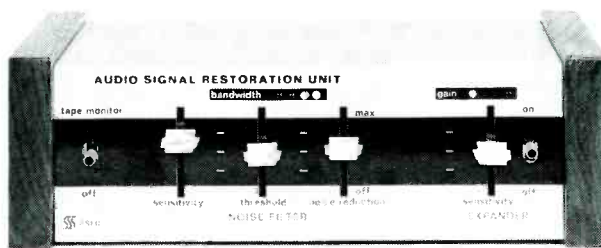
OUTPUT CODE
 2F—Left & Right Front
 3F—Left, Center, & Right Front
 2B—Left & Right Back
 3B—Left, Center, & Right Back
 2S—Left & Right Sides
 SW—Subwoofer



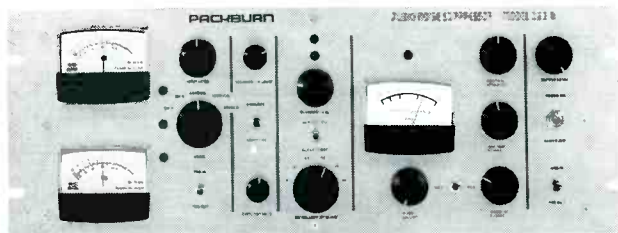
SIGNAL PROCESSORS



BARCUS-BERRY BBE 202R



SYMMETRIC SOUND SYSTEMS ASRU



PACKBURN 323A

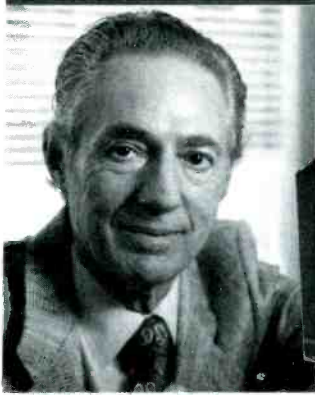


**AUDIO CONTROL
PHASE COUPLED ACTIVATOR**

MANUFACTURER	Model (RI) = Remote Included, (RD) = Remote Optional	Type of Processing	Function: Closed Loop = C, Open Loop = O, Transient = T	Application: Tape Rec. = R, Home = P, FM = F, Video = V, Simultaneous Encode/Decode?	Degree of Noise Reduction, dB @ Hz	Record = R, Play = P, Both = RP	THD, %	Frequency Response, Hz to kHz, ±dB	Price, \$	Notes	
ACE AUDIO	4000	Infrasonic Filter		R/P/F	No	†	RP	0.002	20-20 +0,-3	98.50	†18 dB/octave slope below 20 Hz.
	4100	Infra/Ultrasonic Filter		R/P/F	No	†	RP	0.002	20-20 +0,-3	108.50	†Low, 18 dB/octave slope; high, 12 dB/octave.
	4000-X24	Infrasonic Filter		R/P/F	No	†	RP	0.002	20-20 +0,-3	132.00	†Low, 24 dB/octave slope.
	4100-X24	Infra/Ultrasonic Filter		R/P/F	No	†	RP	0.002	20-20 +0,-3	142.00	†Low, 24 dB/octave slope; high, 12 dB/octave.
APHEX SYSTEMS	Type 'C' Aural Exciter Model 103	Harmonic Enhancer	O	U				0.01	10-100 ± 0.5	299.95	Adds program-dependent harmonics.
AUDIO CONTROL	Phase Coupled Activator	Proprietary	O	U	No		RP	0.005	25-20 ± 0.5	259.00	Restores lower frequencies.
	Soundtracker	Stereo Synthesis	O	V	No	14	RP	0.5	20-20 ± 0.5	159.00	ONR; 15.75-kHz notch filter for video.
BARCUS-BERRY ELECTRONICS	BBE 2002	†	O	U	No	None	RP	0.1		250.00	†Compensates for loudspeaker amplitude and phase distortion.
DBX	38X-DS	Dynamic Expander	O	U		20 @ 20-20k	RP	0.15	20-20 ± 0.5	499.00	Three-band expansion; OverEasy compression; impact restoration circuit.
	18X-DS	Dynamic Expander	O	U		20 @ 20-20k	RP	0.15	20-20 ± 0.5	279.00	As above but one-band (full-band) processing.
	224X-DS	dbx Type II	C	R/V	Yes	40 @ 20-20k	RP	0.1	40-20 ± 0.5	299.00	Two tape monitors, with dubbing.
	150X-DS	dbx Type I	C	R	Yes	40 @ 20-20k	RP	0.1	20-20 ± 0.5	249.00	For recorders with response of 20 Hz to 20 kHz, ±1 dB (such as 15 ips or PCM); expands PCM dynamic range to 115 dB.
FOSTEX	3070	Limiter/Compressor and Noise Gate	O	U				0.03	20-20 ± 1	400.00	Variable attack, release, and compression ratio controls; variable thresholds for compressor and noise gate.
PACKBURN	323A	Transient, Dynamic NR	O/T	U	No	Varies	RP	0.05	Sel.	2650.00	Mono/stereo; has three NR processors.
PHOENIX	P-522NR	2:1 Compressor	C	R/V	Yes	30 @ 1k	RP	0.1	20-20 ± 1	149.95	
RHOADES	TE-600	Dynamic		U		12 @ 7.8k	RP	0.05	20-20	149.95	
SOUND CONCEPTS	IR2100(RI)	Stereo Image Enhancer	O	U	No		P	0.01	5-50 ± 1	289.00	Delay adjustable for speaker angles of 20° to 100°.
	IR2200	Stereo Image Enhancer	O	U	No		RP	0.01	5-50 ± 1	169.00	Kit, Model KIR-1, \$97.00.
	VSP-1	Stereo Synthesizer	O	U	No		P	0.03	10-50 ± 1	159.00	Kit, Model KVSP-1, \$92.00.
	SX-80(V)	CX Decoder	C	P/V	No	20 @ 2-20k	P		20-20 ± 0.25	119.00	For CX-encoded LPs and laser videodiscs; kit, Model KXS-1, \$78.00.
SYMMETRIC SOUND SYSTEMS	ASRU	Dynamic Noise Filter/Expander	O	U		18 @ 20-20k	P	0.2	20-20 ± 1	190.00	Kit, \$120.00.
	PS-1	Click Eliminator	T	P			P	0.02	20-20 ± 1	129.95	Kit, \$79.95.
	EX-1	Expander	O	U		8.5 @ 20-20k	P	0.2	20-20 ± 1	90.00	

“BBE made my audio system sound better than I ever dreamed possible!”

—**Leonard Feather**, Celebrated Jazz Critic for the L.A. Times, Washington Post News Service and Author of many books including “The Jazz Years—Earwitness to an Era.”



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Listening to recorded music, of course, falls short of the delights of listening to a live performance. I was therefore skeptical when told that BBE could make a dramatic improvement to virtually all audio systems and I had to hear for myself.

I was amazed at how much better the BBE 2002 made my music system sound! There was a presence, a *being there* sense of excitement. The rich textures of instrumental sounds, the subtle nuances and details in the music come through with clarity and authenticity.

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—Music & Sound Output

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- Audio Junction, Pittsburgh, PA
- Hillcrest High Fidelity, Dallas, TX
- Audio Craft, Cleveland, OH
- Import Audio—Las Vegas, NV
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BBE™

CROSSOVERS

MANUFACTURER	Model	Type: Active = A, Passive = P Combined Active & Passive = C Mono = M, Stereo = S Other = D				Number of Frequency Bands per Channel	Crossover Frequencies, Hz	Crossover Slopes, dB per Octave	Independent High- and Low-Pass Frequency Selection? Variable = V	Subwoofer Output? Fixed = F, Swappable = S, Inerted for Mono Bridging = M	Level Controls: High Pass = H, Midrange = M, Low-Pass = L (Or add Number of Controls)	S/N Ratio, dB	Distortion, %	Nominal Input Level, V	Input Impedance, Ohms	Output Impedance, Ohms	Price, \$	Notes
		A	S	M	X													
ACCUAPHASE	F-15L	A	S	3	Sel.	18/12	Yes	†		H/M/L	100	0.01		50k	100	2425.00	†Optional plug-in modules, \$40.00 to \$235.00 each.	
ACE AUDIO	6500-DSB	A	M/S/X	2	30-200	12	Yes	P	S/M	H or L	90	0.002	1.0	100k	100	156.00	Optional subsonic filter, \$25.00.	
	6000 6000-6	A C	S S	2 2	200-15k 30-18k	12 6	Yes Yes	P P	S/M S/M	H or L H or L	90 90	0.002 0.002	1.0 1.0	100k 100k	100 150	156.00 175.00	As above. As above: transient-perfect filter.	
ACOUSTIC ELECTRONICS	AQ2000	A	X	2	100	24	No	F	M	L	100	0.002	0.75	100k	86	695.00	Fiber-optic bass output; for Acoustic Electronics AQ2000.	
APOGEE ACOUSTICS	Active Crossover	A	S	3	200-600, 5k-10k	6	Yes	F	No	H/M/L	100	0.01	0.05-2	100k	560	1200.00	For Apogee Scintilla, Full Range, and Duetta II.	
ATHENA	Time Coherent	A	S	2	15-15k	12/6	No	V	S	H/L	90	0.005	2	100k	600	1800.00	Phase-coherent.	
AUDIO CONTROL	Phase Coupled Activator Richter Scale III	A	S	2	20-20k	18	No	P	S	L	118	0.005	1.0	100k	150	259.00	Proprietary Sound Restoration circuits.	
		A	S/X	2	20-20k	24	No	P	S/M/B	L	120	0.005	1.0	100k	150	349.00	Linkwitz-Riley alignment; 1/2-octave EQ and analyzer.	
AUDIO RESEARCH	EC21	C	X	2	50-5k	6/18, 6/6		F	M	L	90	0.01	0.75	50k	500	995.00	Passive 6-dB high; active tube-based 6/18-dB low; optional frequency-setting kits (via soldering).	
BIAMP SYSTEMS	SX23	A	O	†	100-10k	18	No	V	No	H/L	103	0.015	1.23	10k	150	499.00	†Usable as stereo 2-way or mono 3-way.	
	SX35	A	O	†	50-5k, 200-20k	18	No	V	No	H/M/L	98	0.015	1.23	10k	150	599.00	†Usable as stereo 3-way or mono 5-way.	
BOZAK TAI	N-106	A	S	2	†	6	No	F			85	0.01	0.7	50k		249.00	†Model N-106L, 400 Hz; Model N-106H, 2.5 kHz.	
BRYSTON	10B	A	O	†	70-4.5k	6/12/18	Yes	S	S	L	90	0.005	1	20k	100		†Usable as stereo 2-way or mono 3-way. Available in balanced or unbalanced version.	
BSS	FDS360	A	O	†	Custom	6-24	Yes	P	S/M	4	85	0.0005	0.775	10k	1	1025.00	†Usable as stereo 2-way or mono 3- or 4-way; limiter on each band. Custom EQ cards optional.	
CSI	LE-1C	A	M	1	30-200	12	Yes	S/P	M	L	92	0.02	1.0	300k	1k	490.00	ELF system; no filters; low-pass only.	
	LHE-1C	A	M	2	30-200	12	Yes	S/P	M/B	H/L	92	0.02	0.50	10k	600	890.00	ELF system; master level control.	
	LHE-2C	A	S	2	30-200	12	Yes	S/P	S/B	H/L	92	0.02	0.50	10k	600	1290.00	As above.	
DB SYSTEMS	DB-3-18	A	S/X	2, 3	Opt.	18†	Yes	F	S/M/B	H/M/L	86	0.0008	1	90k	1.4k	From 400.00	†6 or 12 dB also available.	
	DB-3-24	A	S/X	2	Opt.	24	Yes	F	S/M/B	H/L	100	0.003	1	90k	1.4k	570.00		
	DBR-3XL	A	S/X	2	50, 70, 100, 150	18	No	S	S/M	H/L	86	0.0008	1	90k	1.4k	650.00		
DBX	120X-DS	A	X	2	50-210	6/12	No	V	M	L	95	0.05	1	100k	470	299.00	Phase-coherent; includes subharmonic synthesizer with tunable filters.	
DeCOURSEY	120-B4	A	S	2	Custom	6/12/18	Yes	P	S	Opt.	90	0.002	2.5	100k	100	167.50	Optional subsonic filters; optional rack and panel cabinets, \$17.50.	
	120-B4S	A	X	2	Custom	6/12/18	Yes	P	M	Opt.	90	0.002	2.5	100k	100	187.50	As above.	
	120-T8	A	S	3	Custom	6/12/18	Yes	P	S	Opt.	90	0.002	2.5	100k	100	262.50	As above.	
	120-T8S	A	X	3	Custom	6/12/18	Yes	P	M	Opt.	90	0.002	2.5	100k	100	282.50	As above.	
	120-Q8	A	S	4	Custom	6/12/18	Yes	P	S	Opt.	90	0.002	2.5	100k	100	352.50	As above.	
	120-Q8S	A	X	4	Custom	6/12/18	Yes	P	M	Opt.	90	0.002	2.5	100k	100	372.50	As above.	
ELECTRO MAGNETIC	13101	A	S/X	2	40/60/80	6/12	Yes	†	S/M/B	L	85		0.775	100k	1k	340.00	†Frequency set with internal jumpers.	
ESSENCE	One	P	S	2	60-12k	6	Yes	V	S	H/L	120	0.001	0.5	†	†	750.00	†Set by plug-in modules. Level controls adjustable with supplied resistor networks.	
	Four	P	S	2	60-12k	6	Yes	V	S	H/L	120		0.5	†	†	10,000.		
FM ACOUSTICS	FM236	A	S	2	80-12.5k	36	Yes	P		H/L	110	0.009		30k	600	5280.00	Class-A operation, linear phase; noninverting.	
GOLD SOUND	224	A	S	2	40-4k	24	Yes	S	S	6	102	0.02	0.775	20k	300	390.00		
	224EQ	A	X	2	40-4k	24	Yes	S	S/M	7	102	0.02	0.775	20k	300	490.00		
GSI	X-1-2	C	S	2	1-10k	12	Yes	F	S	H/L	90	0.01	0.75	100k	1k	295.00	Passive filters and active buffers.	
	X-1-3	C	S	3	1-10k	12	Yes	F	S	H/M/L	90	0.01	0.75	100k	1k	395.00	As above.	
	X-2	C	S	2	1-10k	12	Yes	F	S	H/L	90	0.01	0.75	100k	1k	795.00	As above but tube buffer on high-pass filter.	

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CROSSOVERS

MANUFACTURER	Model	Type: Active = A, Passive = P Combined Active & Passive = C Mono = M, Stereo = S Stereo with Mono = S Other = O					Number of Frequency Bands per Channel	Crossover Frequencies, Hz		Crossover Slopes, dB per Octave	Independent High- and Low-Pass Frequency Sections		Frequency Sensitivity: Variable = V, Plug-in Modules = M, Subwoofer Outputs = Freq = F, Switchable = S, Inverted for Mono Bridging = g	Level Controls: Stereo = S, Mono = M, Low-pass = L, (Q) Total Number of Controls	S/N Ratio, -dB	Distortion, %	Nominal Input Level, V	Input Impedance, Ohms	Output Impedance, Ohms	Price, \$	Notes
		2	3	4	5	6		7	8		9	10									
JANIS	Interphase 1-A Interphase 3/A	A A	X X	2 2	100 100	18 18	No No	F F	M M	L L	98 96	0.01 0.02	0.6 0.6	200k 200k	100 100	675.00 †					Integral 100-watt bass amp. †Included with Model 3/A subwoofer. As above but 50 watts.
JBL	BX63A	C	X	2	63-125	18/6	No	V	B	L	95	0.01	0.775	10k	180	350.00				High-pass impedance-matching switch.	
JRM	3PBP/X4 3PBP/X2	A A	D D	4 2	10-2k, 100-5k, 1k-50k 10-50k	18 18	Yes Yes	P P	S/M/B S/M/B	8† 4†	110 110	0.01 0.01	Sel. Sel.	20k 20k	100 100	750.00 450.00				†0.5-dB steps. Stereo and bridging outputs for all sections; infrasonic and ultrasonic filters; low-frequency EQ optional, \$25.00 per section. As above.	
JS AUDIO	2CX 3CX	P P		2 3	3k 700, 4k	12/18 12/12, 12/18					91 94					150.00 Pair 200.00 Pair					
KINETIC AUDIO	Three-Point Four-Point	P P	M M	† †	60/90/180 60/90/180/350	6 6	Yes Yes	S S	M M	H/M H/M	95 95	0.01 0.01		8 8	Var. Var.	150.00 150.00				†High-pass only. †Low-pass only.	
MARK LEVINSON	LNC-2	A	S	2	Sel.	Sel.	Yes	P		H/L	100	0.01	1	10	200	3280.00					
LINN HI-FI	Aktiv	A	S	3	200, 2k	12/24	No	F		H/M/L			1.0	2k	200	1300.00				For Linn DMS Isobarik.	
MFA SYSTEMS	Magus Mantra Luminescence A	C C C	S S S	2 2 3	Custom Custom Custom	24/6 24/6 24/6, 6/6	No No Yes	F V V	S S S	L L H/M/L	94 94 94	0.01 0.01 0.01	0.5 0.5 0.5	200k 200k 35k	10 10 10	340.00 660.00 2200.00				Battery powered; active on low-pass only. Active on low-pass only. As above; tube buffers on passive sections; midrange lower cutoff, 24 dB per octave on special order.	
MUSIC REFERENCE	RM-3	A	S	2	20-20k	6-24	Yes	P		H/L	100	0.001	1	50k	600	1200.00				Selectable filter characteristics.	
NAIM AUDIO	NAX03-6 NAX02-4 NAPX0	A A P	S S S	3 2 2	375, 3k, or Custom 2.4k or Custom 2.4k or Custom	18 18	Yes Yes No	F F F		H/M/L H/L	90 90	0.1 0.1	1 1	20k 20k 6	47 47	825.00 825.00 145.00				Level controls are internal; requires power supply. As above. For NAIM SBL.	
NELSON-REED	AC 1204	A	M/S	2	63 or Custom	6/12/ 24/48	No		S/M	L	118	0.007	†	33k	600	570.00				†Maximum, 20 V peak to peak. For Nelson-Reed 1204.	
NESTOROVIC LABS	NL 12A	A	S	2	200	18	No	F	S	H/L	90	0.01	1	50k	100	750.00					
PAC	C.P.R.	C	S	2	50-5k	18/6	Yes	S/P	S	H/L		0.01	1	100k	220	1250.00					
RANE	AC 22 AC 23	A A	M/S M/S	† †	75-3.6k 70-1k, 450-7k	24 24	No Yes	V V		H/L H/M/L	92 92	0.02 0.02	0.75 0.75	20k 20k	100 100	389.00 499.00				†Usable as stereo 2-way or mono 3-way. Linkwitz-Riley alignment. †Usable as stereo 3-way, mono 4-way, or mono 5-way. Alignment as above.	
ROHRER	RX5018	P	M	†	50	18	No	F	M	No						300.00 Pair				†Low-pass only. For Rohrer RT1201 and RT1501.	
SESCOM	PO-51	A	M	3	20-20k	18	Yes	P	No	No	85	0.01	0.75	100k	100	100.00				Instructions supplied for user-built modules.	
SIEFERT RESEARCH	Active Crossover	A	X	2	80	18	No	F	S/M/B	H	100	0.005	0.1	80k	100	359.00					
SONOGRAPHE	SX-1	A	S	2	110	24/12	Opt.	P	S	L				100k	100	395.00				Optional filter boards, \$95.00.	
SOUND CONCEPTS	SCO-1	A	S	2	100 or Custom	18	Yes	F	S	L	90	0.001	1.0	30k	100	159.00				Subsonic filter for vented woofers.	
SUMO	Delliah	A	S/X	2	50, 63, 80, 100, 125	†	Yes	S	S/M/B	L	95	0.007	2	50k	100	499.00				†Low-pass, 12 or 18 dB/octave; high-pass, 12 dB/octave.	
THRESHOLD	PCX	A	S/X	2	75-1.6k or 750-16k	18	No	P	S/M/B	H/L		0.01		20k	1.5k	1400.00					
VANDERSTEEN AUDIO	WX-4	C	S	2	80	6	Yes	F	S	L	90	0.01	0.75	100k	400	450.00				For Vandersteen Models 4 and 4A.	
VENETTA RESEARCH	TCP-1	A	S	2	60-300	6/12	No	V	S	L	100	0.01	1	24k	100	449.00					
VMPS	Passive Crossover TPC 1	P A	M S	2 2	100 60-300	6/12 6/12	No No	F V	M S	H L						40.00 449.00				Kit, \$30.00.	

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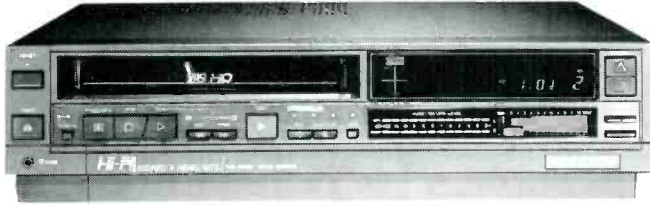
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Hi-Fi VCRs



SCOTT SVR504S



SANSUI SV-R9500HF



SANYO VHR1900



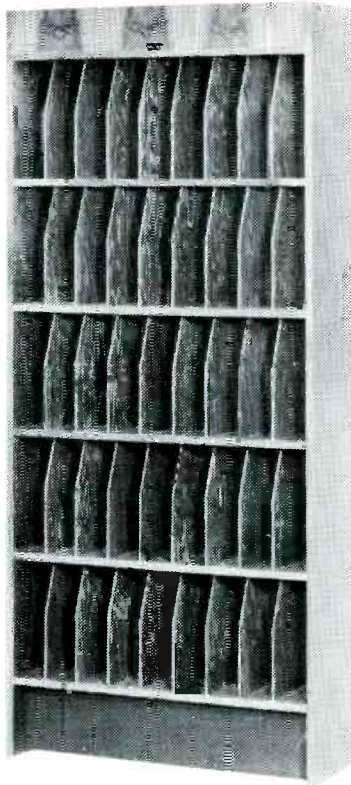
ZENITH VRD700

MANUFACTURER	Model	Format	Portable = P - Table Model = T	Standard Audio Tracks: Mono = M, Stereo = S, Stereo with Dolby NR = D	Frequency Response, Hz to KHz, \pm dB	Audio S/N Ratio, \pm dB, re: 0 dB	THD, %	Separation, dB, at 1 KHz	Simultaneous Recording?	Dynamic Range, dB	Wow & Flutter, μ W, Peak, %	Stereo TV (NTSC SMP) Capability	Built-In Tuner = B, Decoder Jack = J	Programmability	Number of Days/Number of Events	Audio Dubbing?	Phone Jack?	Volume Control on Phone Jack?	Number of Tape Speeds, Record/Play	Price, \$
AKAI	VS-525U-B	VHS HQ	T	M	20-20			Yes	90	0.005 wrms	B	14/6	No	Yes	No	2/3		599.00		
	VS-565U-B	VHS HQ	T	M	20-20			Yes	90	0.005 wrms	B	14/6	No	Yes	No	2/3		699.00		
	VS-M910U-B	VHS HQ	T	M	20-20			Yes	90	0.005 wrms	B	365/6	No	Yes	No	2/3		749.00		
	VS-M930U-B	VHS HQ	T	M	20-20			Yes	90	0.005 wrms	B	365/6	No	Yes	No	2/3		849.00		
AUDIO DYNAMICS	V2D	VHS HQ	T	D	20-15 \pm 1	0.004	60	Yes	80	0.005	B	21/8	Yes	Yes	Yes	Yes	2/3	899.00		
	V4D	VHS HQ	T	D	20-15 \pm 1	0.004	60	Yes	80	0.005	B	21/8	Yes	Yes	Yes	Yes	2/3	999.00		
CANON	VR-HF800	VHS HQ	T		20-20			Yes	90	0.005	B	30/8	Yes	Yes	No	3/3		1199.00		
	VR-HF730	VHS HQ	T		20-20			Yes	90	0.005	B	30/8	No	Yes	No	3/3		750.00		
	VR-HF720	VHS HQ	T		20-20			Yes	90	0.005	B	30/8	No	Yes	No	3/3		1050.00		
	VR-HF710	VHS HQ	T		20-20			Yes	90	0.005	B	30/8	No	Yes	No	3/3		950.00		
DBX	OVR-1	VHS HQ	T	D	20-20 \pm 1	0.003	60	Yes	80	0.005	B	21/8	Yes	Yes	Yes	2/3		1100.00		
FISHER	FVH-950	VHS HQ	T	M	20-20				90	0.005	B	365/8	No	No				600.00		
	FVH-980	VHS HQ	T	D	20-20					0.005	B	365/8	No	No				750.00		
	FVH-990	VHS HQ	T	D	20-20			Yes		0.005	B	365/8	Yes	No				800.00		
HARMAN/KARDON	VCD4000	VHS HQ	T	D	20-20 \pm 3	80	0.5	60	Yes	80	0.005	B	21/8	Yes	Yes	Yes	3/3	1199.00		
HITACHI	VM2500	VHS HQ	T	M	20-20 \pm 3	80	0.3	60	Yes	90	0.005	B	365/8	No	No			749.95		
	VM2600	VHS HQ	T	M	20-20 \pm 3	80	0.3	60	Yes	90	0.005	B	365/8	No	No			849.95		
	VM2700	S-VHS	T	M	20-20 \pm 3	80	0.3	60	Yes	90	0.005	B	365/8	Yes	No			1299.95		
INSTANT REPLAY	615IT4RGB	VHS HQ	T	M	20-20	0.005		Opt.	80	0.005	J	14/4		Opt.	Opt.	3/3†		1595.00; †Also plays two PAL & two SECAM. 1795.00		
	618IT4RGB 750IT6	VHS HQ S-VHS	T T	M M	50-10 20-20	0.005 0.005		Yes Yes	80 80	0.005 0.001	B	14/4		Opt.	Opt.	3/3† 3/3†				

Hi-Fi VCRs

MANUFACTURER	Model	Format	Portable = P, Table Model = T		Frequency Response, Hz to kHz, ±dB	Audio S/N Ratio, -dB, re. 0 dB	THD, %	Separation, dB, at 1 kHz	Simulcast Recording?	Dynamic Range, dB	Wow & Flutter, Wtd. Peak, %	Sergee TV (MTS) CAP Capability, Built into Tuner B, Decoder Jack = J	Programmability, Number of Days Number of Events	Audio Dubbing?	Phone Jack?	Volume Control on Phone Jack?	Number of Tape Speeds, Record/Play	Price, \$
			Standard Auto Track, Mono = M, Stereo = S, Stereo with Dolby NR = D	Standard Auto Track, Mono = M, Stereo = S														
JVC	HRD370	VHS HQ	T	M	20-20 +0,-2	95 dBA	0.25	65	Yes	90	0.005	B	14/4	No	Yes	Yes	2/3	749.00
	HRD470	VHS HQ	T	M	20-20 +0,-2	95 dBA	0.25	65	Yes	90	0.005	B	14/8	No	Yes	Yes	2/3	849.00
	HRD530	VHS HQ	T	M	20-20 +0,-2	95 dBA	0.25	65	Yes	90	0.005	B	14/8	No	Yes	Yes	2/3	
	HRD570	VHS HQ	T	M	20-20 +0,-2	95 dBA	0.25	65	Yes	90	0.005	B	14/8	No	Yes	Yes	2/3	1050.00
	HRS7000	VHS HQ, S-VHS	T	M	20-20 +0,-2	95 dBA	0.25	65	Yes	90	0.005	B	14/8	No	Yes	Yes	2/3	1200.00
KENWOOD	KV-D937HF	VHS HQ	T	M	20-20		0.008		Yes	80	0.008	B	14/8	Yes	Yes	Yes	2/3	1200.00
	KV-936HF	VHS HQ	T	M	20-20		0.005		Yes	80	0.005	B	14/8	Yes	Yes	Yes	2/3	950.00
MITSUBISHI	HS-402UR	VHS HQ	T	M	20-20		0.3	60	No	90	0.005	B	14/5	No	No		2/3	530.00
	HS-413UR	VHS HQ	T	M	20-20		0.3	60	No	90	0.005	B	14/8	No	No		3/3	650.00
	HS-422UR	VHS HQ	T	M	20-20		0.3	60	Yes	90	0.005	B	14/8	No	Yes	Yes	3/3	900.00
	HS-423UR	VHS HQ, S-VHS	T	M	20-20		0.3	60	Yes	90	0.005	B	14/8	No	Yes	Yes	3/3	
NEC	N-966U	VHS HQ	T	D	20-20			60	Yes	90		B	21/8	No	Yes	Yes	3/3	
	DX-2500U	VHS HQ	T	D	20-20			50	Yes	90		B	21/8	No	Yes	Yes	3/3	
	DX-3500U	VHS HQ	T	D	20-20			60	Yes	90		B	21/8	No	Yes	Yes	3/3	
	DX-5000U	VHS HQ	T	D	20-20			50	Yes	90		B	21/8	No	Yes	Yes	3/3	1199.00
PANASONIC	PV-4760	VHS HQ	T	M	20-20	60	0.005	40	Yes	80	0.005	B	21/8	No	Yes	Yes	3/3	700.00
	PV-4761	VHS HQ	T	M	20-20	60	0.005	40	Yes	80	0.005	B	21/8	No	Yes	Yes	3/3	
	PV-4768	VHS HQ	T	M	20-20	60	0.005	40	Yes	80	0.005	B	21/8	No	Yes	Yes	3/3	1000.00
	PV-4780	VHS HQ	T	M	20-20	60	0.005	40	Yes	80	0.005	B	21/8	No	Yes	Yes	3/3	1150.00
PENTAX	PV-T150A	VHS HQ	T	M	20-20				Yes	80	0.005	B	14/4	No	Yes	Yes	3/3	889.00
RCA	VPT630HF	VHS HQ	T	M	20-20 +0,-3	73	0.5	60	Yes	80	0.005	B	365/6	No	Yes	Yes	3/3	
	VPT640HF	VHS HQ, S-VHS	T	M	20-20 +0,-3	73	0.5	60	Yes	80	0.005	B	365/6	No	Yes	Yes	2/3	
	VPT695HF	VHS HQ, S-VHS	T	M	20-20 +0,-3	73	0.5	60	Yes	80	0.005	B	365/8	Yes	Yes	Yes	2/3	
REALISTIC	43	VHS HQ	T	M	20-20	77 dBA	0.2	63	Yes	80	0.01	B	14/4	No	No		3/3	600.00
SANSUI	SV-R9500HF	VHS HQ	T	M	20-20				Yes	90	0.005	B	14/4	No	No	No	2/3	900.00
SANYO	VHR2900	VHS HQ	T	D	20-20 +0.5,-1	70 dBA	0.2	70	Yes	80	0.01	B	365/8	No	No		3/3	449.99
	VHR1900	VHS HQ	T	M	20-20 +0.5,-1	70 dBA	0.2	70	Yes	80	0.01	B	14/8	No	Yes	Yes	3/3	499.99
SCOTT	SVR330S	VHS HQ	T	M	20-20 ±3	70	0.3	65	Yes	80	0.004	B	14/4	Yes	Yes	No	2/3	499.95
	SVR504S	VHS HQ	T	M	20-20 ±3	70	0.3	65	Yes	80	0.004	B	14/4	Yes	Yes	No	2/3	599.95
	SVR510D	VHS HQ	T	M	20-20 ±3	70	0.3	65	Yes	90	0.005	B	14/4	Yes	Yes	Yes	2/3	849.95
SHARP	VC-M64	VHS HQ	T	S	20-20					80		J	14/4	Yes	No		3/3	669.95
	VC-M65	VHS HQ	T	S	20-20					80		B	14/6	Yes	No		3/3	819.95
SONY	SL-HF350	Beta	T	S	20-20				Yes	80	0.005	No	7/6	No	Yes	Yes	2/3	550.00
	SL-HF650	Beta	T	S	20-20				Yes	80	0.005	B	7/6	No	Yes	Yes	2/3	850.00
	SL-HF750	Beta	T	S	20-20				Yes	80	0.005	B	21/6	No	Yes	Yes	3/3	1300.00
	SL-HF1000	Beta	T	S	20-20				Yes	80	0.005	B	21/8	Yes	Yes	Yes	3/3	1700.00
TEAC	MV-600	VHS HQ	T	S	20-20	90			Yes		0.008	B	14/4	Yes	Yes	Yes	3/3	699.00
	MV-900	VHS HQ	T	S	20-20	90			Yes		0.008	B	14/8	Yes	Yes	Yes	3/3	999.00
TEKNIKA	VCR789	VHS HQ	T	S	20-20	60 dBA			Yes	90	0.015	B	21/8	Yes	Yes	Yes	3/3	1099.00
TOSHIBA	DX-900 (With 14-bit PCM processor)	VHS HQ Pro	T	M	20-20	70	0.3	60	Yes	90	0.005	Yes	14/4	Yes	Yes	Yes	2/3	1299.95
	DX-800	VHS HQ Pro	T	M	20-20	70	0.3	60	Yes	90	0.005	Yes	14/4	No	Yes	Yes	2/3	999.95
	M-7900	VHS HQ Pro	T	M	20-20	70	0.3	60	Yes	90	0.005	Yes	14/4	No	Yes	Yes	2/3	749.95
VECTOR RESEARCH	V-4020	VHS HQ	T	M	20-20 ±2	90	0.5	65	Yes	90	0.005	B	21/4	No	Yes	Yes	3/3	699.00
	V-4040	VHS HQ	T	M	20-20 ±2	90	0.5	65	Yes	90	0.005	B	21/4	No	Yes	Yes	3/3	849.00
	V-5040	VHS HQ	T	D	20-20 ±2	90	0.05	65	Yes	90	0.005	B	21/8	No	Yes	Yes	3/3	1099.00
	V-6040D	VHS HQ	T	M	20-20 ±2	90	0.05	65	Yes	90	0.005	B	14/4	No	Yes	Yes	2/3	1099.00
YAMAHA	YV-800	VHS HQ	T	S	20-20 ±0.5	86	0.006	60	Yes	86	0.25	B	21/4	Yes	Yes	Yes	3/3	899.00
ZENITH	VR2220	VHS HQ	T	M	20-20		0.8	60	Yes	80	0.008	B	14/4	No	No		2/3	700.00
	VR2300	VHS HQ	T	M	20-20		0.8	60	Yes	80	0.008	B	14/4	No	No		2/3	900.00
	VR3300	VHS HQ	T	M	20-20		0.8	60	Yes	80	0.008	B	14/8	No	No		2/3	1000.00
	VRD530	VHS HQ	T	M	20-20		0.8	60	Yes	80	0.008	B	14/4	No	Yes	Yes	2/3	
	VRD600	VHS HQ	T	M	20-20		0.8	60	Yes	80	0.008	B	14/8	No	Yes	Yes	2/3	
	VRD700	S-VHS	T	M	20-20		0.8	60	Yes	90	0.008	B	14/8	No	Yes	Yes	2/3	

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Loo. Control? Woofer: W, Midrange: M, Tweeter: T, Superwoofer: ST	Analogic Frequency Response, Hz to kHz, ± dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance Ohms:		Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
													Nominal	Minimum					
ACOUSTAT	Spectra 2	ES	10						30-20 ± 3			4/3	66 x 22 x 2	Opt.	Opt., Cloth	180 Pair	2795.00		
	Spectra 3	ES	10						30-20 ± 2			4/3	66 x 33 x 2	Opt.	Opt., Cloth	220 Pair	2995.00		
	One	ES Sat. & Subwoof.	10				T		30-18 ± 3	75	160	4/3	Three Pieces	Opt.	Opt.	180 Pair	1299.00		
	One + One	ES					T		30-20 ± 2	70		4/3	94 x 11 x 4	Opt.	Opt.	144 Sys.	1750.00		
	Three	ES					T		30-20 ± 2	70		4/3	72 x 28 x 4	Opt.	Opt.	196 Pair	2199.00		
	Two + Two	ES					T		28-20 ± 2	50		4/3	94 x 20 x 4	Opt.	Opt.	200 Pair	2599.00		
	Six	ES					T		26-20 ± 2			6/3	94 x 28 x 4	Opt.	Opt.	340 Pair	4500.00		
	Eight	ES					T		24-20 ± 2			6/3	94 x 36 x 4	Opt.	Opt.	440 Pair	5500.00		
ACOUSTIC ELECTRONICS	AQ200D	Powered Subwoof.	12				W	25-100 ± 1.5	90	200 Inc.	100		18 Dia. x 21	Black Alum.	Black Knit	50	1195.00		
ACOUSTIC INTERFACE	Angstrom	Ac. Sus.	6½		1	Dome		78-20 ± 2.5	90	15	5k	8/6	13 x 7 x 6	Black Enam.	Black Cloth	10	125.00		
	Tremor	Vented Subwoof.	2(12)				M, T	29-200 ± 2.5	95	15	100	8/6	62 x 26 x 16	Black Oiled Wal.	Black Cloth	150	1090.00		
	Shadow	Ac. Sus.	8		1	Dome		69-20 ± 2.5	91	15	5k	8/6	25 x 9 x 9	Black Oiled Wal.	Black Cloth	18	190.00		
	Intimate	Ac. Sus.	10		1	Dome	T	49-20 ± 2.5	93	15	5k	8/6	19 x 12 x 12	Black Oiled Oak	Black Cloth	29	290.00		
	Transcendant	Vented	12	1¼	Dome	1¼	Dome	M, T	38-20 ± 2.5	94	15	1.9k	8/6	24 x 16 x 14	Oiled Wal.	Black Cloth	51	490.00	
	Professional Series II	Vented	12	2	Dome	1	Dome	M, T	29-20 ± 2.5	95	15	800, 6.6k	8/6	36 x 16 x 19	Oiled Oak	Black Cloth	80	890.00	
	Studio Reference	Vented	12	4x15	Horn	2x5½	Horn	M, T	22-20 ± 2.5	98	15	880, 5k	8/6	48 x 16 x 19	Oiled Wal.	Black Cloth	102	1590.00	
	Sound Portal	Horn	24x32	7x19	Horn	5x6	Horn	M, T	15-20 ± 2.5	101	15	800, 5k	8/6	48 x 26 x 24	Oiled Wal.	Black Cloth	175	3500.00	
Sound Prism	Triamped, Horn	24x52	13x22	Horn	3x7¼	Horn	M, T	10-20 ± 1	105	100, 300, 1.5k Inc.	550, 5k	8/6	72 x 27 x 36	Oiled Wal.	None	1000 Pair	30,000.00		
ADS	M15	Closed Box	(2)10	5	Cone	1	Dome	No	30-22 ± 3	89	15	200, 2k	8/4	47 x 12 x 16	Dpt.	Black Steel	105	2750.00	
	M12	Closed Box	(2)8	5	Cone	1	Dome	No	36-22 ± 3	88	15	200, 2k	8/4	43 x 11 x 14	Opt.	Black Steel	85	1850.00	
	M10	Closed Box	10	5	Cone	1	Dome	No	36-22 ± 3	88	15	200, 2k	8/4	34 x 12 x 13	Opt.	Black Steel	80	1350.00	
	CM7	Closed Box	7	1½	Oome	1	Dome	No	40-22 ± 3	87	15	700, 2k	4/3	17 x 9 x 11	Opt.	Black Steel	45	1350.00	
	CM6	Closed Box	6		1	Dome	No	50-22 ± 3	87	15	2k	4/3	13 x 7 x 9	Opt.	Black Steel	33	850.00		
	CM5	Closed Box	5		1	Dome	No	65-22 ± 3	86	15	2k	4/3	10 x 6 x 7	Opt.	Black Steel	22	500.00		
	L990	Closed Box	10	1½	Oome	¾	Dome	No	40-25 ± 3	88	15	700, 3k	8/	35 x 11 x 11	Opt.	Black Steel	65	975.00	
	L690	Closed Box	8		1	Dome	No	45-20 ± 3	88	15	2k	8/	31 x 10 x 10	Opt.	Black Steel	45	590.00		
	L780	Ac. Sus.	8¼	1½	Dome	¾	Dome	T	42-27 ± 3	88	15	650, 5k	8/5	21 x 12 x 11	Opt.	Black Steel	64	749.00	
	L570	Ac. Sus.	8		1	Dome			46-20 ± 3	88	15	1.8k	8/5	20 x 12 x 11	Opt.	Black Steel	50	499.00	
	L300W	Ac. Sus.	5¼		1	Dome			65-20 ± 3	89	10	2.5k	4/3.2	9 x 6 x 7	Wal.	Black Steel	16	399.00	
	L300CC	Closed Box	5¼		1	Dome	No		68-20 ± 3	90	5	2.5k	4/3.2	9 x 6 x 7	Text. Black Steel	Black Steel	7	380.00	
L200CC	Ac. Sus.	4		1	Dome			85-20 ± 3	88	10	2.5k	4/3	7 x 4 x 5	Black Plas.	Black Steel	9	280.00		
ADVANCED ELECTRO-DYNAMIC SYSTEMS	Cybele DLS-73	Inf. Baf.	12		2x6	Cyl.	No	30-20 ± 3	87	40	2k	8/7	15 x 10 x 44	Cloth	Gray Knit	60	1300.00		
ADVENT	Baby	Bass Ref.	6½		1¾	Cone		60-25 ± 3	87		2.5k	8/5.5	17 x 11 x 6	Black Knit	Brown Knit	13	249.95		
	Prodigy	Bass Ref.	8		¾	Dome		48-22 ± 3	87		3k	8/6	22 x 13 x 9	Black Knit	Brown Knit	22	349.95		
	Legacy	Bass Ref.	10		1	Dome		42-23 ± 3	88		2k	8/6	28 x 16 x 10	Black Knit	Brown Knit	46½	449.95		
	Maestro	Bass Ref.	10	2	Dome	1	Dome		42-23 ± 3	90	900, 4.5k	6/4	33 x 16 x 10	Black Knit	Brown Knit	50	699.95		
AERO SPEAKERS	Master	CIE	10, 8	5	Cone	1	Dome		30-22 +1, -4	91	20	900, 1.5k, 6k	4/3.4	18 x 17 x 37	Oiled Teak	Black Knit	66	1998.00	
	909	CIE	10	5	Cone	1	Dome		35-22 +2, -4	89	20	1.5k, 6.5k	8/6	15 x 16 x 30	Oiled Teak	Black Knit	44	1398.00	
	903	CIE	8	6	Cone	1	Dome		45-22 ± 4	92	20	900, 3k	4/4	14 x 12 x 28	Oiled Teak	Black Knit	38	1098.00	

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Speaker Level Control? Woofer = W, Midrange = M, Tweeter = T, Superwoofer = ST	Anechoic, Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, ±dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
ALLISON ACOUSTICS	IC 20 (With Remote)	Ac. Sus.	8															
	CD6	Ac. Sus.	8															
	CD7	Ac. Sus.	8															
	CD8	Ac. Sus.	8	3½	Cone	1	Cone	M, T										
	CD9	Ac. Sus.	10	3½	Cone	1	Cone	M, T										
	110	Ac. Sus.	8			1	Cone											
	120	Ac. Sus.	8			1	Cone											
ALTEC LANSING	55	Inf. Baf.	4			¾	Dome	No	95-22 ±3	85	10	2.8k	4/3	7 x 9 x 6	Black ABS Diled Wal.	Black Metal	5	125.00
	508	Inf. Baf.	(2)8	2	Dome	1	Dome	No	40-20 ±3	90.5	10	750, 3.5k	4/3	11 x 40 x 11	Oiled Wal.	Black Knit	62	500.00
	101	Inf. Baf.	6½			1	Dome	No	40-22 ±3	91	10	2.5k	6/4	17 x 10 x 9	Oiled Wal.	Black Knit	39 Pair	170.00
	201	Inf. Baf.	8			1	Dome	No	33-22 ±3	91	10	2.5k	6/4	22 x 12 x 9	Oiled Wal.	Black Knit	43	250.00
	301	Inf. Baf.	10	2	Dome	1	Dome	No	30-22 ±3	93	10	550, 3.5k	8/6	27 x 15 x 12	Oiled Wal.	Black Knit	47	375.00
	401	Inf. Baf.	12	2	Dome	1	Dome	No	25-22 ±3	93	10	550, 3.5k	8/5	32 x 17 x 12	Oiled Wal.	Black Knit	60	480.00
	501	Inf. Baf.	(2)10	2	Dome	1	Dome	No	28-22 ±3	93	10	550, 3.5k	4/3	46 x 12 x 14	Oiled Wal.	Black Knit	72	750.00
AMBICO	V-0690	Powered Bass Ref.	4		2	Dome	W, T		50-20 ±10	60	8 Inc.	100, 10k	8/3	20 x 5 x 10	Black	Black Knit	22 Pair	169.95
AMBRIA	S-2000	Inf. Baf. Sat. & Subwoof.	(6)5	4	Cone	½	Dome		28-22 ±3	92	20	120, 3k	6/4	Five Pieces	Opt., Lacq.	Dpt., Mesh	62 Sys.	1750.00
	S-1000	Inf. Baf. Sat. & Subwoof.	(4)5	4	Cone	½	Dome		36-22 ±3	92	20	120, 3k	6/4	Three Pieces	Opt., Lacq.	Dpt., Mesh	38 Sys.	900.00
	S-150	Inf. Baf.	4			½	Dome		80-22 ±3	90	20	3k	7/5	9 x 4 x 5	Dpt.	Dpt., Mesh	10	495.00
	S-100	Inf. Baf. Sat.	4		Cone	½	Dome		110-22 ±3	90	20	3k	7/5	9 x 4 x 2	Opt.	Dpt., Mesh	6	335.00
AMERICAN ACOUSTICS	D2550		6½				Dome		65-22 ±3	91.5		3k	4/8	13 x 10 x 7	Dpt.		12	129.95
	D3550		8				Dome		60-22 ±3	94.5		3k	4/8	18 x 11 x 8	Opt.		19	169.95
	D4550		10	5	Cone		Dome		45-22 ±3	95.5		2.7k, 6k	4/8	24 x 15 x 10	Dpt.		34	249.95
	D5550		12	5	Cone	3.3	Dome		43-22 ±3	96.5		1.7k, 6k	4/8	27 x 15 x 10	Dpt.		40	349.95
	D8550		15	5	Cone		Dome		37-22 ±3	98.5		700, 5k	4/8	31 x 18 x 14	Opt.		62	489.95
	D9500A		12	(2)5	Cone	3.3	Dome		32-22 ±3	99.5		1.7k, 6k		41 x 16 x 15	Opt.		76	499.95
PSW200	Powered Subwoof.	15					Cone		28-80		Inc.		19 x 22 x 19	Opt.		76	699.95	
AMRITA AUDIO	Mini-Monitors	Pas. Rad.	8			1	Dome		35-32 ±3	92	30	6k	4/3	11 x 11 x 17	Oiled Wal.	Black Knit	35	850.00
	Mini-Towers	Pas. Rad.	8			1	Dome		35-32 ±3	92	30	6k	4/3	11 x 11 x 35	Oiled Wal.	Black Knit	45	900.00
	Heartland Towers	Pas. Rad.	8			1	Dome		31-32 ±3	96	50	6k	4/3	12 x 17 x 35	Oiled Wal.	Black Knit	70	1150.00
	Reference Standards		12	(2)6½	Cones	1	Dome		28-32 ±3	92	100	150, 6k	8/6	15 x 18 x 49	Oiled Wal.	Black Knit	100	2200.00
	Reference Standard Towers		12	(2)6½	Cones	1	Dome		28-32 ±3	92	100	150, 6k	8/6	15 x 15 x 61	Oiled Wal.	Black Knit	100	2200.00
ANGSTROM	Reflexion	Bass Ref.	(2)8			1	Dome		35-20 ±2	95	7	250, 2k	8/4	32 x 11 x 13	Dpt.	Black	97 Pair	995.00
	Reference	Bass Ref.	8			1	Dome		37-20 ±2	90	10	2.5k	8/7	25 x 11 x 13	Dpt.	Black	73 Pair	795.00
	New Image	Bass Ref.	8			1	Dome		45-20 ±2	89	12	2.5k	8/7	19 x 11 x 13		Black	60 Pair	595.00
APOGEE ACOUSTICS	Scintilla	Ribbon Dipole	12x53	2x53	Ribbon	0.5x53	Ribbon		30-20	100		500, 5k	1, 4/	29 x 57 x 3	Suede Paint	Opt.	290 Pair	3995.00
	Apogee Full Range	Ribbon Dipole	12x80	2x80	Ribbon	0.5x80	Ribbon	T	30-20		8-Amp 100	400, 3.5k	4/	35 x 80 x 3	Suede Paint	Opt.	600 Pair	10,000.00
	Duetta	Ribbon Dipole	12x47	0.8x47	Ribbon		Ribbon	T	30-20	80	100	600	4/3	25 x 57 x 3	Suede Paint	Opt.	225 Pair	2995.00



The high fide to video



If you're a hi-fi buff, you don't settle for sound as it comes straight from a record, tuner or CD. You amplify the sound, shape it with graphic equalizers, and process it through expanders or noise reduction systems.

So why settle for video images as they come off a videocassette? With Akai Audio/Video Systems you don't have to. We take picture quality as seriously as sound quality.

Take, for example, the SS-V20U Audio/Video Selector. It can run the most sophisticated A/V systems, handling up to *six* video components with three sets of inputs and outputs for video recorders and three inputs for other video sources.

And Akai lets you keep track of what you're doing without having to run back to the main set: there's a 4½" diagonal color monitor with speaker built right in.

Switchable external processor loops open your system's door to the widest range of performance-enhancing equipment, including PCM processors, graphic equalizers, and Audio/Video Processors like our PS-V20U-B.

With Color Correction, Chroma Cut, Video Stabilizer, Audio Mixer and Dynamic Noise Reduction, Akai's PS-V20U is a component for the serious videophile. Much more than a mere sharpness control, the Image Enhancer circuit restores image quality and

ity approach images.



SS-V20U-B
Audio/Video Selector

strengthens contours by overlaying a delayed signal on the original. In sum, you can minimize the loss of image quality during copying, restore old tapes, and create post-production effects that are truly "special."

Akai even builds a high-performance Audio/Video Distributor, the DI-V5-B, for multiple editing systems or multi-room installation. You can connect up to 5 VTRs or separate monitors.

Which monitor is up to the calibre of this system? The 26-inch diagonal CT-A267-B, the picture of video fidelity. Specially-engineered phosphors and Automatic Picture Latitude Circuitry render colors with unsurpassed accuracy.

It doesn't take much to put a hi-fi and a TV together in a cabinet and call it an Audio/Video system. To build a real Audio/Video system, it takes Akai.



The picture worthy of an Akai Audio/Video System: the Akai CT-A267-B Stereo Receiver/Monitor.

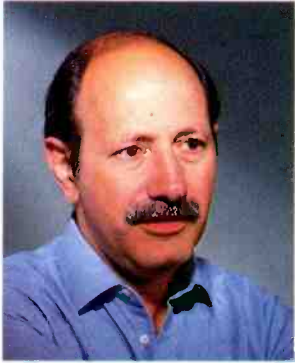
AKAI

Where audio and video are one.

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls? Woofer = W, Midrange = M, Tweeter = T, Subwoofer = ST	Amplifier Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price \$
APOGEE ACOUSTICS (Continued)	Caliper	Ribbon Dipole	12x37	0.8x37	Ribbon		Ribbon		30-20	100	600	4/3	24 x 48 x 2	Suede Paint	Opt.	140 Pair	1995.00 Pair, West, 2100.00 Pair	
	Diva	Ribbon Dipole	12x67	0.9x67	Ribbon	0.2x67	Ribbon	W, M, T	30-25	100	500,10k	4/3	31 x 73 x 3	Suede Paint	Opt.	300 Pair	7000.00 Pair, West, 7150.00 Pair	
AR	TSW 100	Ac. Sus.	6½			1	Cone		72-25 ±3	89	10	6k	8/6.2	14 x 10 x 8	Black Vinyl	Black Knit	12	225.00 Pair
	TSW 110	Ac. Sus.	6½			¾	Dome		68-40 ±3	88	10	5k	8/5	15 x 10 x 8	Black Vinyl	Black Knit	14	260.00 Pair
	TSW 210	Ac. Sus.	8			¾	Dome		54-40 ±3	87	10	5k	8/6	17 x 10 x 8	Black Vinyl	Black Knit	15	350.00 Pair
	TSW 310	Ac. Sus.	10			¾	Dome		45-40 ±3	89	10	3.8k	6/4	28 x 12 x 12	Black Vinyl	Black Knit	35½	500.00 Pair
	TSW 410	Ac. Sus.	8	6½	Cone	¾	Dome		46-40 ±3	86	10	450,3.8k	4/3	24 x 12 x 12	Black Vinyl	Black Knit	30½	560.00 Pair
	TSW 510	Ac. Sus.	10	6½	Cone	¾	Dome		44-40 ±3	87	15	700,5k	4/3.6	30 x 14 x 13	Black Vinyl	Black Knit	49	720.00 Pair
	TSW 610	Ac. Sus.	12	6½	Cone	¾	Dome		40-40 ±3	87	15	700,5k	4/3.6	33 x 14 x 13	Black Vinyl	Black Knit	57	900.00 Pair
	TSW 810	Ac. Sus.	(2)10	(2)6½	Cones	1	Dome		33-32 ±3	87	25	350,4k	4/2.8	42 x 16 x 19	Black Vinyl	Black Knit	95	1700.00 Pair
	TSW 910	Ac. Sus.	(2)12	8, (2)6½	Cones	1	Dome		28-32 ±3	87	35	200,550, 5.5k	4/3.2	53 x 16 x 19	Black Vinyl	Black Knit	140	2000.00 Pair
	Powered Partner Rock Partner Environmental Partner MGC-I	Powered Ac. Sus.	4			1	Cone	W	50-25 ±3		Inc.			6 x 11 x 8	Black Vinyl Alum.	Black Knit	7	379.95 Pair
		Ac. Sus.	8			1¼	Cone		65-22 ±3	88	10	2k	8/	15 x 10 x 9	Black Vinyl Alum.	Black Knit	15	279.95 Pair
		Ac. Sus.	4			1	Cone		95-25 ±3	88	7	3k	6/4	6 x 11 x 8	Black Vinyl Alum.	Black Knit	6	279.95 Pair
	MGC-II	Ac. Sus.	(2)8	(2)4, 1½, 6, (2)4, 6½	Cones	¾, 1	Domes		39-32 ±3	85	25	200,1.1k, 5.3k	4/3.2	52 x 26 x 16	Oiled Wal.	Black Knit	150	3600.00 Pair
	Connoisseur 19T	Ac. Sus.	12			1	Dome		39-27 ±3	85	25	250,3.5k	4/3.2	45 x 17 x 12	Oiled Wal.	Black Knit	100	2000.00 Pair
	Connoisseur 35T	Ac. Sus.	6½			1	Dome		65-22 ±3	88	10	4k	8/	16 x 10 x 7	Oiled Wal.	Black Knit	15	370.00 Pair
	Connoisseur 40T	Ac. Sus.	8	6½	Cone	1	Dome		50-22 ±3	87	10	250,4k	6/	23 x 11 x 11	Oiled Wal.	Black Knit	24	700.00 Pair
	Connoisseur 50T	Ac. Sus.	10	6½	Cone	1	Dome		41-22 ±3	87	15	200,4k	6/	28 x 13 x 13	Oiled Wal.	Black Knit	43	860.00 Pair
Connoisseur Subwoofer	Ac. Sus. Subwoof.	(2)10			1	Dome		31-22 ±3	87	20	300,2.5k	4/	32 x 15 x 13	Oiled Wal.	Black Knit	78	1150.00 Pair	
									85	15	90	4/	16 x 31 x 19	Oiled Wal.	Black Knit	70	630.00 Pair	
ARC	CS-1	Ported				¾	Dome		50-20 ±3	92	5	2.5k	4/3.8	11 x 12 x 10	Opt.	Black Knit	10½	330.00 Pair
	CS-2	Ported	(2)6½			1	Dome		40-21 ±3	93	5	2.5k	4/3.8	12 Dia. x 21	Opt.	Black Knit	22	695.00 Pair
	CS-2A	Powered	(2)6½			1	Dome		38-21 ±3	93	140 Inc.	2.5k		12 Dia. x 21	Opt.	Black Knit	39	1299.00 Pair
	CS-7	Ported	(4)6½	5¼	Cone	1	Dome		30-21 ±3	91	10	150,4k	4/3.2	12 Dia. x 48	Opt.	Black Knit	50	1450.00 Pair
ARISTON ACOUSTICS	QLN-1	Ducted Port	6			1¼	Dome		35-20 ±5	85	30		8/2.5	14 x 8 x 10	Black	Black Knit	19	950.00 Pair
ATC	SCM50	Ported	9	3	Dome	1	Dome		30-20	85	50	400,4k	8/6	28 x 16 x 12	Opt.	Black Knit	85	3300.00 Pair
	SCM100	Ported	12	3	Dome	1	Dome		25-20	88	50	350,4k	8/6	33 x 19 x 16	Opt.	Black Knit	115	4200.00 Pair
	SCM50A	Triamped	9	3	Dome	1	Dome	M, T	30-20	Inc.	380,3.8k		28 x 16 x 12	Opt.	Black Knit	95	5500.00 Pair	
	SCM100A	Triamped	12	3	Dome	1	Dome	M, T	25-20	Inc.	380,3.8k		33 x 19 x 16	Opt.	Black Knit	125	6400.00 Pair	
AUDIO CONCEPTS	Titan E	Aperiodic	12	6½	Cone	1	Dome		30-20 ±3	90	30	275,5k	8/6	36 x 17 x 16	Opt., Wood	Black Knit		Kit, 739.00 Pair
	Super Titan	Aperiodic Push-Pull	(2)12	6½	Cone	1	Dome		33-20 ±3	92	30	275,5k	4/3	36 x 17 x 16	Opt., Wood	Black Knit		Kit, 839.00 Pair
	Bellas III	Vented, Push-Pull Compound Inf. Baf.	(2)10	6½	Cone	1	Dome		40-20 ±3	91	30	300,5k	4/3	36 x 13 x 12	Opt., Wood	Black Knit		Kit, 979.00 Pair
	Mod C		8			1	Dome		50-20 ±3	88	30	2k	8/6	19 x 12 x 10	Opt., Wood	Black Knit		Kit, 215.00 Pair
	Mod S	Aperiodic	6½			1	Dome		65-20 ±3	87	30	2.5k	8/6	16 x 10 x 8	Opt., Wood	Black Knit		Kit, 179.00 Pair
	Mod G	Aperiodic	10	4½	Cone	1	Dome		44-20 ±3	90	30	800,6k	8/6	28 x 14 x 13	Opt., Wood	Black Knit		Kit, 359.00 Pair
	Compact Monitor	Aperiodic	6½			1	Dome		48-20 ±3	87	30	2k	8/6	16 x 10 x 8	Opt., Wood	Black Knit		Kit, 369.00 Pair
	Vanguard	Aperiodic	8¾			1	Dome		45-20 ±3	89	30	2k	8/6	28 x 14 x 13	Opt., Wood	Black Knit		Kit, 559.00 Pair
	Titan	Aperiodic	12	5¼	Cone	1	Dome		30-20 ±3	91	30	800,4.5k	8/6	36 x 17 x 16	Opt., Wood	Black Knit		Kit, 489.00 Pair

(Continued)



“It’s no trick to make a great speaker when price is no object.”

Andy Petite, chief designer, Boston Acoustics



The 3-way T830 Tower System.

It needs only 10 x 9¾" of floor space, only 32" in height. Suggested retail: \$480 a pair.

“It is a far greater engineering challenge for speaker designers to build a great-sounding speaker for \$200 than \$2000. When cost is no object, they can include whatever they need to get the quality they’re looking for.

“However, that kind of quality doesn’t always filter down through their product line. At Boston Acoustics, we take pride in designing every system to measure up to the highest standards. To show you what I mean, let’s look at our newest model, the T830 tower system.

“We designed the T830 to deliver exceptional performance at a very reasonable price, and did it by making knowledgeable and intelligent choices. We custom-designed all three of its drivers: an 8" high-compliance woofer, 3½" midrange and 1" dome tweeter. No compromises here.

“The midrange and tweeter are ferrofluid cooled for greater power handling capacity. The diaphragms of all three drivers are made of copolymer. Although it is more costly than conventional materials, we used copolymer because of its structural uniformity and immunity to atmospheric changes.

“We make all these drivers under our own roof, using specialized machinery and jigs that we’ve designed or adapted ourselves. This helps us maintain consistent high quality, *and* save through efficiency.

“For the enclosure, we used the same dense, non-resonant structural material as in our highest-priced system. To keep the cost down we used wood-grain vinyl instead of costly wood veneer. It looks rich, and makes absolutely no difference in sound quality.

“More important than what we put into our systems is the quality of sound that comes out—and how that matches your expectations.

“From our very first product to our latest, audio critics have appreciated what we’ve accomplished—delivering demonstrably high performance at truly affordable prices. Here’s what Julian Hirsch said about the T830 in *Stereo Review*:

‘In all measurable respects, the Boston Acoustics T830 delivered outstanding performance. Few speakers we have tested have had such a flat frequency response or such low distortion, for example, and most of those were considerably more expensive... we were enormously impressed.’

“When you compare the T830 against similarly-priced systems, you’ll also find it sounds better in a number of ways. More musical, smoother, its imaging more precise. And it can play louder without distortion.

“What we’ve accomplished is no trick. It’s knowing what to do, then doing it.

“If you’d like to know more about the T830 and other Boston Acoustics speakers, please write or call. We promise to reply promptly.”

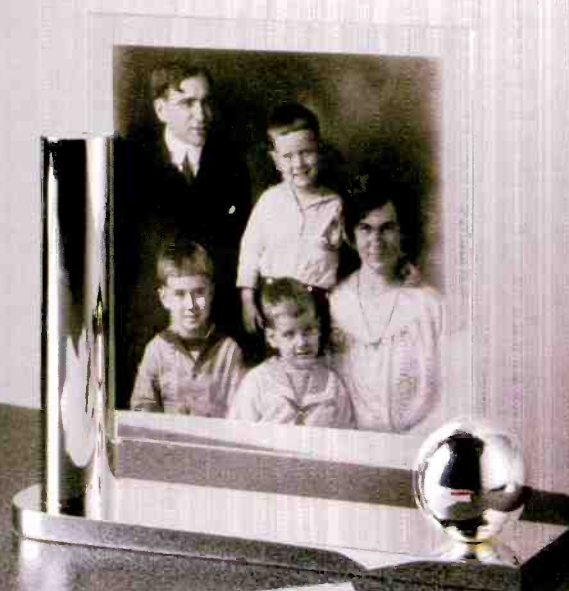
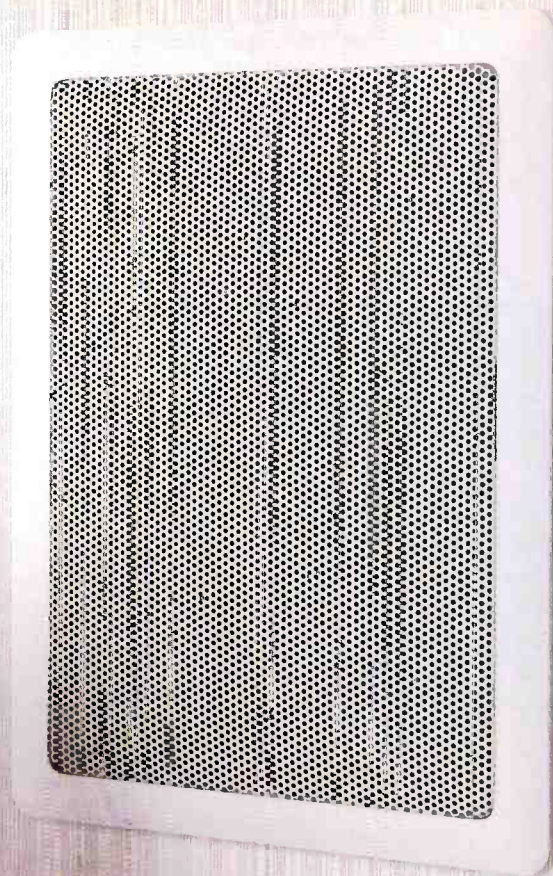
BostonAcoustics

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(617) 532-2111

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches		Tweeter Type	Sensitivity Level (1 Watt/1 Meter)		SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz		Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)		Finish	Grille Color and Material	Weight, Lbs.	Price, \$
AUDIO CONCEPTS (Continued)	Pulse	Push-Pull Compound Subwoof.	(2)10									35-600 ±3	91	30		4/3	18 x 14 x 17	Opt., Wood	Black Knit		Kit, 349.00			
	Quartz T	Hybrid Trans. Line	6½	2	Dome	1		Dome				46-20 ±3	87	30	700,1.2k, 5k	8/6	36 x 13 x 12	Opt., Wood	Black Knit		Pair Kit, 869.00			
	JCRS Sub#1	Push-Pull Compound Subwoof.	(2)12									22-600 ±3	91	30		4/3	21 x 34 x 20	Opt., Wood	Black Knit		Pair Kit, 539.00			
AUDIO-PRO	B1-45	Powered Subwoof.	10									30-200 ±1.5	102	Inc.	Var.		20 x 15 x 15	Opt.		48	874.50			
	B2-70	Powered Subwoof.	(2)8									20-200 ±1.5	103	Inc.	Var.		24 x 22 x 18	Opt.	Black Cloth	90	1424.50			
	B4-200	Powered Subwoof.	(4)8									30-200 ±1.5	110	Inc.	Var.		44 x 21 x 21	Black	None	190	3295.00			
	A2-2	Powered Sat.	4¼			¾		Dome				50-20 ±2	99	Inc.			8 x 5 x 4	Opt.	Black Foam	20 Pair	1195.00			
	A4-14 MKII	Powered	(2)5	4½	Cone	1		Dome				30-20 ±1.5	113	Inc.	300,2.5k		20 x 12 x 10	Opt.	Black Foam	98 Pair	2095.00	Pair w/ Stands		
AUDIOSOURCE	LS-One	Inf. Baf.	4			1		Dome				80-20	87	10	2.5k	4/	7 x 5 x 5	Black Metal Oiled Wal.	Black Mesh Cloth	5¼	180.00			
	LS-One Walnut	Inf. Baf.	4			1		Dome				80-20	87	10	2.5k	4/	8 x 5 x 5	White Metal Oiled Oak	White Mesh Cloth	3½	200.00			
	LS-One W/T	Inf. Baf.	4			1		Dome				80-20	87	10	2.5k	4/	7 x 5 x 5	Black Metal Oiled Oak	Black Mesh Cloth	5½	200.00			
	LS-Seven	Inf. Baf.	6½			1		Dome				70-20	88	10	2k	8/	14 x 9 x 6	Black Metal Oiled Oak	Black Mesh Cloth	7	260.00			
	LS-Nine	Inf. Baf.	8			1		Dome				65-20	88	10	3.5k	8/	18 x 11 x 8	Black Metal Oiled Oak	Black Mesh Cloth	13½	320.00			
AUDIURE	Image I	Ribbon										30-20 ±3	96	25		4/4	72 x 44 x 3	Oiled Wal.	Black Knit	150	6500.00			
	Image II	Ribbon										35-20	93	50		6/6	72 x 36 x 3	Oiled Wal.	Black Knit	125	4500.00			
	Image III	Ribbon										40-20	90	25		3/3	60 x 24 x 2	Oiled Wal.	Brown Knit	60	2700.00			
AVALON ACOUSTICS	HR-M	Inf. Baf.	10	3	Dome	1		Dome				38-20 ±2	91	15		8/5.8	44 x 12 x 13	Oiled Oak	Black Cloth	62	3995.00			
BABB AUDIO	C14	Ac. Sus.	5¼						No			60-18 ±3	93	20		4/4	11 x 7 x 8	Black	Black	15 Pair	335.00			
BANG & OLUFSEN	Beolab Penta	Powered Bass Ref.	(4)5	(4)3¼	Cones	1		Dome	W			40-20	92		700,5k	8/	(5)5¼ x 65H	Steel	Black	53	2999.00			
	RL 140	Bass Ref.	(2)6½	5	Cone	1		Dome	No			40-20	93	10	800,3k	8/	28 x 20 x 9	Gray Plas.	Black	43	900.00			
	RL 60.2	Bass Ref.	(2)5			1		Dome	No			42-20	93	10	2.5k	8/	21 x 16 x 7	Gray Plas.	Black	24	500.00			
	Beovox S80.2	Ac. Sus.	8		Dome	1		Dome	No			50-22	92	20	700,2.5k	8/	12 x 21 x 10	Rswd.	Black	24	700.00			
	Beovox CX100	Ac. Sus.	(2)4			1		Dome	No			50-20	89	20	2.5k	6/	4 x 12 x 8	Black Alum.	Black	13½	350.00			
	CX50	Ac. Sus.	4			1		Dome	No			80-20	89	20	2.5k	6/	4 x 8 x 8	Black Alum.	Black	8	250.00			
	IWS 100	Ac. Sus.	(2)4			1		Dome	No			50-20	90	20	2.5k	6/	21 x 8 x 4	Wood	White	13				
BECKER ELECTRONICS	505A	Tuned Port	10	5	Cone	1		Dome				50-20 ±3	90	15	2.4k,5k	4/3.5	24 x 13 x 10	Wal. Vinyl	Black Knit	28	189.00			
	606A	Tuned Port	12	5	Cone	1		Dome	T			50-20 ±3	91	15	2.4k,5k	4/3.5	30 x 15 x 10	Wal. Vinyl	Black Knit	37	239.00			
	707A	Tuned Port	(2)10	5	Cone	1		Horn	T			60-20 ±3	92	10	1k,9k	4/4	36 x 13 x 12	Wal. Vinyl	Black Knit	51	299.00			
	Pulse B	Port Pas. Rad.	8			1		Dome				35-20 ±3	92	30	2k,2.5k	8/8	14 x 10 x 28	Lacq. Oak	Brown Knit	40	398.00			
	Pulse A	Inf. Baf.	8			1		Dome				50-20 ±3	92	30	2k,2.5k	8/8	13 x 10 x 21	Lacq. Oak	Brown Knit	30½	298.00			
	PRO 200	Ported	8			3		Cone				70-19 ±3	89	5	3.5k	8/6	11 x 9 x 19	Wal. Vinyl	Black Knit	30	89.00			
	PRO 300	Ported	8	5	Cone	3		Cone				65-19 ±3	90	10	4.9k,9k	8/6	12 x 9 x 23	Wal. Vinyl	Black Knit	38	109.00			
	PRO 500	Ported	12	5	Cone	3		Cone				55-19 ±3	91	10	2k,6k	8/6	11 x 11 x 24	Wal. Vinyl	Black Knit	21	169.00			
	PRO 600	Ported	15	5	Cone	3		Cone				50-19 ±3	91	15	4.9k,9k	8/6	18 x 13 x 29	Wal. Vinyl	Black Knit	48	219.00			
	101A	Tuned Port	8			1		Dome				70-20 ±3	90	5	4.5k	6/4	19 x 11 x 8	Wal. Vinyl	Black Knit	51	119.00			
B.E.S.	SM300	Puls. Diaphr.							M,T			30-22 ±3	93	25	500,5k, 10k	8/5.5	22 x 54 x 7	Oiled Oak	Brown	79	1500.00			
	SM275	Puls. Diaphr.							M,T			32-22 ±3	93	10	500,10k	8/5.5	20 x 40 x 6	Oiled Oak	Brown	58	990.00			
	SM90	Puls. Diaphr.										42-19 ±3	88	5	800	8/5.5	19 x 28 x 4	Anod. Alum.	Brown Nylon	20	600.00			
	SM100	Puls. Diaphr.										42-19 ±3	88	5	800	8/5.5	19 x 28 x 4	Vinyl	Brown	26	499.00			
	SM80	Puls. Diaphr.										60-19 ±3	88	5	1.5k	8/5.5	15 x 24 x 4	Vinyl	Brown	21	369.00			

**Let the walls
surround you
with music**



With the new Boston Acoustics Designer Series speaker systems, you can enjoy high fidelity music everywhere in your home. They mount flush in walls or ceilings, blending unobtrusively into any room setting. And unlike conventional speakers, they take up absolutely no shelf or floor space.

As main, surround, or extension speaker systems, our Designer Series speakers give you the accurate, uncompromised sonic performance you've come to expect from Boston Acoustics. Frequency response is smooth and accurate, and stereo imaging is unusually lifelike.

There are two Designer Series models. Shown above is the model 360, with a 6½-inch woofer. The smaller model 350 has a 5¼-inch woofer. Both have our CFT-4 one-inch dome tweeter. The contoured grille and trim,

finished in matte white, can be painted to match or complement the surroundings.

The specially engineered woofers provide full bass performance without need for special enclosures. The tweeter is a new version of the one-inch domes used in our finest home systems. It is of a quality not normally found in built-in speakers. All drivers have water-proof diaphragms, allowing installation in moisture-laden places such as kitchens, baths, and boats.

For a Designer Series brochure, please write to us at 247 Lynnfield St., Peabody, MA 01960. Or call 617-532-2111.

BostonAcoustics

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Sensitivity Level Controls: Woofer = W, Midrange = M, Tweeter = T, Superwoofer = ST			Anechoic Frequency Response, Hz to kHz, ± dB		SPL, -1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz		Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
BEVERIDGE SPEAKERS	SYS-5	ES Hybrid	12									33-20	90	50	200	8/4	18 Dia. x 63	Opt., Wood	Black Foam	90	3895.00		
	SYS-6	ES Hybrid	12									33-20	90	50	200	8/4	22 Dia. x 91	Opt., Wood	Black Foam	170	6495.00		
	SYS-7	ES Hybrid	12									33-20	90	50	200	8/4	18 Dia. x 72	Opt., Wood	Black Foam	100	4995.00		
BGR	BGR-40	Bass Ref.	(2)8			1	Dome					40-20 ±3	91	15	2.5k	6/4	29 x 11 x 14	Opt., Wood	Black Knit	39	789.00		
	8GR-80	Ac. Sus. Sat. & Subwoofer.	13	6½	Cone	1	Dome					38-20 ±3	90	25	180,2.5k	8/6	Three Pieces	Opt., Wood	Black Knit	82 Sys.	999.00		
	BGR-10A	Ac. Sus.	6½			1	Dome					50-20	89	15	2.5k	8/6	12 x 8 x 7	Wal.	Black Knit	12	289.00		
	BGR-25A	Bass Ref.	8			1	Dome					45-20	90	15	2.5k	8/6	16 x 10 x 8	Wal.	Brown Knit	14	319.00		
	BGR-30A	Bass Ref.	8			1	Dome					40-20 ±3	90	15	2.5k	8/6	19 x 12 x 11	Wal.	Black Knit	27	429.00		
	BGR-55A	Bass Ref.	12	2	Dome	1	Dome					40-20 ±3	90	15	700,3k	8/6	25 x 14 x 12	Opt., Wood	Brown Knit	42	719.00		
	BGR-60A	Bass Ref.	10	2	Dome	1	Dome					38-20 ±3	90	15	700,3k	8/5	25 x 14 x 12	Opt., Wood	Black Knit	40	699.00		
	BGR-70A	Bass Ref.	13	5¼	Cone	1	Dome					33-22 ±3	91	25	600,3k	8/6	37 x 14 x 12	Opt., Wood	Black Knit	63	1200.00		
BOSE	901 V	Ac. Matrix	(9)4½											10		8/	21 x 13 x 13	Wal.	Cloth	17½	1485.00		
	601 III	Ported	(2)8			(4)3	Cones						87	10	1.5k-2.5k	8/	12 x 12 x 30	Wal.	Brown Knit	45	1026.00		
	501 IV	Ported	10			(2)3	Cones							20	1.5k-2.5k	8/	16 x 14 x 25	Teak Vinyl	Brown Knit	20	750.00		
	401	Ported	(2)6½			2	Cone							10	2.2k	4/	12 x 12 x 30	Wal. Vinyl	Brown Knit	31	599.00		
	301 II	Ported	8			(2)3	Cones							10	1.5k-2.5k	8/	10 x 17 x 10	Wal. Vinyl	Brown Knit	19	422.00		
	201 II	Ported	6			3	Cone							5	1.5k-2.5k	8/	15 x 18 x 9	Wal. Vinyl	Brown Knit	10	254.00		
	101 Music Monitor	Ported	4½											89	10		8/	6 x 9 x 5	Dpt., Plas.	Dpt., Cloth	10	199.00	
	RoomMate System	Powered	4½											100	Inc.		8/	6 x 9 x 5	Dpt., Plas.	Dpt., Cloth	11½	229.00	
	Video RoomMate System	Powered	4½											100	Inc.		8/	6 x 9 x 5	Gray	Silv.	11½	279.00	
	Acoustimass System AM-5	Acoustimass	(2)6½	(4)2½	Cones	(4)2½	Cones									4/	Five Pieces	Black Knit	Black Knit	33 Sys.	699.00		
	10.2	Ported	(2)8			(2)3	Cones							88	10	1.2k-3k, 4k	4/3.2	12 x 12 x 40	Waxed Teak	Brown Knit	61	1199.00	
	8.2	Ported	10			(2)3	Cones							86	10	1.2k-2.8k	4/	16 x 9 x 33	Teak Vinyl	Brown Knit	41	949.00	
	6.2	Ported	8			(2)3	Cones							10	1k-3.2k, 6k	4/	20 x 10 x 10	Waxed Teak	Brown Knit	19½	599.00		
	4.2	Ported	8			2½	Cone							10	1k-3.2k	8/	18 x 10 x 9	Teak Vinyl	Brown Knit	15	656.00		
2.2	Ported	6			2	Cone							10		8/	10 x 15 x 8	Teak Vinyl	Brown Knit	12	419.00			
BOSTON ACOUSTICS	T1000	Ac. Sus.	(2)8	6½	Cone	1	Dome					38-25 ±3	90	15	250,2.5k	8/6	43 x 10 x 12	Opt., Wood	Gray Cloth	65	1000.00		
	T830	Ac. Sus.	8	3½	Cone	1	Dome					45-20 ±3	88	15	800,4k	8/6	33 x 10 x 10	Opt., Wood	Opt., Cloth	40	480.00		
	360	Inf. Baf.	6½			1	Dome					48-20 ±2	90	5	3.5k	8/6	12 x 9 x 3	Matte White	White Mesh	4	400.00		
	350	Inf. Baf.	5¼			1	Dome					58-20 ±2	90	5	3k	4/4	10 x 7 x 3	Matte White	White Mesh	3	350.00		
	705 White	Inf. Baf.	5¼									58-17 ±3	87	5		4/4	6 x 6 x 2	Matte White	White Mesh	2	100.00		
	A150 Series III	Ac. Sus.	10	3½	Cone	1	Dome					39-20 ±3	90	15	550,3.5k	8/5	33 x 16 x 8	Opt., Wood	Gray Cloth	47	650.00		
	A100 Series III	Ac. Sus.	10			1	Dome					39-20 ±3	90	15	2k	8/5	33 x 16 x 8	Wood Vinyl	Gray Cloth	44	400.00		
	A70 Series II	Ac. Sus.	8			1	Dome					45-20 ±3	90	15	2.5k	8/5	23 x 13 x 9	Wood Vinyl	Gray Cloth	24	300.00		
	A60 Series II	Ac. Sus.	8			1	Dome					52-20 ±3	90	15	3k	8/6	18 x 11 x 8	Opt., Wood	Opt., Cloth	16	220.00		
	A40 Series II	Ac. Sus.	6½		¾	Cone						65-20 ±3	89	5	3.5k	8/5	14 x 8 x 7	Opt.	Opt., Cloth	9	160.00		
	A40V Series II	Ac. Sus.	6½		¾	Cone						68-20 ±3	90	5	3.5k	8/5	14 x 8 x 7	Matte Black	Black Cloth	9	190.00		
	BOZAK/TAI	DMS-2000	Ducted Port	8			¾	Dome					45-23 ±2.5	92	10	2.5k	8/6	11 x 9 x 20	Lam. Wood	Black Knit	40	249.00	
		DMS-2500i	Ducted Port	8			1	Dome					35-21 ±3	90	10	2.5k	8/6	11 x 9 x 22	Opt., Wood	Black Knit	30	399.00	
		DMS-3000i	Ducted Port	8			1	Dome					35-21 ±2.5	91	10	2.5k,13.5k	8/5	12 x 8 x 24	Opt., Wood	Black Knit	34	519.00	
DMS-3500i		Ducted Port	8	4	Cone	1	Dome					35-21 ±3	92	10	2k,3.5k	8/6	11 x 9 x 37	Opt., Wood	Black Knit	40	659.00		
DMS-4500i		Ducted Port	12	4	Cone	1	Dome					30-21 ±3	95	10	800,2.5k	8/6	16 x 10 x 27	Opt., Wood	Black Knit	50	739.00		

(Continued)

The Boston Acoustics

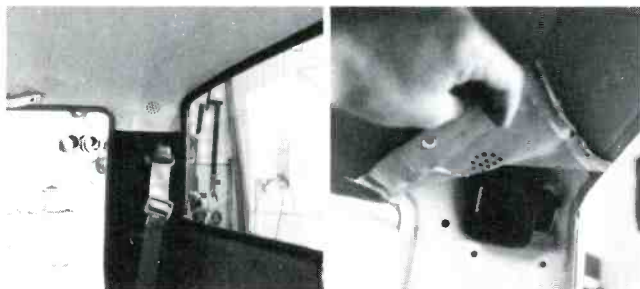
Installation of the Month Contest



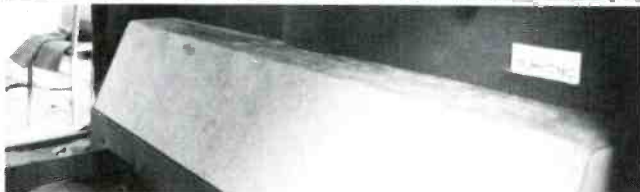
1986 Toyota Long Bed pickup with the winning Boston Acoustics. Installation of the Month for October.



View from rear of truck. The two circles on the door show location of 761 system (1" Varimount tweeter, above, and 6 1/2" woofer below). The half circle at left shows dashboard location of 701 tweeter. (See insert photo.)



(Left) 741 system in rear of cab. Includes 1" Varimount tweeter (above) and 4" woofer (below). (Right) Varimount tweeter under headliner.



Before-and-after views of custom-made enclosure for four Boston Acoustics 780LF 8" subwoofers.

The October winner: Greg de Swart, Pomona, California

Greg de Swart helped Transonic of Walnut, California, design and install this system for his 1986 Toyota Long Bed pickup. Greg got what he wanted: Loud, clean and impressive, yet out of sight. There are actually 14 speakers in the dash, doors, rear side panels, and behind the bench seat. And the five amplifiers (totalling 245 watts/channel) are under the seat. Greg's system also won first place in the Western Regionals of Alpine's 1987 Car Audio Nationals contest. This qualifies him and his truck for the finals in San Diego.

The winner's dealer: Transonic, Walnut, CA

The winner's salesperson: Tracy Stewart

The winner's installation expert: A collaboration between Greg de Swart and Ed Lopez

The winning system:

Boston Acoustics speakers:

Two 701 tweeters in custom-made dash openings.

761 systems in doors, including 1" Varimount tweeters and 6 1/2" woofers mounted behind fabric.

741 systems in rear side panels include 1" Varimount tweeters behind headliner, and 4" woofers mounted behind fabric.

Four 780LF 8" subwoofers in custom-built enclosure behind seat.

Kenwood: KDC-9R Compact Disc player in dash, KGC-6040 7-band equalizer/subwoofer crossover in dash. Two KEC-1100 2-way electronic crossovers in dash. Amplifiers: (watts/channel, Boston speaker models driven): KAC-5020: (15 w/ch; 701 and 761 tweeters). KAC-5020: (15 w/ch; 741 tweeters). KAC-8020: (80 w/ch; 761 woofers). KAC-7020: (35 w/ch; 741 woofers). KAC-9020: (100 w/ch; 780LF subwoofers).

AudioControl: EQL Equalizer/Level Matcher in glove box; Epicenter bass restoration system under dash.

You have 2 more opportunities to win!

Note: Due to press deadlines, all entries must be in by October 5, 1987. Each month's winner will be announced in Audio Magazine through December, 1987.

Listen carefully to your present car system, then drive to your Boston Acoustics dealer to hear how much better it can sound with Boston Acoustics speakers.

Ask him for the contest rules and requirements. Or call or write us.

If we couldn't give you better sound for the road, we'd have stayed home.

Monthly prize: A pair of our newest tower design home loudspeakers, the T830. (\$480 suggested retail value.)

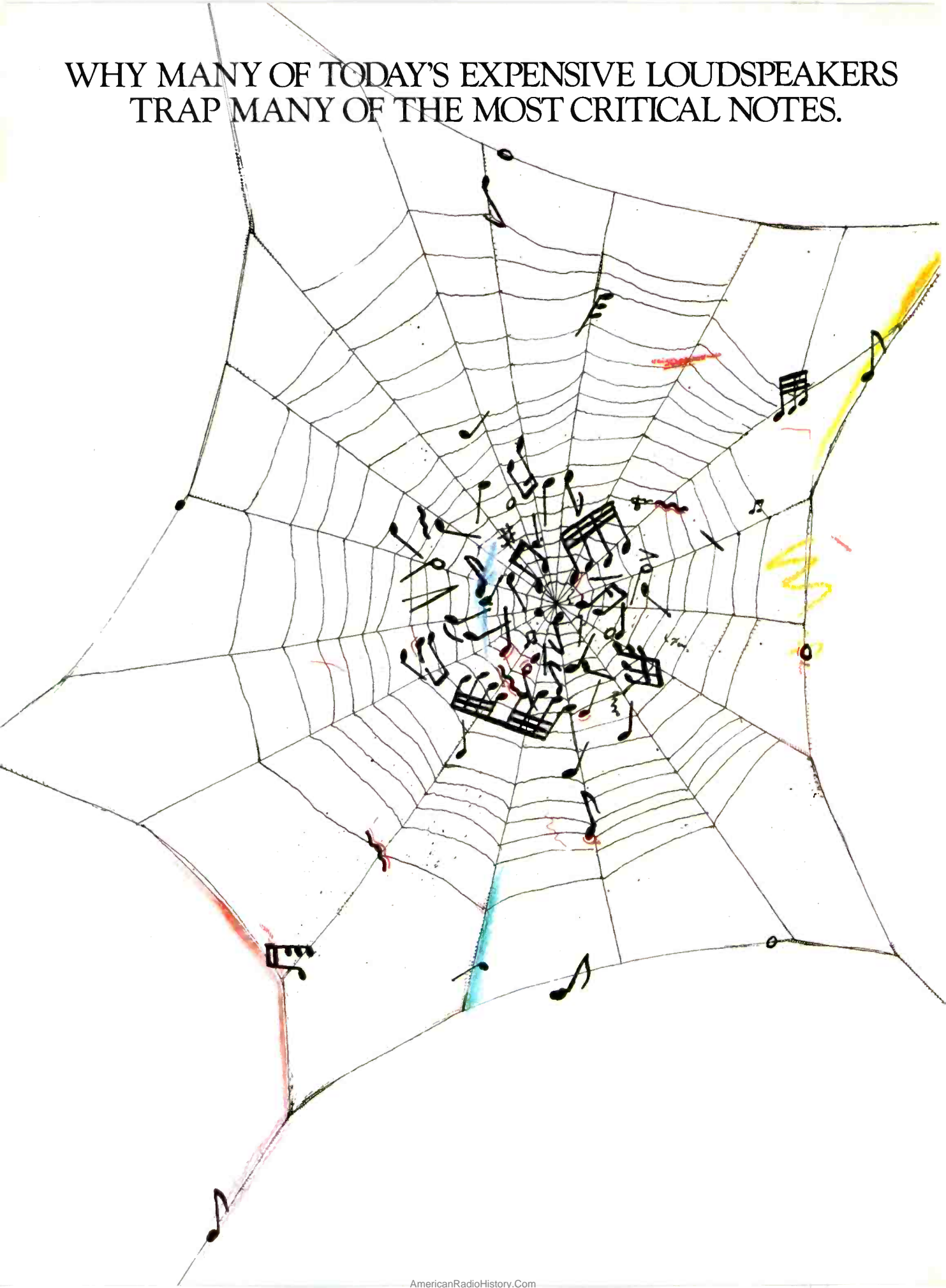
Grand prize: A cruise for two to the Caribbean! Open to all entrants.



Boston Acoustics

247 Lynnfield Street Peabody, MA 01960 (617) 532-2111

WHY MANY OF TODAY'S EXPENSIVE LOUDSPEAKERS
TRAP MANY OF THE MOST CRITICAL NOTES.



The music that goes into many of today's highly priced loudspeakers isn't always the same music that comes out. Many of the finer notes and nuances are often trapped or lost. Why? Because advanced recording techniques and digital processing demand a dynamic range of over 90 dB and an extended frequency response. Demands that are often beyond the limits of ordinary loudspeakers.

The truth is, most people can't hear what's missing from their music—like a broad frequency range—or what's been added—like coloring or distortion. But there are a few who can.

For that select group, listeners with well trained ears, Altec Lansing has engineered a new line of



*Polyimide/Titanium
Mid-range*

loudspeakers to recreate every subtlety of recorded music with a clear open sound and without coloring or distortion. Even the accuracy of CD recordings can be more fully appreciated on these Altec Lansing loudspeakers, prompting Stereo Review to remark "...the bass distortion

was among the lowest we have measured.

The speakers have...very good bass, and a warm, extended and unstrained character."

The secret to Altec Lansing's consummate performance? Remarkably sophisticated technology. Like woofers of a woven carbon fiber material (instead of paper or polypropylene) that is extremely rigid yet sufficiently light for maximum transient response and extraordinary low frequency definition. The result is a pure, clean, deep bass that beautifully complements the performance of our mid and high frequency polyimide/titanium

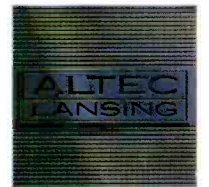
domed drivers. Virtues like these compelled Stereo Review to also comment on Altec Lansing's "...high sensitivity and ability to absorb large power inputs... a



Carbon Fibers in Woofer Cone

speaker that can develop high sound pressure levels in any environment." Even the hand crafted walnut veneered cabinets utilize the latest computer aided design techniques, thick walls and extra bracing to eliminate resonance.

So come hear Altec Lansing loudspeakers. And discover just how much of your music has been trapped by less than extraordinary loudspeakers. Call 1-800-ALTEC 88 for information and the Altec dealer nearest you. (In PA 717-296 HIFI.) In Canada call 416-496-0587 or write 265 Hood Road, Markham, Ontario L3R 4N3.



ALTEC LANSING
LOUDSPEAKERS FOR
THE WELL-TRAINED EAR

WE'LL CHANGE YOUR IDEAS

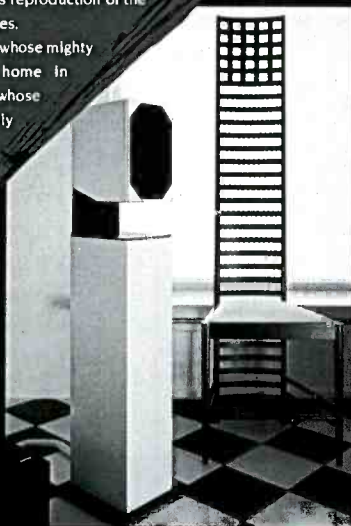
B&W CONCEPT 90 B&W

B&W REVISES AN EQUATION. THE RESULT IS UNBELIEVABLE.

B&W have taken the Matrix quantum leap a stage beyond. They challenged the view that only a sizeable and intrusive enclosure could possibly produce a sound of true monitor quality. That equation between size and sound quality is now rewritten by B&W in their Concept 90 series CMI/CM2 loudspeakers. Giving an incredible response to the wide dynamic range of today's compact discs.

At one end a rich and satisfying bass output. At the other, fastidious reproduction of the most delicate passages.

Here is a loudspeaker whose mighty performance is at home in limited rooms... whose appearance is perfectly attuned to design-conscious living.



THE MATRIX REVOLUTION. SETTING SOUND FREE.



CMI. AN INCREDIBLE SOUND SYSTEM.

By moulding the CMI enclosure and Matrix in one piece and using a new glass-fibre reinforced polyester material, B&W have drastically reduced cabinet thickness – normally 15mm – to just 5mm. The result: a gain of 46% internal volume and a bass output which completely belies the CMI's diminutive size.

Bass/midrange performance has been refined by the introduction of a new version of the woven Kevlar cone (used in B&W's celebrated 801 monitor). System sensitivity of 85dB. Maximum sound pressure level of 105dB (in 2,000 cu.ft.). The perfect expression of the Concept 90 philosophy.

CM2. THE POWER. THE GLORY.

For the resolute perfectionist, Concept 90 reserves a further dimension. The supreme power and bass extension (a full 1½ octaves more) of the CM2. The CMI element crosses to the slender sub-bass module of CM2 at only 150Hz, leaving performance unimpaired and giving a fully omnidirectional pattern of sound radiation. Drivers are reflex loaded and deliver perfect optimisation of output and bass extension. In CM2 the maximum sound pressure level is raised to 107dB with superlative accuracy and stereo imagery.

The
MATRIX
Revolution

B&W Loudspeakers of America
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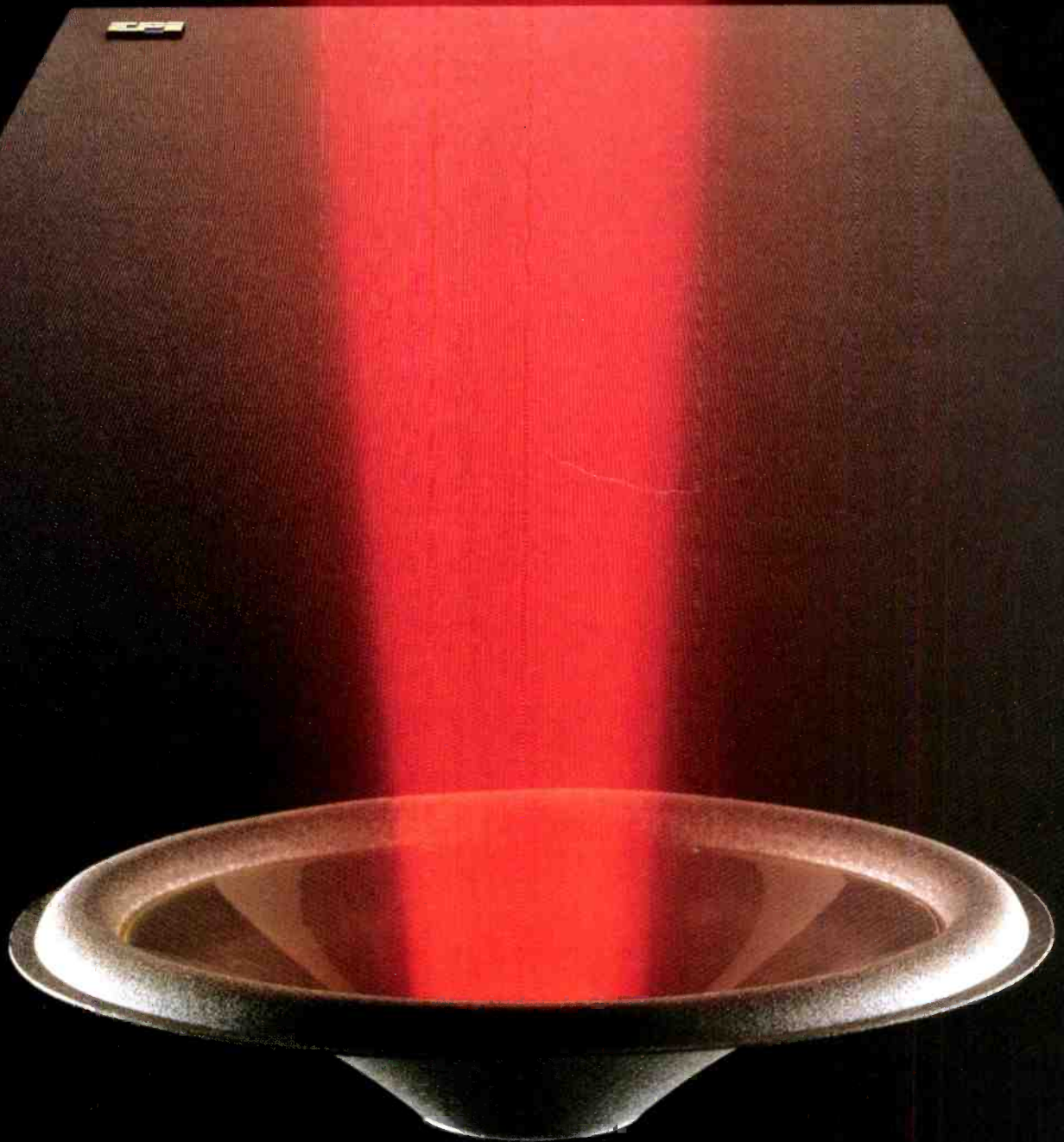
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The clearest sound to ever light up a room.

EPI has pushed distortion to an all-time low. The computer-tested EPI Time Energy Series speakers

are so clean they separate the instruments to let you hear the parts, as well as the sum. EPI makes a whole line of home speakers

that give you a sound so uncolored, and crystal clear you'll think of it as a visual, as well as an audio experience.



Epicure Products, Inc., Newburyport, MA 01950
For information call (800) 225-7932. In MA call (800) 892-0565.

A Harman International Company

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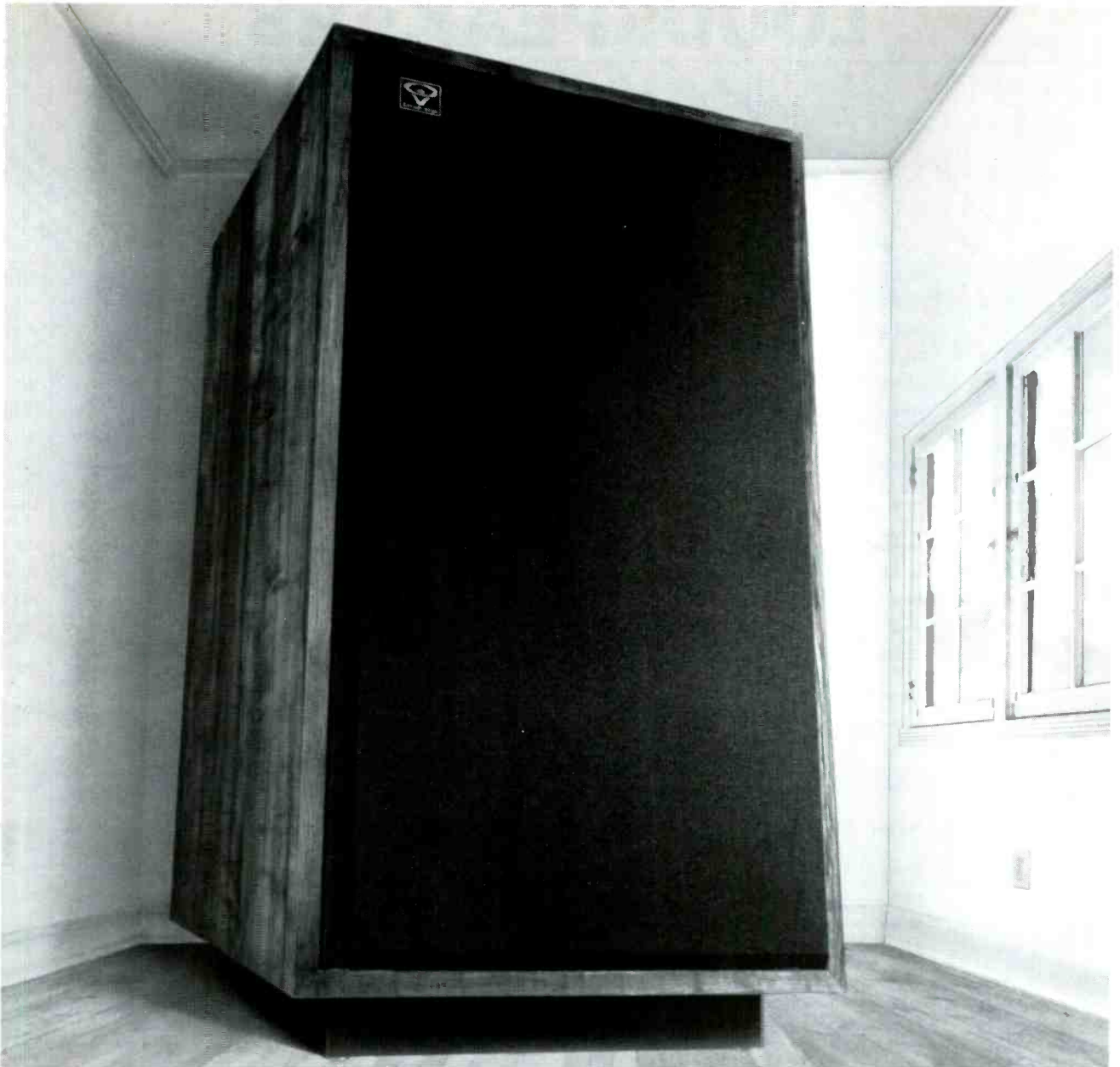
LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls? Woofer = W, Midrange = M, Tweeter = T, Supertweeter = ST	Amplitude Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
dB PLUS	440	Bass Ref.	6½			1	Dome		45-22 ± 3	94	10	3k	8/4	10 x 16 x 9	Wal. Vinyl	Black Knit	16	350.00 Pair
	880	Bass Ref.	10			1	Dome		35-22 ± 3	96	10	2.2k	8/4	12 x 24 x 12	Wal. Vinyl	Black Knit	29	450.00 Pair
	990	Pas. Rad.	10			1	Dome		30-22 ± 3	98	10	2.2k	8/4	12 x 33 x 11	Wal. Vinyl	Black Knit	37	550.00 Pair
	1010	Bass Ref.	(2)10			1	Dome		25-22 ± 3	100	10	2k	8/4	12 x 37 x 11	Wal. Vinyl	Black Knit	45	750.00 Pair
	1212	Bass Ref.	(2)12	6½	Cone	1	Dome		23-22 ± 3	103	10	300,2k	8/4	43 x 15 x 16	Wal. Vinyl	Black Knit	54	1000.00 Pair
DBX	Soundfield 50	Vented	10	6½,4	Cones	(3)½	Domes	No	34-20 ± 2.5	91	40	200,800, 3.15k	4/2.5	14 x 18 x 48	Dpt.	Dpt.	70	2000.00 Pair
	Soundfield 1A	Ac. Sus.	(4)10	(4)4	Cones	(6)½	Domes		20-20 ± 2	90	40	450,3.15k	4/2.5	42 x 16 x 16	Opt., Wood	Brown Knit	80	3000.00 Pair
	Soundfield 10	Ac. Sus.	(2)10	(2)4	Cones	(4)½	Domes		30-20 ± 2.5	90	30	450,3.15k	4/2.5	34 x 16 x 16	Opt., Wood	Brown Knit	55	1500.00 Pair
	Soundfield 100	Vented	10	4	Cone	(3)½	Domes		40-20 ± 3	91	20	450,3.15k	4/2.5	32 x 16 x 13	Wal.	Brown Knit	45	899.00 Pair
	Soundfield 1000	Vented	8	4	Cone	(2)½	Domes		45-20 ± 3	91	20	450,3.15k	4/2.5	31 x 14 x 11	Dpt.	Knit	35	699.00 Pair
DCM	Time Frame TF-2000	Trans. Line	(2)8	(2)6½	Cones	1	Dome		25-20	92	20	500,2.5k	8/4	60 x 23 x 11	Dark Dak	Brown Knit	100	From 1999.00 Pair
	Time Frame TF-1000	Trans. Line	8	4	Cone	¾	Dome		26-20	91	20		8/4	49 x 19 x 8	Dark Dak	Brown Knit	49	From 999.00 Pair
	Time Frame TF-700	Trans. Line	8	4	Cone	¾	Dome		29-20	90	20		8/4	45 x 18 x 7	Dark Dak	Brown Knit	42	From 749.00 Pair
	Time Frame TF-500	Trans. Line	6½			¾	Dome		31-20	89	10	2.5k	8/4	41 x 17 x 7	Dark Dak	Brown Knit	44	From 549.00 Pair
	Time Frame TF-350	Trans. Line	6½			¾	Dome		35-20	89	10	2.5k	8/4	37 x 15 x 7	Dark Dak	Brown Knit	31	From 399.00 Pair
	Time Frame TF-250	Hybrid Trans. Line	6½			¾	Dome		42-20	89	10	3k		34 x 13 x 6	Dark Dak	Brown Knit	21	From 249.00 Pair
	Time Window 3	Trans. Line	8	6½	Cone	(2)¾	Domes	M,T	25-20	90	15			39 x 16 x 12	Dark Dak	Brown Knit	45	From 1399.00 Pair
	Time Window 1A	Hybrid Trans. Line	(2)6½			(2)¾	Domes		30-20	91	10	2.8k		36 x 15 x 12	Dark Dak	Brown Knit	32	From 879.00 Pair
DENNESEN	9	ES Hybrid	6½			(6)3 Sq. In.	ES		40-30 ± 2	88	30	2.2k	8/5	Two Pieces per Side	Diled Wal.	Black Foam	35	1650.00 Pair
DESIGN ACOUSTICS	PS-6	Ac. Sus.	6			¾	Dome		55-20 ± 2	88	10	3k	8/	8 x 12 x 11	Wood Vinyl	Brown Knit	12	119.95
	PS-6V	Ac. Sus.	6			¾	Dome		55-20 ± 2	88	10	3k	8/	8 x 12 x 11	Black Vinyl	Black Knit	12	129.95
	PS-8a	Ac. Sus.	8	4	Cone	¾	Dome	T	50-20 ± 2	90	15	200,2k	8/	9 x 11 x 14	Wood Vinyl	Brown Knit	17	189.95
	PS-10	Ac. Sus.	10	5	Cone	1	Dome	T	47-22 ± 2	90	15	200,2k	8/	11 x 14 x 14	Wood Vinyl	Brown Knit	25	249.95
	PS-5	Ac. Sus.	5			1	Dome	T	140-22 ± 2	90	15	2.4k	8/	11 x 7 x 5	Wood Vinyl	Brown Knit	9	175.00
	PS-LF	Subwoof.	12						40-200	90	15	140	8/	21 x 16 x 16	Diled Wal.	Brown Knit	55	350.00
	PS-30	Ac. Sus. Sat. & Subwoof.	12	5		1	Dome	T	40-22 ± 2	90	15	140,2.4k	8/	Three Pieces	Diled Wal.	Brown Knit	73 Sys.	695.00 Sys.
	PS-103	Ac. Sus.	10	6	Cone	¾	Dome	M,T	38-20 ± 2	88	30	100,3k	8/	38 x 13 x 14	Diled Dak	Brown Knit	55	475.00
DESKTOP LOUDSPEAKER SYSTEMS	DLS-1a	Sat. & Subwoof.	(2)6½	(2)2	Cones	(2)¾	Domes		47-18 ± 3	86	20	175,3.3k	5/4	Three Pieces	Dpt.	Black Knit	30 Sys.	579.00 Sys.
	DLS-2	Pas. Rad. Sat. & Subwoof.	(2)7	(2)2	Cones	(2)¾	Domes		38-19 ± 3	87	20	175,3.3k	4.5/4	Four Pieces	Wal.	Black Knit	40 Sys.	899.00 Sys.
	DLS-2x	Pas. Rad. Sat. & Subwoof.	(2)7	(2)2	Cones	(2)¾, (2)1	Domes, Compr.		36-40 +5,-3	88	25	175,3.3k, 18k	4.5/4	Four Pieces	Black	Black Knit	41 Sys.	999.00 Sys.
	DLS-3	Sat. & Subwoof.	(8)6½	(2)2	Cones	(2)¾, (2)1 ½	Domes, Compr.		22-40 ± 3	88	25	175,3.3k, 18k	4.5/4	Four Pieces	Wal.	Black Knit	70 Sys.	1499.00 Sys.
	DM-1a	Int. Bal. Sat. Subwoof.		2					150-18 ± 2	86	20	3.3k	8/7	3 x 4 x 7	Dpt.	Black Knit	3	180.00
	BMW-1	Sat. Subwoof.	(2)6½						47-175 ± 3	86	20		5/4	5 x 7 x 14	Dpt.	None	20	300.00
	BMW-2	Pas. Rad. Subwoof.	7						38-175 ± 3	87	20		5/4	10 x 12 x 14	Wal.	None	17	420.00 Pair
DUNTECH	PCL1000 Crown Prince	Closed Box	(2)9	(2)4½	Cones	¾	Dome	W	27-20 ± 1	90	100	500,4k	4/4	74 x 12 x 18	Rswd.	Black Knit	125	5985.00 Pair
	PCL-4 Monitor	Closed Box	6½			¾	Dome		55-20 ± 1	86	50	4k	4/	8 x 14 x 6	Rswd.	Black Knit	30	950.00 Pair
	Sovereign 2001	Ac. Sus.	(2)12, (2)7	(2)3	Domes	¾	Dome	W	27-20 ± 2	90	100	300,2k,6k	4.5/3	74 x 32 x 14	Dpt.	Black Knit	375	15,000.00 Pair
	Thor	Ac. Sus. Active Subwoof.	12		Cone			W	24-110 ± 1.5	91	Inc.	110	/4	31 x 17 x 13	Diled Dak	Black Foam	82	950.00



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls: Woofer = W, Midrange = M, Tweeter = T, Subwoofer = ST	Analog Frequency Response, Hz to kHz, ± dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
DUNTECH (Continued)	PCL-3	Closed Box	6½		Cone	1½	Dome		55-20 ± 1.5	83	50	6k	8/6.5	24 x 17 x 4	Oiled Oak	Black Knit	16	850.00
	PCL-5	Closed Box	(2)6½		Cone	1½	Dome		50-20 ± 1.5	92	25	6k	8/6.5	24 x 33 x 4	Oiled Oak	Black Knit	35	1675.00
	PCL-15	Closed Box	6½		Cone	1½	Dome		45-20 ± 1.5	86	50	6k	8/6.5	20 x 8 x 6	Oiled Oak	Foam Black Knit	30	575.00
	PCL-100	Ac. Sus.	(2)12	(2)6½	Cones	1½	Dome		22-20 ± 1.5	92	25	110.6k	8/6.5	76 x 22 x 28	Oiled Oak Opt., Wood	Black Knit	275	10,000.00
DYNAUDIO	Consequence	Inf. Baf.	(2)12	6.3	Cone, Dome	1,¾	Domes		20-40 ± 3	94	100			50 x 16 x 24	Rswd.	Black Knit	120	10,500.00
EBONY ACOUSTICS	D6	Pressure Release	6			2	Cone		60-18 ± 3	90	25	2k	8/7	10 x 8 x 16	Opt., Wood	Black Knit	25	500.00
	D9	Pressure Release	9			1	Dome		35-22 ± 3	91	25	2k	8/7	11 x 16 x 27	Opt., Wood	Black Knit	50	1000.00
	S9	Trans. Line Subwoof.	9						22-85 ± 3	92	30	85	8/7	12 x 10 x 50		Black Knit		800.00
ELECTRO-COMPADET	Prisma	Loaded Port	8	5	Cone	¾	Dome	M.T	45-20	89	50	600.4k	6/4.5	16 x 16 x 40	Black Lacq.	Black Mesh	70	
	SBB-1	Loaded Port	(2)5			1	Dome	No	80-20 ± 2.5	90	25	3.5k		15 x 6 x 9	Black Lacq.	Black Mesh	20	
ELECTRO MAGNETIC	5301	Planar Sat.		(2)9x 34½	Planar	1½x 34½	Planar	No	150-25 ± 6	87	50	40 Ext., 4.5k	4/4	38 x 24 x 3	Opt.	Opt.	30	1980.00
	5500	Planar Sat.		(2)9x 17	Planar	1x17	Planar	No	150-25 ± 6	87	50	80 Ext., 7k	8/2	21 x 24 x 3	Opt.	Opt.	16	1140.00
	1100	Inf. Baf. Subwoof.	(2)10					No	26-150 ± 6	92	35		4/3	37 x 14 x 14	Opt.	Opt.	45	480.00
	1200	Inf. Baf. Subwoof.	12					No	32-150 ± 6	93	35		4/3.3	20 x 15 x 15	Opt.	Opt.	80	440.00
	8000	Planar, Trans. Line	(2) 18x6	3x6	Planar	1½	Planar	No	20-25 ± 6	85	100	40, 4.5k	4/4	94 x 25 x 5	Opt.	Opt.	180	1980.00
ELECTRO- VOICE	Sentry 100A Monitor	B4 Vented	8			1½	Dome	T	45-18 ± 3	91		2k	6/4.5	17 x 12 x 11	Black Vinyl	Gray Knit	28	255.00
	Sentry 100EL Monitor	Powered B4 Vented	8			1½	Dome	T	45-18 ± 3		Inc	2k	30k/ 10k	17 x 12 x 12	Black Vinyl	Gray Knit	33	524.00
	Sentry 500 Monitor	B4 Vented	12			1½	Dome	T	40-18 ± 3	96		1.5k	8/6	24 x 27 x 13	Black Vinyl	Gray Knit	70	499.00
	Sentry 505 Monitor	B4 Vented	12			1½	Dome	T	40-18 ± 3	96		1.5k	8/6	19 x 26 x 19	Black Vinyl	Gray Knit	60	499.00
	Interface 1 Series II	Thiele Vented	8			1½	Dome		56-18 ± 3	92		1.5k	8/5	11 x 21 x 10	Sim. Wal.	Brown Knit	23	210.00
	Interface 2 Series II	Pas. Rad.	8			1½	Dome		47-18 ± 3	92		1.5k	8/5	14 x 24 x 11	Sim. Wal.	Brown Knit	25	273.00
	Interface 3 Series II	Pas. Rad.	8			1½	Dome		40-18 ± 3	92		1.5k	8/5	15 x 25 x 13	Sim. Wal.	Brown Knit	33	315.00
EMINENT TECHNOLOGY	LFT-III	Push-Pull Planar Magnetic	475 Sq. In.	84 Sq. In.	Planar	21 Sq. In.	Planar	T	35-20 ± 4	84	100	400.7k	4/3	54 x 27 x 1	Oak	Black Knit	90	2700.00
ENERGY	22 Reference Designer Series	Bass Ref.	7			1½	Dome		28-45 ± 3	86	20	1.5k	8/4	25 x 11 x 12	Oak Ven.	Black Knit	34	1250.00
	22 Pro Monitor	Bass Ref.	7			1½	Dome		28-45 ± 3	86	20	1.5k	8/4	25 x 11 x 12	Wal. Vinyl	Black	34	800.00
	22 Reference	Bass Ref.	7			1½	Dome		28-45 ± 3	86	20	1.5k	8/4	25 x 11 x 12	Opt.	Black	34	1060.00
	22 Reference Connoisseur	Bass Ref.	7			1½	Dome		25-45 ± 2	86	20	1.5k	8/4	35 x 11 x 14	Opt., Ven.	Opt.	80	1500.00
ENTEC	L-F 10	Powered Servo Subwoof.	10					W	18-100 ± 4	125 Inc.	100	10k		17 x 12 x 24	Opt.	Black Foam		
	L-F 20	Powered Servo Subwoof.	(2)10					W	15-100 ± 4	275 Inc.	100	10k		25 x 12 x 24	Opt.	Black Foam		
	L-F 30	Powered Servo Subwoof.	(3)10					W	12-100 ± 4	350 Inc.	100	10k		25 x 12 x 36	Opt.	Black Foam		
	SW-1	Powered Servo Subwoof.	(3)10					W	15-100 ± 6	250 Inc.	100	10k		17 x 12 x 36	Opt.	Black Foam	100	4495.00
	SW-2	Powered Servo Subwoof.	(3)10					W	12-100 ± 6	300 Inc.	100	10k		25 x 12 x 36	Opt.	Black Foam	140	6495.00
	SW-5	Powered Servo Subwoof.	10					W	18-100 ± 6	120 Inc.	100	10k		17 x 12 x 24	Opt.	Black Foam	60	2695.00
	L-Fx	Powered Servo Subwoof.	10					W	20-100 ± 4	110 Inc.	100	10k		16 x 16 x 18	Gran. Text.		45	880.00
EPI (Continued)	T/E 70 Series II	Inf. Baf.	6			1	Dome		55-20 ± 3	88	15	1.8k	8/	18 x 11 x 6	Wood Vinyl	Brown Cloth	13	99.95



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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Tweeter Type		Separate Level Control		Analog Frequency Response		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance, Ohms		Dimensions, Inches		Finish		Grille Color and Material		Weight, Lbs.		Price, \$			
			Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange	Woofer	Midrange		
EPI (Continued)	T/E 100 Series II	Inf. Baf.	8			1	Dome				40-20 ±3	88	15	1.8k	8/	21 x 13 x 7	Wood Vinyl	Brown Cloth	18	129.95														
	T/E 120 Series II	Inf. Baf.	10			1	Dome				38-20 ±3	88	15	1.8k	8/	26 x 16 x 8	Wood Vinyl	Brown Cloth	24	159.95														
	T/E 250 Series II	Inf. Baf.	8	4	Cone	1	Dome				42-20 ±3	88	15	300,2.5k	6/	26 x 16 x 8	Wood Vinyl	Brown Cloth	26	179.95														
	T/E 280 Series II	Pas. Rad.	8			1	Dome				32-20 ±3	90	15	1.8k	8/	31 x 12 x 9	Wood Vinyl	Brown Cloth	28	199.95														
	T/E 320 Series II	Inf. Baf.	10	4	Cone	1	Dome				38-20 ±3	88	15	300,2.5k	6/	34 x 13 x 10	Wood Vinyl	Brown Cloth	32	249.95														
	T/E Mini Monitor	Vented	10			4 1/2x 2 3/4	Horn				50-20 ±3	91	10	4.5k	8/	25 x 12 x 11	Black Vinyl	Black Cloth	26	179.95														
	T/E Monitor 1	Vented	10	6	Cone	4 1/2x 2 3/4	Horn	T			40-20	92	10	500,5k	6/	31 x 12 x 9	Black Vinyl	Black Cloth	30	219.95														
	T/E Monitor 2	Vented	(2)10	6	Cone	4 1/2x 2 3/4	Horn	T			35-20	93	10	500,5k	6/	37 x 14 x 11	Black Vinyl	Black Cloth	43	299.95														
EPIK AUDIO	210C	Trans. Line Subwoof.	(2)10								22-100 ±3	89	75	100	4/3	17 x 17 x 60	Opt., Wood	Opt., Knit	115	1345.00														
	Tower Monitor LSM	Aperiodic	10	(2)2	Cones		Leaf				100-43 ±3	89	40	500,7k	5/3	20 x 20 x 60	Opt., Wood	Brown Knit	450 Pair	3150.00														
	Tower LSM	Aperiodic	(2)6 1/2	4	Cone		Leaf				50-43 ±2	89	40	500,5k	4/3	16 x 16 x 48	Opt., Wood	Brown Knit	170 Pair	1495.00														
	208	Trans. Line Subwoof.	(3)6 1/2	(2)4	Cones		Leaf				50-43 ±2	90	40	500,5k	4/3	22 x 22 x 54	Opt., Wood	Brown Knit	425 Pair	3995.00														
	410	Trans. Line Subwoof.	(2)10								28-100 ±5	90	60		4/4	16 x 16 x 48	Opt., Wood	Brown Knit	180 Pair	995.00														
	810	Trans. Line Subwoof.	(4)10								16-75 ±2	93	100		4/4	22 x 22 x 72	Opt., Wood	Brown Knit	650 Pair	1995.00														
EPOS	ES 14	Inf. Baf.	8			1	Dome				36-20 ±3	86	35		8/7	20 x 9 x 12	Opt., Wood		24	900.00														
ESB	7/03	Air Sus.	18	8,2	Cone, Dome	1	Dome	W, (2)M, T			35-20 ±3	91	100	500,2k,5k	6/	67 x 22 x 17	Dilled Wal.	Black Knit	227	8500.00														
	7/05	Pas. Rad.	12	8,2	Cone, Dome	1	Dome	W, (2)M, T			35-20 ±3	89	80	500,2k,5k	6/	67 x 19 x 15	Dilled Wal.	Black Knit	162	5500.00														
	7/06	Air Sus.	12	8,2	Cone, Dome	1	Dome	W, M, T			35-20 ±3	89	50	500,2k,5k	6/	55 x 19 x 12	Dilled Wal.	Black Knit	125	3800.00														
	7/07	Air Sus.	12	8,1 1/4	Cone, Dome	1	Dome				40-20 ±3	88	50	550,2.2k, 6k	6/	47 x 17 x 12	Dilled Wal.	Black Knit	92	2500.00														
	7/08	Air Sus.	10	6 1/2, 1 1/4	Cone, Dome	1	Dome				45-20 ±3	88	40	550,2.2k, 6k	6/	43 x 15 x 11	Dilled Wal.	Black Knit	76	1650.00														
	7/09	Air Sus.	10	1 1/4	Cone, Dome	1	Dome				50-20 ±3	87	40	800,6k	6/	13 x 21 x 13	Dilled Wal.	Black Knit	38	950.00														
	7/010	Air Sus.	8	1 1/4	Dome	1	Dome				60-20 ±3	87	40	800,6k	6/	11 x 17 x 12	Dilled Wal.	Black Knit	29	750.00														
	COX-L1	Bass Ref.	4			3/4	Dome				70-20 ±3	84		3.2k	8/	11 x 6 x 11	Dilled Wal.	Black Knit	25	550.00														
ESM/ENERGY	ESM-4	Bass Ref.	6 1/2			3/4	Dome				60-20 ±3	88	10	2.7k	8/4	9 x 13 x 9	Opt., Vinyl	Black Knit	11	200.00														
	ESM-2	Bass Ref.	8			1	Dome				40-22 ±3	86	12	2k	8/4	23 x 11 x 11	Opt.	Black	24	350.00														
	ESM-3	Bass Ref.	8			1	Dome				45-22 ±3	86	10	2k	8/4	20 x 10 x 9	Opt.	Black	20	250.00														
ESSENCE	Amethyst 30	Trans. Line	6			1	Dome				32-21 ±3	90	30	2k	8/6	33 x 10 x 14	Opt., Wood	Opt., Cloth	80	1875.00														
	Amethyst 10a	Trans. Line	8	(2)6, 3	Cones	1.0,7	Domes				26-23 ±3	90	60	80,200, 2k,6.5k Adj.	8/6	51 x 15 x 25	Opt., Wood	Opt., Cloth	220	7985.00														
	Topaz Subwoofer	Trans. Line Subwoof.	6								28-300 ±2	90	50		8/6	33 x 10 x 14	Opt., Wood	Opt., Cloth	80	1995.00														
ESS LABORATORY	PS-820	Pas. Rad.	6			10 1/2 Sq. in.	Heil AMT	No			42-23 ±1	89	5	2k	6/4	10 x 10 x 18	Black Vinyl	Black Knit	34	129.00														
	PS-920	Pas. Rad.	8			10 1/2 Sq. in.	Heil AMT	T			38-23 ±1	91	5	2k	6/4	12 x 11 x 22	Black Vinyl	Black Knit	30	159.00														
	PS-1020	Pas. Rad.	10			10 1/2 Sq. in.	Heil AMT	T			32-23 ±1	92	10	1.6k	6/4	14 x 13 x 25	Black Vinyl	Black Knit	37	184.00														
	PS-1220	Pas. Rad.	12	4	Cone	10 1/2 Sq. in.	Heil AMT	M, T			28-23 ±1	93	10	380,2k	6/4	14 x 12 x 34	Black Vinyl	Black Knit	48	214.00														
	HO 312	Ported	12	2x6	Horn	2 3/8	Horn	M, T			38-20	95	10	1.5k,5k	8/3	14 x 12 x 25	Wal. Vinyl	Black Knit	42 1/2	199.00														
	HO 310	Ported	10	2x6	Horn	2 3/8	Horn	M, T			45-20	95	10	1.5k,5k	8/3	12 x 12 x 22	Wal. Vinyl	Black Knit	35 1/2	169.00														
	HO 210	Ported	10			2 3/8	Horn	T			45-20	95	10	2.5k	8/3	12 x 12 x 22	Wal. Vinyl	Black Knit	33 1/2	139.00														
	AMT Monitor	Pas. Rad.	12			21 1/2 Sq. in.	Heil AMT	M, ST			35-23 ±3	91	35	800	6/3	12 x 19 x 41	Dilled Wal.	Black Knit	82	649.00														
	820 Mini-Monitor	Pas. Rad.	6 1/2			10 1/2 Sq. in.	Heil AMT				55-23 ±3	90	10	1.8k	6/3	8 x 9 x 14	Dilled Wal.	Black Knit	15 1/2	129.95														
	AMT 10	Pas. Rad.	12			21 1/2 Sq. in.	Heil AMT	M, ST			35-23 ±3	91	35	800	6/3	16 x 16 x 35	Dilled Wal.	Black Knit	85	599.00														
	AMT II	Pas. Rad.	10			21 1/2 Sq. in.	Heil AMT	ST			38-23 ±3	91	30	900	6/3	15 x 15 x 34	Dilled Wal.	Black Knit	65	449.95														
620 Mini-Monitor	Pas. Rad.	5 1/4			1 1/2	Oome				60-20 ±5	86.5	10	2.5k	8/3	8 x 7 x 12	Dilled Wal.	Black Knit	17	89.95															



“How Can Everybody’s Speakers Be The Best?”

Read the various ads for speakers and you’ll find many of them loaded with claims about being the best.

You’d think that with so many “bests” out there, you wouldn’t have any problem finding the best speakers for your system. Unfortunately, that isn’t the case.

At KLIPSCH,[®] we’ll be the first to admit there are a lot of good speakers on the market. But we’d be the last to call any of them the “best.” Not even ours.

So what pitch will we give you about KLIPSCH?

Well, take note of the pictures in those ads. The drive components of all those speakers have a remarkable similarity in appearance.

That’s because they’re all about the same, and as a result, they all sound about the same.

KLIPSCH doesn’t use conventional drivers like the other guys. We use special *compression* drivers mated to horns. We’re about the only people that do. These KLIPSCH compression drivers give you higher output, more controlled imaging, greater clarity and wider dynamic range – characteristics so sought after in recording studios and other professional applications.

Do these characteristics make our speakers the “best”? Not necessarily. But KLIPSCH Loudspeakers certainly sound different from others. A *real* difference for your hard-earned money. A difference you can truly

appreciate the first time you listen, and every time thereafter. Uniqueness, if you will, for about the same price as common-place speakers.

You be the judge of what’s best. At your nearest KLIPSCH dealer. Look in the Yellow Pages. Or call toll free, 1-800-223-3527.



KLIPSCH HERESY II[®] PICTURED ABOVE

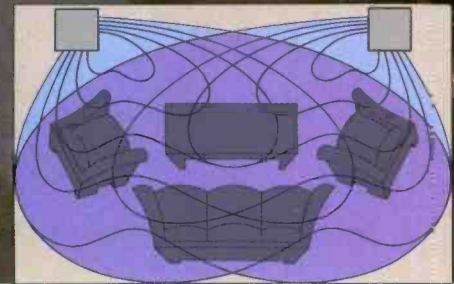
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A LEGEND IN SOUND.[™]

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Stereo Everywhere™ Speakers



Finally, you can hear your stereo system in stereo.

All Bose® speakers put stereo right where it belongs: Everywhere.

When you listen to conventional speakers, you hear mainly sound from the speaker that's closest to you. So, unless you've arranged your room and your guests precisely around your speakers, chances are that *no one* will hear full stereo—because no one will hear the proper balance of sound that full stereo requires.

Instead of listening to complaints about the seating arrangement, why not listen to speakers that can play your stereo system in stereo? Like all Bose Direct/Reflecting® speakers, the new Point Two speakers are true Stereo Everywhere™ listening systems. Their advanced audio technology shapes and controls sound,

producing a lifelike music image that you can hear—and almost feel—throughout your listening room.

The Point Two systems will also let you use your stereo system in a new way: as part of a total audio/video system. Conventional speakers need to be placed either far apart for music or close together for video. Point Two speakers, however, are designed to produce a lifelike sound stage with all sources of sound *without* having to be rearranged. They're capable of putting music on a full, wide soundstage while at the same time putting video soundtracks right where they belong: with the picture on your television.

Each separate part of the Point Two speakers—components, cabinet and crossover—is part of a system that gives the speakers exceptional control



Conventional Speakers



over sound. This Stereo Targeting™ system guides and directs sound into your listening system, allowing you to hear full stereo everywhere you sit or stand—even if it's right next to only one of the speakers. To complete the speaker, the Stereo Targeting system is coupled to an advanced, multi-chamber bass reproduction system (see left) for full-frequency realism.

High power handling and high efficiency make the Point Two speakers ideal for any system and all software, especially digital audio and hi-fi video. The fact that there is a complete series of Point Two speakers available—from compact bookshelf to furniture-quality floor-standing systems—makes them an ideal foundation for *any* audio/video system you intend to build or improve. Judge for yourself by auditioning the Bose Point Two systems at

selected dealers. For more information write: Bose Corporation, Dept. ABG, 10 Speen St., Framingham, MA 01701.



BOSE
Better sound through research.

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Controls: Woofer = W, Midrange = M, Tweeter = T, Superwoofer = ST		Anchoic Frequency Response, SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance, Ohms: Nominal/Minimum		Dimensions Inches (To Nearest Inch)		Finish	Grille Color and Material	Weight, Lbs.	Price, \$
EUPHONIC AUDIO	Precept A	Vented	10	(2)4½	Cones	1	Dome	M, T	35-18.5 ± 2	91	20	175, 2.7k	6/4	39 x 13 x 13	Opt.	Black Knit	65	2200.00	Pair					
	Precept B	Vented	8	4½	Cone	¾	Dome	M, T	36-19 ± 2.5	91	20	175, 2.7k	6/4	36 x 12 x 13	Opt.	Black Knit	53	1550.00	Pair					
EUROSTAT	Motto	Tuned Port	8			1.1	Dome		36-22	92	25	1.8k	8/6	14 x 15 x 23	Opt.	Black	30	1280.00	Pair					
	Mondrian	Tuned Port	8	2	Dome	0.8	Dome		36-45	92	25	800, 5k	8/6	12 x 15 x 25	Opt.	Black	35	1980.00	Pair					
FANFARE ACOUSTICS	Prelude	Tuned Port	6½			¾	Dome		55-22 ± 2	88	20	3.5k	6/3	14 x 10 x 10	Oak	Black	17	295.00	Pair					
	Tempo II	2π/4π	(2)6½			1	Dome		38-22 ± 2	89	20	300, 3k	6/3	24 x 12 x 11	Oak	Black	38	565.00	Pair					
	Prelude Tower Tempo Tower	QB3, Pas. Rad. QB3, Pas. Rad.	6½ (2)6½			¾ 1	Dome Dome		35-22 ± 2 32-22 ± 2	88 89	20 20	3.5k 150, 2.5k	6/3 6/4	38 x 11 x 9 43 x 11 x 10	Oak Oak	Black Black	40 52	450.00 695.00	Pair Pair					
FIDELUS	903FL	Slot Loaded Port	9	5	Cone	1¼	Dome		30-25 ± 3	90	30	250, 6k	8/4	13 x 14 x 48	Oiled Oak	Opt.	65	1795.00	Pair					
	SW	Slot Loaded Subwoof.	12						16-100 ± 2	90	30	Ext.	8/4	22 x 24 x 48	Oiled Oak		170	1195.00						
FISHER	STV-410	Bass Ref.	10	4	Cone	3	Cone		50-20	90	10	1.5k, 6k	8/	12 x 26 x 11	Oak Vinyl	Black Knit	19	200.00	Pair					
	STV-420	Bass Ref.	12	4	Cone	3	Cone		45-20	91	10	1.5k, 6k	8/	14 x 30 x 13	Oak Vinyl	Black Knit	27	300.00	Pair					
	STV-430	Bass Ref.	15	4	Cone	3	Cone		40-20	92	10	1.5k, 6k	8/	18 x 36 x 13	Oak Vinyl	Black Knit	40	400.00	Pair					
	STV-440	Bass Ref.	15	5	Cone	3	Cone		38-20	93	10	1.5k, 6k	8/	18 x 39 x 13	Oak Vinyl	Black Knit	46	600.00	Pair					
F. M. S.	Studio 2	Aperiodic	6½	1½	Dome	¾	Dome	No	45-35 ± 2	87	25	2.2k	5/4	11 x 20 x 9	Lacq.	Black Knit	37	3000.00	Pair					
FOCUS	.7 series II	Tuned Port	8			1	Dome		37-20 ± 2	90	30	2.5k	8/6, 4	12 x 12 x 28	Oiled Oak	Black Foam	38	995.00	Pair					
	.5 series II	Tuned Port	8			1	Dome		48-20 ± 2	90	30	2.5k	8/6, 4	12 x 12 x 19	Oiled Oak	Black Foam	55	750.00	Pair					
	Towers	Trans. Line	(2)8			1¼	Dome		34-20 ± 2	92	30	1k	4/3.2	17 x 14 x 60	Oiled Oak	Black Foam	110	2950.00	Pair					
	Nearfield Monitor	Tuned Port	6			1	Dome		58-20 ± 2	90	30	2.7k	8/6, 4	10 x 10 x 15	Oiled Oak	Black Foam	40	525.00	Pair					
FOSTEX	RP60	Ported	6½			1½	Ribbon	T	70-20	91	120		8/	15 x 9 x 9	Oiled Teak	Brown Knit	14	598.00	Pair					
	RP80	Ported	8			1½	Ribbon	T	58-20	93	150		8/	17 x 10 x 11	Oiled Teak	Brown Knit	19	738.00	Pair					
	RP1001	Ported	8		Planar Ribbon		Planar Ribbon	M, T	40-45	90	100	1k, 7k	6/	16 x 44 x 10	Opt., Wood	Brown Knit	50	1990.00	Pair					
	RP2001	Sealed	12		Planar Ribbon		Planar Ribbon	M, T	30-45	92	125	200, 1k, 7k	6/	21 x 51 x 11	Opt., Wood	Brown Knit	95	3300.00	Pair					
FRANKMANN RESEARCH	FR III	Inf. Baf. Sat. & Subwoof.	(2)12	6	Cone		Horn	T	32-20	92	30	200, 4k	8/6	Three Pieces	Opt.	Opt.		695.00	Sys.					
	FR V	Inf. Baf. Sat. & Subwoof.	(4)12	(2)6	Cones		Horn, Cone	T	28-20	94	30	200, 4k, 10k	8/6	Three Pieces	Opt.	Opt.		995.00	Sys.					
	FR IIB	Inf. Baf. Subwoof.	(2)12						32-200	92	30	200	8/5	29 x 20 x 20	Opt.	Opt.		395.00						
	FR IVB	Inf. Baf. Subwoof.	(4)12						28-200	94	30	200	8/6	30 x 30 x 20	Opt.	Opt.		595.00						
	FR VIIIB	Inf. Baf. Subwoof.	(8)12						19-200	96	30	200	8/6	50 x 34 x 25	Opt.	Opt.		1100.00						
FRIED PRODUCTS	C/3L	Trans. Line	6½			¾	Dome		50-22 ± 3	91	20	2.7k	8/6, 3	11 x 14 x 15	Opt.	Black Foam	35	1000.00	Pair, Kit, 430.00					
	G/3	Trans. Line	10	6½	Cone	¾	Dome		23-22 ± 3	91	20	99, 2.7k	8/6, 3	18 x 16 x 44	Wal.	Black Foam	100	2190.00	Pair					
	Beta	Line Press. Rel.	6½			2½	Cone/Dome		60-20 ± 3	87	20	2k	8/6	8 x 8 x 14	Opt., Vinyl	Black Knit	30	325.00	Pair					
	Q/3	Line Tun.	8			1	Dome	T	45-18 ± 3	89	20	2k	8/6	11 x 9 x 20	Opt., Vinyl	Black Knit	40	440.00	Pair					
	A/3	Line Tun.	8			1	Dome	T	40-18 ± 3	90	20	2k	8/6	13 x 10 x 23	Oiled Wal.	Black Knit	35	635.00	Pair					
	The Subwoofer	Line Tun. Subwoof.	10						32-90 ± 3	89	20	90	8/6	15 x 12 x 24	Opt., Vinyl	Black Knit	55	330.00	Pair					
	Studio IV	Line Tun.	8			¾	Dome		26-22 ± 3	90	20	2.7k	8/6	12 x 18 x 39	Oiled Wal.	Black Foam	80	1230.00	Pair, Kit, 700.00					
	O/3	Trans. Line	10						23-100 ± 3	91	20	100	8/6	24 x 13 x 31			45	700.00	Pair					
SM/3	Trans. Line Subwoof.	12						20-100 ± 3	92	20	100	8/6	29 x 15 x 38			50	800.00	Pair						

Behind this equipment is the best thing

Did you turn the page? If you didn't, go ahead. And then come back.

We've just shown you the other side of our new D Series Components to expose an extraordinary breakthrough in digital sound reproduction.

For the first time ever, our engineers have utilized fiber optics in an external link between the D Series Compact Disc Player and the D Series Integrated

Amplifier. In short, our fiber optic cable allows raw digital data to be transmitted to the amplifier in its purest possible form—light. And because light is totally impervious to outside interference, there's no line loss between the compact disc player and amplifier. None.

The result is pure CD sound as you've never heard it before.

Having discovered the missing link



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g that's ever happened to digital sound.

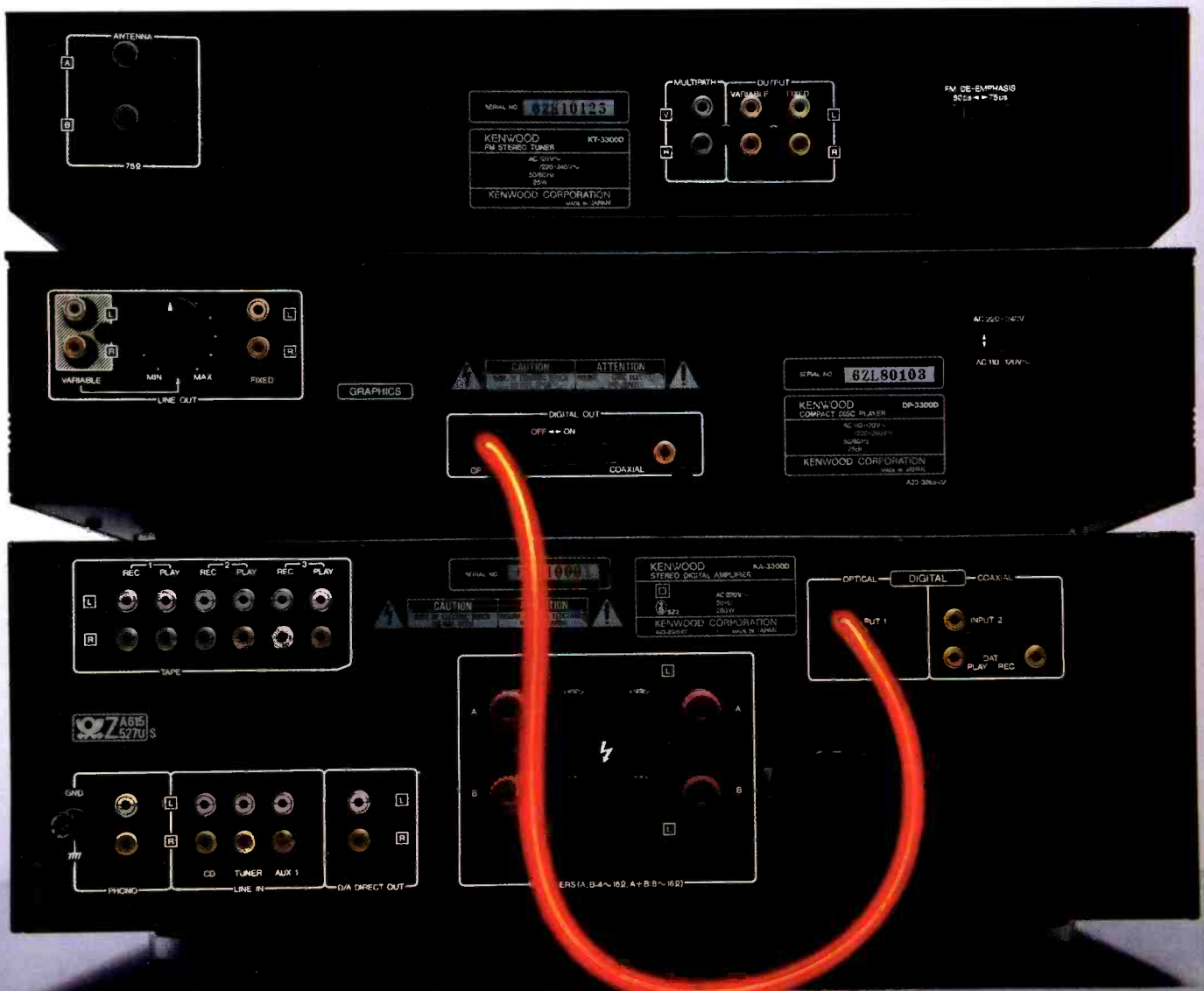
to pure CD sound reproduction, our engineers could have quit while they were ahead. But that's not their style.

Instead, they set out to develop an equally remarkable tuner. And they succeeded. The D Series Tuner incorporates a unique Pentacle Power Supply and 4-D Circuit. Together, these innovative features add up to FM reception that literally

gives new meaning to the word clear.

If you're beginning to get the idea that our new D Series equipment is the best thing that's ever happened to digital sound, we suggest that you call 1-800-4-KENWOOD for the location of your nearest authorized dealer. Just tell them you've seen the light.

KENWOOD And now you'd like to hear it.



We removed the protective coating from the cable shown to clearly illustrate a fiber optic transmission.

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches				Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Crossover Wgts. = W, Midrange = M, Tweeter = T, Subwoofer = ST		Ancholic Frequency Response, Hz to kHz, ±dB		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Impedance, Ohms: Nominal/Minimum		Dimensions - Inches (To Nearest Inch)		Finish	Grille Color and Material	Weight, Lbs.	Price, \$
FULTON AUDIO	Little Maestro	Inf. Baf.	5			1	Dome			58-24 ±2	90	10	1.2k	8/10	8 x 7 x 12	Black Wood	Black Knit	15	495.00							
	Tempo	Oval Window	8	5	Cone	(2)2¼	Cones			35-42 ±2	94	10	55,1.4k, 9k	8/7	12 x 10 x 19	Black Wood	Black Knit	45	795.00							
	Rhapsody	Oval Window	10, 8	5	Cone	(2)2¼	Cones			25-42 ±2	94	10	55,190, 1.4k, 9k, 16k	8/7	12 x 12 x 37	Black Wood	Black Knit	75	2495.00							
	Crescendo	Oval Window	(2)10, 8	(2)5	Cones	(5)2¼	Cones			20-42 ±1.5	92	15	50,90, 1.4k, 9k, 16k	8/6	12 x 12 x 48	Lacq. Wal.	Black Knit	135	3995.00							
	Symphony	Oval Window	(4)10, 8	(2)5	Cones	(4)2¼	Cones			16-42 ±1.5	90	25	45,80, 1.4k, 9k, 16k	8/5	24 x 24 x 50	Lacq. Wal.	Black Knit	285	6900.00							
FUSELIER	2.5	Vented	5¼			1	Dome			50-20 ±2	88	10	300,2.2k	4/4	8 x 11 x 14	Opt., Wood	Brown Knit	16	725.00							
	2.6	Vented	6½			1½	Dome			47-20 ±2	87	20	1.7k	8/5	9 x 13 x 14	Opt., Wood	Brown Knit	21	900.00							
	3.8	Vented	8	2	Dome	1	Dome			40-20 ±2	89	20	800,6.5k	8/3.2	11 x 16 x 21	Opt., Wood	Brown Knit	33	1450.00							
	3.8D	Vented	8	2	Dome	1	Dome			35-20 ±2	88	20	800,6.5k	8/3.2	11 x 18 x 24	Opt., Wood	Brown Knit	39	2100.00							
GENESIS PHYSICS	G7	Ported	6½			¾	Dome			60-20 ±3	90	10	2.5k	6/5	16 x 12 x 5	Oak Vinyl	Brown Knit	12	200.00							
	G11 Series 2	Ac. Sus.	8			1	Dome			50-25 ±3	90	15	1.5k	5/4	19 x 12 x 8	Oak Vinyl	Brown Knit	18	330.00							
	G22 Series 2	Pas. Rad.	8			1	Dome			46-25 ±3	91	15	1.5k	5/4	24 x 14 x 8	Oak Vinyl	Brown Knit	28	440.00							
	G33 Series 2	Pas. Rad.	8			1	Dome			39-25 ±3	91	15	1.5k	5/4	29 x 16 x 8	Oak Vinyl	Brown Knit	31	275.00							
	G44 Series 2	Pas. Rad.	8			1	Dome			34-25 ±3	91	15	1.5k	5/4	33 x 18 x 9	Oak Vinyl	Brown Knit	42	400.00							
	G66 Series 2	Ported	(2)8	3	Dome	1	Dome			28-25 ±3	92.5	30	450,4k	4/3	44 x 18 x 12	Oak Vinyl	Brown Knit	81	900.00							
GNP	Valkyrie Series II	Sat. & Subwoof.	(2)6½	6½,3	Cone, Dome	1	Dome	M,T		34-21 ±3	90	25	125,700, 2.5k	8/	Six Pieces	Opt., Wood	Black Knit	188 Sys.	1895.00							
	System 220	Sat. & Subwoof.	(2)6½	6½,3	Cone, Dome	1	Dome	M,T		34-21 ±3	90	25	125,700, 2.5k	8/	Four Pieces	Opt., Wood	Black Knit	138 Sys.	1149.00							
	System 120	Sat. & Subwoof.	8	6½,3	Cone, Dome	1	Dome	M,T		44-21 ±3	90	25	125,700, 2.5k	8/	Four Pieces	Opt., Wood	Black Knit	116 Sys.	998.00							
	System 210	Ac. Sus. Sat. & Subwoof.	(2)6½	6½	Cone	1	Dome	T		34-21 ±3	90	10	125,2.5k	8/	Four Pieces	Opt., Wood	Black Knit	124 Sys.	900.00							
	System 110	Sat. & Subwoof.	8	6½	Cone	1	Dome	T		44-21 ±3	90	25	125,2.5k	8/	Four Pieces	Opt., Wood	Black Knit	102 Sys.	749.00							
	20	Sat.	6½	3	Dome	1	Dome	M,T		59-21 ±3	90	10	700,2.5k	8/	17 x 9 x 9	Opt., Wood	Black Knit	22	599.00							
	10	Sat.	6½			1	Dome	T		68-21 ±3	90	10	2.5k	8/	12 x 8 x 7	Opt., Wood	Black Knit	15	350.00							
	1	Ac. Sus. Subwoof.	8					No		44-125 ±3	90	10	125	8/	25 x 12 x 12	Opt., Wood	Black Knit	36	399.00							
	2	Ac. Sus. Subwoof.	(2)6½				No		34-125 ±3	90	10	125	8/	25 x 12 x 14	Opt., Wood	Black Knit	47	550.00								
GOLOMUNDO	Prologue	Pas. Rad.	8¼	5	Cone	¾	Dome						89	15 x 10 x 10	Matte Black	Black Knit	15	2250.00								
	Dialogue	Tuned Port	7	7	Cone	1	Dome						96	47 x 14 x 14	Opt., Lacq.	Black Knit	120	4690.00								
GOLD RIBBON CONCEPTS	3.0 Satellite	Sat.				0.8x30	Ribbon			400-30 ±2	91	50	400	2/2	32 x 6 x 1	Nxtl.		30 Pair	1600.00							
	The Gold Wall 3.0		9			0.8x30	Ribbon			42-30 ±2	86	50	400	3/2	41 x 9 x 3	Nxtl.		45 Pair	1960.00							
	Single Line Source		(6)5¼			0.8x30	Ribbon			30-30 ±2	86	50	400	3/2	32 x 11 x 3	Nxtl.		60 Pair	2990.00							
	Double Line Source		(12)5¼			0.8x60	Ribbon			28-30 ±2	86	50	400	5/4	64 x 11 x 3	Nxtl.		120 Pair	5730.00							
GOLD SOUND	Kit #.6	Sealed	6½			1	Dome			58-20 ±3	92	5	3k	4/	16 x 10 x 8	Opt.	Opt.	24 Pair	198.00							
	Kit #1	Vented	10			1¼	Dome			45-20 ±3	93	5	2k	4/	25 x 14 x 11	Opt.	Opt.	58 Pair	389.00							
	Kit #2	Vented	8	4	Cone	½	Dome			45-30 ±3	91	5	90,300,8k	4/	19 x 12 x 10	Opt.	Opt.	36 Pair	329.00							
	Kit #3	Vented	10	4	Cone	½	Dome			38-30 ±3	92	5	80,300,8k	4/	25 x 14 x 11	Opt.	Opt.	58 Pair	489.00							
	Kit #4	Vented	12	6	Cone	1¼, ½	Domes			36-30 ±3	93	5	70,250,3k, 8k	4/	37 x 14 x 11	Opt.	Opt.	128 Pair	719.00							
	Kit #5	Vented	15	7	Cone	1¼, ½	Domes	M		28-30 ±3	95	5	60,250,3k, 8k	4/	44 x 18 x 14	Opt.	Opt.	158 Pair	919.00							
	Kit #7	Vented	(2)12	7	Cone	1¼, 2x3	Dome, Ribbon	M,T		28-35 ±3	95	5	50,300,3k, 8k	4/	44 x 18 x 17	Opt.	Opt.	232 Pair	1189.00							
	Kit #11	Vented	15	7	Cone	5x5	Horn	M,T		28-21 ±3	96	5	300,5k	8/	44 x 18 x 17	Opt.	Opt.	218 Pair	1438.00							

(Continued)



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Controls? Woofer - W, Midrange - M, Tweeter - T		Analog Frequency Response, Hz to kHz, ±dB		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance, Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)		Finish		Grille Color and Material		Weight, Lbs.		Price, \$	
			Woofer	Midrange	Woofer	Midrange	Tweeter	Tweeter	W	M	T	W	M	T	W	M	T	W	M	W	M	W	M	W	M	W	M	W	M	W
GOLD SOUND (Continued)	Kit 2005	Vented	15	8,4	Cones	1	Dome	M,T	28-27 ±3	96	5	400,1.4k, 5k	8/	44 x 18 x 17	Opt.	Opt.	245 Pair	Kit, 1685.00 Pair												
	Pro 12 Kit	Sealed	12			4x10	Horn	T	55-15 ±3	100	5	3k	8/	20 x 16 x 15	Opt.	Black Metal	59 Pair	Kit, 699.00 Pair												
	Pro 15 Kit	Vented	15	7	Cone	4x10	Horn	M,T	42-15 ±3	98	5	400,5k	8/	30 x 24 x 13	Opt.	Black Metal	74 Pair	Kit, 1029.00 Pair												
	Pro Double 15 Kit	Vented	(2)15	7	Cone	4x10	Horn	M,T	38-15 ±3	100	5	400,5k	4/	46 x 24 x 21	Opt.	Black Metal	129 Pair	Kit, 1649.00 Pair												
	Toccata	Vented Subwoof.	12						29-180 ±3	90	5	180	4/	18 x 18 x 16	Opt., Wood	Brown Knit	48	480.00 w/Xover												
	Serenata	Sat. & Subwoof. Sealed	12	4	Cone	2x3	Ribbon		29-40 ±3	90	5	4k	4/	Three Pieces	Opt., Wood	Brown Knit	84 Sys.	998.00 Sys.												
	Virtuoso	Sealed	(2)8	4	Cone	2x3	Ribbon		25-40 ±3	90	5	200,4k	4/	45 x 14 x 13	Opt.	Brown Knit	244 Pair	1500.00 Pair												
	GS12 Kit	Subwoof.	12						36-150 ±3	92	5	150	4,8	18 x 18 x 16	Opt.	Opt.	18	298.00 w/Xover												
	GS12(2) Kit	Subwoof.	(2)12						32-150 ±3	95	5	150	4,8	30 x 18 x 16	Opt.	Opt.	36 Pair	Kit, 454.00 Pair												
	GS12(4) Kit	Subwoof.	(4)12						29-150 ±3	98	5	150	4,8	Two Pieces per Side	Opt.	Opt.	72/ Side	Kit, 819.00 Pair												
	GS15 Kit	Subwoof.	15						32-150 ±3	94	5	150	4,8	44 x 18 x 17	Opt.	Opt.	20	w/Xover Kit, 444.00 w/Xover												
	GS15(2) Kit	Subwoof.	(2)15						29-150 ±3	97	5	150	4,8	44 x 18 x 17	Opt.	Opt.	40	Kit, 799.00 Pair												
	GS15(4) Kit	Subwoof.	(4)15						27-150 ±3	100	5	150	4,8	Two Pieces per Side	Opt.	Opt.	80/ Side	Kit, 1499.00 Pair												
	GS18 Kit	Subwoof.	18						30-150 ±3	95	5	150	4,8		Opt.	Opt.	18	w/Xover Kit, 599.00 w/Xover												
	GS18(2) Kit	Subwoof.	(2)18						27-150 ±3	98	5	150	4,8		Opt.	Opt.	36	Kit, 1119.00 Pair												
	GS18(4) Kit	Subwoof.	(4)18						26-150 ±3	101	5	150	4,8	Four Pieces	Opt.	Opt.	288 Sys.	Kit, 1879.00 Sys.												
	JBL15 Kit	Subwoof.	15						28-150 ±3	96	5	150	8/	44 x 18 x 17	Opt.	Opt.	25	w/Xover Kit, 538.00 w/Xover												
	JBL15(2) Kit	Subwoof.	(2)15						27-150 ±3	99	5	150	8/	44 x 18 x 17	Opt.	Opt.	50	Kit, 998.00 Pair												
	JBL15(4) Kit	Subwoof.	(4)15						25-150 ±3	102	5	150	8/	Four Pieces	Opt.	Opt.	400 Sys.	Kit, 1908.00 Sys.												
	JBL18 Kit	Subwoof.	18						28-150 ±3	95	5	150	8/		Opt.	Opt.	33	w/Xover Kit, 788.00 w/Xover												
JBL18(2) Kit	Subwoof.	(2)18						26-150 ±3	98	5	150	8/		Opt.	Opt.	66	Kit, 1478.00 Pair													
JBL18(4) Kit	Subwoof.	(4)18						24-150 ±3	101	5	150	8/	Four Pieces	Opt.	Opt.	528 Sys.	Kit, 2798.00 Sys.													
GOODMANS	The Maxim	Bass Ref.	5			¾	Dome		60-20	86	15		8/	10 x 7 x 7	Opt., Wood	Black Knit		122.50												
	The Maxamp	Powered Bass Ref.	5			¾	Dome		65-20	97	Inc.		8/	10 x 7 x 7	Opt., Wood	Black Knit		162.50												
	Sterling Point 1	Ac. Sus.	6½			¾	Dome		60-20	89	15		8/	15 x 9 x 8	Opt., Wood	Black Knit		95.00												
	Sterling Point 3	Ac. Sus.	8			¾	Dome		50-20	89	15		8/	18 x 10 x 9	Opt., Wood	Black Knit		120.00												
	Sterling Point 5	Ac. Sus.	8	3½	Cone	¾	Dome		45-20	89	15		8/	22 x 12 x 11	Opt., Wood	Black Knit		170.00												
	Sterling Point 7	Ac. Sus.	10	3½	Cone	¾	Dome		35-20	89	15		8/	27 x 13 x 11	Opt., Wood	Black Knit		295.00												
	Sterling Point 9	Ac. Sus.	(2)10	3½	Cone	¾	Dome		30-20	89	15		8/	37 x 13 x 12	Opt., Wood	Black Knit		370.00												
	GOTT LABS	Studio	Ac. Sus.	5			1	Dome	T	85-20 ±3	87	20	2.7k	8,5	8 x 6 x 10	Wal.	Brown Cloth	15	149.00											
	REUBEN GUSS (Continued)	Custom Monitor System 1	Sat. & Inf. Baf.	(24)15	(48)5	Domes	(32)1, (100)3	Domes, Piezos	M,T	20-30 ±3	98	100	475,650, 950,3.5k	4,3	Eight Pieces	Opt.	Black Knit	2200 Sys.	100,000. Sys.											
Monitor		Sat. & Inf. Baf.	(12)15	(24)5	Domes	(16)1, (50)3	Domes, Piezos	M,T	25-30 ±3	98	50	475,650, 950,3.5k	8,6	Four Pieces	Opt.	Black Knit	1100 Sys.	50,000. Sys.												

....remarkable!



par.a.digm [par'adim] *noun: serving as an example or model of how something should be done.*

Every once in a great while a product comes along that offers performance which rises above the current variety of clever designs and marketing hype. When this occurs the new level of performance achieved can be readily heard by both the ardent audiophile and the novice listener.

Paradigm is a breakthrough loudspeaker that

provides a level of musical truth that simply must be heard.

Oh yes, the price for such glorious performance? Well . . . that's even more remarkable.

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music . . . above all.

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THE STORY OF A THOUSAND DESIGN DECISIONS, CORRECTLY MADE.

Introducing The Monitor Series.

NAD's product philosophy has always been to build no-nonsense components of the highest possible audible performance for the lowest possible price. We've implemented this philosophy by using clever, cost-efficient designs. By eliminating a lot of "features" that we felt provided questionable benefits.

By ignoring certain laboratory measurement techniques that we deemed irrelevant. And—most important—by making a thousand thoughtful, careful and (we think) correct design decisions.

Three years ago, we embarked on a project that would produce the ultimate extension of that product philosophy. The NAD Monitor Series. A group of ultra-high performance audio components that will challenge anything on the market, regardless of price.

Some of the components in the series include innovative, highly useful features. And some establish new standards of performance in the industry. But what really makes the Monitor Series great can't be summed up with a few words. It's the latest in high technology blended with proven ideas we've used for years. It's a thousand subtle design decisions combined with a number of major technical innovations. A very few examples . . .

■ The amplifiers and receiver use NAD's Power Envelope technology which allows them to produce useable, dynamic power far beyond their continuous power ratings. For example, the receiver is rated at 150 watts per channel, but will put out 600 dynamic watts per channel into four ohm speaker loads.

Center Rack: NAD 4300 Stereo Tuner
NAD 5300 Compact Disc Player
NAD 1300 Preamplifier
NAD 2600 Power Amplifier



NAD 5300 Compact Disc Player
NAD 6300 Cassette Deck
NAD 4300 Stereo Tuner
NAD 3300 Integrated Amplifier

■ The preamplifier has a special "null" circuit which electronically subtracts any monaural information from an incoming signal. This feature lets you align your cartridge for perfect electrical balance, or to adjust your FM antenna for minimum multipath distortion.

■ The remote controls (for the receiver, cassette deck and CD player) are the ultimate in ergonomic design—easy to grasp with the controls logically arranged for easy use. Plus they're designed to be operated in an upright position (so you can see the buttons while you're pushing them).

■ The CD player includes a compression circuit for when you want to listen to compact discs as background music—or when you want to make a cassette copy of a CD.

■ The cassette deck is the world's first to combine the Dolby* HX Pro system with Tandberg's DYNEQ** "dynamic equalization" circuit. It will record a stronger, more distortion-free signal than any other cassette deck we know of. It also



features an NAD exclusive circuit that will equalize and compress your tapes specifically for use in an automobile.

■ The tuner and receiver combine the accuracy of digital tuning with the convenience of a traditional analog tuning knob. We find that most people much prefer spinning a heavy flywheel to holding down a little button. The tuner also uses a specially-designed NAD-exclusive front end with a switchable IF circuit. Its useable sensitivity is unequalled.



Rack handles are optional equipment.

NAD 6300 Cassette Deck
NAD 2600 Power Amplifier
NAD 7600 Stereo Receiver

In short, what makes the Monitor Series great . . . is a long story. If you'd like to know more about it, write us for our Monitor Series brochure. Or visit your authorized NAD dealer—and hear the result of a thousand design decisions, correctly made . . .

The Monitor Series From NAD

For more information send this coupon to
NAD (USA) INC. | 575 UNIVERSITY AVENUE | NORWOOD, MASSACHUSETTS 02062

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Controls: Woofer W/Midrange M, Tweeter = T SuperTweeter = ST		Anechoic Frequency Response, Hz to kHz, ± dB		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance, Ohms: Nominal/Minimum		Dimensions, Inches (1 to nearest inch)		Grille Color and Material		Weight, Lbs.		Price, \$	
REUBEN GUSS (Continued)	System 2	Sat. & Inf. Baf.	(4)15	(6)5	Domes	(4)1, (12)3	M, T		27-30 ± 3	96	50	475, 650, 950, 3.5k	4/3	Four Pieces	Oiled Wal.	Black Knit	355 Sys.	12,000 Sys.										
	System 3	Sat. & Inf. Baf.	(4)12	(6)5	Domes	(4)1, (8)3	M, T		30-30 ± 3	92	50	475, 650, 950, 3.5k	4/3	Four Pieces	Oiled Wal.	Black Knit	350 Sys.	9,000 Sys.										
	System 4	Sat. & Inf. Baf.	(2)12	(2)5	Domes	(2)1, (6)3	M, T		30-30 ± 4	88	50	600, 3.5k	8/6	Four Pieces	Oiled Wal.	Black Knit	140 Sys.	3,000 Sys.										
	Sonata	Sat. & Inf. Baf.																										
HARMS LABS	Large Subwoofer	Pas. Rad. Subwoof.	12						To 150 Hz ± 3	94	50	125	4/4	32 x 17 x 13	Oiled Birch	Black Knit	53	399.00										
	Small Subwoofer	Pas. Rad. Subwoof.	10						To 150 Hz ± 3	91	30	125	4/4	25 x 14 x 10	Oiled Birch	Black Knit	38	249.00										
	Mini	Inf. Baf.	5		1	Dome			70-20 ± 2	87	10	3k	8/7	13 x 9 x 6	Wal. Stain	Black Knit	24 Pair	280.00 Pair										
	HL1	Pas. Rad.	5		1	Dome			45-20 ± 2	87	10	3k	8/7	20 x 10 x 9	Wal. Stain	Black Knit	36 Pair	380.00 Pair										
	HL1P	Pas. Rad.	6½		1	Dome			37-20 ± 2	90	10	3k	8/7	22 x 10 x 10	Wal. Stain	Black Knit	44 Pair	480.00 Pair										
	HL2	Pas. Rad.	8		1	Dome			30-20 ± 2	91	10	3k	8/7	24 x 14 x 10	Wal. Stain	Black Knit	70 Pair	580.00 Pair										
	HL3	Pas. Rad.	10	6½	Cone	1	Dome		26-20 ± 2	90	10	300, 3k	8/7	34 x 12 x 13	Wal. Stain	Black Knit	100 Pair	780.00 Pair										
	HL4	Sat. & Pas. Rad. Subwoof.	12	(2)6½	Cones	(2)1	Domes		22-20 ± 2	94	10	200, 3k	8/4	Four Pieces	Wal. Stain	Black Knit	164 Sys.	1,200 Sys.										
	HL5	Sat. & Pas. Rad. Subwoof.	(2)12	(4)5	Cones	(4)1	Domes		18-20 ± 2	97	10	150, 3k	8/4	Six Pieces	Wal. Stain	Black Knit	230 Sys.	3,000 Sys.										
HARTLEY PRODUCTS	H-100	Air Col.	8	1½	Air Col.	2	Cone	No	50-20 ± 4	93	5	2.3k	8/5	11 x 11 x 22	Oiled Wal.	Black Knit	60 Pair	379.95 Pair										
	H-200	Air Col.	10	2½	Air Col.	1	Dome	No	35-25 ± 3	95	5	2.6k	8/6	15 x 15 x 30	Oiled Wal.	Black Knit	120 Pair	649.95 Pair										
	H-300	Air Col.	(2)10	(4)1½	Air Coils	(2)1	Domes	No	30-25 ± 3	96	5	3.4k	4/3	15 x 15 x 43	Oiled Wal.	Black Knit	170 Pair	999.95 Pair										
	SPL-1	Air Col.	10	3	Cone	(4)¾	Phrsr.	No	25-25 ± 3	95	15	3.8k	8/6	Four Pieces	Oiled Wal.	Black Knit	200 Pair	1,699.95 Pair										
	SW-10	Air Col. Subwoof.	10					No	25-3.8 ± 3	93	15		8/6	18 x 18 x 24	Oiled Wal.	Black Knit	70 Sys.	525.00 Sys.										
	ST-4	Phasor Sat.				(4)¾	Phrsr.	No	3.8k-25k ± 2	96	15	3.8k	8/7	5 x 5 x 12	Oiled Wal.	Black Knit	15	190.00										
	Concertmaster	Inf. Baf.	18	10	Cone	(2)7	Cones	No	16-25 ± 3	92.5	25	250, 3k, 8k	8/5	29 x 18 x 42	Oiled Wal.	Black Knit	350 Pair	3,850.00 Pair										
	Reference	Inf. Baf.	24	10	Cone	(2)7	Cones	No	16-25 ± 3	93	25	250, 3k, 8k	8/5	36 x 24 x 50	Oiled Wal.	Black Knit	600 Pair	4,995.00 Pair										
	SW-18	Inf. Baf. Subwoof.	18					No	16-350 ± 4	92.5	25		5/4	29 x 18 x 42	Oiled Wal.	Black Knit	150	950.00										
	SW-24	Inf. Baf. Subwoof.	24					No	16-250 ± 3	93	25		5/4	36 x 24 x 50	Oiled Wal.	Black Knit	250	1,250.00										
HECO	SAT 6000	Sat.	4½		1	Dome			80-32 ± 3	87	60	2.2k	4/	8 x 6 x 5	Black Mesh	Black Mesh	5½	150.00										
	O-6300	Sat.	4½		1	Dome			80-32 ± 3	87	50	2k	4/	4 x 8 x 5	Black Metal	Black Mesh	7¼	115.00										
	SUB 6000	Powered Subwoof. & Sat.	10				W		25-120		90, 60 Inc.	120		11 x 11 x 12	Black	Black Mesh	22	665.00										
	SUB 9000	Amp Powered Subwoof.	12				W		20-150 Adj.		110 Inc.	50-150 Adj.		17 x 14 x 14	Black	Black Mesh	27½	520.00										
HEYBROOK	Point Five	Inf. Baf.	6½		1	Dome			44-20 ± 3	88	10	3k	8/	9 x 9 x 15	Opt.	Black Knit	16	249.95 Pair										
	HB-1	Inf. Baf.	8		1	Dome			42-20 ± 3	89	10	4k	8/	9 x 12 x 19	Opt.	Black Knit	20	349.95 Pair										
	HB-2R	Bass Ref.	6½		1	Dome			40-20 ± 3	88	10	3k	8/	9 x 8 x 16	Opt.	Foam	20	549.95 Pair										
	HB-2C	Bass Ref.	6½		1	Dome			40-20 ± 3	86	20	3k	/8	9 x 8 x 16	Opt.	Foam	20	599.95 Pair										
	HB-3	Inf. Baf.	10	4½	Cone	¾	Dome		35-20 ± 3	90	10	800, 5k	/8	14 x 12 x 25	Opt.	Foam	50	998.00 Pair										
HITACHI	HSW30	Ac. Sus.	6½		¾	Dome			60-20	90	50	6k	8/	9 x 10 x 15	Black Vinyl	Black Knit	13	199.95 Pair										
	HSW50	Ac. Sus.	8	5	Cone	¾	Dome		45-20	90	70	2k, 6k	8/	10 x 10 x 30	Black Vinyl	Black Knit	20	399.95 Pair										
	HSA3050	Bass Ref.	10	3	Cone	2	Cone		45-18	90	50	5k, 8k	8/	13 x 10 x 38	Oak Vinyl	Gray Knit	30	249.95 Pair										
	HSA4050	Pas. Rad.	12	3	Cone	2	Cone		35-18	90	100	5k, 8k	8/	15 x 12 x 41	Oak Vinyl	Gray Knit	40	299.95 Pair										
IMAGE	Reference .5	Ported	6½		¾	Dome			45-20 ± 3.5	87	20	2.5k	6/4	16 x 10 x 9	Hick. Vinyl	Black	15	220.00 Pair										
	Reference One	Ported	8		¾	Dome			40-20 ± 3	89	20	2.2k	6/4	19 x 10 x 9	Hick. Vinyl	Black	20	260.00 Pair										
	Reference Two	Ported	8		1	Dome			35-20 ± 3	88	20	2.2k	6/4	24 x 11 x 12	Hick. Vinyl	Black	31	370.00 Pair										
	Concept 100	Ported	6½		¾	Dome			45-23 ± 2	87	35	2.1k	6/4	16 x 9 x 11	Opt.	Black Knit	23	600.00 Pair										
	Concept 200	Ported	(2)6½		¾	Dome			35-23 ± 2	87	35	2.1k	6/4	43 x 10 x 15	Opt.	Black Knit	66	900.00 Pair										

MAGNEPLANAR[®]

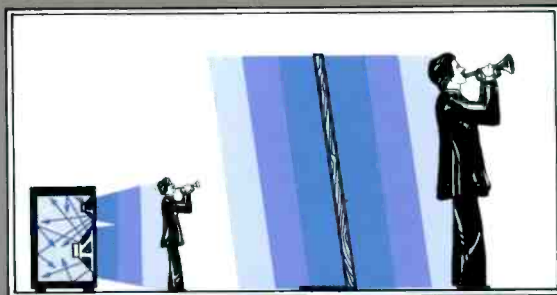
LOUDSPEAKERS



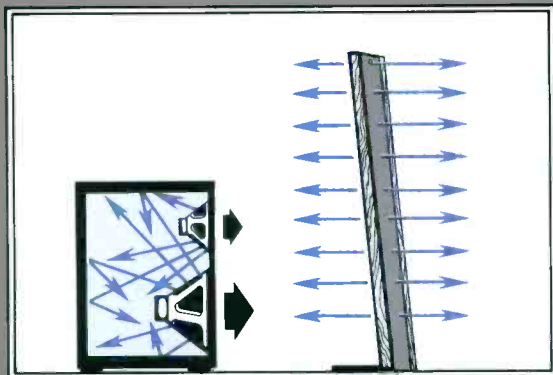
Technology
Serving Music

Magneplanar

IMAGE SIZE—Instruments projected from small boxes sitting on the floor *sound like* they are coming out of boxes on the floor. This problem can be partially corrected by placing the box speakers on tall speaker stands. However, the sound still seems to be coming out of a box, because that's precisely what it is doing. The patented Magneplanar principle eliminates these problems by a fundamentally different approach to sound propagation. The Magneplanar projects sound from top to bottom, giving the sound height as well as stereo width and depth. In the concert hall, instruments project in all directions. Instead of projecting sound out of a box, Magneplanars project in all directions, which closely duplicates the original performance. With your eyes closed the

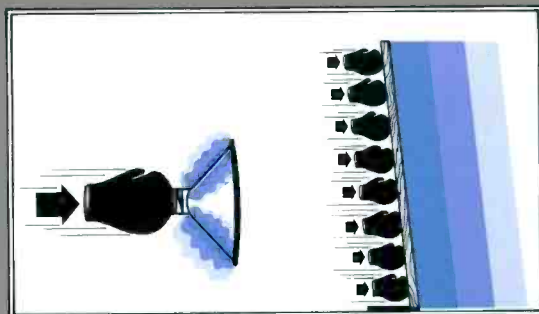


Magneplanar will allow you to “see” the original performance suspended in space. The full height, width and depth of the concert hall can be heard.

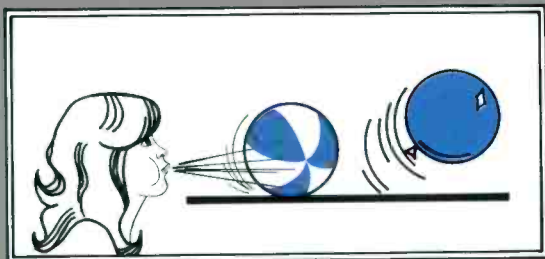


LOADING—Theoretically, loudspeakers should use massless drivers suspended in space with no box, magnet structure, or framework around the drivers. Most conventional box speakers are far from this ideal. The mass of the driver is high and the rear wave is contained within the box or magnet structure. While the frequency response can be smoothed out in a box speaker, the character of the sound is inevitably affected. The music sounds like it is coming out of a box—constricted and unnatural. The Magneplanar diaphragm comes closer to the ideal driver. The mass is low and the diaphragm is not contained. The sound is permitted to radiate freely into space. With the box removed, Magneplanars sound more like you are there.

UNIFORM DRIVE—The power from the amplifier causes the conventional cone speaker to react as if it had received a sharp blow at the voice coil. Since the outer portions of the cone cannot respond instantly, the cone will flex. The resulting cone breakup gives music a “fuzzy,” “blurred” quality. The Magneplanar eliminates cone breakup by driving the Magneplanar diaphragm over its entire area. The force from the amplifier is distributed over the entire diaphragm so that it all moves at the same time. Cone or diaphragm breakup is dramatically reduced and the integrity of the music signal is preserved.



MASS—The effect of mass on a loudspeaker can be illustrated by the comparison of a balloon and a beach ball. In the case of the balloon a nominal force such as a puff of air will cause the balloon to

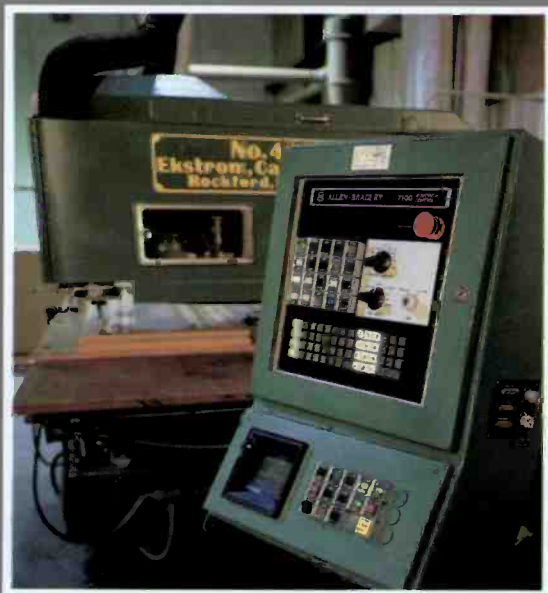


accelerate quickly. When the force ceases, the balloon decelerates quickly. The same force will move the beach ball, but the ball is slower to start and slower to stop. High mass is one of the main causes of sonic degradation in a conventional box speaker. Expecting a heavy cone woofer to move 1000 cycles per second in perfect synchronization with the electrical signal is expecting the impossible. The music is “blurred.” The details and texture of the music is lost—the bass is “boomy” or “muddy”; mids and highs sound “nasal” or “raspy.” The Magneplanar has less mass than the conventional box speaker; consequently the Magneplanar diaphragm is more in step with the electrical signal. The detail and texture of the music is maintained.

Loudspeakers



MAGNEPAN



Magnepan's corporate and manufacturing facilities are located in White Bear Lake, Minnesota, a small community north of the twin cities of St. Paul and Minneapolis. Having rapidly outgrown the original facilities, Magnepan's current plant is over 50,000 square feet, in addition to the corporate and engineering offices.

When production was first started in 1971 the entire speaker was virtually handmade. Today, after more than 130,000 sold, the speakers are made with the same care and attention; but the devices used in the fabrication are much more modern and efficient, affording greater consistency and cost effectiveness. For example, a computerized frame router allowed the older composite wood and metal frames, which incorporated 25 pieces, to be replaced by more rigid, one-piece, high density fiberboard frames.

Magnepan will continue to explore and add any new manufacturing techniques which will improve the construction quality and consistency of their products, which have always enjoyed an excellent reputation for the care with which they were made.

Magnepan's Design Policy

- To seek the most elegant, cost-effective solutions to design problems.
- To design speakers that we at Magnepan, as serious audiophiles, would want to use in our personal music systems.
- To maintain aesthetically pleasing designs which blend well into the home.
- To make model changes based on major performance improvements rather than "making changes for the sake of change."
- To design products that will perform reliably for many years.



MG-2.5/R and MG-IIIa—The MG-2.5/R and MG-IIIa utilize Magnepan's patented line-source ribbon in conjunction with the latest generation planar-magnetic bass.

The line-source ribbon is a transformerless design which eliminates dynamic compression and distortion associated with 2-3 inch long ribbons of the past. The ribbon is bipolar, with near-perfect polar response of 180 degrees off the front and rear at 20,000 Hz. This results in superb image stability, regardless of the listener's position. At 2.5 microns, the Magneplanar ribbon is lower in mass than any previous ribbon, and provides high frequency extension beyond 50,000 Hz. Full, deep bass into the 30 Hz range is insured by the latest planar-magnetic drivers developed by Magnepan.

To approach musical perfection in a loudspeaker, all drivers must be of similar overall characteristics—the MG-2.5/R and MG-IIIa achieve this by employing: line-source, bipolar, transformerless, and low-mass driver technologies in both the new ribbon mid/tweeter and the time-tested, planar-magnetic bass.

As a three-way system, the MG-IIIa surpasses the MG-2.5/R in lower mid-range clarity. The MG-IIIa has a larger bass diaphragm than the MG-2.5/R, which gives deeper extension and more impact in larger rooms. In addition, the MG-IIIa has the added feature of bi-amplification. Both models are of similar design and the choice of serious audiophiles.

A Tradition of Innovation and

Complement Your Decor

Magneplanars provide unique styling not available in box speakers. With optional trim and fabrics, Magneplanar screens can blend or contrast with the surrounding decor, thus forming a backdrop in the same manner as curtains or drapes. With

Magneplanars you have the ability to add a pair of speakers to your living area without adding the visual "weight" of box speakers. Magneplanars are easily moved for vacuuming or repositioning to other listening areas.



Magneplanar Models

SMGa—Incorporates most of the unique qualities of the large expensive models, at an affordable price. This smallest and most popular model is for the serious music lover on a budget and works best in smaller listening rooms. The SMGa can be placed against the wall when you are listening to background music or pulled out 2 or 3 feet to appreciate their full potential. The SMGa is our most efficient model and can be driven with smaller receivers and amplifiers or can be part of a serious audiophile system, utilizing the best of equipment.

The music lover on a budget can now own a music system that will bring him or her much closer to the excitement of a live performance. Available in three trims (oak, brass, or chrome), and three fabric colors (off-white, black, or brown).

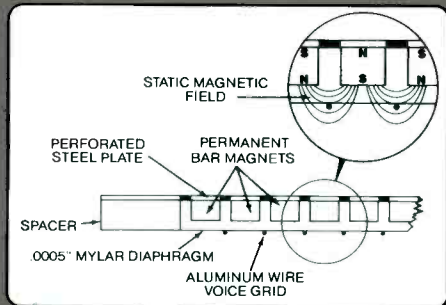
MG-Ic and MG-IIc—These models are of similar design, both representing excellent value. The MG-IIc is one foot taller than the MG-Ic, providing better vertical dispersion and extension of the frequency extremes. Both models appeal to a wide range of listening tastes. For the classical music enthusiast, the critical midrange of the MG-IIc is often the speaker of choice. Having been introduced in their original versions many years ago, these speakers have benefited from years of gradual refinements.

They highlight Magneplanar's belief that there should be no change for the sake of change. Improvements over earlier versions include a reduction in diaphragm mass, refinements in magnetic structure, improved crossover design, more rigid panel construction, inclusion of bi-amplification option, and improved diaphragm mass distribution.

Both models are worthy of the finest ancillary equipment and source material, and are remarkable in their respective price ranges.

Planar-Magnetic Driver

- Low Mass** .0005 inch diaphragm
- Bi-Polar Design**—No cabinet to color sound
- Direct Coupled**—No transformer is necessary. Subtle detailing is maintained with no dynamic compression
- Mirror-Imaged** for stable stereo image
- Linear Power Response**—No compression of dynamic range
- Superb Power Response**
- High Power handling**
- Flat Impedance** for ideal amplifier loading
- Accurate Phase response**

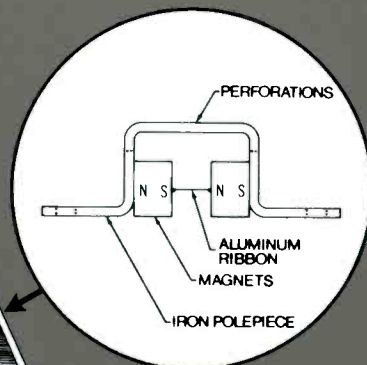


CROSS SECTION MIDRANGE-BASS



**SEE DEALER LIST
ON PAGE 448**

Two Unique Technologies



CROSS-SECTION RIBBON TWEETER

Line-Source Ribbon Driver

- Lowest Mass** ribbon tweeter on the market
- Direct Coupled**—No transformer is necessary. Subtle detailing is maintained with no dynamic compression
- Bi-Polar Design** does not close off the ribbon, which allows the rear wave to radiate freely
- Nearly Perfect 360°** horizontal dispersion at 20 kHz
- Superb Power Response**
- Line Radiator Design** allows excellent phasing with Magneplanar's line-source midrange
- Flat Impedance** due to "straight wire" design
- Wideband Operation (1-50 kHz)**

U.S. PAT. NOS. 4,319,096 & 3,674,946

SPECIFICATIONS

	SMGa/MG-1c/MG-1ic	MG-2.5/R	MG-3IIa
Description:	2-Way, Full-Range, Planar-Magnetic Speaker System	2-Way, Combination Planar-Magnetic and True Ribbon Mid/Tweeter	3-Way, Combination Planar-Magnetic and True Ribbon Tweeter
Frequency Response:	50 Hz/45 Hz/40 Hz respectively, to 18 kHz \pm 3dB	37 Hz to 40 kHz \pm 3dB	32 Hz to 40 kHz \pm 3dB
Recommended Power:	40-150 Watts/50-200 Watts/50-200 Watts RMS, 8 Ohms respectively	50 to 200 Watts RMS, 8 Ohms	75 to 200 Watts RMS, 8 Ohms
Sensitivity, 1 Watt/1 Meter:	90dB/85dB/84dB respectively	84dB	85dB
Impedance:	4 Ohms/5 Ohms/5 Ohms, respectively	5 Ohms	4 Ohms
Dimensions:	19"W x 48"H/ 22"W x 60"H/ 22"W x 71"H respectively	22"W x 71"H	24"W x 71"H
Shipping Weights:	60 lb./85 lb./100 lb. per pair, respectively	105 lb./pair	130 lb./pair
Suggested Retail, Including Freight:	\$495/\$880/\$1195 per pair, respectively	\$1550/pair	\$1995/pair

MAGNEPAN

1645 Ninth Street, White Bear Lake, MN 55110

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type			Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Sensitivity Level Control	Woofer = W. Midrange = M. Tweeter = T. Superwoofer = ST	Acoustic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt 1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Ported	Sealed Box	Trans. Line																	
IMPULSE	I	Ported	10			46L	Ribbon	T		30-20 ±2	83	100	175	5/2	Two Pieces per Side	Diled Wal. Oak	Black Knit Metal	200	5000.00			
	II LeF	Inf. Bal.	12			(4)2	Cones			28-22 ±2	88	100	175	4/3	Two Pieces per Side	Oak	Metal	80	2500.00			
	III LeF	Inf. Bal.	6			2	Cone			46-22 ±2	88	100	175	4/3	10 x 8 x 14	Oak	Metal	26	2000.00 Pair			
INFINITY	RS 6Kappa	Sealed Box	10	3	Dome	3/8x1 1/8	EMIT	M, T		39-45 ±3	88	30	800, 4.5k	6/4	25 x 15 x 11	Oak	Black Knit	42	499.00			
	RS 7Kappa	Sealed Box	12	3	Dome	3/8x1 1/8	EMIT	M, T		37-45 ±3	88	40	800, 4.5k	6/4	37 x 17 x 12	Dak	Black Knit	69	659.00			
	RS 8Kappa	Sealed Box	12	3	Dome	3/8x1 1/8	EMIT	(2)M, T		33-45 ±3	89	50	80, 800, 4.5k	6/3	48 x 21 x 8	Dak	Black Knit	90	949.00			
	RS 9Kappa	Sealed Box	(2)12	3	Dome	3/8x1 1/8	EMIT	(2)M, T, ST		29-45 ±3	89	60	80, 800, 4.5k	6/3	60 x 22 x 8	Oak	Black Knit	120	1349.00			
	RS1000	Sealed Box	4 1/2			1 3/8	Dome			72-22 ±3	89	8	5.5k	6/4	13 x 8 x 7	Oak Vinyl	Black Knit	9	73.00			
	RS2000	Sealed Box	6 1/2			1 3/8	Dome			57-22 ±3	89	15	4.5k	6/4	14 x 9 x 8	Oak Vinyl	Black Knit	14	100.00			
	RS3000	Sealed Box	8			1	Dome			45-22 ±3	89	20	4k	6/4	20 x 12 x 10	Dak Vinyl	Black Knit	28	155.00			
	RS4000	Sealed Box	8	3 1/2	Cone	3/8x1 1/8	EMIT	T		44-44 ±3	89	20	500, 5k	6/4	22 x 12 x 10	Oak Vinyl	Black Knit	30	235.00			
	RS5000	Sealed Box	10	3 1/2	Cone	3/8x1 1/8	EMIT	T		42-44 ±3	89	20	500, 5k	6/4	24 x 15 x 12	Oak Vinyl	Black Knit	34	295.00			
	RS6000	Sealed Box	(2)10	1 1/2	Dome	3/8x1 1/8	EMIT	M, T		42-44 ±3	89	20		6/4		Oak Vinyl	Black Knit		495.00			
	IRS Series V	Servo	(12)12	(24) 4x6x 1/2	EMIMs	(72) 1/2x2	EMITs	M, T, ST		16-44 ±2	87	100	70, 5k	4/3	Four Pieces	Rswd. Vinyl	Black Knit	1550 Sys.	45,000.00 Sys.			
	IRS Beta	Servo	(8)12	(4) 17x9x 1/2, (2) 4x6x 1/2	Large EMIMs		EMIT, Super EMIT	M, T, ST		25-44 ±2	87	75	70, 700, 4k, 8k	4/3	Four Pieces	Nat. Wood	Brown Cloth		9999.00 Sys.			
	IRS Gamma	Servo	(4)12	(2) 17x9x 1/2, (2) 4x6x 1/2	Large EMIMs		EMIT, Super EMIT	M, T, ST		25-44 ±2	86	60	70, 700, 4k, 8k	4/3	22 x 15 x 62	Nat. Wood	Black Cloth		5500.00 Pair w/ Xover			
	IRS Delta	Sealed Box	(4)12	(2) 17x9x 1/2, (2) 4x6x 1/2	Large EMIMs		EMIT, Super EMIT	M, T, ST		29-44 ±2	86	60	70, 700, 4k, 8k	4/3	22 x 15 x 62	Nat. Wood	Black Cloth		4500.00 Pair			
	SM 100	Tuned Port	10			1	Dome	T		35-27	98	10	2.5k	8/6	30 x 14 x 12	Rswd. Vinyl	Black Knit	53	259.00			
SM 120	Tuned Port	12	4 1/2	Cone	1	Dome	M, T		32-27	98	10	750, 5.5k	8/6	33 x 16 x 12	Rswd. Vinyl	Black Knit	64	389.00				
SM 150	Tuned Port	15	(2)4 1/2	Cones	1	Dome	M, T		29-27	101	10	500, 5.5k	8/6	40 x 19 x 12	Rswd. Vinyl	Black Knit	80	559.00				
INNOTECH	D24	Trans. Line	(2)5	1 1/2	Dome	1	Dome	No		37-20 ±3	90	25	3.5k, 7k	8/5	37 x 11 x 16	Opt.	Black Foam	60	1000.00 Pair			
INNOVATIVE TECHNIQUES	ITC 1	Vented, Seventh Order	5 1/4	1 1/2	Oome	1	Oome	M, T		50-18 ±3	86	40	1k, 7.5k	8/7	7 x 12 x 8	Opt., Wood	Brown Knit	16	975.00 Pair w/EQ			
	ITC 3	Vented, Fourth Order	7			3/4	Oome	T		48-20 ±3	91	20	4.5k	8/	10 x 10 x 30	Oiled Wal.	Black Knit	19	560.00 Pair			
	The Wall System	Variable Loading	7			3/4	Dome			60-20 ±4	90	20	5k	8/	8 x 11 x 4	Black Enam.	Perf. Steel	6 1/2	350.00 Pair			
	The Ceiling Speaker	Vented, Fourth Order	7			3/4	Oome			60-16	91	20	6k	8/	19 x 13 x 8	White Enam.	Perf. Steel	26	395.00 Pair			
	The Ceiling Woofer	Vented, Fourth Order	7							40-120 ±3	91	20	100	8/7	14 x 30 x 8	White Enam.	White Knit	20	395.00 Pair			
ITC 4	Vented, Subwoof.	10							24-120 ±2	89	60	120	8/6	18 x 18 x 19	Opt., Wood		50	1395.00 Pair w/Xover				
INTEGRATED AUDIO	IA-110	Vented	15			2	Compr.			47-22 ±5	95	50	1.8k	8/6	25 x 17 x 13	Teak	Black Knit	100	2995.00 Pair			
	IA-115	Vented	15			2	Compr.			37-22 ±3	95	50	900	8/6	36 x 19 x 18	Teak	Black Knit	130	3395.00 Pair			
	IA-120	Vented	(2)15			4	Compr.			29-20 ±3	98	50	650	4/3	41 x 33 x 19	Maple	Black Knit	300	8995.00 Pair			
	IA-120s	Vented	15			4	Compr.			29-20 ±2	98	50	650	8/6	32 x 26 x 19	Maple	Black Knit	200	7495.00 Pair			
INTERAUDIO/BDSE	SA 500	Quad Ported	10			3	Cone/Lens			90	15	1.3k	8/	22 x 13 x 11	Wal. Vinyl	Brown Knit	45 Pair	538.00 Pair				
	SA 300	Ported	8			3	Cone/Lens			90	15	1.1k	8/	18 x 11 x 9	Wal. Vinyl	Brown Knit	31 Pair	338.00 Pair				
	SA 200	Ported	6			3	Cone/Lens			90	10	1.9k	8/	14 x 9 x 7	Wal. Vinyl	Brown Knit	20 1/2 Pair	278.00 Pair				



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls? Woofer W/Midrange W, Tweeter T, Superwoofer = ST		Amphol Frequency Response, Hz to kHz, ±dB		SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
								70-20 ±3	88	3.3	2.6k				4/	7 x 4 x 7					
JAMO	Compact 50	Bass Ref.	4			2	Cone			70-20 ±3	88	3.3	2.6k	4/	7 x 4 x 7	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	2.9	79.95		
	Compact 70	Bass Ref.	6½			1	Dome			45-20 ±3	90	3	2.5k	8/4	12 x 8 x 8	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	8.4	94.95		
	Compact 90	Bass Ref.	8	¾		1	Dome			40-20 ±3	91.6	2.9	1.2k,4k	8/4	15 x 9 x 9	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	11	129.95		
	Compact 120	Bass Ref.	8	5		1	Dome			38-20 ±3	92	2.9	1.2k,5k	8/4	17 x 10 x 9	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	14.3	159.95		
	LS 800	Bass Ref.	6½	5		1	Dome			45-20 ±3	91.4	2.9	1.5k,4k	8/4	18 x 9 x 8	Black Lacq. Opt., Cloth	Black Mesh Opt., Cloth	13.2	179.95		
	LS 1000	Bass Ref.	6½	5		1	Dome			40-20 ±3	91.7	2.7	1.5k,4k	8/4	21 x 11 x 9	Black Lacq. Opt., Cloth	Black Mesh Opt., Cloth	17.6	219.95		
	LS 1400	Bass Ref.	8	5		1	Dome			36-20 ±3	92.4	2.3	1.4k,4k	8/4	24 x 12 x 9	Black Lacq. Opt., Cloth	Black Mesh Opt., Cloth	19.8	259.95		
	Professional 200	Bass Ref.	10	5	Horn	1	Horn			35-20 ±3	93	2	1.2k,6k	8/4	26 x 15 x 12	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	42	399.95		
	Professional 300	Bass Ref.	12	5	Horn	(3)1	Horns			30-20 ±3	94	1.6	1k,5k	8/4	30 x 17 x 13	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	57.3	599.95		
	Professional 400	Bass Ref.	15	5	Horn	(5)1				25-20 ±3	95	1.3	900,4k	8/4	36 x 21 x 17	Black Lacq. Opt., Lacq.	Black Mesh Opt., Cloth	92.6	899.95		
	Digital 70	C B R	5½	3		1	Dome			40-20 ±3	89	3.7	1.2k,4.6k	8/4	19 x 10 x 6	Black Lacq. Opt., Lacq.		15.4	199.00		
	Digital 90	C B R	6½	4		1	Dome	T		35-20 ±3	90	3.4	960,5k	8/4	24 x 12 x 10	Dpt.		24	299.00		
Digital 120	C B R	8	4		1	Dome	T		30-22 ±3	91.2	2.7	820,4.9k	8/4	28 x 14 x 12	Dpt.		37.5	399.00			
Digital 200	C B R	10	5		1	Dome	M,T		28-24 ±3	92	2.1	540,3.8k	8/4	32 x 16 x 14	Dpt.		53	599.00			
JANIS	W1	Slot Loaded Subwoof.	15							30-100 ±1	87	60	100	8/7	18 x 22 x 22	Diled Wal.	Wood	100	795.00		
	W3	Slot Loaded Subwoof.	12							30-100 ±1	85	50	100	8/7	18 x 18 x 18	Diled Wal.	Wood	67	550.00		
	System 3/A	Powered Slot Loaded Subwoof.	12							30-100 ±1	85	50 Inc.	100	8/7	18 x 18 x 18	Diled Wal.	Wood	87	850.00		
JBL	Pro III	Ducted Port	5			1	Dome			65-27	87	10	3k	4/	9 x 6 x 6	Foam	Black Mesh	5½	240.00		
	Everest	Ducted Port	15	1	Compr. (1)			M,T			100		850,7.5k	8/	55 x 36 x 20	Diled Wal.	Gray Knit	320	Pair 4950.00		
	62	Ducted Port	6½			1	Dome				89	10	3k	8/	10 x 7 x 16	Black Vinyl Rswd.	Black Cloth	32	Pair 115.00		
	82	Ducted Port	8			1	Dome				90	10	3k	8/	14 x 8 x 22	Black Vinyl Rswd.	Black Cloth	30	Pair 165.00		
	630	Ducted Port	(2)6½			1	Dome				93	10	400,2.5k	4/	15 x 8 x 36	Black Vinyl Rswd.	Black Cloth	40	225.00		
	830	Ducted Port	(2)8			1	Dome				94	10	400,2.5k	4/	17 x 9 x 40	Black Vinyl Rswd.	Black Cloth	53	295.00		
	940	Ducted Port	8,10	5	Cone	1	Dome				94	10	400,800, 2.5k	4/	19 x 10 x 44	Black Vinyl Rswd.	Black Cloth	65	395.00		
	L20T	Ducted Port	6½			1	Dome				87	10	3k	8/	15 x 9 x 8	Black Vinyl Rswd.	Black Cloth	36	Pair 215.00		
	L60T	Ducted Port	8			1	Dome				88	10	2.5k	8/	31 x 12 x 10	Diled Wal.	Knit Opt., Knit	38	Pair 295.00		
	L80T	Ducted Port	10	5	Cone	1	Dome				90	10	800,4.5k	8/	34 x 14 x 12	Diled Wal.	Knit Opt., Knit	53	425.00		
	L100T	Ducted Port	12	5	Cone	1	Dome				91	10	800,4.5k	8/	37 x 16 x 13	Diled Wal.	Knit Opt., Knit	70	575.00		
	B460	Ducted Port Subwoof.	18								94	200	Ext.	8/	25 x 38 x 24	Diled Wal.	Knit Opt., Knit	125	1700.00		
	B380	Subwoof.	15								90	200	Ext.	8/	21 x 27 x 17	Teak	Brown Knit	70	750.00		
	LT-1	Ducted Port	5¼			1	Dome				87	10	4k	8/6	10 x 6 x 5	Black Alum.	Metal Knit	27	Pair 395.00		
18Ti	Ducted Port	6½			1	Dome				88	10	3k	8/	15 x 9 x 8	Black Alum. Teak	Brown Knit	35	Pair 295.00			
120Ti	Ducted Port	12	5	Cone	1	Dome	M,T			89	10	900,4k	8/	24 x 14 x 11	Teak	Brown Knit	56	Pair 595.00			
240Ti	Ducted Port	14	5	Cone	1	Dome	M,T			89	10	900,4k	8/	37 x 18 x 12	Teak	Brown Knit	85	895.00			
250Ti	Ducted Port	14	8.5	Cones	1	Dome	M,T, ST			90	10	400,1.4k, 5.2k	8/	52 x 22 x 14	Teak	Brown Knit	150	1895.00			
JENSEN	3100	Vented	10	5	Cone	3	Cone			48-21	90			8/	20 x 13 x 11	Wal. Vinyl Wal. Vinyl	Black Knit Black Knit	24	Pair 339.90		
	3120	Vented	12	5	Cone	3	Cone			43-21	91			8/	29 x 16 x 11	Wal. Vinyl Wal. Vinyl	Black Knit Black Knit	30	Pair 399.90		
JPW LOUDSPEAKERS	AP3	Inf. Baf.	8			¾	Dome			55-20 ±3	89	10	3.2k	8/6.2	21 x 10 x 12	Opt., Wood	Dpt., Knit	53	Pair 599.50		
	AP2	Inf. Baf.	8			¾	Dome			60-20 ±3	89	10	3.2k	8/6.2	17 x 10 x 10	Opt., Wood	Dpt., Knit	42	Pair 399.50		
	P1	Inf. Baf.	8			¾	Dome			65-20 ±3	90	10	3.2k	8/6.2	17 x 10 x 10	Opt., Wood	Dpt., Knit	34	Pair 349.50		
JRM	Transparency Subwoofer S18A	B4 Vented Subwoof.	18							25-250 ±1.5	95	200	Sel.	8/6	36 x 30 x 24	Dpt.	Dpt.	175	500.00		
	Transparency Subwoofer S18B	QB3 Vented Subwoof.	18							27-250 ±1.5	94	200	Sel.	8/7	36 x 25 x 24	Dpt.	Dpt.	175	700.00		



SPEAKERS BUILT UPON THE BELIEF THAT MUSIC IS MEANT TO BE PLAYED, NOT PLAYED WITH.

When we built the first Advent® in 1968, we believed music should sound exactly the way the artist had intended. Nothing added. Nothing taken away.

Just music.

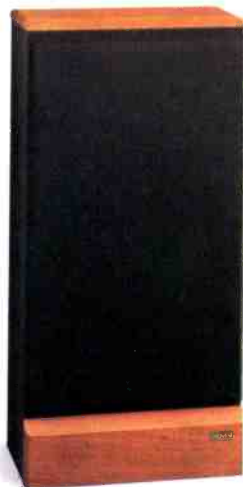
Since then, trends in speaker design have come and gone. But the Advent philosophy has remained the same. You'll know why when you listen to our current line of loudspeakers. They've been designed with the latest technology, yet preserve the clean, accurate sound Advent is known for.

All our speakers feature high efficiency long throw woofers, ferrofluid-filled tweeters and are compact disc ready. The Advent Maestro takes this performance even further with a mica-

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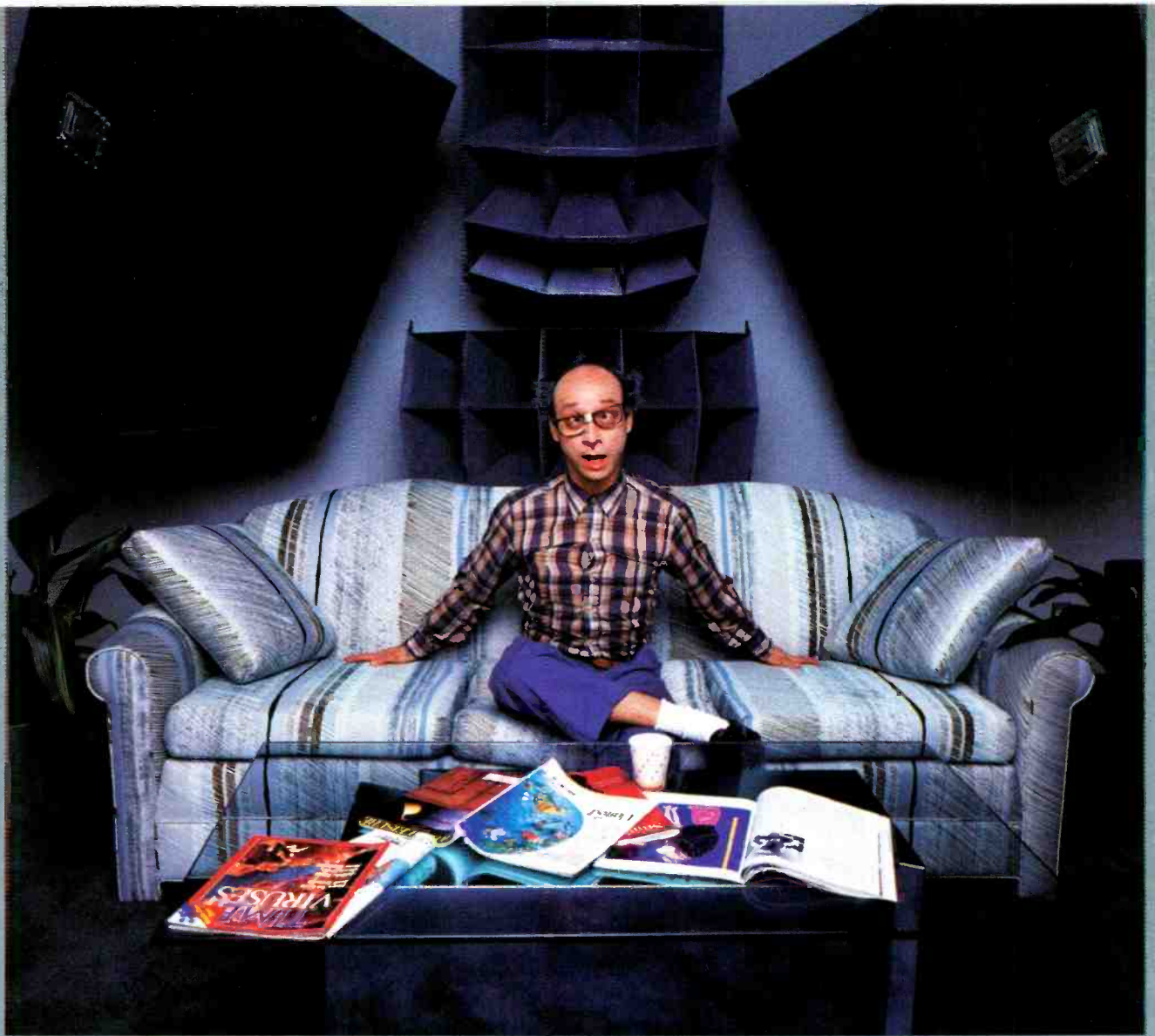


ADVENT®
Sound as it was meant to be heard.



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type	Woofer			Midrange			Tweeter			Separate Level Controls: Woofer=W, Midrange=M, Tweeter=T, Superwoofer=ST	Acoustic Frequency Response, Hz to kHz, ±dB	SPL, 1 W/1m, Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price \$
				Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Diameter, Inches	Tweeter Type	Diameter, Inches	Tweeter Type													
JRM (Continued)	Transparency Subwoofer S18B-6	B6 Vented Subwoof.	18										20-250 ± 1.5	94	200	Set.	8/7	36 x 25 x 24	Opt.	Opt.	175	700.00	
	Transparency Subwoofer S15A	QB3 Vented Subwoof. B6 Vented Subwoof.	15										27-300 ± 1.5	91	200	Set.	8/7	36 x 23 x 16	Opt.	Opt.	130	550.00	
	Transparency Subwoofer S15A-6	B6 Vented Subwoof.	15										20-300 ± 1.5	91	200	Set.	8/7	36 x 23 x 16	Opt.	Opt.	130	550.00	
	Transparency Subwoofer D15A	C4 Vented Subwoof.	(2)15										18-300 ± 1.5	89	200	Set.	Set.	48 x 34 x 24	Opt.	Opt.	200	550.00	
	Transparency Subwoofer D12A	QB3 Vented Subwoof. B6 Vented Subwoof.	(2)12										27-450 ± 1.5	88	200	Set.	Set.	36 x 23 x 18	Opt.	Opt.	150	450.00	
	Transparency Subwoofer D12A-6	B6 Vented Subwoof.	(2)12										18-450 ± 1.5	88	200	Set.	Set.	36 x 23 x 18	Opt.	Opt.	150	450.00	
	Transparency Satellite Tower	Triamped Sealed Sat.	(18)5	3x26	Horn	1 1/8	Horn	W.M.T					20-20 ± 2	98	200 (2) 40 Inc.	150,800, 7k	Set.	8 x 16 x 66	Opt.	Opt.		1700.00	
JS AUDIO	26P	Vented	6 1/2			1	Dome						40-22 ± 3	93	15	3k	8/	16 x 10 x 10	Wood Lam.	Black	28 Pair	600.00	
	28P	Ac. Sus.	8			1	Dome						38-22 ± 4	92	20	3k	8/	22 x 12 x 8	Wood Lam.	Black	32 Pair	600.00	
	28J	Ac. Sus.	8			1	Dome						38-20 ± 5	92	20	2.5k	8/	18 x 10 x 6	Wal.	Opt.	24 Pair	500.00	
	Mesa I	Vented	8			1	Dome						40-22 ± 3	92	20	3k	8/	24 x 11 x 12	Wood Lam.	Black	40 Pair	900.00	
	310P	Vented	10	5	Cone	1	Dome						32-22 ± 3	95	20	700,4k	8/	24 x 14 x 10	Wood Lam.	Black	70 Pair	950.00	
	310N	Vented	10	5	Cone	1	Dome						32-22 ± 3	90	15	700,3k	8/	29 x 13 x 10	Wood Lam.	Black	90 Pair	1100.00	
	Panel	Ac. Sus.	10	5	Cone	1	Dome						38-22 ± 3	90	30	600,4k	8/	41 x 21 x 7	Wood Lam.	Black	100 Pair	1300.00	
	410P	Vented	10	5	Cone	1,3	Dome, Piezo							38-40 ± 3	94	15	700,4k, 10k	8/	25 x 14 x 10	Wood Lam.	Black	80 Pair	1000.00
	412P	Vented	12	5	Cone	1,3	Dome, Piezo							28-40 ± 3	95	15	700,4k, 10k	8/	27 x 16 x 12	Wood Lam.	Black	90 Pair	1200.00
	313N	Vented	13	5	Cone	1	Dome							30-20 ± 3	91	20	600,3k	8/	32 x 15 x 13	Wood Lam.	Black	130 Pair	1600.00
	Mesa II	Trans. Line Vented Subwoofer.	12	3	Dome	1,2	Domes							25-25 ± 2	91	40	400,3k, 10k	8/	34 x 12 x 11	Opt.	Dpt.	160 Pair	3000.00
	Shelf Subwoofer	Vented Subwoofer.	10											22-120	89	30	120	8/4	25 x 14 x 10	Wood Lam.	Black	40	600.00
	312P	Vented	12	2	Dome	1	Dome							28-30 ± 3	94	40	700,4k	8/	32 x 15 x 13	Wood Lam.	Black	78	900.00
	415P	Vented	15	3	Dome	1 (2)3	Dome, Piezos							20-30 ± 3	99	30	700,4k, 10k	8/	36 x 20 x 12	Wood Lam.	Black	130 Pair	1500.00
612P	Vented	(2)12	(2)5	Cones	(4)1	Domes							24-22 ± 3	101	20	600,4k	8/4	74 x 16 x 12	Oak	Opt.	400 Pair	4800.00	
EP2	Vented	(2)6			1 1/4	Dome							32-22 ± 3	95	15	2k	8/	9 x 15 x 31	Opt.	Opt.	70 Pair	1600.00	
JS ENGINEERING	.6	Vented	8			1	Dome						45-18 ± 2	90	10	2.2k	8/5	11 x 13 x 23	Opt.	Black Knit	38	599.00	
	1		8	7	Cone	1	Dome						40-20 ± 2	89	30	2k	8/5	13 x 29 x 15	Dpt.	Black Knit	55	995.00	
	1.8		(2)8, 10	6	Cone	1	Dome						35-20 ± 2	89	50	150,1k	8/5	16 x 38 x 16	Opt.	Black Knit	100	1695.00	
	2		(2)10, 12	6,2	Cone, Dome Cones, Domes	3/4	Dome						30-26 ± 2	90	50	150,1k,4k	8/5	18 x 45 x 16	Opt.	Black Knit	125	2295.00	
	Signature		(2)12	(4)7, (4)2		(4)1/2	Ribbons						20-30 ± 2	91	50	100,1k,4k	8/5	18 x 76 x 29	Opt.	Black Knit	300	9000.00	
JUST SPEAKERS	Bill Reed 6-02A	Bass Ref.	6 1/2			1	Dome						50-20 ± 2	86	25		8/6	16 x 10 x 8	Oiled Wal.	Black Knit	20	435.00	
	Avery Dark 10	Inf. Baf.	10	2	Dome	3/4	Dome						42-25 ± 3	92	50		8/6	25 x 15 x 13	Oiled Wal.	Black Knit	41	815.00	
	Jay Adamson CA-1	Bass Ref.	5 1/4			1	Dome						60-20 ± 3	89	50		8/5.5	12 x 8 x 7	Oiled Wal.	Black Knit	11	290.00	
	Jay Adamson CA-2	Subwoof.	9										38-150 ± 3	89	50		8/7	19 x 12 x 11	Oiled Wal.	Black Knit	24	375.00	
	Jack Caldwell MC	Bass Ref.	6 1/2			1	Dome						65-18 ± 2	88	30		4/4	16 x 10 x 8	Oiled Wal.	Black Knit	18	420.00	
	Jack Caldwell C-12SW	Inf. Baf. Subwoof.	12										30-150 ± 3	90	50		4/4	18 x 18 x 20	Oiled Wal.	Black Knit	55	290.00	
	Kimon Bellas KB-One	Bass Ref.	5 1/4			1	Dome						57-25 ± 2	88	25	250,1.8k	4/3.8	12 x 8 x 7	Oiled Wal.	Black Knit	14	500.00	
	Kimon Bellas KB-Two	Bass Ref.	7			1	Dome						51-20 ± 2	89.5	20	250,2.8k	4/3.8	16 x 10 x 8	Oiled Wal.	Black Knit	20	575.00	
	Kimon Bellas KB-Three	Bass Ref.	8			1	Dome						37-19 ± 2	90.5	20	250,3k	4/3.8	25 x 15 x 13	Oiled Wal.	Black Knit	40	675.00	
	Dick Olsher "Dahlia"	Bass Ref.	8			1	Dome							48-20 ± 3	89	20		8/	20 x 15 x 12	Oiled Wal.	Black Knit	33	700.00
JVC (Continued)	SP3WD	Bass Ref.	10	2 3/4	Cone	2	Cone						40-20	91	30		8/	14 x 24 x 11	Wood Vinyl	Brown Knit	21.4	220.00	
	SP5WD	Bass Ref.	12	5	Cone	2 3/4	Cone						35-20	92	30		8/	15 x 26 x 13	Wood Vinyl	Brown Knit	33	270.00	
	SXA3	Pas. Rad.	8			1	Dome						35-23	88	30	2k	6/	14 x 25 x 11	Wood Vinyl	Gray Knit	34	400.00	



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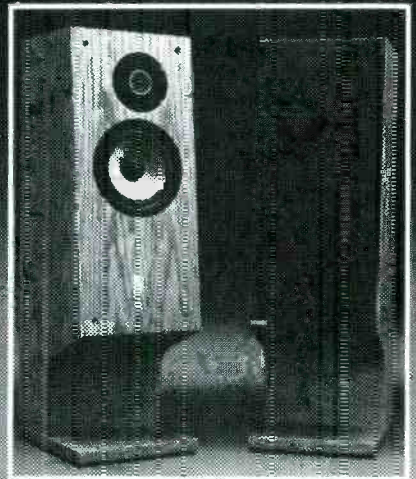
LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches			Separate Level Controls: Woofer = W, Midrange = M, Tweeter = T, Subwoofer = ST	Anchord Frequency Response, SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			8	1 1/4	Dome	1	Dome	W	89	50	Front: 1.2k, 6.5k Rear: 4k										
JVC (Continued)	SXA6	Pas. Rad.	8	1 1/4	Dome	1	Dome		25-23	89	50	Front: 1.2k, 6.5k Rear: 4k	6/	15 x 32 x 10	Wood Vinyl	Gray Knit	38.6	500.00 Pair			
KAMA-ISPEAK	Mini	Inf. Baf.	6			1 1/4	Dome		45-22	89	30	3k	8/6.4	13 x 9 x 9	Opt.	Black Knit	26.4 Pair	790.00 Pair			
	Midi	Inf. Baf.	6	1 1/4	Dome	3/4	Dome		40-40	89	35	3k, 12k	8/6.4	16 x 9 x 9	Opt.	Black Knit	35.2 Pair	990.00 Pair			
	Maxi	Inf. Baf.	8	2 1/4	Dome	3/4	Dome		38-40	92	40	800.5k	8/6.4	21 x 11 x 9	Opt.	Black Knit	56.4 Pair	1290.00 Pair			
KEF	Reference 107	Coherent Phase Coupled Cavity	(2)10	4	Cone	1	Dome	W	20-20 ±2	90	50		4/4	46 x 13 x 18	Opt., Wood	Black Knit	99	3900.00 Pair			
	Reference 104/2	Coupled Cavity	(2)8	(2)4 1/2	Cones	1	Dome		55-20 ±2	92	25		4.4	35 x 11 x 16	Opt., Wood	Black Knit	71	1800.00 Pair			
	Reference 103/3	Coupled Cavity	8	6	Cone	1	Dome	W	50-20 ±2	92	50		4/4	23 x 11 x 13	Opt., Wood	Black Knit	38	1390.00 Pair			
	Reference 102	Conjugate Load	6			1	Dome	W	65-20 ±2	92	50		4/4	13 x 9 x 11	Opt., Wood	Black Knit	15	790.00 Pair			
	C80	Coupled Cavity	8	6	Cone	1	Dome		38-22 ±3	89	20		4/4	33 x 10 x 12	Opt., Wood	Black Knit	44	1090.00 Pair			
	C60	Conjugate Load	8			1	Dome		55-20 ±3	89	20		4/4	19 x 10 x 13	Opt., Wood	Black Knit	27	690.00 Pair			
	C40	Closed Box	8	8	Cone	1	Dome		58-20 ±3	91	10		8/8	26 x 10 x 11	Opt.	Black Knit	21	490.00 Pair			
	C30	Closed Box	8			1	Dome		60-20 ±3	90	10		8/8	20 x 10 x 9	Opt.	Black Knit	16	350.00 Pair			
	C20	Closed Box	8			1	Dome		72-20 ±3	90	10		8/8	14 x 10 x 9	Opt.	Black Knit	12	290.00 Pair			
	C10	Closed Box	6			1	Dome		90-20 ±3	88	10		8/8	12 x 9 x 7	Opt.	Black Knit	8	220.00 Pair			
KENWOOD	LS-P9100	Pas. Rad.	10 1/2	4	Cone	(2)2, 1 1/4	Cones, Leaf Cone, Leaf Cone		20-48	91	25	900, 5.5k, 10k	8/	17 x 45 x 13	Rswd.	Black	62	720.00 Pair			
	LS-P5100	Pas. Rad.		4	Cone	2, 1 1/2			25-48	90	20	800, 5k, 10k	8/	15 x 36 x 11	Rswd.	Black	40	480.00 Pair			
	LSK-702	Air Sus.	12	4 1/2	Cone	2	Cone		40-20	91	5	2k, 5k	8/	15 x 26 x 11	Wal.	Black	26 1/2	285.00 Pair			
	LSK-502	Air Sus.	10	4 1/2	Cone	2	Cone		45-20	90	1	2k, 5k	8/	14 x 24 x 11	Wal.	Black	23	220.00 Pair			
	LSK-302	Air Sus.	8			2	Cone		50-20	90	1	5k	8/	13 x 22 x 9	Wal.	Black	16 1/2	145.00 Pair			
KEVEK SPEAKER TECHNOLOGY	ES. 6	Bass Ref.	6 1/2			3/4	Dome		60-20 ±3	104	20	3.5k	8/6	20 x 12 x 8	Oak	Opt., Knit	18	495.00 Pair			
	ES. 8	Bass Ref.	8	4	Cone	3/4	Dome		50-20 ±3	108	20	500, 4k	8/6	37 x 15 x 10	Oak	Opt., Knit	33	990.00 Pair			
	ES. 10	Inf. Baf.	10	6 1/2	Cone	3/4	Dome		40-20 ±3	110	20	250, 3.5k	8/6	41 x 20 x 10	Oak	Opt., Knit	47	1290.00 Pair			
	ES. 12	Bass Ref.	12	6 1/2	Cone	3/4	Dome		30-20 ±3	115	20	250, 3.5k	8/6	49 x 22 x 11	Oak	Opt., Knit	70	1790.00 Pair			
KINDEL AUDIO	P-50 mkII	Q.7 Box	6 1/2			2	Cone	T	50-20 ±3	86	20	2.5k	8/8	8 x 8 x 14	Opt.	Black Knit	16	260.00 Pair			
	P-100 mkII	Q.7 Box	6 1/2	2	Cone	3/4	Dome	M, T	50-22 ±3	86	20	1.5k, 8k	8/8	9 x 9 x 18	Opt.	Black Knit	21	345.00 Pair			
	P-200 mkII	Q.7, 2π/4π B4,	(2)6 1/2	2	Cone	3/4	Dome	M, T	40-22 ±3	90	20	300, 1.5k, 8k	4/4	10 x 10 x 24	Opt.	Black Knit	29	585.00 Pair			
	Purist ST	Pas. Rad. QB3,	6 1/2			3/4	Dome	T	38-20 ±3	89	20	3k	4/4	38 x 13 x 6	Opt.	Black Knit	38	555.00 Pair			
	Purist LT	Pas. Rad. QB3	(2)6 1/2	1		1	Dome	T	35-20 ±3	90	20	300, 2.5k	4/4	43 x 13 x 7	Opt.	Black Knit	44	795.00 Pair			
	PLS-A		(6)6 1/2	(16)1			Domes	T	32-20 ±2	92	50	2.5k	6/2	64 x 22 x 9	Opt.	Black Knit	140	2100.00 Pair			
KINETIC AUDIO	Titan	TATL (Tap. Ac. Trap. Line)	(2)12	6 1/2	Cone	2, 1 3/4	Domes	(2)M, T, ST	12-22 ±1.5	90	35	60, 90, 350, 3k, 7k	6/3	18 x 22 x 60	Oiled Wal.	Black Knit	245	5000.00 Pair			
	Trapezium	TATL	12	6 1/2	Cone	2, 1 3/4	Domes	(2)M, T, ST	12-22 ±1	89	45	90, 350, 3.5k, 7k	8/5	16 x 20 x 60	Oiled Wal.	Black Knit	205	4000.00 Pair			
	Labyrinth	TATL	12	6 1/2	Cone	2, 1	Domes	(2)M, T	16-22 ±1.5	91	35	90, 350, 3.5k	8/5	16 x 18 x 48	Oiled Wal.	Black Knit	185	3000.00 Pair			
	Trapezoid	TATL	12	6 1/2	Cone	1, 3/4	Domes	M, T, ST	18-22 ±1.5	92	20	90, 2k, 7k	8/6	16 x 14 x 40	Oiled Wal.	Black Knit	115	2000.00 Pair			
	Stat Monitor	TATL	12	6 1/2	Cone		Dome	M, T	18-22 ±1.5	93	15	90, 2k	8/6	15 x 14 x 26	Oiled Wal.	Black Knit	95	1000.00 Pair			
	Stat Miniature Monitor	TAL (Tap. Ac. Line)	6 1/2	1		1	Dome	T	38-22 ±2	93	5	2k	8/6	9 x 9 x 15	Oiled Wal.	Black Knit	30	700.00 Pair			
	Stat S/W	TATL Subwoof.	12						18-2 ±2	93	15	180, 2k	8/6	15 x 14 x 26	Oiled Wal.	Black Knit	80	450.00 Pair			
	Trapezoid S/W	TATL Subwoof.	12						16-2 ±1.5	92	25	180, 2k	8/6	16 x 14 x 40	Oiled Wal.	Black Knit	95	600.00 Pair			
KLEIN & HUMMEL	098	Powered	8 1/4	1 1/2	Dome	3/4	Dome	W, M, T	50-16 ±2.5	Inc.	850, 6.5k	4.7k	15 x 10 x 8	Brown Enam.	Brown Knit	26 1/2	1130.00				
	096	Powered	10	2	Dome	3/4	Dome	W, M, T	50-20 ±2.5	Inc.	600, 4k	4.7k	12 x 21 x 11	Brown Enam.	Brown Knit	48 1/2	1950.00				
	092	Powered	(2)10	3 1/2	Cone	1	Dome	W, M, T	50-17 ±2.5	Inc.	500, 3k	4.7k	17 x 32 x 12	Brown Enam.	Brown Knit	66	3600.00				
KLARK-TEKNIK	Jade I MKII	Powered Bass Ref.	8			1 1/4	Dome	W, T	35-17 ±3	113 Pk.	100 Inc.	2.5k	10k	21 x 15 x 10	Black	None	48.4				

ENERGY 22

The Energy 22 Pro Monitor has been hailed by critics as one of the major loudspeaker design breakthroughs of the last decade.

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Sassafras, Philadelphia, P.A., Charles Hardesty - Bob Morgan. "As Philadelphia's premier high end dealer we had the good fortune to introduce the Energy 22 to our market. Since then the reaction has been incredible from audiophiles and music lovers alike. We believe the Energy 22 represents the pinnacle of loudspeaker design - anywhere near its price range"

Designatron, Long Island, N.Y. - Charles Caccuito. "Never before have we experienced a speaker system which exhibits the level of realism that the Energy 22 provides. The excitement generated by Energy speakers is only exceeded by the pleasure of owning them. The Energy 22 sets a reference standard by which all other speakers must be judged."

Audio Associates, Washington, D.C. - Mike Zazanis. "The Energy 22 is a very musical speaker at a very inexpensive price that easily could cost a lot more money."

Pro Musica, Chicago, IL - Ken Christianson, John Schwarz. "The Energy 22 Reference Connoisseur & Pro Monitors simply outperform the competition. Musically satisfying to the most demanding listeners."

Classic Stereo, Ft. Wayne, IN. - Paul Pohnert. "The Energy 22 Reference Connoisseur and Energy 22 Pro Monitor are the most musically correct speakers we have sold. They deliver excellent stereo imaging; are very intimate when music is intimate, yet powerfully dynamic when music is dynamic."

Audio by Caruso Miami, FL. - Don Caruso. "The Reference Connoisseurs are among the most neutral, uncolored speakers we have found!! They provide very relaxing listening."

Shelly's Stereo, Los Angeles, CA., - Robert Coyle "The Energy 22 and ESM speaker line offers the consumers styling and value at a price no other speaker line can match. The performance rivals the world's finest speakers"

Sound Company, San Diego, CA. - Bob Kokley. "Over the years we have heard many promises of new breakthroughs in speakers with disappointing results. The Energy 22 is one of the only products which performed beyond those promises. A job well done."

Christopher Hansen Ltd., Los Angeles, CA. - Chris Hansen. "The Energy 22 is very musically involving - 'Absolutely Brilliant'."

The Sounding Board, Berkely, CA. - Jim Serena. "The Energy 22 is an outstanding speaker. What's incredible is the value compact size and its performance level."

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type		Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Sensitivity Level (on-axis) Woofer = W, Midrange = M, Tweeter = T, Superwoofer = ST	Angular Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange																
KLH	882	Ac. Sus.	8			1	Dome			45-20 ±6	89	10	2.5k	8/6	11 x 11 x 18	Black Vinyl	Black Knit	19½	320.00	
	8830	Pas. Rad.	(2)8	5	Cone	1	Dome			40-20 ±6	90	10	600.6k	8/6	29 x 11 x 11	Oiled Wal.	Black Knit	31	500.00	
	12SW	Pas. Rad. Subwoof.	(2)12							30-150 ±2	90	15	120	8/	17 x 20 x 18	Black Vinyl	Black Knit	48	329.00	
	608b	Bass Ref.	8			3	Cone			70-20 ±6	88	10	2.3k	8/6	12 x 10 x 21	Oiled Wal.	Black Knit	17-	160.00	
	610b	Bass Ref.	10	5	Cone	3	Cone	T		60-20 ±6	89	10	1.8k,6k	8/6	13 x 11 x 23	Oiled Wal.	Black Knit	24	240.00	
	612b	Bass Ref.	12	5	Cone	3	Cone	M, T		55-20 ±6	92	10	1.8k,6k	8/6	15 x 14 x 26	Oiled Wal.	Black Knit	35	320.00	
	620b	Bass Ref.	(2)10	5	Cone	3	Cone	M, T		55-20 ±6	90	10	2.5k,5k	8/6	13 x 13 x 36	Oiled Wal.	Black Knit	42	420.00	
	862	Bass Ref.	6			1	Dome			50-20 ±6	90	10	2.5k	8/6	14 x 9 x 9	Black Vinyl	Black Knit	13½	238.00	
KLIPSCH	Klipschorn	Folded Horn	15	2	Horn	1	Horn			35-17 ±5	104	20	400.6k	8/4	52 x 34 x 29	Opt.	Opt.	185	1600.00	
	Belle Klipsch	Folded Horn	15	2	Horn	1	Horn			45-17 ±5	104	20	500.6k	8/4	36 x 30 x 19	Opt.	Opt.	133	1300.00	
	LaScala	Folded Horn	15	2	Horn	1	Horn			45-17 ±5	104	20	400.6k	8/4	36 x 24 x 25	Birch		130	853.00	
	Cornwall II	Bass Ref.	15	1½	Horn	1	Horn			38-20 ±3	101	20	600.6k	8/4	36 x 26 x 16	Opt.	Opt.	100	819.00	
	Forte	Pas. Rad.	12	1½	Horn	1	Horn			32-20 ±3	98	20	800.6k	8/4	35 x 12 x 17	Opt.	Opt.	65	590.00	
	Heresy II	Inf. Baf.	12	1½	Horn	1	Horn			50-20 ±3	96	20	700.6k	8/4	21 x 16 x 13	Opt.	Opt.	50	441.00	
	KG4	Pas. Rad.	(2)8			1	Horn			38-20 ±3	94	30	1.8k	6/4	28 x 11 x 16	Opt.	Opt.	45	300.00	
	KG2	Pas. Rad.	8			1	Dhorm			38-20 ±3	90.5	30	1.8k	4/4	19 x 12 x 13	Opt.	Opt.	25	210.00	
KDSS	M/100 Plus	Powered Bass Ref.	(2)4½			1	Dome			50-30	Inc.	2.5k		13 x 5 x 6	Wal. Vinyl	Brown Knit	27	259.95		
	M/90 Plus	Bass Ref.	(2)4½			1	Dome			50-30	88	10	2.5k	6/4	13 x 5 x 6	Wal. Vinyl	Brown Knit	15	219.95	
	M/80 Plus	Ac. Sus.	(2)4½			1	Dome			50-30	86	10	2.5k	6/4.5	13 x 5 x 6	Wal. Vinyl	Brown Knit	8	189.95	
	M/60 Plus	Ac. Sus.	4½			1	Dome			100-30	84	10	2.25k	8/6	8 x 5 x 6	Wal. Vinyl	Brown Knit	4.9	134.95	
	JCK 5000 "Kordless"	Powered Ac. Sus.	6½			2	Cone	T		40-20	Inc.	1.5k		15 x 9 x 5	Wal. Vinyl	Brown Knit		349.95		
LANCER ELECTRONICS	LE-50	Vented	6½			¾	Dome			49-20	87	10	4.5k	4/4	14 x 9 x 9	Oiled Wal.	Black Knit	12	150.00	
	LE-70	Ac. Sus.	10			1	Dome	T		39-20	90	15	2k	8/6	21 x 13 x 10	Oiled Oak	Black Knit	30	200.00	
	LE-90	Vented	10	4½	Cone	1	Dome	M, T		28-20	90	25	800.4k	8/6	39 x 14 x 11	Oiled Oak	Black Knit	48	350.00	
	LE-100	Vented	12	4½	Cone	1	Dome	M, T		36-20	92	25	600.4k	8/6	26 x 15 x 12	Oiled Oak	Black Knit	45	400.00	
	LE-200	Vented	10	3	Dome	1	Dome	M, T		27-20	90	25	700.4,5k	8/6	39 x 16 x 13	Oiled Wal.	Black Knit	57	600.00	
LANTANA	TAD	Vented	(2)4½			2	Cone	T		50-19 ±3	90	20	2k	6/3	17 x 6 x 5	Opt.	Opt., Knit	26 Pair	400.00	
	LAUG Single Channel	Vented, Mono Subwoof.	(2)8							28-100 ±3	20	90		6/3	33 x 11 x 10	Opt.	Opt., Knit	47	800.00	
	LAUG Dual Channel	Vented, Stereo Subwoof.	(2)8							28-100 ±3		90		8/3	33 x 11 x 10	Opt.	Opt., Knit	47	450.00	
LASER AUDIO	FXT-6	Bass Ref.	6½			1	Dome							8/4	15 x 11 x 8	Black Vinyl	Black Knit			
	FXT-8 MKVII	Bass Ref.	8			1	Dome					15		8/4	20 x 10 x 11	Black Vinyl	Black Knit			
	FXT-10 MKVII	Tuned Port	(2)10			1	Dome			35-20 ±2	94	15	3.5k	8/4	33 x 13 x 12	Black Vinyl	Black Knit	30	899.90	
	Signature	Bass Ref.	6½			1	Dome							8/4	Three Pieces	Black Lacq.	Black Knit	46 Sys.	2000.00	
	Signature Subwoofer	Bass Ref. (4)8	15											4/	17 x 32 x 20	Black Lacq.	Black Knit	145	2000.00	
	R-100 MKVI	Bass Ref.	10	4	Cone	1	Dome					15		8/4	30 x 16 x 15	Black Vinyl	Black Knit	40½	699.90	
	R-150 MKVI	Bass Ref.	12	4	Cone	1	Dome					15		8/4	30 x 16 x 15	Black Vinyl	Black Knit	40½	799.90	
	Signature Reference 1000	Bass Ref.	6½, 10			1	Dome							8/4	39 x 13 x 12	Black Vinyl	Black Knit	31		
Signature Reference 1200	Bass Ref.	8, 10			1	Dome							8/4	39 x 13 x 12	Black Vinyl	Black Knit	31½			
LINN HI-FI	DMS Isobarik	Isobarik	(2) 9x12 (2)8	(2)5	Cones	(2)¾	Domes			25-20 ±3	86	50	375.3k	4/3	17 x 15 x 30	Teak	Black Foam	95	3295.00	
	SARA Isobarik	Isobarik				¾	Dome			36-20 ±3	86	35	1.5k	4/3	17 x 14 x 10	Teak	Black Foam	31	1350.00	
	Kan	Inf. Baf.	5			¾	Dome			70-20 ±3	86	15	3k	8/6	8 x 6 x 12	Teak	Black Cloth	11	550.00	
	Index	Inf. Baf.	8			1	Dome			60-20 ±3	86	10	2k	8/6	17 x 11 x 8	Black Cloth	Black Cloth	17	425.00	



by

ENERGY

If you aspire to owning the famous Energy 22 Pro Monitor but can't quite afford it, hear the ESM-2. With size and performance approaching the 22, it is "both a fine loudspeaker and an excellent value."

Or perhaps the more compact ESM-3 will better suit you - it is "definitely an excellent value."

On a student budget? Try the new ESM-4 bookshelf monitor - very affordable!

Audition any of the ESM monitors. We think you'll agree with what *Stereo Review*, *High Fidelity* and *Audio Ideas* say below.



ALL ESM MODELS COME IN MIRROR-IMAGED PAIRS AND ARE AVAILABLE IN EITHER WALNUT GRAIN OR BLACK ASH.

"AMAZING AT THE PRICE"

"response varied only ± 1.5 dB from 180 to 18,000 Hz which is unquestionably one of the smoothest responses we have yet encountered from a speaker ... dispersion on a par with response flatness ... phase shift highly linear ... excellent peak power-handling ability ... only at 100 Hz did we manage to reach the speaker's (power handling) limits: with 990 watts (using single cycle bursts followed by 128 cycles of silence) ... smooth midrange and high frequency response, excellent dispersion and group delay, and exceptional short-term power-handling ability ... definitely an excellent value"
Stereo Review February 1986, on the ESM-3

"a fine loudspeaker and an excellent value ... very smooth and quite flat, falling within $\pm 3\frac{1}{2}$ dB on-axis throughout the range above the 50 Hz band ... in the lab's 300 Hz pulse test the ESM-2 accepted without noticeable complaint the full output of the test amplifier ... (470 watts, peak into 8 ohms), for a calculated SPL (Sound Pressure Level) of 114 $\frac{3}{4}$ dB. Loud transients thus should be handled well ... bass sounds more extended than the response curves might suggest, with surprising heft at the very bottom ... Stereo imaging, too is very good ... **Even if your budget can accommodate twice the ESM-2's price - you owe it to yourself to audition Energy's latest design.**"
High Fidelity January 1986, on the ESM-2

"exceptional overtone balance ... imaging was just about the best I've heard ... excellent dynamic range ... it sounds great ... no real compromises in its design ... anyone looking for a \$1,500.00 to \$2,000.00 system would be foolish not to carefully audition the Energy ESM-2 ... amazing at the price."
Audio Ideas, 1985 edition, on the ESM-2



THE #1 CHOICE

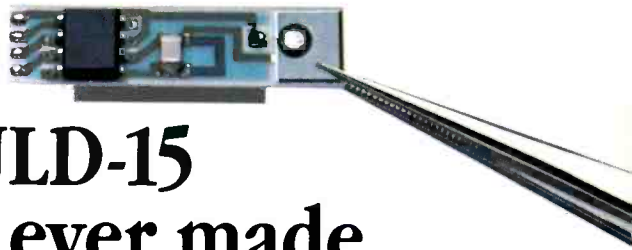
by **ENERGY**

Energy Loudspeakers, 135 Torbay Road, Markham, Ontario L3R 1G7 - (416) 475-0050 • TLX 06-986689

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Sensitivity Level, dB/Watt/1 Meter @ 1 kHz		Recommended Frequency Response, Hz to kHz		Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
MADISOUND	Sledgeling	Sealed	6 1/2			3/4	Dome		90	3.2k	4/3.5	9 x 12 x 6	Oiled Wal. Oak	Brown Knit		300.00	Pair			
	The Movie	Sealed	12	(2)6	Cones	1	Dome		95	50	400,6k	8/6	Four Pieces	Brown Knit		1500.00	Sys.			
	Thallic	Sat. & Sealed Subwoof.	12	6	Cone	3/4	Dome		88	100	100,4k	4/3.5	Three Pieces	Oak	Brown Knit		900.00	Sys.		
MAGNASPHERE	Delta II	Ac. Sus.	(6)5 1/4	(2)2	Domes	(2)1	Domes		32-29 ±3	89	30	200,800.5k	4/3	14 x 44 x 14	Opt., Enam.	Black Mesh	65	2990.00	Pair	
	Gamma	Ac. Sus.	(2)8 (2)5 1/4	(2)2	Domes	(2)1	Domes		32-29 ±3	88	30	200,800.5k	4/3	14 x 50 x 14	Opt., Wood	Black Mesh	67	2190.00	Pair	
	Beta	Ac. Sus.	8, 5 1/4	(2)2	Domes	(2)1	Domes		37-29 ±3	88	30	200,800.5k	4/3	13 x 43 x 13	Opt., Wood	Black Mesh	54	1790.00	Pair	
MAGNAT	Monitor D	Ac. Sus.	10	4	Cone	1	Dome		40-29 ±3	90	25	700,2k	4/3	17 x 25 x 16	Black Vinyl	Black Mesh	27	500.00	Pair	
	Monitor C	Ac. Sus.	8	4	Cone	1	Dome		46-29 ±3	90	25	800,2k	4/3	15 x 23 x 14	Black Vinyl	Black Mesh	22	430.00	Pair	
	Monitor B	Ac. Sus.	8	4	Cone	1	Dome		54-29 ±3	90	25	800,2k	4/3	14 x 21 x 14	Black Vinyl	Black Mesh	20	370.00	Pair	
	Monitor A	Ac. Sus.	8	4	Cone	3/4	Dome		54-20 ±3	90	25	950,5k	4/3	14 x 20 x 18	Black Vinyl	Black Mesh	18	300.00	Pair	
	MSP 300	Ac. Sus.	(2)8	3	Cone/Dome	1	Dome		32-29 ±3	88	30	500,3.5k	4/3	12 x 43 x 11	Opt., Wood	Opt., Knit	60	1490.00	Pair	
	MSP 200	Ac. Sus.	8	3	Cone/Dome	1	Dome		37-29 ±3	88	30	850,5.5k	4/3	12 x 37 x 11	Opt., Wood	Opt., Knit	52	1290.00	Pair	
	MSP 110	Ac. Sus.	8	3	Cone/Dome	1	Dome		39-29 ±3	88	30	500,3k	4/3	12 x 31 x 11	Opt., Wood	Opt., Knit	42	1090.00	Pair	
	MSP 70	Ac. Sus.	10	2 3/4	Dome	1	Dome		39-29 ±3	90	25	600,2.5k	4/3	13 x 23 x 12	Black Vinyl	Black Knit	33	790.00	Pair	
	MSP 60	Vented	8	2 3/4	Dome	1	Dome		41-29 ±3	90	25	800,2.5k	4/3	12 x 20 x 11	Black Vinyl	Black Knit	29	650.00	Pair	
	MSP 50	Ac. Sus.	8			1	Dome		45-29 ±3	88	25	1.8k	4/3	11 x 17 x 10	Black Vinyl	Black Knit	22	500.00	Pair	
	MSP 10	Vented	5 1/4			1	Dome		60-29 ±4	88	25	4k	4/3	6 x 9 x 7	Black Vinyl	Black Mesh	7	390.00	Pair	
MAGNEPAN	Magneplanar SMGa	Planar Mag.	370 Sq. In.			58 Sq. In.	Planar Mag.		50-18 ±4	88	40	2.4k	4/4	19 x 48 x 2	Oak	Opt.	25	535.00	Pair	
	Magneplanar MG-Ic	Planar Mag.	428 Sq. In.			68 Sq. In.	Planar Mag.		45-18 ±4	85	40	1.5k	5/5	22 x 60 x 2	Oak	Opt.	35	875.00	Pair	
	Magneplanar MG-IIc	Planar Mag.	500 Sq. In.			68 Sq. In.	Planar Mag.		40-18 ±4	84	50	800	5/5	22 x 71 x 2	Oak	Opt.	46	1225.00	Pair	
	Magneplanar MG-2.5/R	Planar Mag. & Ribbon	606 Sq. In.			9 Sq. In.	Ribbon	Opt.	35-40 ±4	85	50	1k	4/4	22 x 71 x 2	Oak	Opt.	48	1550.00	Pair	
	Magneplanar MG-IIIa	Planar Mag.	620 Sq. In.	170 Sq. In.	Planar Mag.	15 Sq. In.	Ribbon	Opt.	32-40 ±4	85	50	400,3k	4/4	24 x 72 x 2	Oak	Opt.	52	1995.00	Pair	
	Magneplanar MG-IVa	Planar Mag. & Ribbon	1254 Sq. In.	135 Sq. In.	Planar Mag.	15 Sq. In.	Ribbon	Opt.	30-40 ±4	87	100	350,3k	4/4	54 x 72 x 2	Oak	Opt.	106	3800.00	Pair	
MAGNUS	A10	Vented	10			2 1/4 x 4 1/2	Horn		45-20	91	10	4k	6/	23 x 13 x 12	Wood Vinyl	Brown Cloth	26	159.95		
	A11	Vented	10	6	Cone	2 1/4 x 4 1/2	Horn	M.T	40-20	92	10	500,4k	6/	23 x 13 x 12	Wood Vinyl	Brown Cloth	27	199.95		
	A12	Vented	12	6	Cone	2 1/4 x 4 1/2	Horn	M.T	35-20	93	10	500,4k	6/	26 x 16 x 12	Wood Vinyl	Brown Cloth	35	249.95		
	A24	Vented	(2)12	6	Cone	2 1/4 x 4 1/2	Horn	M.T	33-20	93	10	500,4k	6/	41 x 17 x 11	Wood Vinyl	Brown Cloth	54	349.95		
MAN	MPS-1	Trans. Line	5						35-19 ±3	92	20		8/6	6 Dia. x 54	Opt.	Black Foam	20	1490.00	Pair	
MARANTZ	SP800	Ported	8	4	Cone	2	Cone		70-20	89			8/	26 x 13 x 9	Wal. Vinyl	Black Knit	16.4	150.00	Pair	
	SP1000	Ported	10	4	Cone	3	Cone		40-20	89			8/	27 x 13 x 11	Wal. Vinyl	Black Knit	25.4	240.00	Pair	
	SP1200	Ported	12	4	Cone	3	Cone		25-20	90			8/	30 x 15 x 13	Wal. Vinyl	Black Knit	32.4	300.00	Pair	
	SP1515	Ported	15	5	Cone	3	Cone		18-20	90			8/	33 x 18 x 17	Wal. Vinyl	Black Knit	47.4	400.00	Pair	
	SP208	Inf. Bal.	8			2	Cone		80-20	90			8/	19 x 11 x 8	Oak Vinyl	Black Knit	10.5	120.00	Pair	
	SP103	Inf. Bal.	10	4	Cone	3	Cone		40-20	90			8/	38 x 13 x 11	Oak Vinyl	Black Knit	29.9	300.00	Pair	
	SP104	Pas. Rad.	10	4	Cone	3	Cone		35-20	90			8/	38 x 13 x 11	Oak Vinyl	Black Knit	29.9	340.00	Pair	
	SP124	Pas. Rad.	12	4	Cone	3	Cone		25-20	91			8/	38 x 14 x 14	Oak Vinyl	Black Knit	33.7	400.00	Pair	
MARIAH ACOUSTICS	Thimble	Ac. Sus.	6 1/2			1	Dome		55-20 ±3	90	20		6/	10 Dia. x 16	Oak	Opt., Knit	38	328.00	Pair	
	L.S. #4III	Bass Ref.	8			1	Dome		45-20 ±3	90	20		6/	12 Dia. x 23	Oak	Opt., Knit	48	398.00	Pair	
	L.S. #3II	Bass Ref.	10			1	Dome		38-20 ±2.5	87	30		8/	14 Dia. x 36	Oak	Opt., Knit	50	598.00	Pair	
	L.S. #2II	Bass Ref.	(2)8			1	Dome		35-20 ±2.5	88	30		8/	14 Dia. x 38	Oak	Opt., Knit	50	848.00	Pair	
MARTIN-LOGAN	The Monolith	ES & Subwoof.	12				ES		27-22 ±2	90	50	100	/6	74 x 26 x 12	Laccq. Oak	Black Knit	330	4850.00	Pair	

This little device makes Velodyne's ULD-15 the best subwoofer ever made.



It's called an accelerometer. And you'll find one attached to the voice coil of every Velodyne™ ULD-15™ Subwoofer System. Velodyne's patented High Gain Servo (HGS) technology uses the accelerometer to make the ULD-15's bass reproduction superior to any product on the market.

Bass is by far the most difficult music to reproduce. It puts the heaviest demands on your speakers and amplifier. In fact, most woofers can't play the lowest frequencies. Or can't play them clearly. And no conventional loudspeaker can play bass loudly without breaking up. Or without massive distortion.

HGS technology ends these problems forever.

Motional feedback makes the difference.

HGS is based on motional feedback, a process in which cone motion is monitored and, when necessary, corrected. As the woofer cone moves, the accelerometer reports the motion to our Power Servo Controller. There, it's compared to the input signal – some 3500 times per second. If the woofer cone's out of step with the input, it's instantly corrected. The result? A subwoofer that's flat to below 20 Hz. And virtually distortion-free bass that can't become boomy, muddy or out of control, especially at louder listening levels.



™ Velodyne and ULD 15 are trademarks of Velodyne Acoustics, Inc.

More muscle. Accurate bass requires large drivers and lots of amplifier power. So the ULD-15 matches a 96 oz. magnet structure, 3-inch voice coil (with a full 3/4-inch peak-to-peak travel) to 350 watts of dedicated bass power. That's muscle enough to reproduce even the most demanding deep bass passages – effortlessly.



Cross-section of ULD-15 driver with accelerometer in housing (red) mounted on voice coil (blue). Circuit board contains associated HGS electronics.

Better mids and highs. Beyond adding bass power to your system, our Power Servo Controller incorporates an electronic crossover that frees your main speakers and amplifier from the burden of bass reproduction. This lets them do what they do best – play the mids and highs. And your system's output capability is virtually doubled.

Listening is believing. You owe it to yourself to audition a Velodyne ULD-15 Subwoofer System. Listen to its tightness on drumbeats. Its penetration on deep bass passages. Its overall clarity and punch. You'll agree it's the best subwoofer ever made.

Call **800-VELODYNE** (408-436-0688 in California) for the Velodyne dealer nearest you.

Velodyne

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Power. Precision. Performance. The new generation of Citation separates goes far beyond its predecessors to create the ultimate listening experience.

Designed and developed by Harman Kardon, one of the most respected names in audio, every generation of Citation has earned a reputation of excellence with audiophiles around the world. A true testing and proving ground for the most revolutionary audio concepts, Citation's innovations have ultimately been featured in all Harman Kardon components.



Dr. Sidney Harman, Founder and Chairman of Harman Kardon.

Steeped in audio breakthroughs and advanced designs, Harman Kardon's Citation division introduced the world's first Ultrawideband amplifier in 1963—the Citation 2 vacuum tube amplifier. In 1972, the Citation 14, the first FM stereo tuner with Phase Locked Loop (PLL) MPX decoding

was introduced. In 1977, the 150-Watt-per-channel Citation 19 became the first power amplifier to feature low negative feedback. 1981 saw the introduction of the Citation XX. Its exclusive High Instantaneous Current Capability (HCC) design provided the instantaneous current required to precisely drive and control any loudspeaker system.

Now, just as the original Citation separates established design innovations that were years ahead of their time, the new Citation series sets the standards for the decade to come.

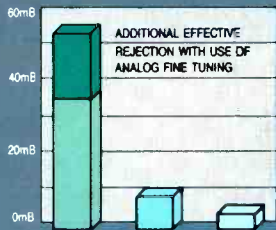
The new Citation twenty-three makes tuner design history as the world's first Active Tracking tuner and the world's first synthesized tuner with Analog Fine Tuning. This patented system delivers two aspects of tuner performance that were previously mutually exclusive: high selectivity and high fidelity. Its

superior adjacent and alternate channel rejection lets you tune in more stations with more fidelity than was ever before possible.



A thorough analysis of internal layout and a strict code of symmetrical circuitry ensure rapid, accurate reproduction of the music signal.

**20Hz-20kHz < 0.08% THD into 8 Ohms and into 4 Ohms.*



■ CITATION TWENTY-THREE ■ TYPICAL SINGLE IFT TUNER
■ NARROW MODE OF TYPICAL WIDE/NARROW TUNER

In contrast to traditional methods, the Citation twenty-three's Active Tracking circuitry provides previously unheard of adjacent channel selectivity, with little or no sacrifice in stereo separation or THD.

As the world's first High Voltage/High Current power amplifiers, the 200-Watt-per-channel Citation twenty-two and the 100-Watt-per-channel* Citation twenty-four redefine amplifier design. With just the flick of a switch, their exclusive High Voltage/High Current technology lets you select the optimum mode for driving either 8-Ohm or 4-Ohm loudspeakers. The result is higher power output and cleaner, clearer sound than any traditional design, without distortion, overheating or current limiting.*

In an area where the smallest interference can result in the biggest problems, the new Citation twenty-one preamplifier further ensures accurate signal reproduction. Its symmetrical circuitry and many design refinements offer the most precise amplification, for a difference you can hear.



Gold-plated input jacks on the Citation twenty-one preamplifier provide reduced signal loss and improve long-term conductivity.

Citation's attention to detail can be seen as well as heard. The heavy roloc-steel, rubber-mounted chassis creates a solid, vibration-free environment that combines world class styling with sophisticated American industrial design.

The new Citation series from Harman Kardon. The next generation of the world's premier high fidelity components.

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Citation
harman/kardon

Citation. The next generation.



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches			Separate Level Controls Woofer, W Midrange, M, Tweeter, T Superwoofer = ST			Analogic Frequency Response, Hz to kHz, ± dB			SPL, 1 Watt/1 Meter, dB			Recommended Min. Amp Power, Watts			Crossover Frequencies, Hz			Impedance, Ohms: Nominal/Minimum			Dimensions, Inches (To Nearest Inch)			Finish			Grille Color and Material			Weight, Lbs.			Price, \$		
			Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter			
MARTIN-LOGAN (Continued)	The CLS The Sequel	Dipole ES ES & Subwoof.	10						ES				45-22 ±2 30-22 ±2	87	50				6/3					56 x 26 x 2	Lacq. Oak Lacq. Oak				135 Pair 220 Pair	2490.00 Pair 1995.00 Pair														
MASTERCRAFT AUDIO	Sound Panels SP-MK 1	Ac. Sus.	8			1			Dome	T			40-22 ±3	89	30	3.1k	8/						12 x 6 x 26	Black Lam. Opt.	Black Knit	58 Pair	759.00 Pair																	
	Sound Panels SP-MK 2	Ac. Sus.	(2)8			1 1/4			Dome, Piezo	T			37-27 ±3	91	30	3k	4/						30 x 15 x 8	Black Knit	Black Knit	88 Pair	1099.00 Pair																	
	Black Box	Ac. Sus.	8			1			Dome				45-22 ±3	91	10	3.1k	8/						14 x 10 x 8	Opt.	Black Knit	42 Pair	349.00 Pair																	
	Music Monitor SW-1	Ac. Sus.	10			1			Dome				38-21 ±3	92	15	2.5k	8/						15 x 26 x 11	Opt.	Black Knit	60 Pair	559.00 Pair																	
			Ac. Sus. Subwoof.	12							W			28-90 ±3	89	50	90	8/						30 x 15 x 10	Opt.	Black Knit	42 Pair	529.00 Pair																
MASTER MUSIC	PY 250	Pressure Chamber Bass Ref.	10	3	Cone	1			Dome	No			32-22 ±1.9	91	20	500,4.4k	8/4						47 x 15 x 15	Opt., Lacq.	Iron Mesh	87	1900.00 Pair																	
	PY 200	Pressure Chamber Bass Ref.	10	2	Dome	1			Dome	No			32-22 ±1.9	91	20	500,4.4k	8/4						41 x 15 x 15	Opt., Lacq.	Iron Mesh	70	1480.00 Pair																	
	PY 150	Pressure Chamber	8			1			Dome	No			38-20 ±3.5	89	20	2.2k	8/4						33 x 13 x 14	Opt., Lacq.	Iron Mesh	48	1260.00 Pair																	
	PY 100	Pressure Chamber	6 1/2			1			Dome	No			45-20 ±4	89	20	2.2k	8/4						24 x 10 x 12	Opt., Lacq.	Iron Mesh	33	1240.00 Pair																	
	PY 50	Pressure Chamber	4			1			Cone	No			90-20 ±4	87	15	2.2k	8/4						16 x 7 x 7	Opt., Lacq.	Iron Mesh	22	500.00 Pair																	
	SWX	Pressure Chamber Bass Ref. Subwoof.	12										29-110 ±2.5	99	20		8/4						17 x 16 x 16	Opt., Lacq.	Iron Mesh	44	420.00 Pair																	
	LS 200	Pressure Chamber	(2)8	3	Cone	1			Dome	No			34-20 ±3.2	90	30	500,4.4k	8/4						40 x 11 x 10	Opt., Lacq.	Iron Mesh	46	1290.00 Pair																	
	LS 190	Pressure Chamber	(2)6 1/2	3	Cone	1			Dome	No			38-20 ±3.4	89	20	500,4.4k	8/4						35 x 11 x 10	Opt., Lacq.	Iron Mesh	40	1230.00 Pair																	
	LS 180	Pressure Chamber	8	3	Cone	1			Dome	No			38-20 ±4	89	20	500,4.4k	8/4						30 x 10 x 12	Opt., Lacq.	Iron Mesh	37	1170.00 Pair																	
	LS 120	Pressure Chamber	10	3	Cone	1			Dome	No			38-22 ±2.8	89	20	500,4.4k	8/4						18 x 12 x 10	Opt., Lacq.	Iron Mesh	30	1070.00 Pair																	
LS 90	Pressure Chamber	6 1/2			1			Dome	No			38-20 ±3.2	88	20	2.2k	8/4						13 x 8 x 8	Opt., Lacq.	Iron Mesh	23	860.00 Pair																		
MAVRICK	Absolute Reference Monitor	Powered Trans. Line	(2)6						Helium Plasma				22-100 ±3			Inc.								Nine Pieces w/Four Mono Amps & Preamp	Opt.	Opt.		30,000. Sys.																
MB ELECTRONICS	220	Inf. Baf.	6 1/2			1			Dome				50-32		20	1.5k	4/						8 x 8 x 12	Opt.	Opt.	12	379.00 Pair																	
	280	Inf. Baf.	8			1			Dome				40-32		35	1.5k	4/						11 x 10 x 19	Opt.	Opt.	22	449.00 Pair																	
	480	Inf. Baf.	10	2	Dome	1			Dome				32-32		45	550,1.5k	4/						13 x 14 x 22	Opt.	Opt.	37 1/2	949.00 Pair																	
	610S	Inf. Baf.	8	2	Dome	1			Dome				38-32		65	600,3.5k	4/						10 x 10 x 34	Opt.	Opt.	39 1/2	1300.00 Pair																	
	980S	Inf. Baf.	(2)8	2	Dome	1			Dome				28-32		75	600,3.5k	4/						11 x 11 x 39	Opt.	Opt.	55	2300.00 Pair																	
McINTOSH	XR1052	Pas. Rad.	10	5	Cone	1			Dome	M, T						55,450, 1.3k	8/						47 x 16 x 11	Wal.	Black Knit	83	1250.00																	
	XRT18	Inf. Baf.	12	6	Cone	(16)1			Domes							150,250, 1.5k	8/						Two Pieces per Side	Wal.	Black Knit	92	2250.00																	
	XRT22	Inf. Baf.	(2)12	8	Cone	(23)1			Domes							150,250, 1.5k 1k	8/						Two Pieces per Side	Wal.	Black Knit	215	3750.00																	
	XL1	Inf. Baf.	6			1			Dome							90	8/						13 x 8 x 7	Wal.	Black Knit	15	525.00 Pair																	
	XL1W	Inf. Baf. Subwoof.	12													90	8/						28 x 18 x 12	Wal.	Black Knit	55	549.00																	
	XL10	Pas. Rad.	8			1			Dome							90,1k	8/						25 x 14 x 8	Wal.	Black Knit	27 1/2	429.00																	
	X0715	Inf. Baf.	10	5	Cone	1			Dome							375,1k	8/						30 x 15 x 10	Wal.	Black Knit	50	599.00																	
X0717	Inf. Baf.	12	6 1/2	Cone	1			Dome							375,1k	8/						38 x 18 x 11	Wal.	Black Knit	70	799.00																		
MERIDIAN	M100	Triamped Pas. Rad. Blamped Port	(4)5	(2)5	Cones	2			Dome				33-20 ±3		Inc.	190,2k	22k						40 x 16 x 18	Opt.	Black Knit	101	6300.00 Pair																	
	M20	Triamped Pas. Rad. Blamped Port	(2)5			2			Dome				35-20 ±3		Inc.	2k	22k						20 x 7 x 15	Opt.	Black Knit	39.6	2300.00 Pair																	
	M30	Triamped Pas. Rad. Blamped Port	6			2			Dome				38-20 ±3		Inc.	2k	22k						15 x 7 x 12	Black	Black Knit	15.4	1625.00 Pair																	
MERLIN	1B +	Bass Ref.	6.5			1			Dome	T			45-22 ±3	87	30	2.7k	8/6.2						11 x 11 x 36	Opt.	Black Foam	50	690.00 Pair																	
	2B +	Bass Ref.	8			1.1			Dome	T			38-32 ±3	89	30	1.7k	8/6.2						12 x 12 x 42	Opt.	Black Foam	62	960.00 Pair																	
	3B +	Bass Ref.	8	4	Cone	1.1			Dome	M, T			33-32 ±3	90	30	600,2.1k	8/6.2						13 x 16 x 42	Opt.	Black Foam	120	1880.00 Pair																	
	4 +	Bass Ref.	(2)8	(2)4	Cones	1.1			Dome	M, T			30-32 ±3	92	30	600,2.1k	4/3.8						13 x 16 x 65	Opt.	Black Foam	185	3100.00 Pair																	

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofers			Midrange		Tweeter		SPL, 1 Watt, 1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance, Ohms Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type											
<small> Separate Low Control? Wood=W, Metal=M, Paper=P, T=Super Tweeter=ST Midrange=M, Tweeter=T, Super Tweeter=ST Anchoic Frequency Response, ±dB SPL, 1 Watt, 1 Meter, dB Recommended Min. Amp Power, Watts Crossover Frequencies, Hz Impedance, Ohms Nominal/Minimum Dimensions, Inches (To Nearest Inch) Finish Grille Color and Material Weight, Lbs. Price, \$ </small>																		
MIRAGE ACOUSTICS	210	Ported	6½			¾	Dome		60-20 ±3	88	15	2.2k	6/4	15 x 9 x 9	Black Vinyl	Black Knit	15	230.00 Pair
	360	Ported	8			¾	Dome		50-20 ±3	88	15	2.2k	6/4	20 x 10 x 9	Black Vinyl	Black Knit	20	300.00 Pair
	460	Ported	8			1	Dome		40-20 ±3	88	15	2.2k	6/4	25 x 10 x 11	Black Vinyl	Black Knit	31	400.00 Pair
	M3	Ported, Bipolar	(2)6½			(2)¾	Domes		25-20 ±3	86	40	2.2k	6/4	41 x 15 x 8	Black Vinyl	Black Knit	40	
	M2	Ported, Bipolar	(2)6½			(2)¾	Domes		30-22 ±3	86	40	2.2k	6/4	53 x 16 x 7	Black Vinyl	Black Knit	60	
	M1	Ported, Bipolar	(2)8	(2)4	Cones	(2)¾	Domes		20-22 ±2	86	60	300, 2.2k	6/4	59 x 19 x 9	Black Lacq.	Black Knit	120	4000.00 Pair
MISSION	70	Inf. Baf.	7			¾	Dome		60-20 ±3	90	20	3.4k	6/	14 x 8 x 8	Black		11	249.00 Pair
	700	Inf. Baf.	7			¾	Dome		55-20 ±3	90	20	3.5k	6/	15 x 8 x 8	Opt.		13	349.00 Pair
	707	Bass Ref.	8			¾	Dome		50-20 ±3	91	20	2.7k	8/	18 x 10 x 11	Opt.		17½	499.00 Pair
	737	Bass Ref.	8			¾	Dome		40-20 ±3	88	30	2.5k	8/	21 x 10 x 11	Opt.		20½	649.00 Pair
	770	Bass Ref.	8			1	Ellip. Load.		35-20 ±3	91	30	1.9k	8/	24 x 10 x 13	Opt.		35	899.00 Pair
	780	Inf. Baf.	(2)8			1	Dome Ellip. Load.		30-20 ±3	95	50	1.7k	4/	37 x 10 x 13	Opt.		61	1500.00 Pair
	M & K	S1B	Ac. Sus. Sat.		(2)5	Cones	(2)1	Domes	M, T	65-22 ±3	96	7.5	2k	4/4	21 x 8 x 8	Opt., Wood	Black Knit	18
S2B		Ac. Sus. Sat.		6½	Cone	1	Dome	M, T	65-22 ±3	93	10	2k	4/4	13 x 9 x 8	Opt., Wood	Black Knit	15	525.00 Pair
S3B		Ac. Sus. Sat.		5	Cone	1	Dome	M, T	85-22 ±3	93	10	2k	4/4	11 x 7 x 7	Opt.	Black Knit	9	425.00 Pair
SX4		Ac. Sus. Sat.		(2)5	Cones	(2)1	Domes	M, T	65-22 ±3	96	7.5	2k	4/4	20 x 8 x 7	Opt.	Black Knit	14	475.00 Pair
SX7		Ac. Sus. Sat.		4	Cone	¾	Dome		100-20 ±3	87	5	2k	4/4	8 x 5 x 5	Black Metal Opt., Wood	Perf. Metal Knit	6	220.00 Pair
V1B		Powered Ac. Sus. Subwoof.	12					W	20-125 ±3	Inc.	50-125	600		18 x 19 x 17	Opt., Wood	Black Knit	50	800.00 Pair
V2B		Powered Ac. Sus. Subwoof.	12					W	24-125 ±3	Inc.	50-125	600		18 x 19 x 17	Opt., Wood	Black Knit	43	650.00 Pair
V3B		Powered Ac. Sus. Subwoof.	12					W	24-125 ±3	Inc.	50-125	600		18 x 18 x 15	Black	Black Knit	38	550.00 Pair
VX4		Powered Ac. Sus. Subwoof.	12					W	30-125 ±3	Inc.	50-125	600		19 x 18 x 14	Opt.	Black Knit	38	400.00 Pair
VX7		Powered Ac. Sus. Subwoof.	8					W	40-180 ±3	Inc.	90-180	600		12 x 10 x 10	Black Vinyl	Black Knit	21	330.00 Pair
MONITOR AUDIO	BM100	Sealed Box	4			1	Dome		80-20 ±3	89	10		8/	7 x 4 x 4	Black	Black	10	229.00 Pair
	R100	Sealed Box	8			1	Dome		60-20 ±3	89	15		8/	16 x 10 x 7	Black Vinyl	Black Knit	13	269.00 Pair
	R252	Sealed Box	8			1	Dome		55-20 ±3	90	15		8/	19 x 10 x 10	Black Vinyl	Black Knit	16	379.00 Pair
	R352	Bass Ref.	8			1	Dome		50-20 ±3	91	20		8/	25 x 10 x 13	Opt., Wood	Opt.	29	559.00 Pair
	R700MD	Bass Ref.	6			1	Dome		55-20 ±3	89	20		8/	14 x 9 x 10	Opt., Wood	Opt.	20	599.00 Pair
	R652MD	Bass Ref.	6			1	Dome		50-20 ±3	89	20		8/	20 x 8 x 11	Opt., Wood	Opt.	22	859.00 Pair
	R852MD	Sealed Box	8			1	Dome		50-20 ±3	89	15		8/	18 x 10 x 11	Opt., Wood	Opt.	22	999.00 Pair
	R952MD	Sealed Box	(2)6			1	Dome		45-20 ±3	89	15		8/	31 x 9 x 13	Opt., Wood	Opt.	44	1349.00 Pair
	MORDAUNT-SHORT	MS10 MkII	Bass Ref.	4½			½	Dome		90-20 ±3	87	5	4.5k	8/7	11 x 8 x 7	Black	Black Cloth	8
MS15 MkII		Inf. Baf.	6½			½	Dome		80-20 ±3	87	10	4.5k	8/7	13 x 9 x 7	Black	Black Cloth	11	225.00 Pair
MS25Ti MkII		Inf. Baf.	8			¾	Dome		70-20 ±3	89	10	3k	8/7	16 x 10 x 9	Opt.	Black Cloth	15	275.00 Pair
MS35Ti MkII		Bass Ref.	8			¾	Dome		60-20 ±3	89	10	3k	8/7	20 x 10 x 9	Opt.	Black Cloth	18	350.00 Pair
MS45Ti MkII		Inf. Baf.	(2)8			¾	Dome		55-20 ±3	89	10	3k	8/7	25 x 10 x 12	Opt.	Black Cloth	25	500.00 Pair
MS55Ti MkII		Inf. Baf.	(2)8			¾	Dome		50-20 ±3	90	10	3k	8/7	33 x 10 x 12	Opt.	Black Cloth	40	700.00 Pair
MOREL ACOUSTICS	CR-7	Ac. Sus.	6			1.1	Dome		70-25 ±3	90	15	1.6k	6/4	7 x 11 x 7	Black	Black Knit	10	395.00 Pair
	MLP-201	Ac. Sus.	9			1.1	Dome		40-20 ±3	90	10	1.5k	8/6	10 x 16 x 10	Wood Ven.	Black Knit	16	295.00 Pair
	MLP-202II	Ac. Sus.	6			1.1	Dome		60-28 ±3	89	15	1.6k	6/4	8 x 13 x 10	Wood Ven.	Black Knit	14	445.00 Pair
	MLP-206	Ac. Sus.	9			1.1	Dome		38-25 ±3	89	20	2.2k	8/6	12 x 20 x 12	Wood Ven.	Black Knit	25	595.00 Pair
	MLP-403II	Ac. Sus.	9	3	Dome	1.1	Dome		38-25 ±3	90	20	500, 5k	6/4	21 x 12 x 10	Wood Ven.	Black Knit	26	750.00 Pair

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls? Woofer W. Midrange M. Tweeter = T. Super Tweeter = ST	Anechoic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
MOREL (Continued)	Duet	Ac. Sus.	6			1.1	Dome		40-22 ±3	91	15	1.8k	5/4	8 x 15 x 12	Wood Ven.	Black Knit	20	950.00 Pair
MORRISON AUDIO	1	Sealed	8			1	Dome	T		86	25	4.5k	8/6	9 x 12 x 29	Wal.	Brown Foam	40	1895.00 Pair
MTX	PRD110	Vented	10	4½	Cone	1	Dome		75-21	94.8	15	2k,5k	4/8	18 x 14 x 13	Gray Cptg. Gray Cptg.	Black Steel Black Steel	42	339.95
	TA-2	Tweeter Array				(2)1½	Domes		5k-17k	98	15	6k	4/	7 x 12 x 7	Gray Cptg. Gray Cptg.	Black Steel Black Steel	27 Pair	229.95
	PRO115	Vented	15	(2)5	Cones	3	Horn		60-21	96.6	15	2k,5k	8/	21 x 30 x 16	Gray Cptg. Gray Cptg.	Black Steel Black Steel	77	599.95
	PRD210	Vented	(2)10	(2)5	Cones	3	Horn		70-21	98.6	15	2k,5k	8/	23 x 18 x 13	Gray Cptg. Gray Cptg.	Black Steel Black Steel	64	439.95
	PRD215	Vented	(2)15	(2)5	Cones	3	Horn		50-21	99.2	15	2k,5k	8/	19 x 47 x 16	Gray Cptg. Gray Cptg.	Black Steel Black Steel	125	699.95
NAD	200	Ac. Sus.	8			1	Dome	T	40-25	90	10	1.7k	4/4	30 x 9 x 10	Opt., Wood Opt., Wood	Black Knit Black Knit	39	500.00 Pair
	300	Ac. Sus.	10	1½	Dome	1	Dome	T	32-25	90	10	900.3k	4/4	32 x 11 x 12	Opt., Wood Opt., Wood	Black Knit Black Knit	57	750.00 Pair
NAIM AUDIO	SBL	Ac. Sus.	8			¾	Dome		30-20 ±3	88		2.4k	6/6	11 x 11 x 34	Dpt.	Black Foam	60	2395.00 Pair
NAS	1	Trans. Line	8			1	Dome		42-20 ±3	90	15	3.5k	8/6	20 x 13 x 12	Oiled Wal.	Black Knit	80 Pair	595.00 Pair
	2	Trans. Line	8			1	Dome		35-20 ±3	90	15	3.5k	8/6	36 x 13 x 12	Oiled Wal.	Black Knit	105 Pair	795.00 Pair
	3	Trans. Line	(2)8	5	Cone	1	Dome		32-20 ±3	92	15	100,1.5k, 4k	8/5	48 x 13 x 12	Oiled Wal.	Black Knit	150 Pair	1295.00 Pair
	4	Bass Ref.	12	6x15	Horn	2x5½	Horn		40-20 ±3	92	25	500,6k	8/4	46 x 15 x 16	Oiled Wal.	Black Knit	225 Pair	1990.00 Pair
	5	Bass Ref.	15	6x15	Horn	2x5½	Horn		36-20 ±3	94	25	6k	8/6	54 x 15 x 20	Oiled Wal.	Black Knit	330 Pair	2990.00 Pair
NEC	RS-500	Ac. Sus.	12	5	Cone	1	Dome		40-20 ±4	92	15	2.2k,7k	8/5	14 x 27 x 11	Oak Vinyl Oak	Black Knit	35	499.00 Pair
	RS-100	Trans. Line	(2)8	1¾	Dome	1	Dome		28-18.5 ±3	90	25	2k,8.5k	4/	14 x 16 x 42	Oak Vinyl Oak	Brown Knit	103	1500.00 Pair
NELSON-REED	5-02	Inf. Baf.	5¼			¾	Dome		60-20 ±3	84	30	3.3k	8/6	12 x 8 x 7	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	25 Pair	520.00 Pair
	6-02/B	Ported	6½			¾	Dome		40-20 ±3	84	30	3.3k	8/6	19 x 12 x 10	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	25	620.00 Pair
	TW 1201	Subwoof.	12						32-120 ±3	84	30	120	8/6	18 x 18 x 18	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	63	570.00 Pair
	TW 1202	Inf. Baf. Subwoof.	12						32-120 ±3	84	30	120	8/6	25 x 15 x 12	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	48	870.00 Pair
	8-04 Pro	Slot Loaded	(2)8	3	Dome	¾	Dome		32-20 ±3	90	30	300,6k	8/6	39 x 15 x 12	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	120	2850.00 Pair
	8-02		8	4	Cone	¾	Dome		16-20 ±3	90	30	300,5.5k	8/6	36 x 15 x 12	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	69	1200.00 Pair
	1204	Inf. Baf. Subwoof.	(4)12						16-65 ±3	90	50	65	8/6	39 x 18 x 18	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	120	1200.00 Pair
	8-04/1204	Sat. & Subwoof.	(2)8, (8)12	3	Dome	¾	Dome		16-20 ±3	90	50	65,300,6k	8/6	Three Pieces	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit		
	5-02/1202	Inf. Baf. Sat. & Subwoof.	(2)12	5½	Cone	¾	Dome		32-20 ±3	84	30	120,3.3k	8/6	Four Pieces	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	123 Sys.	1390.00 Sys.
	5-02/1201	Inf. Baf. Sat. & Subwoof.	12	5½	Cone	¾	Dome		32-20 ±3	84	30	120,3.3k	8/6	Three Pieces	Opt., Wood Opt., Wood	Opt., Knit Opt., Knit	88 Sys.	1090.00 Sys.
NESTROVIC LABS	Type 5AS Mk. III T. Cab.	Nestrovic	8,10	4¾	Dome	4½	Planar	M,T	25-40 +1,-3	91	50	1k,7k	8/5	40 x 15 x 15	Opt., Wood	Black Knit	85	2800.00 Pair
	Type 5AS Mk. III R. Cab.	Nestrovic	8,10	4¾	Dome	4½	Planar	M,T	28-40 +1,-3	91	50	1k,7k	8/5	36 x 15 x 15	Opt., Wood	Black Knit	75	2600.00 Pair
	Type 4A	Sat.	8	4¾	Dome	4½	Planar		60-40 +1,-3	91	50	200,1k,7k	8/6	22 x 12 x 12	Opt., Wood Opt., Wood	Black Knit Black Knit	40	2400.00 Pair
	Type 8	Nestrovic Subwoof.	(2)12						18-200 +1,-3	91	75	200	8/5	22 x 26 x 26	Opt., Wood Opt., Wood	Black Knit Black Knit	125	1450.00 Pair
	System 12A	Sat. & Nestrovic Subwoof.	(2)8, (4)12	(2)4¾	Domes	(2)4½	Planars		18-40 +1,-3	91		200,1k,7k	8/5	Four Pieces	Opt., Wood Opt., Wood	Black Knit Black Knit	330 Sys.	5300.00 Sys.
	System 16A	Sat. & Nestrovic Subwoof.	(4)8, (4)12	(4)4¾	Domes	(4)4½	Planars		18-40 +1,-3	91		200,1k,7k	8/5	Six Pieces	Opt., Wood Opt., Wood	Black Knit Black Knit	410 Sys.	7700.00 Sys.
NIKKO	LS-100	Inf. Baf.	12	3	Cone	2	Cone		30-17 ±5	86	5	2k	8/4	38 x 16 x 11	Black Oak	Black Knit	42	125.00
NOBIS	DM-2st	Ported	(2)6			1	Dome		33-20 ±3	91	35	3k	4/3.6	9 x 13 x 40	Oak	Brown Knit	56	1550.00 Pair
	DM-3t	Ported	(2)6			1	Dome		33-20 ±3	91	35	3k	4/3.6	9 x 11 x 47	Oak	Brown Knit	51	1100.00 Pair
	DM-5	Ported	6			1	Dome		33-20 ±3	90	35	3k	4/3.6	9 x 13 x 21	Oak	Brown Knit	25	650.00 Pair
	DM-7	Ac. Sus.	6			1	Dome		55-20 ±3	89	35	3k	4/3.6	9 x 9 x 15	Oak	Brown Knit	18	450.00 Pair



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separable Low Cones/Woofer: W, Tweeter: W, Superwoofer: ST			Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
								Midrange	High	Low								
		Pressure Release Trans. Line		Midrange		Tweeter		SPL, 1 Watt/1 Meter, dB			Impedance		Dimensions		Weight		Price	
NONSPEAKER	Ribbon Monitor	Pressure Release Trans. Line	6									6/5	8 x 13 x 17	Oak		22	1500.00	
	Ribbon Reference III	Line Trans. Line	6									6/5	12 x 10 x 50	Black Lacq.		50	2000.00	
	Ribbon Reference II	Line Trans. Line	(2)6									6/5	12 x 10 x 50	Black Lacq.		52	2500.00	
	Ribbon Reference I	Line	(2)6									6/5	9 x 11-x 71	Black Lacq.		80	5000.00	
NORMAN LABS	52	Ac. Sus.	6½			1	Dome	75-18 ±3	91	15	2.5k	8/7	12 x 8 x 6	Opt., Wood	Brown Knit	25	260.00	
	62	Ac. Sus.	8			1	Dome	75-18 ±3	90	15	2.5k	8/7	16 x 10 x 8	Opt., Wood	Brown Knit	40	340.00	
	82	Ac. Sus.	10			1	Dome	70-18 ±3	91	15	2.5k	8/7	23 x 12 x 9	Opt., Wood	Brown Knit	60	410.00	
	83	Ac. Sus.	10	5¼	Cone	1	Dome	70-18 ±3	90	15	2k, 4.5k	8/5	23 x 12 x 9	Opt., Wood	Brown Knit	52	510.00	
	332	Ac. Sus.	10	5¼	Cone	1	Dome	55-18 ±3	92	15	2k, 4.5k	8/5	32 x 13 x 9	Opt., Wood	Brown Knit	86	800.00	
	432	Ac. Sus.	(2)10	5¼	Cone	1	Dome	50-18 ±3	93	15	600, 2k, 4.5k	6/4	44 x 15 x 9	Opt., Wood	Brown Knit	120	1000.00	
	632	Ac. Sus.	(3)10	5¼	Cone	1	Dome	45-18 ±3	93	15	300, 2k, 4.5k	4/3	50 x 17 x 11	Opt., Wood	Brown Knit	150	1500.00	
NOVAK	2	Ported	6½			¾	Dome	45-24 ±3	91.5	5		4/	21 x 11 x 10	Opt., Wood	Black Foam	22	300.00	
	2B	Ported	6½			¾	Dome	45-24 ±3	91.5	5		4/	21 x 11 x 10	Black Lam.	Black Foam	22	330.00	
NOW HEAR THIS	I	Ac. Sus.	6			1	Dome	65-23 ±3	91	20	2.8k	6/	12 x 7 x 10	Dpt.	Knit	13	349.00	
OHM ACOUSTICS	SCT	Vented						39-21 ±4	90	15		8/	12 x 12 x 36	Wal. Vinyl	Black Knit		700.00	
	Thirty	Vented	8		(2)1½		Cones		88	15		8/	11 x 16 x 10	Black Knit	Black Knit	17	495.00	
	Forty	Vented	8		¾		Dome		88.5	15		8/	16 x 26 x 7	Vinyl Black Knit	Black Knit	30	645.00	
	Walsh 5	Vented						25-25 ±4	88	100		4/	18 x 18 x 43	Ven. Opt., Ven.	Black Knit	95	4800.00	
	1XO	Vented						48-20 ±4	90	10		8/	12 x 12 x 33	Oiled Wal. Knit	Brown Knit	24	700.00	
	2XO	Vented						44-21 ±4	90.2	15		8/	12 x 12 x 33	Opt., Ven.	Black Knit	29	1000.00	
	3XO	Vented						36-22 ±4	90.6	18		8/	14 x 14 x 36	Opt., Ven.	Brown Knit	43	1500.00	
	4XO	Vented						32-23 ±4	91	30		8/	16 x 16 x 40	Opt., Ven.	Black Knit	63	2000.00	
	SCS	Vented						44-20 ±4	89	15		8/	12 x 12 x 32	Wal. Vinyl	Black Knit		549.00	
OMNI SOUND	TCM I	Vented	6½			1	Dome	62-22 ±3	90	20	3k	4/3.5	8 x 9 x 13	Vinyl Lam.	Black Knit	22	500.00	
	TCM II	Vented	8			1	Dome	50-22 ±3	92	20	3k	8/7	11 x 12 x 20	Vinyl Lam.	Black Knit	35	560.00	
	TCM III	Vented	8			1	Dome	36-22 ±3	92	20	3k	8/7	13 x 11 x 36	Vinyl Lam.	Black Knit	53	660.00	
	TCM IV	Vented	(2)8			1	Dome	31-22 ±3	93	20	425, 3k	8/6	13 x 11 x 36	Vinyl Lam.	Black Knit	61	795.00	
	TCM V	Vented	15	6½	Cone	1	Dome	28-22 ±3	97	50	425, 3k	8/6	15 x 20 x 54	Vinyl Lam.	Black Knit	113	1450.00	
	TCM VI	Vented	(2)15	(2)6½	Cones	(2)1	Domes	18-23 ±3	101	50	425, 3.5k	4/2	18 x 22 x 84	Vinyl Lam.	Black Knit	260	2995.00	
ONBOARD MONITOR	SpaceDrive SD-6.5	Sealed	6½			¾	Dome	45-22 ±3	90	10	3.6k	4/4	8 x 14 x 18	Dpt.	Opt., Mesh	21	579.00	
	SpaceDrive SD-9	Vented	8			1	Dome	38-20 ±3	91	10	1.8k	4/4	11 x 16 x 18	Dpt.	Opt., Mesh	30	759.00	
	SpaceDrive SD-12	Vented	12	6½	Cone	1	Dome	38-20 ±3	91	10	260, 1.8k	4/4	18 x 18 x 18	Opt.	Opt., Mesh	43	1199.00	
ONKYO	S-70	Tuned Port	12	5	Cone	(2)1, ½	Domes	55-20	93	10		8/5	16 x 41 x 10	Oak Ven.	Black Knit	50	600.00	
	S-5B	Tuned Port	15	5	Cone	1	Dome	65-20	92	10		8/5	17 x 33 x 13	Oak Ven.	Black Knit	48	400.00	
	S-3B	Tuned Port	12	5	Cone	1	Dome	65-20	91	10		8/5	14 x 33 x 11	Oak Ven.	Black Knit	37	300.00	
	HS-15	Tuned Port	6¼	2¾	Cone	2	Cone	55-20	89	10	1.5k, 10k	8/	8 x 13 x 10	Oak Ven. Gray	Black Mesh	10	250.00	
ORPHEUS	808	Pas. Rad.	(2)8			1.1	Dome	28-22 ±3	86	25	45, 100, 2k	8/6	45 x 16 x 9	Opt., Wood	Black Knit	70	1400.00	
PARADIGM	3se-mini	Bass Ref.	6½			1	Dome	55-20 ±2	88	20	3k	6/5	15 x 9 x 10	Opt.	Black Knit	35	130.00	
	3se	Bass Ref.	8			1	Dome	45-20 ±2	91	15	2.5k	6/5	20 x 10 x 11	Opt.	Black Knit	44	145.00	
	5se	Bass Ref.	8			1	Dome	38-20 ±2	90	15	2.5k	8/6	21 x 10 x 12	Opt.	Black Knit	48	175.00	
	7se	Bass Ref.	8			1	Dome	32-20 ±2	91	15	2.3k	8/6	24 x 11 x 12	Opt.	Black Knit	55	240.00	
	9se	Bass Ref.	(2)8			1	Dome	38-20 ±2	95	10	2k	4/4	28 x 12 x 14	Opt.	Black Knit	77	320.00	
	11se	Bass Ref.	10	3	Dome	¾	Dome	35-20 ±1.5	91	15	600, 3.2k	6/5	30 x 12 x 14	Opt.	Black Knit	104	430.00	

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KAPPA: THE DEFINITIVE

Kappa is a concept and a group of products. Five unique drivers and four loudspeakers that incorporate them. Kappa speakers differ radically from conventional speakers in appearance, underlying design philosophy, and certainly in performance.

Conventional engineering wisdom has it that a single element loudspeaker is theoretically ideal. Theoretically, yes; practically, no. Our extensive research has convinced us that an array of purposely bandwidth-limited drivers, when properly crossed over, yields superior results.

The Kappa woofer cone is a rigid, yet inert, composite structure that's injection molded from

graphite fiber and polypropylene. It is extremely low in distortion, even at maximum excursion, and exhibits a remarkable absence of midrange coloration. It provides the most accurate non-servo bass reproduction available.



For the frequency range of 85 Hz to 700 Hz we developed a unique transducer which we call Polygraph™. This 5" dome-shaped driver is made of very thin polypropylene supported by an extremely light, stiff lattice of graphite. Its transient response in the midbass and lower midrange — the area of most musical fundamentals — rivals that of the most expensive planar drivers. Its power handling and dynamic range surpass them.

A low mass, highly damped 3" dome constructed of soft polypropylene handles the midrange.



Its edge wound voice coil contributes to high electrical efficiency. This driver not only mates beautifully with the Polygraph, but can go very low in our 3-way systems and provides a sense of utter coherence through the critical midrange.

Two new EMIT™ drivers complete the ensemble. The first, a considerably improved version of our famous EMIT™, features reduced diaphragm mass and ultra-high gauss neodymium magnets

for high frequency response beyond 44kHz. The second, our new SEMIT™ supertweeter is employed only in the flagship 9k loudspeaker and has a smaller aperture for maximized dispersion in the top octave.



All four Kappa series loudspeakers utilize computer optimized crossover networks that are hard-wired with audiophile 12 gauge cable and the finest passive components. All cabinets minimize diffraction with curved edges, special grills and absorptive treatments on the front baffles. And our top rated 8k and 9k speakers radiate sound front and back in the higher frequency ranges for optimal imaging and depth presentation.

At Infinity we've never let reliance on traditional materials confine us to traditional designs. With the help of modern technology and some rather revolutionary manufacturing processes of our own devising, we've succeeded in overcoming the cost/performance limitations of established designs.

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GIVE PERFORMANCE



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Sagable Low Contour? Woofer: W, Tweeter: T, Subwoofer: ST		Anechoic Frequency Response, SPL, 1 Watt/1 Meter, db		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)		Finish		Grille Color and Material		Weight, Lbs.		Price, \$	
			10	3	Dome	3/4	Dome	No	35-20 ±1.5	91	15	600,3.2k	6/5	40 x 13 x 15	Opt.	Black Knit	140 Pair	690.00										
PARADIGM (Continued)	11se-deluxe	Bass Ref.	10	3	Dome	3/4	Dome	No																				
PARASOUND	BPI-A60	Powered Subwoof. Vented	12					W	30-180 ±2		60 Inc.	63-180 Adj. 2.6k			27 x 22 x 14	Rswd.	Black Mesh	66	525.00									
	CPI-440	Vented	4		1	Dome			70-22 ±3	88	20	2.4k	6/4	9 x 6 x 7	Black Oak	Black Mesh	15	235.00										
	AWs280	Vented	5		1 1/2	Cone			55-20 ±3	88	20	2.4k	6/4	14 x 9 x 6	Beige	Beige Mesh	16	255.00										
	CMs330	Sealed	4		1	Dome			60-22 ±3	89	20	2.6k	6/4	9 x 5 x 5	Black Alum.	Black Mesh	12	210.00										
	CRs220	Sealed	4		1 1/2	Cone			80-20 ±3	92	15	2.6k	6/4	9 x 5 x 5	Black Birch	Black Mesh	11	110.00										
PASO SOUND	C-1000	Ac. Sus.	5 1/2				Piezo		100-20	89		14k	16/3	17 x 6 x 4	Beige Steel Dpt., Plast.	Steel Mesh Steel Mesh	9	321.40										
	C-90	Ac. Sus.	5 1/2				Piezo		100-20	85		14k	8/3	11 x 7 x 5			5	130.56										
PHASE TECHNOLOGY	PC 600	Ac. Sus.	8			1	Dome		35-20 ±3	91	20	1.4k	4/3.5	31 x 12 x 8	Dpt., Ven. Opt., Ven. Dpt.	Brown Knit	42	620.00										
	PC 800	Ac. Sus.	10	5/4	Solid Piston	1	Dome		30-20 ±3	91	20	200.2k	4/3.5	36 x 15 x 9		Brown Knit	57	950.00										
	325ES	Ac. Sus.	6 1/2			1/2	Dome		55-20 ±3	92	15	2.5k	4/3.5	17 x 8 x 9		Black Knit	17	240.00										
	535ES	Ac. Sus.	6 1/2	6 1/2	Cone	1	Dome		40-20 ±3	92	15	100,1.7k	4/3	33 x 9 x 10	Dpt.	Black Knit	32	450.00										
	745ES	Ac. Sus.	8	6 1/2	Cone	1	Dome		35-20 ±3	93	15	100,1.7k	4/3.5	35 x 10 x 12	Opt.	Black Knit	42	550.00										
	PC 30	Ac. Sus. Subwoof.	8						35-150 ±3	89	15	150	4/3.5	11 x 12 x 13	Dpt.	Black Knit	25	250.00										
	PC 40	Ac. Sus.	5 1/4			1	Dome		70-20 ±3	89	15	1.5k	4/3.5	6 x 10 x 5	Dpt.	Brown Knit	20 Pair	360.00										
	PC 50	Ac. Sus. Subwoof.	10						30-150 ±3	87	25	150	8/6	13 x 14 x 15	Dpt.	Black Knit	33	350.00										
	PC 60	Ac. Sus.	6			1	Dome		55-20 ±3	87	15	1.2k	4/4	8 x 14 x 8	Opt.	Brown Knit	30 Pair	460.00										
	PC 1000	Pas. Rad.	8	5/4	Solid Piston	1	Dome		30-20 ±3	91	25	250.2k	8/6	15 x 38 x 9	Opt.	Brown Knit	65	1300.00										
	PC 60/50	Ac. Sus.	10	6	Solid Piston	1	Dome		30-20 ±3	87	25	150,1.2k	8/6	Three Pieces	Opt.	Brown Knit	66 Sys.	810.00										
PC 40/30	Ac. Sus.	8	5/4	Solid Piston	1	Dome		35-20 ±3	89	15	150,1.5k	4/3.5	Three Pieces	Opt.	Brown Knit	45 Sys.	610.00											
PINNACLE	PN 5+	Tuned Port	5 1/4			3/4	Dome		50-21	87	10	5k	6/	11 x 7 x 7	Hick. Vinyl	Black Knit	17 Pair	149.00										
	PN 6	Ac. Sus.	6 1/2			3/4	Dome		40-21	88	10	4k	4/	15 x 9 x 8	Hick. Vinyl	Black Knit	24 Pair	199.00										
	PN 6+	Tuned Port	6 1/2			3/4	Dome		40-21	89	10	4.5k	4/	15 x 9 x 8	Hick. Vinyl	Black Knit	25 Pair	229.00										
	PN 7	Bass Ref.	6 1/2			3/4,1	Domes		40-21	89	10	3.5k,10k	4/	15 x 9 x 9	Hick. Vinyl	Black Knit	26 Pair	249.00										
	PN 8	Ac. Sus.	8	4 1/2	Cone	3/4	Dome		40-21	90	10	1.2k,6k	4/	15 x 10 x 9	Hick. Vinyl	Black Knit	32 Pair	299.00										
	PN 10	Bass Ref.	10	1 1/2	Dome	3/4	Dome		36-23	90	10	1.2k,8.5k	6/	26 x 16 x 16	Hick. Vinyl	Black Knit	42 Pair	499.00										
	PN 15	Bass Ref.	10	1 1/2	Dome	3/4,1	Domes		34-23	92	15	1.17k,10k,18k	6/	28 x 16 x 10	Opt., Wood	Black Knit	46	750.00										
	Monitor 200	Ac. Sus.	12	4 1/2	Cone	3/4	Dome		48-21	92	10	800,8k	6/	23 x 13 x 12	Hick. Vinyl	Black Knit	35	449.00										
PIONEER	S-X7		3 1/2							90			16/	5 x 7 x 4	Black	None	3.5	120.00										
	CS-707	Bass Ref.	15 3/4	4 3/4	Cone		Horn	No	30-25	98		1.5k,4k,11k	8/	18 x 29 x 11	Vinyl	Black Cloth	44.1	659.90										
	CS-607	Bass Ref.	12	4 3/4	Cone		Horn	No	33-25	96		2k,5k,11k	8/	16 x 25 x 11	Vinyl	Black Cloth	35.4	559.90										
	CS-407	Bass Ref.	12	4	Cone	2 1/2	Cone	No	35-20	94		3k,10k	8/	15 x 25 x 10	Vinyl	Black Cloth	23.2	329.90										
	CS-G301 W/II	Bass Ref.	12	4 3/4	Cone	2 1/2	Cone	No	35-20	91		3.5k,7k	6/	15 x 27 x 13	Vinyl	Black Cloth	29.1	259.90										
	CS-G201 W/II	Bass Ref.	10	3	Cone	2 1/2	Cone	No	40-20	90		3k,6k	6/	14 x 24 x 12	Vinyl	Black Cloth	20.2	198.90										
	CS-G101 W/II	Bass Ref.	10			2 1/2	Cone	No	55-20	90		5.5k	6/	13 x 22 x 8	Vinyl	Black Cloth	14.5	139.90										
	DSS-9	Bass Ref.	12	4 3/4	Cone		Ribbon		30-50	91		650,4k	6/	15 x 27 x 14	Vinyl	Black Cloth	57.5	959.90										
	DSS-7	Bass Ref.	12	2 1/2	Cone		Ribbon		30-50	91		850,4.5k	8/	15 x 26 x 14	Vinyl	Black Cloth	49.1	659.90										
	DSS-5	Bass Ref.	10	2 1/2	Cone	3/4	Dome		38-30	91		1.2k,5k	8/	13 x 22 x 11	Vinyl	Black Cloth	31.2	459.90										
	DSS-E10	Bass Ref.	12	4 3/4	Cone		Ribbon		30-50	91		650,4k	6/	15 x 27 x 14	Wood	Black Cloth	57.5	1000.00										
DSS-E6	Bass Ref.	8	2 1/2	Cone		Ribbon		40-50	90		1k,5k	6/	11 x 19 x 10	Vinyl	Black Cloth	23.2	400.00											
PLASMA-TRDNICS	HiII Type I	Plasma Inf. Baf.	14	6 1/2	Cone		Plasma	T	18-100 ±3	107	100	130,700	8/3	58 x 25 x 20	Opt.	Black Cloth	580 Pair	10,000.00										
PLC AUDIO	7	Ac. Sus.	5		2	Cone			76-22 ±3	87	20	1k,10k	8/4	8 x 5 x 10	Dpt.	Black Mesh	6 3/4	345.00										
	5	Ac. Sus.	5		2	Cone			81-22 ±3	87	15	1.5k,10k	8/4	8 x 5 x 7	Wal. Vinyl	Black Mesh	5	285.00										

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls? Woofer W. Midrange M. Tweeter T. SuperWoofer = ST	Angular Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance Dimm: Nominal/Minimum	Dimensions, Inches (No. nearest inch)	Finish	Grilles Color and Material	Weight, Lbs.	Price, \$
PLEXUS AUDIO SYSTEMS	Small Woofer System One	Slot Loaded Subwoofer.	(2)8				W	27-100 ± 2	93	25	100	8/8	27 x 13 x 26	Oiled Walnut	Black Knit	35	599.00	
PDLK	SDA-SRS	Pas. Rad.	15	(8)6½	Cones	(4)1	Domes		10-26	93	10	45,2k	6/	64 x 21 x 13	Opt., Wood	Black Cloth	185	1495.00
	SDA-SRS2	Pas. Rad.	15	(4)6½	Cones	(2)1	Domes		12-26	92	10	45,2k	6/	50 x 21 x 13	Opt., Wood	Black Cloth	150	999.95
	SDA-1C	Pas. Rad.	12	(4)6½	Cones	(2)1	Domes		14-26	92	10	50,2k	6/	44 x 17 x 12	Opt., Wood	Black Cloth	85	799.95
	SDA-2B	Pas. Rad.	12	(2)6½	Cones	1	Dome		15-26	92	10	50,2k	6/	40 x 17 x 12	Opt., Wood	Black Cloth	70	599.95
	SDA-CRS +	Pas. Rad.	10	(2)6½	Cones	1	Dome		24-26	92	10	60,2.5k	6/	13 x 20 x 10	Opt., Wood	Black Cloth	38	399.95
	RTA 12C	Pas. Rad.	12	(2)6½	Cones	1	Dome		17-26	92	10	50,2k	6/	39 x 16 x 12	Opt.	Black Cloth	75	479.95
	RTA 11t	Pas. Rad.	(2)8	(2)6½	Cones	1	Dome		18-26	93	10	60,3k	6/	39 x 11 x 14	Opt.	Black Cloth	55	425.00
	Monitor 10B	Pas. Rad.	10	(2)6½	Cones	1	Dome		20-26	92	10	60,3k	6/	28 x 16 x 12	Opt.	Black Cloth	50	329.95
	Monitor 7C	Pas. Rad.	10	6½	Cone	1	Dome		24-26	91	10	60,3k	6/	24 x 14 x 9	Opt.	Black Cloth	36	259.95
	Monitor 5B	Pas. Rad.	8	6½	Cone	1	Dome		28-26	91	10	60,3k	6/	22 x 11 x 9	Opt.	Black Cloth	29	199.95
	Monitor 5jr +	Pas. Rad.	6½	6½	Cone	1	Dome		29-26	92	10		6/	19 x 9 x 9	Opt.	Black Cloth	25	149.95
	Monitor 4.5	Ported	6½			1	Dome		30-25	92	10	4.5k	6/	17 x 9 x 9	Opt.	Black Cloth	22½	109.95
	Monitor 4A	Ported	6½			1	Dome		31-25	92	10	4.5k	6/	14 x 9 x 7	Opt.	Black Cloth	16	84.95
	VS-25	Pas. Rad.	6½	6½	Cone	1	Dome		26-25	93	3	100,3k	6/	21 x 9 x 11	Black	Black Cloth	27	199.95
	VS-19	Ported	6½			1	Dome		28-25	93	3	3k	6/	17 x 9 x 11	Black	Black Cloth	24	149.95
VS-12	Ported	6½			1	Dome		30-25	93	3	3k	6/	14 x 9 x 11	Black	Black Cloth	20	99.95	
PRES SPEAKERS	Dual	Bass Ref.	10,6½	1¼	Dome	7x2	Horn		35-20	90	200,3.2k, 6.5k 3.2k	8/6	26 x 15 x 14	Opt., Wood	Opt., Knit	45	995.00 Pair	
	Mini "S"	Bass Ref.	6½			1	Dome		50-20	90		8/8	16 x 10 x 8	Opt., Wood	Opt., Knit	25	450.00 Pair	
	Classic I	Bass Ref.	10	2	Dome	1	Dome		35-22	92	1k,5.5k	8/8	48 x 13 x 18	Opt., Wood	Opt., Knit	65	1450.00 Pair	
	Classic II	Ac. Sus.	8			1	Dome		45-22	92	3k	8/8	19 x 12 x 12	Opt., Wood	Opt., Knit	39	849.00 Pair	
PRINCETON ACOUSTICS	PA 5	Inf. Baf.	8			2			42-23	86	40	8/	22 x 11 x 11	Opt.	Black Knit	29	895.00 Pair	
	PA 7	Bass Ref.	8			2			35-23	86	40	8/	40 x 10 x 13	Opt.	Black Knit	60	1160.00 Pair	
	PA 10	Inf. Baf.	(2)8		(2)2				34-23	89	30	4/	42 x 12 x 12	Opt.	Black Knit	75	1695.00 Pair	
	PA 20	Trans. Line Sat. & Bass Ref. Subwoofer.	(2)8		(4)2				28-23	90	40	4/	Four Pieces	Opt.	Black Knit	350 Sys.	3500.00 Sys.	
	Aria One EB	Trans. Line Sat. & Bass Ref. Subwoofer.	(4)8		(4)2				25-23	90	60	8/	Four Pieces	Opt.	Opt., Knit	240 Sys.	4600.00 Sys.	
PRDAC	Super Tablette Studio 1	Ported	4		¾	Dome			70-20	85	25	5k	8/6	10 x 6 x 9	Opt., Wood	Black	15	595.00 Pair
		Ported	7		1	Dome			45-20	89	25	3k	8/6	16 x 9 x 10	Opt., Wood	Black	25	1095.00 Pair
	Super Tower	Ported	(2)7		1	Dome			35-20	90	50	2.6k	8/6	42 x 8 x 10	Opt., Wood	Black	55	2295.00 Pair
	EBS	Ported	10	3	Dome	¾	Dome		25-20	89	100	450,5k	8/6	35 x 12 x 13	Opt., Wood	Black	90	3895.00 Pair
PROTON	AL-300	Air Sus.	12	3½	Cone	1	Dome		39-22 ± 3	90	30	500	4/3.3	36 x 16 x 14	Black Wood	Black Knit	64	899.00 Pair
QUAD	ESL-63US	ES							35-20	87	30	8/	36 x 26 x 11	Teak	Black	55	3600.00 Pair	
	ESL-63Pro	ES							35-20	87	30	8/	36 x 28 x 11	Black	Black	60	3800.00 Pair	
QUADRANT ACOUSTICS	Q-250	Bass Ref.	8		1	Dome			36-20 ± 3	90	15	2.8k	8/6	23 x 13 x 11	Black Vinyl	Black Knit	54 Pair	695.00 Pair w/ Stands
QUANTA	III	Hybrid Trans. Line	6½		1½	Dome			47-20 ± 3	89	25	2k	8/6	20 x 9 x 13	Matte Black	Black Foam	28	1260.00 Pair
	V	Hybrid Trans. Line	8		1½	Dome			34-20 ± 3	90	25	2k	8/5.2	28 x 11 x 17	Matte Black	Black Foam	48	1680.00 Pair
	VII	Hybrid Trans. Line	8		1½	Dome			29-20 ± 3	90	40	2k	8/5.2	34 x 11 x 18	Matte Black	Black Foam	58	2750.00 Pair
	IX	Hybrid Trans. Line, Pas. Rad.	8		1½, ¾	Domes			28-35 ± 3	90	40	2k,19k	8/5.2	38 x 17 x 14	Opt., Wood	Brown Knit	58	4900.00 Pair

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But it's also equipped with top-of-the-line features like a digitally-synthesized, quartz-lock tuner. Dual tape monitor circuits. CD input. Full-size chassis. Metal front panels. Extended three-year warranty. And electronic protection against overheating, shorts, and stray DC.

NIKKO AUDIO
The Power of Technology

Asti Nikko Technology Corporation of America
5830 South Triangle Drive, Commerce, CA
(213) 721-1163

Nikko Audio systems and components are available exclusively through Authorized Nikko Audio Dealers

The same features you'll find on our most modest receiver, the 25 watt/channel R-25.

The same features, in fact, you'll find on all our receivers. From our 38 watt/channel NR-650 to our 48 watt/channel NR-750 to our 65 watt/channel remote-controlled NR-850R.

What's more, every receiver is engineered and manufactured in Japan. Where quality audio isn't an industry.

It's an obsession.

So along with all the features listed above, you get the very important one listed below:

Craftsmanship.

And at a very competitive price.

Which means, for whatever you're planning to spend, you can own a receiver from the top of our line.

Instead of the bottom of someone else's.



Enter No. 73 on Reader Service Card

"Is the sun coming up or going down?"



"I don't know, the last thing I remember is you turning up the stereo."

That's the way it happens. The clean, clear sound of Pyle Driver[®] car stereo speakers transforms an ordinary ride in the country into a spellbinding experience.

The new Pyle Driver Pounder[®] systems make superior sound a reality in virtually any type vehicle. Innovative features like heavy duty woofers, volume-weighted passive radiators, high fidelity dome tweeters, and low-leakage 12 dB crossovers are computer matched and hand built into custom tuned enclosures.

That same dedication to quality is built into Pyle's new Digital Demand amplifiers. Powerful yet distortion free, Pyle Digital Demand amplifiers provide the purest sound possible.

Make your next drive a spellbinding experience with Pyle Driver Pounder[®] speaker systems and electronic components.



PYLE

For the name of the Pyle dealer nearest you write:
Pyle Industries, Inc. • Huntington, IN 46750



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A Herman International Company

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate and Crossover? Woofer - W Midrange - M, Tweeter - T Superwoofer - ST	Acoustic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt, 1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance Ohms - Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$	
REVOX (Continued)	Atrium MKII	Bass Ref.	10	4 3/4	Cone	1	Dome		22-26 ±3	91	20	400.4k	4/4	14 x 34 x 15	Wal. Ven. Black Knit	84	1000.00		
	Symbol MKII	Pas. Rad.	12	4 3/4	Cone	1	Dome		20-26 ±3	92	20	340.3k	4/4	17 x 40 x 17	Wal. Ven. Black Knit	113	1600.00		
	Agora B	Internal Triamp Ac. Sus.	(2)12	5	Cone	3/4	Dome	W, T	30-21 ±3	Inc.	200, 3.7k		17 x 29 x 17	Wal. Ven. Opt. Knit	37 Pair	2000.00			
	Studio 4	Ac. Sus.	9	1	Dome	3/4	Dome		50-20 ±3	86	20	760, 3.2k	4/4	19 x 12 x 12	Black Varn. Black Metal	40 Pair	325.00		
	Piccolo/Bass	Sat. & Subwoof.	10 1/4	4 1/4	Cone	1	Dome		48-22 ±3	86	20	120, 1.8k	4/4	Three Pieces	Black Varn. Black Metal	43 Pair Sys.	725.00 Sys.		
RH LABS	SB-3a	Powered Subwoof.	12					W	22-120		150 Inc.	Var., 40-120		24 x 20 x 18	Opt., Wood	108	950.00		
	SB-4a	Powered Subwoof.	10					W	27-120		100 Inc.	Var., 40-120		20 x 16 x 17	Opt., Wood	68	695.00		
ROBERTSON AUDIO	Eleven	Inf. Baf.	8			1 1/2	Cone		40-22	90	20	1.5k	8	21 x 12 x 11	Mahog	Black Knit	36	495.00	
	Twenty One	Inf. Baf.	(2)8			1 1/2	Cone		30-22	92.5	20	3.5k	4	32 x 19 x 9	Mahog	Black Knit	54	1695.00	
ROGERS	LS2	Bass Ref.	5			3/4	Dome		60-20 ±3	88	15	3.5k	8/6	14 x 9 x 8	Opt.	Black Knit	13	399.00	
	LS6	Bass Ref.	8			3/4	Dome		50-20 ±2	89	10	3.5k	8/6	20 x 11 x 11	Opt.	Black Knit	21	599.00	
	LS7I	Bass Ref.	8			1	Dome		50-20 ±2	88	15	3k	8/6	22 x 11 x 11	Opt.	Black Knit	30	899.00	
	Studio 1A	Bass Ref.	8			1 1/4	Dome		40-20 ±2	89	10	2.8k	8/6	25 x 12 x 12	Opt.	Black Knit	36	1299.00	
	LS3-5A	Inf. Baf.	5			3/4	Dome		70-20 ±3	82	25	3k	15/8	12 x 8 x 6	Opt.	Black Tygan	11 1/2	599.00	
	LS5-9	Bass Ref.	8			1 3/8	Dome		60-16 ±3	88	15	3k	8/6	18 x 11 x 11	Opt.	Black Tygan	28 1/2	2595.00	
	PM510	Bass Ref.	12			1 3/8	Dome		40-20 ±3	92	15	2.5k	8/6	30 x 16 x 18	Opt., Wood	Black Knit	70 1/2	3495.00	
ROGERSOUND LABS	Eighty	Pas. Rad.	12	4 1/2	Cone	1	Dome	M, T	32-22	88	10	1k, 4k	8/	38 x 15 x 11	Opt., Vinyl	Black Knit	58	199.00	
	Forty	Bass Ref.	12	4 1/2	Cone	1	Dome	M, T	40-22	88	10	1k, 4k	8/	25 x 14 x 11	Opt., Vinyl	Black Knit	40	149.00	
	Outsider 3800 Studio Monitor	Ac. Sus.	6 1/2			1 1/2	Cone	M, T	50-20	83	15	2.4k	8/	13 x 8 x 7	Opt., Wood	Black Knit	17	99.00	
	3600 Studio Monitor	Bass Ref.	12	4	Cone	1	Dome	M, T	32-22	87	20	1k, 5k	8/	26 x 15 x 12	Opt., Wood	Black Knit	52	299.00	
	2800 Black Shadow	Ac. Sus.	12	5	Cone	1	Dome	M, T	35-22	87	15	800, 4k	8/	25 x 14 x 11	Opt., Wood	Black Knit	50	250.00	
	2600 Mini Monitor	Ac. Sus.	10	4	Cone	1	Dome		41-22 ±5	92	20	1k, 6k	4/	22 x 12 x 11	Black Vinyl	Black Knit	23	199.00	
	1600 Mini Monitor	Ac. Sus.	8	4	Cone	1	Dome		60-18	92	20	1k, 6k	4/	14 x 11 x 9	Black Vinyl	Black Knit	13	119.00	
	Titan	Pas. Rad.	12, 8	5	Cone	2	Horn	M, T	55-20 ±3	90	20	3.75k	8/	12 x 9 x 8	Black Vinyl	Black Knit	9	89.00	
	Élan	Pas. Rad.	12, 8	5	Cone	(2)1	Oomes	M, T	40-18	94	10	250, 1.2k, 4.7k	8/	39 x 30 x 11	Opt., Wood	Black Knit	137	750.00	
	Nevada XT	Pas. Rad.	12, 8	5	Cone	2x4 1/4	Horn	M, T	20-22	88	15	1k, 5k	8/	41 x 15 x 13	Opt., Wood	Black Knit	67	449.00	
ROHRER ACOUSTIC	RM702R	Bass Ref.	7				Leaf	T	43-40 ±3	91	30	4.5k	8/8	19 x 12 x 40	Oak	Black Knit	65	1800.00	
	RM2902R	Bass Ref.	(2)9				Leaf	T	32-40 ±3	91	30	4.5k	8/8	20 x 13 x 43	Oak	Black Knit	75	2700.00	
	RB702D	Bass Ref.	7				Dome	T	43-40 ±3	91	30	4.5k	8/8	12 x 10 x 19	Oak	Black Knit	35	800.00	
	RF702R	Bass Ref.	7				Leaf	T	30-40 ±3	91	30	4.5k	8/8	15 x 12 x 41	Oak	Black Knit	65	1600.00	
	RT1201	Bass Ref. Subwoof.	12						16-750 ±3	91	30		8/6	19 Dia. x 84	Black Knit	None	75	1200.00	
	RT1501	Bass Ref. Subwoof.	15						16-750 ±1	92	30		8/6	25 Dia. x 84	Black Knit	None	95	2400.00	
	ROKSAN	Darius	Inf. Baf.	8			1	Dome	No	65-20 ±3	89	10	3k	9/6	19 x 16 x 11	Black Ash	Black Cloth	44	2750.00
																		Pair w/ Stands	
	ROSSMAN AUDIO	SA.5	Powered Bass Ref.	5			1	Dome	No	55-20 ±3	88	15 Inc.	2.3k	100k	13 x 9 x 12	Black Slate	Black Knit	48 Pair	400.00
SA.8		Powered Bass Ref.	6 1/2			1	Dome	No	42-20 ±3	89	15 Inc.	2.3k	100k	17 x 10 x 12	Black Slate	Black Knit	60 Pair	500.00	
RR AUDIO LABORATORY	803-S	Slot Loaded Sat. & Subwoof.	8	3 3/8	Cone	3/4	Dome		27-22 ±2	87	30	150, 2.5k	7/5	Six Pieces	Black Lacq.		175 Sys.	1995.00 Sys.	
	1201-S	Slot Loaded Subwoof.	12						19-80 ±1	90	50	80	7/5	25 x 16 x 22	Black Lacq.		240 Pair	3500.00	
	Trapagon	Ac. Sus.	8	2	Dome	3/4	Dome		55-22 ±2	90	50	500, 5k	7/5	29 x 16 x 10	Black Lacq.		110 Pair	3500.00	

SAUL MARANTZ, JOHN CURL AND LINEAGE

Three decades of leadership in American audio electronics



Perhaps no man can be better said to represent the philosophy of excellence in audio than Saul Marantz. Many audiophiles and journalists consider him the father of high performance audio. The electronic components he created during the 1950's and 60's are considered classics—respected and in demand in the U.S., Europe and Japan.

In the 1970's, when Saul Marantz was introducing the first Phased Array loudspeaker, a young electronics designer named John Curl was gaining international recognition for his innovative solid state electronics. These designs were also destined to become classics.

Today, Saul Marantz and John Curl have joined together in a new endeavor—one whose name, Lineage, reflects not only a distinguished history, but also a future of continued leadership in the American audio industry.

To create new classics for the 1980's and 90's, Lineage has brought together a multi-generational group of

talented audio professionals. Their design brief is startlingly simple: To develop quality products of lasting value.

The CP 100 Control Preamplifier, shown above, is the first of these new classics. The CP 100 employs an innovative all-F.E.T. circuit topology and precision parts to assure true audiophile sound quality. It also offers a full complement of features, ease of operation and an integrity of construction that will provide years of musical pleasure.

Lineage components are made available through a network of experienced audio/video specialists. They are knowledgeable professionals who offer quality products, proper demonstration facilities and a commitment to after-sale service and support.

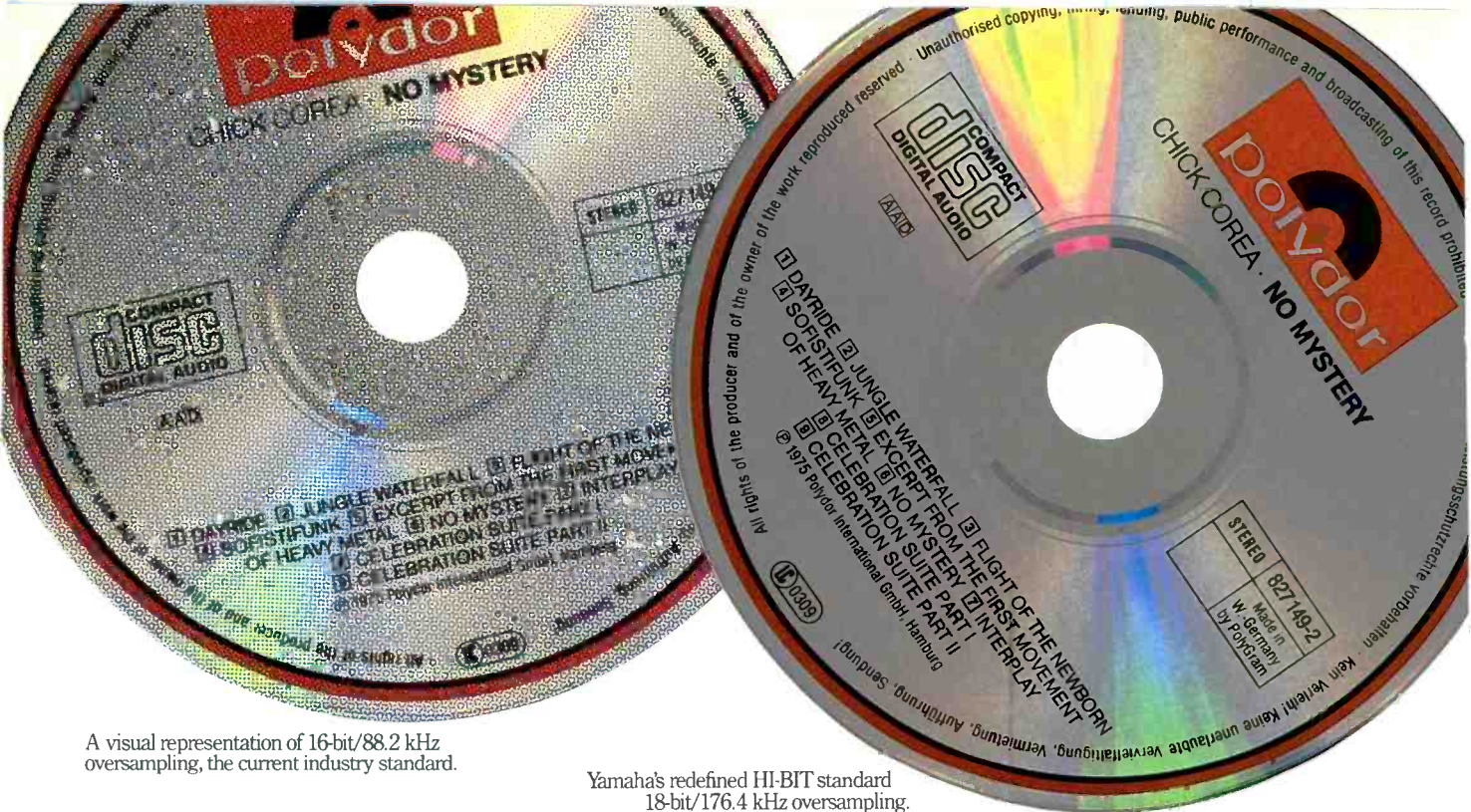
The first Lineage products will be available in late 1987. We hope that you'll take the opportunity to audition Lineage, the new audio company with three decades of experience.

Lineage

LINEAGE CORPORATION 1556 Third Avenue, New York, NY 10128

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A visual representation of 16-bit/88.2 kHz oversampling, the current industry standard.

Yamaha's redefined HI-BIT standard
18-bit/176.4 kHz oversampling.

Yamaha has just redefined the compact disc.

The new Yamaha CDX-1100U brings a whole new definition to the term definition.

It does so by simply integrating the most innovative and advanced CD technologies ever. No doubt exactly what you expect from the leader in digital audio sound reproduction.

But if you think that's all we did to improve our new CD player, listen carefully. Because the CDX-1100U also employs HI-BIT technology no other manufacturer has even thought of.

Like quadrupling the sampling rate to 176.4 kHz, then combining it with our exclusive 18-bit



digital filter and 18-bit dual digital-to-analog converters. This unique combination produces waveform resolution accuracy four times greater than any other CD player on the market today.

What does all this accuracy mean? For starters, a more precise interpretation of the music that was always on your discs to begin with. A truer, more realistic soundstage, articulated without sacrificing musical warmth or smoothness.

Of course, there are other design features that put the CDX-1100U at the forefront of CD performance. Including a floating suspension system that eliminates vibration-induced signal modulation, and photo-optical couplings for a noise-free digital signal transmission.

And there's more than leading-edge technology to the CDX-1100U. There's also leading-edge convenience. By way of our 44-key wireless remote that has interactive control compatibilities, our 4-way repeat play, and our 24-track random programming that lets you play the music in the order you want it played.

If you'd like more details on Yamaha's latest advances in digital technology, write for a free technical white paper. But for the simplest and best explanation of our technological superiority, slip one of your compact discs into a CDX-1100U and push "Play."

Then you'll know you've finally heard it all.



YAMAHA 1887-1987

Yamaha Electronics Corporation, USA, P.O. Box 6660, Buena Park, CA 90622

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Controls: Woofer = W, Midrange = M, Tweeter = T, Superwoofer = ST			Anechoic Frequency Response, Hz to kHz, ± dB		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance, Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)		Finish		Grille Color and Material		Weight, Lbs.		Price, \$							
SANSUI	XL-500	Pas. Rad.	12	4¾	Cone	1	Ribbon	M, T	27-40	93	25		8/	15 x 41 x 13	Wal.	Dark Blue	66	1300.00																			
	XL-300	Inf. Baf.	12	4¾	Cone	1	Ribbon	M, T	30-40	93	25		8/	15 x 26 x 13	Wal.	Blue	46	1000.00																			
	XL-100	Inf. Baf.	10½	4	Cone	2	Cone	T	35-25	92	25		8/	13 x 23 x 12	Wal.	Blue	29	850.00																			
	S-5000U	Pas. Rad.	12	5	Cone	1	Dome		25-23	90	25		8/	16 x 41 x 11	Oak	Dark Blue	48	850.00																			
	S-3000U	Inf. Baf.	12	5	Cone	1	Dome		26-22	90	25		8/	16 x 38 x 11	Oak	Brown	44	700.00																			
	S-2000U	Pas. Rad.	12	4	Cone	3	Cone		29-22	92	25		8/	15 x 41 x 11	Oak	Brown	44	530.00																			
	S-1000U	Inf. Baf.	12	4	Cone	3	Cone		32-22	91	25		8/	15 x 38 x 11	Oak	Brown	39	350.00																			
SARAS	ST 200A	Inf. Baf.	(2)10	5	Cone	1	Dome	No	30-18 ± 2	90		500.5k	8/	43 x 15 x 12	Satin Wal.	Brown	80	1600.00																			
	ST 101	Inf. Baf.	(2)8	5	Cone	1	Dome	No	30-18 ± 2	88		375.3.5k	6/4	36 x 13 x 12	Satin Wal.	Brown	74	1300.00																			
	45	Ac. Sus.	12	5	Cone	1	Dome	No	40-18 ± 3	89		500.5k	8/6	25 x 16 x 12	Satin Wal.	Brown	65	1000.00																			
	33	Ac. Sus.	10	5	Cone	1	Dome	No	40-18 ± 3	87		500.5k	8/5	24 x 14 x 12	Satin Wal.	Brown	52	800.00																			
	22	Ac. Sus.	12			1	Dome	No	40-18 ± 3	90		2k	8/	25 x 16 x 12	Satin Wal.	Brown	55	650.00																			
	12	Ac. Sus.	10			1	Dome	No	40-18 ± 3	87		1.8k	4/	24 x 14 x 12	Satin Wal.	Brown	46	550.00																			
	8	Bass Ref.	8			1	Dome	No	60-18 ± 4	87		2.2k	8/	19 x 12 x 10	Satin Wal.	Brown	32	500.00																			
	SSB 1	Powered Subwoof.	12					W		20-160	Adj.	Inc.	Sel.		18 x 18 x 21	Satin Wal.	Brown	90	950.00																		
SASS	SA-1	Ported	8			2	Cone	T	46-20 ± 3	90	25	2.5k	8/7	38 x 10 x 10	Opt., Wood	Black Knit	31	735.00																			
	SA-2	Ported	8			2	Cone	T	46-20 ± 3	90	25	2.5k	8/7	23 x 12 x 13	Opt., Wood	Black Knit	27	576.00																			
	Odyssey IV	Ported	8			2	Cone		44-22 ± 4	90	25	2.5k	8/	33 x 11 x 13	Opt., Wood	Black Knit	41	595.00																			
	Odyssey VI	Ported	8	4¾	Cone	2	Cone		32-22 ± 3	88	75		8/	45 x 14 x 16	Opt., Wood	Black Knit	75	995.00																			
SCAN-SPEAK	SD-18	Inf. Baf.	6			¾	Dome		42-22 ± 3	91	40		8/6	23 x 10 x 11	Rswd.	Black Knit	29	525.00																			
	SD-21	Inf. Baf.	8	4	Cone	¾	Dome		38-22 ± 3	92	40		8/6	29 x 12 x 13	Rswd.	Black Knit	42	675.00																			
	SD-25	Inf. Baf.	10	4	Cone	¾	Dome		33-22 ± 3	94	50		8/6	32 x 13 x 14	Rswd.	Black Knit	50	780.00																			
	Extreme	Inf. Baf.	13	4	Cone	¾	Dome		22-22 ± 3	94	75		8/6	46 x 16 x 16	Rswd.	Black Knit	92	2150.00																			
S.C.D.	G.C. Rock Monitor	Sealed	(2)8	3	Dome	(2)2	Ribbons	No	50-20 ± 3	91	25	1k,4k	10/6	11 x 10 x 36	Wood Vinyl	Black Knit	105	799.00																			
	J.C. Classical Monitor	Sealed	12	3	Dome	(2)2	Ribbons	No	38-24 ± 3	91	100	800,4k	8/4	Four Pieces	Black Vinyl	None	235	1695.00																			
SCOTT	S62	Ac. Sus.	6½			1¾	Cone		60-20 ± 4	90	5	3.5k	8/7	10 x 8 x 15	Hick. Vinyl	Black Knit	8½	140.00																			
	S82	Ac. Sus.	8			1¾	Cone		55-20 ± 4	92	5	3.5k	8/7	10 x 8 x 18	Hick. Vinyl	Black Knit	14	160.00																			
	S103	Ac. Sus.	10	4	Cone	1¾	Cone		45-20 ± 4	92	10	1.1k,3.5k	8/7	12 x 9 x 22	Hick. Vinyl	Black Knit	25	230.00																			
	S123	Ac. Sus.	12	4	Cone	1¾	Cone		45-20 ± 4	92	10	1.1k,3.5k	8/7	16 x 11 x 32	Opt., Vinyl	Black Knit	35	330.00																			
	S153	Ac. Sus.	15	4	Cone	1¾	Cone		40-20 ± 4	91	15	1k,3.5k	8/7	19 x 11 x 33	Opt., Vinyl	Black Knit	45	400.00																			
	S10T5	Ac. Sus.	10	4	Cone	(2)1¾	Cones		45-20 ± 4	92	10	1k,3.5k	4/4	14 x 9 x 32	Vinyl Oak	Black Knit	35	400.00																			
	S12T6	Ac. Sus.	12	4	Cone	(2)1¾	Cones		45-20 ± 4	92	15	1k,3.5k	4/4	17 x 11 x 32	Vinyl Oak	Black Knit	45	480.00																			
	Audiophile One	Ac. Sus.	6½			1	Dome		55-22 ± 4	90	15	2.2k	4/4	10 x 8 x 15	Vinyl Oak	Black Knit	14	300.00																			
SDM	Monitor One	Bass Ref.	8	5	Cone	1	Horn		35-22 ± 3	96	10	2k,5k	8/4	23 x 12 x 9	Opt., Vinyl	Black Knit	29	400.00																			
	Monitor Two	Bass Ref.	10	5	Cone	1	Horn		30-22 ± 3	97	10	2k,5k	8/4	24 x 14 x 9	Opt., Vinyl	Black Knit	29	500.00																			
	Monitor Three	Bass Ref.	12	5	Cone	1	Horn		25-22 ± 3	98	15	2k,5k	8/4	26 x 15 x 12	Opt., Vinyl	Black Knit	33	600.00																			
SEATTLE SOUND TECHNOLOGY	M2	Tuned Port	5¼			¾	Dome		50-21 ± 3	91	5	2.5k	8/	13 x 7 x 8	Opt.	Opt., Knit	13	119.00																			
	M3	Tuned Port	6½			¾	Dome		42-21 ± 3	91	10	2.5k	8/	21 x 8 x 10	Opt.	Opt., Knit	23	179.00																			
	M4	Tuned Port	8			¾	Dome		36-21 ± 3	92	20	2.5k	8/	28 x 10 x 12	Opt.	Opt., Knit	39	239.00																			
	M5	Tuned Port	8	6½	Cone	1	Dome		34-21 ± 3	93	20	180,2.5k	8/	13 x 11 x 13	Opt.	Opt., Knit	47	349.00																			
S.G.M.	The Mystique	Aperiodic	(2)6			1½	Dome		37-23 ± 1.5	89	20	1.7k	4/2	53 x 32 x 12	Pearl Gloss	Black Knit	222	2400.00																			
SHAHINIAN ACOUSTICS	Obelisk	Trans. Line, Pas. Rad.	8	(2)1¾	Domes	(4)¾	Domes		28-22 +0,-3	90	50	1.8k,9k	5/4	15 x 13 x 29	Opt., Wood	Opt., Knit	55	1750.00																			
	Arc	Pas. Rad.	8	1¾	Dome	1	Dome		28-18 +0,-3	88	30	1.8k,9k	6/4	14 x 10 x 28	Oiled Oak	Brown Knit	43	1050.00																			



AUTHORIZED CARVER DEALERS*

"A relatively but not, necessarily, completely accurate listing of AUTHORIZED CARVER DEALERS.
The following is subject to on-going change. (Fall 1987)

<p>ALABAMA</p> <p>Birmingham Likis Audio Dothan Sight & Sound Mobile Fidler Hi-Fi</p> <p>ALASKA</p> <p>Anchorage Pyramid Audio Fairbanks Holit's Stereo</p> <p>ARIZONA</p> <p>Mesa Hi-Fi Sales Phoenix Buzz Jensen's Sound Jerry's Audio Video Tucson Jerry's Audio Video</p> <p>ARKANSAS</p> <p>Fayetteville Stereo One Fort Smith Stereo One Harrison The Listening Room Little Rock Walloch TV & Appliance</p> <p>CALIFORNIA</p> <p>Alhambra Audio Video Center Bakersfield Sound Advice Berkeley The Sounding Board Burlingame Kustom Hi Fi Chico Sounds By Dave Concord Sound Distinction El Toro Genesis Audio Encino Sound Factor Eureka The Works Fallbrook Uplink System's Fresno Banana's Glendale Marconi Radio Goleta Creative Stereo House Of Audio Video Greenbrae Catania Sound Hollywood Hollytron Irvine Soundquest Los Angeles Ametron Robert's Home Audio & Video Mill Valley World Of Sound Mission Viejo Home Technology System Monterey Monterey Stereo North Hollywood Sound Factor Orange Absolute Audio Palo Alto Western Audio Imports Redondo Beach System Design Group Riverside Speaker Craft Sacramento Turntables Unlimited</p>	<p>San Diego Sound Company San Francisco Mayburn's Hi Fi The Stereo Store Transvision World Of Sound San Jose Century Stereo San Luis Obispo Audio Ecstasy San Mateo Century Stereo Santa Ana Solid State TV-Audio Santa Barbara Creative Stereo Santa Rosa Catania Sound Golden Ear Hi Fi Sherman Oaks System Design Group So. Lake Tahoe El Dorado Audio Stockton Gluskin's Camera Corner Torrance Paris Audio Ventura Creative Stereo Dexier's Camera & Hi Fi Visalia Metro Stereo Walnut Creek Sound Distinction West Los Angeles Paris Audio Westminster Videotek-Stereo Woodland Hills Paris Audio</p> <p>COLORADO</p> <p>Arvada Soundtrack Aurora Soundtrack Boulder Soundtrack Colorado Springs The Sound Shop Denver Soundtrack Soundings Durango Gramophone Audio & Video Grand Junction Raeleck/Sound Co. Littleton Soundtrack Thornton Soundtrack Wheat Ridge Soundtrack</p> <p>CONNECTICUT</p> <p>Avon Hi Fi Stereo Brookfield Sounds Incredible Greenwich Aud-Vid Manchester Sounds Great Newington Hi-Fi Stereo House Sounds Great New London The Stereo Lab Orange Sounds Alive Sounds Great Stamford County Audio Sounds Alive Westport Sounds Alive</p> <p>DELAWARE</p> <p>Wilmington Bryn Mawr Stereo</p>	<p>FLORIDA</p> <p>Altamonte Springs Audio Spectrum Bradenton Kuban's Boca Raton Vern's Stereo & Electronics Sound Advice Clearwater Sound Advice Coral Gables Sound Advice Daytona Beach Audio Analysts Stereo Types Ft. Lauderdale MAE Sound Advice Ft. Meyers Stereo World Gainesville Edwards Corp. Tech Electronics Hialeah Sound Advice Hollywood Sound Advice Kendall Sound Advice Lakeland The Sound Factory Lake Park World Of Sound Melbourne Audio Trend Merritt Island Southern Audio Miami Electronic Equipment Ritz Shop-Las Fabricas Sounds Great Center Naples House Of High Fidelity N. 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Twin Falls The Sound Co.</p> <p>ILLINOIS</p> <p>Aurora United Audio Centers Carbondale Southern Stereo Champaign August Systems Charleston Uptown Audio Chicago Musicraft United Audio Center Deerfield United Audio Center De Kalb Appletree Stereo Hoffman Estates Simply Stereo Kankakee The Shoppe Morton Grove Musicraft Niles United Audio Center Palatine Musicraft Palos Hills Gill Custom House Rockford Appletree Stereo Schaumburg Hi Fi Hutch United Audio Center Sidney August Systems Vernon Hills United Audio Center Villa Park Hi Fi Hutch</p> <p>INDIANA</p> <p>Evansville Risley's Electronics Ft. Wayne Lehman Electric Indianapolis Ovation Audio Lafayette Pro Audio South Bend Audio Specialists Terre Haute Hoosier Electronics Valparaiso Audio Junction</p>	<p>Vicennes Risley's Electronics</p> <p>IOWA</p> <p>Ames Stereo Sound Studios Des Moines Stereo Sound Studios Triad Productions Dubuque The Audio Room Iowa City Glazer Audio Hawkeye Marion The Audio Room Marshalltown John's Hi Fi & Sound Sioux City Audio Vision</p> <p>KANSAS</p> <p>Emporia Audio Video Connection Great Bend Audio Electronics Hayes Touch Feeling Of Sound Hutchinson Hayes Sight & Sound Junction City Audio Junction Mission Accent Sound Overland Park Audio Electronics Brandsmart Midwest Salina Electronics Wichita Audio Vision</p> <p>KENTUCKY</p> <p>Bowling Green Audio Center Glasgow Audio Center Lexington Ovation Louisville Audio Video By Design Madisonville Risley's Electronics Owensboro Risley's Electronics Paducah Risley's Electronics</p> <p>LOUISIANA</p> <p>Alexandria Simpson Electronics Baton Rouge Kadair's Gretna New Sound Trek Harahan New Sound Trek Lafayette Sound Electronics Lake Charles Sight & Sound Metairie New Sound Trek New Orleans New Sound Trek Shreveport Stereo & Record Center West Monroe Audio West</p> <p>MAINE</p> <p>Freeport The Great Northern Sound Outlet So. Portland The Great Northern Sound Co. Westbrook Hawks TV & Sound Cellar</p>	<p>MARYLAND</p> <p>Annapolis Spaceway's Sound Baltimore Soundscape Bethesda Professional Products Frederick Evergreen Gaithersburg Audio Buys Langley Park Audio Associates Laurel Audio Associates Rockville Audio Associates</p> <p>MASSACHUSETTS</p> <p>Belmont Trolley Stereo Bridgewater Bridgewater Audio Video Cambridge Lechmere Danver Lechmere Deham Lechmere Framingham Lechmere Natural Sound Hyannis Sound Dynamics Littleton Radio Shack Northampton Sound & Music Orlean's Snows Pittsfield Taylor's Sound Seekonk Lechmere Sounds Great So. Wemouth Lechmere Springfield Lechmere Wilbraham Industrial Component Corp. Woburn Lechmere Worcester Audio Video Connection</p> <p>MICHIGAN</p> <p>Ann Arbor Hi Fi Buys Stereo Center Birmingham The Gramophone Co. East Lansing Hi Fi Buys Flint Stereo Center Grand Rapids Stereo Showcase Kalamazoo Stereo Showcase Lansing Hi Fi Buys Marquette American TV Midland Hi Fi Buys Muskegon Stereo Showcase Petosky Kurtz Music Center Saginaw The Listening Room Traverse City Kurtz Music & Sound</p>
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C A R V E R

MINNESOTA

Brooklyn Center
Audio King
Burnsville
Audio King
Edina
Audio King
Roseville
Audio King
St. Cloud
Sound Electronics

MISSISSIPPI

Columbus
Hooper Sound
Gulfport
Hooper Sound
Hattisburg
Hooper Sound
Jackson
Hooper Sound
Meridian
Hooper Sound
Pascagoula
Hooper Sound
Tupelo
Hooper Sound

MISSOURI

Kansas City
Brandsmart Midwest
Rolla
End Of The Rainbow
St. Louis
Antech Labs
Best Sound

MONTANA

Billings
Videosat & Sound
Great Falls
Rocky Mountain Hi Fi
Helena
The Stereo Shop

NEBRASKA

Lincoln
Stereo West
Omaha
Custom Electronics
Stereo West

NEVADA

Las Vegas
Import Audio

NEW HAMPSHIRE

Concord
Sound Waves
Hanover
Hanover Audio
Keene
Melody Shop
Manchester
Lechmere
Tweeter Etc.
Nashua
Lechmere
Tweeter Etc.
Newington
Tweeter Etc.

NEW JERSEY

Cliffside Park
Entertainment Environments
Deptford
Hi Fi Connection
Eatontown
Hi Tech Stereo & Video
Franklin Lakes
Franklin Lakes Stereo
Lawrenceville
Hal's Stereo
Maple Shade
Bryn Mawr Stereo
Marlton
Hi Fi Connection
Morristown
Sight & Sound

New Brunswick

Hi Fi Haven
Northfield
Sound, INC.
Paramus
Harvey Electronics
Leonard Radio
Tom's River
Rand's Camera & Hi Fi
Upper Montclair
C.S.A. Audio

NEW MEXICO

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Sound Ideas
West Coast Sound
Las Cruces
Sound Room
Santa Fe
Candyman Ltd.
West Coast Sound

NEW YORK

Albany
Lechmere
Mom's Stereo Warehouse
Sounds Great

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Soundtrack
Amherst
Brandsmart
Batavia
Vinyl Jungle
Brooklyn
Innovative Audio Products
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Stereo Plus
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Depew
Sounds Great
Fresh Meadows
Sound Stage Audio
Goshen
Long Player Stereo
Greece
Sounds Great
Henrietta
Sounds Great
Hicksville
Audio Exchange
Designatron's Stereo Store
Ithaca
D L & G Audio
Nanuet
Eardrum
Newburgh
Audio Expressions
New Hartford
Big Apple Imports
New York City
Audio Exchange
Cosmophonnic Sound
Grand Central Radio
Harvey Electronics
Lyric Hi Fi
Sound Stage Audio
Thalia Hi Fi
Oneonta
Stereo Lab
Patchogue
Square Deal Radio & TV
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Northern Music
Queensbury
Sounds Great
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Maynard's Sound World
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Clone Island
Syracuse
Sounds Great
Vestal
Hart Electronics Corp.
Wappinger Falls
Sound Odyssey

Watertown

Big Apple Imports
Westbury
Audio Exchange
White Plains
Harvey Electronics
Audio Experts
Lyric Hi Fi

NORTH CAROLINA

Asheville
Sound One
Boone
Holton's
Chapel Hill
Electronics Unlimited
Charlotte
Higher Fidelity
Conover
Tri City Electronics
Durham
Tarts
Fayetteville
Tarts
Goldsboro
Tarts
Greenville
Todd's Stereo
High Point
Sound Source
Klingston
Stereo Concepts
Morehead City
Anderson Audio
New Bern
Anderson Audio
Raleigh
High Fidelity International

Rocky Mountain
Tarts
Wilmington
Tarts

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Bismarck
Eggers Audio

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Golden Gramophone
Bowling Green
Hart Audio
Canton
Belden Audio
Cincinnati
Swaliens
Cleveland
B & B Appliance
Columbus
Digital Sights & Sounds
Palmer Electronics
Heath
Threshold Audio
Lima
Hart Audio
Mansfield
Swaliens
Miamisburg
Stereo Showcase
Middleburg Heights
B & B Appliance
Middletown
Swaliens
Parma Heights
Ericsson Stereo
Sandusky
Audio Force
South Euclid
Atlantis Home Entertainment
Systems
Wooster
Far East Audio
Zanesville
Stereo Limited

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Austin
Audio Video
Bartlesville
Copeland Appliance Center

College Station

Eugene Enterprises
Lawton
Audio Tech
Midwest City
Audio Midwest
Shawnee
Rave Electronics
Stillwater
Audio Innovations
Tulsa
Audio Advice
Wichita Falls
Audio Tech

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Audio Video Lab
Corvallis
Good Guys Stereo Warehouse
Eugene
Good Guys Stereo Warehouse
Gresham
Fred's Sound Of Music
Klamath Falls
The Sound Chamber
La Grande
La Grande Stereo
Medford
Larsons
Portland
Fred's Sound Of Music
Tigard
High Technology Video
Systems

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Bryn Mawr
Bryn Mawr Stereo
Camp Hill
Bryn Mawr Stereo
Clearfield
Mack Audio Electronics
Erie
House Of Records
Warren Radio
Frazer
Bryn Mawr Stereo
Gibsonia
The Listening Post
Greensburg
Pat's Stereo
Jenkinson
Bryn Mawr Stereo
Lancaster
GNT Stereo
Lewisburg
M & M Stereo
Monroeville
The Listening Post
Montgomeryville
Bryn Mawr Stereo
Natronia Heights
Stereo Land
Philadelphia
Bryn Mawr Stereo
Pittsburgh
Audio Junction
The Listening Post
Quakertown
Bryn Mawr Stereo
Stage College
Paul & Tony's Stereo
Throop
Shehadi Brothers
Washington
The Stereo Outlet
Whitehall
Bryn Mawr Stereo

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Sound Unlimited
Warwick
Lechmere
Sounds Great

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Tarts
Florence
Tarts
Greenville
Music Machine
Spartanburg
Road Music & More

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Brookings
Stereo Town
Rapid City
Team Electronic
Sioux Falls
Audio King
Pro Audio

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Lindsey Ward
Nashville
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Amarillo
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Beaumont
Beaumont Sound
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Sound Waves
Corpus Christi
Tape Town Audio Video
Dallas
Digital Center
Laburie Professional Sound
Preston Trail Audio
El Paso
Century Sound
Soundquest
Ft. Worth
Marvin Electronics
Houston
B & M Electronics
Groove Audio & Video
Sheffield Audio
Laredo
Metex International
Longview
Stereo Record Center
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Stereo & Record Center
Nacogdoches
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Odessa
Harold's Electronics
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Richardson
Stereo Dallas
San Antonio
Bill Case Sound
Stereo International
San Marcos
Discovery Audio Video
Sherman
Best Marketing
Texarkana
Audio Center
Sound Towne
Tyler
Stereo & Record Center

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Lynn's Audio Video
Ogden
Hi Fi Shop
Salt Lake City
Audio Works
St. George
Arrow Audio

VERMONT

Essex Junction
Creative Sound
Rutland
Sound Directions

VIRGINIA

Arlington
Audio Associates
Charlottesville
Stereotypes
Fairfax
Audio Associates
Falls Church
Audio Buys
Franklin
Audio Showroom
Fredericksburg
Ross Music & Audio
Hampton
The Sound Shop
Harrisonburg
Ace Music N Electronics
Leesburg
Evergreen Audio
Norfolk
The Sound Shop
Richmond
Gary's Enterprises
Roanoke
Lee Hartman & Sons
Springfield
Audio Associates
Virginia Beach
The Sound Shop

WASHINGTON

Bellevue
Magnolia Hi Fi
Bremerton
Bremerton Stereo Center
Lynnwood
Magnolia Hi Fi
Seattle
Definitive Audio
Magnolia Hi Fi
Spokane
Huppini's Hi Fi
Tacoma
Magnolia Hi Fi
Paulson's

WEST VIRGINIA

Huntington
Webco Mack & Dave's
Morgantown
Sound Investments
Wheeling
Look & Listen

WISCONSIN

Appleton
American TV
Eau Clair
EME Audio Systems
Green Bay
Hi Fi Heaven
La Crosse
Audio One
Madison
American TV
Oak Creek
American TV
Waukesha
American TV

WYOMING

Cheyenne
Electronics Unlimited

CARVER

POWERFUL

MUSICAL

ACCURATE

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate level Controls? Woofer, W Midrange, M, Tweeter, T Super-tweeter, ST	Frequency Response, Hz to kHz, ± dB	SPL, 1 Watt 1 Meter, dB	Recommended Min. Amp Power, Watts	Crossover Frequencies, Hz	Impedance Ohms, Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
SHAHINIAN ACOUSTICS (Continued)	Lyre	Pas. Rad.	8	5 1/4	Cone	1	Dome	T	30-18 +0, -3	90	30	500.5k	6/4	12 x 12 x 24	Dpt.	Dpt.	43	850.00 Pair
	Elit	Vented	5 1/4			1	Dome	T	55-18 +0, -3	90	25	4.5k	6/4	7 x 8 x 13	Diled Oak Opt., Wood	Brown Knit	26	375.00 Pair
	Double Eagle	Subwoof.	(2)8						25-600 +0, -3	88			7/3.5	23 x 15 x 32	Diled Oak Opt., Wood	Brown Knit	105	850.00 Pair
	Contra-Bombarde	Slot Loaded Subwoof.	(2)8						16-200 +0, -3	89	50	Ext.	8/4	28 x 19 x 35	Diled Wal.	Diled Wal.	188	2000.00 Pair
SHANNON-BRODKE AUDIO	I	Ac. Sus.	12	6 1/2	Cone	3/4	Dome		27-35 ± 3	89	40	200,3.2k	4/3	20 x 19 x 39	Wal.	Black Knit	80	1750.00 Pair
SIEFERT RESEARCH	Maxim III	Ducted Port	6 1/2			1	Dome		46-22 ± 3	86	30	3k	8/6	13 x 11 x 9	Dpt.	Black Knit	18	499.00 Pair
	Maxim IIID	Ducted Port	6 1/2			7/8	Dome		46-32 ± 2	86	30	2.5k	8/6	13 x 11 x 9	Dpt.	Black Knit	18	599.00 Pair
	Maxim IV	Ducted Port	6 1/2			1	Dome		46-24 ± 2	86	30	2.8k	8/6	15 x 11 x 9	Dpt.	Black Knit	20	549.00 Pair
	Magnum III	Ducted Port	8	4	Cone	1	Dome		36-24 ± 2	88	25	250,3k	6/4	22 x 14 x 14	Dpt.	Black Knit	44	839.00 Pair
	Subwoofer	Ducted Port Subwoof.	12					W	19-80 ± 3	90	30	80	8/6	26 x 18 x 17	Dpt.	Black Knit	66	659.00 Pair w/Kover
SIGNET	SL-100	Tuned Port	10	3	Dome	(2)1	Domes		26-20 ± 4	90	25	500.6k	5/	13 x 36 x 16	Opt., Wood	Black Knit	66	1450.00 Pair
SNELL ACOUSTICS	Type A-III	Inf. Baf.	12	4 1/2	Cone	1, 3/4	Domes		24-20 ± 3	87	80	275,2.7k, 10k	6/4	51 x 24 x 14	Dpt.	Black Cloth	148	4680.00 Pair
	Type Ci	Inf. Baf.	10	4 1/2	Cone	(2)3/4	Domes		26-20 ± 3	85	100	350,2.7k, 15k	8/4	44 x 15 x 13	Dpt.	Black Cloth	80	1890.00 Pair
	Type E-II	Bass Ref.	8			1, 3/4	Domes		35-20 ± 3	93	15	2.3k, 10k	8/5	33 x 14 x 11	Dpt.	Black Cloth	50	990.00 Pair
	Type J-II	Bass Ref.	8			1	Dome		45-20 ± 3	92	15	2.3k	8/5	23 x 13 x 10	Dpt.	Black Cloth	35	680.00 Pair
	Type K	Inf. Baf.	8			3/4	Dome		68-20 ± 3	90	15	2.3k	8/8	18 x 11 x 9	Dpt.	Black Cloth	26	450.00 Pair
	Type Q	Inf. Baf.	6 1/2			1, 3/4	Domes		70-20 ± 1.5	90	15	2.2k, 15k	8/8	16 x 11 x 7	Dpt.	Black Cloth	23 1/2	780.00 Pair
SOUNDGRAPHE	SL21	Bass Ref.	6 1/2			1	Dome		52-20 ± 3	90	20	1.5k	8/4	10 x 14 x 14	Diled Oak	Dpt., Foam	22	695.00 Pair
	SL500	Bass Ref. Subwoof.	10						28-110 ± 3	90	50		8/4	18 x 18 x 19	Diled Oak	Dpt., Cloth	40	595.00 Pair
	SL1000	Bass Ref. Subwoof.	(2)10						25-110 ± 3	90	50		8/4	18 x 36 x 19	Diled Oak	Dpt., Cloth	80	849.00 Pair
SONY	APM-66W	Bass Ref.	10	3 1/2	Flat Diaph.	1	Flat. Diaph.	M, T	30-30 +4, -8	89	20	300,1.5k	6/	26 x 15 x 14	Wal.	Black	57 1/2	1100.00 Pair
	APM-22W	Bass Ref.	8		Flat Diaph.	1	Flat Diaph.		40-20 +4, -8	88	20	2.2k	6/	20 x 12 x 13	Dpt.	Black	31	500.00 Pair
SDTA	Vista	Ported	7		Cone	1	Dome	No	50-20 ± 2	91	25	2.7k	8/6	14 x 10 x 24	Oak	Brown Knit	40	895.00 Pair
	Panorama	Pas. Rad.	8		Cone	1	Dome	No	45-22 ± 3	91	25	3.2k	8/6	12 x 8 x 16	Lacq. Chry	Foam	35	1295.00 Pair
SOUND ASSOCIATES	Enigma	Dipole Subwoof.	36x36					W	20-100 ± 3	88	100	100	6/6	46 x 36 x 7	Dpt.	Black Knit	80	2495.00 Pair
SOUND DYNAMICS	100 S MK II	Bass Ref.	6 1/2			1	Dome		50-20 ± 3	93	10	2k	8/4	9 x 16 x 9	Dpt., Vinyl	Black	20	250.00 Pair
	100 CM	Bass Ref.	6			1	Dome		38-23 ± 3	96	5	2k	8/4	17 x 9 x 10	Wal. Vinyl	Black	20	300.00 Pair w/ Stands
	500 CM	Bass Ref.	10			1	Dome		34-23 ± 3	98.5	10	2k	8/4	23 x 12 x 12	Wal. Vinyl	Black	38	500.00 Pair w/ Stands
	700 CM	Bass Ref.	12			1	Dome		32-23 ± 3	101	15	1.9k	8/4	28 x 14 x 12	Wal. Vinyl	Black	45	700.00 Pair w/ Stands
	1500 CM	Bass Ref.	15			1	Dome		28-23 ± 3	102	20	1.8k	8/4	35 x 18 x 16	Wal. Vinyl	Black	90	900.00 Pair
SOUND-LAB	DynaStat	ES & Dynamic ES	9			48x4	ES	T	35-22 ± 2	86	50	200	6/4	72 x 15 x 3	Cloth	Black Knit	65	1795.00 Pair
	A-1	ES					ES	T	30-22 ± 2	84	100		4/3	81 x 35 x 11	Opt., Wood	Dpt., Linen	185	8950.00 Pair
	A-2x	ES	48x20			48x4	ES	T	34-22	86	50	200	8/6	57 x 28 x 3	Opt., Wood	Dpt., Linen	88	2950.00 Pair
	A-3	ES					ES	T	32-22	84	100		4/3	73 x 31 x 9	Opt., Wood	Dpt., Linen	145	6350.00 Pair
	A-4	ES	61x20			61x4	ES	T	33-22 ± 2	86	100	200	8/6	70 x 28 x 3	Opt., Wood	Dpt., Linen	105	3950.00 Pair
	A-6	ES	72x40			72x4	ES	T	28-22 ± 2	86	100	200	8/5	82 x 44 x 4	Opt., Wood	Dpt., Linen	205	12,500.00 Pair
SPEAKERLAB (Continued)	DAS2	Tuned Port	5 1/4			3/4	Dome		50-21 ± 3	91	5	2.5k	4/6	13 x 7 x 8	Opt., Wood	Dpt., Knit	13	119.00 Pair
	DAS3	Tuned Port	6 1/2			3/4	Dome		42-21 ± 3	91	10	2.5k	4/3.3	21 x 8 x 10	Opt., Wood	Dpt., Knit	23	179.00 Pair

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'For decades, loudspeaker design was a matter of random trial and error. Engineers had no systematic means of identifying and correcting development problems.

'At KEF, computerised testing and computer-aided design have changed all that. For example, KEF's computerised modal analysis ena-

bles me to pin-point troublesome cabinet vibrations. And it helps me determine the most effective countermeasures.

'While computers will never take the place of innovative engineering, they do enable us to examine and perfect loudspeaker performance as never before.'

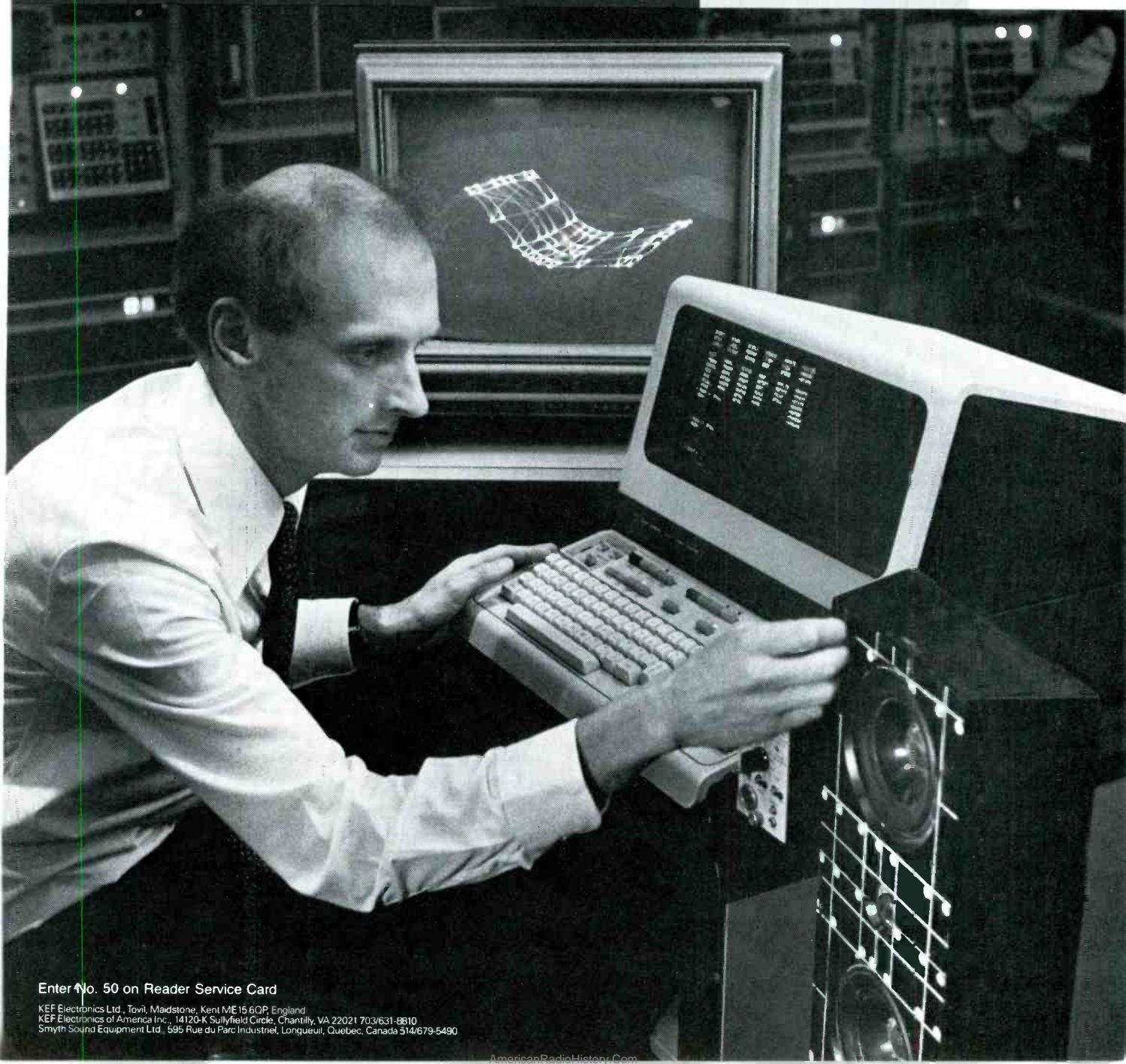


KEF
The Speaker
Engineers

MODEL C40

'By the time we build the final prototype in wood, we've already "built" dozens on computer.'

— Tim Barton, KEF SENIOR RESEARCH ENGINEER



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KEF Electronics of America Inc., 14120-K Sullyfield Circle, Chantilly, VA 22021 703/631-8810
Smyth Sound Equipment Ltd., 595 Rue du Parc Industriel, Longueuil, Quebec, Canada 514/679-5490

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches		Separate Low Midrange = W, High = M, Tweeter = T, Super-tweeter = ST	Ancholic Frequency Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp Power, Watts	Impedance Ohms		Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange	Midrange Type	Tweeter	Tweeter Type	Nominal/Minimum	Maximum												
SPEAKERLAB (Continued)	DAS4	Tuned Port	8			3/4	Dome				36-21 ±3	92	20	2.5k	4/3.3	28 x 10 x 12	Opt., Wood	Opt., Knit	39	239.00	
	DAS5	Tuned Port	8	6 1/2	Cone	1	Dome				34-21 ±3	93	20	180,2.5k	4/3.2	13 x 11 x 13	Opt., Wood	Opt., Knit	47	349.00	
	DAS6	Tuned Port	10		Cone	1	Dome				30-21 ±3	94	20	180,2.5k	4/3.4	36 x 12 x 14	Opt., Wood	Opt., Knit	62	459.00	
	DAS7	Tuned Port	10,12	6 1/2	Cone	1	Dome				25-21 ±3	94	20	180,350, 3k	4/3.2	38 x 14 x 16	Opt., Wood	Opt., Knit	86	569.00	
	DAS8	Tuned Port	10,12	6 1/2,3	Cone, Dome	1	Dome				23-21 ±3	94	20	150,350, 1.5k,5k	4/3.2	46 x 16 x 13	Opt., Wood	Opt., Knit	105	899.00	
	DAS SW	Subwoof.	10									30-160 ±3	92	20	150	8/6	18 x 18 x 18	Opt., Wood	Opt., Knit	62	359.00
SPECTRUM LOUDSPEAKERS	108A	Bass Ref.	8			1/2	Dome				48-20 ±3	92	15	2.3k	8/8	15 x 12 x 10	Opt.	Black Foam	36 Pair	249.00 Pair	
	208A	Bass Ref.	8			1/2	Dome				38-20 ±3	91	15	2.3k	8/8	26 x 15 x 11	Dpt.	Black Cloth	38 Pair	395.00 Pair	
	410	Bass Ref.	10			1	Dome				28-20 ±1.5	89	30	2.3k	8/6	39 x 15 x 12	Opt., Wood	Black Cloth	65 Pair	749.00 Pair	
SPENDOR	LS 3/5A	Inf. Baf.	4 1/2			1	Dome				80-20 ±3	83	25	3k	15/8	12 x 7 x 7	Opt., Wood	Black Cloth	12	500.00 Pair	
	Prelude MKII	Bass Ref.	8			1	Dome				50-20 ±3	88	20	3k	8/7	20 x 10 x 11	Opt., Wood	Black Cloth	28	600.00 Pair	
	SP-2	Bass Ref.	8			3/4	Dome				50-20 ±3	88	25	3k	8/7	20 x 10 x 11	Opt., Wood	Black Cloth	32	750.00 Pair	
	BC-1	Bass Ref.	8			1 1/4, 3/4	Domes				45-18 ±3	85	25	3k,13k	8/7	25 x 12 x 12	Opt., Wood	Black Cloth	38	1000.00 Pair	
	SP-1	Bass Ref.	8			1 1/4, 3/4	Domes				45-20 ±3	88	25	3k,13k	8/7	25 x 12 x 12	Opt., Wood	Black Cloth	42	1050.00 Pair	
	SA-3	Bass Ref.	12			1 1/2	Dome				38-20 ±2	90	40	2k	8/7	34 x 15 x 18	Opt., Wood	Black Foam	85	2000.00 Pair	
SPICA	Angelus	Inf. Baf.	8			1	Dome				45-17.5 ±3	87	25	3.4k	8/6	46 x 21 x 10	Opt., Wood	Black Knit	57	949.00 Pair	
	TC-50	Sealed	6 1/2			1	Dome				56-15 ±3	83	25	2.7k	4/	13 x 16 x 12	Opt., Wood	Black Cloth	45 Pair	450.00 Pair	
	Servo	Active Servo Subwoof.	8					W			-3 dB @ 25 Hz	50 Inc.	88			18 x 15 x 16	Opt., Wood	Black Cloth	53 Pair	595.00 Pair	
SPL	1000	Bass Ref.	(2)5 1/4			3/4	Dome				40-20 ±3	90	10	3k	8/4	21 x 10 x 12	Opt.	Black Knit	26	400.00 Pair	
	2000	Pas. Rad.	8			1	Dome				35-22 ±3	95	10	2.2k	8/4	33 x 12 x 9	Opt.	Black Knit	33	500.00 Pair	
	3000	Bass Ref.	(2)8			1	Dome				30-22 ±3	96.5	15	2.2k	8/4	37 x 12 x 16	Opt.	Black Knit	52	700.00 Pair	
	4000	Bass Ref.	(2)10			1	Dome				25-22 ±3	98	20	2.2k	8/4	43 x 13 x 16	Opt.	Black Knit	65	900.00 Pair	
STILLWATER DESIGNS	Hideaways	Pas. Rad.	8			1	Dome	No			35-20	92	10	3k	8/	17 x 30 x 5	Text. Black	Black Cloth	47 Pair	469.50 Pair	
SUMO	Opus Two	Inf. Baf.	6 1/2			1	Dome				42-24 +0,-3	85	50	2.5k	4/3.4	38 x 11 x 5	Dak	Black Knit	41	699.00 Pair	
	Opus Three	Inf. Baf.	6 1/2			1	Dome				42-24 +0,-3	85	50	2.5k	4/3.4	11 x 10 x 16	Dak	Black Knit	60 Pair	649.00 Pair	
	Samson	Ducted Port Subwoof.	15								25-125 ±0.5	91	200	Sel.	8/7	30 x 24 x 19	Dak	Black Knit	150 w/1-kW Amp.	649.00; 1249.00	
SYMDEX AUDIO SYSTEMS	Sigma S	Ac. Sus.	6 1/2			1	Dome				60-20	84		2.8k	8/	6 x 10 x 22	Wal.	Black Foam	25	995.00 Pair	
	Omega S	Add-On Subwoof. Ac. Sus.	10								35-100	84		100	8/	14 x 14 x 31	Wal.	Black Foam	65	1495.00 Pair	
	Epsilon	Ac. Sus.	10	6 1/2	Cone	1	Dome				35-20	84		100,2.8k	8/	13 x 13 x 48	Dak	Black Knit	100	1795.00 Pair	
	Gamma	Ac. Sus.	6 1/2			1	Dome				60-20	84		2.8k	8/	6 x 10 x 39	Dak	Black Knit	40	995.00 Pair	
SYNTHESIS	Reference System	Bass Ref. Sat. & Subwoof.	(2)10	7	Cone	1, 1/2x2	Dome, Leaf	W			25-35 ±3	91	50	100,1.25k, 20k	8/4	Four Pieces & Xover	Oiled Oak	Opt., Knit	350 Sys.	6800.00 Sys.	
	LM 310	Bass Ref.	10	7	Cone	1	Dome				28-20 ±3	91	20	85,1.25k	8/4	14 x 15 x 44	Oiled Oak Fabr.	Opt., Knit	90	2950.00 Pair	
	LM 300	Bass Ref.	10	7	Cone	1	Dome				30-20 ±3	91	20	85,1.25k	8/4	14 x 15 x 44	Wrap Oiled Oak Fabr.	Opt., Knit	90	2450.00 Pair	
	LM 260	Bass Ref.	8			1	Dome				42-20 ±3	91	20	1.25k	8/4	11 x 12 x 40	Oiled Oak Fabr.	Opt., Knit	58	1595.00 Pair	
	LM 250	Bass Ref.	8			1	Dome				45-20 ±3	91	20	1.25k	8/4	11 x 11 x 34	Wrap Oiled Oak Fabr.	Opt., Knit	47	1185.00 Pair	
	LM 210	Bass Ref.	6 1/2			1	Dome				48-20 ±3	89	20	1.5k	8/4	11 x 11 x 34	Oiled Oak Fabr.	Opt., Knit	42	950.00 Pair	
	LM 200	Bass Ref.	6 1/2			1	Dome				48-18 ±3	89	20	1.5k	8/4	10 x 10 x 34	Wrap Oiled Oak Fabr.	Opt., Knit	40	850.00 Pair	
TANNOY (Continued)	Stirling	Tuned Port	10			2	Compr.	M,T			35-20 ±3	93	30	1.2k	8/5	28 x 19 x 12	Wal.	Beige Knit	49	3699.00 Pair	
	Edinburgh	Tuned Port	12			2	Compr.	M,T			30-20 ±3	95	30	1.2k	8/5	40 x 26 x 17	Wal.	Beige Knit	97	5499.00 Pair	
	G.R.F. Memory Westminster	Tuned Port	15			2	Compr.	M,T			29-20 ±3	95	30	1k	8/5	50 x 33 x 23	Wal.	Beige Knit	137	6799.00 Pair	
		Horn	15			2	Compr.	M,T			18-20 ±3	97	30	1k	8/5	51 x 41 x 25	Wal.	Beige Knit	308	9999.00 Pair	

ONE STEP IN THE MAKING OF A KEF

Anyone can build a good prototype. The real challenge is assuring the quality of everyday production. That's why KEF have the most stringent production test programme in the industry.

'We test each individual Reference Series driver for amplitude response with respect to frequency. The computer collates the tested drivers and crossovers into left and

right pairs that match to better than $\pm 0.5\text{dB}$. This accounts for KEF's spot-on stereo imaging. Then we test the completed pairs for frequency and phase response against the original prototype.

'We keep all this data by serial number on permanent file. If a driver should ever need replacement, we can supply an exact duplicate.

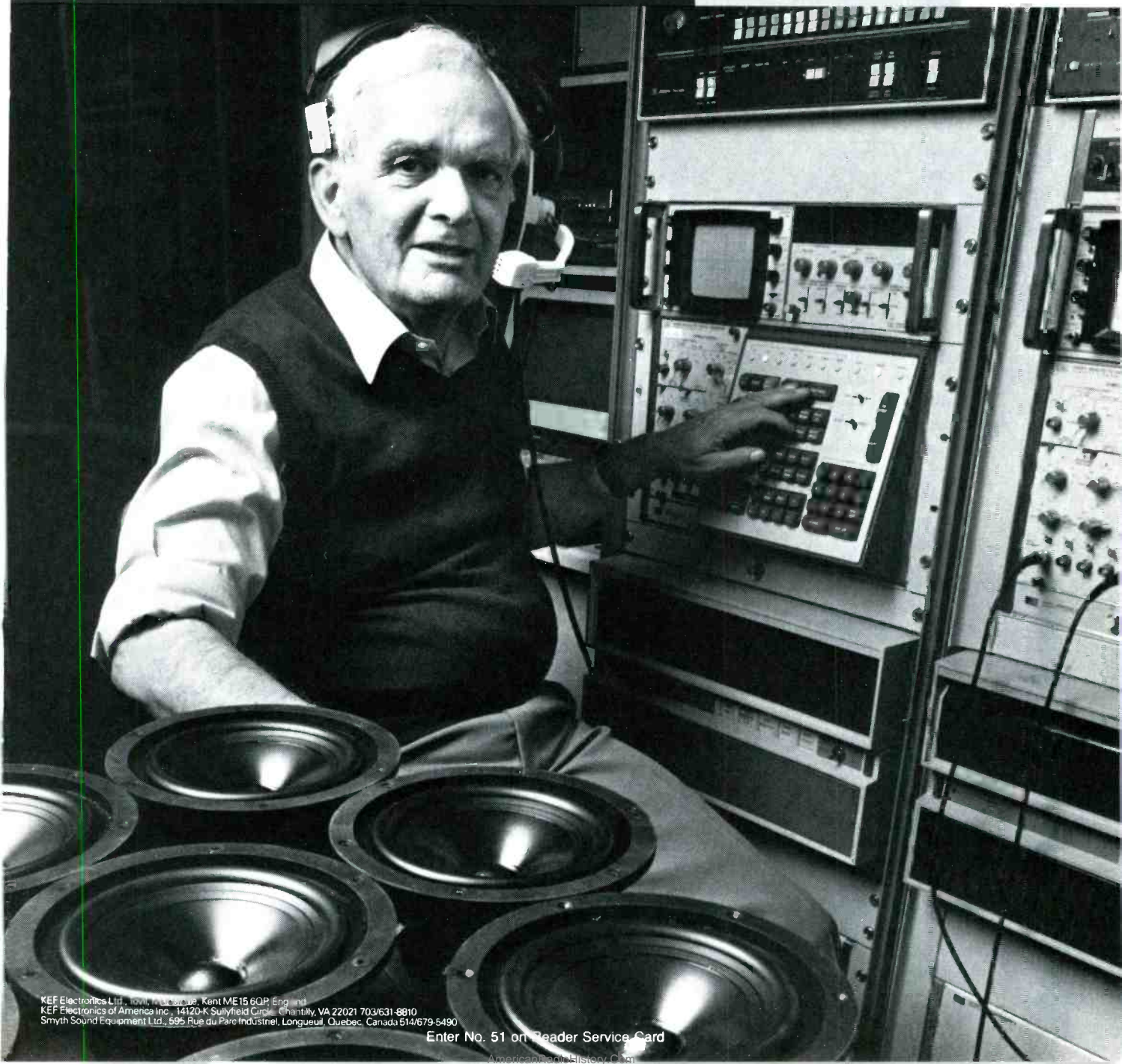


REFERENCE MODEL 107



'Our testing may seem fanatical, but it's the only way to guarantee performance!'

—Frank Merricks, KEF PRODUCTION ENGINEER



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Sagable Level Controls? Woofer, W. Superwoofer = ST		Analogous Frequency Response, Hz to kHz, ± dB		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp Power, Watts		Crossover Frequencies, Hz		Impedance Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)		Finish	Grille Color and Material	Weight, Lbs.	Price, \$
TANNOY (Continued)	Eclipse	Tuned Port	6½			1	Dome		53-20 ± 3	93	25	3k	8/5	12 x 8 x 8	Opt.		9	349.00	Pair							
	Mercury	Tuned Port	8			1	Dome		52-20 ± 3	93	25	3k	8/5	20 x 10 x 9	Opt.		16	599.00	Pair							
	MRK II	Tuned Port	8			1	Dome		52-20 ± 3	93	25	3k	8/5	20 x 10 x 9	Opt., Wood		17	849.00	Pair							
	MRK II Gold	Tuned Port	6½			¾	Dome		55-20 ± 3	94	10	3k	8/5	12 x 8 x 8	Opt., Knit		12	249.00	Pair							
	Comet	Tuned Port	8			1	Dome		55-20 ± 3	94	10	3k	8/5	19 x 11 x 9	Opt.		15	299.00	Pair							
	Comet I	Tuned Port	10			1	Dome		40-20 ± 3	96	10	2.5k	8/5	26 x 25 x 13	Opt.		25	449.00	Pair							
TOL	Reference Standard Monitor	Trans. Line	(2) 9½x6½	(2)4½		Cones	(3)1	Domes	16-35	87	50	200,3.5k,13k	8/5	20 x 22 x 48	Wal./Brass	Brown	154	6995.00	Pair							
	Studio 3	Trans. Line	(2) 9½x6½	4½		Cone	(2)1	Domes	18-35	87	40	300,3.5k,13k	8/5	18 x 12 x 47	Wal./Brass	Brown	103	4595.00	Pair							
	Studio 2	Trans. Line	(2)8				1	Dome	20-20	87	30	3k	8/5	16 x 12 x 39	Wal./Brass	Brown	59	1995.00	Pair							
	Super Compact	Bass Ref.	8			1	Dome		24-20	87	30	3k	8/5	15 x 11 x 35	Wal./Brass	Brown	48	1595.00	Pair							
	Compact	Bass Ref.	8			1	Dome		28-20	87	25	3k	8/4	22 x 11 x 20	Wal./Brass	Brown	53	1095.00	Pair							
		Bass Ref.	6			1	Dome		30-20	86	20	3k	8/4	12 x 9 x 18	Wal./Brass	Brown	44	935.00	Pair							
TEAC	S-2001	Bipolar						Cone	50-20	98			8/	16 x 32 x 12			12.1	499.00	Pair							
	S-10								200-8					12 x 12 x 6			12.2	219.00	Pair							
TECHNI- COUSTICS	Alpha	Sealed	10			1	Dome		60-20 ± 3	92	15	4.5k	4/3.2	20 x 13 x 9	Wal. Lam.	Black Knit	25	250.00								
	Beta	Vented	10			1	Dome		32-20 ± 3	92	25	4.5k	4/3.2	29 x 12 x 18	Wal. Lam.	Black Knit	50	399.00								
	Rock Master	Vented	12			4x11	Horn		38-18 ± 3	96	25	3.5k	8/5.2	26 x 16 x 18	Opt.	Black Knit	75	800.00								
TECHNICS	SB-RX30	Bass Ref.	9			1½	Flat	No	44-30	88		2.5k	6/	10 x 15 x 9	Sim. Wood	Brown	16.5	450.00	Pair							
	SB-RX50	Bass Ref.	9½			1½	Flat	T	30-48	87		2.2k	6/	12 x 19 x 11	Sim. Wood	Brown	36.4	490.00	Pair							
	SB-L35	Bass Ref.	10			2½	Cone	No	42-22	92		4k	8/	13 x 23 x 9	Sim. Wood	Black Knit	16.3	160.00	Pair							
	SB-L55	Bass Ref.	10	4	Cone	2½	Cone	No	37-22	92		2.5k,5k	8/	13 x 25 x 10	Sim. Wood	Black Knit	18.7	230.00	Pair							
	SB-L75	Bass Ref.	12	4	Cone	2½	Cone	No	33-22	92		2.5k,5k	8/	14 x 27 x 13	Sim. Wood	Black Knit	23.8	280.00	Pair							
	SB-L95	Bass Ref.	15	4	Cone	2½	Cone	No	32-22	93		3k,5k	8/	18 x 31 x 13	Sim. Wood	Black Knit	35.9	190.00	Pair							
	SB-M3	Bass Ref.	13	3½	Cone	1½	Cone	M,T	150-15 ± 1.5	90		450,3.5k	6/	16 x 27 x 13	Sim. Wood	Brown Net	68.3	1000.00	Pair							
	SB-F1MK2	Ac. Sus.	4¾			1½	Cone	No	48-35	86		2k	8/	6 x 9 x 6	Silv.		6.4	320.00	Pair							
	SB-F2MK2	Ac. Sus.	5½			1½	Flat			55-33	88		2.5k	8/4	6 x 10 x 7	Silv.		11	380.00	Pair						
	SB-R200	Flat Coax					Flat Coax	T		55-30	89		2.7k	8/	24 x 15 x 4	Sim. Wal.	Black Knit	19.8	800.00	Pair						
SB-R100	Flat Coax					Flat Coax	No		55-30	87		2k	8/	13 x 13 x 3	Black Metal		9.9	420.00	Pair							
TENNESSEE SOUND	Symphony 1	Ac. Sus.	6½			1¾	Cone			89	30	1.8k	10.5/8.5	16 x 13 x 11	Opt., Chry	Opt.	21	750.00	Pair							
	Symphony 2	Ac. Sus. Subwoof.	(2)8							89	30		8/6	34 x 22 x 19	Opt., Chry	Opt.	86	1200.00	Pair							
THIEL	CS 3.5	Electr.	10	4	Cone	1	Dome		20-20 ± 2	88	40	400,3k	4/4	13 x 13 x 41	Teak	Black Cloth	75	2450.00	Pair							
	CS 2	Bass Ref.	8	3	Cone	1	Dome		38-20 ± 2	87	40	800,3k	6/5	12 x 12 x 39	Teak	Black Cloth	62	1550.00	Pair							
	CS 1	Bass Ref.	6½			1	Dome		57-18 ± 2	87	40	3k	6/5	10 x 10 x 36	Teak	Black Cloth	41	950.00	Pair							
3D ACOUSTICS	Cube	Ac. Sus.	6			¾	Dome		70-20	88	15		8/5	10 x 10 x 10	Opt.	Black	15	240.00	Pair							
	Column	Pas. Rad.	6	6	Cone	1	Dome		35-20	88	25		8/5	12 x 31 x 11	Opt.	Black	42	490.00	Pair							
	610 System	Sat. & Subwoof.	10	6	Cone	1	Dome		30-20	88	30		8/5	Three Pieces	Opt.	Black	79	650.00	Sys.							
	610 Surround	Sat. & Subwoof.	10	6	Cone	1	Dome		30-20	88	30		16/10	Five Pieces	Opt.	Black	109	885.00	Sys.							
TIARE ACOUSTICS	TL-17	Trans. Line	7			1.1	Dome		49-22 ± 3	87	50	2.3k	8/6	9 x 13 x 39	Foam Wrap	Black	47	995.00	Pair							
TNT - LINES	T1	Trans. Line	8			1½	Dome		30-20 ± 3	91	30	3.5k	8/4	43 x 13 x 13	Oiled Oak	Brown Knit	83	1495.00	Pair							
	B1	Bass Ref.	7			1½	Dome		50-21 ± 3	89	30	3.5k	8/4	16 x 10 x 9	Opt., Wood	Black Knit	23	695.00	Pair							
	SW1	Trans. Line, Dual V.C. Subwoof.	8						30-70 ± 3	89	40	70	8/6	27 x 16 x 15	Black Lam.		60	500.00	Pair							



Why Passport is the most expensive* radar detector in the world

What sets Passport above other detectors is the technical reach of our engineers, and their insistence on excellence at every design step. *Road & Track* called us "the industry leader in detector technology." Here's why:

Double-ridge waveguide: It was always taken as gospel that miniaturizing a detector would hurt performance. Passport proved this wrong. The miniaturized horn antenna feeds into a double-ridge waveguide. Dual compound chokes are required, and the notch filters are press fit to exact depth. The design process was incredibly complex. But the payoff is indisputable. Passport's performance is uncompromised by its discreet size.

Rashid rejection: In another engineering first, our detectors have been made immune to K-band signals transmitted by the Rashid VRSS collision warning system. Other detectors produce false alarms in the presence of Rashid. Our AFR™ (Alternating Frequency Rejection) circuitry isolates and neutralizes Rashid signals, yet leaves the radar detection capability undiminished for your protection.

X-K differentiation: Passport has separate warning tones to distinguish X-band from K-band. The difference is important. Traffic radar is just one of many transmitters assigned to X-band by the FCC. Motion detectors, burglar alarms and microwave door openers also share this frequency. When you hear the X-band warning, you respond accordingly.

But just two transmitters operate on K-band — radar and Rashid. K-band radar's short effective range requires immediate response. Since our AFR circuitry rejects Rashid, Passport's K-band warning is positively radar, and you always know how to respond.

Variable-rate warning: On radar contact, Passport's bar graph of eight Hewlett-Packard LEDs indicates radar strength, and you



will hear the audible warning — pulsing slowly at first, quicker as you approach, then constant as you near effective radar range. Our engineers have preprogrammed the warning system to tell you everything you need to know about radar. Passport asks no further programming of you, unlike many lesser detectors.

SMD circuitry: Passport's miniaturization was made complete by the use of SMD's (Surface Mounted Devices), micro-electronics common in satellites but long considered too exotic for radar detectors. SMD circuit boards also provide ruggedness unobtainable with conventional technology.

Compact dimensions: Passport was designed to be the most discreet detector ever — only 0.75" H x 2.75" W x 4.50" L. On guard, it never draws attention to itself.

Die-cast aluminum housing: The antenna is integrated into Passport's die-cast SAE 308 aluminum housing. This way no amount of abuse can ever shake the antenna

loose, and Passport's precision electronics are protected by a rugged metal vault for durability under extreme conditions.

Nextel finish: The alloy housing is finished in charcoal Nextel — a light-absorbing coating — to eliminate all possibility of reflection and glare.

Twin speakers: A fully adjustable volume control allows you to set the loudness of the audible warning from twin speakers. The warning tone is 1024 Hz, identical to that used for Morse code, for maximum clarity yet minimum annoyance.

All accessories included: Passport comes complete with everything needed for installation in any car, including coiled cord, straight cord, windshield mount bracket, visor mount bracket, hook-and-loop fastener, lighter adapter, direct-wire power adapter, and comprehensive owners manual. A leather travel case is also included.

Satisfaction guaranteed: We engineered Passport, we build it, and we sell direct to you. We take full responsibility for your satisfaction. If you're not completely satisfied within 30 days, return Passport. We'll refund all your money, including postage.

Now... same-day shipping: Call us toll free with your questions. If you decide to buy, orders in by 3:00 pm eastern time Monday through Friday go out the same day by UPS, and we pay for shipping. Overnight delivery is guaranteed by Federal Express for \$10 extra.

Passport's price reflects the exacting standards of our engineers... and of our customers.

* Based on lowest price offered for dash-mounted detectors in leading auto magazines.

Call Toll Free 800-543-1608

(Phone Mon-Fri 8am-11pm, Sat & Sun 9:30-6 EST)

PASSPORT
RADAR · RECEIVER

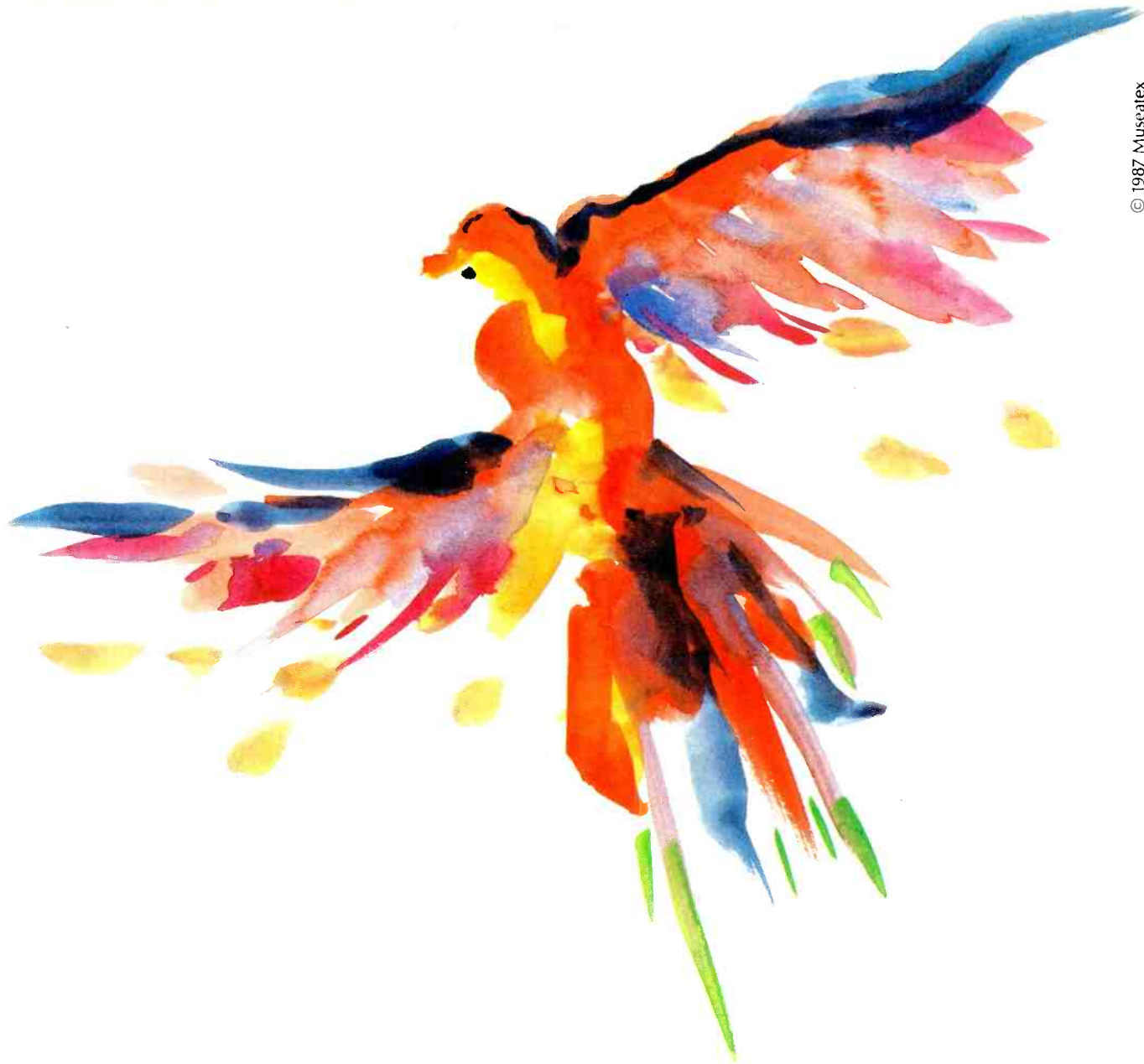
\$295 (OH res. add \$16.23 tax)
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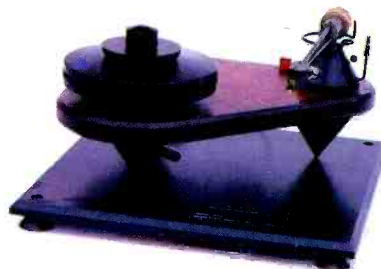
LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches			Separate Level Controls Woofer, W Midrange, M, Tweeter, T, Subwoofer, S			Anechoic Frequency Response, Hz to KHz, ±dB			SPL, -1 Watt/1 Meter, dB			Recommended Min Amp Power, Watts			Crossover Frequencies, Hz			Impedance, Ohms: Nominal/Minimum			Dimensions, Inches (To Nearest Inch)			Finish			Grille Color and Material			Weight, Lbs.			Price, \$		
			Woofer	Midrange	Tweeter	Woofer	Midrange	Tweeter	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T	W	M	T						
TRIAD DESIGN	System One	Sat. & Powered Subwoof. Powered	6½	3½	Cone	¾	Dome				45-21 ±4	88	25	150,4k	8/5	Three Pieces	Dpt.	Black Knit	23 Sys.	525.00 Sys.																								
	System Two	Sat. & Powered Subwoof. Powered	6½	3½	Cone	¾	Dome				35-21 ±4	88	25	150,4k	8/5	8 x 8 x 36	Opt., Wood Opt.	Black Knit Black Knit	44 Pair 17	800.00 Pair 350.00 Pair																								
	System Three Satellite	Sat.	6½		Cone	1	Dome				90-20 ±3	88	25	2k	8/6	13 x 9 x 11	Opt.	Black Knit	19	250.00																								
	System Three Woofer 3 Amp	Powered Subwoof. Powered Inf. Baf. Sat.	8								38-100 ±3	88	70 Inc.	100	6/6	13 x 10 x 11	Opt.	Black Knit																										
	System Four Satellite	Powered Subwoof. Powered Inf. Baf. Sat.	6½			1	Dome				90-20 ±3	88	70 Inc.	2k	6/6	13 x 9 x 11	Dpt.	Black Knit	22	300.00																								
TRUE IMAGE RESEARCH	HR-6.5	Trans. Line	6½			1	Dome				45-20 ±3	86.5	50	2.8k	8/2	9 x 11 x 13	Oak	Brown Knit	15	590.00 Pair																								
	ULTRALINEAR	1530	Inf. Baf.	15	4½	Cone	2½	Cone	M, T	40-22 ±5	92.5	10	1k, 5k	6/3	14 x 18 x 30	Wal. Vinyl	Black Knit	55	169.00																									
	1230	Inf. Baf.	12	4½	Cone	2½	Cone			45-22 ±5	92.5	5	1k, 5k	6/3	14 x 11 x 26	Wal. Vinyl	Black Knit	60 Pair	139.00																									
	1030	Inf. Baf.	10	4½	Cone	2½	Cone			50-22 ±5	92.5	5	1k, 5k	6/3	14 x 11 x 26	Wal. Vinyl	Black Knit	60 Pair	109.00																									
	20B	Inf. Baf.	8	4½	Cone	2½	Cone			60-22 ±5	92.5	5	1.2k, 5k	6/3	8 x 11 x 18	Wal. Vinyl	Black Knit	36 Pair	89.00																									
VANDERSTEEN AUDIO	1B	Trans. Line	8			1	Dome	T		38-20 ±3	90	30	2.8k	8/6	12 x 10 x 36	Opt., Wood	Opt., Knit	50	650.00 Pair																									
	2C	Pas. Rad.	8	4½	Cone	1	Dome	M, T		29-21 ±3	88	50	500, 5k	8/6	16 x 10 x 36	Opt., Wood	Opt., Knit	63	1195.00 Pair																									
	4A	Inf. Baf., Biamp	8	4½	Cone	1½, ¾	Domes	M, T		26-30 ±3	88	70	80, 500, 5k, 13k	8/4	18 x 17 x 52	Dak	Opt., Knit	150	4250.00 Pair																									
	2W	Powered Inf. Baf. Subwoof.	(2)12 (3)8					W		26-80 ±3		300 Inc.	80		18 x 17 x 18	Opt., Wood	Opt., Knit	90	1200.00 w/Amp																									
VECTOR RESEARCH	VSP-82	Inf. Baf.	8		Cone	2	Cone	No		40-17.5 +3, -4	89	10	2k	8/	19 x 11 x 8	Oak	Black Knit	29 Pair	99.00																									
	VSP-102	Bass Ref.	10		Dome	1	Dome	No		30-20 +2, -2.5	91	10	200, 3.5k	8/	27 x 13 x 11	Dak	Black Knit	26	199.00																									
	VSP-123	Bass Ref.	12	5	Dome	1	Dome	No		20-20 ±3	92	10	150, 3.5k	8/	27 x 14 x 11	Oak	Black Knit	37	299.00																									
	VSP-124	Pas. Rad.	12	5	Dome	1	Dome	No		20-20 +3, -2	92	10	150, 3.5k	8/	39 x 14 x 12	Dak	Black Knit	47	449.00																									
VELODYNE ACOUSTICS	ULD-12	Powered Servo Subwoof.	12					W		15-85 ±3		100 Inc.	85		21 x 16 x 17	Opt.	None	51	849.00 w/Amp																									
	ULD-15	Powered Servo Subwoof.	15					W		15-85 ±3		350 Inc.	85		22 x 17 x 18	Dpt.	None	76	1350.00 w/Amp																									
	ULD-18	Powered Servo Subwoof.	18					W		15-85 ±3		350 Inc.	85		23 x 31 x 21	Opt.	None	105	1850.00 w/Amp																									
VINTEC ACOUSTICS	Vibrato	Vented Subwoof.	(2)10							20-250 ±2	90	20	75 or 250	4/3	30 x 19 x 22	Oak	Black Knit	75	625.00																									
	Valour	Vented	6½			1	Dome			37-22 ±2	89	20	2k	8/5	23 x 10 x 11	Dak	Black Knit	60 Pair	625.00 Pair																									
	Vesuvius	Vented Subwoof.	(2)12							16-200 ±1.5	91	50		2/1	36 x 28 x 28	Pearl Gloss	Black Knit	222	2100.00																									
VISONIK	Ambassador 100	Ac. Sus.	8	4	Cone	¾	Dome			25-25 ±3		10	800, 5k	8/4	20 x 12 x 9	Opt.	Alum. Mesh	20	660.00 Pair																									
	Ambassador 120	Ac. Sus.	10	4	Cone	¾	Dome			25-25 ±3		10	800, 5k	8/4	21 x 12 x 10	Opt.	Alum. Mesh	25	850.00 Pair																									
	Ambassador 150	Ac. Sus.	10	4¾	Cone	¾	Dome			20-22 ±3		10	600, 4k	8/4	23 x 13 x 10	Opt.	Alum. Mesh	34	1200.00 Pair																									
	David 5001	Ac. Sus.	4			1	Dome			50-25 ±3		10		8/4	7 x 5 x 4	Opt.	Alum. Mesh	4	320.00 Pair																									
	David 6001	Ac. Sus.	4			1	Dome			45-25 ±3		10		8/4	8 x 5 x 5	Opt.	Alum. Mesh	6	440.00 Pair																									
	David 8001	Ac. Sus.	5	1¼	Dome	1	Dome			38-35 ±3		10		8/4	10 x 6 x 6	Opt.	Alum. Mesh	9	600.00 Pair																									
	David 9000	Ac. Sus.	7	1½	Dome	¾	Dome			35-25 ±3		10		8/4	14 x 9 x 10	Gray HxL	Alum. Mesh	21	1100.00 Pair																									
	Sub-4 Woofer	Ac. Sus. Subwoof.	10							25-400 ±3			10			20 x 15 x 14	Black Lacq.	Alum. Mesh	50	400.00																								
	VMPS	QSO 808	Ported	12	5	Cone	1	Dome	M, T		34-20 ±3	94	20	600, 5k	8/6	26 x 15 x 12	Oiled Wal.	Black Knit	50	630.00 Pair																								
Mini Tower II		Pas. Rad.	(2)12	5	Cone	1.2	Dome, Piezo	M, T, ST		28-30 ±3	94	20	80, 400, 4k, 12k	8/6	35 x 15 x 16	Oiled Wal.	Black Knit	65	878.00 Pair																									
Tower II		Multiband Bass	(3)12	5	Cone	1, (2)2	Dome, Piezos	M, T, ST		22-30 ±3	95	20	80, 400, 4k, 12k	8/6	43 x 15 x 15	Oiled Wal.	Black Knit	95	1199.00 Pair																									
Tower II/R		Multiband Bass	(3)12	5	Cone	1, (1)2	Dome, Ribbon	M, T, ST		22-50 ±3	95	20	80, 400, 4k, 12k	8/6	43 x 15 x 15	Oiled Wal.	Black Knit	95	1329.00 Pair																									
Super Tower/R		Multiband Bass	(2)15, 12	(2)5	Cones	(2)1, (2)2	Domes, Ribbons	M, T, ST		20-50 ±3	96	20	80, 400, 4k, 12k	8/6	49 x 22 x 17	Oiled Wal.	Black Knit	150	1938.00 Pair																									



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MANUFACTURER	Model	Design Principle, Enclosure or System Type	Wooler Diameter, Inches				Midrange Diameter, Inches		Tweeter Diameter, Inches		Sensitivity		Impedance		Dimensions, Inches		Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			(2)15, (3)12	(4)5	Cones	(5)1, (1)	Domes, Ribbon	M, T, ST	17-50 ±3	100	20	80,400,4k, 12k	8/6	76 x 22 x 17	Oiled Wal.	Black Knit				
VMPS (Continued)	Super Tower IIa/R Special Edition	Multiband Bass	(2)15, (3)12	(4)5	Cones	(5)1, (1)	Domes, Ribbon	M, T, ST	17-50 ±3	100	20	80,400,4k, 12k	8/6	76 x 22 x 17	Oiled Wal.	Black Knit	250	3876.00		
	Widerange Ribbon II	Pas. Rad.	12, (2)8	69L	Ribbon	(1)	Ribbon	M, T	17-50 ±3	92	50	80,300, 18k	3/3	Five Pieces	Oiled Wal.	Black Knit	800 Sys.	9500.00		
	Smaller Subwoofer	Pas. Rad. Subwoof.	12						28-600 ±3	92	20	Var.	8/6	26 x 15 x 16	Oiled Wal.	Black Knit	52	299.00		
	Original Subwoofer	Pas. Rad. Subwoof.	12						19-600 ±3	94	20	Var.	8/6	27 x 22 x 17	Oiled Wal.	Black Knit	95	375.00		
	Larger Subwoofer	Pas. Rad. Subwoof.	15, 12						17-250 ±3	95	20	Var.	4/3	39 x 22 x 17	Oiled Wal.	Black Knit	140	549.00		
WAVEFORM RESEARCH	The Waveform Loudspeaker	Bass Ref.	15	(2)6½	Cones	1½, (1)	Dome, Ribbon	W	28-20 ±2	90	150	150,3k,9k	8/4	20 x 30 x 48	Oiled Wal.	Gray Knit	210	17,000.00		
	The Waveform Loudspeaker HFM	Bass Ref.	15	(2)6½	Cones	1½, (1)	Dome, Ribbon	W	28-20 ±2	90	150	150,3k,9k	8/4	20 x 30 x 48	Black Lacq.	Black Knit	180	9000.00		
WENGER/ALS	1104	Pas. Rad.	10	5	Cone	(2)1	Domes		32-20 ±3	91	50	650,5k	6/4	16 x 13 x 9	Opt.	Black Knit	35	829.00		
	1124	Pas. Rad.	12	5	Cone	(2)1	Domes		25-20 ±3	93	50	500,5k	6/4	34 x 15 x 11	Black	Black Knit	57	987.00		
	1154SW	Pas. Rad. Subwoof.	15						20-800 ±3	95	150		6/4	34 x 19 x 15	Black	Black Knit	65	499.00		
	2154	Pas. Rad. Subwoof.	(2)15						20-800 ±3	98	150		6/4	32 x 34 x 19	Black	Black Knit	125	813.00		
	4154	Pas. Rad. Subwoof.	(4)15						20-800 ±3	101	250		6/4	33 x 33 x 33	Black	Black Knit	250	1546.00		
WESTLAKE AUDIO	BBSM-4/4F	Ported	(2)4			¾	Dome		65-20 ±3	89	25	1.5k	4/2	8 x 15 x 10	Opt.	Opt.	25	1074.00		
	BBSM-5/5F	Ported	(2)5			1¼	Dome		63-18 ±3	89.5	25	1.2k	4/2	11 x 18 x 10	Opt.	Opt.	35	1298.00		
	BBSM-6/6F	Ported	(2)6	3½	Cone	1	Dome		60-20 ±3	90	50	600,6k	4/2	11 x 22 x 13	Opt.	Opt.	43	1648.00		
	BBSM-8/8F	Ported	(2)8	3½	Cone	1	Dome		65-18 ±3	91	50	600,5k	4/2	13 x 26 x 17	Opt.	Opt.	68	1990.00		
	BBSM-10/10F	Ported	(2)10	6½	Cone	1¼	Dome		50-16 ±3	92	75	600,4k	4/2	16 x 30 x 22	Opt.	Opt.	90	2590.00		
	BBSM-12/12F	Ported	(2)12	6½	Cone	1¼	Dome		50-16 ±3	94	100	500,4k	4/2	19 x 34 x 23	Opt.	Opt.	123	2990.00		
	BBSM-15/15F	Ported	(2)15	10	Cone	2	Horn	T	50-15 ±3	98	150	350,1.6k	4/2	27 x 41 x 25	Opt.	Opt.	345	5990.00		
	SM-1/1F	Quadra-Amped, Ported	(2)18	12	Cone	2, 1	Horns		28-20 ±3	104	100	200,800, 3.2k, 10k	4/8, 16/8	39 x 49 x 32	Opt.	Opt.	450	19,900.00		
	TM-3/3F	Quadra-Amped, Ported	(2)15	2	Horn	2, 1	Horns		40-16 ±3.5	97	100	800,4k	4/8, 16	30 x 44 x 20	Opt.	Opt.	305	8750.00		
	HR-1/1F	Ported Biamped, Ported	(2)15	10	Cone	2, 1	Horns		34-16 ±3	97	100	250,1k, 5.2k	4, 1.6	30 x 44 x 20	Opt.	Opt.	325	9500.00		
WILSON AUDIO SPECIALTIES	WHOW	Ported Subwoof.	18						16-55 +0, -3	91	80	55	16/8	17 x 29 x 32	Onyx	Black Foam	170	6000.00		
	WAMM Series IV	Sat. & Subwoof.	18	(2)5, (2)8¼x 11¼	Cones, ES	(2)1, (9)5x5	Domes, ES	W, M, T, ST	17-30 ±3	98	50	55,400,3k	4/3	Four Pieces	Opt.	Black Foam	1650 Sys.	w/Xover 65,000.00		
	WATT	Ported	6½			1	Dome	No	50-18 ±3	90	30	1.8k	8/5	12 x 14 x 17	Opt.	Black Foam	120 Pair	4600.00		
WOLCOTT AUDIO	MDH	Bass Ref.	(4)6½			1½	Dome	T	30-20 ±3	90	20	2k	6/4.5	21 x 21 x 50	Gray Nxtl. Oiled Wal.	Black Knit	90	2950.00		
	MDF	Bass Ref.	(4)6½			1½	Dome	T	30-20 ±3	90	20	2k	6/4.5	21 x 21 x 50	Oiled Wal.	Black Knit	90	3750.00		
YAMAHA	NS-1000M	Ac. Sus.	12	3½	Dome	1¼	Dome	M, T	40-20 ±3	98	30	500,6k	6/	14 x 27 x 13	Black	Black Knit	68	699.00		
	NS-200MA	Ac. Sus.	10	4	Dome	1¼	Dome	M, T	50-20 ±3	90	30	800,5k	6/	13 x 23 x 13	Black	Black Knit	37	299.00		
	NS-20M	Ac. Sus.	9	2½	Cone	1¼	Dome		55-20 ±3	91	30	2k, 10k	6/	11 x 16 x 10	Black	Black Knit	21	199.00		
	NS-100X	Ac. Sus.	9	2½	Dome	1¼	Dome		45-20 ±3	91	30	2k, 10k	6/	12 x 21 x 11	Black	Black Knit	31	249.00		
	NS-10M	Ac. Sus.	7			1¼	Dome		60-20 ±3	91	30		8/	9 x 15 x 8	Black	Black Knit	13	169.00		
	NS-W2	Powered Bass Ref. Subwoof.	10						30-100 ±3	91	40 Inc.			18 x 14 x 13	Black	Black Knit	27	249.00		
	NS-A10.3	Bass Ref.	10	4	Cone	1	Dome		29-20 ±3	91	30	500,3k	6/	37 x 12 x 10	Oak Vinyl	Black Knit	45	259.00		
	NS-A10.2	Bass Ref.	10			1	Dome		32-20 ±3	91	30	3k	6/	32 x 12 x 10	Oak Vinyl	Black Knit	35	209.00		
	NS-A8.2	Bass Ref.	8			1	Dome		35-20 ±3	91	30	3k	6/	28 x 11 x 9	Oak Vinyl	Black Knit	25	169.00		
YANKEE AUDIO	FPR-72	Planar Ribbon	1020 Sq. In.						27-20 ±2	88	75		4/4	30 x 72 x 3	Opt., Wood	Opt., Wood	240 Pair	4000.00		
	FPR-64	Planar Ribbon	884 Sq. In.						31-20 ±2	88	75		4/4	30 x 64 x 3	Opt., Wood	Opt., Wood	210 Pair	3800.00		

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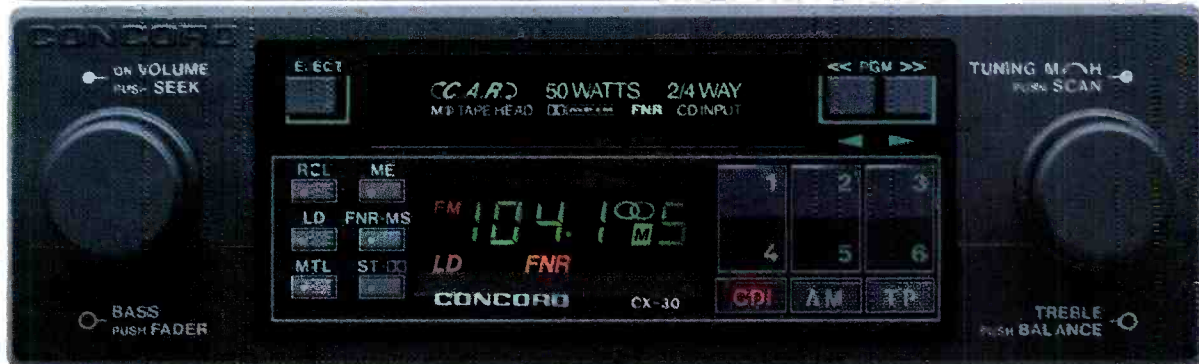
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THE NEW MAXIMALISM



Illustration: Rick Tulka

Wagner Overtures. The London Symphony Orchestra, Barry Tuckwell.
MCA Classics MCA-25968.

Wagner! Four opera overtures and two other famous excerpts. It is, for these times, a somewhat startling recording.

Back in the palmy days of the electrical 78 and the AM-network classical broadcast, it was hardly possible for a "good music" listener to avoid Wagner. He was everywhere, instrumentally in overtures, long excerpts, and Stokowski "syntheses" manufactured from the originals. Of course, there were also the operas themselves, with the famed voices of Flagstad and Melchior, to name two. No longer. With the huge expansion of available music via LP and tape, Wagner has sunk into an unworthy desuetude. He's out of style in a time of mysticism, Baroque rhythms, Mozart, and minimalism. Wagner is mid-19th-century maximalism, overpoweringly extroverted.

For ears that heard the great Wagner performances of those days, this recording is both an astonishing reminiscence and a distinct new Wagner, tightened up, given more speed, not nearly as portentous as in the old days. Here, for instance, are those familiar

flying Valkyrie maidens again, once the very epitome of spine-shivering horror, now riding at a merely comfortable fast canter. And not really scary! Not bad, even if Wagner's original intent to scare the daylights out of his audience is quite put aside. This is what we can do with the music, for our present ears, and I think it is good.

No attempt here, you must understand, to whip an elderly set of musical corpses back into hideous life. That has been tried too often. The music is allowed to speak more casually, without that enormous *significance* it used to have, and it speaks very well for itself. Do not forget, Wagner was one of the big musical geniuses.

The digital recording is superb, giving the composer a breadth and a liveliness of impact that brings out the maximum in color and movement. Just try the concluding item, the short prelude to Act III of "Lohengrin," for a splendid sample of this new Wagner. Terrific!

Dvořák: Complete Slavonic Dances. Artur Balsam and Gena Raps, piano.
Arabesque ABQ 6559, digital.

These 16 central-European dances, in two sets of eight, are familiar in their

orchestral version by Dvořák, and a few of them will be recognized by everybody out of a thousand assorted transcriptions, background and foreground. This is their original form, using two piano players at one instrument, and such lively, interesting music you will seldom hear, much more sprightly than the slower and heavier orchestral alternatives.

Yes, this is "folk" music in a sense, out of many close-by regions where these dances, or at least the rhythms and patterns of each, were widely known by the local people. But the resulting music is all Dvořák, folk transformed into art. It was not really for dancing, even if plenty of listeners (and players) knew the dances intimately from their social get-togethers all over the "Slavonic" region (which, by the way, goes as far afield here as Yugoslavia and the Ukraine as well as Poland). This was the spirit of the first great era of folk art, the transformation of local folk, pseudo-folk, and popular music into classical idiom for music performance.

Artur Balsam left Poland in 1939 and has built a piano career in the U.S. that leaves his fingers still incredibly fluent, as are those of his sometime pupil, Gena Raps. The dances are fast, incredibly fast in the rapid movements, far faster than is possible in the heavier orchestral format. But there is not a hasty note or an unmusical flub to be heard, and the very special mid-European styling is instantly impeccable and right, from whirlwind to ultra-slow Romantic. Artur Balsam obviously still carries his musical heritage with him as few foreigners can ever learn it.

The (single) piano for these 20 fingers is another of those Hamburg Steinways that are beginning to tweak the lordly musical nose of the American Steinway here in the good old U.S.A. It is indeed a different sound, and many local pianists are getting to like it.

Two people on one grand piano can tax any recording system, maybe even a digital one (in this case a Sony 1600 series). The percussives are terrific, particularly down in the bass. LP groove cutting must be very cautious; here, it at first seemed to me a bit low in level. But that, I conclude, is in part a result of the dead acoustic—or better,

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The Kronos Quartet has chosen compositions so strident that I thought dire harm might come to their instruments.



the non-acoustic. Perfectly proper for this type of piano recording—the instrument, after all, has its own built-in “reverb” whenever needed. So turn the volume up a bit; this Teldec-mastered LP can take it.

White Man Sleeps:
The Kronos Quartet.
Nonesuch 79163.

In this day it is possible to find the means to promote any sort of strong-minded, vigorous new music, if not commercially then through the great complex of grants and awards and prizes—it is the way much music moves forward. The last element of concern, unfortunately, is the general listener, and this is precisely the opposite of our much-vaunted pop music, where the listener supposedly rules all, via sales statistics. I really wonder what listening audience, aside from the composers, performers, and their friends, is envisioned for a record such as this one.

The problem is not the recording, which is excellent. Rather, it is the sounds themselves, from a variety of composers, all of whom seem bound to produce the harshest, most strident noises conceivable from the innocent foursome of stringed instruments inherited from Haydn, Mozart, and Beethoven. Okay! No complaints unless there is dire harm done to the instruments themselves, which seemed to me highly likely as I listened. None of us has any business being “against” dissonance and harshness of sound

per se. We have plenty of it, and plenty popular, in all sorts of mass-appeal music. The Bartók “String Quartet No. 3,” an early example here from 1927, is full of content and by no means a trivial work—not from *that* composer. Even the Ives “Scherzo,” variously revised from 1903 to 1914 and hideously dissonant, has much merit as a vigorous antidote to the shallow elegance of music in those days. So as I say—no complaint!

Just a warning. You will not hear any more expert string-quartet mayhem than is embodied in these works, many of which were commissioned by the Kronos players for their own use. Note the cover picture, the four players somehow hard-faced like a glowering punk band. *They* know what they are doing. Now *you* know what you will hear.

Carl Nielsen: Symphony No. 4, “Inextinguishable”; **Helios Overture.**
Swedish Radio Symphony, Esa-Pekka Salonen.
CBS IM-42095, digital.

I try, I try. Each time a record of the Danish composer Nielsen comes through (he was born in 1865, the same year as Finland’s Sibelius), I fight a sort of absent-mindedness. I can’t keep my mind on him. Maybe his is the ultimate Romantic background music.

Nielsen is hailed in the CBS notes as a more modern-minded composer than Sibelius, who looked backward. This is ancient dogma. As times change, so does our view of music.

True, Sibelius sounds very old-fashioned and Romantic, or Finnish-Impressionist, as we listen. But it is more and more obvious that Sibelius structured his symphonies in ways that are curiously related to contemporary thinking today.

As for Nielsen, he is far more old-fashioned and conventional in his symphonic organization, also more contrapuntal, full of counter-melodies and incipient fugues and tunes one against another, tending to make his music fluent but not memorable at all. I keep hearing echoes of Nielsen’s cousin, the earlier Swedish composer Franz Berwald, who had similar ways of writing symphonic music. But Berwald is much stronger, more intense, and definitely more memorable. You will find Nielsen, then, easily melodious and often sweet in spite of a grim emotional background (this symphony was composed during World War I). But, as I say, your mind may wander, if pleasantly, as you listen.

The LP, recorded in a space named Berwald Hall, has been given a good and quiet pressing and a clean digital sound, rather distant in the microphoning. No doubt about the feeling of energy generated by Esa-Pekka Salonen, the youthful whirlwind conductor out of Finland.



Esa-Pekka Salonen

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THE INSIDE STORY

Sibelius: Finlandia. The London Symphony Orchestra, Gennadi Rozhdestvensky.

JEM Classics JC 100, digital.

The reliable London Symphony Orchestra is the very best for this kind of easy-listening LP, an all-Sibelius album recorded in the EMI Studios on London's Abbey Road. The orchestra's excellent and careful ensemble and accuracy and their intelligent sense of musical style result in unusually good performances.

In this case, however, there is a complication—a strong-willed conductor of greater than average fame who leads the orchestra in his own direction. On side two, which contains a pair of major Sibelius tone poems in the mysterious, gloomy, far-North Impressionist manner of the turn of the century, there are no problems; apparently Rozhdestvensky finds this music sympathetic and meaningful. He allows his orchestra—which knows its Sibelius cold, like just about every British orchestra—to do its best, which is plenty good.

But on side one, which includes the inevitable warhorses, "Finlandia" itself and "Valse Triste," I get the feeling that the conductor is not really familiar with the standard Western approach to these works and is forcing the orchestra into some rather odd tempi and emphases. Considering the all-out Finnish nationalism of the music, this is perhaps not too surprising. We can remember the unpleasant Russo-Finnish conflict of early World War II that led to decades of "cool and correct" political relations between Finland and its monster neighbor. Thus politics seems to rear its musical head.

Flora Gave Me Fairest Flowers—English Madrigals: Members of The Cambridge Singers; John Rutter.
Collegium COL 105, digital.

The English madrigal shares much with the equally English Gilbert and Sullivan operetta—both are very stylized creations that must be done "right," as every G & S enthusiast knows, or not at all. And both are much involved with the British language, rather than the American. That makes for many difficulties, both in the per-

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forming and in the appreciation. Nobody does G & S in the style of *Oklahoma*, which wouldn't do at all. Nor can an American sing a madrigal with a southern accent!

All of which is brought to a nice point in this wholly English LP collection of more than 20 works (also available on CD and cassette), sung by one of today's leading groups in the long tradi-

tion of madrigal singing. No question about it, these people know the tradition and sing as perhaps no American group could—not better, just more idiomatically. The sound, the moods, the styling, are as right as we can know today.

Unfortunately, the recording is not optimum for the purpose. The conductor (and a prolific composer), John Rut-

THE OUTSIDE STORY

The Vintage performance story continues on the outside. Sansui's AU-X901 features a double chassis to reduce resonance and provide heavy shielding, plus a strategically placed fifth foot to further reduce resonance. Coupled with gold-plated terminals and balanced inputs, the result is sound clarity.

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ter, is one of the two named producers and may have had some slightly misguided composer's notions. The problem: Far too much large-space ambience for such essentially small and intimate music, combined with a curious miking that brings spurts of solo voices while at the same time seems to blur the ensemble. (Some of the works are done with several singers on a part,

others with solo voices, one to a part.) Having worked at a large part of this music with my own small, all-too-American chorus, I found these flaws disturbing.

Yes, ambience is desirable in current recording styles. But it must be tempered by the needs of the music, solo versus blending. The earliest madrigal recordings, by the famed En-

glish Singers on early 78s, were made in a sonic vacuum yet with exquisite musical effect and a consummate balance and blend among clearly defined parts. The various elements are not nearly as well delineated in this digital recording, and this works to the detriment of the music.

Impressions of France: Cristina Ortiz, piano.
MCA Classics MCA-25969.

This is a wonderfully communicative LP for a number of reasons. First, it is so quiet and so steady that it sounds like a CD. Second, Cristina Ortiz is a relaxed yet powerful pianist, clearly knowledgeable about the style and content of this varied French piano music—enthusiastic, imaginative, but never "macho" in a competitive way, as so many male pianists are. For good listening, macho is no good at all. I could compare Ortiz to a good storyteller. Third, the program is unusually well chosen and, even more, very well put together.

First comes a whole side of Debussy, some popular works, faultlessly and casually well done, intermingled with several major and supremely difficult big pieces, which Ortiz tosses off with casual ease. Side two, after the definitive French delineation of all that Debussy, takes off in other directions, and one feels ever so strongly the French ties that bind all these works into a real tradition, from Chabrier to Milhaud, Ravel to Poulenc. If Ortiz's Debussy is communicative, her Ravel is spectacular—she has a marvelous sense for the unusual harmonies, still so modern sounding. In another deft programming stroke, the too-often-heard Satie "Gymnopédie No. 1," a dirge-like bit of nothing which is usually made more significant than it really is, comes between two lively pieces on side two, giving it the advantage of sudden contrast.

There is also the recording, which is quite remarkable. This piano sounds *like a piano*, without any of the usual interferences we've come to expect—unwanted thumpings and poundings, overblown bass, shrill, pounding treble. Somehow, all the usual problems have been solved. The music just flows. I wish I knew how they did it.

SEATTLE'S SUPER SONICS

Prokofiev: Romeo and Juliet. The Seattle Symphony Orchestra, Gerard Schwarz. Delos CD-3050.

My colleague John Earle engineers most of the major Delos recording projects, and he has handled this Prokofiev CD in typical fashion. As many of you may know, John is the author of *The Microphone Handbook*. If his book is a distillation of his many years of experience with microphones and recording, he has channeled all this expertise into a method for recording music that provides an extraordinary sense of reality and verisimilitude.

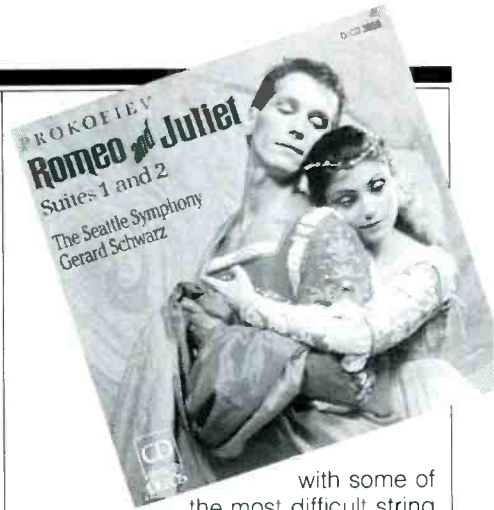
The chief characteristic of John's microphone technique for large-scale classical recording is the transparency it yields—it lets you "see" into the music, with every orchestral element clearly delineated, with natural depth

perspectives maintained, and with totally uninhibited dynamic range. All this without recourse to obtrusive multi-miking.

A trained musician himself, John works closely with conductor Gerard Schwarz to optimize certain sonic aspects of the recording. For example, the orchestral seating is a bit different from what is usual in this country. Schwarz and Earle decided to follow the old European practice of placing the second violins to the right of the conductor. This clarifies the "dialogues" between first and second violins. Schwarz is also very aware he is recording in the digital medium and is thus free to exploit the wide dynamic range.

Schwarz is often thought of as a "classicalist" through his work with the Los Angeles Chamber Orchestra and New York's Mostly Mozart Festival. However, his musical interests are far ranging, and in the two years he has been at the helm of the Seattle Symphony Orchestra, he has performed quite a diverse group of programs.

That he has done wonders for this orchestra is evident from this recording. Prokofiev's "Romeo and Juliet" is a virtuoso piece,



with some of the most difficult string work in symphonic literature. Listen to the quicksilver, scurrying string passages in track 7, "The Death of Tybolt," and again in track 8, "Montagues and Capulets." The Seattle musicians play these passages with unexpected finesse and refinement.

The sound Earle has recorded is stunning. Strings are smooth and ethereal, when the score demands, and show an incisive attack when that is required. The brass sound is rich, opulent, truly brazen, with great projection. Percussion—from scintillating cymbal crashes to sharp explosive tympani to bass drums of awesome impact—is ultra-clean. Every strand of music is clearly defined. The CD is a sonic tour de force!

Schwarz's performance does not have the passionate intensity of Neeme Järvi's reading for Chandos. On the other hand, it is truly balletic, a quality often lacking in many performances of this great work. *Bert Whyte*

Dick Clark's All Time Hits, Volume 1: Various Artists
Dick Clark Compact Discs DCC 3001.

Over the years, Dick Clark has assembled quite a few oldies collections. Usually they strike some kind of balance between the sublime and the ridiculous, and this package, containing 15 hits from the '50s, is no exception. Clark has included rockabilly milestones like Carl Perkins' "Blue Suede Shoes," killer New Orleans sounds like Huey (Piano) Smith and the Clowns' "Rockin' Pneumonia and the Boogie Woogie Flu," classic ballads like The Skyliners' "Since I Don't Have You,"



and novelties like Bobby Day's "Rockin' Robin." There are also a couple of dubious picks, like Paul Anka's "Diana," which I could have gone another 20 years without hearing.

The booklet enclosed with the CD is very helpful, listing the performers and writers for each song, the date the song first charted, its highest position and number of weeks on the chart, the original label and catalog number, and a picture of each artist.

What is referred to as "the best available source tapes" were used in preparing the release. Selections that had been issued in electronically re-channeled stereo have been restored to the original mono, the way they were meant to be heard. The sound is surprisingly acceptable, though hearing these songs again in the sonically revealing CD format shows just how far "high fidelity" has come in the past three decades.

The most important thing, however, is that this is a fun collection to play through, with the genuine greats far outnumbering the teen bleaters. (A second volume was announced with the release of the first; its ratio of greats to silly stuff seems to be a bit lower.) The set weighs in at just 38 minutes, and this means a lot more could have been included. Still, what is here adds up to an excellent party collection.

Michael Tearson

Beethoven: Symphony No. 6 in F, Op. 68, "Pastorale." The Cleveland Orchestra, Christoph von Dohnanyi. Telarc CD-80145.

There are more than a dozen CDs of this most tuneful of Beethoven's symphonies, including some legendary conducting performances from the likes of Bruno Walter, Toscanini, Furtwängler, and Mengelberg. In modern recordings of this work, those led by von Karajan, Bernstein, and Ashkenazy are highly regarded.

From a strictly sonic viewpoint, this new disc comfortably surpasses all previous versions. In most of the Cleveland Orchestra recordings that Jack Renner has engineered, he has used Schoeps microphones. In this recording, made in Severance Hall, Jack used the new Sennheiser MKH 20 omnidirectional condenser microphones.

These are said to have a particularly flat response from 20 Hz to 20 kHz, and exceptional transient response as well. I note in this CD that the first violins in particular have a very extended top end, yet they are quite smooth and free of stridency. Renner has achieved a very open, transparent sound with wonderful depth perspectives, while maintaining high definition.

Dohnanyi provides an unusually vigorous reading with rather brisk tempos. He emphasizes the rhythmic, dance-like elements in the score and is very expressive in dynamic contrasts. His fourth-movement "thunderstorm" is quite intense, and he makes a wonderful transition into the uplifting themes of the finale, with the magnificent Cleveland Orchestra playing this glorious music with truly stunning sonority. The "Pastorale" is preceded by a strongly propulsive performance of the "Leonore Overture." *Bert Whyte*

One Voice: Barbra Streisand
Columbia CK 40788.

Crickets chirp softly in the gentle California night air. Ocean waves hiss on the shore. A deep, ethereal synthesizer tone washes in, another high-pitched synth does a swirling firefly dance above it, and Barbra Streisand's *One Voice* concert has begun.

On September 6, 1986, Streisand gave her first full-length concert in 20 years, outdoors at her home in Malibu. Its purpose was to raise funds for various causes the singer supports; in addition to doing that, it resulted in an utterly splendid Compact Disc.

Streisand is simply one of the finest performers of our time. Her voice is a superb instrument. She has full command of it these days, and on *One Voice* she exhibits the maturity to balance the stratospheric volume she is capable of delivering with passages of exquisite restraint. The singer's ease with an audience also contributes to the myriad pleasures of this disc; the recording preserves many of her spoken comments and the crowd's unbridled delight.

As Barbra soars and whispers through an impeccable selection of classics ("The Way We Were," "People," "Over the Rainbow," "Send in the Clowns") and glides through a pair of

duets with Barry Gibb, the ambience of an outdoor concert is masterfully maintained. Her liquidly mobile voice bears a slight reverb, and an additional sense of spaciousness is created as the audience's cheers, whistles, and roars of approval roll in from the lawn like the breakers rolling in on the nearby shore.



Barbra Streisand

As with any project in which Streisand has a hand, every aspect of this recording is totally professional and as near perfection as possible. The sound on this CD is flawless. Balances are perfect, vocals and instrumentals are rich and vibrant. If you close your eyes and use a little imagination, you'll be transported to Malibu yourself.

Paulette Weiss

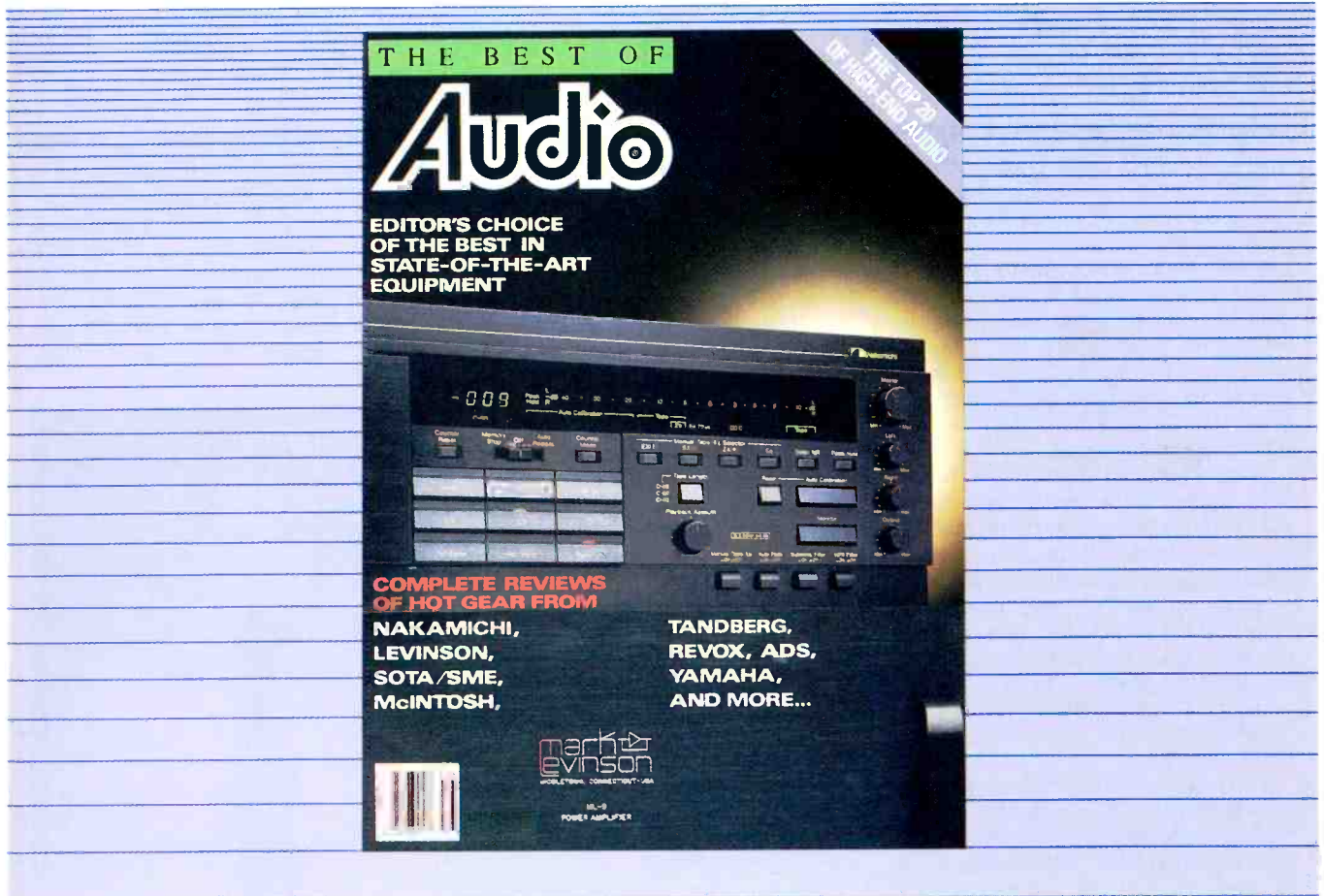
The Well-Tuned Piano: La Monte Young

Gramavision 18-8701-2, five-disc set.

Sound: B+ Performance: A-

The Well-Tuned Piano, like its composer, La Monte Young, is an enigma. It is a work of inspiring brilliance and stultifying length, of startling implications and alarming pretensions. This is a solo piano excursion to end solo piano excursions: One performance, spanning five hours and five Compact Discs. Such an extended work might

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La Monte Young



appear contradictory for someone regarded as the father of minimalism, the one who started Terry Riley, Steve Reich, and Philip Glass on their paths.

Young has maintained a low profile, releasing only three recordings in 30 years. To be sure, his previous works did not lend themselves to casual listening. One chord, played on sine-wave generators, could last a day or more. Certainly that kind of music would be limited by most recording media.

The Well-Tuned Piano is something else entirely. A work that Young has been refining and expanding since 1964, it is based on tunings done in just intonation, a more mathematically precise method of tuning than conventional equal temperament. The title is both a jibe at Bach's "Well-Tempered Clavier" and a measure of Young's sense of self-importance.

However, Young's manifesto is both powerful and eloquent as he careens through dozens of minute movements with names like "The Theme of the Dawn of Eternal Time," "The Theme of the Magic Chord," and "Young's Böse Brontosaurus Boogie." Each movement accelerates into a rolling ball of sound until the air shudders under the density of overtones; then this density is supplanted by the sparsest, deepest space as Young slowly begins to build it all up again.

Using a Bösendorfer Imperial grand, Young extracts a wealth of psycho-acoustic effects through the unusual overtones. Clouds of sound seem to lift from the keyboard, monks are heard chanting a subharmonic dirge, rapid arpeggiations lead to a hundred mandolins, and feedback guitars and cellos wail in the background. But it's all coming from the piano.

The performance was recorded in

1981 and digitally mixed and mastered. The CD's dynamic range allows Young to go from a whisper of fragile melody into thundering crescendoes accompanied by ghostly reverberations. The only sonic flaw is that, despite the multiple close-miking, the hum of steam pipes is heard in the background of the performance space.

The five-hour length of this work can be daunting, and extended listening can result in a sort of exalted jet lag. But in shorter doses, *The Well-Tuned Piano* yields ample rewards.

John Diliberto

Beauty in the Beast: Wendy Carlos
Passport SYNCD 200.

The Light in the Clouds: Michael Gilbert

GIBEX 003. (Available from GIBEX Recordings, 73 Spaulding St., Amherst, Mass. 01002.)

The Key to Songs, The Return: Morton Subotnick

New Albion NA012 CD. (Available from New Albion Records, 584 Castro St., #436, San Francisco, Cal. 94114.)

Everyone remembers the sensation Wendy Carlos created 20 years ago with *Switched-On Bach*. Since then, electronic synthesizers have evolved from cumbersome, inflexible lab equipment into sophisticated musical instruments capable of incredibly sensitive expression. These three CDs, electronic performances of original compositions, demonstrate what the newest generation of synthesizers can do. The sounds are much more realistic now; more important, the sounds are much more under the control of the performers.

Carlos' *Beauty in the Beast* uses musical elements from various cultures,

following the increasingly popular path of "world music." The opening "Incantation" borrows from Tibetan styles, with bells, gongs, and chanting monks all in Tibetan scales and harmonies. "Poem for Bali," easily the most attractive piece on the album, skillfully and gracefully evokes the sounds of a Balinese gamelan orchestra. Carlos is especially intrigued by the unusual tunings available on synthesizers. Sometimes she uses scales and tunings from other cultures, as in the Tibetan and Balinese pieces, but at other times she uses completely new and unusual ones. For example, in the title track, she contrasts the sounds of two artificial scales. The warm, translucent colors in "Just Imaginings," however, result from the sound of chords in just intonation, although to the casual listener they may simply sound like brighter synthesizer timbres. What *Beauty in the Beast* lacks is a sense of ambience—a problem endemic to electronic music. Now that the tools for creating imaginary acoustical spaces are readily available, we can reasonably expect to be given more than simple reverberation.

In *The Light in the Clouds*, Michael Gilbert blends live acoustic instruments with electronic sounds, deftly weaving jazz, New Age, and folk styles into his own musical language. African drums and finger pianos, reed flutes, bells, and marimbas mix with jazz guitar, acoustic bass, drums, and synthesized strings, providing a wonderfully fresh sound. The production is equally fresh and open sounding, with a sonic



Wendy Carlos

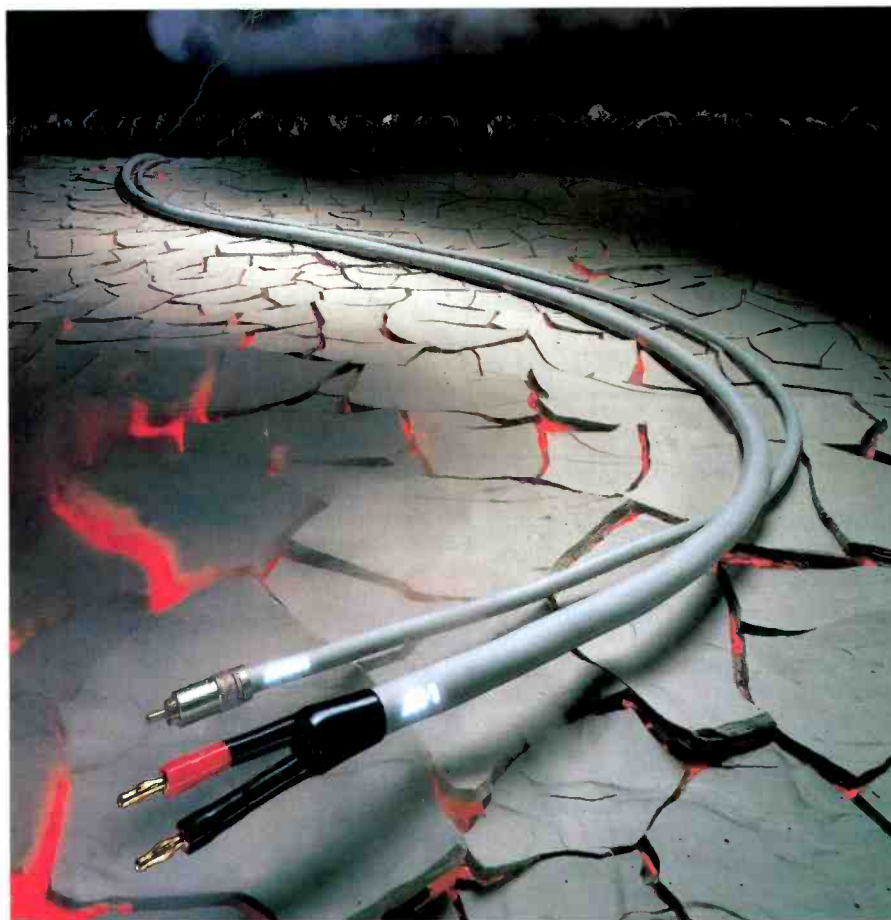
"The Key to Songs" is an outstanding electronic composition, filled with fascinating sounds and surreal atmospheres.

transparency and airy spaciousness rarely achieved. Because Gilbert paid attention to the ambience problem, each track has the sense of a space genuinely appropriate to its expressive purpose. Some instruments are in the foreground, others in the background, all bathed in controlled reverb.

Morton Subotnick, the dean of American electronic music composers, has assimilated the new technology with amazing craft and expressive skill on his latest disc, which pairs "The Key to Songs" with "The Return." The former is not just an outstanding piece of electronic music, it is a major work by one

of America's most important composers. Complex and tightly organized, it also is enjoyable to hear, filled with stunning, fascinating sounds. To convey the surrealistic atmosphere of the Max Ernst novel on which the work is based, Subotnick uses both acoustic and electronic instruments. At times, the two types are indistinguishable; at other times, they combine to produce unusual timbres and even new colors. Subotnick makes ambiguous reality/unreality a major structural feature of the piece. Near the end, he quotes fragments of Schubert lieder, adding to the work's dreamlike character. The intensely percussive nature of "The Key to Songs" and the densely overlaid rhythmic patterns make it a real workout for a good audio system. New Albion's razor-sharp sound conveys all the score's intricate details with expansive ambience. *Steve Birchall*

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Dvořák: Symphony No. 8. The Vienna Philharmonic Orchestra, Herbert von Karajan.

Deutsche Grammophon 415 971-2.

There is no denying Herbert von Karajan's absolute mastery of his craft. He has made more recordings than just about any other conductor, and he has ranged through a vast spectrum of musical compositions.

His reading of the Dvořák Eighth Symphony is simply stunning in its veracity, dynamic expression, and sheer musicality. With an incredibly responsive Vienna Philharmonic under his baton, the music flows in a most logical progression, the phrasing is very apt and immaculate, and the tempos are completely appropriate. The playing von Karajan elicits from the orchestra is rapturous—as witness the brilliant declamatory trumpet fanfares which open the fourth movement. This is followed by a noble theme taken at a stately, measured pace, which then gives way in a magical transition to a spirited Slavonic dance.

The sound is very clean in the fabled warm acoustics of Vienna's Grosser Musikvereinsaal, although the high strings are brightly lit in traditional DG fashion.

This is the definitive performance of the Dvořák Eighth Symphony and a most compelling CD. *Bert Whyte*



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ROUSING RESURRECTION



In the Dark: The Grateful Dead Arista AL 8452.

Sound: B- Performance: B+

In the Dark, the first Grateful Dead studio album in seven years, is one of the very best these venerable graduate-hippies have ever done. Maybe the fire in their playing is due to Jerry Garcia's brush with death last year. But whatever the reason, the Dead play here with real commitment as they deliver the most forceful recording they've ever made.

On their studio forays, I've always found the Dead's recorded sound squeaky and somewhat wimpy, somehow half-hearted. However, here they sound not only involved but hungry. Compare this to their last studio album, *Go to Heaven*, on which they seemed half asleep. On *In the Dark* the boys have a polished sound, with stereo guitars, fine detail, and even good harmony singing.

Neither is the album hurt by its strong collection of songs—the best bunch since *Workingman's Dead* and *American Beauty*. It begins with the hit single "Touch of Grey," a song with the promise of becoming an anthem. Hearing Garcia's voice list life's tribulations and come triumphantly to the "I will get by/I will survive" chorus can't

help but make you feel good. It's a song that could add five years to the life of the band. Their fans will cheer the opening chords and sing the chorus at concerts for a long time to come. However, Garcia's best singing is reserved for the slow, folksy "Black Muddy River," one of those deliberately paced things that Jerry gets to do a couple of on every album.

Bob Weir's best shot comes on the cautionary "Throwing Stones" (one of those preserve-the-planet songs), but his rocking "Hell in a Bucket" is fun too. The only real clinker on the whole album is the train song "Tons of Steel."

The cassette includes an extra song not found on the LP or CD, "My Brother Esau," the flip side of the "Touch of Grey" single release. It is a worthy addition to the set—more than the throw-away that bonus songs often are—as it spins a tale of sibling rivalry taken to a very serious degree.

If it weren't for sound quality, the cassette would be the clear format of choice. But the cassette sound is inferior to that of the CD, and in this case to the album as well. The Dead have done an uncommonly good job of getting a hot, rich sound onto the vinyl—so good, in fact, that the differences between LP and CD are minimal. The cassette by comparison sounds blunt-

ed and mild mannered. All this noted, you are on your own when selecting your medium here.

In the Dark is an album that, quite honestly, I was dreading before its release. Upon finally hearing it I couldn't help being charmed by the upbeat attitude of the band and by the high quality of the songs. This is an album that you don't have to be a Deadhead to enjoy. It works quite well on its own merits. Let's just hope it doesn't take the guys another seven years to follow it up with a worthy successor.

Michael Tearson

Trust Your Heart: Judy Collins Gold Castle 171 002-1.

Sound: C+ Performance: B-

Judy Collins' first album since ending her 25-year association with Elektra Records is nice but somewhat uneven. Seven of the 10 selections are 1985 recordings done in London; the other three were done more recently in New York.

Judy is in excellent voice throughout, singing with great confidence, and her two original compositions are the collection's highlights. Cat Stevens' "Morning Has Broken" is a terrific selection for Collins, and with Tony Britten's lovely arrangement she soars. Rupert Holmes' "Moonfall" is a Sondheim-ish song, difficult and atmospheric. It's the kind of song Judy loves to tackle, and she does quite well with it. On the other hand, some of her covers (e.g. "Amazing Grace" and "The Rose") seem to add little that's new to the familiar material.

The album is very lush both in arranging and recording. The strings are just to the good side of icky, though the overly echoed sound tries hard to push the whole over the edge. But oh, Judy Collins' glorious voice is such a joy to listen to as it wraps itself around a song!

Michael Tearson

Loud and Clear: Autograph RCA 5796-2-R.

Sound: B+ Performance: C

The ultra-slick gloss of Andy John's production cannot hide the fact that the L.A. pop metal band Autograph has nothing to say beyond the title on *Loud and Clear*.

Photograph: ©1987, Philip Gould

It's a shame, too, because the band sports talented musicians, most notably techno-wiz guitarist Steve Lynch, who gets in a few good licks on the title cut and a handful of other songs. But really, lyrics like "If it's too loud/You're too old" plus every trite rhyme (rock/top/stop) and sentiment ("heaven is in your arms") in the rock bag of tricks are an insult, even to a 12-year-old.

Autograph seems to be aiming at the vapid anthemic, a territory already staked out with a certain cleverness and panache by the likes of Ratt and Motley Crue. They owe it to their audience and themselves to offer a little more than the two dimensions of *Loud and Clear*.

Michael Wright

Shaka Zulu: Ladysmith Black Mambazo

Warner Bros. 25582-1.

Sound: B Performance: B +

Ladysmith Black Mambazo is the extraordinary South African a cappella group Paul Simon introduced to millions on his landmark *Graceland* album. He has followed up by producing a record of pure, spellbinding Ladysmith—sung half in English, half in Zulu.

Ladysmith performs songs written by its leader Joseph Shabalala. There is a feeling of reverence in these songs, a hymnlike quality that extends beyond the spirituals to include Shabalala's love songs and his compositions about his homeland.

Lead vocals too are supplied by Shabalala, whose voice is a reedy and friendly instrument. The nine other voices swoop like birds with their fills and garnishments, some acting as a chorus, others as a contrapuntal rhythm section, and all contributing to the songs which have a call-and-response form. It all adds up to a breathtaking musical sound.

That Simon used his leverage to get this album made and released is not at all surprising. In the early '70s he did the same thing for a South American group called Los Incas, taking them on tour and then recording a terrific album of their music released under the name *Urubamba*.

The new Ladysmith album repeats the cycle. *Shaka Zulu* is a marvelous LP, but it is not the only example of the

group's unique sound. Several more are available stateside on Shanachie Records. All are quite fine.

Michael Tearson

Ready or Not: Lou Gramm
Atlantic 81728.

Sound: B Performance: B

The similarities between this record and Robert Plant's first solo album are too strong to be ignored—both were made by singers from successful hard-rock bands on Atlantic Records who stepped away from their songwriting partners (and musical directors), handing over production chores to Pat Moran.

As Plant hesitated to leave his Led Zeppelin sound too far behind, Gramm's album revels in the trademark guitars and drum patterns of Foreigner. Gramm has succeeded in recreating this sound with an assortment of musicians including his brothers Ben on drums and Richard on guitar (two tracks only), rhythm guitarist/bassist/songwriter Bruce Turgon (Gramm's old crony from Black Sheep), and "name" guitarists Eddie Martinez and Nils Lofgren.

Side two of this record consists of five absolute throwaways, but the first side beats the pants off any record Foreigner's ever made. After a somewhat lackadaisical start with two pedestrian rockers, the album kicks into

high gear with "Midnight Blue." Gramm's winning attempt at a personal statement (though his chorus lyric seems perfunctory). "Time" is like a lot of (good) Foreigner songs, and "If I Don't Have You" resembles "Waiting for a Girl Like You," which is to say that it goes after the adult contemporary market without losing its rock grip.

Let's not say much about side two. It's obvious that if they had had another side of material, all of these songs would have stayed in the can.

Sonically, Moran and Gramm have done a good job of keeping a rock edge with a fair amount of ambience. Foreigner records haven't sounded that terrific lately, so it's nice to hear Gramm's voice against drums with a lot of sock to them. However, at times it does seem as if he is losing a bit of the bottom in his voice; on a couple of tracks he sounds thin, and the boys in the booth could have compensated a little more.

Altogether, this is a better record than one might expect from Lou Gramm—who would have anticipated "Midnight Blue"? Foreigner fans will not be disappointed. *Jon & Sally Tiven*

Les Misérables: Original London Cast
Relativity Records 88561-8140-1,
two-record set.

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Ladysmith
Black Mambazo

Les Misérables has some shining moments, but much of the music has no more variety than the lup-dup of a marching band.



ater awards, and a platoon of critics ransacking their vocabularies for new superlatives, *Les Misérables* is an established commercial and popular success. Whatever a critic writes now can do nothing to diminish the show's status, and that is, for me, a comforting and liberating realization, since—reacting only to this album—I cannot feel any urgency to stand in line for tickets. To put the matter simply, the music and English lyrics for *Les Misérables* seem to me a supreme achievement in pedestrian monotony. I can only imagine that audiences leave the theater humming the sets.

Victor Hugo's novel of social conscience has been turned into an epic theater piece by Alain Boublil and Claude-Michel Schönberg, with music by Schönberg and English lyrics by Herbert Kretzmer. In no fewer than 28 musical numbers, the hallowed story of Jean Valjean has become a crowd-pleaser, but that must be due more to the production values than to the music, which is monumentally forgettable.

This is not to say it is without significance, however. From the opening call, "At the End of Day," *Les Misérables* is a work that would have won the approval of no less a man of the theater than Bertolt Brecht, for the story is everywhere carried by the music, not just supported or decorated by it. There are some shining moments, as when Patti LuPone sings "I Dreamed a Dream," a tender musical elegy in the manner of Jacques Brel that tells of betrayal and loss. The crystalline quality of this LP is particularly evident here, as the 20-piece orchestra under Martin Koch is cleanly balanced and separated. The show's star, Colm Wilkinson, defends his character's innocence in the impressive "Who Am I?" and the gently effective prayer "Bring Him

Home," which has become the show's signature. His duet with LuPone, "Come to Me," may be the best thing in the musical, as it builds to a poignant death scene and the promise to keep a dying woman's child.

But as we listen to the album, numbers like "Confrontation" begin to accumulate: The rhythms are solid and tedious, and the sameness of the musical idiom and melodic textures begins to be annoyingly obvious. By the time I came to "Master of the House," the repetition of the harmonic language was, I'm sorry to say, deafeningly apparent and embarrassingly boring. Which may be just why it is so irresistible for so many people: This is undemanding, fundamentally martial music with no more variety than the lup-dup of a high school marching band. I challenge any partisan of this show to distinguish the melodies or rhythms of "Confrontation" from those of "Stars" or any one of a half-dozen other numbers. Everything seems thumpingly monotonous.

Some musicals can exist apart from their visuals. Gershwin's *Of Thee I Sing* was such; so were Rodgers and Hammerstein's *Oklahoma*, Leonard Bernstein's *Candide*, Stephen Sondheim's *Company*, and a dozen or so other shows you could name as well as I. But *Les Misérables* depends on the crowd-

pleasing grandeur of its production values and its apparent good-heartedness. This album will be prized only by those already in love with the show.

Donald Spoto

Angel Band: Emmylou Harris
Warner Bros. 25585.

Sound: B+ Performance: A

Angel Band is a project Emmylou Harris has wanted to do for years, an album of hymns performed acoustically and recorded live in the studio. Actually there are overdubs, but only for Mark O'Connor's fiddle and Jerry Douglas' and Mike Auldridge's dobro parts. Other than these, all voices and instruments were recorded together. Harris is joined by her coproducer Emory Gordy on bass, Carl Jackson on acoustic lead guitar, and Vince Gill on acoustic guitar and mandolin. All three add gorgeous three-part harmonies to Emmylou's lead voice. The singing is sweet and pure but never slick, and the playing is spare and tasty.

Emmylou Harris deserves credit for following a commercial breakthrough like *Trio* (a collaboration with Linda Ronstadt and Dolly Parton) with as uncommercial an album as *Angel Band*. Undeniably from the heart, it is an album that makes a joyful noise.

Michael Tearson





Andy Summers

XYZ: Andy Summers
MCA 42007.

Sound: B+ Performance: A-

Arresting, isn't it, when parts of a pop trio like The Police are subtracted during solo efforts; creative contributions are isolated as if a "personality filter" had been applied. You can hear this exotic effect on Andy Summers' first solo LP, *XYZ*.

Taking up where *Synchronicity* left off, *XYZ* is richly layered studio pop swirling with Summers' dense, varied guitar textures and laconic vocals. His songs are full of catchy hooks, changes of pace, clever musical quotes (you'd swear it's Billy Gibbons playing on "Almost There"), and good lines ("Some sex can be better when it's on the phone"). The lyrics strongly favor moody introspection ("Hold Me") and mystical convolution ("The Only Road," the highlight of the LP). "Eyes of a Stranger" and "Nowhere" (a virtual remake of "Message in a Bottle") come

closest to sounding like The Police (sans reggae). The overall effect of *XYZ* is very reminiscent of Lindsey Buckingham's *Go Insane*.

Andy Summers' *XYZ* features good sound, slick production, and mature, talented (if somewhat somber) songwriting. It's another step forward in the remarkable Police tradition.

Michael Wright

Mercy: Steve Jones
MCA 2006.

Sound: B Performance: B-

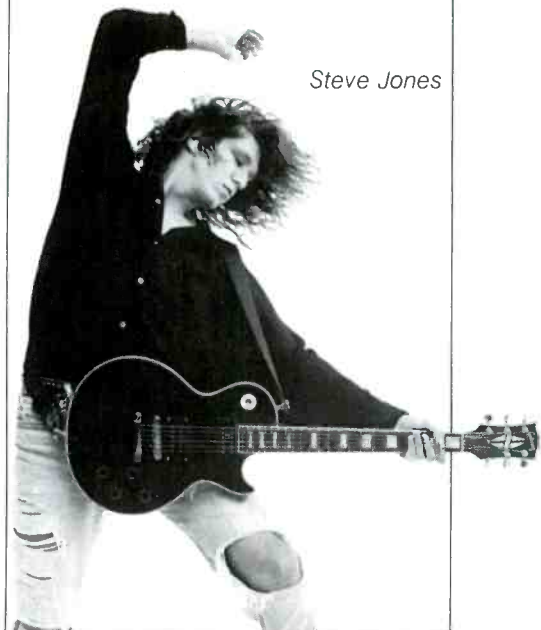
It would be nice to be able to say more positive things about Steve Jones' solo debut, given that this year he's helped Iggy Pop make one of his better records and helped save Andy Taylor's solo career from being completely vapid. This is the third leg of the ex-Sex Pistol's re-emergence, and it's too bad that it is only so-so.

As in his latter Pistols work, Jones is handling guitar, bass, vocals, and

songwriting—a load too heavy for him to bear. First off, he's a limited singer, with only a limited range to carry him through, and his intonation isn't always on. His guitar playing is stylized but never stunning, his bass playing serviceable but never strong. His songs are good but would probably benefit enormously from another voice. "Raining in My Heart," "Pleasure and Pain," and the title track are the best things here, but they are all in a similar vein. Imagine Billy Idol fronting for Dire Straits or Jim Morrison singing John Waite songs, and you might get an idea of Jones' direction. There is some Pistols-style high-energy rock here, but this material is even more difficult for Jones' limited voice to handle.

Sonically, the album has all the power and space you'd want—Neil Dorfman has done a terrific job with Mickey Curry's drums and has put enough reverb on Jones' voice so that his out-of-tuneisms are easier to take. But a foil for his talents would have been appreciated—all the digital keyboards in the world don't take the place of what another singer/guitarist could have provided. Steve Jones is great as part of an act, but there are few guitar player/songwriters capable of putting out solo albums worthy of more than a cursory listening, and he's not one of them.

Jon & Sally Tiven



Steve Jones

Mark O'Connor's new LP has a lot of guts and a big, full sound that fills the audio space.

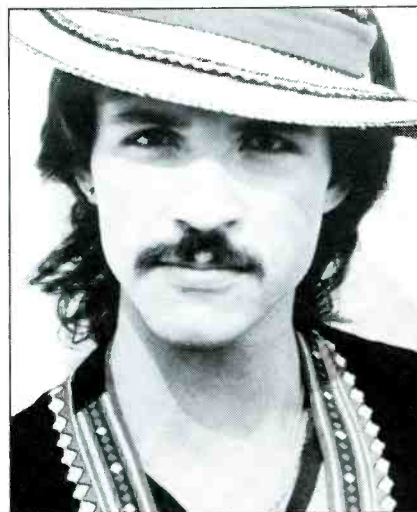
Stone from Which the Arch Was Made: Mark O'Connor
Warner Bros. 25539-1.

Sound: B+ Performance: A

With far more guts than his acoustically oriented *Meanings Of LP*, multi-talented multi-instrumentalist Mark

O'Connor's *Stone from Which the Arch Was Made* boasts a seamless fusion of bluegrass, rock, and jazz.

O'Connor's violin and guitar virtuosity bounce off crackerjack musicians including keyboardist T Lavitz and guitarists Steve Morse and Chet Atkins. It's a varied set, as O'Connor swings

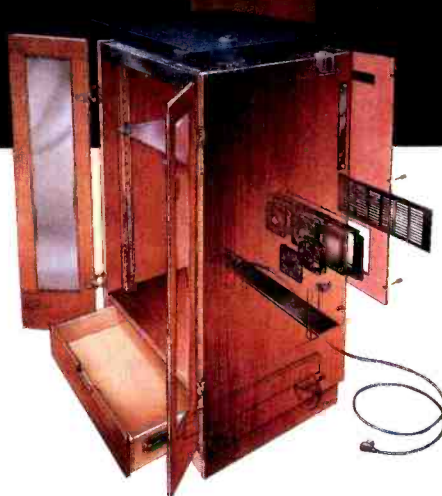


from the Bach-ish title cut to the lively mariachi syncopation of "From Panama to El Pichincha," the cascading country/rock fusion of "Hear the Sunshadows Dance," and the inspired folk symphony of "Remember Ireland."

With a big, full sound that fills the audio space, Mark O'Connor's *Stone from Which the Arch Was Made* is solid entertainment that combines the best of traditional and modern music.

Michael Wright

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The Bears
Primitive Man IRS-42011.

Sound: B+ Performance: A

Finger-popping hooks that make you nod like you've always known them run amok on The Bears' eponymous debut, the first release on the brand-new I.R.S. subsidiary label, Primitive Man.

A marriage between members of The Raisins and ex-Zappa/King Crimson twang-bar king Adrian Belew, The Bears spin infectious melodies with lyrics just offbeat enough to be interesting. Propelled by Belew's whining guitar textures and squiggled embellishments, the result sounds sort of like Men at Work and Big Country meet The Beatles (circa *White Album*).

At times, The Bears' influences get a little too close to the surface, especially The Beatles, who are evoked in "Man Behind the Curtain" and "Wavelength." But just as you think REO Speedwagon has slipped into the session (on "Superboy"), Belew's avant-garde twang bar alters the course and

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Guitar wiz Mason Ruffner plays songs that are hot, inventive, and full of ear-catching phrases.



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Digitally recorded and excellently produced by Belew, *The Bears* contains not one song that couldn't survive Top 40 airplay and improve the airfare in the process. An auspicious start for Primitive Man. *Michael Wright*

Gypsy Blood: Mason Ruffner
CBS Associated BFZ 40601.

Sound: C+ Performance: B

Hard Times in the Land of Plenty:

Omar and The Howlers

Columbia BFC 40815, digital.

Sound: B Performance: B

The return to favor of gritty rock 'n' roll as played by the likes of The Fabulous Thunderbirds and The Georgia Satellites is one trend I'm delighted to see. Here are two of the trade's finer practitioners: Mason Ruffner from New Orleans and Omar and The Howlers from Austin, Tex.

Gypsy Blood is Mason Ruffner's second album. His first was one of last year's genuinely intriguing debuts, though far too few took notice. He sings like a rougher version of Dire Straits' Mark Knopfler; also like Knopfler, he is a guitar wiz who just loves to play, and you can feel it in the liveliness of his solos. His New Orleans background shows up in his songs, which are simmering hot, consistently inventive, and full of ear-catching phrases. The title song is a thumper that deserves to be a hit.

With *Gypsy Blood*, Dave Edmunds

has taken over production duties for Ruffner, to mixed results. On one hand, Edmunds is clearly sympathetic to an artist like Ruffner, with whom he obviously feels kinship. But in bringing Ruffner over to England to record with Edmunds' band (Dave Charles on drums, John David on bass, Mark Avsec on keys), the producer has imposed a boomy "British" sound on the rhythm section; while not hurting any, it doesn't help much either. But that sinewy guitar of Ruffner's is welcome.

As for Omar, he is Omar Dykes, a native of McComb, Miss. who has fronted his Howlers (bassist Bruce Jones and drummer Gene Brandon) for more than a decade. They play strong, solid, rocking blues with healthy doses of Elmore James, Jimmy Reed, and (especially in Omar's voice) Howlin' Wolf as prime influences. For this album the group has added occasional organ and synth for flavor and variety, but they don't water down their style at all. *Hard Times in the Land of*

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Roger Waters' music kicks and groans with surges of power but is undermined by lyrics that have more holes than Swiss cheese.



Plenty is an impressive debut by a good, tough band with a good, tough sound. It doesn't hurt, either, that the album was digitally recorded.

Both Mason Ruffner and Omar and The Howlers present music that comes from spirit rather than from machines or formulas, and that is precisely where their value lies. *Michael Tearson*

Radio KAOS: Roger Waters
Columbia FC 40795.

Sound: C+ Performance: B-

This is the kind of record that shouldn't be critiqued for at least three years after release. As Waters has often demonstrated, both solo and with Pink Floyd, he is no dedicated follower of fashion—his musical and thematic concerns are as eclectic as Stravinsky's were in his day, and their value often grows with the years. He doesn't always pull it off, but still, Waters runs deep.

On *Radio KAOS*, he postulates a

renegade radio station in a *Max Headroom* world, complete with smooth commentary by disc jockey Jim Ladd and an electronic-voiced caller. His scatter-shot themes attack the increasingly soulless programming of radio, media overkill, and the trivialization of major issues through neat news bites. To Waters' credit, these themes do not overwhelm the music—the album kicks and groans with power surges that take the shape of wailing electronic honky-tonk ("Sunset Strip"), brightly plucked acoustic ringing ("Me or Him"), and action-packed congas and

bongos ("Home"). Yet, despite such definite positives, *Radio KAOS* jells only patchily.

Part of the problem is Waters' unaccountably homely voice on this album. It can't be taken seriously, and it undermines his aim. Besides which, the unacceptably noisy pressing distracts from the sharp veneer he intends. Another part of the problem is thematic, as his criticisms of political figures comes off as rather simplistic. A third problem is Waters' vague lyrics, which have more holes in them than Swiss cheese.

When his lyrics do break through the mist Waters is everything a Pink Floyd aficionado would expect. But in the end he undermines himself. In his final song he pats our heads and tells us everything's all right—backed by a choir of seraphim, no less. The song tells of "technology's sword [wrested] from the hand of the War Lords." I dunno, Roger. You really believe that's gonna happen? *Frank Lovece*

A L I N G.



FROM RADIO DAYS



Butterflies in the Rain: Jonah Jones and His Swing Band

Circle CLP 83, monaural. (Available from Circle Records, 1206 Decatur St., New Orleans, La. 70116.)

Sound: B+ Performance: A/B

From the mid-1930s through World War II, a handful of companies recorded thousands of big bands, combos, singers, and musicians of every kind and caliber, producing 16-inch discs to be used exclusively for radio airplay. These noncommercial monaural recordings became collectors' items after the war, when many stations stopped using this kind of program service. But in the past several years, George Buck's Circle label has been transferring to LP some of the best of these recordings, including this one made in 1944 by the World Broadcasting System (whose transcription library Buck purchased a decade ago). The careful transfer was done by Jack Towers, a former State Department employee with deep roots in jazz.

The *Butterflies in the Rain* session was produced by Milt Gabler, then a full-time producer at Decca Records,

which had a tie-in with World. The leader was Jonah Jones, a gifted, Louis Armstrong-inspired musician who was Cab Calloway's solo trumpet at the time. Eight other members of Calloway's band also participated: Trombonist/vibist Tyree Glenn, clarinetist Al Gibson, tenor man Ike Quebec, alto saxist Hilton Jefferson, pianist/arranger Buster Harding, and the Calloway rhythm section of Danny Barker, guitar; Milt Hinton, bass, and J. C. Heard, drums.

There are eight titles, including myriad alternate takes, false starts, and incomplete takes or breakdowns, as Circle makes full use of the World archives. It is fascinating to hear the musicians' work evolve, to hear producer Gabler make succinct suggestions. The first side includes most of the incomplete or unissued takes, and the second has the cuts selected originally for release by World.

Harding's arrangements are spare and uncluttered yet full of color, and they support the musicians well. The leader's solos show off plenty of fine trumpet, with Jones' full tone and capacity for invention. The solos of altoist

Jefferson on the lovely and rarely heard "Butterfly in the Rain" are doubly worth preserving, since Jefferson made so few solo appearances on record. His full tone and advanced ideas make the most of this long-forgotten song. Ike Quebec was one of the last players to take up the mantle of Hawkins and Webster, and here he shows the full-toned, surging, melody-based solo style that died as be-bop ushered in a new jazz era after 1945. Gibson, another player featured only infrequently—if at all—on commercial records, has some nice moments on clarinet. Tyree Glenn acquits himself well on both trombone and vibes, especially the latter (I find his brass work a bit bland, on the whole). Bassist Milt Hinton is a tower of strength and has some good solo spots as well.

Everyone works well together, as one might expect from players who've been working together, night after night, for several years. This is very fine music, swing style, played by mature musicians. Recommended.

Frank Driggs

Alternate Takes: Sonny Rollins
Contemporary Stereo C-7651.

Sound: B Performance: A

One of the recent approaches to re-issuing records has been to release all the alternate takes to important (and some not-so-important) albums from the past. This record contains the alternates to *Way Out West*, which was released nearly 30 years ago. At the time, it was considered a landmark in modern jazz, and it established Sonny Rollins as one of the genre's foremost exponents. (The original LP is still available on Contemporary.)

Working with bassist Ray Brown and drummer Shelly Manne, or in a combo with Hampton Hawes, piano; Victor Feldman, vibes; Barney Kessel, guitar; Leroy Vinnegar, bass, and Manne on drums, Rollins fashioned exemplary extended saxophone solos. Most notable is Johnny Mercer's 1936 hit "I'm an Old Cowhand."

I found the original *Way Out West* album puzzling, amazing, and full of comic surprises. *Alternate Takes* amplifies that original feeling. Still, alternate takes do provide a means by which we can study how a contempo-

rary master works out his ideas. This album will be a valuable addition to Sonny Rollins' catalog. *Frank Driggs*

Everything I Have Is Yours—The MGM Years: Billy Eckstine
Verve 819442-1, two-record set.

Sound: B+ Performance: A

This is a good example of doing things right. Long overdue, *Everything I Have Is Yours* presents the best of Billy Eckstine's many fine ballad performances for MGM from 1947 through 1957, including some jazz numbers with the Metronome All Stars and a combo led by his accompanist Bobby Tucker. Produced by Richard Seidel and Bob Porter, it is a standout.

This is only peripherally a jazz record. What it is is a great pop record—pre-rock pop, of course, the kind of thing we associate with Frank Sinatra, Mel Tormé, Nat "King" Cole, and many other fine singers who made important records in this genre.

Billy Eckstine became a star with the Earl Hines band between 1939 and 1943. He then led the best of the big

be-bop bands until 1947, the year he became the second artist (Art Lund—remember him?—was the first) to sign with the new MGM label. With Nat "King" Cole, Billy Eckstine was the major black male star of the era. However, he had come up before World War II, when black male singers—and there were many good ones—were not allowed to record love songs. It was only when he got to MGM that he was able to do so—in quantity and with huge success.

Most of these recordings have been unavailable for many, many years. Now, cleaned up and repackaged with good liner notes by Lee Jeske, they make a most attractive set. There are the large orchestras conducted with style by Hugo Winterhalter, Russ Case, Pete Rugolo, Nelson Riddle, Joe Lippman and Hal Mooney. There are fine duets with Sarah Vaughan, Eckstine's discovery, and some wonderful moments from the likes of Roy Eldridge, Lester Young and Teddy Wilson. Billy Eckstine is one of the best, and this is some of the finest ballad singing a man can perform. *Frank Driggs*



Billy Eckstine and Sarah Vaughan

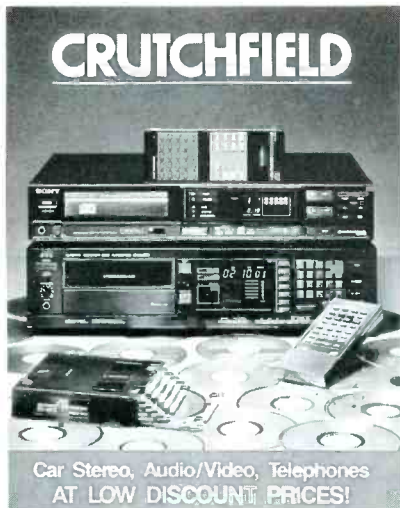
The Complete Ben Webster
Emarcy 824 836-1, two-record set.

Sound: B+ Performance: A to D

In the past year, Polygram has done more than any other major label to make good use of its valuable archives. It has dug to the bottom of Mercury's vault for this set of Ben Webster performances, recorded between 1951 and 1953, a time when the saxophonist was working only irregularly.

Fourteen of the 33 tracks were made under Webster's leadership, and by and large they have the most satisfactory performances. The dates done with Jay McShann and Johnny Otis were aimed at the rhythm-and-blues market, and are secondary items (with the exception of three matchless takes of "Stardust," done with Otis in standard ballad form).

Better are the selections with Webster leading his own group, which included Benny Carter (who inexplicably is allowed only one solo); Maynard Ferguson, who plays within reason; Gerald Wiggins, and bassist John Kirby, whose last recordings were these.



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On this first-rate debut, Joe Louis Walker's nimble guitar and gospel-trained vocals are set against dynamic arrangements.

"Old Folks" and "You're My Thrill" are further examples of Webster's ballad artistry. There is also a good solo on Dinah Washington's "Trouble in Mind," two rare sides with The Ravens, an excellent session conducted and arranged by Johnny Richards, and a final date with altoist Marshall Royal. Perhaps the unidentified original producer may have felt it wise to present Webster in a semi-bop setting, in an effort to widen his audience. Whatever the reason, Webster shows himself able to deliver music in any setting.

Only slightly more than half the selections in this set can be considered essential. But if you are a passionate and devoted Ben Webster fan, you will want these records. *Frank Driggs*

Upside Downside: Mike Stern
Atlantic 81656-1.

Sound: B+ Performance: A

With sinuous guitar tones that cut high like a horn, Mike Stern wails through six instrumentals that lean toward the jazz side of fusion.

Stern, an off-and-on Miles Davis sideman, has garnered quite a reputation for chops; while heard here, they're secondary to the overall musical effect. Highlights include the syncopated intervals of the title cut; the speedy, slippery scales of "Little Shoes," and the phased, highly vibratoed solos on "Mood Swings" (with Jaco Pastorius on bass) and "Scuffle." Notable sax performances are contributed by David Sanborn and Bob Berg.

Although the compositions on *Upside Downside* don't break new

ground, Stern's well-articulated playing and versatile sound stand out in a field already crowded with noteworthy fusion fretburners. *Michael Wright*

Cold Is the Night: Joe Louis Walker
Hightone Records HT8006. (Available from Hightone Records, P.O. Box 326, Alameda, Cal. 94501.)

Sound: B+ Performance: B+

One of the many burdens of a small record label is reviewing endless demo tapes from would-be but won't-be stars. Hightone Records probably expected little from a demo by singer/guitarist Joe Louis Walker, a performer obscure even by the standards of the blues world. You can share Hightone's surprise and thrill of discovery from the opening track—the title track—of Walker's first album, *Cold Is the Night*. Just like the bystanders who witnessed the dazzling exploits of the Lone Ranger, you may well wonder, "Who is that man?"

The title cut is so good that even if Walker had released it as a 45 and done nothing more, his performance would have earned him a footnote in blues history. It is a highly polished showcase for Walker's gospel-trained vocals and nimble guitar, set against a dynamic arrangement. Expect to hear the song faithfully copied by bar bands.

Nothing else matches the impact of the opening track, but the album is a first-rate debut. As lucky as Hightone may have been to find Walker, he was perhaps just as lucky to find a home on one of the few labels that play an ac-



The playing on *Mystique* is very hot, the sound is crystal clear, and the production is impeccable.

tive role in the production of an album instead of merely providing studio time. The songs are fresh and rhythmically varied, ranging from the witty Sonny Boy Williamson-like lyrics of "Gettin' Even" to the rocking "Ridin' High."

Walker has cited guitarists Earl Hooker and Freddy King as influences on his sophisticated guitar work, but his picking brings to mind another Chicago giant, Magic Sam. Walker's own "Don't Play Games" is derived from Sam's classic "All Your Love," while his "I Need Someone" recalls Sam's "I Feel So Good."

Cold Is the Night may be Walker's debut, but the 37-year-old Californian is clearly no newcomer to the blues.

Roy Greenberg

to move, while "Rainy Sunday" and "A Side Street in Paradise" turn contemplatively inward. However, note that at several points the arrangements veer dangerously close to elevator music, as on "Dreamer of Dreams," which is saved only by an exotic Middle Eastern guitar break.

Minucci and Jinda are very hot players (as are their backup musicians), the sound is crystal clear, and the production is impeccable. If you like fusion, New Age and lighter pop jazz (à la Earl Klugh), you should find *Mystique* a satisfying experience.

Michael Wright

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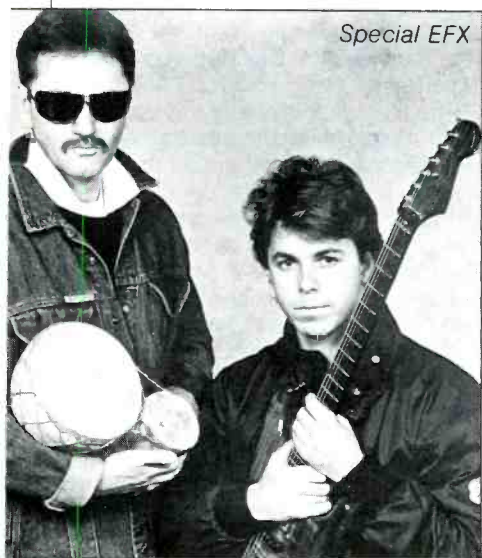
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Special EFX

Mystique: Special EFX
GRP GRD-9543.

Sound: B+ Performance: A-

Between New Age and fusion lies an expanding, uncharted territory of new music which combines mood painting with a jazzier punch and direction. Upon that terrain you'll encounter Special EFX and *Mystique*.

New Yorkers Chieli Minucci (guitars) and George Jinda (percussion) have created a fertile soundscape which moves back and forth between background and foreground music. Tunes like the Latin "Udu Voodoo" and the funky "Islands" leap out at you with sensuous rhythms that make you want

Luther Allison's gritty and muscular blues is a welcome throwback to the stinging blues/rock fusion of the 1960s.

Serious: Luther Allison
Blind Pig 2287. (Available from Blind Pig Records, P.O. Box 2344, San Francisco, Cal. 94126.)

Sound: B- Performance: B

Bluesman Luther Allison's career is a classic example of the whole equalling

less than the sum of its parts. He is blessed with a throaty roar and guitar technique to spare, but his career has never built up any momentum, despite two promising early-'70s releases on Motown. His LPs gradually disappeared from record stores, and his stage sets slowly degenerated into

covers of the Chicago blues' greatest hits. Instead of reaching larger audiences, he retreated to Europe, which is where he's cut his latest album.

Serious is yet another tantalizing record on a small label. Once again, you can't help but wonder if it's not too late for this Arkansas-born bluesman to stage a comeback. Allison's electric blues is crossover music with the grit and muscle intact, a welcome throwback to the stinging blues/rock fusions of the '60s.

Allison's five-piece group variously brings to mind The Rolling Stones ("Parking Lot"), Son Seals ("Should I Wait"), and Freddy King (just about everywhere). His singing is ideally suited for belting out rock as well as blues. He has the vocal power, if not the sense of contrast, of a deep soul singer, as he proves on "Just Memories," which echoes the Otis Redding classic "I've Been Loving You Too Long."

The title track is one of the best and most mature things this bluesman has ever recorded. Pianist/producer Michel Carras has given his bandleader a keyboard-based framework to show that his guitar can cry as well as shout. The song builds to a fine solo with some of the most deliberate and effective bends this side of Albert King. Not every cut is this good, but even the album's throwaways boast some fine guitar work.

Like Allison's earlier domestic release on Rumble, *Serious* will probably disappear without a ripple. Too bad. Luther Allison, like too many other bluesmen, deserves better.

Roy Greenberg

Pump It! Jeff Berlin
Passport Jazz PJ 88017.

Sound: B+ Performance: A

Punchy funk fusion with a kick you can dance to fills the grooves on bassist Jeff Berlin's *Pump It!* The album's tight compositions are rich in melodic hooks and heavy on theme-and-variation structures which give Berlin's excellent band members room to show their chops. Especially noteworthy is guitarist Frank Gambale, whose aggressive facility sounds like *Strikes* Twice-era Larry Carlton.

However, Berlin's bass steals the show. Check out "Bach," a skittering

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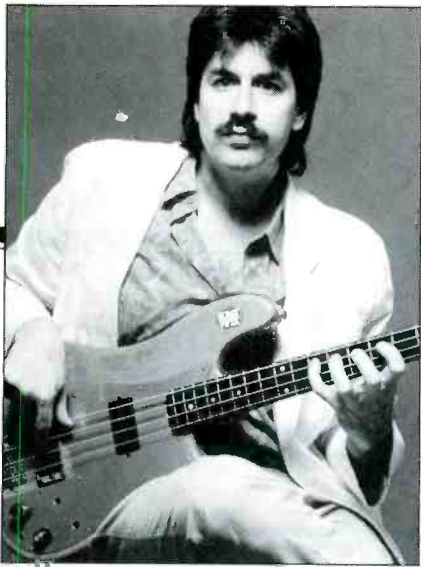
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Bassist Jeff Berlin plays punchy funk on an album that'll give your woofers a real workout.

Rush turns in a masterfully eloquent solo. And his gifts as a vocalist almost equal his power as a guitarist.

If it sounds as if the Mississippi-born bluesman can do no wrong, that's exactly the case on *Right Place, Wrong Time*. Readers who've seen this blues giant on stage know that he's alive and

well, and that he has more albums this good or better in him. The only sad note is that Rush hasn't had much luck with record companies since this classic date, with the exception of a wonderful live set, *So Many Roads* (Delmark DS-643), cut in Japan in 1975.

Roy Greenberg

jam on a Bach organ fugue; the amazing *lead* bass solo on Robert Johnson's blues classic "Crossroads" (Buddy Miles on vocals), and the speed bass on "Manos De Piedra."

All in all, *Pump It!* will give your woofers a lively, syncopated workout.

Michael Wright

Right Place, Wrong Time: Otis Rush **Hightone Records HT8007.** (Available from Hightone Records, P.O. Box 326, Alameda, Cal. 94501.)

Sound: B Performance: A

In the blues world, tales of great unreleased sessions are equivalent to fishermen's yarns about the big one that got away. So blues fans paid little heed to rumors of a landmark Otis Rush LP cut for Capitol in 1971 but languishing in their archives. After all, Rush, one of the deans of Chicago blues guitarists, had a history of being ill served by the recording industry. His legendary reputation rested largely on a handful of increasingly obscure 45s.

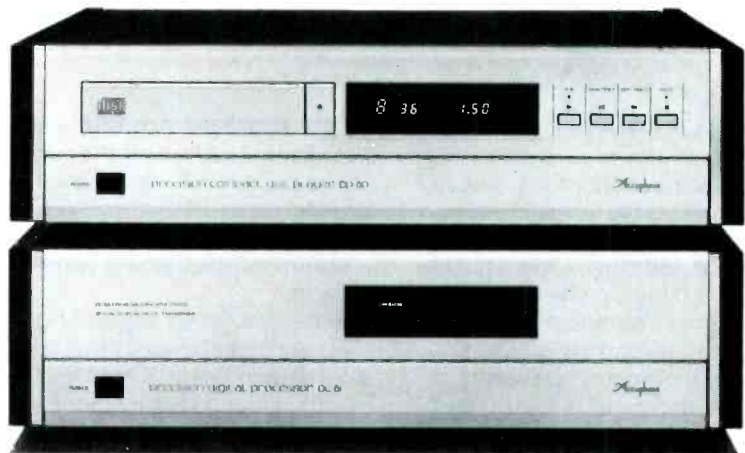
When that Capitol session was finally released on Bullfrog in the mid-'70s, it was greeted as much with surprise as with pleasure, for it exceeded the expectations of all but Rush's truest supporters. The disc's recent reissue on Hightone provides a perfect opportunity to recommend it to anyone who missed it the first time.

Right Place, Wrong Time is a benchmark of modern blues guitar. The album's mix of fresh songs showcases Rush's considerable talent, as he plays with a mature, concise style of great depth. He steamrolls through "I'm Tore Up" and "Natural Ball" with chorus after chorus of imaginative, riveting guitar runs. The elegant guitar lines of the instrumental "I Wonder Why" recall Earl Hooker's classic "Blue Guitar." On the title track (not the Dr. John hit),

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Blue Matter, a tribute to the blues roots of jazz, was recorded mostly live in the studio with only a few keyboard overdubs.

Blue Matter: John Scofield
Gramavision 18-8702-1.

Sound: B+ Performance: B+

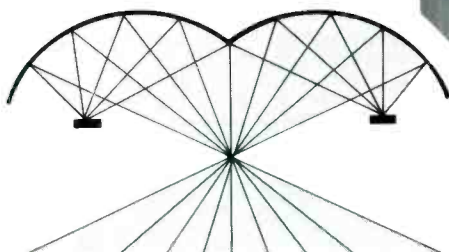
Bent notes and wrinkled improvisations over grooves that circle around R&B mark *Blue Matter*, John Scofield's tribute to the blues roots of jazz.

Recorded mostly live in the studio with only a few keyboard overdubs, Scofield's excellent new combo (notably bassist Gary Grainger and ex-Funkadelic drummer Dennis Chambers) achieves a tight spontaneity that proves an excellent foil for his nimble scalar workouts. Check out the laid-

back be-bop go-go dance groove of the title tune, the Hammond organ blues of "Heaven Hill," and the non-stop blowing on "The Nag."

Blue Matter is a decided change of pace from Scofield's previous, more mainstream *Still Warm*. It should please traditional jazz and fusion fans alike.
Michael Wright

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3rd Degree: Johnny Winter
Alligator 4748.

Sound: B Performance: B+

Johnny Winter plays blues guitar so fast that his speed often masks the depth of his talent. It's true that other guitarists may be every bit as eloquent with far fewer notes. However, to argue that Winter should strive to sound like such economical guitarists as B. B. King completely misses the point of the blues. Winter can no more play like B. B. King than he can *be* B. B. King—at least, not without sacrificing the individual expression and personal integrity at the heart of the blues. Winter's guitar-on-fire approach to his music is a crucial ingredient in his brand of the blues.

Winter's latest record for Alligator, *3rd Degree*, is in many ways a throw-back to his first album, 1968's aptly titled *Progressive Blues Experiment*, issued on Imperial. Like that earlier set, *3rd Degree* is very much focused on Winter's guitar; on none of the cuts is he backed by more than a trio. Sidemen include Dr. John on keyboards, members of Albert Collins' band, and even Tommy Shannon and "Red" Turner, who backed Winter on his debut LP. Two tracks showcase Winter's work on the National Steel guitar, once the favorite of country bluesmen. The cuts mark the first time since 1977 that Winter has recorded on the instrument, whose sound he affectionately likens to "a garbage can with wire on it."

Not surprisingly, *3rd Degree* is more memorable for its stream of solos than for its material, which would have benefited from the addition of some early rock 'n' roll or R&B. The best cut is a slow blues, "Love, Life and Money," in which Winter fully integrates his solo with the song's melody.

This album is another tight, satisfying set from a musician whose lightning runs have set a goal for legions of

Red Tyler has assembled an accomplished group of musicians for this album of modern jazz; I wish I liked the music more.

fledgling guitarists. If you were raised on rock, chances are good that the unflagging energy of Winter's barrage of blues will be to your liking.

Roy Greenberg

**Cloud About Mercury: David Torn
ECM 1322.**

Sound: B+ Performance: A

Heavy-metal guitar screeching over sensuous, African-inspired rhythms is just one of the curious conjunctions to be found on the sometimes molten, sometimes ethereal *Cloud About Mercury* by guitarist/composer David Torn. Backed by an all-star combo of Mark Isham (trumpet/flugelhorn), Tony Levin (Chapman stick/synthesizer), and Bill Bruford (drums/synthesizer/percussion), Torn creates a delightfully out-of-this-world landscape of exotic guitar tonalities, all without synthesis or sampling. It adds up to great-sounding, well-produced, innovative instrumental jazz which will take you far beyond the outer limits of ordinary "fusion."

Michael Wright

**Heritage: Alvin "Red" Tyler
Rounder 2047.**

Sound: B+ Performance: B/C

Alvin "Red" Tyler, a tenor saxist of considerable stature in the rhythm and blues field, is making his debut as a jazz soloist on Rounder's Modern New Orleans Masters series.

Born and raised in New Orleans, Tyler did not begin playing until 1947, working mainly with trumpeter Dave Bartholomew's band. He was soon playing steadily in the burgeoning post-war R&B studio recording scene and remained active through the '50s and '60s. For the past 20 years, Tyler has worked a day job outside music, and plays only when the date suits his style.

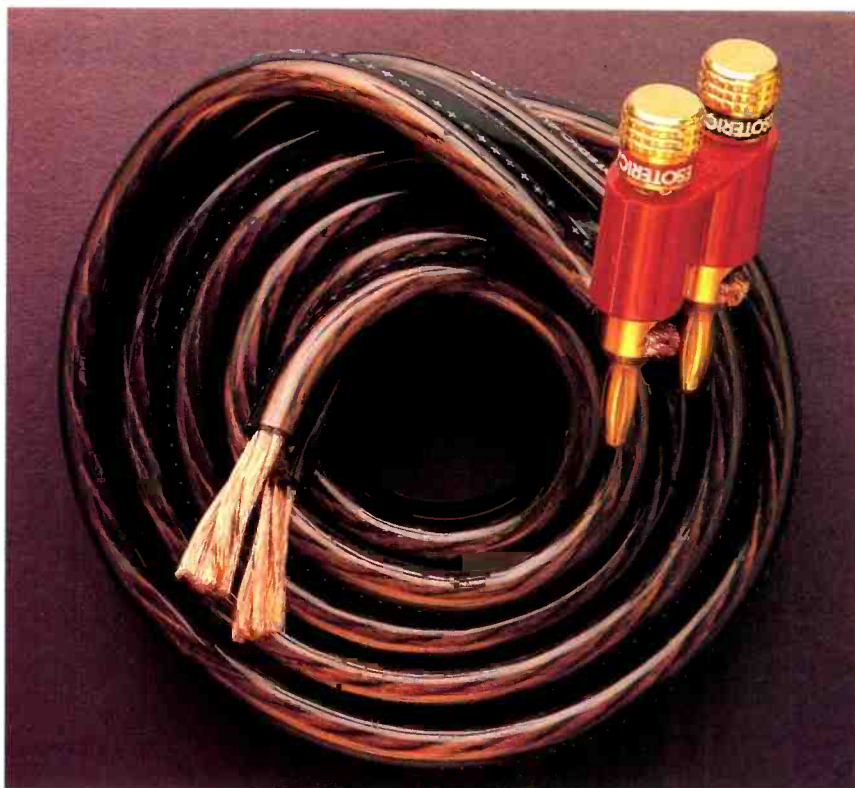
Tyler's preference has always been to jam after hours in the modern jazz style. On *Heritage*, he is joined by trumpeter Clyde Kerr, Jr., son of a prominent bandleader, and several young players in the rhythm section. Six of the eight original pieces are by Tyler; also included are two standards.

This is a very accomplished group of professional jazz musicians who have their instrumental technique down and

are able to express their ideas fully. Having said that, I wish I could say I liked the music more. I've heard it all before, and mostly with more fire and imagination. Much is made in the notes about New Orleans having a be-bop scene. I don't doubt it, but it seems to me that be-bop has little to do with

New Orleans or the rich heritage it is supposed to stand for. Other than the fact that these are New Orleans musicians, this music could have been played anywhere. It's just another modern jazz record, indistinguishable from the mass of product turned out in any given year.

Frank Driggs



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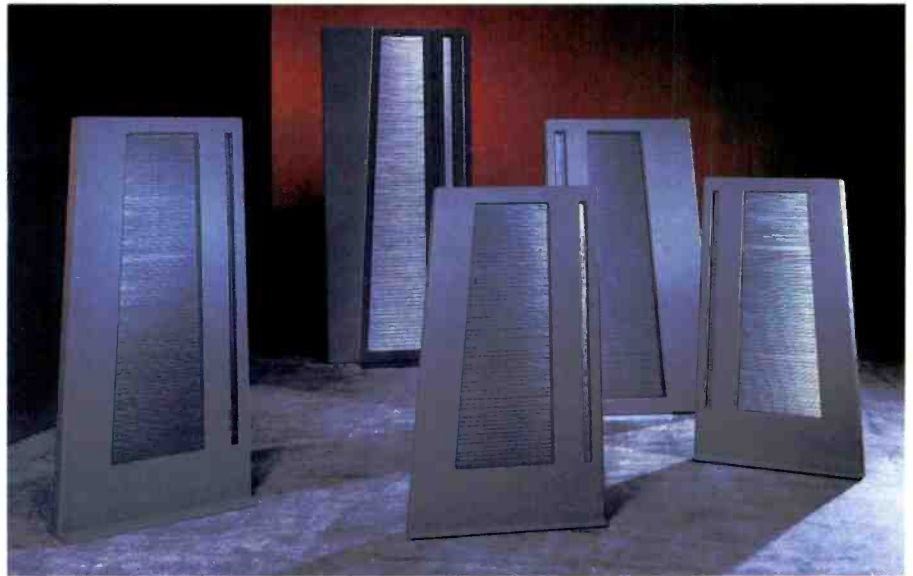
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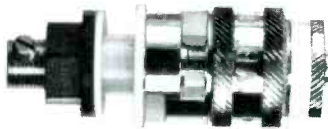
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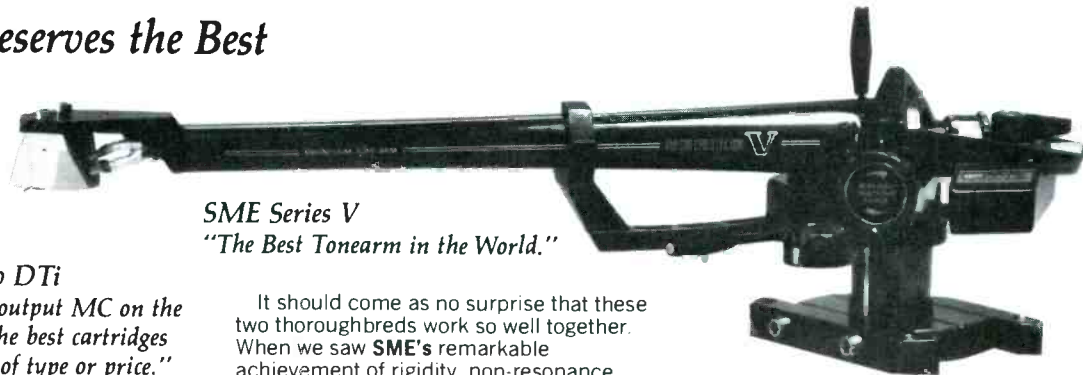
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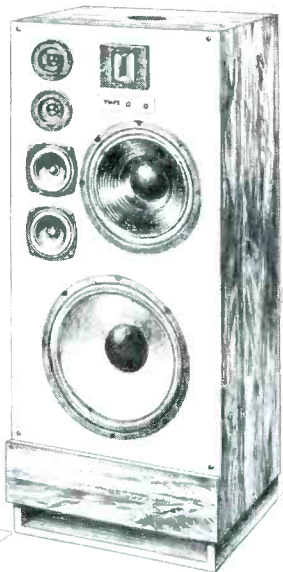
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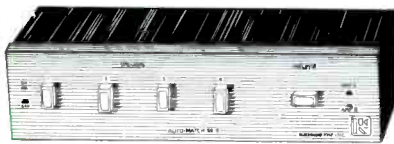
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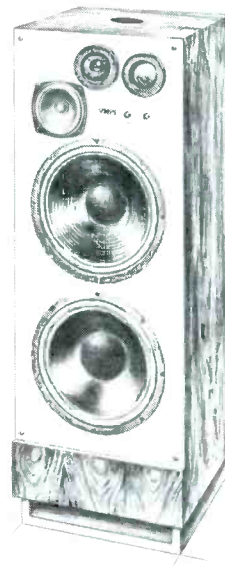
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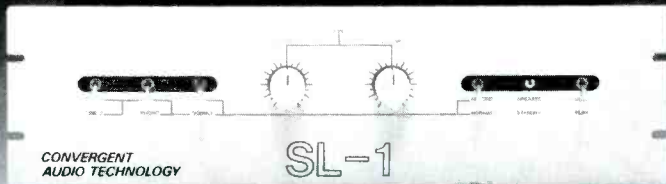


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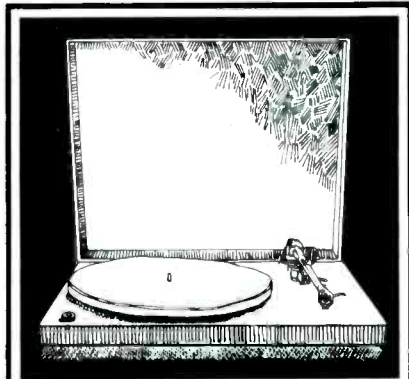
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4.7	2.75	35.0	10.00
5.0	2.75	40.0	11.10
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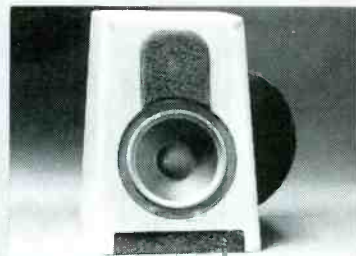
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2.0	.31	.88	3.5	13.00
2.25	.33	.88	3.5	13.80
2.5	.36	.88	3.5	14.60
2.75	.39	.88	3.5	15.30
3.0	.42	.88	3.5	16.00
3.3	.45	1.0	4.0	16.80
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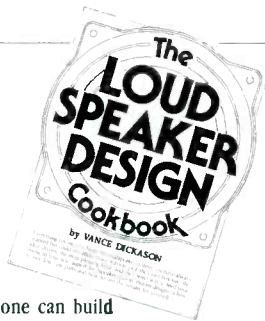
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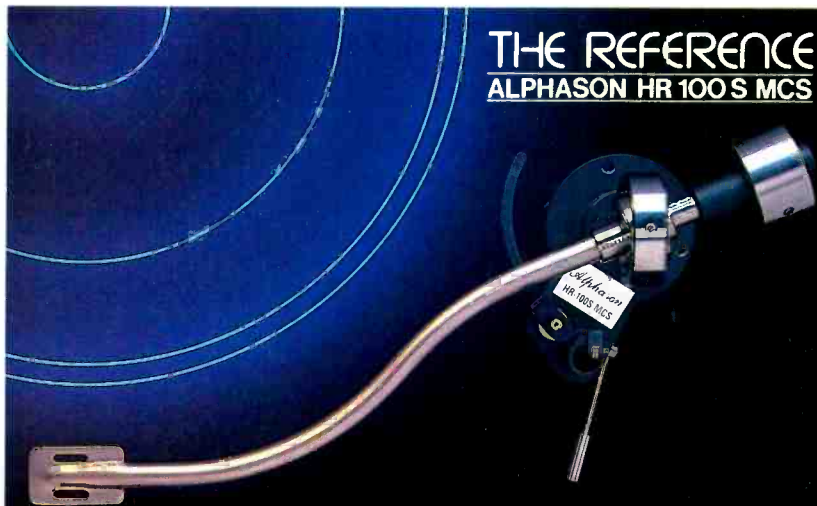
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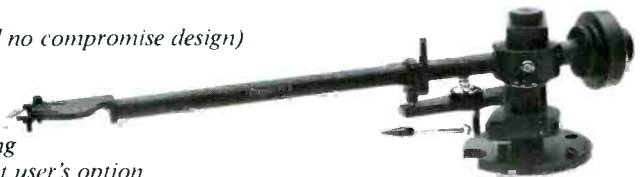
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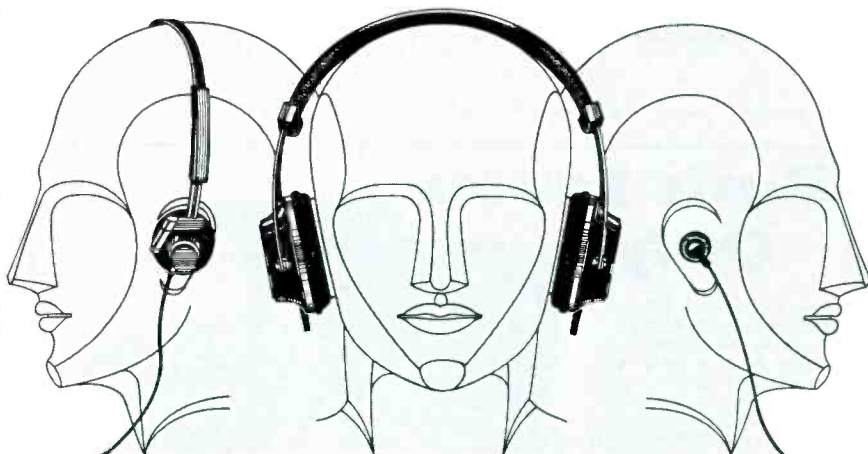
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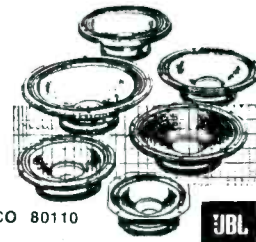
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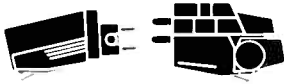
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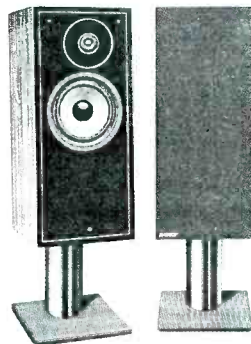


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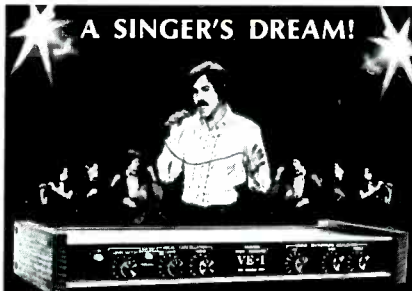
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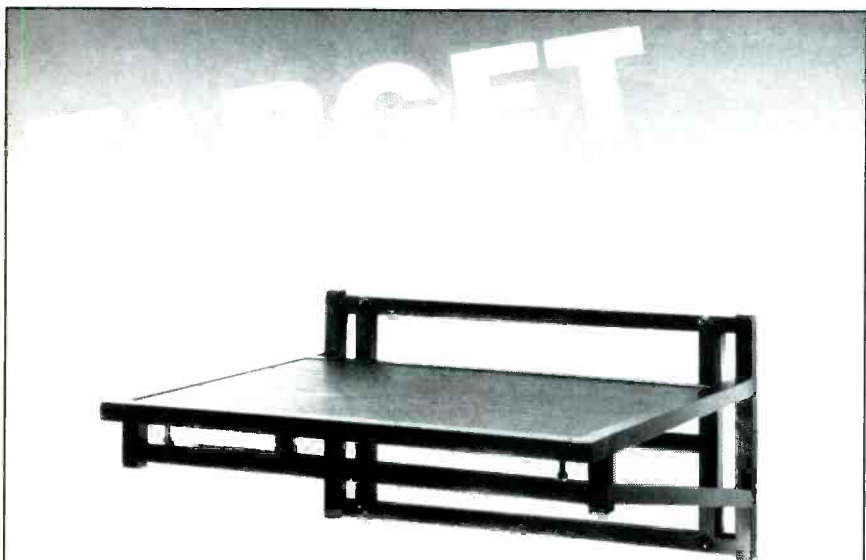
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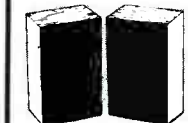
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For more than a decade, we have been flirting with ways to include in our Directory equipment categories that don't reduce easily to our tabular format. Amplifiers, for example, almost always have a rated power output, but there's no EIA Standard for testing record cleaners. At one point, we offered to run "New Products" style announcements; it was a bust, since few makers replied.

This past spring, the principals of a firm which makes powered record cleaners and of a distributor of exotic interconnects proposed that we add their categories to the Directory. In the end, it was decided there was insufficient manpower to do yet more tables. However, being aware that there is reader and market interest in powered record cleaners and in wire & interconnects, our Technical Editor spent an afternoon he would have otherwise frittered away playing computer chess, adding the addresses of these firms to the list below.

COMPANY ADDRESSES 1 9 8 7

<p>Accuphase See Madrigal</p> <p>Ace Audio 532 Fifth St. East Northport, N.Y. 11731</p> <p>Acostat 3101 S.W. First Terrace Fort Lauderdale, Fla. 33315</p> <p>Acoustic Electronics 1308 Doris Ave. Wanamassa, N.J. 07712</p> <p>Acoustic Interface P.O. Box 6632 Santa Barbara, Cal. 93160</p> <p>Acoustic Research See AR</p> <p>ADC See dbx</p> <p>Adcom 11 Elkins Rd. East Brunswick, N.J. 08816</p> <p><i>a/d/s/</i> One Progress Way Wilmington, Mass. 01887</p> <p>Advanced Electrodynamic Systems 860 North Cypress St. Orange, Cal. 92667</p> <p>Advent 4138 North United Pkwy Schiller Park, Ill. 60176</p> <p>AERO Speakers 8332 Bristol Court Jessup, Md. 20794</p> <p>Aiwa 35 Oxford Dr. Moonachie, N.J. 07074</p>	<p>Akai Div., Mitsubishi 225 Old New Brunswick Rd. Piscataway, N.J. 08854</p> <p>AKG Acoustics 77 Selleck St. Stamford, Conn. 06902</p> <p>Allison Acoustics 7 Tech Circle Natick, Mass. 01760</p> <p>Alphason See May Audio Marketing</p> <p>Alphasonik 701 Heinz Ave. Berkeley, Cal. 94710</p> <p>Altec Lansing Milford, Pa. 18337</p> <p>Ambico 50 Maple St. Norwood, N.J. 07648</p> <p>Ambria See Parasound</p> <p>American Acoustics One Mitek Plaza Winslow, Ill. 61089</p> <p>Amrita Audio 200 Emerson Pl. Davenport, Iowa 52801</p> <p>Analog Excellence 12021 Wilshire Blvd., #131 Los Angeles, Cal. 90025</p> <p>Analogic Design Group P.O. Box 6227 High Point, N.C. 27262</p> <p>Andante See Sumiko</p>	<p>Angstrom Associates 2175 Dunwin Dr., Unit 7 Mississauga, Ont. Canada L5L 1X2</p> <p>Apature Div., ACR Industries RFD #1, Route 2 Preston, Conn. 06360</p> <p>Apax Marketing 7066 Commerce Circle Unit C Pleasanton, Cal. 94566</p> <p>Apex Systems 13340 Saticoy St. No. Hollywood, Cal. 91605</p> <p>API Audio Products International 135 Torbay Rd. Markham, Ont. Canada L3R 1G7</p> <p>Apogee Acoustics 35 York Industrial Park Randolph, Mass. 02368</p> <p>Apt 176 Walker St. Lowell, Mass. 01854</p> <p>AR 330 Turnpike St. Canton, Mass. 02021</p> <p>Aragon See Mondial</p> <p>Arcam See Audio Influx</p> <p>ARC Loudspeakers 2510 North 47th St. Boulder, Colo. 80301</p> <p>Archer See Radio Shack</p>	<p>Argent See Direct Sound</p> <p>Ariston Acoustics 12 Route 17 North Suite 309 Paramus, N.J. 07652</p> <p>Artech Electronics 699 Meloche Ave. Dorval, Que. Canada H9P 2S4</p> <p>A & S Speakers 2371 Dahlia St. Denver, Colo. 80207</p> <p>As-One See Aural Symphonics</p> <p>Astatic See CTI</p> <p>ATC See Audio Ecstasy</p> <p>Athena Audio P.O. Box 210465 San Francisco, Cal. 94121</p> <p>Audible Illusions See Apax Marketing</p> <p>Audio Advancements P.O. Box 15 Verona, N.J. 07044</p> <p>Audio Authority 1720-B Fortune Court Lexington, Ky. 40505</p> <p>Audio Concepts 1631 Caledonia St. LaCrosse, Wisc. 54603</p> <p>Audio Control P.O. Box 3199 Lynnwood, Wash. 98036</p>	<p>Audio Design Associates 610 Mamaroneck Ave. White Plains, N.Y. 10605</p> <p>Audio Dynamics See dbx</p> <p>Audio Ecstasy 231 Elwood Dr. Rochester, N.Y. 14616</p> <p>Audio Influx P.O. Box 381 Highland Lakes, N.J. 07422</p> <p>Audiolab See Artech</p> <p>Audiomeca/Lurné See Madrigal</p> <p>Audionics P.O. Box 70 Heber City, Utah 84032</p> <p>Audiophile Accessories 119 East Wayne St. Butler, Pa. 16001</p> <p>Audiophile Systems 8709 Castle Park Dr. Indianapolis, Ind. 46256</p> <p>Audio Pro See Sonic Research</p> <p>AudioQuest 629 Camino de Los Mares #306 San Clemente, Cal. 92672</p> <p>Audio Research 6801 Shingle Creek Pkwy Minneapolis, Minn. 55430</p> <p>Audioribbon See PS Audio</p>
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COMPANY ADDRESSES

<p>AudioSource 1185 Chess Dr. Suite G Foster City, Cal. 94404</p> <p>AudioStream MPO Box 2410 Niagara Falls, N.Y. 14302</p> <p>Audio-Technica 1221 Commerce Dr. Stow, Ohio 44224</p> <p>Audire 9576 El Tambor Ave. Fountain Valley, Cal. 92708</p> <p>Audix P.O. Box 265 San Carlos, Cal. 94070</p> <p>Aural Symphonics 2016 Flintbury Court San Jose, Cal. 95148</p> <p>A.V.A. AUDIO by Van Alstine 2202 River Hills Dr. Burnsville, Minn. 55337</p> <p>Avalon Acoustics P.O. Box 704 Boulder, Colo. 80306</p> <p>Azden 147 New Hyde Park Rd Franklin Square, N.Y. 11010</p> <p>B</p> <p>Babb Audio 3234 Towerwood Farmers Branch, Tex. 75234</p> <p>Bang & Olufsen 1150 Feehanville Dr Mount Prospect, Ill. 60056</p> <p>Barcus-Berry Electronics 5500 Bolsa Ave. Suite 245 Huntington Beach, Cal. 92649</p> <p>BASF Systems Crosby Dr Bedford, Mass. 01730</p> <p>Beard Audio 401 Lyndhurst Rd. Columbia, S.C. 29212</p> <p>Becker Electronics Route 145 East Durham, N.Y. 12423</p> <p>Bedini Amplifiers 16220 Orange Ave Paramount, Cal. 90723</p> <p>BEL Brown Electronic Labs 1233 Somerset Dr San Jose, Cal. 95132</p> <p>Belles Research P.O. Box 307 East Rochester, N.Y. 14445</p> <p>Benjamin International 1460 Old Country Rd Plainview, N.Y. 11803</p>	<p>David Berning Co. 11007 Candlelight La. Potomac, Md. 20854</p> <p>B.E.S. 12753 Moore St Cerritos, Cal. 90701</p> <p>Beveridge Speakers See California Audio Technology</p> <p>Beyerdynamic 5-05 Burns Ave. Hicksville, N.Y. 11801</p> <p>BGR B. G. Roberts Audio 137 Route 22 East Greenbrook, N.J. 08812</p> <p>Biamp Systems P.O. Box 2160 Portland, Ore. 97208</p> <p>B & K Components 1971 Abbott Rd Lackawanna, N.Y. 14218</p> <p>Bose 100 The Mountain Rd. Framingham, Mass. 01701</p> <p>Boston Acoustics 247 Lynnfield St. Peabody, Mass. 01960</p> <p>Boulder Amplifiers See Silver Lake Research</p> <p>Bozak/TAI 326 South St. New Britain, Conn. 06051</p> <p>British Fidelity (In U.K., Musical Fidelity) See RCS Audio</p> <p>Bryston Ltd. 57 Westmore Dr. Rexdale, Ont. Canada M9V 3Y6</p> <p>Brystonvermont R.F.D. 4, Box 2255 Montpelier, Vt. 05602</p> <p>BSC Bennett Sound Corp 6029 Reseda Blvd Tarzana, Cal. 91356</p> <p>BSM See Laser Audio</p> <p>BSS Brooke Siren Systems See Klark-Teknik</p> <p>B & W Loudspeakers P.O. Box 653 Buffalo, N.Y. 14240</p> <p>C</p> <p>Cabasse See Lyric Hi-Fi</p> <p>Cadawas Acoustics 92 Oneida Ave Staten Island, N.Y. 10301</p>	<p>California Audio Labs 21962 Annette Ave El Toro, Cal. 92630</p> <p>California Audio Technology 14747 Artesia Blvd. Unit 3A La Mirada, Cal. 90638</p> <p>Camac See Madrigal</p> <p>Camber Acoustics 7101 Park Ave., Suite 120 Montreal, Que. Canada H3N 1X9</p> <p>Canon One Canon Plaza Lake Success, N.Y. 11042</p> <p>Canton 254 First Ave. North Minneapolis, Minn. 55401</p> <p>Cardas Audio Design See VTL</p> <p>Carver Corp. P.O. Box 1237 Lynnwood, Wash. 98046</p> <p>Cascade Audio Systems P.O. Box 747 Rocklin, Cal. 95677</p> <p>Castle Acoustics See May Audio Marketing</p> <p>CDE Speaker Systems 7700 Old Branch Ave. Suite C-102 Clinton, Md. 20753</p> <p>Celestion P.O. Box 521 Holliston, Mass. 01746</p> <p>Cello Ltd. 315 Peck St. Bldg. 23 New Haven, Conn. 06513</p> <p>Cerebaun Systems 4445 Weymouth Commons Mississauga, Ont. Canada L5R 1P5</p> <p>Certron 1651 S. State College Blvd Anaheim, Cal. 92806</p> <p>Cerwin-Vega 555 East Easy St. Simi Valley, Cal. 93065</p> <p>Chapman Sound P.O. Box 18123 Seattle, Wash. 98118</p> <p>Classé Audio 9414 Cote de Liesse Rd Lachine, Que. Canada H8T 1A1</p> <p>Clearaudio/Goldmund See International Audio Technologies</p> <p>Clearaudio/Souther See Souther</p>	<p>Clearaudio VPI See VPI</p> <p>Clements Audio Systems 10178 Yonge St Richmond Hill, Ont. Canada L4C 1T6</p> <p>Compusonics 2345 Yale St Palo Alto, Cal. 94306</p> <p>conrad-johnson design 2800R Dorr Ave Fairfax, Va. 22031</p> <p>Convergent Audio Technology 24 Falcon Dr West Henrietta, N.Y. 14586</p> <p>Counterpoint 10635 Roselle St. San Diego, Cal. 92121</p> <p>Creek Audio Systems See Music Hall</p> <p>Crest Audio 150 Florence Ave. Hawthorne, N.J. 07506</p> <p>Crown International 1718 West Mishawaka Rd. Elkhart, Ind. 46517</p> <p>CSI Calibration Standard Instruments P.O. Box 2727 Oakland, Cal. 94602</p> <p>CTI P.O. Box 120 Harbor & Jackson Sts Conneaut, Ohio 44030</p> <p>Cyrus See Mission Electronics</p> <p>D</p> <p>Dahlquist 601 Old Willets Path Hauppauge, N.Y. 11787</p> <p>D'Ascanio Audio 11450 Overseas Hwy Marathon, Fla. 33050</p> <p>Davidson Roth P.O. Box 95707 Hofman Estates, Ill. 60195</p> <p>dB Plus See API</p> <p>DB Systems Main St Rindge Center, N.H. 03461</p> <p>dbx 71 Chapel St Newton, Mass. 02195</p> <p>DCM 670 Airport Blvd. Ann Arbor, Mich. 48108</p> <p>DeCoursey Engineering Laboratory 11828 West Jefferson Blvd. Culver City, Cal. 90230</p>	<p>Dennesen Electrostatics P.O. Box 51 Beverly, Mass. 01915</p> <p>Denon P.O. Box 5370 Parsippany, N.J. 07054</p> <p>Design Acoustics See Audio-Technica</p> <p>Desktop Loudspeaker Systems P.O. Box 3340 Rosedale Station Kansas City, Kans. 66103</p> <p>Digitrac 122 Dupont St Plainview, N.Y. 11803</p> <p>Dimensional Optics See Mavrick</p> <p>Direct Sound 150 Fifth Ave Suite 516 New York, N.Y. 10011</p> <p>Discwasher 4309 Transworld Rd. Schiller Park, Ill. 60176</p> <p>Distech Discrete Technology 3254 Fifth St. Oceanside, N.Y. 11572</p> <p>DLW Audio Consultants Main St Stevens, Pa. 17578</p> <p>DNM Design See Music Hall</p> <p>Dual 122 Dupont St. Plainview, N.Y. 11803</p> <p>Duntech Speakers See W & W Audio</p> <p>Dynaudio East See Madisound or A & S West See Just Speakers</p> <p>E</p> <p>Ebony Acoustics See Mavrick</p> <p>Eidolon Research P.O. Box 1237 Davidson, N.C. 28036</p> <p>Electrocompaniet See Music & Sound</p> <p>Electro Magnetic 7028 Texas Rd. Fort Smith, Ark. 72903</p> <p>Electron Kinetics 1055 Empire Dr Lake Havasu City, Ariz. 86403</p> <p>Electro-Voice 600 Cecil St Buchanan, Mich. 49107</p>
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COMPANY ADDRESSES

<p>Emerson Radio One Emerson La North Bergen, N.J. 07047</p> <p>Eminent Technology 508 Cactus St Tallahassee, Fla. 32301</p> <p>EMT See Gotham Audio</p> <p>Energy See API</p> <p>Entec 41934 Christy St. Fremont, Cal. 94538</p> <p>Entré See Analog Excellence</p> <p>EPI</p> <p>Epicure Products 25 Hale St. Newburyport, Mass. 01950</p> <p>Epik Audio 1720 Lilac Dr Walnut Creek, Cal. 94595</p> <p>Epoch See Stanton</p> <p>Epos See Music Hall</p> <p>ESB See Mondial</p> <p>ESM/Energy See API</p> <p>Esoteric Audio RR3 Box 262 Winder, Ga. 30680</p> <p>Esoteric Sound 4813 Wallbank Ave Downers Grove, Ill. 60515</p> <p>Essence 805 'M' St Lincoln, Nebr. 68508</p> <p>ESS Laboratory 2575 El Presidio St. Long Beach, Cal. 90810</p> <p>Euphonic Audio RD 1, Box 266 Oakwood Dr. New Egypt, N.J. 08533</p> <p>Euphonic Technology 207 Mountain Rd. Wilton, Conn. 06897</p> <p>Eurostat 1132 East Ave Rochester, N.Y. 14607</p> <p>Excellerator Cable See Audio Authority</p> <p>F</p> <p>Fanfare Acoustics 4650 Arrow Hwy., F-4 Montclair, Cal. 91763</p> <p>Fenton Audio P.O. Box 212 Yellow Springs, Ohio 45387</p>	<p>Fidelity Research See Bryston</p> <p>Fidelus See Apax Marketing</p> <p>Fischer See Madrigal</p> <p>Fisher 21314 Lassen St. Chatsworth, Cal. 91311</p> <p>FM Acoustics P.O. Box 854 Benicia, Cal. 94510</p> <p>FMS Favorite Music Systems 319 A St. (Rear) Boston, Mass. 02210</p> <p>Focus Speaker Systems 1101 East Second St. Dayton, Ohio 45403</p> <p>Forté Audio 1955 Industrial Dr. Auburn, Cal. 95603</p> <p>Fosgate P.O. Box 70 Heber City, Utah 84032</p> <p>Fostex 15431 Blackburn Ave. Norwalk, Cal. 90650</p> <p>Frankmann Research P.O. Box 125 Greenville, Ohio 45331</p> <p>Freitag See Hifonics</p> <p>Fried Products 7616 City Line Ave Philadelphia, Pa. 19151</p> <p>Fuji 555 Taxter Rd Elmstord, N.Y. 10523</p> <p>Fulton Audio P.O. Box 22537 Minneapolis, Minn. 55422</p> <p>Fuselier Loudspeakers 5269-2 Buford Hwy Atlanta, Ga. 30340</p> <p>G</p> <p>GC-Thorsen P.O. Box 1209 Rockford, Ill. 61105</p> <p>Genesis Physics 225 Heritage Ave Portsmouth, N.H. 03801</p> <p>GNP Loudspeakers 1244 East Colorado Blvd. Pasadena, Cal. 91106</p> <p>Goldmund See International Audio Technologies</p> <p>Gold Ribbon Concepts 211 East 11th St Coralville, Iowa 52241</p>	<p>Goldring See Import Audio</p> <p>Gold Sound P.O. Box 141 Englewood, Colo. 80151</p> <p>Goldstar Electronics 1050 Wall St. West Lyndhurst, N.J. 07071</p> <p>Goodmans Loudspeakers 14160 East Evans Ave. Aurora, Colo. 80014</p> <p>Gordon Instruments P.O. Box 794 Blacksburg, Va. 24060</p> <p>Gotham Audio 1790 Broadway New York, N.Y. 10019</p> <p>Gott Labs 424 Clay Pitts Rd East Northport, N.Y. 11731</p> <p>Grace See Sumiko</p> <p>Grado Laboratories 4614 7th Ave Brooklyn, N.Y. 11220</p> <p>Joseph Grado Signature 921 Tice Pl. Westfield, N.J. 07090</p> <p>Grommes Precision See Precision Electronics</p> <p>GSI Musical Electronics 622 Bloomfield Ave Bloomfield, N.J. 07003</p> <p>Reuben Guss Enterprises 215 West 92nd St New York, N.Y. 10025</p> <p>H</p> <p>David Hafler Co. 5910 Crescent Blvd. Pennsauken, N.J. 08109</p> <p>Harman America Harman/Kardon 240 Crossways Park West Woodbury, N.Y. 11797</p> <p>Harms Labs 3040 West Vine Dr. Fort Collins, Colo. 80521</p> <p>Hartley Products 1200 North 23rd St. Suite 105 Wilmington, N.C. 28405</p> <p>Heco See Alphasonik</p> <p>Heybrook See D'Ascanio Audio</p> <p>Hifonics 845 Broad Ave Ridgefield, N.J. 07657</p> <p>Highphonic See Analog Excellence</p>	<p>Hirschmann P.O. Box 229 Riverdale, N.J. 07457</p> <p>Hitachi 401 West Artesia Blvd. Compton, Cal. 90220</p> <p>Hitachi Cable 28360 Hawthorne Blvd Suite 101 Torrance, Cal. 90505</p> <p>I</p> <p>Image See API</p> <p>Import Audio Ltd. 3149 Shenandoah St. St. Louis, Mo. 63104</p> <p>Impulse Route 2, Box 477 Dover, Ark. 72837</p> <p>Incon See May Audio Marketing</p> <p>Infinity Systems 9409 Owensmouth Ave. Chatsworth, Cal. 91311</p> <p>Innotech 77 Clinton St. Brooklyn, N.Y. 11201</p> <p>Innovative Techniques 703 Revere Dr Herbertsville, N.J. 08724</p> <p>Instant Replay 2951 South Bayshore Dr. 8th Floor Coconut Grove, Fla. 33133</p> <p>Integrated Audio 540 North S.R. 434 Suite 7 Altamonte Springs, Fla. 32714</p> <p>Interaudio/Bose 100 The Mountain Rd Framingham, Mass. 01701</p> <p>International Audio Technologies 13897 Willard Rd. Suite J Chantilly, Va. 22021</p> <p>Interworld Electronics 5601 N.W. 78th Ave. Miami, Fla. 33166</p> <p>Itone Audio 3412 Eric El Sobrante, Cal. 94803</p> <p>J</p> <p>Jadis See Madrigal</p> <p>Jamo Hi-Fi 425 Huehl Rd., 3A Northbrook, Ill. 60062</p> <p>Janis See John Marovskis</p> <p>JBL See Harman America</p>	<p>Jecklin See May Audio Marketing</p> <p>Jensen 4136 North United Pkwy Schiller Park, Ill. 60176</p> <p>JPW Loudspeakers See Power Audio</p> <p>JRM 3716 Broadway N.E. Knoxville, Tenn. 37917</p> <p>JS Audio 643 Speedwell Ave. Morris Plains, N.J. 07950</p> <p>JS Engineering 519 East Middle Turnpike Manchester, Conn. 06040</p> <p>Just Speakers 3170 23rd St. San Francisco, Cal. 94110</p> <p>JVC 41 Slater Dr. Elmwood Park, N.J. 07407</p> <p>K</p> <p>Kama-Ispeak Kibbutz Beit Kama D.N. Negev 85 325 Israel</p> <p>KEF 14120-K Sullyfield Circle Chantilly, Va. 22021</p> <p>Kenwood 2201 East Dominguez St. Carson, Cal. 90810</p> <p>Kevek Speaker Technology See RMI</p> <p>Kevro Electronics P.O. Box 1355 Buffalo, N.Y. 14205</p> <p>Kimber Kable 20675 Industrial Dr Ogden, Utah 84401</p> <p>Kindel Audio 3615 Presley Ave. Riverside, Cal. 92507</p> <p>Kinergetics 6029 Reseda Blvd Tarzana, Cal. 91356</p> <p>Kinetic Audio P.O. Box 31075 Chicago, Ill. 60631</p> <p>Kiseki See Sumiko</p> <p>Klark-Teknik 30B Banfi Plaza North Farmingdale, N.Y. 11735</p> <p>Klein & Hummel See Gotham Audio</p> <p>KLH 100 Randolph Rd. CN 6700 Somerset, N.J. 08873</p>
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COMPANY ADDRESSES

Klimo
See Audio Advancements

Klipsch
P.O. Box 688
Hope, Ark. 71801

Klyne Audio Arts Ltd.
828 7th Ave. S.E.
Olympia, Wash. 98501

Koetsu
See Krell

Koss
4129 North Port Washington
Milwaukee, Wisc. 53212

Krell Industries
20 Higgins Dr.
Milford, Conn. 06460

Kyocera
100 Randolph Rd.
CN 6700
Somerset, N.J. 08873

L

Lancer Electronics
12340 McCann Dr.
Santa Fe Springs, Cal.
90670

Lantana Ltd.
P.O. Box 1958
Garden Grove, Cal. 92642

Laser Audio
1140 Eighth Line
Oakville, Ont.
Canada L6H 2R4

Lazarus Electronics
701-03 Ivy St.
Glendale, Cal. 91204

Lemo
P.O. Box 11488
Santa Rosa, Cal. 95406

Mark Levinson
See Madrigal

Lineage
1556 Third Ave., Suite 401
New York, N.Y. 10128

Linn Hi-Fi
See Audiophile Systems

Logan Labs
See Symdex

Logic Ltd.
See RCS Audio

Loran
10-48 Clark St.
Warren, Pa. 16365

LSR&D
10415 Forest Bridge Dr.
Alpharetta, Ga. 30201

Luxman
Div. Alpine Electronics
19145 Gramercy Pl.
Torrance, Cal. 90501

Lyric Hi-Fi
1221 Lexington Ave.
New York, N.Y. 10028

M

Madison Fielding
200 Williams St.
Port Chester, N.Y. 10573

Madisound Speakers
P.O. Box 4283
Madison, Wisc. 53711

Madrigal Ltd.
P.O. Box 781
Middletown, Conn. 06457

Magnasphere
Magnat
70 Atlantic Ave.
Marblehead, Mass. 01945

Magnavox
See NAP Consumer Electronics

Magnepan
1645 Ninth St.
White Bear Lake, Minn.
55110

Magnum/Dynalab
255 Great Arrow Ave.
Buffalo, N.Y. 14207

Magnus
See EPI

MAN
6301 Riggs Pl.
Los Angeles, Cal. 90045

Marantz
20525 Nordhoff St.
Chatsworth, Cal. 91311

Mariah Acoustics
2 Market St.
Oneonta, N.Y. 13820

John Marovskis
Audio Systems
2889 Roebling Ave.
Bronx, N.Y. 10461

Marshall Electronics
P.O. Box 2027
Culver City, Cal. 90230

Martin-Logan
P.O. Box 741
Lawrence, Kans. 66044

Mastercraft Audio
Box 2661
Huntington Station, N.Y.
11746

Master Music
See M.O. Sales

Mavrick Audiophile
Marketing
9016 Wilshire Blvd.
Suite 2000
Beverly Hills, Cal. 90211

Maxell
60 Oxford Dr.
Moonachie, N.J. 07074

May Audio
Marketing
P.O. Box 1048
Champlain, N.Y. 12919

Mayware
P.O. Box 58
Edgware, Middlesex
England HA8 7UE

MB Electronics
25 Walpole Park South
Walpole, Mass. 02081

McIntosh Laboratory
2 Chambers St.
Binghamton, N.Y. 13903

McLaren Audio
See AudioQuest

Meitner Audio
See Museatex Audio

Melos Audio
723 Bound Brook Rd.
Dunellen, N.J. 08812

Memorex
Memtek Products
P.O. Box 58118
Santa Clara, Cal. 95052

Meridian
See Madrigal

Merlin International
217 Alexander St.
Rochester, N.Y. 14607

Merrill Audio
2125 Central Ave.
Memphis, Tenn. 38104

MFA Systems
3178 Fowler Rd.
San Jose, Cal. 95135

J. A. Michell Engineering
2 Theobald St.
Borehamwood,
Hertfordshire
England WD6 4SE

Micro Seiki
See Analog Excellence

Mirage Acoustics
See API

Mirror Image Audio
700 Springvale Rd.
Great Falls, Va. 22066

Mission Electronics
5985 Atlantic Dr., Unit 6
Mississauga, Ont.
Canada L4W 1S4

Mitsubishi
5757 Plaza Dr.
Cypress, Cal. 90630

M & K
Miller & Kreisel
10391 Jefferson Blvd.
Culver City, Cal. 90230

Modern Audio
Consultants
East
112 Swanhill Court
Baltimore, Md. 21208
West
2888 Bluff St., Suite 210
Boulder, Colo. 80301

The Mod Squad
542 Coast Highway 101
Leucadia, Cal. 92024

Mogami
See Marshall Electronics

Monarchy Engineering
380 Swift Ave.
Unit 21
South San Francisco, Cal.
94080

Mondial
2 Elm St.
Ardsley, N.Y. 10502

Monitor Audio
See Kevro Electronics

Monster Cable
101 Townsend St.
San Francisco, Cal. 94107

Mordaunt-Short
See RCS Audio

Morel Acoustics
414 Harvard St.
Brookline, Mass. 02146

Morrison Audio
334 King St. East
Toronto, Ont.
Canada M5A 1K8

M.O. Sales
1953 Lac Renaud St.
Sainte-Adèle, Que.
Canada J0R 1L0

Motif
See conrad-johnson

MTX
One Mitek Plaza
Winslow, Ill. 61089

Museatex Audio
3143 DeMiniac St.
Ville St. Laurent, Que.
Canada H4S 1S9

Music Hall
108 Station Rd.
Great Neck, N.Y. 11023

Music Interface
Technologies
See Transparent Audio Marketing

Music Reference
1525 Cliff Dr.
Santa Barbara, Cal. 93109

Music Ribbon
See Straight Wire

Music & Sound Imports
30 Snowflake Rd.
Huntingdon Valley, Pa.
19006

N

NAD
575 University Ave.
Norwood, Mass. 02062

Nady Systems
1145 65th St.
Oakland, Cal. 94608

Nagaoka
See Ångstrom Associates

NAIM Audio
1759 North Sedgwick St.
Chicago, Ill. 60614

Nakamichi
19701 South Vermont Ave.
Torrance, Cal. 90502

NAP Consumer
Electronics
P.O. Box 14810
Knoxville, Tenn. 37914

NAS
North American Sound
2445 Midway Rd.
Carrollton, Tex. 75006

NEC Home Electronics
1255 Michael Dr.
Wood Dale, Ill. 60191

Nelson-Reed
15810 Blossom Hill Rd.
Los Gatos, Cal. 95032

Nestorovic Labs
8307 N.E. 110th Pl.
Kirkland, Wash. 98034

Neumann
See Gotham Audio

Nikko Audio
5830 South Triangle Dr.
Commerce, Cal. 90040

Nitty Gritty
4650 Arrow Highway #F4
Montclair, Cal. 91763

Nobis
5412 West Burnham St.
Milwaukee, Wisc. 53219

Nonspeaker
See Mavrick

Norman Laboratories
10925 Estate La., #340
Dallas, Tex. 75238

NOVA Electro-Acoustics
P.O. Box 25488
Los Angeles, Cal. 90025

Novak Loudspeaker
Merrits Island Rd.
Pine Island, N.Y. 10969

Now Hear This
P.O. Box 1228
Fullerton, Cal. 92632

O

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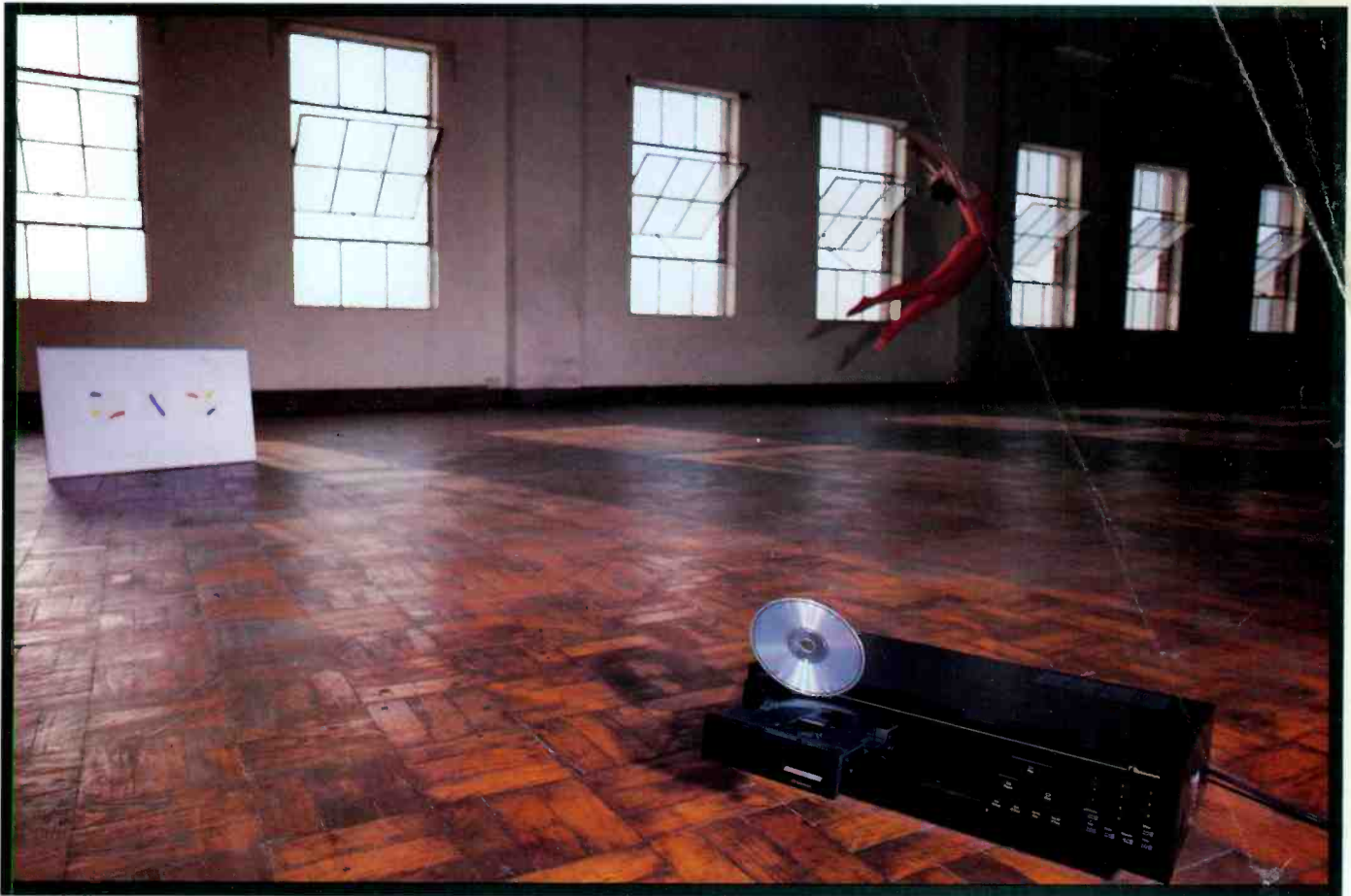
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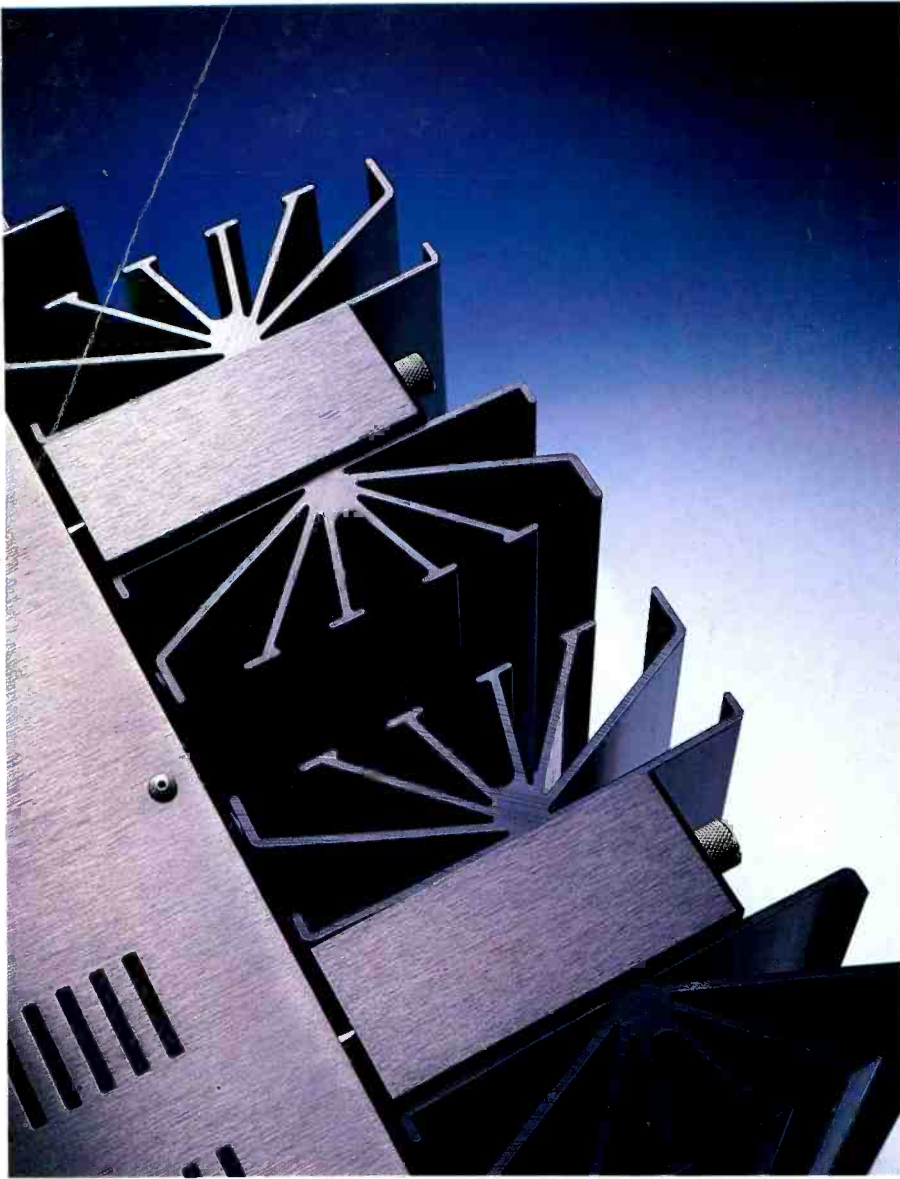


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