

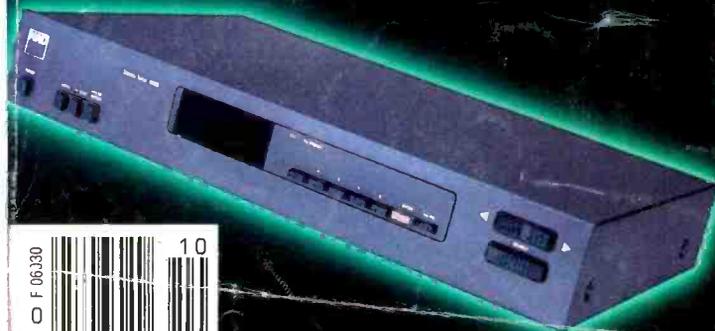
Audio

OCTOBER 1984 • \$2.95

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BIBLE

ANNUAL EQUIPMENT DIRECTORY

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60,000 SPECS!



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first, the second
you hear us.*



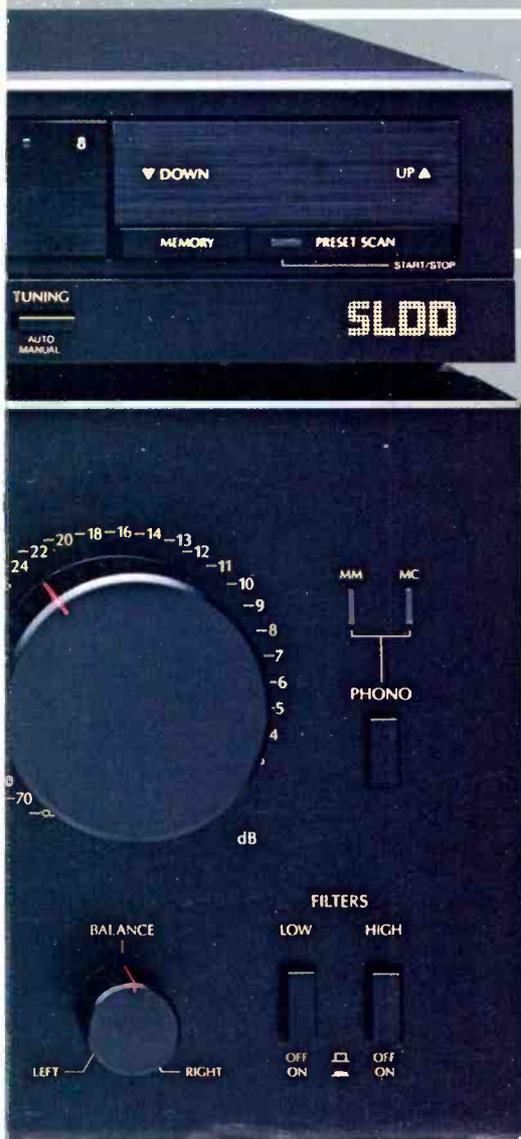
First it was DC. Then DD/DC and Super Feed-forward. Now Sansui astounds the audiophile with the greatest improvement in an amp. X-Balanced circuitry. It cancels out external distortion by eliminating the transformer to chassis ground; and decisively removes IHM.

You'll find X-Balanced circuitry in a wide range of superior Sansui products, like our AU-G99X amp, shown with TU-D99X quartz-PLL synthesizer tuner which incorporates our new Super Linear Digital Decoder for improved rejection of spurious signals and interference. Another version of this tuner has AM stereo capability.

When it comes to digital sound, our new PC-X11 Tri-code PCM Processor is the world's finest for any VCR. With 100 times the accuracy of any other PCM processor, it even reads blurred sections of digital material and lets you record up to eight hours of music on one VHS video cassette.

Our ingenious new XL-900C digital/analog speakers handle broad dynamic range with incredibly quick response to energy flow. Patented Tri-composite Carbon Fiber multi-layer diaphragms, plus high-polymer air-tight cores deliver higher resonance, fewer breakups and overall flat response.

There's more worth hearing about these great Sansui components. Write: Consumer Service Dept., Sansui Electronics Corp., Lyndhurst, NJ 07071, Carson, CA 90746, Sansui Electric Co., Ltd., Tokyo, Japan.



Putting More Pleasure in Sound.



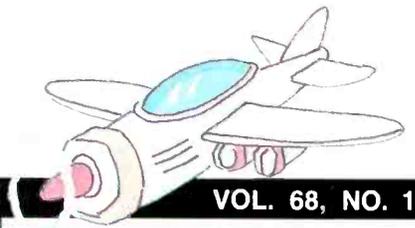
PC-X11

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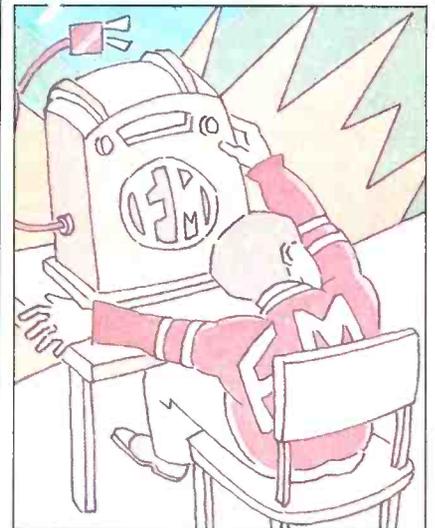
Audio

OCTOBER 1984

VOL. 68, NO. 10



See page 181.



See page 14.

ANNUAL EQUIPMENT DIRECTORY

INTRODUCTION	181	PHONO CARTRIDGES	230
DIGITAL RECORDERS/ PROCESSORS	182	OPEN-REEL TAPE DECKS	236
COMPACT DISC PLAYERS	184	BLANK TAPE	238
PREAMPLIFIERS	190	NOISE-REDUCTION UNITS	240
AMPLIFIERS	202	CASSETTE DECKS	242
TUNERS	212	MICROPHONES	248
RECEIVERS	215	HEADPHONES	256
TURNTABLES	222	EQUALIZERS	261
TONEARMS	228	LOUDSPEAKERS	264
		COMPANY ADDRESSES	352

MUSIC REVIEWS

COMPACT DISCS		306
ROCK/POP RECORDINGS	Michael Tearson, Jon & Sally Tiven	318
CLASSICAL RECORDINGS	Edward Tatnall Canby	324

DEPARTMENTS

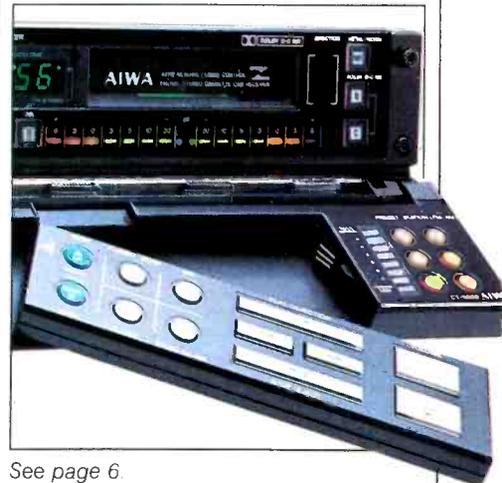
ROADSIGNS	Ivan Berger	6
AUDIO ETC	Edward Tatnall Canby	14
THE BOOKSHELF		41
WHAT'S NEW		42, 49, 62, 71
BEHIND THE SCENES	Bert Whyte	76
SPECTRUM	Ivan Berger	98
TAPE GUIDE	Herman Burstein	112
DIGITAL DOMAIN	Ken Pohlmann	136
AUDIOCLINIC	Joseph Giovanelli	147
SIGNALS & NOISE		155

The Cover Equipment: Apt HP/2 preamplifier, Wharfedale Diamond speakers, NAD 4155 tuner, Sony CDP-610ES Compact Disc player, Yamaha M80 amplifier, Akai GX-R99 cassette deck, Acoustic Research turntable.
The Cover Photographer: Ross Elm.

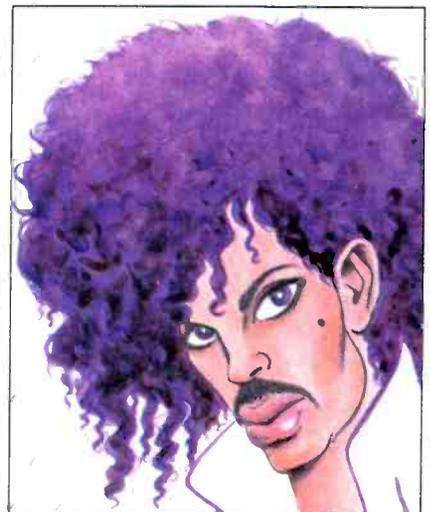
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See page 6.



See page 318

The new Computer Direct-Line Separates from SAE

I102 Integrated Amplifier and T102 Tuner

Sophisticated computer technology and SAE's advanced audio expertise combine to make possible the first major innovation in circuit design since the beginning of audio — Direct-Line Audio. This means that front panel controls on the I102 and T102 no longer come in contact with internal circuitry and the audio signal — reducing the length of the signal path by over 50 percent! This allows the most direct and efficient path for the audio circuits, resulting in less noise, less distortion, and more pure sound.

The Direct-Line I102 Integrated Amplifier has a 60 watt/ch main power amplifier capable of delivering the high current needed to handle low impedance loads at less than .025% THD. Easy to see alpha-numeric digital readouts are

used to indicate selected input, tone settings, and volume and balance settings.

The Direct-Line T102 Tuner has an on-board computer that monitors the quartz-reference tuning for precise station selection. This computer chip also controls the signal, station memory, and tuning functions, providing superior reception and ease of operation. There are 16 station memories, manual or auto search tuning, and auto stereo switching.

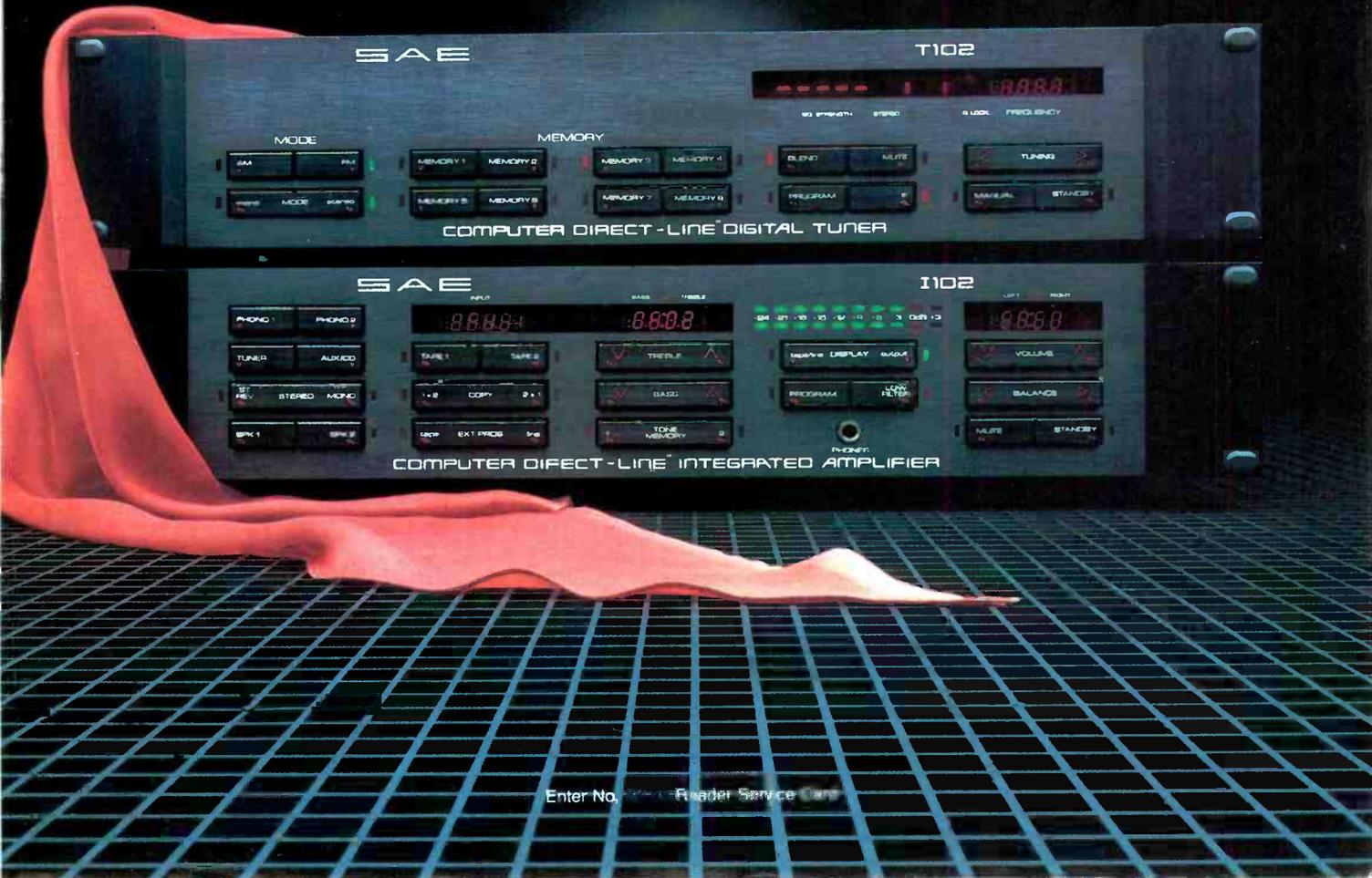
The I102 and T102 are both designed with the user in mind — easy to use soft touch controls and easy to see multi-purpose displays. And best of all . . . the I102 and T102 *sound* great together — at a very competitive price! Hear them today at your SAE dealer.

For more information on the full line of SAE products, please contact: Scientific Audio Electronics, Inc. 1734 Gage Road, Montebello, CA 90640



In Canada: The Pringle Group 30 Scarsdale Road Don Mills, Ontario, Canada M3B 2R7

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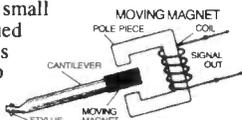
Number 8 in a Series

The Magnetic Personality

With very few exceptions, quality high fidelity phono cartridges use a basic magnetic principle to convert the motion of the stylus in the groove into electrical energy. If an adjacent magnet and coil of wire move relative to each other, a small electrical signal is generated in the coil. There are three popular approaches to the use of this principle.

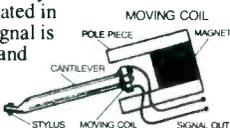
The Moving Magnet

The most widely used design concept locates a magnet at the end of the stylus cantilever where it will move when the stylus traces the groove. A coil, with pole pieces extending near the magnet, senses this motion and an electrical current is induced in the coil. This small signal is amplified and eventually is turned back into sound by the speaker.



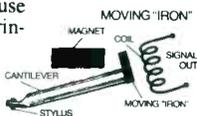
The Moving Coil

The second approach simply trades the location and size of the two elements. A very small coil is located at the end of the cantilever so that it can move in the field of a relatively large fixed magnet. A similar, but generally smaller electrical current is generated in the coil. This signal is then amplified and converted into sound by the speaker.



The Moving "Iron"

A third variant uses a piece of ferrous metal like iron, attached to the stylus cantilever. It is located between the fixed magnet and fixed coil so that as it moves it varies the magnetic field and generates an electrical signal in the coil. As can be seen, all three designs use the same basic principle, differing only in the way the concept is applied.



It Takes Two

While our simple drawing shows just one magnet and one coil for clarity, in a real stereo cartridge there must be two complete systems to sense the two independent stereo signals contained on the two sides of the record groove. These two systems must fit within the confines of a tiny phono cartridge. And they must operate with minimum effect on the motion of the stylus as it traces the stereo groove. In the next column we'll discuss some specific approaches.

Good listening,



Jon R. Kelly, President
Audio-Technica U.S., Inc.
1221 Commerce Dr., Stow, OH 44224



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The World's Favorite Phono Cartridge

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Technics Digital Compact Disc Players. Lasers and computers give you the one experience your conventional audio system never could: Reality.

Reality: The duplication of a live musical performance. The most elusive goal of all. Yet reality is precisely what you hear with Technics digital Compact Disc players.

How? Technics revolutionary Compact Disc players have a laser instead of a conventional stylus. Because instead of conventional record grooves, digital Compact Discs have a computer code. The laser "reads" this code. And a computer instantaneously translates it into music.

What you hear is not just a reproduction of the music, but a re-creation of it: Reality.

And nothing touches the Compact Disc except the laser beam. That means there is no wear. No noise. And no distortion. All of which can plague conventional records.

All this Technics digital technology comes together in the latest generation of Technics Compact Disc players. The remarkable SL-P8 and SL-P7. You can program the SL-P8 up to 32 different

ways. Play any selection you want. In any order you want. Repeat the selections you like. Even skip ones you don't.

Auto Music Scan automatically lets you hear the first 10 seconds of every selection. So finding the selection you want is easy.

The fluorescent display shows you precisely where the laser is on the disc. So you can even find the exact notes you want to hear.

And to let you do all this from across the room, the SL-P8 even has an infrared remote control.

Experience the full range of Technics digital technology. Including the SL-P8 and the affordable SL-P7.

The digital revolution continues at Technics.

Technics
The science of sound

Get a Technics CD Starter Kit*—3 Free Discs: The Jacksons' "Victory," "Flashdance," "Classical Sampler."
Plus a Free CD Cleaning System & CD Club Membership Including 1 Free Disc. Total Suggested Retail Value Over \$85.

*with purchase of any Technics CD Player from September 1 to December 31, 1984. See participating Technics dealers for details.

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IVAN BERGER

DASH IT ALL

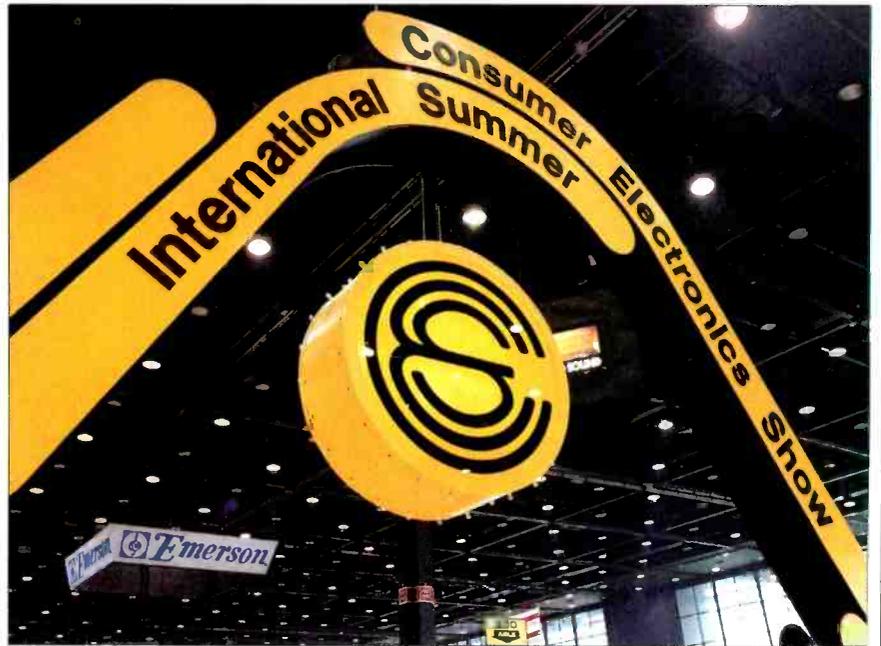
Incidents and Equipment

An incident at the Summer Consumer Electronics Show brought home to me a lot of what is right and wrong about car stereo. I was listening to a pleasant, natural, jazz tape at the Sansui booth, when a young dealer turned the equalizer's top and bottom sliders full up, glowed at the resulting thump and jingle and volunteered, "That's g-o-o-d!"

And, in truth, it didn't sound that bad—for rock. In rock, the sound is so much hype and fantasy, so different on record from what's heard in performance, that you don't feel guilty hyping it still further. But it wasn't rock. It was the music of un-amplified acoustic instruments, now transmogrified to sound like amplified electric ones. "Haven't you ever heard live music?" I asked. He had—but only through amplifiers and speakers, at rock concerts. He simply didn't know what other kinds of music sounded like; I pity his customers who want to hear those other kinds.

More and more, the manufacturers are giving us the tools to get natural sound in our cars, if we're willing to spend time shopping and money on the gear and installation—and if we can find installers who know what natural sound is. (Avoid installers who don't have tapes of your kind of music around—they may not know what that music should sound like.)

Overall, I was pleased by the tools the manufacturers offered at the Summer CES; at least, once I had flattened out the equalizers which had been set in U-curves by the listeners ahead of me. One product stood out in my memory, Nakamichi's TD-700,



due late this year. According to Nakamichi, its tape and FM performance will nearly equal those of the TD-800 (see *Audio*, September 1984), but it will cost less and fit on one chassis instead of two.

Credit for the slight difference in tape performance and most of the big difference in size goes to a slot-loading transport that's more compact than the TD-800's drawer-loading one. I like the TD-700's features better: "Program Seek" to find selections on a tape, a tuner "Scan" function to sample all the stations for you, and six station-preset buttons instead of five. The controls also look easier to use, helped by night illumination from soft, broad, incandescent lights. The manual azimuth control is now on the front panel, but the older model's front/rear fader is gone—you'll need an external one.

In addition to the TD-700, there will be a less-expensive TD-500, with a single-capstan drive, only five station-preset buttons, and no "Program Seek." Both units will have flaps for easy head-

cleaning access, Dolby B and C NR, and a digital clock.

The next most striking entries were Aiwa's three prototypes, all with flip-down control panels which have theft-detering blank faces when flipped up. Much of the top model's control panel could be removed to serve as a remote control, even working with the flap flipped up. Thieves would be even more discouraged if you took the remote with you when you parked the car—without it, the set is quite visibly inoperative. As a further discouragement, the receivers will come with slide brackets, so owners can hide the units in the trunk or take them home when parking.

Theft deterrence, drop-down control panels, and remote control are all hot trends. As reported here before, Sony, JVC and Kenwood now have removable chassis (JVC's and Sony's can be used as portables, too). Kenwood also has a snap-on disguise cover for its KRC-929, but plenty of others (such as the B. B. & J. Cover-Up, \$4.95) are available from accessory suppliers. Alpine and Panasonic have announced overall alarm systems, and JVC has a car alarm that can interface with some of its car stereos, triggering not only if

Continued on page 13



*Aiwa CT-X500.
Three trends in one.*

KYOCERA

YOU'LL LIKE THE WAY WE SOUND.

A MULTI-FACETED COMPANY WITH A SINGLE-MINDED GOAL.

It's a goal common to all of Kyocera's endeavors: to create the best products available. It sounds simple, but when you're good enough to be in a class by yourself, the competition is fierce.

TECHNOLOGY FROM THE GROUND UP.

Much of Kyocera's technology base revolves around the use of ceramic, an incredibly versatile material with outstanding chemical properties. Like modern-day alchemists, Kyocera's scientists are extracting some of the earth's most abundant raw materials and turning them into a technological gold mine of ceramic products.

FROM ENGINES TO EMERALDS.

Kyocera's expertise in the ceramic art has led to a wide range of products for diverse applications—from ceramic car engines that increase fuel efficiency by 30%, to cutting tools that slice through steel, to emeralds, rubies and sapphires—created gemstones with a composition identical to natural stones.

COMPLETING THE CIRCUIT.

But it is Kyocera's long experience in electronics, in combination with our ceramic technology, that has been a key to the company's success. We are the world's largest manufacturer of electronic ceramic products, including IC packages, resistors, capacitors, and hybrid circuits. It is also this combination that has allowed Kyocera to produce such finished goods as knee-top computers, satellite receivers... and some of the finest audio products available today.

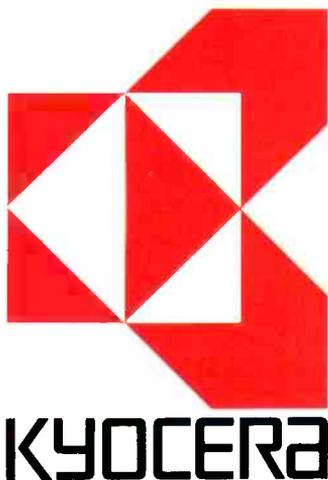
THE SOUND OF SUCCESS.

In our 25-year history, Kyocera has become one of Japan's fastest growing corporations, with sales over \$1 billion. We're listed on the New York Stock Exchange. Kyocera is a trusted supplier to virtually every major electronics company in the world. And our number of employees worldwide is now over 12,000.

WHAT'S IN A NAME?

The name "Kyocera" is a contraction of two words: Kyoto, the location of our world headquarters in Japan, and, of course, *ceramics*. Just for the record, the name is pronounced "Key-oh-sarah." Ask for it by name.

Kyocera. You'll like the way we sound.



Kyocera International, Inc., 7 Powder Horn Drive, Warren, NJ 07060. (201) 560-0060.

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ONLY ONE AUDIO DEALER IN TWENTY WILL CARRY THE KYOCERA R-851 TUNER/AMPLIFIER WITH MOS FET AMPS.



Very simply, our R-851 is not for everyone. Not for every dealer. Not for every audio buyer.

Only for those who demand the best. Those who want sound that's pure and distinctive... who hear subtleties others miss. For those discriminating listeners, the R-851 is well worth the quest.

Hear the silence before you hear the sound.

Switch on the R-851, switch from one function to another. Try Phono. Tape 1. Tape 2. Auxiliary. Back to Phono.

Absolute silence (of course, you'll get sound on AM/FM). The silence is the mark of a great receiver. And great engineering.

The kind of quiet an audiophile loves to hear.

Sound that takes you closer to the source.

We've turned on the R-851 for some very experienced—even jaded—audio ears, and all we can say is it stops 'em every time. The sound is different. The sense of *being there* is almost overpowering. All this comes from 85 watts per channel of power* (with dynamic power far above this figure) and some of the most sophisticated circuitry in the business. Above all, it uses MOS FET's, the new breed of output transistors, in the amplifier section. They can handle the transients, the power surges, the power requirements of present-day sound (and tomorrow's digital sound) better than bipolar transistors ever could—and give you a sonic purity like no other (many claim MOS FET's have picked up the warm, rich sound of the great tube amps and gone a step beyond!).

Fine tuned for every audio need.

From front end to output jacks, the R-851 offers every feature an audio enthusiast might want. The most commonly used controls are right up front—the more esoteric ones are placed behind a neat flip-down front panel. There's microprocessor-controlled quartz-locked tuning with 14 station programmable memory (7 AM & 7 FM); automatic station seek; 3-band parametric-style equalizer; fluorescent display panel; and two-way tape monitoring and dubbing.

Call (201) 560-0060 for the name of the nearest dealer. Kyocera International, Inc., 7 Powder Horn Drive, Warren, NJ 07060.



*85 watts RMS per channel, both channels driven, at 8 Ohms with no more than 0.015% THD from 20-20,000 Hz.

HOW COULD A CASSETTE DECK WITH TWO HEADS BE SO HARD TO GET?



The Kyocera D-801 Cassette Deck is hard to get because so much more is built into it. For example, it has five circuit boards where most decks have only one or two. But that's only the beginning.

It more than meets the ultimate tape deck challenge.

The challenge is to move tape across the heads at as nearly a constant speed as possible. Variations in speed, of course, come out in your speakers or headphones as wow and flutter.

Many decks claim a wow and flutter figure of 0.05% WRMS—trouble is, speed variations of 0.05% are clearly audible with piano music (one of the most revealing tests you can give a cassette deck—try it on the D-801 and marvel!).

The D-801 by Kyocera comes through with a remarkably low wow and flutter figure of 0.02% WRMS—and that is derived from a unique, three-motor, dual capstan drive mechanism. Two capstans are driven by a direct drive motor. A beltless/clutchless simple DC motor drives the feed and takeup reels, while a third motor is used as a head-position assist drive (it greatly prolongs head-to-tape azimuth accuracy). The dual capstan system provides that sensorially accurate tape travel, maintaining proper tension between capstans to eliminate external shock source modulating noise.

It more than meets the needs of the audio perfectionist.

The D-801 goes above and beyond even the fussiest audiophile's needs with 3-position bias/equalization selection (with fine bias adjustment), 400 Hz calibration tone. Automatic Program Mute Recording, automatic search, and electronic 4 digit display, including counter, elapsed time and time remaining functions.

The D-801's noise reduction systems were built for the audio purist. It has two—Dolby* B & C—Dolby B for music material of limited dynamic range, Dolby C for music of the widest dynamic range, so noise reduction can be tailored to program material.

Finally, the specs everyone wants: frequency response of 30-20,000 Hz \pm 3 dB using metal or CrO₂ tape, and a S/N ratio of 78 dB with metal tape in Dolby C NR mode.

Call (201) 560-0060 for the name of the nearest dealer. Kyocera International, Inc., 7 Powder Horn Drive, Warren, NJ 07060.



*Dolby is a registered trademark of Dolby Laboratories, Inc.

**The new Kyocera DA-910
Remote Control
Compact Disc Player.**

How? With ceramics technology—Kyocera's innovative method of ensuring steady laser tracking—immune to vibrations. The bottom line: total purity of sound.

Why ceramics? They're rigid and inert, so they provide uncommon stability and resistance to mechanical vibrations from audio feedback. They're non-ferrous, so there are no chassis eddy currents to cause electrical hum.

The handsome ceramic-compound resin base of the DA-910 CD player is actually the

chassis—supporting and housing all components and isolating vibration. Resonance from the cabinetry is almost non-existent.

But Kyocera doesn't stop there. Digital audio's technical requirements demand unprecedented circuit capability so we use fine ceramics throughout to further conquer vibration. For example, all discrete hi tolerance audio components and the 3rd order Bessel analog filters are ceramic enclosed.

There are other material differences. Instead of an ordinary laminated E frame, we use a solid ferrite cladless core power

Stops vibration in its track.

transformer to cut eddy currents, minimize flux leakage and improve voltage regulation. And instead of ferrous metals, we use 100% aluminum and zinc chassis construction including a diecast laser head and a precision disc drive mechanism.

What else does the DA-910 offer?

- Infrared wireless remote control system.
 - Three separate power supplies to allow complete isolation to critical circuits.
 - Direct coupling (audio stages) for excellent low frequency response.
 - Floating horizontal motorized disc loading to further improve stability and accuracy from external feedback.
 - Separate digital to analog conversion for left and right channels.
 - 176.4 KHz quadruple over-sampling technology.
 - Quality digital and improved analog filtering for superior phase distortion performance.
 - Full feature programmable keyboard entry. Even before Kyocera added ceramics, the DA-910 CD player provided remarkable purity. With ceramics, the results are truly astounding. Put it to the test at a selected Kyocera dealer now.
- Kyocera International, Inc., 7 Powder Horn Drive, Warren, New Jersey 07060, (201) 560-0060



BETTER SOUND BASED ON CERAMICS.

To avoid turntable rumble, hum and howling, stability is all. Steadiness of the needle in the groove—and in the platter rotation.

Kyocera's solution: It starts with ceramics. This unique material provides uncommon stability and isolation of mechanical and electrical feedback. The result is a performance that is virtually free of vibration and resonance.

A rigid ceramic-compound resin forms the subchassis of the PL-701. To further eliminate vibration, this subchassis is suspended by three springs within a sturdy wood base. The base has four adjustable shock-mounted

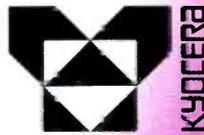
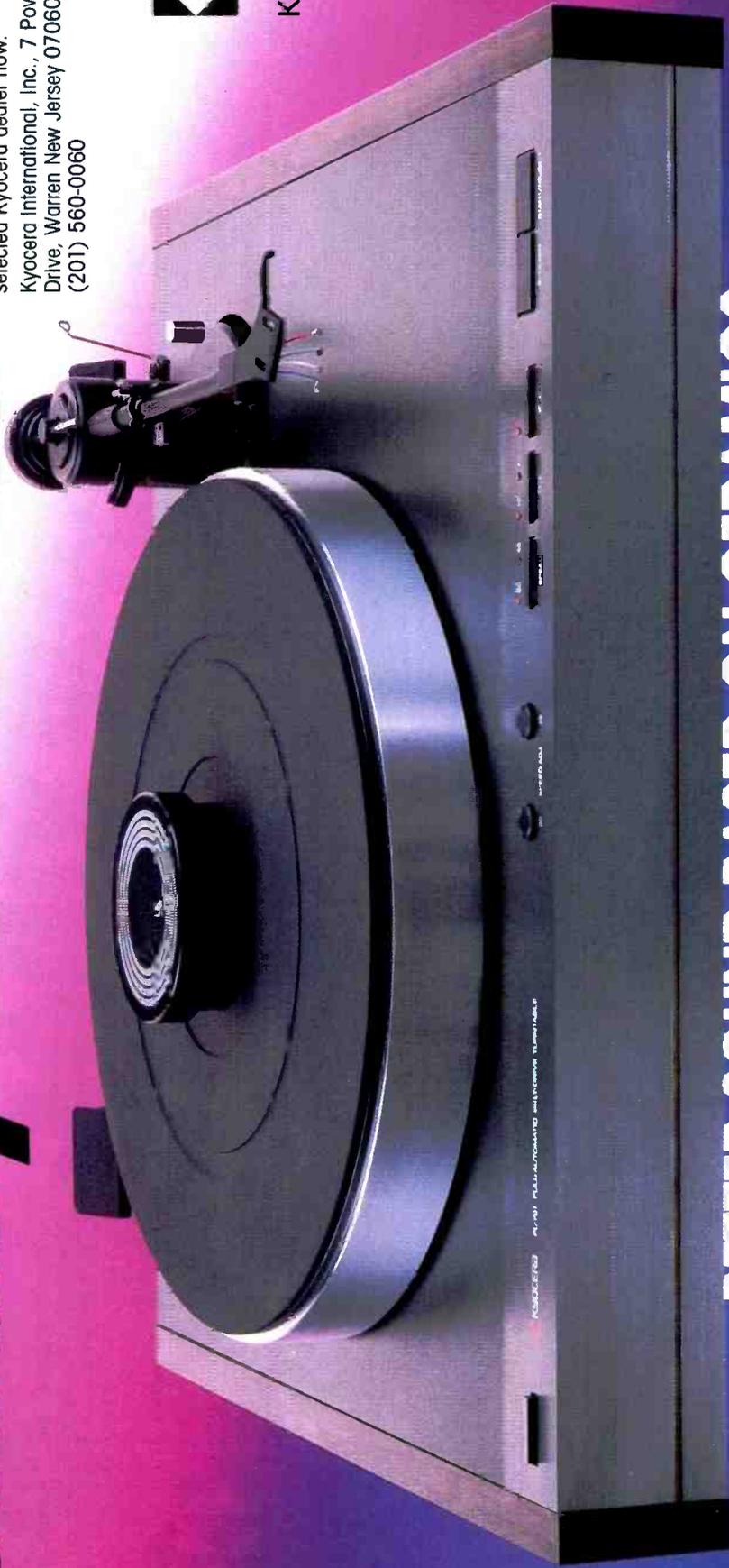
feet. This dual-isolation foundation supports the platter and arm. For even greater stability and uniform rotation, the platter weighs in at 3.3 lbs. Add an advanced two-motor belt drive system to eliminate motor vibration and you have a turntable that is truly—steady as a rock.

Other features:

- Straight aluminum tubular low mass tonearm with removable carbon fiber shell.
 - Micro-computer electronic sensing non-friction tonearm control.
 - Stabilizer (.7 lb) with built-in two-speed strobescope.
 - Wow and flutter of 0.03%.
 - Signal-to-noise ratio of 70 dB (DIN-B)
 - Tinted dust cover and convenient soft-touch front panel controls.
- Performance says it all. Put it to the test at a selected Kyocera dealer now.
- Kyocera International, Inc., 7 Powder Horn Drive, Warren New Jersey 07060, (201) 560-0060

**The new Kyocera PL-701
Full Automatic
Belt Drive Turntable**

Steady as a rock.



BETTER SOUND BASED ON CERAMICS.

The key is Kyocera ceramics technology—a superior new way to virtually eliminate mechanical and electrical vibrations that impede dynamic performance.

It starts with a handsome ceramic-compound resin base (actually the chassis) that supports all components. Because ceramics are rigid and inert, they provide vibration-free stability immune from volume and frequency irregularities. Because ceramics are non-ferrous, there are no eddy currents—so there's no electrical hum. Result: a chassis with practically no mechanical and electrical impurities.

In addition, fine ceramics encapsulate critical components throughout the circuitry to further isolate vibration. Kyocera also uses a heavy duty cultuss core power transformer to reduce eddy currents, minimize flux leakage and improve voltage regulation.

- There are many other features that distinguish this extraordinary integrated amp:
- Rated a full 150 watts per channel into 8 OHMS at 0.02% THD from 20-20,000 HZ.
 - New MM/MC equalizer with ultra low noise and input impedance transistors.
 - Heavy duty high speed 80 MHz power amplifier design incorporating parallel triple push pull final stages with MOS FET drivers.
 - Single stage push pull amplifier circuitry for improved signal to noise ratio and wide band frequency response.

Kyocera's matching PLL Quartz synthesized AM/FM Stereo T-910 Tuner.

- Non-ferrous ceramic-compound resin base with adjustable feet.
 - Fluorescent digital display (low noise type).
 - Dynamic noise reduction circuitry for improved weak signal reception.
 - Programmable 16 station pre-selects.
 - Narrow or wide IF bandwidth programmable selection.
 - Two FM antenna—programmable selected.
 - Multiplex decoder with pilot and birdie noise cancelling circuit.
- Performance says it all. Put it to the test at a selected Kyocera audio dealer now.

Kyocera International, Inc., 7 Powder Horn Drive, Warren New Jersey 07060, (201) 560-0060



Pure power without bad vibes.



KYOCERA

BETTER SOUND BASED ON CERAMICS.

I question remote controls in cars. They're easily lost, and who needs them? The driver, that's who.

Continued from page 6



Nakamichi TD-700: One chassis, with azimuth for all.



Blaupunkt Los Angeles: For New York, Philadelphia, Detroit . . .



Sparkomatic SR 315: Unexpectedly deluxe.

the whole car is stolen but even if the stereo alone is

Control flaps (as used in Jensen's ATZ series and Pioneer's Centrate) and wireless remote control (used by Blaupunkt, Centrate, Fujitsu Ten and maybe others) are both by-products of digital control technology. Because only digital control impulses, not audio signals, go through the controls, those controls can be moved from the main chassis without



Regency Polar MS 5000: Unsinkable.

affecting performance. And because these all-electronic control systems require no torque to turn knobs, remote control is easy. (Manual control is still easier with old-fashioned knobs, alas.)

I question the wisdom of wireless remotes in cars, where they can easily be lost behind the seat cushions, under the seats, or behind the one glove that actually made it to the glove compartment. A holster might be worthwhile. I also question why remotes are necessary. The front-seat passenger can always reach the stereo, while the back seats of most cars on the roads are either empty or filled with kids—and do you really want to give those kids the power to startle the driver with full-throttle rock without giving him a warning glimpse of tiny hands on the volume knob?

The one who needs remote control the most is usually the driver. And, according to *Road & Track*, our sister magazine, there's at least one car in which he gets it: Nissan's 50th Anniversary 300ZX Turbo, which has audio-system controls on its wheel hub. Implementing that on a dealer-installed stereo would be hard, but I bet someone does it, eventually.

Aside from the Nakamichi and Aiwa lines, few in-dash units struck me as needing detailed comment. Concord has helped swell the ranks of those offering Motorola's C-Quam stereo-AM system, and Concord's new parent company, EPI, has introduced some stereo units under its own name. Blaupunkt has now expanded its ARI traffic warning system to Detroit, and has a new, ARI-equipped

model, the Los Angeles. Sparkomatic has a deluxe new model, the SR 315, with Dolby B and C NR, plus DNR, for \$349.95; interestingly, no power rating is quoted, but a power versus distortion graph is given, showing about 18 watts at 0.5% THD, 20 watts at about 1.0%. Sanyo introduced a new, high-end line for home and car, called ULTRX; its flagship mobile model, the UR80, has dbx, Dolby B and Dolby C NR. And Regency introduced a new marine system, the Polaris, with weathertight packaging.

The only production-ready CD players for the car were the two Sony models covered in our July issue, but Pioneer, Fujitsu Ten and Technics showed prototypes; the latter was the first Technics mobile product ever shown here. I'd already seen prototypes from Kenwood, Mitsubishi, Panasonic and Philips—and CD would be a logical next step for Denon, which will have a car-sound line next year. So if you want CD in your car, this year you can have a Sony, but next year you can have a very wide choice.

Enough for this month. Next time, I'll cover amplifiers, equalizers, speakers and accessories.

Pioneer CDX-1: Almost here.



Mail-Order Ride

The Delco-GM/Bose car stereo system will soon be available in more GM cars. In addition to the current choice of Cadillac Seville (K-body), Buick Riviera, Olds Toronado and Cadillac Eldorado (all E-bodies) and the Chevrolet Corvette (Y-body—and 88% are being sold with the system), it will soon be available in three C-body models (Cadillac DeVille, Buick Electra and Oldsmobile Regency 98). Come fall, it should also be available in even less-expensive GM cars.



Meanwhile, for those who already own a system, Bose is establishing a mail-order tape club, called the Private Performances Collection. It will offer 12 tapes a year in each of four musical genres: Easy-listening, soft rock, country and light classical, all chosen to be "dynamic and uplifting" and to "add to the enjoyment of driving GM cars." (For further information, write Private Performances Collection, The Bose Corp., 100 The Mountain Rd., Framingham, Mass. 01701.)

Illustration: George Blume

EDWARD TATNALL CANBY

DIALING THROUGH THE YEARS

One of our heaviest problems, to my way of observation, is that we are so rapidly forgetting how to think in diversity, each of us freely different (up to a point) and not necessarily ruled and ridden by the ever-persistent majority. Sure, we have to go along. Man is gregarious, so ordained by our biological inheritance. Man in the bulk, that is. The individual is—well, individual. So is the small group. Variety within homogeneity—what else in any species? No two alike, no two absolutely different, and all can interbreed.

Can we interbreed our divergent interests? Especially when they are small in terms of numbers? Or dollars? Is the biggest always the best?

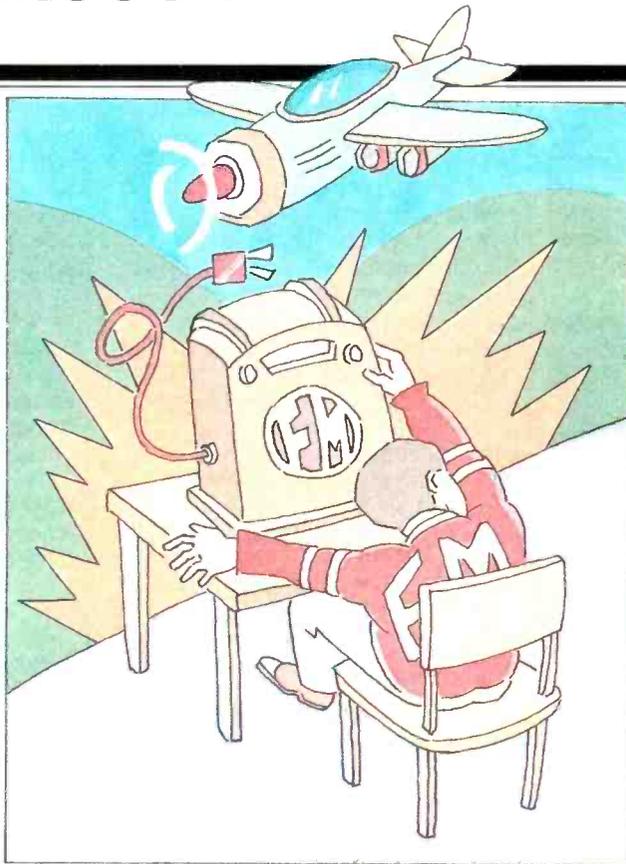
Would you have enjoyed life c. 1946 if your entire little wartime FM world had crashed about you together

with all your hopes for a rosy future in radio? When that happened to some of us, it was a personal tragedy, as well as a group tragedy on the largest scale we could experience. And that multiplied many times in many places. Do the mere numbers really matter? And was our work unimportant merely because it was—via the numbers—on a small scale?

A perfectly well-meaning correspondent in Texas (where big numbers matter) brings these words out of me. Reading the first of my FM articles (not yet the second), he writes that I am making a lot of fuss over no great thing because, after all, "There were only 25 FM stations in the United States on January 1, 1942. Most of America did not have the benefits of high-fidelity reception which you discuss."

There it is—the tyranny of numbers! A mere 25? And—was it?—500,000 FM sets on the old band? Peanuts.

Does it matter that, in that fleeting moment when the declaration of war froze FM progress, there happened to be 25 stations on the air, no more? So what! I might suggest that on January 1, 1933 (with FM already a fact) there



was not a single FM station in existence. Nor on January 1, 1913 (with AM radio a fact, also thanks to Armstrong) there was no "consumer" broadcasting whatsoever for the benefit of the mass of Americans. So, Mr. Factfinder, what are you proving? A decade or so later there was *one* commercial AM station on the air, the same KDKA in Pittsburgh that today interferes with my New York AM news station. How very unimportant, therefore, was this pioneer radio station? Numbers, numbers!

Oh yes, and, on January 1, 1942, there was not a single consumer hi-fi amplifier on sale anywhere at all, nor any other gear of the sort that makes up our present business. How very unimportant we were, though there were good commercial amplifiers on hand inside those few old-band FM sets.

What we need, to temper these raw and mostly meaningless sets of numbers, is more perception in depth and, particularly, in the dimension of time. Though the public old-band FM stations may have been frozen at the grand total of 25, we also must understand that in only a couple of years

before the freeze began the applications for new FM stations (FM-only, not AM/FM) had been piling up by the hundreds and hundreds at the F.C.C. New stations, even new networks, were budding forth in every stage of development—mostly high-power stations, primed for that updated, hi-fi FM networking that could well have replaced the entire AM broadcast system of the time. One can argue, I suppose, that it never would have worked, using all our present commercial and engineering hindsight. The fact is that it was working then, working like crazy, going through all the preliminary stages that are absolutely necessary for any new system before, as we say, it is "launched." Behind the scenes there had been almost a decade of slow progress, now, from 1939 on, the launching began, the

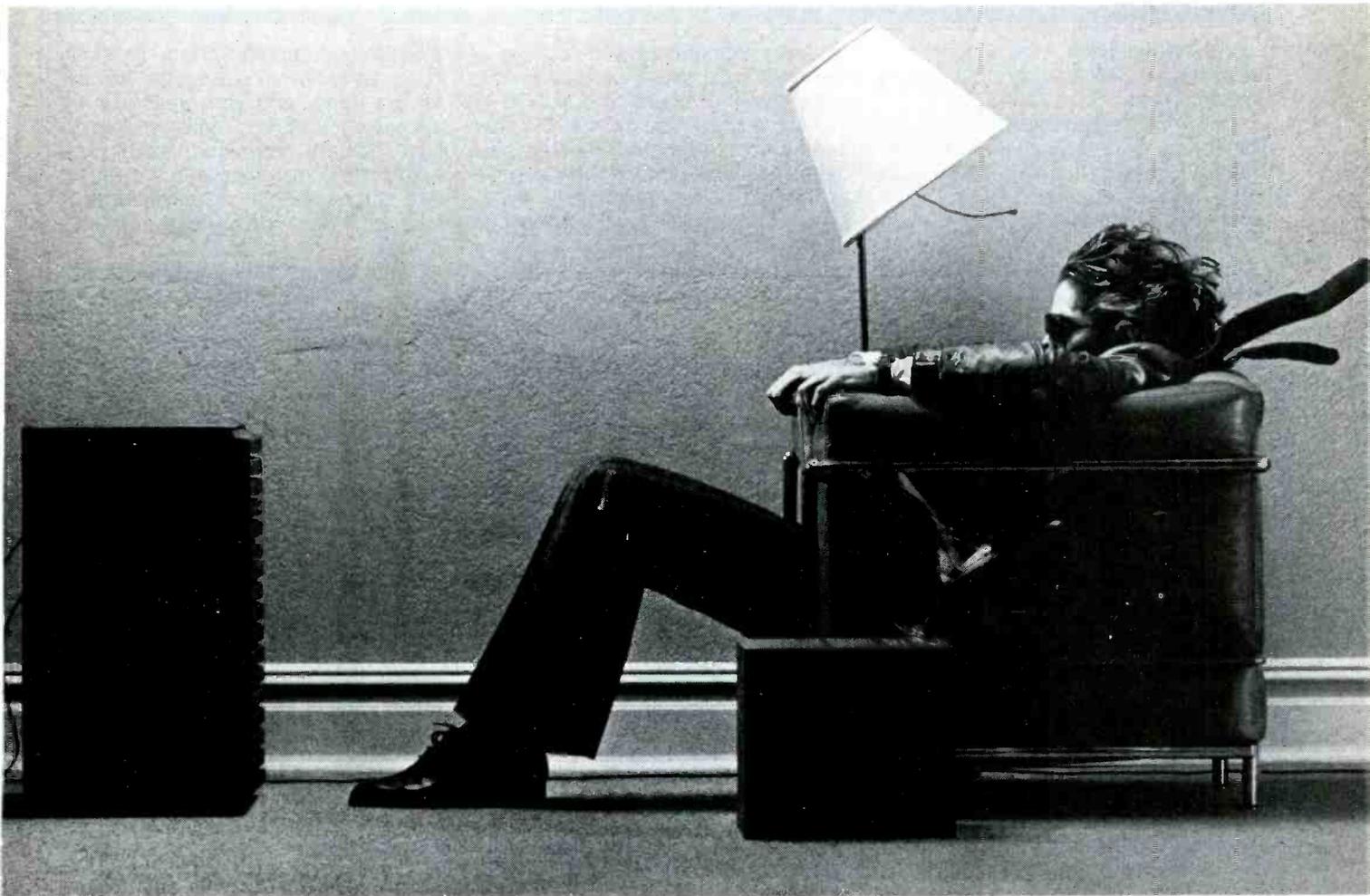
big public explosion was under way. But barely.

How many FM stations would have been on the air on January 1, 1943 if we had managed to stay out of the war *one more year*? That is an interesting question. How many high-quality, old-band FM sets on the market and in consumer hands? With GE, Zenith and numerous others at work, that figure might have been pretty high, already enough to catch the interest of the rest of America.

My correspondent friend, whom I call Mr. Factfinder (because he does deal in undeniable facts if, as I think, wrong interpretations), also notes that the new postwar FM band, our present 88 to 108 MHz, provided for no fewer than 100 FM channels, in comparison to the restricted number on the old 42 to 50 MHz. "That's quite a difference!" he says. True, true, but again there is more to it than numbers. Other factors, as I see it, were very much to the fore, both political (read: Power struggle) and engineering, which makes me seriously wonder whether the big change was initiated for altruistic and noble reasons. One hundred channels! A

Illustration: Michael A. Donato

AFTER 500 PLAYS OUR HIGH FIDELITY TAPE STILL DELIVERS HIGH FIDELITY.



If your old favorites don't sound as good as they used to, the problem could be your recording tape.

Some tapes show their age more than others. And when a tape ages prematurely, the music on it does too.

What can happen is, the oxide particles that are bound onto tape loosen and fall off, taking some of your music with them.

At Maxell, we've developed a binding process that helps to prevent this. When oxide particles are bound onto our tape, they stay put. And so does your music.

So even after a Maxell recording is 500 plays old, you'll swear it's not a play over five.



IT'S WORTH IT.

After the war, suddenly FM was to take on a virtuous role in our society. It would cover everything *but* big-time commercial networking.

good talking point, and very convenient for a cover, leaving other matters unmentioned.

You must remember again that the high megas were still a relatively unexplored region at that time and fraught with serious engineering problems, quite aside from the necessity of a total "retooling" of the entire FM enterprise. But far more important was the political power background, with TV as the great bludgeon. The war postponed an epic battle for the life of FM, basically between Major Armstrong himself and the moguls of the enormously profitable AM system so successfully developed in the previous years. That's what *really* mattered. The fight was, of course, mainly behind the scenes and it was all by indirection, replete with weasel words, sounding much high virtue, acting the mega-thug. If not the weasel, then the hatchet. That's how it is done, and do not think otherwise unless you, too, wish to be naive.

Why so many FM channels, so suddenly, so soon? Ah yes, could it just have possibly had to do with what I would call forced FM fragmentation, that coyly launched idea—hadn't you heard?—that FM is best not for "the people" en masse (i.e. network broadcasting) but for all those assorted little groups, the cultural minorities, the small communities, for local news items, homey small-town entertainment. Yes, of course, there is some validity to this. Indeed, it can be an inspiring concept. We are still seeking for it in many later ways (cable, upper-channel TV) if not very successfully.

After the war, suddenly FM was to take on this virtuous role in our society. It would cover everything—indeed anything *but* big-time commercial networking. Low-power FM in hundreds of nice little stations looked very pretty in print. But one smells the ulterior motive. The real message is brutal: *There would be no FM network*, high fidelity all the way, to replace the huge and profitable AM network system, lo-fi from start to finish.

Strange, you see, that this new network was precisely what Major Armstrong had in mind before the war and was well on the way to achieving. No quaint little stations for *him*, unless on a strictly experimental development basis. His own W2XMN was, as I have

said, a whopper in power, such as we have not seen since; he was hard at work enlisting others to build FM on that same scale. You can call him mercenary—but his network would have been technically enormously superior to the AM arrangement. It is always possible to imagine that the AM people could have gone along with the changeover, perhaps with radio and TV much more satisfactorily integrated than in the ensuing system which we now inherit. Who can say at this point? As it worked out, Armstrong lost. The same large vested interests that had dominated network AM continued to hold sway into postwar TV and even, within TV, in the dominant "low-number" channels, up to 13, where the big money is made.

There's a remarkable similarity, in fact, between that rather too sudden creation of 100 new FM channels back in the 1940s and the similar allocations of super-high-band channels in television, then, again, the cable channels for "public access." The thinking is suspiciously like that which went before. Ah yes, very high-minded, full of democracy and the rights of small groups, even unto the porn artists! Let everybody have his day (and night) on the public (and private) air. If you wish, you may take all this at its face value. But you shouldn't. Wheels within wheels, just like the Bible said. Ezekiel saw the big wheels and the little wheels, yes?

Actions, they say, speak louder than words. Especially the pretty words that come from large corporations about to swallow somebody in one gulp. Even if they don't succeed, we can infer what they have in mind.

This is no place to delve into cable and public access but I do not really think that the multiplicity of cable and TV channels, like the 100 FM channels, was designed for the exalted and virtuous purposes we hear about. The world is never all good or all bad; the two always mix. There is truth and value to "public access" and it was good to have 100 FM channels. But historically speaking—even unto today—I can't help hearing the blunt action-message, which is an ancient one: *Divide and conquer*. Divvy up your rivals into little bits, scattered every which way, and you have them. Fragment

their forces, spread them in small hunks as in FM via our current formula for coverage, and you need fear no serious competition. That's how things have actually happened, though the better has come along with the worse. (We can have both. We must, indeed, have both if we are to keep ourselves going).

Well, here's a surprise twist. What if Major Armstrong had won, what if his FM network had been completed, perhaps even with the cooperation of such as RCA and, of course AT&T (who owned all those rental phone and cable lines on which the old network depended)? Well, oddly, I suspect that we would have come out today much as we are now.

We've had 40 years and more to play around with FM since then. After so long, forces tend to balance out inevitably, like pendula coming to rest—whether for good or bad or both. Armstrong's broadcast hi-fi, our first quality consumer audio, thus might simply have become a different route to the present scene, audio and video in all the forms we now know. Curious thought.

Would Armstrong be amazed if he could return after these 30 years since his death in the '50s, seemingly in defeat. I'd personally love to show him a Walkman-type AM-FM insert tuner "cassette"—the basic inventions of a lifetime of genius in one tiny capsule. Might make him feel a little better to see how his offspring grew.

And he would have been so interested in how FM has become the least hi of the hi-fi audio sources now available, since it is widely acknowledged that tape and disc outstrip it by a good margin. Too, he'd get a laugh about how the AM broadcasters are getting stereo capability after a lapse of 30 years—"to put them on equal competitive footing," or so the AM proponents claim.

I would also like to hear the Major comment on FM-simulcasting, named as if the audio were some after-the-fact appendage, added on the last minute, rather than the most essential portion of the program, the one without which the program could not be broadcast! Imagine, for example, a Metropolitan Opera program done without the audio or one strictly lo-fi. . . . A

CARVER
CARVER

Throughout the world, CARVER high fidelity audio components are acclaimed for technology, respected for execution of design, and depended upon for reliability. They are also, and perhaps this is most important of all, appreciated for musicality.

"State-of-the-Art" is merely a point of departure for Carver Corporation. Indeed, since it introduced its first products, the M-400 Magnetic Field Amplifier and the C-4000 Sonic Holography-Autocorrelation Pre-amplifier at the Winter Consumer Electronics Show in January of 1979, Carver Corporation, under the direction of its founder, Bob Carver, has been said to have "redefined the state-of-the-audio art."

Located near Seattle, Washington, Carver Corporation is the second company founded by inventor-entrepreneur Bob Carver. His first company, Phase Linear, was a leader in amplifier technology through the seventies.

Committed to the design and manufacture of audio electronics which bring the listener as close as possible to the sound of the original musical performance, Carver has pushed the audio art to unprecedented heights and price/performance standards.

SONIC HOLOGRAPHY



Conventional stereo is a pale, muddled version of live sound. No matter how good your speakers are. No matter how good the sound source is.

The problems of sonic imagery inherent in conventional stereophonic reproduction have been solved by the Sonic Hologram Generator, available in three different components: The C-4000 and C-1 Preamplifiers and the C-9 Sonic Hologram Generator.

Very briefly, the Sonic Hologram presents timing and phase information that exists in sonic program material—but is normally inaudible. With Sonic Holography, this information emerges in three-dimensional space around the listener who is thus able to establish the precise location of the instruments and voice.

Stereo sound is an illusion, and for some listeners it is not a particularly successful or convincing one. Stereo reproduction is subject to fundamental distortions of spatial perspective, sufficiently severe that no six-year-old with normal hearing will be fooled into confusing a stereo playback with a real, live sonic event.

Rather, the imaging of stereo is an acquired taste which audiophiles learn to be sensitive to—acclimating to its unnatural perspective in order to enjoy the portrait of sound which the stereo system paints upon the wall between the loudspeakers.

Consider, by analogy, the illusion of depth perspective that is provided in photographs and paintings by converging straight lines and the hazy reduction of contrast in "distant" objects. The geometry of perspective is part of the perceived real world, and rendering it is an essential requirement for any landscape painter. Certainly the historic discovery of optical perspective a few hundred years ago resulted in paintings that are generally more pleasing to view than, for instance, the flat two-dimensional figures in Egyptian paintings from the tombs of the Pharaohs. Still, few people viewing paintings have ever been fooled into believing they were looking through a window at a real three-dimensional scene. And while stereo sound is both more realistic and more pleasing than monophonic reproduction, it is still only an attractive illusion.

Many listeners don't care about its limitations. But some of us want more. For decades "high fidelity" has been billed as providing either they-are-here or you-are-there realism, and this is what we look for. And by this criterion stereo sound is flawed.

Now, the problem with stereo is simple: each ear hears both speakers.

To see why this is important, consider the process of recording and reproducing a sound—on musical note played by one instrument, located several feet to the left of the center of the stage.

CARVER

Powerful • Musical • Accurate

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Lynnwood, WA 98036

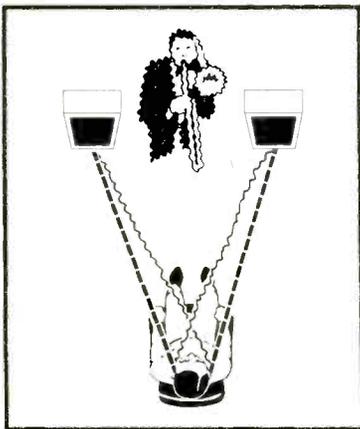


A live sound source produces one sound arrival at each ear.

What would you hear as a listener if you were located in an ideal front-and-center seat? The sound spreads out in all directions at a speed of approximately 1100 feet per second. If you are facing the center of the stage, the sound arrives at your left ear first and at your right ear very shortly afterward—how long afterward depends on its angle of arrival.

If the sound source is exactly in front of you, identical signals arrive at both ears at the same time. Since the instrument in our example is only a few feet left of stage center and so is only slightly to the left of front (rather than 90 degrees around to the left), the arrival of the sound at your right ear is delayed by a small fraction of a millisecond and since your head blocks high frequencies, but isn't large enough to be an effective barrier for lows, your right ear receives a sound that is slightly filtered by the acoustic shadow of your head.

If the sound is recorded and later played back via loudspeakers, the result will depend on the microphone technique employed. Consider the simplest and most common: the sound is recorded via a single close-up microphone whose signal is "pan-potted" i.e. split and recorded in both stereo channels but slightly stronger in the left channel in order to place its image slightly to the left of center. In playback the sound emerges simultaneously from both speakers (a little louder in the left). Assume



Stereo speakers produce two sound arrivals at each ear, confusing the ear-brain center and diluting the image.

that you are sitting equally distant from the speakers, facing the mid-point between them. The sound from the left speaker arrives at your left ear, and at the same time the sound from the right speaker arrives at your right ear. A fraction of a millisecond

later the sound from the left speaker, after filtering by the acoustic shadow of your head, arrives at your right ear, and similarly the sound from the right speaker arrives at your left ear. In the "live" listening experience the single sonic event produced two arrivals at the ear; the delay and frequency spectrum differences between the arrivals at the two ears are the primary cues which the brain uses to determine the direction of the sound source. The sonic event's now been muddled in a total of four arrivals at the ears, the first two being simultaneous and identical in frequency spectrum—a very different set of cues.

Your brain can't help but get confused. The goal of the Carver Sonic Hologram Generator is to eliminate the "extra" two sonic arrivals that occur with conventional stereo playback, but which do not occur in real life. The ear/brain system can thus receive the unambiguous timing and phase information that exists when we listen to real sonic events with only two arrivals, one per ear. A great deal of the subtlety of a real performance, including a clear sense of the size, or "sonic signature" of the performance environment can be recovered from the recording, which is all but lost in conventional stereo playback.

By acoustically cancelling the two unwanted arrivals, Sonic Holography restores perception of differences in depth and ambience in the stereo image which are "masked" in ordinary stereo playback.

Why is this process called Sonic Holography? An optical hologram is a photograph made with a laser whose coherent beam of light is split into two beams and used to illuminate an object; the two beams are recombined, forming alternate rings of constructive and destructive interference, and the interference pattern is photographed. When the picture is developed and another laser is used to project it, a three-dimensional image of the photographed object is projected in space. By analogy, a sonic hologram generator takes the beam of sound produced by each loudspeaker and splits it so that a related beam of sound is produced by the opposite speaker in such a way that acoustic interference patterns of the sounds occur in the air near each ear, revealing the true three-dimensional sound image that was hidden in the stereo recording. And it is spectacular!

The impact to the listener of Sonic Holography is best described by the most experienced and knowledgeable experts in the audio industry.

"When the lights were turned out we could almost have sworn we were in the presence of a real live orchestra."

Hal Rodgers, Senior Editor,
Popular Electronics

"The effect strains credibility—had I not experienced it, I probably would not have believed it... the 'miracle' is that it uses only the two normal front speakers."

Julian Hirsch, Hirsch-Houck Labs,
Stereo Review

"... it brings the listener substantially closer to that elusive sonic illusion of being in the presence of a live performance."

Larry Klein, Technical Director,
Stereo Review

"... seems to open a curtain and reveal a deployment of musical forces extending behind, between and beyond the speakers... terrific."

High Fidelity

Visit your nearest Carver dealer and hear for yourself.



Live performance: Note that in the concert hall setting the sound is heard with timing and amplitude cues. Three dimensional!

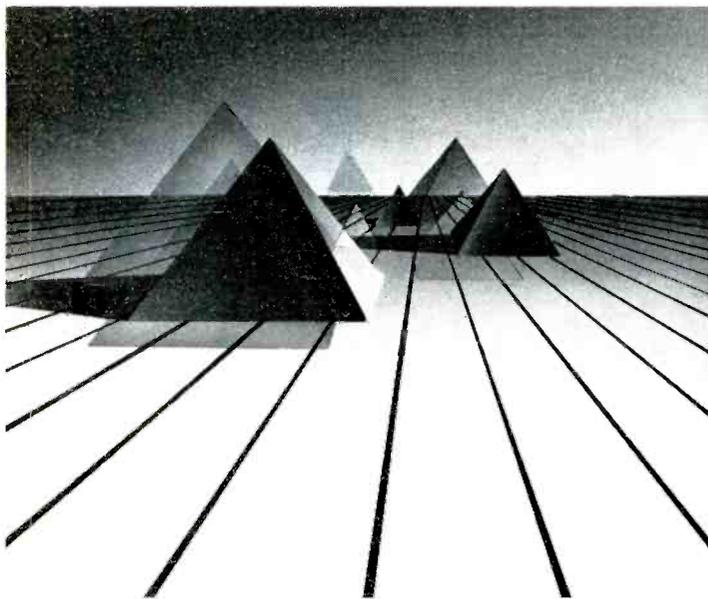


Conventional stereo: Note that when listening to conventional stereo the sound is heard, more or less, on a flat curtain of sound between the two speakers. Volume differences only. The timing cues are gone.

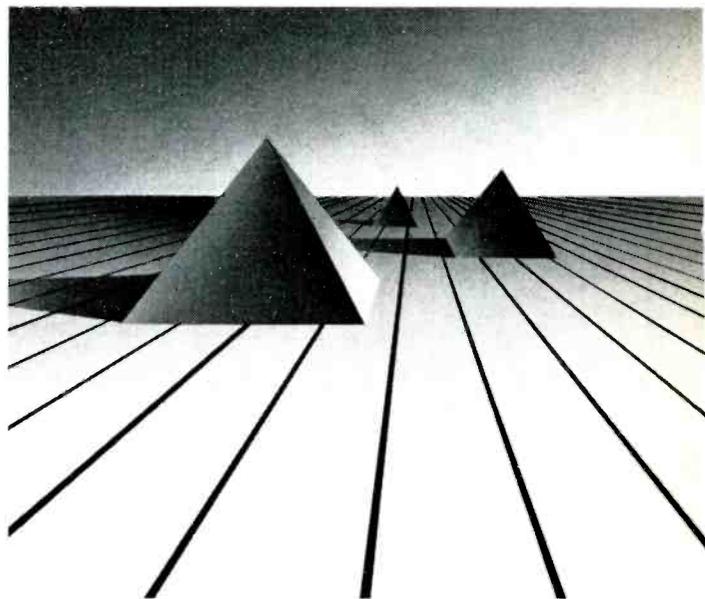


Sonic Holography: With SONIC HOLOGRAPHY, the sound is reproduced much like that of a concert performance, complete with timing, phase and amplitude cues.

CLEARING THE AIR With the Carver Asymmetrical Charge-Coupled FM Stereo Detector



Reflected multi-path signals cause audible distortion.



Asymmetrical Charge-Coupled FM Detector gives your ears a true sonic image.

Bob Carver has solved three major problems that face anyone who likes to listen to music. Two of these solutions, adequate and affordable power, and true dimensional realism, address problems you may not have known you had until your Carver dealer demonstrates the vast improvement Magnetic Field Amplifiers and Sonic Holography deliver.

But the third breakthrough solves a problem you live with every time you tune in an FM station. A problem you've heard a thousand times. A problem that may have weighed against even spending the money for an FM tuner due to poor broadcast/reception sound quality.

The Carver Asymmetrical Charge-Coupled FM Detector is an elegant, practical solution which will open up a whole new world of listening enjoyment.

FM was originally designed to broadcast rich, full-frequency mono. Frequency modulation transmitters were intended to broadcast better sound by varying frequency over a narrow, assigned band instead of changing the intensity of the signal (amplitude) the way AM did. The result was less noise, deeper lows and crisper highs. Voila! High fidelity broadcasting.

This system worked just fine—and still does if you have a mono FM receiver. However, stereo arrived in the Fifties and engineers set about finding some way to send TWO signals. They toyed with putting the left channel on FM and the right channel on AM, splitting left and right channels into two smaller bands within the assigned FM band and a number of other "discrete" approaches.

None of which impressed the FCC. "Whatever you come up with," they ruled, "has to be able to deliver the whole signal to all those folks with mono FM receivers. We're not going to allow instant obsolescence just because some audiophiles want this new-fangled stereo."

A brilliant solution... if you live within sight of the transmitter. The approach that was finally adopted is clever to say the least. It divides each FM band into blocks. The first is composed of left-channel-plus-right-channel... mono... and this is what mono receivers use exclusively. The second

band is left-minus-right, that is, all those things which differ between left and right. This second signal is assigned its own block.

The trouble is, this important second signal is extremely prone to mishaps between the transmitting tower and your FM tuner. It is this signal component that, when degraded in the least, causes noise and distortion problems. These are usually induced by multipath reflections off hills, buildings and the ground, causing more than one L - R signal to arrive at your tuner to confuse things.

The effect is much like that of ghosting of TV pictures which increases with the number of skyscrapers, tall hills and passing cars between you and the tower. As the main signal deviates in frequency, it "beats" with the reflected signals (phase modulation), causing destructive interference patterns which bear no resemblance to the original signal. Even the most expensive FM tuners are tricked into reading this phase modulation as frequency modulation: the better the tuning circuit, the more easily it is deceived!

Charge-Coupled Delay. The first part of the Carver ACCFMD circuit can be thought of as the "Search and Destroy" section. It takes advantage of the fact that almost all noise and distortion in the L - R signal portion. For every instantaneous noise or distortion voltage, there is a replica in the opposite channel.

The Carver Charge-Coupled Delay circuit detects these dirty, mirror images and cancels them before they can reach your ears. The results are a dramatic reduction in hiss, clicks, pops, picket-fencing and the myriad indescribable, unpredictable noises which often disturb FM listening. But merely eliminating redundancy is not enough. If you get rid of too much of the L - R signal through cancellation, you will have thrown the baby (the stereo-ness of music) out of the dirty bathwater (the noise and multipath).

The Leading Edge Detector. Luckily, 85% of the L - R signal duplicates the L + R signal, so quite a bit can be cancelled without losing imaging and ambiance. The other 15% is totally different and represents the instantaneous phase relationships which produce the stereo experience. Rather than stop at 85%, Bob invented another circuit which could "treat" this last critical 15% of the L - R signal while maintaining its sonic integrity.

Through psychoacoustic research which brought us Sonic Holography, Carver discovered that, if properly matrixed, only 1/3 of the non-redundant 15% of the L - R signal is required to convince our senses of a fully separated stereo experience.

The Leading Edge Detector circuit operates only on that part of the L - R signal necessary for our ears and brain to construct true stereo localization. By processing this ultra-important remaining 5% of the L - R signal and then carefully returning it to the FM tuner's receiver matrix, a net noise and distortion reduction of 93.5% (over 20dB) is achieved.

Finally, Audiophile-grade FM. You will, of course, want to audition this technology, to hear for yourself what the experts have said about The Asymmetrical Charge Coupled FM Stereo Detector when first introduced in the Carver TX-II.

"It is by a wide margin the best tuner we have tested to date."

"What distinguished the TX-II is its ability to pull clean, noise-free sound out of weak or multipath-ridden signals that would have you lunging for the mono switch on any other tuner we know of."
High Fidelity (January 1983)

"Breakthrough in FM tuner performance. A tuner which long-suffering fringe area residents and those plagued by multipath distortion have probably been praying for."

"The significance of its design can only be fully appreciated by setting up the unit, tuning 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 multipath interference."

Audio

(Len Feldman, December 1982)

"A major advance..."

"Its noise reduction for stereo reception ranged from appreciable to tremendous. It makes the majority of stereo signals sound virtually as quiet as mono signals, yet it does not dilute the stereo effect."

Stereo Review

(Julian D. Hirsch, December 1982)

Four ways to hear what they heard. Our Asymmetrical Charge-Coupled FM Detection circuit is available in the TX-2 Tuner and Carver Receiver as well as the breakthrough TX-II.

Even if we can't persuade you to part with your tuner or receiver, you can still enjoy the benefits of the Asymmetrical Charge-Coupled FM stereo Detector in a compact add-on, the TXI-II. It connects to any receiver or tuner to bring you the instant, audible benefits of noise-free stereo FM.

THE CARVER DIGITAL TIME LENS



The Digital Time Lens adds the finishing touches of sonic accuracy and realism to Compact Digital Audio Discs. It turns an innovation into near musical perfection.

Why digital discs should sound better than analog discs. While hundreds of articles and reviews have been written on the digital audio recording process, it is valuable to review just how the process works in theory to better appreciate the Digital Time Lens' further contribution.

Analog recording uses magnetic tape to record varying amounts of musical signal. The more musical impulses in a given passage of music, the more magnetism is imparted on that portion of tape passing the recording head.

While this recording method has given us thirty years of memorable recordings, it labors under at least five physical limitations which cause audible degradation of the signal. 1) *Tape has finite limits as to the amount of energy it can record.* Saturation and distortion occur when the limit is reached, yet musical dynamics extend far louder and softer than the medium can handle. 2) *Magnetic tape, by its very composition, imparts some internal energy which we hear as hiss.* Thus quiet parts of recordings can suffer from annoying background noise. 3) *It is very hard for tape to deal with extremely high and extremely low frequencies,* again due to physical realities of tape oxide composition, speed and head configuration. 4) *Even if problems 1-3 are minimized, the result gets scratched into the surface of a piece of plastic and played back by letting a small diamond wiggle around in the groove.* Not theoretically the best method by any stretch of the imagination. 5) *Even if said grooved plastic disc is the best virgin vinyl and the wiggly diamond is a \$400 handmade cartridge on a \$2000 turntable, the record can come to a bad end in seconds at the hands of a) a five-year-old with a peanut butter sandwich, b) an inquisitive pussycat, c) your best friend after half a bottle of Cabernet.*

Digital recording gets around all of these problems. The musical signal is sampled and analyzed by a computer which, in effect, impartially measures the signal with a ruler. This segment is VERY loud—98dB—and goes down to 20Hz. *This segment is extremely quiet and contains a flute solo with harmonics to 19,000Hz. This segment increases in dynamics by 60dB in less than a hundredth of second, etc.*

Instead of trying to make a physical model of these measurements the way analog tape does, digital recording simply "prepares a report," coded in 1's and 0's much the way a floppy disc can contain

the text of a book encoded in binary language.

The Compact Disc playback unit "reads" the report and changes the sound back to analog musical impulses which are fed into your hi-fi just like a tuner, cassette deck or phonograph source. Except that the digital source will be free of background hiss, contain the full range of frequencies from deepest fundamentals to almost inaudible highs and provide dynamics ranging from gossamer-soft to thunderstorm loud.

For sheer excitement, sonic impact and definition of individual instruments, digital has proved a quantum leap ahead of previous recording and playback methods. You might compare it to a good stereo disc versus an Edison wax cylinder. That's how much better a Compact Disc can be than the average vinyl recording—as well as being impervious to normal wear, five-year-olds, kitty-cats and partying friends.

What went wrong? Many professional musicians, audiophiles and audio journalists, while praising the quietness and dynamic range of Compact Discs, have often expressed a lingering disappointment in the way music itself sounds on many commercial examples. This is particularly evident when the compact disc is compared with a well-executed analog counterpart. The complaint boils down to a lack of ambience and spatial detail, along with a midrange which often has been described as sounding bright, hot and harsh.

When Bob Carver received his first Compact Disc player, he too was not prepared for the poor sound he heard. The three-dimensional perspective which his analog system provided in lush abundance on phono discs evaporated into a flat, brittle wasteland. The next day, he purchased no less than 23 Compact Discs and their analog vinyl counterparts and set about quantifying the differences.

As expected, the CD discs were quieter with better dynamic range and richer, tighter bass. But testing uncovered two inherent flaws. 1) different spectral energy balance. The overall frequency response was shifted on the CD towards more mid-range above 400Hz; 2) the amount of Left-minus-Right channel information versus the amount of Left-plus-Right differed by about 1.25dB between analog and digital.

The Left-minus-Right (L-R) component of stereo carries the three-dimensional part of sound field information, much as is done with FM stereo (refer to the section on Carver's tuner circuitry). A deficiency of 1.25dB doesn't sound like much. But since power goes up as the square of the voltage, it means that analog records carry a whopping thirty-

three percent more ambience information than digital discs. That's a noticeable reduction in three-dimensionality, imaging and other psychoacoustic factors that put the realism into music.

How does the Digital Time Lens correct these problems? Bob Carver's circuitry adjusts the ratio of L-R to L+R and restores the octave-to-octave balance originally intended by the musician and recording engineer as evidenced by the analog recording.

More specifically, Bob discovered that the L+R component of a digital disc had to be equalized somewhat differently than the L-R component of the digital disc so that it would match the analog disc (the analog version of the same musical recording). There were two equalization curves necessary to make the digital disc sound the same, exactly the same as its analog counterpart. In addition to equalizing the L+R band and the L-R band independently, it was necessary to increase the level of the L-R band so that it would match the L-R level that was on the analog disc.

Now, since the equalizations were different for the two bands, it was necessary to introduce a time correction in the L+R band because the equalization was steeper in the L-R and so the signal would go through the L-R band with a greater group delay than it would go through the L+R signal chain and would arrive out of step, so a compensating delay, just micro-seconds, is employed in the L+R signal chain so that when the two signals arrive at the matrix to be turned back into left signal and right signal, they arrive without time domain errors.

If you are willing to make a commitment to vastly improving your sound source with a Compact Digital Disc player, you should also go the short extra step that lets digital realize its true potential.

That step is a Carver Digital Time Lens, connected between your CD player and preamplifier. Visit your nearest Carver and ask for a demonstration of how we've "focused" digital playback into a crystal-clear image of the original performance.

Specifications. Input: 2 v, 50k ohms impedance. Output: 2 v. Distortion: 0.005%. Frequency Response: 20 Hz-20 khz. Dimensions: 17 3/8" wide, 4" deep, 1 1/2" high. Line Voltage: 120 VAC 60 HZ. Dither signal: 0dB, -70 dB adjustable.



THE MAGNETIC FIELD POWER AMPLIFIER

All our amplifiers and receivers utilize Bob Carver's proprietary technology, the CARVER Magnetic Field Power Amplifier.

Its innovative design ingeniously solves some of the most basic problems of conventional power amplifiers: high cost, great weight, and excessive heat generation.

The problem. The most basic audio problem has been and probably always will be how to turn electrical energy into physical waves of sound. In other words, your speakers.

Speakers use electricity to move air. No matter what kind of speakers you own or contemplate owning, they all have to achieve the same effect: Electrical energy has to cause movement of some physical "driver" such as a woofer cone, which in turn transfers that movement to the air in your listening room. A drum beat sounds on the record; energy flows to your speakers; the speakers push the air in some semblance of the original drum beat's impact.

The air doesn't want to move. The problem is, the air in your room doesn't particularly want to move sixty or eighty times a minute without considerable resistance. (Hold a record jacket perpendicular to your body and try swinging it to prove this.) In an effort to get your room air moving, speaker woofers often move up to half an inch, often against their own internal air resistance as well.

Moving air properly takes more energy than most amplifiers have. The plain fact is, few amplifiers have the beef to provide enough power. They achieve, say, 90% of a musical waveform. But just can't deliver that last 10%. If you look at a graph of this ever-present problem, you'll notice the top of the impulse has been clipped off. That's where the phrase *clipping* comes from.

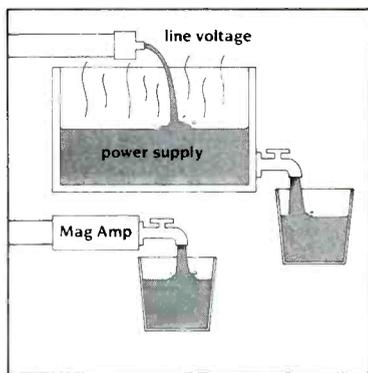
Clipping causes audible distortion. If an amplifier just sort of gave up when it couldn't complete a musical waveform, you'd just get less performance and weaker reactions from a speaker. But that's not how electronics work. Even though most clipping happens as the amplifier is trying to complete a *bass* waveform, destructive distortion is generated in the *treble* range!

Called clipping distortion, these impulses are literally "electronic squeals of pain" as the amplifier hits the bottom of its power reserves. They're touted through the speaker crossover into the tweeter and out to your ears. At moderate levels, they veil music with a thin film of distortion that occurs with every musical impulse.

At higher sound levels, they concentrate so much energy in the tweeter that it can burn out. This is why most of the speakers languishing in repair shops with crisped tweeters got there through the inability of a 20-40 watt amplifier to deliver enough power. Got that? Too little power burns out speakers. Not too much.

The conventional solution. Until Bob Carver came along, the only way to get enough power was to buy a traditional, brute-force power amplifier. Often weighing over 100 lbs., these designs store massive amounts of power against the instantaneous demands of music. They are very costly and inefficient because they produce a constant high-voltage level at all times—irrespective of the demands of the everchanging audio signal—even when there is no audio in the circuit at all!

Field Power Amplifier is to imagine an enormous cast iron tub containing several hundred gallons of water. That's a good analogy for a conventional amplifier's power supply. Huge capacitors and a gigantic power transformer soak up a load of electrical power and store it in a heavy, unwieldy storage tank.



Conventional amplifiers must store massive amounts of power in reserve. The Magnetic Field Amplifier draws directly from the source, eliminating bulky power supplies.

When power is needed, it is squirted into a bucket and the circuitry "refills" the sink during a lull.

This leads to LESS POWER during peak demands... and MORE wasted power during lulls.

Note that it takes an enormous "sink" to store a lot of water (amp power) against sudden demand. The more rated power an amp has, the grosser the power supply. Also noted the amount of power which is "evaporated" into heat when the amplifier is at rest.

The Carver Magnetic Field Solution. Now imagine, instead, a little valve on the water main line. When water is needed, the valve senses the

demand and opens, using the water line pressure to quickly shoot out a large quantity of water.

Note that this leads to ALL THE POWER YOU WANT during peak demands... and no need for any excess during lulls.

Also note that the WATER MAIN is doing the work of storing the excess, not a huge reservoir.

Enough said about water buckets. The "valve" we've described is our analogy for the Magnetic Field Coil inside each Carver amplifier.

Instead of converting a lot of power to heat during lulls, the Carver Magnetic Field Amplifier delivers power only WHEN NEEDED.

What's more, it uses line power and hence, the ACTUAL POWER GENERATOR to provide muscle.

This results in less heat, smaller components, lower cost AND less DISTORTION.

The Carver M-400t is the first amplifier to utilize this technological breakthrough. A 200 watt per channel amplifier in a seven-inch cube weighing less than ten pounds, the M-400t is powerful, accurate, and musical!

Rave Reviews. "Its distortion and noise levels are entirely negligible. It is hardly conceivable that a small, inexpensive, lightweight cube such as this could deliver as much clean power as any but a few of the largest conventional amplifiers on the market—but it does... An important new amplifier design." (Hirsch-Houck Labs in *Stereo Review*)

"Music reproduction was superb and completely free of any false bass coloration or muddiness. The amplifier handled the toughest transients we were able to feed it, with ease. It is, to put it mildly, quite an achievement and one that is likely to change the way many of us think of power amp design in the future." (Leonard Feldman in *Audio*)

Five powerful choices. Carver has utilized the basic technology of the Magnetic Field Power Amplifier in three additional power amplifiers: the Carver M-200t (120 watts/channel), the Carver M-500t (250 watts/channel) and the Carver M-1.5t, which provides 600 watts per channel long-time-period reserve power into 8 ohms, 750 watts per channel Dynamic Headroom! It is also built into our new receiver with 130 watts per channel into 8 ohms.

An expert's opinion. Of the Carver M-1.5t, Peter Aczel, Editor and Publisher of *The Audio Critic* has said, "... the equal of any power amplifier in transparency, focus and smoothness and, of course, far ahead of any other we tested in sheer gut-shaking power and dynamic range. We especially enjoy hearing spatial detail, instrumental definition and completely natural dynamics on familiar records to a degree we did not know was extractable from the grooves when we listened through lesser amplifiers. At this level of sonic performance, the astoundingly small size and cool operation of the M-1.5t become the icing on the cake, rather than the main attraction."

Necessary for conventional records; mandatory for digital discs. If you haven't heard the fantastic dynamic range of the new Digital Audio Discs, you're in for a wonderful surprise. If you have, you'll agree that the sheer sonic impact of this recording medium makes underpowered amplifiers not only inadequate, but potentially fatal to even the best speakers.

In fact, owner's manuals with many current Compact Digital Disc players specifically warn against the clipping problems which can be unleashed on unsuspecting speakers by the lightning-fast transients of digital recording.

On the following pages, you will find more specific information on each of Carver's Magnetic Field Amplifiers.

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OPERATION OF THE MAGNETIC FIELD AMPLIFIER

According to Bob Carver, President and founder of Carver Corp., there are two concepts associated with the Magnetic Field Amplifier that combine to give it its small size and weight. The first of these is the power supply which he calls a "magnetic field" power supply because energy storage is shared, to some extent, between the electric field that exists between the plates of the filter capacitors and the magnetic field that exists in the core of the magnetic field coil.

The magnetic field coil looks like a small transformer but its mode of operation differs from that of the conventional transformer. It has the ability to deliver extremely high power for power requirements that have a large crest factor, or high peak-to-average ratio, making it particularly suitable for musical signal applications.

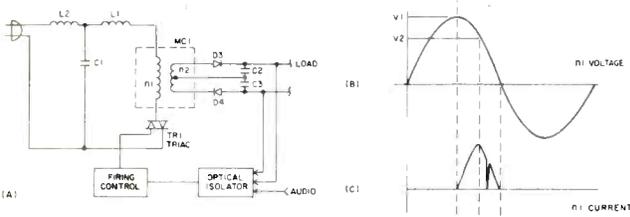
The second concept is that the output of the amplifier is, in reality, the output of the power supply being switched on and off at a rate directly related to the incoming audio frequency. The switching is done by a so-called "commutator"

which supplies an amplitude-modulated, step-like approximation of the audio signal to the output. This approximate waveform is then converted to a replica of the audio input by a small feedback linear amplifier. In effect, the small linear amplifier uses as its power supply rail the changing output of the commutator. Since the *instantaneous* voltage output of the commutator is very close to the instantaneous output of the power amplifier, the voltage drop across the output devices is small and the overall efficiency is high. This obviates the need for large heat sinks. Though more efficient than conventional amplifiers, the amplifier still requires cooling, and this is provided by the small chassis itself.

Theory of Operation of the Magnetic Field Coil

Referring to Figs. B1A, B1B and B1C, TR₁ is fired and turns on at time t₁. Current flows into MC₁ from time t₁ to time t₂. During this interval, current also flows in the secondary winding and charges C₂ and C₃ to voltage equal to V₂ times the winding ratio of MC₁. Since the output is clamped at ±80 volts by D₃ and D₄, C₂ and C₃, the difference between the reflected clamp voltage (V₂) is: V₂ = 80 (n₁/n₂). V₁ must appear, because of conservation of energy, somewhere. Ordinarily, the voltage drop (V₁ - V₂) would appear as IR losses in the primary. However, by winding a magnetic shunt into the

Fig. B1 — Theory of operation of Magnetic Field Coil.



magnetic field coil (similar to a ferro-resonant transformer), a deliberate and controlled leakage inductance L₁ is formed. This causes V₁-V₂ to appear across L₁ in the form:

$$(V_1 - V_2) = -L \frac{di}{dt}$$

The energy associated with that quantity is stored in the field of L₁. The amount of energy thus stored is 1/2 L₁ i², where i is the current flowing at time t₂. The amount of power that would otherwise be wasted is:

$$\text{Power} = \text{energy/time} = \frac{1/2 L_1 i^2}{t} = \frac{1/2 L_1 i_1^2}{(t_2 - t_1)}$$

At time t₂, the incoming 60-Hz line has fallen below the clamping voltage, hence D₃ and D₄ switch off. Once D₃ and D₄ are turned off, the tank circuit formed by L₁ (the leakage inductance) and C₁ (the commutating capacitor) begins to oscillate. However, since TR₁ commutates off as soon as its current passes through zero, only one half cycle of oscillation can take place. Once TR₁ has commutated off, the field surrounding L₁ begins to collapse. Since the flux linkages of L₁ are common with n₂, a flyback voltage appears on the secondary and causes D₃ and D₄ to switch on again, clamping the output to 80 volts. At time t₄ current is no longer maintained by L₁ since the stored energy has been transferred to the secondary of MC₁ and to the load. The same sequence of events takes place during the negative half of the input voltage cycle.

Commutator Details

A more detailed circuit diagram of the power supply, as shown in Fig. B2, reveals that the secondary of the magnetic field coil has multiple taps which drive three full-wave bridge rectifiers to form six different levels of supply voltage: ±25, ±50, and ±80 volts. A duty-cycle control circuit maintains these three voltage levels relatively constant, with some "softness" of regulation programmed into the system for good dynamic headroom of the amplifier. The output of

Fig B2—Detailed view of secondary taps of Magnetic Field Coil.

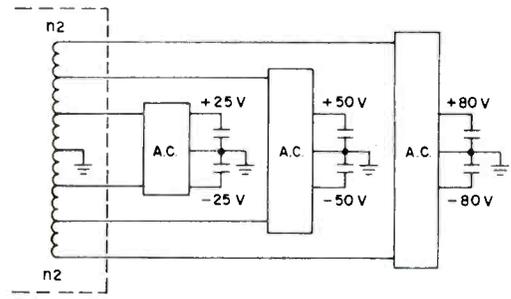
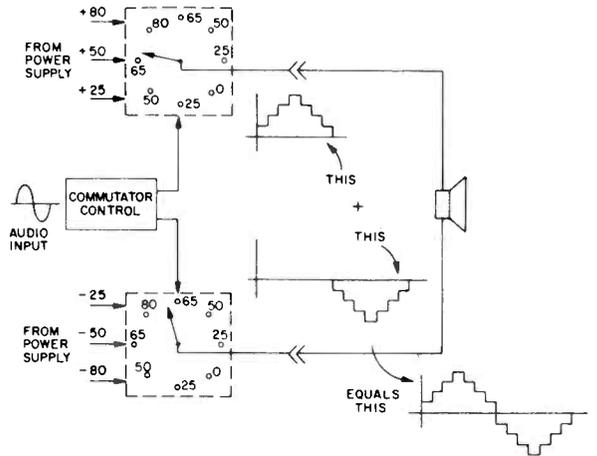


Fig. B3—Conceptual explanation of commutator action.



these six voltage levels goes to the input of the commutator. In concept, the commutator may be thought of as a rotary switch which is controlled by the input signal (or the output signal, since input and output are identical except for 30 dB of gain). The commutator delivers an output voltage that is a step-like approximation of the audio envelope, as illustrated in the diagram of Fig. B3.

The loudspeaker loads could be connected directly to the

Fig. B4 — "Filter" amplifier translates step waveform into replica of audio input.

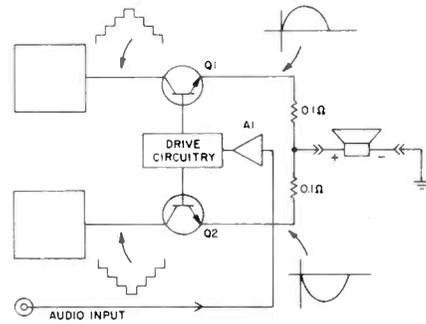
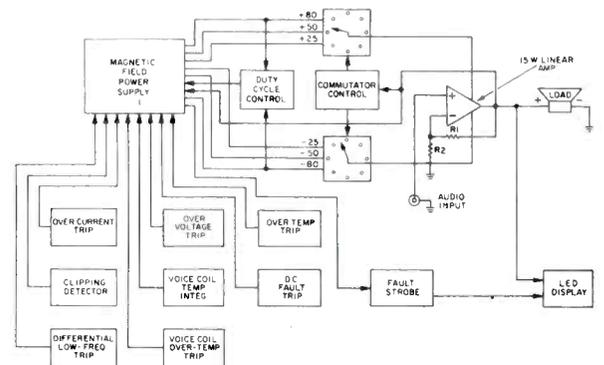


Fig. B5 — Block diagram of Carver Magnetic Field Amplifier.



outputs of the commutators as shown in Fig. B3, but such an approach would obviously result in highly distorted sound reproduction. Furthermore, for signal levels between 0 and 25 volts, there would either be zero output or 25 volts of d.c. at the speaker!

Consequently, the time-varying, conjugate-output voltages of the commutator go to a pair of complementary transistors, which may be thought of as a filter, to remove the steps, or as a small 15-watt amplifier whose B+ and B- supplies vary in level with the audio signal, as shown in Fig. 4. Note that this amplifier, composed of A₁, Q₁, Q₂ and associated drive circuitry is a linear amplifier, biased so that both Q₁ and Q₂ conduct simultaneously for small signals. A conceptually complete block diagram of the entire Magnetic Field Amplifier is shown in Fig. B5.

As indicated in Fig. B5, there is an assortment of protective circuits all designed to make the amplifier as fail-safe as possible. Carver also supplied us with details and descriptions of how some of these protection circuits work.

The Clipping Detector

This circuit senses the presence of high-frequency components that occur during clipping. It will allow some clipping to occur, but if too much occurs for too long (and at too high a frequency content), the circuit will shut down the amplifier for a while. The circuit, detailed in Fig. B6, has two inputs: The input audio signal and the output audio signal from the amplifier. So long as the output follows the input, the output of the differential amplifier, A₂, will be zero. If the output fails to follow the input because of clipping or overload, A₂ will have an output that is then differentiated by C₁R₁ and peak rectified by D₁C₂. This positive d.c. voltage is then time integrated by D₂C₃. The voltage appearing at C₃ represents the "stress history" imparted to the high-frequency driver during prolonged clipping. Too much clipping will cause the trip threshold to be exceeded, shutting off the supply.

Voice-Coil Temperature Integrator

Referring next to Fig. B7, this circuit represents a first-approximation analog of a high-fidelity loudspeaker's thermal properties. The audio output of the amplifier is rectified and filtered by D₁ and C₁. Average voltage on C₁ is related to the spectral energy distribution and to signal amplitude. C₂ charges through R₁. The voltage on C₂ represents, to a first approximation, the thermal stress history of the loudspeaker system, taken as a whole. The integral $\int V_i dt$, the volt-amp-time product, increases faster for high frequencies than for low frequencies. (Tweeters break down more easily than woofers, generally speaking.) The logarithmic junction of Q₁ is used to get the product of $v \times i$ (power) delivered to the speaker.

Over-Current Trip Circuit

If too much current flows in the 0.1-ohm resistors in the output circuit, transistor Q₁ in Fig. B8 turns on Q₂ which trips

the power supply. R₁C₁ serve as an integrating circuit (with an approximate time constant of 200 milliseconds) to prevent shut-down during very brief overloads.

Differential Low-Frequency Trip

Since the output of the left-channel amplifier is 180 degrees out of phase with the right channel (see Equipment Profile), in-phase signals at the input to the left and right channels will result in a small signal at T_{p1}. Out-of-phase signals, on the other hand, will produce a large signal at T_{p1}. Accordingly, the low-frequency response at T_{p1} is small for (L+R) signal components, and large for (L-R) signal components. Response for high-frequency signals is virtually zero for both (L+R) and (L-R) signals because of the bypassing effect of C₁.

A dropped tonearm, for example, will generate large (L-R) signals, whereas musical bass tones generate primarily (L+R) in-phase signals. Therefore, a low-frequency shutdown is arranged so that it will allow high-power, low-frequency musical signals to pass through, but will shut down for high-power, low-frequency faults.

Additional blocks shown in Fig. B5 but not fully described here are a d.c. fault trip, an over-temperature trip (a simple thermal switch on the chassis) and a circuit which is a voice-coil over-temperature trip, the details of which Mr. Carver asked me not to divulge.

Basic Shutdown Circuitry

While several fault types will cause circuit shutdown, the shutdown circuitry itself is illustrated in Fig. B9. When a "trip command" reaches amplifier A₁ (for whatever reason and from whatever fault detection circuit), its output goes high in voltage, turning on Q₁ and charging C₁. Q₂ turns on and discharges the power supply capacitors through R₁ and the LED that shines in the vicinity of the LDR. The R₂C₁ time constant determines the minimum amount of time that the power supply can remain in the shutdown state. Once the power supply capacitors discharge, the power supply will come on again. If one of the trip lines to A₁ is still high, the power supply will try to come on again but will turn off almost immediately (in about 20 milliseconds) after rising in voltage only slightly.

It should be clear from all of the above that the Carver Magnetic Field Amplifier is an extremely sophisticated piece of audio equipment that, despite its long gestation period, has left little to chance insofar as long-term reliability is concerned.

L.F.

Fig. B6 — Clipping detector circuit.

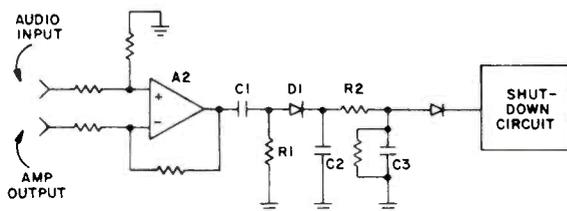


Fig. B7 — Voice-coil temperature integrating circuit.

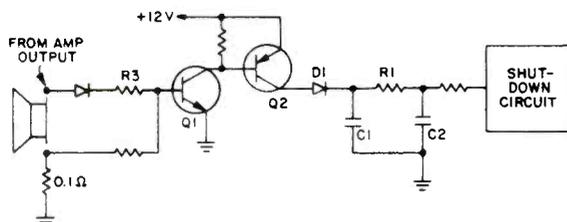


Fig. B8 — Overcurrent trip circuit.

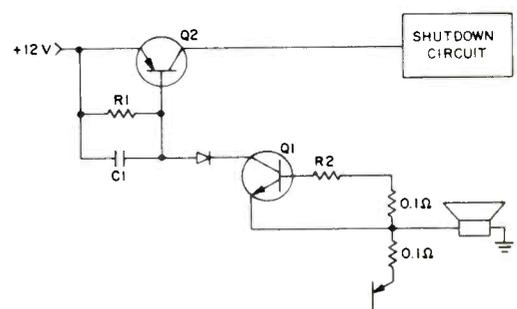
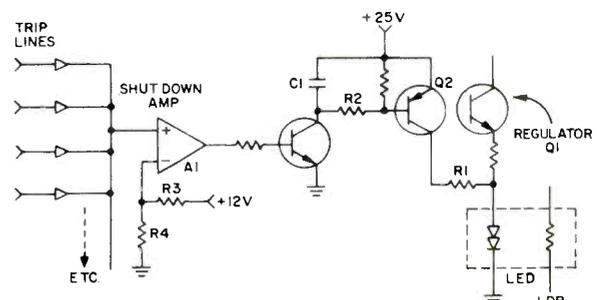
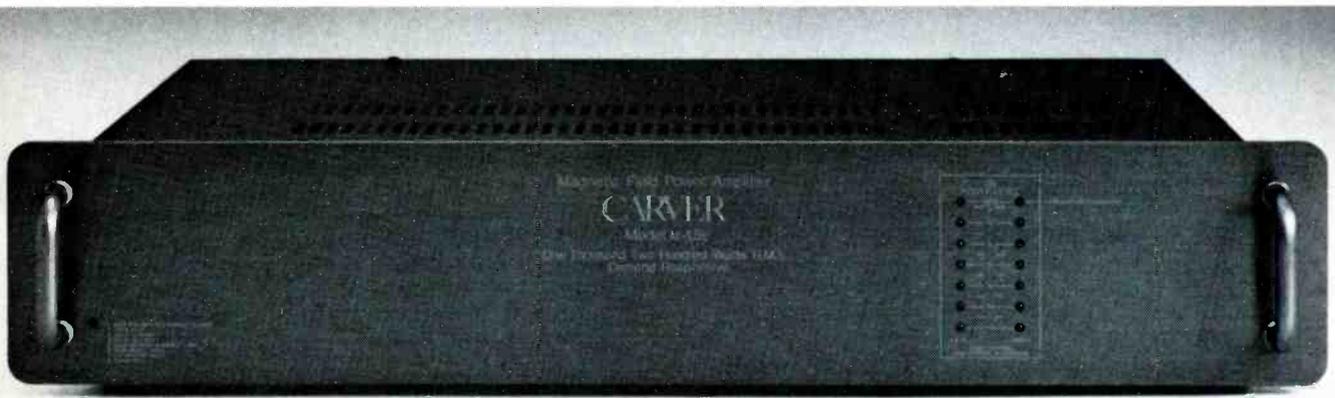


Fig. B9 — Shutdown circuit.



CARVER M-1.5t MAGNETIC FIELD POWER AMPLIFIER



Our M-1.5t description starts out with a story instead of the usual superlatives.

Once, Bob Carver visited a famous sound researcher who was attempting to recreate the "snip" of an ordinary pair of scissors. He used no less than TWENTY-FOUR 200-watt amplifiers for playback, yet when viewed on an oscilloscope it was apparent that the top of that instantaneous transient was being distorted. Believe it or not, he needed more power! It was evident that real-world sound occurs very quickly and requires far more power than ANY current amplifier could produce.

The M-1.5t is a culmination of Bob's search for Enough Power, the ultimate amplifier for the reproduction of music today and for years to come.

Why one thousand two hundred watts? Music is full of surprises such as explosive crescendos, combinant crests of demand created by multiple instrument sounds and the shock levels that some well-recorded instruments can instantly attain. This is what makes music live. These incredibly intense bursts of sound don't necessarily have to be loud. They are too short in duration. But, like the scissor snip, they are intense and demand power.

Recorded music sounds dull without these constantly-occurring, high-intensity peaks.

If your amplifier cannot provide the instantaneous power to surmount these rigorous musical punches when they are presented at its inputs, it makes a sound of its own devising, literally an electronic gagging we call clipping.

The result is an audible degradation which has pervaded your listening for years. A form of distortion which has been difficult to avoid until the M-1.5t arrived.

How can the M-1.5t weigh less than some preamps and yet pack more muscle than power amps weighing FIVE times as much?

The M-1.5t vs. convention. A traditional amplifier's power supply has only two chances during each AC line voltage cycle to recharge and store energy. To meet musical demands in between, it must maintain a reservoir of energy, which means that as conventional amplifiers grow more powerful, their transformers and supply capacitors must grow proportionately larger, too. The result is a vast increase in size, mass, heat and expense.

Light as a preamplifier, cool as a cucumber, the M-1.5t transforms almost *all* of the energy it draws into useable audio power with a patented power regulator. Engineered to be directly responsive to the moment-to-moment power requirements of your music, it is a direct "value" from the power circuits of your house with no need for inefficient intermediate storage. Your speakers are literally getting their energy from the power generator! This down with a patented Triac switch and Magnetic Field Coil which actually spend most of their time stepping UP the line voltage values and only deliver maximum line voltages at times of peak musical demand.

Rating the M-1.5t. The conservative 350 watt per channel rating on the back of the M-1.5t only hints at its true capabilities. When a musical note sounds each channel of the M-1.5t immediately puts out up to 600 watts, diminishing over several seconds to the rated 350 watts.

Several seconds is a long time in the life of a music waveform. Any peaks requiring anything like 600 watts will come and go in a few HUNDREDTHS of one second. Let the waveform subside for as little as 1/100 of a second and the amplifier resets itself, capable of providing the 600 watts per channel again. Because of the tremendous capacity of the M-1.5t's power supply, there has been no need to isolate the channels. Thus, when pressed hard, either channel is free to BORROW an additional 150 watts from the other for a total of 750 watts.

Brute power controlled. Implicit in this much power is a set of carefully designed speaker and amplifier protection circuits. Should you ever overload your amplifier, a unique clipping eliminator circuit pulls the 1.5t out of clipping.

Next we designed a set of total shut-off mechanisms into the 1.5t to protect against 1) temperatures above 70°C, 2) excessive out-of-phase infrasonic/low frequency signals, 3) excessive DC currents. Your speakers are protected from ungrounded line-level connectors, oscillation, and real-world accidents like shorted speaker wires.

The M-1.5t's final protection mechanism is very special. While good speakers have voice coil heat dissipation safeguards, the 1.5t also keeps track, actually averaging loudspeaker input and "remembering" for about three minutes backward in time. If it judges the amount

to exceed the safe limits for high quality loudspeaker woofer voice coils, it will momentarily interrupt power to cool them.

A window on power. Thirteen LED's on the 1.5t's face simply monitor power. The fourteenth signals headroom exhausted. (When it blinks at high levels, you know the special anti-clipping circuits are operating.)

The fifteenth LED is a diagnostical fault indicator. Along with first two LED's, and an internally-generated tone, it informs you of overload problems, routine protection shut down and other occurrences.

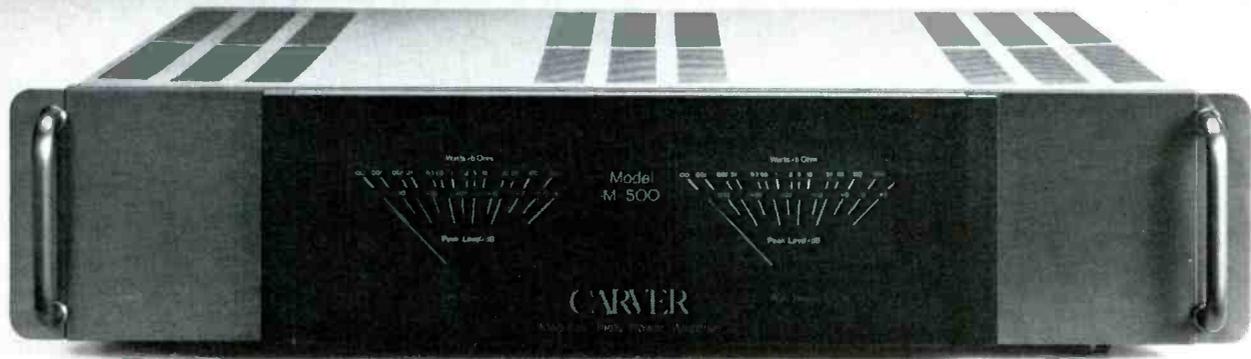
The music of power. Of the Carver M-1.5t, Peter Aczel, Editor and Publisher of *The Audio Critic* has said, "... the equal of any power amplifier in transparency, focus and smoothness and, of course, far ahead of any other we tested in sheer gut-shaking power and dynamic range. We especially enjoy hearing spatial detail, instrumental definition and completely natural dynamics on familiar records to a degree we did not know was extractable from the grooves when we listened through lesser amplifiers. At this level of sonic performance, the astoundingly small size and cool operation of the M-1.5t become the icing on the cake, rather than the main attraction."

Power for life. The Carver M-1.5t is all the amplifier your hi-fi system will ever need. If you like the final edge of reality in your playback, no matter what sound level you choose, the M-1.5t is your answer. Are you ready?

Specifications. Power, 350 watts/channel into 8 ohms 20 Hz-20k Hz with no more than 0.5% THD; Power at clipping continuous per channel, 550 watts at 4 ohms, 430 watts at eight ohms, 240 watts at sixteen ohms. Dynamic headroom (each channel) 750 watts at 4 ohms, 750 watts at eight ohms, 380 watts at sixteen ohms, 600 watts per channel long-time-period reserve power at 8 ohms.

Noise, > 100dB down, IHF-A weighted, Harmonically related commutation noise is equal to or less than nonlinear distortion components, IHF-A weighted; IM Distortion, 0.1% SMPTE; TIM Distortion, Unmeasurable; Frequency Bandwidth, + 0-3dB, 0Hzx-250K Hz at 1 watt; Slew Factor, greater than 100 (small signal bandwidth equal to large signal bandwidth), Display Tracking, + dB; Display Ballistics, Peak responding 100 millisecond attack, Input Impedance, 150K ohms, Infrasonic filter, - 3dB at 0.4 Hz; Ultrasonic filter, better than - 3dB at 80KHz (related to load impedance) 3 1/2"H, 19"W, 10 1/2"D. Wt. 16 lbs.

CARVER M-500t MAGNETIC FIELD POWER AMPLIFIER



Why you need more amplifier power. If you think two hundred and fifty watts a channel with peak reserves of up to 700 watts is overkill, read on. You'll change your mind. The reasons are logical and ultimately surprising.

Power is not loudness. Certainly to play music at high sound levels, speakers do require more power. But we're talking high fidelity, not sound reinforcement. Assume you don't intend to play your music any louder than you do now when you own a Carver M-500t... the improvement will still be audible.

LOW power kills speakers. NOT high power. A 40-watt receiver can actually burn out a speaker faster than the M-500t! Here's why.

To produce a bass note, a speaker can take up to 80% of an amp's power. If a speaker woofer to move faster or farther than your receiver can provide power for, the amplifier circuitry generates a high-frequency harmonic spike, a sort of electronic "cry of pain" which is routed directly to the tweeter either producing horrible distortion or eventual burn-out of the tweeter. Thus the tweeter (and your ears) are punished for the woofer's inability to get power from a weak amp.

Adequate power makes an audible difference. While the burned tweeter example is an extreme one, some audible clipping occurs virtually every time a low bass pulse sounds, even at moderate listening levels. The strike of a floor tom, beat of a tympani or snap of a Fender bass all can draw short peaks of over 500 watts per channel. When your modestly-powered amplifier can't handle it, there are audible consequences.

Prove it to yourself by auditioning good speakers with the Carver M-500t and any 100-watt unit (which is probably more power than you have now). It won't take a Golden Ear to hear the tight, crisp bass notes and the sudden absence of annoying high-end distortion you previously accepted as a normal part of music: The M-500t's power is freeing your entire signal chain from the tyranny of insufficient power!

And if the new digital PCM "laser disks" excite you, healthy power reserves are mandatory. Digital technology's tremendously expanded dynamic range taxes the best conventional amps and makes many more obsolete.

Why you'll want the Carver model M-500t Magnetic Field Power Amplifier.

If you're wisely sold on the electronic and sonic benefits of generous power resources, now we'll explain why you needn't invest in a massive "art welder" power amp to satisfy those needs.

While the M-500t is a bit larger than our remarkable M-400t cube amp, it weighs just 22 pounds. Less than some preamps!

No cooling fans vent its backside; no extruded fins protrude; the unit runs barely warm to the touch.

In contrast, conventional amps continually court meltdown by converting up to 60% of their energy into heat. The M-500t transforms fully 80% of its energy into useable audio energy. Thanks to a more advanced, more elegant and more practical approach to the design of power supply sections. Gone are the coffee-can sized capacitors, massive power transformers and gigantic heatsinks found in old-style high-power amps costing thousands of dollars.

In their place is a patented, compact Magnetic Field coil which stores and controls

energy, eliminating all need for heavy, costly parts required by the very best traditional designs.

Instead of two mono amps with dual transformers, capacitors, etc., each channel of the M-500t can actually BORROW unused power from the other channel during peak loads. Indeed, the M-500t can be operated as a 600-watt mono amp without any special switching!

Conventional amplifier are crude next to the M-500t's micro-computer monitor system. Instead of controlling input stages, causing delays and distortion, the M-500t's computer acts as a FINAL gate, just before the speaker terminals, for instant overload protection. Thus sonic perfection stands no risk of being marred even while fully protecting your valuable loudspeakers against potential damage.

Dual, lighted, precision Vu-ballistic meters provide a musically accurate picture of power output, averaging yet react instantaneously to important transients.

We made sure the M-500t has a completely neutral signal path transparent in sonic character, resulting in zero listener fatigue. First compare the power, musicality and accuracy of the M-500t to any traditional amplifier made.

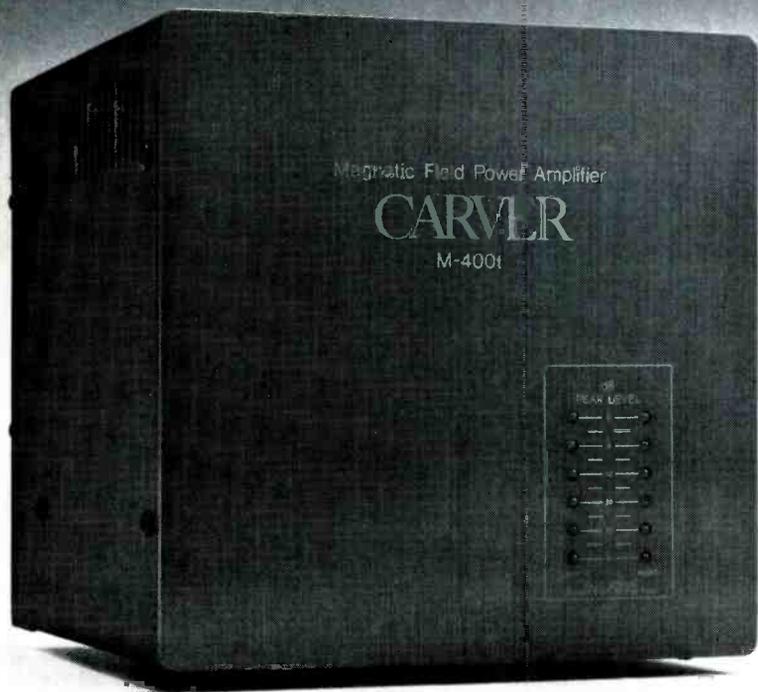
You'll be impressed by the superb, colorless sound of the cool, unruffled, light-heavy-weight M-500t.

Next compare price tags and discover what designing away all that scrap metal does to the watts-per-dollar price of a Carver Magnetic Field Amplifier.

Specifications. Power, 251 watts/channel into 8 ohms 20Hz-20K Hz with no more than .15% THD; Power at Clipping, 270 watts/channel into 8 ohms at 1K Hz, 350 watts into 4 ohms at 1K Hz, 700 watts RMS into 8 ohms single channel; Noise, < 100dB down, IHF-A weighted. Harmonically related commutation noise is equal to or less than non linear distortion components, IHF-A weighted; IM Distortion, 0.15% SMPTE; TIM Distortion; Unmeasurable; Frequency Bandwidth, + 0-3dB, 1Hz-100K Hz at 1 watt; Slew Factor, > 200; Display Tracking, \pm 1dB; Display Ballistics, Peak responding 1 millisecond attack, 1 second delay; Input Impedance, 15K ohms

ALL SPECIFICATIONS OR FUNCTIONS SUBJECT TO CHANGE WITHOUT NOTICE.

CARVER M-400t MAGNETIC FIELD POWER AMPLIFIER



Why 201 watts per channel? Does the remarkable Carver M-400t put out more power than you ever considered necessary for accurate music reproduction at normal listening levels? The surprising fact is, you need every watt of the power provided by this remarkable little ten-pound cube. Here's why.

Music is full of surprises such as quick transients, combinant crests of demand created by multiple music waveforms and the explosive levels that some well-recorded instruments can instantly attain. We hear all this in live music; indeed, this is what makes music live. But we don't hear these incredibly intense bursts of sound as being loud—they are too short in duration—just *live!*

Nonetheless these lightning-fast, high-intensity peaks **MUST** be reproduced to make recorded music feel real.

And that's up to the power amplifier. If the amplifier cannot provide the instantaneous power to surmount these rigorous musical peaks, it makes a sound of its own devising, literally an electronic squeal of anguish. It may be an inoffensive "click" at low levels, a sound you've come to accept as part of the music—or it may be an annoying "snap" which we call clipping, an ominous sign the amplifier's reserves are being drained with each waveform.

That sound is proof of the audible degradation of your system sound when adequate power is lacking. Prove it exists, compare the M-400t and any lower-powered amplifier with the same signal chain and speakers. One sounds crisp and fresh. The other vaguely muddled, even at low volumes.

Manufacturers of underpowered electronics have helped foster several myths we'd like to address after you've convinced your ears that 201 watts/channel is musically refreshing.

MYTH 1. Power means loudness. The point of more power is to have much of it in *reserve*, not to blast the neighbors. We don't intend you to play your music any louder than you did when you under-powered your system without an M-400t.

MYTH 2. High power kills speakers. Actually, **LOW** power destroys many more speakers. Yes, illogical as it may seem, the lowly 40-watt receiver can "kill" a speaker far faster than the M-400t!

When an amplifier can't put out what a speaker demands, it sends a nasty spike of high frequency sound out to the speaker, which is routed to the easily-to-burn-out tweeter. Which often does. The less power your system has, the more chance there is these clippings spikes will occur when you play music with lots of bass, digital disks or turn up rock music loud.

MYTH 3. High power means heat and weight. The M-400t weighs less than most pre-amps and yet packs more muscle than power amps weighing five times as much? How?

After all, no cooling fans vent it, no extruded fins protrude and the unit runs barely warm to the touch!

The M-400t vs. convention. In a traditional amplifier, the power supply only has two chances during each AC line voltage cycle to recharge and store power. To meet musical demands in between it must maintain a reservoir of power.

This means that as conventional amplifiers grow more powerful, their transformers and supply capacitors must grow proportionately larger and court meltdown by converting up to 60% of their energy into heat.

The M-400t transforms fully 80% of its energy intake into useable audio energy with a patented power supply engineered to be directly responsive to the moment-to-moment

power requirements of your music.

This is no simple feat, however, and requires a special Triac commutator and Magnetic Field Coil which actually spend most of their time stepping UP line voltage values and are only called upon to handle maximum line voltages at times of maximum demand.

Sophisticated protection for your system. The M-400t dutifully responds to musical input and will transmit those demands to your speakers... which will get quite a work-out. To prevent damage, the M-400t has an elaborate logic-controlled protection system, and to prevent clipping and over driving, the system simply shuts down output for several seconds before resumption, testing output demand before continuing. Should the problem be a short or other massive malfunction, no damage can occur.

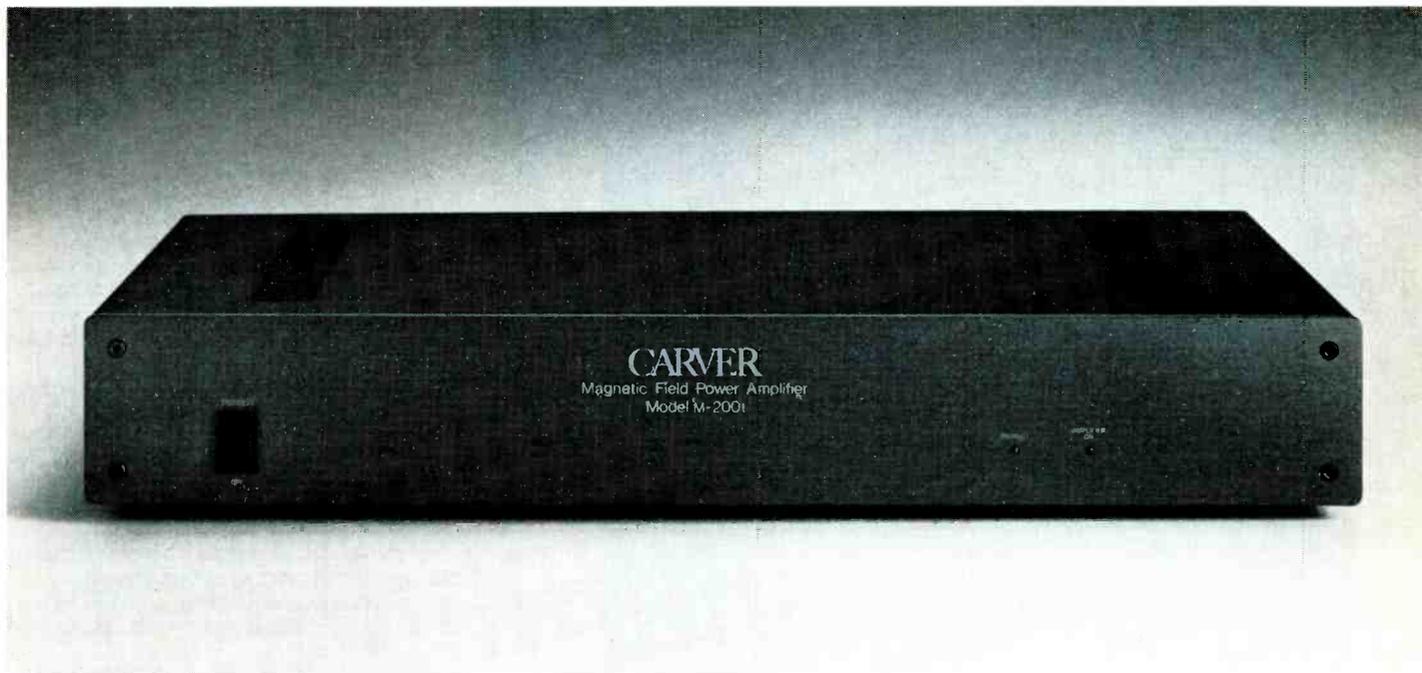
Physically the M-400t is simplicity itself. Only a matched set of power LED's accent its front. Volume is controlled by the input signal eliminating the need for gain controls.

The M-400's back utilities are spare and to-the-point: speaker terminals and input sockets.

The most important test. Hardware, buzzwords and specmanship aside, your final decision should be made by the sound of an amplifier. Compare the Carver M-400t to any 200-250 watt/channel conventional power amplifier around. Class A, B, H, G, Z, Q or otherwise. The class that stands out will be the superb colorless sound of the cool, unruffled, light-heavyweight M-400t. Powerful. Musical. Accurate and, above all, affordable.

Specifications. Power, 201 watts/channel into 8 ohms, 20Hz-20K Hz with no more than .5% THD; Power at Clipping 250 watts/channel into 8 ohms at 1K Hz, 300 watts into 4 ohms at 1K Hz, 500 watts RMS into 8 ohms single channel strapped for mono. Noise, 100dB down. IHF-A weighted. Harmonically related commutation noise is equal to or less than non linear distortion components. IHF-A weighted. IM Distortion, 0.05% SMPTE; TIM Distortion, Unmeasurable; Frequency Bandwidth, + 0-3dB, 1Hz-100K Hz at 1 watt; Slew Factor, 200; Display Tracking, \pm 1dB; Display Ballistics, Peak responding 5 millisecond attack, 1 second decay; Input Impedance, 30K ohms. Size: 6 3/4" cube; wt. 9 lb.

M-200t MAGNETIC FIELD POWER AMPLIFIER



Bob Carver's smallest amp is more powerful than most company's largest amps!

The reasons you may not have even considered this much power—and the reasons Carver considers this the "bare minimum" are two sides of the issue: musical clarity and accuracy.

Why do you need the 200t? To surmount the physical problems of sound reproduction which plague all systems at all listening levels.

Even at modest listening levels, your speakers are making peak power demands which cannot be fulfilled with a less powerful amplifier. Sharp percussion beats, a rolling bass line, a clamor of brass as a Wagnerian tenor enters from stage left, the sinuous synthesizer pulses of a Michael Jackson song. Your amp or receiver *almost* delivers enough power, but somewhere just before the sound pulse is finally formed, it gives out and sends a sort of electronic "note of regret," called *clipping*. This sharp high-end distortion veils the sound slightly, undoing all the accuracy of recording, cartridge and electronics as well as speakers.

At moderate listening levels, you may not have noticed it. The world of underpowered TVs, car radios, and portable sound sources has made us used to the frosting of minute clipping distortions which occur thousands of times a minute. Yet when you sonically compare the 200t to more modest amplifiers in straight A/B comparisons, you'll INSTANTLY notice the improvement which adequate power makes.

This simple demonstration at your Carver dealer should dispel the commonly-held belief that power is only necessary for loudness. A demonstration of the new digital Compact Disc players will leave you totally convinced that adequate power is not just a luxury but a virtual necessity!

That's because the digital recording process will completely overturn your idea of "loudness." The narrow dynamics of your conventional record library have always meant that if you chose to listen to a disc at moderate levels, the whole record would remain at that

level. Compact Discs hold surprises with every passage. The quiet parts are quiet. But the parts that were intended to be louder are REALLY louder. Instantly and spectacularly louder the way they are in a live concert hall. Tympani explode with impact. Cymbals crash. Rock and disco hammer you with exciting live presence.

All of which immediately taxes your system beyond anything it had experienced before. The veil of clipping distortion suddenly becomes an obviously audible factor: jarring, jangling, and potentially destructive to your speakers.

The simple answer is to add the 200t with its remarkable amplifier and speaker protection circuitry. A simple proposition even if you want to keep your existing receiver or integrated amplifier.*

The Magnetic Field design represents the ability to deliver power with absolute clarity, in a cool running package 1/3 the size of the technological dinosaurs of the past.

The M-200t delivers power in a variety of ways not previously possible: First, its basic ability is to produce 120W RMS per channel into 8/ohms. For special applications, both channels can be used as one without special wiring to deliver an earthshaking 350 watts in mono!

Another innovative benefit of the M-200t is its sensitivity to your particular speakers. At all times the amplifier monitors conditions that could damage your speakers, allowing them to cool off if they begin to show signs of overuse.

These safety circuits afford you new listening freedom because you don't have to be afraid to unchain the power of the 200t. Whether you're spinning an old Grateful Dead record or a state-of-the-art Compact Digital Disc of the Cleveland Symphony, you can play it at the volume you want without compromising sound quality or your speakers.

The spaciousness, sonic impact and sheer musicality will make your existing speakers and signal chain seem better than brand new.

If you're interested in significantly upgrading your system for a minimum outlay of money and a maximum amount of immediately noticeable sound improvement, consider all the benefits Magnetic Field Technology can offer.

When you audition a Carver M-200t, you will find it to be sonically superior to any conventional amplifier on the market and far superior in dependability.

Specifications. Power Output: 120W rms per channel into 8 ohms from 20 Hz to 20kHz with no more than 0.15% total harmonic distortion. Power at Clipping: 130W rms per channel into 8 ohms at 1 kHz; 200W rms per channel into 4 ohms at 1 kHz; 350W mono bridged into 8 ohms at 1 kHz. Noise: Greater than 100 dB down, IHF A-weighted. Harmonically related commutation noise is equal to or less than nonlinear distortion component, IHF A-weighted. Intermodulation Distortion: 0.15% SMPTE (Maximum). Transient Intermodulation Distortion: Less than .001%. Frequency Bandwidth: -3 to +0 dB from 1 Hz to 80 kHz at 1W. Power Requirements: 120V, 60 Hz; 240 V, 50 Hz (optional). Power Consumption: 500W. Dimensions: 2.55"/17.32"/9.20" (h/w/d). Weight: 10.25 lbs. Optional Accessory: 19" Appearance Panel.

MC-t MIRROR-IMAGE GEOMETRY



The Carver MC-t performs as well as esoteric transformers costing hundreds of dollars, making the potential of moving coil cartridges affordable for all music lovers.

Moving coil cartridges aren't a fad.

They've been around long enough so that many believe they offer significant improvements in the way record grooves are transduced into electrical energy. At their best, moving coil cartridges give the ear a feeling of fine-grained delicacy, of sheerness, transparency and effortlessness not found with even the best moving magnet cartridges. They have been likened to the difference between a fine silk scarf and a heavy woolen muffler, or a crisp champagne vs. a heavy-bodied vintage port.

A conventional moving magnet cartridge might be likened to a "tail wagging a dog": Each minute movement of the stylus causes a group of magnets to move on the other end of a cantilever. The fluctuations in magnetic field are picked up by coils positioned around the magnets. Magnets—even the very tiny ones in a cartridge—present considerable mass when asked to gyrate up to 20,000 times a second. This can lead to distortion when tracking a complex record groove.

Moving coil cartridges turn the tables, putting the heavy magnets *around* a lightweight coil at the end of the cantilever. The dog is now wagging the tail, so to speak, resulting in quicker response to the movement of the stylus. Unfortunately, *far less* energy is generated by waving a coil around in a magnetic field than by waving the magnets around a coil of wire. In short, moving coil cartridges have very weak outputs.

Some sort of pre-preamplifier is needed to get their output up to line level.

Active versus passive amplification.

Some preamplifiers (our own C-1 and C-2, for example) include electronic circuitry to perform the step-up to higher voltages. Unfortunately, even the finest active circuit cannot match a passive transformer for sheer quiet and ultimate signal to noise ratio.

Such transformers are truly passive devices. That is, they are simply two interwoven coils of wire without any power source or other components. They are as noise-free as the metal they're composed of. A signal enters the smaller of the coils and creates a magnetic flux which is picked up by a larger coil and hence "amplified" to line voltage. Pure simplicity.

Passive transformers may be simple

but they're not cheap. Until Bob Carver approached the problem, moving coil transformers cost as much as \$500. Handmade and often composed of exotic metals, they pro-

vided performance for a price too dear for many consumers. Less expensive transformers often exhibited ringing, phase shift and low frequency distortion.

Here, as with many other "esoteric" areas of audio, Carver has combined quality and affordability in a single product.

Dual, mirror-image transformers share a shielded space. The heart(s) of the MC-T are two totally separate transformers. One for the right channel and one for the left, sharing a specially-designed geometric space which eliminates interaction. Each of the four coils is wound with the finest, low-oxygen wire in a proprietary configuration. Distortion and ringing are non-existent. Signals which enter and exit the MC-t differ only in their strength, not in their quality.

But we didn't stop with the coil configuration. A critical concern is shielding, since any sensitive coil of wire acts as a sophisticated

antenna, collecting external signals ranging from radio transmissions and hair dryers to the very patch cords and speaker wire in your system!

To combat this interference, the MC-T is housed in a seamless, grain-metal case, which in turn is shielded by grain oriented silicon steel, based on designs used in high-performance defense and space guidance systems. The internal transformers operate in total isolation from the electronically-noisy outside world.

Music to your ears and your pocket-book. In conjunction with a good moving coil cartridge and the right playback equipment, the MC-T will lift the final veil obscuring musical reality.

Massed instruments and voices resolve into individual yet interwoven points of sound. The intricacies of harmonics, overtones and ambience spring sharply into focus. Harshness melts into musical piquancy. Storm clouds of muddy bass emerge as lofty peaks of tight, well-defined fundamentals. The very bouquet of a recording rises to fill your listening room.

Tall promises? Visit your Carver dealer and audition a good moving coil against the moving magnet cartridge you're using now. Then compare any other method of MC amplification with the remarkable MC-T Mirror-Image Geometry Moving Coil Transformer.

We guarantee you'll leave a believer in what the MC-T can do for the sound of your favorite music.

Specifications. Dimensions: 6" wide, 2" high, 3" deep. Weight, 1 lb. 11 oz. Gain: 24 dB. Signal-to-noise ratio: greater than 100 dB IHF A-weighted. Impedance: 3.9ohms, 39ohms, 110 ohms. Frequency response: -3dB at 3Hz and 80 kHz

CARVER Z-1 WIDE BAND Z COUPLER



While CARVER Magnetic Field Power Amplifiers are usually found in systems which are controlled by a preamplifier, a growing number of serious audiophiles with modest budgets utilize a Magnetic Field Power Amplifier (connected through a CARVER Z-1 Wide Band Z Coupler) with low-power receivers or integrated amplifiers.

The CARVER Model Z-1 Wide Band Z Coupler is an impedance matching device which enables a receiver or integrated amplifier to be used with CARVER Magnetic Field Power Amplifiers.

Many low-powered receivers and integrated amplifiers have excellent phono stages

and line amplifiers. However, their power amplifier sections, in addition to being under-powered, are frequently incapable of even mediocre performance with many loudspeaker loads.

The Z-1 presents an optimum noninductive load to the power amplifier in the low-power receiver or integrated amplifier. When coupled with the Z-1, the outputs of the receiver or integrated amp are used to drive the CARVER Magnetic Field Power Amplifier. The result is awesome sonic performance from a relatively inexpensive system.

Dimensions: 2" x 2" x 2 3/4"

CARVER C-4000 HIGH FIDELITY CONTROL CONSOLE SH

Under all those buttons and knobs is, first and foremost, one of the finest audio pre-amplifiers in the world. Although the C-4000 can combine up to five separate functions to recreate the vivid reality of live sound, its primary role is that of a fine "straightwire" pre-amplifier dedicated to perfectly amplifying real-world musical signals without a trace of distortion.

Its phono stage lets you match virtually any cartridge to the ultra-sensitive phono pre-amp stage where infinitesimal impulses from your cartridge are translated into line level voltage. Not only does the C-4000 allow capacitance matching between itself and the cartridge/cable load, it eliminates a main source of noise and distortion in the bargain.

As the signal passes through successive stages it retains fidelity to the point where one watt of real-world output results in just 0.000000251 watts of distortion. Zero normalized phase shift. Zero group delay. Noise performance within 1dB of the theoretical limit of real-world cartridges. No slew limiting. No overload.

A superb range of controls. There are separated tone controls for each channel, plus a choice of turnover frequencies and a defeat for instant comparison. A 12dB/octave infrasonic filter helps eliminate speaker cone flutter and distortion caused by warped records, acoustic feedback, and tonearm resonance along with a discrete headphone amplifier, a speaker mute switch allows you to cut sound momentarily without changing master volume control setting. A stereo-mono switch instantly checks for cartridge and speaker phasing errors. You can dub between two tape decks interchangeably. Additional external processors may be added at any time and switched from the front panel. And of course ALL sound processing circuitry is instantly defeatable for comparison and for the pursuit of eternal flatness, may it exist in all our hearts and longings.

Yet we think there is more to reality than flatness...

Consider the nature of music. Music arrives at our ears in-phase, alive with all nuances of the reverberant room, the crisp dynamics of instruments, the position, sound quality and even natural spectral frequency responses all vivaciously present. It was this challenge of reproducing reality which set Bob Carver to creating the complete C-4000.

The achievement of Sonic Holography. Consider each sonic event of a musical performance. For example, when a drum strikes a note in front of you, each ear receives a sound arrival which tells it just where that drum is in space: one sound source; two sound arrivals. A pair of speakers attempt to deceive your ear with two sound arrivals just like in real life. But then each ear gets another sound arrival from the opposite speaker. Two sound sources; four sound arrivals. Confusion.

Sonic Holography generates yet another set of signals which *exactly cancel* the spurious second set of sound arrivals. Your ear again hears true sound with two sound arrivals.

Sound suddenly bursts forth wider than your speakers. Higher (and lower) than your speakers. Closer and farther back—even to the sides of you. Instead of a tiny window, the image of sound is a giant panorama, freeing you from the room's dimensions.



Example: "Time" from Dark Side of the Moon by Pink Floyd. Each clock is individually discernible. Did you know that they were set up in rows?

Example: Suite in F by Holst. You can discern the position of the first and second trumpet sections and even the three saxophones. The tuba's valve sounds are discernible *below* the sound emanating from his bell!

Example: Your favorite music, no matter what your tastes.

Restoring the hall: Time Delay. Along with the sound field in front of us, we must consider the total listening environment including reflected sounds received from behind us. These place us within the listening environment, giving depth and dimension, immersing your body in sound.

The C-4000 time delay system is designed to re-create this larger feeling of acoustic space with a special processing circuit and two built-in auxiliary amplifiers. This requires just two inexpensive speakers which may be unobtrusively placed behind the listener. Adjustments allow you to control the "size" of the environment you wish to simulate: a line level output is provided should more than fifteen watts per channel be desired.

Putting the punch back in: The Peak Unlimiter Circuit. Recording tape simply cannot capture extreme loud and soft passages of music. Quiet sounds founder in tape hiss; loud passages saturate and distort the tape. Recording engineers compensate with electronic devices that "limit" loud sections and boost or "compress" soft sections, resulting in a dynamically neutered sound effect: lacking the delicate pianissimos and thundering *forte's* of live music. The C-4000's Peak Unlimiter circuit automatically senses when the dynamics have been "squashed" and restores their punch, quickly and without distortion.

Eliminating the noise: The Autocorrelator Noise Reduction System. Tape, record vinyl and even your electronics inevitably adds hiss to music. Eliminating this final veil between you and reality is achieved by a spe-

cial circuit which discriminates between random noise and musical information, stripping hiss from 2kHz to 20kHz. Non-random, low frequency noise such as hum and rumble are removed by a level-sensitive dynamic filter that operates below 200Hz. Music emerges from an almost silent background.

The Carver C-4000 as an instrument. With SONIC HOLOGRAPHY, Time Delay, Auto correlator and Peak Unlimiter features, the Carver C-4000. The C-4000 opens up the opportunity for truly realistic sound reproduction. And you are in control.

Specifications. Phono stages. Frequency response: within + 0.25dB extended RIAA. Phono 1: moving magnet. Phono 2: moving coil. Frequency response: 20-Hz to 20 kHz \pm 0.25dB. 1.5Hz to 60k Hz + 0. -3dB S/N ratio (IHF "A"): 86dB re 0.5V. Distortion: THD 0.05% at rated output. Typically 0.003%. SMPTE IM 0.05% at rated output. Typically 0.003%. T.I.M. unmeasurable. Infrasonic Filter. -3dB at 15Hz. 12dB/octave. -22dB at 5Hz. Autocorrelation. High-frequency noise reduction. -3dB at 1.5k Hz, reaching -8dB at 2.5 k Hz, extending to 20k Hz. Low-frequency noise reduction -3dB at 200Hz reaching -10dB at 100Hz extending to 20Hz. Peak Unlimiter. Total dynamic range recovery approximately 5.5dB. Sonic Hologram Generator. Image resolution: better than 5° arc in the vertical plane (Holographic Injection Ratio set to Theoretical). Time Delay. Delay: 15 or 25 ms, switch selectable. Echo recirculation: variable from 0 to 100%. Distortion: less than 0.25%. Dimensions 19 x 6 1/4 x 8 1/2". Weight: 11 lbs. (5 kg)

- Precision, gold band, laser trimmed resistors
- 24K gold contacts on all mating surfaces insure perfect signal transfer.
- G-10 glass/epoxy circuit boards insure electrical stability year after year after year.
- Precision machined (not stamped) metal parts.
- Sealed, lubricated switches eliminate noisy switches over the lifetime of the instrument.
- High clamping pressure, hot molded external connectors with dual wipers insure absolute electrical contact.

CARVER C-1 SONIC HOLOGRAPHY PREAMPLIFIER



The C-1 as one of the world's best pre-amplifiers. Forget for a moment the miracle of Sonic Holography.

Concentrate on one of the best pre-amplifiers on the market today. And one of the best *pre*-pre-amplifiers.

Accurately amplifying the infinitesimal output of a moving magnetic photo cartridge (with its varying impedance and capacitance), while matching the theoretical RIAA equalization curve built into every master disc, is the true determiner of a preamplifier's "sound."

We start with two separate extended-curve phono stages utilizing the quietest multiple emitter transistors in the world. The result is zero cartridge interaction. Zero normalized phase shift. Zero group delay. And noise performance within one dB of the theoretical limit of real-world cartridges.

No slew limiting. No overload. Unmeasurably low TIM distortion. In fact, its output can drive virtually any load. No matter how resistive; no matter how capacitive.

Many esoteric preamplifiers would stop here, making a name for themselves just on the elaborate technology we have incorporated into the C-1's phono stage, pre-pre-amplifier.

Next, we paid such close attention to following stages by designing out group and phase delay that the C-1 can drive real-world loads with an input to output null in excess of 86dB.

That means a watt of output signal tracks the input signal with such astonishing precision that just 0.000000251% of the output signal is imperfect, a level absurdly lower than the molecular level of your eardrum.

Included is a precision, infrasonic filter circuit to cut power robbing, destructive cone flutter caused by warped records, floor vibrations, direct drive turntable resonances and acoustic feedback from high listening levels. They result in visible cone flopping, waste of amplifier power, and obvious distortion. Careful research has shown that 12dB/octave allows maximum elimination of subsonics without inducing the loudspeaker group delay possible

with 18dB/octave circuits.

Next we added a set of variable turnover tone equalization controls, allowing general room and speaker adjustment. By providing a way of varying the mid-point of both bass and treble controls, you can change the "shade" as well as the intensity of tone control. If you prefer you can switch out the eq control section at any time for in stand sound comparison.

A good preamplifier should also be the total nerve center of your stereo component system. So we were careful to include five important switching features besides source selection.

Not only can you operate two tape decks through the C-1, you can dub from one to the other without reconnection.

A special external processor loop allows you to add outboard devices without engaging a tape monitor circuit. A stereo/mono switch lets you check speaker and signal source phasing.

Finally, instead of simply providing a powered headphone outlet which cuts out speakers when you plug in, we designed a speaker defeat switch which lets you select speakers, headphones or both.

Put quite simply, the specifications, features and performance of the C-1 preamplifier up to this point should place it in the \$1000 to \$3000 price range.

The C-1 is your gateway to sonic holography.

While the best you can claim from good stereo is that it "images between the speakers," Sonic Holography expands that postcard of sound into a magnificent cycloramic mural.

Wider than your speakers. Higher than your speakers.

Extending around you, closer than, yet many feet deeper than your speakers. A true three-dimensional stage.

The difference between a porthole and picture window.

How does Sonic Holography work? Snap your finger a few feet from your right ear. That single "sonic event" resulted in two "sound arrivals." One to your right ear and one at your

left ear. Now while ALL sound events in real life result in two sound arrivals, conventional stereo bombards the ear with FOUR sound arrivals: giving you a muddled and completely different set of cues than your ear-brain system has learned to process over a millenia of evolutionary adaptation.

Bob Carver's special circuitry analyzes these spurious signals and sends out another set which exactly cancel the second, confusing set. The result is your ears get just one pair of sound arrivals and think they're actually witnessing the sound event!

High Fidelity magazine said it "seems to open a curtain and reveal a deployment of musical forces extending behind, between and beyond the speakers."

Julian Hirsch of Hirsch-Houck Labs noted, "... the effect strains credibility."

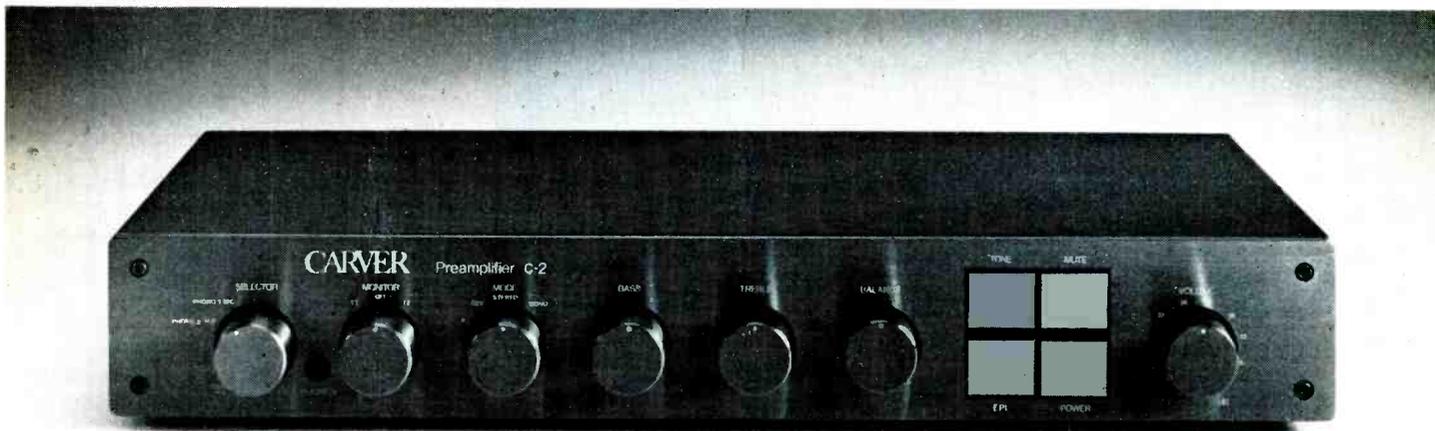
All with two ordinary stereo speakers and the C-1's Sonic Hologram section.

Quite frankly, while Sonic Holography works with virtually any speaker system, it requires precise attention to initial speaker placement. This initial set-up is made easier by detailed, lucid instructions and rewards the listener with a quantum leap in sound reality, whether you fancy Lizst or Def Leppard.

No matter what your listening tastes, the C-1 represents the ultimate combination of sheer musicality and superb value in one fine electronic instrument.

Specifications. Phono Inputs, RIAA \pm 0.25dB "extended" RIAA curve, overload 110mV at 1k Hz; High Level Inputs, Freq. resp. 5Hz-200 kHz + 1-3dB, Infrasonic filter, Tone, Hologram OUT; Infrasonic Filter, 12dB/octave below 20Hz, $f_3 = 15$ Hz; Noise, Phono 1.82dB, IHF-A, High Level, 96dBv, IHF-A, below 1Vrms, Hologram, 92dBv, IHF-A, below 1Vrms, Hologram, 92dBv, IHF-A; Distortion (worst case) THD, 0.05% or less, below 3 Vrms out, (typical case, see text paragraph 5), IM (CCIR or SMPTE), 0.04% or less, TIM, unmeasurable; Sonic Hologram, Image Resolution, 5° horizontal, 20° vertical in Theoretical Mode; Dimensions 19 x 3.5 x 10"; Weight, 61b, (2.7 kg).

CARVER C-2 STEREO PREAMPLIFIER



The C-2 preamplifier joins a tradition of excellence. Imagine a sound system in your home utilizing your favorite turntable with either a moving coil or moving magnet phono cartridge being taped by your cassette deck and reel to reel.

Now imagine taping from one tape desk to another with the ease of just one click. Then, when you wish to move on to new dimensions, switch to either your digital disc player, your tuner or an extra signal processor at will.

All this flexibility is offered by the C-2 with one overriding prime directive: To reproduce your music with absolute sonic purity. This is made possible with the use of the finest quality electronic components, mounted on the highest quality, glass-epoxy circuit boards. The end result is the virtual absence of distortion.

The CARVER C-2 preamplifier offers the discriminating audiophile with a relatively moderate budget the opportunity for uncompromised sound and handsome design.

Let's take a "guided" tour of the C-2's front panel and explore the advanced features this remarkable preamplifier can bring to your system.

The **Selector** switch controls the various signal sources which you may have in your system: turntables with moving magnet and/or moving magnet phono cartridges, FM tuner and an auxiliary input that's perfect for the new generation of Compact Digital Disc players, laser video disc soundtracks or VCRs. You can even hook up the audio output of many computers such as the Commodore 64, Apple or PC sound cards.

The **Selector** switch also controls which signal is sent to your cassette and/or reel-to-reel decks. In conjunction with the next switch this allows not only taping any input source but transferring the signal (dubbing) between two tape recorders.

The tape **Monitor** switch is normally left off unless you want to listen to a tape or check out how well it's being recorded. When you wish to play a cassette or open reel tape, simply click the selector from off to Tape source 1 or 2. Ergonomically, this is a far easier approach to signal selection than the traditional "Tape Monitor" and "Dubbing" buttons often stuck off to the side of the regular controls.

A special **Mode** switch allows listening in mono, stereo, reversed-phase stereo, left only and right-only modes. This allows enjoyment of classic monophonic transcriptions and provides a quick way of checking speaker phasing and turntable/cartridge performance.

In between these two signal selection buttons is a **Headphone plug** which allows you to enjoy the new breed of high-performance individual listening devices. Unlike some preamplifiers, this is not an underpowered afterthought. The C-2 lets you add headphone extensions of up to fifty feet and even pair up two sets of headphones *without loss of volume or degradation of sound quality*.

The C-1's **Bass and Treble Tone Knobs** control equalization circuits which allow carefully-planned increases and decreases in the overall sound spectrum. They are designed to boost and cut at the outer edges of the bass and treble frequency range without major effect to the midrange areas.

After the self-explanatory **Balance** control are four switches controlling various important functions. If you are not in need of equalization, a corresponding switch is provided which totally disengages the circuitry for "flat" response and Compact Disc enjoyment.

An **External Processor Loop** switch lets you add and enjoy equalizers, expanders, special speaker EQ boxes, open-ended noise reduction units or our own C-9 Sonic Holography Generator.

The Mute control lets you cut off sound output without changing the volume control during record changes, telephone calls or while

listening to headphones only.

Additional specialized circuits are accessed from the back of the C-2 as well. An **Infrasonic Filter** circuit helps protect your speakers from power-robbing, ultra-low bass distortions caused by turntable resonance, warped records, acoustic feedback and other "real world" problems.

Next to the phone inputs are a second set of sockets which allow precise control of **Phone Cartridge Loading Impedances**. By adding or subtracting resistance values with special plugs, your cartridge and connecting cable can be balanced to sound their best without peakiness or hollowness caused by improper loading impedance.

Two **Line Gain Sockets** allow a high-level gain choice of 15 or 25 dB to ensure the best possible match with your power amplifier's input needs.

The preamplifier measures 17.3 inches wide, 9 inches deep, 2.55 inches high. Weight approximately 6.5 pounds.

Technical excellence aside, the true measure of the C-2 is its overall sonic accuracy: rich, musical, and totally uncompromised sound delivered in a truly affordable package.

Explore the promise and performance of the C-2 at your Carver dealer today.

Specifications. Phono Inputs: RIAA + 0.25 "extended" RIAA curve. Overload Moving Coil = 15 mV. Overload Moving Magnet = 100 mV. High Level Inputs: Frequency Response - 3 dB at 3 Hz and 80 kHz (infrasonic Filter out). Infrasonic Filter: 18 dB per octave below 20 Hz, $f_3 = 15$ Hz. Noise: Moving Coil, 77 dB; IHF A-weighted re 50 μ V; Moving Magnet, 83 dB; IHF A-weighted re 5 mV; High Level, 96 dBV, IHF-A, below 2V rms; Infrasonic Filter, 95 dBV, IHF-A; Tone: 96 dBV, IHF-A. Distortion: THD 0.05% below 6V rms out; IM (CCIR or SMPTE), 0.04% or less; TIM, unmeasurable. Tone: Bass, Max Boost = +10 dB at 100 Hz; Max Cut = -7 dB at 100 Hz; Treble, Max Boost = +7 dB at 10 kHz; Max Cut + -3.5 dB at 10 kHz. Line Gain: HI 25.0 dB, LO 15.0 dB. Output Impedance: 600 ohms. Input Impedance: Line, 100k ohms in parallel with 150 pf. Phono: Moving magnet, 47k in parallel with 100 pf (may be infinitely programmed); Moving Coil, 47k in parallel with 100 pf (may be infinitely programmed).

CARVER TX-11 STEREO FM TUNER **ACC**



Finally, an FM stereo tuner which can drastically reduce multipath and distant station noise and still provide fully separated stereo reception with space depth and ambience.

A rich, textured sound as it was intended thirty years ago.

Thirty years?

Yes. Back then, FM was a noise-free, wide-band alternative to thin, static-filled AM. But it was monophonic and by the Fifties stereo was the new recording standard.

Unfortunately, the transmission system selected to turn mono FM into stereo ended up degrading the ratio of signal to noise FIFTEEN TIMES! (More than 23 dB) That's the system we live with today: hiss and distortion-filled unless you're in direct line with a strong station.

Understanding FM.

Stereo FM is not like a 2-track cassette with separate signals next to each other. Rather, there is a Left-Minus-Right and a Left-Plus-Right signal. (A receiving circuit adds and subtracts the sums and differences to get Left-only and Right-only Signals.) Left + Right comes in just fine because it's mono. It's that Left - Right signal that's to blame because it's extremely prone to "mishaps" on the way to your home.

Audio Ghosting. To get stereo FM perfectly, you'd have to be the only house in the middle of a vast flat plain with no other buildings anywhere. Any protruding mass—hills, skyscrapers, other antennas—looms up to reflect signals while on their way to your tuner, resulting in two signals.

One directly, and one a fraction of a second later, after it's bounced off something.

The result is not only scratchy reception but rhythmic pulsing of the sound (called "beating") and whole new noises caused as conventional receiver circuitry wrestles with the interference.

Not even the most expensive traditional tuner circuitry can conquer these problems because none of them approach the problem the way Bob Carver's TX-11 does.

Charge-Coupling Delay, the "Find and Cancel" circuit. Almost all noise and distortion is exactly 180 degrees out of phase with itself. For every instantaneous noise or distortion voltage, there is a replica in the opposite channel.

Simply put, the TX-11's Charge-Coupled Delay Line detects these tell-tale, dirty mirror images and cancels them before they reach your ears.

If that sounds like we're eliminating the L - R channel entirely, we're not.

While 85% of the information carried in the "dirty" L - R channel is duplicated by "clean" L + R signal (and can be edited out by our Charge Coupling circuit), 15% is the critical phase relationship information which produces ambient stereo.

Stopping at 85% would give us stereo plus 15% distortion; knocking off 100% would be mono. Here's how we achieved mono quality with stereo ambience.

The Leading Edge Detector. While studying the relationship of ear and brain during development of Sonic Holography, Bob Carver discovered that only one third of non-redundant L - R information (1/3 of 15%, or just 5%) is required to convince our senses of a fully separated stereo experience. But only if that 5% is properly electronically processed.

The Carver Leading Edge Detector operates on just that part of the L - R signal required for our ears and brain to construct true stereo localization. By blending that 5% back into the TX-11's signal matrix, a net reduction of 93.5% or in excess of 20dB of noise reduction is achieved!

All of the ambient and localizing information is recovered.

Without the hiss.

Without the distortion.

Sixteen presets for a reason. The reason you'll appreciate no less than sixteen different instant FM listening choices.

You'll suddenly pull in stations in surprisingly distant cities and suburbs. Underpowered local FM stations will be noise and distortion-free. Stations previously overpowered by strong adjacent signals will sound as steady as if they were alone on the dial. Stations which threw intermittent tantrums of intolerable racket will be pacified.

The TX-11's special circuitry can't make weak stations louder—you'll have to do that with your volume control—but when you do turn up a feeble station it will not be clean and clear.

Quartz synthesis. The TX-11 uses an incredibly precise circuit which generates a perfect replica of the desired FM frequency and then matches it to the incoming signal for perfect drift-free reception.

Digital tuning... with your digits. Touch the UP or DOWN button and the tuner automatically stops at each FM station it can adequately tune.

The TX-11 remembers. Not only will it store sixteen stations even when unplugged for up to three weeks, it also remembers the last station you played before it was shut off.

Wide and narrow band selection. In areas with many signals, FM frequency bands can end up close enough to cause interference. The Narrow setting "crops" the edges of the station's frequency just slightly without losing frequency response. Use the Wide mode when such interference is not a problem to receive slightly greater dynamic range.

Full instrumentation. Not only does the TX-11 digitally display station response, it also reads out six, 10-dB signal strength stops, indicates when the quartz circuitry has closed on a station and when a stereo station has been detected.

How to sell yourself a TX-11. Visit your dealer and ask to hear the most expensive, famous or esoteric tuner he sells. Tune to a multipath-ravaged, hiss filled station and compare the sound to the affordable Carver TX-11.

Now press TX-11's Multipath and Noise Reduction Circuits. And appreciate what Carver technology has done for the FM tuner.

Specifications. Tuning range:

87.5MHz-108 MHz; Usable sensitivity 1.0 μ V 50db quieting in stereo 3.1 μ V. Alternate channel selectivity 110db. Antenna term.: 75 ohms. unbal. coax. input, 300 ohms bal.; Intern. freq.: 10.7 MHz; Freq. resp.: 20 Hz-15 kHz, \pm 1 dB; Selectivity: 90 dB at 400 kHz (narrow) 35 dB (wide). Capture ratio: 1.0 dB; Spurious resp. ratio: 110 dB; Output lev. (75 kHz dev.): 700 mV, 600 ohms; System: PLL crystal-locked digital synthesizer system; Power req.: 120 Vac, 60 Hz; Power consumption: 15 W; Dim. (w/h/d): 17 1/2 x 3 1/2 x 12 1/2" (w/o rackmount); Wt. 11 1/4 lb; FM ribbon antenna and RCA-type patch cords and supplies

CARVER TX-2 AM/FM STEREO TUNER



With Asymmetrical Charge-Coupled FM Stereo Detector

If you're tired of having to treat AM and FM as mere background music due to the quality of the signal, you should seriously consider the Carver TX-2. The TX-2's Asymmetrical Charge-Coupled FM circuit makes stereo FM the sonic equal of phonograph records and good cassettes.

Even if the TX-2 *didn't* have this special circuit, it would be the rival of any tuner you find on the market today. Sleekly styled and ergonomically designed, it has the features which make tuning, holding and adjusting stations as easy as touching a single button.

Not a single knob interrupts the front of the TX-2, for all controls are activated by large, inlaid pressure pads. Touch the power switch and watch the tuning panel come alive. You'll see a crisp, easy-to-read digital tuning read-out.

Automatic scanning and 16-preset memory. Press AUTO, then touch the UP or DOWN button and watch the TX-2 search the dial for strong stations. The LOCKED light will indicate perfect tuning. If it's one of your favorites, just enter it on one of the eight pre-sets pushbuttons. The LED above the button will light, so you can remember its position. Continue until you've picked eight FM stations.

That's probably more than you listen to right now. Because you probably can't GET eight perfect FM signals right now. With the TX-2, you probably can. That under-powered but well-programmed college station. The FM station behind the hill you could never tune just right... they're all waiting to become presets on the TX-2.

Manual tuning and superb AM, too. The Asymmetrical Charge-Coupled circuit does more than just clear away the hash caused by multipath distortion. It also lets you tune distant stations using the MANUAL control. Find a fascinating but faint signal buried in the background hiss? The TX-2's circuitry goes to work. Like a curtain rising, the annoying hiss falls away, leaving a clear signal, as accurate and well-modulated as stronger, local stations.

How about AM? You probably don't listen because the quality has been so low. You'll be surprised just how good many stations sound when received through the TX-2. That's why we give you eight AM presets!

Most tuners and receivers treat AM like a poor afterthought with only token investment made in circuitry. The TX-2 uses components and design as good as those in its FM section, cutting distortion to below 1% for a crystal-clear signal.

Everything you need to make broadcast part of your listening experience.

From the six-stage signal strength indicator to 75 and 300-ohm inputs the TX-2 gives you everything you need to clean up AM and FM stations' acts. We even provide an easy-to-read manual written like a textbook on how to get the best reception through antenna selection and placement.

Whether you live in a rural area where the FM signals you really like have been too far away or in a crowded urban sculpture of skyscrapers, highrises and factories which deflect FM like mirrors, the TX-2 represents an opportunity to enlarge your listening horizons.

The TX-2 has also been designed to function as a superb companion to the Carver C-2 preamplifier and the Carver M-200t Magnetic Field Power Amplifier.

Visit your nearest Carver dealer for a personal audition of the Carver TX-2.

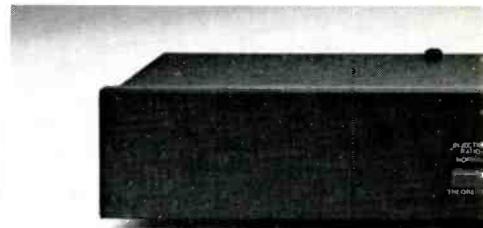
Specifications. FM Tuner. Sensitivity (IHF), 1.8 microvolts; Sensitivity for 50dB quieting, 3.1 microvolts Mono, 5 microvolts Stereo; Limiting Sensitivity (-3dB), 1.5 microvolts; Signal-to-Noise Ratio (1V), 74dB; Image Rejection, 82dB; IF Rejection, 80dB; Capture Ratio, 1.0dB; Harmonic Distortion, 0.15% mono, 0.2% stereo; AM Suppression, 80dB; Stereo Separation (1kHz), 40dB.

AM Tuner. Sensitivity, 20 microvolts Terminal, 250 microvolts/m for 20dB S/N Radiated; Distortion (5mV/m), 0.9%; Selectivity, 42dB; image Rejection, 45dB; IF Rejection, 45dB; AGC Figure of Merit, 50dB.

Dimensions, 17.3" wide, 9" deep, 2.55" high; Weight, 121 lbs.; Antennas, AM loop and

FM dipole plus 75 and 300 ohm terminals for external antennas; Power Requirements, 120V AC, 60Hz (15 watts max.)

CARVER C-9



Now any hi-fi system, from the smallest receiver to the largest separate stack, can be used to expand your listening horizons with the magic of Sonic Holography.

We've extracted the complex holography circuitry found in our C-400 and C-1 audiophile pre-amplifiers and placed it in a compact unit just over an inch high.

It connects in minutes to any receiver, pre-amplifier or integrated amplifier which has a tape monitor loop or external processor circuit.

The result is a sensually-stunning leap beyond conventional stereo.

While the best you can claim from good stereo is that it "images between the speakers," Sonic Holography expands that postcard of sound into a magnificent cycloramic mural.

Wider than your speakers. Higher than your speakers.

Extending around you, closer than, yet many feet deeper than your speakers. A true three-dimensional stage.

The difference between a porthole and a picture window.

How does Sonic Holography work?

Put simply, Sonic Holography CANCELS, in the air and acoustic space around you, extra

CARVER TX1-11 ASYMMETRICAL CHARGE COUPLED FM DECODER



Ever since his TX-11 tuner dazzled audiophiles and critics in late 1982, Bob Carver has been deluged with requests for an add-on component to give existing tuners and receivers the kind of stereo FM performance that had been considered impossible before the invention of the Asymmetrical Charge Coupled FM Circuit.

CARVER's response to those requests is the TX1-11 Asymmetrical Charge Coupled FM Decoder which will give your stereo system virtually noise-free, multipath-free FM reception. In minutes, the stereo quality of your stereo FM tuner or receiver will be improved by 20 dB. That's 10 times quieter!

Basically, FM was never designed to transmit stereo signals. The technical compromises which had to be made left FM stereo extremely prone to many common sorts of interference.

A number of manufacturers and designers of tuners and receivers have dealt with the noise problem by either *blending* the stereo signals into *mono* or *automatically switching* into *mono* when the stereo signal becomes weak. The benefits of *stereo* sound are sacrificed for less noisy reception.

However the Asymmetrical Charge Coupled FM Decoder in both the TX1-11 Decoder and the TX-11 Tuner is unique. You hear full stereo separation without irritating interference.

The TX1-11 is designed to make use of your existing tuner or receiver. You simply route the output of your tuner through the TX1-11 on its way to your preamplifier or integrated amplifier. If you're using a receiver, the TX1-11 is routed through the tape monitor loop. An extra tape monitor circuit is provided so that the Decoder does not rob your system of its tape circuits.

Once connected with just two sets of patch cords, TX1-11 is simplicity to operate.

One button engages the Decoder circuitry. We doubt you'd ever want to remove its benefits from *any* FM signal, but it is an effective way of proving to yourself just how much hiss is removed by the TX1-11's circuitry.

The important button is marked NOISE REDUCTION / NOISE & MULTIPATH REDUCTION. In its "out" position, this circuit continuously removes the annoying background hiss from FM broadcasts. Not only will it remove a veil of distorting noise from strong local stations, it will also open up a whole new range of weaker stations which used to be submerged in a sea of hiss. The difference is dramatic. The result is a far wider range of audiophile-level FM programming in your living room.

But hiss is not the only inherent FM stereo transmission problem. A much more annoying phenomenon is *multipath*, that loud, explosive, erratic distortion which can make listening to even strong stations unpleasant.

It is here that the Carver Asymmetrical Charge Coupled circuitry truly excels. By separating, analyzing and specially processing the stereo portion of FM transmissions, it eliminates the "beating," "picket-fencing" and gross distortions that plague reception. All ambient and localizing information that makes stereo sound like stereo is retained. Without the problems that often relegate FM listening to the background music.

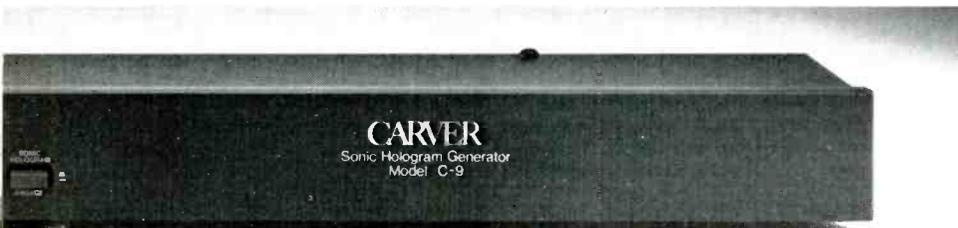
No other single add-on device will do as much for your enjoyment of FM broadcasts as the TX1-11. If you're a classical music lover, you can now tape operas, symphonies and delicate chamber recordings at nearly phonograph record quality. If you have a favorite rock or pop station, you'll be able to listen to it at far louder levels without scrambling for the volume control when an attack of multipath threatens to obliterate your speakers.

We urge you to visit your Carver dealer for a demonstration of the compact, "set-and-forget" FM enhancer which can make your existing tuner or receiver out-perform esoteric tuners costing ten times the TX1-11.

Expect to be astonished.

Specifications. Rated output voltage: 0 dB (2.4V); Maximum output voltage: 6V; Frequency response: -3 dB at 5 Hz and 60 kHz; Total harmonic distortion: 0.05%, 20 Hz-20 kHz; Intermodulation distortion: SMPTE 0.05%, CCIF 0.05%; Separation, better than 30 dB, 20 Hz-20 kHz, 50 dB stereo quieting; Will improve multipath rejection by 10 dB; Mono quieting: 0 dB (no effect); Output impedance: 910 ohms; Input impedance: 50k ohms; Turn-on muting delay: Less than three seconds; Power consumption: 15W; Controls and functions: Front Panel: Bypass; noise reduction; multipath reduction; tape monitor; Back Panel: Threshold set control; Dimensions: 17 1/8 in. long, 1 1/2 in. high, 5 in. deep.

SONIC HOLOGRAM GENERATOR



sound arrivals which confuse our ear and brain. When your ears hear only those sound arrivals which they would hear in real life, normal stereo program sources are transformed into stunningly lifelike performances. Executionally this simple effect is an extremely complicated process of generating interference signals which perfectly cancel the spurious extra sound arrivals with a complex, ever-varying sequential mix of spectral shading and time domain correction based on interaural ear spacing. The result is a psychoacoustic filtering of all but the true sound destined by nature to reach right and left ears. Once again, each ear is receiving only the information intended for it.

Don't confuse Sonic Holography's natural sound with the plethora of artificial ambient add-ons and speakers which abound today. While they toss off terms such as "random reflection" and "spacial extension," the achievement of a merely "spacey" sound inevitably comes with the cost of even more confusing sound arrivals and sonic smearing.

By making sound more NATURAL, the C-9 will never tire a listener the way mere "stereo enhancement" devices often can sound. Instead of adding and complicating your sonic landscape you'll actually bring it into *better* focus by eliminating spacially confusing noise.

The result is not just an improvement in sound, it is an improvement on what you always thought was sonic reality.

Since two radically different types of recording techniques are used in modern recording (two-microphone and multi-mike/mixdown), two different processing modes are provided. Theoretical and Normal. Also, to enhance the effect in rooms with less than optimum acoustics, a Listening Aperture switch is provided for Normal and Narrow settings.

And there is a switch to take the Sonic Holography circuitry in and out of the signal chain. Yet, once installed we're certain you'd no sooner do without the C-9 than you'd trade your speakers for a transistor radio. The In/Out switch becomes solely a way of showing your friends what they're missing on their systems. Ask for a demo today.

Specifications. Rated Output, 2 Vrms; Maximum Output, 6 Vrms; Distortion, THD, less than 0.05% 20 Hz-20 kHz; IM Distortion, less than 0.05% SMPTE; TIM Distortion, Unmeasurable; Noise, < 100 micro volts, A-weighted; Sonic Hologram Generator, Image resolution, 5° horizontal, 20° vertical in Theoretical mode; Dimensions, 1 3/4" x 3 7/8" x 17"; Weight 3.5 lbs (1.6 kg); Utilities, 1 unswitched 110V outlet.

THE CARVER RECEIVER

MFA ACC



When Bob Carver designs a receiver, you can be sure it is like no other.

To give you the power you need for today's recording advances plus virtually noise-free stereo FM reception, CARVER has designed a receiver with astonishing performance. An instrument designed to make the most of innovations such as stereo/hi-fi video and digital audio discs. An extraordinary synergy of circuitry incorporating two of high fidelity art's most advanced technological breakthroughs: Bob Carver's Magnetic Field Power Amplifier and his Asymmetrical Charge Coupled FM Detector.

With the CARVER Receiver you command 130 watts per channel* and a fully digital, quartz synthesized AM-FM stereo tuner through a highly sophisticated and meticulously engineered pre-amplifier section.

At your fingertips, the comprehensive control of your entire system. On the front panel: control for turntable, video/audio disc player selection, an auxiliary input selector, and two tape input selectors.

Not only can you individually control bass, treble and midrange tone, but the loudness contour as well. And all tone controls can be taken totally out of the preamplifier circuit for "flat" response.

Choose from two sets of speaker outputs, a combination of both or eliminate them entirely for headphone listening through the Carver Receiver's special headphone amplification circuitry.

Monitor and dub between two sets of tape decks. Match the meter output range to your listening levels. Even switch to mono to detect speaker and cartridge phasing problems instantly.

Pick up to six FM and six AM stations at the touch of a button without having to tune all over the dial. Even activate a special AM filter circuit to cut hiss and sharpness. All in a compact unit no larger than any other conventional receiver lacking the innovations and human engineering Carver has become famous for.

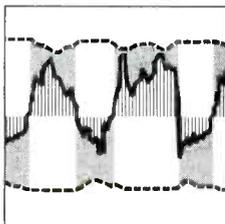
Power. There are very few 130 watt-per-channel receivers on the market today. Frankly, no other company has discovered how to make adequate amplifier power as affordable, light, compact and cool to operate as Carver. Their loss is your gain.

The reasons you may not have even considered over a hundred watts per channel—and the reasons we know this is the "bare minimum" are two sides of the issue: musical clarity and accuracy.

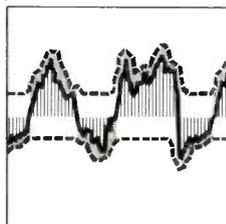
Only the Carver Receiver can surmount the inherent problems of sound reproduction which plague lesser powered receivers at all listening levels.

Even at modest listening levels, your speakers are making peak power demands which cannot be fulfilled with your existing amplifier. Lightning-fast transients, combinant crests of demand created by multiple waveforms and high-intensity peaks: Sharp percussion beats, a rolling bass line, a clamor of brass as a Wagnerian tenor enters from stage left, the sinuous synthesizer pulses of a Michael Jackson song.

Conventional, weaker receivers *never* deliver enough power, and somewhere, just before each sound pulse is finally formed, it gives out and sends a sort of electronic "note of regret," called *clipping*. This sharp high-end distortion veils the sound terribly, undoing all the accuracy of recording, cartridge and electronics as well as speakers.



Conventional power amplifier.



The Carver Receiver's Magnetic Field Amplifier.

Solid line: audio output signal. Broken line: power supply voltage. Shaded area: wasted power. Vertical lines: power to speakers.

At moderate listening levels, you may not have noticed it. The world of underpowered TVs, car radios and portable sound sources has made us used to the frosting of minute clipping distortions that occur thousands of times a minute. Yet when you sonically compare the Carver Receiver to any other receiver straight A/B comparisons, you'll

INSTANTLY notice the improvement which adequate power makes.

This simple demonstration at your Carver dealer should dispel the commonly-held belief that power is only necessary for loudness; a demonstration of the new digital Compact Digital Audio Disc players will leave you totally convinced that 130 watts per channel a *necessity*, not a luxury.

That's because the digital recording process will completely overturn your idea of "loudness." The narrow dynamics of your conventional record library have always meant that if you chose to listen to a disc at moderate levels, the whole record would remain at that level. Compact Discs hold surprises with every passage. The quiet parts are quiet. But the parts that were intended to be louder are REALLY louder. Instantly and spectacularly louder the way they are in a live concert hall. Tympani explode with impact. Cymbals crash. Rock and disco hammer you with exciting live presence.

All of which immediately taxes your system beyond anything it ever experienced before. The veil of clipping distortion suddenly becomes a wall of audible hash: jarring, jangling and potentially destructive to your speakers.

The simple answer is the Carver Receiver with the patented Magnetic Field Amplifier and ultra-sophisticated speaker protection circuitry. It delivers 130 watts per channel* of *pure*, clean power so you can truly appreciate your favorite music.

The technological elegance of the Magnetic Field Amplifier enables it to produce large amounts of power (absolutely necessary for the accurate reproduction of music) without the need for heavy heat sinks, massive transformers, and enormous power capacitors required by conventional amplifier design.

Unlike conventional amplifiers which produce a constant high voltage level at all times, irrespective of the demands of the ever-changing audio signal and indeed even when there is no audio signal in the circuit at all, the Magnetic Field Amplifier's power supply is signal responsive and highly efficient. It produces *exactly and only* the power needed to carry the signal with complete accuracy and fidelity.

ALL SPECIFICATIONS OR FUNCTIONS SUBJECT TO CHANGE WITHOUT NOTICE

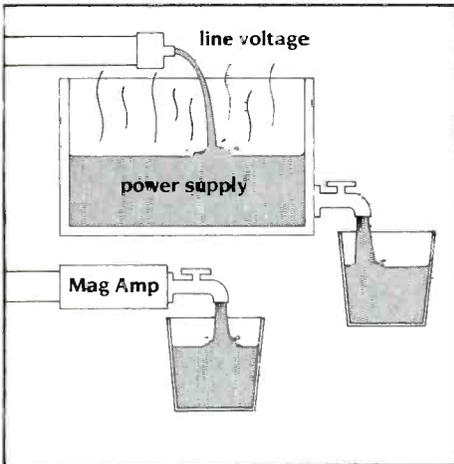
Magnetic Field Power Amplifier



METER RANGE

the same magnetic field technology as our M-200t, M-400t, M-500t and M1.5t amplifiers built right in.

At all times, the Carver Receiver monitors your speakers at all times for conditions that could cause damage, allowing them to cool off long before they reach a state which could be damaging. The same circuits also guard against surges caused by shorts and accidental dropping of the tonearm on a record when the volume is turned up.



Conventional amplifiers must store massive amounts of power in reserve. The Magnetic Field Amplifier draws directly from the source, eliminating bulky power supplies.

These built-in precautions afford you new listening freedom because you don't have to be afraid to unchain the power of the Carver Receiver. Whether you're spinning your original copy of Dark Side of the Moon or a state-of-the-art Compact Digital Disc of the 1812 Overture, you can play it at the volume you want without compromising sound quality or your speakers.

The resulting spaciousness, sonic impact and sheer musicality will invigorate your existing speaker's system, your own ears and those of your friends.

The CARVER receiver gives you FM stereo performance unmatched by that of any other receiver. As it is transmitted from the station, the stereo FM signal is extremely vulnerable to distortion, noise, hiss and multipath interference. In fact, because of the transmission system in use today, the signal to noise ratio of FM stereo has been degraded fifteen times (more than 23 dB!).

However, when you engage CARVER's Asymmetrical Charge Coupled FM Detector circuit, the stereo signal arrives at your ears virtually noise-free. The result is fully separated stereo with space, depth and ambience!

You'll suddenly pull in stations in surprisingly distant cities and suburbs. Underpowered but interestingly-programmed college FM stations will be noise and distortion-free. Stations previously overpowered by strong adjacent signals will sound as steady as if they were alone on the dial. Stations which three intermittent tantrums of intolerable racket will be pacified. The special circuitry can't

make weak stations louder—you'll have to do that with your volume control—but when you crank up a feeble station it will not be submerged in a sea of hiss and multipath.

You will also appreciate the AM section. Meticulous attention to every aspect of tuner performance gives you an AM section with true high fidelity response. You will not find another receiver with such high performance anywhere.

The CARVER Receiver has been designed for serious music listeners who seek fidelity, accuracy and musicality.

We know you will want to visit your nearest CARVER dealer for a personal audition of this remarkable instrument.

Specifications. FM SECTION. Tuning Range: 87.5 MHz-108 MHz; Usable sensitivity 1.8 μ V 50 db quieting stereo 4.5 μ V. Antenna Term: 75 ohms unbal. coax. input, 300 ohms bal.; Intermediate Freq.: 10.7 MHz; Frequency Response: 20 Hz-15 kHz \pm 1 dB; Alt. Chan. Selectivity: 58 dB; Capture Ratio: \pm 1.5 dB; AM Suppression Ratio: 50 dB, 65 dB with CCD; Image Response Ratio: 75 dB; IF Response Ratio: 100 dB; Spurious Response Ratio: 100 dB. Output Level (7.5 kHz Dev.): 700 mV, 600 ohms; System: * PLL Crystal-locked Digital Synthesizer System.

	MONO	STEREO W/O CHARGE-COUPLED DETECTOR	STEREO WITH CHARGE-COUPLED DETECTOR
USABLE SENSITIVITY	75 ohms: 11.3 dB/1.0 μ V 300 ohms: 11.3 dB/2.0 μ V	34 dB/1.4 μ V 34 dB/2.8 μ V	16.3 dB/1.78 μ V 16.3 dB/3.57 μ V
50 DB QUIETING SENS.	75 ohms: 16.1 dB/1.7 μ V 300 ohms: 16.1 dB/3.4 μ V	37 dB/1.9 μ V 37 dB/3.9 μ V	23.5 dB/4.0 μ V 23.5 dB/8.0 μ V
SIGNAL/NOISE RATIO	75 ohms: 82 dB @ 85 dBf 300 ohms: 82 dB @ 85 dBf	74 dB @ 85 dBf 74 dB @ 85 dBf	85 dB @ 85 dBf 85 dB @ 85 dBf
STEREO SEPARATION (WIDE)		1 kHz: 45 dB 100 Hz: 36 dB 10 kHz: 36 dB	45 dB 30 dB 25 dB

AM SECTION. Tuning Range: 520-1710 kHz; IF Rejection Ratio: 45 dB; Output Level at 1 kHz: 160 mV \pm 2.5 dB.

PREAMP SECTION. Phono RIAA: \pm 0.25 dB; Phono S/N ratio: 80 dB ref. 5 mV; Input Impedance: Phono: 50k; Video/DAD: 50k; Auxiliary: 50k; Tape 1: 50k; Tape 2: 50k; THD: 20 Hz: 0.05%; 1kHz: 0.05%; 20kHz: 0.05%; Frequency Response: 20 Hz-20 kHz, \pm 0.5 dB; Tone Controls: Bass, Max at 100 Hz, + 10 dB; Min at 100 Hz, - 10 dB; Treble Max at 10 kHz, + 10 dB; Min at 10 kHz, - 10 dB; Midrange Max at 1.5 kHz, + 6 dB; Min at 1.5 kHz, - 6 dB; High Filter: - 3 dB point: 5 kHz (6 dB/octave).

POWER AMP SECTION. * Power 20 Hz-20 kHz: 130 W/both channels into 8 ohms; THD at Rated Power: 0.05%; IM Distortion: 0.1% SMPTE; TIM Distortion: Unmeasurable; Frequency Response: \pm 0.5 dB, 20 Hz-20 kHz; Damping Factor: 60; Noise: > 100 dB, IHF-A weighted.



The Carver Receiver's tuning section gives you the same quartz digital/Asymmetrical Charge-Coupled detection circuitry as our famous TX-11 tuner.

CRITICAL ACCLAIM

"Bob Carver is definitely an audio and r.f. genius."

(Leonard Feldman, *Audio Magazine*, June 1984)

The Magnetic Field Power Amplifier

The technology of the Carver Magnetic Field Power Amplifier solves some of the most basic problems of conventional power amplifiers: high cost, great weight, and excessive heat generation.

The Carver M-400 is the first amplifier to utilize this technological breakthrough. A 200 watt per channel amplifier in a seven-inch cube weighing less than ten pounds, the M-400 is powerful, accurate, and musical.

"Its distortion and noise levels are entirely negligible. It is hardly conceivable that a small, inexpensive, lightweight cube such as this could deliver as much clean power as any but a few of the largest conventional amplifiers on the market—but it does... An important new amplifier design."

(Hirsch-Houck Labs in *Stereo Review*)

Music reproduction was superb and completely free of any false bass coloration or muddiness. The amplifier handled the toughest transients we were able to feed it, with ease. It is, to put it mildly, quite an achievement and

one that is likely to change the way many of us think of power amp design in the future."

(Leonard Feldman in *Audio*)

Of the Carver M-1.5t, Peter Aczel, Editor and Publisher of *The Audio Critic* has said, "... the equal of any power amplifier in transparency, focus and smoothness and, of course, far ahead of any other we tested in sheer gut-shaking power and dynamic range. We especially enjoy hearing spatial detail, instrumental definition and completely natural dynamics on familiar records to a degree we did not know was extractable from the grooves when we listened through lesser amplifiers. At this level of sonic performance, the astoundingly small size and cool operation of the M-1.5t become the icing on the cake, rather than the main attraction."

Sonic Holography

The problems of sonic imagery inherent in conventional stereophonic reproduction have been solved by the Sonic Hologram Generator, available in three different components: The C-4000 and C-1 Preamplifiers and the C-9 Sonic Hologram Generator.

Very briefly, the Sonic Hologram presents timing and phase information that exists in stereo program material—but is normally inaudible. With Sonic Holography, this information emerges in three-dimensional space around the listener who is thus able to establish the precise location of the instruments and voice.

The impact on the listener of Sonic Holography is best described by the most experienced and knowledgeable experts in the audio industry.

"When the lights were turned out we could almost have sworn we were in the presence of a real live orchestra."
Hal Rodgers, Senior Editor,

Popular Electronics

"The effect strains credibility—had I not experienced it, I probably would not believe it... the 'miracle' is that it uses only the two normal front speakers."

Julian Hirsch, Hirsch-Houck Labs,

Stereo Review

"... it brings the listener substantially closer to that elusive sonic illusion of being in the presence of a live performance."

Larry Klein, Technical Director,

Stereo Review

"... seems to open a curtain and reveal a deployment of musical forces extending behind, between and beyond the speakers... terrific."

High Fidelity

"Instruments and performers are located where they belong whether to the front of, between, beside or behind the speakers—in sort, anywhere in a 180 degree arc facing the listener."

Omni Magazine

"The effect is both impressive and exciting to experience."

Stereo Review

Breakthrough in FM Stereo Reception

Carver's most recent technological breakthrough is the Asymmetrical Charge-coupled FM Detector circuit, a special feature of the Carver TX-II FM Stereo Tuner.

This unique circuit drastically reduces multipath and distant station noise, while providing fully-separated stereo reception with space, depth and ambience.

The TX-II has received unprecedented acclaim from reviewers:

"It is by a wide margin the best tuner we have tested to date."

"What distinguishes the TX-II is its ability to pull clean noise-free sound out of weak or multipath ridden signals that would have you lunging for the mono switch on any other tuner we know of."

High Fidelity (January, 1983)

"Breakthrough in FM tuner performance: Carver TX-II."

"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."

"A tuner which long-suffered *fringe area residents and those plagued by multipath distortion and interference have probably been praying for..."

Leonard Feldman

Audio (December, 1982)

"... enjoy the music and forget about noise and distortion."

"Under conditions of weak signal stereo reception the effectiveness is almost magical."

Ovation (December, 1982)

"A major advance..."

"Its noise reduction of stereo reception ranged from appreciable to tremendous."

"It makes the majority of stereo signals sound virtually as quiet as mono signals, yet it does not dilute the stereo effect."

Julian D. Hirsch,

Stereo Review (December, 1982)

The Carver Receiver

The 130 watt per channel Carver Receiver which incorporates both the technology of the Magnetic Field Power Amplifier and the Asymmetrical Charge Coupled FM Detector has also received unprecedented praise from the reviewers.

"The Carver Receiver is, without question one of the finest products of its kind I have ever tested and used."

Leonard Feldman, *Audio Magazine*, June 1984

"I consider the Carver Receiver to be the 'most' receiver I have yet tested in terms of the quantitative and qualitative superiority of almost all its basic functions."

Julian D. Hirsch, *Stereo Review*, April 1984

AUTHORIZED CARVER DEALERS*

* A relatively but not, of necessity, completely accurate listing of AUTHORIZED CARVER DEALERS.
The following is subject on-going change. (Fall, 1984)

ALABAMA

Birmingham
Jikis Audio
Brewton
McDowell Electronics

ALASKA

Anchorage
Pyramid Audio
Fairbanks
Loitt's Stereo & Strings
Juneau
Alaska Music
Soldatna
C.G. Electronics

ARKANSAS

Fayetteville
Stereo Buff

ARIZONA

Phoenix
Jerry's Audio Exchange
Tucson
Jerry's Audio Exchange

CALIFORNIA

Anaheim
Audio Consultants
Belmont
Peninsula Audio Systems
Berkley
Sounding Board
Big Bear Lake
Long Ear
Chico
Sounds by Dave
El Cojan
Audio Specialty
Encino
Sound Factor
Eureka
The Works
Fairfield
C & M Stereo Unlimited
Hayward
Century Stereo
Huntington Beach
Havens & Hardesty Audio
Irvine
Executive Sound
Lancaster
California Sound Works
Los Angeles
Ametron
Paris Audio
Western & Olympic Audio
Menlo Park
Eber Electronics
Mill Valley
World of Sound
Monterey
Monterey Stereo
Newport Beach
Executive Sound
North Hollywood
The Sound Factor
Palm Desert
Desert Stereo
Pasadena
GNP Showcase
Redondo Beach
Systems Design Group
Sacramento
Turntables Unlimited
San Carlos
Hermar's
San Diego
Stereo Horizon
San Francisco
Eber Electronics
Stereo Store
San Jose
Century Stereo
Sunnyvale Electronics
San Luis Obispo
Audio Ecstasy
San Raphael
Catania Sound
Santa Ana
Absolute Audio
Santa Clara
Sunnyvale Electronics
Santa Cruz
Stereo Solution
Santa Maria
Lombard's Electronics of California, Inc.
Santa Rosa
Catania Sound
Solana Beach
Audio Specialty
Stockton
Jack Hanna Music
Sunnyvale
Sunnyvale Electronics
Ventura
Dexter's Camera & Hi Fi
Woodland Hills
Absolute Audio

COLORADO

Boulder
Crisman Audiovision
Listen Up, Inc.
Wave Length Stereo
Colorado Springs
Crisman Audiovision
Denver
Crisman Audiovision
Listen Up, Inc.
Durango
Gramophone Audio & Video
Estes Park
Estes Park Music Center
Ft. Collins
Crisman Audiovision
Grand Junction
Lafayette Associates Store
Steamboat Springs
Norm's TV & Sound
Sterling
Select Systems

CONNECTICUT

Avon
Hi Fi Stereo House
Brookfield
Sounds Incredible
Darren
Music Box-Valenti's TV
Fairfield
Audiotronics
New Haven
Take 5 Audio
New London
The Stereo Lab
Newington
Hi Fi Stereo House
Norwalk
Audiotronics
Norwich
Sound Advice
Vernon
Hi Fi Stereo House

DELAWARE

Newark
Sound Studio

DISTRICT OF COLUMBIA

Washington, D.C.
Myer-Emco

FLORIDA

Altamonte Springs
Audio Spectrum, Inc.
Boca Raton
Vern's Stereo & Electronics
Bradenton
Kuban's
Clearwater
Pyramid Audio, Inc.
Daytona Beach
Audio Video Analysts
Fort Lauderdale
Broadcast International
Joyful Noise Sound
M & E
T. M. Sound & Lighting
Fort Meyers
Stereo World
Fort Pierce
The Sound Shack
Gainesville
Team Electronics
Hollywood
Audio Encounters
Jacksonville
Audio Tech
Lake Worth
The Sound Shack
Lakeland
The Sound Factory
Merritt Island
Southern Audio
Miami
Brandsmart USA
Electronic Equipment Co.
Oversea's Electronic Dist.
Neico
Ritz Shop - Las Fabricas
Sounds Great Center
Sounds Great Stereo
Naples
House of Hi Fi
North Miami Beach
Harris Audio Systems
North Palm Beach
Exclusive Electronics
Orange Park
Audio Tech
Orlando
Electronic Store
Panama City
World Wide Stereo

Pensacola
All Pro Sound
Pinellas Park
21st Century Sound
Sarasota
Kuban's
Tallahassee
Audio Labs
Tampa
Pyramid Audio, Inc.
Sensuous Sound Systems
Vero Beach
Lake Audio
West Palm Beach
The Sound Shack

GEORGIA

Athens
Hi Fi Buys
Atlanta
Hi Fi Buys
Macon
Georgia Music
Marietta
Hi Fi Buys

HAWAII

Honolulu
Mid Pacific Stereo, Inc.

IDAHO

Boise
The Stereo Shoppe
Burley
The Sound Co.
Twin Falls
The Sound Co.

ILLINOIS

Beverly
Musicraft
Champagne
Appletree Stereo
August Systems
Charleston
Mr. D's
Chicago
Musicraft
United Audio Centers
Decatur
Appletree Stereo
Deerfield
United Audio Centers
DeKalb
Appletree Stereo
Evergreen Park
Musicraft
Homewood
Musicraft
Lombard
Musicraft
Mt. Prospect
Hi Fi Hutch
Niles
United Audio Centers
Normal
Appletree Stereo
Oak Park
Musicraft
Palos Hills
Gill Custom House
Peoria
Appletree Stereo
Riverdale
Stereo Designs
Rockford
Appletree Studio
Schaumburg
Hi Fi Hutch
Sidney
August Systems
Vernon Hill
United Audio Centers
Villa Park
Hi Fi Hutch

INDIANA

Bloomington
American Audio-Video
Carmel
Sound Productions
Evansville
Risley Electronics
Fort Wayne
Lehman Electronic
Lafayette
Pro Audio
South Bend
Audio Specialists
Terre Haute
Audio Connection
Valparaiso
Audio Junction

IOWA

Des Moines
Hawkeye Electronics of Iowa
Stereo Sound Studios, Inc.
Triad Productions, Inc.
Fairfield
Hawkeye Electronics of Iowa
Mason City
Sound
Marshalltown
John's Hi Fi & Sound
Sioux City
Audio Emporium
Pflanz Electronics

KANSAS

Hutchinson
Hayes Sight & Sound
Junction City
Audio Junction
Lawrence
Keif's Gramophone
Mission
Accent Sound
Overland Park
Audio Electronics
KC Music & Pro Sound
World Radio
Salina
Electronics, Inc.
Wichita
Audio Systems

KENTUCKY

Bowling Green
Bowling Green Audio
Lexington
Ovation Audio Video
Owensboro
FM High Fidelity
Paducah
Risley Electronics

LOUISIANA

Baton Rouge
Kadairs
Gretna
Sound Trek Audio
Metairie
Sound Trek Audio
New Iberia
Unlimited Sounds
New Orleans
Sound Trek Audio

MAINE

Augusta
Hi Fi Exchange
Falmouth
Hi Fi Exchange
Westbrook
Cuomo's

MARYLAND

Annapolis
Spaceways Sound
Baltimore
Soundscape
Bethesda
Audio Associates
Frederick
Golden Ear Audio-Video
Langley Park
Audio Associates
Laurel
Audio Associates
Rockville
Myer Emco
Salisbury
Sound Studio

MASSACHUSETTS

Boston
Tweeter Etc.
Brockton
Sound Track Audio
Burlington
Tweeter Etc.
Cambridge
Tweeter Etc.
Chestnut Hill
Tweeter Etc.
Danvers
Tweeter Etc.
Dedham
Tweeter Etc.
Framingham
Natural Sound
Tweeter Etc.

Hyannis
Sound Dynamics
Northampton
Sound - Music

MICHIGAN

Ann Arbor
Hi Fi Buys
Birmingham
The Gramophone
E. Lansing
Hi Fi Buys
Filnt
The Stereo Center
Grand Rapids
Stereo Showcase
Grosse Pointe Woods
Pointe Electronics
Jackson
Hi Fi Buys
Kalamazoo
Stereo Showcase
Lansing
Hi Fi Buys
Saginaw
Listening Room
Traverse City
Kurtz Music Center

MINNESOTA

Brooklyn Center
Audio King
Burnsville
Audio King
Duluth
Mel's TV-Audio
Minneapolis
Audio King
Mnetonka
Audio King
Roseville
Audio King
St. Cloud
Sound Electronics

MISSISSIPPI

Jackson
Hooper Sound
Meridian
Hooper Sound

MISSOURI

Cape Girardeau
Stereo One
Kansas City
Video Westport
St. Louis
Best Sound Co.
Springfield
Stereo Buff

MONTANA

Great Falls
Rocky Mountain Hi Fi
Helena
Stereo Shop

NEBRASKA

Columbus
Good Music
Lincoln
Stereo Studio
Omaha
Stereo Studio

NEVADA

Las Vegas
Sound Emporium

NEW HAMPSHIRE

Manchester
Tweeter Etc.
Nashua
Tweeter Etc.
Newington
Tweeter Etc.
Salem
Cuomo's

NEW JERSEY

Deptford
Hi Fi Connection
Lakewood
Sound Environments, Inc.
Lawrenceville
Hal's Stereo
Maple Shade
Bryn Mawr Stereo
Morristown
Sight & Sound
New Brunswick
Hi Fi Haven
Northfield
Sound Inc.

Paramus
Leonard Radio
Ridgewood
The Sounding Board
Toms River
Rands Camera - Hi Fi
Wyckoff
Conklin's Inc.

NEW MEXICO

Albuquerque
Sound Ideas
West Coast Sound Systems
Las Cruces
The Sound Room
Santa Fe
The Candyman

NEW YORK

Albany
Gordon Electronics
Mom's Stereo Warehouse
Alfred
Jericho Audio
Amherst
Transcendental Audio
Batavia
Unicorn Audio
Binghamton
JSG Audio
Gordon Electronics
Brooklyn
Innovative Audio Products
Buffalo
Stereo Plus
Cedarhurst
Martr Electronics Lab. of NY
Garden City
Audio Exchange
Glens Falls
Audio Genesis
Hicksville
Designatron
Kenmore
Stereo Plus
Nanuet
Eardrum
New York
Audio Exchange
Grand Central Radio
Harvey Sound
Leonard Radio
Lyric Hi Fi
Thalia Hi Fi
Patchoque
Square Deal
Potsdam
Northern Music Company
Remsenburg
Media Room
Rochester
The Sound Chamber
Setauket
Designatron
Syosset
Harvey Sound
Syracuse
Gordon Electronics
Tanawanda
Stereo Plus
Vestal
Gordon Electronics
Wappinger Falls
Sound Odyssey
West Seneca
Stereo Plus
White Plains
Audio Experts
Harvey Sound
Lyric Hi Fi
Williamsport
Stereo Plus

NORTH CAROLINA

Asheville
Sound One
Burlington
Stereo Village
Carrboro
Stereo Sound
Chapel Hill
Stereo Sound
Conover
Tri City Electronics
Fayetteville
Tart's
Greensboro
Stereo Station
Stereo Village
Greenville
Stereo Village
Havelock
Rainbow Audio
Morehead City
Rainbow Audio
Stereo Village

New Bren
Rainbow Audio
Stereo Village
Raleigh
Stereo Sound
Winston Salem
Stereo Sound

NORTH DAKOTA

Minot
Midwest Audio

OHIO

Akron
Audio Craft Co.
Golden Gramophone
Bowling Green
Audio Craft
Canton
Audio Corner
Cincinnati
Swallen's
Cleveland
Audio Craft Co.
Phil Reddish Stereo
Columbus
Digital Sights & Sounds
Palmer Electronics
Dayton
Carlin Audio
Lima
Hart's Audio
Lorain
Grassos Audio, Inc.
Mansfield
Swallen's
Mayfield Heights
Audio Craft
Middleton
Swallen's
New Philadelphia
Lahmers Natural Hi Fi
Parma Heights
Phil Reddish Stereo
Sandusky
Audio Force
Warren
Electronics Ltd.
Westlake
Audio Craft
Youngstown
Electronics Ltd.

Gibsonia
Listening Post
Greensburg
Pat's Stereo Center
Jenkintown
Bryn Mawr Stereo
Lewisburg
M & M Stereo
Natrona Heights
Stereo-Land
Pittsburgh
The Listening Post
Worldwide Stereo
Pleasant Hills
Stereo Outlet
Quakertown
Bryn Mawr Stereo
Throop
Shehadl Stereo
Washington
Stereo Outlet
W. Reading
D.S. Audio, Inc.
Windbar
Pro Audio
Whitehall
Bryn Mawr Stereo

RHODE ISLAND

Providence
Tweeter, Etc.
Warwick
Tweeter, Etc.

SOUTH CAROLINA

Anderson
John B. Lee "For Music"
Charleston
Read Brothers Stereo
Columbia
John B. Lee "For Music"
Greenville
John B. Lee "For Music"
Greenwood
John B. Lee "For Music"

SOUTH DAKOTA

Brookings
Stereo Town
Mitchell
Stereo Town
Rapid City
Team Electronics
Sioux Falls
Pro Audio

TENNESSEE

Chattanooga
College Hi Fi
Johnson City
Sound Concept
Knoxville
Lindsay Ward

TEXAS

Austin
Austin Audio One, Inc.
Beaumont
Beaumont Sound Co.
College Station
Audio Video
Corpus Christi
Tape-Town Audio Video
Dallas
Melody Shops
Del Rio
Western Auto
El Paso
Century Sound
Soundquest
Fort Worth
Marvin Electronics
Houston
B & M Electronics
Sheffield Audio
Laredo
Stereo Den
Metex International Corp.
Lubbock
The Electric Ear
Nacagdoches
Branch Patton
Odessa
Harold's Electronics
Pharr
El Centro Sound Center
San Antonio
San Antonio Audio Concepts
Stereo International
Texarkana
Audio Center

UTAH

Provo
Aleen's Camera & Sound
Logan
Lynn's Audio & Video
Murray
Crisman Audiovision
Odgen
The Hi Fi Shop
Salt Lake City
Audio Works

VERMONT

South Burlington
Audio Den

VIRGINIA

Charlottesville
The Sound Machine
Fairfax
Audio Associates
Falls Church
Myer Emco
Norfolk
The Audio Connection
Richmond
Gary's Stereo
Springfield
Audio Associates
Virginia Beach
Digital Sound
Audible Image
Audio Connection

WASHINGTON

Bellevue
Magnolia Hi Fi
Bellingham
QC Stereo
Bremerton
Bremerton Stereo Center
Ellensburg
Stereocraft
Federal Way
Audio Northwest
Lynnwood
Magnolia Hi Fi
Mt. Vernon
QC Stereo
Oak Harbor
QC Stereo
Pullman
Stereocraft
Seattle
Definitive Audio
Magnolia Hi Fi
Spokane
Hoffman Music
Huppins Hi Fi
Tacoma
Magnolia Hi Fi
Paulson's
Walla Walla
Stereocraft
Yakima
Stereocraft

WEST VIRGINIA

Charleston
Mack and Dave's
Huntington
Mack and Dave's
Morgantown
Sound Investments

WISCONSIN

Appleton
American TV
Eau Claire
Engandela Musical
Green Bay
Hi Fi Heaven
La Crosse
Mountain Electronics
Madison
American TV
Manitowac
Ray's World of Electronics
Marquette
American TV of Madison
Milwaukee
Port of Sound
Sound Investment
Strum
Engandela Musical
Wisconsin Rapids
Salon 1

WYOMING

Cheyenne
Crisman Audiovision

NO MORE 'SCUSES

'Scuse Me While I Kiss the Sky by David Henderson. Bantam Books, paperback, \$3.95.

David Henderson tries to include something for everyone in his biography of Jimi Hendrix. "Tech" heads will enjoy the involved descriptions of Hendrix's stage and recording setups; rock historians will be pleased by detailed descriptions of every gig the man played from high school onward, while the multitudes of just plain fans will gorge themselves on the gossipy remains of this musician's legend. The book lacks focus to some extent because of this, but, for the same reason, will appeal to any reader.

The author has an annoying habit of switching from an objective narrative to the perceptions of individuals without attributing the quotes. When the person being described is the source, the origins of a tale are obvious. But too often, Henderson shifts points of view without acknowledging the source. Still, an intriguing figure emerges.

No psychological study this, nor does Henderson allow himself many poetic flights of fancy into his subject's mind. Instead, he gathers up all the Hendrix stories he can and, by putting them in chronological order and social context, creates a picture of an artist-of-the-times. Hendrix may never have been particularly political, preferring his musical obsession and inner explorations to political action. Yet, Henderson makes us see him and his work as product, reflection, and mouthpiece of his era. This, perhaps, is the only point of view the author allows himself, and Hendrix probably would have been flattered by this presumption. In any case, no one can come away from a given chapter of this book without having learned much about the music and recording business circa 1967 and even more about Jimi Hendrix.

Jon & Sally Tiven

Handbook of Noise Control, Second Edition, edited by Cyril M. Harris. McGraw-Hill, 720 pp., \$43.50.

The first edition of the *Handbook of Noise Control* appeared in 1957 and also was edited by Dr. Harris. There have been a great number of changes

in noise control since that time, of course, but this second edition is not really an updating of the earlier version. In general, there is a reduction in the amount of space devoted to industrial noise and vibration control but a considerable increase in the coverage of legislation and regulations. To some extent, there has been a corresponding shift in the general interest of the public concerning noise. Much of the depth of the first edition is missing in several areas, as might be expected from the reduction in pages from over 1,000 to 720 and the addition of new subjects.

There is noticeable updating in the material, and the new type face and illustrations make for much easier reading. The total of 45 chapters is divided roughly this way: Four chapters on the properties of sound and sound fields, three chapters on measurements and standards, six on hearing and conservation, four on the effects of noise, three on vibration and its control, four on absorption and insulation with coverage on building problems, five on various types of equipment and machinery, four on construction and transportation equipment, four on community responses and the law, six on various types of regulations, and one chapter on environmental impact statements. The 23-page index is quite good, an essential part of this handbook. Specific chapters, which would be most helpful to audio engineers or studio acousticians, include "Sound in Enclosed Spaces," "Sound Absorptive Materials," "Airborne Sound Insulation," "Structure Borne Sound," "Noise Control in Buildings," "Fans and Blowers," "HVAC Systems," and "Ventilating Systems for Small Equipment."

Plans for locating a studio may be aided by information contained in the chapters on transportation noise, which include a fair amount of level data, as well as some spectra. This is not an inexpensive book, and quite a few of the sections will not be of much interest to *Audio's* readership. Because of the considerable meat in the chapters mentioned above, however, there is good value per dollar even for those with a limited need for an understanding of noise control.

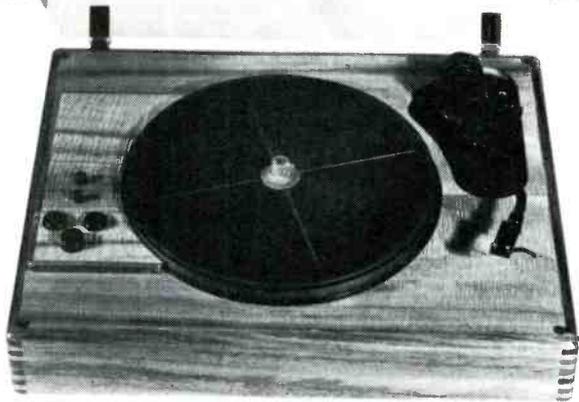
Howard A. Roberson

The Yardbirds by John Platt, Chris Dreja and Jim McCarty. Sidgwick/Jackson Books, \$8.50.

If one group from the '60s is truly legendary, it is The Yardbirds. Just as the band was reaching the point where its music could be appreciated, the group self-destructed. Alumnae such as Eric Clapton and Jeff Beck distinguished themselves while the group was still active under the wing of Jimmy Page (who would become a household name in his next endeavor, a modest outfit called Led Zeppelin). In The Yardbirds' day, there was no progressive radio and the group was limited to a cultish popularity by virtue of being what is known as "ahead of their time." As a result, the legacy left by The Yardbirds is a scattered affair—disjointed records, a few bootlegs, but no complete picture of the group exists from that time.

The Yardbirds provides an historical context for all these loose strands of rock-music history. The tale is told by Chris Dreja and Jim McCarty, the only surviving veterans of all the different personnel changes. Keith Relf passed away a few years ago, Paul Samwell-Smith left the group in midstream to pursue a career as a record producer, Clapton left before the completion of their first studio album to play "pure" blues with John Mayall, Jeff Beck came in as his replacement soon after but left to pursue women problems, and Jimmy Page filled in until the demise of the group. In between these little stories are interesting and often hysterical anecdotes of the first progressive rock band, its encounters with California psychedelia, and the ups and downs of the group from its inception through to the end. Not all of the loose ends are tied together in a neat bow—but there is an attention to detail here which should at least appease, if not satisfy, the legions of Yardbirds fanatics. Among the most influential rock bands ever, The Yardbirds were certainly among the most experimental pop stars of their generation, and this chronicle of those times is rather incredible to read. Highly recommended. And incidentally, watch for our lead review next month, of *Box of Frogs*, the self-titled return-to-the-wars record for these guys.

Jon & Sally Tiven



SOTA Turntable

The SOTA Star Sapphire turntable is now also available in a version with vacuum record-clamping. It has a 22-pound subchassis with four-point suspension, sapphire-disc thrust bearing, and outboard

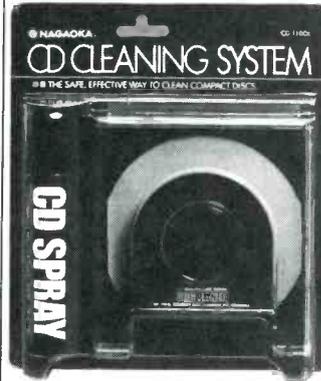
power supply. It plays 33 $\frac{1}{3}$ - and 45-rpm records. Price without arm: \$1,450.00 in oak; \$1,600.00 in koa wood; a vacuum kit for other Sapphires is \$400.00.

For literature, circle No. 100

Souther Record Clamp

The Clever Clamp holds records down by clamping directly to the turntable center spindle. Weighing only 23 g (0.8 oz.), the clamp adds no significant load to turntable bearings, and its transparent construction allows record labels to be read without removing the clamp. Price: \$10.00.

previous track beginning or index mark; silent cueing at 30X normal speed or audible cueing at 10X, and stepping ahead or back in increments as small as one second. The display shows



Nagaoka CD Cleaning System

The Nagaoka CD-1100K cleaning system for Compact Discs includes a nonabrasive solvent spray, a lamb's wool buffer, and a storage base which also holds the disc during cleaning. The importer, MicroFidelity, claims endorsements from several manufacturers of Compact Discs. Price \$29.95. For literature, circle No. 102

track or index number, elapsed time in track or time remaining on the disc. Price: \$548.00. For literature, circle No. 103

Martin-Logan Electrostatic Speaker

The Martin-Logan Monolith is a full-range electrostatic speaker with unusual properties. The diaphragm is cylindrically shaped for wider dispersion; below 100 Hz, a subwoofer provides bass power. Sensitivity is 90 dB for 1 watt input at 1 meter, allowing 113 dB SPL output from a 100-watt amplifier; impedance is 6 to 8 ohms at all frequencies. Price: \$4,250.00 per pair. For literature, circle No. 104



NAD Compact Disc Player

The drawer-loading NAD 5255 CD player offers several ways of accessing music: "Skip" buttons jump the laser to the next or



MAXIMUM MUSIC AT MINIMUM COST

STEP
NUMBER



GETTING THE RECORD TOTALLY CLEAN BEFORE YOU PLAY IT

That new record you just bought may *look* clean on the surface, but it's not.

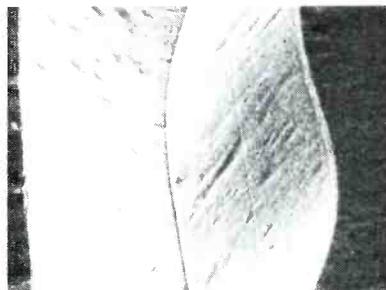
The music comes out of the grooves, and every record ever made left the record company with traces of compounds still in the grooves from the record pressing process. To get the full sound you paid for when you bought the record, you'll have to clean the record before you play it. After all, it just makes sense that clean sound starts with a clean record.

But here's the problem: the water-based cleaner that came with the nice wooden handle just won't do the job, because the deposits and trace compounds on your record are not water-soluble.

Older records are an even bigger problem, because so many of the contaminants like air pollution and fingerprints simply cannot be removed by water-based cleaners effectively.

That's why we developed LAST® System Formula 1™, Extra-Strength Record Cleaner, the first step in our system formula series. Formulated for first-play and deep-cleaning use, LAST Extra Strength Record Cleaner is guaranteed to remove all record surface contaminants...*safely*.

LAST System Formula 1 Extra-Strength Record Cleaner is an exclusive formula, designed specifically for use on records, and is guaranteed safe and guaranteed effective. What's more, it's easy to use, with one-step application and drying that takes only seconds.



DEEP-CLEANED WEAR-PROTECTED & MAINTAINED WITH LAST SYSTEM FORMULAS (AFTER 200 PLAYS)



WE KEEP YOUR
RECORDS SOUNDING
BRAND NEW

LAST

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SYSTEM FORMULA 2: RECORD PRESERVATIVE
SYSTEM FORMULA 3: ALL-PURPOSE RECORD CLEANER
SYSTEM FORMULA 4: STYLUS CLEANER
SYSTEM FORMULA 5: STYLAST STYLUS TREATMENT

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LAST System Formulas are sold separately and in convenient combination kits, from professional-use sizes to low-cost trial sizes. For the dealer nearest you or to order if no dealer is near you, call TOLL FREE 800-223-LAST (California 800-222-LAST)

Enter No. 37 on Reader Service Card

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MAXIMUM MUSIC AT MINIMUM COST

STEP
NUMBER **2**

SOLVING THE PROBLEM OF RECORD WEAR: "BRAND NEW" SOUND EVERY TIME

People who are serious about their music know that every time a record is played, there is a little more noise, a few more "pops" and "clicks" until one day, it's just not enjoyable to listen to that album any more. In technical terms, the record has been subject to microscopic "shock-wave fracturing" with every play.

The problem is so severe that a lot of people actually go to the trouble and expense of recording their favorite albums as soon as they buy them, or sometimes are just afraid to play their albums at all.

If this sounds like you, you can stop cheating yourself out of musical enjoyment as of right now.

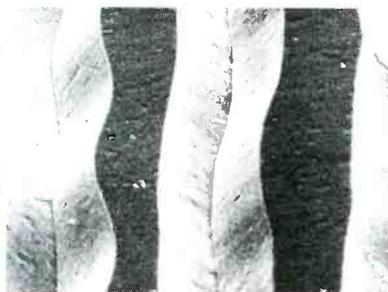
Why? Because one of the best-kept secrets in the world of sound is LAST System Formula 2, Record Preservative... a unique chemical treatment that actually *stops record wear completely*. There is nothing like it on the market.

Remarkable as this may seem, LAST System Formula 2 Record Preservative is absorbed into the record vinyl itself, below the surface, and making the vinyl more stable, enables the record groove to withstand repeated plays without wear. Quite simply, your records do not wear out when treated with LAST System Formula 2 Record Preservative. The best part is that LAST System Formula 2 Record Preservative is an inexpensive, one-time treatment that takes only 30 seconds, and is guaranteed to *wear-protect* a record for 200 plays or more.

Now, imagine playing the first record you ever bought and hearing it sound as good as the first play. (...or better, if you've up-graded your system since then). You get brand new sound every time when your records have been "wear-protected" with LAST System Formula 2 Record Preservative.



NEW, UNTREATED RECORD. 50 PLAYS



MICROSCOPIC PHOTO OF LAST-TREATED RECORD. 200 PLAYS



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RECORDS SOUNDING
BRAND NEW

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MAXIMUM MUSIC AT MINIMUM COST

STEP
NUMBER

3

KEEPING YOUR RECORDS CLEAN (... WITHOUT MAKING MATTERS WORSE)

We admit that at first glance, "record cleaners" look pretty much alike, and they all seem to do just about the same thing: get the dust off.

The problem is not so much what the record cleaner will get off your record, but what it *leaves on* in the way of residue. Unfortunately, many music lovers get distracted by the aesthetics of walnut-handled brushes and polished aluminum brushes, when it's the record-cleaning fluid that will go on and in some cases, stay on the record.

LAST System Formula 3 All-Purpose Record Cleaner is formulated to maintain a clean record surface, without any trace of residue. It is easy to apply, dries quickly and is extremely economical, since one kit will clean hundreds of records. As the name implies, LAST All-Purpose Record Cleaner is for regular use, safe for use every time you play a record. Each kit contains a scientifically-designed applicator with an optimum surface area made

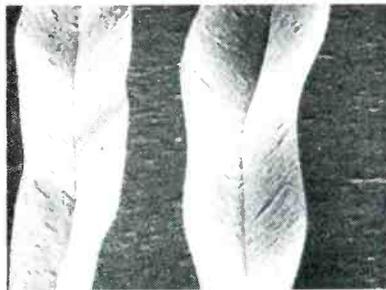
with light-colored microfibre so you can see how effective the cleaning action is.

Perhaps most importantly, LAST System Formula 3 All-Purpose Record Cleaner is an integral part of the LAST System Formula Series of Record and Stylus Care Components. Each formula works together, guaranteed to be effective in bringing you unparalleled sound from your present system.

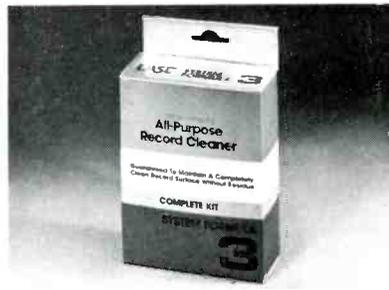
We recommend that for maximum results, you first use LAST System Formula 1 Extra Strength Record Cleaner to remove all stubborn contaminants that get between you and your sound...second, *wear-protect* your records with LAST System Formula 2 Record Preservative to keep your records sounding new for 200 plays or more...and third, use LAST System Formula 3 All-Purpose Record cleaner to maintain the clean, wear-protected surface free of annoying "pops" and "clicks."



RECORD TREATED WITH WELL-KNOWN PRODUCT:
50 PLAYS



DEEP-CLEANED WEAR-PROTECTED & MAINTAINED
WITH LAST SYSTEM FORMULAS (AFTER 200 PLAYS)



WE KEEP YOUR
RECORDS SOUNDING
BRAND NEW

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STEP NUMBER **4**

CLEANING YOUR STYLUS (...BUT WHY BOTHRER?)

In the "old days" it was a fairly common sight to see someone "clean the needle" of the phonograph with a fingertip.

Today's technologically advanced stylus/cartridge assemblies have made that a very bad idea, indeed. But the problem still remains... how to clean the stylus?

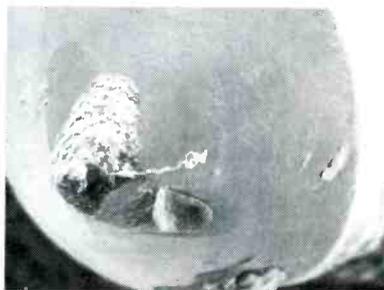
The real problem is much worse than it looks, because deposits on the stylus are almost impossible to see except under magnification, but these tiny deposits can cause big problems, like increased friction, noise, greatly increased record wear, and scratchy-sounding groove damage. (See below)

So what? A dirty stylus can change some of the music on your record into noise... permanently. Not only that, but a dirty stylus doesn't track properly, so no matter how you look at it, you're just not getting all the music from your record. Your stylus becomes very hot (in

excess of 350°) so deposits are literally "baked" on the tip, particularly if the record hasn't been *deep-cleaned* and *wear-protected*. (See "Step #1" and "Step #2")

But it's so easy and economical to solve this problem with LAST System Formula 4 Stylus Cleaner. And since LAST Stylus Cleaner doesn't contain alcohol, it's completely safe for *all* cartridge assemblies. Each kit costs so little, yet contains a stylus cleaning brush with enough formula to clean your stylus thousands of times.

As with each product in the LAST System Formula Series, LAST System Formula 4 Stylus Cleaner is guaranteed effective... guaranteed to safely remove all stylus deposits. To our knowledge, it's the only product that is *guaranteed to work*.



STYLUS WITH "BAKED-ON" DEPOSITS



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STEP
NUMBER

5

TREATING YOUR STYLUS TO A MILE OF MUSIC

Fact: Your stylus travels about one mile through record grooves every time you play an album. Add to that the fact that the pressure of the stylus on the record groove is measured in "tons per square-inch" and you've got some idea of what your stylus is going through in order to make the music you're hearing.

Consider also that the stylus is the very point at which musical information enters the stereo system, and that if you expect absolutely perfect sound, the contact between the stylus and the record has to be perfect. In other words, a small problem with your stylus makes for big problems with getting all the music you want to hear. And a worn stylus not only doesn't work very well, but can gouge a record groove so as to change music into noise ... permanently.

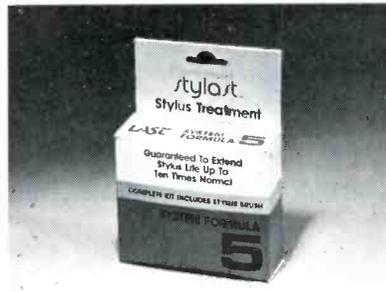
The good news is that it's easy and inexpensive to solve these problems once

and for all... with LAST System Formula 5, STYLAST™ Stylus Treatment. Not only does LAST Stylast Stylus Treatment improve that all-important contact between stylus and record groove, but it's guaranteed to extend stylus life up to ten times normal while maintaining the critical flexibility of the stylus suspension.

Using the LAST System Formula Series of products is just about standard operating procedure at places like the Consumer Electronics Show and whenever people who know good sound want to hear what's really on the record and want to hear the same great sound the same way every time. And why not? Using the entire LAST System Formula series costs only about a penny per play.



STYLAST PREVENTS THIS STYLUS WEAR



WE KEEP YOUR
RECORDS SOUNDING
BRAND NEW

LAST

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THE LAST[®] SYSTEM FORMULA SERIES OF RECORD AND STYLUS CARE IS WORTH LOOKING FOR

We wish we could say that the LAST System Formula Series of record and stylus care components was in every single record and stereo dealer, but it's not.

Up until now, only select dealers have made LAST[®] products available to professionals and serious music lovers...because a lot of professionals say it's the only system they will use. And thousands of serious music lovers who have tried everything use LAST[®] products every time. But it's the classic case of great products that have been a sort of "secret discovery" for people who want to get the most music from their records and equipment.

Still, you'll have to look for the LAST System Formula Series and ask your dealer more than once.

LAST SYSTEM FORMULA 1 EXTRA-STRENGTH RECORD CLEANER:

For first-play and deep-cleaning use-guaranteed to safely remove all record surface contaminants.

LAST SYSTEM FORMULA 2 RECORD PRESERVATIVE:

Guaranteed to wear-protect records and keep them sounding brand-new for 200 plays or more.

LAST SYSTEM FORMULA 3 ALL-PURPOSE RECORD CLEANER:

Guaranteed to maintain a completely clean record surface without residue.

LAST SYSTEM FORMULA 4 STYLUS CLEANER:

Guaranteed to safely remove all stylus deposits.

LAST SYSTEM FORMULA 5 STYLAST[™] STYLUS TREATMENT:

Guaranteed to extend stylus life up to 10 times normal.

LAST
SYSTEM
FORMULA
SERIES

For the dealer nearest you,
call TOLL-FREE
800-223-LAST

(800-222-LAST in California)



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BRAND NEW

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Pyle Speakers

Only 1½ in. of mounting depth is required for the Pyle FS65C100-FR coaxial speaker. It uses a ribbon tweeter and a 6½-in. woofer, available with either paper or polypropylene cone.

Price: \$129.95 per pair.
For literature, circle No. 105



Zapco Amplifier

Zapco's most powerful amplifier, the System 200, delivers 100 watts per channel (bridgable to 210 watts, mono) at 0.15% distortion. It features a separate power supply, gold-plated phono input jacks and an alternator-



whine rejection circuit. Also available is the 200A, with hand-selected, matched components and better specs (0.03% THD, stereo slew rate of 50 V/μS).

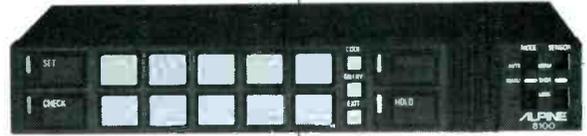
Price: System 200, \$570.00; System 200A, \$760.00.
For literature, circle No. 106

Alpine Car Alarm

The lowest-priced of three new alarm systems from Alpine, the 8100, features a Computer Servo Motion Sensor which can be used even when parking on hills, a 110-dB siren and an ignition-kill circuit. If

triggered, the alarm runs for a preset time of one to four minutes, then silences and rearms. Sensors detect motion, shock and noise. The alarm allows sensor checking and valet parking. Price: \$249.95.

For literature, circle No. 108



Panasonic Receiver

Both dbx and Dolby B NR systems are included in this CQ-S934 receiver. The tuner section features Panasonic's Hypertuner FM

circuitry, with seek, scan and Daily Priority Station (which tunes in one FM or AM station at the same time each day). Price: \$429.95.

For literature, circle No. 109



Mitsubishi Car Stereo

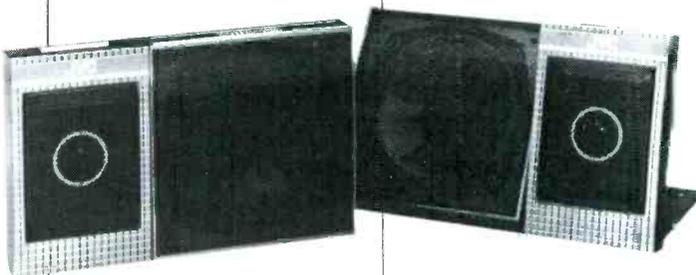
Tuning buttons are conveniently placed across the top of the panel in Mitsubishi's RX-731 car stereo receiver. Other features include full auto-stop at power-off or tape

end, automatic seek plus rotary manual tuning, four-speaker fader and loudness compensation. Power output is 7 watts maximum continuous into 4 ohms. Price: \$199.95.

For literature, circle No. 110

Parasound Speakers

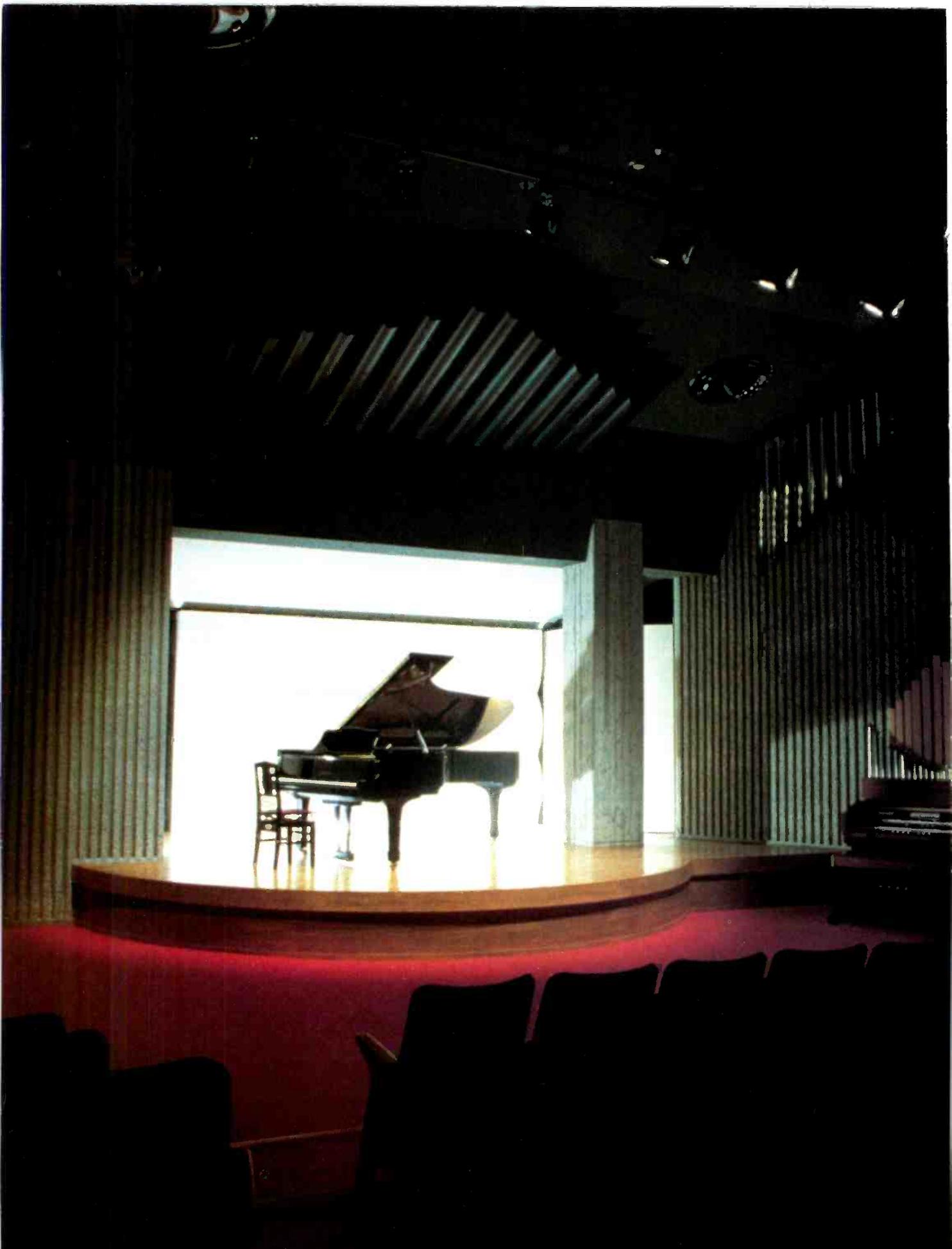
These two-way plate speakers have 4-in. polypropylene woofers and 1-in. tweeters, crossing over at 2.6 kHz. Frequency response of the Model CMS250 is rated as 65 Hz to 22 kHz, ±4 dB. Price: \$149.95 per pair. For literature, circle No. 111



JVC Speakers

JVC's Audio Express CS-100K plate speaker has some unusual features: Its woofer and tweeter can be separated or installed as a single unit, and the tweeter can be angled up to 90°

from the mounting panel. The 5¼-in. woofer has an olefin cone for moisture and heat resistance. Mounting depth is only 1⅝ in. Price: \$239.75 per pair. For literature, circle No. 107



Nakamichi Sound Research Center Concert Hall

This is Nakamichi

Nakamichi—The *first* name in cassette recording

In 1973 we shocked the world by introducing the Nakamichi 1000—the first “Discrete 3-Head” cassette deck—the first cassette recorder that *outperformed* the open-reel decks of its day.

In the past decade, Nakamichi has shattered one technological barrier after another with such innovations as NAAC, our Auto Azimuth Correction system, UDAR, our unique *Unidirectional Auto Reverse*

mechanism, and our exclusive Asymmetrical Dual-Capstan Diffused-Resonance transport, quite simply, the world's most *precise* tape drive.

As impressive as these technological breakthroughs are, they are merely means to an end—*sound purity!* Hearing is believing. Listen to *any* of our decks and you'll be convinced that Nakamichi Sound is in a class by itself—pure, clean,

transparent, utterly refreshing, and quite unlike ordinary cassette sound.

Nakamichi Sound characterizes our entire line from the inexpensive BX-1 to the exotic DRAGON. When you pay less for a Nakamichi deck, you get fewer features—not inferior sound! Each Nakamichi design must pass the *ultimate* test—critical live vs. recorded listening in our Sound Research Center Concert Hall.



DRAGON Auto Reverse Cassette Deck

The world's first Discrete 3-Head Dual-Capstan Direct-Drive Auto-Reverse Cassette Deck. Nakamichi's unique Auto Azimuth Correction system—NAAC—guarantees 20-22,000 Hz response in *both* playback directions!



ZX-9 Discrete 3-Head Cassette Deck

The *perfectionist's* cassette recorder. Azimuth, bias, and sensitivity calibration controls for perfect recording on virtually any tape and our unique SLT direct-drive motor for flutter-free reproduction.



RX-505 Unidirectional Auto-Reverse Discrete 3-Head Cassette Deck

Our exclusive UDAR mechanism combines unidirectional performance with auto-reverse convenience. Discrete 3-Head recording and playback on both sides! The 2-Head RX-303 and RX-202 offer UDAR performance and many unique features.



LX-5 Discrete 3-Head Cassette Deck

Revel in the aesthetic luxury of the LX-5 and companion 2-Head LX-3. Tap the right panel to reveal the hidden controls, then sit back and enjoy the unique purity of Nakamichi Sound. A feast for the eyes and ears!



BX-150 2-Head Cassette Deck

Designed for those who appreciate simple virtuosity, the BX-150 and BX-100 demonstrate the sound purity that can be realized at an economical price. Compare them with decks costing much more. You'll be surprised!



BX-1 2-Head Cassette Deck

Think you can't afford Nakamichi Sound? Think again! The remarkable BX-1 costs less than \$300, but outperforms decks at twice the price. Hearing is believing so audition one now and convince yourself!



Nakamichi U.S.A. Corporation 19701 South Vermont Ave., Torrance, CA 90502 (213) 538-8150
In Canada W. Carsen Co., Ltd., 25 Scarsdale Road, Don Mills, Ontario M3B 3G7



The Nakamichi DRAGON The Most Incredible Creature Of The Decade

Dragon—the first deck to reproduce every cassette with exquisite clarity and definition. Dragon's revolutionary NAAC (Nakamichi Auto Azimuth Correction) system determines the actual recorded azimuth and continuously manipulates the *play-back* head into perfect alignment *without* special test tones—*automatically*—on every cassette. Restored are the missing highs that have made pre-recorded cassettes (and many home-recorded ones!) inferior to phonograph records. Gone is the dullness caused by noise-reduction systems that don't receive all the high-frequency energy that was recorded. Move into the future with a deck that's already there!

Dragon—Nakamichi's first auto-reverse deck. Not until we created NAAC to correct the playback-azimuth error that occurs when tape is reproduced in the reverse direction would we put our name on an auto-reverse deck.

Dragon—the world's first deck to reproduce in *both* directions with equal perfection, the first auto-reverse deck to employ Asymmetrical Dual Capstans, each directly driven by its own Super Linear Torque DD Motor electronically locked to a precision quartz-crystal reference for amazingly low flutter.

Dragon—with a full complement of "traditional" Nakamichi features and such new innovations as switchable subsonic filters to prevent tape overload when recording a warped record and an Auto Rec Pause that triggers automatically whenever a 10-second program break is detected!

Dragon—another Nakamichi miracle! See it now at your Nakamichi dealer.



Nakamichi U.S.A. Corporation, 19701 South Vermont Ave., Torrance, CA 90502

To Nakamichi, Convenience without performance is unthinkable.

Now you have a choice of three Nakamichi Auto-Reverse Cassette decks—each with UDAR, Nakamichi's revolutionary *Unidirectional Auto Reverse* mechanism that eliminates bidirectional azimuth error and assures you of 20-20,000 Hz response on *both* sides of the cassette.

UDAR is simple, fast, and reliable. It automates the steps you perform on a conventional one-way deck. At the end of each side, UDAR disengages the cassette, flips it, reloads, and resumes operation *in under 2 seconds*. Tape plays in the *same* direction on Side A *and* on Side B so performance is everything you've come to expect from traditional Nakamichi decks—and more!

Every RX-Series deck records and plays *both*

sides of the cassette automatically. Auto Rec Standby simplifies recording setup on *each* side while a Dual-Speed Master Fader helps you make truly professional tapes. Direct Operation loads and initiates the desired function at a touch, and Auto Skip provides virtually continuous playback!

UDAR—the revolutionary auto-reverse recording and playback system—only from Nakamichi. Check out the RX Series now at your local Nakamichi dealer. One audition will convince you there's no longer a reason to sacrifice unidirectional performance for auto-reverse convenience!

19701 South Vermont Ave., Torrance, CA 90502 In Canada: W. Carsen Co., Ltd. 25 Scarsdale Road, Don Mills, Ontario M3B 3G7



RX-505

The world's first *Discrete 3-Head Auto-Reverse* Cassette Recorder. Quite simply, the best!

RX-303

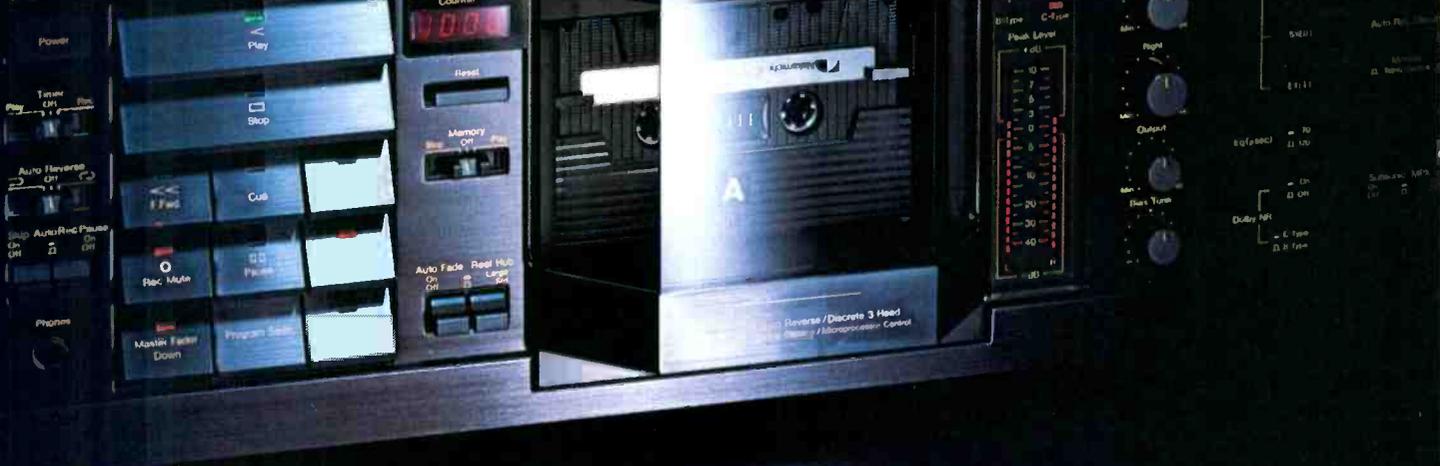
The RX-505's only rival. Record/Playback Auto Reverse in a 2-Head Dual-Capstan configuration.



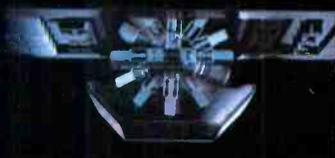
RX-202

The origin of the UDAR revolution. The basic *Unidirectional Auto-Reverse* deck that outperforms the pack.

RX-505 Unidirectional Auto Reverse Cassette Deck



Nakamichi didn't invent auto reverse... We perfected it!...The RX-505



Unidirectional Auto Reverse Mechanism



Discrete 3-Head Configuration



Asymmetrical Dual-Capstan Transport



Precision Electronics

If you're willing to gamble performance, choose *any* auto-reverse deck. If gambling isn't your style, audition the RX-505—the auto-reverse deck that meets *Nakamichi* standards of perfection.

We *invented* the Discrete 3-Head configuration to ensure you of *total* performance. We know that only *physically* discrete recording and playback heads can be adjusted for perfect magnetic azimuth and optimized to utilize a tape's *full* potential.

We *invented* the Asymmetrical Dual-Capstan Dif-fused-Resonance transport to eliminate vibration-induced flutter and isolate the tape from reel perturbations. We perfected the transport so inter-capstan guides and pressure pads aren't required. With them removed, scrape flutter is gone and music emerges with *incredible* clarity.

We created precision equalizers and direct-coupled electronics to match our unique recording and playback heads and ensure unparalleled response and remarkably low distortion.

Until now, these tech-

nologies couldn't be applied to an auto-reverse deck that *records* and plays in both directions. Our newest creation—UDAR—Unidirectional Auto Reverse—changes that.

UDAR is a radically new concept in auto reverse. Tape doesn't change direction; the head doesn't "flip over." Such tricks cause azimuth misalignment and destroy frequency response. Instead, UDAR turns the *cassette* as you do by hand. UDAR is fast, reliable, and gentle. And, since the tape always moves in the *same* direction, there's *no* bidirectional azimuth error. The RX-505 provides *Nakamichi* performance on *both* sides!

Learn what *perfect* auto reverse is all about. Audition the RX-505 at your Nakamichi dealer. It has everything you expect from Nakamichi—and many

unique features that make auto-reverse *recording* easier than ever. You'll also find the RX-303—a 2-Head deck with the same transport and many of the features of the RX-505.

For more information, write Nakamichi U.S.A. Corporation, 19701 South Vermont Ave., Torrance, CA 90502



 Nakamichi



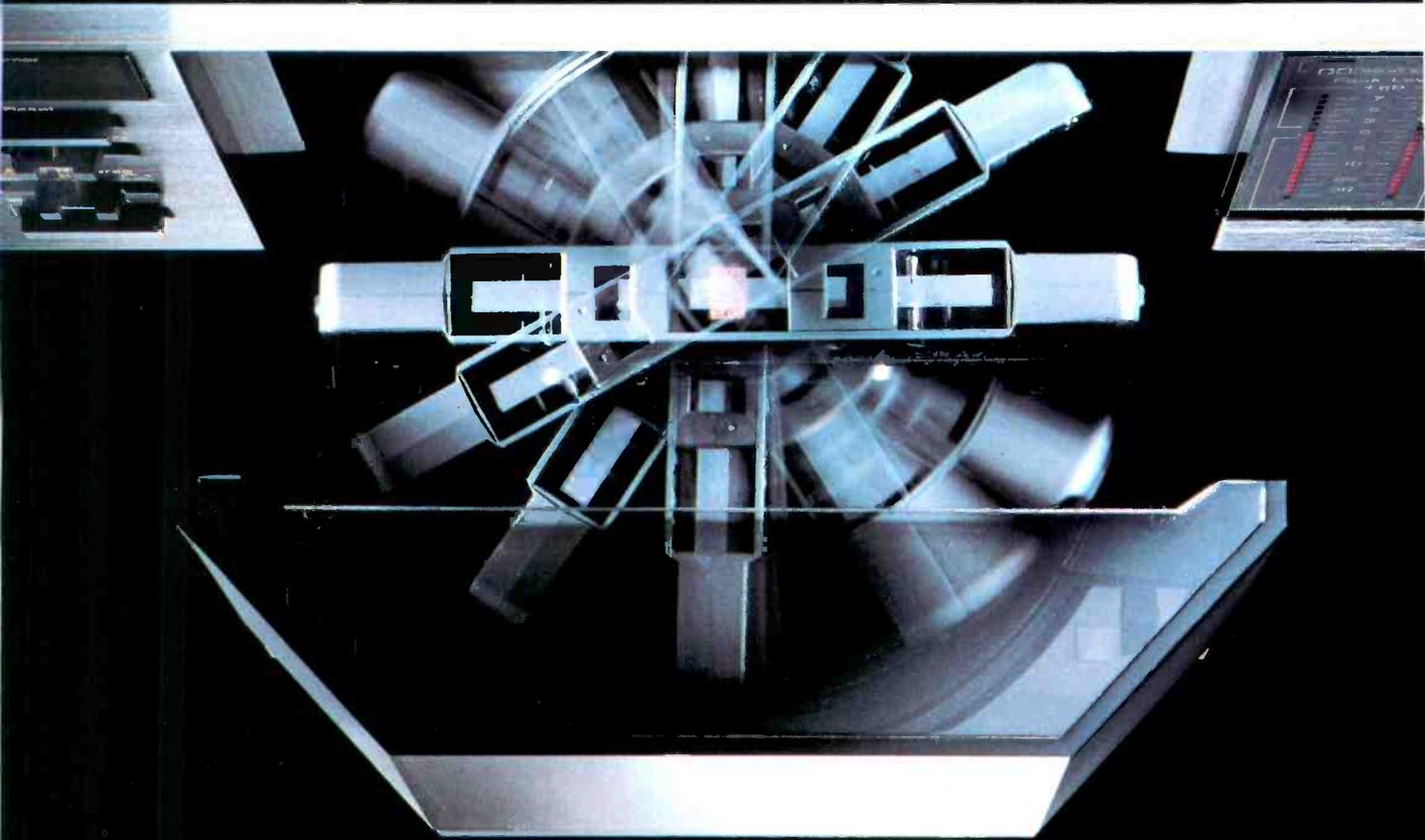
Nakamichi

RX-202 Unidirectional Auto Reverse Cassette Deck

RX-202 Unidirectional Auto Reverse Cassette Deck



Unidirectional Auto Reverse A Revolutionary Auto-Reverse System!



There's no denying that auto-reverse operation is convenient. There's no denying that it's desirable. But there's also no denying that conventional auto-reverse decks do not perform as well on Side B as on Side A.

Conventional auto-reverse decks are *bidirectional*, that is, the tape changes direction at the end of each side. On Side A, tape travels from left to right; on side B it moves from right to left. This creates a number of technical problems, the most important being "bidirectional azimuth error."

"Bidirectional azimuth error," like any azimuth misalignment causes a loss of high-frequency response. Noise reduction systems compound the error. The result is dull lifeless sound. Nakamichi was the first to solve the bidirectional azimuth problem by creating NAAC—the Nakamichi Auto Azimuth Correction system found in DRAGON and in the Nakamichi Mobile Sound System. NAAC actually tracks the azimuth of the *recording* but doing so requires exotic and expensive technology.

Now Nakamichi introduces a revolutionary new auto-reverse system that eliminates "bidirectional azimuth error" by *avoiding* it altogether. *UDAR*—the Nakamichi *Unidirectional Auto Reverse* mechanism—flips the cassette at the end of each side just as you do by hand on a conventional deck. And UDAR is fast! In just over a second, UDAR disengages the cassette from the transport, turns it end for end, reloads it, and resumes normal operation!

UDAR is independent of the transport so it does not affect mechanical operation in any way. And, since tape moves in the *same* direction on *both* sides, there's no bidirectional azimuth error. Response is as perfect on Side B as on Side A!

UDAR provides *auto-reverse* convenience and *unidirectional* performance—a combination unachievable with any other system save NAAC! And, UDAR offers a number of features of its own—like Direct Operation and Single-Head Bidirectional Recording. UDAR—the revolutionary auto-reverse system—only from Nakamichi!



The RX-202 With UDAR Auto Reverse Convenience... Unidirectional Performance!

What's wrong with ordinary auto reverse?

Nothing would be wrong with conventional auto reverse if cassettes were perfect. Unfortunately, they're not! Tape can't be made to perfectly uniform width. Housings can't be molded to zero tolerance. And, tolerances can't be ignored!

Cassette guides must be broad enough to accommodate the widest tape. Most of the time, the tape is narrower and is guided by one edge. It's impossible to guarantee that the pins on which the guides rotate are perfectly perpendicular to the direction of motion. The tape edge in contact with the roller then forces the guide up or down the pin.

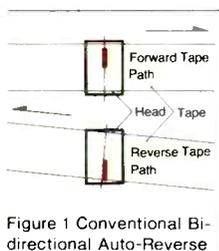


Figure 1 Conventional Bi-directional Auto-Reverse

As long as the tape moves in one direction, equilibrium is established. The tape carries the guide to one side and it stays there. But when direction is reversed, the tape

is likely to carry the guide to the opposite side of the pin and track differently.

That's the "bidirectional azimuth problem" in a nutshell. Conventional auto-reverse decks change *tape* direction going from Side A to Side B. On Side A, tape moves from left to right; on Side B, it moves from right to left. If the tape was recorded moving from left to right—the normal case—there probably will be azimuth error when it's played from right to left.

Even a tiny error has considerable effect on high-frequency response. An error of 2/15 of a degree causes a 3-dB loss at 10kHz and eliminates 20-kHz information entirely, and noise-reduction systems compound the problem.

The RX-202... Unconventional Auto Reverse!

Nakamichi always has been keenly aware of the "bidirectional azimuth problem" and, for years, offered only *unidirectional* cassette recorders for we could not sacrifice performance for convenience!

NAAC—Nakamichi Auto Azimuth Correction used in the DRAGON and TD-1200 Mobile Tuner/Cassette Deck—eliminates azimuth error entirely by *tracking* recorded azimuth and aligning the playback head with it automatically.

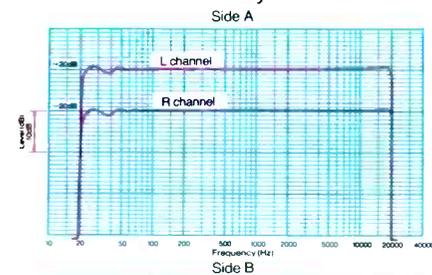


Figure 2 Playback Frequency Response
PB Eq 70 μ s Level -20 dB NR OFF Tape ZX (Metal)

UDAR—*Unidirectional Auto Reverse*—featured in the RX-202 *avoids* bidirectional azimuth error altogether!

Unidirectional Auto Reverse... Convenience Without Compromise!

UDAR offers the convenience of conventional auto-reverse and the performance for which Nakamichi is famous. The concept is so simple that it's elegant.

UDAR *automates* the actions *you* perform when the tape runs out. At the end of a side, UDAR disengages the cassette, turns it around, reloads it, and resumes operation. Simple! Reliable! Effective! And *fast!* UDAR flips the cassette and is back in operation in just over a second!

The RX-202 transport is *Unidirectional*. Tape *always* moves in the *same* way in which it was recorded so there is *no* "bidirectional azimuth error." Response is as perfect on Side B as on Side A—flat from 20 Hz to 20 kHz! And, with unidirectional motion, fast forward always moves the tape towards the *end* of the side, reverse towards the *beginning* so you're never confused as with some bidirectional decks.

UDAR performs every normal auto-reverse operation: "one-way," "once-through," or "continuous" playback *and* "one-way" or "once-through" recording. Sides change automatically when the tape runs out or whenever you press REVERSE. UDAR is independent of the transport and so does not affect mechanical precision in any way. It's operated by its own motor and controlled by a microprocessor that prevents mistakes.

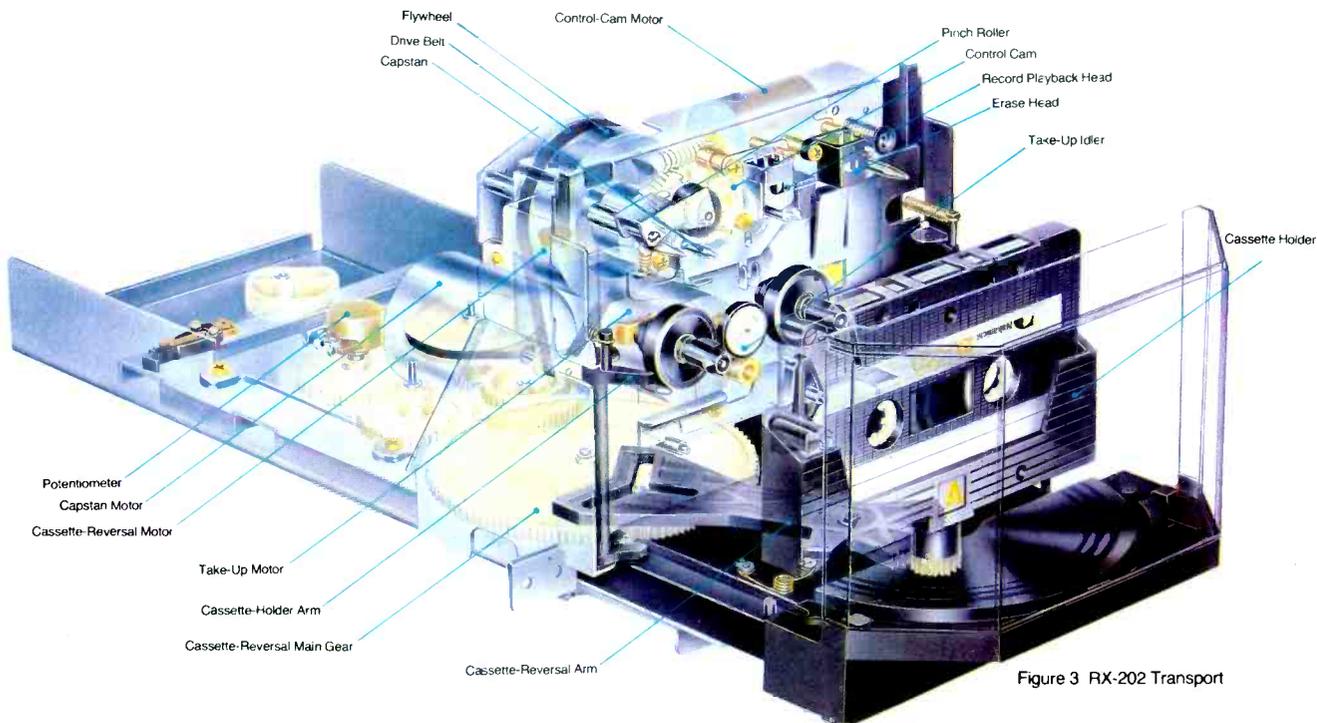


Figure 3 RX-202 Transport

A New Era In Auto-Reverse Operation With Features To Match

Direct Operation and Program Monitor

UDAR's microprocessor is very "smart." It operates the transport itself which makes possible some unusual features—like "Direct Operation" and "Program Monitoring."

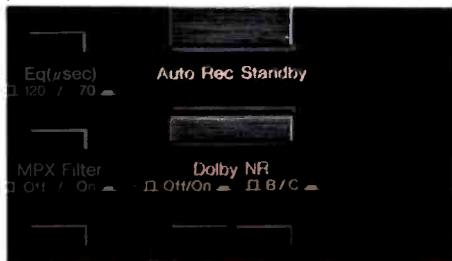
To play a cassette, just drop it in and press PLAY. UDAR loads the cassette, closes the door, and the RX-202 enters the playback mode. Any mode can be entered directly merely by inserting a cassette and touching one button!

During playback, UDAR monitors the tape and, when it finds the end of the program (indicated by a 40-second blank), fast forwards to the end of the side and flips the cassette so there's no long wait for a blank "tail" to play through.

Recording has never been easier!

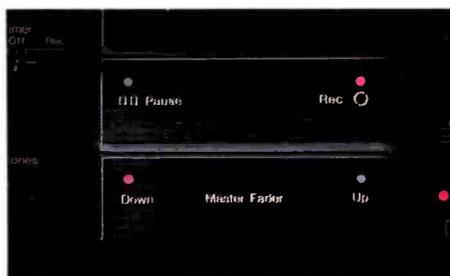
The RX-202 records *both* sides of the tape using the *same* record and erase heads to ensure *identical* performance on Side B and on Side A.

Nakamichi's "Auto Rec Standby" feature makes recording simpler than ever. Say you've started to record a disc and miss the



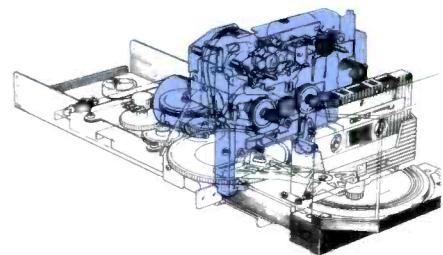
beginning. One touch of the button rewinds the tape, fast forwards through the leader, records a 6-second blank header, resets the tape counter and leaves the RX-202 in the record-standby mode ready to try again. If you're approaching the end of Side A and wish to start the next selection on Side B, press Auto Rec Standby twice in succession. The RX-202 fast forwards to the end of Side A, flips the cassette, skips through the leader, records a blank header, resets the counter, and is ready to record the next selection!

Recording level is set by independent left- and right-channel sliders and monitored by two fast-acting peak-responding LED indicators that span a 37-dB range (from -30 dB to +7 dB).



You can create professional fades in recording level very easily with the Nakamichi Dual-Speed Master Fader. One tap on UP or DOWN creates a smooth 4-second sweep to or from the maximum levels you've set on the sliders. If you press and hold either button, the fade occurs in 2 seconds. Used in tandem, the Master Fader and Auto Rec Standby controls help create tapes with minimum interruption between two sides. You can fade out Side A and fade in Side B without resetting recording level and without reentering the recording mode.

High-performance single-capstan transport



Reel torque and chassis vibration affect tape motion and produce flutter that is not revealed by specifications. Weighted measurements ignore high-frequency flutter although it destroys clarity. Eliminating it is the key to achieving "Nakamichi Sound!"

The RX-202 is powered by four motors: one for UDAR, another to drive the reels, a third for the capstan, and a fourth to operate the unique Nakamichi Motor-Driven-Cam control system. By maintaining functional independence, speed stability is improved and flutter minimized.

In a single-capstan transport, reel-torque variations enter the tape path. The RX-202 uses a reel-drive motor specially developed to produce uniform torque. A precision metal pulley (instead of plastic wheel) transmits the torque, and the RX-202 actually produces less wow than many dual-capstan decks!

The unique Nakamichi Motor-Driven-Cam control system eliminates solenoid vibration, generates less heat, and is much more gentle. The cam brings the heads up to the



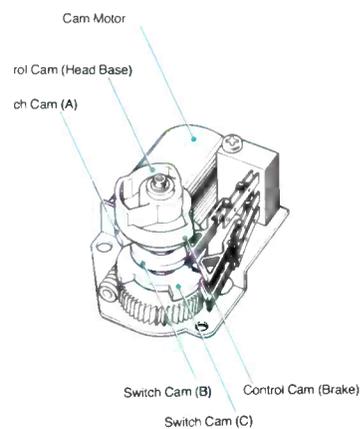


Figure 4 Motor-Driven-Cam Assembly Diagram

	Control Cam Shaft	Cam Position Switch (K2)	Cam Position Switch (K1)	Cam Position Switch (K0)	K ₂	K ₁	K ₀
FF/REW					1	1	1
STOP					1	0	0
PAUSE					1	0	1
REC/PLAY					0	1	0
					0	1	1

Figure 5 Cam Positions And Codes

operate very rapidly but, just before contact, slows down and eases into position to preserve head alignment. The Motor-Driven Cam is supervised by a microprocessor that scans the keyboard, monitors cam position, and inserts the necessary steps so you can go directly between modes without tape damage.

Head performance that rivals most 3-head decks!

Using a single head for recording and playback presents significant problems. The gap must be wide enough for recording, yet narrow enough to resolve extremely short wavelengths in playback. The core must have sufficient flux-handling ability to record metal tape, yet sufficient permeability to serve as a sensitive playback device.

These conflicting requirements are exquisitely balanced in the RP-2D R/P head

whose response rivals that of many 3-head systems! Its high-permeability laminated-sandust core provides almost 7 dB headroom on metal tape yet its 1.2-micron gap permits uniform response to 20 kHz on playback. And, low-frequency response is virtually free of "head bumps" thanks to Nakamichi's special hyperbolic contour.

The E-2D erase head's double-gap construction and low-loss ferrite core allow operation at very high frequency and drive level without overheating and so ensure complete erasure of high-coercivity, high-remanence metal tape.

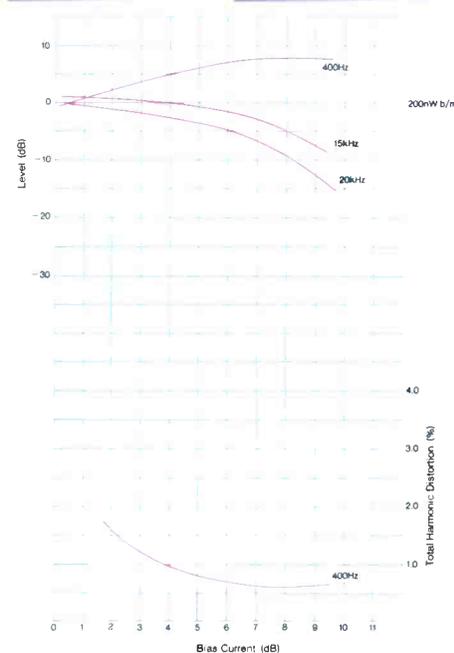
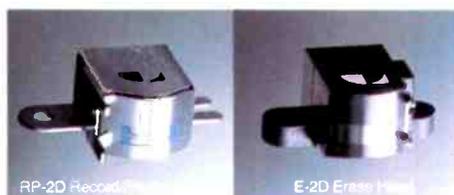


Figure 6 RP-2D Record/Play Head MOL/THD vs. Bias Current
Tape : ZX
Bias Freq. : 105 kHz

Nakamichi high-performance electronics

A cassette deck's record and playback amplifiers are just as important as its heads and transport. The RX-202 record circuits use high-performance low-noise operational amplifiers of extremely wide dynamic range. Nakamichi's renowned "Double-NF" topology reduces distortion and ensures accurate equalization.

The playback preamp also uses Double-NF equalization but is discretely configured from low-noise transistors that are perfectly matched to the playback head to ensure highest reproduction quality.

The bias oscillator operates at an extremely high frequency to prevent program intermodulation. Special care was taken to eliminate even-harmonic distortion and to provide superior level stability.

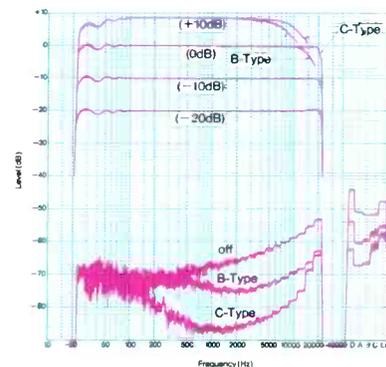


Figure 7 RX-202 Frequency Response/Noise Analysis

Tape Deck : RX-202
Tape : ZX (Metal)
PB Eq. : 70 μs

Painstaking adjustments ensure that your RX-202 meets specifications

Tolerances are inherent in every device much as we strive to minimize them. When tolerances are allowed to accumulate, performance varies from deck to deck even though "average production" may be fine.

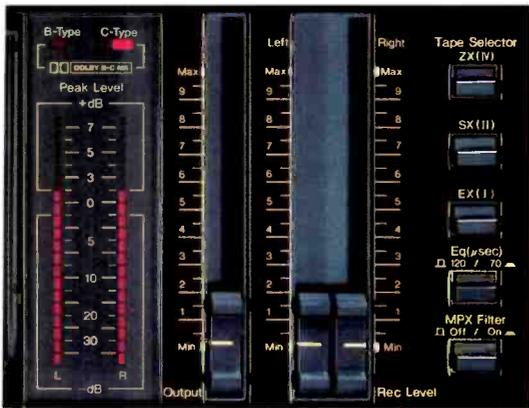
Internal controls are expensive, but without numerous internal adjustments it is impossible to calibrate a deck and prevent tolerance accumulation. And, unless individual internal adjustments are provided, it is impossible to recalibrate the deck for new tapes.

To achieve our goal of "zero-tolerance production," each RX-202 has numerous internal controls. Every deck is hand tested and calibrated before it leaves the factory. Bias and recording level are set independently for each track and for each major tape type—Normal, Chrome, and Metal. In all, more than 30 individual adjustments were made to your RX-202 before it left the factory!



RX-202 FEATURES

- Unique Nakamichi Uni-Directional Auto-Reverse (UDAR) Mechanism Eliminates The Azimuth-Error Loss Of Conventional Auto-Reverse Decks
- Auto Rec Standby Automatically Rewinds The Tape, Skips Over The Leader, Records A 6-Second Blank Header, And Activates The Record Standby Mode. Pressed Twice During Recording, Auto Rec Standby Instantly Advances The Tape To The End, Switches To Side B, Skips The Leader, Records A Blank Header, And Enters Record Standby
- Music-Sensing Circuit Monitors Playback And Fast-Forwards Through Blank "Tail" To Provide Uninterrupted Playback
- Direct Operation Automatically Loads And Initiates The Desired Function
- Dual-Speed Master Fader Creates Smooth 4- Or 2-Second Fades At A Touch
- Microprocessor-Controlled Silent Tape Transport Ensures Smooth Operation And Minimum Flutter
- Frequency Response Rivals That Of Most Three-Head Decks Thanks To A Specially Designed Laminated-Sendust Record/Play Head
- Precision Manufacturing And Quality Control With More Than 30 Individual Adjustments On Each Deck
- Dolby B- And C-Type Noise Reduction With Defeatable MPX Filter
- Independent Tape And Equalization Switches To Accommodate All Tape Types
- Independent Record Level Sliders With Rec Mute And One-Touch Record/Pause
- Precision -30 to +7 dB LED Peak-Responding Meters And 4-Digit Electronic Tape Counter With "-" Display
- Output Level Control And Headphone Output Jack
- "One-Way," "Once-Through," And "Continuous" Playback
- Timer Record/Playback



RX-202 SPECIFICATIONS

Track Configuration	4 tracks/2-channel stereo (auto-reverse recording and playback)
Heads	2 (erase head × 1, r/p head × 1)
Motors	Transport DC servo motor (capstan drive) × 1 DC motor (reel drive) × 1 Mechanism DC motor (cam operation) × 1 DC motor (cassette reversal) × 1
Power Source	100, 120, 120/220-240, 220 or 240 V AC; 50/60 Hz (according to country of sale)
Power Consumption	30W max.
Tape Speed	1-7/8 ips (4.8 cm/sec) ±0.5%
Wow and Flutter	Less than ±0.11% WTD Peak Less than 0.06% WTD RMS
Frequency Response	20 Hz – 20,000 Hz (–20 dB recording level)
Signal-to-Noise Ratio	Dolby-C NR (A-WTD rms re 3% THD at 400 Hz) Better than 68 dB Dolby-B NR (70 μs, ZX tape) Better than 62 dB
Total Harmonic Distortion	Less than 1.0% (ZX, EXII tape) (400 Hz, 0 dB) Less than 1.2% (SX tape)
Erasure	Better than 60 dB (100 Hz, 0 dB)
Separation	Better than 36 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Fast-Wind Time	Approx. 85 seconds (C-60)
Input (Line)	50 mV, 30k ohms
Output (Line)	0.5 V (0 dB, output control max.) 2.2 k ohms
Output (Headphone)	2.2 mW (0 dB, output control max.) 8 ohms
Dimensions	451 (W) × 136 (H) × 255 (D) millimeters 17-3/4 (W) × 5-3/8 (H) × 10 (D) inches
Approximate Weight	9 kg; 19 lb 13 oz

- Specifications and appearance subject to change for further improvement without notice.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
- The word "DOLBY" and the Double-D Symbol are trademarks of Dolby Laboratories Licensing Corporation.



SP-7 Stereo Headphones



Tapes

ZX Metalloy Cassette Tape
(70 μs, metal bias)
ZX C-60 ZX C-90

SX Ferricobalt Cassette
(70 μs, CrO₂ bias)
SX C-60 SX C-90

EX Ferrioxide Cassette Tape
(120 μs, normal bias)
EX C-60 EX C-90

SX II Super Ferricobalt Tape
(70 μs, CrO₂ bias)
SX II C-60 SX II C-90

EX II Ferricrystal Cassette Tape
(120 μs, normal bias)
EX II C-60 EX II C-90



DM-10 Head Demagnetizer



SF-10 Subsonic Filter

Nakamichi Corporation
Tokyo Office
Nakamichi U.S.A. Corporation
Nakamichi GmbH

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Stephanienstrasse 6, 4000 Düsseldorf 1 Phone: (0211) 359036

The BX-100 and BX-150 Surprisingly Affordable... Unquestionably Nakamichi!



The BX-100 and BX-150 are available in black or silver to coordinate with any decor.

Think you can't afford a Nakamichi? Think again! The BX-100 and BX-150 are proofs positive that quality needn't be expensive. Compare their sound with *any* competitively priced deck (even more expensive ones) and judge for yourself. You'll find cheaper decks. You'll find similarly priced decks with more "features." But if *music* is as important to you as it is to us, you'll not find one to match the BX-100 or BX-150.

The BX-100/BX-150 emphasize essentials, not frills. No other single-capstan transport matches their microprocessor-controlled "Silent Mechanism" for the smooth, vibration-free motion that lets you hear every musical nuance. Ordinary single-capstan decks shroud music in a veil of high-frequency flutter and modulation noise that specs don't reveal. One listen to the BX-100 or BX-150 will tell you what you've been missing!

Magnetics and electronics—two other areas of particular Nakamichi expertise. Our RP-2D record/playback head not only

outperforms conventional combination heads but most "sandwich" types used on 3-head decks. Response is flat from 20 Hz to 20 kHz so you hear every musical overtone. And, on metal tape, response holds up at -20 dB and at -10 dB and (with the BX-150's Dolby[®]-C circuit) at 0 dB—clear proof of superior heads and electronics.

The final essential—calibration. Inexpensive decks usually have few setup controls so performance is a matter of luck. The BX-100 and BX-150 have *two dozen* internal adjustments and undergo a 30-step alignment procedure. *Every* deck is individually calibrated on *each* track on *three* tapes before it leaves the factory to assure you of Nakamichi Sound.

Nakamichi Sound is unique. Measurements and specs only hint at the sound we demand of our recorders so we apply the acid test—direct comparison of live and recorded music. Our ultimate test instrument is our Concert Hall! Hear what we've been hearing! Audition a BX-100 or BX-150 at your Nakamichi dealer now.



Nakamichi Sound Researched at Center Concert Hall

* © Dolby Laboratories Licensing Corporation

 Nakamichi

For more information, write Nakamichi U.S.A. Corporation, 19701 S. Vermont Ave., Torrance, CA 90502



Dual Turntable

The new Dual 1254 belt-driven automatic turntable, now available through Adcom, can be used as either a single-play or multiple-play unit by changing center spindles. The ULM arm/cartridge

combination has less than 8 grams total effective mass. The base is of a highly damped compound to reduce acoustic and mechanical feedback. Price: \$159.95.

For literature, circle No. 112



Sennheiser Compact Headphones

The Sennheiser MS-100 headphones are compact, open-air types designed for use with personal portables as well as fixed sound systems. For outdoor use, they feature a four-foot, steel-reinforced cable with 3.5-mm mini plug; a six-foot extension with 1/4-in. plug is provided for indoor use. Impedance is 42 ohms, and frequency range is rated from 20 Hz to 20 kHz; sound output is 96 dB for 1 mW. Price: \$85.00. For literature, circle No. 113

Phoenix Systems Ambience Decoder

Designed to extract ambience from stereo recordings and surround

Antenna Specialists FM Booster

Antenna Specialists' ASC-100 FM antenna booster, now available in black and with an LED pilot light, plugs in between an antenna and car radio. This unit boosts FM broadcast signals up to 13 dB. It is also available with an on-off switch, for areas with some strong local signals, as the ASC-100DX. Price: ASC-100, \$25.00; ASC-100DX, \$28.00.

For literature, circle No. 114



sound from encoded movies, the P-250 includes a matrix decoder, a stereo synthesizer (for monophonic sources) and



AudioSource Handheld RTA

The RTA-One is a handheld, 10-band real-time analyzer. It accepts input from its built-in microphone, external microphones, or external, line-level sources, and can be used to measure sound or signal level as well as frequency response or content. The display reads ± 10 dB, in 2.5-dB increments, referred to levels selectable from 60 to 110 dB (microphone) or -40 to +10 dB (line). Fast and slow decay can be selected. The RTA-One is \$199.95. Options include an a.c. adaptor (\$12.95), a remote microphone (\$24.95) and pink-noise generator (\$44.95).

For literature, circle No. 115

a delay system variable from 5 to 50 mS. Price: \$250.00 assembled; \$180.00 kit.

For literature, circle No. 116



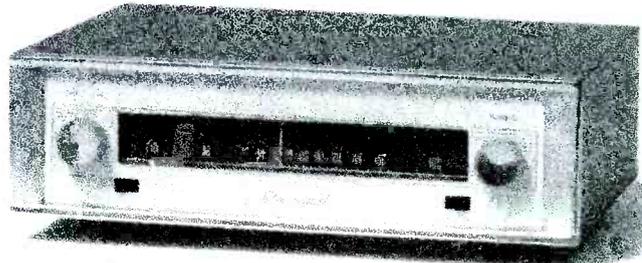
“Sherwood products offer excellent performance at very reasonable prices.”

Leonard Feldman,
Audio Magazine



Sherwood
Quality and Innovation You Can Afford.

Enter No. 64 on Reader Service Card



An early Sherwood tuner.

It's been over 30 years since two engineers began a company on a single elegant idea: Make quality audio equipment more affordable through innovation. That company is Sherwood, and today, after producing more than two million sets, its philosophy of affordable quality through innovation remains.

Through the years Sherwood innovation has been seen in a number of industry firsts: Sherwood supplied equipment for the first stereo FM broadcast, produced the first tuner with digital readout and the first computer-controlled FM tuner. The spirit of innovation lives at Sherwood. And nowhere is that spirit more in evidence than in Sherwood receivers.

In reviewing Sherwood's top-of-the-line S-2680CP receiver in *Audio Magazine*, noted audio scientist and author Leonard Feldman states "...[O]ne guiding principle seems to have been retained all through the years: Sherwood products offer excel-

lent performance at very reasonable prices..." All five Sherwood receivers reflect this concept, delivering true high-fidelity performance at every price level.

We never cut corners on sound. Even our budget-priced S-2610CP receiver sounds better than many separate components. Such quality comes only from carefully attending to each detail of design and manufacture.

Sherwood takes such careful consideration of individual details that each receiver is separately and thoroughly tested and each measurement is *certified*. On the outside of every carton is a certificate showing measurement details of the power amplifier, phono preamp and FM tuner

sections of each individual receiver. These are not just a recap of the rated specs, but actual measurements of the individual unit contained in that carton, so you know exactly what you're buying. No other manufacturer does this.

Certified performance, a legacy of industry firsts, and world-wide critical acclaim underscore the Sherwood philosophy: *Quality and innovation you can afford.*



S-2680CP *The quality of separate components for the price of a receiver.*



All things being equal, most people want the quality available only from separate components. But most people don't own separate components; they own receivers.

Because receivers combine preamp, power amp and tuner into a single chassis, they are more convenient to install and use and generally cost less than equivalent separates. The problem is, rarely is a receiver truly the equivalent of quality separates.

The S-2680CP is the exception. The tuner section of this receiver outperforms many separate tuners selling for far more than this receiver. Also included is discrete differential input phono preamp circuitry, so every record in your collection sounds its cleanest. Such circuitry is rarely found in a receiver, and is often compromised in separate amplifiers.

Creative features which are standard on the S-2680CP, like ultra-low-bass EQ and dubbing for two tape decks, can make significant contributions to your listening enjoyment and convenience. And the sophisticated high-AB-class power amplifier effortlessly delivers power on demand to even the most irregular speaker loads, assuring accurate articulation of musical sounds and detailed imaging.

S-2680CP SPECIFICATIONS

Audio Amplifier Section

Power output, minimum RMS per channel at less than 0.05% THD:	
Into 8 ohms from 20Hz to 20kHz:	70 Watts
Into 8 ohms at 1kHz:	80 Watts
Into 4 ohms at 1kHz:	100 Watts
Intermodulation distortion, 70 Watts into 8 ohms	0.05%
Frequency response (aux, +0/ -3dB) with built-in low-pass filter:	5Hz-40kHz
RIAA accuracy:	+0.5dB
Signal-to-noise ratio, phono with 5mv input:	92dB
Signal-to-noise ratio, aux:	100dB
Phono input overload at 10kHz:	1200mv
Phono input required for rated output:	2.5mv
Line level input required for rated output:	150mv
Tone control range at 10kHz, 100Hz:	+10dB
Ultra-low-bass EQ:	+6dB at 30Hz, -16dB at 10Hz
High Filter:	12dB/octave, -3dB at 8kHz

FM Tuner Section

Usable sensitivity:	9.3dBf
50dB quieting, mono:	14.1dBf
50dB quieting, stereo:	36.3dBf
Signal-to-noise ratio, mono:	80dB
Signal-to-noise ratio, stereo:	75dB
Total harmonic distortion, mono:	0.1%
Total harmonic distortion, stereo:	0.1%
Selectivity:	70dB
Capture ratio:	1.2dB
Stereo separation:	50dB
Frequency response:	20-15kHz, +0.5, -1dB

AM Tuner Section

Usable sensitivity:	300uv/m
Signal-to-noise ratio, 30% mod:	45dB
IF rejection:	35dB
Image rejection:	45dB

Dimensions:

17 ³ / ₈ " W x 4 ³ / ₈ " H x 13 ³ / ₄ " D
44cm W x 11cm H x 35cm D
Weight: 21.6 lbs.; 9.8 Kg



S-2660CP *Dollar for dollar, probably the best receiver in the world.*



If your quest is for fine tuner performance, record reproduction to rival the finest separate amplifiers, and a full array of features in a *very* affordable package, the S-2660CP is just what you're looking for.

Compared to the S-2680CP, the S-2660CP has the same outstanding tuner section, the same clean and quiet discrete phono circuitry, and nearly the same array of convenience features. So what's the difference?

The S-2680CP can deliver a very strong 70 watts per channel into 8 ohm speakers; the S-2660CP is capable of a more modest though very respectable 50 watts similarly rated.

The added quality of the S-2680CP means an extra degree of excellence in sound reproduction for those tricky, highly dynamic musical passages. If perfection in a receiver is what you're looking for, choose the S-2680CP. If you listen at more modest levels, use more efficient loudspeakers or select program material with limited dynamic range, the S-2660CP will do the job extremely well.

S-2660CP SPECIFICATIONS

Audio Amplifier Section

Power output, minimum RMS per channel at less than 0.05% THD:	
Into 8 ohms from 20Hz to 20kHz:	50 Watts
Into 8 ohms at 1kHz:	55 Watts
Into 4 ohms at 1kHz:	70 Watts
Intermodulation distortion, 50 Watts into 8 ohms	0.05%
Frequency response (aux, +0/ -3dB) with built-in low-pass filter:	5Hz-40kHz
RIAA accuracy:	± 0.5dB
Signal-to-noise ratio, phono with 5mv input:	88dB
Signal-to-noise ratio, aux:	100dB
Phono input overload at 10kHz:	670mv
Phono input required for rated output:	2.5mv
Line level input required for rated output:	150mv
Tone control range at 10kHz, 100Hz:	± 10dB
Ultra-low-bass EQ:	+6dB at 30Hz, -16dB at 10Hz

FM Tuner Section

Usable sensitivity:	10.8dBf
50dB quieting, mono:	15.8dBf
50dB quieting, stereo:	39.2dBf
Signal-to-noise ratio, mono:	75dB
Signal-to-noise ratio, stereo:	70dB
Total harmonic distortion, mono:	0.1%
Total harmonic distortion, stereo:	0.15%
Selectivity:	65dB
Capture ratio:	1.5dB
Stereo separation:	50dB
Frequency response:	20-15kHz, +0.5, -1dB

AM Tuner Section

Usable sensitivity:	300uv/m
Signal-to-noise ratio, 30% mod:	45dB
IF rejection:	35dB
Image rejection:	45dB

Dimensions:

17³/₈" W x 4³/₈" H x 13³/₄" D
 44cm W x 11cm H x 35cm D
 Weight: 19.4 lbs.; 8.8 Kg



S-2640CP *Redefining the sound of value.*



In a world where “value” has come to mean “cheap,” the S-2640CP returns traditional meaning to the term. Value—in the old-fashioned sense—is what this receiver is all about.

Many other brands in this very popular price range offer receivers that appear to have good value: Plenty of power, lots of features, digital tuning, and so on. But as you examine these other receivers more closely, you can begin to see that more and more details have been compromised. Not so with the S-2640CP.

Compare the *real* power output, including power bandwidth and distortion figures of other similarly-priced units to the S-2640CP. Also compare tuner specifications. On close examination, you will see real differences on paper. But the real test is to listen. Listen critically.

You might not think there’s much difference in the sound of two similarly-priced receivers from well-known brands. But you might be surprised.

Listen to the S-2640CP on a weak FM station. Then listen to the same signal in the same place with the same antenna on another brand of receiver in the same price range. Listen again. Listen to your favorite record with a good turntable and cartridge through the S-2640CP. Listen to the same set up through a competitive receiver on the same speakers. Let your ears tell you how careful attention to detail sounds. Listen, and you’ll know why the performance of every S-2640CP is individually certified. That’s real value.

S-2640CP SPECIFICATIONS

Audio Amplifier Section

Power output, minimum RMS per channel at less than 0.05% THD:	
Into 8 ohms from 20Hz to 20kHz:	35 Watts
Into 8 ohms at 1kHz:	40 Watts
Into 4 ohms at 1kHz:	53 Watts
Intermodulation distortion, 35 Watts into 8 ohms	0.05%
Frequency response (aux, +0/-3dB) with built-in low-pass filter:	5Hz-40kHz
RIAA accuracy:	± 0.5dB
Signal-to-noise ratio, phono with 5mv input:	92dB
Signal-to-noise ratio, aux:	100dB
Phono input overload at 10kHz:	1200mv
Phono input required for rated output:	2.5mv
Line level input required for rated output:	150mv
Tone control range at 10kHz, 100Hz:	± 10dB
Ultra-low-bass EQ:	+ 6dB at 30Hz, - 16dB at 10Hz

FM Tuner Section

Usable sensitivity:	9.3dBf
50dB quieting, mono:	14.1dBf
50dB quieting, stereo:	36.3dBf
Signal-to-noise ratio, mono:	80dB
Signal-to-noise ratio, stereo:	75dB
Total harmonic distortion, mono:	0.1%
Total harmonic distortion, stereo:	0.1%
Selectivity:	70dB
Capture ratio:	1.2dB
Stereo separation:	50dB
Frequency response:	20-15kHz, + 0.5, - 1dB

AM Tuner Section

Usable sensitivity:	300uv/m
Signal-to-noise ratio, 30% mod:	45dB
IF rejection:	35dB
Image rejection:	45dB

Dimensions:

17 ³ / ₈ " W x 3 ³ / ₄ " H x 11 ¹ / ₁₆ " D
44cm W x 9.5cm H x 30cm D
Weight 17 lbs.; 7.7 Kg



S-2620CP Convenience and performance on a budget.



The receiver shopper on a tight budget usually can achieve neither convenience nor performance, but most often must settle for mediocrity in favor of low price.

But the S-2620CP, an excellent example of Sherwood's tradition of quality and innovation you can afford, delivers both convenience features and high-fidelity performance on a budget.

Through innovation, Sherwood found a way to use sequential scanning light-emitting diodes instead of digital readout to show tuning frequency. This meant that all the convenience and precision of electronic tuning, including preset stations and autoscans could be built into a receiver in a price range usually populated only by receivers with manual tuning.

But electronic tuning isn't the end of the story. The quality audio amplifier in the S-2620CP delivers its full power at the same low distortion level and wide power band of the top-of-the-line S-2680CP. Such performance is rare in the price range of the S-2620CP. And the sound quality of this budget-stretching receiver surpasses many other brands at far higher prices.

S-2620CP SPECIFICATIONS

Audio Amplifier Section

Power output, minimum RMS per channel at less than 0.05% THD:	
Into 8 ohms from 20Hz to 20kHz:	20 Watts
Into 8 ohms at 1kHz:	25 Watts
Into 4 ohms at 1kHz:	32 Watts
Intermodulation distortion, 20 Watts into 8 ohms	0.05%
Frequency response (aux. +0/-3dB) with built-in low-pass filter:	5Hz-40kHz
RIAA accuracy:	±.5dB
Signal-to-noise ratio, phono with 5mv input:	88dB
Signal-to-noise ratio, aux.	100dB
Phono input overload at 10kHz:	670mv
Phono input required for rated output:	2.5mv
Line level input required for rated output:	150mv
Tone control range at 10kHz, 100Hz:	±10dB
Subsonic filter:	12dB/octave, -3dB at 20Hz

FM Tuner Section

Usable sensitivity:	10.8dBf
50dB quieting, mono:	15.8dBf
50dB quieting, stereo:	39.2dBf
Signal-to-noise ratio, mono:	78dB
Signal-to-noise ratio, stereo:	72dB
Total harmonic distortion, mono:	0.12%
Total harmonic distortion, stereo:	0.15%
Selectivity:	65dB
Capture ratio:	1.5dB
Stereo separation at 1kHz:	50dB
Frequency response:	20-15kHz, +0.5, -1dB

AM Tuner Section

Usable sensitivity:	300uv/m
Signal-to-noise ratio, 30% mod:	45dB
IF rejection:	35dB
Image rejection:	45dB

Dimensions:

17 ³ / ₈ " W x 3 ³ / ₄ " H x 11 ¹ / ₁₆ " D
44cm W x 9.5cm H x 30cm D
Weight: 14.6 lbs., 6.6 Kg



S-2610CP *Where true high fidelity begins.*



Everything has a beginning. And the S-2610CP receiver is where true high-fidelity performance begins in receivers. For an impressively low price, this unit delivers quality of sound and a range of features that truly qualify it as high fidelity equipment.

Too often low price means sound quality that really can't be called high fidelity. But not at Sherwood. The S-2610CP is designed and built with the same care and passion for detail that goes into everything we make. And that same philosophy of making quality more affordable through innovation is at the roots of this amazing package of performance.

Connected to a pair of accurate yet reasonably efficient speakers, the S-2610CP will sound better than many receivers with far higher prices. And, like all Sherwood receivers, the performance of every S-2610CP is individually certified. No other receiver brand regardless of price certifies performance. But Sherwood does. Because when we say this is where high-fidelity begins, we want to make sure it's true.

S-2610CP SPECIFICATIONS

Audio Amplifier Section

Power output, minimum RMS per channel at less than 0.08% THD:	
Into 8 ohms from 20Hz to 20kHz:	20 Watts
Into 8 ohms at 1kHz:	24 Watts
Into 4 ohms at 1kHz:	28 Watts
Intermodulation distortion, 20 Watts into 8 ohms	0.05%
Frequency response (aux, +0/-3dB):	8Hz-50kHz
RIAA accuracy:	±1dB
Signal-to-noise ratio, phono with 5mv input:	91dB
Signal-to-noise ratio, aux:	100dB
Phono input overload at 10kHz:	680mv
Phono input required for rated output:	2.5mv
Line level input required for rated output:	150mv
Tone control range at 10kHz, 100Hz:	±10dB

FM Tuner Section

Usable sensitivity:	11.2dBf
50dB quieting, mono:	14.8dBf
50dB quieting, stereo:	39.2dBf
Signal-to-noise ratio, mono:	80dB
Signal-to-noise ratio, stereo:	72dB
Total harmonic distortion, mono:	0.1%
Total harmonic distortion, stereo:	0.2%
Selectivity:	65dB
Capture ratio:	1.5dB
Stereo separation:	40dB
Frequency response:	20-15kHz, +0.5, -1dB

AM Tuner Section

Usable sensitivity:	300uv/m
Signal-to-noise ratio, 30% mod:	45dB
IF rejection:	35dB
Image rejection:	45dB

Dimensions:

17 ³ / ₈ " W x 3 ³ / ₄ " H x 10 ⁵ / ₁₆ " D
44cm W x 9.5cm H x 26cm D
Weight: 11.6 lbs., 5.26 Kg



RECEIVER FEATURES

MODEL	S-2680CP	S-2660CP	S-2640CP	S-2620CP	S-2610CP
Tuning Pre-Sets (AM/FM)	8/8	8/8	6/6	5/5	
Quartz Phase-Locked-Loop Synthesizer Tuning System	•	•	•	•	
High-AB-Class Accurate Image Power Amplifier Circuit	•				
Autoscan Tuning	•	•	•	•	
Dual-Gate MOS-FET Front End	•	•	•	•	•
Digital Frequency Readout	•	•	•		
LED Signal Strength Meter	•	•	•	•	•
High-Headroom Discrete Circuitry Phono Preamplifier	•	•			
Number of Signal Sources	7	7	6	5	5
Number of Tape Monitors	2	2	2	1	1
Tape-to-Tape Dubbing	•	•	•		
Loudness Contour	•	•	•	•	•
All-Mode Mono and FM Mute Defeat Switch	•	•	•	•	•
High Filter	•				
Ultra-Low-Bass EQ	•	•	•		
Subsonic Filter				•	
High/Low Power Meter Range	•				
Dual 8-Segment LED Power Meter	•	•			
Switching for Two Pairs of Speakers	•	•	•	•	•
Headphone Jack	•	•	•	•	•
Three-Year Limited Warranty	•	•	•	•	•
Certified Performance	•	•	•	•	•

Features and specifications are subject to change without notice.



Sherwood
Quality and Innovation You Can Afford.

17107 Kingsview Avenue, Carson, California 90746 In Canada: The Pringle Group, Don Mills, Ontario



Proton Receiver

The Proton 930 stereo receiver features a Schotz digital tuner with memory for five FM and five AM stations, plus bi-directional station search. The amplifier section features MC/MM phono input, a

switchable bass equalization circuit providing 10 dB of boost at 42 Hz, and an Anti-Clipping soft-clip circuit. Output is 30 watts per channel. Price: \$360.00. For literature, circle No. 117

Nakamichi Mobile Line Amp

The LA50, from Nakamichi, is designed to interface car-stereo components of different manufacturers by solving impedance and level mismatches. It has a high input impedance (100 kilohms) and low output impedance (100 ohms), and its gain is variable from 0 to 14 dB. Price: \$50.00. For literature, circle No. 118

Marantz Portable Recorder

The PMD 430 is a three-head, portable recorder with third-head monitoring and simultaneous record/play Dolby B and dbx NR circuitry. Other features include: VU meters for each channel, with concentric level controls; peak-indicator light and switchable limiter; switchable stereo/mono

microphone inputs with 1/4-in. jacks and 3-position (0, -15, -30 dB) attenuator; phono and quick-connect DIN jacks for high-level signals, and a cover over the NR, tape-type, pitch and bias-adjust controls. Price: \$495.00; RB 430 rechargeable battery pack, \$49.95. For literature, circle No. 119



For those who waited.
And those who wish they had.



All Compact Disc players are *not* created equal. This much, at least, has emerged from all the hype and hoopla.

Some CD players are built better than others. Some have more sophisticated programming features. Some are easier to use. And, yes, some *do* sound significantly better than others.

The new B225, from Revox of Switzerland, excels on all counts. For those who have postponed their purchase, patience has been rewarded. For those who didn't wait, the B225 is the logical upgrading route.

First, the B225 is designed for unexcelled CD reproduction. By using oversampling (176.4 kHz) in conjunction with digital filtering, the B225 guarantees optimum sound resolution and true phase response.

For your convenience, the B225 offers programming of nearly every conceivable combination of start, stop, pause, and loop functions, in any sequence, and using mixed combinations of track numbers and times. Cueing time is always less than 3 seconds, and a single infrared remote transmitter (optional) operates the B225 as well as all other components in the Revox 200 audio system.

Finally, the B225 is a product of refined Swiss design and meticulous craftsmanship. Behind its faceplate of functional elegance, you'll find the B225 is an audio component built in quiet defiance of planned obsolescence.

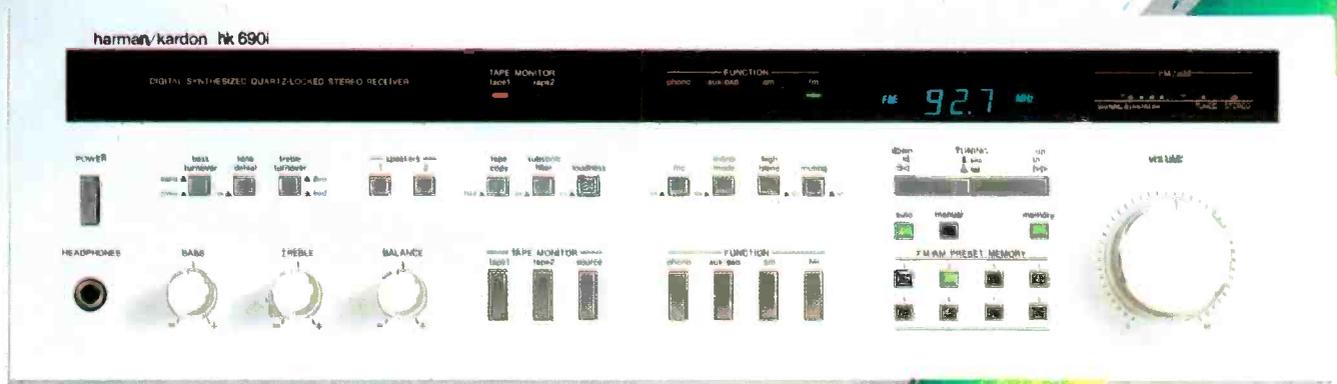
Without question, the definitive CD player has now arrived. For those who waited (and those who didn't), now is the time to see an authorized Revox dealer.

STUDER REVOX

1425 Elm Hill Pike, Nashville, TN 37210/(615) 254-5651

ARTISTRY IN

HIGH FIDELITY



The hk690i is Harman Kardon's unique expression of ultimate artistry in high fidelity. In it are found the same control of technique, mastery of detail and creative excellence inherent in every great and enduring work of art.

The hk690i receiver is exemplary of the technological strokes of genius created and perfected by Harman Kardon throughout its more than 30 year history. 45 Amps of High Instantaneous Current Capability allows the hk690i to develop up to 150 Watts per channel into 2 Ohms under peak conditions. An Ultrawideband Frequency Response of 0.2Hz to 150kHz delivers extremely fast and accurate transient response. Low Negative Feedback results in the virtual elimination of TIM distortion. An exclusive Sample-And-Hold Multiplex Decoder decreases high frequency switching noise while eliminating the need for much of the filtering normally required in FM processing. And, the use of Discrete Components demonstrates Harman Kardon's inherent technical integrity.

With this dedication, Harman Kardon stands ready to deliver the ultimate in high fidelity listening pleasure with every model in their entire product line.

Harman Kardon... Dedicated to mastering the fine art of high fidelity.

SPECIFICATIONS Power Output, (FTC) RMS, per channel, both channels driven into 8 Ohms, 20-20,000Hz: 60 Watts per channel @ <.06% THD 4 Ohms, 1kHz, IHF Signal (Dynamic Power): 120 Watts 2 Ohms, 1kHz, IHF Signal (Dynamic Power): 150 Watts Negative Feedback (overall): 12dB HCC (High Instantaneous Current Capability): 45 Amps Power Bandwidth, at half-rated output, 8 Ohms: <10Hz-100kHz Frequency Response, at 1 Watt output, +0/-3dB: 0.2Hz-150kHz TIM: Immeasurable Slew Rate: 200V/ μ sec Usable FM Sensitivity: mono (dB/ μ V-75 Ohms): 10.8dBf/0.95 μ V Stereo Separation: 1kHz, 65dBf, 100% mod: 55dB FM THD: mono 1kHz, 100% mod: 0.06%; stereo: 0.08%.

harman/kardon

240 Crossways Park West, Woodbury, NY 11797; In Canada, Gould Marketing, Montreal. For more information call toll-free 1-(800) 633-2252 ext. 250.

Enter No. 32 on Reader Service Card

READ THIS AD AND YOU'LL BUY A HARMAN KARDON CASSETTE DECK



That's a bold statement, but Harman Kardon has been making bold audio statements for over thirty years, introducing the world's first high fidelity receiver, the first stereo receiver and ultrawideband frequency response. Harman Kardon was also the first company to use Dolby[®] in a cassette deck.

Today, Harman Kardon products continue to be so technologically advanced that "state-of-the-art" falls short of describing them. They have become "state-of-the-mind," the highest level at which the mind can create.

The CD491 is Harman Kardon's most sophisticated state-of-the-mind cassette deck and one of the few in the world that can equal the full range of human hearing. The CD491 has a remarkable 20Hz to 24kHz frequency response using any tape formulation, not just expensive metal tape. An audiophile would settle for nothing less. Even more remarkable is that in a national challenge,² Harman Kardon measured frequency response and beat 98% of the competition, including units costing twice as much.

The CD491 incorporates a dual capstan transport with twin flywheels to insure perfect movement of the tape across its 3 high performance heads. The dual capstan serves to isolate the tape from the cassette shell while the dynamically balanced flywheels help generate a

consistently accurate tape speed. Together they enable the CD491 to reduce wow-and-flutter to an inaudible .025%. The only "wow" you'll ever hear is the reaction of people listening to your Harman Kardon cassette deck.

The CD491 incorporates Dolby HX Pro¹ for extended frequency response, plus Dolby B and C¹ for maximum noise reduction. Three precision heads offer improved performance and the convenience of monitoring while recording. Included is a Sendust head to withstand high record levels without overload and a ferrite playback head for extended high frequency response.

The combined benefits of the CD491's performance features allow for the accurate recording of more dynamic audio signals than previously possible. In fact, the large signal response (frequency response at 0V_u) of the CD491 is a virtually unrivaled 20Hz-20kHz \pm 3dB. This is especially significant as more demanding forms of software, such as digital audio, become available.

So, while other manufacturers continue to pile on unnecessary features and gimmicks, Harman Kardon continues to develop only fundamentally advanced audio equipment.

(1) Dolby is the registered trademark of Dolby Laboratories Inc.
(2) In 1982, Harman Kardon challenged individuals to bring in their cassette decks to a local HK dealer. All units were cleaned and demagnetized in order to insure fair test results. The Harman Kardon unit was factory packed.

harman/kardon

Our state-of-the-mind is tomorrow's state-of-the-art.

A R T I S T R Y I N

H I G H F I D E L I T Y

In a true masterpiece, subtle details combine with unique design to become the ideal. Harman Kardon has achieved this ideal with the introduction of the technologically advanced T65C Turntable.

An example of disc reproduction excellence, the T65C incorporates a sophisticated 3-point suspension system, counter-balanced to center the moving mass at the platter spindle. This keeps the platter, tonearm, and belt drive system isolated from vibration. The T65C's AC sine-wave driven motor is crafted to turn with pure harmonic motion, a dramatic improvement over conventional turntables that use a series of DC pulses, resulting in high frequency deviations in platter rotation.

The T65C's tonearm exemplifies Harman Kardon's technological know-how. A straight, tapered tube to suppress natural resonances, it features a weight and wire anti-skating mechanism for additional precision. Its high mass pivot assembly acts as a high frequency vibration filter, and a lateral balancer on the tonearm compensates for

uneven surfaces. A carbon fiber headshell provides low resonance and vibration damping. The T65C's massive 3.3 pound platter, disc stabilizer, capacitance trim and optically-sensed auto-lift further illustrate Harman Kardon's commitment to the art of high fidelity. A commitment that is reflected in all Harman Kardon products.

Harman Kardon... Dedicated to mastering the fine art of high fidelity.

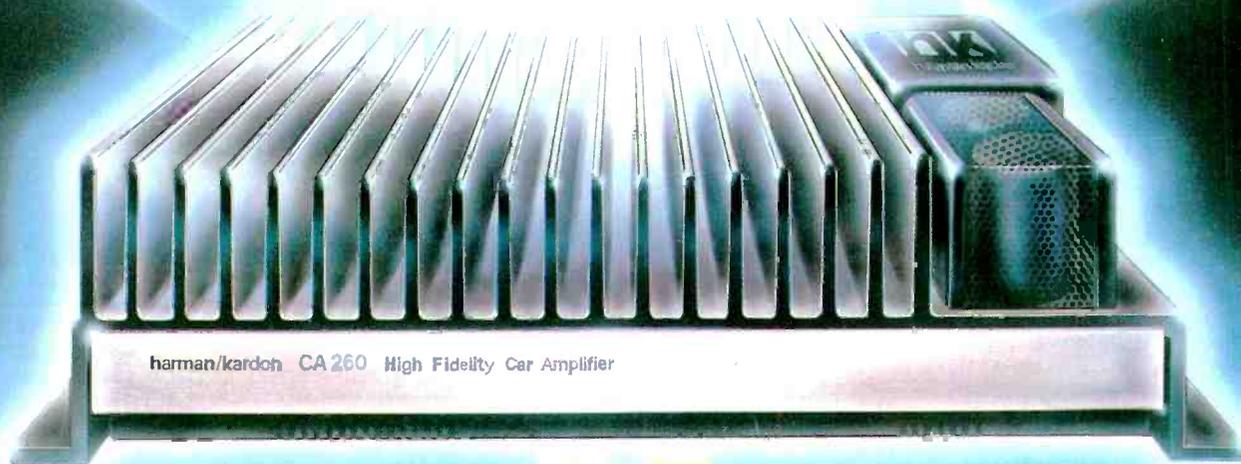
SPECIFICATIONS: Wow & Flutter (WRMS): 0.025% Rumble (DIN-B WTD): -70dB Pitch Adjustable Range: \pm 3% Effective Tonearm Mass: 9.5 Grams Stylus Overhang: 18mm Offset Angle: 25.5% Effective Tonearm Length: 216mm Tracking Error: \pm 2° Phono Capacitance: 70/170/270 Tracking Force: 0-3 Grams



harman/kardon

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HARMAN KARDON'S STATE-OF-THE-MIND TECHNOLOGY TAKES TO THE ROAD



harman/kardon CA260 High Fidelity Car Amplifier

With the introduction of the CA260 high fidelity car amplifier, Harman Kardon blazes new trails. The commitment to sonic superiority that's synonymous with Harman Kardon home audio equipment is now ready for those who demand the same quality on the road.

At Harman Kardon, we believed that there was a need for quality car audio components for the discerning listener. A car amplifier that would outperform any car amplifier on the market. Harman Kardon's thirty years of audio expertise is unleashed with the CA260.

The unrivaled design technologies that are embodied in the CA260 include: High instantaneous Current Capability, Low Negative Feedback, Ultrawidebandwidth and Discrete Components. The CA260 goes beyond industry standards to set new ones.

Incorporated in the Harman Kardon CA260 is 30 amps of High instantaneous Current Capability to provide 60 Watts of power into 4 Ohms, 90 Watts into 2 Ohms, and 180 Watts bridged mono into 4 Ohms. Two 10,000 μ F capacitors provide full power even at 20Hz.

The CA260 is rugged and reliable enough to perform under any environmental and automotive conditions. It has been designed to overcome extreme humidity, varying voltages in the car's electrical system, mechanical vibrations, intense temperatures and engine noise.

The CA260 is the debut of a line of superior and fundamentally advanced car stereo products from Harman Kardon.

Harman Kardon's state-of-the-mind technology. Unparalleled excellence in advanced audio equipment now journeys with you.

harman / kardon

Our state-of-the-mind is tomorrow's state-of-the-art.

240 Crossways Park West, Woodbury, NY 11797; In Canada, Gould Marketing, Montreal. For more information call toll-free 1-(800) 633-2252 ext. 250

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BERT WHYTE

ANALOG ANNOUNCEMENTS

As always, there are so many new products at the CES that I can provide little more than token coverage, even in the categories I find of major interest. Thus, without further preamble, here is a further sampling of new audio equipment and developments.

More and more people are beginning to realize the importance of acoustical control in listening rooms. Monster Cable responded to this by introducing Soundex One acoustic-control wall panels, Soundex Two free-standing acoustic-control panels, and Soundex Three hanging acoustic-control panels. All of the panels are constructed of one-inch thick, high-density fiberglass mixture, with an absorption coefficient of 0.90. They are covered in a special porous acoustic fabric in a variety of colors. The free-standing panels can be connected by special hinges to form a quasi live-end/dead-end wall behind and to the side of a speaker or possibly act as room dividers. Needless to say, the use of these panels in CES demo rooms was de rigueur. A 30-inch wide by 84-inch high left and right set of panels cost \$1,400. The hanging Soundex Three panels can help control standing waves in a room and are available in 60-inch wide x 26-inch high and 60-inch wide x 34-inch high sizes. Of course, all three types of Soundex panels can be intermixed according to the acoustic requirements. All these new ideas in the control of room acoustics are great.

Krell's top-of-the-line KMA-200 monophonic, Class-A, 200-watt power amplifier has had a number of refinements, including the use of Discrete Technology Lab's Distech interconnect cables for all internal wiring. Speaking of Distech wire, this interconnect cable and a speaker cable are the brainchildren of Sal DeMicco, head of Discrete Technology Lab. The excellent Acoustic Engineering AIR-2 power amplifier is also internally wired with his cable. A number of other high-end preamps and amplifier manufacturers will be wiring their units with Distech cable in the near future. Pentagram loudspeakers and the VMPS ribbon loudspeaker are internally wired with the Distech speaker wire.

Sal manufactures another product,



Monster Cable's Soundex panels

Soundsorber acoustic panels. These are 4-inch thick, foot-square polyurethane foam panels with deeply sculptured wedges. On one wedge running down the center line of the panel, there is a narrow slot leading to a hollow semi-circular chamber. This is, in essence, a Helmholtz resonator, and apparently it increases the effectiveness of the absorption. Years ago, there were some heavy ¾-inch thick wood panels made in Germany, which had similar slot resonators cut into them at two-inch intervals across the length of the panels. In fact, a number of concert halls in Germany and in other European locations are extensively panelled with this product. These Soundsorber panels seem to be very effective for acoustic control and have had an enthusiastic reception for both commercial use and consumer use in the home. Information on Distech cables and Soundsorber panels can be had from Sal DeMicco, Discrete Technology Lab Inc., 2911 Oceanside Road, Oceanside, N.Y. 11572.

Last month, I reported on new models of Compact Disc players. Before I leave the digital domain, a note on the new Sansui Tricore PCM digital audio processor, Model PC-X11. This is a slimline unit, less expensive (\$900) than the original Sansui processor. It

features the same EIAJ-standard, 14-bit linear encoding and has the same data-reading capability that permits digital audio recording even in a VCR's Extended Play mode. Thus, with a T-160 videocassette, eight hours of digital recording is possible. All the usual EIAJ digital audio performance parameters apply. Recording level is monitored with a double-row LED display, there are microphone inputs, and direct digital copying is possible with a second VCR. On a cost-per-minute basis, the PC-X11 can provide digital recording that is cheaper than an audio cassette recorder using premium-formulation cassettes.

Speaking of audio cassettes, according to RIAA statistics, 1983 sales of prerecorded cassettes surpassed those of LP records for the first time. As for cassette recorders at the SCES, they were legion and have become ever more sophisticated, even at lower price levels. A typical example was the new JVC Model DD-VR9, that features a quick auto-reverse system utilizing their Flip Reverse Head, which is said to provide highly accurate playback in both directions of tape travel, and what JVC calls a Jewel Lock to prevent head misalignment. The three-head recorder has ceramic-clad Sen-Alloy heads, and their B.E.S.T. (bias, equal-



KEF 104.2 speakers

Tandberg 3006 A power amplifier



Hafler 120 amplifier



B & W 808 speaker

ization, sensitivity, tape) optimization system is provided, as are Dolby B and C. Other features are direct-drive transport with pulse-servo motor, digital recording-level display with peak hold, and a whole array of convenience functions, even—would you believe?—a motorized slide-out control panel! It is all yours for \$800.

Like any dedicated audiophile and music lover, I'm always keenly interested in new preamplifiers and amplifiers. As usual, there was no dearth of these products at the SCES, including several that could qualify as bargains and some that are in the most rarified levels of high-end audio.

The ever-astute David Hafler introduced his new DH-120 power amplifier. This Class AB unit uses MOS-FET output transistors and is rated at 62 watts per channel into 8 ohms from 20 Hz to 20 kHz. A flip of a switch bridges it to double this power in the mono mode. Minimal negative feedback is used in the circuit, and it is claimed there is sufficient current output for 2 dB of IHF Dynamic Headroom. David has designed his DH-120 amplifier with quite a number of convenience features. On the rear panel are separate right and left output controls to facilitate biampification applications, the stereo/mono switch for bridging, and main and auxiliary speaker outputs for simultaneous operation of two sets of speakers. Of particular interest is the stereo-ambience circuitry to recover ambience signals in recordings and feed them to the auxiliary speaker outputs. A pair of speakers fed from these outputs, positioned to the sides or rear of the listening position, provide the well-known Hafler-Effect ambience enhancement.

Another MOS-FET power amplifier is the Tandberg TPM 3006A, a 150-watt per channel unit (8 ohms, from 20 Hz to 20 kHz), incorporating many of the principles espoused by Dr. Matti Ojala.

The 3006A employs no negative feedback whatsoever and has a super-fast 500 V per μ S slew rate. TIM and DIM are said to be unmeasurable. A toroidal power transformer is used in this high-current amplifier design (more than 25 amperes per channel). All audio stages use discrete circuitry, (no ICs), and capacitors are polystyrene and polypropylene, while metal film resistors are used. The MOS-FET output transistors are kept linear by a Voltage Comparator Servo Circuit, and d.c. is eliminated from the output by what Tandberg calls a Thermic Servo Loop. This 25-pound amplifier is user-bridgable for a mono output of 410 watts into 8 ohms. At normal 150-watt per channel stereo operation, THD is said to be less than 0.02%. Obviously, the Tandberg TPA 3006A employs circuitry and components much favored by high-end devotees. At \$995, this amplifier should garner much attention.

The Mark Levinson ML-2 pure Class-A amplifier has long been regarded by many audiophiles as a sort of "dream amplifier," a design of ultra-high fidelity and extravagant cost. The well-heeled owners of these exotic amps loved them, but often expressed their desire for a new Mark Levinson Class-A power amplifier with more than the 25-watt output of the ML-2. At the Raphael Hotel in Chicago, Mark Levinson Audio Systems was demonstrating a prototype of the ML-15 power amplifier that will become the "flagship" of the Levinson line of power amplifiers. The ML-15 is not a replacement for the ML-2, which will be produced as long as there is a demand for them, and like the ML-2, it is a monophonic amp.

The ML-15 is a completely new design, incorporating a number of unique circuit features. The massive power supply has sufficient computer-grade capacitors to control any crest factor. It is claimed that the linear d.c. regulator, with followers, which supplies all

stages, including the output, can handle even the most highly reactive loads and has specifications comparable to the highest quality laboratory power supplies. The Levinson company claims that the new driver circuitry features a four-transistor configuration that reduces all types of distortion. Audio pre-drive current of greater than 6 amps is available so that the output stage is not limited by performance of the earlier stages. Sufficient bias is used in the output stage to provide 100 watts into 8 ohms in pure Class-A operation, and 50 watts into 4 ohms, also in the Class-A mode. In Class-AB operation, the ML-15 furnishes 200 watts into 4 ohms and 400 watts into 2 ohms. All these figures are over the full 20 Hz to 20 kHz audio spectrum. Levinson states that a 20 Hz pulse with a repetition rate of 500 nanoseconds will produce a peak power output of over 2,500 watts! Peak current is rated at 63 amperes; you can always use it for arc welding! As noted, the ML-15 is a mono amplifier, so you need a pair of them for stereo; it will be available in the fall at the rather heart-clutching price of \$9,000 the pair! Other Levinson developments include improvements and refinements to the ML-6A preamplifier (present 6A owners can have their units retrofitted) and a new amplifier designed specifically for impedance loads of 1 ohm.

Bill Conrad and Lewis Johnson of conrad-johnson design were giving a first-rate demonstration of their new pride and joy, the Premier Five mono tube amplifier. This unit uses eight EL-34 tubes to achieve 200 watts minimum into 4, 8, or 16 ohms from 30 Hz to 15 kHz with no more than 1% THD or IMD. A massive power supply and no current limiting enable the amplifier to drive high-amplitude music transients into reactive speaker loads. Frequency response of the Premier Five is -0.5 dB from 20 Hz to 20 kHz and

The Mark Levinson ML-2 has long been many audiophiles' "dream amplifier." Now there's an ML-15, at \$9,000 the pair!



B & W VM-1 video monitor speakers

hum and noise—so often a problem in tube amplifiers—is a very low 96 dB below full power output. Driving Infinity RS-1 speakers, the Premier Five had a very smooth, clean sound, with a big sound stage and superb front-to-back dimensionality. It is clear that the Premier Five is an exceptionally musical amplifier. A pair of these 81-pound Premier Five amplifiers is \$6,000.

At the Krell exhibit, Dan D'Agostino was proudly demonstrating his new PAM-3 preamplifier. This very likely will be one of the most versatile of the high-end preamps on the market. There is a moving-coil phono input that features 16 separate impedance adjustments. Another input is provided for moving-magnet cartridges, and there are inputs for tuner, auxiliary, tape one and two and, for the first time on any preamplifier, a special input for Compact Disc playback which includes a compensating circuit to correct the phase inversion and phase shift present in the output stage of CD players. This circuit is adjustable for various brands of CD players, and authorized Krell dealers will be able to make these adjustments. The tape facilities permit the recording of one program while listening to another. The high-level stages of the PAM-3 use a high-current, low output-impedance approach, providing the ability to drive cables of great length. All gain stages in the PAM-3 use discrete components and are separately regulated. All components in the PAM-3 are computer or NASA grade with a quality-control tolerance of 1%. The frequency response of the PAM-3 is very wideband, ranging from d.c. to 2 MHz. High-level voltage swing is more than 10 V rms. A weighted signal-to-noise ratio on phono is -110 dB. The PAM-3 is expected to sell for \$2,850.

At Electrocompaniet, the charming and urbane Karen Sumner was on hand, giving—as always—a most civilized and musically satisfying demonstration. The Ampliwire Two A and Ampliwire Mono amplifier have been further refined and, in combination with the Preampliwire One or Two preamps, are even smoother and more musical sounding than before, while maintaining high definition.

Spectral brought forth a \$1,495 DMC-5 preamplifier with many of the

features of their more expensive units, but incorporating some interesting new technology as well. The unit has megahertz-wide powerband and sufficient gain that most moving coil cartridges can be used straight in without a head amplifier. Selectable cartridge loading is available by means of DIP switches. The unit is claimed to have extremely fast rise and settling times.

As usual, there were more loudspeakers demonstrated at the SCES, at least at the Conrad Hilton and McCormick Inn, than any other product category. Also as usual, most of them were eminently forgettable. Herewith a report on a few interesting designs.

Acoustat has been concentrating on a series of electrostatic loudspeakers that are relatively tall, standing an imposing (and possibly intimidating to some people) 7-feet, 10-inches high. Now they have introduced the Model One, their first single-panel electrostatic speaker, scaled down to a more modest six feet in height, 11 inches in width by 3½ in depth. Of course, with this reduced diaphragm area, bass response would be reduced. Thus, the Model One is sold only with the companion 18-inch subwoofer cube whose floor-loaded, 10-inch driver provides bass response to below 30 Hz. Overall frequency response is said to be ±3 dB from 30 Hz to 18 kHz. A 75-watt amplifier can produce an SPL of 108 dB at 15 feet in a 14 by 18-foot room. The Model One sounded very clean and transparent, with Acoustat's usual sharp transient response and really good imaging. Price is \$1,195 per pair, including the subwoofer.

Apogee Acoustics were at the Raphael Hotel demonstrating their new Scintilla full-range ribbon loudspeaker. Smaller at 57 inches high by 30 inches wide and less expensive at \$3,500 than its big brother, it has retained most of the performance parameters of the original design. The Scintilla uses the same ribbon concept for woofer, mid-range, and tweeter, with 6 dB per

octave internal crossovers. Although the Scintilla can be biamplified, it can also be driven by a single stereo amplifier. At the demo, a 100-watt per channel Krell was used, and it is claimed that 110 dB SPL at 4 meters can be attained in a 14 by 27-foot room. Frequency response is rated at below 30 Hz to over 25 kHz. Interestingly, the Scintilla's impedance can be either 4 ohms or 1 ohm, switch-selectable! As noted earlier, Mark Levinson has a new amplifier specifically designed to operate into 1 ohm. Cosmetically, the Scintilla is as visually striking as the Apogee.

Clements Audio Systems, of Dallas, Texas, was demonstrating a hybrid ribbon/dynamic-driver speaker. The speaker uses a 28-inch ribbon, which is directly driven (no transformer required) with tri-polymer cone bass drivers in a patented compression-line bass-loading system. Very little information on this speaker, as I write, but what I heard sounded pretty good, with clean fast transients, but with some resonant colorations in the upper bass that should be damped.

KEF was showing a new speaker of quite a radical design, the Model 104.2. This is a columnar speaker with such unusual things as two bass drivers mounted cone-upwards, separated by a non-ferrous alloy bar, inside the enclosure. They operate in a push-pull configuration, which KEF terms a "Coupled-Cavity Bass-Loading System." The entire low-frequency output is radiated by a duct placed below the mid- and high-frequency enclosure, the duct effectively becoming a 5-inch air piston. The mid- and high-frequency drivers are in a separate enclosure, flexibly mounted to the front of the main enclosure. Most interestingly, the two midrange drivers have no chassis (basket)! The diaphragm assembly is fixed directly to the enclosure, with the magnet systems being bolted to the rear of the enclosure. There is a great

Continued on page 86

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2. A new three-point suspension turntable whose predecessor was a legend among audiophiles ten years ago. So much of a legend we decided to bring it back in a totally updated version—re-designed from the dustcover on down. With your choice of universal tone arm mounting platform, or AR's own new medium mass straight arm.

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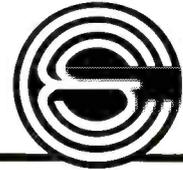
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AR9LS



AR Rolls Another Nine

THE ORIGINAL AR-9 (test report, October 1978) was Acoustic Research's first all-out assault on the state of the loudspeaker art in quite a few years. That model was, to a very considerable extent, responsible for the revival of AR's reputation as a premier manufacturer of quality loudspeakers. It also became one of the company's all-time best sellers. Now, almost exactly four years later, AR has retired the 9 (and its little brother, the 90) and introduced an updated version dubbed the AR-9LS. The price of the new unit, wonder of wonders, is the same as that of the original 9 when it was first introduced and \$150 less than when it was finally dropped from the line.

In basic form, the 9LS is little changed from the 9. Both are tall, columnar four-way systems with five drivers: two acoustic suspension woofers, an 8-inch acoustic suspension lower-midrange driver, a 1½-inch upper-midrange dome, and a ¾-inch dome tweeter. Crossovers are also similar, occurring at 20 Hz, 1.1 kHz, and 5.5 kHz. And the design goals are essentially unchanged — high sensitivity, excellent power-handling ability, wide dispersion, and flat frequency response when placed as recommended, against the rear wall and at least a couple of feet from any side walls.

In the new speaker, however, AR has tended to the problem of room boundary interactions somewhat differently. Instead of two side-firing 12-inch woofers, there is a single forward-facing 12-inch driver and a 10-inch driver aimed down into a foam-lined "Bass Contour Chamber" that is vented to the front. This cavity shapes the response of the bottom-mounted woofer so as to compensate for a cancellation notch in the front woofer's response, which is induced by its distance from the rear wall. The result is a flat bass response overall. One benefit of the new arrangement is that it gives better bass response than two side-mounted woofers when the speaker is moved out into a room, away from the rear wall, thus increasing its versatility. (AR does note, however, in its unusually candid and complete owner's manual,



Acoustic Research AR-9LS floor-standing loudspeaker system, in wood cabinet with walnut veneer finish. Dimensions: 10½ by 51½ inches (front), 14½ inches deep. Price: \$750. Warranty: Full, five years parts and labor. Manufacturer: Teledyne Acoustic Research, 16 American Drive, Norwood, Mass. 02062.

that bass response will begin to roll off about an octave higher in this position than when placed, as recommended, against a wall.)

The company's engineering team has also attacked a subtle problem detected in the 9's high end. The vertical driver alignment prevented irregularities in horizontal dispersion, but it did nothing to ameliorate the corresponding problem with *vertical* dispersion. Consequently, the 9's perceived frequency response depended partly on how high or low you were sitting when you listened to it. The problem of acoustical interference was particularly acute in the treble. AR's solution for the 9LS was to design an upper midrange/tweeter assembly with a shared magnet structure, so that the domes could be mounted extremely close to one another — so close, in fact, that they behave acoustically as though they were a single driver. Their output in the critical crossover region, therefore, remains in phase, thereby preventing any acoustical comb filtering.

Other, less dramatic changes include improved drivers, elimination of the driver level controls, and a handsome new styling. The eagle-eyed may also spot the lack of an "Acoustic Blanket" around the 9LS's drivers: AR found that by going to a new grille mounting system it could eliminate destructive reflections between the inner edges of the grille frames. The remaining diffraction effects turned out to be inaudible, so the blanket was dispensed with. As with the AR-9, amplifier connections are made to color-coded binding posts on the rear.

Diversified Science Laboratories tested the AR-9LS in the position recommended by the manufacturer. The speaker's sensitivity turns out to be quite high, but at the expense of a very low-lying (albeit smooth) impedance curve, with a maximum of only 7.6 ohms at 600 Hz and a minimum of 3.3 ohms at about 65 Hz. The average impedance is just slightly greater than 5 ohms. Most amplifiers should have no trouble driving a pair of 9LSs, but we would counsel against running another pair of speakers in parallel with them.

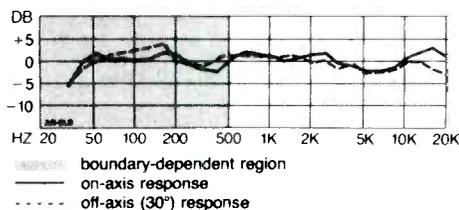
In power-handling tests, the ARs took in stride everything DSL dished out. With 300-Hz tone bursts, the 9LSs proved capable of accepting the full 63½-volt peak output of the lab's amp — equivalent to 27 dBW (504 watts) into 8 ohms, or a stupendous 30 dBW (a kilowatt) into 4 ohms. The benefit of the speaker's four-way design and two large woofers is clearly evident in DSL's harmonic distortion measurements, which are exceptionally low, even in the deep bass and near the crossover frequencies — regions where most other speakers run into trouble. At a moderately high sound pressure level (SPL) of 85 dB, total harmonic distortion (THD) remains below 1½% over the entire test range, from 30 Hz to 10 kHz, and averages less than ½%. The figures barely change at 90 dB SPL. At 95 dB SPL, THD reaches a maximum of 3½% at 63 Hz, but remains less than 1% from 100 Hz up. And at a very loud 100 dB SPL, it reaches a maximum of 6%, again at 63 Hz, and averages only about 2%. These are superb results.

As we expected, the AR-9LS's bass response is unusually extended and its overall response exceptionally smooth, remaining within a mere $\pm 2\frac{1}{2}$ dB from 35 Hz to 20 kHz on axis. Indeed, except for a dip between 200 and 500 Hz (apparently a cancellation from a floor reflection) and another from 3 kHz to 11 kHz (centered near the tweeter/midrange crossover frequency), the curve is almost dead flat. The off-axis curve is commendably similar, with a range of $\pm 3\frac{1}{2}$ dB from 40 Hz to 20 kHz. Few other loudspeakers can match these new ARs for smooth, extended frequency response and wide, even dispersion.

The sound of the 9LS is likewise smooth and extended with an immediate, gutsy quality. Its crowning glory is its bass: perhaps the deepest, firmest, cleanest, and most natural reproduction we have ever heard. Completely gone is the slight heaviness that marred the sound of the original 9. Some members of our panel report hearing what might be described as a tinge of hotness on some high-frequency material (for which we have no ready explanation), but that has been the sole reservation. Imaging is precise and stable, and the speakers can be played, very, very loud without strain.

The AR-9LS is yet another fine loudspeaker from a company that has long made a habit of top-drawer engineering and construction. It is an altogether worthy successor to the AR-9, and congratulations are due to all concerned.

ROOM RESPONSE CHARACTERISTICS



SENSITIVITY (at 1 meter; 2.8-volt pink noise, 250 Hz to 6 kHz) 91¼ dB SPL

AVERAGE IMPEDANCE (250 Hz to 6 kHz) 5.3 ohms

9LS Dual-Dome™ Driver

Use of a single magnet structure for both drivers enables AR to position the 9LS's tweeter and midrange domes close enough together to act as a virtual point source, eliminating acoustical interference between the outputs of the two drivers in the crossover region. The design intent is improved vertical dispersion and a tonal balance that is substantially independent of listener position.

THE AR TURNTABLE

Manufacturer's Specifications Turntable

Drive System: Belt.

Motor Type: 24-pole synchronous, 300 rpm.

Speeds: 33 $\frac{1}{3}$ and 45 rpm.

Wow & Flutter: 0.04%, DIN weighted.

Rumble: -73 dB, DIN B weighted.

Tonearm

Effective Mass: 13 grams without cartridge.

Pivot Friction: Less than 20 mg, horizontal or vertical.

Effective Length: 9 in. (229 mm).

Stylus Overhang: 0.6 in. (15 mm).

Allowable Cartridge Weight: 3 to 9 grams.

Tracking Force Range: 0 to 3 grams.

Cable Capacitance: 85 pF.

General Specifications

Dimensions: 18.2 in. (46.2 cm) W x 15.25 in. (38.7 cm) D x 7 in. (17.8 cm) H with dust cover closed; 17 in. (43.2 cm) H with dust cover open.

Weight: 18 lbs. (8.2 kg).

Price: \$450.00 with tonearm, \$325.00 without tonearm.

Company Address: 10 American Dr., Norwood, Mass. 02062.



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The September and October 1962 issues of *Audio* contained a two-part article by Edgar Villchur, Acoustic Research's founder, which belongs in the library of every turntable designer. By studying the best features of older turntables (such as the late-'50s Weathers and H. H. Scott designs), and digging out long-buried engineering data (such as the correct equations for minimizing lateral tracking error in pivoted tonearms), Villchur put together quite a "... thorough analysis of the physical principles and geometry involved in the design of an arm and turntable." Villchur emphasized ideas such as:

- Mounting the platter and the tonearm on a rigid sub-chassis in order to minimize unwanted *relative* motion of the stylus and platter;
- Using very compliant springs to obtain a suspension frequency below 5 Hz, in order to provide maximum isolation of the platter and stylus from external vibration;
- Minimizing the effective inertial mass of the tonearm (regardless of its total mass), for dramatically improved stylus tracking;
- Locating the arm's vertical pivot in the same plane as the record surface, to eliminate warp wow;
- Maintaining constant platter speed despite the drag of the stylus in the groove and that of a Dust Bug disc cleaner, and
- Evaluating turntable performance with "weighted" measurements of rumble and flutter that correctly reflect their audibility.

The culmination of Villchur's analysis was the original Acoustic Research turntable. It was introduced in 1962 at a list price of \$58 (a remarkable bargain even in those pre-inflationary days), becoming both a popular best-seller and a critical reference standard. More than a third of a million AR turntables were sold over a 17-year period, and, thanks to its simple and reliable design, many of those are still in use today.

Minor faults in the product, such as a foam mat that decomposed and a drive motor that often ran backward, were soon corrected. But AR made the mistake of continuing to use its original tonearm, which lacked such niceties as anti-skating, cueing, end-of-side lift-off, and a convenient means of adjusting the tracking force. Most seriously, the arm had enough pivot friction to compromise the tracking of high-compliance cartridges. (By coincidence the AR turntable was born at the same time as the original ADC-1, the first of the new generation of ultra-high-compliance cartridges that proved to be the old AR tonearm's downfall.)

By the mid-'70s, the direct-drive revolution was in full cry, and the AR turntable was outclassed by many imported models which, though sonically inferior, had the advantage of modern conveniences and good tonearms. So five years ago, when AR's accountants discovered that rising manufacturing and overhead costs had made the turntable a money-loser, they chose to shelve it rather than investing in a new arm. Ironically, even as the AR turntable was being phased out here, a counterrevolution in turntable design was already underway in Europe, with companies such as Linn, Thorens, and Ariston (and currently a dozen more) producing new high-performance audiophile models whose design is fundamentally similar to the AR's. Ultimately, Vill-

chur may turn out to have been as seminal an influence in the turntable field as he was in loudspeakers (he invented the acoustic-suspension woofer in 1953).

The excellence of the basic AR mechanism was never in doubt; some of the best-sounding record-playing systems of my acquaintance are 15-year-old AR tables fitted with modern tonearms. Happily, AR has now brought back this classic mechanism, in a restyled base and with a fine, Japanese-made tonearm.

The new AR turntable is also available without arm, for audiophiles who prefer to choose their own. AR modified the original T-bar suspension, shortening the I-beam and adding an open frame to which a wood-composite tonearm mounting board is bolted, so other arms may be substituted if one simply replaces the mounting board. The excellent bilingual (English/French) instruction manual explains in detail how to trim the spring tension to compensate for the different weight of another arm, and how to determine whether the motor must be shimmed to recenter the drive belt on the pulley.

Measurements

The following measurements were made by my colleagues Alvin Foster and J. K. Pollard of the Boston Audio Society:

The turntable speed, which is not user-adjustable, was unaffected by variations in power-line voltage from 75 to 130 V, and was exactly correct at both 33 $\frac{1}{3}$ and 45 rpm. (The speed is changed by lifting off the outer platter and moving the belt to the larger or smaller of two pulleys on the motor shaft.) The DIN-weighted wow and flutter was 0.05%, which is excellent.

The drive torque was relatively low; under a 10-gram load the platter speed dropped by 0.27%, so if you plan to use a Dust Bug brush you may want to reduce its drag by taping a coin on its rear end as a counterweight. The instruction manual recommends dusting the drive belt annually with talcum powder to minimize slippage, which will help the platter to maintain correct speed despite modest variations in drag. Nevertheless, a Discwasher brush stops the platter completely, as it will most belt-drive units.

The new AR tonearm, a straight, black anodized-aluminum medium-mass arm, comes with a carbon-fiber headshell that is similar to (but, unfortunately, not plug-compatible with) the ADC-type headshells that are used by several brands of turntables. The tonearm's indicated vertical tracking force was accurate within 0.1 gram at all settings. Evidently, the anti-skating control is calibrated to balance the side-thrust on the stylus at average groove-modulation levels; with a 1-gram tracking force, an indicated 1.5-gram setting of the anti-skating control was required to obtain optimum tracking of very heavily modulated grooves.

The damped cueing worked well, but, since the cueing lever is on the floating subchassis, the entire platter/arm assembly tended to rock when the lever was touched. As with many other designs, the anti-skating force moves the arm slightly outward when it is raised.

The new AR tonearm, like most of today's arms, violates one of Villchur's dicta: The vertical pivots are nearly a half-inch above the record surface, which means that some

The AR sounds as good as its measurements suggest, and its splendid performance is matched by an elegant appearance.



warp wow may be audible when playing imperfectly flat records.

The captive tonearm cable, after emerging from the tonearm pillar, is looped in a semi-circle before being attached to the base of the turntable. This is to minimize the stiff cable's tendency to transmit vibration to the floating subchassis, bypassing the soft suspension. (Some turntable makers neglect this important detail.) The remaining length of cable, which terminates in gold-plated phono plugs, is a relatively short 32 inches. The measured cable capacitance was only 82 pF per channel.

Although AR has made no special claims about the damping of the infrasonic tonearm/cartridge resonance, their new arm turned out to be remarkably well damped. Its infrasonic behavior was assessed with the Shure V15 Type IV cartridge, to allow comparison with previous tonearms tested with the same cartridge. With the pickup's damping brush disengaged, the amplitude of the infrasonic resonance typically exceeds 20 dB in tonearms that have low pivot friction and no damping, but in the new AR arm, the resonance, at 7.5 Hz, peaked at only 8 dB. The combination of the V15's damping brush and the tonearm's damping yielded virtually ideal behavior: With the brush down, the infrasonic resonance became a gentle 2-dB rise in the 11 to 16 Hz range, with a rapid roll-off below 9 Hz.

In normal tonearms, the infrasonic resonance produces exaggerated cantilever deflection in response to record surface irregularities and warps, with a consequently large variation in the effective vertical tracking force holding the stylus in the groove. We used a strain-gauge cartridge to observe these effects. On a visibly flat record, the variation in effective tracking force was 0.2 gram peak-to-peak, increasing to 0.5 gram on a disc with a severe, 4-mm warp. These are excellent results, bettered only by a reference arm, which is equipped with paddles and a trough of silicone oil for optimum damping.

The spectrum of the rumble was measured with the aid of the Thorens *Rumpelmesskoppler*, a device which attaches to the spindle to provide data uncontaminated by the cutting-lathe rumble inherent in test records. The AR turntable had less rumble than any other turntable we have measured to date. Its low-level rumble was mainly infrasonic, with a narrow peak of -40 dB (unweighted) centered at 6 Hz, dropping to -60 dB at 12 Hz, -70 dB at 20 Hz, -80 dB at 30 Hz, and -90 dB at audible frequencies. With this turntable, the only rumble that you ever hear will be the fault of the record manufacturer.

The new AR turntable, like the original, has one remark-

ably serendipitous characteristic. The inner and outer cast-aluminum platters, tested separately, had very pronounced resonances, with clear, bell-like tones when tapped. But when the outer platter was installed on the inner platter (even without a mat), the assembly became, quite amazingly, dead! Since there is no need for a rubber platter mat to absorb metallic ringing, AR provides a simple felt mat to cushion the disc.

In an informal test of the turntable's isolation from external vibration, we placed the unit on the test bench 1 meter away from a full-range speaker and turned up the preamp's volume control until a low-frequency feedback howl occurred. The test was repeated with a second turntable in the same location (a Kenwood KD-500 direct-drive model fitted with an SME Series III Improved tonearm), and the difference in system gain was noted. The gain could be raised 19 dB higher with the AR than with the reference turntable, an impressive confirmation of the legendary effectiveness of the AR's suspension. However, the very low frequency (3 Hz) of the suspension resonance also means that the turntable must be placed on a stable cabinet or shelf that will not transmit any lateral or tipping motion to the turntable base. Such motions (which can be caused by heavy footfalls on a poorly supported wooden floor) will cause severe flutter or groove-skipping.

The AR turntable's thin felt mat is not as effective as a soft-rubber platter mat at suppressing the microphonic behavior of LP discs (the tendency of the large, thin disc to pick up the loudspeaker's sound directly from the air and couple it to the stylus). This was assessed by placing the stylus in the groove with the platter rotation stopped, playing midrange white noise at a high level, and measuring the cartridge output. The microphonic sensitivity of the AR was about average. It was improved about 6 dB by substituting a Platter Matter mat, but the latter's 1-pound weight nearly bottomed the turntable's soft suspension. While the spring tension could have been adjusted to compensate for this extra weight, doing so would have probably raised its frequency and so this is not recommended. Audiophiles who are concerned about disc microphonics may wish to investigate the use of a spindle clamp, perhaps with a thinner soft-rubber mat.

Conclusion

In listening tests, the new AR turntable/tonearm system sounded every bit as good as its measurements suggest. Its most notable characteristic (thanks, no doubt, to its freedom from rumble and acoustic feedback) is the clarity of the reproduced sound—with bass that is well-defined and non-boomy, open and transparent midrange, a deep and stable stereo image, and an almost palpable sense of hall ambience with good recordings. The splendid performance of this product is matched by its elegant appearance—which is in gorgeous contrast to the plain-Jane box of yore. Welcome back, AR!

Peter W. Mitchell

Peter W. Mitchell is a freelance writer (specializing in audio, video, and microcomputers) and a consultant providing design advice and technical writing to NAD and other manufacturers.

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AR STEREO REMOTE CONTROL

HIRSCH-HOUCK LABORATORIES

CONNECTED in the tape-monitor loop of an amplifier or receiver or between a preamplifier and power amplifier, the AR Stereo Remote Control (SRC) provides wireless remote control of system power, volume, and balance as well as permitting replacement of the regular program source by any high-level source connected to its external-processor-loop (EPL) jacks. The SRC also has tape input and output jacks to replace the ones in the amplifier, with tape playback selected by a flush-mounted button on the top.

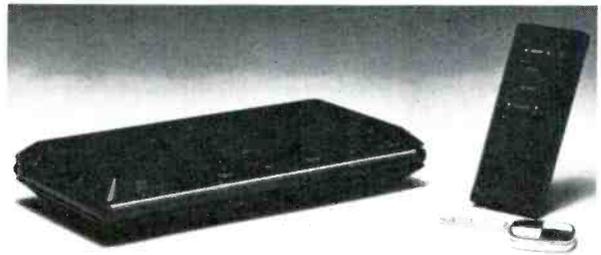
The black plastic case of the AR SRC is 11½ inches wide, 5½ inches deep, and 1¾ inches high. It consumes only about 6 watts from a 120-volt a.c. power line and is normally left energized at all times. On its front edge are the receiving window for the infrared signals sent by the battery-powered handset and five easily visible green or red status lights. One green light indicates that the system power is switched on and another that the stereo channel levels are balanced. A third green light goes on only while a signal is being received from the remote unit. One red light shows that the 20-dB MUTE function is activated (the SRC always comes on with the audio output muted to prevent inadvertent overdriving of the speakers), and another lights when the EPL source is selected. The various input and output jacks are located on the rear edge of the SRC together with a single switched a.c. outlet that can control up to 600 watts.

The remote-control handset is also black and resembles a scaled-down version of the main SRC unit. It has four flush-mounted press plates pivoted at the middle. The POWER control turns the system on or off, and the VOLUME control raises or lowers the volume, depending on which side of the plate is held in, in steps of 1.5 dB over a range of 75 dB, with a "full off" limit of at least -85 dB. The BALANCE control operates in a similar manner, shifting the balance to the left or right as the corresponding side of the plate is pressed. Finally, the MUTE/EPL plate controls the muting and program-source switching; each side is used for both on and off functions on alternate operations.

These eight basic remote-control functions are expanded to a total of fifteen by using the POWER switch as a kind of "shift key." Just as a typewriter's shift key selects alternative characters for the same keystrokes, pressing the "on" side of the SRC's POWER control plate after the system has already been turned on makes alternative functions for the other controls available. The shift mode lasts for 2 seconds after POWER is pressed, and then the controls revert to their basic functions.

In the shift mode, the VOLUME control initiates a more rapid change of volume level than normal, and pressing one side of the BALANCE control silences the other channel completely. If shift operation is followed by pressing EPL, the two channels are instantly balanced; if MUTE is pressed, instead of the regular 20-dB volume reduction, the signal is completely silenced. Finally, if the shift operation is followed by pressing the other side of the POWER plate to turn the system off, a "sleep switch" function is activated and the system stays on for another 30 minutes before automatically switching off.

The AR SRC has a rated maximum gain of unity (0 dB) with a nominal output level of 1 volt and a rated peak output at clipping of 4.5 volts. Its distortion is rated at 0.01 per cent or less from 20 to 20,000 Hz at a 1-volt rms output, and the A-weighted signal-to-noise ratio is better than 95 dB relative to 1 volt at the maximum volume setting (the noise level decreases at lower settings). The frequency response is specified as ± 0.25 dB from 6 to 60,000 Hz at any volume-attenuation setting up to 50 dB. The input impedance is 100,000



ohms for the selected input and 33,000 ohms for the other input; the output impedance is 330 ohms for the main output and 220 ohms (plus the source impedance) at the tape and EPL outputs. Price: \$159.95. Teledyne Acoustic Research, Dept. SR, 10 American Drive, Norwood, Mass. 02062.

• **Laboratory Measurements.** We tested the AR SRC with a standard load of 10,000 ohms in parallel with 1,000 picofarads. It passed our bench tests with flying colors. The output clipped at 3 volts rms (roughly equal to the rated peak level of 4.5 volts). The distortion at 1,000 Hz was less than 0.003 per cent at any output level up to 3 volts. The A-weighted noise was -97 dB referred to 1 volt at maximum gain. The channel separation was 89 dB at 1,000 Hz, and crosstalk from the EPL input to the main input was better than -78 dB in the midrange (1,000 Hz or below) and -42 dB at 20,000 Hz. The isolation from the tape input to the main input was 50 dB at 1,000 Hz. The frequency response was flat within +0, -0.3 dB from 5 to 50,000 Hz, reaching -1 dB at 100,000 Hz and -3 dB at 130,000 Hz. The attenuation steps were quite accurate, typically 1.2 to 1.8 dB over the full control range. At the normal (lower) rate of volume change, going from minimum to maximum volume required about 10 seconds. In the shift mode it took about 4 seconds.

• **Comment.** The AR SRC proved to be an extremely useful adjunct to a music system. It always worked as expected, with never a trace of an unwanted sound or anomalous behavior. Like most wireless remote controls, this one operated with full effectiveness from anywhere in the room and usually did not require that the handset be pointed at the main units. (We even used it at the other end of the room, facing away from the receiver, by bouncing the infrared signal from a wall.)

The SRC has at least one other unexpected application that for some users could supersede its advertised purpose. It has all the functions of a high-quality preamplifier except phono equalization and tone controls. If your regular programs are from high-level sources such as a tuner, tape deck, or CD player, the SRC provides all the controls you are likely to need, including switching between two of these sources (or three if you use the manual tape switch). This is in addition to its full remote capabilities, compact size, low cost, and superlative electrical performance. Not many preamplifiers can match the low distortion, flat response, and almost unmeasurable noise of the SRC, and those that do are usually considerably more expensive. All in all, the AR SRC is an intriguing, useful product and a good value as well.

—Julian D. Hirsch

As usual, speakers were numerous at CES, and most were eminently forgettable. But I found some interesting exceptions.

Continued from page 78

deal more to say about this unusual speaker, which I unfortunately was unable to hear when I visited their room. Obviously, an early audition is in order.

B & W had a lot to show at their press conference, not the least of which was their new Model 808, which becomes the flagship of the line. It was designed in response to requests from record companies (particularly EMI) for a speaker with all the desirable characteristics of the 801F (now virtually the official monitor speaker for the classical recording activities of most of the major record companies) but with the ability to operate at very high output levels, e.g. 120 dB plus!

The Model 808 is not an update of the 801F, but is an entirely new design, purpose-built to satisfy the record companies' requirement. Thus, new bass drivers were designed, as were new Kevlar midrange drivers and a new high-efficiency tweeter. All were configured through extensive use of laser interferometry and computer interface studies, and the new cabinet and crossover were similarly designed. I am deliberately glossing over the same details of the 808, since the exigencies of time at the press conference allowed but a tantalizingly brief audition of it. Nonetheless, the stentorian, but ultra-clean blast of some pop and rock music I heard was enough to anticipate that the Model 808 will become a classic speaker in the tradition of the 801F.

B & W, cognizant of the increasing popularity of component video monitors, and the imminence of the new FCC-approved stereo TV transmissions, also introduced the VM-1 and VM-2 video monitor speakers. These speakers are specially designed with no magnetic field by using driver shielding. Placed in cheek-to-jowl adjacency to the sides of the video monitor, there was no picture distortion whatever. These are true high-fidelity speakers, with a sensitivity of 90 dB SPL at 1 meter for 1 watt into 8 ohms; power handling of the VM-1 and VM-2 is 75 watts and 100 watts respectively. Frequency response of the VM-1 is 50 Hz to 20 kHz; the VM-2, 30 Hz to 20 kHz. The VM-1 is a 2-way speaker; the VM-2, a three-way unit. Both units use a 26-mm polyamide tweeter and a 200-mm diameter bass-midrange driver



Sansui PC-X11 audio processor

with specially impregnated composite short-fiber cones. Distortion in both models is less than 0.5% third harmonic from 90 Hz to 20 kHz at 96 dB SPL. I have already used the VM-1 model with a video monitor and the performance is quite remarkable. The fidelity of reproduction from Dolby stereo movie videocassettes is far superior than with the speakers furnished with the video monitor. Best of all was a live TV transmission of the United States Marine Corps Marching Band on the Fourth of July. After all, TV sound is wideband FM, and the crisp tattoo of the snare drums, brazen blare of the trumpets, shimmering cymbal clashes radiating myriads of high-frequency harmonics, and the solid, satisfying whump of the bass drums were thrilling in their realism. And this was only mono! Perhaps by next Fourth of July it will be broadcast in stereo!

John Marvoskis introduced his Janis System Three mini-subwoofer. This unit is an 18-inch cube, employing a new 12-inch polypropylene cone driver. Crossover point is 100 Hz. At 30 Hz, harmonic distortion is under 1%. The -3 dB point is 24 Hz. The response of this mini-subwoofer is almost identical to the original Janis W-1 model but with less output. The price of the W-3 subwoofer is \$500 in standard walnut or oak; rosewood is \$75 extra. The Interface 1A crossover and a 45-watt amplifier are sold only as part of the System Three, with the W-3 subwoofer and Interface 1A priced at \$795 complete. John had teamed up his new W-3 mini-subwoofer with Quad ESL-63 and, alternatively, the new Duntech PCL-3 wall loudspeakers. The W-3 mated particularly well with the PCL-3. On my Crystal Clear recording of Virgil Fox playing French organ music, the mighty 32-foot pedal tones were reproduced with awesome sonority and accuracy, while the Duntech reproduced the State Trumpets of the Ruffatti organ with brazen clarity, cutting through the thick texture of sound from the multi-

tude of pipes. Best of all, the organ sound above the 100-Hz crossover was singularly free of the nasal colorations which so many speakers impose on organ music. Obviously, the new Janis W-3 mini-woofer and the Duntech PCL-3 are a very synergistic combination.

The Duntech exhibit was right next to the Janis room. Warren Weingrad, of W & W Audio (importers of the Duntech wall loudspeakers), was on hand to demonstrate the big brother of the Duntech PCL-3, the new PCL-5 wall loudspeaker. You may recall my rather unbridled enthusiasm for the Duntech PCL-3 wall loudspeaker in the April issue. I was impressed most of all by the accuracy of the speaker and its utterly neutral, uncolored sound. I readily admit that I am ultra-sensitive to resonant colorations in a loudspeaker, believing this to be the single greatest flaw that corrupts the illusion of reality in most loudspeakers.

I was enthusiastic about the PCL-3, but the PCL-5 is, at the very least, an order of magnitude better. How did the PCL-5 sound? In a word, marvelous. With its efficiency, it can play quite loudly. Warren was playing a Telarc CD of Michael Murray organ music and the great clarity and huge sonority of the pedal bass prompted people to claim a subwoofer was being used! Transient response is outstanding—the piano in the "Trio" recording I reviewed in the May issue had a naturalness most people found hard to believe. String tone was smooth, sweet, and blessedly free of edginess. Above all, there was a tonal neutrality, with lovely delicate flute passages unbesmirched by amusical coloration. Warren's room was always crowded and reviewers from the little magazines were bugging him for review speakers.

Even the relatively brief audition I had of the PCL-5 has convinced me that John Dunlavy deserves a tip of the hat for his extraordinary audio engineering design work. 



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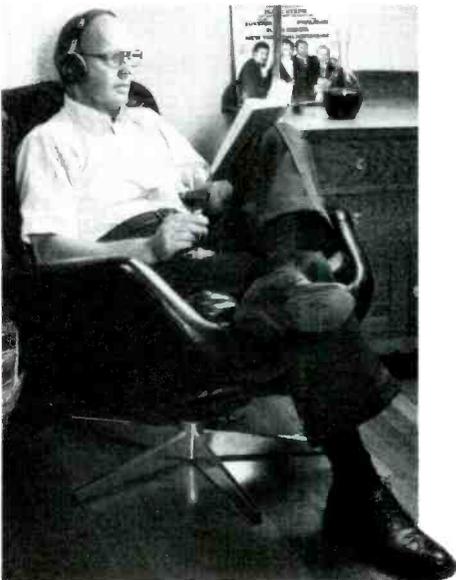
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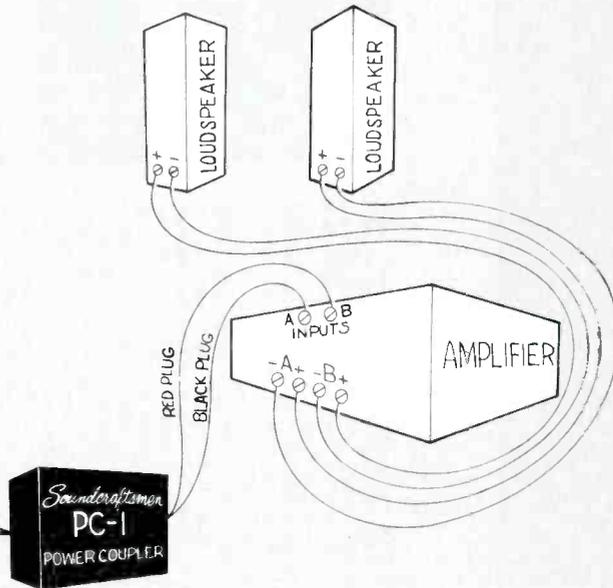
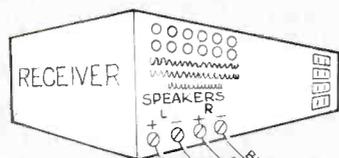
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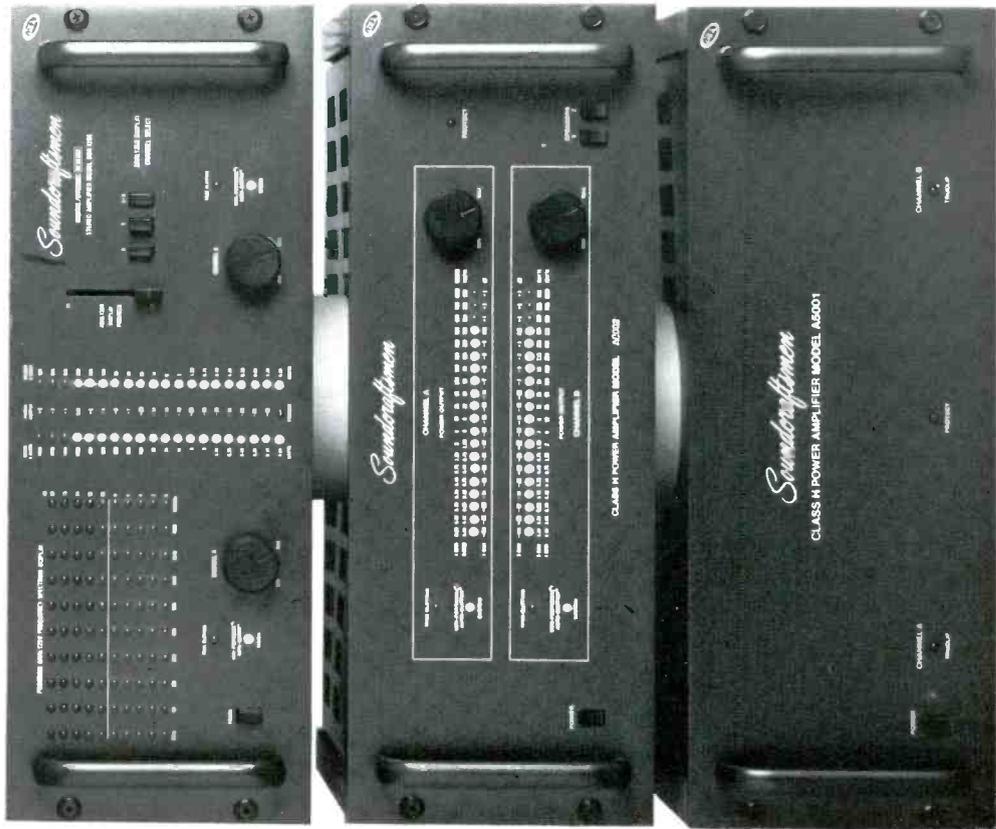
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AMPLIFIERS by Soundcraftsmen

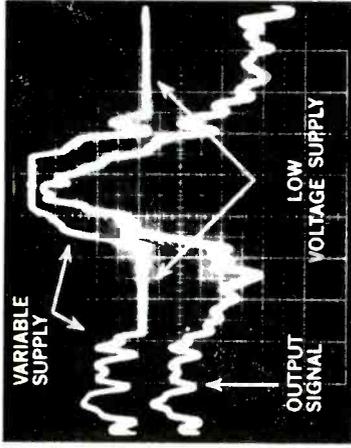


CLASS H

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-POROTIONAL® 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 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 paralleled 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 equalization...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): 16-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

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%
 TIM DISTORTION: Unmeasurable

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

DDR1200 \$1199. A5002 \$899. A5001 \$749.

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.

POWER MOSFET and CLASS H



A2502 POWER MOSFET AMPLIFIER

The Soundcraftsman A2502 Stereo Amplifier represents a major advancement in amplifier design, due largely to the incorporation of a new type of output device called POWER MOSFET. Unlike conventional bipolar output transistors which need elaborate protective circuitry to prevent catastrophic failure under extreme, abnormal operating conditions, the POWER MOSFET is inherently self-protecting. This characteristic allows the engineer to design an amplifier strictly for its ability to amplify musical information with complete sonic purity, without the need for expensive and sometimes distortion-producing protection circuits.

The Soundcraftsman A2502 produces 125 watts of continuous power at 8 ohms, with nearly 200

watts of undistorted dynamic headroom with almost total freedom from noise and distortion. 190 watts of continuous power is available at 4 ohms with almost 300 watts (1.8dB) dynamic headroom, for low-impedance or multiple-loudspeaker systems. The amplifier is one of the most thoroughly reliable ever made, offering years of trouble-free musical enjoyment.

Every conceivable user feature is integral to this new amplifier, including Calibrated Power Output Meters, versatile Speaker Switching, Input Level Controls and Informational Indicator LED's. Even carrying handles are included on the standard rack-mount 19" charcoal front panel. **A2502 \$649.**

GUARANTEED SPECIFICATIONS

CONTINUOUS AVERAGE POWER OUTPUT:
125 watts, 20Hz to 20KHz (8 ohms)
190 watts, 20Hz to 20KHz (4 ohms)
600 watts total dynamic reserve

THD AND NOISE:

(125w @ 1KHz): Typ. less than .01%
(112w to 125w 20-20K): Less than .05%

FREQUENCY RESPONSE: ±0.1dB, 20Hz to 20KHz

PHYSICAL

INPUT CONNECTORS: Standard phono pin plug...**OUTPUT CONNECTORS:** 5-way binding post (banana-type)...**FRONT PANEL:** Brushed aluminum, charcoal finish with heavy-duty handles. Standard 19" rack-mount...**CHASSIS:** Ruggedized 16-gauge steel wrap-around. All modular construction...**SIZE:** 5 1/4" x 19" x 15" deep...**WEIGHT:** 30 Pounds...**WARRANTY:** Two years limited parts & labor...**SIDE PANELS:** Genuine Oak or Walnut optional



A2801 POWER MOSFET AMPLIFIER

Ordinary Recordings—even so-called "audio-ophile 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, Digital, dbx and CX-encoded records have changed all that. Where 20 to 40 watts once was acceptable, not even double and triple that power is enough to reproduce these new recordings without severe "clipping" distortion!

Designed specifically for this new technology, the A2801 produces 140 watts per channel continuously with 8-ohm loads and 205 watts per channel continuously with 4-ohm loads and huge power reserves of more than 700 watts are always available to reproduce the tremendous Digital dynamic "peaks" with absolutely effortless clarity. More than enough for these new wide-range program sources.

Featuring the latest POWER MOSFET circuitry, the A2801 offers power, sonic purity and unmatched reliability. **A2801 \$549.**

GUARANTEED SPECIFICATIONS

CONTINUOUS AVERAGE POWER OUTPUT:
140 watts, 20Hz to 20KHz (8ohms)
205 watts, 20Hz to 20KHz (4ohms)
700 watts total dynamic reserve

THD AND NOISE:

(140w @ 1KHz): Typ. less than .01%

(112w to 140w to 20-20K): Less than .05%

FREQUENCY RESPONSE: ±0.1dB, 20Hz to 20KHz

I.M. DISTORTION: (60H/7KHz): Less than .05%

T.I.M. DISTORTION: Less than .02% (unmeasurable)

SIGNAL-TO-NOISE RATIO: (A-weighted): Greater than 105dB

SLEW RATE: Greater than 40v per microsecond

RISE TIME: better than 2.2 microseconds

PHYSICAL

INPUT CONNECTORS: Standard phono pin plug...**OUTPUT CONNECTORS:** 5-way binding post (banana-type)...**FRONT PANEL:** Brushed aluminum, charcoal finish with heavy-duty handles. Standard 19" rack-mount...**CHASSIS:** Ruggedized 16-gauge steel wrap-around. All modular construction...**SIZE:** 5 1/4" x 19" x 15" deep...**WEIGHT:** 30 Pounds...**WARRANTY:** Two years limited parts & labor...**SIDE PANELS:** Genuine Oak or Walnut optional

PRE-AMPLIFIERS by Soundcraftsmen

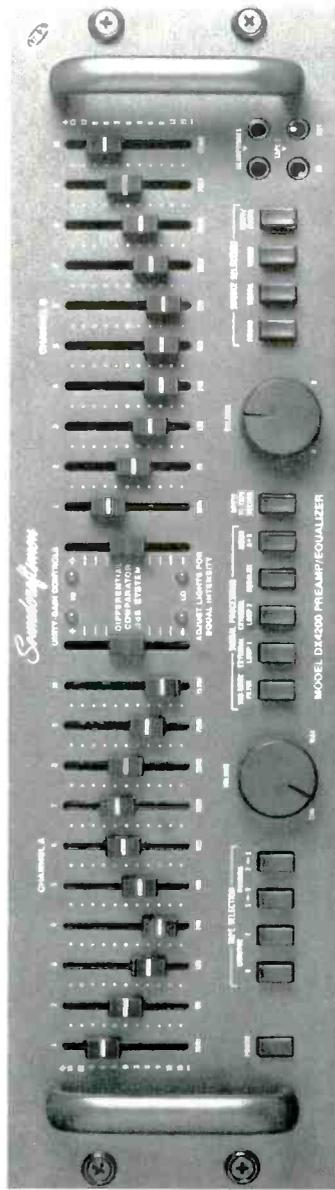
DX4200 DESCRIPTION

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-proof" 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 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 identical to the DC2215, described on pages 3 and 4, considered to be the finest octave-band equalizer available. The DX4100 and DX4000 include many of the features of the DX4200, as the comparison chart below indicates.

FEATURES

DX4200	<input type="checkbox"/>	Dual 10-Band ± 15 dB equalization.
DX4100	<input type="checkbox"/>	Dual 10-Band ± 12 dB equalization.
DX4000	<input type="checkbox"/>	Differential/Comparator® Unity Gain/LED adjustments
	<input type="checkbox"/>	Sub-Sonic Filter: -3 dB @ 15Hz, 12dB/octave rolloff
	<input type="checkbox"/>	Auto/Bridge®
	<input type="checkbox"/>	Variable cartridge loading
	<input type="checkbox"/>	Individual phono input level adjustments
	<input type="checkbox"/>	Moving-coil cartridge inputs
	<input type="checkbox"/>	Two mono phono preamplifiers
	<input type="checkbox"/>	CD Digital Audio Inputs
	<input type="checkbox"/>	Noble 31-position volume control
	<input type="checkbox"/>	Inputs for audio portion of video source
	<input type="checkbox"/>	Three-way tape dubbing
	<input type="checkbox"/>	Two-way tape dubbing
	<input type="checkbox"/>	Low-impedance headphone output jack w/amplifier
	<input type="checkbox"/>	Front-Panel tape inputs & outputs
	<input type="checkbox"/>	Three signal-processor loops
	<input type="checkbox"/>	Two signal-processor loops
	<input type="checkbox"/>	Handles
	<input type="checkbox"/>	19" rack-mount front panel
	<input type="checkbox"/>	Frequency Spectrum Analyzer Test Record
	<input type="checkbox"/>	Compu-tone Charts
	<input type="checkbox"/>	Genuine Walnut or Oak side panels Optional.



DX4200 \$699.

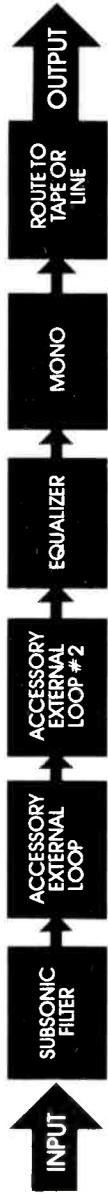


DX4100 \$549.



DX4000 \$399.

SIGNAL PROCESSING



Four useful and individually costly components are combined in each Soundcraftsmen 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 Soundcraftsmen 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.

PREAMP SECTION

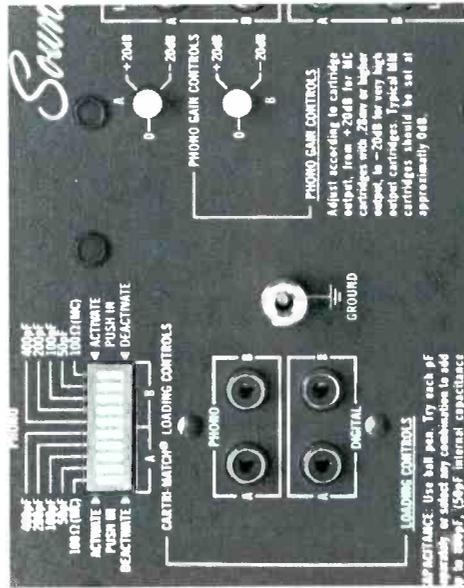
FREQUENCY RESPONSE: Hi-level $\pm 1/4$ dB, 5 Hz to 100 kHz Phono $\pm 1/2$ dB, 20 Hz to 20 kHz
 TOTAL HARMONIC DISTORTION: 0.1% at 1 Volt
 IM DISTORTION: Less than 0.1% at 1 Volt
 PHONO IMPEDANCE: 47K or 100 Ohms
 PHONO SIGNAL-TO-NOISE: 97 dB
 PHONO CARTRIDGE SENSITIVITY: Any High Fidelity cartridge 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
 100 dB at 2 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 / - 38 dB - all controls maximum
 UNITY GAIN CONTROLS: 18dB range
 FILTER TYPE: Precision tuned passive wire-wound coil inductors
 DIMENSIONS: $5\frac{1}{4}'' \times 19'' \times 11''$
 WEIGHT: 23 LBS.
 SIDE PANELS: Genuine Oak or Walnut, optional

CARRI-MATCH®

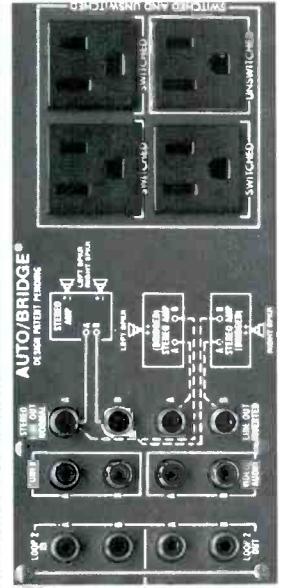
Every magnetic phono cartridge is designed to operate optimally only when it "sees" the correct capacitance and impedance loads at the phono preamp. Improper loading results in degraded frequency response and inaccurate reproduction of recorded material. The Soundcraftsmen DX4200 Carri-Match® permits 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! Soundcraftsmen has developed an active circuit called AutoBridge® to deal with this

problem. AutoBridge® allows the normal connection of a stereo amplifier to a Soundcraftsmen 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 Soundcraftsmen stereo amplifiers with absolutely *no* degradation of any aspect of performance. AutoBridge® assures non-obsolescence no matter how elaborate your music system becomes in the future.



EQUALIZERS by Soundcraftsmen

A SOUND CRAFTSMEN FIRST! DIFFERENTIAL COMPARISON EQUALIZATION

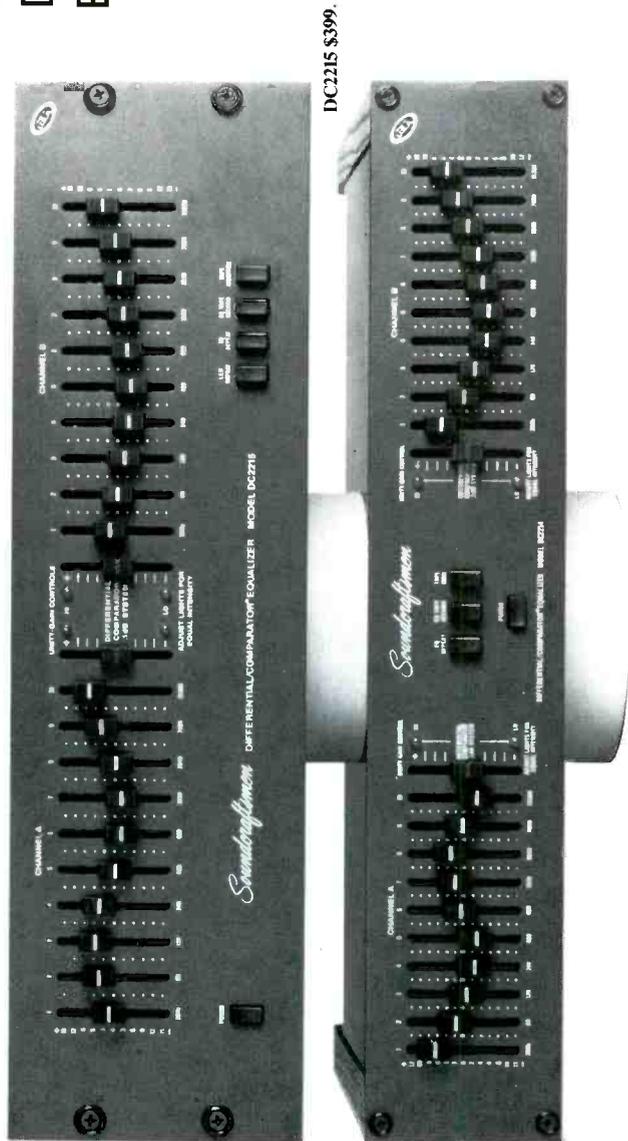
The Soundcraftsmen DC2215 is the finest high-fidelity graphic equalizer available today. Fourteen years of designing and manufacturing equalizers have given us significant performance advantages over other manufacturers, with revolutionary technology like the **Differential/Comparator® 0.1dB True Unity 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!**

The DC2214 sets new high standards in its price range with many of the features of the DC2215. The Soundcraftsmen **Differential/Comparator® True Unity Gain** controls with LED displays are identical to the DC2215, assuring full headroom for digital audio discs and wide-dynamic-range recordings, with minimum distortion and an outstanding Signal-to-Noise Ratio of 106dB. Front panel switching for tape monitor and routing of the equalized signal to a tape recorder are provided on the low-profile 3 1/2" front panel. As with the DC2215, the front panel fits a standard 19" rack. Genuine Oak or Walnut side panels are available at slight extra cost.

The SE550 is Soundcraftsmen's lowest-priced equalizer. Even at its remarkably low price it offers nearly identical performance to the DC2214, with the exception of the unity gain circuitry which is designed for audible adjustment, rather than the visual LED indicators. It is supplied complete with black accessory case. Soundcraftsmen-quality equalization is now within easy reach of every audiophile. **SE550 \$189.**

DC2215 and DC2214
Differential/Comparator® True Unity Gain w/LED Display
Tape and Line Equalization
19" Charcoal Brushed Aluminum Rack-Mount Panel
Frequency Spectrum Analyzer Test Record
Computone Charts
Connecting Cables
SE550

Unity Gain Controls
Tape and Line Equalization



DC2215 \$399.

DC2214 \$299.

EQUALIZATION EVALUATION KIT

How accurate is your music system?
Here are the tools you need to actually measure and record the true frequency response of YOUR music system - in YOUR room!
We've put together a totally unique performance evaluation kit which can quickly demonstrate the need for an equalizer, if such a need exists.
Fully narrated and easy to use with any stereo system containing a receiver or amplifier with a balance control.

16-PAGE FULL-COLOR BROCHURE! \$19.95 EQ-EVALUATION KIT, includes 1-12" LP Frequency 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.**

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Exclusive Differential/Comparator True Unity Gain Controls offer "EQUALIZATION COMPATIBILITY" FOR ALL STEREO SYSTEMS

EQUALIZER SPECIFICATIONS

DC2215

IN-OUT MONITORING: Differential/Comparator® Circuit with LED's for 0.1dB accuracy.
HARMONIC DISTORTION: Less than .01% at 2 V
IM DISTORTION: Less than .01% at 2 V
SIGNAL-TO-NOISE: 114dB at 10 V output 100dB at 2 V output.
OCTAVE CONTROLS: ± 22dB boost or cut — each octave (all other octaves set at maximum) ± 15dB boost or cut — each octave (all other octaves set at zero).
GAIN/CUT CAPABILITY: + 32dB / - 38dB — all controls maximum.
UNITY GAIN CONTROLS: 18dB range.
FILTER TYPE: Precision tuned passive wire-wound coil inductors.
DIMENSIONS: 5 1/4" x 19" x 11 1/4"
WEIGHT: 2 1/2 lbs.
SIDE PANELS: Genuine Oak or Walnut, optional

DC2214

IN-OUT MONITORING: Differential/Comparator® Circuit with LED's for 0.1dB accuracy.
HARMONIC DISTORTION: Less than .01% at 2 V.
IM DISTORTION: Less than .01% at 2 V
SIGNAL-TO-NOISE: 106dB at 10 V output
OCTAVE CONTROLS: ± 16dB boost or cut — each octave (all other octaves set at maximum) ± 12dB boost or cut — each octave (all other octaves set at zero).
GAIN/CUT CAPABILITY: + 22dB / - 28dB — all controls maximum.
UNITY GAIN CONTROLS: 18dB range.
FILTER TYPE: Op-Amp synthesized inductors.
DIMENSIONS: 3 1/2" x 19" x 8 3/4"
WEIGHT: 18 lbs.
SIDE PANELS: Genuine Oak or Walnut, optional

SE550

HARMONIC DISTORTION: Less than .01% at 1 V.
IM DISTORTION: Less than .01% at 1 V.
SIGNAL-TO-NOISE: > 105dB
GAIN CUT CAPABILITY: + 22dB / - 28dB
UNITY GAIN CONTROLS: 18dB range.
FILTER TYPE: Op Amp synthesized inductors. Discrete.
DIMENSIONS: 3 1/2" x 17" x 9"
WEIGHT: 9 lbs.
CABINET: Black pebble-finish case

NOTE: All Soundcraftsmen Equalizer products incorporate unity-gain control circuits. Models with LED circuits also have visual indication of unity or zero gain.

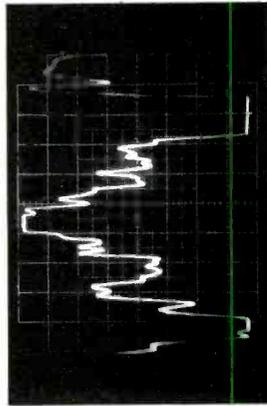


FIG. 1

The Differential/Comparator® Unity-Gain balancing LED's in FIG. 1 indicate an output voltage which is higher than the input voltage. Notice that the upper pair of LED's is glowing brightly, while the lower pair is unlit. FIG. 2 shows a scope picture of an actual musical signal as it leaves the improperly-adjusted equalizer. The "clipped" peaks show the severe distortion that can occur when any equalizer is not adjusted for True Unity Gain.

EXCESSIVE GAIN

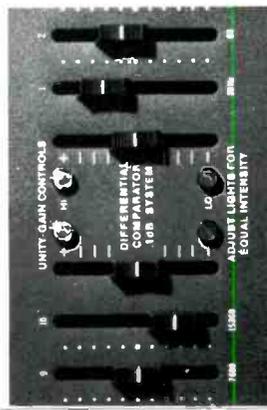


FIG. 2

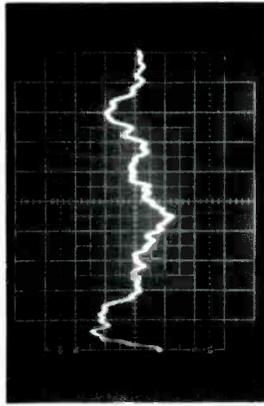


FIG. 3

Just as excessive gain is undesirable, insufficient gain can create a poor signal-to-noise ratio and cause related components to operate at less than their capabilities. Bottom LED's glowing as in FIG. 3 indicates an output voltage of less than the equalizer's input voltage. (EXAMPLE: 1 volt input; 1/2 volt output.)

INSUFFICIENT GAIN

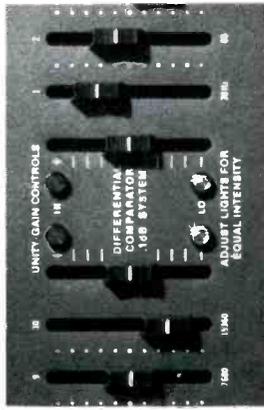


FIG. 4

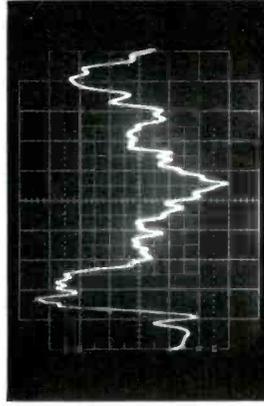


FIG. 5

TRUE UNITY GAIN

When both top and bottom LED's have been balanced for equal intensity, as in FIG. 5 there is "True Unity Gain" through the equalizer. Unity-Gain means that the equalized output voltage (or musical signal) is exactly the same as the unequalized input voltage. FIG. 6 shows the same musical signal as it leaves the properly-adjusted equalizer. Note the absence of clipping. When True Unity Gain is established, the equalizer's full dynamic range is available for undistorted reproduction of wide-dynamic-range recordings. Exclusive Differential/Comparator® 0.1dB Unity Gain Controls with LED display assure full dynamic range with the most demanding recordings.

How equalization is accomplished with the Soundcraftsmen Equalizer.

The ten controls on the left and the ten controls on the right of the Soundcraftsmen Audio Frequency Equalizer give you individual control of the left and right channels of your music system. With these, you are able to control, individually, each of the ten octaves covering the full range of each channel (20 to 20,480 Hz).

By raising the octave-band control above the center zero (0) mark, you are able to boost the intensity of that octave. By lowering the same octave-band control, you are able to lower the intensity of sound of that particular octave (nearly to the point of silencing it, if you wish). With these 20 controls, ten octave-bands for each channel of your system, you have much the same control of your music as the engineer in the sound studio from which it emanates or was recorded!

Indeed, many of the problems overcome by audio engineers within the recording studio, parallel those you will find within your own "sound reproduction studio," your home listening area. Just as the audio engineer has the equipment necessary to overcome the sound studio's acoustic and equipment problems to produce a recording of the finest fidelity, you now have the means of overcoming the equipment and acoustical problems within your reproduction studio, to recapture all the fidelity of the finest recordings.

You now have the ability to correct the situation when an octave barely struggles through to your ear, either weakened by your system, or dissipated by your acoustical environment. You simply raise that octave's control to intensify it, and equalize its intensity with that of the other octaves. Conversely, octaves overly intensified by your system or environment may be reduced to match the intensity of the other octaves.

To allow you to accomplish the initial equalization of your music system and acoustical environment, Soundcraftsmen has created an Instructional Test Record to be used in conjunction with your Soundcraftsmen Equalizer. You will find the step by step instructions are easily followed, and the process of equalization unusually fascinating, as you hear for the first time an octave by octave accounting of what your system and listening environment have been doing to your music!

Utilizing the test tones for each octave, the recording enables you to arrive at the proper setting, of each individual octave-band control, that provides a complete equalization of all octaves. These individual control positions should be recorded for future reference. The Soundcraftsmen Compitone Charts, supplied with your Equalizer, provide a diagram of the settings calibrated on the front panel of the instrument. After you have marked the positions of the control knobs on the chart, label the chart as the "Master Equalization Curve." Now, you have a means of quickly replicating these settings after further experimentation with your Equalizer's capabilities.

COMPONENTS

by Soundcraftsmen

FM-AM TUNER



MODEL T6002 AM-FM STEREO TUNER

The new Soundcraftsmen tuner's advanced technology incorporates sophisticated Frequency Synthesized Tuning with a highly stable Quartz Crystal Oscillator that locks onto the broadcast signal and makes station selections precise and drift-free. A 14-station Microcomputer Memory System, coupled with two-way Automatic Scanning, provides incredibly simple pre-programming and station selection. Scan to the desired station, then simply push "Activate Memory" and push any station recall button.

FEATURES

14 of your favorite FM and AM stations can be easily pre-set through the Microcomputer System for 14-station (7-AM, 7-FM) memory programming; Program Maintenance Circuitry to hold preset stations in memory. Two-

way Automatic Scanning/Tuning selection. "Directional Scanning"; Scans forward or reverse to stop at next usable station. "Scan Manual"; Scans forward or reverse to next station frequency. Signal-strength, liquid crystal metering indicators. "Stereo" indicator shows usable stereo station signal. "AM" and "FM" mode LED indicators. "Mono" mode selector. "High Blend" for lowest noise reception of marginal stereo signals. "Auto-Mute" for inter-station noise-free tuning. 5-digit readout in 50kHz steps, for possible future US station spacing requirements and worldwide operation. Phase-locked loop automatic optimum-tuning circuitry. Digital Quartz PLL Synthesizer circuitry. Deemphasis convertible from 75 to 50 micro seconds for world wide use. 300 ohm/75 ohm antenna connectors. 19" Rack-Mount charcoal-finish aluminum panel. **ST6002 \$299.**

GUARANTEED SPECIFICATIONS

FM SECTION

FM SENSITIVITY: 9.8dBf usable 1.7 microvolt IIF
QUIETING: 36dBf for 50dB stereo. 42dBf for 50dB mono.

SIGNAL TO NOISE: 72dB stereo (IIF)

IHD: 0.1% stereo

IF REJECTION: 90dB

IMAGE REJECTION: 86dB

CAPTURE RATIO: 1.0dB

PHYSICAL: FRONT PANEL: 19" rack mount...DIMENSIONS: 2" x 19" x 12" deep...SIDE PANELS: Genuine Oak or Walnut, optional...WEIGHT: 10 lbs.

STEREO SEPARATION: 50dB

FREQUENCY RESPONSE: +0.5dB, -1.5dB, 25/75 kHz

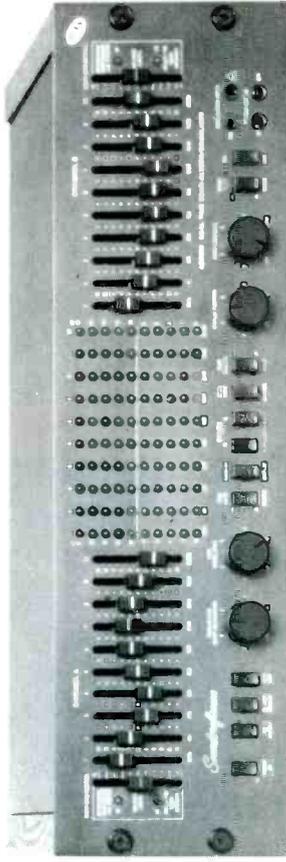
AM SECTION

USABLE SENSITIVITY: 25 microvolts

SELECTIVITY: 40dB

ANTENNA: Adjustable ferrite loop

ANALYZER-EQ



MOST ACCURATE REAL-TIME ANALYZER-EQ, 0.1dB READ-OUT,

Soundcraftsmen's new AE2000 Auto-Scan-Alyzer represents a landmark in professional quality analysis/equalization equipment. Incorporated into one compact chassis is a Real-Time Spectrum Analyzer, utilizing Soundcraftsmen's revolutionary Differential-Comparator® circuitry (Patent-Pending) with an astounding readout accuracy of 0.1dB, AND an Octave Equalizer of unparalleled performance. The analyzer's automatic octave-scanning mode makes incredibly fast, accurate analysis of room acoustics possible and the 100:1 ED full-frequency spectrum

bargraph display constantly shows real-time frequency response. The precision-tuned, passive, Wire-Wound Coil Filter circuits (no synthetic IC's) of the equalizer eliminate unwanted noise, hiss, and distortion common to inexpensive equalizers, while Soundcraftsmen's True Zero-Gain circuitry perfectly matches input and output voltages, crucial to the undistorted reproduction of the new wide-dynamic-range records and tapes. The AE2000 is amazingly versatile and is designed to satisfy the most demanding audiophile and professional user alike. **AE2000 \$699.**

GUARANTEED SPECIFICATIONS

EQUALIZER SECTION

HARMONIC DISTORTION: Less than .01% @ 2V.

IM DISTORTION: Less than .01% @ 2 V.

SIGNAL-TO-NOISE RATIO: 114dB @ max. output.

OCTAVE CONTROLS: ± 22dB boost or cut—

each octave (all other octaves set at max

imum), ± 15dB boost or cut—each octave

(all other octaves set at "0")

GAIN/CUT CAPABILITY: + 32dB! - 38dB—all

controls maximum

UNITY-GAIN CONTROLS: 18dB range,

wound coil inductors.

DIMENSIONS: 5 1/4" X 19 1/4" Wt. 28 lbs.

SIDE PANELS: Genuine Oak or Walnut optional

ANALYZER SECTION

DIFFERENTIAL-COMPARATOR®: Minimum input 75 millivolts.

Measurement accuracy 0.1dB.

Gain: adjustable—30dB max

Frequency response: ± 0.1dB 20Hz to

20KHz.

MIC PREAMP: Input impedance 2k ohms.

Gain: 80dB max.

Frequency response: ± 0.1dB 20Hz to

20KHz.

PINK NOISE SOURCE: Internal generator.

BAND-PASS FILTERS: Standard ISO center fre

quencies 30, 60, 120, 240, 480, 960 Hz

1,92, 3.84, 7.68, 15.36KHz.

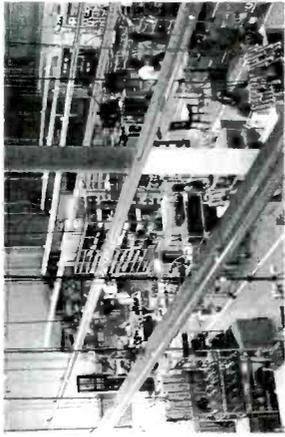
SELECTABILITY: Manual or Auto-Scanning with

adjustable scan rate. Electronic switching

of Display and Analyze filters.

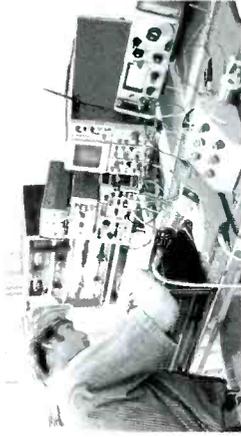
the Soundcraftsmen STORY

Soundcraftsmen celebrates its *fifteenth* year of manufacturing audio components for the discriminating audiophile. From the introduction of our first equalizer in 1970 through today, our goal has been to design and manufacture very affordable "separates" with the unique and necessary features that audio buffs demand.



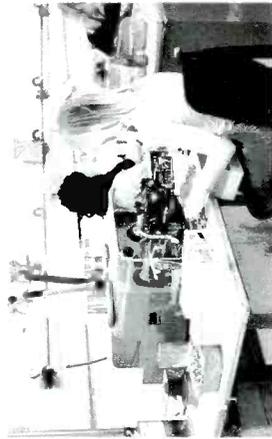
PRODUCTION AREA

Soundcraftsmen engineers are highly respected in audio design circles as being very forward thinking, yet practical, when engineering new products. By using proven design principles from the past with tomorrow's technology, we have brought the finest in equalization, preamplification and amplification products to you. The audiophile is a rare breed!



ENGINEERING

While price is important, performance and, most of all, sound quality are the determining purchase criteria—this is our criteria for design and manufacturing. We will continue to offer *value*, which can be significantly different from price!



COIL CIRCUITS

In our more expensive equalizers and preamplifiers we use uncompromising L/C coil circuitry. Through these expensive coil circuits, we are able to obtain greater than $\pm 15\text{dB}$ boost or cut levels on our "eq" circuits. By winding our own coil, we maintain exacting center frequency tolerances and have the ability to wind each coil to the specified octave center.



It has been well established that coils offer significant advantages over I.C.'s in equalizer circuitry but, as with everything we purchase, the best is not cheaper. In our moderately priced equalizers we have refined op-amp synthesized inductor design to allow a true $\pm 12\text{dB}$ boost or cut. Our exclusive Differential/Comparator® True Unity Gain circuitry is designed to complement the newest wide-dynamic-range recordings by providing maximum dynamic "headroom" with the best possible distortion and signal-to-noise performance.

Soundcraftsmen pioneered the use of solderless "wire wrap" construction, eliminating the possibility of cold solder joints. Our ferrous chassis, coupled with isolated trans-



WIRE WRAPPING

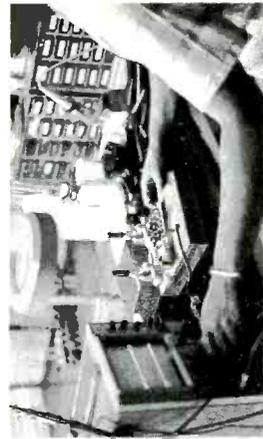
former shielding, stops all magnetic radiation and gives extraordinary 105/114dB equalizer signal-to-noise ratios and 97dB preamp signal-to-noise ratios.

All transistors are of special low noise type and resistors are high grade carbon film. Circuit boards are glass epoxy or



equivalent. The highest quality switches and other components are used to achieve maximum specifications and long trouble-free service.

Thirty-five percent of Soundcraftsmen's production staff is involved in quality control procedures. One hundred percent quality control is seen on **EVERY** unit manufactured. **EVERY** transistor and cir-



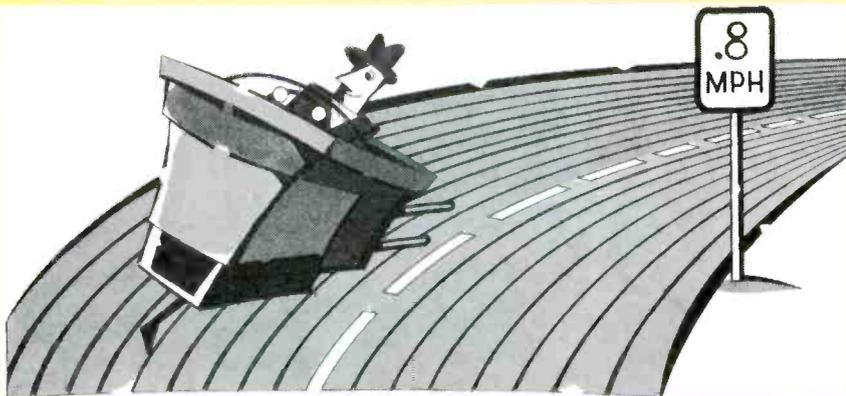
QUALITY CONTROL—ELECTRONICS — 100%
circuit board is put through an individual test. **EVERY** completed unit is electronically tested for specification accuracy and then **EVERY** unit is connected to a high fidelity system and listened to—just like you would at home. If your unit meets or exceeds the critical standards set forth on these tests, it is then packaged for shipment.



QUALITY CONTROL—CONSUMER TEST — 100%
From the finest equalizers, the most accurate analyzers to the unique preamps, to the revolutionary Class H and Power MOSFET amplifiers, you cannot purchase finer audio components.



THE 800 MILE STYLUS



Stylus Mileage

How long does a stylus last? Assuming that the average record plays 22 minutes per side, then at 33 $\frac{1}{3}$ rpm it will turn 733 times before the needle hits the run-out groove. Assuming that the average record (I just measured one) has an outer groove diameter of 11 $\frac{1}{2}$ inches, and a 5-inch inner groove, then the average groove diameter is 8 $\frac{1}{4}$ inches, and the average circumference is 26 inches.

Multiply that by 733 turns, and you get a groove length of about 0.3 miles

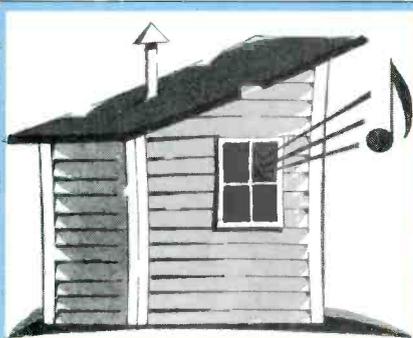
per side, playing at an average speed of about 0.8 mph. No wonder they recommend checking styli after every thousand hours—that's 800 miles.

So why do tires of mere rubber last 40,000 miles, when styli of ultra-hard diamond last a fiftieth as long? In part that's because only about one tenth of a tire's tread is on the road at any given moment—any given spot on a 40,000-mile tire has only accumulated 4,000 miles of actual road contact. And though the weight it carries is much less, a stylus's contact area is

so tiny compared to a tire's that it carries much higher loads per square inch. According to George Alexandrovich, of Stanton Magnetics, a modern stylus may have a contact area of about 0.0000002 square inch. A downward force of 1.5 grams on that small area yields 7.5 million grams—16,534.5 pounds—of pressure per square inch. A two-ton car resting on four tires with contact footprints of 5 x 7.5 inches would exert less than 27 pounds of pressure per square inch.

These figures are approximate, of course. Real life is full of variables. Take that figure I quoted for the contact area of a modern stylus: It will vary, says Alexandrovich, with the log of the stylus force and with the speed, the compliance of the vinyl used in the particular disc, and the stylus design. As a stylus wears down, its footprint increases, too, as much as tripling its original area. If a worn stylus did not increase its area (which decreases the pressure it exerts) its effect on record wear would probably be even greater than it is.

Illustrations: Philip Anderson



Sound and the Cost of Living

Sound equipment prices have remained surprisingly stable in this inflationary era—just look at a 10-year-old hi-fi magazine or catalog, and you'll see what I mean. Record prices have gone up more steeply, but still at less than the inflation rate.

Nonetheless, both have had an impact on our cost of living: They're among the many items monitored by the government's Bureau of Labor Statistics in making up its Consumer Price Index. I guess even the government knows that living isn't really living, without music.

A Deck Named FRED

I recently ran across a professional open-reel tape deck that cannot record (though it can erase, a little) and isn't really designed for playback, either.

As its name, FRED (for FRee EDitor), implies, it was designed for editing. It has a built-in tape cutter and splicing block, a capstanless tape drive with nominal speeds of 7 $\frac{1}{2}$ and 15 ips and a 45-ips top, and a tape counter that reads ± 1 hour, 59 minutes, 59 seconds.

You can monitor the tape through stereo headphones or a mono speaker. A safety switch shorts out the erase head; when you want to erase, you hold down a spring-loaded switch, and the erase current ramps on and off to prevent clicks and pops on the tape—perfect for taking out little glitches. FRED takes 10 $\frac{1}{2}$ -inch reels, has half-track stereo heads, and sells for \$2,475; that's a bit steep for most hobbyists, but those who need a FRED can call Digital Entertainment Corp. at (212) 581-8100 in New York.

Wipe with a Clean, Damp Gadget

One of the advantages first cited for the Compact Disc was that it didn't need the elaborate care and cleaning that LPs do. "Just wipe it off with a clean, damp cloth" was what I first heard—and my own CDs haven't even needed that, yet.

Nonetheless, the list of CD cleaners keeps on growing. Last I heard, Allsop, Discwasher, Nagaoka, Nitty Gritty and Sony had all introduced them, and I've probably missed a few. "Why this product?" I asked one supplier (who, I suspect, would rather remain anonymous). "Well," he replied, "our customers like to feel involved."

San Antonio Gets EARS

San Antonio has a new audio club, the Esoteric Audio Rating Society (EARS). The club meets bi-monthly, and carries on such projects as recording local concerts for radio or other purposes. For information, write them at P. O. Box 27621, San Antonio, Tex. 78227.



Bit Error

Back in the September, 1983 "Spectrum," I checked out Len Feldman's reference to watching "billions of bits" from a Sony PCM-701 on his video monitor, and calculated that it would take about half an hour to see a billion. Wrong!

Both *Audio* contributor Peter W. Mitchell and reader Tom Ace pointed out that my calculations were off. According to Mitchell, who does PCM recording, "There are 1.4 million data bits per second . . . or 46,993 bits in each 1/30th second [one video frame]. A billion data bits go by in 709 seconds (i.e., 11.8 minutes), or in about seven minutes if you count the error-correction bits, too. . . . The formatting of the data as a pseudo-video signal leaves a fair amount of blank space around the edges of the screen, so all the bits are . . . visible, even on a TV set with typically excessive overscan."

The Quality of Mercy

Some components are more revealing than others, letting you hear clearly every nuance of the music, but letting you hear every defect in your system and the recording, too. The first is an unalloyed advantage; the second is often praised as such, but I find it a two-edged sword. It is good to unmercifully reveal the defects in our systems, to correct them. But since correcting them sometimes takes more money than we have, it would be nice to mercifully obscure them, to simply enjoy music. Maybe what every system needs is a switch: "Merciless/Merciful."

Survivors

A good product can survive vicissitudes, as the Sequerra tuner and Apt amps and preamps prove.

The Sequerra 1, one of the first hot tuners, is more than ten years old, but still sells. That's a tribute to the tuner itself and to the late Frederick E. Barrett, a black business leader whose company, United Sounds of America, picked up manufacture of the tuner several years ago. Mr. Barrett was cut off in his prime in 1983, but his company and the tuner continue; they are certainly among the monuments he would have chosen for himself.

The Apt line also broke new ground (especially in preamps), but the company was limping to a halt—till last March, when Apt Corporation was purchased by Wayne Friedrichs, now its President. The old line is in production and new models are in the offing.



A Loss of Direction

The myth still pops up in print that "low-frequency sound is non-directional." Add one more word, though, and it wouldn't be a myth. That word is: "Relatively."

The lower the frequency, the smaller the speaker system producing it, and the closer that speaker is to the main speakers, the more difficult it is to hear where the bass is coming from. But go to the opposite extreme (a big woofer system cutting in at above 150 Hz, placed in the rear of the room) and you'll be able to hear where the bass is.

I've heard all these factors ignored, with predictable results. Take, for example, the many car-stereo companies who offered separate tweeters and "woofers," crossing over

at 2 kHz or so, then suggested mounting the woofers in the back, because "bass is non-directional." Maybe bass is—but a lot of that back sound was not bass, but midrange. You could hear the split in the sound, every time.

Even with a lower crossover, your ears can find the woofer when it's in a different direction from the main speakers. My car's subwoofer, for example, crosses over at 70 Hz, and I can tell when it's playing (though not as much as when it was crossed over at 150 Hz or so), because it is behind me, while the rest of the sound comes from the front. I recently heard a demo of a three-piece speaker system, where the subwoofer was up front, but outboard of the satellites; you could tell where it was.

The bit about speaker system size I learned from editing Glen Ballou's "Sound Reinforcement for the Amateur" (*Audio*, March, 1984). Until then, I'd always known that a tweeter's directional pattern depended in part on the relative size of the dome or cone and the wavelength being reproduced. What I learned from Ballou was that, for woofers, enclosure size, not just driver size, is a factor.

I think part of the myth is due to a confusion between low-frequency speakers being less directional, or "beamy," (which they are, a lot) and low frequencies *themselves* being less directional, or harder to locate (which they are—but not as much). Close your eyes in a concert hall, and you can usually tell where the double-basses are on the stage—not the pinpoint kind of location you get in some stereo systems, but a definite sense of direction, anyway.

Yet even the concert hall can fool you. At a chamber concert I attended last year, I could see where the cello was and hear where it was (from upper overtones and the bite of the bow)—yet its bass tones seemed to come from under the first violinist's chair. *Continued on page 105*

NOW YOU DON'T HAVE TO PAY AN ARM AND A LEG FOR YOUR EARS.

Becoming an audiophile has always had its price. We have a way of lowering it.

Introducing two of Yamaha's new high-end separates—the M-40 power amplifier and the C-40 pre-amplifier.

Both have the highest state-of-the-art circuitry and features. For the highest quality sound reproduction possible.

But at a lower price than ever before possible from Yamaha.

For pure sound combined with pure power, the M-40 uses our exclusive Auto Class A circuitry. It automatically switches from pure Class A operation to Class AB when music peaks require high power levels. So purity is never sacrificed for power.

To eliminate crossover distortion during switching, as well as transistor non-linearity distortion, the M-40 has our unique Zero Distortion Rule circuitry.

*Suggested U.S.A. retail prices

The C-40 uses ZDR in the phono EQ section. For the purest phono reproduction possible.

And to effectively capture the quieter passages that today's digital sources are capable of, the M-40 has a phenomenal 127dB S/N ratio.

The result is exceptionally pure and accurate musical reproduction.

Which is in keeping with the C-40's and M-40's purpose—basic, audiophile-quality sound reproduction—pure and simple.

And at \$350* for the C-40 and \$400* for the M-40, affordable.

So visit your Yamaha dealer. And satisfy your ears. Without having to sacrifice any other part of your anatomy.



Newly designed speaker terminals make either heavy-gauge audiophile cable or standard-gauge cable a snap to connect.



Yamaha Electronics Corporation, USA, P.O. Box 6660, Buena Park, CA 90622



Enter No. 75 on Reader Service Card

YAMAHA CD-2

Natural Sound Compact Disc Player

Compact 3-Beam Laser Pickup

New, Improved LSI Circuitry

High-Precision Digital Filter

Simplified 10-Key (Plus Index) Operation

Easy Memory Programming / Convenient Music Search

Versatile Play Mode Selection / Handy Repeat

Disc Remaining Time Indicator / Cordless Remote Control



COMPACT
disc
DIGITAL AUDIO

Behind the Superior Yamaha Sound

Yamaha's foundation as a manufacturer spans more than a hundred years in a number of specialized fields. Since the company began as a producer of reed organs, it has expanded steadily until today, Yamaha music instruments, sound reinforcement gear, music education and popularization programs, motor products, sports equipment, and of course, audio products, are renowned worldwide for their highly refined performance. Naturally, the many years spent in in-

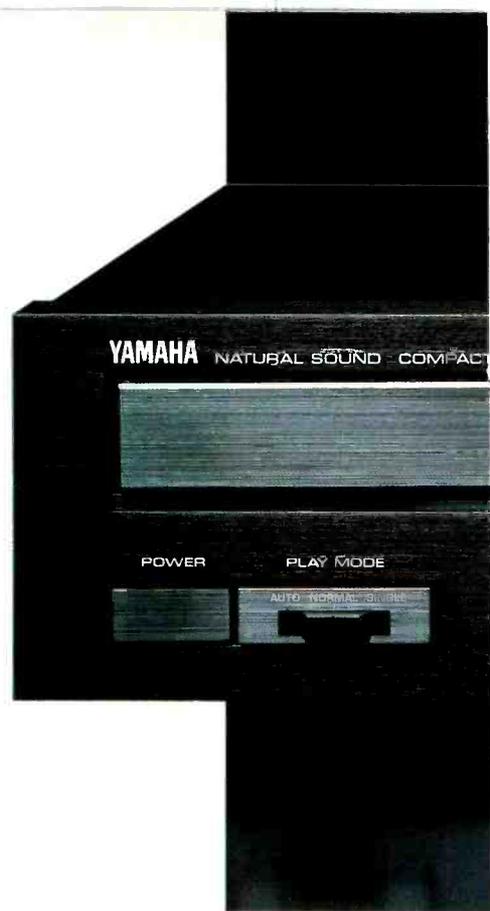
tensive research and development in all these fields has resulted in a vast and varied store of technology. Moreover, the finely balanced inter-relationship between the many Yamaha in-house technologies, production facilities and product groups creates a highly efficient network that makes it possible to achieve optimum quality and performance in every product.

Yamaha audio know-how, however, does not stop at technology. Each and every new audio product must face the most demanding challenge imaginable: the critical ears of Yamaha music instrument designers. Unless the reproduced sound is exactly like the real thing, the product is not considered finished. Yamaha gives you vast technology tamed by musical sensitivity—a claim no other audio manufacturer can honestly make.

SOPHISTICATED OPERATION COMPLEMENTS SUPERB SOUND — BEAUTIFULLY

If you've been waiting to see just how good "second generation" compact disc players could be, your wait is over. Because the exciting Yamaha CD-2 is here, now. One look at the CD-2 proves that the wait was worth it. First, you see significant new audio technologies—a new, compact laser pickup system; two new LSIs which replace hundreds of ICs; high-precision filters—the works. Next you notice the sophisticated front panel layout, with a stunning

array of controls which allow faster, more versatile and convenient operation than ever before—10-key data input, memory store/cancel/check, three-way music search, three-mode playback, multi-function and remaining time indicators, even an automatic 3-second inter-song spacer function. Plus the unsurpassed convenience of a full-function remote control unit. Then there's the final payoff—sleek, modern styling. The CD-2 looks every bit the sophisticated audio component



it is. Adding it to your stereo system will show the world that it has come of age. The digital age. The Yamaha CD-2 audio performance age.

Advanced New Yamaha LSI Circuitry

The CD-2 embodies the special capabilities that separate Yamaha CD players from conventional products. All of our technologies are developed in-house, which means our engineers have complete freedom in producing the kinds of advanced new technologies

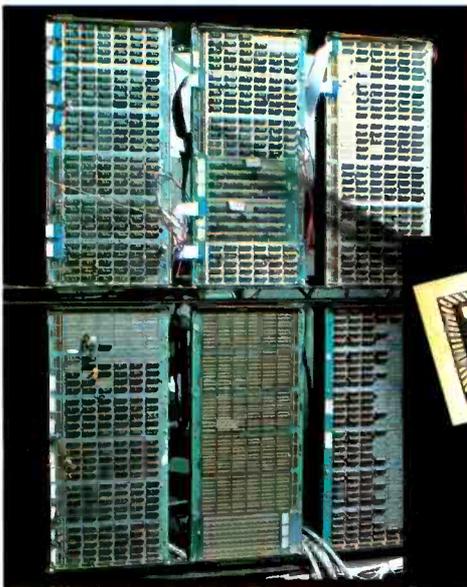
that meet their exacting requirements—and standards. The original LSIs incorporated in the CD-2 are a prime example of this. Because we're one of the few audio manufacturers to produce our own LSI circuits, we applied that know-how to develop two new super LSIs that do the job of hundreds of semiconductor chips. And do it better. They handle the enormously complicated functions of signal processing, servo control, and digital filtering with unsurpassed accuracy and reliability, resulting in audibly superior sound quality—the high musical standard that only Yamaha can reach.

High-Resolution Digital Filter

Another important advantage of Yamaha's new LSIs is the incorporation of a unique digital filter system that doubles the 44.1 kHz sampling frequency to 88.2 kHz, effectively doubling the playback resolution. By placing the sampling frequency so far above the highest audio frequency to be reproduced—4 times higher instead of 2 times higher—a relatively simple filter circuit with a gentle cutoff slope can be used to remove the sampling frequency from the music signal. This not only eliminates the need for complex filtering circuitry, but the filter itself greatly reduces phase distortion, which can be a problem with conventional filtering systems. You'll notice more natural, vibrant sound, especially in the high frequency range.

Compact 3-Beam Laser Pickup

The microscopic tolerances required in laser pickup systems leave absolutely no room for error—deviations of a few microns can result in degradation of sound quality. Again, Yamaha has provided a superior system for the CD-2. A 3-beam laser pickup so exceptionally high in tracking accuracy that distortion caused by "spurious data" pickup is virtually eliminated. Every bit of precision performance built into compact discs is delivered with stunning clarity and fidelity—digital audio at its fantastic best.



The advanced LSIs developed for the CD-2 incorporate the performance of hundreds of individual ICs mounted on huge circuit boards.

This complex circuitry has been refined into just two integrated circuits.



The resulting LSI chips provide the CD-2 with extremely high precision and outstanding reliability, unobtainable with conventional circuit configurations.

CD-2

Natural Sound Compact Disc Player



Unsurpassed Operating Sophistication

The advanced circuitry developed for the CD-2 does more than provide exceptional musical reproduction performance. They bring incredible sophistication to operation, as well. But don't confuse "sophisticated" with "complicated." There's not one feature on the CD-2 that doesn't contribute directly to easier, more flexible operation, giving you greater flexibility in controlling playback than ever before. The CD-2 elevates the state of listening to state of the art.

Three-Way Play Mode Selection

The CD-2's versatility becomes readily evident as soon as you load a disc. After the disc has been loaded into the slide-out tray, you can close it in any of three ways—by gently pressing the tray front, touching the Open button again, or pressing the Play button. But the convenience is just beginning, because you now have three playback modes to choose from to get your music off to the right start. In the Auto mode, playback begins as soon as the tray is closed. In the Normal mode the CD-2 waits until you press the Play button—this is the mode used to program the CD-2. Finally, the Single mode plays one song at a time and pauses, which makes it handy for taping selected parts of discs.

Simplified 10-Key (Plus Index) Operation

10 music input keys, plus a special index key, make selecting the songs or sections of selections you want to hear a smooth, pushbutton operation. After you've loaded a disc, you can begin playback from any selection just by keying in the appropriate

number. During playback, too, you can skip to any other selection at any time merely by pressing that number. These keys also permit easy programming of songs merely by pressing the numbers of the songs you want to hear. These keys also allow easy cueing of index points in discs which contain these points.

Easy Random Memory Programming

It seems that even our favorite discs contain a selection or two that we don't particularly like. Or maybe our favorite song is somewhere toward the end, but we want to hear it first. No problem with the CD-2, as its random memory playback function allows you to "reprogram" a disc to get just the playback order you want—up to 12 songs in all. That's enough capacity to even let you hear your favorite songs more than once. What's more, programmed selections can be easily cancelled with the Memory Cancel button, and the numbers and total remaining time of the programmed selections can be checked while in the stop mode merely by pressing the Memory Check button.

Convenient 3-Way Music Search

Sometimes it's not practical, or even possible, to find certain portions of the disc by referring to the information on the disc jacket and re-keying the player. That's why the CD-2 offers you three ways to scan the disc with pushbutton ease and accuracy. The first of these is with the "+ -" bar, which permits locating the pickup at the beginning of any selection or index point on the disc. Say you're playing a song and decide you want to skip to the next one (or the next pro-

grammed selection, or the next index point in the index mode)—merely press the "+ -" end of the bar and playback will start from the next song immediately. Pressing it again will advance the pickup to the beginning of the next song or index point, right on to the end of the disc. Pressing the "-" side returns the pickup to beginning of the selection, and pressing it again moves it to the start of the previous song. The "<<>>" bar controls fast forward/reverse, but in two ways. When the CD-2 is in the Play mode, the search operation starts slowly for three seconds, then increases to high speed. While this is happening, playback sound is muted 20 dB to allow you to hear when the desired section is found. With the CD-2 in the Pause mode, one minute of disc time is covered in one second for extremely fast forwarding and reversing. With all music search functions, the current selection number and elapsed time location of the pickup on the disc are displayed for real-time visual confirmation of these operations.

Three-Way Music Repeat

There are times when we want to hear a disc, or certain parts of it, over and over, such as during a party, or after purchasing a favorite artist's latest album. Again, the CD-2 provides all the versatility you want, with 3-way repeat. To repeat the entire disc, just engage the repeat button. Or program the CD-2 first for selected songs or index points—the CD-2 will repeat-play the programmed selections. Or designate any A-B segment of the disc for playback—the choice is yours with the CD-2.

Full-Information Multifunction Indicators

With turntables and most tape decks, you have no indication of such useful information as remaining playback time, for example. The CD-2 provides this, and much, much more—all the information you need, instantly and accurately.

When you load a disc, you get an automatic display of total disc playback time and the number of selections on the disc. As the disc is being played, elapsed time is displayed in minutes and seconds—and remaining time is available at the push of a button, a handy feature when making tapes. Also, memory programs can be reviewed at the touch of a button, showing both the selection numbers and total remaining playback time in sequential order.

Other indicators tell you whether or not a disc is loaded, play, pause, or stop operating status, and whether program sequences and repeat play sequences are preset into memory—everything you need to know, at a glance.

Space Play Function for Flawless Taping

Today's sophisticated cassette decks often incorporate a music search function. To work properly, however, a gap of at least three seconds must be left between selections on the tape. The CD-2 will make these gaps for you, automatically, allowing you to create recordings that will perform flawlessly in audiophile class cassette decks.

Relaxed, Cordless Remote Control Operation

We've explained the major operating features that make using the CD-2 an audiophile's delight. Now here's a feature every user will enjoy—cordless remote control. All of the CD-2's main operating functions can be controlled from across the room, with pushbutton ease and convenience. But there's more good news—the RS-2 remote control unit is supplied as standard equipment. What would be an attractive option with other CD players, if it were available, is part of the CD-2 package. Which makes it even more irresistible.

RS-2 Cordless Remote Control Unit



The CD-2 is available in the standard Yamaha silver front panel finish for stylish compatibility with any audio system, and any listening environment. An RS-2 cordless remote control unit is standard equipment with every CD-2 CD player.

CD-2 SPECIFICATIONS

System	Compact disc digital audio system
AUDIO CHARACTERISTICS	
Frequency Response	3—20,000 Hz, ± 0.5 dB
Harmonic Distortion	Less than 0.0015% (1 kHz)
Noise + Harmonic Distortion	Less than 0.004% (1 kHz)
Dynamic Range	Better than 96 dB
S/N Ratio	Flat 96 dB (1 kHz) IEC Flat 100 dB (1 kHz) IEC A 102 dB (1 kHz)
Wow and Flutter	Unmeasurable
Channel Separation	Better than 95 dB (1 kHz)
Output Voltage	2 V (at 600 ohms)
FUNCTIONS	
Program Selection	Direct with 10-key panel. Sequential with + and - keys
Playback Programming	10-key entry, confirmation with check key, up to 12 selections, random playback
High-Speed Search	2 speed fast forward/reverse with sound, high-speed search in pause
Remaining Time Display	With check key

Space Play	Spaced at intervals of 3 seconds during normal program or A—B repeat playback
Repeat	A through B, all selections, or all selections in memory
Reset	Press the Stop key twice
Auto Pause	Pause for each selection, or each time program is repeated (Single play mode)
Disc Loading	Motor driven horizontal loading
DIGITAL SIGNAL PROCESSING	
Optical Pickup	3-beam laser
Error Correction	CIRC
D/A Conversion	16-bit linear
Filter	Digital filter + (7th order LC filter)
GENERAL	
Power Supply	Matched to supply voltage and frequency of each area
Power Consumption	20 W
Dimensions (W x H x D)	435 x 93 x 290 mm (17-1/8" x 3-5/8" x 11-3/8")
Weight	4.8 kg (10 lbs. 9 oz.)

Specifications subject to change without notice

For details please contact:

SINCE 1887

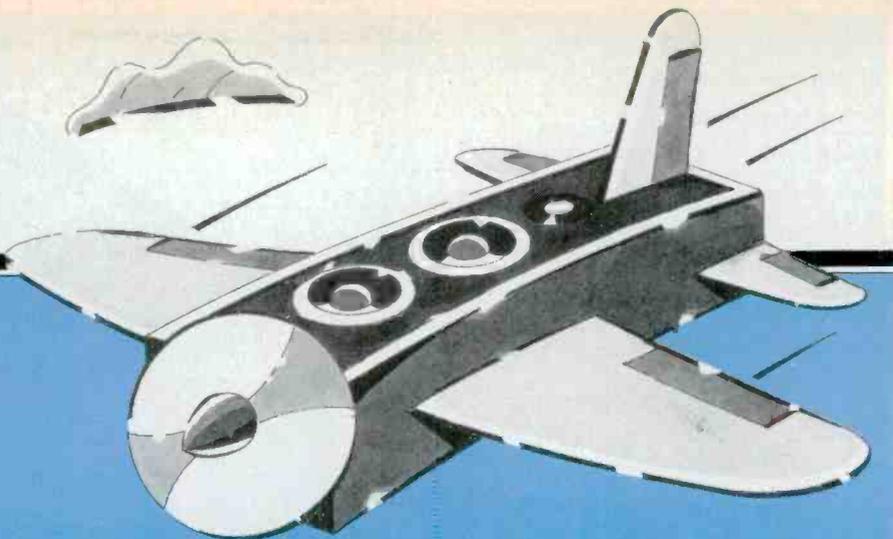


YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

The time-hallowed steam railway demo record lives on, in CD form. But other forms of transport are diluting the tradition.

Continued from page 99



Non-Rail Dynamics

The traditional hi-fi demo sound effect has long been the steam locomotive, as I noted here a few months back. The first commercially released stereo record, in fact, was probably *Rail Dynamics*. But as other forms of transport gain sway, this tradition is getting diluted. Cases in point: Wharfedale's demonstration at a Consumer Electronics Show included a tape of someone hammering on a garage door—already becoming a famous demo bit in Britain. And Warner/Elektra's CD-only release, *The Digital Domain*, has a helicopter cut that's so realistic you can almost feel the propwash.

In Japan, I recently picked up a whole CD of jet-plane sounds, *The Newest Fighters of the World: Documentary Sounds* (King Records K35Y 2003, though it also bears a "Seven Seas" logo). This was taped

(on an analog Nagra) at the Paris Air/Space Show of 1981 and covers a variety of U.S. and European jet fighters, including the Saab Viggen—one Saab which I assume has no stereo system. Jet planes lack excitement for me, though, and the constant narration doesn't help (though I am glad it's in English).

Propeller plane sounds *do* excite me—and I'm not alone. Leo de Gar Kulka, of Sonic Arts, caused a stream of grins by playing his *Thunder in the Skies* (Sonic Arts Repertoire Records

RR-CS6306) in a ballroom with four Acoustat speakers at a Consumer Electronics Show a year or so ago. The room was big enough to hold a few planes, if not quite to fly 'em, which added to the realism.

Yet, despite all this air-age stuff, steam locomotives are alive and well and living on CD—at least in Japan. *Steam Locomotive* (Toshiba EM! CA35-1047) has 59 minutes, 19 seconds of good old train sounds, plus a bit of Japanese train-crew chatter.

More Automation

Two more aspects of tape deck operation have been automated, this time by Akai, whose new GX-7 deck has a "Rec Cancel" and an "Auto Monitor."

Should you decide you don't want to tape what you're taping, a poke at

there is one little catch: As soon as the tape ends, the deck goes into stop mode, and the audio output is automatically switched back to the "Source" signal. This means that, unless you're awake enough to notice the brief silence while the tail-end leader passes over the heads, you



the "Rec Cancel" button rewinds the tape to the beginning of the program you have just recorded, blanks 4 seconds of tape, and then goes into "Rec Pause" mode.

When the deck is in "Rec Standby," the "Auto Monitor" feature switches the deck's audio output to the "Source" mode, automatically switching to the signal from the playback head when you start to record or play. That's handy—but

won't notice that the tape has ended and you're no longer recording.

That, at least, is how Akai tells me their "Auto Monitor" works—I haven't used a GX-7, yet. What I have used, since writing the above, is a Pioneer CT-A9, which also has an auto monitor. The Pioneer version, however, definitely stays in "Tape" mode when the tape runs out, shutting off the sound to warn you that it's stopped recording.

Translation Technology

Taping lectures in a language you understand is old hat. But how do you tape them when the lectures are in a foreign language, with translations supplied through headphone radios? When the problem arose on a recent trip to Japan, I ran a patch cord from the radio's second headphone jack to my recorder's mike input during the lectures themselves; during the discussions afterward, I simply placed the radio headset over my recorder's built-in mike to capture both the English questions and translated answers. Rich Warren, of WFMT and *Chicago* magazine, also on the trip, used a similar solution: He clipped his recorder's tiny microphone to his headset, just outside his ear.

Now's Not the Time . . .

Back in the '60s, as I recall, Jim Kweskin made a record whose first side ended with a chorus of:

Now is the time,

To turn the record over . . .

To me, that was the record's most memorable cut. The question is, what will become of it if they ever reissue the album as a single-sided CD?

Dividing and load matching network LF

Balanced twin bass drivers

Real wood veneers

Coupled cavity bass enclosure

High density damping polymer

Dividing and load matching network MF/HF

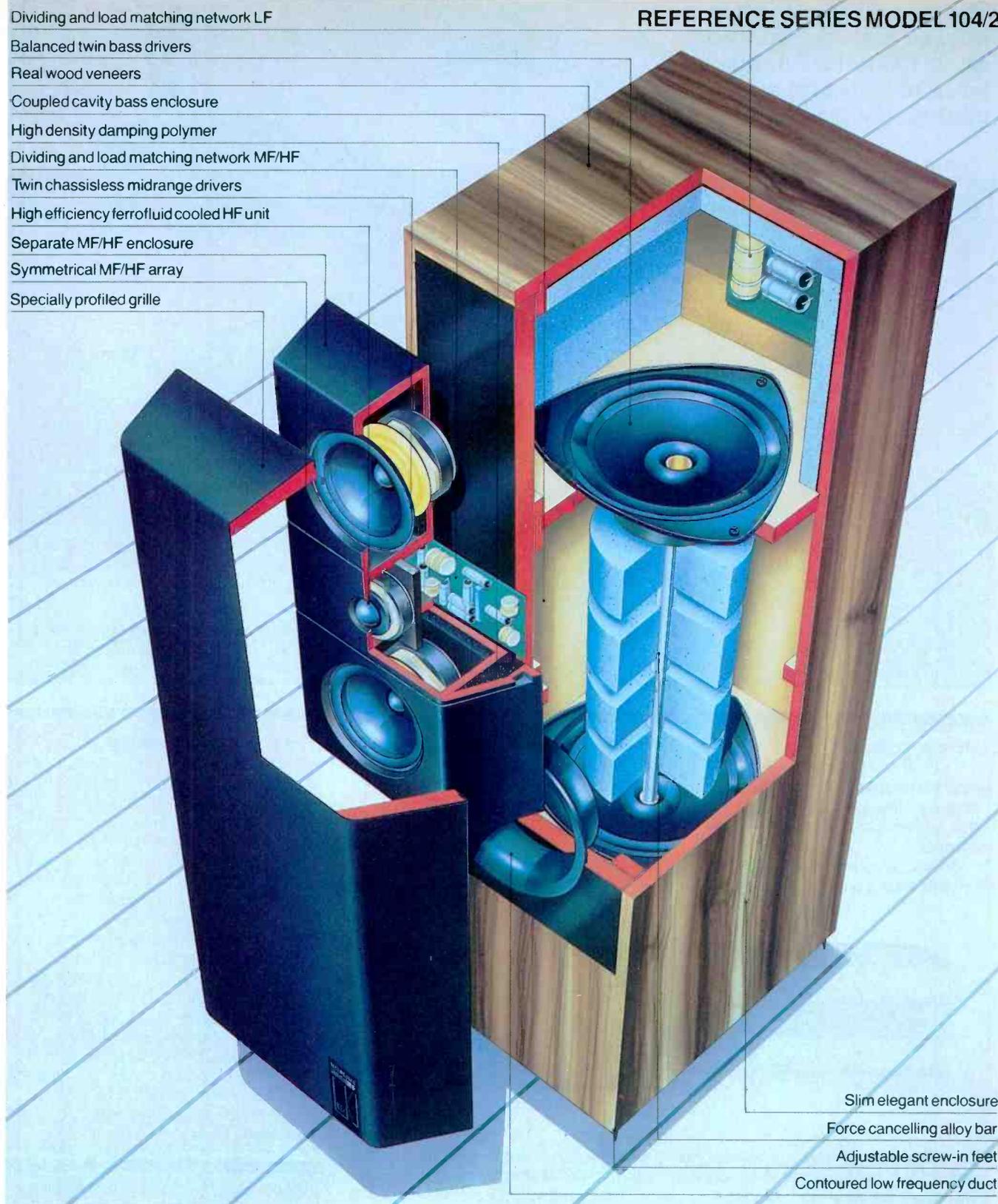
Twin chassisless midrange drivers

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Separate MF/HF enclosure

Symmetrical MF/HF array

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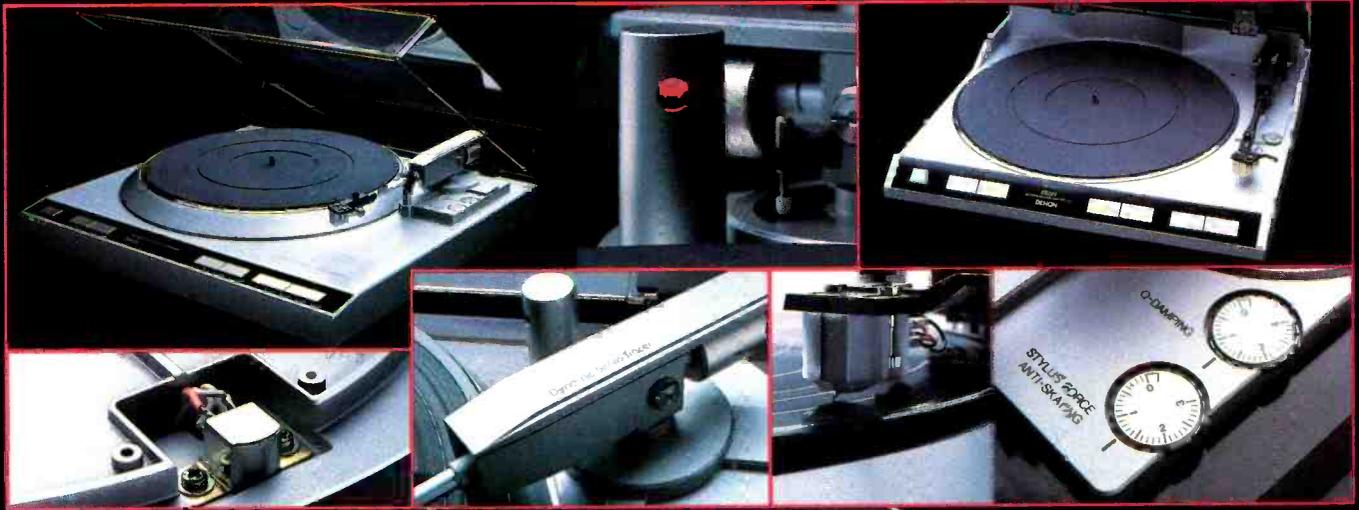
"A GREAT TURNTABLE DOES NOT COMPROMISE ONE DESIGN PARAMETER FOR ANOTHER."

There is no reason that a maximum performance turntable should not also be beautiful and simple-to-use. Denon can prove it.

From the DP-15F, featuring a Dynamic Servo Tracer microprocessor controlled tonearm, flat-twin direct drive motor with magnetic speed detection for \$199; to the DP-35F with a Dynamic Servo Tracer tonearm and high density, anti-resonance base for \$300; to the DP-45F which

packages the DP-35F's performance in an elegant high gloss rosewood style veneer base for \$350 — each model in the new Denon DP-Series offers the maximum combination of performance, construction quality, convenience and styling.

The new Denon DP-Series Turntables. Honest designs that give you something extra for your money, without taking something else away.



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D E S I G N I N T E G R I T Y

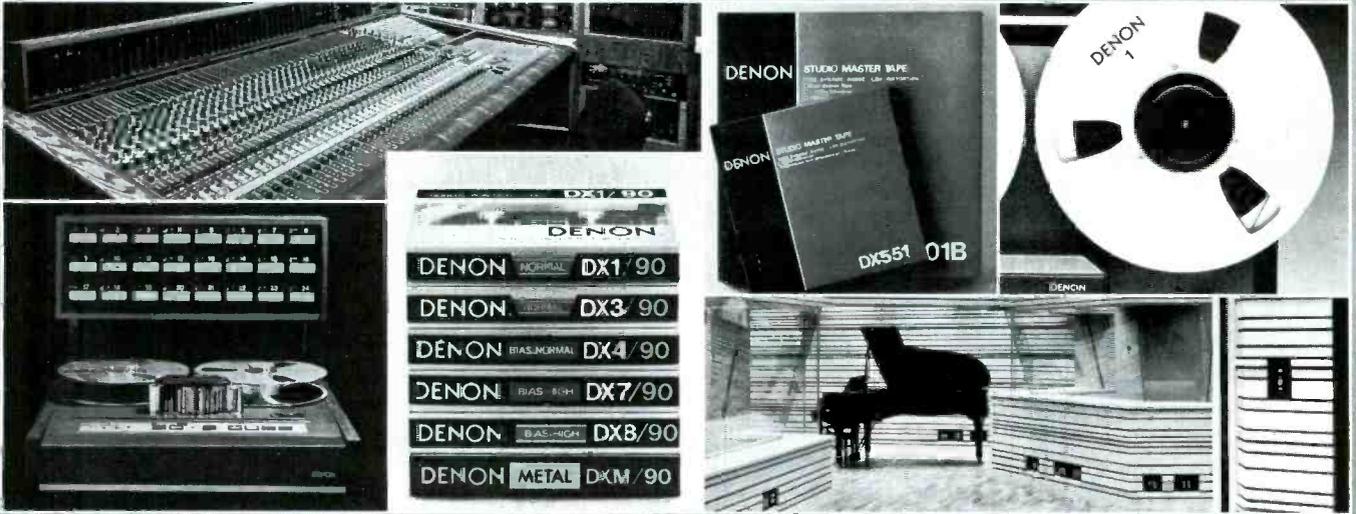
Prices are for comparison purposes.

Denon America, Inc., 27 Law Drive, Fairfield, N.J. 07006 (201) 575-7810

TO MAKE A CASSETTE TAPE SOUND LIKE MUSIC, YOU'VE GOT TO KNOW WHAT MUSIC SOUNDS LIKE.

Think about it. What other tape manufacturer also builds professional recording equipment including 24-track and digital studio tape recorders? What other tape manufacturer has 72 years of experience as a major record company? Other tape manufacturers may talk about "digital ready," but do you know Denon developed the digital recording process in 1972?

It is this unique combination of technical and musical expertise that led Denon to use Dynamic Distortion Testing to optimize DX cassette tape performance in the presence of real musical signals, not mere laboratory test tones. The result is the most *musical* of all cassette tape. Denon DX-Cassette tape. When we claim it's better, we say it with music.



DENON

D E S I G N I N T E G R I T Y

Nippon Columbia Co., Ltd., No. 14-14, 4-Chome, Akasaka, Minato-Ku, Tokyo 107, Japan

Denon America, Inc., 27 Law Drive, Fairfield, N.J. 07006 201-575-7610
Queon Imports, 3950 Griffith St., Montreal, Quebec H4T 1A7, Canada, 514-735-4338

TO MAKE CASSETTE DECKS SOUND MORE LIKE OPEN REEL, YOU HAVE TO KNOW HOW TO BUILD OPEN REEL DECKS.

An audio cassette should be really no more than two miniature open reels in a case. It follows, therefore, that extracting "open reel-like" performance from cassettes will involve miniaturized open reel technology.

Denon has been producing open reel tape and tape recorders for over 25 years. Not simply 1/4" machines, but 24-track 2" studio machines. This open reel technology helped Denon become one of Japan's largest recording companies and a prime supplier of equipment to Japanese recording studios and radio stations.

It also led to the Non-slip Reel Drive Motor and Closed-loop

Dual Capstan technologies found on Denon's DR-M33 and the DR-M44 Three-head Cassette Decks. Similarly, the outstanding audio performance of these decks can be attributed to Denon's electronics experience building the world's finest hi-fi components.

The net result is the most advanced in the series of cassette decks considered by serious recordists to be "the most musical cassette decks available at any price." Proof that no matter how much anyone tells you or charges you, there simply is no substitute for experience.

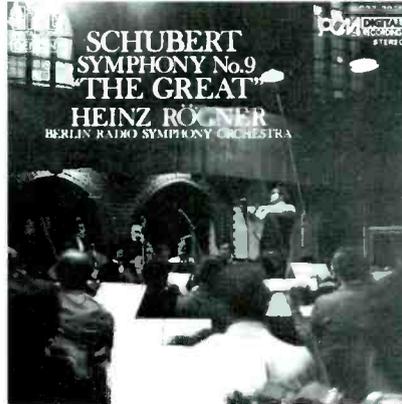


DENON

D E S I G N I N T E G R I T Y

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"HERE ARE THE DENON REFERENCE CD'S. AND HERE ARE THEIR REFERENCES."



"... the most convincing reproduction of recorded music I've heard yet..."
 "... for a Schubert Ninth that really sounds like an orchestra playing I think this issue has no equal."
Ovation Magazine, November 1983



"For anyone starting a compact-disc collection, I can think of no better release with which to begin."
 "The Smetana Quartet's version of Beethoven's Op. 59, No. 1... one of the most exciting versions of that particular work ever recorded."
Ovation Magazine, November 1983



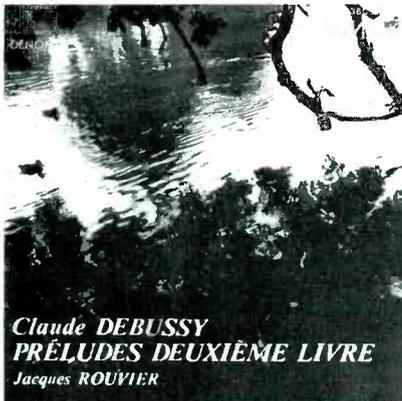
"... a sense of air around the instrumentalists that one ordinarily encounters only in live performances."
Fanfare Magazine, September/October 1983



"This is one of the most exciting organ records ever made."
 "... completely hypnotizing."
 "... uncannily like being in Freiberg's beautiful cathedral, listening in person to the splendid organ..."
Ovation Magazine, October 1983



"A superb reading as a digital LP, the bass definition and general clarity are even greater on the CD, with no loss of warmth."
Ovation Magazine, November 1983



"... Jacques Rouvier is a superb technician, with tremendous power and solidity and remarkably precise fingers."
 "The sound is excellent: the overall acoustic is warm, the dynamic range is wide, and the Steinway's bass is reproduced with stunning fidelity."
Ovation Magazine, November 1983



"... compelling... uncommon fire and precision."
 "This excellent performance is a revelation in CD!"
 "... the most natural string-quartet sound I have yet heard on a recording, creating the impression that the players are sitting right in the room with the listener."
Ovation Magazine, November 1983



NEW RELEASE!
 Beethoven: Symphony No. 9 ("Choral")
 Staatskapelle Berlin, Otmar Suitner, cond.

DENON IMAGINE WHAT WE'LL DO NEXT.

THE ONLY WAY YOU WILL BUILD A BETTER DIGITAL AUDIO PLAYER IS IF YOU KNOW MORE ABOUT DIGITAL AUDIO.

While other manufacturers talk of "second generation" CD Players, Denon has already produced 5th generation PCM Digital Recorders (having first developed the process of digital recording in 1972).

While CD software makers are just now experimenting with microphone placement to improve digital sound, Denon has already recorded over 650 digital titles and pressed many of the finest-sounding CD's.

In the process Denon discovered that the key to musicality in a CD player is the reduction of distortion in the digital-to-analog (D/A) conversion process. Therefore, Denon uses two D/A

converters in the DN-3000FC Professional CD Player and Direct Digital-to-Analog Circuitry (DDAC) in the new DCD-1800.

The DCD-1800 also adopts the DN-3000FC's single-pivot transport system for greater shock resistance, and fastest access time. This speed makes possible unprecedented CD operation convenience (ex., 10-key Direct Program Access, Block Repeat Program Sampling and Index Location Cueing).

While other manufacturers are trying to build cheap CD players that sound like a good deal, Denon builds one that sounds a good deal better.



DENON

D E S I G N I N T E G R I T Y

Denon America, Inc., 27 Law Drive, Fairfield, N.J. 07006 (201) 575-7810

Mixed Dolby

Q. My cassette deck has both Dolby B and Dolby C noise reduction. I have just ordered another deck which has only Dolby B. Should I continue recording Dolby C or switch to Dolby B? If a tape recorded with Dolby C is played with Dolby B, what is the effect?—Robert J. Ehrentraut, Hamilton, Ohio

A. If your objective is flat response, you should record with Dolby B if you plan to play back with Dolby B. If you record with Dolby C and play back with Dolby B, the result will be exaggerated treble. It is possible that you will enjoy this result; some people do, particularly if their music system doesn't have enough treble response to satisfy them. I am not suggesting this is the proper way to go about doing things, but there is no harm in experimenting by recording with one Dolby system and playing back with another.

Deck Incompatibility

Q. I bought two cassette decks, each with two heads, of the same make but different models at the same time, and both have done a creditable job. But when I take a tape recorded on deck 1 and play it back on deck 2, there is a slight dulling of the extreme high frequencies. What is the reason?—Larry Cook, Albany, Ga.

A. There are several possibilities. Azimuth alignment may differ for the two decks. Playback equalization may also be different; specifically, deck 2 may have greater bass boost, which amounts to the same thing as deeper treble cut. Deck 2 may not have as good a record-playback head; it may have a wider gap, limiting its ability to reproduce the very high frequencies.

Recording Techniques

Q. Which do you think is better: To record from a tuner's or tape deck's output into another deck's input, or to record from a tuner's or deck's head-phone jack into another deck's microphone input jacks? Is it better to record directly from a magnetic cartridge into a deck's microphone input jack or to go through regular channels (cartridge to amplifier to deck)?—Ward G. Erwin, Kissimmee, Fla.

A. To answer your first question, it is

desirable to minimize the amount of electronic circuitry through which a signal travels in order to minimize distortion, noise, change in frequency response, phase shift, etc. To maximize signal-to-noise ratio, it is desirable to start with a strong audio signal. Therefore, it is better to record from a tuner's or tape deck's output jack into another deck's input.

The answer to your second question is that the magnetic cartridge's signal should go through what you call "regular channels" (phono input section of a preamplifier, amplifier, or receiver). The phono preamp supplies not only the substantial amount of amplification required but also the necessary equalization, consisting of bass boost and treble cut. No such equalization is available at the mike input of a tape deck.

Static on Static

In a recent "Tape Guide" item, a reader complained about static when taping from TV by means of a microphone placed in front of the TV. Another reader (who asks that his name be withheld) offers the following explanation and cure:

"Visualize how a consumer would 'hang' the mike in front of the TV set (if he has no mike stand). It is hanging by the cable and likely held in place by something on top of the set. Remember, the tube has about 30 kV if it is a color monitor, and that produces a lot of static on the face of the tube. You can feel it with your hand in almost any climate. The entire cable and the mike are likely to pick up voltage spikes, causing the problem. Solution: Move the mike a bit farther from the set."

Another comment, from Lancelot Braithwaite (Technical Editor of *Video* magazine), suggests that, if the mike is a dynamic or ribbon type (both of which work by the movement of a generating element in a magnetic field), it's possible for interference to be caused by the TV set's magnetic field.

Fading Problem

Q. When I play back music that I've just recorded, there is a significant loss of midrange and treble sounds; the signals fade in and out. The music sounds fine (no fading) when recording, but in playback it fades. My deck

has a single record-playback head. I have cleaned and demagnetized the head before recording and have used different tapes, but to no avail. What is causing the problem?—Carl A. McGhee, Bethesda, Md.

A. Are you certain that your deck operates correctly in recording? Inasmuch as it employs the same head for recording and playback, you cannot truly monitor what is going on the tape when in the record mode. To check recording performance, record a tape and play it back on another deck (perhaps a friend's or in an audio store). If playback then sounds okay, the problem apparently lies in your deck's playback.

If the problem does lie in recording, the cause could be your deck's bias oscillator circuitry. If bias varies, this would cause the signal recorded on the tape to vary in strength, i.e., fade in and out. Such variation would be greater for the middle and high frequencies than for the low ones.

Whether your problem occurs in recording or playback, the help of a qualified audio technician is indicated.

Tolerable Wow and Flutter

Q. Can you tell me the significance of wow and flutter specifications when selecting cassette tape decks?—W. W. Coxe, Jr., Wilmington, N.C.

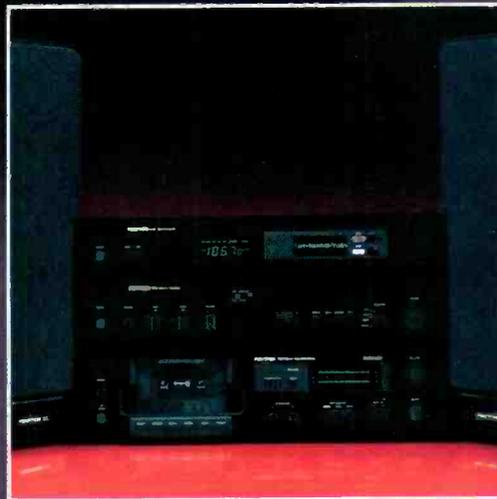
A. The audibility of wow and flutter depends on the type of program material and on the hearing acuity of the individual listener. Wow and flutter are more audible on a single sustained note, such as piano, than on symphonic material with many instruments.

At one time, unweighted average wow and flutter up to about 0.2% was considered acceptable. However, today's cassette decks are capable of considerably better performance than that, and expectations have risen. For most people and program material, a maximum figure of about 0.1% would be inaudible. A safer figure, of which many decks are capable, would be 0.05%; some decks can go down to as little as 0.025%.

Continued on page 134

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.

Music just met its Master.



PROTON
Audio

Enter No. 56 on Reader Service Card

Proton Audio: A Breed Apart

It's an audio jungle out there – a confused forest of claims and counterclaims. There are too many competing products, each hoping to stand out from the pack with differentiating cosmetics or gimmicks. But most have come up with the same tired "solutions"; functions and features seemingly designed to appeal to aspiring airline pilots, pin-ball wizards, or juke-box impresarios. The qualities that make a product truly impressive – functional design and impeccable sonic performance – have been generally ignored in favor of commercial razzle-dazzle. Until now, that is.

Proton – Designed For the Real World

Each Proton product is engineered to deliver the finest possible sound quality in your home... under real-life reception and playback conditions, driving real-world loudspeakers. Faddish circuitry directed at the latest "popular" distortion is ignored in favor of truly innovative designs with clearly audible benefits. Test bench results are backed up with intensive listening sessions – and "conventional audio wisdom" is under constant close scrutiny for its truths and fallacies.

For many companies, audio design has reached a dead end, simply because they are stuck on the path of least resistance: technical gimmickry for the sake of a technical claim, and, of course, ever more lights and knobs. For Proton, however, each new product on the drawing board represents an opportunity to take a fresh, hard, reality-based look at what we consider to be the important issues. Does the new circuitry contribute toward a more natural, noise-free sound in the listener's home? Do the features truly enhance convenience and performance, or only add visual and ergonomic complexity? You'll find our carefully thought out answers to those questions embodied in every Proton component – from our simplest digital FM/AM high-fidelity clock radio to our highly acclaimed video-monitor systems.

Real-World Performance

What do we mean by "real-world performance"? Simply this: it is our design philosophy that products should be engineered to cope with the actual reception and reproduction conditions likely to be encountered in a real-world listener's home environment, not merely to provide good measurements in the test lab.

Our amplifiers provide excellent examples of the practical application of this philosophy. Because we know that loudspeakers "nominally" rated at 8 ohms can fall as low as 2 ohms when playing music (and 4-ohm speakers can go even lower), we design all our amplifiers with the current capacities to handle very low impedance loads. Perhaps "handle" is too modest a term – the fact

of the matter is the moderately priced 930, our 30-watt-per-channel receiver (as measured into 8 ohms), is able to provide an instantaneous output of 115 watts per channel (!) to handle musical peaks when the load falls to 2 ohms.

And for those few signals that exceed even a Proton's power capabilities, a soft-clipping circuit reduces the damaging effects of short- and long-term overloads. You will find a host of other practical, real-world audio performance features detailed in the individual product descriptions later in this catalog. See the technical descriptions of the 520 Integrated Amplifier and 930 Digitally Synthesized Stereo Receiver.

Enhanced FM Performance

Proton has certainly not neglected FM reception in our on-going reappraisal and analysis of audio design. The tuners in all Proton audio components use the latest designs of Larry Schotz, an FM-circuit engineer who is generally acknowledged to be the innovative leader in the field. The latest Schotz tuner designs go far beyond conventional technology: sophisticated circuits automatically compensate for real-world reception problems. Weak, noisy, multipath-ridden signals are processed by one or more special Schotz circuits for enhanced listenability. Previously unlistenable stations are raised to acceptability, and weak, problematic stations come in loud and clear, untroubled by interference, noise, and distortion. For further technical details on the remarkable Schotz-designed tuners, see the product descriptions for the 440 Stereo FM/AM Tuner and 930 Digitally Synthesized Stereo Receiver.

Esthetics and Ergonomics

Proton equipment is designed to appeal to more than the critical ear; we feel the eye and the hand must be satisfied also. The equipment must sound good, look good, and feel good. Toward that end, our pure black styling will coordinate unobtrusively with any decor, and the clean, functional front panels are self-explanatory – even to an audio novice. And all controls have the smooth silken feel that confirms Proton's dedication to quality.

Proton Audio – specifically designed for the listening environment. Nothing sounds like it... nothing looks like it... nothing performs like it... because it's pure Proton, by design.



PROTON 930 Stereo FM/AM Receiver PROTON 440 Stereo FM/AM Tuner

The 930 digitally synthesized stereo receiver – the only receiver that could be called a Proton.

It combines the technology of our 520 Integrated Amplifier and 440 FM/AM Tuner into one complete package, designed to deliver pure sound.

The 930 is packed with technology... starting with the Schotz Tuner. A Proton innovation, this Schotz Tuner employs a phase-locked-loop system that senses weak or noisy signals, then automatically cleans up the sound by varying the bandwidth.

The 930 achieves excellent sensitivity, and that translates into superior reception compared to conventional tuners. And the Schotz Tuner contributes to lower overall FM distortion for clean, pure sound.

The tuner section incorporates a four-gang triple JFET frontend, designed and manufactured by Proton.

The 930 delivers 30 watts per channel minimum rms into 8-ohm speakers, with no more than 0.02% total harmonic distortion, and has "high current capability." That means the 930 has all the dynamic power and headroom necessary to faithfully reproduce even the most demanding music in real-life listening situations.

The 930 features our Anti-Clipping Circuit." It's designed so you can achieve effectively higher volume levels without distortion or danger to your speakers – pure, clean sound with none of the harshness normally associated with waveform clipping.

There's also a special Bass Equalization Circuit to compensate for bass deficiency common in most acoustic suspension speakers and typical listening environments.

Other features include a digital tuning indicator with LED frequency display, memory presets for 5 FM and 5 AM stations, automatic bi-directional search control and video input jacks.

The Proton 930 – unsurpassed sonic performance that's the heart of your audio system, or your Proton audio and video system.

Pure sonic performance. The perfect tuner for any home audio system.

The heart of the 440 is our famed Schotz Tuner. It's uniquely Proton. You'll be impressed with the sound reproduction of the 440 – pure and true.

The 440 delivers great FM reception because of our superior sensitivity – 1.8mV. And because of this sensitivity, the 440 can receive many more stations.

And while other manufacturers tout their MOS FET frontends, the Proton 440 tuner incorporates a more expensive, but vastly superior, four-gang triple JFET frontend. The four-gang triple JFET frontend allows a ten-time higher input level before it overloads, ensuring the highest quality performance over a wide range of weak to strong stations. Plus, it's designed and manufactured completely by Proton for the strictest quality control.

Some tuners now use Dolby noise reduction circuitry for FM. This noise reduction system is only effective on those few FM stations broadcasting Dolby NR encoded information.

On the other hand, the 440 tuner features our Schotz Noise Reduction (SNR) system. This circuit independently improves FM performance, electronically eliminating annoying background hiss, common in medium-strength FM signals and it works on every station.

Proton's latest tuner technology provides unmatched ease of operation. You can pre-select six FM and six AM stations, then store them in memory. And in the "search" mode, you can rapidly scan the available stations up or down.

The 440 Stereo FM/AM Tuner – Proton power... Schotz precision.



PROTON 520 Integrated Amplifier

The ultimate power source and an excellent choice for any home audio system. The 520 delivers 20 watts per channel minimum rms into 8-ohm speakers, with typically no more than 0.005% total harmonic distortion. That's clarity you can hear.

Proton Audio components are designed to deliver sonic performance in real-life situations. For example, while the 520 is rated at 20 watts per channel, that figure is relative when compared to conventional amplifiers. The 520 has "high current capability."

This high current capability combined with 4.7 dB of dynamic headroom allows the 520 to accurately reproduce the entire dynamic range of today's program material.

The 520 features a highly sophisticated, versatile "phono" section. Internally, there are two programmable phono pre-amps for optimum performance. So whether you're using a low output moving coil cartridge, or a conventional moving magnet cartridge, you can fine tune the 520 to deliver the cleanest sound from any phono cartridge. It also offers a low signal-to-noise ratio, 90 dB and a high phono overload, 250mV for added clarity and performance.

The 520 features Proton's Anti-Clipping Circuit™ that electronically eliminates the hard edge clipping distortion occurring when music requires more power than what's available. This allows you to achieve effectively higher volume levels without distorting your music...or endangering your speakers.

And the 520 has a special Bass Equalization Circuit (± 10 dB at 55 Hz). This circuit allows you to correct bass response to match your particular speakers, compensating for the bass deficiency common in most acoustically suspended speakers and typical listening environments.

The 520 can also receive direct audio from a video tuner source (VCR, video disc player or broadcast tuner). And there's a DAD input for a Digital Audio Disc player.



PROTON 720 Stereo Cassette Deck

This tape deck is packed with Proton performance. It accurately records even the most demanding music, then faithfully plays it back, time after time, note after note.

The Proton 720 Cassette Deck is the perfect complement to the Proton 520 Integrated Amplifier, Proton 930 FM/AM Stereo Receiver, or the Proton 300 Table Radio.

The 720 is a perfect example of Proton's innovative engineering responding to the needs of today's complex music. When the 720 was designed, we added new bias circuits to reduce crosstalk and improve channel separation. The benefit – you hear a noticeably superior stereo image.

As a byproduct, this new technology also increases the dynamic range of the 720 for superior musical reproduction.

The 720 features both Dolby™ "B"-type and "C"-type noise reduction circuits. These Dolby systems dramatically improve sound quality by reducing the level of audible tape hiss on your recordings.

Like all Proton Audio components, the 720 is designed to perform under real-life conditions. For example, FM stereo stations utilize a "pilot tone" when they broadcast. For the most part, this tone goes unnoticed. But when you record from an FM stereo broadcast, this "pilot tone" can cause inaccurate operation of Dolby noise reduction systems...but not with the 720. We've included a special MPX filter to remove this high frequency interference, improving the quality of your recording.

When you're ready to record – you're ready for the Proton 720 Stereo Cassette Deck.

*Dolby is a registered trademark of Dolby Laboratories.



PROTON 300 Table Radio, and 301 Powered Speaker

The Proton 300 Table Radio and the 301 Powered Speaker let you put the music wherever you want it.

The 300 is elegantly understated in appearance. Pure black. And all the nonessential controls are conveniently located out of sight.

But looks are only part of the story. This Table Radio features advanced electronics and our own Schotz Tuner. It pulls in more stations with less distortion than many higher priced conventional tuners.

And you can really enjoy the sound, too. The 300 features a sophisticated bi-amplified speaker system. Bi-amplification technology means there is a separate power amplifier for each speaker driver – one 20 watt amplifier powers the 4-1/2" woofer, and a second 5 watt amp drives the 1-3/4" ferro-fluid cooled tweeter. Each amplifier is designed to function best within its own assigned portion of the frequency spectrum. That's sound quality you can hear.

The 300 Table Radio offers the essential versatility of a component system – uncompromising FM and AM reception – plus connections for an optional cassette deck (like the Proton 720).

You can enjoy the Proton 300 in stereo with the addition of the optional Proton 301 Powered Speaker. The 301 is more than just an extension speaker. It features the same bi-amplification technology and drivers found in the 300, and is powered by its own 25 watt amplifier.

And because each speaker has its own amplifier, additional speakers may be added to bring stereo to as many as ten different locations at once. All controlled simply and accurately by the 300 Table Radio.

PROTON 320 Digital FM/AM Clock Radio

The Proton 320 Digital FM/AM Clock Radio – eye-opening sound with up-to-the-minute convenience.

The 320 goes beyond every conventional clock radio and ventures into the world of sophisticated, quality home audio.

The 320 Clock Radio brings high fidelity sound into your bedroom or any other room in your home. There's a full-range 5-inch speaker. And the 3 watt amplifier has a low 0.2% total harmonic distortion. Together, they offer fidelity and power previously unknown in a clock radio.

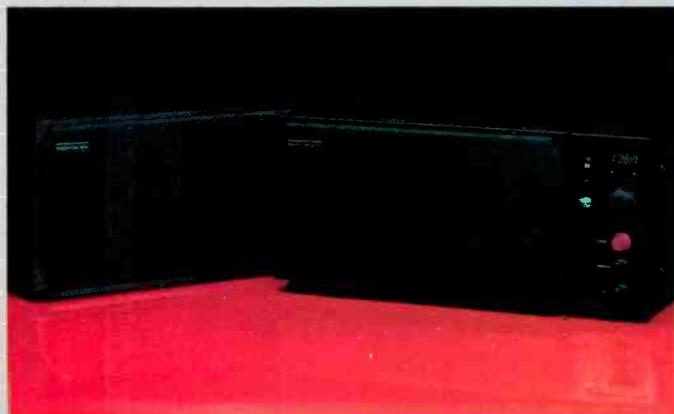
The Clock Radio also features separate treble and bass controls, plus automatic loudness compensation.

The 320 is packed with features you'll really appreciate. Our Ramp-up Volume control brings the music or alarm up gradually, so you're awakened gently out of your sleep...not scared out of it.

And for your convenience, there are two independent programmable alarms that you can set either forwards or backwards, and a six-minute snooze control. You can even go to sleep with music, thanks to our Sleep Control.

Plus the LED display automatically adjusts to the light level in the room. The clock even has battery back-up, so you don't lose time when you lose power.

The 320 – pure Proton by design.



Proton – Pure Audio Meets Pure Video



The Proton Video System is without equal. Ever since its introduction, Proton Video components have been consistently acclaimed as "the best" by leading industry sources.

And now, that Proton performance is available in both video *and* audio systems. Proton systems are specifically designed to complement...to interface...to combine, delivering "super real" video and audio.

Proton video and audio components are cosmetically compatible, too. Everything is pure black. Our monitors, tuners, receivers, cassette decks, televisions ... everything.

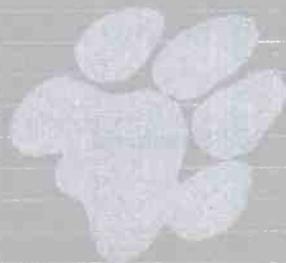
Now you can enjoy the performance of fine video *and* fine audio componentry. These purely superb electronic components give you the flexibility and choice to build *your* ultimate home entertainment system.

Proton Video and Audio componentry. Nothing looks like it. Nothing sounds like it. Because it's pure Proton, by design.

PROTON 302/303 Loudspeakers

The perfect Proton addition to the ultimate home entertainment system. Both speakers deliver rich, expanded high fidelity. Each has an acoustically suspended 1-3/4" ferro-fluid cooled tweeter and a 4-1/2" woofer for wider, more dynamic response.

And these speakers also match our video monitors in performance, height and finish. The 302 speakers go with the Proton 600 System (19" monitor), while the 303 speakers coordinate with the Proton 602 System (25" monitor).



Specifications

930 Digitally Synthesized Stereo Receiver



Amplifier Section

Power Output*	30W per Channel
Rated IM at 8 Ohms, 30 W/Ch	0.015%
Total Harmonic Distortion	0.02%
Dynamic Power at 1 kHz	at 2 Ohms 115W
	at 4 Ohms 81W
	at 8 Ohms 60W

Signal-to-Noise Ratio	95 dB (A weighted)
Channel Separation	60 dB

Frequency Response	17 Hz to 35 kHz ± 1 dB
Power Band Width	>100 kHz

Phono Section

RIAA Deviation	± 5 dB 20 Hz-20 kHz
Phono Overload	200 mV

Tone Controls Bass (100 Hz)	± 10 dB
Treble (10 kHz)	± 10 dB

Tuner Section

Usable Sensitivity	1.5 μ V
50 dB Quieting Sensitivity	2.8 μ V
Total Harmonic Distortion	0.2% (Stereo)
Signal-to-Noise Ratio	70 dB (Stereo)
Capture Ratio	1.5 dB
Separation (1 kHz)	50 dB

AM Section

Usable Sensitivity	300 μ V/m
Dimensions Width	41.9cm/16 $\frac{1}{2}$ "
Height	9.5cm/3 $\frac{3}{4}$ "
Depth	24.8cm/9 $\frac{3}{4}$ "
Shipping Weight	9.1 kg/20 lbs.

440 Stereo FM/AM Tuner



Usable Sensitivity	1.8 μ V
50 dB Quieting Sensitivity	2.8 μ V
Total Harmonic Distortion	0.4% (Stereo)
Signal-to-Noise Ratio	75 dB (Stereo)
Capture Ratio	1.5 dB
Separation (1 kHz)	65 dB
IF Response Ratio	115 dB

Spurious Response Ratio	66 dB
AM Suppression	67 dB
Image Response Ratio	51 dB
Dimensions Width	41.9cm/16 $\frac{1}{2}$ "
Height	11.1cm/4 $\frac{3}{8}$ "
Depth	24.8cm/9 $\frac{3}{4}$ "
Shipping Weight	6.7 kg/15 lbs.

520 Integrated Amplifier



Power Output	20W per Channel
Rated IM at 8 Ohms, 20 W/Ch	0.014%
Total Harmonic Distortion	0.015%
Dynamic Power at 1 kHz	at 2 Ohms 100W
	at 4 Ohms 80W
	at 8 Ohms 52W
Signal-to-Noise Ratio	92 dB (A weighted)
Separation (1 kHz)	90 dB
Frequency Response	20 Hz-20 kHz ± 0.1 dB
Power Bandwidth	>100 kHz
Dampening Factor	>100

Phono Section

RIAA Deviation	20 Hz-20 kHz ± 0.2 dB
Phono Overload	290 mV
Phono Input Resistance (mm/mc)	47k Ohm/100 Ohm
Phono Input Capacitance (Selectable)	100pf/200pf/320pf
Signal Noise Ratio (mm)	82 dB/(mc) 68 dB
Dimensions Width	41.9cm/16 $\frac{1}{2}$ "
Height	8.3cm/3 $\frac{1}{4}$ "
Depth	25.7cm/10 $\frac{1}{8}$ "
Shipping Weight	6.7 kg/15 lbs.

720 Cassette Deck



Frequency Response	
Normal Tape	30 Hz-17 kHz ± 3 dB
Chrome Tape	30 Hz-17 kHz ± 3 dB
Metal Tape	30 Hz-18 kHz ± 3 dB
Signal-to-Noise Ratio	
Chrome B	69.5 dB
Chrome C	78 dB
Normal B	65.5 dB
Normal C	74 dB

Wow and Flutter	.08 (WRMS)
Crosstalk @ 1 kHz	40 dB
Output Level	580 mV
Output Impedance	10 Ohm
MK Input Sensitivity	0.4 mV (600 Ohm)
Line Input	90 mV (20 k Ohm)
Dimensions Width	41.9cm/16 $\frac{1}{2}$ "
Height	11.1cm/4 $\frac{3}{8}$ "
Depth	24.8cm/9 $\frac{3}{4}$ "
Shipping Weight	6.7 kg/15 lbs.

300 Table Radio



FM Tuner Section

Sensitivity	1.0 μ V
Separation	>40 dB
Capture Ratio	1.5 dB
Selectivity	>60 dB
Signal-to-Noise Ratio	80 dB (Mono)
	77 dB (Stereo)

Total Harmonic Distortion	0.10% (Mono)
	0.15% (Stereo)
AM Suppression	>60 dB
Dimensions Width	28.9cm/11 $\frac{3}{8}$ "
Height	16.8cm/6 $\frac{5}{8}$ "
Depth	20.6cm/8 $\frac{1}{4}$ "
Shipping Weight	9.1 kg/20 lbs.

320 Digital FM/AM Clock Radio



Power Output	3 Watts (WRMS)
Total Harmonic Distortion	0.2%
Frequency Response	80 to 18,000 Hz
Signal-to-Noise Ratio	65 dB
Sensitivity	1.8 μ V

Dimensions Width	26.7cm/10 $\frac{1}{2}$ "
Height	14cm/5 $\frac{1}{2}$ "
Depth	7.6cm/3"
Shipping Weight	2.7 kg/6 lbs.

302 Speakers

Frequency Response	100 Hz-20 kHz
Speaker Drivers	1 $\frac{3}{4}$ " Ferro-fluid
	Cooled Tweeter
	4 $\frac{1}{2}$ " Woofer

Dimensions Width	16.5cm/6 $\frac{1}{2}$ "
Height	45.7cm/18"
Depth	18.4cm/7 $\frac{1}{4}$ "
Shipping Weight	10 kg/22 lbs.

303 Speakers

Frequency Response	60 Hz-20 kHz
Speaker Drivers	1 $\frac{3}{4}$ " Ferro-fluid
	Cooled Tweeter
	4 $\frac{1}{2}$ " Woofer

Dimensions Width	16.5cm/6 $\frac{1}{2}$ "
Height	58.4cm/23"
Depth	18.4cm/7 $\frac{1}{4}$ "
Shipping Weight	12.3 kg/27 lbs.

PROTON
Audio

*Power Output is minimum RMS Power per Channel 20 Hz-20 kHz, both channels driven with no more than the rated distortion.

Note: Due to continuing product improvement, specifications and design are subject to change without notice.

SCHOTZ Tuner Patent Pending.

Call 1-800-447-4700 toll-free, for the Proton dealer nearest you.

A THOUGHTFUL GIFT FOR A FRIEND WHO ENJOYS GOOD SOUND AS MUCH AS YOU DO

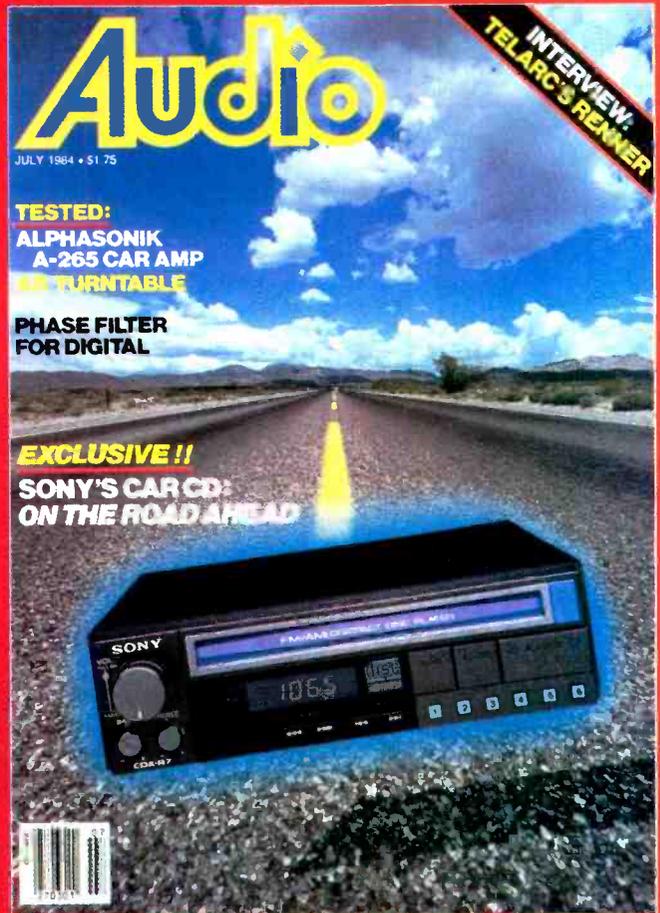
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NEW HI FI SOUND says "The sound was open, lively, detailed and enjoyable to listen to, and as for the RA820B amplifier, well, it was a real gem".

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HI FI CHOICE says "The Rotel system stands out in its ability to play records properly. The stereo soundstage is well defined, and with a good cartridge there is clarity, precision, and evenness of reproduction that allows the music to sound lively and vivid...Quite clearly, its performance is something special".

Listen to Rotel yourself and let's hear what **YOU** have to say.



ROTEL

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The world's 12 great classical record companies* have this in common.



They all monitor the fidelity of what they record on B&W speakers.

*CBS, London, Deutsche Grammophon, EMI, Decca, Pathe, L'Oiseau-Lyre, Philips, Digital, Capital, HMV Concert Classics, Argo.

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LISTEN AND



DM3000



DM2000



YOU'LL SEE

All the vast knowledge and expertise gained from the experience of building loudspeaker systems that have led the world for two decades has gone into the creation of models DM2000/DM3000. They are at the top of the exciting new generation of B&W Digital Monitors.

DM2000 is a floor-standing model incorporating completely new, inter-related concepts in enclosure styling, drive units and equalisation. A true digital monitor with performance and appearance further enhanced by the most recent advances in B&W loudspeaker technology.

- Sensitivity: 87dB.
- Extended linear response to the accepted standard set by our famous professional monitor, Model 801.
- ETD: electronic time delay.*
- ETD supersedes physical stepping, permits a flat front baffle.

- Optimisation of the diminishing sound source as frequency increases.†

Two completely new acoustic drivers plus an acoustically driven radiator (ADR) to further augment drive unit area in the extreme bass.

DM3000 pushes the sound frontier an appreciable further step towards reality with the addition of another (identical) bass/midrange drive unit, with a first order difference filter between the two.

The sensitivity achieved is 89dB.

* ETD (electronic time delay) realisation of an ideal



Several years ago, our DM6 was the precursor of all linear-phase loudspeakers and it is still widely copied around the world.

Meantime, our design team has been quietly working towards an elusive ideal: the correction of inter-unit time delay without the disadvantages – acoustical and cosmetic – of the stepped baffle configuration.

That ideal is now realised in ETD (electronic time delay) in which cumbersome physical time delay is replaced by

automatic delay of the signals. This is another world first for B&W, which is built into DM2000/DM3000. The technological requirements of the acoustics engineer are at last reconciled with the desire for loudspeakers with the elegance of distinctive furniture.

Acoustically, sharp boundary changes are advantageously avoided and we come nearer to minimum phase transfer characteristic between bass, midrange and tweeter.



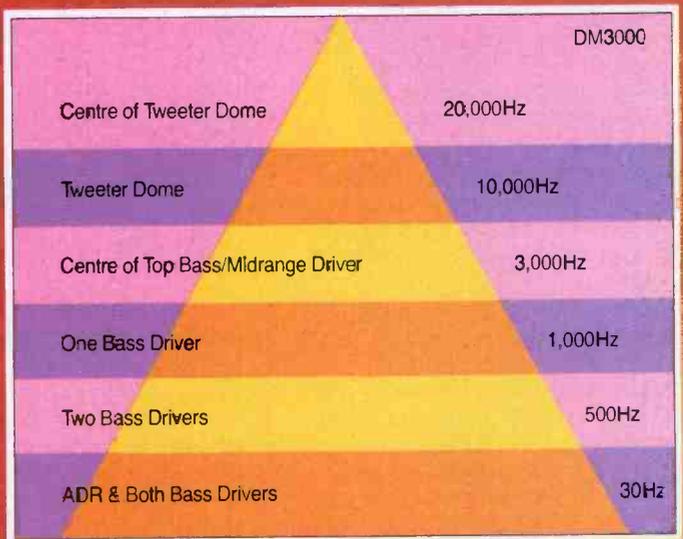
† Principle of the acoustical triangle and another significant advance

DM2000/DM3000 embody another significant advance towards an acoustical ideal. The new drive units are laser-optimised to behave as a source which diminishes in size as frequency increases. This results in:

- Smoother directivity index.
- Better-defined stereo perspective.
- Improved depth imagery.
- Broader options for seating.

Behind this development is the principle of the acoustical triangle. *The higher the sound frequency, the smaller the source of that sound.*

At the base of the acoustical triangle are the ADR and bass drivers, which take care of the very lowest frequencies (say bass drum). At its apex is the centre of the tweeter dome, which handles the very highest frequencies (triangle for example).



Bass/Midrange Unit

This unit (BK200) is completely new in design and – like all B&W drive units – is made entirely in our own factory.

Interesting features are:

Laser-optimised diminishing source (see 'The acoustical triangle').

30mm Kaptor voice coil capable of withstanding temperatures of 250°C and more. This material also provides a better high-frequency extension than does aluminium.

The 160mm cone is formed in Kevlar (patented), which – with its high stiffness-to-weight ratio and inherent internal damping – produces the superb transient performance so highly acclaimed in our Model 801.

The pole piece in the magnet system is capped with a copper sleeve. This eliminates the usual rise in impedance with frequency due to voice coil inductance, reduces distortion and further extends the high frequency performance.

High Frequency Unit

Development work with the laser interferometer guided us in the optimised design of this new unit (TX26) which has an exceptionally efficient diaphragm.

The 26mm cone is formed in a new type of polyamide – inherently damped acoustically and airtight. This ensures consistent quality because no variables such as additional sealing or damping compounds are required.

The 26mm Kaptor voice coil enables this unit to withstand 30% more power than could its predecessor.

Crossover

New techniques are employed to keep losses to a minimum.

All capacitors are of low leakage polyester construction and inductors employ heavy gauge copper with generous ferrite cores where necessary to keep down DC resistance.

Sources of loss in the harness have been reduced by means of heavy gauge wire; all connections are soldered to eliminate contact resistance.

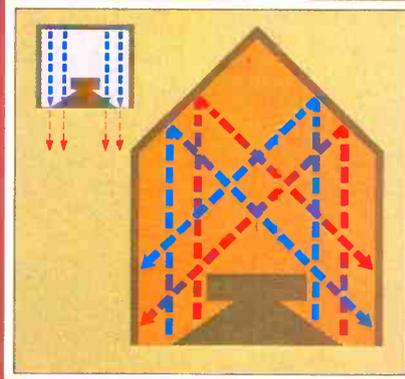
The all-pass network employs our new ETD approach to the problem of time-delay correction, permitting the system drive units to be mounted on a flat baffle.

The circuit has a perfectly flat amplitude response, but a phase shift which changes from 0° at low frequencies to 180° at high frequencies. This is then adjusted to give the required time-delay over the critical crossover region.

The Cabinets

The attractive cabinets are designed by Kenneth Grange of Pentagram and their functional styling produces positive acoustical advantages.

The internal geometry is so arranged as to reduce standing waves – in particular, those direct reflections off the back of the cabinet which can be heard through the cone of the bass/midrange unit of many loudspeakers.



Construction is to the usual B&W high standard, using 18mm high-density particle board throughout, with braces and bituminous pads to reduce vibrational modes in the walls.

Surface discontinuities and their resulting diffraction effects were closely studied during the design programme, with very beneficial results.

In particular, the fillet on the tweeter front plate is designed so that the tweeter does not 'see' the cone of the bass/midrange unit. An additional safeguard is the ring on the surround of the bass/midrange unit itself.

In addition, various cabinet dimensions in the tweeter area are critically adjusted to prevent those cancellations in response that can be caused by energy re-radiated from the cabinet edges.

A choice of four cabinet finishes is available for both models:

Walnut, rosewood, natural oak, black ash.

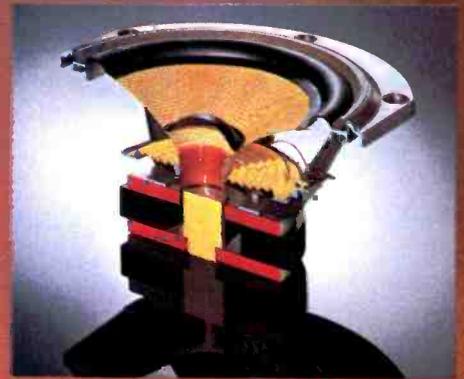
Grille

Those who prefer to use the grille covers will find that performance is virtually unaffected.

The patented B&W wire-framed grille is to exactly the same specification as that fitted to professional monitor 801. (Patent No. 2 068 6798.)

Overload Protection

DM2000/DM3000 are protected automatically against all forms of AC or DC overload. This is achieved by APOC – audio-powered overload circuit – the safety device pioneered and perfected by B&W. If and when the preset power level is exceeded, the drive units cut out and a visual indication is signalled by the LED on the cabinet. (Patent No. 2 038 574.)



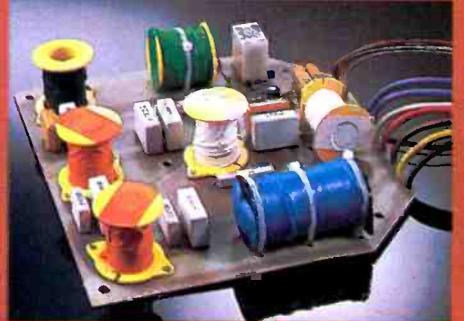
Cut-away driver shows the heart of the laser-optimised diminishing sound source.



Advanced laser technology plays a crucial part in the patented Kevlar cone assembly.



High-technology within the driver magnet system: the pole piece has a copper-aminated sleeve.



Computer-optimised crossover network ensures accurate classic 4th-order Butterworth characteristic.



Super-heavy gauge hard-wired connecting harness with soldered terminations



Patented wire-framed grille totally eliminates acoustic problems.

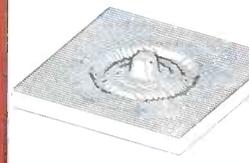
Diaphragm behaviour shown by laser interferometry computer-linked measurement plots.

BASS/MIDRANGE DRIVER BK200

at 120 Hz

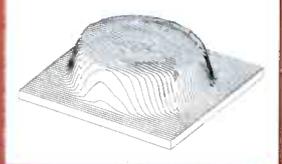


at 2 kHz

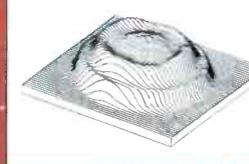


HIGH-FREQUENCY DRIVER TX26

at 1 kHz



at 8 kHz



YOU'LL SEE

DM1200/DM1400 are natural extensions to the B&W digital monitor range. They represent two systems offering a quality of reproduction – from both digital and analogue material – probably superior to any other loudspeaker of comparable size and price.

DM1200 is an extremely compact two-driver system with a quite superb frequency response and acoustical output. DM1400 is a sophisticated 28-litre internal volume system of the three-driver closed box type. Both are equally appropriate to the professional studio or high quality home installation.

Two great advances

These two new loudspeakers incorporate significant technological advances: ETD (electronic time delay), in which cumbersome physical time delay of the signals is replaced by automatic delay; and the TZ26 high-frequency driver, a vital new component in the exploration of the digital recording technique. As the sound source diminishes frequency increases. The improved dispersion and transient behaviour which result transform performance in the top three octaves.

Crossover and filter design

One of the many advantages of group time delay correction for the drivers is the facility to employ even-order Butterworth squared filter characteristics, ensuring a symmetrical vertical polar response. With the advent of ETD it was therefore possible to computer-optimize the filters for both models, giving a classic fourth-order Butterworth squared acoustical response.

Meticulous care has been taken with DM1200/DM1400 to ensure that all internal losses, both in inductors and connecting leads, are significantly reduced compared with previous models.



Sophisticated computer-optimized four-order Butterworth squared crossover network incorporates B&W's patented APOC system.

Automatic overload protection

A further B&W development for handling the demands of digital recording is APOC (audio powered overload circuit). This is a safety device giving automatic protection against all forms of AC or DC overload. If the pre-set power level is exceeded the drive units simply cut-out, an event which is signalled on a visual LED indicator.



Advanced drivers – produced in-house – enjoy 100% digital control, ensuring finest precision engineered quality.



Super-low resistance, high-pressure terminals take 4mm plug or cable connection.

Cabinet design perfected

DM1200/DM1400 inherit the basic overall appearance of their distinguished predecessors (DM12 & DM14). However, the refinements in audio technology found in DM1200/DM1400 are reflected in the cabinet design detailing. Significant improvements have been achieved with additional bracing and damping materials, endowing the enclosures with a greater degree of neutrality and significantly less spurious radiation than their predecessors.

With the arrival of ETD, DM1200/DM1400 incorporate all the advances needed to meet the demands of digital recording without having to lose the sheer convenience of a flat-fronted baffle and cabinet.

Optimum performance assured

DM1200 is small enough to position on most items of furniture – and in fact virtually anywhere in the home. A stand is therefore not a necessity, but is available as an optional extra. DM1400 is supplied complete with its own stand to guarantee the necessary height position for obtaining optimum performance.

The B&W difference

B&W is one of the very few UK loudspeaker manufacturers to exercise absolute control over the design and manufacture of its products. Each and every component (cabinets excepted) is produced in our factory. New designs are only initiated on the basis of genuinely advanced ideas.

This is the concept that distinguishes B&W from other loudspeaker manufacturers and is a guarantee of the new experience awaiting you in DM1200/DM1400. Both systems are in every respect significantly better loudspeakers than the famous models they supersede.

B&W brings you reality

We meet the challenge of the digital age with our new B&W Digital Monitors DM110 and DM220. Within that challenge there is another. If you invest in new loudspeakers now, you will want top performance from analogue as well as compact disc (digital audio) to carry you through the revolution, happily enjoying the best of both worlds.

Our DM110/DM220 will meet this challenge.

The enhanced sensitivity of these loudspeakers enables them to handle all the greatly increased dynamic range of compact discs, without the need of a larger amplifier. With analogue recordings – even played through budget systems – this super-sensitivity means there is no need to upgrade the amplifier.

There is another strong characteristic: DM110/DM220 are capable of extremely high acoustical output. And incidentally, this new generation of digital monitors are probably the finest analogue loudspeakers ever created ... even by B&W.

DM110/DM220 have total spectrum capability. Pop, jazz, rock, or classical – whatever your kind of music – these loudspeakers will handle it superbly.

Today there's greater than ever appreciation of good design and B&W retain Europe's leading international designer Kenneth Grange of Pentagram to ensure that the standards of visual concept equal our engineering excellence.

The ingenuity of the B&W design team has achieved something else: the DM110/DM220 are, in a word, affordable.



Used by the major digital recording studios worldwide



Behind the successful development of DM110/DM220 lies B&W's world leadership in the reproduction of digital recording.

The most famous conductors, orchestras, instrumentalists, recording companies and balance engineers worldwide selected Model 801 as their exclusive classical music monitor. Decca International alone have monitored and edited more than 18,000 hours of digitally recorded music on our 801 monitors.

The world's professional musicians and engineers put their trust in B&W 801 as their reference standard. This in turn was our standard as we designed and developed DM110/DM220. They are heirs to this vast experience. That is why they are so far in advance of anything near their price bracket today.

801's at a Deutsche Grammophon digital recording session in the Kingsway Hall, London.

'Follow that' they said.
So we produced the B&W DM330.



B&W DM330

Another new-generation Digital Monitor from B&W? Already our DM110 and DM220 are meeting the challenge of the digital age with their total spectrum capability. Pop, jazz, rock or classical – compact disc or analogue recordings – these loudspeakers handle everything superbly.

Their attractive combination of super-sensitivity, high acoustical output and low cost won DM110/DM220 many a bouquet from the hi-fi critics. One of the most respected* concluded his review with "So I say to B&W (or anyone else) 'How do you follow that?'"

Now we have the answer to that very question. It is our new Digital Monitor DM330.

The system comes in, not as a replacement, but at the top of the new range of Digital Monitors DM330/DM220/DM110. That's because it outperforms the other two in several significant ways, while still positioning itself in the 'very affordable' category.

BASS RESPONSE is further extended, as these figures for the -6dB point demonstrate:

DM330
40Hz

DM220
45Hz

DM110
60Hz



Bass/midrange driver BM220.



High-frequency driver TZ26.

SENSITIVITY

On their introduction, DM110/DM220 showed virtually double the sensitivity of established systems – hailed as an astonishing advance. Now, even that degree of sensitivity is surpassed by DM330:

DM330
91dB

DM220
90dB

DM110
90dB

* Geoffrey Horn of Gramophone magazine

SPECIFICATION

Frequency response
±3dB 48Hz to 20kHz.

Lower cut-off frequency
40Hz (-6dB free-field).

Dispersion
Vertical: ±3dB of axial 20Hz to 20kHz for 20° arc.
Horizontal: ±2.5dB of axial 20Hz to 15kHz for 120° arc.

Drive units
Three, vertically in-line.

Laser-optimised to produce piston action and controlled symmetrical diaphragm decoupling, ensuring near perfect transient behaviour and extended linear dispersion.

Bass/midrange driver
200mm nominal piston dia, 26mm high temperature voice coil with critically impregnated composite short fibre cone. Bass unit is fed by a first-order difference filter.

High-frequency driver
26mm dia, using an entirely new dome/coil construction of special polyamide material.

Crossover network
3kHz acoustic Butterworth-squared giving 24dB per octave in stop-band. -6dB at crossover frequency.

Distortion
For a nominal s.p.l. of 96dB at 1m, 90Hz to 20kHz.
Second harmonic: less than 3%.
Third harmonic: less than 0.5%.

Sensitivity
1 watt into 8ohms load for a s.p.l. of 91dB at 1m.

Power handling
Suitable for amplifiers with 10 to 100 watt output.

Dimensions
Height: 857mm (33¾in).
Width: 290mm (11½in).
Depth: 320mm (12½in).

Weight
17.1kg (37.4lb).

Cabinet finish
Simulated veneers of:
American walnut with brown baffle.
Black ash with grey baffle.

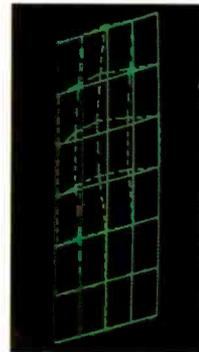
ENCLOSURE

Advanced optimisation techniques – employing modal analysis of the cabinet structure – put the DM330 on course to achieve (1) a significant reduction in lower mid-band colouration and (2) dramatic improvement in bass transient response. Critical bracing and increased board section have contributed much to a structure that comes close to the ideal in cost-effectiveness.



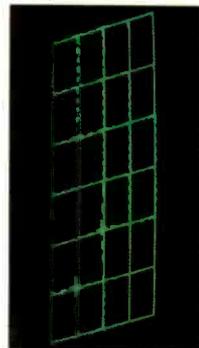
The technique of modal analysis enables enclosure wall vibration to be examined by taking measurements at a number of points.

These computer video images illustrate how inside bracing research improves cabinet effectiveness.

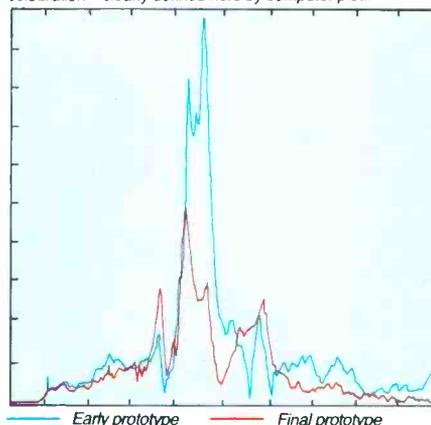


An early prototype DM330.

The finally accepted version.



Optimisation of the bracing struts achieves reduced colouration – clearly defined here by computer plot.



STYLING

We decided that DM330 should be a modern beauty among floor-standing systems. The result is a visual concept that parallels the enhanced engineering excellence of this new Digital Monitor.

There has never been a better time to invest in new loudspeakers. In DM330 you will find an affordable system that delivers superb performance from both analogue and compact discs. It will carry you happily through the digital audio revolution and beyond. Seek out your B&W dealer. Listen to DM330 . . . and you'll see.

CAN YOU SEE THE MUSIC?

B&W's newest star is in the spotlight.

To celebrate the marriage of Audio and Video, B&W of England commissioned its world renowned research team to design a loudspeaker dedicated to the audio/video environment. A new star was born!

Until recently, TV was meant to capture the eye rather than the ear, a one-experience medium. But now, with the availability of Beta and VHS Hi Fi and the advent of Stereo TV, it has become a two-experience medium. Yes, you can expect theatre quality sound in your own living room. B&W video acoustic monitors reproduce the whole eight octaves of sound, an astounding improvement over the four to five octaves reproduced by ordinary TV speakers.

The television picture tube and associated components are seriously affected by stray magnetic fields. The magnets employed in TV loudspeakers are shielded to prevent magnetic interference but if large magnets required to produce true high fidelity are used, then shielding is only partially effective.

B&W goes one step beyond. B&W has totally redesigned the magnet circuits and motor system by producing nickel-cobalt centre pole magnets. B&W has produced ZMF speakers, giving virtually a Zero Magnetic Field. This revolutionary new approach actually enhances the performance of the loudspeaker system beyond anything achievable with simple screening; B&W ZMF speakers can be placed immediately adjacent to the television monitor without creating any adverse effect.

Behind the successful development of these video acoustic monitors lies B&W's world leadership in loudspeaker technology and design. B&W's Model 801 has been selected by famous recording companies, orchestras and conductors worldwide as their classical music monitor. For both the professional recording artists and the critical music lover, B&W has dedicated itself to the pursuit of perfection in the recreation of live sound.

More than a contribution to viewing pleasure, B&W ZMF loudspeakers provide all that has been missing from the complete audio/video experience. LISTEN AND YOU'LL SEE!



B&W

VIDEO ACOUSTIC MONITORS

SUPERB SOUND WITHOUT PICTURE DISTORTION OR MOVEMENT

Anglo American Audio P.O. Box 653, Buffalo, NY 14240 (416) 297-0595

B&W DIGITAL MONITORS



LISTEN AND YOU'LL SEE

The new DM110 and DM220 are built to the same exacting standards as the monitors we supply to major digital recording studios throughout the world.

They are, happily, much more affordable.

At around \$300 for the DM110, and \$500 for the

DM220, you now have a perfect excuse to upgrade your equipment to digital standard.

Ask to hear them soon.

Close your eyes and listen.

Then you'll see.



AS USED BY DIGITAL STUDIOS WORLDWIDE. AND SOON, WE HOPE, BY YOU



Perfect bass... Perfect treble... Perfect sound forever...

Introducing Rotel. Audio components with extraordinary features, yet surprisingly affordable. An incorporation of superb quality and elegant, modern design has been achieved only through painstaking research and development...in both the engineering laboratory and listening room. In the interest of audio signal purity, Rotel has dispensed with all tone controls and extra switching. Instead, there is a high standard of precision and enhanced sensitivity within...eliminating the necessity for manual adjustments. Rotel audio com-

ponents are highly refined, and provide perfect reproduction of your favourite music, as originally recorded by professional sound engineers. This high performance and outstanding quality is the product of a perfect marriage...prestigious British design, coupled with advanced Japanese technology. If you want to achieve the ultimate in sound quality at an affordable price...don't settle on anything less than perfection... The Rotel Revolution...built better to sound better.

ROTEL

P.O. Box 653, Buffalo N.Y. 14240 U.S.A.

Recording chrome tape with normal bias risks distortion and exaggerates treble by about 4.5 dB at upper frequencies.

Continued from page 112

Switching For Chrome

Q. My cassette deck has a combined selector for bias and equalization. When using a CrO₂ cassette, should I both record and play with the selector in the chrome position? Or should I record with the switch in the normal position and play back in

chrome position, or record in chrome and play back in normal?—Rami Beydoun, College Station, Tex.

A. Ideally you should both record and play a chrome (or chrome-equivalent) tape with the combined selector switch in the chrome position. In all events, you should at least record with

the selector in chrome position, in order to supply sufficient bias to avoid noticeable distortion. Such bias is about 50% more than obtained when the switch is in the normal (ferric) position. Underbiasing produces not only distortion but also exaggerated treble. In playback, if you wish, you can experiment with the switch in normal instead of chrome position. This will add about 4.5 dB of boost in the upper reaches of the treble range.

Checking Magnetism

Q. Is there any test I could do that would show the amount of magnetism in my tape deck?—Leo A. Gutman, New York, N.Y.

A. To check whether your heads, guides, and other metallic parts contacted by the tape are magnetized, you would use a magnetometer, such as sold by R. B. Annis Co. (1101 N. Delaware St., Indianapolis, Ind. 46202). It should be recognized that, owing to factors such as the earth's magnetic field, it is often impossible to reduce magnetism completely to zero, even though you have demagnetized with a powerful demagnetizer.

VCR Audio

Q. I am not much interested in video recording, but if it is possible to use a VCR for audio recording it becomes an attractive proposition. Is it necessary to use an analog-to-digital converter ahead of the VCR, or can you run the analog signal directly into the VCR? Is any frequency equalization necessary ahead of the VCR input? Is there any frequency response limitation in the VCR that would impair the fidelity of the audio recording?—Charles L. Franklin, Mechanicsburg, Penn.

A. The relatively new Beta Hi-Fi and VHS Hi-Fi VCRs permit one to make analog audio recordings of very high quality, with performance rivaling or exceeding that of the best open-reel analog tape decks. By connecting a PCM digital sound processor to them, both old and new VCRs can be used to make digital recordings of even higher quality—though the improvement will not necessarily be evident to the ear.

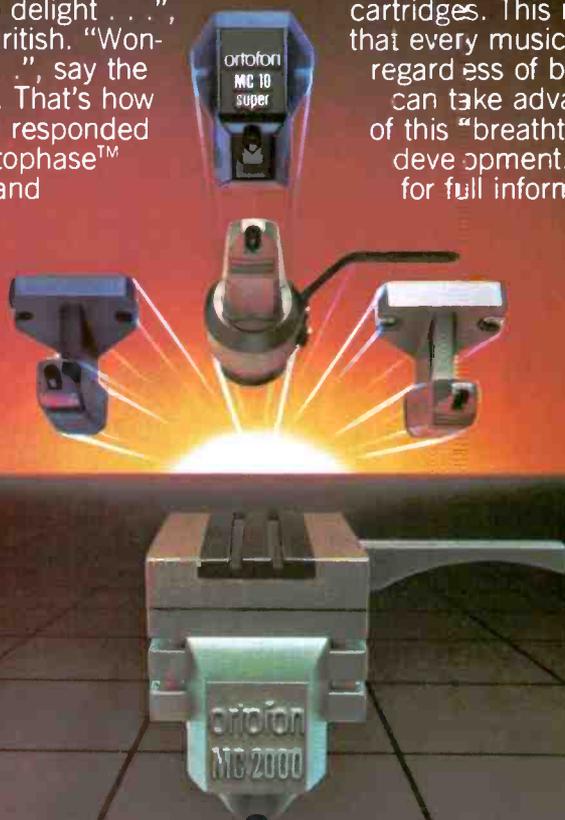
In either case, no equalization is required ahead of the VCR input. Response is essentially flat over the audio range (20 Hz to 20 kHz). A

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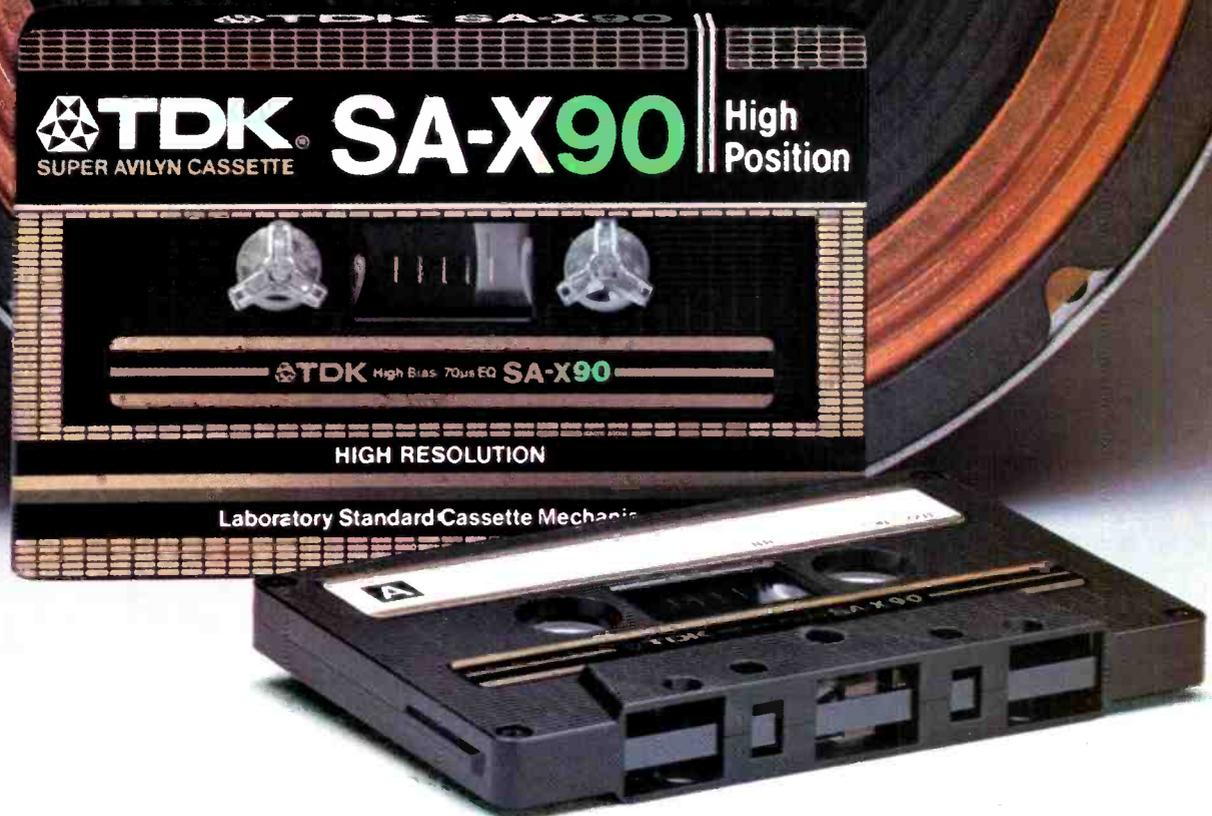
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vides optimum performance at all frequency ranges. You get crisp, clean highs and rich, solid lows. With pure sonic pleasure in between.

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KEN POHLMANN

FOLD OVER BEETHOVEN

In the history of audio, I doubt whether any topic has provoked as much controversy, enthusiasm, and condemnation as has digital audio. I think that is to be expected; no other technological breakthrough has so thoroughly shaken things up. A lot of analog investment and expertise has been threatened and incredible opportunity has been created for newcomers. The idea of scrapping all present recording and reproduction equipment and relegating to antiquity all analog recordings, challenging all analog recording technique, and replacing all of that with new hardware, software, and method—yes, I think that might lead to a few discussions. Will digital audio prevail, or end up in the garage with your quadraphonic decoder? The answer is clear in my mind, but for those of you still wondering, keep reading and follow the evolution of the greatest coup in audio history.

Thus far we've covered some of the fundamentals of digital audio such as sampling and quantizing and held the presentation at a fairly general level. Now I would like to delve a little deeper into some of the promises and pitfalls of digital audio. One particular challenge to the audio digitization system designer is that of aliasing, a kind of sampling confusion that can take place in the recording side of the chain. Just as a criminal can take two names, and thus confuse his identity, a sampled signal can be mistaken for another if aliasing is allowed to occur. It is thus the designer's obligation to prevent aliasing from ever occurring; as we will see, an input low-pass filter will accomplish this, but only if its cut-off frequency is carefully chosen.

What is aliasing? It is a digital system's improper, but inevitable, response to an input signal whose frequency is out of bounds—that is, more than half the sampling frequency. Ny-

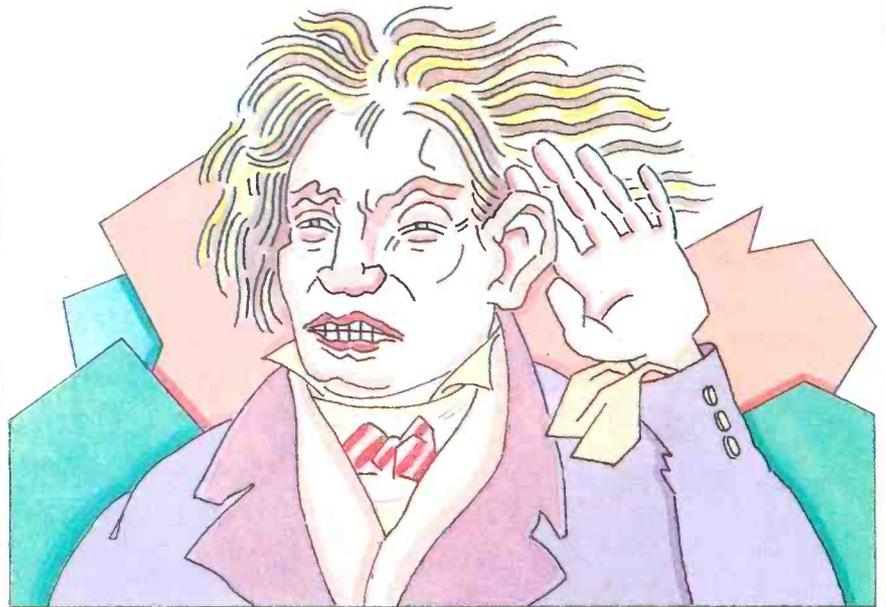


Illustration: Michael A. Donato

quist has shown that the highest signal frequency in a sampling system can be no more than half the sampling frequency. As the signal frequency becomes higher and higher, the number of sample points per cycle becomes fewer. When the signal frequency reaches half the sampling frequency, there are only two samples per cycle, which is the absolute minimum needed to record the bipolar nature of the waveform.

If we defiantly attempt to sample even higher frequencies, the sampler will continue to produce samples at its fixed rate, and these deviate audio frequencies are, indeed, recorded—but spurious new frequencies are "recorded" as well. As the deviate frequencies go higher and higher, new descending frequencies are created. Specifically, if S is the sampling rate and F is a frequency higher than half the sampling rate, then a new sampling frequency F_f is also created at $F_f = S - F$. For exam-

ple, if $S = 44$ kHz, and we attempt to sample a 23-kHz signal, another sampled frequency appears at 21 kHz, if we attempt to sample a 24-kHz signal, 20 kHz appears. In other words, a new frequency appears back in the audio band, folded over from the sampling frequency. In fact, it is affectionately called foldover, or as the more literate types call it—aliasing.

To further elaborate upon this depressing scenario, in which a false frequency accompanies the actual frequency following the sampler, we must remember that a low-pass filter is used at the output of a digitization system to smooth the staircase function and thus recover the original signal. That output filter will be designed to cut at half the sampling frequency; thus our errant input frequencies which were above that value would be filtered out, and we would be left with *only* the aliased frequency running around our audio band. That isn't all—but before we consider further ramifications of this nasty business, let's take a look at an example.

Suppose we have a digitization system sampling at 44 kHz. Further, suppose that a signal with a frequency of 36 kHz has somehow sneaked into our sampler. Our sampler would obediently produce the samples shown in Fig. 1, faithfully recording a series of amplitude values at sample times. Given

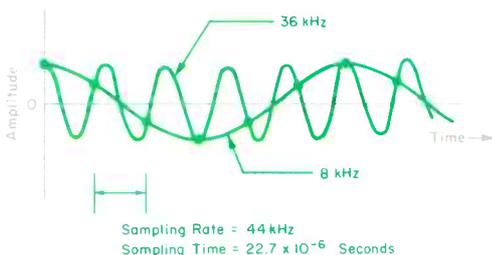


Fig. 1—Digital samples from a signal higher than half the sampling frequency are identical to those from a signal of lower frequency. Here, a 36-kHz input masquerades as an 8-kHz signal.

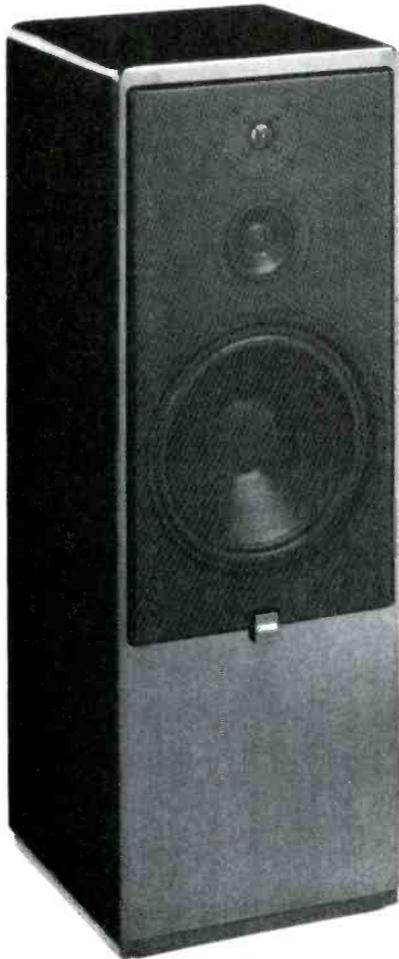
SOLID

Introducing the Canton CT 2000 floor standing speaker - our first using proprietary vent technology. The result is sound reproduction so fast, natural and free of coloration you must hear it to appreciate the acoustic achievement it represents.

Engineered to meet the most exacting demands of digital technology, the CT 2000's superior dynamic range, resolution and transient response stem from Canton's solid technical expertise.

And, like the entire Canton product line, every element of the new CT 2000 is designed, engineered and manufactured within Canton's factory...this gives us the solid quality for which we are known worldwide.

Solid detailing goes into every Canton speaker as well. That's why we offer our speakers in a variety of fine finishes, like walnut and oak veneers, rich black,



bronze and white lacquers and now a premium finish, glass mahogany. For at Canton, we believe speakers should look as good as they sound.

And what about the CT 2000's technical specs? We think you'll find these solid as well:

Efficiency:

92dB (1 meter/1 watt)

Frequency Response:

18-30KHz

Power Handling:

300 Watts (music spectrum)

Distortion:

0.1% (DIN Standard)

Dimensions (WxHxD):

14" x 38" x 14"

Solid acoustic technology & design principles, solid detailing & quality. For you it means a solid investment. Visit your local Canton dealer today.

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CANTON

Die reine Musik

Just as a criminal's alias
confuses his identity,
aliasing can confuse one
sampled signal for another.

those samples, could you decide which signal was the intended one—36 kHz, or 8 kHz? No—but don't feel bad, because no device, digital or otherwise, could distinguish either. After the output filter, the 36-kHz signal is gone, but the 8-kHz signal remains, containing samples as innocuous as any legitimate 8-kHz signal. What does

that unwanted signal give to the fidelity of our audio system? Distortion.

Aliasing is about as bad as being trapped in a house of mirrors. If you were sampling at 44 kHz, an input frequency from 0 Hz to 22 kHz would sound fine, but as the frequency ranged from 22 to 44 kHz, we would hear it returning as a frequency de-

scending from 22 kHz to 0 Hz. If we persevered, and raised the frequency from 44 to 66 kHz, it would appear again from 0 Hz to 22 kHz.

As if that weren't bad enough, we must complete our discussion with a look at the different manifestations of aliasing. First, aliasing occurs not only around the sampling frequency, but also from multiples of the frequency. For example, all of these components would be produced in an aliasing scenario: $S \pm F$, $2S \pm F$, $3S \pm F$, etc. Thus in our example of a 44-kHz sampler and a 36-kHz input signal, some of the resulting frequencies would be: 8, 52, 80, 96, 124, 168 kHz, etc. That sure looks nasty, although only the $S-F$ component will bother us directly as an interfering frequency.

Second, more complex tones exaggerate the problem. Our simple sine-tone examples have limited foldover to one and only one frequency. With more complex tones, aliasing frequencies could be generated separately for each harmonic.

For example, a tone of 5 kHz would normally have harmonics at 10, 15, 25 and 30 kHz. With digital sampling at 44 kHz, however, the 25-kHz fifth harmonic would fold over to 19 kHz, and the sixth harmonic (30 kHz) would pop in at 14 kHz, just shy of the 15-kHz third harmonic. A particularly loathsome kind of distortion, akin to intermodulation distortion, would result.

After this look at aliasing, you digital enthusiasts out there are perhaps ready to smash your CDs. But hold it! As bad as aliasing *might* be, in practice it isn't so bad. In fact, in a well-designed digital-recording system, it doesn't exist at all. The solution is simple. We merely bandlimit the input frequencies, with a sharp low-pass filter designed to provide a healthy attenuation of 60 dB or more at half the sampling rate, to make sure the throughput never exceeds half that frequency. Neither disallowed fundamentals nor partials are allowed to enter the sampler, thus aliasing cannot occur. If those frequencies don't exist, neither will aliasing. No need to worry about something that isn't there.

But if the problem of aliasing upsets you, I'll be happy to take such CDs off your hands, especially Beethoven works. Just send them care of *Audio*. 

“1984 Loudspeaker of the Year”

(Category One)

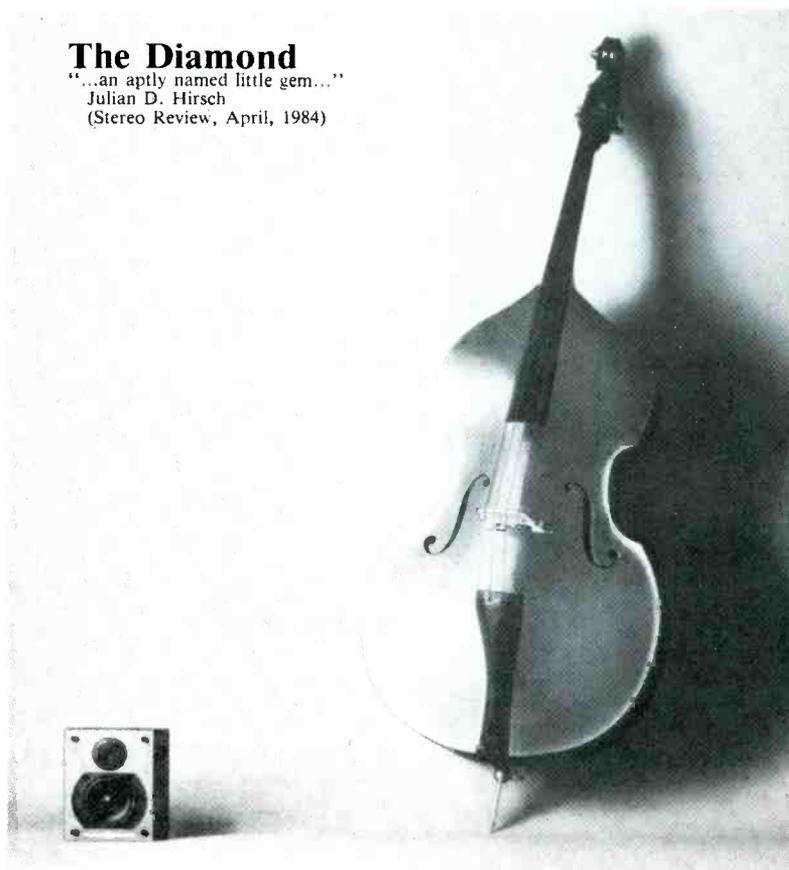
Federation of British Audio

The Diamond

“...an aptly named little gem...”

Julian D. Hirsch

(Stereo Review, April, 1984)



If you can't get a double bass out of a 9½" box,
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Now available in the U.S. to music lovers on small budgets.



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Quality and innovation since 1932

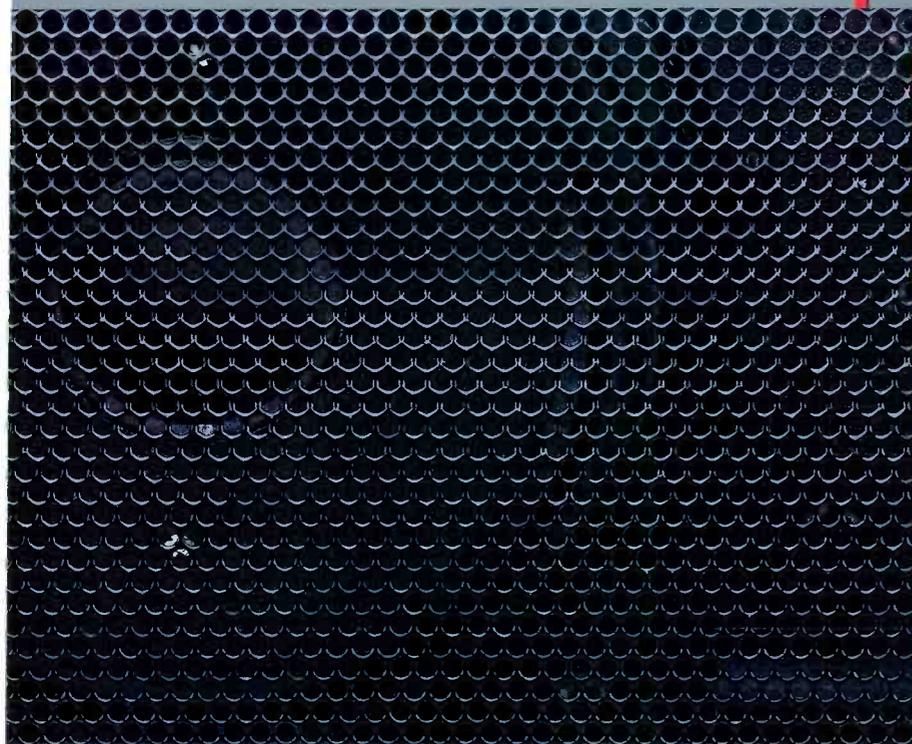
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AUDIO/OCTOBER 1984

ADS



ADS Atelier:
World-class performance



ADS Loudspeakers:
Technological precision



ADS Automotive:
Continuing innovation

ADS high-performance audio: An overview

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ADS Atelier



P2, C2, A2, T2



P2, R1, C2

World-class performance



Both the audio press and knowledgeable consumers have been consistently enthusiastic about each model in the ADS Atelier component series. The consensus is clear — the engineering and electronic design of Atelier effortlessly deliver world-class performance. But the praise doesn't stop there. Over and over, reviewers and users mention that Atelier's design introduces a new, welcome friendliness to living with audio. These comments are particularly pleasing to us because we try never to lose sight of the fact that our products are as much about the simple enjoyment of music as the continual refinement of technology.



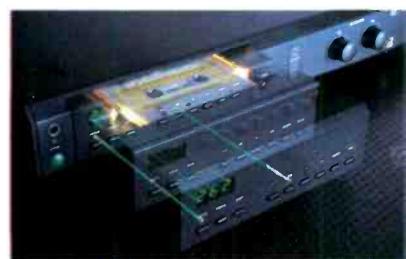
The design of the Atelier module gives components a new, accessible form. ADS technology fills that form with a new adaptability, offering consumers high quality equipment, built to last, that need not be replaced to be upgraded — a genuine system, specifically designed to grow. Atelier's fusion of design and technology (we think of the components as ingots of technology with the future built in) sets these components apart.



Once again, as with our home loudspeakers and our automotive products, ADS has defined the standard for the industry to follow. Experience Atelier for yourself. We know you'll be pleased.



Atelier components can be stacked, placed side by side, or located on shelves. Hinged panels cover all system wiring.



A motor-driven drawer in the C2 places the illuminated cassette at hand only when needed.

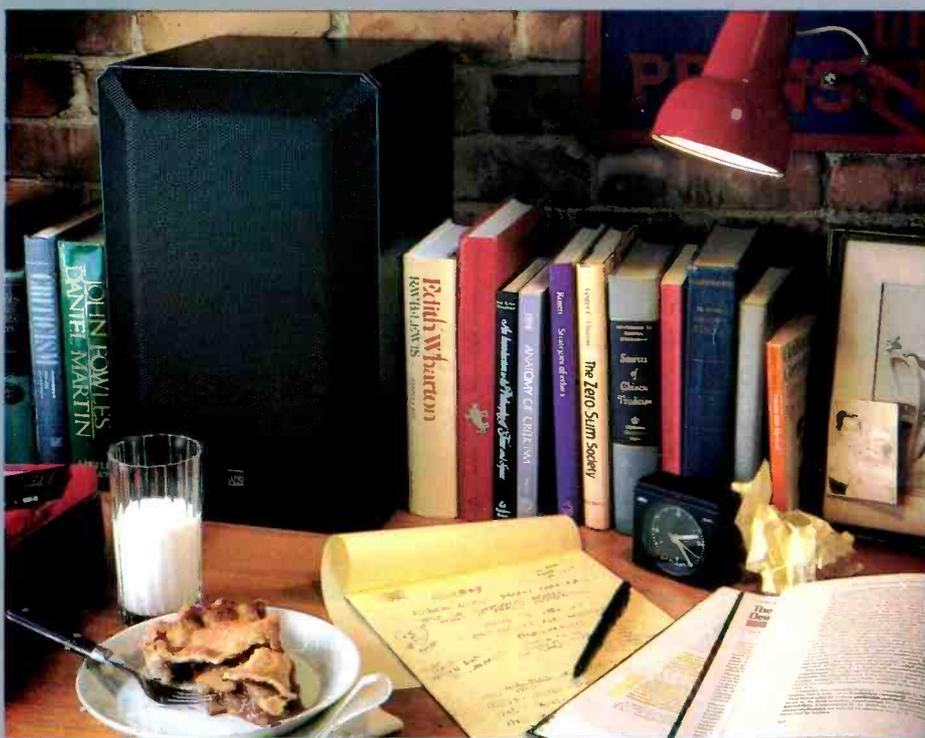


Digital accuracy, convenience and control are the hallmarks of the T2. The digital frequency synthesizer system also provides the convenience of 16 station presets and 'search' tuning.

ADS Loudspeakers



L1590



L470

Technological precision



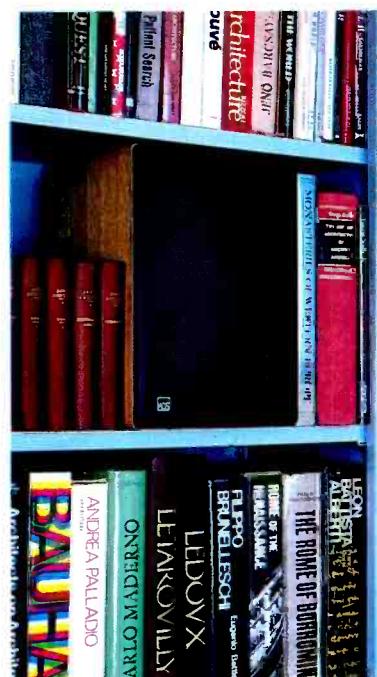
The increased fidelity of digital recordings can be realized only by loudspeakers of impeccable accuracy and precision. Because of their musical integrity, ADS loudspeakers are used as monitors in the recording of many of the most respected Compact Discs. The experience gained from our decade of work with digital extends through the eleven home loudspeakers we offer. The line includes mini speakers (which we pioneered), two-way and three-way bookshelf models and monitor towers.



Every driver in every speaker is made by ADS. Each shares a technology unsurpassed worldwide. We use woven soft-dome tweeters and midrange drivers exclusively, to achieve clarity and pinpoint stereo imagery. Our Linear Drive woofers feature Stiffite® cones in butyl surrounds. Materials of this quality cost us more, but with them we can deliver bass performance unavailable any other way. Our crossover networks use computer-grade components and elegant circuitry designed to keep efficiency high. We're proud of our finishes, too. The veneers we choose are the best available, and great care is given to the craftsmanship.



We invite and encourage you to listen to the ADS loudspeakers. This level of precision and performance offers exceptional value at competitive cost.



ADS pioneered the development of the high performance mini-speaker. The L400 places genuine high fidelity where it otherwise wouldn't have been possible.



The premium butyl surround allows long linear woofer travel for maximum movement of air while precisely controlling excursion for tight definition and low distortion.

ADS Automotive



320i



300i

Continuing innovation



There is an undeniable affinity between cars and music. More than transportation, the automobile at its best offers comfort, privacy and time alone — and no one has more experience bringing innovation to automotive high fidelity than ADS. Our early products were the first ever to introduce digital technology. They, and the products that followed, have built a loyal and enthusiastic group of ADS owners who are happy with the thought of driving anywhere.



We design and build every driver in our five automotive speakers with the same care and attention that we bring to our home loudspeakers. Every model features our proven performers — woven soft-dome tweeters, Stiff-lite woofer cones in butyl surrounds, and low-loss crossovers. Our exclusive Linear Drive bass design endows our subwoofers with sonic impact that larger, conventional woofers cannot approach. Our digital technology means that ADS Power Plate amplifiers will fit in more places, work more reliably, and sound better than any other choice you can make.



In size, shape, materials, finish and workmanship, we design ADS automotive products to take the bumps, the heat and the demanding use that are all part of being 'high performance.' You owe it to yourself to hear the best.



The unique materials and construction of the 320i system make it the right speaker for applications where flexibility, durability, and superior sound are required.



ADS Power Plates can be thought of as building blocks; they easily accommodate more speakers, additional amplifiers, or a subwoofer system.

Atelier components



R1 Receiver



P2 Turntable



C2 Cassette deck



T2 FM stereo tuner



A2 Control amplifier



CD3 Compact Disc player
available in 1985



PA1 Biampifier for L1290
and L1590

For suggested retail prices and specifications, see the directories in this issue of *Audio*.

Loudspeaker systems

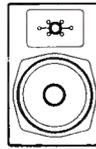
Minispeaker systems



L200
black

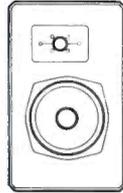


L300
black
walnut

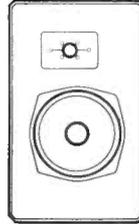


L400
walnut
oak

2-way bookshelf systems

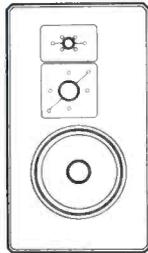


L470
black
walnut vinyl

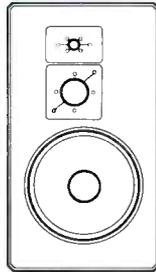


L570
black
walnut

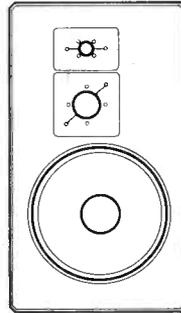
3-way bookshelf systems



L780
black
walnut

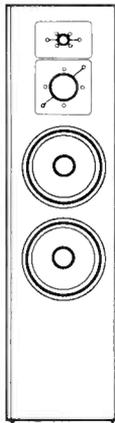


L880
black
walnut

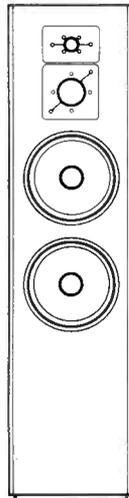


L980
black
walnut

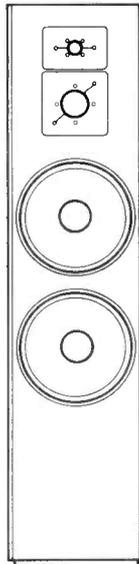
Tower systems



L1090
black
walnut



L1290
black
walnut

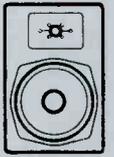


L1590
black
walnut
rosewood

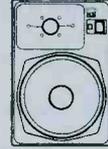
Automotive products



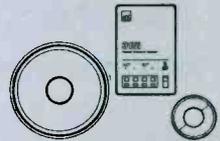
200CC Integrated
loudspeaker system
with swivel bracket



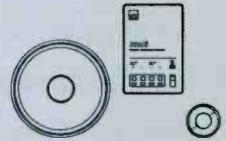
300CC Integrated
loudspeaker system
with swivel bracket



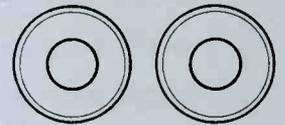
300i Integrated
loudspeaker system



315i Discrete loudspeaker
system



320i Discrete loudspeaker
system with Samarium-cobalt tweeter



CS700 Subwoofer
system with AX2
electronic crossover



P80 40W/40W high
performance amplifier



P120 60W/60W stereo
bridgeable power
amplifier

A word about ADS dealers

The ADS commitment to quality extends to the dealers who sell our equipment. There are not many of them, and they are chosen for audio expertise and the ability to stand behind ADS honorably with service. To find the ADS dealer nearest you, call us, toll free, at 1-800-824-7888 (in California 1-800-852-7777), Operator 483. Mention that you read about us in *Audio*, and we will promptly send you the names and locations for your area.



**Analog & Digital
Systems, Inc.**

One Progress Way
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Massachusetts 01887
USA
617 658-5100

Tuner Volume Control

Q. My FM tuner has an output-level control marked "0" to "10." To me, it is like an extra volume control. What is the correct setting for it?—John Drouzek, Southbridge, Mass.

A. The correct setting depends on your needs. It can be used to match the listening level from your FM tuner to that provided by your turntable or, if you have a bare-bones system where the tuner directly feeds the input of your power amplifier, you can use it as an ordinary volume control.

Dust on Phonograph Stylus

Q. I have a dust problem. The tip of the stylus accumulates lots of dust. Although I clean it before and after each play, dust gathers between playing sessions. Can I cover the cartridge to prevent this?—C. K. Chan, Long Island City, N.Y.

A. Your first precaution in terms of preventing dust from being deposited on the stylus tip or anywhere else, is to keep the dust cover in place whenever the turntable is not in use.

At the time of purchase, the cartridge probably was equipped with a stylus protector. If you still have this, use it. It should be a good dust shield for the stylus.

Cleaning Compact Discs

You may wish to pass on to your readers something which I have found to be invaluable for Compact Disc cleanliness, the "Static Master" brush. Small particles of dust or lint are easily removed without the risk of scratching the surface.—Gary Lewis, Wichita Falls, Tex.

Sampling Rate

Q. I would like the term "sampling rate" explained. I have heard that one of the negative aspects of digital discs involves the sampling rate.—Bill Fox, Alexandria, Va.

A. Audio signals are converted to digital form by "sampling"—measuring the signal voltages at frequent intervals. The frequency with which this is done is called the "sampling rate." One widely quoted theory says that the sampling rate must be at least twice the highest frequency to be recorded, or 40 kHz for audio frequencies up to 20 kHz. In practice, a slightly higher

rate (44.1 kHz for the Compact Disc, and higher still for studio master recordings) is used, mainly to make it easier to filter out the sampling frequency without filtering any of the audio band.

Some critics feel this sampling rate is too low to accurately reproduce the waveshape of high frequencies. Others feel that any irregularities in the shape of a 20-kHz wave represent frequencies too high to hear, so the loss of these frequencies will not affect the sound. At this point, the debate is still an active one, and neither side has completely proved its case.

Apparent Noisy Volume Control

Q. My question concerns a phenomenon I have observed with some, but not all, solid-state amplifiers. The effect is this: If, when power is first applied to the amplifier, the volume control is moved back and forth between zero and some low setting, a sound, not unlike that of a noisy control, will be heard. This effect disappears after a couple of seconds. One might think that the control was indeed noisy, and that moving it caused a temporary cleaning effect. If, however, the control is not moved till the amp has warmed up for a few seconds, no "noisy control" sound is heard. What is the real cause of this effect?—Jack Rubeck, Portland, Ore.

A. This "noisy control" phenomenon is quite common and is the result of the coupling capacitor which feeds signal into that control charging up while the control is being adjusted. During the charge-up, d.c. is present across the control. The resistive element of the control is not absolutely smooth. Thus, the contact wiper, as it moves across the element, will encounter slightly erratic changes in resistance. These, in turn, will lead to slight changes in d.c. voltage at the wiper. The wiper will feed these changes into the rest of the circuitry, where they will appear as "static." Because the d.c. disappears once the capacitor has fully charged, no further static is heard.

Compact Disc Requirements

Q. What, specifically, does a Compact Disc player require of the rest of a stereo system in order to produce maximum fidelity? Is the amplifier the

main component of concern? What about the cassette deck that will be used to tape these discs? And the loudspeakers?—Samuel J. Neiditch, Redlands, Cal.

A. I am not thoroughly convinced that a CD player requires anything more by way of a sound system than what you now have. I have used my old, reliable 35-watt-per-channel power amplifier and made all the noise I wanted to when playing these discs. Most people believe that louder sound levels are required in order to take advantage of the wide dynamic range found on many Compact Discs. I believe that if you are now listening to music at a suitable, comfortable level, it should not be increased. Rather, let the softer passages be heard at a lower volume than one generally is used to hearing. In analog systems, such passages are either artificially boosted during recording or are buried in the noise and hiss.

If you are driving your present amplifier close to its limits in order to obtain suitable listening levels, you may have to consider an amplifier of higher power. Rather than buying a more powerful amplifier, however, it is sometimes better to buy more efficient loudspeakers. This is especially true if you are already considering new ones. Keep in mind that the loudspeaker system makes the single, largest contribution to the overall sound of your system. It may well be that by changing to more efficient loudspeaker systems, which also sound better to you, you will have made a far more significant contribution than would be the case if you obtained a new power amplifier.

The cassette recorder needed to tape CDs must be good and should be equipped with either Dolby C or dbx noise reduction. Compact Discs, however, will not deteriorate with time and with repeated plays, so you may not have many reasons for taping them. We'll have portable equipment soon enough so that these discs can be taken anywhere without having to carry the entire sound system along.

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.

Phono input capacitance isn't all that critical. That's why some amps switch it in steps as large as 100 pF.

Direct Metal Mastering

Q. Some albums on sale here in Germany are manufactured with Teldec's DMM (Direct Metal Mastering) technology. What is this process?—Jerry Crayton, APO, N.Y.

A. A conventional master disc is made by cutting into a lacquer surface (on an aluminum substrate). This "lacquer master" is then electroplated, and the plated-on metal is removed to make a "metal master." The metal master is a negative mold of the lacquer which can be used, in turn, as a mold from which a small number of records can be pressed directly.

Usually, though, the metal master is replated and that plating stripped off to make a "mother," which is a negative of the metal master (and therefore like the original lacquer). The mother is then plated to make more negative molds, called "stampers," from which the actual records will be pressed. With care, a master can make several mothers, each of which can make several stampers, from which a great many records can be pressed.

In Direct Metal Mastering, however, the cutter works directly on a metal master disc, which then becomes the mother. By cutting down the number of steps, the sonic accuracy can be improved, and noise kept to a minimum.

Unexpected Cone Excursions

Q. I noticed recently that my speakers' 5-inch cones exhibit strange excursions. Specifically, the cones will bottom out and then return to their rest positions. This cycle takes about 1 S to complete. There is usually just one oscillation cycle per occurrence. These excursions occur in the presence or absence of program material, even with the volume control at minimum. Further, it occurs even when my 18 dB/octave filter is employed. What is the cause of this phenomenon? How can I trace and remedy it? Is there a danger to my speakers?—Steve Williamson, Wayne, Mich.

A. Whatever the cause of your problem, it affects the later stages of your equipment, after all of its controls and filters. It may be that the voltage regulation of the equipment is not good and/or that your power-line voltage is unstable. You must monitor your power-line voltage to see if it changes

drastically during these strange episodes.

Another possibility is that the power-supply capacitors may be lower in value than they should be. This, in turn, could give rise to amplifier instability. The amplifier might break into a cycle of low-frequency oscillation when a transient of any kind enters the equipment. Even small changes in power-line voltage (which are to be expected) could cause the problem.

Perhaps you can move the equipment to another circuit in your home, one which is less prone to the problem. You may have old house wiring. Rewiring to heavier cable, plus segregating the house into a greater number of individual circuits, may be required before the problem can be solved.

The repeated "bottoming" of your speaker cones can eventually produce voice-coil damage. You should take steps to solve the problem as quickly as possible.

Phono Capacitance Too High

Q. My integrated amplifier has phono input capacitance settings for 100, 200 and 300 pF. My turntable's cable capacitance of 200 pF plus my amplifier's lowest capacitance setting (100 pF) add up to 300 pF. This is far higher than the 225 pF required by my cartridge. I guess this makes my system's high-frequency response roll off too fast.

What can I do to solve this problem? Is there any way I can lower the capacitance of the turntable?—Arquimedes Sayas, Miami, Fla.

A. It is true that your high frequencies may be somewhat affected because there is a bit too much capacitance across your phono cartridge. But the amount of capacitance is not terribly critical. A considerable error in this regard can occur without audible degradation. This is why the input capacitance is switchable in steps of 100 pF. I suggest that you disregard the extra capacitance.

If you wish to trim it, you can shorten the cable which connects the turntable to the phono input of your equipment. The amount by which the cable can be shortened depends on the amount actually required to make the connections. To know just how much capacitance will result from cutting the cable

depends on the capacitance per foot of the cable used. Check the manufacturer for this information or find someone to measure it.

In the event that the cable cannot be shortened, you should be able to locate cable having a lower capacitance per foot and replace the original cable with this alternate.

And, most important, when you say you "guess" this rolls off the high end, are you actually hearing this effect? Or are you just assuming, on theoretical grounds, that it must be so? It would be interesting to know whether trimming cables, as suggested above, had any audible effect or not.

Tonearm Problems

Q. I have a turntable with a straight, low-mass tonearm. I had no problems with this equipment until I took it for a simple adjustment to correct the cueing. The tonearm was not being lifted at the end of the side.

When the turntable was brought home, cueing worked fine. Ever since, however, some grooves will stick on almost any recording.

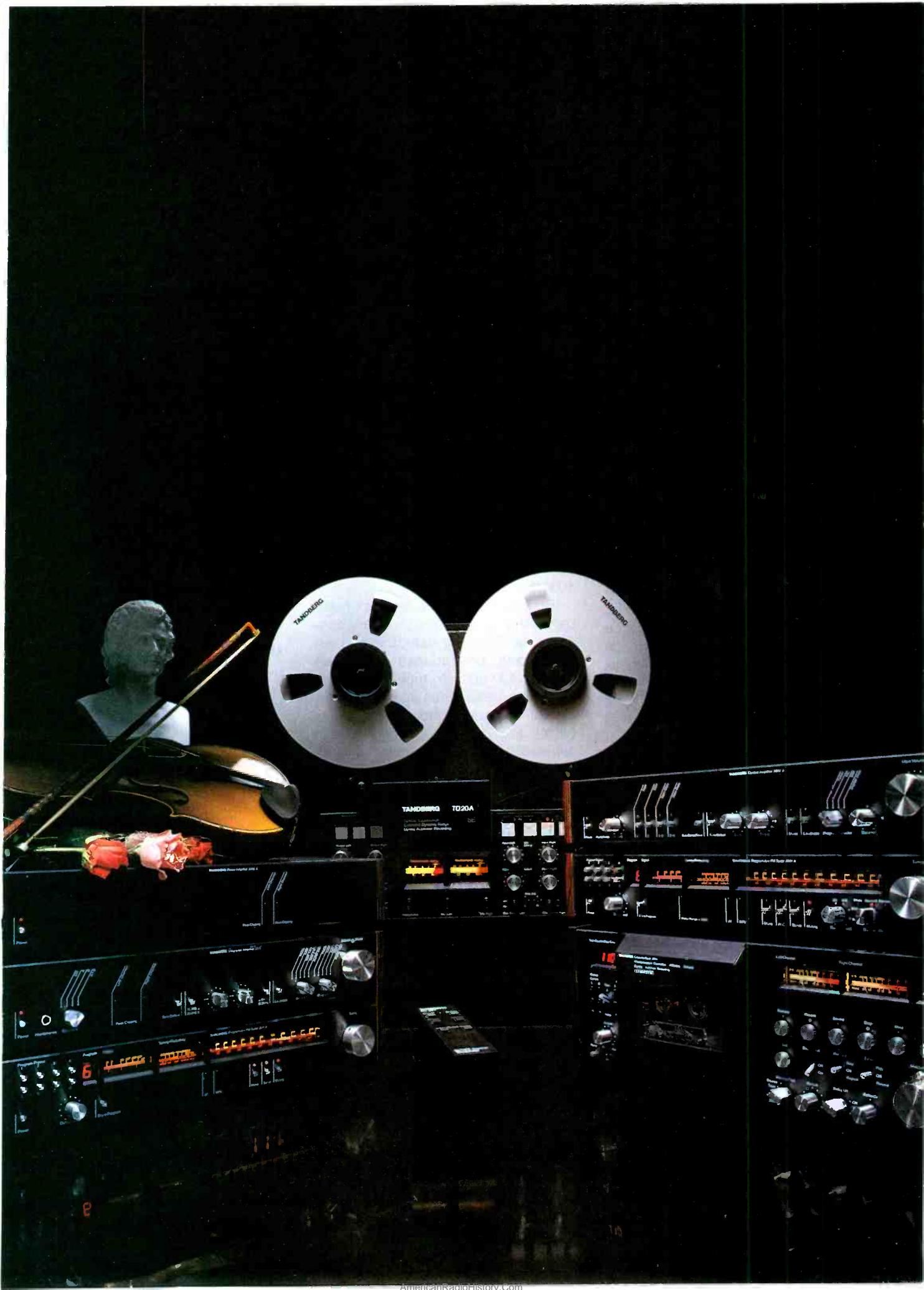
Different technicians suggest that perhaps the tonearm pivot is sticking slightly, restricting horizontal motion. When this was checked, it was not so.—Dom Gray, Wausau, Neb.

A. Your problem is a bit unusual. I do wonder, however, if this mistracking has to do with the repair of the cueing system. It could be that the lifting device is now so close to the tonearm that, when the stylus is supposed to rest on the disc, some of the weight of the arm is also taken by the cueing lifter. Thus, while tracking force might appear fine, insufficient force would be applied at the stylus tip. This would also manifest itself in higher distortion, especially on loud passages, as well as skipping.

I agree that pivots can also cause this problem. Pivot friction is not always easy to check. About all you can do is to lubricate them and hope for improvement. You should also check the pivots to see if perhaps there is an adjustment which is designed to remove "slop" in the bearings. If this is made too tight, the pivot will bind.

How about the anti-skating system? Can you examine it to see if it is introducing drag?

A



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TANDBERG TD20A

Automatic Frequency Tuning
Variable Automatic Bandwidth



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Test Reports excerpted from:

Audio

TIA 3012 Integrated Amp/ TPT 3001A Programmable Tuner

I had the good fortune of visiting the Tandberg factories in Norway a few years ago....I was shown some magnificent prototypes of audio components, each of which had been painstakingly designed by Tandberg's dedicated staff of engineers. Those prototypes were later to become the 3000 series of components, of which the TPT 3001A tuner and the TIA 3012 integrated amplifier are the latest examples. Since these two units are so obviously made for each other, *Audio's* editors thought it would be a good idea to evaluate them as a pair, and I heartily agree. That's not to suggest for a moment that each of these magnificent examples of Scandinavian craftsmanship doesn't deserve its own detailed test report and analysis. The new 3001A tuner is, in my opinion, one of the finest FM tuners I have ever tested, while the 3012 integrated amplifier was obviously designed to take into account the demands of new and better program sources, such as Compact Discs. Further, it incorporates the latest thinking concerning the influence of components on ultimate sound quality, the desirability of eliminating protection circuitry components from the signal path, the superiority of MOSFET output devices and much, much more....

To receive the 4/color 18" x 24" poster shown on the preceding page, as well as literature on the complete Tandberg line, send \$2 for postage & handling to: Tandberg of America, One Labriola Court, P O Box 58, Armonk, NY 10504.

Tuner Measurements:

I was actually able to measure a signal-to-noise ratio of 90 dB for this tuner in mono and 84 dB in stereo. I strongly suspect that these measurements were limited by my signal generator, since they are the highest (for mono) that I have ever read for any tuner....

In the wideband mode, I measured the lowest distortion I have ever recorded for any tuner: 0.02% in mono and 0.03% in stereo for a 1-kHz modulating test signal. While distortion rose when I switched to the narrow bandwidth setting, it was still quite acceptable, with readings of 0.25% in mono and 0.35% in stereo for a 1-kHz test signal....

In the wide-bandwidth mode, I measured a separation of 62 dB at mid-frequencies, 50 dB at 100 Hz, and 48 dB at 10 kHz....

(Regarding their automatic noise cancelling circuit, being) typically conservative, Tandberg stated that separation would be reduced something around 10 dB. In fact, separation remained greater than 20 dB. Furthermore, unlike many simple blend circuits (which this definitely is *not*), channel separation remains virtually constant over the entire frequency range from 30 Hz to 15 kHz....

Trying to measure capture ratio while in the wide mode was next to impossible. When capture ratio gets this low, I find that I have difficulty getting the same results twice in a row. Suffice it to say that capture ratio under those conditions was well under 1.0 dB, though I was able to confirm a consistent 1.0 dB for the normal mode and a 2.8 dB figure for the narrow mode.

I measured AM suppression slightly higher than the 70 dB claimed by Tandberg, as high as I have ever measured for any tuner....

Amplifier Circuit Highlights:

Because MOS-FET power transistors are used in the 3012, there is no need for current or voltage limiting of the output, and therefore, the 3012 is very suitable for use with electrostatic speakers, which often trigger such limiting devices and cause audible distortion.

Direct current must never be allowed to appear on an amplifier's output. In

the 3012, d.c. voltage is controlled by Tandberg's new "Thermic Servo Loop" (pat. pend.), which utilizes heat-difference sensing devices to detect d.c. offset voltage and to adjust operating parameters so as to eliminate any d.c. voltage at the output. This system, unlike any other, has no direct connection to the audio signal path and therefore it cannot degrade sound quality.

The special digital-disc input...has *no* amplification at all before the volume control and power amplifier. Furthermore, it can handle the extremely high input signal levels such as are likely to occur with digital program sources having extremely high dynamic ranges.

Amplifier Measurements:

I should point out that Tandberg is one of a very few companies that conforms in every last detail to the EIA standards for specifying amplifier performance. I don't have to apologize, therefore, for any difference in reference levels between my readings and the published specs; they are one and the same, making it simple to compare their claims with my measured results. Other companies who continue to ignore these standards, please take note!

Use and Listening Tests:

....The amp delivers an open sound that is ideally suited to the new, noise-free, wide dynamic range Compact Discs. Where I disagreed with the recording engineers' ideas of sweetening, the simple but versatile tone control arrangement on the 3012 allowed me to adjust tonal balance without upsetting half the audio spectrum. Certainly, there may be instances where 100 watts per channel will not be enough to handle the dynamics of CDs (especially if you own an inefficient set of loudspeakers, as I do), but so long as you keep levels below clipping (the 3012 warns you about this with a reliable indicator for each channel), you're not likely to find an integrated amplifier that delivers cleaner, more accurate sound....It's a top-performing amplifier well worth its price.

As for the 3001A tuner....Are there enough high-quality FM stations to justify such an expenditure? Tandberg's belief is that a Mercedes or a Rolls-Royce can't get you through rush-hour traffic any faster than a lower cost automobile and yet....there are some people who just have to have the best there is, no matter what it costs, even if

there's no way to avail themselves of all its inherent benefits. Evidently enough people feel that way about this new tuner to make it worthwhile for Tandberg to produce and sell it. Being a dedicated FM listener, I wouldn't mind owning one of these Norwegian tuner masterpieces myself. I'm willing to wait until station practice catches up with it!

Leonard Feldman

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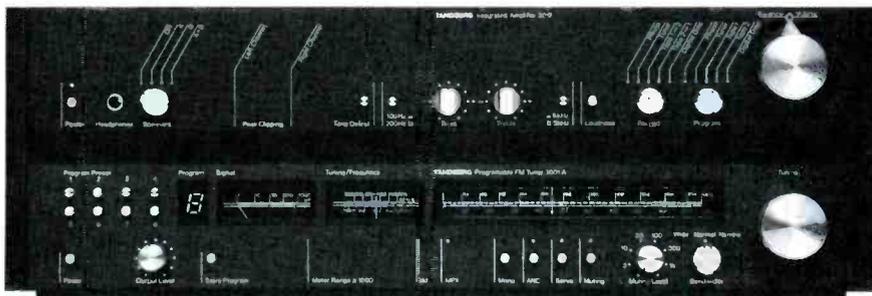
High Fidelity Deluxe Separates/Receiver

Perhaps it isn't fair to compare a combination of two superbly engineered separates to a true, all-in-one receiver. But if it is, this set from Tandberg rates as the finest "receiver" we have ever tested. And if your response to the \$2,000 price tag is that this had better be the world's greatest receiver, or something very close to it, we'd point out that very few combinations of any description yield anything like comparable performance at this price. From this point of view, the ensemble is a bargain....

Turning to the front panel, you're immediately struck by the dial and tuning knob, which almost seem like relics in this age of digital readouts, frequency synthesis, and stepper tuning buttons. Tandberg's view is that when the chips are down (pun intended), the residual noise in a true digital front end will always be greater than that in a "conventional" tuning circuit. The familiar memory buttons, which are almost a natural by-product of digital tuning, are included here (eight of them) and govern some unusual control functions....

Response is outstandingly flat and virtually identical in both mono and stereo and in all IF modes. Channel separation, which is superb in NORMAL and WIDE, is about 40 dB up to 4 kHz even in NARROW....distortion is good in NARROW, admirably low in NORMAL, and superbly low in WIDE....

When DSL measured adjacent-channel selectivity, the TPT-3001A in WIDE proved the equal of many other tuners in their normal IF modes — 2¼dB, which is not atypical for this measurement. In NORMAL, the adjacent-channel figure improves to an excellent 11¼dB, and NARROW yields an astonishing figure of 30¼dB, making it our champion to date.



Turning to the TIA-3012 amplifier, we find such refinements as MOS FET transistors in the output stage, elimination of electrolytic capacitors from the signal path, passive tone controls using precision (1-percent) resistors, and Tandberg's Thermic Servo Loop to eliminate DC offset in the output....

Distortion is all below our reporting threshold of 0.01 percent at the 0-dBW (1-watt) level and only slightly above it at full power....

The amp meets its power specification with ease: The 1¾-dB headroom measurement means that it can achieve the 150 watts per channel into 8 ohms on typical musical waveforms, which is a lot of muscle for anything even resembling a receiver.

Finally, the sound quality of the ensemble is superb. It has been achieved, in our estimation, by a combination of control flexibility to cover the many situations that might diminish the signal's bloom (consider, in particular, the IF-bandwidth switch and the tone controls) and close attention to fine detail. On occasion, some companies have created prodigies with a stroke of engineering legerdemain, but this is not the case here: For all the suavity of its European exterior and the smoothness of its switches and knobs, this ensemble reminds us of Edison's dictum on the importance of perspiration to achievement. And these components certainly represent a significant achievement by Tandberg.

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High Fidelity Luxury and Performance

As rugged as the fjords of Norway is the individualism of Tandberg. No recordist could mistake the TCD-3014 for a deck from any other company, and every recordist should be aware of Tandberg's long history of technical innovation. In recent years, this Scandinavian com-

pany has aimed increasingly at producing equipment (including electronics as well as tape gear) with top performance at prices that, although hardly modest, aren't all that heady. And for a no-holds-barred model — one that is designed to attract professional users as well as perfectionist audiophiles — the 3014's \$1,400 price tag is actually restrained by today's standards.

Using the TCD-3014 affords a number of surprises, particularly because of the way its control buttons can be operated in tandem — both simultaneously and sequentially — to perform far more functions than a perusal of their markings suggests....

To achieve this remarkable flexibility, Tandberg uses an eight-bit microprocessor together with an EPROM (erasable programmable read-only memory) that can be reprogrammed by Tandberg to provide newly developed functions. This on-board brain also keeps track of hub rotation speeds and figures elapsed time, as well as taking care of housekeeping tasks such as removing slack from the tape before beginning any function.

Recording levels are set with what may be the best system going. One knob preadjusts balance, and the master fader has an outer element that marks "full" level with a detent. The master knob can be faded quickly and easily to the detent without disturbing the position of the marker, and it can be turned past the marker (impossible in most systems of this type) if you find you want to push the level a little without disturbing the basic calibration of the fader. The size, feel, and frictioning of the elements are delicately balanced so that everything works together superbly....

Between its individuality and its not inconsiderable price, the TCD-3014 is not a model for everyone. But it is an important contender for any recordist who wants a truly perfectionist cassette deck. The more we work with it, the more we agree that it has "professional" properties — something often claimed for consumer tape gear but very seldom delivered....

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Stereo Review

TCD 3014 Cassette Deck

The Tandberg TCD 3014 cassette deck is one of a small group of "no compromise" home recorders that can seriously be considered the best that money can buy. In addition to its three heads, dual-capstan transport, and both Dolby-B and Dolby-C noise reduction, the TCD 3014 provides facilities for fine tuning bias, sensitivity, and azimuth that tape aficionados will appreciate. At the same time, however, the deck is designed for ease of operation by those who simply want top-quality sound without fuss....

The TCD 3014 includes two proprietary Tandberg circuits that are intended to optimize performance. The first is Dyneq, a dynamic-equalization circuit that automatically adjusts the amount of treble boost applied to the tape during recording....

The second special circuit is Tandberg's Actilinear II, a "transconductance" stage at the output of the recording amplifier chain that presents a pure current source to the head. At the same time, the circuit mixes and amplifies the audio and bias signals at a low level, eliminating the need for the usual phase-shifting bias trap at the audio output.

To achieve the lowest possible noise levels, the TCD 3014 uses discrete transistors throughout (except for the Dolby chips) rather than integrated circuits. Similarly, film capacitors rather than electrolytic ones are used for stage-to-stage coupling, and precision low-noise film resistors are used throughout.

Transport operations are controlled by an eight-bit microprocessor in conjunction with a 32K EPROM (Erasable Programmable Read-Only Memory)....

Recording levels are monitored by a pair of equalized peak-reading meters (a welcome change from the usual LED readouts that cannot show the precise strength of a signal between their fixed segments)....

Because the meters are both peak-reading (they respond to peaks in less than 2 milliseconds) and equalized (they register not only the incoming signal level but also the treble and bass boost applied during recording), Tandberg sets the 0-dB point much

nearer the maximum undistorted recording level than Japanese manufacturers typically do....

This practice takes fuller advantage of the capabilities of today's tapes than the 165-nWb/m 0-dB marking on some Japanese decks, which often results in wasting 6 to 8 dB of headroom....the user-adjustable bias and sensitivity controls, coupled with built-in test-tone generators, make the deck suitable for use with virtually any tape available....

On an overall record-playback basis, the frequency response at the -20-dB level was also remarkably flat: +1, -1.5 dB from 20 to 20,000 Hz with all three of the Maxell tapes. Equally impressive were the 0-dB curves recorded at the 250-nWb/m IEC reference level. The effect of the Dyneq circuitry is shown in the flattening of the treble-saturation curves above approximately 10,000 Hz; with most recorders, the high-frequency rolloff is precipitous once it begins. What was really astonishing, however, was that using Maxell MX (metal) tape and Dolby-C it was possible to record and play back at the 250-nWb/m level within 0.5 dB all the way to 20,000 Hz!....

Comment:

From the measurements alone it would be reasonable to conclude that the Tandberg TCD 3014 is one of the very finest cassette decks available. Its sure, silent, and positive tape handling leaves no doubt. Except to zero that tape counter or set a marker for memory, the nontechnically oriented user need never address the microprocessor, much less fiddle with the fine adjustments that mean so much to dedicated audiophiles. But even *with* all its "bells and whistles," we found the deck easy to use.

In terms of sound quality, the TCD 3014's performance was excellent. No recorder can make a perfect copy, but where the difference is sufficiently slight it is permissible to speak of "virtually flawless" dubbing. This standard was very nearly met in our tests of the TCD 3014. The sound was crisp, and the extreme highs were clear, not gravelly (as so often happens)....

In sum, we found the Tandberg TCD 3014 to be a superb-sounding deck that's built to last. If you are fortunate enough to be able to shop in its price class, you would make no mistake in selecting it.

Craig Stark

MODERN
RECORDING
& MUSIC

TD20A-SE Reel-to-Reel Tape Recorder

The "SE" after the model number of this deck stands for "special equalization"....

The SE technique involves using less treble boost (equalization) in the deck's playback circuitry based on the premise that today's better tapes do not need as much treble boost in playback as tapes did a few years ago. Tape recorder manufacturers use equalization of their own choice for the recording half of a record/playback cycle, but the playback equalization has been standardized to enable any deck to play with reasonably flat response a tape made on the other deck. The TD20A-SE has this standard EQ, but in addition it has the special EQ developed by Tandberg. Either kind of equalization is selected by a front-panel switch marked "normal" and "special." The special position applies a time constant of 10 microseconds at 7½ ips (the "normal" time constant for both speeds is 50 microseconds).

Two other Tandberg circuit developments (used in previous decks) also included in the TD20A-SE are "Dyneq" and "Actilinear"....

The transport of this deck is powered by four motors — two for the tape reels, one for the capstan drive and the fourth for the pinch-roller and tape gate. Full-logic transport controls permit fast-buttoning, including flying-start recording....

Our net impression is that "SE" does indeed do what it is intended to do — which is to say, it helps widen the recorder's dynamic range and it gives up very little in the way of useful high-end response in doing so....

Tandberg has taken the bold step of reducing the amount of treble boost (equalization) built into the playback circuitry of this deck on the premise that today's better tapes do not need nearly as much treble emphasis in playback as tapes did in "the old days." Based

upon the lab measurements and my observations during use, this new "SE" combined with Dyneq makes for a system that offers tremendous dynamic range without the need for any electronic noise reduction, and it still manages to provide extended frequency response with very low distortion....

This newest version of the Tandberg open-reel deck incorporates a genuine improvement in its circuitry that makes an already fine machine that much better. The upgrading is in terms of greater dynamic range with reduced distortion. Mechanically, nothing has been overlooked either – the wow-and-flutter measurement is almost unbelievable, and the deck handles like a real thoroughbred. The "product personality" of the TD20A-SE is such that it seems to me it would appeal to a fairly broad group of users – advanced amateur and semi-pro or even full-pro recordists....

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Stereo Review

Model 3012 Integrated Amplifier

Tandberg's new Model 3012 integrated amplifier is rated to deliver 100 watts per channel into 8-ohm loads from 20 to 20,000 Hz with no more than 0.02 per cent distortion....

Its styling and size match those of current Tandberg tuners, and it can be stacked with one of them to form a "receiver" of exceptional quality....

It is noteworthy that the DIGITAL DISC input is *not* identical to the other high-level inputs, tuner and tape. The latter two are buffered by low-distortion amplifier stages before they are selected by the front-panel switches, so that crosstalk between them is completely eliminated. The DIGITAL DISC input, however, is switched directly to the volume control, minimizing the number of extraneous elements in the signal path.

The 3012 embodies a number of de-

sign concepts that its creators felt would contribute significantly to its audible qualities, if not to its measured performance. For example, Tandberg engineers concluded that dielectric absorption in certain types of electrolytic or ceramic capacitors used in most amplifiers for interstage coupling tends to degrade sound quality in subtle ways. To eliminate any possibility of such degradation in the 3012, no electrolytic or ceramic capacitors are used in its signal path, from the phono inputs to the speaker outputs. Low-loss plastic (polyester) foil-dielectric capacitors are used instead in all signal-carrying circuits. The designers also felt that a high slew rate was a desirable quality in an amplifier, and the 3012's 1,000-volt-per-microsecond slew rate is the result. Within the amplifier circuitry, every opportunity was taken to eliminate known or suspected causes of signal degradation....

Laboratory Measurements:

Using the tone-burst signal of the dynamic-headroom test, we measured short-term clipping outputs of 156, 213, and 156 watts into loads of 8, 4 and 2 ohms, respectively. The 8-ohm dynamic headroom was, therefore, 1.93 dB.

The 1,000-Hz harmonic distortion, driving 8 ohms, rose from 0.003 per cent at 1 watt to 0.014 at 100 watts. With 4-ohm loads, it was 0.0056 per cent at 1 watt and 0.034 per cent at 100 watts (the thermal-protection circuit cut off the amplifier at this point)....

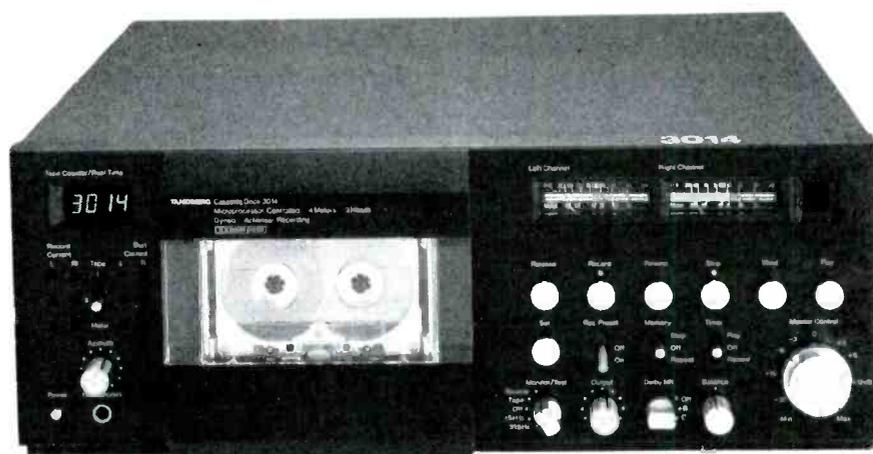
The characteristics of the 3012's tone controls were as close to ideal as we have seen from a simple bass-and-treble configuration. Even at their extreme settings, where the response at the frequency limits was varied by about 10 dB, the midrange was totally unaffected....

Comment:

The 3012 has absolutely no vices that we could detect. It is not in the least fragile, since it shuts itself off if abused electrically or thermally, returning to service automatically when conditions have gone back to normal. There are *no* extraneous noises connected with its operation; no switching transients, no start-up or turn-off thumps, no audible hum or hiss at any control setting, and so forth. We did much of our listening using a digital Compact Disc player as the program sources, and the results were as satisfying as one would expect from the combination of a state-of-the-art amplifier (the expression "state-of-the-art," although much abused, definitely applies to both products in this case).

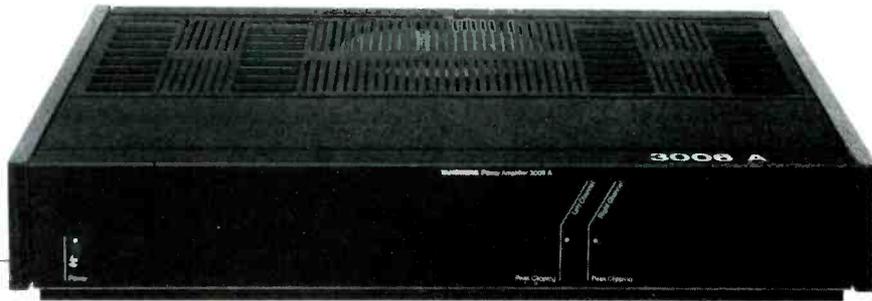
The solid construction and quality of the components used in the Tandberg 3012 set it apart from most of its competition and appear to justify its considerable (but not unreasonable) price. This amplifier is built so well and performs so satisfactorily that it is rather difficult to criticize. It is that good. – *Julian D. Hirsch*

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TANDBERG

Tandberg's advanced engineering offers less.



Tandberg's dedicated staff of audiophile engineers long ago decided that ideally there should be nothing between the listener and the music . . . no IM, no THD, no TID . . . no audible distortion of any kind.

However, in the real world of audio electronics, "nothing" wasn't easy to come by; virtually every aspect of the signal path, and the circuitry that supports it, required reevaluation. Tandberg embarked on a 5-year research project to systematically localize and eliminate *every* source of audible distortion, however subtle.

In Pursuit of Nothing

The practical result of our concentrated research effort is the remarkable TPA 3006A Power Amplifier. Breaking new ground, and old rules, the TPA 3006A employs unique *zero feedback* MOSFET output stages. This is a difficult design topology, but the only one guaranteed to eliminate the audible time domain distortions undetected by conventional test methods. Available power output is 150 watts per channel into 8 ohms and 235 watts per channel into 4 ohms, with less than 0.02% THD/IM.

And, although MOSFETs have been used before, our constant-source impedance driver stage design is specifically engineered, for the first time, to take full advantage of these remarkable output devices.

The voltage and current limiting protection circuits of conventional amplifier designs also proved to be major obstacles to full fidelity. Tandberg's MOSFET configuration eliminates the need for all such circuit limitations; the MOSFET stages themselves are maintained at full linearity

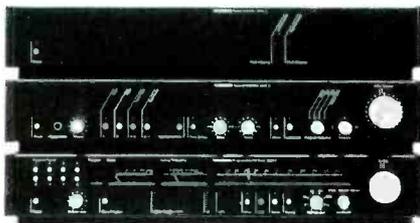
by a unique Voltage Comparator Circuit. The TPA 3006A, therefore, has an output-current capacity exceeding 25 amperes per channel, supported by a massive, tightly regulated toroidal transformer power supply with over 30,000 microfarads of filter/storage capacitance.

Damaging DC is kept from the output signal path via our (patented) Thermic Servo Loop system that monitors the amplifier's output, automatically and instantaneously rebiasing the amplifier as necessary . . . but, unlike other designs, with no connection whatsoever to the musical signal.

Once the major areas of power amplifier distortion were eliminated, Tandberg engineers were free to pursue the much more subtle, less definable sources of sound degradation.

Further technical nuances

Tandberg's pursuit of absolute fidelity led to the use of carefully chosen, costly high tolerance components: 1% metal-film resistors for their stability and low noise; plus sonically superior polypropylene capacitors (instead of electrolytic and ceramic types) are used in all audio stages. And, all audio stages employ discrete (no ICs!)



TANDBERG

circuitry for maximum headroom and minimum distortion.

Tandberg has even reevaluated circuit board design. The lowest possible noise levels and totally identical performance between channels could be realized only when there is symmetrical parts layout and the reverse side of the circuit boards copper-plated to form a shielding ground plane; all housed in an unusually compact, nonmagnetic, anodized extruded-aluminum chassis.

Compact & Cost Effective

Never before has a power amplifier of this degree of performance been compact enough to match our TCA 3002A Preamplifier and the world-famous TPT 3001A Programmable Tuner.

It should be evident that in the TPA 3006A, Tandberg has mounted an all out assault on audible distortion, breaking new ground in those areas that elude conventional measurements . . . and designers.

The final proof, of course, is in the sound. Audition the TPA 3006A at your Tandberg dealer . . . and hear why our engineers feel that they have achieved a quality of music reproduction comparable to the most costly esoteric units, in a compact, cost-effective design that is unobtrusive in any room setting.

For a Technical Paper on the remarkable TPA 3006A Power Amplifier and a beautiful color poster showing the complete Tandberg family of purist audio components, send \$2 for postage and handling to: Tandberg of America, Dept. AM, One Labriola Court, P O Box 58, Armonk, N. Y. 10504.

Enter No. 70 on Reader Service Card

Digital Gets His Vote

Dear Editor:

Hallelujah! Your esteemed Mr. Ken Pohlmann agrees exactly with what I have long believed: That the Compact Disc is the first time we can experience the feeling of *live* music in the home. Let's face it, despite all the claims of the detractors, analog sound is vastly inferior to digital, what with record players' finicky setup and mechanical resonances, and tape's high-frequency hiss and modulation noise. Add to this the very large phase shifts that occur at all frequencies, and now you know why I think the LP will go the way of the 78s by the end of this decade. Take that, Doug Sax!

Raymond Chuang
Sacramento, Cal.

Truth in CD Labelling

Dear Editor:

I appreciate the constantly engrossing and quite often funny writing in the "Digital Domain" and "Audio ETC" columns. Please continue to educate and entertain me.

My question seems to fall into the awkward area of "digital semantics." I am referring to the meaning of the following terms found on CDs: "Digital Mastering" (Epic), "Digitally Mastered Analog Recording" (CBS), "Digital Stereo," and "Digital Recording" (Vogue), and, of course, "Digital Audio," found on all CDs.

The above terms seem ambiguous, not to mention misleading, particularly when referring to Compact Discs. Now, I don't consider myself ignorant in audio as I have studied this and associated fields for many years, but I think some clarification is called for.

All CDs are digital of course, but what of the information that was placed on the disc? As in the case of CDs manufactured by CBS, is the information truly digital to start with? And if it is, why degrade the quality by converting to analog then back to digital?

I realize that the digital era is in its infancy relative to the analog period, but couldn't some standardization of terms be arranged, just like the bit sampling rate and error correction systems were agreed to by those same companies?

Antonio J. Aguilera
Miami, Fla.

Editor's Note: Your letter certainly touches upon a serious question facing the advance of digital technology into the audio field. Whenever any new technology is introduced, some confusion (and temptation to make a fast buck) always exists; with digital I think this is especially true because of some of the misconceptions particularly surrounding the technology. The outcome, of course, is damage to people's confidence in digital audio as they purchase "digital" recordings which sound about the same as analog recordings (because they are essentially analog recordings). One solution is legal action; one record company was issuing electronically processed monaural recordings labelled as "stereo." A healthy fine cured that problem quickly.

The other solution is a more gentlemanly approach; perhaps all record companies could agree on a common labelling procedure which would accurately represent the contents of any recording. Phrases such as the ones you have presented are, of course, totally useless because they do not fully define the entire signal path. Even one analog piece in the chain could negate the benefits of the other digital sections. Although a complete description would create more confusion than it would overcome, a simplified code might provide the consumer with the information he most needs to make an informed purchase. SPARS (Society of Professional Audio Recording Studios) has proposed a three-letter code, with each letter representing recording, mixing, and mastering. An A or D would denote analog or digital technology used in that section of the signal chain. For example, an ADD recording would have been recorded on analog, mixed to stereo digital, and released on Compact Disc.

Will the record companies perceive the fact that honesty is the best policy (and that consumer confidence in digital will yield enormous profits)? That is a question awaiting an answer. Polygram is adopting the SPARS code for use on its CDs; no word from other companies.—*Ken Pohlmann*

Dear Editor:

This letter is being sent to over 100 different sources, all of whom have a

vested interest in the strong survival of Compact Discs.

As an audiophile, acting singly, I am submitting a proposal as shown below. I express full confidence in the technology of the Compact Disc. It has clearly set new reproduction standards.

Interested audiophiles, however, simply need more cover and jacket information in order to make intelligent purchasing decisions. Some manufacturers are more tuned into this type of marketing—others are not.

I call for a voluntary compliance to my proposed "Truth-in-Recording Proposal." I doubt seriously if I am the first consumer to have thought of this. However, I can only speak for myself and act accordingly.

By trade, I am a Doctor of Mathematics teaching in high school, an audiophile for many years, and a fascinated follower of the current analog/digital debate. Are not we all?

James F. Kregg
Evanston, Ill.

"Truth-In-Recording" Proposal.

Each Compact Disc shall provide the following information:

Recording: Name, site, and date of recording.

Recorder: Name and model of master tape machine.

Microphone(s): Name, model, and number of each employed.

Mixing: Name of mixing console (if digital, so stated).

Analog Intervention: A "yes" or "no" statement as to whether any intervening analog processing was used.

Doctoring: A "yes" or "no" statement as to the use of limiting, compression, and/or equalization during any stage of processing.

Sampling Frequency Converter: Name and model (if any).

Monitoring: Name and model of monitoring amplifier and speakers.

Editor's Note: It seems unlikely that all of Mr. Kregg's suggestions will be followed. But Polygram and CBS have already announced plans to indicate at least which CDs were originally mastered in analog and which in digital, and a committee has been formed to coordinate others. We'll announce details as we get them.—*I. B.*

Please Sir, I Want Some More

Dear Editor:

I am a recent subscriber to *Audio*, primarily due to your monthly Compact Disc reviews. In spite of the arguable quirks of the technology, I find myself listening to my new CD player almost exclusively. My LP albums sound just too dull in comparison!

I am sure there are many other CD player owners who are in my same position—they wish to make the Compact Disc their music source of choice but are limited by their own meager CD collections. Considering their expense and reputation for having both good and poor recordings, some guide would help us all. Therefore, my proposal to you is to increase the number of CD reviews in each issue.

I understand that space for detailed, lengthy reviews is limited. Why not include a page or so of a rating system based on sonic quality and performance? It might also be helpful and fun to compile a list done every month or so from readers' responses to the CDs in their own collections.

Please consider our plight and humor my obsession for more Compact Disc reviews.

Chuck Belanger
Richmond, Cal.

Music, Not Maintenance

Dear Editor:

This is in regard to the continuing debate over the sound quality of the Compact Disc player.

I recently bought one, and what I did not get with the deal is as follows: A rumbling turntable, a mis-aligned cartridge, a stylus that has to be replaced twice a year, cracking and popping (even on so-called "audiophile records"), a step-up device for certain cartridges, record and stylus cleaning paraphernalia, or uppity salesmen cutting down my carefully considered choices of components to sell me their inventory overstock!

What I did get was 50 to 70 minutes of the best music I ever heard without having my listening interrupted by having to turn over an album.

I don't care if they say the sampling rate is too low (whatever that means), or the sound doesn't measure up to their ultra-high-end turntables (which cost 10 times as much as my CD play-

er). I couldn't get near the same sound from a turntable for the same amount of money that I paid for the CD player. Now, I can direct my attention to my real reason for having a stereo system: Music, not maintenance! I never realized how much I disliked all the little chores involved in having a turntable. For the time being, I seem to want to ignore my collection of 500 LPs and only play my 6 CDs.

Even the best high-end turntable, tonearm and cartridge combinations are only as good as the LPs played on them. Faults in the recording process are now apparent that few knew about before the Compact Disc. Now there is no room for shoddy recording techniques.

Compact Disc technology will improve the sound of record albums and CDs once the newly learned recording techniques are applied on a wide scale.

Al Larson
Lake Worth, Fla.

Sing a Song of Souther

Dear Editor:

I wish to congratulate Ed Long on his fine evaluation of the Souther SLA-3 tonearm in the May issue of *Audio*. I concur with Mr. Long in his observation that, among linear tracking tonearms, the Souther is, "the best of its type I have seen." In addition, I would like to offer a few comments of my own.

First, I believe that, in an effort, perhaps, to achieve a measured and objective tone, Mr. Long may have understated the virtues of this singular product. While the "remarkable tracking," "stereo effect . . . as good as the reference system," "tighter and more solid" bass (noted by some, but not all, members of the listening panel), and "best results I have seen to date" for toneburst testing were duly noted for the Souther/Shure combination, I would go even further. For, despite the many positive comments, I am not sure the reader could appreciate from this review the phenomenal subjective clarity, detail, "air," and precision afforded by the SLA-3. The soundstage revealed by the Souther Linear Arm is equalled by few and, in my experience, surpassed by none. The ability to track impossible groove modulations and faithfully reproduce dynamic

contrasts may be unmatched anywhere. In my years in audio, this is truly one of the standout products I have encountered.

Second, I would like to pass along to your readers that the Souther is now available with steel-filled arm tubes which effectively increase mass, lower resonant frequencies, and generally allow the arm greater compatibility with a wider range of low compliance cartridges without materially affecting the virtually frictionless operation of the arm bearings. While I believe that Mr. Long may have somewhat overstated his concerns about such cartridges (we have achieved fine results with quite a range of cartridges), this option should alleviate any cautions in this area. Resonant frequencies in the supposedly ideal 10 to 12 Hz range are routinely attainable with moving-coil and moving-iron or moving-magnet cartridges such as the Dynavector Ruby, Accuphase, Alpha, Shure, Grace, Talisman, and others.

I could rightfully be accused of bias. I own and operate a high-end audio store which carries the Souther Linear Arm. However, we also carry other similar products, many of them far more costly than the Souther. I honestly believe that this is an exemplary product, and both the consumer and the manufacturer deserve to have attention paid to it. In its price range, it is well more than a reasonable value. It approaches true state-of-the-art performance at a fraction of the price of some of its direct competitors. Congratulations are in order for Lou Souther.

Once again, thanks to Ed Long for his thorough and insightful review. I hope *Audio* will print this reader response and demonstrate that mainstream audio magazines, as well as smaller, underground publications, can support subjective discussion of important trends and products in the audio industry. Such discussion benefits consumers and industry members alike. Keep up the good work.

Jeffrey Teuber
The Record Player
Goleta, Cal.

Erratum

The June 1984 cover of *The Carver Receiver* was photographed by Robert Lewis.

Polk Speakers Sound Better! We are The Speaker Specialists.



□ SDA Series □ Monitor Series □ Mobile Monitor Series □ VideoSound Series

"Vastly Superior to the Competition" *Musician Magazine*

polkaudio
The Speaker Specialists

Enter No. 55 on Reader Service Card



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

Polk's Dedication to a Philosophy of Quality Results in Dramatically Better Sound for You

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

We 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 Why Polk is #1

Last year 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!

"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.

Digital Disc Ready

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 3 years and being selected for the prestigious CES Design and Engineering Exhibition for the last seven 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's 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

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.

Polk's Design Goals and Performance Benefits

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 illusion 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.

polkaudio
The Speaker Specialists



SDA TRUE-STEREO
LOUDSPEAKER

The Polk Audio SDA Series (left to right) SDA-2, SDA-CRS and SDA-1A.

“They Truly Represent a Breakthrough” Rolling Stone Magazine

Polk's Revolutionary True Stereo SDAs

Always Sound Better Than Conventional Speakers

The Experts Agree!

Polk's critically acclaimed, Audio Video Grand Prix Award winning SDA (patented) technology has been called the most important fundamental advance in loud-speaker technology since stereo itself. Listener's jaws drop in amazement 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 the dramatic audible benefits of Polk's exclusive true stereo SDA technology are available in 3 uniquely superb loudspeaker systems, the SDA-1A, the SDA-2 and the SDA Compact Reference System.

Hear SDAs Remarkable Sonic Benefits Now!

Words alone cannot fully describe how much more lifelike true stereo reproduction is. Reviewers, critical listeners and novices alike are usually overwhelmed by the magnitude of the sonic improvement achieved by Polk's Stereo/Dimensional 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, subtle musical nuances and other information, (which is 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, CD's, tapes, video and FM all benefit equally as dramatically. SDAs allow you to experience the spine tingling excitement, majesty and pleasure of live music in your own 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."

The First True Stereo Speakers

Without exaggeration, the design principals embodied in the SDAs could be said to make them the world's first true stereo speakers. When the big switch was made from mono to stereo about 25 years ago, the basic concept of loudspeaker design was never modified to take into account the fundamental difference between a mono and stereo signal.

What is the difference between a mono and stereo loudspeaker? It's quite simple. 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.

Polk's SDA Technology Maintains Full Stereo Separation

Only SDAs maintain full stereo separation. Although a lot of effort is devoted to maintaining full stereo separation in your hifi, much is lost when you use conventional (non SDA) speakers. When each ear hears both speakers and signals, as occurs when you listen to conventional speakers in stereo, full stereo separation is lost. The spurious signal reaching each ear from the "wrong" speaker is a form of acoustic distortion called interaural crosstalk, which confuses your hearing mechanism. By utilizing patented exclusive and elegantly sophisticated technology; the Polk SDA systems maintain full stereo separation by cancelling interaural crosstalk. Each ear hears only the one correct channel's speaker (like headphones) and the resulting overall improvement in lifelike sound and dimensional realism is remarkable. Although mono speakers played in stereo

can sound good, as evidenced by the superb performance of the Polk Monitors, they can never sound as good as a true stereo SDA.

The Polk SDA systems eliminate interaural crosstalk distortion and maintain full 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. It is this difference signal that acoustically and effectively cancels the interaural crosstalk signal and thereby restores the stereo separation and imaging lost when you listen to normal "mono" speakers. The results are remarkable.

The SDA-1A — (\$850) is a beautifully styled, full size floor-standing system combining Polk state-of-the-art components with our exclusive true stereo technology for the most lifelike sound possible. It has tremendous dynamic range (120 db output) high efficiency and truly awesome bass performance. While efficient enough to be driven by a small receiver, it will handle a 500 watt per channel super amp.

The SDA-2 — (\$599.95) is very similar in construction and performance to the top of the line SDA-1A, but is scaled down in size and price. It is similar in efficiency and power handling to the SDA-1A but, because it is smaller and has one less driver, its bass performance and dynamic range are slightly reduced. High Fidelity said listening to the SDA-2, is "an amazing experience."

The New SDA Compact Reference System — (\$395) is the world's best sounding bookshelf loudspeaker. It combines the exceptionally lifelike sonic performance achieved by Polk's exclusive true stereo technology with a strikingly handsome enclosure of modest proportions, which can be easily and unobtrusively located in any room. A built in rear mounted 10" subwoofer allows the CRS to achieve remarkably dynamic bass performance, normally impossible for a speaker of its size. They can be placed right up against the back wall, on a stand or on a shelf without compromising the ability of these amazing compact speakers to project a huge sonic image throughout your room.

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The Speaker Specialists

Call Toll Free 800-843-3800 for your nearest dealer.



The Polk SDA-2

SDA TRUE-STEREO
SUBWOOFER

polkaudio
The Speaker Specialists

“Polk

Pol

“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 than we were that first day at the system’s sometimes mind-boggling powers of sonic persuasion... The problem the SDA-1 seeks to overcome is known as acoustical crosstalk... Acoustical crosstalk occurs when a signal that should ideally be heard by only one ear is heard by the other as well. Unfortunately, non-ideal behavior is inevitable in ordinary stereo systems. Sound from the right speaker, which really should be heard by only the right ear, sneaks around the head to the left ear, where it competes with the desired signal from the left speaker. And the same effect happens from left to right. To generate a more nearly correct image, each Polk SDA-1 speaker has two arrays of drivers... the trick is that the two arrays are separated by a distance just slightly greater than the human head... the right channel dimensional array is displaced just enough to the right that its output (-L) will arrive at the right ear at the same time as the acoustic crosstalk signal from the left stereo array, so that the two cancel.

“Devastatingly dramatic”

In the listening room we wound up placing the SDA-1s against the rear wall, where they seem to image better than when placed away from the wall (a first in our experience)... The SDA-1’s strong suit (to put it mildly) is its imaging which ranges from very good to flabbergasting, depending on the material... It seems to be at its best with simply miked jazz and classical recordings or with heavily produced rock which it can make 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 it’s stuff... it really is great

Reinvents the Loudspeaker™

High Fidelity Magazine

The Nation's Top Audio Experts Agree

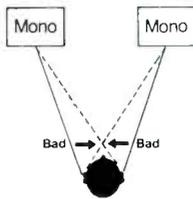
SDAs Always Sound Better Than Conventional Speakers

Monaural



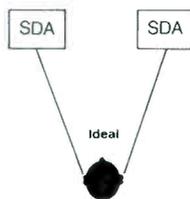
Conventional loudspeakers are designed for monaural operation where one speaker is heard by both ears at once.

Normal Stereo



When conventional speakers reproduce stereo, stereo separation is reduced because each speaker is heard by both ears.

True Stereo



Polk SDA loudspeakers maintain full stereo separation because each ear hears only the one proper speaker.

Polk's Exclusive True Stereo SDA Reproduction

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". And we're going to miss being able to find out when the time comes to send them back to Baltimore. 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... With conventional speakers, each ear hears the sound from the speaker closest to it, followed a short time later by the sound from the opposite speaker. If this delay is eliminated as in the new Polk SDA-1... the resulting sound takes on the spaciousness that most people find desirable.

This is an unconventional speaker, and even more than most speakers — its overall performance can only be judged subjectively... The sound of the Polk SDA-1 is beautifully balanced... The smoothed and averaged frequency response was quite uni-

form... 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... The systems phase response was very good, with a group delay between 0 and .2 millisecond from 2 to 20khz.

Polk SDA-1 speakers produce a broad, precisely defined soundstage, not only between the speakers, but extending appreciably beyond them laterally as well... the result is always better than would be achieved by conventional speakers... it borders on the spectacular.

"Spectacular"

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."

"Super Stereo from Polk Audio"

High Fidelity Magazine

"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 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... the SDAs try to create 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 and averaging about ¼ percent at a moderately loud 85db sound pressure level (SPL). Another 10db is required to get the distortion up over ½ percent... 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.

"An amazing experience"

What does remain unchanged is the remarkable stereo imaging that set the first SDAs apart from the crowd. Everything sounds a little more solid and there on the SDA-2s than it does on conventional speakers. They also have the ability to place sounds out to the left or right, beyond the confines of the space between the speakers, an amazing experience, and quite startling the first few times you realize it happening... we have yet to hear any stereo program that doesn't benefit... In short these are very fine and utterly fascinating loudspeakers. Even if you know you'll never be able to afford them, you owe it to yourself to audition them, just to see what they can do."



The Polk Audio Monitor Series (left to right) Monitor 10B, Monitor 5jr, RTA 12C, Monitor 4A, Monitor 5B and Monitor 7C (stands optional).

A New Generation of Polk Monitors Redefines Incredible Sound/Affordable Price

"Vastly Superior to the Competition"

A new generation of Polk Monitors is now available which incorporate the same high definition polymer tweeter and Optimized Flux Density drivers developed for the SDA's. 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 SDA's, 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. Now they sound even better than ever.

One Uncompromising Standard of High 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 SDA's. The Monitor's 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 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.

A Polk Monitor Perfect for You

There are six Polk Monitor Series loudspeakers (Plus the LF 14 Add on Subwoofer). As you move up the Monitor Series the speakers get larger, and 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.

The RTA 12C — (\$459.95) is the finest conventional (non SDA) speaker system that Polk manufactures. Its extremely high power handling (500 watts) and efficiency (92 db 1 meter 1 watt) result in remarkable dynamic range from large or small amplifiers. It utilizes phase-coherent open air driver mounting in a mirror imaged, fullsize floor-standing 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 and was selected for the prestigious CES Design and Engineering Exhibition was one of the industry's most innovative products!

The Monitor 10B — (\$324.95 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. Like the 12, 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 — (\$239.95 ea) is basically a smaller, less expensive version of the Monitor 10, utilizing the same 10" subwoofer and one less bass midrange driver. It can be either shelf or stand mounted with excellent results. How good? Audio Alternative Magazine said, "It is Amazing."

The Monitor 5B — (\$179.95 ea.) Similar in design and performance to the Monitor 7, however, it utilizes an 8" subwoofer (rather than 10") and is more compact. While this means the bass performance isn't quite as full as that of the 7, it is still superb. Of course the smaller cabinet allows even more placement options.

The Monitor 5jr — (\$124.95 ea.) has been called the best sounding speaker of its size in the world (regardless of price). It has also been called the best sounding speaker of its price in the world (regardless of size). It incorporates the same components as the top of the line SDA 1A, and achieves lifelike three dimensional musical imaging which 10 years ago was not available in any bookshelf speaker at any price!

The Monitor 4A — (\$79.95 ea.) Even though the 4A is Polk's least expensive home loudspeaker, one quick look and listen will demonstrate that it shares many of the same high technology components and rewarding musical performance of the more expensive Polk's. 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!

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The Speaker Specialists

"Polk 10 image

Audio exper

"Vastly superior to the competition"

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."

"It is amazing"

Audio Alternatives

"Speakers are the heart of any good system yet precious few of the bookshelf variety sound any good. Within this price range 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."

The Polk Monitor 10B

produce the kind of open, uncolored, perfectly
sound we thought began at twice the price."

Musician Magazine

ive about the extraordinary sound quality and unbeatable value
of Polk Monitor Series Loudspeakers

"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."

"Outstanding
loudspeakers"

*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."

"At their price, they are
simply a steal"

Audiogram

"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 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."

"The affordable
dream"

Off the Record

"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 invisive quality... A remarkable quality of the 12's is their ability to 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. It is an outstanding example of how advanced technology can be employed in the service of music... Polk's RTA-12 may well be the best high performance speaker value on the market today!"

"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."

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The Speaker Specialists



The Polk Audio VideoSound Loudspeaker Series (left to right) VS 25, VS 19 and VS 12.

Join the Stereo Video Revolution!

Polk's Superb New VideoSound Loudspeakers Will Make Your TV Come Alive

The Stereo Video Revolution

High quality audio combined with video makes the whole TV viewing experience much more lifelike and exciting. Even with the lifesize images at the movies, high quality sound still dramatically enhances the "you are there" realism. Starting this summer TV stations around the country will begin broadcasting shows in high quality stereophonic high fidelity sound. Just imagine the thrill of reality that lifelike sound will bring to your favorite TV shows! Movies will come alive, sporting events will sound like you're in the stadium, music videos and concerts will be dramatically vibrant and lifelike. Are you ready for the Stereo Video Revolution? Take full advantage of it by adding the world famous sound quality of Polk Speakers to all your TVs and make them come alive.

A Pair of Polks For Every TV

Speakers are the most important component in determining the ultimate sound quality that you hear. At Polk Audio we specialize in speakers, and our speakers sound better because we do. Polk VideoSound speakers have been specifically developed for updating mono TVs to stereo, and for adding on to stereo TVs to upgrade the sonic performance to that of a high quality hifi system. VideoSound Loudspeaker's unique hi-tech styling has been developed to compliment your TV, while their unusual depth takes full advantage of the deep space next to all TVs to achieve greater internal cabinet volume. This results in higher efficiency and dramatically better bass performance. There are three different sized VideoSound Loudspeakers to match the most popular TV sizes, and two designer finishes—hi-tech black and silver. The sound quality is of course, pure Polk: open, boxless, lifelike and three dimensional.

Better Quality Polk Sound With No Picture Distortion

All the Polk VideoSound Loudspeakers utilize specially modified Polk components incorporating unique DOS (Dual/Opposed/Shielded) magnet structures which enable them to be placed right next to a TV set without the picture distortion that occurs with conventional speakers. As many unknowing consumers have found out, to

their chagrin, you can not locate normal hi fi speakers right next to your TV, because the magnetic field disturbs the picture. Polk VideoSound Loudspeakers do not have this problem because of the specially engineered magnet structures. Otherwise, the sonic performance of the state-of-the-art Polk drivers remains unchanged. They also incorporate the same massive and complex, 12db/octave crossover network used in the Monitor Series.

Update Your Mono TV With VideoSound Loudspeakers

There is no need to throw out your old mono TV sets and buy all new stereo TVs to take advantage of the new high fidelity stereophonic broadcasts. Simply update your current TVs to stereo with a pair of Polk VideoSound Loudspeakers and a small audio receiver which receives the TV band (several are now available and more will be shortly). The VideoSound Loudspeakers deliver the exciting lifelike sound quality that Polk is famous for and can be placed right next to the TV, if desired. Their high efficiency means that they will get very loud with the low wattage amplifiers built into small receivers and TV sets, while their high power handling means you can use a powerful 100 watt per channel amp for really loud listening. Get the right size VideoSound Loudspeakers for all your TVs and make them come alive.

Make Your New Stereo TV Sound Its Best with Polk VideoSound Loudspeakers

A pair of exceptional sounding Polk VideoSound Loudspeakers can be added to virtually any stereo TV (and powered by its internal amplifiers) by just plugging into the auxiliary speaker jacks. If you want the best sound for your TV you need the best speakers. Polk Audio is The Speaker Specialist! We have achieved worldwide critical acclaim for building better sounding loudspeakers. The renowned sound quality of Polk loudspeakers will make every TV sound its best. Almost all the new stereo TVs and stereo TV receivers have auxiliary output jacks for extension speakers. If you want the best sound add on a pair of Polk VideoSound Loudspeakers. Polk VideoSound Loudspeakers are highly efficient

(much higher than most built-in and other TV speakers) and will deliver surprising output from even modest 3 and 5 watt per channel built in amps. And they sound great!

Perfect for Regular Hi Fi's Too

Of course, Polk VideoSound loudspeakers also work great in a regular, non-video hifi. They look great, sound great and have the extra advantage of being able to be placed next to a TV (without picture distortion) should you ever desire to.

The VS-25 — (\$199.95) is the top model in Polk's new VideoSound Loudspeaker Series. It utilizes a one inch polymer dome high frequency radiator for sparkingly clear high frequency response and matches it with a Polk trilaminate polymer bass-midrange driver which activates a 6½" fluid coupled subwoofer for dramatic, silky smooth midrange and bass-performance. The complex Polk Iso-phase Crossover System perfectly blends the sound of the separate drivers so that they sound like one. The VS-25's high efficiency and power handling allows use with almost any built in or separate amplifier or receiver.

The VS-19 — (\$149.95) utilizes the same bass-midrange driver, high frequency radiator and Iso-phase Crossover as the VS-25. Although it is smaller than the VS-25 and lacks the fluid-coupled subwoofer, the VS-19 is still almost as efficient with just slightly less bass response. It is capable of remarkable sonic performance in audio-video or audio systems.

The VS-12 — (\$99.95) is the smallest and least expensive VideoSound loudspeaker. However, it is still built utilizing the same high quality components and uncompromising sonic standards as the larger more expensive VS19 and VS25. It is also highly efficient and has remarkably dynamic bass for a speaker of its size. Plug a pair into a TV today and make it come alive!

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The Speaker Specialists



The Polk Audio Mobile Monitor Series (left to right) MM V, MM I, MM IV and MM III.



Unusually complex home quality isophase crossover system

The Life-Like Sound Quality of Polk Mobile Monitors Turns Your Car Into A Concert Hall

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 unswerving dedication to achieving better, more musical sound results in a new level of sonic performance for automotive loudspeaker systems. The Mobile Monitor's high definition clarity, crisp, silky smooth high frequency response, lifelike three dimensional imaging and natural uncolored midrange will turn your car into a mobile concert hall.

Choose From Four Discrete Systems and Limitless Exciting Combinations

The Polk Mobile Monitor Series consists of four discrete speaker systems: The MM I, MM III, MM IV, and MM V. They 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.

The MM V (134.95) is Polk's top of the line automotive sound system. It consists of two separate units per channel: a small, easy to mount $\frac{3}{4}$ " ferro-fluid damped polymer dome high frequency radiator and a cast magnesium basket $5\frac{1}{4}$ " high definition bass-midrange driver, featuring a polymer impregnated nylon cone. A highly complex 12db/octave isophase crossover network is built into each separate driver.

This two piece configuration allows optimum placement of each driver in the automotive environment for perfect balance and imaging. Advanced material and adhesive technology results in high power handling and long-term reliability. Polk's sonic superiority is made apparent by an extremely open, well defined, crystal clear sound with rich warm timbre and life-like depth and imaging.

The MM V Bass Midrange (89.95) and MM V Satellite Tweeter (49.95) are available separately (with their complex built-in crossovers) as an add-on woofer-midrange and satellite tweeter for more elaborate installations. The MM V/W can be used in any multiple for added bass, and the MM V/HF will usually be used up front on the dashboard for added high frequency fill and better imaging.

The MM IV (109.95) system consists of the same polymer laminate cone $5\frac{1}{4}$ " driver, $\frac{3}{4}$ " wide dispersion high frequency radiator and sophisticated crossover network as the MM V, all elegantly combined in one compact and easy to install flush mount unit measuring $8\frac{1}{4}$ " x 6 " x $1\frac{1}{2}$ " with a mounting depth of only $1\frac{1}{4}$ ". The attractive housing is molded of incredibly tough, space-age Lexan to assure long-term performance and design integrity.

The MM III (79.95) is a unique and remarkable speaker that achieves sonic performance almost equal to the MM IV and V but in a smaller package at a lower cost. It combines co-axially the same two drivers used in the MM IV and MM V systems in a more compact and easier to mount system. It is probably the most accurate sounding unit of its type in production.

The MM I (39.95) 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 of kick panels of a car for fuller sound or better sonic fill.

Mobile Monitors are Ideal for Wall and Ceiling Installations

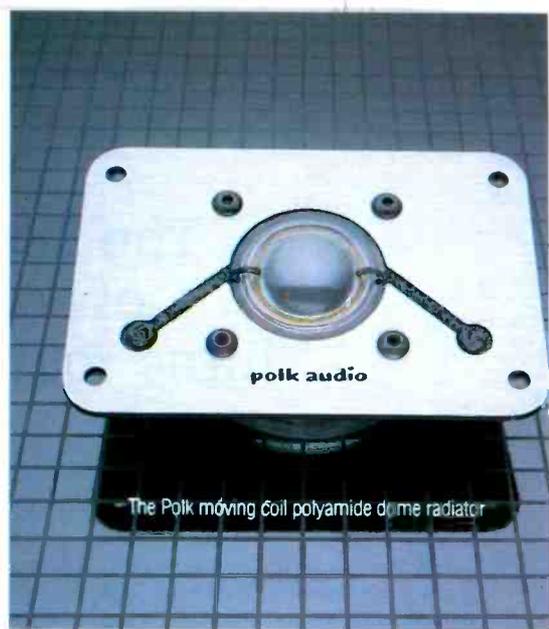
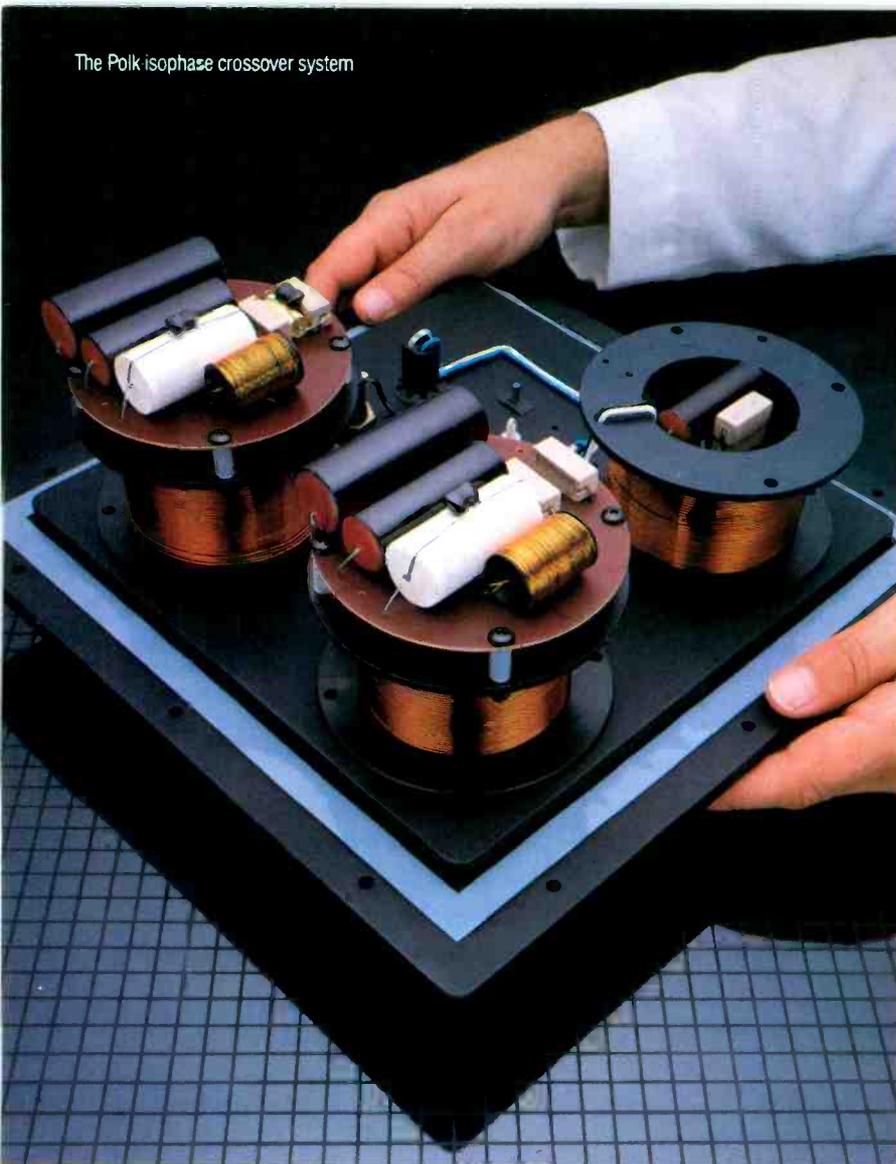
The Polk Mobile Monitors were also designed to be easily and inconspicuously mounted in walls and ceilings. The Polks are perfect when you want inconspicuous built-in decorator styling and high sonic performance in any room of your home, office or commercial facility. Just paint them to match your walls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

Design Features and Performance Benefits

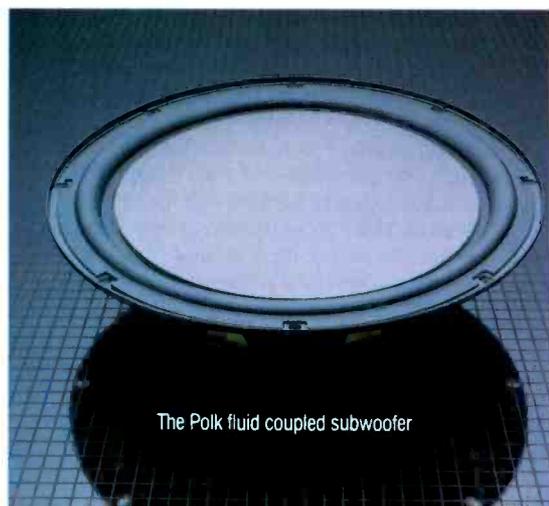
- *Natural home quality sound*
Turns your car into a concert hall.
- *Moisture resistant, polymer technology drivers*
For life-like high definition sound and total performance reliability.
- *High power handling*
For tremendous dynamic range and high volume listening.
- *Excellent imaging and spatial fidelity*
Fills your car with sound.
- *Easy flush mount design*
Assures simple and convenient installation for superb performance in your vehicle, home or office.
- *Full sonic compatibility between all four systems*
You can create the ideal combination to satisfy your needs.
- *Building block system concept*
You can start with a modest system and build your dream super system step by step.
- *Wide sonic dispersion*
For superb sound in all listening positions.
- *Rugged space-age Lexan construction*
Assures long term design integrity and satisfaction.

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The Speaker Specialists

The Polk isophase crossover system



The Polk moving coil polyamide dome radiator



The Polk fluid coupled subwoofer



The Polk trilaminate polymer driver

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

High Definition Performance

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 — 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 whatever sonic colorations remain by effectively damping the cone structure. The exceptional performance gained when all three are combined together could never be equalled by a single, one layer cone of any signal material. The performance benefits gained from the use of this exclusive, Polk developed, technology include smoother more extended frequency response, greater clarity, wider dispersion, higher efficiency, improved phase linearity and lower distortion. In addition, Polk drivers utilize costly butyl rubber surrounds which allow for more accurate cone movement and deeper, better bass response. They also 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 — are responsible for the seamlessly smooth and coherent sound of the Polks. Many listeners do not realize that 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 loudspeakers telling each driver just when to come in and exactly how loud to play. The elaborate Polk Isophase Crossover Systems utilize huge copper coil and precision capacitors and resistors to assure the lowest possible harmonic, IM, and transient distortion with 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. The Isophase Crossovers are the most expensive and important component in every Polk home system, and almost all our automotive systems.

The Polk Polyamide Dome Radiators — achieve a unique combination of sparkling, life-like clarity and silky smooth, easy to listen to, high frequency performance. This state-of-the-art trans-

ducer incorporates a proprietary dome diaphragm made out of ultra thin polyamide. The extremely light dome allows exceptionally quick transient response while the inherently well damped polyamide eliminates annoying resonances. The small diameter diaphragm is carefully formed into a hyperbolically shaped dome to assure the accurate 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. These costly units are fuse protected to protect against accidental damage and ensure long term sonic integrity.

The Polk Fluid Coupled Subwoofers — achieve uniquely musical and dynamically awe inspiring bass performance. 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.

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The Speaker Specialists



A skilled Pölk quality assurance engineer checks every speaker.

Polk's Extraordinary Quality Assurance Program Is Your Guarantee of Sonic Excellence and Total Satisfaction

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 Regardless of Cost

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 exhaus-

tive quality assurance program as the top of the line SDA-1A. 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 and 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 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 per-

form high-accuracy measurements covering all relevant parameters of loudspeaker performance.

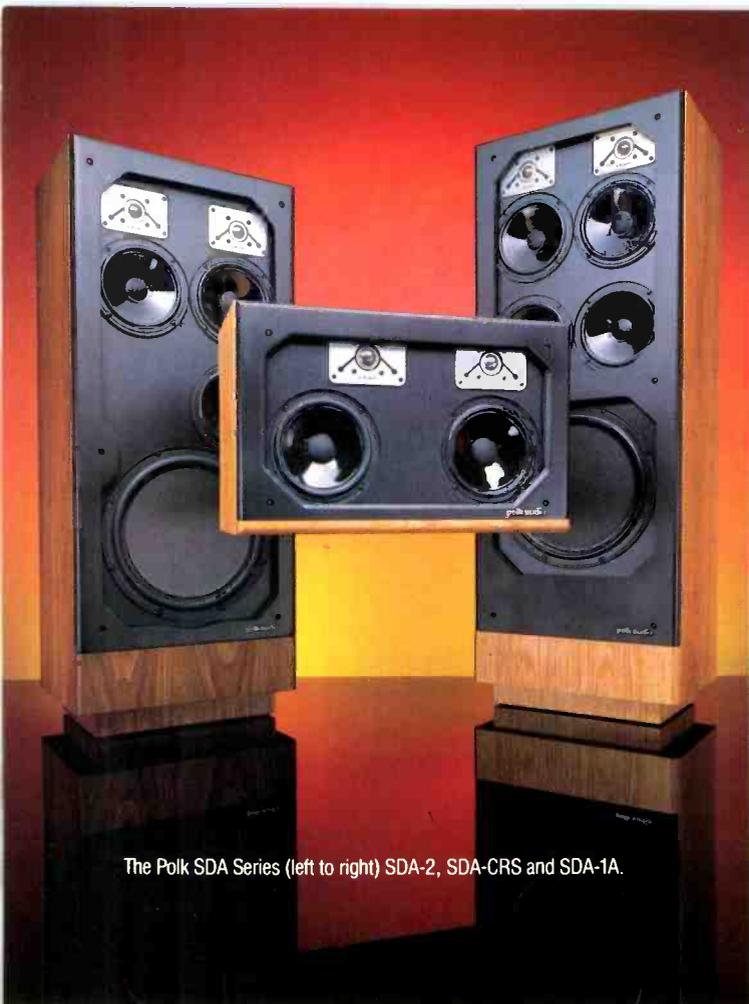
The Human Element

There are some quality assurance tasks for which there is no substitute for trained human judgment. After all, 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. Sometimes there is no substitute for a human being.

The Pride of Polk Ownership

The very special pride of ownership that comes with every Polk loudspeaker is uniquely fulfilling. 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.

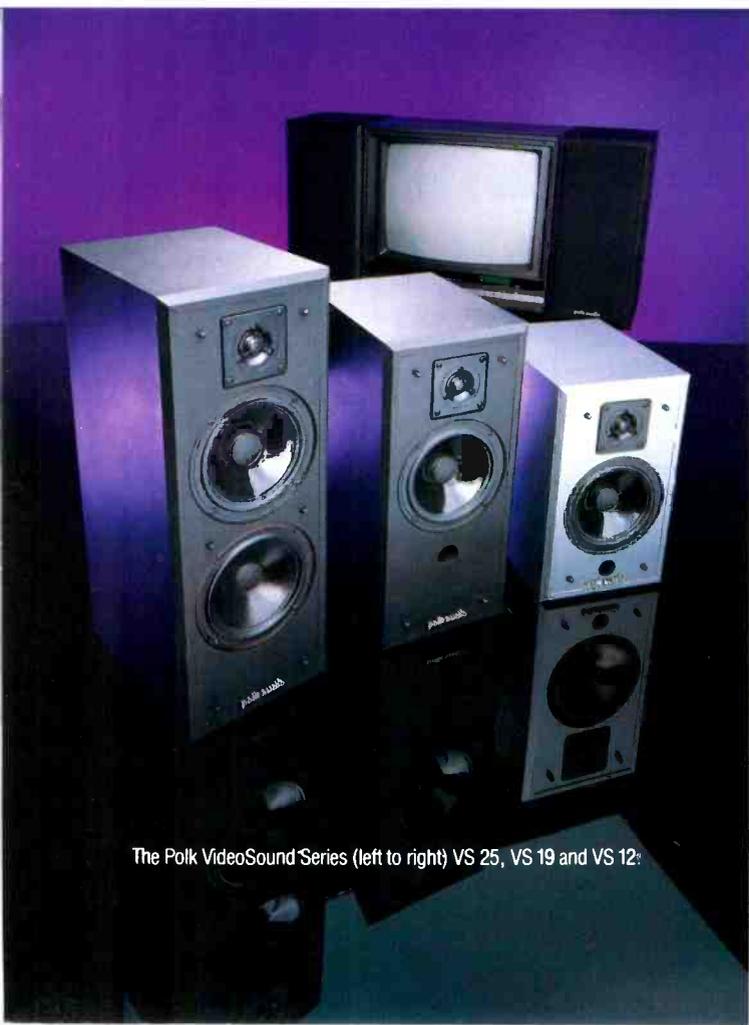
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The Speaker Specialists



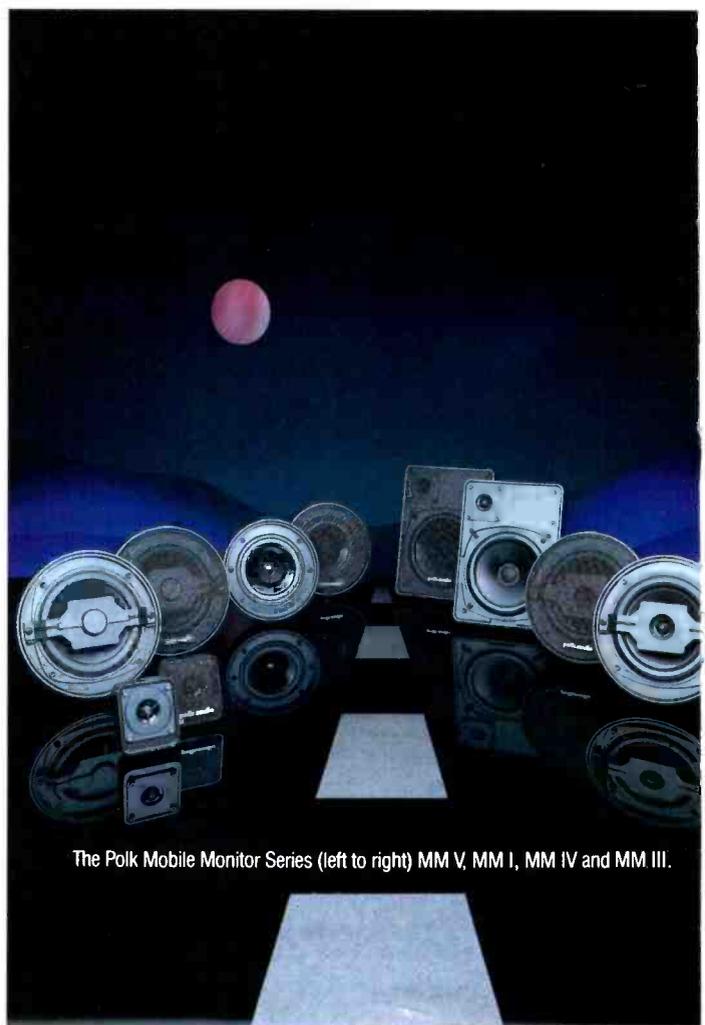
The Polk SDA Series (left to right) SDA-2, SDA-CRS and SDA-1A.



The Polk Monitor Series (left to right) 10B, 5jr, 12C, 4A, 5B and 7C (stands optional).



The Polk VideoSound Series (left to right) VS 25, VS 19 and VS 12:



The Polk Mobile Monitor Series (left to right) MM V, MM I, MM IV and MM III.

Polk Audio Loudspeaker Specifications

	SDA-1A	SDA-2	SDA-CRS	Monitor 12C	Monitor 10B	Monitor 7C
Driver Complement	Two 1 inch Polk SL 1000 high frequency radiators (fuse protected) Four 6½ inch tri-laminate polymer bass-midrange drivers (6600x) One 12 inch planar fluid-coupled sub-woofer	Two 1 inch Polk SL 1000 high frequency radiators (fuse protected) Three 6½ inch tri-laminate polymer bass-midrange drivers (6600x) One 12 inch planar fluid-coupled sub-woofer	Two 1 inch Polk SL 1000 high frequency radiators (fuse protected) Two 6½ inch tri-laminate polymer bass-midrange drivers (6600x) One 10 inch fluid-coupled sub-woofer	One 1 inch Polk SL 1000 high frequency radiator (fuse protected) Two 6½ inch tri-laminate polymer bass-midrange drivers (6600x) One 12 inch planar fluid-coupled sub-woofer	One 1 inch Polk SL 1000 high frequency radiator (fuse protected) Two 6½ inch tri-laminate polymer bass-midrange drivers (6600x) One 10 inch fluid-coupled sub-woofer	One 1 inch Polk SL 1000 high frequency radiator (fuse protected) One 6½ inch tri-laminate polymer bass-midrange driver One 10 inch fluid-coupled sub-woofer
Size (inches)	43½H x 16W x 12D	39½H x 16W x 12D	12½H x 20W x 9½D	39H x 16W x 11½D	28H x 16W x 11½D	24H x 14W x 9¼D
Shipping Weight	85 pounds	80 pounds	38 pounds	75 pounds	50 pounds	36 pounds
Frequency Response	15 Hz-26,000 Hz	16 Hz-26,000 Hz	31 Hz-26,000 Hz	17 Hz-26,000 Hz	22 Hz-26,000 Hz	24 Hz-26,000 Hz
Recom. Assoc. Amplification	10-500 watts/channel	10-500 watts/channel	10-200 watts/channel	10-500 watts/channel	10-200 watts/channel	10-125 watts/channel
Crossover Frequency	50 Hz, 100 Hz and 2500 Hz	50 Hz and 2500 Hz	100 Hz and 3000 Hz	50 Hz and 2000 Hz	60 Hz and 3,000 Hz	60 Hz and 3,000 Hz
Nominal Impedance	4 ohms	4 ohms	6 ohms	4 ohms	6 ohms	4 ohms
Maximum Output Level	120dB	118dB	114dB	117dB	115dB	113dB
Efficiency	91dB	91dB	91dB	94dB	92dB	91dB
Warranty	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor
Price	\$849.95	\$599.95	\$395.95	\$459.95	\$324.95	\$239.95
	Monitor 5B	Monitor 5jr	Monitor 4A	LF 14	MM I	MM III
Driver Complement	One 1 inch Polk SL 1000 high frequency radiator (fuse protected) One 6½ inch tri-laminate polymer bass-midrange driver One 10 inch fluid-coupled sub-woofer	One 1 inch Polk SL 1000 high frequency radiator (fuse protected) One 6½ inch tri-laminate polymer bass-midrange driver	One 1 inch moving coil high frequency radiator (fuse protected) One 6½ inch tri-laminate polymer bass-midrange driver	Two 6½ inch tri-laminate polymer bass-midrange drivers One 12 inch planar fluid-coupled sub-woofer	Full Range 4 inch polymer-treated system	One ¾ inch ferro-fluid damped polymer dome high frequency radiator One 5¼ inch polymer treated bass-midrange driver
Size (inches)	21½H x 10½W x 8½D	17H x 9W x 8¾D	14½H x 8½W x 7¾D	28H x 16W x 11½D	5¾ Diam. x 1¼ H	6½ Diam. x 1½ H
Shipping Weight	29 pounds	45 pounds per pair	32 pound per pair	54 pounds	5 pounds per pair	5 pounds per pair
Frequency Response	29 Hz-26,000 Hz	30 Hz-26,000 Hz	31 Hz-25,000 Hz	24 Hz-200 Hz	80 Hz-15,000 Hz	40 Hz-20,500 Hz
Recom. Assoc. Amplification	10-80 watts/channel	10-100 watts/channel	10-80 watts/channel	10-150 watts/channel	5-50 watts/channel	5-100 watts/channel
Crossover Frequency	60 Hz and 3000 Hz	3000 Hz	4500 Hz	120 Hz or 180 Hz		
Nominal Impedance	4 ohms	4 ohms	4 ohms	4 ohms	4 ohms	4 ohms
Maximum Output Level	110dB	110dB	108dB	115dB	108dB	112dB
Efficiency	91dB	92dB	92dB	92dB	—	—
Warranty	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor	Limited one year parts and labor	Limited one year parts and labor
Mounting Depth	—	—	—	—	1 inch	1¼ inch
Price	\$179.95	\$124.95	\$79.95	\$350	\$39.95	\$79.95
	MM IV	MM V	VS-12	VS-19	VS-25	
Driver Complement	One ¾ inch ferro-fluid damped polymer dome high frequency radiator One 5¼ inch polymer-treated bass-midrange driver	One ¾ inch ferro-fluid damped polymer dome high frequency radiator One 5¼ inch polymer-treated bass-midrange driver Driver: 6½ Diam. x 1½ H	One 1 inch polymer dome high frequency radiator One 6½ inch tri-laminate polymer bass-midrange driver	One 1 inch polymer dome high frequency radiator One 6½ inch tri-laminate polymer bass-midrange driver	One 1 inch polymer dome high frequency radiator One 6½ inch tri-laminate polymer bass-midrange driver One 6½ inch fluid coupled sub-woofer	
Size (inches)	8¼L x 6W x 1½H	Tweeter: 2¾L x 2¾W x 1H	14¼H x 8½W x 11D	17H x 8½W x 11D	21H x 8½W x 11D	
Shipping Weight	7 pounds per pair	8 pounds per pair	19 pounds	22 pounds	25 pounds	
Frequency Response	40 Hz-20,500 Hz	40 Hz-20,500 Hz	30 Hz-25,000 Hz	28 Hz-25,000 Hz	26 Hz-25,000 Hz	
Recom. Assoc. Amplification	5-100 watts/channel	5-100 watts/channel	3-80 watts/channel	3-100 watts/channel	3-125 watts/channel	
Crossover Frequency	4000 Hz	4000 Hz	3000 Hz	3000 Hz	100 Hz and 3000 Hz	
Nominal Impedance	4 ohms	4 ohms	6 ohms	6 ohms	6 ohms	
Maximum Output Level	112dB	112dB	110dB	112dB	113dB	
Efficiency	—	—	93dB	93dB	93dB	
Warranty	Limited one year parts and labor	Limited one year parts and labor	Limited five year parts and labor	Limited five year parts and labor	Limited five year parts and labor	
Mounting Depth	1¾ inch	1¾ inch				
Price	\$109.95	\$134.95	\$99.95	\$149.95	\$199.95	

Your choice of many beautiful cabinet finishes:

SDA-1As are available in a beautiful hand-oiled oak or walnut finish. All other SDA and Monitor speakers come standard in furniture grade walnut or rosewood woodgrain vinyl. All models except the 4A are available at extra cost in hand-oiled oak or walnut finishes. Video Sound Loudspeakers are available in several finishes including designer black and silver.

Call Toll Free 800-843-3800 for your nearest dealer.

Exclusive True Stereo Technology Makes Polk's New SDA Compact Reference System The World's Best Sounding Bookshelf Loudspeaker

SDA TRUE-STEREO
LOUDSPEAKER



Front view



Now Polk's "Astounding" * SDA technology will fit beautifully on your bookshelf.

Rear view



A built-in 10" subwoofer assures dynamic, room-filling bass.

Come Hear the CRS and All The Remarkable Polks Today!

Matthew Polk's Personal Invitation to You

"My speakers sound better; come hear them for yourself
and you may win a free pair of SDA-1As."

Office of Matthew Polk

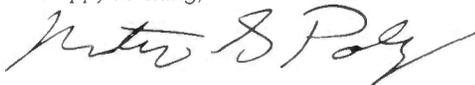
Dear fellow music lover:

My life and work is dedicated to designing better sounding loudspeakers for your listening pleasure. I am certain that when you hear the remarkable sonic capabilities of my loudspeakers for yourself, you will agree. I would like to join with your nearest authorized Polk dealer in extending a personal invitation to you to audition all the superb sounding Polk speakers, the Monitors, the Mobile Monitors, the new VideoSound Loudspeakers and especially my revolutionary new SDAs. When you visit your nearest Polk dealer to hear them, you will get a free chance to win a pair of SDA-1As.

My goal in designing all Polk loudspeakers is to make listening a more satisfying and enjoyable experience for you. Polk speakers have been acclaimed by the world's experts as the best sounding speakers for the money available on the market. Now SDA technology takes music reproduction a giant step forward (or more properly allows you to correctly hear the full sonic benefits of stereo, over loudspeakers). You must hear the SDAs for yourself to experience the sound that High Fidelity called "Mind Boggling, Astounding and Flabbergasting."

I want to know which audible benefits of SDA technology are the most dramatic and significant to you. I would sincerely appreciate this input and to thank you I will be giving away a free pair of SDA-1As every 3 months to someone like yourself. Imagine, you may win a free pair of SDA-1As just for listening! Don't pass up this opportunity to hear how much better my speakers can make your music sound, and maybe win a pair for free. You will enjoy visiting your local Polk dealer. They have been selected to handle our products because of the high quality of professionalism, expertise and customer service that they offer. I can personally recommend them to take care of all your audio needs. Visit them soon. Make sure you listen to all the excellent equipment they carry including all my incredibly affordable Polk Monitor Series loudspeakers (priced from approx. \$79.95 ea.). They share many of the same components and features of the SDA and bear a strong family resemblance in sound quality as well. I look forward to hearing from you. Thanks again for your help.

Happy listening,



Matthew Polk
V.P. Engineering
Chairman of the Board

P.S. Someone will win a free pair of SDA-1As — I hope it's you!

ACT NOW
Free SDA-1A Drawing

- Listen to the Polks
- Let Matthew Polk know what you think
- You may win a free pair of SDA-1As!

A New Winner
Every 90 Days!

This is an entry form in a nationwide drawing for a free pair of SDA-1A loudspeakers. Simply fill out this form and leave it with your participating Polk dealer, after you audition the SDA-1As.

Name _____

Address _____

City _____ State _____ Zip _____

Phone (please include area code) _____

What most impressed you about the sound of the True Stereo SDAs?

Three dimensional imaging

Huge sound field

Deep, tight, dynamic bass

Lifelike ambience

High efficiency and dynamic range

True Stereo separation

1915 Annapolis Rd., Baltimore, MD 21230 / 301-837-4300 / Cable Address "Polk" • Telex: 87-993 / Polk Audio BAL

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The Speaker Specialists

Call Toll Free 800-843-3800 for your nearest dealer.

Polk Speakers Sound Better! Win a Free Pair of Polk SDA-1As

← turn the page for details

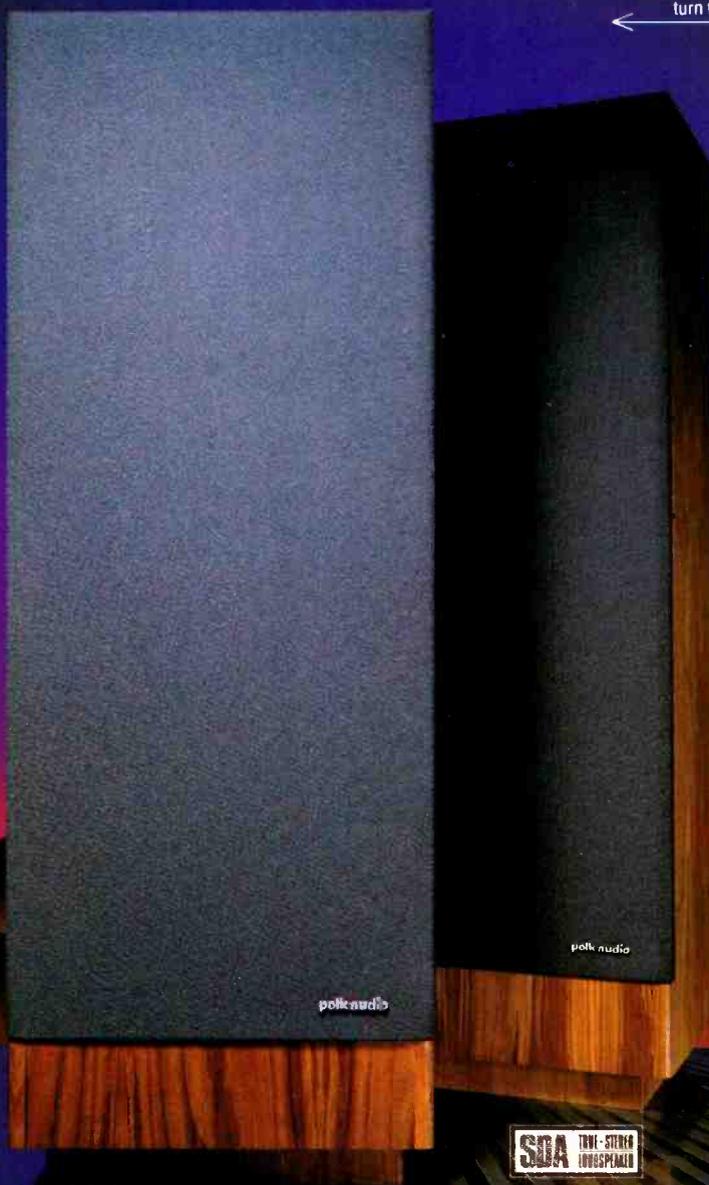
“Our advice is not to buy speakers until you’ve heard the Polks.”

Musician Magazine

- Come listen
- Hear for yourself
- Get a free chance to win

“You owe it to yourself.”

High Fidelity Magazine

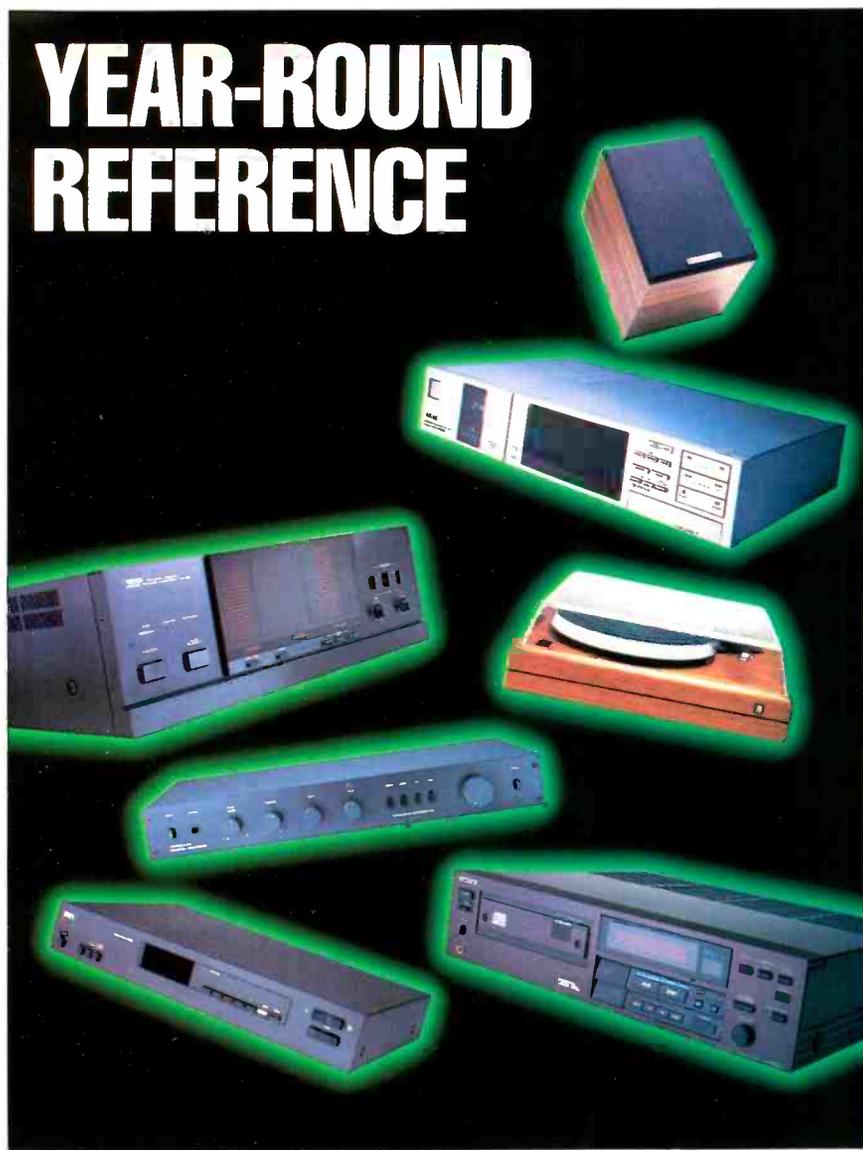


Come Listen and Get a Free Entry
Call Free 800-843-3800
For the name of your nearest Polk dealer

polk audio
The Speaker Specialists

1984 ANNUAL EQUIPMENT DIRECTORY

YEAR-ROUND REFERENCE



The Annual Equipment Directory is larger than ever, thanks primarily to the "cataloging" of pages by various manufacturers who wish to commend their wares to you. We think this cataloging greatly increases the information value of the Directory, since it is not possible, even with our tabular format, to cover all relevant specifications. Such pages can go further than a specs table in describing the operation and value of a feature; even more information can be gotten by writing the maker whose address appears in our back-of-issue list, along with a cross-reference.

It has also been interesting, each year, to note the expansion and contraction of categories, and to think about what changes might mean about the buying public's wants. For example, receivers are down, again, this year by 35 models to 140, while amps and preamps have risen by about the same number. You might guess that the coming of the Compact Disc—58 this year—would signal the end of LP-related items. But while turntables are down, phono cartridges listed are up.

The biggest category, as always, is speakers, up this year by 181 models to an all-time high of 1,172. The category which showed the biggest percentage rise of all, almost 30%, was headphones, with a listing of 202 models.

A special vote of thanks to Directory Assistant Frank Lovece, who helped us edit and proof this year. It was nice to find that someone else knows the difference between V μ S and furlongs per fortnight. *E.P.*

DIGITAL RECORDERS/ PROCESSORS



dbx 700



SANSUI PC-X11



TECHNICS SV-100



SONY PCM-F1

MANUFACTURER	Model	Unit Type: Recorder = R Processor = P, Both = RP If Recorder, Tape Format Type	Coding Format	Quantization: No. of Bits:		Maximum Recording Time: Minutes	VCR Speed Capability—See Code	Frequency Response, Hz to kHz, ±dB		Dynamic Range, dB	Total Harmonic Distortion, %	Inputs: M=M, L=Line=L, Direct Digital=D, Video Composite=V	Outputs: Headphone=H, Line=L, Digital Video=V	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes
				A	B			Linear=L	Floating Point=F								
DBX	700	P	dbx †		A	20-20 ± 0.5		110	0.05	ML	HLV		19 x 5¼ x 11½	35	4600.00	†Companded Predictive Delta Modulation.	
SANSUI	PC-X1 PC-X11	P	EIAJ	14L	A/B	5-20		86	0.007	MLDV	HLV		10½ x 11¾ x 2¾	5½	1000.00	Separate power pack inc.	
		P	EIAJ	14L	A/B	5-20		86	0.007	MLDV	HLV		17 x 12 x 2¼	11	900.00		
SONY ES	PCM-F1 PCM-701ES	P	EIAJ	14L, 16L	120	A	10-20 ± 0.5	90	0.005	MLD	HL		8½ x 3¼ x 12½	8¾	1900.00	Portable, d.c. operation.	
		P	EIAJ	14L, 14L, 16L	120	A	10-20 ± 0.5	90	0.005	LD	HLV		17 x 4¼ x 14¾	18½	1200.00		
TECHNICS	SV-110 SV-100	RP	VHS, Beta	EIAJ, NTSC	14L	480	B	2-20 ± 0.5	86	0.01	MLDV	HLV		17 x 3 x 14¾	13.4	800.00	Separate power pack inc.
		RP	VHS	EIAJ/ NTSC	14L	120	A	2-20 ± 0.5	86	0.01	MLDV	HLV		9¾ x 3¾ x 9¾	6.4	900.00	

“It’s made by who?”



Most people aren't aware that Magnavox makes anything as technologically advanced as the Total Audio Component System. Yet it's one of the most sophisticated, complete music systems ever assembled. The only one with total remote control.

Here's how these exquisite components stack up: *Compact Disc.* From a recording sealed in an almost indestructible 5" disc, a laser beam transmits the purest, most accurate sound ever. Music takes on the emotional intensity of a live performance. *Turntable.* Microcomputer controlled, fully automatic with linear tracking. *Tuner.* Digital synthesized with 8AM and 8FM random pre-sets. *Cassette Tape Deck.* Full record, playback and auto reverse. *Amplifier* 100 watts per channel at .05% THD, 20Hz-20kHz at 8 ohms. *Speakers.* Two 12" woofers, two 5" mid range, two 3" tweeters.

Now that you know us better, maybe next time you see a Magnavox, instead of saying "who?" you'll say "hello."

MAGNAVOX

America's best kept secret.

COMPACT DISC PLAYERS



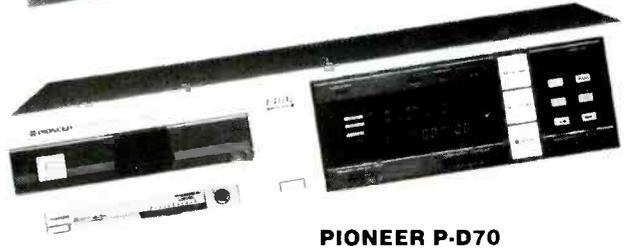
QUASAR CD8994



HITACHI DA3500



KENWOOD DP1100



PIONEER P-D70

MANUFACTURER	Model	Frequency Response, Hz to KHz, ± dB	Dynamic Range, dB	S/N Ratio, - dB	Channel Separation, dB	Harmonic Distortion, dB, at 1 kHz	Line Output Level, V, Fixed=F	Required (Amplifier Input) Load Impedance, Kilohms	Headphone Output = H, Load from Turntable = D, Front Slide On, Brower = T, Top = T	Headphone Output = H, Load from Turntable = D, Front Slide On, Brower = T, Top = T	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes
DENON	DCD-1800								HL	S			900.00	
FISHER	AD-844B	20-20	90	90	90	0.006			H	S	17.3 x 3.5 x 11.4	11	649.95	
HITACHI	DA3500	5-20 ± 0.5	95	95	92	0.003	2.5F	47		S	13 1/8 x 12 1/4 x 3 1/4	10 3/4	550.00	
	DA550	5-20 ± 0.5	95	95	92	0.003	2.5F	47		S	17 1/8 x 10 3/8 x 3 1/4	10 3/4	600.00	
	DA600	5-20 ± 0.5	95	95	92	0.003	2.5F, 0-2.5	47	HL	S	17 1/8 x 10 3/8 x 3 1/4	10 3/4	700.00	
JVC	XL-V2	5-20 ± 0.5	96	100	100	0.0025	2.2F		HL	S	13 3/8 x 4 1/4 x 11	14.7	750.00	
	XL-V300	5-20 ± 0.5	95	96	90	0.0035	2.0F		H	S	17 1/8 x 3 3/4 x 11 3/4	11	549.00	
KENWOOD	DP1100	20-20 ± 0.5	95		90	0.0015	2.0		HL	S	17 3/8 x 12 1/4 x 3 1/2	14	899.00	
	DP800	5-20 ± 0.5	96		90	0.003	2.0		HL	S	16 1/2 x 12 1/4 x 3 3/8	14	660.00	
	DP700	5-20 ± 0.5	96		90	0.003	2.0		HL	S	13 1/2 x 13 3/8 x 3 3/8	13	599.00	
KYOCERA	DA-910	5-20 ± 0.5	90	95	90	0.005	Sel.	1	H	S	17 x 5 1/2 x 13	21	1600.00	
	DA-810	20-20 ± 0.5	90	90	90	0.008	Sel.	1	H	S	18 1/8 x 4 x 12 1/8		1100.00	
	DA-01	20-20 ± 0.5	90	90	90	0.005	0-2.0	0.5	D	S	18 1/4 x 5 1/4 x 12 3/8	18 1/2	1050.00	
LUXMAN	DX-103	5-20 ± 0.5	90		90	0.007	2.0F, 0-5.0		HL	S	17 3/8 x 5 7/8 x 13 3/4	14	999.95	
MAGNAVOX	FD1040	20-20 ± 0.3	90	90	90	0.004	F	10	None	T	12 1/2 x 12 x 3 1/2	15 1/2	499.95	
	FD2040	20-20 ± 0.3	90	90	90	0.004	F	10	H	T	16 1/2 x 12 x 3 1/2	16 1/2	499.95	
	FD3040	20-20 ± 0.3	90	90	90	0.005	F	10	H	T	16 1/2 x 12 x 3 1/2	17 1/2	599.95	
MARANTZ	CD54	4-20	90	94	90	0.0025	2			S	3 1/2 x 12 3/8 x 11 1/2	16 1/2	649.95	
MERIDIAN	MCD	20-20 ± 0.3	90	90	90	0.004	2F	1		T	12.8 x 3 x 10.7	11	850.00	
MITSUBISHI	DP-205	5-20	90		90	0.003	2		HL	S	16.7 x 3 x 11.4			
	DP-105	5-20	90		90	0.005	2		HL	S	16.7 x 3 x 11.4			
NAD	5255	20-20 ± 0.5		98	90	0.01	2.0F		None	S	16 1/2 x 13 x 3 1/4	12 1/8	548.00	
NEC	CD-803	5-20 ± 0.5	90	90	70	0.01	F		HL	D	17 1/8 x 6 x 14 1/2	26.4	1300.00	
	CD-705	5-20 ± 0.5	90	90	70	0.01	F		HL	S	17 x 4 3/4 x 14 1/4	23.1	995.00	
NIKKO	NCD-100	5-20 ± 0.5	96		90	0.003			HL				650.00	
ONKYO	DX-300	2-20 ± 0.5	95	95	90	0.003	2.0F		HL	S	17 3/4 x 15 x 4 1/2	22	999.95	
	DX-100	5-20 ± 0.5	95	95	90	0.003	2.0F		HL	S	13 1/8 x 12 x 3 3/8	12	649.95	
PARASOUND	CDP-900	5-20 ± 0.5	95	100	90	0.0015	2F	10		S	13 3/4 x 3 3/8 x 11 1/4	8	449.95	
PIONEER	P-D70	5-20	95	95	90	0.004	F	50	HL	S	16 5/8 x 3 7/8 x 11 7/8	16 5/8	630.00	
QUASAR	CD8994	4-20 ± 0.5	96	96	90	0.003				S	18 1/8 x 4 3/4 x 12 3/4	17 7/8	599.95	
REALISTIC	CD-1000	5-20	92	92	90	0.004	2.0	47		S			399.95	

COMPACT DISC PLAYERS

SHERWOOD CDP-100

MARANTZ CD54

REVOX B225

ULTRIX CP400

MANUFACTURER	Model	DISPLAY FUNCTIONS										ACCESS FUNCTIONS										Notes
		Elapsed Time From Disc Start = D, From Track Start = T, Both = B	Remaining Time To Disc End = D, To Track End = T, Both = B	Track/Program Selection Number?	Index Display?	Program-Recall Display?	Programmable - Number of Selections: Random = R, Sequential = S	Repeat Functions: Entire Disc = D, Track = T, Use-Marked Phrase = P, Index = I, Entire Program = E	Random Access by Time Within Track?	Access by Index Code?	Maximum Access Time - Seconds	Audible Fast Search?	Auto Scan of Track Beginnings?	Remote Control Type: Infrared = I, Wired = W, Gives Confirmation Beep = B	No. of Remote Control Functions?	Output Level Control?	Decode System: 16 Bit = A, 14 Bit Oversampling = B, 16 Bit Dersampling = C	Filterroll: Digital = D, Analog = A, Both = B				
DENDN	DCD-1800	B		Yes	Yes	Yes	15	D/T/P/E	No	Yes	4	Yes	Yes	None		No	A	A	DDAC linear converter.			
FISHER	AD-844B	B	B	Yes	Yes	Yes	S	D/T/P/E	Yes			Yes				†	A	D	†Headphone only.			
HITACHI	DA350 DA550 DA600	T T T		Yes Yes Yes	Yes Yes Yes	No No No	15R 15R 15R	D.T/P/E D.T/P/E D.T/P/E	No No No	Yes Yes Yes	3 3 3	Yes Yes Yes	No No No	Opt., I/B	10	No No Yes	A A A	A A A				
JVC	XL-V2 XL-V300	D D	D D	Yes Yes	Yes Yes	Yes Yes	12R 12R	D.T/P D.T	No No	Yes 2	2	Yes Yes	No No	None None		No No	A A	A A				
KENWOOD	DP1100 DP800 DP700	D D D	D D D	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	16R S S	D.T/E D.T/E D.T/E	Yes Yes Yes	Yes Yes Yes		Yes No No	No No No	None None None	23	† † †	A A A	A A A	†Headphone only.			
KYDCERA	DA-910 DA-810 DA-01	T T B	D D B	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	24R 24R 24R	D.E D.E T.P.E	No No Yes	Yes Yes Yes	5	Yes Yes No	No No No	I None None	B	Yes Yes Yes	C C C	B B B				
LUXMAN	DX-103	B	D	Yes	Yes	Yes	16R	D.T/P	No	Yes		Yes	Yes	I/W	2	Yes	A	A				
MAGNAVOX	FD1040 FD2040 FD3040	B B B	T T B	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	20R 20R 24R	D.T/E D.T/E D.T/P.E	No No Yes	No No Yes		No No No	No No Yes	None None None	B	No No Yes	B B B	B B B				
MARANTZ	CD54	B	D	Yes		Yes	24S	D/T						I			B	D				
MERIDIAN	MCD	No	No	Yes	Yes	Yes	15R	D.T/E	No	No	8	No	No	None		No	B	B				
MITSUBISHI	DP-205 DP-105	B B			Yes Yes		15S No	D.T/E D.T/E						I None			A A	A A	Three-beam pickup. As above.			
NAD	5255	T	D	Yes	Yes	No	No	D	Yes	Yes	1.4	Yes	No	None		No	C	B				
NEC	CD-803 CD-705	B B	B B	Yes Yes	Yes Yes	Yes Yes	99R 15R	D.T/P D.T/P.E	Yes Yes	Yes Yes		Yes Yes	No No	I I	12 11	Yes No	C C	D D	Non-delay filter, vertical emphasis. Non-delay filter, horizontal emphasis.			
NIKKO	NCD-100	D																	A			
ONKYO	DX-300 DX-100	T T	D D	Yes Yes	Yes Yes	Yes	8R R	D.E D.E	No No	Yes Yes	3 3	No No	No No			No No	A A	A A				
PARASDUND	CDP-900	D	D	Yes	Yes		S	D/P	Yes	Yes	3	Yes	No	None			A	B	Three-beam laser, 88.2k sampling rate.			
PIONEER	P-D70	T	D	Yes	Yes	Yes	10R	D.T/P/E	Yes	Yes		Yes	No			No	A	A	Binary display.			
QUASAR	CD8994	B	D		Yes	Yes		D/T				Yes	No			No	A	A				
REALISTIC	CD-1000	T		Yes	Yes	Yes	9R		No				No			No	A					

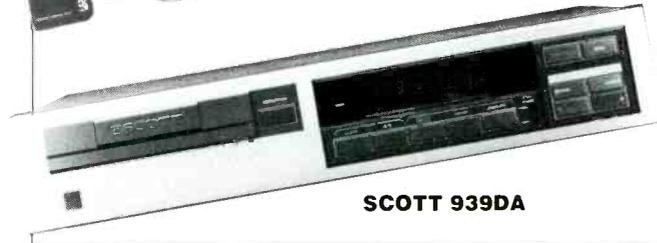
COMPACT DISC PLAYERS



KYOCERA DA-910



PARASOUND CDP-900



SCOTT 939DA



LUXMAN DX-103

MANUFACTURER	Model	Frequency Response, Hz to kHz, ±dB	Dynamic Range, dB	S/N Ratio, dB	Channel Separation, dB, at 1 kHz	Harmonic Distortion, %, at 1 kHz	Line Output Level, V, Fixed = F	Required (Amplifier Input) Load Impedance, Kiloohms	Headphone Output, H	Headphone Output with Level Control = HL	Leads from Turn-Down Box = D, From Side-Panel Drawer = S, Top = T	Dimensions, inches	Weight, Lbs.	Price, \$	Notes
REVOX	B225	20-20 +0, -6	96	100	90	0.006	2F, 0-2	47	HL	S	18 x 13 1/4 x 4 3/8	18 3/4	1150.00		
SANSUI	PC-V1000 PC-V300	5-20 5-20	96 95			0.003 0.005	2.0F 2.0F		H H	S S	17 x 11 1/2 x 4 3/8 13 3/8 x 11 3/8 x 3 3/8	15.9 7	850.00 500.00		
SANYO	CP200	5-20	96	96	90	0.003			H	S	13 1/4 x 3 1/2 x 12 5/8	13 1/4	549.95		
H. H. SCOTT	939DA	5-20 ± 0.5	95	100	90	0.005				S	3 5/8 x 17 x 11	10	599.95		
SEARS	57H9751C	20-20 ± 0.5	90	90	90	0.005			H				499.99		
SHARP	DX-100BK DX-600BK	5-20 ± 3 5-20 ± 3	93 93	93 93	90 90	0.01 0.01	2.0F 2.0F	10 10	H H	S S	13 x 11 3/4 x 3 1/8 16 1/8 x 11 3/4 x 3 1/8	11 14 3/8	399.95 449.95		
SHERWOOD	CDP-100	5-20 ± 0.5	95	100	90	0.004	2F		None	S	13 3/8 x 3 5/8 x 11 3/8	8	499.00		
SONY	CDP-111	5-20 ± 0.5	90	90	90	0.004	2	10	HL	S	17 x 13 1/4 x 4 1/4	19	600.00		
SONY ES	CDP-210ES CDP-610ES CDP-701ES	5-20 ± 0.5 5-20 ± 0.5 5-20 ± 0.5	90 95 95	90 95 95	90 90 90	0.004 0.003 0.003	2F 2 2	10 10 10	HL HL HL	S S S	14 x 13 1/2 x 3 3/4 17 x 13 1/4 x 4 1/4 17 x 15 1/4 x 4 1/4	14 1/2 20 1/2 25 1/2	500.00 850.00 1500.00		
SONY PROFESSIONAL	CDP-5000 CDP-3000	20-20 ± 0.5, -1 20-20 ± 0.5, -1	94 94	94 94	90 90	0.01 0.01	2F 2F	10 10	HL HL	T S	19 3/4 x 22 1/4 x 34 1/8 †	115 24 1/8 Sys.	6500.00 5400.00	Console floor-standing unit. †Two pieces, control unit and disc drives; disc drives are rack-mountable.	
SYLVANIA	FDD104 FDD304	20-20 ± 0.3 20-20 ± 0.3	90 90	90 90	90 90	0.004 0.005	F	10 10	None H	T T	12 1/2 x 12 x 3 1/2 16 1/2 x 12 x 3 1/2	15 1/2 17 1/2	449.95 599.95		
TEAC	PD-11	5-20 ± 0.5	95	95	90	0.0015	2.0F			S	13 5/8 x 3 3/4 x 11 1/2	14	599.00		
TECHNICS	SL-P7 SL-P8 SL-P15 SL-P50	4-20 ± 0.5 4-20 ± 0.5 4-20 ± 0.5 4-20 ± 0.5	96 96 96 96	96 96 96 96	90 90 90 90	0.003 0.003 0.003 0.003	2F 2F 2F Sel.		HL HL HL HL	S S S D	12 1/2 x 3 1/2 x 12 3/4 17 x 3 1/2 x 12 3/4 17 x 7 3/4 x 15 3/4 17 x 20 7/8 x 7 1/2	10.8 13.4 29.8 66	500.00 700.00 1500.00 4000.00		
TOSHIBA	XRZ70K XRZ50K	20-20 ± 0.5 5-20 ± 0.5	90 95	90 95	85 90	0.007 0.003	2.0F, 0-5 2.0F, 0-5	10 10	HL HL	S S	16 1/2 x 3 5/8 x 11 1/8 16 1/2 x 3 5/8 x 12 5/8	11 15.4	799.95 499.95		
ULTRX	CP400	5-20 ± 1	96	96	92	0.003	2	0.47	HL	S	16 1/2 x 3 1/2 x 12 5/8	15	699.95		
YAMAHA	CD-X1 CD-2	5-20 ± 0.5 3-20 ± 0.5	95 96	100 102	90 95	0.0015 0.0015	2F 2F	100 100		S S	13 3/8 x 11 3/8 x 3 5/8 17 1/8 x 11 3/8 x 3 3/8	8 10 1/2	499.00 599.00		

COMPACT DISC PLAYERS



NEC CD-705E



TECHNICS SL-P8



MAGNAVOX FD 1000SL



SONY CDP-610ES

MANUFACTURER	Model	DISPLAY FUNCTIONS										ACCESS FUNCTIONS						Notes	
		Elapsed Time: From Disc Start = D, From Track Start = I, Both = B	Remaining Time To Disc End = D, To Track End = T, Both = B	Track/Program Selection Number?	Index Display?	Program-Recall Display?	Programmable: Number of Selections, Random = R, Sequential = S	Repeat Functions: Entire Disc = D, Track = T, Disc-Marked Phrase = P, Index = I, Entire Program = E	Random Access By Time Within Track?	Access By Index Code?	Maximum Access Time, Seconds	Audible Fast Searches?	Auto Scan of Track Beginnings?	Remote Control Type: Infrared = I, Wired = W, Infrared Confirmation Beep = B	No. of Remote Control Functions	Output Level Control?	Decoding System: 16 Bit = A, 18 Bit Overcoding = C		Filtering: Digital = D, Analog = A, Both = B
REVOX	B225	B		Yes	Yes	Yes	19R	D/T/P/E	Yes	Yes	3	No	Yes	I/W	6	Yes	B	B	Digitally generated 1-kHz calibration tone, remote access to serial bus.
SANSUI	PC-V1000 PC-V300	D D		Yes Yes	Yes Yes	Yes Yes	15R 15R	D/T/P/E D/T/P/E	Yes Yes	No No			Yes Yes	I	11	No	A A	D D	
SANYO	CP200			Yes	Yes		16R	D/T/P	No	No	2	No	No	None		No	A	A	
H. H. SCOTT	939DA	D	D	Yes	Yes	Yes	23S	D/T/P/E		No		Yes	No				C	D	
SEARS	57H9751C	No	No	Yes		No	16R	D/T	No	No		No	No	None		Yes	C	A	
SHARP	DX-100BK DX-600BK	T T		Yes Yes	No No	Yes Yes	15R 15R	D/T/E D/T/E	Yes Yes	No No	No No	No No	No No			No No	A A	D D	
SHERWOOD	CDP-100	B	B	Yes	No	No	No	D/T	No	No		Yes	No	None		No	C	B	
SDNY	CDP-111	T	D	Yes	Yes	Yes	99S	D/T/P	No	Yes	4	Yes	No	I/B	11	Yes	A	A	Accessory port; timer play.
SDNY ES	CDP-210ES CDP-610ES CDP-701ES	T T T	D D B	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	99S 99S 99S, 8R	D/P D/T/P D/T/P	No No Yes	Yes Yes Yes	4 4 4	Yes Yes Yes	No No Yes	I/B I/B I/B	11 11 10	Yes Yes No	A A A	A A A	Timer play. As above; accessory port. As above.
SONY PROFESSIONAL	CDP-5000 CDP-3000	B B	B B	Yes Yes	Yes Yes	Yes Yes	99S, 8R 99S, 8R	D/T/P D/T/P	Yes Yes	Yes Yes	2 2	Yes Yes	Yes Yes			Yes Yes	A A	A A	Production mastering player with CDA-5000 analyzer. Broadcast player; twin-drive system.
SYLVANIA	FDD104 FDD304	B B	T B	Yes Yes	Yes Yes	Yes Yes	20R 24R	D/T/E D/T/P/E	No Yes	No Yes		No No	No Yes	None I	8	No Yes	B B	B B	
TEAC	PD-11	B	B	Yes	Yes	Yes	S	D/T/P	Yes	Yes		Yes	No			No	A	B	
TECHNICS	SL-P7 SL-P8 SL-P15 SL-P50	T T T T	D D B	Yes Yes Yes Yes	Yes Yes Yes Yes	Yes Yes Yes Yes	S 32R 12R R	D/T D/T/P D/T/P	No Yes Yes Yes	Yes Yes Yes Yes	6 6 15 6	Yes Yes Yes Yes	Yes Yes No	None I None	13 24	No No No Yes	A A A A	A A A A	
TOSHIBA	XRZ70K XRZ50K	B B	B B	Yes Yes	Yes Yes	Yes No	16R S	D/T/P/E D/T/E	No No	Yes No	2 2	Yes Yes	Yes Yes	I None	15	Yes Yes	A A	A A	
ULTRX	CP400	B	B	Yes	Yes	Yes	10R	D/T/P	No	Yes	2	No	Yes	I	8	Yes	A	A	
YAMAHA	CD-X1 CD-2	T T	B B	Yes Yes	No No	Yes Yes	15S 12R	D/T/P D/T/P	No Yes	No No	3 3	Yes Yes	No No	None I	8	No No	C C	D D	

“DIGITAL AUDIO IS TRANSFORMING US ALL.”

—*Giorgio Moroder*

“I’ve heard people say they really wanted to hate digital audio. But, of course, they couldn’t. Because nothing sounds as real as digital.” So begins Giorgio Moroder, the award-winning composer/producer and owner of one of the world’s most extensive Sony digital installations—three 24-track digital recorders and one PCM-1610 mastering system.

“Listening to digital is truly an ear-opening experience. You can’t even tell if what you’re hearing is a first generation track or a tenth. The fidelity is absolutely incredible.”

And these are just a few of the reasons why so many top recording artists and producers, like Moroder, Phil Ramone, Neil Young, Elliot Mazer, Frank Zappa and Nile Rodgers now own or use Sony digital equipment.

“After all,” Moroder explains, “I want my studio to be compatible with studios the world over and Sony has set the standard. And, of course, Sony has led this transformation right from the start.”

We couldn’t have said it better ourselves.

SONY
The Leader in Digital Audio.

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*A scene from Giorgio Moroder's
rescored version of Fritz Lang's
1926 film classic, "Metropolis,"
which includes the world's first
totally digital sound track.*

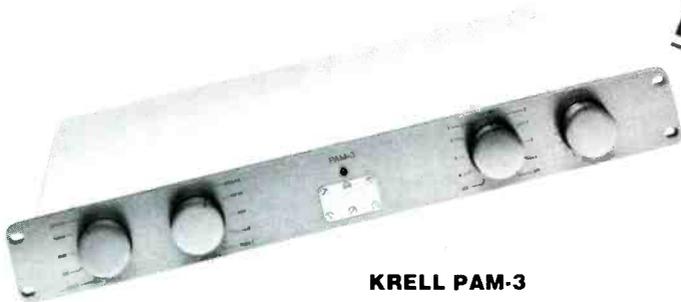
PREAMPLIFIERS



AUDIO RESEARCH SP-10



THRESHOLD STRAIGHTWIRE II



KRELL PAM-3



VSP FET ONE

MANUFACTURER	Model	Unit Type: KT = Tube, T = Transistor, MM = Moving Coil Stage Only = MC	Frequency Response, Hz to kHz, ± dB	Maximum Output, V	THD, %	IHF IM Distortion, %	Number of Tape & Processor Loops	MM Phono Sensitivity, mV for 0.5 V Output at 1 kHz	MM Phono S/N, -dB	MC Phono S/N, -dB	High Level Sensitivity, mV	Number of Tone Controls per Channel	MM Phono Input Capacitance, pF	Moving Coil Input?	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes		
ACCUHASE	C-280		1-500 +0, -3	10	0.005	2	0.5	300	82	76	126	†	47k	Yes	No	39.9	4100.00	†Selectable loudness compensation.		
	C-222		1-500 +0, -3	8	0.005	2	0.5	300	85	78	126	†	47k	Yes	No	21.3	1500.00			
ACOUSTAT	TNP		2-250 +0, -3	16	0.01	0.01	2	3.5	240	90	80	250	0	Sel.	47k	Yes	No	12	950.00	Pure FET, achromatic RIAA EQ.
ADCOM	GFP-1A		6-40 +0, -1	10	0.007	.0012	3	0.65	290	85	76	150	2	Sel.	Sel.	Yes		16	375.00	Record sel., DAD input, tone defeat.
AGI	511A		20-20 ±0.1	9.5	0.005	0.005	3	1.3	160	82		230	0	Sel.	Sel.	No	No	13	650.00	
	511AH		20-20 ±0.1	9.5	0.005	0.005	3	0.56	70	82		230	0	Sel.	Sel.	No	No	13	650.00	
	511AM		20-20 ±0.1	9.5	0.005	0.005	3			77		230	0	Sel.	Sel.	Yes	No	13	740.00	
AMBER ELECTRONICS	FF-17		6-120	13	0.008	0.005	3	5	140	90	70		2	Sel.	47.5k	Yes	No	12	699.00	Tape buffers, headphone amp.
	SL-17		6-120	13	0.008	0.005	3	5	140	90				Sel.	47.5k	No	No	12	499.00	As above.
APT	HP		20-20 ±0.5	7	0.006	0.01	3	1.25	180	76	80	320	2	Var.	Var.	Yes	No	12	650.00	Tape to tape dubbing, infrasonic filter, dedicated phono balance.
	P2		20-20 ±0.5	7	0.006	0.01	1	1.25	180	76	80	320	2	Var.	Var.	Yes	No	9	417.00	Infrasonic filter, dedicated phono balance.
	L1		20-20 ±0.5	2	0.006	0.01	0	1.25	180	76	80	320	0	†	†	Opt.	No	2	185.00	†Continuously variable.



NOW YOU DON'T HAVE TO BE ON YOUR TOES TO MAKE PERFECT RECORDINGS.

Until now, making serious recordings was a matter that couldn't be taken lying down.

But now, there's the CT-90R, a tape deck so automatic you can practically make perfect recordings in your sleep.

To begin with, the CT-90R will automatically reverse direction, allowing you to record in both directions without stopping to turn the cassette over. Because an IC Sensor detects the leader at the tape's end, it can reverse directions so fast (0.5 seconds) that you hardly miss a beat of music.

An Auto BLE system measures the first eight seconds of tape and automatically sets the correct tape bias, level and equalization, for the specific tape and brand you're using. This assures wide, flat

frequency response and the lowest distortion.

A Real Time Counter displays the exact minutes and seconds of remaining recording time, digitally. So you never run out of tape or music or patience.

As for the CT-90R's music reproduction quality, Pioneer's exclusive three-head design guarantees optimum recordings because each head is designed for a specific function.

The CT-90R also features Pioneer's exclusive Ribbon Sendust Heads for wide dynamic range, extended high frequency response, and high signal-to-noise ratio. Dolby® C noise reduction minimizes tape noise.

A sophisticated 3-Direct-Drive-Motor Tape Transport features our own smooth, cog-free, DC Servo Hall design motors for low wow and flutter. Then there's C.A.C. (Computer Aided Convenience), a system that provides a unique ease-of-operation package that includes Blank Search, Index Scan, Blank Skip and Reverse, and Music Repeat.

Together, all these features give you a cassette deck that's so automatic, you only have to do one thing.

Go out and buy it.



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Because the music matters.

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PREAMPLIFIERS

MANUFACTURER	Model	Unit Type: Kit = T, Tube = T, Mono = M, Phono Stage Only = P, Moving Coil Stage Only = MC	Frequency Response, Hz to kHz, ±dB	Maximum Output, V	THD, %	IHF IM Distortion, %	Number of Tape & Processor Loops	MM Phono Sensitivity mV for 0.5 V Output at 1 kHz	MM Phono Overload, mV	MC Phono S/N, -dB	High Level Sensitivity, mV	Number of Tone Controls per Channel	MM Phono Input Capacitance, pF	Moving Coil Input?	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes		
																			10-50 +0, -1	50
AUDIBLE ILLUSIONS	Modulus Uranus II	T	10-50 +0, -1	80	0.02	0.02	1	0.5	600	78	100	100	47k		No	22	1295.00			
AUDIO CLASSICS ATLANTA	Mark 7	T	20-20 +0, -0.5	10	0.09	0.09	2	0.5	250	85	75	250	7	100	47k	Yes	No	20	975.00	Kit, \$795.00.
AUDIO INTERFACE	CST-80-II CSA-50-II ES-10	MC MC	5-160 2-500 2-420	1 5 18	0.01 0.01 0.01	0.01 0.01 0.01	1	1	800	86	80 60 60	63	0	0	47k	Yes Yes Yes	No No Sel.	2 1½ 11½	400.00 300.00 2500.00	Transformer. With remote.
AUDIONICS	ET-1 SC-3	MC	5-20 ±0.25 20-20 ±0.25	† 8	0.05 0.02	0.05 0.02				95 82					Yes No	No No	3 11	260.00 650.00	†11 mV.	
AUDIO RESEARCH	SP7 SP8 SP10 SP12	T T T T	1-50 ±0.25 5-30 ±0.25 5-30 ±0.25 5-30 ±0.5	14 60 60 50	0.002 0.01 0.01 0.02	0.002 0.002 0.002 0.07	1 1 1 1	0.5 0.5 0.5 1.0	500 900 300 600	68 60 88 60	50 50 50 50	0 0 0 0	40 40 40 40	50k 50k 50k 50k	No No Yes No	No No No No	16 22 35 9	995.00 1895.00 3700.00 995.00		
AUDIO VOIS	V22		10-50	2			3	2.0	200	70	60	80	0		Yes	No	11	690.00	With Model S-22 power supply.	
AUDIRE	Diffet 2 Legato Poco	MC	0-100 +0, -0.25 0-100 +0, -0.25 0.1-1M	18 10 1.0	0.005 0.005 0.025	0.001 0.001 0.01	2 2 2	1.0 1.0	285 150	86 75	72 100 80	100 170	47k 47k	Yes No Yes	† No Yes	7 6 2	775.00 370.00 175.00	†Phase inverted for MC only.		
BEARD AUDIO SYSTEMS	P-505 US	T	3-30 +0, -1	40	0.09		2	0.65	300		65	0	100	Var.	Yes		33	1295.00	Two phono inputs.	
BEDINI ELECTRONICS	6677 66		5-150 5-35		0.1 0.015	0.15 0.22	2 1	3.5 3.5	125 125	96 90	175 175	0 0	47 47	47k 47k	No Yes	Yes Yes	12 6	850.00 325.00		
BELLES RESEARCH	DMM DMC		20-20 ±0.05 20-20 ±0.05	9 9	0.002 0.002	0.002 0.002	2 2	1.25 1.25	190 190	90 90	† †	2 2	150 150	47k 47k	No Yes	No No	7 7		†1.15 V.	
DAVID BERNING CO.	TF-10A TF-10AH	T T	5-100 +0, -3 5-100 +0, -3	10 10	0.05 0.05		2 2	1 1	240 240	68 68	58 58	200 200	0 0	40 40	47k 47k	No Yes	No No	13 13	1845.00 2095.00	
BEVERIDGE	RM-1/RM-2	T	1-100 ±0.05	10	0.02	0.02	3		1V	85	80	1V	0		47k	Adj.	Opt.	47	3500.00	
B & K COMPONENTS	Pro-10		20-80 ±0.1	9	0.09	0.09	2	1.0	200	90	80	200	2	100	47k	Yes	No	13	399.00	Additional MC input optional.
BOZAK	CMA-10-2DL E-909A		20-20 ±0.25 20-20 ±0.25	13 13	0.09 0.09		3 2	2.0 2.0	200 200	100 100		200 200	2 2	470 470				14 14	1099.00 650.00	Mixer/preamp.
BROADCAST ELECTRONICS	EP-1 EP-2 BETMS-100 BETMS-200	P P P P	30-20 ±0.5 30-20 ±1 50-15 ±1 50-15 ±1		0.008 0.2 0.25 0.25	0.008 0.008		1.0† 1.0†	320 320	88 88			110 110 50 50	47k 47k 47k 47k	Yes Yes Yes Yes	No No Yes Yes	4½ 4½ 3½ 3½	385.00 400.00 225.00 295.00	†For 1 V out; 600-ohm balanced resistive output. 150 600-ohm balanced transformer output. 150 ohms unbalanced output. 150 600-ohm balanced transformer output.	
BRYSTON	18 Transformer	MC	20-20 ±0.1 20-20	20	0.005	0.005	2	5	200	80		100	50	50k	No	Yes	13	765.00 435.00	Model 18-T, inc. MC transformer, \$1200.00. MC transformer.	
BURMESTER	838 808 785		30-20 ±0.1 30-20 ±0.1 30-20 ±0.1	10 10 7.7	0.003 0.003 0.003	0.003 0.003 0.003	1 2 2		300 300 300	70 70 70			0 0 0	56 56 56	100k 100k 100k	Yes Yes Yes	Var. Var. Var.	4.5 13.2	1445.00 8450.00 1997.50	MM, MC, and CD inputs. Module with inputs as above.
CARVER	C-4000 C-1 C-2		5-200 +1, -3 5-200 +1, -3 3-80 +1, -3	7 7 7	0.003 0.003 0.003	0.003 0.003 0.003	3 3 3	0.8 0.8 0.8	100 100 100	81 81 83	75 75 77	500 500 500	2 2 2	Sel. Sel. Sel.	Sel. Sel. Sel.	Yes Yes Yes	No No No	11 6½ 6½	1099.00 549.00 375.00	Time delay, peak expander, noise reduction, and Sonic Hologram Generator inc. Sonic Hologram Generator inc.

To Find Out Where Audio Is Going, You Should Know Where We've Been.

Onkyo Industry Innovations

1975

Affordable Quartz Digitally Synthesized Tuning

1976

Quartz & Servo Locked Tuning

1977

Straight Low Mass Tonearms

1978

Auto Accubias

1979

Super Servo & Linear Switching

1980

First Cassette/Receivers

1981

High Speed Dubbing Cassette Decks, Real Time Counters

1982

Receivers with CX Decoders

1983

*Delta Power Supply, Digital Ready Amplifiers,
Automatic Precision Reception, Triple Stage Isolation Systems*



1984

*First Compact Disc Player
with FOUR Power Supplies.*

*First Cassette Deck with all
Noise Reduction Systems;
Dolby B-C NR HX Pro,* dbx†*

*First Receiver with dbx
and Dynamic Bass Expander*

*First Dual Auto Reverse
Dubbing Cassette Deck*

For the past nine years, Onkyo has been responsible for many of the important advances in audio technology. And, we've added to that list in 1984.

Whether it's filling the gap between basic components and costly audiophile products (our Integra Series) or providing exceptional feature per dollar value (our new decks, receivers, turntables), Onkyo should be your #1 choice in quality audio equipment.

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PREAMPLIFIERS

MANUFACTURER	Model	Unit Type: HI K, Tube = T, Mono = M, Phono Stage Only, MC = P, Moving Coil Stage Only, MC = P.	Frequency Response, Hz to kHz, ±dB	Maximum Output, V	THD, %	IHF IM Distortion, %	Number of Taps & Processor Loops	MM Phono Sensitivity, mV for 0.5 V Output at 1 kHz	MM Phono S/N, -dB	MM Phono Overload, mV	MC Phono S/N, -dB	High Level Sensitivity, mV	Number of Tone Controls per Channel	MM Phono Input Capacitance, pF	Moving Coil Input?	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes			
																				80	25	0
CLASSE AUDIO	NIL	MC	0.35-1M	0.5																		
CONRAD-JOHNSON DESIGN	PV3K	K T	20-100 +0, -1	10	0.1	0.1	1	0.32	400	70												
	PV4	T	20-100 +0, -1	25	0.1	0.1	1	0.80	500	70												
	PV6	T	20-100 +0, -1	25	0.05	0.05	2	0.22	500	72												
	PV5	T	20-100 +0, -1	25	0.05	0.05	2	0.15	500	72												
	Premier Three	T	20-100 +0, -1	25	0.05	0.05	2	0.20	500	72												
MITCHELL A. COTTER	MK-2L	MC	2-40 +0, -1		0.01	0.01					105											
	MK-2	MC	2-40 +0, -1		0.01	0.01					100											
	PCS-2	P	5-35 +0, -1	9	0.01	0.01		15	300	100			40	49.9k	No	No	3					
	CM-2		5-40 +0, -1	9	0.01	0.01	2					35	0		No	No	9					
	SYB-2		5-40 +0, -1	9	0.01	0.01	2	1.0	300	100	105	35	0	40	49.9k	Yes	No	27	3300.00 Sys.	Models CM-2, PSC-2 and PW-2; MK-2 or MK-2L opt.		
COUNTERPOINT	SA-2	T/MC	0.5-350 ±0.1	38	0.18	0.18	1	2.5	800	80			Var.	Var.	Yes	Yes	18			External transformer. As above.		
	SA-3	T	2.5-30 ±0.1	70													18			As above.		
	SA-5	T	0.5-88 ±0.1	70	0.08	0.08	1	0.5	700	86			Var.	Var.	Yes	Yes	24			External power supply.		
	SA-6	T/MC	1-30 ±0.1	30	0.06	0.07	1	0.8	500				180	47k	Yes	Yes	10			External transformer.		
	SA-7	T	2-30 ±0.1	30	0.25	0.3	1	0.8	500						Yes	Yes	10					
CROWN INTERNATIONAL	Straight Line Two DL-2		10-50 ±0.25	2.5	0.009	0.025	2	6.6	330	87					No		11					
			10-50 ±0.1	11	0.003	0.002	4	6.6	330	87	94	250	5	5	51k	Yes		20			2999.00	
DAYTON WRIGHT	DW-536	MC	20-20 +0, -1	1.5	0.002	0.002					72				Yes	No	5					
	DW-777	MC	7-500 ±3	2	0.001	0.001					87				Yes	No	5					
	SPS Mk 4		3-350 ±3	8	0.001	0.002	1	0.2	160	88			45	30	47k	No	Yes	6				
	SPA Mk 1a		0.27-350 +0, -3	8	0.001	0.002	2	0.2	160	88	72	45		30	47k	Yes	Yes	10				
	SPA Mk 1b		0.27-350 +0, -3	8	0.001	0.001	2	0.2	160	88	87	45		30	47k	Yes	Yes	10				
	SPA Mk 2a		0.5-290 ±1	8	0.001	0.001	2	Sel.	Sel.	90	88	45		30	Sel.	Yes	Yes	10			Dual mono.	
DB SYSTEMS	DB-1B/DB-2A		20-20 ±0.04	9	0.008	0.001	1	0.9	150	77			120	100	47k	No	Var.	7.6			External power supply.	
	DB-1A		20-20 ±0.04	9	0.008	0.001	1	0.9	150	77			120	100	47k	No	Var.	4.6			As above.	
	DB-2A		20-20 ±0.04	10	0.008	0.001	1	0.9	150	77			120	6	100	47k	No	Var.	7.2			As above.
	DBR-15B/DB-2A		20-20 ±0.04	2	0.008	0.001										Yes	No	1.1			DB-2A or DBP-1 cable required.	
	DB-4B	MC	10-100 ±0.1	2	0.008	0.001					80	50										
DENNESEN	Sirius		5-100 ±0.1	10	0.01	0.01	2	2	200	80			125	0	100	47k	No	No	7			489.00
	JC-80	M	1-2M ±0.1	20	0.005	0.005	2	2	500	100	80	100	0	100	Adj.	Yes	Adj.	15			External power supply.	
DENDN	PRA-1000		20-100 ±0.2	5	0.002	0.002	2	2.5	320	90	77	150	2		47	Yes		22			No negative feedback.	
	PRA-6000		10-100 +0, -0.3	23	0.002	0.002	2	2.5	400	86	76	150	2		50	Yes		32			3000.00	
EIDOLON RESEARCH	Julia	T	0.1-200 +0, -1.5	42	0.01	0.01	2	0.1	500	78	68	Sel.		Adj.	Adj.	Yes	Var.	24			Dual mono.	
	Menlat	T	0.1-200 +0, -1.5	40	0.02	0.01	2	0.1	500	76	68	Sel.		Adj.	Adj.	Yes	Var.	19			External power supply.	
	Salesia	T	0.5-100 +0, -1.5	40	0.02	0.01	2	0.1	500	76		Sel.		Adj.	Adj.	No	Yes	15			Active and passive RIAA.	
ESOTERIC AUDIO RESEARCH	802	T	5-80 +0, -1	10	0.03	0.05	2	2.0	250	90			150	0	100	47k		No	15		No negative feedback, passive RIAA.	
	The Head	MC														Yes	No				699.95	Passive amplifying device.
FUJITECH	A502	K	5-200 ±0.2	15	0.005	0.005	2	2	270	80	70	140	2	150	47k	Yes	No	12			349.00	
GOETZ SYSTEMS	The Pre "M"		1-300 +0, -1	14	0.01	0.01	2	0.5	40	80	68	200	0	Var.	Var.	Yes	No	21			1600.00	Dual mono.

ULTRX

MOST PEOPLE WOULD CALL IT OVERKILL.

The new ULTRX™ R100 receiver isn't for everybody.

You don't really need 100 watts per channel* of virtually distortionless power. Unless you like listening to today's ultra-high quality recordings at "live concert" sound levels.

And a remote-controlled digital tuner with 20-station memory is probably more than enough—unless you're a dedicated FM listener with wide-ranging tastes.

Likewise, most people could get along without the built-in dbx and DNR noise reduction systems. Except those few who've become spoiled by the almost eerie absence

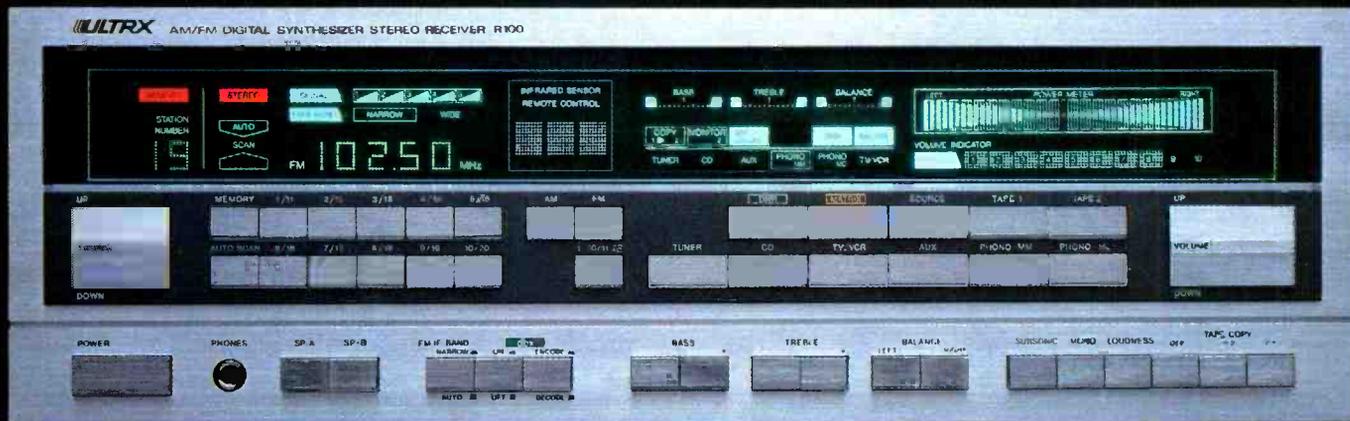
of noise in CD digital recordings. With the dbx, any cassette deck can make virtually noise-free recordings, while the DNR "cleans up" existing noisy signals.

Unless you're a nut about *video* sound quality, too, you won't have much use for the TV/VCR inputs and stereo synthesizer circuit.

The R100 is packed with features that are best appreciated by an audio perfectionist. It may be the best-equipped receiver ever built.

Get an ULTRX dealer to put an R100 (or one of our other new receivers) through its paces for you.

Some people might call it overkill. But you'll call it overwhelming.



Beyond the Ordinary.

*Minimum Continuous Average Power per channel, both channels driven into 8 ohms, from 20-20,000Hz, with no more than 0.009% Total Harmonic Distortion. dbx is trademark of dbx, Inc.

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Sansui has developed an amazing new receiver; we call it the S-X1050. You'll call it incredible. That's because no other 35 watt* stereo receiver can match the Sansui S-X1050 for great sound, beauty and value.

Achieving more than any other receiver in its range, the S-X1050 incorporates a 5-band graphic equalizer. It's a built-in exclusive for a receiver at this level, that gives you complete tonal versatility for tailoring sound and attaining flat frequency response.

The Sansui S-X1050 also features Quartz PLL synthesis zero tuning that assures you of drift-free reception. Clean bass response is provided by our DC servo circuitry, and our 5-LED power display lets you see what's happening—even in daylight.

We put all this overachievement under easy control with velvet-touch slides, tabs and push-buttons, to make the S-X1050 as pleasurable to operate as it is to listen to. For instance, simultaneous switching lets you go instantly from one source to another at the

touch of a tab. And when you want to lock in your favorite music stations, you can at the touch of a button with 12 presets (6FM, 6AM).

All this, plus playing two pairs of speakers simultaneously, slide volume control and a 2-track connection for tape 1 to 2 dubbing make the S-X1050 a most incredible unit.

So achieve a new level of sound quality, convenience and value with Sansui's S-X1050. We know you'll be overwhelmed. SANSUI ELECTRONICS CORPORATION, Lyndhurst, NJ 07071; Carson, CA 90746, Sansui Electric Co., Ltd., Tokyo, Japan



Our S-X1030 25 watt* receiver is another Sansui achiever with many of the great features of our S-X1050 unit.

OVERACHIEVER.



Putting More Pleasure in Sound.

Sansui

*S-X1050—35 watts, 0.02% THD; S-X1030—25 watts, 0.05% THD. Maximum RMS, both channels driven into 8 ohms, from 20-20,000 Hz.

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PREAMPLIFIERS

MANUFACTURER	Model	Unit Type Type = K, Table = T, Mono = M, Phono Stage Only = P, Moving Coil Stage Only = MC	Frequency Response, Hz to kHz, ±dB	Maximum Output, V	THD, %	IHF IM Distortion, %	Number of Tape & Processor Loops	MM Phono Sensitivity, mV, for 0.5 V Output at 1 kHz	MM Phono SNR, -dB	MM Phono SNR, -dB, 'A' Wid. re: 5 mV	MM Phono SNR, -dB, 'A' Wid. re: 0.5 mV	High Level Sensitivity, mV	Number of Tone Controls per Channel	MM Phono Input Impedance, Ohms	Moving Coil Input Impedance, Ohms	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes	
																				82
GSI	4TP	T	10-300 ±3	35										47k	No	No	20	550.00		
	5TP	T	10-300 ±3	35										47k	Yes	No	22	750.00		
DAVID HAFLER CO.	DH100	B	20-20 ±0.25	8	0.005		1	12	180	87		50	2	130	47k	No	No	7	199.95	Kit, \$149.95.
	DH110	B	20-20 +0, -0.1	14	0.001		3	12.5	300	87		50	2	Adj.	47k	†	No	8½	399.95	†Optional with Model DH112 kit, \$74.95; kit, \$324.95.
HARMAN KARDON	hk825		0.1-180 +0, -3	8	0.006		2	1.1	220	83	80	135	2	Sel.	47k	Yes	No	15	425.00	
HEYBROOK	C-2		20-50 ±1	9	0.01	0.01	1								Yes		15	550.00	Selectable active crossover.	
HITACHI	HCA8500 MKII		5-100 +0, -1	6.5	0.005	.0025	2	1.3	260	97	81	150	2†		Sel.	Yes	No	9¾	370.00	†Bass/treble 2-step turnover.
JRM	Preamp		5-50 +0, -1	7	0.01	0.01	2	1.25				150		150	50k	Opt.	No		450.00	Dual phono inputs.
JVC	P-L10			2	0.002		2	2.5	300	85	77	150	2	Adj.	Adj.	Yes	No	26.4	1650.00	
KENWOOD	C-1		1-250 ±3	5	0.004			2.5		87	70	200	2	200	47k	Yes		12	225.00	
	C-2		5-350 ±3	10	0.002			2.5		87	70	200	2	200	47k	Yes		12	295.00	
KINERGETICS	KPA-1		1-300 +0, -3	7.5	0.05	0.05	2	0.75	155	77	77	150	0	Var.	Var.	Yes	Sel.	20	775.00	Dual mono.
KLYNE AUDIO ARTS	SK-2A	MC	0.8-350 +0, -3	3	0.005	0.005									Yes	No	4	695.00	Switchable high-fre- quency contour and input impedance.	
	SK-4		0.5-250 +0, -3	10	0.005	0.005		5	100	85	72			Adj.	Adj.	Yes	No	12	1950.00	
	SK-5		0.5-250 +0, -3	10	0.005	0.005	1	5	100	85	72			Adj.	Adj.	Yes	Var.	12	2495.00	
KRELL	PAM-1		1-500 +0, -1	10	0.005	0.005	1	1.5	250	100	90	500	0	Adj.	47k	Yes	No	25	2000.00	Dual mono.
	PAM-3		1-1M +0, -1	15	0.005	0.005	2	1.5	300	110	98	500	0	120	47k	Yes	No	30	2850.00	As above, stereo controls.
	KRS	M	0-1M +0, -1	26	0.001	0.001	2	1.2	500	110	100	500	0	Adj.	Adj.	Yes	No	40	3250.00	
KYOCERA	C-910		0-400 +0, -3	25	0.003		2	2.2	300	86	76	125	2		47k	Yes		22	1200.00	
MARK LEVINSON	ML-6A	M	20-20 ±0.1		0.01	0.01	0							Sel.	Sel.	Yes	No	18	6130.00 Pair	External power supplies.
	ML-7		20-20 ±0.1		0.01	0.01	2							Sel.	Sel.	Yes	No	21	4460.00	External power supply.
	ML-10A		20-20 ±0.1		0.02	0.02	1							Sel.	Sel.	Yes	No	18	2870.00	
	ML-12A		20-20 ±0.5		0.05	0.05	1							Sel.	Sel.	Yes	No	14	1370.00	Optional PLS-124 power supply, \$390.00.
LSR&D	The Leach Pre-Preamp	MC	0.2-200 +0, -3	4	0.005	0.005									Yes	No	3	149.00	Selectable input resist- ance; kit, \$95.00.	
LUXMAN	C-05		3-60 ±0.2	14	0.003		2	1.8	285	86		120	2		50k	Yes		24.3	1800.00	
	CX-100		10-100 ±0.5	18	0.005	0.005	2	2	270	90		130	2		50k	Yes		15.4	499.95	
MAVRICK AUDIO	Spatial II						2									No		20	2000.00	External power supply, dual volume controls.
	Spatial IIM						2									No		25	2500.00	External power supply, dual mono.
McINTOSH	C33		20-20 +0, -0.5	10	0.01		4	2.5		90		250	5	65	47k	No			2299.00	With 20-W monitor amp, compressor/expander; sep. dubbing.
	C29		20-20 +0, -0.5	10	0.02		3	2.5		90		250	2	65	47k	No			1299.00	
	C504		20-20 +0, -0.5	10	0.02		2	2.5		90		250	3	50	47k	No			975.00	
MEITNER AUDIO	PA-6		1-100 +0, -3	8	0.01	0.01	1			95	85	500	0		†	Yes	Sel.	5¾	1400.00	†Neg-Z current MM input; with remote.
MELOS AUDIO	PGK-1	T	3-500 ±1	65	0.08		1	1.00	750	90	70	150		200	47k	Yes	Yes		795.00	
	ZLDP-1	T	3-500 ±1	65	0.04		2	1.00	750	90	70	150		200	47k	Yes	Var.		2800.00	
	Preamp	T/MC	3-500 ±1								70				Yes				395.00	

PREAMPLIFIERS

MANUFACTURER	Model	Unit Type: M = Mono, S = Stereo, T = Tube, P = P-Moving Coil, MC = Moving Coil	Frequency Response: Hz to kHz, ±dB	Maximum Output: V	THD: %	IHF IM Distortion: %	Number of Tape & Processor Loops	MM Phono Sensitivity: mV for 0.5 V Output at kHz	MM Phono Overload: mV	MC Phono S/N: -dB	High Level Sensitivity: mV	Number of Tone Controls per Channel	MM Phono Input Impedance: pf	Moving Coil Input?	Does Unit Invert Phase?	Weight: Lbs.	Price: \$	Notes		
MERIDIAN	MSP MLP		6 6	0.01 0.01		† †	1 1	100 100	75 75	70 70	100 100	† †	100 100	47k 47k	† †	Sel. Sel.		395.00	†Modular system, 32 inputs maximum. †Modular system, 12 inputs maximum.	
MICHAELSON & AUSTIN	TVP-X	T	5-40 +0, -1	17	0.01			550					Sel.	Sel.	Opt.		11	2200.00	With 12-pound power supply.	
MICRO-TRAK	6411 ST-11		20-15 ±1 20-15 ±1	0.05 0.05	0.05 0.05		5 5	300 300	72 72		0 0		47k 47k	No No	No No	1 0.5	299.50 169.50	Switchable rumble filter, adjustable high-end response, flat position. Internally selectable rumble filter.		
MISSION ELECTRONICS	776		20-20 ±0.2	11	0.05	0.05	1	1	150	80	72	100	150	47k	Yes	No	37½	999.00	Battery powered.	
MONOLITHIC SOUND	MOT SSP	T	5-50 +0, -3 5-50	20 10	0.1 0.05	0.05	2 2	1V			2 100	2	Adj. Adj.	Adj. Adj.	Yes Yes	No Yes	16	960.00 399.00	Dual mono.	
MONSTER CABLE	Alpha Plus	MC	10-300	2	0.03	0.03					80				Yes	No	1	398.00	Optional voltages: 100, 110, or 220 V.	
MUSICAL FIDELITY	AC-1	MC	1-1M +0, -3	2	0.03	0.03					†				Yes	No	4.2	600.00	†70 dB unweighted; dual mono.	
NAD	1020B		20-20 ±0.5	15	0.02	0.02	1	1.25	200	76	73	80	2	Sel.	47k	Yes	No	8½	178.00	
NAIM AUDIO	NAC 42N NAC 42S NAC 32		20-20 ±0.5 20-20 ±0.5 20-20 ±0.5				1 1 2	2.0			75 100 100	0 75 0	470		Yes	Yes	8 8 9	495.00 495.00 795.00	Overload margin, all inputs, 40 dB. As above.	
NEW YORK AUDIO LABORATORIES	NCPII NCPII/HTMPS Moscocode Mimucode Moscocode Sarabande	T T T T	2-200 ±2 2-200 ±2 5-50 5-50	80 80 30 30	0.005 0.005 0.01 0.01	0.005 0.005 0.01 0.01	0 0 1 2	0.125 0.125 0.125 0.125	150 150 200 200	72 72 80 80	64 64 95 95	150 150 0 250	0 100 150 150	Sel. Sel. Sel. Sel.	Yes Yes Yes Yes	No No No No	30 50 14 16	2600.00 3600.00 599.00 999.00	Separate power supply. Tube power supply. Tube and MOS-FET hybrid. As above.	
NIKKO	Beta 50 Beta 30		20-20 ±0.5 20-20 ±0.5	9 9	0.004 0.004	0.004 0.004	4 3	2.5 2.5	200 200	88 88	70 70	150 150	2 2	100 100	Sel. Sel.	Yes Yes	No No	8½ 8½	475.00 325.00	
NOVA ELECTRO-ACOUSTICS	CPA-100 PPA-202	MC	1-200 +0, -3 0.05- 1.5M +0, -3	12 1	0.01 0.01	0.01 0.01	1	2.50	300	75		98	0	40	44k	Opt. Yes	Sel.	14	1695.00 295.00	For use with CPA-100 only.
ONKYO	P-3030 P-3060R P-3090		1-170 +0, -3 1-170 +0, -3 1-170 +0, -3	13 20 13	0.004 0.003 0.004	0.003 0.003 0.004	2 2 2	2.5 2.5 2.5	300 300 380	82 82 82	76 76 76	150 150 150	2 2 2	Sel. Sel. Sel.	Yes Yes Yes		15 21 23	379.95 549.95 1249.95		
ORTOFON	T-2000 T-30 T-20 T-10 T-5	MC MC MC MC MC	5-50 +0.5, -1 8-90 +0.3, -1 10-60 +0.5, -1 20-45 +0.5, -1 20-30 ±1												No No No No No			1000.00 699.00 250.00 160.00 50.00		
PAC	The Pro-Reference The Pro-Reference II	T T	10-100 +0, -1 10-100 +0, -1	28 28	0.01 0.01	0.01 0.01	1 1	0.3 0.3	300 300			29 30	0 0	150 100	47k 47k	Yes Yes	No No	39 30	4000.00 2600.00	External transformers.
PARASOUND	PR200		10-100 ±1	12	0.01	0.01	2	2	200	88		150	2	175	50k		No	9	199.95	Variable loudness, bass EQ with 18 dB octave cut.
PERFECTIONIST AUDIO	Pretentious One	T	0.5-4M	27	0.3	0.3	2	1.2	1	85	80	300	0	250	500	Yes	Sel.	100	52,563.	Guaranteed for life; transferrable upgrades free; digital circuitry.
PERREAUX	SA-2 SM-2		20-50 ±0.25 20-50	25 27	0.009 0.009	0.009 0.009	1 1	† †	500 1.2V	86 86	66 72	110 110	0 0	100 100	50k 50k	Yes Yes	No No	12 12	850.00 1299.00	†1.85 mV for 1.5 V out; Pure Class A. †2 mV for 1.5 V out; as above.

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See feature cover review — Audio Magazine August 1984.

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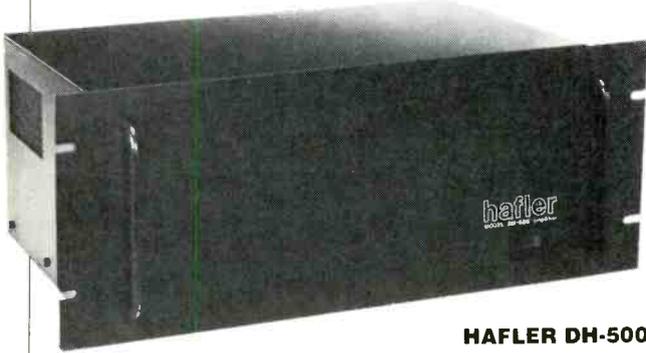
PREAMPLIFIERS

MANUFACTURER	Model	Unit Type: K=K Tube=T Wg=MM Phono Stage Only=P Wgng Coil Stage Only=MC	Frequency Response, Hz to KHz, ±dB	Maximum Output, V	THD, %	IHF IM Distortion, %	Number of Tape & Processor Loops	MM Phono Sensitivity, mV, for 0.5 V Output at 1 KHz	MM Phono S/N, -dB	MC Phono S/N, -dB	High Level Sensitivity, mV	Number of Tone Controls per Channel	MM Phono Input Capacitance, pF	Moving Coil Input?	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes		
PHASE LINEAR	P3800		10-100 +0. -3	10	0.003	0.008	3	0.63	200	85	82	150	3	Sel.	47k	Yes	No	17	650.00	Headphone amp, 18 dB/octave low-pass filter, twin tape copying, Headphone amp.
	P3600		10-100 +0. -3	10	0.003	0.008	3	0.63	150	80	80	150	2	Sel.	47k	Yes	No	14	450.00	
PHOENIX SYSTEMS	P-10-MMA		20-20 ±0.1	8	0.01	0.01	0	5	150	85		1V	0	100	47k	No	Sel.	5	200.00	Kit, \$150.00.
	P-10-MCA	MC	20-20 ±0.1	8	0.01	0.01				88					Yes	Sel.	5	200.00	As above.	
PICKERING	P-75	MC	10-120 ±3	4	0.035	0.002								Yes	1.2			189.00	For LZ cartridges; uses two 9-V batteries.	
PLEXUS AUDIO SYSTEMS	Photon	MC	5-150 +0. -3	1.3	0.02	0.02					95			Yes	No	2		190.00	Variable impedance.	
	Phonon		20-300 +0. -1	10	0.01	0.01	1	0.7	140	87		100	0	100	47k	No	No	10		649.00
POWER FACTOR	Playback One	P	20-150 +0. -3	12	0.05	0.02		5	350	86			20	47k	No	No	3½	299.00		
PRECISION FIDELITY	C-8	T	15-50 +0. -1	3.5	0.02	0.02	2	5	700	90		100	0	70	47k		Yes	16	749.00	Hybrid.
PRINCETON DESIGN GRDUP	Active Cartridge Stabilizer	P MC	0-150 ±0.5	0.7									0	Dyn.	Yes	Yes	1	395.00	Electronic damping; no RIAA; 26-dB MC gain.	
PS AUDIO	IVH Source MCA II	K MC	2-500	16	0.01	0.01	2	5	160	88	80	210	0	100	Var.	Yes	No	17	690.00	
			2-500	16	0.01	0.01	1	5	160	88	80	210	0	100	Yes	Yes	No	15	329.00	
			2-2M	16	0.005	0.005									Yes	Yes	No	8	180.00	
PSE	Studio One		5-100 +0. -0.5	12	0.005	0.005	2	9	200	80	75	250	2	50	47k	Opt.	Sel.		760.00	With MC Input, \$880.00.
QUAD	34		30-20 ±0.3	1.5	0.005		1	Var.	150	75	68			100	Yes	No	4	595.00	†Bass lift, step and high/low shelving.	
	44		30-20 +0. -1	5	0.002		2	Var.	300	75	72			Var.	Yes	No	6	795.00		
REVOX	B252		20-20 +0. -0.2	12	0.01	0.01	2	Adj.	23	75	75	160	2	Adj.	47k	Opt.	No	17	1200.00	†Tuner-preamp; see also "Receivers," Model B780, for tuner specs.
	B739	†	20-20 +0. -0.7	4	0.02	0.03	2	1.35	300	82		150	3	220	47k	No	No	28¾	1900.00	
RGR	Four-2		0.2-270 ±3	10	0.012	0.015	2	0.05	150	68	70	200	2	120	47k	Yes	Var.	13	795.00	
ROBERTSON AUDIO	EK-1		0.1-400	19	0.01	0.01	1					160				No		35	2000.00	With strain gauge cartridge. †15.5 V.
	Twenty Twenty		0.1-400	†	0.01	0.01	1	8.7	129	90	85	73			47k	Yes	No	15	995.00	
ROTEL	RC870		20-20		0.004	0.004			150	78	64				Yes			11½	299.00	
SAE	P101 PA10 X1P		20-20	11	0.008	0.008	2	5	160	85	80		2	Sel.		Yes	No	20	650.00	
			20-20	15	0.01	0.01	5	0.5	160	74	80		3	Yes	Yes	No	12	349.00		
			20-20	17	0.01	0.01	2		160	74	80			Yes	Yes	No	12	1200.00		
SANSUI	C-2301		0-500 +0. -3	1.2	0.003		2	2.0		90	80	110	2		47k	Yes		46	2700.00	†Built-in parametric EQ.
	C-2101		5-300 +0. -3	1.5	.0015		2	2.5		90	80	110	2†		47k	Yes		13.2	800.00	
SFI	RC2		20-100 +0. -1	40	0.1	0.1	1	1.0	100	126		Sel.	0	200	47k	No	No	15½	2250.00	No loop feedback.
	RC3		20-100 +0. -1	40	0.1	0.1	1	1.0	100	126		Sel.	0	200	47k	No	No	15½	2750.00	External power supply.
SHERWOOD	S-6020CP		0-100	10	0.005	0.005	2	1.25	250	100		150	2	150	47k	No		11	259.95	
SIMA ELECTRONICS	P-2001		20-100 +0. -3	11	0.05	0.05	1	2	260	70	66	200		100	50k	Yes	No	8	635.00	
SONDEX	PCU Disc Equalizer	† P MC					6					450	0					3	339.00	†Model below required; passive unit with no gain. Disc input matching via optional plug-in boards, \$29.95 each.
							2								100	47k	Yes		6	
SONY ESPRIT	TA-E900		0-300 +0. -1	12	0.005	0.008	2	2.5	180	84	70	150		Sel.	Sel.	Yes		28¾	3200.00	Dual mono.
	TA-E901		0-200 +0. -1	12	0.008	0.008	2	2.5	180	84	70	150	2	100	Sel.	Yes		22	2500.00	As above.

PREAMPLIFIERS

MANUFACTURER	Model	Unit Type: KT=k, Tube, T Mag. = M, Phono Stage, Only = P Moving Coil Stage, Only = MC		Frequency Response Hz to KHz, ±dB	Maximum Output, V	THD, %	IHF-IM Distortion, %	Number of Tape & Processor Loops	MM Phono Sensitivity, mV for 0.5 V Output at 1 KHz	MM Phono Overload, mV	MC Phono S/N, -dB	MC Phono S/N, -dB, "A" Wld. re. 5 mV	High Level Sensitivity, mV	Number of Tone Controls per Channel	MM Phono Input Impedance, pF	Moving Coil Input?	Overs Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes
		1	2																	
SDTA	II Head Amp		1-500 +0, -3	2	0.03	0.03				90	100			Yes	No	4		500.00	Dual mono.	
SOUND-CRAFTSMEN	DX4200		5-100 ±0.25	10	0.01	0.005	4	Adj.	300	97	97	90	†	Adj.	Sel.	Yes	No	25	699.00	†Dual 10-band EQ; auto bridging circuitry. As above.
	DX4100		5-100 ±0.25	10	0.01	0.005	3	1.4	200	97		90	†	100	47k	No	No	22	549.00	
	DX400		5-100 ±0.25	10	0.01	0.005	4	1.4	200	97		90	0	100	47k	No	No	20	419.00	
SPECTRAL	DMC-10 Series Gamma		0-1M +0, -1	15	0.01	0.01	1							100	Sel.	Yes	No	25	2395.00	External power supply.
	DMC-5		0-1M +0, -1	15	0.01	0.01	1							100	Sel.	Yes	No	16	1495.00	
SPECTRASCAN	LCA-10		20-20 ±0.2	15	0.05	0.05	2	1.0	250	85	78	100	0	250	47k	Opt.	No	9	695.00	Optional MC plug-in card, \$275.00. As above.
	LCA-20		20-20 ±0.2	15	0.05	0.05	2	1.0	250	85	78	100	2	250	47k	Opt.	No	9	849.00	
	LCA-30		20-20 ±0.2	15	0.05	0.05	2	1.0	250	85	78	100	2	250	47k	Opt.	No	9	995.00	
	PPA-40	MC	10-100 ±0.1		0.05	0.05										Yes	No	5	395.00	
STANTON	310 SP98	P MC	20-20 10-120 ±3	10 4	0.05 0.035	0.002		0.5	120	70		2	Adj.	47k	No Yes	No No	No No	1.2	240.00 189.00	For LZ cartridges; uses two 9-V batteries.
STAX	CA-X Pro		0-1M +0, -0.3	20	0.002	0.003	1	1	200	90	68	100	0	Var.	100	Yes	No	34	4000.00	Dual mono.
STREETS ELECTRONIC SYSTEMS	FET 1000		1-200	15	0.05	0.03	2	5		95	90	200	0	68	47k	Yes	Sel.	23	1950.00	
STRELIOFF	PS 1		10-60 ±1.5	25			3	1.0	250	92		100	0	Sel.	Sel.	No	No	33	2500.00	Special order.
	PS 11		10-60 ±1.5	25			3	1.0	250	92		100	0	Sel.	Sel.	No	No	39	3500.00	As above; dual mono.
SUMIKO	The PhonoAmp		1-1M	10	0.02	0.02	1		500	85	80		0	50	Var.	Yes	No	2	600.00	Front-mounted variable cartridge loading.
SUMO	Electra		2-100 +0, -3	18	0.01	0.01	1	0.37	125	85	80	50	2	10	47k	Yes	No	12	449.00	
SUPERPHON	Revelation Basic		2-300 +0, -1	†	0.005		1	7	190	77		250	0	100	47k	No	No	8½	399.00	†13.5 V.
SWISS PHYSICS	MDN 831		0.1-800	40		0.002	1	5	2V	100	100				Yes	Sel.		15	3950.00	
TANDBERG	TCA 3002A		5-130 +0, -1.5	10	0.004	0.004	2	1	290	80	74	70	2	Adj.		Yes	No	12½	795.00	CO input with 20-V overload.
TECHNICS	SU-A8		0-100 +0, -3	8	0.007		2	1.25	140	76	75	75	2		47k	Yes	No	10	350.00	
	SU-A6MKII		0.5-200 +0, -3	8	0.002		3	0.63	150	80	77	36	4		47k	Yes	No	13	600.00	
	SU-A4MKII		0-100 +0, -3	8	0.006		2	0.64	150	77	76	38	4		47k	Yes	No	18	1100.00	
THRESHOLD	FET one II		1.5-125 +0, -3	20	0.02	0.02	2	12	350	83	81	100	0	Sel.	47k	Yes	No	11½	2200.00	-70 dB crosstalk, 475 ohms output impedance. As above.
	FET two II		1.5-125 +0, -3	20	0.02	0.02	1	12	350	82	80	100	0	Sel.	47k	Yes	No	9½	1250.00	
TIBI ELECTRONICS	MCP-100	MC	20-20 ±0.1		0.02	0.02										Yes	No	1½	139.00	
VENDETTA RESEARCH	SCP-1	MC	0.1-1M	0.3	0.01	0.001					90				Yes	Yes		5	750.00	
VSP LABS	Straight-wire II		10-60 ±0.5	9	0.05	0.02	2	0.5	245	82	72	500	0	47	47k	Yes	No	20	995.00	
WINGATE AUDIO	1000P		0.1-150 +0, -1	10	0.05	0.05	1	1.0	500	80		100	2	150	50k	No	No	9	350.00	No negative feedback.
WIN LABORATORIES	Jewel	MC	10-50	1.2	0.01		1									No		2½	1495.00	With remote.
YAMAHA	C-80		20-20 +0, -0.2	8.5	0.001	0.002	2	2.5	500	95	91	150	2	Sel.	Sel.	Yes	Yes	15	750.00	
	C-60		20-20 +0, -0.2	8.5	0.002	0.002	2	2.5	500	95	90	150	2	Sel.	Sel.	Yes	No	15	500.00	
	C-40		20-20 +0, -0.2	11	0.002	0.002	2	2.5	170	94	90	150	2	220	47k	Yes	No	15	350.00	

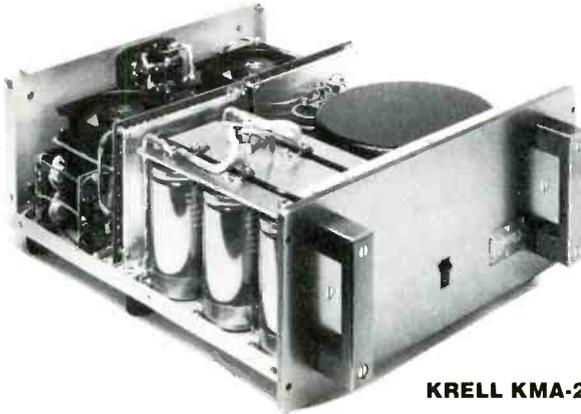
AMPLIFIERS



HAFLER DH-500



TANDBERG 3012



KRELL KMA-200



SOUNDCRAFTSMEN DDR1200

MANUFACTURER	Model	Unit Type	Integrated = I, Basic = B, Tube = T, Mono = M, Kit = K, Moving Coil Input = MC	Cont. Average Watts/Channel into 8 Ohms	Cont. Average Watts/Channel into 4 Ohms	Power Bandwidth, Hz to MHz	Rated THD, %	Rated Inf IM, %	Class of Output Operation	MM Phono S/N, -dB	MM Phono S/N, -dB "A" Wtd re: 5 mV	Maximum Sensitivity, mV	Rated Slow Rate, V/μS	High Level Sensitivity, mV	Meters = M, Peak/Clip Indicators = I	Dynamic Headroom, dB	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes
AB SYSTEMS	8120	M	†	††	20-20	0.25	0.25	AB2				1.5V						40	1099.00	Biamp with selectable crossover; †300 and 125 W; ††500 and 200 W. Triamp with selectable crossover; †300 and (2) 125 W; ††500 and (2) 200 W. Biamp for CFR-180 speaker; †300 and 150 W; ††500 and 250 W. VLF amp for LBS-125 speaker. Unbalanced phone input. As above. Balanced XLR with ground lift, unbalanced phone. As above. 1099.00 As above. 1649.00 As above.
	9130	M	†	††	20-20	0.25	0.25	AB2				1.5V						41	1249.00	
	712CFR	M	†	††	20-20	0.25	0.25	AB2				1.5V						40	1192.00	
	821LBS	M			300	500	20-20	0.25	0.25	AB2			1.5V					39	1192.00	
	600	B			175	300	20-20	0.25	0.25	AB2			1.5V	I		No		30	625.00	
	900	B			300	450	20-20	0.25	0.25	AB2			1.5V	I		No		39	835.00	
	2220	B			50	75	20-20	0.25	0.25	AB2			1.5V	I		No		17	599.00	
6220	B			175	300	20-20	0.25	0.25	AB2			1.5V	I		No		31	739.00		
9220	B			300	450	20-20	0.25	0.25	AB2			1.5V	I		No		39	1099.00		
1200A	B			300	500	20-20	0.25	0.25	AB2			1.5V	I		No		65	1649.00		
ACCUHASE	M-100	B/M		500	800	20-20	0.01	0.003	AB			120	M		Sel.			91.4	3500.00	MOS-FET. As above. As above.
	P-600	B		300	500	20-20	0.01	0.01	AB			120	M		No			84.7	3950.00	
	P-266	B		130	200	20-20	0.005	0.003	AB	80		120	M		No		44	1600.00		
	E-303X	I		150	200	20-20	0.01	0.005	AB			170	M		No		45.2	2000.00		
	E-204	I		75	90	20-20	0.01	0.005	AB	80	300	120	M		No		30	900.00		
ACOUSTAT	TNT-120	B		120	180	2-450	0.01	0.01	AB			160			1.2	No		28	950.00	Pure FET, zero output impedance. As above.
	TNT-200	B		200	325	2-400	0.01	0.01	AB			160			1.2	No		40	1350.00	
ADCOM	GFA-1A	B		200	300		0.05	0.1	AB			80			2.8			23	499.95	Dual power supplies. Can drive 2-ohm load.
	GFA-2	B		100	170		0.05	0.05	AB									29	375.00	
	GFA-555	B		200	350		0.05	0.05	AB										549.95	
ADS	A2	I/MC		80	100	20-20	0.05	0.05	AB	80	0.26	120	30	350	M, I	2	Yes	20	579.00	Rail-switching amp.
AKAI	AM-U3	I		45			0.02							M					249.95	
	AM-U5	I/MC		60			0.05							M					299.95	
	AM-U7	I/MC		80			0.05							M					399.95	

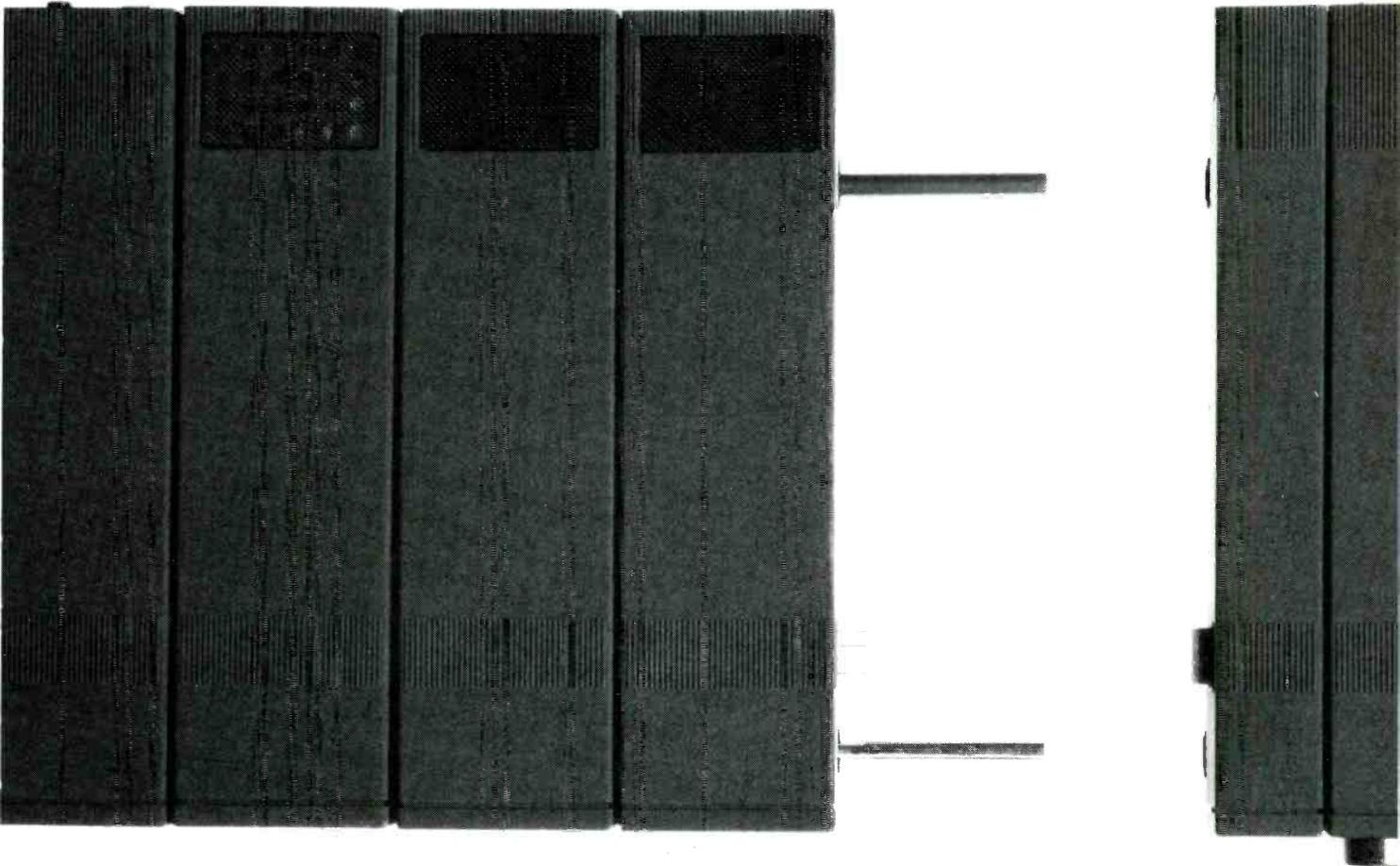
AMPLIFIERS

MANUFACTURER	Model	Unit Type Integrated = I, Basic = B, Tube = M, Mono M, Kit = K, Moving Coil Input = MC.		Cont. Average Watts/Channel into 8 Ohms	Cont. Average Watts/Channel into 4 Ohms	Power Bandwidth, Hz to kHz	Rated THD, %	Rated IHF IM, %	Class of Output Operation	MM Phono S.N. - dB, 'A'	MM Phono Sensitivity, mV	Maximum MM Phono Input, mV	Rated Slew Rate, V/μs	High Level Sensitivity, mV	Meters = M, Peak/Clip Indicators = I	Dynamic Headroom, dB	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes
		50	80																	
AMBER ELECTRONICS	Series 50b	I	50	80	2-55	0.01	0.01	AB	80	5	140	25	Var.		No	24	599.00	Preamp-out jacks. Bridgeable, no current limiting. As above.		
	Series 70	B	70	120	0-65	0.01	0.01	AB				25			No	32	579.00			
	Series 200	B	200	350	2-70	0.01	0.01	AB							No	42	975.00			
APT	A1	B	125		20-20	0.01	0.01	AB				60	900	I	3	No	26	680.00		
AUDIBLE ILLUSIONS	S-50	B	50	100	20-20	0.08	0.08	AB1				1.5V			No	27	595.00			
	S-150	B	150	300	20-20	0.05	0.05	AB1				1.5V			No	55	995.00			
	M-80	B M T	80	80	20-20	0.5	0.5	Pure A				1.5V			No	45	1495.00			
AUDIO CLASSICS/ATLANTA	Mark 9	B T M	250	250	30-20	0.9	0.5	AB				20	1.5V	M, †	1.0	No	75	975.00	† Bias Indicator, kit, \$795.00.	
AUDIONICS	CC-3 mkII	B	100	170	5-60	0.10	0.10	A AB				50	1V	I	1.5	No	21	795.00		
	CC-5	B	70	120	5-60	0.10	0.10	A AB				40	1V	I	2.25	No	18	495.00		
AUDIO RESEARCH	D70	B T	60	60	15-30	1	0.1	AB				10	850		No	49	1995.00			
	D79C	B T	75	75	15-40	1	0.5	AB				10	750	M	0	No	103		6000.00	
	D115	B T	100	100	12-60	1	0.1	AB				15	1.2V		0	No	68		2995.00	
	D120	B	120	200	0.6-150	0.25	0.035	AB				40	1.5V		0	No	43		1995.00	
	D160	B T	160	160	12-50	1	0.1	AB				15	1.2V	I	0	No	105		6000.00	
	D250	B T	240	240	12-60	1	0.1	AB				25	1.2V		0	No	138		5500.00	
AUDIO VOIS	V22-V210	I MC	40	60	10-50	0.1	0.1	AB	70	2.0	200				No	24.2	1190.00	Two chassis.		
	V10	I MC	20	30	10-50	0.1	0.1	AB	70	2.0	200				No	80	390.00			
AUDIRE	Monarch	M	100	200	2-50	0.008	0.0025	A				50			No	150	6000.00	720 W into 1 ohm. Dual mono. As above. As above.		
	Parlando	B	100	200	2-50	0.02	0.003	A				50			No	90	2850.00			
	Otez	B	250	500	2-50	0.015	0.015	A				50			No	90	2750.00			
	Forté II	B	25	50	2-50	0.025	0.008	A				50			No	45	950.00			
	Forté	B	125	250	2-50	0.025	0.008	A				50			No	45	895.00			
	Crescendo	B	75	130	2-50	0.05	0.01	AB				45			No	25	395.00			
BEARD AUDIO SYSTEMS	P-100 US	B T	100	100	20-20	0.9		A AB							No	77	2195.00	Class A, 20 W.		
BEDINI ELECTRONICS	25.25DE		28.5		0-75	0.1	0.25	A		0.5		40		No	Yes	25	795.00			
	50.50DE		70		0-100	0.1	0.25	A		0.5		50		No	Yes	25	895.00			
	100.100DE		110		0-100	0.1	0.25	A		0.5		55		No	Yes	45	1095.00			
	200.200DE		220		20-50	0.1	0.15	A		0.5		55		No	Yes	45	1595.00			
	25.1 Meg							A		0.5		150		No	Yes	45	2000.00			
	100.1 Meg							A		0.5		150		No	Yes	95	3500.00			
BEL	2002	B	100	200	3-250			A					1.7V	†	No	52	2395.00	† Status/fault indicators.		
	1001	B	50	100	5-200			A					1V		No	30	1395.00			
BELLES RESEARCH	B-II	B	50	80	20-20	0.2	0.2	AB						No	2	No	16	500.00		
	B-I	B	80	140	20-20	0.2	0.2	AB						No	2	No	27	750.00		
DAVID BERNING CO.	EA-230	B T	30	30	20-50	2		AB				10	1V	2	No	30	895.00			
EA-2100	B T	100	100	20-50	2		AB				10	1V	3	No	40	2695.00				
BGW SYSTEMS	75	B	25	37.5	20-20	0.1	0.03	AB				700		No	14	409.00	With meters, Model 250E, \$959.00. With 25/70 V XFMR output. As above. With clip LEDs, Model 750C, \$1339.00.			
	150	B	50	75	20-20	0.05	0.02	AB				1V	M	No	18	639.00				
	250D	B	100	150	20-20	0.1	0.02	AB				1.4V	I	No	33	839.00				
	320B	B	100		20-20	0.2	0.05	AB				700	I	No	39	909.00				
	620B	B	200		20-20	0.25	0.06	AB				700	I	No	58	1209.00				
	750B	B	225	360	20-20	0.1	0.02	AB				2.1V	M	No	57	1439.00				
	6000	B	100	130	20-20	0.1	0.02	AB				1.2V	M	No	25	749.00				
8000	B	225	350	20-20	0.1	0.02	AB				20		M	No	25	999.00				
BIAMP SYSTEMS	1200	B	165	290	20-27	0.05	0.002	A				40		Var.	44	799.00	Soft limiting; no fan. As above.			
	2400	B	360	580	20-27	0.05	0.002	A				50		Var.	58	999.00				
B & K COMPONENTS	ST-140	B	70	110	20-20	0.09	0.09	AB				20		I	3.2	No	30	399.00		
	EX-140	B	100	150	20-20	0.09	0.09	AB				20		I	4.0	No	35	699.00		
BOZAK	E-929A	B	150	188	20-20	0.05		AB				100		M		53	1200.00			
	E-939A	B	70	90	20-20	0.05		AB				95			34	650.00				
BRYSTON	2B-LP	B	50	100	0.5-100	0.01	0.01	AB				60		I	No	20	550.00	Bridgeable.		
	3B	B	100	200	0.5-100	0.01	0.01	AB				60		I	No	38	925.00	As above.		
	4B	B	200	400	0.5-100	0.01	0.01	AB				60		I	No	56	1450.00	As above; with LED meter package, Model 4B "L," \$1650.00.		
CARVER	M-1.5I	B	350	550	1-250	0.5	0.5	AB				100		I	3	No	16	799.00	Magnetic Field Amp. As above. As above. As above.	
	M-500I	B	251	350	1-100	0.05	0.05	AB				80		M	0.5	No	22	559.00		
	M-400I	B	201	300	1-100	0.05	0.05	AB				80		I	0.5	No	9	449.00		
	M-200I	B	200	200	1-80	0.05	0.05	AB				80		I	0.5	No	10 1/4	375.00		
CLASSE AUDIO	DR-2	B	25	50	0.1-80	0.1	0.1	Pure A				800			No	65	2000.00			
CONRAD-JOHNSON	MV45	B T	45	45	35-15	1.0	1.0	AB							No	33	985.00			
	MV75	B T	75	75	35-15	1.0	1.0	AB							No	43	1450.00			
	Premier Four	B T	100	100	35-15	1.0	1.0	AB							No	80	2950.00			
	Premier One	B T	200	200	35-15	1.0	1.0	AB							No	140	4350.00			
	Premier Five	B T M	200	200	35-15	1.0	1.0	AB							No	81	3000.00			

AMPLIFIERS

MANUFACTURER	Model	Unit Type: Integrated = I, Basic = B, Tube = T, Mono = M, Ster. = S, Moving Coil Input = MC	Cont. Average Watts Channel into 8 Ohms		Power Bandwidth, Hz to KHz		Rated THD, %	Rated IMF IM, %	Class of Output Operation	MM Phono S.W. — dB	MM Phono Sensitivity, mv	Maximum MM Phono Input, mv	Rated Slew Rate, V/μs	High Level Sensitivity, mv	Meters = M, Peak/Clip Indicators = I	Dynamic Headroom, dB	Does Unit Invert Phase?	Weight, Lbs	Price, \$	Notes
			Cont. Average Watts Channel into 4 Ohms	Power Bandwidth, Hz to KHz																
MITCHELL A. COTTER	LA-2				5-50	0.01	0.01								No	3		700.00	Uses PW-2 power supply.	
COUNTERPOINT	SA-4	T/M	130	80	1-22	0.2	0.65	AB Var.						M	2	No	60	4495.00	No output transformer, d.c. coupled, Hybrid tube front-end, MOS-FET output.	
	SA-8	T	200	300	5-140	1.0		AB							3	Yes	45	Pair 2395.00		
CREEK AUDIO	CAS 4040	I	40	70	10-60	0.05	0.01		2.0			480			No	10		299.95		
CROWN INTERNATIONAL	D-75	B	40	55	20-20	0.001	0.05	AB + B			6	812					10	499.00	†1300 W.	
	D-150A	B	80	125	1-20	0.001	0.05	AB + B			6	1.19V					24	729.00		
	DC-300A-2	B	155	250	1-20	0.001	0.05	AB + B			6	1.75V					45	1149.00		
	PSA2	B	220	350	1-20	0.002	0.01	AB			30	2.1V					57	1699.00		
	Delta-Dmega 2000	B/M	730	†	0-45	0.05	0.05	AB + B			32	Var.					92	2995.00		
	PS-200	B	90	135	1-20	0.001	0.05	AB + B			16	1.3V					25	769.00		
	PS-400	B	165	260	1-20	0.001	0.05	AB + B			16	1.76V					55	1179.00		
	Power Line Two	B	50	60	20-20	0.001	0.02	AB + B			8	970					15	579.00		
Power Line Three	B	90	140	20-20	0.001	0.02	AB + B			12	1.3V					25	949.00			
Power Line Four	B	165	265	20-20	0.001	0.02	AB + B			16	1.76V					55	1349.00			
DB SYSTEMS	DB-6	B	40	60	20-40	0.003	0.002	AB			15	1V			2	No	18	625.00	Subsonic filter.	
	DB-6M	B/M	140	225	20-40	0.008	0.004	AB			30	1V			2	No	18	625.00		
DENNESEN	Antares	B	75	120	5-100	0.01	0.01	AB			50	1V			3	No	21	600.00	MOS-FET.	
DENON	PMA-737	I/MC	60	65	5-80	0.007	0.005	Dir. A	B6	2.5	160	150	150		3		19	300.00	No negative feedback. As above. As above. As above.	
	PMA-757	I/MC	80	100		0.02	0.02	Dir. A	88			200			3			450.00		
	PMA-777	I/MC	100	240	5-100	0.005	0.005	Dir. A				250			3			620.00		
	POA-1500	B	150	200	5-100	0.005	0.005	Dir. A				400		M, I	3			695.00		
POA-8000	B/M	200									380			3				2800.00		
ELECTRON KINETICS	Eagle 7A	B	300	550	0-300	0.1	0.1	AB			680				No	110	3950.00			
	Eagle 2	B	120	200	0-200	0.1	0.1	AB			120				No	40	850.00			
ESDTRIC AUDIO RESEARCH	516	B/T	50	50	12-50	0.25	0.2	A				900		3	No	38	1899.95	Dual mono. Modified version, Model 509M, \$3700.00.		
	509	B/T/M	100	100	12-60	0.25	0.2	A				300		3	No	35	2600.00			
	549	B/T/M	200	200	12-60	0.25	0.2	A				1.5V		3	No	58	5000.00			
	529	B/T/M	500	500	12-60	0.25	0.2	A				1.5V		3	No	88	10,000.			
FUJITECH	A501	K	100	150	20-20	0.01	0.007	AB†			100				No	23	299.00	†Sel. mode: pure A, 25 W; bridged A, 100 W; bridged AB, 300 W. †Sel. mode: triode, 15 W.		
	A1033	I/K	30	30	50-30	0.4	1	UL†	72	2.2	250		190			42	449.00			
GOETZ SYSTEMS	Muriel	B	100	150	10-50	0.01	0.01	Dyn A-AB						6	No	50	1900.00	Dual mono. As above.		
		B	125	180	10-50	0.01	0.01	Dyn A-AB						6	No	70	2400.00			
		B	200	300	10-50	0.01	0.01	Dyn A-AB						6	No	85	3900.00			
GOLD SOUND	Swax	B/M	150	300		0.01	0.01				100				No	12	350.00	Subwoofer amp and crossover; semi-kit (assembled circuit board), \$275.00.		
GROMMES	G252HF	B	90	125	20-20	0.05	0.05	AB			30	750	M	1.5	No	31	660.00			
GSI	A1	B/T	50	100	10-500			AB							2	No	40	600.00	Tube/FET d.c. servo hybrid. As above.	
	A2	B/T	200	400	10-500			AB							2	No	60	1400.00		
DAVID HAFER CD.	DH220	B-K†	115	175	6-60	0.02	0.005	AB			30				2.5	No	26	449.95	†Kit, \$349.95; mono bridge kit opt †Kit, \$599.95; as above.	
	DH500	B-K†	255	400	5-40	0.025	0.007	AB			45				1.5	No	45	749.95		
	DH120	B/M	62	80	10-30	0.009		AB			45				No	16				
HARMAN/KARDON	hk870	B	100		10-80	0.06		AB			160	1V			No	30	525.00			
	PM640	I	35		10-60	0.05		AB	80	2.2	120	80	135		No	18	225.00			
	PM650	I	50		10-80	0.03		AB	80	2.2	200	80	135		No	26	425.00			
	PM660	I/MC	80		10-100	0.02		AB	84	2.2	200	80	135		No	31	595.00			
HEATH	AA-1800	B/K	250	500		0.025	0.02								2.5	No	50	649.95	Remote a.c. switching.	
HEYBROOK	P-2	B	80	150	20-50	0.01	0.01	AB						No		30	750.00	Unconditionally stable into all loads.		
HILL AUDIO	DX1000	B	300	600	20-20	0.003	0.002	Sup. A			100	1V	M, I	2	No	37	1499.00	†1000 W.		
	DX1000A	B	600	900	20-20	0.003	0.002	Sup. A			100	1V	M, I	2	No	40	1649.00			
	DX2000	B	300	600	20-20	0.003	0.002	Sup. A			100	1V	M, I	2	No	77	1849.00			
	DX3000	B	600	†	20-20	0.003	0.002	Sup. A			100	1V	M, I	2	No	79	2499.00			
HITACHI	HMA 8500	B	100	100	5-100	0.005	0.002	Sup. B				1V	M		No	34 1/8	650.00			
	MKII		100		5-40	0.005	0.005	B	96	2.5	230				No	12 3/8	430.00			
	HA6	I/MC	100		10-40	0.05	0.05	B	76	3.0	150		M, I		No	12 3/8	190.00			

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AMPLIFIERS

MANUFACTURER	Model	Unit Type: Integrated = I, Basic = B, Tube = T, Mono = M, Stereo = S, Moving Coil Input = MC	Cont. Average Watts/Channel into 8 Ohms		Power Bandwidth, Hz to kHz		Rated THD, %	Rated IHF IM, %	Class of Output Operation	MM Phono S.N. - dB	MM Phono S.N. - dB, "A" Wtd. re: 5 mV	Maximum MM Phono Input, mV	Rated Slew Rate, V/μs	High Level Sensitivity, mV	Meters = M, Peak Clip Indicators = I	Dynamic Sensitivity, mV	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes
			Cont. Average Watts/Channel into 4 Ohms	Power Bandwidth, Hz to kHz																
JANIS	Interphase 1-A	I	100		1-1	0.03		AB							Yes	20	625.00	Crossover and amp, 18 dB/octave filters at 100 Hz. Bass amp, 63-Hz low-pass filter, 18 dB/octave slope.		
	60-18	I	60		1-1	0.05		AB							No	17	395.00			
JRM	Power Tower	B/M	†	††	3-30	0.02	0.02	AB				80	†††	M, I	1.5	No	65	2000.00	†(2) 45 W and (2) 180 W, ††(2) 80 W and (2) 300 W, †††(2) 1.1 V and (2) 2.2 V; will drive 2-ohm speakers.	
JVC	M-L10	B	160		5-100	0.002	0.002	Sup. A	83	2.5	150			M	No	61.6	2100.00			
	A-X900B	I/MC	120		7-60	0.003	0.001	Dyn. Sup. A				200	No	No	27.6	550.00				
	A-X500V8	I/MC	100		5-40	0.007	0.005	Dyn. Sup. A	83	2.5	120		M	No	21	500.00				
	A-X400	I/MC	70		5-40	0.007	0.005	Dyn. Sup. A	85	2.5	100		M	No	17.2	300.00				
KENWOOD	KA-92B	I	120	560	20-20	0.04	0.02		79	2.5	170		M			23	350.00			
	KA-72B	I	70	290	20-20	0.05	0.02		79	2.5	150		M			16	245.00			
	KA-52B	I	50	250	20-20	0.09	0.02		79	2.5	150		M			16	180.00			
	M1	I	105		20-20	0.005	0.005	A				100		2.1		23	330.00			
	M2	I	220		20-20	0.004	0.004	A				100		1.5		38	600.00			
	KA-82B	I	130	750	20-20	0.007	0.004	A	87	2.5	200		M			20 1/4				
KINERGETICS	KBA-100	B	100	200	3-70	0.01	0.01	AB				60	1.5V	3.0	No	29	795.00			
	KBA-200	B	200	350	3-100	0.01	0.01	AB				90	1.5V	3.0	No	55	1495.00			
KRELL	KSA-50	B	50	100	0-500	0.05	0.05	A				250	700	0	No	65	1900.00			
	KSA-100	B	100	200	0-500	0.05	0.05	A				250	1V	0	No	95	2700.00			
	KMA-100	B/M	100	200	0-1M	0.01	0.01	A				500	1V	0	No	70	2100.00			
	KMA-200	B/M	200	400	0-1M	0.01	0.01	A				500	1.5V	0	No	140	3500.00			
KYOCERA	B-910	B	150	200	10-50	0.02	0.02	AB	94	2.2	200	120	2V	I	0.58		60	2000.00		
	A-910	I	150	200		0.02	0.02	AB				250	200	I	0.7		52	1550.00		
	A-710	I	100	140		0.02	0.02	AB	81	2.2	120	60	200	I			44	800.00		
MARK LEVINSON	ML-2	B/M	25	50	20-20	0.1	0.1	A				50	860		1.0	Sel.	65	6890.00	Pair	
	ML-3	B	200	400	20-20	0.2	0.2	AB2				15	1.3V	2.0	No	116	5575.00			
	ML-9	B	100	200	20-20	0.2	0.2	AB2				15	1.5V	2.5	No	56	2960.00			
	ML-11	B	50	100	20-20	0.5	0.5	AB2				15	633	1.0	No	25	1800.00			
	ML-15	B/M	100	200	20-20	0.1	0.1	A				15			Sel.		9000.00			
LSR&D	The Leach Amp	B	160	300	0.37-220	0.05	0.05	AB				70	1.8V	I	1.7	No	34	899.00	Twin toroidal power supply; kit, \$565.00. As above.	
	The Leach Super-Amp	B/M	300	500	0.3-200	0.05	0.05	AB				80	2.4V	I	2.0	No	34	899.00		
LUXMAN	M-05	B	105	210	20-20	0.025	0.012	Pure A				800	M			88.4	2800.00	Bridges to 320 W.		
	MX-100	B	140		20-20	0.012	0.012	AB	86	2.5	200		I		32	699.95				
	LX-104	I	120		20-20	0.012	0.012	AB	87	1.8	130		I		35.2	899.95				
	L-430	I	100		20-20	0.012	0.012	AB	87	1.8	130		I		28.7	529.95				
	L-400	I	55		20-20	0.012	0.012	AB	90	1.8	130		I		17.4	329.95				
	L-210	I	40		20-20	0.012	0.012	AB	90	1.8	130		I		14.8	299.95				
MARANTZ	PM730	I/M	70	85	20-20	0.03	0.03		85	2.5	120					18.7	420.00			
	PM64	I/M	100	125	20-20	0.01	0.01		80	2.5	225					26.5	429.95			
	PM54	I/M	60	75	20-20	0.015	0.015		80	2.5	200					22	349.95			
	PM440	I/M	45	55	20-20	0.02	0.02		80	2.5	175					11.7	259.95			
McINTOSH	MC2500	B	500	500	20-20	0.02	0.02	AB2					M			129	3300.00	Mono, 1000 W. Mono, 500 W. As above. Mono, 300 W. As above. Mono, 150 W. As above. Mono, 600 W.		
	MC2255	B	250	250	20-20	0.02	0.02	AB2					M			82	2790.00			
	MC2250	B	250	250	20-20	0.02	0.02	AB2					M			80	2300.00			
	MC2155	B	150	150	20-20	0.02	0.02	AB2					M			65	2150.00			
	MC2150	B	150	150	20-20	0.02	0.02	AB2					M			58	1800.00			
	MC502	B	50	75	20-20	0.02	0.02	AB2					M			27	1100.00			
	MA6200	I	75	100	20-20	0.05	0.05	AB2	85	2.5		250				30	1649.00			
	MC2002	B	200	300	20-20	0.01	0.01	AB2					Sel.	M, I	1.7	No	50		1850.00	
MERIDIAN	MPA	B	70	120	20-20	0.005	0.005	AA				775		0	Sel.		950.00	Bridges to 200 W.		
	MCA	I	35		20-20	0.003	0.003	AA						0	Sel.		870.00			
MICHAELSON & AUSTIN	Monoblok 100	B/T/M	100		12-65	0.3		AB								31	2200.00	Up to 60 W Class A.		
	Monoblok 200	B/T/M	200		12-70	0.25		A/AB								70	4400.00			
	TVA-1X	B/T/M	70		8-45	0.05		AB								72	2200.00			
MICRO-TRAK	10-P	I	10	12	20-15	0.1	0.1	A				10			22	No	3 1/2	199.50		
MISSION ELECTRONICS	Cyrus I	I	25	50	1-50	0.004	0.005	AB	83	0.4	115	140	325	1.4	No	10	399.00			
	Cyrus II 777	B	50	100	1-50	0.004	0.004	AB	83	0.31	115	150	325	1.4	No	11	599.00			
MONOLITHIC SOUND	100i	I/T/MC	100	160	5-50	0.1	0.1	A/AB				50	200		Sel.	38	1499.00	Hybrid crossover. As above.		
	150m	B/T/M	150	240	5-50	0.1	0.1	A/AB							Sel.	32	899.00			
	a 150	B	150	240	5-50	0.05	0.05	AB							Sel.	36	899.00			
	80i	I/MC	80	140	5-50	0.05	0.05	AB							Sel.	28	799.00			
	a 80	B	80	140	5-50	0.05	0.05	AB							Sel.	24	499.00			



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AMPLIFIERS

MANUFACTURER	Model	Unit Type: Tube - T Magnetic Core - M Cath. Input - MC	Cont. Average Watts/Channel into 8 Ohms		Cont. Average Watts/Channel into 4 Ohms		Power Bandwidth, Hz to kHz	Rated THD, %	Rated IHF IM, %	Class of Output Operation	MM Phono S.N. - dB		Maximum MM Phono Input, mV	Rated Slew Rate, V/μs	High Level Sensitivity, mV	Meters = M, Peak Clip Indicators = I	Dynamic Headroom, dB	Does Unit Invert Phase?	Weight, Lbs.	Price \$	Notes
			25	35	10-50	0.03					0.02	AB									
NAD	3020B	I	25	35	10-50	0.03	0.02	AB	75	1.25	170	200†	3	No	11½	218.00	†1 V out.				
	3120	I	25	35	10-50	0.03	0.02	AB	75	1.25	170	200†	3	No	11½	198.00					
	3125	I	30	35	10-50	0.03	0.02	AB	75	1.25	140	200†	4	No	10½	248.00					
	3155	I	55	65	10-100	0.03	0.02	AB	79	1.75	200	175†	3	No	18½	398.00					
2155	B	55	65	10-100	0.03	0.02	AB				20	20	3	No	17½	298.00					
NAIM AUDIO	NAIT	I	20		20-20			B		2.5		75				12	399.00				
	NAP110	B	40	55	20-20			B		2.5						14	695.00				
	NAP160	B	50	80	20-20			B								27	1095.00				
	NAP250	B	70	125	20-20			B								28	1895.00				
	NAP135	B M	70	135	20-20			B								30	1895.00				
NEC	A7E	I MC	50	100	5-150	0.006	0.006	AB	90	2.5	150				10	26.4	349.00	Volume mute, 20 dB; two tape inputs with copy. Class A phono.			
	A11E	I	70	140	5-150	0.003	0.003	AB	90	2.5	300				10	48.4	799.00				
NEI	A100	B	100	160	3-70	0.1	0.1	AB	95			40	No	3	No	19	649.00	Bridges to 350 W, 8 ohms; 550 W, 4 ohms.			
NEW YORK AUDIO LABORATORIES	OTL-1	T/M	100	80	1.4-200	0.05	0.05	AB				33	M	12	No	300	10,000.	Four chassis, two power supplies. Triode output.			
	OTL-2	T	30	15	1.4-200	0.05	0.05	AB				33	M	8	No	80	3000.00				
	OTL-3	T/M	90	75	1.4-200	0.05	0.05	AB				33	M	8	No	110	5500.00				
	OTL-4	T	45	30	1.4-200	0.05	0.05	AB				33	M	8	No	80	3000.00				
	Moscade I	T	150	225	1.2-200	0.005	0.005	AB				33		8	No	20	899.00				
	Moscade II	T	250	400	1.2-200	0.005	0.005	AB				33		8	No	40	1599.00				
NIKKO	Alpha 450	B	220	240	5-100	0.008	0.008	A†				100	1V		No	47	1050.00	†Non-switching.			
	Alpha 230	B	120	130	5-70	0.008	0.008	A†				100	1V		No	29¾	550.00				
	Alpha 130	B	100	150	10-40	0.03	0.03	AB				100	1V		No	28¾	400.00				
	NA 2000	I MC	85		5-45	0.01	0.01	AB	86	2.5	150	150			No	22	330.00				
	NA 700 II	I MC	60		5-40	0.03	0.03	AB	88	2.5	150	150			No	16½	250.00				
	NA 500 II	I MC	40		10-35	0.06	0.06	AB	80	2.2	120	150			No	12¾	210.00				
NOVA ELECTRO-ACOUSTICS	DCA-300	B	75	150	20-750	0.01	0.01	A/AB				60	150	1	No	35	1595.00	Class A, 8 W.			
DNKYO	A-22	I	40		40-20	0.5		Lin. AB	75	2.5	150	150				13½	159.95				
	A-44	I	50		40-20	0.5		Lin. AB	75	2.5	180	150				13½	249.95				
	A-8015	I	55		20-20	0.018		Lin. AB	80	2.5	180	150				20	329.95				
	A-8017	I	75	115	20-20	0.015		Lin. AB	80	2.5	210	150				25	414.95				
	A-8019	I	100	170	20-20	0.012		Lin. AB	80	2.5	210	150				26	494.95				
	M-5030	B	100		20-20	0.005	0.005	Lin. AB					M			38	599.95				
	M-5060R	B	130		20-20	0.005	0.005	Lin. AB					M			41	799.95				
	M-5090	B	200		20-20	0.01	0.01	Lin. AB					M			68	1799.95				
	PAOLI	Sons	B/T/M	80	80	20-30	1.0	1.0	AB1							No	49	4000.00	Pair		
PARASOUND	PA260	B	60	70	20-20	0.02	0.01	AB				95	250		2	No	14	219.95	Bridges to 150 W.		
PERREAUX	PMF 1150B	B	100	200	10-3M	0.009	0.009	AB					No	3	No	36	1150.00	120 V peak-to-peak. 1550.00 220 V peak-to-peak.			
	PMF 2150B	B	200	400	10-3M	0.009	0.009	AB					No	3	No	52	1550.00				
	PMF 5150B	B	500	1k		0.03	0.03	AB					No	3	No	110	3500.00				
PHASE LINEAR	DRS250	I MC	50			0.015	0.009	AB	90	1.1	150	100	64	6.0	No	26	875.00				
	DRS400	B	50			0.015	0.009	AB				100	500	6.0	No	24	695.00				
	DRS900	B	150			0.015	0.009	AB					M, I	4.8	No	44	1095.00				
PIONEER	A-90	I MC	200		20-20	0.002	0.002	†	89	2.5	300	150	L			43.2	1030.00	†Non-switching.			
	A-70	I MC	120		20-20	0.003	0.003	†	87	2.5	150	150	L			27.1	520.00				
	A-60	I MC	100		20-20	0.007		†	86	2.5	200	150	L			20.8	350.00				
	A-40	I	70		20-20	0.009		†	86	2.5	150	150	L			14.3	270.00				
PRECISION FIDELITY	M-8	B T	100	200	5-50	0.5	0.1	AB				40	1V	1.5	No	35	899.00	Hybrid tube input; no negative feedback.			
	M-7B	B T	80	80	20-30	0.1	0.1	AB				30	1V	6	No	46	1899.00				
PROTON	P550	I	50		20-20	0.02		AB	78								300.00				
	P520	I MC	20		10-100	0.015	0.014	AB	82		290			4.7		15	200.00				
PS AUDIO	Elite	I MC	55	110	5-50	0.1	0.1	AB	80	1	165	40	210		No	25	750.00	Remote power supply. As above. As above. As above.			
	Elite +	I MC	70	135	5-50	0.01	0.005	AB	80	1	165	140	210		No	25	920.00				
	IIC	B	55	110	5-50	0.1	0.1	AB				40	140		No	23	450.00				
	IIC +	B	70	135	5-50	0.01	0.005	AB				40	140		No	23	630.00				
PSE	Studio Two	B	80	140	10-30	0.02	0.02	AB				100	100	1	No	23	790.00	Rack mount opt.			
QED	A230	I	30	50	15-30	0.1		AB	65	3	120		300	No	No	10	269.00				
QUAD	303	B	45		30-35	0.03		B				0.1			Yes	18	395.00	Feedforward.			
	405.2	B	100	145	20-50	0.01		B							Yes	20	675.00				
QUICKSILVER AUDIO	Mono Amp	B T M	65	95	13-55			AB				10			No	30	498.00				
	MX-190	B T	95	95	16-70			AB				30			No	95	2650.00				
REVDX	B740	B	100	175	20-20	0.04	0.04	AB	75	1.6	23	30	1V	M	2	No	44	2200.00	†LCD bar.		
	B251	I MC	100	140	20-20	0.01	0.01	AB					160	†	No	18¾	1500.00				

AMPLIFIERS

MANUFACTURER	Model	Unit Type: Integrated = I, Basic = B, Tube = T, Mono = M, Kit = K, Moving Coil Innd. = MC.	Cont. Average Watts/Channel into 8 Ohms		Cont. Average Watts/Channel into 4 Ohms		Power Bandwidth, Hz to kHz	Rated THD, %	Rated IHF IM, %	Class of Output Operation	MM Phono S/N, -dB	A' Wid. re: 5 mV	Maximum MM Phono Input, mV	Rated Stew Rate, V/μS	High Level Sensitivity, mV	Meters = M, Peak/Clip Indicators = I	Dynamic Headroom, dB	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes
			100	180	20-20	0.01															
RGR	Five-2	B	100	180	20-20	0.01	0.015	AB						I	2	No	33	1275.00	50 amperes/channel, peak-to-peak.		
ROBERTSON AUDIO	Forty Ten Sixty Ten	B B	60 200	125 400	0.5-330 0.5-250	0.1 0.1	0.05 0.0023	AB AB					159 256			No No	25 65	895.00 2550.00			
ROTEL	RBB80 RB870 RAB70 RAB40B RAB20B	B B I/MC I/MC I	100 60 60 40 25	200 118 118 58 35	20-20 20-20 20-20 20-20 20-20	0.03 0.03 0.03 0.03 0.03	0.03 0.03 0.05 0.03 0.08										27 20½ 21½ 16½ 12	499.00 375.00 475.00 299.00 199.00			
SAE	A201 A301 A501 A1001 P10 A14 I102 X10A X15A X25A	B B B B B I I B B B	100 150 250 500 100 140 60 100 150 250	150 225 375 750 150 210 90 150 225 375	20-20 20-20 20-20 20-20 20-20 10-60 20-20 20-20 20-20 20-20	0.025 0.025 0.025 0.025 0.025 0.05 0.05 0.02 0.02 0.02	0.025 0.025 0.025 0.025 0.025 0.05 0.05 0.02 0.02 0.02	AB AB AB AB AB AB A A A			84 82	2.5 2.5	200			M M M M M M M M M M	No No No No No No No No No No	28 35 50 80 88 32 28 28 36 47	650.00 850.00 1050.00 1550.00 399.00 799.00 499.00 900.00 1100.00 1500.00		
SANSUI	B-2301 B-2101 AU-G99X AU-G90X AU-G77X AU-G55X AU-G33X	B B I/MC I/MC I/MC I/MC I/MC	300 200 160 130 110 65 45	300 200 160 130 110 65 45	20-20 20-20 20-20 20-20 20-20 20-20 20-20	0.003 0.003 0.003 0.003 0.004 0.004 0.004	0.003 0.003 0.003 0.003 0.004 0.004 0.004	X-Bal. X-Bal. X-Bal. X-Bal. X-Bal. X-Bal. X-Bal.										81.4 39.6 39.6 37.4 25.9 18 17.1	2600.00 800.00 900.00 800.00 500.00 370.00 300.00	X-balanced circuitry, 8-ohm speaker switch. As above. As above. As above. As above; built-in five-band EQ. As above less EQ. As above.	
H. H. SCOTT	459A 439A	I I	45 35	45 35	20-20 20-20	0.05 0.05	0.05 0.05			80 80	2.5 2.5	180 160						17 15	264.95 229.95		
SFI	RM2	B	100	200	20-100	0.3	0.3	AB						No		No	33	2500.00	No loop feedback.		
SHERWOOD	AD-2220CP AD-2210CP S-6040CP	I I B	65 30 100	90 42 180	20-20 20-20 20-20	0.02 0.08 0.03	0.02 0.08 0.03	AB AB AB	92 88	2.5 2.5	160 140	150 150	M M M	1.3 1.4 1.67			20 16 31	299.95 199.95 399.95	MOS-FET.		
SIMA ELECTRONICS	PW-2000 W-2002 W-2003	I B B	40 120 250	80 200 450	20-20 20-20 20-20	0.2 0.09 0.09	0.2 0.09 0.09	AB AB AB	70	2.5	200	40 60 60	200	Opt. Opt.		No No No	27 20 55	710.00 775.00 1500.00	Bridges to 400 W. Bridges to 850 W.		
SONOEX	S 230	I/MC	30	50	10-60	0.05	0.06	AB	80	2		450			26		8	449.00	MM or MC disc-matching plug-in boards, \$29.95.		
SONY	TA-AX500	I/MC	80		5-50	0.008	0.008	AB	91	2.5	150	150			1.8	24%		320.00			
SONY ES	TA-F444ES TA-F555ES	I/MC I/MC	80 100	100 100	5-80 5-100	0.004 0.004	0.004 0.004	AB AB	93 93	2.5 2.5	150 150	100 100	150 150		1.2 1.2	29¾ 28¾	490.00 650.00				
SONY ESPRIT	TA-N900 TA-N901	B/M B	200 150	200 150		0.05 0.1	0.05 0.1	A A				150 150	1.7V 1.4V	I		23¾ 28¾	1750.00 2500.00	MOS-FET; no negative feedback. No negative feedback.			
SOUNDCRAFTSMEN	PCR800 A5001 A5002 DOR1200 A2801 A2502	B B B B B B	205 250 250 250 140 125	205 375 375 375 205 190	20-20 20-20 20-20 20-20 20-20 20-20	0.05 0.09 0.09 0.09 0.05 0.05	0.05 0.05 0.05 0.05 0.05 0.05	AB H H H AB AB				40 50 50 40 40	950 1.3V 1.3V 1.3V 950 950	I M, I M, I M, I	2.1 2.1 2.1 2.6 2.0	No No No No No	18 50 52 55 30 32	449.00 749.00 899.00 1199.00 549.00 649.00	Phase control regulated. Vari-portional signal tracking supply. As above. 100 LED real-time display. MOS-FET. As above.		
SPECTRAL	DMA-100	B	100	200	0-1M	0.01	0.01	A				600	1.4V			No	66	3495.00	All FET.		
SPECTRASCAN	BPA-100B BPA-100M BPA-200B	B B B	100 120 150	175 175 200	1.6-150 1.6-150 1.6-150	0.05 0.05 0.05	0.05 0.05 0.05	AB AB AB				50 50 50	1V 1V 1V	I M, I I	† † †	No No No	35 35 40	995.00 1395.00 1195.00	†Regulated power supply.		
STAX	DA-100M DA-50M	M M	100 50	200 100	5-60 5-60	0.008 0.008	0.008 0.008	A A				100 100	1.4V 1.4V	I I	2.0 1.0	No No	34 30	2000.00 1400.00	Special order. As above.		
STREETS ELECTRONIC SYSTEMS	950	B	95	180	0.5-80	0.1	0.05	AB1				70			0	No	46	2295.00			
STRELIOFF	DC1 400/400 SC1 300 SC1 500	B B/M B/M	500 400 600	740 650 850	10-30 10-30 10-30			AB AB AB				45 55 60	1.75V 1.75V 1.75V	1.0 1.0 1.0	No No No	67 65 85	3500.00 2500.00 4000.00	Special order. As above. As above.			
SUMO	Nine Nine Plus Andromeda Polaris	B B B B	60 65 200 100	120 120 375 175	20-20 20-20 20-20 20-20	0.25 0.10 0.05 0.05	0.05 0.05 0.05 0.05	A A AB AB				15 15 20 20	1V 1V 1.8V 1.3V		1.0 1.5 1.5	No No No No	35 35 35 25	779.00 999.00 899.00 479.00			
SWISS PHYSICS	MDN 300 MDN 100	M B	300 100	550 200	0-800 0-800	0.005 0.005	0.002 0.002	X X								No No	27 27	3900.00 3950.00			

AMPLIFIERS

MANUFACTURER	Model	Unit Type: Integrated=I, Base=B, Tube=M, Mono=M, Kit=K, Working Coil=WC, Inpd=MC	Cont. Average Watts/Channel into 8 Ohms	Cont. Average Watts/Channel into 4 Ohms	Power Bandwidth, Hz to kHz	Rated THD, %	Rated IHF IM, %	Class of Output Operation	MM Phono S/N, -dB	MM Phono S/N, -dB, A Wid. re: 5 mV	Maximum MM Phono Input, mV	Rated Slew Rate, V/μS	High Level Sensitivity, mV	Meters=M, Peak/Clip Indicators=I	Dynamic Headroom, dB	Does Unit Invert Phase?	Weight, Lbs.	Price, \$	Notes
TANBERG	TIA 3012	I	100	125	20-20	0.02	0.02	AB	78	0.19	250	400	150	I	13½	No	21.4	995.00	14 amperes/channel, peak-to-peak. No negative feedback; 28 amperes/channel, peak-to-peak.
	TPA 3006A	B	150	235	20-20	0.02	0.02	AB				70	1V	I		No	25	995.00	
TECHNICS	SU-V4X	I	65	65	20-20	0.004	0.004	New A	77	0.3	150		210		No	16	300.00	†At 8 ohms, 1.5 dB; at 4 ohms, 3.2 dB. †At 8 ohms, 1.0 dB; at 4 ohms, 2 dB.	
	SU-V6X	I	100	100	20-20	0.003	0.007	New A	77	0.25	170		170		No	24	390.00		
	SE-A5 MKII	B	150	150	20-20	0.002	0.002	New A						†	No	41	800.00		
	SE-A3 MKII	B	300	300	20-20	0.002	0.002	New A						†	No	86	2200.00		
	SE-A7	B	60	60	20-20	0.003	0.003	New A							No	21	500.00		
THRESHOLD	S/150II	B	90		7-100	0.1	0.1	Stasis				50			No	44	1490.00	20 amperes/channel, peak-to-peak. 30 amperes/channel, peak-to-peak. 40 amperes/channel, peak-to-peak. 50 amperes/channel, peak-to-peak.	
	S/300II	B	150		7-100	0.1	0.1	Stasis				50			No	56	2200.00		
	S/500II	B	250		7-100	0.1	0.1	Stasis				50			No	78½	3150.00		
	S/1000II	B/M	500		7-100	0.1	0.1	Stasis				100	M		No	79	3450.00		
VECTOR RESEARCH	VA-1100	I/M	40	60	20-20	0.03	0.03		78	2.5		150	M	3		13¾	239.95	Discrete, 8 output transistors. As above; bridgeable. As above.	
	VA-1400 VA-1450	I/M B	60 60	100 100	20-20 20-20	0.03 0.03	0.03 0.03		80	2.5		150 1V	M 3	3 3		20 20¾	299.95 279.95		
VSP LABS	TransMos 150	B	150	200	20-20	0.05	0.05	AB				70	1.76V	3	No	40	975.00	Transconductance MOS-FET. As above.	
	Gold Edition	B	200	300	20-20	0.08	0.05	AB				70	2V	1.6	No	50	1400.00		
WINGATE AUDIO	4000A	B	100	200	0.05-300	0.2	0.1	A				100		4	No	47	950.00	MOS-FETs with no negative feedback.	
YAMAHA	A-1000	I/MC	120	170	10-100	0.003	0.002	A/AB	94	0.23	165		150		1.4	No	28¾	590.00	
	A-700	I/MC	105	150	10-100	0.003	0.002	A/AB	92	0.25	165		150		1.4	No	24¾	450.00	
	A-500	I/MC	70	100	10-50	0.003	0.01	AB	92	2.5	165		150		1.5	No	16	320.00	
	A-400	I/MC	40	60	10-40	0.007	0.02	AB	83	2.5	165		150		1.3	No	12	220.00	
	BX-1	B/M	100	100	10-100	0.001	0.001	A				600			No	40½	2000.00		
	M-80	B	250	330	10-100	0.003	0.003	A AB							1.6	50¾	950.00		
	M-60	B	160	210	10-100	0.003	0.003	A AB							1.6	33	650.00		
	M-40	B	120	170	10-100	0.003	0.003	A AB							1.4	30¾	400.00		

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From the Hirsch-Houck Test Report, Stereo Review, June 1984

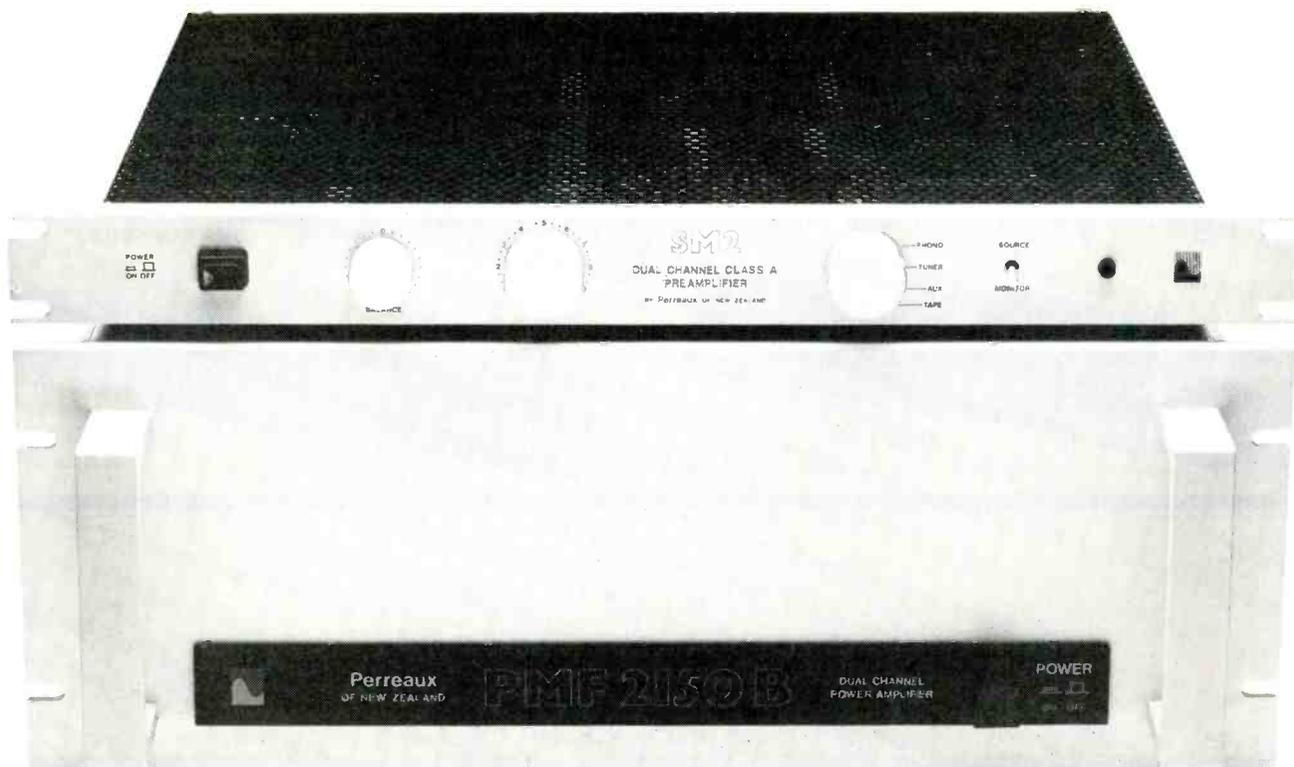


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In audio, excess means a profusion of lights, switches, and a confusing array of features you probably will never use. You wonder whether this melodrama is really necessary to transmit pure sound.

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At Perreaux of New Zealand we believe that excess is vulgarity and simplicity is refinement. Perreaux uses no integrated chips or trick circuits. Every circuit has been refined over and over again until it accomplishes its task with the shortest circuit path and the fewest parts.

Perreaux's audio components require far fewer parts than any other audio components made. Therefore, they are the most refined audio components in the world.

- While others use additional parts to correct for differences in transistors, Perreaux tests, calibrates and matches every transistor. Over 90% of the transistors tested for use in Perreaux preamplifiers are rejected.
- While others use additional parts to block radio interference, Perreaux plates its circuit board with 24 karat gold, creating the most conductive ground plane possible to "absorb" and isolate interference.
- While others require complex protection circuits to prevent their amplifiers from self destructing, Perreaux power amplifiers require no protection circuitry whatsoever because their stability is inherent in their design.
- While others require fans to cool high powered amplifiers, Perreaux designed and manufactured heat sinks of such detail and precision that over 60 ribs are extruded per inch of fin providing more cooling per square inch than any other amplifier in the world, while maintaining each output device's temperature within $\pm 1^\circ$ centigrade.

In order to achieve this state of simple beauty, every Perreaux audio component is completely handcrafted with the utmost of skill and precision. From the cutting and anodizing of the metalwork to the soldering of the parts, everything is accomplished with exactitude in one facility, under the supervision of Peter Perreaux, as it has been for over 10 years.

Purity can only be achieved through refinement. The fewer the parts the original signal is modified by, the purer the result. What may seem to the eye to be a paucity of components is actually a classic attitude – where less is more.

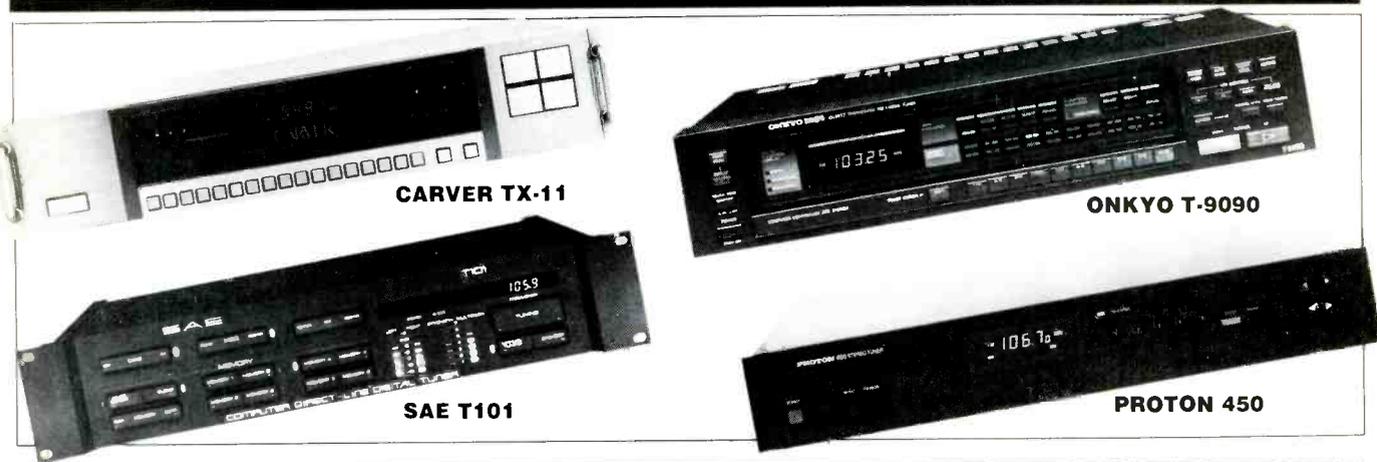
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Only one factory in the world completely handcrafts audio components – Perreaux of New Zealand

TUNERS



MANUFACTURER	Model	FM Only = F, Digitally Synthesized = D	IHF 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 Memory Presets	Separation, db, 1 MHz	Separation, db, 10 MHz	THD, %, Mono/Stereo, 1 kHz, 100% Modulation	THD, %, Mono/Stereo, 6 kHz, 100% Modulation	Maximum S/N, — db, Mono/Stereo	Weight, lbs.	Price, \$
ACCUPHASE	T-106	D	11/29	17/37	1.5/1.5	80	70/100	14	50	45	0.04/0.04	0.04/0.08	83/79	19.8	1100.00
ADCOM	GFT-1A GFT-2	D D	9.8	17.2/34.7 17.5/38.5	1.0 1.2	50	85 70	16 14	55 50	45 45	0.08/0.1 0.09/0.18	0.09/0.15 0.1-0.22	80/75 75/70	14 14	375.00 249.95
ADS	T2	D	11.0/26.1	14/35	2.5	55	75	16	38	32	0.15/0.2		70/65	13.2	399.00
AKAI	AT-S3 AT-S7	D D			1.5 1.0		25 25/35	16 20	45 53				75/65 80/75		199.95 249.95
AMBER	7	D	11.2/37.2	15.2/37.2	1.0	58	60	12	48		0.08/0.1		75	8½	349.00
CARVER	TX-11 TX-2	F/D D	11.3/16.3 11.3/16.3	16.3/21 16.3/23.5	1.0/1.5 1.5	65 50	65/110 58	16 16	45 45	36 25	0.04/0.08 0.3/0.3	0.05/0.1 0.05/0.1	82/85 82/85	11¼ 8¼	599.00 375.00
CREEK AUDIO	CAS 3040	F							40	40				10	299.95
CROWN INTERNATIONAL	FM-2	D	9.3/	11.2/	1.5	80	75	6	60	45	0.05/0.05	0.05/0.05	75/70	9½	699.00
DENON	TU-720 TU-747 TU-767	D D D	9.8 10.2 10.2	15.6/34.7 14.2/35.2 14.2/35.2	1.0 1.0 1.0	55 60 65	65 65 50/60	16 16 16	55 50 57		0.04/0.06 0.08/0.10 0.03/0.04		86/84 86/84 86/84	8½ 8 8½	225.00 275.00 350.00
DAVID HAFNER CO.	DH330	F/D	11.3	17.2/37.2	1.5		60	5	45	35	0.1/0.1		72/68	9	449.95; Kit, 374.95
HARMAN/KARDON	TU910 TU915	D	10.8 10.8	16.4/37.3 16.4/37.3	1.0 1.0	54 60	70 70	16	58 60		0.06/0.1 0.05/0.08	0.05/0.08	82/74 82/74	10 11	235.00 365.00
HITACHI	FT5500UR FT2	D D	10.8 10.8	19.2/38.2 19.2/39.2	1.0 1.0	65 56	45/65 55	10 16	60 45	45	0.04/0.06 0.15/0.3	0.06/0.08	85/78 25/70	8⅞ 5⅞	350.00 150.00
JVC	T-X900B T-X300	D D	10.8 10.8	16.3/38.1 16.3/38.1	1.0 1.0	65 60	30/80 65	20 16	60 50		0.04/0.06 0.08/0.08		88/82 82/78	8.4 3.2	350.00 270.00
KENWOOD	KT-52B KT-42B T-1 KT-727	D D D D		14.5/37.2 14.5/37.2 16.4/37.2 16.2/38.8	1.5 1.5		50 50 50 70	10 6 12 12	45 45 45 69	35 35	0.15 0.15 0.1/0.15 0.02/0.04		77/73 76/71 72/69 68/83	8 8 8 8.6	200.00 165.00 200.00
KYOCERA	T-910	D	9.8/	14.8/35	1.0	65	85/40	16	58	40	0.06/0.07		88/76	26½	625.00
LUXMAN	TX-101 T-240	D	10.3/ 10.3/	13.2/ 13.7/	1.2 1.5	47	80 80	24 24	50 50		0.06/0.07 0.08/0.1		78 76	9.8 6	349.95 229.95
MARANTZ	ST530 ST440 ST340	D D D	10.3/ 10.8/ 12.1/	14/37 15/37 17/40	1.2 1.0 1.5		72 60 60	16 16			0.15/0.25 0.15/0.3 0.2/0.5		78/71 76/68 75/68	6.6 4.6 5.1	265.00 179.95 149.95
McINTOSH	MR80 MR75 MR500	F/D F/D	9.3/ 11.2/ 13/	14.7/ 19.1/ 16.8/37.3	1.5 1.8		110 75 70	4 6 0	50 45 50	35	0.2/0.2 0.18/0.38 0.08/0.18	0.15 0.08/0.18	75 70 80/75	27 23 18	2499.00 1349.00 1499.00
MERIDIAN	MCT	F			1	55		8	45		0.02/0.12		70/65		395.00
NAD	4020B 4125 4155	D D D	10.9/ 9.8/ 9.8/	16/37 13.2/32 13.2/32	1.5 1.5 1.5	60 65 75	65 70 70	10 10 10	42 50 52	32 40 45	0.2/0.3 0.09/0.09 0.09/0.09	0.3/0.4 0.2/0.3 0.2/0.3	75/70 83/80 84/82	9⅞ 6 8½	198.00 248.00 348.00

TUNERS

MANUFACTURER	Model	FM Only = F, Digitally Synthesized = D	IHF Sensitivity, dbf, Mono/Stereo	Signal Strength for 50-dB Quieting, dbf, Mono/Stereo	Capture Ratio, db, Mono/Stereo	AM Suppression, db, Wide/Narrow	Alternate Channel Selectivity, db, Wide/Narrow	Total Number of Memory Presets	Separation, db, 1 kHz	Separation, db, 10 kHz	THD, % Mono/Stereo, 1 kHz, 100% Modulation	THD, % Mono/Stereo, 6 kHz, 100% Modulation	Maximum S/N, -db, Mono/Stereo	Weight, Lbs.	Price, \$
NEW YORK AUDIO LABORATORIES	MOS Code Major Armstrong (Tube)	D	10.3/16.1	16.1/37	0.5	65	8	50	35	0.1/0.15	0.12/0.17	65/80	7	599.00	
NIKKO	Gamma 30 NT-2000 NT-7001 NT-5001	D	11.2/	14.34	1.5	50	60	14	45	35	0.15/0.2		70/67	8.8	425.00
		D	11.2/	14.20	1.5	50	60	14	45	35	0.15/0.2		70/67	8.6	270.00
		D	11.5/	14.7/36	1.5	60	60	12	45	35	0.1/0.2		75/68	9.5	228.00
		D	10.8/	14.7/36.1	1.5	50	60	0	45	35	0.1/0.2		75/65	9.9	166.00
ONKYO	T-22 T-33 T-44 T-4015 T-4017 T-9060 T-9090	D	11.2/17.2	17.3/39.2	1.5	50	55	16	40	30	0.15/0.3		70/63	7	114.95
		D	11.2/17.2	16.1/36.1	1.5	50	55	16	40	30	0.1/0.2		73/66	8 1/2	189.95
		D	10.8/17.2	16.1/36.1	1.5	50	55	16	40	30	0.1/0.2		73/66	7	259.95
		D	10.8/17.2	16.1/36.1	1.3	50	55	16	40	30	0.1/0.2		75/68	10	259.95
		D	10.3/17.2	14.7/36	1.0	80	16	45	33	33	0.05/0.1		81/73	10 1/2	364.95
		F/D	10.3/17.2	14.7/36.1	1.0	60	80	7	45	33	0.05/0.13		81/73	12 1/2	489.95
		F/D	10.3/18.0	15.8/37.2	1.0	60	80	20	55	33	0.009/0.02		95/85	15	599.95
PARASOUND	ST220	D	10.8/	16.1/37.7	1.4	65	66	12	48	36	0.1/0.15	0.1/0.15	82/76	12	219.95
PHASE LINEAR	T5200	D	10.8/	15/37	1.0/2.5	65	40/85	12	55	48	0.03/0.05	0.03/0.10	90/85	15	450.00
PIONEER	F-90 F-70 F-101T	D	10.8/	16.2/37.7	0.8		85	16	65	50	0.0095/0.02	0.01/0.07	93/86	9.9	320.00
		D	10.8/	16.2/37.2	1.0		56	16	50	35	0.05/0.08	0.1/0.2	85/80	5.5	200.00
		D	10.8/	17.3/39.2	1.0		70	16	40		0.02		75/70	7.9	270.00
PROTON	P440 P450	D	10.3/	14.2/14.2	1.5	67		12	65		0.4/0.4		75/75	15	270.00
		D	5/	12.5	0.5	70	70	10	40		0.05/0.08		83/80		295.00
PSE	Studio Three	F		17/40	1			6	50		0.2/0.3		75/70	9	530.00
QED	T231	F					55	6					72	18	299.00
REVOX	B261	D	10.8/34.8	13.2/34.8	2.2	72		20	43	40	0.031/0.07	0.01/0.01	79/75	18 3/4	1500.00
ROTEL	RT820 RT860	D		16.39.4	2		62	0	38	33			70/65	7	149.00
		D		14.6/37.2	1		58	12	48	40	0.2/0.3		75/73	8 1/2	299.00
SAE	T101 T102 T14 T6	D	10.3/17	14.35.3	1.2/2.2		60	8	55/45	40/35	0.05/0.08	0.01/0.15	75/70	20	650.00
		D	17.2/23.3	20.4/41.9	1.7	55	30	16	50	40	0.1/0.15		75/70	17	349.00
		D	10.3/17.3	17.3/34.8	1.5/1.0	55	40/70	5	48/40	40/36	0.08/0.15	0.22/0.30	76/70	12	599.00
		D	11.25/17.3	17.3/36.11	1.5/1.5	55	65/65	0		40	0.10/0.25		75/67	12	329.00
SANSUI	TU-D99X TU-S77AMX with AM & FM Stereo TU-D55X TU-D33X	D	10.8/	16.2/	1.0			16					50/	7.7	350.00
		D	10.8/	16.2/	1.0			16					50/	7.7	390.00
		D	10.8/	16.0/	1.0			16					50/	6.2	280.00
		D	10.8/	17/	1.0			12					50/	5.3	190.00
H. H. SCOTT	559T 539T	F/D	9.8/	15/35	1.2	55	75	14	50	45	0.1/0.15		75/70	8	249.95
		F	10.3/	15/35	1.2	55	65		50	45	0.1/0.15		72/66	8	159.95
SEQUERRA	Model 1 Broadcast Analyzer	F	5.0/15	12.9/34	0.75	70	100		40	40	0.10/0.15	0.10/0.18	70/70	48	5000.00 Spectrum, multipath & vector analyzers inc.
SHERWOOD	TD-2010CP S-6010CP	D	10.8/	15.8/39.2	1.5		65	12	50		0.1/0.15		75	8	199.95
		D	10.3/	15.3/36.5	1.0		80	16	50		0.09/0.09		75	10	259.95
SONY	ST-JX500	D	10.3/	16.1/37.9	1.0	60	80	10	50	35	0.08/0.1	0.1/0.15	90/84	6 1/2	250.00
SONY ES	ST-S444ES ST-S555ES	D	10.3/	16.8/37.9	1.0/	65	60/90	8	60	45	0.03/0.04	0.03/0.12	91/86	9 1/4	340.00
		F/D	10.3/	16.8/37.9	1.0/	65	60/90	8	60	45	0.03/0.04	0.03/0.12	92/86	10 1/4	450.00
SOUNDCRAFTSMEN	T6002	D	9.5/30	16.2/35	1.2		70	14	50		0.1/0.2		80/74	13	299.00
SUMO	Charlie	F/D	13/18	17/37	1.0/1.0	60	65/100	5	50	40	0.04/0.05	0.05/0.08	80/74	12	499.00
TANDBERG	TPT 3001A TPT 3011A	F	7.5/	10.3/25.2	0.4/3	70	30/90	8	70	50	0.03/0.04	0.03/0.1	95/92	15.3	1195.00
		F	9.8/	14.8/37.3	0.9	70	100	8	40	40	0.2/0.3	0.3/0.4	78/75	12.6	695.00
TECHNICS	ST-G5 ST-G7 ST-S8	D	10.8/	18.1/38.1	1.0	55	55/25	16	65	50	0.03/0.04		80/70	6	220.00
		D	12.8/	18.1/38.1	1.0	70	55/25	16	65	50	0.02/0.03		94	9	400.00
		D	10.8/	16.3/37.2	1.0	55	55/25	16	55	50	0.04/0.06		80/74	9	400.00
VECTOR RESEARCH	VU-1200 VU-1500	D	11.2/	16.39	2	62	60		40	35	0.3/0.6		70/65	6 3/4	109.95
		D	11.2/	14.6/37	1	58	60		50	40	0.08/0.2	0.2/0.3	75/73	8 1/2	179.95
YAMAHA	T-80 T-1000 T-700 T-500 T-300	D	10.3/	15.3/37.2	1.2	70	85	10	65	50	0.03/0.03	0.06/0.07	94/86	11	395.00
		D		15.3/37.2		65	30/85	10	65	50	0.03/0.05	0.06/0.08	92/85	8 3/8	320.00
		D		15.3/37.2		60	55	10	58	45	0.05/0.07	0.1/0.15	89/84	8 3/8	280.00
		D		15.1/37.7	1.5	55	85	5	40		0.1/0.2		81/76	6 1/4	230.00
		D		15.1/37.7	1.5	55	85	85	40		0.15/0.3		81/76	7	180.00

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And once you've experienced its performance, you'll feel more at home on the road with Sansui than any other brand.

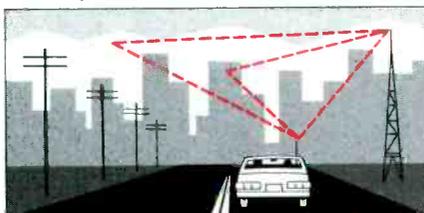
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Whether you're mellowing out with Sinatra or reaching exit velocity with Hendrix, Sansui sound will exhilarate you most.

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And with our ASRC™ (Automatic

Stereo Reception Control) you're home-free from multipath distortion, fading and drift caused by tall buildings, mountains and tunnels—anywhere you drive.



Sansui's computerized ASRC automatically reduces multipath interference and weak signal problems.

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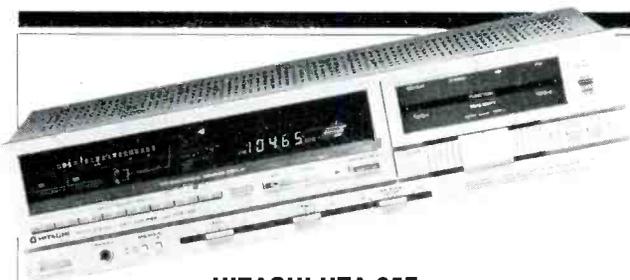


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RECEIVERS



HITACHI HTA-35F



PIONEER SX-V90



SHERWOOD S-2660CP



VECTOR RESEARCH VRX-9100

MANUFACTURER	Model	AMPLIFIER SECTION										TUNER SECTION						
		FM Only = F, Digitally Synthesized = D	Average Watts Channel into 8 Ohms	THD, %	IHF IM, %	Rated Power Bandwidth, Hz to kHz	MM Phono S/N, dB, *A, Wtd. re 5 mV	MM Phono Overload, mV	Dynamic Headroom, dB	Total Number of Memory Presets	IHF Sensitivity, dBt, Mono/Stereo	Signal Strength for 50 dB Quieting, dBt, Mono/Stereo	Capture Ratio, dB, Mono/Stereo	THD, %, 100% Modulation, 1 kHz, Mono/Stereo	Alternate Channel Selectivity, dB, Wide/Narrow I.F. Bandwidth	Maximum S/N, dB, Mono/Stereo	Weight, Lbs.	Price, \$
AOS	R1		35	0.1	0.05	20-20	73	80	2.0	5	11.2/31	16.5/37.7	1.8	0.15/0.25	75	70/67	17.4	499.00
AKAI	AA-A45	D	65	0.02						20								449.95
	AA-A35	D	48	0.02						16								349.95
	AA-A25	D	32	0.02						16								259.95
	AA-R1S	D	22	0.02						16								169.95
BANG & OLUFSEN	BM-8000	F/D	100	0.05	0.1	20-20	75	125	1	9	15	19/34	1.8					1595.00
	BM-6000	F	75	0.08	0.05	20-20	75	125	0.7	6	15	22/39	1.8		56	75/72	32	895.00
	BM-5000	D	55	0.02	0.15	20-20	74	110	1	9	15/17	21/42	1.8	0.05/0.25	56	70/67	18.5	1195.00
	BM-2000	F	25	0.1	0.1	20-20	75	50	1.6	5	20/15	20/40	1.7		60	74/70	15.4	540.00
CARVER	Carver Receiver	D	130	0.05		20-20	80	100	0.5	12	11.3/16.3	16.1/23.5	1.5	0.3/0.3	58/50	82/85	28 1/2	749.00
DENON	DRA-350	D	36	0.05	0.03	5-40	80	150	2	10	9.3	16.4/38.5	1.2	0.07/0.12	55	82/80	15	320.00
	DRA-550	D	50	0.015	0.025	5-40	86	150	2	16	9.3	16.4/38.5	1.2	0.07/0.12	55	82/80	17 1/2	420.00
	DRA-750	D	70	0.01	0.005	5-40	90	200	2	16	9.3	15.3/38.5	1.2	0.05/0.07	55	85/81	21 1/2	550.00
FISHER	RS-255	D	50	0.2	0.2	20-20	150			12	14.4/21.5	21.5/39.2	1.0		70	73/68	15	299.95
	RS-225	D	25	0.2	0.2	20-20	130			12	14.4/21.5	21.5/39.2	1.0		60	66/62	17	249.95
	RS-36	D	20	0.5	0.5	60-20	150			12	14.4/21.5	21.5/39.2	2.0		60	65/60	10	169.95
HARMAN/KARDON	hk330i		20	0.09		10-60	80	120			12.1	17.3	1.5	0.08/0.12	60	74	18	250.00
	hk380i		30	0.08		10-60	80	135			11.2	16.8	1.5	0.08/0.12	60	74	19	335.00
	hk490i	D	30	0.08		10-100	80	170			10.8	15.6	1.0	0.08/0.12	70	75	20	425.00
	hk590i	D	45	0.08		10-100	80	170			10.8	15.6	1.0	0.08/0.12	70	75	21.6	550.00
	hk690i	D	60	0.06		10-100	80	220			10.8	15.6	1.0	0.06/0.08	70	76	26.4	700.00
HEATH	AR-1250	F/D	30	0.009	0.01	20-20	75	150	2.5		10/15	16.1/36.8	1.5	0.15/3	52	70/65	16 1/4	KH, 349.95
	AJA-1200-2	AM																KH, 39.95
	AJA-1600-2 Dolby NR																	KH, 54.95
HITACHI	HTA2	D	25	0.1	0.05	10-30	70	120			13.2	8.2/38.2	1.5	0.15/0.25	53	76/70	11 1/8	160.00
	HTA25F	D	25	0.5	0.15	10-30	72	140		12	13.2	20.2/38.2	1.5	0.3/0.4	53	74/70	11 1/8	200.00
	HTA35F	D	35	0.05	0.05	10-30	72	140		8	13.2	20.2/38.2	1.5	0.15/0.25	53	74/70	12 1/8	250.00
	HTA4F	D	40	0.01	0.01	10-30	71	150		10	13.2	20.2/38.2	1.5	0.15/0.25	53	76/70	15 1/8	340.00
	HTA6F	D	60	0.01	0.01	10-30	71	150		10	13.2	20.2/38.2	1.5	0.15/0.25	53	76/70	17 1/8	470.00
JVC	R-X500B	D	100	0.007	0.007		80	120		30	10.8	14.8/38.3	1.5	0.08/0.1	75	82/73	20.5	650.00
	R-X490	D	70	0.007	0.007		80	120		30	10.8	14.8/38.3	1.5	0.08/0.1	75	82/73	19.6	500.00
	R-X350VB	D	55	0.007	0.007		78	100		30	10.8	14.8/38.3	1.5	0.08/0.15	60	82/73	15	370.00
	R-X300	D	55	0.007	0.007		78	100		30	10.8	14.8/38.3	1.5	0.08/0.15	60	82/73	15	330.00
	R-K200	D	40	0.5			78	100		16	10.8	14.8/38.3	1.5	0.08/0.15	60	80/73	10.1	240.00
	R-K100	D	25	0.5			78	100		16	10.8	17.3/38.3	1.5	0.15/0.3	60	76/70	10.1	170.00
KENWOOD	KVR-A50	D	45	0.05			81			16			1.5				14	305.00
	KR-A50	D	45	0.05			80			16							14	292.00
	KR-A30	D	30	0.08			88			16							14	247.00
	KR-950	D	80	0.015			92			12							23	530.00
	KR-930	D	60	0.03			84			12							17	380.00

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- SONY
- Sansui
- Robertson
- NAD
- Nakamichi
- Mitsubishi
- Kyocera
- Harmon/Kardon
- Denon
- Fisher
- etc.

How can Belles Research, an American manufacturer, compete against all these products from the Orient?

Quite easily.

Belles Research audio components are all *handcrafted*. Each transistor is tested, calibrated, and matched by Belles. No cost cutting integrated chips are used in the signal path or power supply. Costly polyester and polypropylene capacitors are used throughout. All resistors are metal film with 1% tolerances. Connectors are machined nickel cadmium, knobs are machined from solid aluminum. Belles power amplifiers require *no protection circuitry whatsoever* and can therefore deliver high current into *any speaker load*.

Belles preamplifiers accept low output moving coils straight through with a single gain stage.

Which of these competitors from the Orient offer you all of this? None, not a single one. Some are even more expensive than Belles, considerably more.

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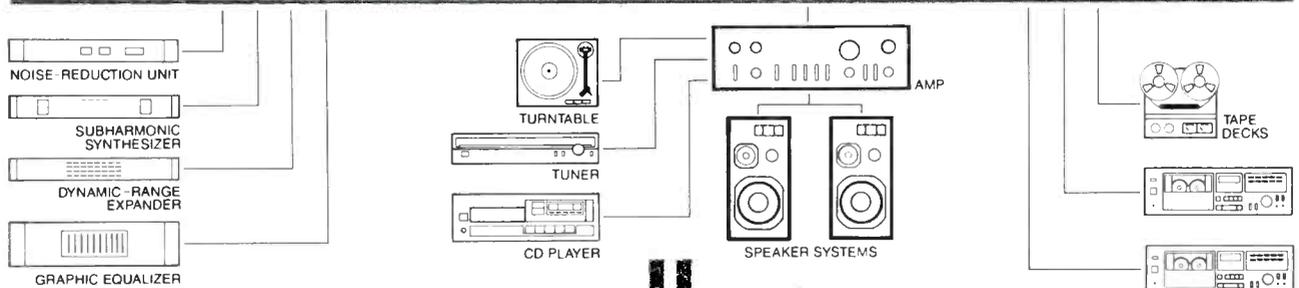
GALA SOUND, 650 Monroe Avenue, Rochester, NY 14607 (716) 461-3000

RECEIVERS

MANUFACTURER	Model	AMPLIFIER SECTION										TUNER SECTION						
		FM Only = F. Digitally Synthesized = D	Average Watts/Channel into 8 Ohms	THD, %	IHF IM, %	Rated Power, Watts	Hz to kHz	MM Phono S/N, -db	MM Phono S/N, -db, 1 kHz Wtd. re 5 mV	Dynamic Headroom, dB	Total Number of Memory Presets	IHF Sensitivity, dB, Mono/Stereo	Signal Strength for 50dB Quiding, dB	Capture Ratio, dB, Mono/Stereo	THD, % 100% Modulation, Wide/Narrow	Alternate Channel Selectivity, dB, Wide/Narrow I.F. Bandwidth	Maximum S/N, -db, Mono/Stereo	Weight, Lbs.
SHARP	SA-150		10	0.9	0.2	40-20	70	150	2.5		11.7/25.2	19.2/37.2	1.5	0.3/0.6	55	73.68	11	119.95
SHERWOOD	S-2610CP		20	0.08	0.08	20-20	85	140			11.2/	14.7/37.3	1.5	0.15/0.15	65	80/75	15	199.95
	S-2620CP	D	20	0.05	0.05	20-20	88	140	1.3	10	10.8/	15.8/39.2	1.5	0.15/0.15	65	78/72	15	219.95
	S-2640CP	D	35	0.05	0.05	20-20	88	140	1.4	12	10.8/	15.8/39.2	1.5	0.15/0.15	65	78/72	17	299.95
	S-2660CP	D	50	0.05	0.05	20-20	92	250	1.2	16	10.3/	15.3/36.5	1.2	0.1/0.1	70	80/75	20	399.95
	S-2680CP	D	70	0.05	0.05	20-20	92	250	1.2	16	9.8/	14.1/36.5	1.2	0.1/0.1	70	80/75	22	499.95
SONY	STR-VX250	D	25	0.08	0.08		80	150	1.2	8	11.2/	17.3/38.3	1.5	0.2/0.3	60	75/70	12 3/4	180.00
	STR-VX350	D	30	0.03	0.03		80	150	1.4	10	11.2/	17.3/38.3	1.0	0.15/0.25	60	80/75	12 1/2	250.00
	STR-VX450	D	40	0.008	0.008		81	150	1.4	10	11.2/	17.3/38.3	1.0	0.15/0.25	60	80/75	13 3/4	300.00
	STR-VX550	D	50	0.008	0.008		85	150	1.4	10	11.2/	17.3/38.3	1.0	0.08/0.15	60	82/76	17 3/4	360.00
	STR-VX750	D	70	0.006	0.006		85	150	0.5	10	11.2/	17.3/38.3	1.0	0.08/0.15	60	82/76	14 3/4	490.00
TECHNICS	SA-120		35	0.5	0.5	40-20	73	140	1.0		10.8/	16.1/38.3	1.0	0.15/0.3	65	76/70	11	160.00
	SA-150	D	25	0.5	0.5	40-20	73	140	1.2	14	10.8/	16.1/38.3	1.0	0.15/0.3	65	77/71	9	180.00
	SA-350	D	40	0.007	0.007	20-20	76	150	1.2	16	10.8/	16.1/38.3	1.0	0.15/0.3	70	77/71	13	270.00
	SA-450	D	50	0.007	0.007	20-20	75	150	1.2	16	10.8/	16.1/38.3	1.0	0.2/0.08	70	78/72	14	320.00
	SA-550	D	70	0.005	0.005	20-20	74	170	1.8	16	10.8/	16.1/38.3	1.0	0.2/0.08	70	78/72	19	450.00
ULTRX	R25		25	0.5	0.5	40-20			2.5	0	14.1/21.5	21.2/39.2	2.0	0.3/0.4	50	70/60	12 7/8	149.95
	R35		35	0.03	0.03	40-20			2.5	14	14.1/17.2	21.5/39.2	1.5	0.2/0.4	70	70/60	15 3/4	219.95
	R55		55	0.03	0.03	20-20			2.5	14	14.1/17.2	21.5/39.2	1.5	0.2/0.4	70	70/60	19	329.95
	R70		70	0.03	0.03	20-20			2.5	20	14.1/17.2	21.5/39.2	1.5	0.2/0.4	70	70/65	22	479.95
	R100		100	0.003	0.003	20-20			2.5	20	14.1/17.2	21.5/39.2	1.5	0.2/0.4	70	70/65	26 1/2	599.95
VECTOR RESEARCH	VR-2200		25	0.09	0.09	20-20	80		2.0	16	10.8/	17.2/	1.0	0.15/0.3		75/70	13	169.95
	VRX-3500	D	40	0.09	0.09	20-20	80		2.0	16	10.8/	17.2/	1.0	0.15/0.3		80/75	17	249.95
	VRX-7100	D	60	0.08	0.08	20-20	80		3.0	16	10.2/	14.6/	1.0	0.08/0.1		80/75	17	349.95
	VRX-9100	D	90	0.08	0.08	20-20	80		3.0	16	10.2/	14.6/	1.0	0.08/0.1		85/80	23	449.95
YAMAHA	R-100	D	100	0.008	0.01	10-30	88	110	1.5	10	8.8/	14.8/37.3	1.2	0.05/0.07	85/35	88/83	24 1/8	795.00
	R-90	D	70	0.008	0.01	10-30	88	110	1.5	10	8.8/	14.8/37.3	1.2	0.05/0.07	85/35	88/83	21 1/8	595.00
	R-70	D	45	0.008	0.008	10-30	72	110	1.3	10	9.3/	15.3/38.1	1.5	0.1/0.15	55	85/81	18 1/4	465.00
	R-50	D	35	0.015	0.01	10-30	73	85	1.8	10	9.3/	15.3/38.1	1.5	0.1/0.15	55	85/81	14 3/8	335.00
	R-30	D	25	0.015	0.01	10-30	73	85	1.7	5	9.3/	15.3/38.1	1.5	0.1/0.2	55	82/80	14	249.00

Now you can connect up to three tape decks, three sound processors and a noise-reduction unit to any system—with receiver or separates—and use them with push-button ease.

All you have to do is add a dbx Program-Route Selector between your present system and any or all of the above—just as the hookup diagram shows. It's as simple as that. Your only decision now is whether you want to process your tapes when dubbing. If so, you'll want the 400X. Otherwise, the 200X will do nicely. You'll know better when you visit your dbx dealer.



All these units connect via the 400X or 200X to a single tape-monitor loop of your amp/preamp or receiver.



71 Chapel St., Newton, MA 02195 617-964-3210

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For the best possible sound, all you need are the Basics.

Kenwood Basic components. They give you all the audio technology you need. Whether you're looking for full-size components, or record-jacket size components like our HD (High Density) series.

Both offer you pure sound and high power at easy-to-handle prices.

Both provide perfectly matched components that provide the ultimate in individual performance, too.

And both give you patented features that are uniquely Kenwood.

For example, Sigma Drive, the ingenious amp-to-speaker negative feedback device that insures sonic clarity.

Or, Dynamic Linear Drive (DLD): super-efficient, dual-output amplifier technology that produces power, purity and a dynamic range wide enough for Kenwood's amazing full and jacket-size CD players.

Look into the remarkable, digital-ready Basic components.

Whatever size you choose, you'll find everything you need for the best possible sound.

KENWOOD
Shaping the future of sound.

Enter No. 34 on Reader Service Card



THE ULTIMATE MACHINE

JVC'S NEW R-X500B RECEIVER IS A SUPERB EXAMPLE OF HOW FAR JVC WILL GO TO BRING YOU THE ULTIMATE IN SOUND.

Some hi-fi equipment delivers slightly higher fidelity. Especially when it's designed by JVC®. In fact, JVC's entire line

remote equalization and unheard-of-refinements, it is virtually without equal.

ADVANTAGE: A POWER AMP WITH INCREDIBLE POWERS

The R-X500B boasts two of the highest refinements in power amp technology available today—Dynamic Super A and Gm Driver. Dynamic Super A improves

of high fidelity components is known throughout the world for technological brilliance and painstaking craftsmanship.

The R-X500B receiver is a case in point. With the technology of JVC's power amp, equalizer and tuner, plus

performance in two significant ways. One, it renders music reproduction silky and pure by eliminating offensive switching distortion. Two, it capably controls speaker motion by forming an ideal interface between the amplifier and the speaker.

HIGH FIDELITY



JVC's newest technology, Gm Driver, improves actual in-use performance at all listening levels, high and low, by driving the power stage at a constant voltage.

ADVANTAGE: AN EQUALIZER WITH A GRAPHIC DIFFERENCE

Since 1966, when JVC pioneered equalizers for home use, we have remained in the very forefront of equalizer technology.

The computer controlled graphic equalizer in the R-X500B is a superb example of engineering to achieve an end. It combines unequalled versatility with automatic capabilities, while maintaining sonic integrity.

Five equalized responses can be memorized for instant recall at a touch.



And an infrared wireless remote control makes it possible to adjust equalization from your arm-chair without sacrificing sound quality.

In a further refinement, JVC engineers opted for an LSI to handle electronic switching for both channels at seven different control frequencies. The result—electrical loss and tonal

degradation never enter the picture.

ADVANTAGE: A TUNER AS SMART AS A COMPUTER

The R-X500B puts an advanced microcomputer in charge of the digital synthesizer tuner and references it to the accuracy of a quartz oscillator, making it highly versatile and easy to use. The microcomputer lets you pre-set 15 AM and 15 FM frequencies, scan them all for 5 seconds each, read out aerial signal strength in 5dB increments, plus much more.

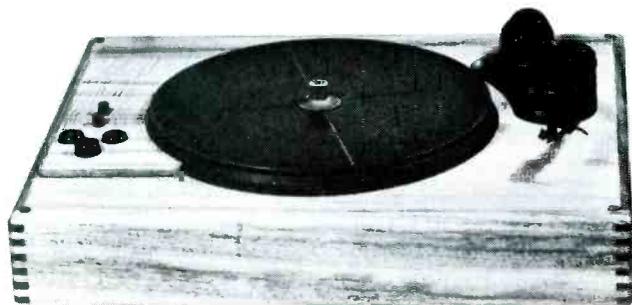
SPECIFICATIONS
AMPLIFIER SECTION Output Power 100 Watts per channel, min. RMS, both channels driven into 8 ohms, from 20Hz to 20kHz, with no more than 0.007% total harmonic distortion. Signal-to-Noise Ratio ('66IHF/DIN) Phono—80dB/66dB Video/Aux/DAD/Tape—100dB/67dB RIAA Phono Equalization ± 0.5dB (20Hz -20kHz)
S.E.A. SECTION Centre Frequencies—63, 160, 400, 1k, 2.5k, 6.3k, 16kHz Control Range—± 10dB
FM TUNER SECTION ('78 IHF) 50dB Quieting Sensitivity Mono—14.8dBf Stereo—38.3 dBf Signal to Noise Ratio (IHF-A Weighted) Mono/Stereo—82dB/73dB

ADVANTAGE: JVC

It is the attention to engineering detail and craftsmanship evident in the R-X500B which separates every JVC hi-fi component from all others. JVC makes changes in design for the sake of improvement. Not just for the sake of change. And the result is the difference between excellent and average. See, and hear, this difference at your nearest JVC dealer.



TURNTABLES



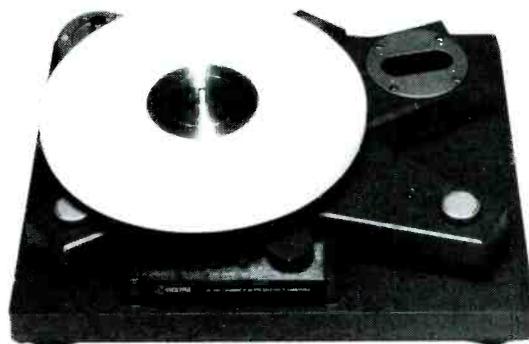
SOTA STAR SAPPHIRE



LOGIC TEMPO



LINN SONDEK LP12



KYOCERA PL-910

MANUFACTURER	Model	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	Record Clamp Supplied?	Front Load?	TONEARM/CARTRIDGE										Price, \$		
												Arm Type: None = N, Det = D, Pivoted = P, Linear = L, Servo = S	Pivot Stylus Distance, Inches	Auto Cue = C, Auto Return = R, Programmable Play = P	Recommended Tracking Force, Grams	Anti-Skating Adjustment?	Total Cable Capacitance, pF	Cart. Mount: Fixed = F, Removable Shell = R, P-Mount = P, Changeable Wand = W	Dimensions, Inches, Including Dustcover					
ADC	LT-32	B	0.19	59	Belt	+2, -1		Yes	No			L	C/R	3	No	275	F					13½ x 13¾ x 4¾	109.95	
ADS	P2-H	B	0.05	70	Direct		5	Yes	No	No	No	P	8¾	R	0-2	Yes	150	R					17½ x 14¼ x 4¾	329.00; 399.00 w Cart.
AKAI	AP-A1 AP-A2 AP-D3 AP-M33S	B B B B			Belt Direct Direct			Yes Yes Yes Yes		No No No No	P P P/S L		R R C/R/P C/R/P				P P P P						99.95 135.00 149.95 199.95	
AR	The AR Turntable	B	0.04	73	Belt	0.05		No	No		No	P	9		0-3	Yes	85	R					18 x 15 x 7	325.00; 450.00 w/Arm
ARISTON	RD11s RD80 RD40 RD20	B B B B	0.05 0.05 0.08 0.07	75 74 73 74	Belt Belt Belt Belt		2.5	Yes No Yes No	Yes Yes Yes Yes	No No No No				R		No		F				17½ x 6¾ x 13¾ 17½ x 6¾ x 13¾ 16¼ x 5¾ x 13¼	725.00 450.00 350.00 250.00	
BANG & OLUFSEN	BG-8002 BG-TX BG-5000 BG-2000 BG-1800 BG-RX	B B B B B B	0.02 0.025 0.035 0.035 0.035 0.06	75 70 75 75 75 65	Direct Belt Belt Belt Belt Belt	0.003 0.2 0.2 0.2 0.2 0.2	3	Yes Yes Yes Yes Yes No	No No No No No No	No No No No No No	L/S L/S P P P P		C/R/P C/R C/R C/R C/R C/R		Yes Yes Yes Yes	100 100 100 100 100 100	F F F F F F					19¾ x 3½ x 14¾ 19¾ x 3½ x 14¾ 16½ x 3 x 12¾ 16½ x 2½ x 12½ 16½ x 2½ x 12½ 17¾ x 3½ x 13½	695.00 495.00 320.00 280.00 250.00 195.00	
BENJAMIN ELECTRO-PRODUCTS	B-55BR	D	0.12	60	Idler		Var.	No	No	No	No	P	9			Yes		R					18½ x 5¾ x 14½	210.00
BROADCAST ELECTRONICS	12C 12C2 16C Galaxy II	C B C D	0.1 0.1 0.1 0.14	38 38 38 38	Rim Rim Rim Rim	+1, -0 +1, -0 +1, -0		Yes Yes Yes Yes		Yes Yes Yes Yes													15 x 15½ x 5 15 x 15½ x 5 20¾ x 20¼ x 5¾ 16¾ x 17¾ x 2½	425.00 425.00 610.00 695.00

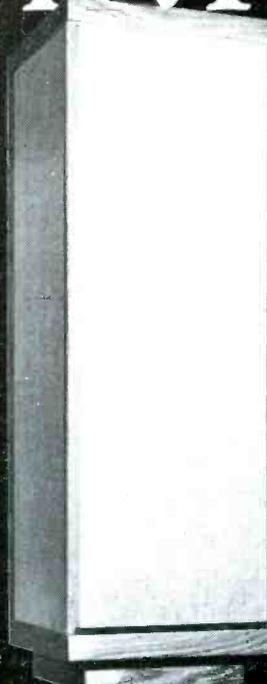
TURNTABLES

MANUFACTURER	Model	SPEED CODE				Drive System	Speed Accuracy, ±%	Speed Adjustment Range, ±%	Controls Outside Dustcover?	Multi-Play	Record Range, ±%	Record Number of Discs	Front Load?	TONEARM/CARTRIDGE									
		A	B	C	D									Speeds—See Code	Wow & Flutter, % DIN 45507	Rumble, —dB DIN 45509-B	Arm Type: None=N, Opt.=O, Photo.=P	Pivot: S=Stilus, D=Distance, I=Inches, Auto Cue=C, Auto Return=R, Programable Play=P	Recommended Tracking Force Range, Grams	Anti-Skating Adjustment?	Total Cable Capacitance, pF	Cart. Mount Fixed-F Removable Shell=R, P-Mount=L, C-Changeable Wand=W	Dimensions, Inches Including Dustcover
BSR	86MX	B	0.25	55	Belt	+2, -1		No	3			P	C/R	3	No	275	F	15 x 13 x 5 1/8	69.95				
	82SX	B	0.25	55	Belt	+2, -1		No	No			P	C/R	3	No	275	F	15 x 13 x 4 7/8	59.95				
MITCHELL A. COTTER	B-1	C	0.02	98	Direct	0.001	9.9	Yes	Yes	Yes	Yes	N						20 x 25 1/2 x 9					
DENON	DP-15F	B	0.018	78	Direct	0.01		Yes	No	No	No	P/S	8 7/8	C/R	0-3	Yes	R	14 5/8 x 4 x 13 1/2	199.95				
	DP-30LH	B	0.015	78	Direct	0.002		Yes	No	No	No	P/S	8 7/8	C/R	0-2.5	Yes	R	18 x 5 5/8 x 16 1/2	275.00				
	DP-35F	B	0.012	78	Direct	0.002		Yes	No	No	No	P/S	8 7/8	C/R	0-3	Yes	R	17 1/2 x 5 1/2 x 16 1/2	275.00				
	DP-37F	B	0.012	78	Direct	0.002		Yes	No	No	No	P/S	8 7/8	C/R	0-3	Yes	R	17 1/2 x 5 1/2 x 16 1/2	325.00				
	DP-45F	B	0.012	78	Direct	0.002		Yes	No	No	No	P/S	8 7/8	C/R	0-3	Yes	R	17 1/2 x 5 1/2 x 16 1/2	375.00				
	DP-61F	B	0.01	78	Direct	0.002		Yes	No	No	No	P/S	9 3/4	C/R	0-3	Yes	R	18 3/4 x 5 1/4 x 17	500.00				
	DP-62L	B	0.008	82	Direct	0.002		No	No	No	No	P/S	9 3/4	Lit.	0-3	Yes	R/W	19 1/2 x 7 1/2 x 16 1/2	595.00				
	DP-72L	B	0.008	82	Direct	0.002		No	No	No	No	P/S	9 3/4	Lit.	0-3	Yes	R/W	19 1/2 x 7 1/2 x 16 1/2	695.00				
	DP-75	B	0.008	82	Direct	0.002		No	No	No	No	N						15 Dia. x 5 3/4	550.00				
	DP-80	B	0.008	82	Direct	0.002	6	No	No	No	No	N							15 Dia. x 5 3/4	895.00			
	DP-100M	C	0.003	90	Direct	0.002	9.9	No	No	No	No	P/S	11 1/4		0-3	Yes	R-W	22 3/4 x 12 1/2 x 18 3/4	6200.00				
	DUAL	CS515	B	0.045	72	Belt		6	Yes	No	No	No	P	8 3/4	R	0-3	Yes	R	17 1/2 x 14 1/2 x 4 1/2	134.95			
CS530		B	0.035	75	Belt		6	Yes	No	No	No	P	8 3/4	C/R	0-3	Yes	R	17 1/2 x 14 1/2 x 4 1/2	149.95				
CS616Q		B	0.025	75	Direct			Yes	No	No	No	P	8 3/4	C/R	0-3	Yes	R	17 1/2 x 14 1/2 x 4 1/2	179.95				
CS620Q		B	0.025	78	Direct			Yes	No	No	No	P	8 3/4	C/R	0-3	Yes	R	17 1/2 x 14 1/2 x 4 1/2	199.95				
CS630Q		B	0.02	80	Direct		10	Yes	No	No	No	P	8 3/4	C/R	0-3	Yes	R	17 1/2 x 14 1/2 x 4 1/2	249.95				
CS1254		B	0.05	68	Belt		6	No	6	No	No	P	8 3/4	C/R	0-3	Yes	R	16 3/4 x 14 1/2 x 7 1/4	159.95				
CS1258		B	0.05	70	Belt		6	No	6	No	No	P	8 3/4	C/R	0-3	Yes	R	16 3/4 x 14 1/2 x 7 1/4	189.95				
CS505-2WB		B	0.05	72	Belt		6	No	No	No	No	P	8 3/4	R	0-3	Yes	R	16 3/4 x 14 1/2 x 7 1/4	199.95				
EMT FRANZ	EMT938	C/D	0.075	70	Direct	0.01	10	Yes	No	No	No	P	9 3/4			Yes	R	19 1/2 x 17 1/2 x 7 1/2	2580.00				
ENTEC	Granite	B	0.03	70	Direct	0.02	5			Yes								24 x 24 x 36	5000.00				
FISHER	MT-751CD	B	0.035	70	Direct	1.5		Yes	No	No	No	L	6.3	C/R/P				17.3 x 4.5 x 14.5	299.95				
	MT-730CD	B	0.035	70	Belt	1.5		Yes	No	No	No	L	6.3	C/R				17.3 x 4.5 x 14.5	199.95				
	MT-720CD	B	0.035	70	Direct	0.5	3	Yes	No	No	No	P	6.3	C/R		Yes	R	17.3 x 4.5 x 14.5	149.95				
	MT-710CD	B	0.08	55	Belt	1.0		Yes	No	No	No	P	8.7	R		Yes	R	17.3 x 4.5 x 14.5	119.95				
MT-36CD	B	0.04	55	Belt	1.5		Yes	No	No	No	P	8.7	R		Yes	R	15.8 x 4.3 x 13.8	119.95					
GOLDMUND	Reference Studio	B			Belt		4	Yes	No	Yes		N						24 x 22 x 30	10,900.				
	Stuiletto	B			Direct			Yes	No			N							2500.00				
HARMAN/KARDON	T25	B	0.05	65	Belt		3	Yes	No	No	No	P	8 1/2	C/R	0-3	Yes	160	R	15 1/4 x 14 1/4 x 5 1/4	185.00			
	T35	B	0.04	68	Belt		3	Yes	No	No	No	P	8 1/2	C	0-3	Yes	160	R	17 3/8 x 14 1/4 x 5 5/8	245.00			
	T45	B	0.04	68	Belt		3	Yes	No	Yes	No	P	8 1/2	C	0-3	Yes	160	R	17 3/8 x 14 1/4 x 5 5/8	300.00			
	T55C	B	0.04	68	Belt		3	Yes	No	Yes	No	P	8 1/2	C	0-3	Yes	160	R	17 3/8 x 14 1/4 x 5 5/8	375.00			
	T60	B	0.035	68	Belt		3	Yes	No	Yes	No	P	8 1/2	C	0-3	Yes	160	R	17 3/8 x 14 1/4 x 5 5/8	450.00			
	T65C	B	0.025	70	Belt		3	Yes	No	Yes	No	P	8 1/2	C	0-3	Yes	160	R	17 3/8 x 14 1/4 x 5 5/8	575.00			
HEYBROOK	TT-2	B	0.1	73	Belt	0.1	0	No	No	No	No	O						17 1/2 x 14 1/4 x 6 1/4	498.00; 679.00 w/Arm				
HITACHI	HT101	B	0.08	70	Belt			Yes	Vac.	No	No	P	8 3/4	C/R	1-1.5	Yes	140	P	17 1/8 x 14 3/8 x 4	90.00			
	HT202	B	0.04	78	Direct	0.003		Yes	Vac.	No	No	P	8 3/4	C/R	1-1.5	Yes	140	P	17 1/8 x 14 3/8 x 4	130.00			
	HT6	B	0.04	78	Direct	0.003		Yes	Vac.	No	No	O/P	8 3/4	C/R	1-1.5	Yes	140	P	17 1/8 x 14 3/8 x 4 3/8	190.00			
	HTL303	B	0.08	70	Belt			Yes	Vac.	No	No	O/P/L	3 3/4	C/R	1-1.5	No	140	P	17 1/8 x 12 5/8 x 3 3/4	180.00			
	HTL55	B	0.04	78	Direct	0.003		Yes	Vac.	No	No	O/P/L	3 3/4	C/R	1-1.5	No	140	P	12 5/8 x 12 5/8 x 3 3/4	240.00			
JVC	QL-A75	B	0.03		Direct	0.0015		No	No	No	No	P/S	10	C	0-3	Yes	W	19 1/2 x 8 1/4 x 16 1/2	650.00				
	QL-Y66F	B	0.03		Direct	0.002		No	No	No	No	P	10	C/R	0-3	Yes	W	19 1/2 x 7 3/8 x 16	470.00				
	QL-L2	B	0.045		Direct	0.005		Yes	No	No	No	L	6.2	C/R	1.25	No	P	17 3/8 x 3 7/8 x 14 1/4	240.00				
	L-L1	B	0.07		Belt			Yes	No	No	No	L	6.2	C/R	1.25	No	P	17 3/8 x 3 7/8 x 14 1/4	190.00				
	L-E22	B	0.08		Belt			Yes	No	No	No	L	4.4	C/R	1.25	No	P	13 3/8 x 3 3/8 x 14	175.00				
	QL-F320	B	0.045		Direct	0.005		Yes	No	No	No	P	8.7	C/R	0-3	Yes	R	17 1/8 x 4 1/8 x 14 1/4	160.00				
	L-F210	B	0.055		Direct		3	Yes	No	No	No	P	8.7	C/R	0-3	Yes	R	17 1/8 x 4 1/8 x 14 1/4	130.00				
	QL-A220	B	0.045		Direct	0.005		Yes	No	No	No	P	8.7	C/R	0-3	Yes	R	17 1/8 x 4 1/8 x 14 1/4	125.00				
	L-A120	B	0.07		Belt			Yes	No	No	No	P	8.7	R	0-3	Yes	R	17 1/8 x 4 1/8 x 14 1/4	95.00				
	KENWOOD	KD-72FB	B	0.05	40	Direct			Yes	No	Yes	Yes	L				No	P	16 1/2 x 14 1/2 x 4 1/2	300.00			
KD-52FB		B	0.05	43	Direct			Yes	No	Yes	Yes	L				Yes	P	16 3/8 x 14 3/8 x 4 1/2	165.00				
KD-42RB		B	0.05	43	Direct			Yes	No	Yes	Yes	P				Yes	P	16 1/2 x 14 3/8 x 4 3/8	145.00				
KD-12R 12RB		B	0.05	40	Belt			Yes	No	Yes	Yes	P				Yes	P	16 1/2 x 14 3/8 x 4 3/8	115.00				
KD-770		B		55	Direct			No	No		Yes	P				Yes	P	19 1/4 x 16 1/4 x 6 3/8	410.00				
KD-727	B		74	Direct			Yes	No		Yes	P				No	P	13 1/2 x 13 1/2 x 4 1/2						
KYOCERA	PL-701	B	0.03	70	Belt		3	Yes	Yes	Yes	Yes	P	8 1/2	C/R	0-3	Yes	R	18 1/8 x 6 x 15 3/8	450.00				
	PL-601	B	0.035	68	Belt		3	Yes	Yes	Yes	Yes	P	8 1/2	C	0-3	Yes	R	18 1/8 x 6 x 15 3/8	350.00				
	PL-910	B	0.025	78	Belt		3	No	No	Yes	Yes	N				Yes	R	18 x 7 1/2 x 15 1/4	2000.00				
LINN	Linn Sondek LP 12	A	0.03	70	Belt	0.02		No	No	Yes	Yes	N						17 1/2 x 14 x 9 7/8	795.00				
LOGIC LIMITED	QM 101 Electronic	B	0.08	78	Belt		3	No	No	No	No	O	8 1/4		1.25-4.0	Yes	180	F	19 x 15 x 6	750.00; 895.00 w/Arm			
	Tempo Electronic	B	0.08	78	Belt		3	No	No	No	No	O	8 1/4		1.25-4.0	Yes	180	F	18 1/4 x 14 x 5 3/4	350.00; 495.00 w/Arm			

TURNTABLES

MANUFACTURER	Model	Speeds—See Code	Wow & Flutter, % DIN 45-507	Rumble, —dB, DIN 45-539-B	Drive System	Speed Inaccuracy, ±%	Controls Adjustment Range, ±%	Multi-Play	Record Outside Dustcover?	Record Clamp	Number of Discs Supplied?	Front Load?	Arm Type	Type	Pivot Stylus Distance, Inches	Auto Cue = C, Auto Return = R, Programmable Play = P	Recommended Tracking Force	Anti-Skating Adjustment?	Total Cable Adjustment?	Cant. Mount = F, Free = F, Removable Shell = R, P. Mount = P, Changeable Wand = W	Capacitance, pF	Dimensions, Inches, Including Dustcover	Price, \$																																										
																								Speed	Wow	Flutter	Rumble	Drive	Speed	Controls	Multi-Play	Record	Clamp	Discs	Front	Arm	Type	Pivot	Stylus	Distance	Inches	Auto	Cue	=	C,	Auto	Return	=	R,	Program	mable	Play	=	P	Recommended	Tracking	Force	Anti-Skating	Adjustment?	Total	Cable	Adjustment?	Cant.	Mount	=
TRANS AUDIO/ ORACLE	Delphi Mark II	B	0.04		Belt	0.01	5	No	1	Yes	No											18.9 x 14.5 x 6.2	1250.00																																										
	Alexandria Mark II	B	0.04		Belt	0.01	5	No	1	Yes	No	D/P										19.4 x 14.8 x 6.5	750.00; 1095.00 w/Arm																																										
	Premiere Mark II	B	0.04		Belt	0.01	5	No	1	Yes	No	D/P										19.4 x 14.8 x 6.5	2200.00; 3095.00 w/Arm																																										
VECTOR RESEARCH	VT-160	B	0.08	63	Belt			Yes					P	8 3/4	R		Yes		P			16 3/4 x 13 1/2 x 4	89.95																																										
	VT-240	B	0.05	70	Belt		3	Yes					P	8 3/4	C/R		Yes		P			16 3/4 x 14 1/4 x 4 1/2	149.95																																										
	VT-280	B	0.05	70	Belt			Yes					L	5 1/8	C/R				P			16 1/4 x 13 3/4 x 3 3/4	169.95																																										
VPI	HW-19	B			Belt	0.05																21 1/4 x 17 1/2 x 6 1/2	735.00																																										
C. J. WALKER/ MUSIC & SOUND	CJ-55 II	B	0.06	77	Belt	0.02	No	Yes	No	No	No	O	9			0.5-3.0	Yes	100	R			18 3/4 x 14 1/2 x 6 12 Dia.	369.00; 179.00; 329.00 w/Arm																																										
	CJ-61	B	0.06	77	Belt	0.02	No	Yes	No	No	No	O																																																					
C. J. WALKER/ REFERENCE AUDIO	CJ55	B	0.06	77	Belt	0.02	No	Yes	No	No	No	O/P				0.75-3	Yes		F			18 3/4 x 14 1/2 x 6	369.00; 499.95 w/Arm																																										
	CJ61	B	0.06	77	Belt	0.02	No	Yes	No	No	No	O/P				0.75-3	Yes		F			12 Dia.	179.00; 329.95 w/Arm																																										
WIN LABORATORIES	SEC-10 Catherine	B	0.001 0.03	60 60	Direct Direct			Yes No	No No	No No	No No	N N											2995.00 550.00																																										
YAMAHA	PF-1000	B	0.023	78	Belt		6	No	Yes	Yes	Yes	P		C	1-3	Yes	110	R/P			18 5/8 x 14 3/4 x 6 1/8	649.00																																											
	PF-800	B	0.028	78	Belt		6	No	Yes	Yes	Yes	P		C	1-3	Yes	110	R/P			18 5/8 x 14 3/4 x 6 1/8	449.00																																											
	PX-3	B	0.015	78	Direct			Yes	No	No	No	L/S		R	1-2.5	Yes	130	F/R			18 1/2 x 16 7/8 x 5 7/8	670.00																																											
	P-700	B	0.015	78	Direct			Yes	No	No	No	P		R	1-3.5	Yes	100	R/P			17 1/8 x 14 7/8 x 4 3/8	229.00																																											
	P-520	B	0.015	78	Direct		3	Yes	Yes	Yes	Yes	P		R	1-3.5	Yes		R/P W			17 1/8 x 14 7/8 x 4 3/8	189.00																																											
	P-320	B	0.04	78	Belt			Yes	Yes	Yes	Yes	P		R	1-3.5	Yes		R/P W			17 1/8 x 14 7/8 x 4 3/8	149.00																																											
	P-220	B	0.04	70	Belt			Yes	Yes	Yes	Yes	P		R	1-3.5	Yes		R/P W			17 1/8 x 14 7/8 x 4 3/8	129.00																																											

SYNTHESIS™

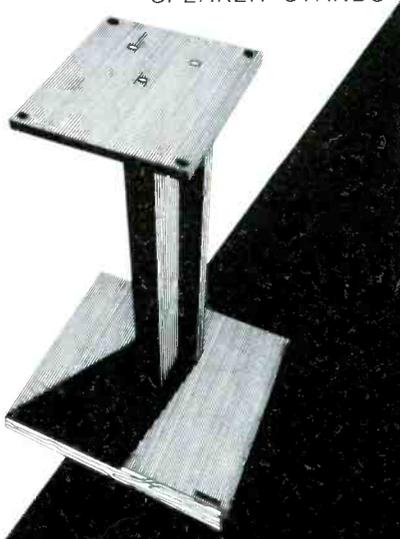


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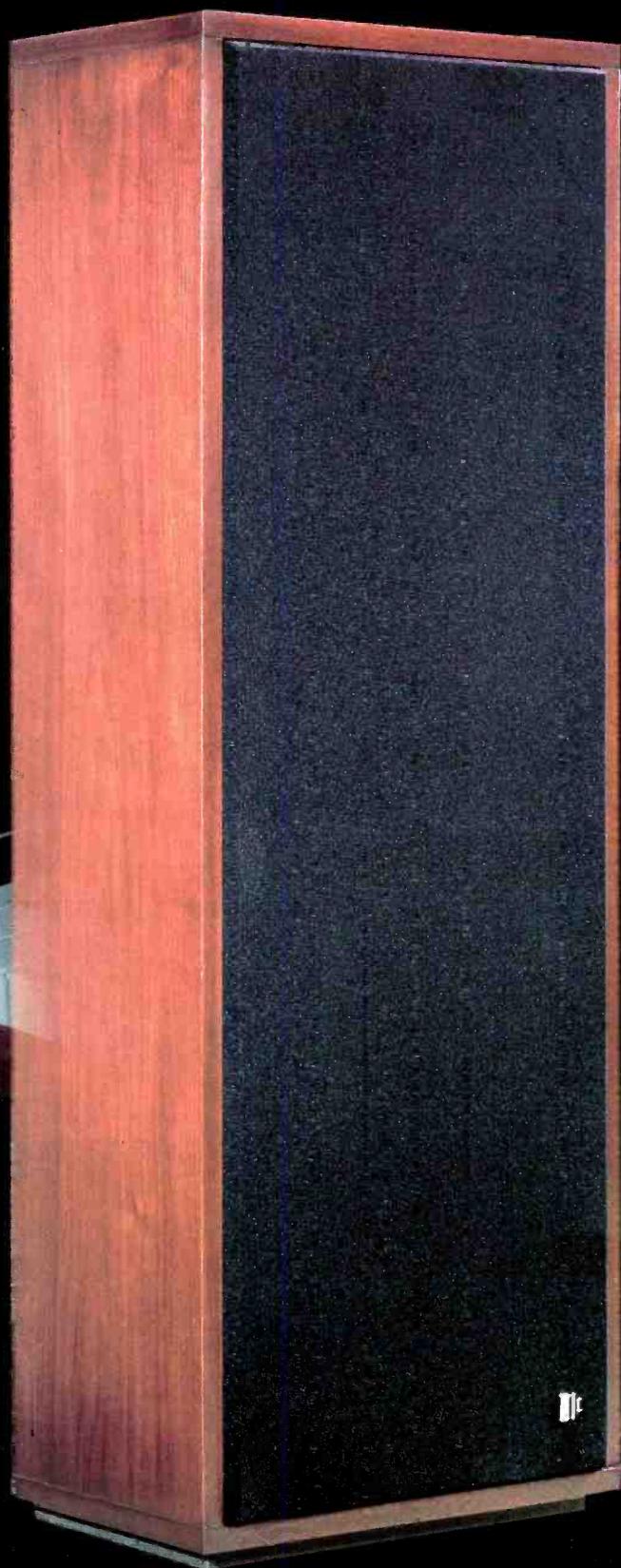
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TONEARMS



SUMIKO MDC-800



PROFILE II



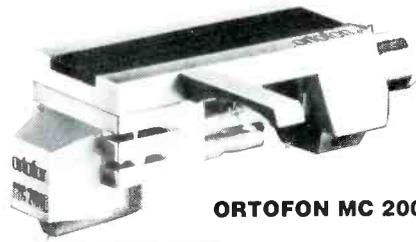
MICRO-TRAK



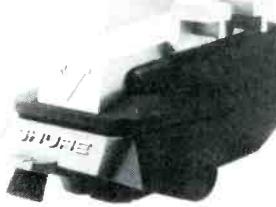
LINN ITTOK

MANUFACTURER	Model	Type: Pivoted = P, Linear = L, Servo = S	Cartridge Mount: Fixed = F, Removable Shell = R, P-Mount = P	Changeable Wind = W	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
ALPHASON	HR100S	P	F	Yes	Yes	Yes	9	11 1/4		0-3.0	3-12	100			750.00	Titanium tube; tungsten carbide bearings.
ARISTON	Opus	P	F	Yes	Yes	Yes									150.00	
AUDIOQUEST	317S 407.23 407.EX	P P P	R R R	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	9 1/4 9 1/4 9 3/4	12 1/2 12 1/4 12 1/2		0.5-3.0 0.5-3.0 0.5-3.0	4-14 4-14 4-14		1 1/8 1 1/8 1 1/8		495.00 795.00 795.00	
AUDIO-TECHNICA	AT1010	P	R	Yes	Yes	Yes	9 1/2	13	1.5	0-2.5	4-14	48	1		375.00	Planar pivot.
BROADCAST ELECTRONICS	S-320 S-260	P P	R R	Yes Yes	Yes Yes	Yes Yes	9 12 1/2	12 1/4 15 3/4	1.0 1.0	1.0 1.0					150.00 175.00	
CADAWAS ACOUSTICS	Columbia One			Yes	Yes	Yes				0-30	1-30				500.00	Modification.
MITCHELL A. COTTER	FR66fx-B1	P	R	Yes	Yes	Yes	12.09	15 1/2	0.235	0.5-8	4-35	150	1 5/8	1350.00		
DECCA AUDIO ACCESS	International	P	R	Opt.	Yes	Yes	9 1/2	12		0-3 1/2	3-13	100	1 1/8		295.00	Magnetic float and bias; viscous damping opt.
DENNESEN	ABLT-1	L†	W	Yes		Yes	Adj.	12	0	Adj.	Any	100			1450.00	†Air-bearing.
DYNAVECTOR	DV-501 DV-507	P P	R R	Yes Yes	Yes Yes	Yes Yes	9 1/4 9 1/2	12 11 1/2		0-3 0-3	4-12 4-12	84 84	1 1/2 1 1/2		600.00 850.00	Electrodynamic damping. As above.

PHONO CARTRIDGES



ORTOFON MC 2000



SHURE V-15 V-MR



EPOCH II HZ9S

MANUFACTURER	Model	Frequency Response, Hz to kHz, ±dB	Principle Moving Coil = MC, Induced Magnet = IM, Moving Coil = MC, 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 (Radius), Mils	Dynamic Compliance, µm/mN, Vertical/Lateral	Stylus Replacement: User = U, Factory = F	Mounting: Integral Slew = I, P-Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$	
																		MC
ACCPHASE	AC-2	20-20 ±1.0	MC	Yes <td>30</td> <td>0.18</td> <td>1.5-2.5</td> <td></td> <td></td> <td>X</td> <td>0.6 x 3.5</td> <td>15/15</td> <td>F</td> <td>S</td> <td></td> <td>475.00</td> <td>238.00</td>	30	0.18	1.5-2.5			X	0.6 x 3.5	15/15	F	S		475.00	238.00	
	AC-3	20-20 ±1.0	MC	Yes <td>30</td> <td>0.20</td> <td>1.5-2.0</td> <td></td> <td></td> <td>X</td> <td>0.2 x 7</td> <td>18/18</td> <td>F</td> <td>S</td> <td></td> <td>375.00</td> <td>188.00</td>	30	0.20	1.5-2.0			X	0.2 x 7	18/18	F	S		375.00	188.00	
ADC	TRX-3	20-30 ±1.5	IM	No	30	3	1-1.4	275		X	0.12 x 0.06 x 0.05	40/40	U		8	300.00	125.00	
	TRX-1	20-26 ±1.5	IM	No	30	3	1-1.4	275		X	0.3 x 0.22 x 0.5	40/40	U		8	225.00	87.50	
	PSX-40	20-24 ±1.5	IM	No	28	3.5	1.05-1.45	275		E	0.2 x 0.7	35/35	U	P/S	5-9	135.00	67.50	
	PSX-30	20-23 ±2	IM	No	26	3.5	1.05-1.45	275		E	0.3 x 0.7	35/35	U	P/S	5-9	110.00	55.00	
	PSX-20	20-22 ±2	IM	No	20	4	1.05-1.45	275		E	0.3 x 0.7	30/30	U	P/S	5-9	90.00	45.00	
	PSX-10	20-20 ±2	IM	No	20	4	1.05-1.45	275		C	0.65	30/30	U	P/S	5-9	60.00	30.00	
ADCOM	HC-E II	20-20 +2.5,-1	MC		22	2.3	1.6-2.0			E	0.3 x 0.7		F	S	4.7	140.00	77.00	
	HC-vdH II	20-20 +2.5,-1	MC		22	2.3	1.6-2.0			V	0.2 x 2.8		F	S	4.7	220.00	121.00	
	XC-LT II	20-20 ±1	MC		25	2.3	1.6-2.0			X	0.15 x 1.5		F	S	4.7	260.00	143.00	
	XC-MR II	20-20 ±1	MC		25	2.3	1.6-2.0			X	0.15 x 3.0		F	S	4.7	325.00	179.00	
	SXC-vdH	20-20 +3,-0	MC		25	2.3	1.8			V	0.15 x 3.3		F	S	4.7	450.00	248.00	
AKG	P-100		IM				1.0			V			F	S		1300.00		
	P-25MD	10-28 ±1	IM	Yes <td>30</td> <td>2.7</td> <td>1.0</td> <td>300</td> <td></td> <td>X</td> <td></td> <td>24/27</td> <td>U</td> <td>S</td> <td>3.5</td> <td>250.00</td> <td>150.00</td>	30	2.7	1.0	300		X		24/27	U	S	3.5	250.00	150.00	
	P-15MD	10-23 ±1.5	IM	Yes <td>30</td> <td>3.4</td> <td>1.25</td> <td>300</td> <td></td> <td>X</td> <td>0.18 x 0.8</td> <td>27/27</td> <td>U</td> <td>S</td> <td>3.5</td> <td>165.00</td> <td>82.00</td>	30	3.4	1.25	300		X	0.18 x 0.8	27/27	U	S	3.5	165.00	82.00	
	P-10ED	20-20 ±2	IM	No	25	5.8	1.5	300		E	0.18 x 0.8	20/20	U	S	3.5	115.00	55.00	
	P-5ED	20-20	IM	No	23	5.8	1.5	300		E	0.2 x 0.8	20/20	U	S	3.5	80.00	40.00	
	P-4DP	20-20	MM	No	20	5.8	1.5	470		E	0.2 x 0.8	20/20	U	P	3.5	50.00	25.00	
	P4	20-20	MM	No	20	15	5.8	1.5	470		E	0.2 x 0.8	20/20	U	S	3.5	50.00	50.00
ANDANTE	FGV	12-40	MM	No	30	5.0	1.3-2.3	100		X		20/20	U	S	6	200.00	120.00	
	E	12-30	MM	No	30	5.0	1-2.5	100		S	0.5	18/18	U	S	6	100.00	60.00	
	S	18-27	MM	No	28	5.0	1-2.5	100		S	0.5	18/18	U	S	6	75.00	37.50	
	HSP	18-25	MM	No	27	8.0	1-2	100		S	0.2 x 0.7	18/18	U	S	6	65.00	32.50	
	H	18-25	MM	No	27	10.0	1-2.5	100		S	0.5	15/15	U	S	6	55.00	27.50	
APATURE	MC-150	15-40	MC		25	3.2	1.7-1.9			E	0.3 x 0.7	10/10	U	F	S	4.2	129.95	69.95
ARGENT	Diamond Sapphire	10-50	MC	Yes <td>30</td> <td>25</td> <td>0.2</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>8</td> <td>1200.00</td> <td>660.00</td>	30	25	0.2	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	8	1200.00	660.00	
	MC-110 Sapphire	10-50	MC	Yes <td>30</td> <td>25</td> <td>0.2</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>8</td> <td>385.00</td> <td>212.00</td>	30	25	0.2	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	8	385.00	212.00	
	MC-300	10-40	MC	Yes <td>25</td> <td>20</td> <td>0.1</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>7</td> <td>200.00</td> <td>110.00</td>	25	20	0.1	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	7	200.00	110.00	
	MC-310	10-40	MC	Yes <td>25</td> <td>20</td> <td>0.1</td> <td>1.8-2.2</td> <td>100</td> <td>E</td> <td>0.3 x 0.7</td> <td>8/</td> <td>F</td> <td>S</td> <td>7</td> <td>175.00</td> <td>97.00</td>	25	20	0.1	1.8-2.2	100	E	0.3 x 0.7	8/	F	S	7	175.00	97.00	
	MC-500H	10-40	MC	Yes <td>25</td> <td>20</td> <td>1.9</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>7</td> <td>200.00</td> <td>110.00</td>	25	20	1.9	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	7	200.00	110.00	
	Boron	10-50	MC	Yes <td>25</td> <td>20</td> <td>1.9</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>7</td> <td>260.00</td> <td>143.00</td>	25	20	1.9	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	7	260.00	143.00	
	MC-500HS Sapphire	10-50	MC	Yes <td>25</td> <td>20</td> <td>1.9</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>7</td> <td>300.00</td> <td>165.00</td>	25	20	1.9	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	7	300.00	165.00	
MC-500HR Ruby	10-50	MC	Yes <td>25</td> <td>20</td> <td>1.9</td> <td>1.8-2.2</td> <td>100</td> <td>X</td> <td>0.3 x 0.6</td> <td>8/</td> <td>F</td> <td>S</td> <td>7</td> <td>300.00</td> <td>165.00</td>	25	20	1.9	1.8-2.2	100	X	0.3 x 0.6	8/	F	S	7	300.00	165.00		
ARISTON	150c	15-35	MC	No	25	2.5	1.70-2.30			C	0.6		F	S	4.2	110.00	35.00	
	150E	15-40	MC	No	25	2.5	1.7-2.3			E	0.3 x 0.7		F	S	4.2	150.00	45.00	
ASTATIC	MF-100	10-20 ±1	Moving Flux	No	30	25	3.5	1-1.5	100	X	Parabolic		U	S	5.5	290.00	133.75	
	MF-200	10-20 ±2	MF	No	28	20	4.2	1.5-2	100	X	Parabolic		U	S	5.5	160.00	80.00	
	MF-300	10-20 ±2.5	MF	No	25	18	4.2	1.5-2	100	S	0.3 x 0.7		U	S	5.5	100.00	50.00	
	MF-400	10-18 ±3	MF	No	22	18	4.2	1.5-2.5	100	S	0.5		U	S	5.5	80.00	40.00	
	IM10	10-15 ±3	IM	No	20	12	4.2	2.0-2.5	47	S	0.5		U	S	7.5	40.00	25.00	
	IM10E	10-15 ±2.5	IM	No	22	15	4.2	2.0-2.5	47	S	0.3 x 0.7	30/30	U	S	7.5	51.00	35.00	
AUDIO NOTE	I-0 Type II van den Hul	10-55	MC	Yes <td>25</td> <td>20</td> <td>0.15</td> <td>1.9</td> <td></td> <td>V</td> <td></td> <td>15/15</td> <td>F</td> <td>S</td> <td>18</td> <td>1250.00</td> <td>625.00</td>	25	20	0.15	1.9		V		15/15	F	S	18	1250.00	625.00	
	Soara MS-10 van den Hul	20-40	MC	Yes <td>25</td> <td>20</td> <td>0.16</td> <td>1.9</td> <td></td> <td>V</td> <td></td> <td>10/10</td> <td>F</td> <td>S</td> <td>8</td> <td>750.00</td> <td>375.00</td>	25	20	0.16	1.9		V		10/10	F	S	8	750.00	375.00	
AUDIOQUEST	AQ M-1		IM	No	25		3.0	1.50		E	0.3 x 0.7	15/15	U	S	5.5	95.00	40.00	
	AQ MC-3	15-35	MC	No	25		2.5	2.00		E	0.3 x 0.7	8/8	U	S	3.5	145.00	70.00	
	AQ T-5H	10-50	MC	Yes <td>25</td> <td></td> <td>2.2</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>8.8</td> <td>295.00</td> <td>145.00</td>	25		2.2	1.75		X	0.3 x 1.6	12/12	F	S	8.8	295.00	145.00	
	AQ T-5M	10-50	MC	Yes <td>25</td> <td></td> <td>1.1</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>8.8</td> <td>295.00</td> <td>145.00</td>	25		1.1	1.75		X	0.3 x 1.6	12/12	F	S	8.8	295.00	145.00	
	AQ T-5L	10-50	MC	Yes <td>25</td> <td></td> <td>0.22</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>8.8</td> <td>295.00</td> <td>145.00</td>	25		0.22	1.75		X	0.3 x 1.6	12/12	F	S	8.8	295.00	145.00	
	AQ T-7H	10-50	MC	Yes <td>25</td> <td></td> <td>2.2</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>6.9</td> <td>495.00</td> <td>245.00</td>	25		2.2	1.75		X	0.3 x 1.6	12/12	F	S	6.9	495.00	245.00	
	AQ T-7M	10-50	MC	Yes <td>25</td> <td></td> <td>1.1</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>6.9</td> <td>495.00</td> <td>245.00</td>	25		1.1	1.75		X	0.3 x 1.6	12/12	F	S	6.9	495.00	245.00	
	AQ T-7L	10-50	MC	Yes <td>25</td> <td></td> <td>0.22</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>6.9</td> <td>495.00</td> <td>245.00</td>	25		0.22	1.75		X	0.3 x 1.6	12/12	F	S	6.9	495.00	245.00	
	AQ T-100H	10-50	MC	Yes <td>25</td> <td></td> <td>2.2</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>9.2</td> <td>795.00</td> <td>395.00</td>	25		2.2	1.75		X	0.3 x 1.6	12/12	F	S	9.2	795.00	395.00	
	AQ T-100M	10-50	MC	Yes <td>25</td> <td></td> <td>1.1</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>9.2</td> <td>795.00</td> <td>395.00</td>	25		1.1	1.75		X	0.3 x 1.6	12/12	F	S	9.2	795.00	395.00	
	AQ T-100L	10-50	MC	Yes <td>25</td> <td></td> <td>0.22</td> <td>1.75</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>12/12</td> <td>F</td> <td>S</td> <td>9.2</td> <td>795.00</td> <td>395.00</td>	25		0.22	1.75		X	0.3 x 1.6	12/12	F	S	9.2	795.00	395.00	
	AQ S-100H	10-50	MC	Yes <td>25</td> <td></td> <td>2.2</td> <td>2.00</td> <td></td> <td>X</td> <td>0.3 x 1.6</td> <td>8/8</td> <td>F</td> <td>S</td> <td>9.2</td> <td>795.00</td> <td>395.00</td>	25		2.2	2.00		X	0.3 x 1.6	8/8	F	S	9.2	795.00	395.00	

PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response - Hz to kHz. ±dB	Principle Moving Iron MM Induced Magnet MM 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	Stylus Type - See Code	Stylus Radius (Radius) - Mils	Dynamic Compliance - μmm/MHz Vertical - Lateral	Stylus Replacement - User = U, Factory = F Mounting - Integral Shell = I, P-Round = P, Standards = S	Weight - Grams	Price - \$	Replacement Stylus Price - \$		
																Yes	No
AUDIOQUEST (Continued)	AQ S-100M	10-50	MC	Yes	25	15	1.1	2.00		X	0.3 x 1.6	8.8	F	S	9.2	795.00	395.00
	AQ S-100L	10-50	MC	Yes	25	15	0.22	2.00		X	0.3 x 1.6	8.8	F	S	9.2	795.00	395.00
	AQ 404S	10-50	MC	Yes	25	15	2.2	2.00		X	0.3 x 1.6	8.8	F	S	9.5	225.00	112.50
	AQ 404T	10-50	MC	Yes	25	15	2.2	1.75		X	0.3 x 1.6	12.12	F	S	9.5	225.00	112.50
	AQ 1.1G	10-50	MC	Yes	25	15	1.1	2.00		X	0.3 x 1.6	8.8	F	S	9.5	325.00	162.50
	AQ 1.1S	10-50	MC	Yes	25	15	1.1	2.00		X	0.3 x 1.6	8.8	F	S	9.5	325.00	162.50
AUDIO-TECHNICA	AT30E	15-25	MC	No	25	15	0.3	1.4-2.0		E	0.3 x 0.7		U	S	5	140.00	65.00
	AT30HE	15-25	MC	No	29	20	2.0	1.4-1.8		E	0.3 x 0.7		U	S	5	140.00	65.00
	AT31E	15-28	MC	No	29	20	0.4	1.2-1.8		E	0.2 x 0.7		U	S	4.8	185.00	80.00
	AT35E	15-30	MC	No	30	20	0.4	1.2-1.8		E	0.2 x 0.7		U	S	4.3	275.00	100.00
	AT105	20-20	MM	No	26	16	4.5	1.5-2.5	100-200	E	0.6		U	S	7	55.00	30.00
	AT110E	20-22	MM	No	26	17	4.5	1.0-2.0	100-200	E	0.4 x 0.7		U	S	7	70.00	35.00
	AT120E	15-25	MM	No	29	20	5	1.0-1.8	100-200	E	0.3 x 0.7		U	S	6.4	95.00	45.00
	AT125LC	10-28	MM	No	29	20	5	1.0-1.8	100-200	X	0.2 x 0.7		U	S	6.4	135.00	60.00
	AT130E	10-30	MM	No	30	20	5	0.8-1.8	100-200	X	0.2 x 0.7		U	S	6.4	125.00	50.00
	AT135E	5-30	MM	No	30	20	5	0.8-1.8	100-200	E	0.2 x 0.7		U	S	6.4	160.00	60.00
	AT140LC	5-32	MM	No	30	20	5	0.8-1.8	100-200	X	0.2 x 0.7		U	S	6.4	185.00	75.00
	AT155LC	5-35	MM	Yes	31	21	5	0.8-1.6	100-200	X	0.2 x 0.7		U	S	8.2	240.00	100.00
	AT160ML	5-35	MM	No	31	21	5	0.8-1.8	100-200	X	0.2 x 0.7		U	S	8.2	275.00	125.00
	MicroLine																
	AT112EP	20-22	MM	No	26	17	5	1.0-1.5	100-200	E	0.4 x 0.7		U	P	6	75.00	35.00
	AT122EP	15-25	MM	No	29	20	5	1.0-1.5	100-200	E	0.3 x 0.7		U	P	6	100.00	45.00
	AT122LP	10-28	MM	No	29	20	5	1.0-1.5	100-200	X	0.2 x 0.7		U	P	6	130.00	60.00
	AT132EP	10-30	MM	No	30	20	5	0.8-1.8	100-200	X	0.2 x 0.7		U	P	6	150.00	50.00
	AT152LP	5-35	MM	No	31	21	5	0.8-1.8	100-200	X	0.2 x 0.7		U	P	6	240.00	100.00
	AT201P	20-22	MM	No	26	16	5	1-1.5	100-200	X	0.6		U	P	6	55.00	25.00
AT201EP	20-25	MM	No	26	17	5	1-1.5	100-200	X	0.4 x 0.7		U	P	6	65.00	30.00	
AT211EP	15-25	MM	No	29	18	5	1-1.5	100-200	E	0.4 x 0.7		U	P	6	75.00	35.00	
AT216EP	15-27	MM	No	29	20	5	1-1.5	100-200	E	0.3 x 0.7		U	P	6	100.00	45.00	
AT221EP	10-28	MM	No	31	20	5	1-1.5	100-200	E	0.2 x 0.7		U	P	6	135.00	65.00	
AT231LP	10-30	MM	No	31	21	3.5	1-1.5	100-200	X	0.2 x 0.7		U	P	6	130.00	60.00	
AT312EP	15-25	MC	No	30	20	0.3	1-1.5	100-200	X	0.3 x 0.7		U	P	6	160.00	65.00	
BANG & OLUFSEN	MMC 1	20-20 ± 1	MI	Yes	30	20	2.12	1		X	0.1 x 0.1	30.30	U	P	1.6	445.00	
	MMC 2	20-20 ± 1.5	MI	Yes	25	20	2.12	1		X	0.12 x 0.12	30.30	U	P	1.6	445.00	
	MMC 3	20-20 ± 2	MI	Yes	25	20	2.12	1		E	0.15 x 0.15	25.25	U	P	1.6	180.00	
	MMC 4	20-20 ± 2.5	MI	Yes	22	17	2.12	1.2		E	0.20 x 0.20	25.25	U	P	1.6	105.00	
	MMC 5	20-20 ± 3	MI	Yes	20	15	2.12	1.5		E	0.25 x 0.25	20.20	U	P	1.6	60.00	
BOSTON ACOUSTICS	MC-1E	20-20 ± 1.5	MC	No	25	23	3.5	1.5-2		E	0.3 x 0.7	20.8	F	S	5	140.00	100.00
	MC-1vdH	20-20 ± 1.5	MC	No	25	23	3.5	1.5-2		V	0.14 x 3.3	20.8	F	S	5	200.00	140.00
MITCHELL A. COTTER	ADB-1	10-40 ± 1	MC	Yes	35	30	1.0	2.5-8		X	0.8 x 1.2	4.8.4.8	F	S	23	700.00	425.00
	ADB-2	20-30 ± 0.5	MC	Yes	35	30	1.0	2.5-8		X	0.8 x 1.2	4.8.4.8	F	S	23	1000.00	700.00
DECCA AUDIO ACCESS	Super Gold	20-40	MI	No	25	5	1-2	220	V		5.12	F	S	6.7	450.00		
	vdH	20-20	MI	No	20	5	1.5-2.25	100	V		7.5.15	F	S	6.8	850.00		
DECCA/ROCELCO	Super Gold	10-40	MI	No	25	4	1.7	220	V		5.12	F	S	6.7	450.00	300.00	
DYNAVECTOR	DRT	20-100	MC	Yes	25	25	0.1	1.7-2		E	0.25 x 0.7		F	S	9	1100.00	
	DV-17D2MR	20-100	MC	Yes	20	20	0.2	1.8-2		X	0.16 x 0.2		F	S	5.3	480.00	288.00
	DV-23RSMR	20-80	MC	Yes	20	20	0.2	1.5		X	0.16 x 0.2	15/20	F	S	5.3	350.00	192.50
	DV-19A	20-70	MC	Yes	20	20	0.25	1.7-2		E	0.25 x 0.7		F	S	5.3	230.00	125.00
	DV-50A	20-50	MC	Yes	20	25	0.2	1.3-1.7		E	0.3 x 0.7	20.20	F	S	4.5	198.00	110.00
	DV-20B2	20-40	MC	Yes	20	3.6	1.8			E	0.3 x 0.7	24/25	F	S	5.3	298.00	164.00
	DV-20A2	20-40	MC	Yes	20	3.6	1.8			E	0.3 x 0.7	24/25	F	S	5.3	240.00	132.00
	DV-10X4	20-25	MC	Yes	20	2.5	1.7			E	0.3 x 0.7	24.25	F	S	4.5	160.00	88.00
ELAC	ESG 791E	10-20	MM	No	22	8	1.5-2	550	E	0.2 x 0.7	15.15	U	S	6.5	65.00	39.00	
	ESG 792E	10-20	MM	No	22	12	1.5-2	550	E	0.2 x 0.7	18/18	U	S	6.5	115.00	69.00	
	ESG 793E	10-22	MM	No	24	20	5.6	1-1.25	300	E	0.2 x 0.7	30.30	U	S	6.5	140.00	89.00
	ESG 794H	10-23	MM	No	26	20	5.6	0.75-1	300	V	0.2 x 3.0	40.40	U	S	6.5	200.00	99.00
	ESG 795E	10-25	MM	Yes	27	20	5.6	1.5-1.75	300	E	0.2 x 2.0	20.20	U	S	6.5	225.00	129.00
	ESG 796H	10-30	MM	Yes	28	20	5.6	1-1.25	300	V	0.2 x 3.0	30.30	U	S	6.5	300.00	179.00
	EMC 1	10-50	MC	Yes	28	20	0.14	1.25-1.75		V	0.2 x 3.0	20.20	F	S	6.8	400.00	
	EMC 2	10-30	MC	Yes	28	20	0.14	1.5-1.75		E	0.2 x 2.0	20.20	F	S	6.7	315.00	
EMT FRANZ	XSD 15	40-12 ± 2	MC	Yes	25	1	2-3		S	0.6	15	F	I		499.00	185.00	
EPOCH	HZ9S	10-25	MM	Cal.	35	22	0.8	0.75-1.5		X	0.2 x 3.0	25	U	S		250.00	90.00
	LZ9S	10-50	MM	Cal.	35	22	0.04	0.75-1.5	100	X	0.2 x 3.0	25	U	S		250.00	90.00
	HZ8S	10-20	MM	No	35	22	0.8	0.75-1.5		X	0.2 x 3.0	20	U	S		190.00	75.00
	LZ8S	10-40	MM	No	35	22	0.04	0.75-1.5	100	X	0.2 x 3.0	20	U	S		190.00	75.00
	HZ7S	10-40	MM	No	30	20	0.8	0.75-1.5		X	0.3 x 2.8	17	U	S		120.00	50.00
	HZ6E	10-20	MM	No	30	15	0.8	0.75-1.5		X	0.2 x 0.7	15	U	S		95.00	40.00
FIDELITY RESEARCH	MC-44	10-40	MC		27	25	0.2	1.0-1.5		X			F	S	6.2	199.95	137.00
	FR-1MK2	20-20	MC		27	23	0.1	1.5-2.0		E	0.3 x 0.8		F	S	10	204.95	134.00
	FR-1MK3f	10-40	MC		26	22	0.14	2		X	0.3 x 3		F	S	10	264.95	173.00
	MC-201	20-35	MC		27	0.16	1.5-2		X	0.3 x 2		F	S	7.5	329.95	215.00	
	MC-202	20-35	MC		27	0.16	1.0-1.3		X	0.1 x 0.2		F	S	7.5	369.95	250.00	
	MC-702	10-45	MC		28	0.2	2-3		X			F	I	29	729.95	478.00	
GOLOBUG	Medusa	20-20 ± 0.5	MC	Yes	30	25	0.2	1.8		X	0.3 x 0.7	12.9	F	S	5.8	220.00	110.00
	Clement	20-20 ± 0.5	MC	Yes	30	25	0.1	1.5		X	0.3 x 0.7	36.13	F	S	5.6	350.00	175.00
	Mr. Brier	20-20 ± 0.5	MC	Yes	30	25	0.22	1.7		X	0.3 x 0.7	17.15	F	S	7		

PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response, Hz to kHz, ± dB	Stylus Type	Principle: Moving Iron MM, Induced Magnet = M, Moving Coil = MC	Individual Response	Channel Separation, 1 kHz, dB	Output, mV, 1 MHz, dB	Recommended Tracking Force	Stylus Type—See Code	Stylus Radius (Radius), Mills	Dynamic Compliance, μm/mN, Vertical/Lateral	Stylus Replacement: μm/mN, User = U, Factory = F	Mounting: Integral/Shell = I/S, Phono = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$		
																	MM	Yes
GRACE	F-9E Ruby	10-50 ± 2	MM	No	30	25	2.6	1.25-2	400	E	20/20	U	S	6	300.00	200.00		
	F-9E Super	10-47 ± 2	MM	No	30	25	3.75	1.25-2	200	X	20/20	U	S	6	200.00	100.00		
	F-9L	10-40	MM	No	30	25	5.5	1.25-2	350	X	20/20	U	S	6	180.00	90.00		
	F-8L	20-20	MM	No	25	20	5.5	1.25-5	100	X	20/20	U	S	6	125.00	62.50		
GROOV-DANCER	IM + MC +	15-35	IM	No	25	25	3.0	1.50		E	0.3 x 0.7	15/15	U	S	85.00	40.00		
			MC	No	25	25	2.5	2.00		E	0.3 x 0.7	8/8	U	S	135.00	67.50		
HIGH-PHONIC	MC-A3 MC-R5 MC-A6 MC-D15	10-70	MC	Yes	30		0.12	1.0		X	0.1 x 1.2	17	F	S	6.5	225.00	150.00	
		10-70	MC	Yes	30		0.12	1.0		X	0.1 x 1.2	18	F	S	6.5	350.00	235.00	
		10-75	MC	Yes	30		0.12	1.0		X	0.1 x 1.2	18	F	S	6.5	475.00	325.00	
		10-85	MC	Yes	30		0.12	0.9-1.0		X	0.1 x 1.2	18	F	S	6.5	1200.00	850.00	
IMS	165S	10-20	IM	No	25		3.6	1.7-2.3	200-300	S	0.5	8/8	U	S	5.6	55.00	17.00	
	185E	10-22	IM	No	25		3.6	1.7-2.3	200-300	E	0.3 x 0.7	8/8	U	S	5.6	65.00	27.00	
	210E	10-25	IM	No	25		4.0	1.5-2.0	200-400	E	0.3 x 0.7	20/20	U	S	5.8	110.00	55.00	
	220CE	10-25	IM	No	25		4.0	1.5-2.0	200-400	E	0.3 x 0.7	20/20	U	S	5.8	150.00	75.00	
	1400ER	20-22	IM	No	20		3.5	1.75-2.25	200-400	S	0.6	5/5	U	S	5.4	55.00	14.00	
	1440E	20-22	IM	No	22		3.5	1.75-2.25	200-400	E	0.4 x 0.7	5/5	U	S	5.4	65.00	17.00	
	1466E	20-22	IM	No	25		3.5	1.75-2.25	200-400	E	0.4 x 0.7	5/5	U	S	5.4	80.00	26.00	
	1460IE	20-22	IM	No	22		3.5	1.75-2.25	200-400	E	0.4 x 0.7	5/5	U	I	9	90.00	23.00	
	P-2000	20-30	IM	No	22		3.8	1.25	100	S	0.6		U	P		70.00	24.00	
	P-2500	20-30	IM	No	22		3.8	1.25	100	E	0.3 x 0.7		U	P		110.00	40.00	
	MC-5	16-25 +1.8, -0.5	MC	No	20		2.5	1.7-2.3	200-400	S	0.6 x 0.6	5.1/5.1	U	F	S	3.7	150.00	
	KISEKI	Blue Purple Heart Agaat Ruby Lapus	20-50 ± 2	MC	No	30	28	0.35	1.2-2		E	0.2 x 0.6	20/20	F	S	8.5	600.00	330.00
			20-50 ± 1	MC	No	30	28	0.4	1-2		X	0.14 x 0.6	20/20	F	S	7.5	900.00	
			20-50 ± 1	MC	No	30	28	0.4	1-2		X	0.14 x 0.6	20/20	F	S	11.2	1250.00	
20-50 ± 0.5			MC	No	32	28	0.45	1.5-2		X	0.14 x 0.6	20/20	F	S	14	3500.00		
KLIPSCH	MCZ-2 MCZ-7 MCZ-10 MCZ-110	20-45 ± 2	MC	Yes	27		0.2	1.5-2.1		X	0.3 x 0.7	9/9	U	S	5.1	215.00		
		20-45 ± 2	MC	Yes	27		0.2	1.5-2.1		X	0.3 x 0.7	9/9	U	S	5.1	375.00		
		20-45 ± 2	MC	Yes	27		0.2	1.5-2.1		X	0.3 x 0.7	9/9	U	S	5.1	325.00		
		20-45 ± 2	MC	Yes	27		0.2	1.5-2.1		X	0.3 x 0.7	9/9	U	S	5.1	1000.00		
LINN PRODUCTS	Karma Asak Trak Basik III	20-20 ± 1.0	MC	No	30		0.2	1.5-1.6		E	0.2 x 0.8		F	S	6	425.00	483.33	
		20-20 ± 1.0	MC	No	27		0.2	1.5-1.7		E	0.2 x 0.8		F	S	6	725.00	283.33	
		20-20 ± 1.0	MC	No	25		0.2	1.7-2.0		E	0.2 x 0.8		F	S	6	225.00	150.00	
			MM	No				1.6-1.8		E						75.00		
LOGIC LIMITED	Claro Gold Claro Black	20-30 ± 2	MC	No	30	25	0.3	1.5-2.0		E	0.3 x 0.7		F	S	8.3	250.00	150.00	
		20-50 ± 3	MC	No	30	25	0.2	1.8-2.0		X	0.08 x 0.3		F	S	8.3	550.00	330.00	
LOTUS		20-20	MC	No	20		0.2	0.8-1.5		V			F	S	5.5	650.00		
JOHN MAROVSKIS	MIT-1	20-20 ± 3	MC	No	25	20	0.25	2.25-2.5		V	0.2 x Line	16	F	S	5.5	550.00	275.00	
MAYWARE	MC-2 Vital MC-3L 11	10-50 ± 2	MC	Yes	29	25	0.25	1.8-2.1		X			F	S	6.9	250.00		
		10-50 ± 2	MC	Yes	29	25	2.5	1.8-2.1		X			F	S	6.9	250.00		
MICRO-ACOUSTICS	830CSA	10-30 ± 0.75	Elect.	Yes	30	25	3.5	0.75-1.25	25-1500	X	0.15 x 1.5	42/42	U	S	2.5-4	335.00	148.00	
	630MP	10-30 ± 1.0	Elect.	Yes	30	25	3.5	0.75-1.25	25-1500	X	0.2 x 1.2	40/40	U	S	2.5-4	265.00	117.00	
	3002	10-30 ± 1.5	Elect.	No	30	25	3.5	0.75-1.25	25-1500	E	0.2 x 0.7	40/40	U	S	2.5-4	170.00	57.00	
	382	10-25 ± 1.5	Elect.	No	25	20	3.5	0.75-1.25	25-1500	E	0.2 x 0.7	35/35	U	S	4	140.00	48.00	
	309	10-20 ± 1.5	Elect.	No	25	20	3.5	1.0-1.5	25-1500	E	0.2 x 0.7	30/30	U	S	4	120.00	38.00	
	100E	10-20 ± 2.0	Elect.	No	25	20	3.5	1.0-1.5	25-1500	E	0.2 x 0.7	25/25	U	S	4	99.00	30.00	
	Stratus I	10-25 ± 1.5	Elect.	No	25	20	3.5	0.75-1.25	25-1500	E	0.2 x 0.7	35/35	U	S	4	200.00	50.00	
	Stratus II	10-20 ± 1.5	Elect.	No	25	20	3.5	1.0-1.5	25-1500	E	0.2 x 0.7	30/30	U	S	4	150.00	40.00	
	Stratus III	10-20 ± 2.0	Elect.	No	25	20	3.5	1.0-1.5	25-1500	E	0.2 x 0.7	25/25	U	S	4	115.00	32.00	
	50-PE 25-PS	10-20 ± 3.0 10-20 ± 3.0	IM IM	No No	25 25	20 20	3.5 3.5	1.0-1.5 1.0-1.5	375-500 375-500	E C	0.25 x 0.7 0.5	35/35 35/35	U U	P/S P	6 6	75.00 45.00	25.00 20.00	
MISSION ELECTRONICS	Solitaire	20-20 ± 2	MM	Yes			3.5	1.8-2.0		E			U	S	5.7	99.00	49.00	
	773MM	20-20 ± 2	MM	No			3.5	1.6		E			U	S	5.5	79.00	39.00	
	773L	20-20 ± 2	MC	Yes				2.0		S			S	6.2	199.00	99.00		
	773HC	20-20 ± 2	MC	Yes				2.0		S			S	6.2	399.00	199.00		
	The Rose	20-20 ± 1.5	MC	Yes				2.0		E			S	7	599.00	299.00		
MIYABI	Ivory MCA	10-50 ± 2	MC	No	25		0.25	1.5-2.0		X		10/10	F	S	13.5	1300.00		
		10-50 ± 2	MC	No	25		0.25	1.5-2.0		X		10/10	F	S		400.00		
MONSTER CABLE	Alpha 1 Alpha 2	20-20 ± 1	MC	Yes	25		0.3	1.75	80	X	0.01 x 0.45	15/15	F	I	6.5	475.00	280.00	
		20-20 ± 1	MC	Yes	30		0.3	1.75	30	X	0.03 x 0.8	15/15	F	I		650.00		
NAD	9001	20-20 ± 2	MC	No	24	20	3.0	1.8-2.1		E	0.3 x 0.7		F	S	4.4	180.00	90.00	
ORTOFON	MC2000	5-50 + 5, -1	MC	Yes	30		0.05	1.2-1.8		X		20/20	F	S	11	1000.00		
	MC200U	20-25 + 3, -1	MC	No	30		0.09	1.2-1.8		X		13/13	F	S	5.3	350.00		
	MC200I	20-25 + 3, -1	MC	No	30		0.09	1.2-1.8		X		13/13	F	S	16.5	400.00		
	MC100U	20-20 + 3, -1	MC	No	25		0.09	1.2-1.8		E		11/11	F	S	5.3	250.00		
	MC10 Super	20-20 + 4, -1	MC	No	25		0.2	1.5		X		14/14	F	S	7	149.00		
	TMC200	20-35 ± 2	MC	No	30		0.09	1.25		X		13/13	F	P	6	350.00		
	MCP-100 Super	20-20 + 4, -1	MC	No	25		0.2	1.25		E		14/14	F	P	6	250.00		
	SPU-Gold	20-20 ± 1.5	MC	Yes	25		0.2	3-5		E		8/8	F	I	32	900.00		
	MC-30	20-20 ± 1	MC	Yes	25		0.08	1.5		X		13/13	F	S	7	850.00		
	MC-20II	20-20 ± 1	MC	No			0.09	1.5		X		12/12	F	S	7	295.00		
	(Continued)										0.6							

PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response Hz to KHz. ± dB	Stylus Type	C—Conical S—Spherical E—Elliptical Q—For CD-4 Use V—Van den Hul X—Hyper-Elliptical, Stereohedron, Fine Line, Line Contact, Long Line, Line Trace, or similar	Pivotal Moving Iron = MI, Integral Magnet = IM, Moving Coil = MC	Individual Response	Channel Separation - 1 KHz. dB	Channel Separation - 10 KHz. dB	Output, mv. rms. Lateral Velocity	Recommended Tracking Force Range Grams	Stylus Type—See Code	Stylus Radius (Radius), Mills	Dynamic Compliance, μm/mN, Vertical/Lateral	Stylus Replacement: Mounting = U, Factory = F P-Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$	
																		Principal Moving Iron = MI, Moving Coil = MC
ORTOFON (Continued)	MC-10II	20-20 ± 1.5	MC	No	No	25	0.09	1.5	200-500	E	X	11/11	F	S	7	195.00		
	OM-30	20-27	MC Var. Mag. Shunt	No	No	25	3.5	1.0-1.5	200-500	E	X	40/35	F	S	2.5	225.00	120.00	
	OMP-30	20-27	VMS	No	No	25	3.5	1.25	200-500	X	X	40/35	U	P	6	225.00	120.00	
	OM-20	20-22	VMS	No	No	25	4.0	1.0-1.5	200-500	E	E	35/30	U	S	2.5	175.00	75.00	
	OMP-20	20-22	VMS	No	No	25	4.0	1.25	200-500	E	E	35/30	U	P	6	175.00	75.00	
	OM-10	20-22	VMS	No	No	22	4.0	1.25-1.75	200-500	E	E	30/25	U	S	2.5	95.00	40.00	
	OMP-10	20-22	VMS	No	No	22	4.0	1.25	200-500	E	E	30/25	U	P	6	95.00	40.00	
	OM-5E	20-20	VMS	No	No	22	4.0	1.25-1.75	200-500	E	E	25/20	U	S	2.5	65.00	30.00	
	OMP-5E	20-20	VMS	No	No	22	4.0	1.25	200-500	E	E	25/20	U	P	6	65.00	30.00	
	FF15XEII	20-20	VMS	No	No	20	6.0	1.5-3.0	400	X	X	20/20	U	S	5	50.00	20.00	
	VMS30II	20-20	VMS	No	No	25	5.0	0.8-1.25	400	X	X	30/30	U	S	5	185.00	90.00	
	VMS20EII	20-20	VMS	No	No	25	5.0	1.0-1.6	400	E	E	28/28	U	S	5	155.00	70.00	
	VMS10EII	20-20	VMS	No	No	20	6.0	1.7-2.3	400	E	E	20/20	U	S	5	130.00	50.00	
	VMS5EII	20-20	VMS	No	No	20	6.0	1.7-2.3	400	E	E	20/20	U	S	5	80.00	30.00	
	VMS3E	20-20	VMS	No	No	20	6.0	1.7-2.3	400	E	E	15/15	U	S	5	60.00	20.00	
	TM30	20-20	VMS	No	No	25	3.5	1.25	200	X	X	30/30	U	P	6	175.00	120.00	
	TM20	20-20	VMS	No	No	25	3.5	1.25	200	E	E	20/20	U	P	6	115.00	75.00	
	TM14	20-20	VMS	No	No	25	4.5	1.25	200	E	E	20/20	U	P	6	75.00	30.00	
	TM7	20-20	VMS	No	No	22	5.0	1.25	200	E	E	15/15	U	P	6	60.00	25.00	
	Concorde STD	20-20	VMS	No	No	20	5.0	1.7-2.3	400	E	E	25/20	U	I	15	125.00	50.00	
Concorde EC10	20-20	VMS	No	No	20	5.0	1.7-2.3	400	E	E	20/15	U	I	15	95.00	40.00		
Concorde Pro	20-20	VMS	No	No	20	5.0	3.0-5.0	400	E	E	8/8	U	I	16	95.00	42.00		
LM Pro	20-20	VMS	No	No	20	5.0	3.0-5.0	400	E	E		U	I	16	75.00	42.00		
PARASOUND	PCe55	20-20 ± 1	IM	No	No	28	5.0	1.5-2.0	300	C	E	0.6	U	S	3.7	49.95	27.50	
	PCe77	20-26 ± 0.8	IM	No	No	30	4.0	1.25	300	E	E	0.4 x 0.7	U	P	5.9	69.95	44.00	
PICKERING	XL2/7500S	10-50	MM	No	No	35	0.06	0.75-1.5	1000	X	X	0.3 x 2.8	U	S	5.5	250.00	90.00	
	TL2/7500S	10-50	MM	No	No	35	0.06	0.75-1.5	1000	X	X	0.3 x 2.8	U	P	5.9	250.00	90.00	
	XSV/4000	10-36	MM	No	No	35	4.9	0.75-1.25	275	X	X	0.3 x 2.8	U	S	5.8	200.00	56.00	
	XSV/3000	10-30	MM	No	No	35	5.0	0.75-1.25	275	X	X	0.3 x 2.8	U	S	5.8	180.00	49.95	
	XV-15/1200E	10-30	IM	No	No	35	4.4	0.5-1.25	275	X	E	0.2 x 0.7	U	S	5.5	150.00	35.00	
	XV-15/757S	10-25	IM	No	No	35	4.4	0.75-1.5	275	X	E	0.3 x 2.8	U	S	6.3	125.00	43.75	
	XV-15/625E	10-25	IM	No	No	35	0.82	0.75-1.5	275	X	E	0.3 x 0.7	U	S	5.5	100.00	30.00	
	XV-15/400E	10-25	IM	No	No	35	5.5	1-2	275	X	E	0.4 x 0.7	U	S	5.5	85.00	28.50	
	XSP/4004	10-36	MM	No	No	35	2.5	0.75-1.5	275	X	X	0.3 x 2.8	U	P	5.9	200.00	56.00	
	XSP/3003	10-30	MM	No	No	35	3.0	0.75-1.5	275	X	X	0.3 x 2.8	U	P	5.9	180.00	49.95	
	TL-4S	10-25	IM	No	No	35	4.4	0.75-1.5	275	X	X	0.3 x 2.8	U	P	5.9	150.00	45.00	
	TL-3S	10-25	IM	No	No	35	4.4	0.75-1.5	275	X	X	0.3 x 2.8	U	P	5.9	125.00	40.00	
	TL-2S	10-22	IM	No	No	35	4.4	0.75-1.5	275	X	X	0.3 x 2.8	U	P	5.9	100.00	36.00	
	TL-2E	10-22	IM	No	No	35	4.4	0.75-1.5	275	E	E	0.3 x 0.7	U	P	5.9	85.00	29.50	
	TL-1	10-20	IM	No	No	32	4.4	0.75-1.5	275	E	E	0.4 x 0.7	U	P	5.9	75.00	24.50	
	TL-E Type 2	10-22	IM	No	No	28	3.0	1-1.5	275	E	E	0.4 x 0.7	U	P	5.9	55.00	24.50	
	XV-625-DJ	20-20	IM	No	No	30	0.8	1-4	275	E	E	0.4 x 0.7	U	S	5.5	75.00	30.00	
	TL625DJ	20-20	IM	No	No	30	0.8	3.5-4	275	E	E	0.4 x 0.7	U	S	5.5	55.00	30.00	
	V-15 Series II S	10-25	MM	No	No	25	3.5	0.75-1.5	275	X	X	0.3 x 2.8	U	S	5.5	80.00	37.50	
	V-15 Series II E	10-20	MM	No	No	25	3.5	0.75-1.5	275	E	E	0.3 x 0.7	U	S	5.5	50.00	21.50	
V-15 Series II EE	10-18	MM	No	No	22	3.5	1-2	275	E	E	0.4 x 0.7	U	S	5.5	45.00	16.50		
TL-E	10-20	MM	No	No	28	4.4	1-1.5	275	E	E	0.4 x 0.7	U	P	5.9	50.00	20.00		
TLC	10-20	MM	No	No	28	4.4	1-1.5	275	S	S	0.7	U	P	5.9	45.00	15.00		
PREMIER	LMX Boron	10-45	MC	Yes	No	30	0.35	1.8-2.2		X	E	0.3 x 0.8	F	S	4.75	250.00	125.00	
	LME Improved	10-40	MC	No	No	30	0.35	1.3-2.0		E	S	0.6	F	S	4.75	170.00	85.00	
	LMS Improved	10-35	MC	No	No	27	0.35	1.3-2.0		S	S	0.6	F	S	4.75	125.00	62.50	
PROFILE	BX-150	15-40 ± 1.5	MC	No	No	25	2.5	1.7-2.3		E	E	0.3 x 0.7	F	S	4.2	129.00		
PROMETHEAN AUDIO PRODUCTS	Green Positive Pivot	15-25 ± 1	MI MI	No	No		3	1.7 1.7	500	E	E	0.3 x 0.7	F	S	7	180.00 600.00	120.00	
REALISTIC	RXT5	20-20	MI	No	No	25	4.0	1.25-1.75	250	E	E	0.2 x 0.7	U	S	8.3	49.95		
	R25XT	20-20	MI	No	No	20	4.5	2.5-3.5	250	E	E	0.4 x 0.7	U	S	6.0	19.95	14.95	
	R47XT	20-20	MI	No	No	20	4.5	1.75-2.25	250	E	E	0.4 x 0.7	U	S	6.0	29.95	19.95	
	R1000XT	20-20	MI	No	No	25	4.5	1.0-1.25	250	E	E	0.4 x 0.7	U	S	6.0	39.95	27.95	
REGA RESEARCH	R100	10-20 ± 3.0	MM	No	No		4.5	1.0-2.0		E	E	0.2 x 0.8	U	S	6.2	95.00	50.00	
SHINON	Titan		MC	No	No		0.25	1.25-1.75		E	X		F	S		199.00	100.00	
	MV 2.5		MC	No	No		2.5	1.75-2.5		X	X		F	S		299.00	150.00	
	Saphic		MC	No	No		0.25	1.75-2.25		X	X		F	S		395.00	200.00	
	Red (Boron)		MC	No	No		1.00	1.75-2.25		X	X		F	S		599.00	300.00	
	Red (Sapphire)		MC	No	No		0.2	1.75-2.25		X	X		F	S		650.00	325.00	
SHURE	V15 Type V-MR MicroRidge	20-28 ± 1.5	MM	Yes	No	25	18	3.2	1-1.25	250	X	X	0.15 x 3.0	U	S	6.6	275.00	125.00
	V15 Type V-B	20-28 ± 1.5	MM	Yes	No	25	18	3.2	1-1.25	250	X	X	0.2 x 1.5	U	S	6.6	220.00	110.00
	V15 Type V-P	20-28 ± 1.5	MM	Yes	No	25	18	3.2	1.25	250	X	X	0.2 x 1.5	U	P	5.9	205.00	100.00
	ML140HE	20-22	MM	No	No	25	15	4.0	1-1.25	250	X	X	0.2 x 1.5	U	S	4.5	190.00	100.00
	ML120HE	20-20	MM	No	No	25	15	4.0	1-1.25	250	X	X	0.2 x 1.5	U	S	4.5	155.00	95.00
	M111HE	20-20	MM	No	No	25	15	4.0	1-1.25	250	X	X	0.2 x 1.5	U	P/S	7.9	135.00	82.50
	M110HE	20-20	MM	No	No	25	15	4.0	1.25	250	X	X	0.2 x 1.5	U	P/S	7.4	110.00	67.50
	M105E	20-20	MM	No	No	25	4.7	1.25	250	E	E	0.2 x 0.7	U	P/S	7.8	100.00	61.00	
	M104E	20-20	MM	No	No	20	5.0	1.25	250	E	E	0.2 x 0.7	U	P/S	7.4	70.00	44.00	
	M99E	20-20	MM	No	No	20	5.0	1.25	250	E	E	0.2 x 0.7	U	P/S	7.4	50.00	30.00	
	M92E	20-18	MM	No	No	20	5.0	1.25	250	E	E	0.4 x 0.7	U	P/S	7.3	30.00	20.00	
	M44C	20-20	MM	No	No	20	9.5	3-5	450	S	S	0.7	U	S	6.7			

PHONO CARTRIDGES

MANUFACTURER	Model	Frequency Response, Hz to kHz, ±dB	Stylus Type	Principal Moving Iron - MI, Induced Magn. IM, Moving Coil - MC	Channel Separation, 1 kHz, dB	Channel Separation, 10 kHz, dB	Output, mv, 1 kHz, 5 cm/sec, rms Lateral Velocity	Recommended Tracking Force, Grams	Stylus Type - See Code	Stylus Radius (Radius), mils	Dynamic Compliance, µm/mN, Vertical/Alateral	Stylus Replacement, µm/mN, User = U, Mounting Factory = F	P-Mount = P, Standard = S	Weight, Grams	Price, \$	Replacement Stylus Price, \$
SIGNET	TK10ML	5-35	MM	No	35	26	2.2	1.0-1.5	100-200	X						
	TK9Lca	5-35	MM	No	35	26	2.2	0.8-1.6	100-200	X						
	TK9Ea	5-30	MM	No	35	25	2.2	0.8-1.6	100-200	X						
	TK7Lca	5-35	MM	No	33	23	5	0.8-1.6	100-200	X						
	TK7Ea	5-30	MM	No	33	22	5	0.8-1.6	100-200	X						
	TK5Ea	10-30	MM	No	29	20	5	0.8-1.6	100-200	X						
	TK3Ea	15-28	MM	No	28	19	5	0.9-1.9	100-200	E						
	TK1Ea	15-25	MM	No	26	17	5	1.3-2.3	100-200	E						
	MK-110E	15-28	MC	No	30	20	0.4	1.2-1.8		E						
	MK-111Ea	5-50	MC	No	30	20	0.4	1-2		E						
	MK-220E	5-50	MC	No	30	20	0.4	1-2		E						
	TK2Ep	15-25	MM	No	26	17	5.0	1-1.5	100-200	E						
	TK4Ep	15-28	MM	No	28	19	5.0	1-1.5	100-200	E						
	TK6Ep	10-30	MM	No	29	20	5.0	1-1.5	100-200	E						
	TK8Lcp	5-35	MM	No	33	23	5.0	1-1.5	100-200	X						
SONUS	Dimension 5	20-20 ± 1	MI	No	30	25	4.0	1-1.5	350	X						
	Super Blue	20-20 ± 1.5	MI	No	30	25	4.0	1-1.5	350	X						
	Gold Blue	20-20 ± 1.5	MI	No	30	25	4.0	1-1.5	350	X						
	Silver P	20-20 ± 2	MI	No	30	20	4.0	1-1.5	350	X						
	Silver E	20-20 ± 2	MI	No	30	20	5.0	1-1.5	350	X						
	SPM-5	20-20	MI	No	25	20	4.0	1.25	350	X						
	SPM-4	20-20	MI	No	25	20	4.0	1.25	350	X						
	SPM-3	20-20	MI	No	25	20	4.0	1.25	350	X						
	SPM-2	20-20	MI	No	25	20	4.0	1.25	350	E						
	SONY	VL-5	10-20	MM	No	20		3.5	2.0		C					
VL-45G		10-25	MM	No	25		3.5	1.25		E						
XL-MC1		10-30	MC	No	26		0.2	1.5	40	E						
XL-MC2		10-45	MC	No	30		0.2	1.5	40	E						
XL-MC3		10-50	MC	No	30		0.2	1.5	40	X						
STANTON	981 HZS	10-50	MM	Cal.	35	25	0.7	0.75-1.5	100	X						
	981 LZS	10-50	MM	Cal.	35	25	0.06	0.75-1.5	100	X						
	885 LZS	20-40	MM	No	35		0.06	0.75-1.5	100	X						
	785 LZS	20-30	MM	No	30		0.06	0.75-1.5	100	E						
	881S	10-25	MM	Cal.	35		0.9	0.75-1.25	275	X						
	681EEE(S)	10-12 ± 0.5	MM	Cal.	35		0.7	0.75-1.5	275	X						
	681EEE	10-12 ± 0.5	MM	No	35		0.7	0.75-1.5	275	X						
	L847S	10-36	MM	No	35		2.5	0.75-1.5	275	X						
	L837S	10-30	MM	No	35		3.0	0.75-1.5	275	X						
	L747S	10-25	MM	No	35		4.4	0.75-1.5	275	X						
	L737S	10-22	MM	No	35		4.4	0.75-1.5	275	X						
	L737E	10-22	MM	No	35		4.4	0.75-1.5	275	E						
	L727E	10-20	MM	No	32		4.4	0.75-1.5	275	E						
	L725E	10-22	MM	No	28		3.0	0.75-1.5	275	E						
	L720EE	10-20	MM	No	28		3.2	0.75-1.5	275	E						
	680EL	20-18	MM	No	30		1.1	2-5	275	E						
	L680EL	20-18	MM	No	30		1.1	3.5-4	275	E						
	681SE	10-10	MM	Cal.	35		1.0	2-4	275	E						
	680AL	20-18	MM	No	30		1.1	2-5	275	S						
	500AL	20-17	MM	No	28		1.0	2-5	275	S						
	680EE(S)	10-20	MM	No	35		0.82	0.75-1.5	275	X						
	680EE	20-20	MM	No	35		0.82	0.75-1.5	275	E						
	600EE	20-20	MM	No	35		1.0	1-2	275	E						
600E	20-20	MM	No	35		1.0	1.5-3	275	E							
500EE MK II	10-22	MM	No	35		1.0	0.75-1.5	275	E							
500E MK II	10-22	MM	No	35		1.0	0.75-1.5	275	E							
500A MK II	10-20	MM	No	35		1.0	1-2	275	S							
SUPEX	SDX-2000	10-45 ± 2	MC	Yes	30	25	2.0	1.7-2.1		X						
	Boron High Output															
	SDX-2000 Boron	10-45 ± 2	MC	Yes	30	25	0.2	1.7-2.1		X						
	SD-900	20-45 ± 2	MC	Yes	30	25	0.2	1.2-1.7		E						
TALISMAN	Mk 4 TQA	20-45 ± 2	MC	Yes	30	25	2.5	1.2-1.7		E						
	Alchemist IHS	10-60	MC	Yes	30	25	2.0	1.5-2.5		X						
		20-40	MC	Yes	25	20	2.0	1.5-2.1		E						
		10-60	MC	Yes	30	25	0.26	1.7-2.3		X						
		10-50	MC	Yes	30	25	0.26	1.5-2.1		X						
Alchemist IA	10-60	MC	Yes	30	25	0.26	1.5-2.1		X							
	20-40	MC	Yes	25	20	0.22	1.5-2.1		X							
TECHNICS	EPC-P205CMK4	20-15 ± 0.5	MM	Yes	25	20	2.5	1.0-1.5		X						
	EPC-205CMK4	20-15 ± 0.5	MM	Yes	25	20	2.5	1.0-1.5		X						
	EPC-P310MC2	20-15 ± 0.5	MC	Yes	25	20	0.22	1.0-1.5		E						
	EPC-P550	20-35 ± 3	MM	No	25		2.5	1.0-1.5		E						
	EPC-P540	20-35 ± 3	MM	No	25		2.5	1.0-1.5		E						
	EPC-P530	20-30 ± 3	MM	No	25		2.5	1.0-1.5		E						
WIN LABORATORIES	Jewel	15-25	MC	Yes	32	21	0.33	0.75-1.5		X						
	FET-70	5-100	FET	Yes	35	22	1.0V	0.75-1.0		X						
YAMAHA	MC-1000	10-20 ± 1.5	MC		30		0.17	1-1.4		E						
	MC-3	10-20 ± 1.5	MC		28		0.2	1-1.4		E						
	MC-4	10-20 ± 1.5	MC		28		0.2	1.2-1.6		E						
	MC-5	10-20 ± 1.5	MC		28		0.3	1-1.4		E						
	MC-7	10-20 ± 1.5	MC		28		0.3	1.2-1.8		E						
	MC-9	10-20 ± 1.5	MC		28		0.3	1.2-1.8		E						
	MC-11	10-20 ± 1.5	MC		28		0.35	1.5-2.1		E						
	MC-21	10-20 ± 1.5	MC		28		2.0	1.5-2.1		E						

Save up to \$25 during the Shure 60th Anniversary Rebate Sale.

Buy a genuine Shure cartridge or replacement stylus between September 1 and October 31, 1984 and get a hefty cash rebate direct from our factory. Just supply the information requested below, mail it to Shure and earn up to a \$25 rebate on a quality phono cartridge—up to \$10 on a stylus.

A Shure cartridge is the best investment you can make to improve the sound of your system. And a Shure replacement stylus will reduce record wear, extending record life. Remember, with Shure, you're getting 60 years of audio experience. Get all the details on this offer at a Shure dealer near you or write Shure Rebate Offer, 222 Hartrey Ave., Evanston, IL 60204.

Save \$10 to \$25 on a quality Shure phono cartridge.

Cartridge rebate	Your rebate
V15 Type V-MR	\$25
V15 Type V-B	\$20
ML140HE	\$15
ML120HE	\$15
M110HE	\$10

Save up to \$10 on a genuine Shure replacement stylus.

Stylus model	Compatible with this Shure cartridge	Your rebate
VN5MR	Upgrade for V15 Type V	\$10
VN5HE	Replacement for V15 Type V	\$10
VN45HE	Replacement for V15 Type IV	\$ 5
N97HE	Upgrade for M97ED Replacement for M97HE	\$ 5
N95HE	Upgrade for M95ED Replacement for M95HE	\$ 5
N95ED	Replacement for M95ED	\$ 5
N91ED	Upgrade for M91E Replacement for M91ED	\$ 5

Earn up to a \$25 rebate during the Shure 60th Anniversary cartridge and stylus sale.

To receive your rebate on selected Shure phono cartridges and replacement styli, send: (1) your dated sales receipt (non-returnable), (2) the complete outer carton from your Shure cartridge or stylus, and (3) this completed request to: Shure Rebate Offer—Dept. 63, 222 Hartrey Avenue, Evanston, Illinois 60204.

Name _____

Address _____

City _____

State _____

Zip _____

Phone (Area Code) _____

(Number) _____

Offer valid only on purchase made between September 1, 1984 and October 31, 1984. All requests must be postmarked by November 15, 1984. Limit of one rebate per household, and/or consumer regardless of number of Shure cartridges or styli purchased. This is a consumer rebate offer only. Shure dealers, companies and employees of Shure and their advertising agencies, distributors and retailers are not eligible. This offer may not be used in conjunction with any other rebate from Shure. Shure is not responsible for late, lost or misdirected mail. Offer good only on purchases made in U.S.A. Void where taxed or prohibited by law. Allow 6-8 weeks for delivery of check.

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OPEN-REEL TAPE DECKS

SPEED CODE A—7½, 3¾ B—7½, 3¾, 1⅞ C—7½, 3¾ D—15, 15.16 E—15, 7½, 3¾		Model	Speeds—See Letter Code	Maximum Reel Size, Inches	Number of Heads	Number of Tracks	Number of Channels, Record/Play	Drive to Capstan	Frequency Response, Hz to kHz, ±dB, with Best Tape at Highest Machine Speed	Wow & Flutter, Wtd. Peak, %	S/N, —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
AKAI	GX-4000D		7	3	4	2	3						No					399.95		
	GX-77D		7	6	4	2	3						No					795.00		
	GX-747		10½		4	2							Yes					1400.00	dbx Type I NR.	
MARK LEVINSON	ML-5	†	12½	3	2	2	3	30-25 ±1.5	0.04	385	No						25½ x 21½ x 11¼	117	14,400.	†15/30 ips; built on Studer A80RC transport.
	IV-SD	E	7†	3	2	2	1	30-20 ±2	0.05	72	400	Yes	Var.	2 Peak Mtrs. 2 Peak LEDs	No		13.2 x 9.6 x 4.5	15	6983.00	†10½ inches with adaptor.
NAGRA	T-Audio	†	12½	3	2	2	5	30-20 ±1	0.02	78	Var.	No	B	2 Peak Mtrs. 2 Peak LEDs	Yes		15.7 x 13.2 x 9.4	45	12,000.	†Speed E plus 30 ips.
	MX5050-BII	E	10½	4	2/4	2	3	Idler 25-22 ±2	0.04†	72		Yes	150-10k, B	2 VU Mtrs. & 2 Peak LEDs	Yes		20.8 x 17.4 x 10.2	60	2295.00	†Unweighted.
PIONEER	RT-909	A	10½	4	4	2	3	Idler 20-28 ±3	0.04	60	450	Yes	27k	2 Peak Mtrs. 2 Mtrs.	No		13.4 x 18.9 x 12.5		900.00	
	RT-707	A	7	4	4	2	3	Idler 30-24 ±3				Yes			No		9.1 x 18.9 x 14		700.00	
REVDX	B77 MKII	†	10½	3	2/4	2	3	Direct 30-22 +2,-3	0.06	67	775	Yes	22k, 110k	2 Mtrs. & 2 Peak LEDs	No		16½ x 17¾ x 8¼	37½	1799.00	†Any two adjacent speeds from 15/16 to 15 ips.
	PR99 MKII	A,D	10½	3	2	2	3	Direct 30-22 +2,-3	0.06	67	775	Yes	†	2 Mtrs. & 2 Peak LEDs	No		17¾ x 19 x 8	40½	2250.00	†22k, 110k, balanced opt.; balanced line in/out; self-sync.
TANDBERG	TD 20A SE	A,D	10½	3	2/4	2	4	Belt 20-30 ±2	0.03	80	1.5V	Yes	Auto	Peak Mtrs.	No		17¼ x 17½ x 6	49	1195.00	Actilinear II record, Dyneq equalization.
TASCAM	22-2	D	7	3	2	2	3	Belt 40-22 ±3	0.07	68	310	Yes		2 VU Mtrs.	No		16¾ x 16¾ x 10¼	40	775.00	
	32	D	10½	3	2	2	3	Belt 40-22 ±3	0.05	68	310	Yes		2 VU Mtrs.	No		16¼ x 18¼ x 10¼	60	1300.00	
	42-NB	D	10½	3	2	2	3	Direct 30-22 ±3	0.05	70		Yes		2 VU Mtrs.	No		17 x 19¾ x 12½	70.5	2295.00	
	52-NB	D	10½	3	2	2	3	Direct 30-24 ±2	0.04	70		No		2 VU Mtrs. & 2 Peak LEDs	No		17 x 19¾ x 12½	77.2	3495.00	
TEAC	X-300	A	7	3	2/4	2	3	Belt 40-30 ±3	0.04	65	450	Yes	250	2 VU Mtrs.	Yes		16¾ x 12½ x 9½	30¾	620.00	
	X-300R	A	7	3	2/4	2	3	Belt 40-30 ±3	0.04	65	450	Yes	250	2 VU Mtrs.	Yes		16¾ x 12½ x 9½	33¾	690.00	Auto-reverse playback.
	X-700R	A	7	6	2/4	2	3	Belt 40-30 ±3	0.03	†	450	Yes	250	2 VU Mtrs.	Yes		17 x 14¾ x 10¾	40	950.00	Auto-reverse record and playback; †95 dB with dbx NR.
	X-2000	A	10½	3	2/4	2	3	Belt 25-33 ±3	0.03	††		Yes		2 VU Mtrs.	Yes		17 x 18 x 10¾	55¼	1400.00	††100 dB with dbx NR.
	X-2000R	A	10½	6	2/4	2	3	Belt 25-33 ±3	0.03	††		Yes		2 VU Mtrs.	Yes		17 x 18 x 10¾	55¼	1500.00	Auto-reverse record and playback.
	A-3440	D	10½	3	2/4	4	3	Belt 40-22 ±3	0.04	55	310	Yes		4 VU Mtrs.	No		17½ x 20½ x 9¼	55	1890.00	
TECHNICS	RS-1500	E	10½	4	2/4	†	3	Direct 30-30 ±3	0.035	68		Yes		2 VU Mtrs.	No		19¾ x 17½ x 10½	57	1600.00	†2 channels record/play, 4 channels play.
	RS-1506	E	10½	4	2/4	†	3	Direct 30-30 ±3	0.035	66		Yes		2 VU Mtrs.	No		19¾ x 17½ x 10½	57	1600.00	†4 channels record/play, 2 channels play.
	RS-1700	E	10½	4	4	4	3	Direct 30-30 ±3	0.035	66		Yes		2 VU Mtrs.	No		19¾ x 17½ x 10½	58	2100.00	
	RS-1520	E	10½	4	2/4	†	3	Direct 30-30 ±3	0.035	68		Yes	B	2 VU Mtrs.	No		22¼ x 18 x 10½	62	2100.00	†2 channels record/play, 4 channels play.
UHER/MARTEL	4400 Report Monitor AV 5000	C	5	3	4	2	1	Idler 20-25 ±2	0.15	66	1V	No	Low	2 Peak Mtrs.	Yes		11 x 3½ x 9	9	1285.00	
	4000AV	C	5¾	2	2	1	1	Idler 40-16 ±3	0.2	60	900	No	Low	1 Peak Mtr.	Yes		13 x 6 x 13	19	1249.00	
		C	5	3	2	1	1	Idler 20-25 ±2	0.15	66	1V	No	Low	1 Peak Mtr.	Yes		11 x 3½ x 9	9	1185.00	
UHER/MINERDFF	4000	C	5	3	1	1	1	Belt 20-25 ±2	0.1	66	750	No	200	1 Mtr.	Yes		10 x 4 x 8	7	1200.00	A.c. and d.c. operation, movie sync. As above.
	4400	C	5	3	4	2	1	Belt 20-25 ±2	0.1	66	750	Yes	200	2 Mtrs.	Yes		10 x 4 x 8	7	1400.00	
	4200	C	5	3	2	2	1	Belt 20-25 ±2	0.1	66	750	Yes	200	2 Mtrs.	Yes		10 x 4 x 8	7	1400.00	As above.
	S6562	C	7	4	2/4	2	1	Idler 20-25 ±2	0.07	68	750	Yes	200	2 Mtrs.	Yes		18 x 6 x 12	20	1600.00	Interchangeable heads, movie sync.



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BLANK TAPE

CASSETTE TAPE TYPE CODE I — Normal Ferric II — Chrome/Chrome Equivalent III — Ferrichrome IV — Metal Particle	MANUFACTURER	Brand	CASSETTES							OPEN-REEL				Notes
			Tape Type—See Code							1200 Feet	1800 Feet	2400 Feet	3600 Feet	
			C-30	C-45 or C-46	C-60	C-90	C-120							
	BASF	Performance I Pro I Super Pro II Chrome Ferromchrom III Metal IV Ferro LH Ferro Super LH Chrome EE	I II III IV			2.99 4.49 4.69 4.49 8.59	4.19 5.99 6.29 5.99 11.49	13.99		9.99 11.99 19.99	11.99	31.99 49.99	7- and 10½-inch reels. As above, back-coated, for EE-capable decks.	
	BTM	AML Reel to Reel AML Reel to Reel	I II		4.39	4.49 4.79	5.29						Miniature open-reel type. As above.	
	CERTRON	Ferex I Ferex II High Energy High Density	I II I I	1.29	1.39	3.00 3.00 1.99 1.59	3.99 3.99 2.59 2.09	2.99 2.49						
	DENON	DX1 DX3 DX4 OX7 DX8 DXM DX551 DX1101B	I I I II II IV			2.50 3.25 4.00 4.00 5.50 7.50	3.50 4.50 5.50 5.50 7.50 10.00			X	X		Head-cleaning leader. Double-coated. Large tape-viewing window. Double-coated, cobalt doped. Metal reel. As above; back-coated.	
	DIRECT-TO-TAPE RECORDING	Direct Type I Direct Type II API Agfa PEM 369 Agfa PEM 468 Ampex 407 Ampex 456 Ampex 642	I II I			2.95† 3.75† 2.10	3.50†† 4.50†† 2.50	3.70		9.00 9.50	10.70 9.00 11.00 6.20	23.30 21.80	25.70 23.30 25.90 14.10	†C-66; ††C-96. †C-68; ††C-99.
	FUJI	FR Metal FR-II FR-I ER DR GT-I GT-II	IV II I I I I II		5.75 3.95 3.95 2.90 2.35 4.45 4.95	6.35 4.35 4.35 3.30 2.75 4.95 5.45	8.60 5.95 5.95 4.60 3.80 6.95 7.45	5.30					For car stereo.	
	JVC	F1 OA-3 OA-7 ME-90PH	I II IV			2.95 4.75 5.25	3.95 6.95 7.45 16.95							
	KONICA	Metal GM II GM-I ML	IV II I I			5.99 3.49 3.49 2.09	7.49 3.99 3.99 2.59	3.59						
	LORAN	LHB LNB LMB	II I IV		5.25 5.25	5.75 5.75 12.70	7.95 7.95 15.75						Lexan shell. As above.	
	MAXELL	UD-50 UD-35 UD-25 UD-18 XL-I-50-B XL-I-35-B XL-II-35 LN UD UD-XL I UD-XL II XL I-S XL II-S MX	I I I I I I II II II II IV		1.49 2.09 4.49	1.59 2.29 2.89 2.89 3.39 3.39 5.29	1.89 3.09 3.59 3.59 4.39 4.39 6.99	2.69 3.99	7.29 8.99†	7.49 9.49† 26.79††	22.79† 9.99 28.99†† 37.59††	†2500 feet, 10½-inch NAB metal reel. †10½-inch NAB metal reel. †2500 feet. †Back-coated; ††2500 feet, back-coated, 10½-inch NAB metal reel. †Back-coated; ††back-coated, 10½-inch metal reel. †For EE-capable decks; ††for EE-capable decks, 10½-inch NAB metal reel.		
	MEMOREX	MRX I High Bias II Metal IV db Serles	I II IV I	2.79	2.99	3.19 3.19 4.59 2.59	4.79 4.79 6.29 3.79	6.39						
	MIS	MIS MIS	I II	1.45 1.75	1.60 1.90	1.75 2.00	2.05 2.10							
	NAKAMICHI	ZX SXII SX EXH	IV II II I			6.50 5.85 4.50 3.70	9.00 8.00 5.85 5.40							

BLANK TAPE

MANUFACTURER	Brand	Cassette Tape Type—See Code	CASSETTES							OPEN-REEL			Notes	
			C-30	C-45 or C-46	C-60	C-90	C-120	1200 Feet	1800 Feet	2400 Feet	3600 Feet			
PANASONIC	RT-90EN2 RT-90EX2	I II				6.45† 13.95†								†2-pack.
PDMAGNETICS	Tri-Oxide Ferro 500 Crolyn HG 1100 Metal HG	I II IV			4.69 5.29 8.99	6.99 7.99 11.99								
PRO-FI	One Two Three Reference Meta	I II III				2.49 3.99 4.99								
RAKS	HD HD-I HD-II	I II		1.79 2.59 3.49	2.49 3.49 4.79	3.39 4.79 6.59								
REALISTIC	Supertape Metal Supertape Hi-Bias Supertape Gold Lo Noise Concertape Supertape Realistic Concertape	IV II I I I I I I	1.59	2.69	5.99 3.99 2.99 1.99 .88	6.99 4.69 3.99 2.79 1.25	4.99 3.49			5.79 3.99	6.49 5.49 2.49	6.49	11.49 7.99	
REVOX	631												35.00	
SONY	LNX HF BHF HF-S AHF UCX UCX-S Metal-ES ULH FeCr	I I I I I II II IV		2.05 2.05	2.25 2.25 3.10 3.10 3.80 4.15 5.00	3.15 3.15 4.25 4.25 5.20 5.75 7.00 11.50	4.05 4.05			9.00	11.50 14.00		31.00 39.00	
SWIRE MAGNETICS	Laser XL Laser UHD-I Laser UHD-II	I I II		1.39	1.49 1.99 1.99	1.89 2.59 2.59	2.49							
TDK	MA SA AD D MA-R HX-S SA-X AD-X GX SA LX	IV II I I IV II II II II	1.90	2.10	6.20 4.30 3.00 2.30 8.30 6.20 4.60 3.60	8.30 6.00 4.40 3.10 11.10 8.30 6.50 5.10	3.70			10.20† 9.20†	12.00† 14.80† 10.20†	27.70††	32.30†† 38.80†† 28.60††	C-180, \$5.20. Type II metal particle. †7-inch plastic reel; ††10-inch metal reel; all back-coated. Without back coating; for EE-capable decks. Back-coated; without back treatment: 1800 feet, \$9.20; 3600 feet, \$25.80.
TEAC	CDC CRC MDX	I II IV			5.75 5.95 4.75	6.00 6.50 6.30								Miniature open-reel type. As above.
3M	Scotch XSM IV Scotch XS II Scotch XS I Scotch CX Scotch BX	IV II I I I			7.99 4.79 4.49 3.29 2.19	10.29 5.99 5.77 4.79 3.29								
VISA	High Performance Extra Performance FDXI Professional CX II Professional UFX I Turbo UCX-II Turbo UCX II-S Turbo	I II I II I II II			1.59 1.99 1.99 2.49 2.99 2.99 3.49	1.99 2.49 2.79 3.49 3.99 3.99 4.99								
YSL	Reel Cassette	II				5.99								Miniature open-reel type.

NOISE REDUCTION UNITS



CARVER TX1-11

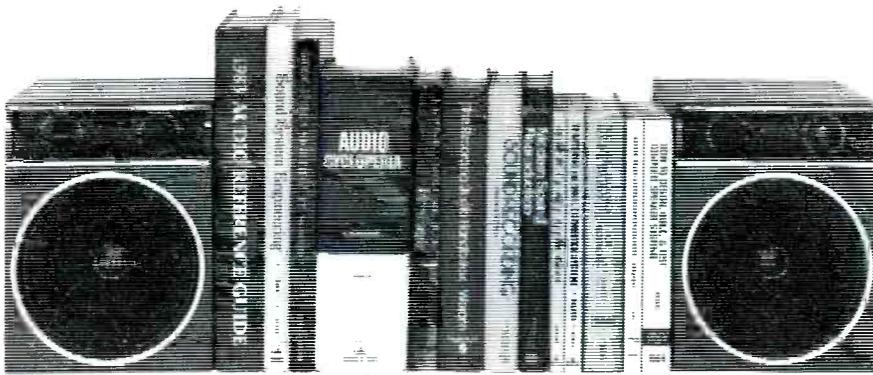


PACKBURN 323



SYMMETRIC SOUND SYSTEMS ASRU

MANUFACTURER	Model	NR Type	Function: Closed Loop = C Open Loop = O, Transient = T	Application: Tape Rec. = R Phono = P, FM = F, Video = V, Universal = U	Simultaneous Encode/Decode?	Degree of Noise Reduction, dB @ Hz	Record = R, Play = P, Both = RP	THD, %	Frequency Response, Hz to kHz, ±dB	Price, \$	Notes
ANT TELE-COMMUNICATIONS	telcom c4	Compander	C	RFV	Yes	30 @ 30	RP	0.2	30-20 ± 0.5	650.00	Dolby CAT 22 plug-compatible card. 8- to 24-track systems. One, two, or three channels.
	telcom c4DM	Compander	C	RFV	Yes	30 @ 30	RP	0.2	30-20 ± 0.5		
	telcom c4F	Compander	C	R	Yes	30 @ 30	RP	0.2	30-20 ± 0.5	650.00	Encode or decode; for use over line or satellite transmission.
	telcom c4 231-233	Compander	C	V	Yes	30 @ 30	RP	0.2	30-20 ± 0.5		
	telcom c4 122	Compander	C	F	No	30 @ 30	RP	0.2	30-20 ± 0.5		
AUDIO CONTROL	Video Soundtracker	DNR	O	U	No	14 @ 7k	P	0.05	20-15.75 ± 1	159.00	
BURWEN	ONF 1201A	Burwen	O	U		30 @ 5k	P	0.2	10-20	350.00	Sensitivity control; three bandwidth choices.
	TNE 7000	Transient Noise Eliminator	T	P			P	0.1	20-20 ± 0.05	350.00	
CARVER	TX1-11	†	O	F	Yes	20		0.05	20-20 ± 0.1	249.00	†Asymmetrical charge-coupled FM decoder; for FM tuners.
MITCHELL A. COTTER	NFB-2RE	Special EQ	O	U	No†	16	R	0.01	20-30 ± 0.5	750.00	†Needs LA-2RE; encoder only; 0-dB gain in line.
	LA-2RE	Special EQ	O	U	No†	16	P	0.01	10-30 ± 0.5	850.00	†Needs NFB-2RE; decoder only; 26-dB line gain.
DBX	224X	dbx Type II	C	RV	Yes	40 @ 30-20k	RP	0.5	30-20 + 0.5, -2	249.00	Level-match controls and display; decodes dbx-encoded records. As above less display. For tape decks; at 15 ips, 20 Hz to 20 kHz, ±1 dB; not compatible with dbx Type II; level-match controls. Adaptor for headphone cassette decks; dbx B for decoding other NR-system tapes.
	NX-40	dbx Type II	C	RV	Yes	30 @ 30-15k	RP	0.5	50-15 ± 1.5	129.00	
	150	dbx Type I	C	RV	Yes	40 @ 20-20k	RP	0.5	20-20 + 0.5, -1	310.00	
	PPA-1	dbx Type II	C	R	No	30 @ 50-15k	P	0.3	50-15 ± 1.5	49.00	
	1BX III	dbx Expander	O	U	No	20	RP	0.15	20-20 ± 0.5	229.00	
	3BX III	dbx Expander	O	U	No	20	RP	0.15	20-20 ± 0.5	599.00	
	4BX	dbx Expander	O	U	No	20	RP	0.15	20-20 ± 0.5	799.00	
SX-10	dbx Expander	O	U	No	Varies	P	0.3	20-20 ± 1 (Audio Mode)	149.00		
HEATH	AD-1706	Dynamic & Expander	CO	U		12 @ 10k	RP	0.1	20-20	299.95	Kit; separate noise-reduction and expander circuits.
L T SOUND	NR-8	2:1 Compander	C	R	Yes	30 @ 1k	RP	0.06	20-22 ± 0.25	795.00	Compatible with dbx system; 8-channel.
	NR-4	2:1 Compander	C	R	Yes	30 @ 1k	RP	0.06	20-22 ± 0.25	495.00	As above but 4-channel.
	NR-2	2:1 Compander	C	R	Yes	30 @ 1k	RP	0.06	20-22 ± 0.25	295.00	As above but 2-channel.
PACKBURN ELECTRONICS	123	Transient, Dynamic	OT	U		Varies	RP	0.05	Sel.	1950.00	Mono, for playing old records.
	323	Transient, Dynamic	OT	U		Varies	RP	0.05	Sel.	2450.00	Mono/stereo.
PHOENIX SYSTEMS	P-522-SA	2:1 Compander	C	R	Yes	30 @ 1k	RP	0.5	20-20 ± 1	125.00	Kit, Model P-522-S, \$75.00.
RG DYNAMICS	SS One	Expander	O	U	No	20	RP	0.04	20-20	650.00	
SAE	5000A		T	RP				0.1	20-20 ± 1	199.00	
SOUND CONCEPTS	SX-80	CX	C	P	No	2 @ 20-20k	P	0.01	10-30 ± 0.2	119.00	Peak expander; may be modified for videodisc standard.
SYMMETRIC SOUND SYSTEMS	ASRU	Spectral Slope and Expander	O	U		18	P	0.2	20-20 ± 1	120.00	Kit.



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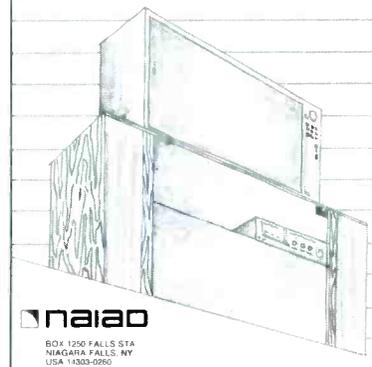
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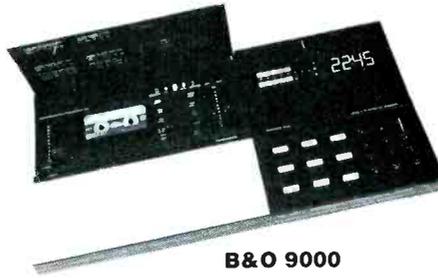
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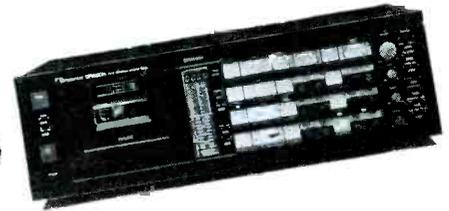
CASSETTE DECKS



TANBERG 3014



B&O 9000



NAKAMICHI DRAGON

MANUFACTURER	Model	Frequency Response with CD ₂ Tape (Type H), Hz to kHz, ±dB	Number of Heads	Wow & Flutter	S/N without Noise Reduction, -0dB	S/N with Noise Reduction, -0dB	Noise Reduction Circuit: Dolby B = B, Dolby C = C, dbx = D, Hi Pre = H	Auto A. Manual = M	No. of Preset Bias ED Positions	Program Search?	Auto Reverse?	Level Indicators: Average = A, Peak = P, Peak-Hold = PH	Counter Indications: No. of Turns = T, Elapsed Time = E, Remaining Time = R	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes
ADS	C2	20-18 ± 2	2	0.06	58	74	B/C		4	No	No	P	T	17½ x 14¾ x 2¾	18½	579.00	
AIWA	AD-F990	20-19 ± 3	3	0.025	63	80	B/C/H	A	3	Yes	No	PH	T/R	16½ x 11¾ x 4¾	12.1	595.00	Dual wells, 4X speed.
	AD-F770	20-18 ± 3	3	0.025	63	80	B/B/H	A	3	Yes	No	PH	T/R	16½ x 11¾ x 4¾	12.1	495.00	
	AD-R650	20-17 ± 3	3	0.035	63	80	B/C/H	M	3	Yes	Yes	P	T	16½ x 11¾ x 4¾	11	395.00	
	AD-F660	20-18 ± 3	3	0.028	63	80	B/C/H	M	3	Yes	No	PH	T/R	16½ x 11¾ x 4¾	12.1	375.00	
	AD-R550	20-15 +2, -3	2	0.038	60	78	B/C/H	M	3	Yes	Yes	P	T	16½ x 11¾ x 4¾	11.4	300.00	
	AD-WX220	20-15 +2, -3	2	0.038	61	78	B/C	M	3	Yes	No	P	T	16½ x 12¾ x 4¾	12.3	460.00	
	AD-WX110	20-15 +2, -3	2	0.05	61	76	B/C	M	3	Yes	No	P	T	13 x 12¼ x 4¼	11.5	360.00	
	AD-F350	25-15 +2, -3	2	0.035	60	78	B/C	M	3	No	No	P	T	16½ x 11¾ x 4¾	8.8	220.00	
	AD-F250	25-15 +2, -3	2	0.038	60	78	B/C	M	3	No	No	P	T	16½ x 11¼ x 4¾	8.8	160.00	
AKAI	HX-A1			0.04	66	B	M		3	No	No		E			139.95	
	HX-A2			0.05	76	B/C	M		3	No	No		E			159.95	
	HX-3			0.05		B/C	A		3	No	No		E			229.95	
	HX-1C					B/C	M			No	No		E			199.95	
	HX-R44					B/C	A		3	Yes	Yes	P	E			218.00	
	GX-R55					B/C	A		3	Yes	Yes	P	E			359.95	
	GX-7		3			B/C	A		3	Yes	No	P	E			399.95	
	GX-R66		3			B/C/D	A		3	Yes	Yes	P	E			419.95	
	GX-R88		3			B/C	A		3	Yes	Yes	P	E			599.95	
GX-R99		3			B/C	A		3	Yes	Yes	PH	E			799.95		
BANG & OLUFSEN	Beocord 9000	20-20 ± 3	3	0.045		80	B/C/H	A	3	Yes	No	P	E/R	20¾ x 11¾ x 5½	17	1295.00	
	Beocord 8004	20-20 ± 5	2	0.045	58	68	B/C/H	A	3	Yes	No	P	E	20¾ x 11¾ x 5½	16.5	695.00	
	Beocord 5000	30-18 ± 3	2	0.078	56	65	B/C/H	A	3	Yes	No	P	T	16½ x 3 x 12¾	18.7	695.00	
	Beocord 2000	30-15 ± 3	2	0.08	56	65	B	A	3	Yes	No	P	T	16½ x 2¾ x 9¾	9	450.00	
DENON	DR-M11	30-16 ± 3	2	0.045 wrms	56	75	B/C	M	3	Yes	No	P	T	17¾ x 4¾ x 11½	12	320.00	Dual capstan.
	DR-M22	30-17 ± 3	3	0.045 wrms	56	75	B/C	M	3	No	No	P	T	17¾ x 4¾ x 11½	12	420.00	
	DR-M33	30-18 ± 3	3	0.04 wrms	56	75	B/C	M	3	No	No	PH	T	17¾ x 4¾ x 11½	12½	500.00	
	DR-M44	30-18 ± 3	3	0.035 wrms	56	75	B/C	A	3	No	No	PH	T	17¾ x 4¾ x 11½	12½	600.00	
FISHER	CR-27	40-15 ± 3	2	0.06 wrms	50	70	B/C	M	3			P	T	15.8 x 4.8 x 7.8	5.8	129.95	Dual wells. As above; As above; high-speed dubbing.
	CRW-38	40-15 ± 3	2,2	0.06 wrms	51	61	B	M	3/3			P	T	15.8 x 4.8 x 7.8	7	159.95	
	CRW-50	40-15 ± 3	2,2	0.06 wrms	51	70	B/C	M	3,3	Yes		P	T	17.3 x 4.9 x 10.3	10	199.95	
	CRW-81	40-15 ± 3	2,2	0.06 wrms	52	72	B/C	A		Yes		P	T	17.3 x 4.9 x 10.3	10	249.95	
	CR-277	30-16 ± 3	2	0.04 wrms	52	72	B/C	A/M	3		Yes	P	T	17.3 x 4.6 x 10.5	10	249.95	
HARMAN/KARDON	CD91	20-20 ± 3	2	0.08	57	65	B	M	3	No	No	P	T	17¾ x 13½ x 4¾	16	285.00	
	CD191	20-21 ± 3	2	0.08	57	73	B/C	M	3	No	No	P	T	17¾ x 13½ x 4¾	16	375.00	
	CD291	20-21 ± 3	2	0.08	57	73	B/C/H	M	3	No	No	P	T	17¾ x 13½ x 4¾	16	450.00	
	CD391	20-22 ± 3	2	0.04	58	74	B/C/H	M	3	Yes	No	P,PH	T	17¾ x 13½ x 4¾	17.6	595.00	
	CD491	20-24 ± 3	3	0.04	58	75	B/C/H	M	3	Yes	No	P,PH	T,E	17¾ x 13½ x 4¾	18	825.00	
HITACHI	DE12	30-15 ± 3	2	0.08 wrms	58	66	B		3	No	No	A	T	17½ x 8½ x 4¾	7½	140.00	
	DE4	30-15 ± 3	2	0.07 wrms	58	72	C		3	No	No	P	T	17½ x 8½ x 4¾	7¼	170.00	
	DE5	30-16 ± 3	2	0.04 wrms	58	72	C		3	No	No	P	T	17½ x 8½ x 4¾	8½	220.00	
	DX6	30-15 ± 3	2	0.04 wrms	60	74	C		3	Yes	Yes	PH	T	17½ x 11½ x 4¾	9¼	290.00	
(Continued)																	

CASSETTE DECKS

MANUFACTURER	Model	Frequency Response with CO ₂ Tape (Type II), Hz to KHz, ±dB	Number of Heads	Wow & Flutter	S/N without Noise Reduction, -dB	S/N with Noise Reduction, -dB	Noise Reduction, Dolby B = B, Dolby C = C, dbx = D, HX Pro = H	Circuit, Conformity Adequate Bias Auto = A, Manual = M	No. of Preset Bias/ED Positions	Program Search?	Auto Reverse?	Level Indicators Average = A, Peak = P, Peak Hold = PH	Counter Indications No. of Turns = T, Elapsed Time = E, Remaining Time = R	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes	
																		Wtd. Peak, %
HITACHI (Continued)	DW500	30-15 ± 3	2	0.08 wrms	58	66	B		3	No	No	P	T	17 1/8 x 8 5/8 x 4 3/8	8 7/8	240.00	Dual wells.	
	DW800	30-15 ± 3	2	0.04 wrms	58	72	C		3	Yes	No	P	T	17 1/8 x 10 3/4 x 4 3/8	10 9/8	390.00	As above.	
	DX10	30-19 ± 3	3	0.03 wrms	61	75	C		3	Yes	Yes	PH	T/R	17 1/8 x 11 1/8 x 4 1/2	12 1/8	660.00		
	D2200UR	30-20 ± 3	3	0.019 wrms	61	75	C		4	No	No	PH	T/E	17 1/8 x 11 1/8 x 5 7/8	16 1/8	640.00		
JVC	DD-VR9	25-18 ± 3	3	0.035	60	80	C	A	3	Yes	Yes	A/PH	T/E/R	17 1/8 x 4 3/8 x 11	15.7	800.00		
	DD-VR7	30-17 ± 3	2	0.035	58	78	C	No	3	Yes	Yes	A/PH	T/E/R	17 1/8 x 4 3/8 x 11 1/8	12.8	500.00		
	KD-V6	20-19 ± 3	3	0.05	58	78	C	No	3	Yes	No	A/PH	T	17 1/8 x 4 3/8 x 11 1/8	10	350.00		
	KD-V400	30-16 ± 3	2	0.05	58	78	C	No	3	Yes	Yes	P	T	17 1/8 x 4 3/8 x 11	10	315.00		
	KD-V350	30-16 ± 3	2	0.05	58	78	C	No	3	Yes	Yes	P	T	17 1/8 x 4 3/8 x 11	10.4	270.00		
	KD-V300	30-15 ± 3	2	0.08	58	78	C	No	3	Yes	Yes	P	T	17 1/8 x 4 3/8 x 11	10	220.00		
	KD-V200	40-15 ± 3	2	0.08	58	78	C	No	3	Yes	No	P	T	17 1/8 x 4 3/8 x 9 1/4	8.1	165.00		
	KD-V100	40-15 ± 3	2	0.08	58	68	B	No	3	No	No	P	T	17 1/8 x 4 3/8 x 9 1/4	7.7	130.00		
	KD-W110	30-16 ± 3	†	0.08	58	68	B	No	3	Yes	No	P	T	17 1/8 x 4 3/8 x 11	10.3	250.00	†Dual wells, two heads per well.	
	KD-W5	30-16 ± 3	†	0.05	58	68	B	No	3	Yes	No	P	T	17 1/8 x 4 3/8 x 11 1/8	11	340.00		
KENWOOD	KX-72RB	30-16 ± 3	3	0.055	58	75	B/C	A	3	Yes	Yes	P		16 1/2 x 10 7/8 x 4 1/2	12	290.00		
	KX-42B	30-15 ± 3	2	0.055	56	72	B/C	M	3	No	No	P		16 1/2 x 11 x 4 3/8	10	200.00		
	KX-32B	30-15 ± 3	2	0.055	56	64	B	M	3	No	No	P		16 1/2 x 11 x 4 3/8	10	165.00		
	KX-92B	20-17	2	0.055	75	75	B/C	A	0	Yes	Yes	P		16 1/2 x 14 3/8 x 4 1/2	18	300.00	Dual wells.	
	X-1	20-18	2	0.027	59	74	B/C	A	3	Yes	Yes	PH		17 3/8 x 12 3/4 x 4 3/8	15	350.00		
	KX-727A	30-16 ± 3	2	0.05	58	75	B/C	A	3	Yes	Yes	P		13 3/8 x 14 x 4 1/2	11 1/2			
KYOCERA	D-801	20-20 ± 3	2	0.02	58	78	B/C	M	3	Yes	No	P/PH	T/E/R	18 1/8 x 5 1/4 x 12 1/8	17 1/2	590.00		
	D-601	20-20 ± 3	2	0.035	58	78	B/C	M	3	No	No	P	T	18 1/8 x 4 x 12 1/8	16	450.00		
LUXMAN	KX-102	20-18 ± 3	2	0.04	61	94	B/C/D	A	3	Yes	No	P	E	17 7/8 x 5 3/4 x 14 3/8	20.9	999.95		
	KX-101	20-18 ± 3	2	0.04	58	73	B/C	M	3	No	No	P	E	17 7/8 x 5 3/4 x 14 3/8	17.6	499.95		
	KX-100	20-16 ± 3	2	0.04	58	73	B/C	M	3	No	No	A	E	17 7/8 x 5 3/4 x 14 3/8	17.6	399.95		
	K-240	20-18 ± 3	2	0.04	60	71	B/C	M	3	Yes	No	P	T	17 7/8 x 4 3/8 x 10 7/8	11.7	299.95		
	K-220	20-17 ± 3	2	0.06	58	70	B/C	M	3	No	No	P	T	17 7/8 x 4 3/8 x 10 7/8	10.3	199.95		
MARANTZ	SD530	35-17	2	0.05	53	71	B/C			Yes	Yes	P	T	16 3/8 x 4 x 11 7/8	8	350.00		
	SD440	30-17	2	0.04	56	81	B/C/D			Yes	Yes	P	T	16 3/8 x 4 x 11 7/8	11	329.95		
	SD340	35-16	2	0.04	56	73	B/C			Yes	Yes	P	T	16 3/8 x 4 x 7 7/8	8.8	279.95		
	SD242	40-15	2	0.05	52	66	B/C			Yes	Yes	P	T	16 1/2 x 4 3/8 x 7 7/8	7.5	189.95		
	SD142	40-14	2	0.08	51	59	B			Yes	Yes	P	T	16 1/2 x 4 3/8 x 7 7/8	7.5	149.95		
MITSUBISHI	DT-4						B/C			Yes								
	DT-2						B/C			No								
NAD	6125	30-16 ± 3	2	0.10	56	72	B/C	M	3	No	No	P	T	16 1/2 x 9 1/2 x 4	7 1/2	198.00		
	6050C	30-16 ± 3	2	0.10	58	72	B/C	M	3	No	No	P	T	16 1/2 x 9 1/2 x 4	12 1/2	238.00		
	6155	30-18 ± 3	2	0.08	58	74	B/C/H	M	3	No	No	P	T	16 1/2 x 9 1/2 x 4	14	348.00		
NAKAMICHI	Dragon	20-21 ± 3	3	0.04	72	72	B/C	M	3	No	Yes	P	T	17 3/4 x 5 3/8 x 11 7/8	21	1850.00		
	ZX-9	20-20 ± 3	3	0.045	72	72	B/C	M	3	No	No	P	T	17 3/4 x 5 3/8 x 11 7/8	21	1450.00		
	RX-505	20-20 ± 3	3	0.08	70	70	B/C	M	1	Yes	Yes	P	T	17 3/4 x 5 3/8 x 11 7/8	22	1090.00		
	RX-303	20-20	2	0.08	68	68	B/C	M	1	No	Yes	P	T	17 3/4 x 5 3/8 x 11 7/8	22	890.00		
	RX-202	20-20	2	0.11	68	68	B/C	M	1	No	Yes	P	T	17 3/4 x 5 3/8 x 10	19 3/8	650.00		
	LX-5	20-20	3	0.11	70	70	B/C	M	1	No	No	P	T	17 3/4 x 5 3/8 x 12 1/8	18 3/4	850.00		
	LX-3	20-20	2	0.11	68	68	B/C	M	1	No	No	P	T	17 3/4 x 5 3/8 x 12 1/8	18 3/4	585.00		
	BX-150	20-20	2	0.11	68	68	B/C			No	No	P	T	16 7/8 x 4 3/8 x 9 1/8	12 3/8	495.00		
	BX-100	20-20	2	0.11	62	62	B			No	No	P	T	16 7/8 x 4 3/8 x 9 1/8	12 3/8	349.00		
	BX-1	20-20	2	0.11	62	62	B			No	No	P	T	16 7/8 x 4 3/8 x 9 1/8	12 3/8	299.00		
	BX-300	20-20 ± 3	3															Pitch control.
	NIKKO	ND-1000C	30-19 ± 3	3	0.05	75	75	B/C	A	3	No	Yes	P	T	17.3 x 4.3 x 10	11.6	550.00	
		ND-750	30-16 ± 3	2	0.045	58	72	B/C	A	3	No	Yes	P	T	17.3 x 4.4 x 10.6	8.6	300.00	
ND-550		30-16 ± 3	2	0.05	72	72	B	A	3	No	No	P	T	17.3 x 4.3 x 10.9	8.2	180.00		
ONKYO	TA-2026	30-16 ± 3	2	0.05	60	80	B/C		3	Yes	No	P	T	16 1/2 x 10 5/8 x 4 3/8	10	209.95		
	TA-2036	30-16 ± 3	2	0.05	60	80	B/C		3	Yes	No	P	T	16 1/2 x 10 5/8 x 4 3/8	10	259.95		
	TA-R33	30-16 ± 3	2	0.05	60	80	B/C		3	Yes	Yes	P	T	16 1/2 x 10 5/8 x 4 3/8	11	314.95		
	TA-RW11	30-16 ± 3	4	0.05	60	80	B/C		3	Yes	†	P	T	16 1/2 x 13 1/4 x 4 3/8	15	414.95	†Dual auto reverse.	
	TA-2044	30-16 ± 3	2	0.045	60	80	B/C		3	Yes	No	P	T	17 1/8 x 14 3/8 x 4 3/8	13	309.95		
	TA-R77	30-17 ± 3	2	0.04	60	80	B/C		3	Yes	Yes	P	T	17 1/8 x 14 3/8 x 4 3/8	15	414.95		
	TA-2056	30-17 ± 3	3	0.045	60	80	B/C	M	3	Yes	No	P	E/R	17 1/8 x 14 3/8 x 4 3/8	14 1/2	394.95		
	TA-2066	25-18 ± 3	3	0.035	60	80	B/C	A	3	Yes	No	P	T	17 1/8 x 14 3/8 x 4 3/8	15	499.95		
	TA-2070	20-18 ± 3	3	0.021	60	80	B/C	A	3	No	No	PH	E/R	17 3/4 x 15 1/2 x 4	21	699.95		
	TA-2090	25-19 ± 3	3	0.02	60	80	B/C	A	3	Yes	No	PH	E/R	17 3/4 x 15 1/2 x 4	20	799.95		
PANASONIC	RS-636	20-16	2	0.07 wrms	66	56	B					E		16 7/8 x 4 3/4 x 8 1/8	8 3/8	125.00		
PARASOUND	CD200	20-16 ± 3	2	0.06	56	65	B		3	No	No	P	T	17 x 4 1/2 x 11	16	199.95		
PIONEER	CT-A9	25-20 ± 3	3	0.018	58	77	B/C	A	3	Yes	No	P	R	5.1 x 16.6 x 14.8	22.1	800.00		
	CT-A7	25-19 ± 3	3	0.028	57	75	B/C	A	3	Yes	No	P	R	5.1 x 16.6 x 14.8	17.4	500.00		
	CT-90R	20-18 ± 3	3	0.03	58	77	B/C	A	3	Yes	Yes	PH	R	4.7 x 16.5 x 14	15.9	520.00	Music repeat, real-time counter, opt. remote.	
	CT-70R	30-17 ± 3	2	0.03	58	77	B/C		3	Yes	Yes	P		4.7 x 16.5 x 14	14.6	420.00	As above but electronic counter.	
	CT-50R	35-15 ± 3	2	0.04	57	76	B/C		3	Yes	Yes	P	A	4.7 x 16.5 x 11.3	11.9	310.00	Record mute, opt. remote.	
(Continued)	CT-1040W	35-15 ± 3	3	0.045	57	67	B/C		3	Yes	No	P	A	4 x 16.5 x 12.4	15.9	375.00	Dual wells, sync. record.	
	CT-1050W	25-16	3	0.06	57	76	B/C		3	Yes	No			4 x 16.6 x 12.4		300.00	Dual wells.	

CASSETTE DECKS

MANUFACTURER	Model	Frequency Response with F02 Tape (Type II), Hz to kHz, ±dB	Number of Heads	Wow & Flutter, Wtd. Peak, %	S/N without Noise Reduction, dB	S/N with Noise Reduction, dB	Noise Reduction, dB	Dynamic Range, dB	Continuous Playback, dB	Auto Reverse?	Level Indicators	Count Indicators	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes
PIONEER (Continued)	CT-40	35-15 ± 3	2	0.04	57	76	B/C		3	Yes	No	A	3.9 x 16.5 x 11.5	10.1	260.00	IC full logic, electronic counter, one-touch record.
	CT-30	35-15 ± 3	2	0.04	57	76	B/C		3	No	No	A	3.9 x 16.5 x 11.5	10.1	220.00	Full logic, one-touch record.
	CT-501	35-14	2	0.06	57	76	B/C		3	No	No	A	4.8 x 16.6 x 9.4	8.6	160.00	One-touch record.
	CT-301	35-14	2	0.06	57	76	B		3	No	No	A	4.8 x 16.6 x 9.4	8.4	135.00	As above.
PRDTON	P720	30-17 ± 3	2	0.08	60	69.5	B/C		3	No	No	P	16 1/2 x 4 3/8 x 9 3/4	15	240.00	
REALISTIC	SCT-90	30-18	2	0.07		74	B/C		3	Yes	No	A	16 1/2 x 9 7/8 x 4 3/8		279.95	
	SCT-70	40-14	2	0.1		60	B		3	No	Yes	A	16 1/2 x 8 3/8 x 5		199.95	
	SCT-42	45-17	2	0.04		75	B/C		3	Yes	Yes	A	17 1/8 x 11 1/4 x 4 3/8		299.95	
	SCT-80	40-15	2	0.07		72	B/C		3	Yes	Yes	A	17 x 10 1/8 x 4		239.95	
	SCT-40	27-16	2	0.05		74	B/C		3	Yes	Yes	A	17 x 9 7/8 x 4 3/8		179.95	
	SCT-41	27-15	2	0.06		73	B/C		3	Yes	Yes	A	15 3/8 x 8 1/4 x 4 3/8		149.95	
REVDX	B710 MKII	22-22 +2, -3	3	0.035	58	72	B/C		3	No	No	P	18 x 14 x 6	23	1999.00	
ROTEL	RD850	30-17 ± 3	2	0.08	55	64	B/C	M	3	No	No	P	16 x 5 x 10 1/2	17 1/2	199.00	
SAE	C2	30-14 ± 2	2	0.06	52	68	B/C	M	3	Yes	No		16 1/2 x 14 x 14 3/8	11	299.00	
	C101		2				B/C			Yes	No				650.00	
SANSUI	D-990R	20-19	2	0.04	58	88	B/C/D	M	3	Yes	Yes	P	17 x 12 3/4 x 4 3/8	13.2	650.00	
	D-590R	20-19	2	0.04	58	78	B/C	M	3	Yes	Yes	P	17 x 12 1/4 x 4 3/8	12.6	480.00	
	D-390R	20-18	2	0.05	58	78	B/C	M	3	Yes	Yes	P	17 x 9 x 4 3/8	8.6	340.00	
	D-290	20-17	2	0.05	57	77	B/C	M	3	Yes	No	P	17 x 9 1/2 x 4 3/8	7.9	240.00	
	D-W9	20-19	2	0.04	58	78	B/C	M	3	Yes	No	P	17 x 12 1/4 x 4 3/8	14	450.00	
	D-99CW	20-17	2	0.06	58	78	B/C	M	3	Yes	No	P	17 x 9 x 5	10.1	360.00	Dual wells. High-speed dubbing.
	D-99MW	20-16	2	0.07	58	68	B	M	3	Yes	No	P	17 x 9 x 5	9.3	320.00	Dual wells.
	D-79R	20-18	2	0.05	58	68	B	M	3	Yes	Yes	P	17 x 9 x 5	8.8	290.00	
	D-79C	20-18	2	0.05	58	78	B/C	M	3	Yes	No	P	17 x 9 x 5	7.9	230.00	
	D-69C	20-17	2	0.07	58	78	B/C	M	3	Yes	No	P	17 x 9 x 5	7.1	200.00	
	D-59M	20-16	2	0.07	58	68	B	M	3	Yes	No	P	17 x 9 x 5	7.1	170.00	
SANYD	RPS18	40-15 ± 3	2	0.1	51	61	B/C	M	3	No	No	P	16 5/8 x 4 3/4 x 7 3/4	7	109.95	
	RPS28	40-15 ± 3	2	0.1	50	60	B/C	M	3	Yes	No	P	16 5/8 x 4 3/4 x 7 3/4	7 3/8	139.95	
	RDW33	40-14 ± 3	†	0.1	50	60	B	M	†	No	No	P	16 5/8 x 4 3/4 x 8 3/4	8 3/8	139.95	†Dual wells: Well A, one head and two bias/EQ positions; well B, two heads and three bias/EQ positions.
	RDW55	40-13 ± 3	†	0.1	50	60	B	M	†	No	No	P	16 5/8 x 4 3/4 x 8 3/4			
H. H. SCOTT	659DA	25-16 ± 2	2	0.04	65	74	B/C	M	3	No	Yes	PH	17 x 4 1/2 x 10 3/8	13.7	299.95	
	639DC	25-16 ± 2	2	0.04	65	74	B/C	M	3	No	No	PH	17 x 4 1/2 x 10 3/8	13.2	249.95	
	619DB	25-16 ± 2	2	0.045	60	66	B/C	M	3	No	No	PH	17 x 4 1/2 x 10 3/8	13	219.95	
SHARP	RT-1010(S)	40-14 ± 3	3	0.07	56	66	B		3	Yes	No	A	16 3/8 x 8 1/4 x 4 3/8	8 1/8	199.95	Dual wells.
	RT-350	40-14 ± 3	2	0.06	57	77	B/C		3	Yes	Yes	A	16 3/8 x 9 7/8 x 4 3/8	9	239.95	
	RT-310(S)	40-12 ± 3	2	0.09	52	62	B		3	No	Yes	A	15 5/8 x 9 x 4 7/8	6 3/8	119.95	
	RT-160(S)	40-13 ± 3	2	0.07	56	76	B/C		3	No	No	A	15 5/8 x 9 1/4 x 4 3/8	6 3/8	109.95	
	RT-100	50-12 ± 3	2	0.1	52	62	B/C		3	No	No	A	15 5/8 x 8 3/8 x 4 3/8	5 1/2	109.95	
SHERWOOD	S-90	30-15.5 ± 3	2	0.10	54	63	B	M	3	No	No	P	17 3/8 x 4 3/8 x 8	10	149.95	
	S-150CP	30-16.5 ± 3	2	0.07	57	66	B	M	3	No	No	P	17 3/8 x 4 3/8 x 11 3/4	12	219.95	
	S-250CP	30-18	2	0.07	57	74	C	M	3	No	No	P	17 3/8 x 4 3/8 x 11 3/4	12	249.95	
	S-450CP	30-18 +1, -3	2	0.06	57	75	C	M	3	Yes	No	P	17 3/8 x 4 3/8 x 13 3/4	14	299.95	
	S-6000CP	30-19.5 +1, -3	3	0.055	57.5	76.5	C	M	3	No	No	P	17 3/8 x 4 3/8 x 13 3/4	15	399.95	
SONY	TC-FX210	30-14 ± 3	2	0.05	58	65	B		3	No	No	PH	17 x 4 1/4 x 10 7/8	8 3/4	160.00	
	TC-FX310	30-15 ± 3	2	0.05	58	71	B/C		3	No	No	PH	17 x 4 1/4 x 10 7/8	9 1/4	190.00	
	TC-FX410R	30-17 ± 3	2	0.045	58	71	B/C		3	Yes	Yes	PH	17 x 4 1/4 x 10 7/8	10 1/4	230.00	Auto tape select; pre-end alarm.
	TC-FX510R	30-17 ± 3	2	0.045	58	71	B/C		3	Yes	Yes	PH	17 x 4 1/4 x 10 7/8	10 1/4	280.00	Music scan; blank skip.
	TC-FX705	30-17 ± 3	2	0.04	59	72	B/C		4	Yes	Yes	PH	17 x 4 1/4 x 10 7/8	13	360.00	IC-logic control.
	TC-FX707R	30-17 ± 3	2	0.04	59	72	B/C		4	Yes	Yes	PH	17 x 4 1/4 x 10 7/8	13 3/4	430.00	
	TC-K555	25-18 ± 3	3	0.04	60	72	B/C	M	4	No	No	PH	17 x 4 1/4 x 11 1/8	13 1/2	430.00	
	MTL-10	30-16 ± 3	3	0.07	57	65	B		3	Yes	Yes		14 x 4 1/4 x 11	12 1/2	250.00	Ten-cassette player/changer.
TC-D6C	40-15 ± 3	2	0.04	58	71	B/C		3	No	No	P	7 1/4 x 1 3/8 x 3 3/4	1 1/2	500.00	Portable with a.c. adaptor.	
SONY ES	TC-K555ES	25-18 ± 3	3	0.04	60	75	B/C	M	4	No	No	PH	17 x 4 1/4 x 11 1/8	13 1/2	500.00	
	TC-K666ES	25-19 ± 3	3	0.025	62	75	B/C	M	4	No	No	PH	17 x 4 1/4 x 11 1/8	14 1/4	650.00	
TANDBERG	TCD 3014	18-20 ± 1.5	3	0.09	72	80	B/C	M	3	Yes	No	P	17 1/4 x 6 1/2 x 15	22	1395.00	Actilinear II record, Dyneq equalization.
TEAC	V-330	30-16	2	0.05		65	B		3	No	No	P	17 x 4.3 x 10.6	8	200.00	
	V-360C	30-16	2	0.05		70	B/C		3	No	No	P	17 x 4.3 x 10.6	8	230.00	
	V-430X	30-17	2	0.045		90	B/D		3	No	No	P	17 x 4.3 x 10.6	10.8	280.00	
	V-530X	30-17	2	0.045		90	B/C/D	M	3	Yes	No	P	17 x 4.3 x 10.6	10.8	350.00	
	R-555	30-17	2	0.045		73	B/C		3	Yes	Yes	P	17 x 4.3 x 10.6	8.5	360.00	
	R-666X	30-17	2	0.045		90	B/C/D		3	Yes	Yes	P	17 x 4.3 x 10.6	8.5	459.00	
	V-700	25-19 ± 3	3	0.035	59	79	B/C	M	3	Yes	No	P/PH	17 x 4.5 x 13	16.5	500.00	
	V-800X	25-19 ± 3	3	0.035	59	92	B/C/D	M	3	Yes	No	P/PH	17 x 4.5 x 13	16.5	599.00	
	R-777X	30-19	2	0.03		91	B/C/D	M	3	Yes	Yes	P/PH	17 x 4.7 x 13.7	17.6	650.00	
	V-900X	30-20 ± 3	3	0.028	60	92	B/C/D	A	3	Yes	No	P/PH	17 x 4.5 x 13	16.5	725.00	
	R-999X	20-20	3	0.025		92	B/C/D	M	3	Yes	Yes	P/PH	17 x 4.7 x 13.7	18.7	899.00	
	225	40-14 ± 3	2	0.07	53	61	B		2	No	No	A	17 x 4.4 x 11.2	11	350.00	Overdub capability.

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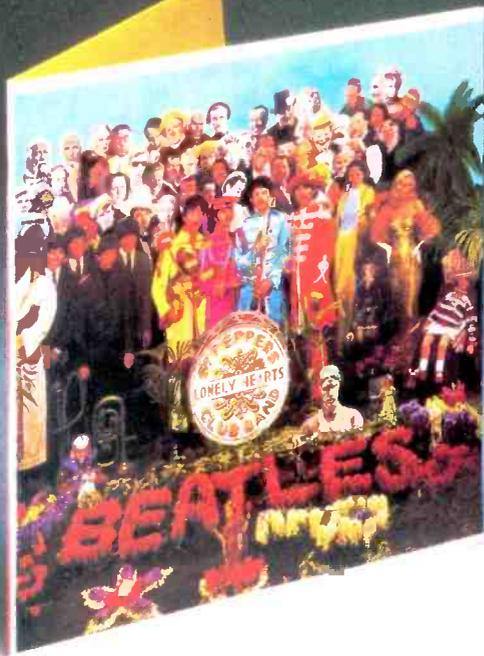
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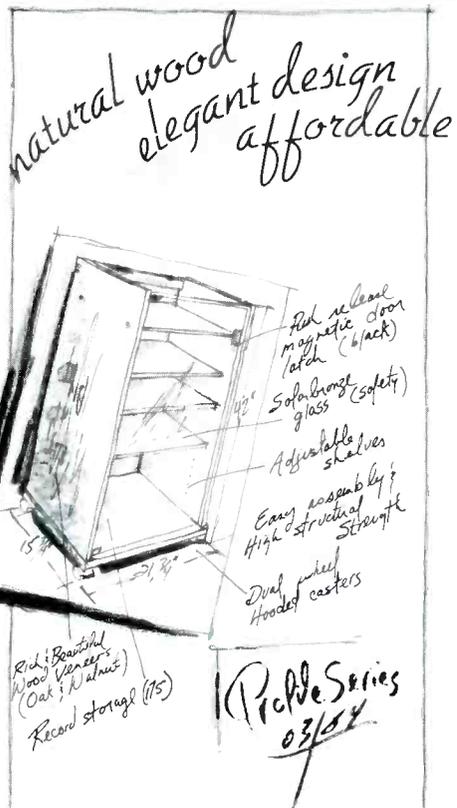
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CASSETTE DECKS

MANUFACTURER	Model	Frequency Response with CrO ₂ Tape (Type II), Hz to KHz. ±dB	Number of Heads	Wow & Flutter	S/N without Noise Reduction. %	S/N with Noise Reduction. %	Noise Reduction Circuit: Dolby B = B, Dolby C = C, dbx = D, MX Pro = H	Contiguously Adjustable Bias: Auto = A, Manual = M	No. of Preset Bias/EQ Positions	Program Search?	Auto Reverse?	Legal Indicators: Average = A, Peak = P, Peak-to-Peak = Ph	Coupler Indicators: Average = A, Exposed Time = E, Remaining Time = R	Dimensions - inches	Weight - Lbs.	Price - \$	Notes
TECHNICS	RS-B12	20-17	2	0.07	56	66	B		3	No	No	P		16 7/8 x 4 1/4 x 8 3/8	7	130.00	Dual wells, 2X speed, mike mixing. As above, series play, synchro start.
	RS-B14	20-17	2	0.07	57	75	B/C		3	No	No	P		16 7/8 x 4 1/4 x 8 3/8	7	160.00	
	RS-B18	20-17	2	0.07	57	92	B/C/D		3	No	No	P		16 7/8 x 4 1/4 x 8 3/8	7	180.00	
	RS-B50	20-20	2	0.045	58	92	B/C/D	A	3	No	No	PH		16 7/8 x 3 7/8 x 10 3/4	10	230.00	
	RS-M245X	20-20	2	0.045	57	92	B/C/D	A	3	Yes	No	PH	E/R	16 7/8 x 3 7/8 x 10 3/4	11	330.00	
	RS-M253X	20-22	3	0.045	58	92	B/C/D	A	3	Yes	No	PH	E/R	16 7/8 x 3 7/8 x 10 3/4	11	450.00	
	RS-B11W	20-17	2	0.07	57	67	B		3	No	No	PH		16 7/8 x 4 1/4 x 9 1/8	9	220.00	
	RS-M222	20-18	2	0.048	57	67	B		3	No	No	P		16 7/8 x 4 1/4 x 11	13	300.00	
	RS-B48R	20-17	2	0.05	57	92	B/C/D	A	3	No	Yes	P		16 7/8 x 3 7/8 x 10 1/4	11	260.00	
	RS-B68R	20-19	2	0.05	57	92	B/C/D	A	3	Yes	Yes	PH		16 7/8 x 3 7/8 x 10 3/4	11	330.00	
RS-B78R	20-19	2	0.045	58	92	B/C/D	A	3	Yes	Yes	PH	E/R	16 7/8 x 3 7/8 x 10 3/4	11	400.00		
RS-B100	20-21 ±3	3	0.022	60	92	B/C/D	M	3		No	PH	E/R	16 7/8 x 3 7/8 x 10 3/4	12	800.00		
TOSHIBA	PCG10	30-15	2	0.05	56	63	B	M	3	No	No	P	E	16 1/2 x 4 3/8 x 10 5/8	7.7	139.95	
	PCG30	30-16	2	0.04	57	75	B/C	A	4	No	No	P	E	16 1/2 x 4 3/8 x 10 5/8	10.8	179.95	
	PCG50R	20-17	2	0.04	57	75	B/C	A	4	Yes	Yes	P	E	16 1/2 x 4 3/8 x 10 5/8	10.8	229.95	
UHER/MINEROFF	CR260	30-16 ±1	2	0.1	58	64	B	A	4	No	No	P	T	9.2 x 2.3 x 7.2	6	995.00	Portable. As above.
	CR160	30-16 ±1	2	0.1	60	75	B/C	A	4	No	No	P	T	9.3 x 2.3 x 7.3	6	795.00	
ULTRX	RDC11	30-14 ±3	2	0.06	57	75	B/C		3	Yes		A	T	16 1/2 x 4 1/2 x 8 7/8	7.3	149.95	
	RDC21	30-15 ±3	2	0.06	57	92	B/C/D		3	Yes		A	T	16 1/2 x 4 1/2 x 8 7/8	7.3	169.95	
	RDC41	20-16 ±3	2	0.05	57	92	B/C/D	A	3	Yes		P	T	16 1/2 x 4 1/4 x 8 7/8	8.4	219.95	
	RDC61	20-18 ±3	2	0.05	57	93	B/C/D	A	3	Yes		P	E/R	16 1/2 x 4 1/4 x 8 7/8	8.4	269.95	
	RDR81	20-17 ±3	2	0.04	57	92	B/C/D	A	3	Yes	Yes	P	E/R	16 1/2 x 4 3/8 x 8 7/8	9.9	329.95	
	RDR31	30-13 ±3	2	0.08	50	60	B	M	3	No	Yes	A	T	16 1/2 x 4 3/4 x 10 7/8	9.7	169.95	
VECTOR RESEARCH	VCX-250	30-18 ±3	2	0.05	56	73	C		3	Yes	No	P	T	17 x 13 1/2 x 4 1/2	14	189.95	Five-band record/play EQ inc.
	VCX-450	30-18 ±3	2	0.05	58	75	C		3	Yes	No	P	T	17 x 13 1/2 x 4 1/2	18	329.95	
	VCX-650	25-21 ±3	3	0.04	58	75	C		3	Yes	No	P	T	17 x 13 1/2 x 4 1/2	20	449.95	
YAMAHA	K-2000	20-20 ±3	4	0.08	59	108	B/D	A	3	No	No	PH	E/R	17 1/8 x 13 5/8 x 4 7/8	19 7/8	795.00	
	K-1000	25-20 ±3	3	0.08	59	105	B/D	M	3	No	No	PH	E/R	17 1/8 x 13 5/8 x 4 7/8	17 7/8	595.00	
	K-700	30-19 ±3	2	0.08	59	75	B/C		3	Yes	No	P	E/R	17 1/8 x 11 1/4 x 4 1/2	12 1/8	449.00	
	K-600	30-18 ±3	2	0.1	59	75	B/C		3	Yes	Yes	P	E/R	17 1/8 x 11 1/4 x 4 1/2	11 1/2	379.00	
	K-520	30-17 ±3	2	0.08	58	74	B/C		3	Yes	No	P	E/R	17 1/8 x 10 3/4 x 4 3/8	8 1/2	299.00	
	K-320	30-16 ±3	2	0.08	58	74	B/C		3	Yes	No	P	T	17 1/8 x 19 1/8 x 4 3/8	8 1/2	219.00	
	K-200a	40-15 ±3	2	0.08	58	76	B		3	No	No	P	T	17 1/8 x 11 x 4 3/8	9 7/8	199.00	

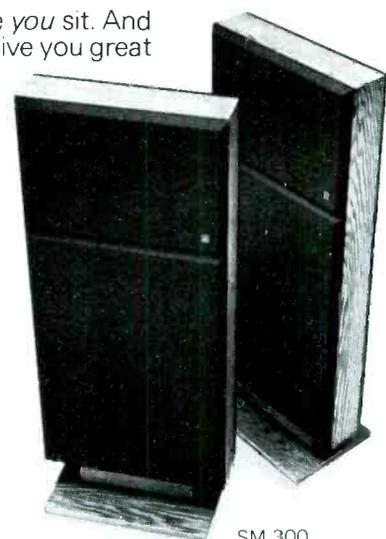


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MICROPHONES



AKG D330BT



BEYER MC-734



CROWN PZM 180



SHURE SM81

MANUFACTURER	Model	Directional Pattern Plus Channels. M.S. = 1-5	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 μbar	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
AIWA	CM-27	Sel.	Electret Condenser	Alum.	Vocal/Record	600	60-14	Var.	Cannon XLR-3		6	WSF	150.00		
	DM-06	Uni	Dynamic	Zinc	Vocal/Record	600	80-12	55	Cannon XLR-3		8.8	S	50.00		
	DM-D30	Uni	Dynamic	Alum.	Vocal/Record	600	100-10	75		10	6	S	20.00		
	CM-70	Card. x2	Condenser	Plastic	Hall/Record	250	100-12	65			0.8	S	40.00	Tie clip.	
	CM-60	Omni	Condenser	Plastic	Hall/Record	250	100-12	48		2.6	Mini	0.5	SF	29.50	As above.
	CM-30A	Card. x2	Condenser	Alum.	Hall/Record	1k	80-15	54		1.4	Mini	2.2	WS	39.00	
CM-Z3	Var.	Condenser	Alum.	Vocal/Record	250	100-13	Var.		4	Mini	1.4	WS	39.00		
AKG ACOUSTICS	C-34	Multi x2	Condenser	Brass	Studio	200B	20-20	47	Multi	66	XLR	9 3/4	WF	1629.00	Remote control with 9-pattern selector.
	C-422	Multi x2	Condenser	Brass	Studio	200B	20-20	44.5	Multi	66	XLR	15 1/2	WF	2500.00	As above.
	C414EB/P48	Multi	Condenser	Brass	Studio	200B	20-20	41	XLR		XLR	12	WF	795.00	Four patterns.
	C-460B	Multi	Condenser	Brass	Multi	200B	20-20	40	XLR		XLR	4	WF	464.00	Modular system.
	C-535EB	Card.	Condenser	Brass	Vocal	200B	20-20	Var.	XLR		XLR	10	F	295.00	
	C-568EB	Lobe	Condenser	Brass	Record	200B	50-20	42	XLR		XLR	6 1/4	WF	295.00	Shotgun.
	C-567E	Omni	Condenser	Brass	Speech	200B	20-20	45	XLR		XLR	3 1/2	WF	235.00	Lavalier.
	The Tube	Multi	Condenser	Brass	Instr.	200B	20-20	60	12-Pin Tuchel	30	XLR	24	WSF	1700.00	Remote control with 9-pattern selector.
	D-12E	Card.	Dynamic	Zinc	Instr.	200B	30-15	53	XLR		XLR	1 1/2		295.00	
	D-40	Card. x2	Dynamic	Zinc	Record	600	80-15	59	Attached	15	Phone	7		99.00	
	D-58E	Card.	Dynamic	Zinc	Instr.	200B	75-15	63	XLR		XLR	1 1/2		99.00	Noise cancelling.
	D-80	Card.	Dynamic	Brass	Vocal	200B	60-15	56	XLR	15	Phone	7 1/4	S	90.00	With XLR plug, \$95.00.
	D-109	Omni	Dynamic	Zinc	Speech	200B	70-15	59		30		5 1/2		99.00	
	D-125E	Card.	Dynamic	Zinc	General	200B	90-18	54	XLR		XLR	8		110.00	
	D-130E	Omni	Dynamic	Zinc	General	200B	50-15	56	XLR		XLR	8		105.00	
	D-190E	Card.	Dynamic	Brass	Record	200B	30-16	56	XLR		XLR	6 1/2	S	115.00	
	D-202E1	Card.	Dynamic	Record	200B	30-15	53	XLR			XLR	10	F	350.00	Two-way system.
D-222EB	Card.	Dynamic	Zinc	Record	200B	20-17	56	XLR		XLR	9	F	290.00	As above.	
D-224EB	Card.	Dynamic	Zinc	Record	200B	20-20	58	XLR		XLR	10	F	500.00	As above.	
D-310	Card.	Dynamic	Zinc	Vocal	200B	80-18	58	XLR		XLR	8 1/2	S	135.00		
D-320B	Hyper Card.	Dynamic	Zinc	Vocal	200B	80-18	57	XLR		XLR	10 1/2	F	170.00		
D-330BT	Hyper Card.	Dynamic	Zinc	Vocal	200B	50-20	58	XLR		XLR	12	F	210.00	EQ switching.	
D-900	Lobe	Dynamic	Zinc	Sound Reinf.	200B	60-15	50	XLR		XLR	18	WF	310.00	Shotgun.	
D-1200	Card.	Dynamic	Brass	Vocal	200B	40-17	73	XLR		XLR	8 1/2	F	125.00		
ASTATIC	985cn	Card.	Dynamic	Zinc	Vocal	250B	40-15	75	A3F	18	A3M	9.5	WS	119.00	
	980cn	Card.	Electret Condenser	Zinc	Record	600B	40-20	68	A3F	18	A3M	6.5	WS	192.00	
	975cn	Card.	Dynamic	Zinc	Vocal	500B	60-14	74	A3F	18	A3M	8.8	WS	98.00	
	970cn	Omni	Dynamic	Zinc	Vocal Brdcst.	200B	50-15	82	A3F	18	A3M	7.5	WS	128.80	
	965cn	Card.	Dynamic	Zinc	Vocal	230B	50-15	74	A3F	18	A3M	9.5	WS	123.40	
	960cn	Card.	Dynamic	Zinc	Vocal/Record	250B	40-16	75	A3F	18	A3M	9.5	WS	151.00	
	827	Card.	Electret Condenser	Black Chrome	↑	600B	80-18	72	A3F			6.5	W	66.70	†Lectern; 13- or 17-inch gooseneck.
	840s	Card.	Dynamic	Zinc	Sound Reinf. Conf.	200B	50-12	82	None	30	None	1.3	S	93.50	Lavalier.
	1070	Card.	Dynamic	Plastic	Conf.	250B	100-15	75	None	21	None	14.5		199.00	Spring shock mount, hum filter.
	BL14	Card.	Dynamic	Zinc Alloy	Instr.		40-15	53		20		21	SF	92.00	
BL24	Omni	Dynamic	Alum.	Acous.	200	50-16	82		30	A3M	5.5	S	86.00	Lavalier.	
BL34	Card.	Dynamic	Zinc Alloy	Instr.	230	60-14	74	A3F	25	A3M	10.5	SF	49.95		
BL44	Card.	Dynamic	Zinc Alloy	Vocal	230	40-15	74	A3F	25	A3M	10.5	SF	110.00		
(Continued)	BL54	Omni	Dynamic	Zinc Alloy	Acous.	200	50-15	82	A3F	25	A3M	7.5	SF	113.00	

MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Sere=2, Quad=4, 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 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 Proximity Filter = F	Price, \$	Notes
ASTATIC (Continued)	BL64	Card.	Dynamic	Zinc Alloy	Instr.	230	40-15	74	A3F	25	A3F	9	SF	115.00	
	BL74	Card.	Dynamic	Zinc Alloy	Vocal	230	50-16	74	A3F	25	A3M	9.5	S	127.00	
	BL94	Card.	Dynamic	Zinc Alloy	Vocal	250	40-16	75	A3F	25	A3M	9.5	SF	152.00	
	BLJT30	Omni	Crystal	Zinc Alloy	†	500	30-10	49	Mini	20		8.5		78.75	†Harmonica.
	BLJT30P	Omni	Crystal	Zinc Alloy	†		30-10	49			A3M	8.5		58.10	
	BLJT30PC	Omni	Crystal	Zinc Alloy	†		30-10	49	A3F	20	A3M	8.5		88.75	
	BLJT30PS	Omni	Crystal	Zinc Alloy	†		30-10	49	A3F	20	A3M	8.5		98.75	
AUDIO-TECHNICA	AT9000	Omni	Electret Condenser	Alum.	Vocal	1.5k	60-10	63†	Attached	10	Mini	1.65	S	13.95	†0 dB = 1 mW per 10 dynes/cm ² .
	AT9100	Uni	Dynamic	Plastic	Vocal	600	60-15	63†	Attached	10	Mini	6.7	S	24.95	
	AT9200	Uni	Electret Condenser	Plastic	Music	1.5k	60-17	48†	Attached	10	Mini	7.1	S	34.95	
	AT9300	Uni/Omni	Electret Condenser	Alum.	Video	1k	40-10	61†	Attached	6	Mini	2.75	SW	79.95	
	AT9400	Uni x2	Electret Condenser	Plastic	Music	1.5k	60-17	53†	Attached	10	Mini	7.1	S	49.95	
	AT9500	Omni	Electret Condenser	Alum.	Vocal	2k	50-16	53†	Attached	10	Mini	0.18	S	29.95	
	AT9600	Uni	Dynamic	Alum.	Vocal/Music	600	60-16	62†	Attached	13	Mini	6.7	SF	49.95	
	AT9700	Uni	Electret Condenser	Alum.	Vocal/Music	600	50-17	52†	Attached	16	Mini	5	SF	59.95	
	AT9800	Uni	Dynamic	Alum.	Music	250	50-18	58†	A3M	16	Mini	10	SF	99.95	
AT9900	Uni	Electret Condenser	Alum.	Music	600	4-20	56†	A3M	16	Mini	6.5	SF	129.95		
BEYER DYNAMIC	M-69	Hyper Card.	Dynamic	Brass	Vocal	200B	50-16	52	3-Pin Male XLR			11.4		165.00	
	M-69S	Hyper Card.	Dynamic	Brass	Vocal	200B	50-16	52	3-Pin Male XLR			11.4	F	200.00	
	M-88	Hyper Card.	Dynamic	Brass	Vocal	200B	30-20	52	3-Pin Male XLR			11.4		320.00	
	M-201	Hyper Card.	Dynamic	Brass	Instr.	200B	40-18	57	3-Pin Male XLR			7.9	W	190.00	
	M-160	Hyper Card.	Double Ribbon	Brass	Instr.	200B	40-18	59	3-Pin Male XLR			5.6		360.00	
	M-260	Hyper Card.	Ribbon	Brass	Instr.	200B	50-18	57	3-Pin Male XLR			10.7		200.00	
	M-260S	Hyper Card.	Ribbon	Brass	Instr.	200B	50-18	57	3-Pin Male XLR			10.7	S	210.00	
	M-101	Omni	Dynamic	Brass	Vocal	200B	40-20	57	3-Pin Male XLR			5.7	W	220.00	
	M-130	Figure 8	Ribbon	Brass	Instr.	200B	40-18	59	3-Pin Male XLR			5.4		440.00	
	M-111	Omni	Dynamic	Zinc Alloy	Vocal	200B	60-15	62	3-Pin Male XLR			2.7		230.00	Lavalier.
	M200	Card.	Dynamic	Alum.	Vocal	600B	50-15	56.6	3-Pin Male XLR			5		100.00	
	M200S	Card.	Dynamic	Alum.	Vocal	600B	50-15	56.6	3-Pin Male XLR			5	S	110.00	
	M300	Card.	Dynamic	Alum.	Vocal	250B	50-15	58.5	3-Pin Male XLR			8.6		125.00	
	M300S	Card.	Dynamic	Alum.	Vocal	250B	50-15	58.5	3-Pin Male XLR			8.6	S	135.00	
	M400	Super Card.	Dynamic	Brass	Vocal	200B	40-16	53	3-Pin Male XLR			9.2		160.00	
	M400S	Super Card.	Dynamic	Brass	Vocal	200B	40-16	53	3-Pin Male XLR			9.2	S	170.00	
	M500	Hyper Card.	Ribbon	Alum.	Vocal	200B	40-18	57	3-Pin Male XLR			9		240.00	
	M500S	Hyper Card.	Ribbon	Alum.	Vocal	200B	40-18	57	3-Pin Male XLR			9	S	250.00	
	M600	Hyper Card.	Dynamic	Brass	Vocal	250B	40-16	57	3-Pin Male XLR			8.75		270.00	
	M600S	Hyper Card.	Dynamic	Brass	Vocal	250B	40-16	57	3-Pin Male XLR			8.75	SF	280.00	
	M260.80	Hyper Card.	Ribbon	Brass	Vocal	200B	100-18	57	3-Pin Male XLR			8.2	F	210.00	
	M411	Card.	Dynamic	Brass	Vocal	200B	200-12	56	5-Pin Tuchel			5.4		130.00	
	M412	Card.	Dynamic	Rubber	Vocal	200B	200-12	56	5-Pin Tuchel			5.4		135.00	
	M64	Card.	Dynamic	Brass	Vocal	200B	100-12	59	5-Pin DIN†			4		100.00	†For gooseneck mounting.
	M420	Hyper Card.	Dynamic	Brass	Vocal	200B	100-12	57	3-Pin Male XLR			5.3		155.00	
	M422	Super Card.	Dynamic	Brass	Vocal	200B	100-12	59	3-Pin Male XLR			2.5		75.00	
	MC734	Card.	Condenser	Alum.	Vocal	150B	20-18	43.8	3-Pin Male XLR				F	830.00	
MC736	Card./Lobe	Condenser	Alum.	Vocal	150B	40-20	28.2	3-Pin Male XLR			8.6	F	725.00	Short shotgun.	
MC737	Lobe	Condenser	Alum.	Vocal	150B	40-20	28.2	3-Pin Male XLR			15.7	F	825.00	Long shotgun.	
CK701	Omni	Condenser	Alum.	Vocal	200B	40-20	41	3-Pin Male XLR			0.6	F	210.00		
CK702	Omni	Condenser	Alum.	Vocal	200B	40-20	41	3-Pin Male XLR			0.6	WF	250.00	Elastic suspension of capsule.	
(Continued)	CK703	Card.	Condenser	Alum.	Vocal	200B	40-20	39	3-Pin Male XLR			1	F	260.00	

MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo=2, Quad=4, MS=MS	Operating Principle	Case Material	Most Common Use	Actual Impedance, 1 kHz, Ohms, Balanced = B	Operating Range, 1 kHz, Ohms	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 Switches Low or Proximity Filter = F	Price, \$	Notes
BEYER DYNAMIC (Continued)	CK704	Card.	Condenser	Alum.	Vocal	200B	40-20	39	3-Pin Male XLR		1	WF	300.00	As above.	
	CK706	Card./Lobe	Condenser	Alum.	Vocal	200B	40-20	39	3-Pin Male XLR		3	F	400.00		
	CK707	Lobe	Condenser	Alum.	Vocal	200B	40-20	39	3-Pin Male XLR		8.7	F	500.00		
	CK708	Figure 8	Condenser	Alum.	Vocal	200B	40-20	39	3-Pin Male XLR		4.4	F	460.00		
	MCE-5.11	Omni	Electret Condenser	Brass	Vocal	200B	20-20	36	3-Pin Male XLR	10	3-Pin Male XLR	0.25	W	275.00	Lavalier.
	MPC-50	Omni	Boundary Layer	Wood	Vocal	200B	20-20	33	3-Pin Male XLR		18			530.00	
CROWN INTERNATIONAL	PZM-30GP	PZM Heml.	Electret Condenser	Alum.	Piano/ General Orch.	150B	20-20	70	Swcft. A3M		6½	W	359.00		
	PZM-31S	PZM Heml.	Electret Condenser	Alum.	General	150B	20-20	72	Swcft. A3M		6½	W	359.00		
	PZM-6LP	PZM Heml.	Electret Condenser	Alum.	Conf.	150B	20-20	70	Swcft. A3M	15	Swcft. A3M	5	W	359.00	
	PZM-6S	PZM Heml.	Electret Condenser	Alum.	Orch.	150B	20-20	72	Swcft. A3M	15	Swcft. A3M	5	W	359.00	
	PZM-2ORMG	PZM Heml.	Electret Condenser	Alum.	Conf.	150B	20-20	70	Swcft. A3M		6½			299.00	
	PZM2.5	PZM Heml.	Electret Condenser	Alum.	†	150B	20-12	64	Swcft. A3M		61			359.00	†Stage floor, lectern.
	PZM-3LVR	PZM Heml.	Electret Condenser	Plastic		150B	20-15	70		10	Swcft. TA4F	½		329.00	Redundant lavalier.
	PZM-3LV	PZM Heml.	Electret Condenser	Plastic		150B	20-15	70		15	Swcft. TA4F	½		239.00	Lavalier.
	PZM-2LV	PZM Heml.	Electret Condenser	Alum.	Stage Props General	150B	20-20	70		15	Swcft. A3M	1		269.00	
	PZM-12SP	PZM Heml.	Electret Condenser	Nylon	General	150B	20-20	70	Swcft. A3M		2	W		259.00	
	PZM-180	PZM Heml.	Electret Condenser	Nylon	General	150B	20-15	70	Swcft. A3M		2	W		160.00	
	Sound Grabber	PZM Heml.	Electret Condenser	Nylon	Conf.	1.6k	40-15	55		10	Mini	2	W	99.00	
	ELECTRO- VOICE	RE20	Card.	Dynamic	Steel	Music/ Voice	50B/150B/ 250	45-18	57†	A3F	15	None	26	WF	484.50
RE18		Super Card.	Dynamic	Steel	Music/ Voice	150B	80-15	57†	A3F	15	None	8	W	279.25	
RE16		Super Card.	Dynamic	Steel	Voice	150B	80-15	56†	A3F	15	None	8	WF	269.50	
RE15		Super Card.	Dynamic	Steel	Voice	150B	80-15	56†	A3F	15	None	6	WF	256.75	
RE11		Super Card.	Dynamic	Steel	Voice	150B	90-13	56†	A3F	15	None	8	WF	179.50	
RE10		Super Card.	Dynamic	Steel	Voice	150B	90-13	56†	A3F	15	None	6	WF	166.50	
DS35		Card.	Dynamic	Steel	Voice/ Music	150B	60-17	60†	A3F	15	None	9.2	WF	159.00	Bass-boost proximity effect.
PL77AA		Card.	Condenser	Zinc & Alum.	Voice/ Music	150B	60-17	60†	A3F	15	None	12	W	183.75	Phantom and/or battery power, pop filter.
CS15P		Card.	Condenser	Steel	Voice/ Music	150B	40-18	45†	A3F	15	None	8	W	263.00	
CO15P		Omni	Condenser	Steel	Music	150B	20-20	45†	A3F	15	None	7.5	W	283.25	Phantom powered.
RE55		Omni	Dynamic	Steel	Music	150B	40-20	57†	A3F	15	None	8.5	W	259.00	
DO54		Omni	Dynamic	Steel	Music	150B	50-18	58†	A3F	15	None	6.5	W	150.00	
OO56		Omni	Dynamic	Steel & Alum.	Music	150B	80-18	61†	A3F	15	None	6.5	W	125.00	Integral shock mount.
DD56L		Omni	Dynamic	Steel & Alum.	Voice	150B	80-18	61†	A3F	15	None	5.5	W	141.00	As above, long handle.
RE50		Omni	Dynamic	Alum.	Voice	150B	80-15	55†	A3F	15	None	9.5	W	156.00	Integral shock mount.
635A		Omni	Dynamic	Steel	Voice	150B	80-13	55†	A3F	15	None	6	W	95.50	
DL42		Super Card.	Dynamic	Alum. & Steel	Voice	150B	50-12	50†	A3F	1	A3M	27	W	525.00	Shotgun, shock mount.
667A		Card.	Dynamic	Alum.	Voice	50B/150B/ 250B		51†	A3F	2	A3M	24	WF	525.00	Boom mount, selectable patterns.
CO94		Omni	Condenser	Brass & Alum.	Voice	150B	80-15	45†	A3F	15	A3M	0.7	W	231.75	Lavalier.
CO90		Omni	Condenser	Brass & Alum.	Voice	150B	40-15	57†	A3F	15	None	0.7	W	145.00	Lavalier, battery powered.
CO90P		Omni	Condenser	Brass & Alum.	Voice	150B	40-15	57†	A3F	15	None	0.7	W	176.50	Lavalier, phantom powered.
CO90E		Omni	Condenser	Brass & Alum.	Voice	150B	40-15	57†	A3F	15	None	0.7	W	98.00	Lavalier, for wireless.
RE85		Omni	Dynamic	Steel	Voice	150B	90-10	61†	A3F	15	None	8	W	145.50	
649B	Omni	Dynamic	Alum.	Voice	150B	80-10	61†	A3F	15	None	1.1	W	132.00		
PL80	Super Card.	Dynamic	Zinc & Alum.	Voice	150B	60-17	56†	A3F	0	None	12.5	W	216.00		
PL91A	Card.	Dynamic	Alum.	Voice	150B	60-15	59.5†	A3F	0	None	8	W	132.00		
PL95A	Card.	Dynamic	Steel	Voice	150B	60-17	60†	A3F	0	None	9.2	W	180.00		
PL76B	Card.	Condenser	Zinc & Alum.	Voice	150B	50-20	55†	A3F	0	None	12	WS	177.00	Battery powered.	
PL77B	Card.	Condenser	Zinc & Alum.	Voice	150B	50-20	50†	A3F	0	None	12	WF	210.00	Battery or phantom powered.	
PL5	Omni	Dynamic	Steel	Music	150B	80-13	55†	A3F	0	None	6	W	110.00		
PL6	Super Card.	Dynamic	Zinc	Music	150B	90-13	56†	A3F	0	None	10.5	W	119.00		
PL9	Omni	Dynamic	Steel	Music	150B	50-18	58†	A3F	0	None	6.5	W	169.00		
PL11	Super Card.	Dynamic	Steel	Music	150B	90-13	56†	A3F	0	None	6	W	204.00		
PL20	Card.	Dynamic	Steel	Voice/ Music	50B/150B/ 250B	45-18	57†	A3F	0	None	26	WF	570.00		
681	Card.	Dynamic	Steel	Voice/ Music	150B/Hi-Z	60-14	59.5†	A3F	15	None	8	W	135.00		
644	Super Card.	Dynamic	Zinc & Brass	Voice/ Music	150B/Hi-Z	40-12	53†	QC-4M	15	None	41	W	244.00	Shotgun.	
RE30	Omni	Condenser	†	Voice	200B	40-15	54†	A3F	15	None	11.7	WS	400.00	†Various; special ENG/EFP with limiter.	
RE34	Card.	Condenser	†	Voice	200B	40-15	54†	A3F	15	None	11.8	WS	400.00	As above.	

MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels: Stereo = 2, Quad = 4, MS = MS	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 μbar	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 High Imp. Filter = F	Price, \$	Notes
GC ELECTRONICS	30-2373	Uni	Dynamic	Alum.		30k	50-17	58	2-Pin Screw	16.5	Phone	S	39.95	Lavalier strap.	
	30-2374	Uni	Dynamic	Alum.		500-50k	80-15	72/52	4-Pin Screw	20	Phone	S	27.95		
	30-2376	Uni	Dynamic	Alum.		500	100-13	85	2-Pin Screw	15	Phone	S	37.95		
	30-2372	Uni	Dynamic	Alum.		200	60-15	75	3-Pin Attached	20	Phone	S	70.00	Built-in preamp.	
	30-2378	Uni	Electret Condenser	Alum.		600	30-16	68	3-Pin Attached	20	None	WS	30.95		
	30-2382	Uni x2	Electret Condenser	Alum.		600	50-16	68	Attached	9.9	None	S	43.00		
	30-2398	Omni	Electret Condenser	Alum.		600	50-16	65	Attached	20	Phone	WS	23.95	As above.	
	30-2388	Omni	Dynamic	Alum.		250/50k	100-10	78/60	4-Pin Screw Attached	15	Phone	S	38.00		
	30-2300	Omni	Dynamic	Plastic		200	100-10	70	Attached	4	Micro, Mini	S	6.75		
	30-2302	Omni	Dynamic	Plastic		30k	50-13	60	Attached	4.5	Micro, Mini	S	10.35		
	30-2308	Omni x2	Dynamic	Plastic		500	100-10	74	Attached	4.3	Micro, Mini	WS	21.40	Lapel style.	
30-2384	Omni	Electret Condenser	Alum.		1k	50-16	63	Attached	13.2	Phone Mini	S	20.95			
30-2383	Omni	Dynamic	Alum.		30k	70-12	57	Attached	16.5	Mini	S	16.95	Lavalier.		
JVC	M-201	Card. x2	Condenser	Alum.	Hall	600	40-18		(2) Phones	6		WS	59.95		
MARANTZ	EC-1	Omni	Electret Condenser			2k	60-13	164		10	Mini	3.5	18.00		
	EC-3	Card.	Electret Condenser			1.5k	50-15	164		10	Mini	8.8	28.00		
	EC-5	Card.	Electret Condenser			2.2k	40-15	164		10	Mini	4.1	42.00		
	EC-7	Card.	Electret Condenser			250B	40-16	164		10	Phone	10.3	64.00		
	EC-9P	Card.	Electret Condenser			250B	30-17	177	XLR	10		13.8	110.00		
	EC-12B	Omni	Electret Condenser			250B	100-15	164		10	Mini	2.3	54.00		
	EC-15P	Omni	Electret Condenser			250B	70-16	164		15	XLR	1	100.00		
EC-33S	Card. x 2	Electret Condenser			1k	50-15	145		10	Mini	6.2	66.00			
NAKAMICHI	DM-1000	Card.	Dynamic	Alum.	General	250B	30-18	76		16 1/2	Phone	WSF	300.00		
	DM-500	Card.	Dynamic	Alum.	General	200B	50-15	73		16 1/2	Phone	W	100.00		
	CM-300	Card. or Omni	Electret Condenser	Alum.	General	200B	30-18	76		16 1/2	Phone	WSF	170.00		
	CM-100	Card.	Electret Condenser	Alum.	General	200B	30-18	76		16 1/2	Phone	WSF	110.00		
NEUMANN	KM 83	Omni	Condenser	Alum.		200	40-20	77	A3M	0	A3F	3	W	349.00	1 mV/Pa (1 Pa = 94 dB SPL).
	KM 84	Card.	Condenser	Alum.		200	40-20	107	A3M	0	A3F	3	W	349.00	
	KM 85	Card.	Condenser	Alum.		200	40-20	91	A3M	0	A3F	3	W	349.00	Transformerless.
	U 89	Sel.	Condenser	Alum.	Studio	150	40-18	81	A3M	25	A3F	14	WF	1048.00	
	TLM 170	Sel. x2	Condenser	Alum.	Studio	150	40-18	81	A3M	25	A3F	22	WF	1148.00	
USM 69fet	Sel. x2	Condenser	Alum.	Studio	150	40-16	107	A5M	33	A3F	16	WF	3305.00		
NUMARK	UD885	Card.	Dynamic	Alum.		500	60-12			10	Phone	WS	26.95	With mini adaptor.	
	UD9100	Card.	Dynamic	Alum.		600	50-12			10	Phone	WS	29.95		
	UD9100S	Card. x2	Dynamic	Alum.		600	50-12			10	Phone	WS	60.00		
	UD9200	Card.	Dynamic	Alum.		600	50-12		XLR	10	Phone	WS	37.25		
	UD9500	Card.	Dynamic	Alum.		600/50k	60-12			10	Phone	W	33.50		
	UD925	Card.	Dynamic	Alum.		600	60-15			10	Phone	WS	58.00	Calibrated measurement standard.	
	STD272	Omni	Electret Condenser	Alum.		600	30-16		XLR	15	Phone	S	69.95		
	UC935	Card.	Electret Condenser	Alum.		600	30-16		XLR	10	Phone	WS	69.95		
TC995	Omni	Electret Condenser	Alum.		800	50-16			10	Phone		49.95	Lavalier.		
UD940	Card.	Dynamic	Alum.		250B	45-16		XLR	10	Phone	WS	90.00			
PIONEER	DM-61		Dynamic		Vocal	600	80-12	75	Cannon	16.4	Phone	8.6	S	129.95	
	DM-51		Dynamic		Vocal	600	80-14	72	Cannon	16.4	Phone	5.4	S	99.95	
	DM-21		Dynamic		Vocal	500	100-15	75	Cannon	16.4	Phone	5.6	S	29.95	
QUASAR	KT585SE												5.95		
REALISTIC	33-919	Card. x 2	Condenser	Alum.	Vocal	600	30-15		Attached	10	Phone	S	39.95		
	33-1066	Card. x 2	Condenser	Plastic	Vocal	600	50-18		Attached	8	Mini	WS	29.95		
	33-1065	Card. x 2	Condenser	Plastic	Vocal	600	50-15		Attached	6.5	Mini	WS	19.95		
	33-984	Card.	Dynamic	Alum.	Vocal	600	80-15		Attached	16	Phone	S	49.95		
	33-1070	Omni	Dynamic	Alum.	Vocal	600	40-17		Attached	16	Phone	S	39.95		
	33-1071	Card.	Dynamic	Alum.	Vocal	600	50-15		Attached	12	Phone	S	29.95		
	33-992	Card.	Dynamic	Alum.	Vocal	600	80-12		Attached	6	Phone	S	24.95		
	33-985	Omni	Dynamic	Alum.	Vocal	600	50-13		Attached	6	Phone	S	19.95		
	33-986	Uni	Dynamic	Plastic	Vocal	600	80-15		Attached	9.8	Phone	S	14.95		
	33-1089	Omni	Condenser	Plastic	Vocal	1k	20-18			5	Mini	S	12.95		
	33-1090	Omni	Condenser	Alum.	Vocal	600	20-18		Attached	18	Phone	WS	39.95		
	33-1056	Omni	Condenser	Alum.	Vocal	600	30-12		Attached	10	Phone	S	19.95	Tie clip. As above.	
	33-1052	Omni	Condenser	Alum.	Vocal	600	50-15		Attached	5	Mini	S	12.95		
	33-1062	Card.	Condenser	Alum.	Vocal	600	80-12		Attached	18	Mini	WS	49.95	For video cameras.	
	33-1050	Omni	Condenser	Alum.	Vocal	600	20-13		Attached	9	Phone	WS	17.95		
	33-990	Omni	Dynamic	Alum.	Vocal	10k	150-10		Attached	6	Phone	WS	15.95	Lavalier with neck cord and mike stand.	

H I G H F I D E L I T Y V I D E O

ONLY NEC OFFERS THE BEST OF BOTH FORMATS.

Whether you're watching the movie that won the Academy Award's "Best Picture" or want to make your own video movie with the best picture possible, NEC has the video cassette recorder that's exactly right for you.

Now, you've probably heard pretty convincing arguments for the superiority of VHS versus Beta and vice versa.



THE NEC VC-N833EU VHS VIDEO CASSETTE RECORDER. Add Dolby stereo to a high performance four-head, CATV-ready VCR and double your recording pleasure.



THE NEC VC-N895EU VHS HI-FI VCR. This state-of-the-art VCR's features include true hi-fi audio; a 139 channel, CATV-ready PLL Quartz tuner; 14 day, 8 event programmable timer; 4 heads for clear special effects; stereo recording and playback with Dolby Noise Reduction; segment recording; variable speed control; automatic editing system; picture sharpness control; electronic tape counter and full function infrared wireless remote control.

The Paramount Home Video Videocassettes pictured are \$39.95 each suggested retail price and are supplied courtesy of Paramount Home Video.

That's because each format has its respective strengths.

While VHS decks play longer, which saves tape costs; Beta video cassettes are smaller and employ a faster writing speed, making Beta the favorite of serious field and home video recordists.



THE NEC BM-11EU BETAMOVIE. NEC put it all together with an integrated Color Video Camera/Video Cassette Recorder that only weighs 5.5 lbs. including its battery.

This is why NEC became the only VCR manufacturer to offer both formats under its own name in the United States. This includes the very finest Beta and VHS models in each category.



THE NEC VC-N40EU BETA SLIMLINE VIDEO CASSETTE RECORDER. Whatever the recording speed, it produces the best possible VCR picture available.

Suddenly, the answer to the question, "Which VCR is best?" becomes very simple.
NEC.

NEC
THE ONES TO WATCH.
NEC Corporation, Tokyo, Japan



THE NEC VC-739E BETA HI-FI VCR. The VCR with the picture that sounds as good as it looks. It features studio quality hi-fi audio; a 134 channel, CATV-ready PLL Quartz tuner; 21 day, 8 event programmable timer; 4 heads for clear, special effects; three slow motion speeds; picture sharpness control; segment recording; electronic tape counter and full function infrared wireless remote control.

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Introducing the 500 CROLYN[®] HG Audio Cassette. Clear sound, clear shell...clearly superior.

The new 500 CROLYN[®] High Grade cassette will exceed even *your* high standards. We engineered it for you, the audiophile. We want to hear from you. We challenge you to compare it with the likes of XL-IIS and SA-X. Hear the difference genuine chromium dioxide tape makes versus cobalt-iron oxide imitations or other "chrome equivalent" tapes. Also, ask about 1100 Metal HG and Tri-Oxide Ferro HG.

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Rating vs. Leading Premium Cassettes

	500 CROLYN [®] HG
Tape Background Noise	SUPERIOR
S/N, Low Frequency	SUPERIOR
S/N High Frequency	EQUAL
Dynamic Range	SUPERIOR
Frequency Response	EQUAL
Shell Quality	EQUAL
Overall Listening Quality	SUPERIOR

Specific test results available on request. For free cassette offer, technical information or the PDMagnetics dealer serving your area, write us at address below.

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MICROPHONES

MANUFACTURER	Model	Directional Pattern Plus Channels. M-S = M-S W-S = W-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 μbar	Mike Connector Type	Cable Length, Feet End of Cable	Connector Type on Equipment	Weight, Ounces Switched Low or Program Filter = S	Price, \$	Notes	
SANSUI	D-M7	Uni	Ribbon		Vocal/Music	600B			20				80.00		
	D-M5	Uni	Ribbon		Vocal/Music	500B			17				35.00		
	D-M3	Dynamic	Ribbon		Vocal/Music	500B			10				20.00		
	E-M5	x2	Ribbon		Vocal	1000B			7				37.00	Lavalier.	
SCHOEPS SCHALLTECHNIK	CMC 32U	Omni	Condenser	Nickel/Brass	Orch.	20B	20-20		XLR-3M		3		640.00		
	CMC 34U	Card.	Condenser	Nickel/Brass	Orch.	20B	40-20		XLR-3M		3		640.00		
	CMC 35U	Card./Omni	Condenser	Nickel/Brass	Drch.	20B	20-20		XLR-3M		3		835.00		
	CMC 36U	Card./Omni/BI	Condenser	Nickel/Brass	Drch.	20B	2C-20		XLR-3M		3		985.00		
	CMC 38U	Figure 8	Condenser	Nickel/Brass	Orch.	20B	40-16		XLR-3M		3		780.00		
	CMC 341U	Hyper Card.	Condenser	Nickel/Brass	Film/TV	20B	40-20		XLR-3M		3		730.00		
	BLM-33U	Hemi. Card.	Condenser	Alum.	Orch.	20B	20-20		XLR-3M		23	WF	790.00		
	CMH 34U CMTS 301U	Card./Omni/BI x2	Condenser Condenser	Nickel/Brass	Orch. Orch.	20B 20B	20-20 40-16		XLR-3M XLR-5		7 12½		835.00 2125.00	†Black anodized brass.	
SENNHEISER	MD 200	Omni Card.	†	PVC	General	600	60-13		Phone	10		3.7	33.00	†Pressure transducer.	
	MD 400	Card.	†	PVC	Record	600	60-13		Phone	10		3.7	41.00		
	MD 402 U	Super Card.	Dynamic	Metal	Record	200B	80-12.5	151	XLR	15		5.4	85.00		
	MD 402 K	Super Card.	Dynamic	Metal	Record	200	80-12.5	151	Phone	10		6.7	80.00		
	MD 421	Dynamic	Dynamic	Plastic	Voice	200	30-17	146	3-Pin XLR			18	332.00		
SHURE	SM11-CN	Omni	Dynamic	Alum.	Voice	150B	50-15	85	None	4	3-Pin Male	0.3†	98.00	†Without cable; lavalier.	
	SM57LC	Card.	Dynamic	Alum.	Instr.	150B	40-15	75.5	3-Pin Male			10	127.75		
	SM58LC	Card.	Dynamic	Alum.	Vocal	150B	50-15	75.5	3-Pin Male			10.5	164.75		
	SM81LC	Card.	Condenser	Steel	Instr./Vocal	150B	20-20	65	3-Pin Male			8	336.75		
	SM83CN	Omni	Condenser	Brass	Voice	150B	80-20	69	None	10	3-Pin Mini	1.6	210.00	Lavalier.	
	SM85LC	Card.	Condenser	Alum.	Vocal	150B	50-15	74	3-Pin Male			6.3	251.25		
	SM87LC	Super Card.	Condenser	Alum.	Vocal	150B	50-18	74	3-Pin Male			6.3	329.00		
	SM80LC	Omni	Condenser	Steel	Instr./Vocal	150B	20-20	65	3-Pin Male			8	336.75		
	515SAC	Card.	Dynamic	Zinc	Voice/Music	Hi-Z	80-13	59	None	15	Phone	18	S	56.75	
	545L	Card.	Dynamic	Alum.	Voice	150	50-15	77.5	None	20	None	12½	S	100.50	As above.
	545SDLC	Card.	Dynamic	Zinc	Voice	150	50-15	78	3-Pin Male			9	S	109.50	
565SDLC	Card.	Dynamic	Zinc	Instr.	150	50-15	76	3-Pin Male			10½	S	121.50		
588SBLC	Card.	Dynamic	Zinc	Vocal/Music	150	80-13	82	3-Pin Male			12	S	64.25		
586SBLC	Card.	Dynamic	Zinc	Voice/Music	150	50-13	56	3-Pin Male				S	94.25		
579SB	Omni	Dynamic	Zinc	Voice/Music	150	50-14	78	3-Pin Male	20			S	99.50		
57B	Omni	Dynamic	Steel	Voice/Music	150	50-15	80	None	15	None	16		113.75		
SIGNET	RK-201	Card.	Electret Condenser	Alum.	Music	600	45-17.5	64	Attached	16½	Phone	6½	WS		
SONY	F-V30T	Card.	Dynamic	Alum.	Vocal	200	80-12	74	Attached	16	Mini/Phone	6.2	29.95		
	F-V50T	Card.	Dynamic	Alum.	Vocal/Music	200	80-15	75	Attached	16	Mini/Phone	9.4	44.95		
	F-V6ET	Omni	Dynamic	Alum.	Music	200	100-12	73	Attached	16	Mini/Phone	4.9	54.95	Variable echo.	
	F-99T	Card. x2	Dynamic	Alum.	Music	200	80-12	65	Attached	5	Mini/Phone x2	6.4	39.95		
	ECM-220T	Card.	Electret Condenser	Alum.	Instr.	200	50-14	65	Attached	16	Mini/Phone	8.3	49.95		
	ECM-23FM	Card.	Electret Condenser	Alum.	Studio	250B	20-20	74	Attached	16	Phone	6.7	WF	115.00	
	ECM-929LT	M-S	Electret Condenser	Alum.	Stereo Music	200	70-15	67	Attached	6	Mini/Phone	3.8		85.00	
	ECM-939LT	M-S	Electret Condenser	Alum.	Stereo Music	200	70-15	57	Attached	6	Mini/Phone	2.6	W	115.00	
	F-V200	Uni	Dynamic	Alum.	Vocal	600B	70-15	74	XLR-3			9.2	WF	150.00	
SOUND-CRAFTSMEN	SAM II	Omni	Electret Condenser	Alum.	RTA	600	20-18	65†	Phone	15		3	69.00	†dBm.	
SWINTEK	Mark 50A-dbs		†	Alum.			50-12		A3F			¼	580.00	†Wireless lavalier transmitter in high VHF band between 130 and 250 MHz.	
TECHNICS	RP-V340	Card.	Dynamic	Alum.	Vocal		100-10				9	W	26.00	With adaptor.	
	RP-V370	Card.	Dynamic	Alum.	Music/General		40-12				12	W	40.00	As above.	
	RP-3500E	Card.	Electret Condenser	Alum.	Music		50-12					W	60.00	With desk tripod.	
	RP-3215E	Card. x 2	Electret Condenser	Alum.	Music		50-10					W	60.00		
RP-3545E	Card.	Electret Condenser	Alum.	Vocal		40-14					W	70.00	With adaptor.		

HEADPHONES



AKG K-240



BEYER DT880



B&O U-70

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, Phone = P, Adaptor = A	Individual Volume Controls?	Construction: A, Supra-Aural = S, Headband: None (Fits In Ear) = N, Adjustable = A, Folding = F	Cover Material on Ear Cup	Weight, Ounces	Price, \$	Notes	
AIWA	HP-T10	Dynamic	10-24	40	103	200mW	8 1/4	F	A	Yes	O	A/F	Foam	2.5	65.00	Built-in unidirectional mike. With extra ear pads.	
	HP-T5	Dynamic	15-24	32	103	200mW	8 1/4	F	A	No	O	A/F	Foam	2.2	45.00		
	HP-A55	Dynamic	15-24	32	100	100mW	5	F	A	No	O	A/F	Foam	2	35.00		
	HM-7Y	Dynamic	20-22	25	100	100	5	F	M	No	O	A/F	Foam	2.4	45.00		
	HP-V2	Dynamic	20-20	32	102	50	4	F	M	No	O	N	Foam	0.2	22.00		
AKG	K-1	Dynamic	30-18	20	100	1.5V	1.0	4	F	M/A	No	S/O	F	Foam	2.3	29.00	Belt case inc.
	K-2	Dynamic	30-18	200	92	6.3V	0.9	8	F	P	No	S/O	A	Foam	3.2	35.00	Passive diaphragms.
	K-3	Dynamic	20-20	200	92	6.3V	0.9	10	F	P	No	S/O	A	Cloth/Foam	2	79.00	
	K-4	ES/Dyn.	20-25	400	92	8.9V	0.9	10	F	P	No	S/O	A	Cloth/Foam	2.3	99.00	Two-way system.
	K-45	Dynamic	30-18	200	94	6.3V	0.9	8	F	P	No	S/O	A	Foam	3.7	45.00	Passive diaphragms.
	K-130	Dynamic	20-20	200	94	9V	0.7	9	F	P	No	S/O	A	Cloth/Foam	4.4	55.00	
	K-141	Dynamic	20-20	600	107	11V	0.5	10	F	P	No	S/O	A	Foam	6.9	80.00	Passive diaphragms.
K-240	Dynamic	15-20	600	112	11V	0.3	10	F	P	No	C/O	A	Foam	7.9	99.00		
K-340	ES/Dyn.	15-25	400	104	10V	0.1	10	C	P	No	C/O	A	Plastic/Foam	13.5	195.00	As above, two-way system.	
ASTATIC	Floater I	Dynamic	35-20	200		3V	1	10	F	P	No	O	†	†	13 1/2	95.50	†Off-the-ear design, rests on top of head.
	Floater II	Dynamic	35-20	200		3V	0.8	10	F	P	No	O	†	†	13 1/2	125.00	
AUDIOTECHNICA	ATH 0.2	Dynamic	35-20	4-16	105	2V	0.6†	5	F	M/A	No	S	A	Foam	1	34.95	†At 100 dB.
	ATH 0.2F	Dynamic	35-20	4-16	105	2V	0.6†	5	F	M/A	No	S	A	Foam	1.1	39.95	
	ATH 0.4	Dynamic	25-20	4-16	100	1.7V	0.4†	8.2	F	M/A	No	S	A	Foam	1.6	59.95	
	ATH 0.6	Dynamic	20-20	4-16	100	1.7V	0.4†	8.2	F	M/A	No	S	A	Foam	1.6	89.95	
	ATH-70	Dynamic	25-20	4-16	9B	1.8V	0.3†	8.2	F	M/A	No	S	A	Vinyl	3.3	54.95	
BANG & OLUFSEN	U-70	Dynamic	20-16	140	94		1†	10	F	P	No	C	A	Plastic	10.6	100.00	†8 mV in.
BEYER DYNAMIC	DT-880	Dynamic	5-25	600	94	7.75V	0.5†	12	C	P	No	C	A	Vinyl	7	130.00	†At 114 dB.
	DT-880 Studio	Dynamic	5-35	600	94	7.75V	0.5†	12	C	P	No	C	A	Vinyl	7	170.00	†At 114 dB.
	DT-660 MKII	Dynamic	15-25	600	93	7.75V	0.5†	12	C	P	No	C	A	Vinyl	9	120.00	†At 113 dB.
	DT-550	Dynamic	10-22	600	95	7.75V	1.0†	12	C	P	No	C	A	Vinyl	7	90.00	†At 114 dB.
	DT-330 MKII	Dynamic	15-18	40	85	2V	1.0†	12	F	P	No	C	A	Vinyl	8	60.00	†At 105 dB.
	DT-220	Dynamic	20-20	400	102	6.4V	1.0†	12	C	P	No	C	A	Vinyl	9.3	75.00	†At 122 dB.
	DT-320	Dynamic	20-20	50	88	7.75V	1.0†	12	F	P	No	C	A	Vinyl	3.8	45.00	†At 108 dB.
	DT-48A	Dynamic	16-20	5	112	1V	1.0†	12	C	P	No	C	A	Rubber	14.2	242.00	†At 135 dB.
	DT-48	Dynamic	16-20	200	105	4.4V	1.0†	12	C	P	No	C	A	Vinyl	14.2	215.00	†At 125 dB.
	DT-100	Dynamic	30-20	Sei.	94	20V	1.0†	10	F	P	No	C	A	Vinyl	12.5	120.00	†At 120 dB.
	DT-96A	Dynamic	30-17	50-400	94	12V	1.0†	5	F	P	No	C	A	Vinyl	4.3	105.00	†At 124 dB.
	DT-920	Dynamic	300-8	400	110	5V	1.0†	5	F	P	No	C	A	Plastic	2.8	38.00	†At 128 dB.
	DENON	AH-P18	Dynamic	20-22	18	109	30mW		7	F	M/A	No	S	N	Foam	4	17.00
AH-P58		Dynamic	20-22	32	100	100mW		7	F	M/A	No	O	F	Foam	4	39.95	
AH-33		Dynamic	20-22	32	100	100mW		7	F	M/A	No	O	A	Foam	1.4	25.00	
AH-55		Dynamic	20-22	32	100	100mW		7	F	M/A	No	O	A	Foam	1.4	35.00	
AH-77		Dynamic	20-22	50	100	100mW		4	F	M/A	No	O	A	Foam	0.9	55.00	
AH-99		Dynamic	20-22	80	102	100mW		3 1/2	F	M/A	No	O	A	Foam	0.2	85.00	
GC ELECTRONICS	90-100	Dynamic	20-15	4-16		500mW		10	C	P	No	C	A	Rubber	8	8.95	
	90-102	Dynamic	30-18	4-8		500mW		10	C	P	Yes	C	A	Vinyl	11 1/4	11.95	
	90-112	Dynamic	20-20	4-16		100mW		10	C	P	No	C	A	Vinyl	6	16.95	
	90-107	Dynamic	20-20	4-100		100mW		5 1/2	F	M/A	No	O	A	Foam	1 1/2	11.95	
	90-114	Dynamic	20-20	32		300mW		4 1/2	F	M/A	No	O	A	Foam	7/8	8.95	
	90-115	Dynamic	20-20	32		50mW		3 1/2	F	M/A	No	O	N	Foam	1/4	9.95	
	90-116	Dynamic	20-20	32		100mW		3	F	M/A	No	O	F	Foam	1	10.95	
IMS	P-10	Dynamic	20-22	32	102	50mW		3 1/2	F	A	No		N	Foam	0.5	11.95	
	HG-102	Dynamic	20-20	32	102	50mW		3 1/2	F	A	No		N	Foam	0.5	14.95	
	HG-128	Dynamic	20-20	32	102	50mW		3 1/2	F	A	No		N	Foam	0.5	29.95	
	HG-201	Dynamic	20-20	4-32		50mW		4	F	M	No		A	Foam	1.4	9.99	
	HG-401	Dynamic	20-20	4-32		50mW		4	F	A	No	C	A	Foam	1.4	14.99	

HEADPHONES

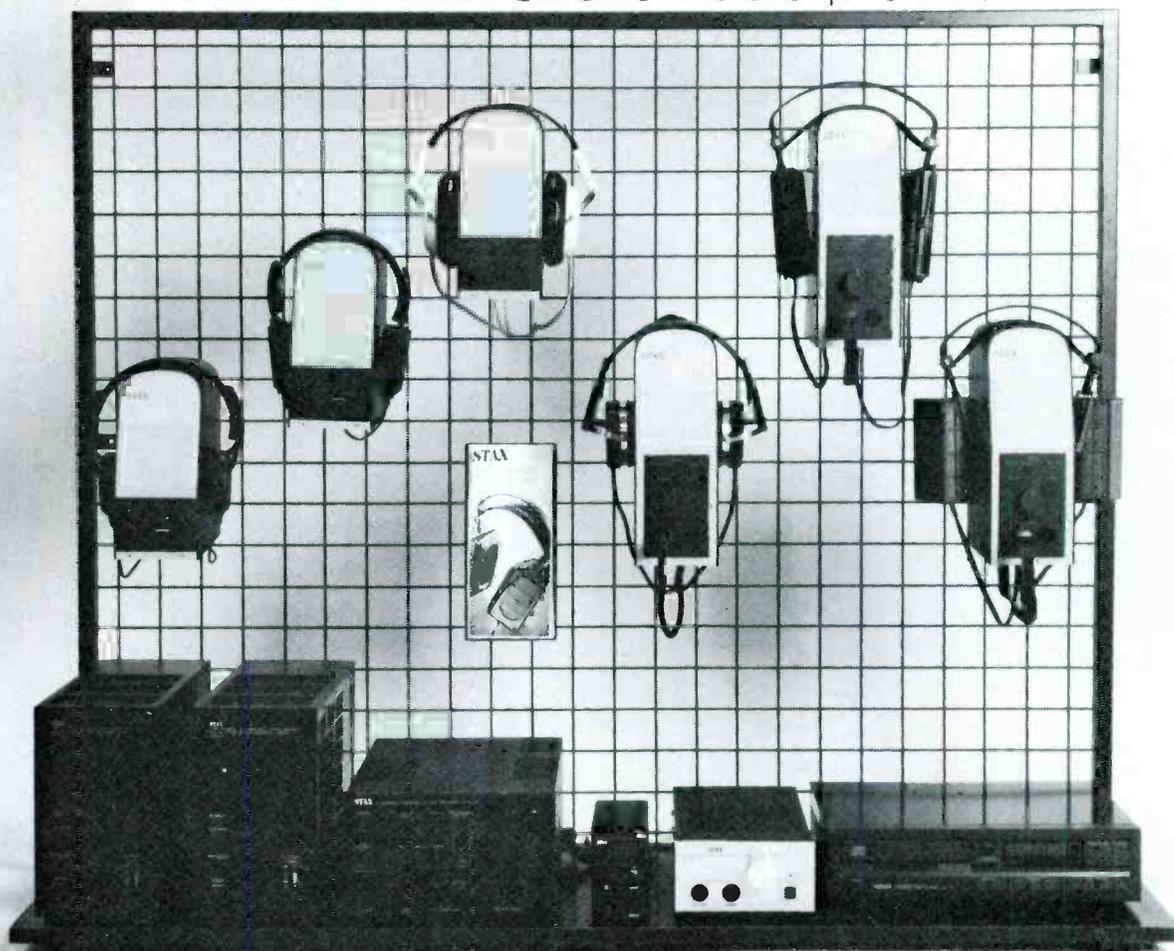
MANUFACTURER	Model	Operating Principle	Frequency Range	Impedance	Sensitivity	Maximum Input	THD at 95 dB SPL	Cord Length	Cord Style	Plug	Individual Volume Controls?	Circumference	Weight	Price	Notes		
					dB SPL for 1 mW input	mV	%	Feet	Flat = F, Coiled = C	Type 3 5-mm Mini = M, Phone = P, Adaptor Incl. = A	Yes = Y, No = N	Ear = E, Supra-Aural = S	gms	\$			
JVC	HM-15 H-707 HM-8 H-505 HM-4 H-404	Dynamic Dynamic Dynamic Dynamic Dynamic	18-22 20-20 20-20 20-20 30-18 20-20	63 63 32 8 32 16	106 104 102 106 98 102	100mW 100mW 100mW 100mW 30mW 100mW	9.8 9.8 9.8 9.8 6.5 9.8	F F F F F F	M/P P M/A P M/A P	No No No No No No	O A O A O C	A A A A A A	Foam Plastic Foam Plastic Foam Plastic	4 7.1 2.4 6 1.9 5.2	110.00 60.00 60.00 40.00 35.00 30.00		
KOSS	PortaPro PRO/4X PRO/4AAA HV XLC HV7X HV11LC HV11A Technician VFR K.6XLC K.6X K.4DLC K.20 KSP P-19 Music Pals ESP-10	Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic ES	15-25 10-40 10-22 15-35 15-35 15-30 15-30 10-22 10-22 10-22 18-20 20-17 17-20 20-20	60 100 220 85 100 140 140 100 100 100 100 35 35 32	0.33† 0.24† 0.26† 0.77† 0.66† 0.20† 0.20† 0.20† 0.78† 0.33† 0.46† 100	0.20 0.5 0.75 0.05 1.25 0.75 0.75 1 1 1 0.75 0.75 1	6 10 10 10 10 10 10 10 8 8 6.6 4	F C C C C C C C F F F F	M/A P P P P P P P M/A M/A M	No No Yes No Yes No No Yes No No No No	S C C C C C C C S S S C	F A A A A A A A A A A A N A	Foam Foam Foam Foam Foam Foam Vnyl Vnyl Vnyl Foam Foam Foam Foam	2.5 8.3 15.5 8.4 7.7 10.8 10 14 13 10 4.2 3.5 2.5 0.6	59.95 85.00 85.00 79.95 69.95 59.95 49.95 80.00 39.95 29.95 39.95 19.95 34.95 19.95 16.95 350.00	Mute switch; Comfort Zone adjustment; †V rms input at 100 dB SPL output.	
NAD	830	Dynamic	15-25	75	100	0.5†	6.10	F/C	M/P	N	O	A	Foam	1 3/4	55.00	†At 100 dB.	
NAKAMICHI	SP-7	Dynamic	20-20	45	100		10	F	P	No	O	A	Plastic	11	70.00		
NUMARK	FLS 10 FLS 25 FLS 150 FLS 200 FLS 75 FLS 300 FLS 310 HV100 DH15B HV105A HV106V HV115A	Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic	80-18 80-20 20-20 20-25 20-22 20-22 20-22 20-22 20-20 20-15 20-19 20-19 15-22	32 30 35 100 100 100 100 100 96 96 96 96 32	90 92 96 100 100 100 100 100 96 90 96 96 96	100mW 100mW 100mW 100mW 100mW 100mW 100mW 100mW 100mW 100mW 100mW 100mW	6 7 7 10 7 4 4 6 8 8 8 10	F F F F F M P/A P P P P P	M/A M/A M/A M/A M/A M P/A P P P P	No No No Yes No No No No No No No No	A A F A A N F A A A A	Foam Foam Foam Foam Foam Cloth Cloth Vnyl Vnyl Foam Foam Vnyl	1 1 1.5 1.5 1.5 0.7 1 6 8 6 6 7	10.95 14.95 19.95 29.95 24.95 16.75 17.35 17.95 7.95 24.50 29.95 34.95	Stethoscope style.		
ONKYO	HP-S1 HP-L1ME HP-L2 HP-L3	Dynamic Dynamic Dynamic Dynamic	20-22 20-20 20-20 20-20	32 32 32 32	96 96 101 103	100 100 100 100	5 5 5 5	F F F F	M/P M/P M/P M/P	No No No No	† S S S	N A A A	Foam Foam Foam Foam	0.2 0.9 1 1.2	19.95 29.95 39.95 49.95	†fits inside pinna.	
PANASONIC	EAH-S12 EAH-10 EAH-Z7 EAH-Z5 EAH-S20	Dynamic Dynamic Dynamic Dynamic Dynamic	20-20 20-20 20-20 20-20 20-20	16 16 32 32 32		100mW 100mW 50mW 50mW	4 4 4 4	F F F F	A A A A	No No No No		A N N N	1.4 1.4 0.7 0.2	22.95 24.95 29.95 24.95 39.95			
PEERLESS/DLK	PMB 5 PMB 20 PMB 45 PMB 80 PMB 100 PMB 15 PMB 25 PMB 65 PMB 500	Dynamic Dynamic Dynamic Orthodyn. Orthodyn. Dynamic Dynamic Dynamic Dynamic ES	20-20 20-20 16-20 15-26 15-26 20-20 20-20 16-20 16-20 16-25	400 400 400 150 150 50 400 400 400 B	107 96 92 89 84 98 96 92 92 B	6.3V 6.3V 6.3V 6.7V 6.7V 6.3V 6.3V 6.3V 6.3V 0.1	0.4 0.5 0.5 0.3 0.3 0.4 0.5 0.5 0.5 0.1	10 10 10 10 10 10 10 10 10 10	F F F F F F F F F F	P P P P P M/P/A P P P DIN	No No No No No No No No No No	S/O S/O C C/O S/O S/O S/O S/O S/O D	A A A A A A A A A A	Foam Foam Foam Plastic Plastic Plastic Plastic Plastic Plastic Plastic	0.2 3.3 8.3 10.5 15 2 7 8.3 15	34.95 49.95 79.95 99.95 149.95 39.95 49.95 89.95 249.95	Matching transformer inc.
PICKERING	QA-7 QA-349 QA-303 QA-203 QA-4 QA-101P QA-88 QA-66P	Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic	20-22 20-22 20-20 10-20 10-20 20-18 20-20 20-20	100 100 100 40 40 40 32 32	110 110 101 105 105 100 98 92	100mW 100mW 100mW 50mW 50mW 50mW 50mW 100mW	0.5† 0.5† 0.5† 0.5† 0.5† 0.5† 0.5† 0.5†	10 7 7 6 7 5 4 5	F F F M/P M/P F F F	P P M/P M/P M/P M M/P	No No No No No No No No	O A O A O A O A	Nylon Vnyl Vnyl Vnyl Foam Foam Foam Foam	6 4.5 4.5 2.5 2 2 0.5 1.1	70.00 60.00 45.00 29.95 49.95 24.95 21.95 20.95	†At 110 dB. †At 110 dB. †At 101 dB. †At 105 dB. †At 100 dB. †At 100 dB. †At 100 dB. †At 100 dB.	
PIONEER	SE-L90 SE-L70 SE-L50 SE-L30 SE-L10 SE-205 SE-L22 SE-L44 SE-L66	Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic	10-22 10-22 10-22 12-22 12-22 20-20 16-22 16-22 16-22	40 40 40 103 101 103 110 110 30	103 103 103 101 101 103 110 110 110		10 10 10 8 8 8.2 6.6 6.6 6.6	F F F F F F F F F	M/A M/A M/A M/A M/A P M/A M/A M/A	No No No No No No No Yes Yes	S S S S S C O O O	A A A A A A A A F	Plastic Plastic Plastic Plastic Plastic Plastic Resin Resin Resin	2.5 2.5 2.1 2.1 1.3 15 0.6 0.6 0.6	80.00 60.00 50.00 40.00 25.00 25.00 25.00 35.00 40.00		
QUASAR	SV400TQ													19.95			
REALISTIC	Pro 60 LV-10 Pro-30 Nova-Pro Nova-40 Nova-16 Nova-10	Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic Dynamic	15-30 20-20 20-20 20-20 30-18 50-15				0.5 10 10 10 10 6.5 6.5	C C C C C C C	P P P P P P P	No No Yes No Yes No		A A A A A A A	Foam Plastic Plastic Plastic Plastic Plastic Plastic	8 10	49.95 39.95 29.95 31.95 24.95 19.95 14.95		
(Continued)																	

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, 1/4" Phone = P, Adaptor Incl. = A	Individual Volume Controls?	Circumaural = A, supra-aural = S, Open Air = O	Headphone None Fits in Ear = N, Adjustable = A, Folding = F	Cover Material on Ear Cup	Weight, Ounces	Price, \$	Notes
REALISTIC (Continued)	Nova-45	Dynamic	20-20	32	94			6.7	F	M/A	No	O	A	Foam	3.3	24.95	With extra ear pads.
	Nova-52	Dynamic	50-20	32				5	F	P	No	O	F	Foam	2.5	19.95	
	Nova-51	Dynamic	50-20	32				5	F	P	No	O	F	Foam	3	19.95	
	Nova-35	Dynamic	50-20	32				5	F	P	No	O	A	Foam	3	13.95	
	Nova-50	Dynamic	50-20	32				6.5	F	P	No	O	A	Foam	3	13.95	
	Nova-33	Dynamic	50-20	32				4	F	M	No	O	A	Foam	1.5	9.95	
	Nova-34	Dynamic	50-20	32				4	F	M	No	O	A	Foam	2	4.95	
Micro-IV-Ear	Dynamic	50-20	32	4	F	M	No	D	N	Foam	0.6	12.95					
RECOTON	ST-66	Dynamic	20-25	25	98	400mW	10	F	A	No	O	A	Foam	2.5	24.99		
	ST-77	Dynamic	20-25	25	98	300mW	10	F	A	No	O	A	Foam	1.7	19.99		
	ST-90	Dynamic	20-20	32	96			F	A	No	O	F	Foam	0.8	17.49		
	ST-91	Dynamic	20-25	200	100			F	A	No	O	A	Foam	1.2	27.49		
	ST-92	Dynamic	20-20	32	90	100mW	4	F	A	No	O	A	Foam	1.4	12.99		
	ST-93	Dynamic	20-22	32	100	100mW	5	F	A	No	O	F	Foam	1	16.49		
	ST-94	Dynamic	20-22	32	92	200mW	4	F	A	No	O	F	Foam	1.2	22.99		
	ST-95	Dynamic	20-20	25	100	300mW	7	F	A	No	O	A	Felt	2.2	27.99		
	ST-96	Dynamic	20-20	20	100	300mW	7	F	A	No	O	A	Felt	2.2	29.99		
	ST-98	Dynamic	50-22	32	102	100mW	4	F	M	No	S	N	Foam	0.2	16.99		
	ST-99	Dynamic	20-22	20	100	300mW	5	F	M	No	S	N	Foam	0.7	15.99		
	ST-100	Dynamic	20-20	38	98	300mW	4	F	M	No	S	N	Foam	0.5	22.99		
	ST-101	Dynamic	20-20	32	98	100mW	6	F	A	No	O	F	Foam	1.2	26.99		
	ST-102	Dynamic	50-20	32	109	30mW	4	F	A	No	S	F	Foam	0.5	22.49		
ST-103	Dynamic	30-20	32	98	100mW	6	F	A	No	D	A	Foam	1	17.49			
ROGERSOUND LABS	R.S.L. H-4	Dynamic	20-22	600	94	300	1.0	6	F	P	No	S	A	Foam	7.4	37.50	With volume controls, Model R.S.L. H-4v, \$42.50.
SANSUI	SS-L55	Dynamic	20-20	27	98	1W	8	F	P	No	C	A		7	40.00		
	SS-L33	Dynamic	30-20	30	97	500mW	8	F	P	No	C	A		5	30.00		
	MS-7EX	Dynamic	30-20	40	100	250mW	8	F	A	No	D	A		1.3	40.00		
	MS-33	Dynamic	35-20	32	101	100mW	6	F	A	No	D	A		1.1	20.00		
SENNHEISER	MS 100	Dynamic	20-20	42	96		1	4, 6	F	M/A	No	S/O	A	Foam	1.4	85.00	
	HD 44	Dynamic	40-15	17			3	10	F	P	No	S/O	N	Foam	1.2	49.00	
	HD 40	Dynamic	22-18	600	90	1.5V	1	10	F	P	No	S/O	A	Foam	2	37.50	
	HD 410	Dynamic	20-18	600	88	1.5V	1	10	F	P	No	S/O	A	Foam	3	49.00	
	HD 414SL	Dynamic	16-20	600	102	1.8V	1	10	F	P	No	S/O	A	Foam	2.6	84.00	
	HD 420	Dynamic	18-20	600	94	8V	0.6	10	F	P	No	S/O	A	Foam	4.6	94.00	
	HD 430	Dynamic	16-20	600	94	8V	0.6	10	F	P	No	C	A	Vinyl & Foam	6.8	134.00	
	HD 222	Dynamic	16-20	600	94	8V	0.6	10	F	P	No	C	A	Vinyl & Foam	8.8	128.00	
	HD 40W	Dynamic	20-18	42	90		1.5	4	F	M	No	S/O	A	Foam	2	37.50	
	SIGNET	TK-33	ES	20-22 ± 2	4-16	100†	17V	0.1††	8.2	F	A	No	C	A	Plastic	7.4	
TK-22		Dynamic	20-20	4-16	96	5V	0.4††	11.5	F	P	No	S	A	Plastic	7.2		
TK-20		Dynamic	25-20	4-16	100	1.7V	0.5††	4.9	F	M/A	No	O	A	Plastic	7.2		
TK-11		Dynamic	30-20	4-16	93	1.7V	0.6††	4.9	F	M/A	No	O	A	Plastic	7.2		
SONY	MDR-10T	Dynamic	20-20	32	98	100mW	0.04	6.6	F	M/P/A	No	D	A	Foam	1	13.95	Binaural mike with headphone.
	MDR-20T	Dynamic	20-20	25	100	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	1	19.95	
	MDR-30II	Dynamic	18-20	25	100	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	1.3	29.95	
	MDR-40II	Dynamic	18-22	55	101	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	1.7	44.95	
	MDR-70II	Dynamic	18-24	45	101	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	1.6	64.95	
	MDR-80II	Dynamic	16-24	45	106	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	2.1	84.95	
	MDR-M55	Dynamic	16-22	45	106	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	2.7	64.95	
	MDR-M77	Dynamic	16-25	45	108	100mW	0.04	9.9	F	M/P/A	No	O	A	Foam	2.7	84.95	
	DR-W70C	Dynamic	18-20	16	108	50mW	0.02	4.9	F	M	Yes	S	A	Plastic	0.5	59.95	
	MDR-CD5	Dynamic	2-22	45	108	500mW	0.02	9.9	F	M/P/A	No	C	A	Foam	2.9	99.95	
SONY ES	MDR-CD7	Dynamic	2-24	45	110	500mW	0.02	9.9	F	M/P/A	No	C	A		2.9	119.95	
STANTON	Dynaphase 60A	Dynamic	10-20	100	110	250mW	0.25†	10	F	P	No	O	A	Foam	5.5	75.00	†At 110 dB.
	Stereowafer 80	Dynamic	10-22	100	110	100mW	0.5†	10	F	P	No	O	A	Nylon	5.5	70.00	
	Dynaphase 55/600	Dynamic	20-22	600	110	250mW	0.25†	10	F	P	No	O	A				
	Microwafer 16	Dynamic	10-22	32	110	100mW	0.5††	5	F	M/A	No	O	A	Foam	1	39.95	††At 100 dB.
	Microwafer 14	Dynamic	10-20	32	98	100mW	0.5††	5	F	M/A	No	O	A	Foam	1.4	29.95	
Microwafer 4	Dynamic	20-18	40	100	50mW	0.5††	5	F	M/A	No	O	A	Foam	2	24.95		
			20-20	32	100	100mW	0.5††	5	F	M/A	No	O	A	Foam	1	19.95	
STAX	SR-34	ES	25-25	8	95	1.5V	0.02	7	F	A	No	C/O	A	Vinyl	8	109.95	Class-A amp Inc.
	SR-84	ES	25-25	8	95	1.5V	0.02	7	F	A	No	C/O	A	Vinyl	7.5	159.95	
	SR-5/N	ES	25-25	8	97	1.5V	0.05	7	F	A	No	C/O	A	Vinyl	13.9	199.95	
	SR-X/Mk3	ES	25-25	8	97	1.5V	0.05	7	F	A	No	C/O	A	Vinyl	13.2	329.95	
	SR-Lambda	ES	8-35	8	102	1.5V	0.05	7	F	A	No	C/O	A	Vinyl	15.1	399.95	
	SR-Sigma	ES	25-35	8	94	1.5V	0.05	7	F	A	No	C/O	A	Vinyl	16.4	489.95	
	SR-Lambda Professional	ES	8-35	50k	102	2V	0.005	7	F	A	No	C/O	A	Vinyl	15.1	799.95	
TECHNICS	EAH-T5	Dynamic								M/A		C	A/F			30.00	
	EAH-T10	Dynamic								M/A		O	A/F			50.00	
	EAH-O5	Dynamic	20-20	32		100				M/A		D	A/F			50.00	
YAMAHA	YH-100	Orthodyn.	20-20	150	98	3V	0.3	8	F	P	No	S	A	Plastic	13.7	95.00	
	YH-1	Orthodyn.	20-20	150	94	3V	0.3	8	F	P	No	S	A	Plastic	10.2	70.00	
	YH-2	Orthodyn.	20-20	150	93	3V	0.3	8	F	P	No	S	A	Plastic	8.1	50.00	
	YH-3	Orthodyn.	20-20	150	93	1V	0.3	8	F	P	No	S	A	Plastic	7.4	40.00	
	YHL-003	Dynamic	20-20	45	103	100	0.5	8	F	M	No	O	A/F	Plastic	3.7	50.00	
	YHL-005	Dynamic	20-20	45	102	100	0.5	8	F	P	No	O	A	Plastic	2.8	40.00	
	YHL-006	Dynamic	20-20	45	103	100	0.5	8	F	M	No	O	A/F	Plastic	3.4	40.00	
	YHL-D07	Dynamic	20-20	45	99	100	0.5	8	F	F	No	O	A	Plastic	2.5	30.00	

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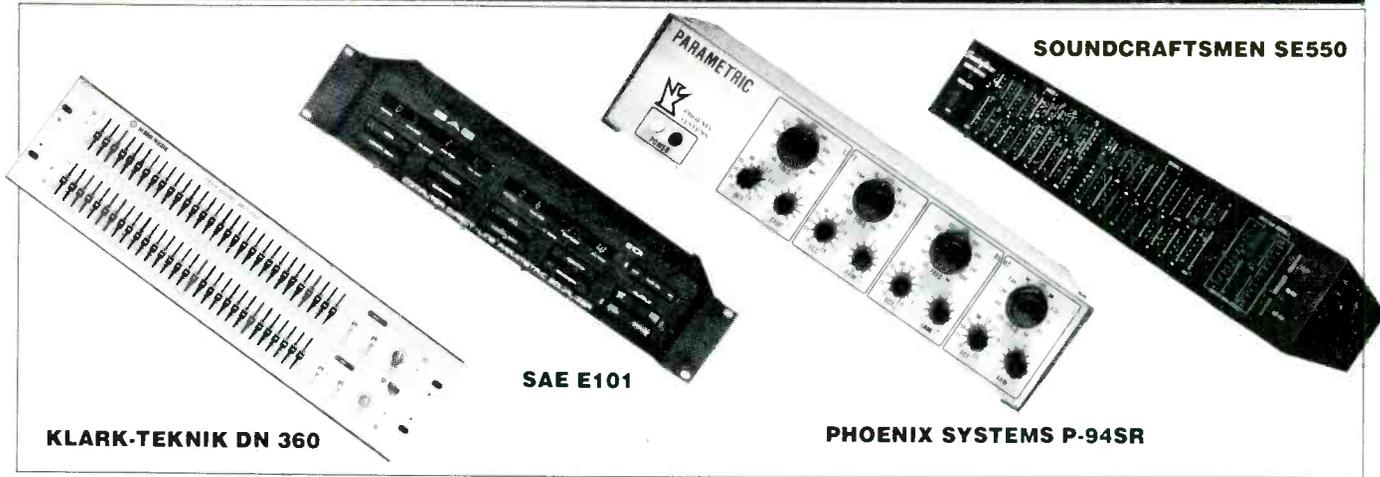
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EQUALIZERS



KLARK-TEKNIK DN 360

SAE E101

PHOENIX SYSTEMS P-94SR

SOUNDCRAFTSMEN SE550

MANUFACTURER	Model	No. of Channels	No. of Bands per Channel	Bandwidth, Octaves	Switched Tape EQ?	Unity Gain Control?	Rated Output	THD at Rated Output, rms V	S/N, -db, at Rated Output, %	Variable Center Frequencies?	Variable Filter "Q"?	Boost/Cut Range, ±dB	RTA?	Test Generator? Prim Noise = P, Warble Tone = W	With Calibrated Mics?	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes
ADC	315X	2	10	1	Yes	Yes	0.009	102	No	No	15	Yes	Yes	Yes	No	17 1/8 x 8 3/4 x 3 1/2	9 1/4	379.95	Subsonic filter.
	115X	2	10	1	Yes	Yes	0.009	100	No	No	15	Yes	No	No	No	17 1/8 x 8 3/4 x 3 1/2	7	229.95	
AKAI	EA-A2	2	9															149.95	
	EA-A7	2	7															249.95	
AUDID CONTROL	Octave	2	10	1	Yes	No	7	0.008	118	No	No	12	No	No	No	17 x 2 1/2 x 6	6	149.00	Bass only.
	Octave Plus	2	10	1	No	No	7	0.008	118	No	No	12	No	W	Yes	17 x 2 1/2 x 6	6	239.00	
	Ten	2	10	1	Yes	No	7	0.005	120	No	No	15	No	No	No	17 x 3 1/4 x 7 1/4	9	229.00	
	Ten Plus	2	10	1	Yes	No	7	0.005	120	No	No	15	No	W	Yes	17 x 3 1/4 x 7 1/4	9	329.00	
	C-101 II	2	10	1	Yes	No	7	0.009	116	No	No	15	Yes	P	Yes	19 x 3 1/2 x 6 1/2	10	429.00	
Richter Scale	2	5	1/2	No	No	7	0.008	108	No	No	12	No	W	Yes	17 x 2 1/2 x 6	6	259.00		
AUDIOSOURCE	EQ-One Series II	2	10	1	Yes	No	6.8	.0045	96	No	No	12	Yes	P	Yes	19 x 8 1/2 x 5 1/4	8.4	429.95	Subsonic filter, 18 dB/octave.
	EQ-Four	2	10	1	No	Yes	5	0.035	90	No	No	12	No	No	No	17 5/8 x 9 5/8 x 3	7.5	179.95	Peak program meter.
	EQ-Five	2	5	2	No	Yes	5	0.01	80	No	No	12	No	No	No	10 1/4 x 7 x 3 1/2	3	99.95	
	EQ-Seven	2	10	1	Yes	Yes	5	0.03	90	No	No	12	No	No	No	16 1/2 x 8 3/8 x 3	6	249.95	
BIAMP SYSTEMS	220	2	10	1	Yes	Yes	18	0.005	90	No	No	15	No	No	No		8	329.00	Dual peak indicators. In/out and line/tape switches. As above, subsonic filter, adjustable (3.5k to 20k).
	230	2	15	2 2/3	Yes	Yes	18	0.005	90	No	No	12	No	No	No		9	529.00	
	290	1			Yes	Yes	18	0.005	90	No	No	12	No	No	No		9	549.00	
	140	1	4	4		Yes		0.005	90	Yes	Yes		No	No	No		7	429.00	
BSR	SS-33	2	10	1	Yes	Yes		0.015	95	No	No	12	Yes	Yes	Yes	16 7/8 x 8 3/8 x 4 1/2	11.8	399.95	Subsonic filter.
	SS-22	2	12	1	Yes	Yes		0.015	98	No	No	12	No	No	No	16 7/8 x 8 3/8 x 4 1/2	10	329.95	
	SS-11	2	10	1	Yes	Yes		0.018	95	No	No	12	No	No	No	17 x 6 1/2 x 4 1/2	8	249.95	
CROWN INTERNATIONAL	EQ-2	2	11	1	No	No	2.5	0.01	90	Yes	No	15	No	No	No	19 x 14 1/2 x 7 1/2	16	1299.00	EQ bypass, switchable tone controls.
DB SYSTEMS	DB-5	2	6		Yes		3	.0008	96	Yes		15				8.5 x 3.2 x 7	2.8	348.00	DB-2A power supply or DBP-1 cable required.
DBX	1020	2	10	1	Yes	Auto	2	0.03	104	No	No	12	Yes	P	Yes	18 x 3 1/2 x 12 1/4	17 1/2	1200.00	Computerized automatic room/speaker EQ, SPL meter, 10 memories, averaging, infrasonic filter.
DENON	DE-70	2	12	1/3	Yes	Yes	1	0.003	113	No	No	12	No	No	No	17 3/8 x 5 1/4 x 12	13 1/4	425.00	Built-in dynamic processor.
GROMMES	G4EQ	1	28	1/3	No	Yes	1	0.01	80	No	No	12	No	No	No	19 x 3 1/2 x 6	12	540.50	High- and low-frequency cutoff filters.
DAVID HAFLER CO.	DH160	2	10	1	Yes	Yes	3	0.004	108	No	No	12			Opt.	17 x 9 x 3 1/2	12	399.95	Test record opt.; kit, \$299.95.
HARMAN/KARDON	EQ8	2	10	1	Yes	Yes	2	0.02	105	No	No	12	No	No	No	17 3/8 x 4 x 13 3/8	12	235.00	
HEATH	AD-1703	2	10	1	Yes	No	1.5	0.001	90	No	No	12	No	No	No	19 x 14 x 5 1/4	12	274.95	Kit.
HITACHI	HGE1100	2	10		Yes	No	5	0.05	96	No	No	10	No	No	No	17 1/8 x 8 7/8 x 3 1/4	6 5/8	150.00	
	HGE2100	1	9		Yes	No	5	0.05	70	No	No	10	No	No	No	17 1/8 x 8 7/8 x 3 1/4	6 5/8	200.00	
JRM	Remote Unit	2	6	1	Yes	Yes	7	0.01		No	No	8	No	No	No	9 x 5 x 1 1/2		300.00	JRM preamp or 3BPB crossover required.

EQUALIZERS

MANUFACTURER	Model	No. of Channels	No. of Bands per Channel	Bandwidth, Octaves	Switched Taper EQ?	Unity Gain Control?	Rated Output, rms V	THD at Rated Output, %	S.N. - dB, at Rated Output, "A" Wtd.	Variable Center Frequencies?	Boos/Cut Range, ±dB	RTA?	Test Generator? With Calibrated Mike?	Peak Noise = P, Variable Tone = W	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes	
JVC	SEA-M9	2	12	1	Yes	No	2	0.003	118	No	No	12, 6	Yes	P	Yes	17 1/8 x 5 7/8 x 14 7/8	22	1200.00	
	SEA-R7	2	12	1	Yes	No	2	0.001	118	No	No	12, 6	No	No	Yes	17 1/8 x 6 1/4 x 13	12.1	400.00	
	SEA-66	2	10	1	Yes	No	2	0.005	115	No	No	12, 6	Yes	P	No	17 1/8 x 3 x 11	7.7	300.00	
	SEA-33	2	10	1	Yes	No	2	0.005	115	No	No	12, 6	No	No	No	17 1/8 x 2 3/4 x 10 1/2	6.6	160.00	
KENWOOD	GE-52	2	10		Yes	Yes	5	0.01	110							16 1/2 x 10 3/8 x 3 1/2	8	200.00	
	GE-770B	2	10		Yes	Yes	9	0.003	105							16 1/2 x 12 3/8 x 5	13	335.00	
	GE-1100	2	12		Yes	Yes	9	0.003	105							17 3/8 x 13 3/4 x 6 1/2	14	415.00	
KLARK-TEKNIK	DN300	1	30	1/3	No	Yes	9.5	0.05	112	No	No	12	No	No	No	19 x 8 x 3 1/2	13	960.00	
	DN301	1	30	1/3	No	Yes	9.5	0.05	112	No	No	-15	No	No	No	19 x 8 x 3 1/2	13	1008.00	
	DN332	2	16	2/3	No	Yes	9.5	0.05	112	No	No	12	No	No	No	19 x 8 x 3 1/2	13	1000.00	
	DN360	2	30	1/3	No	Yes	9.5	0.05	112	No	No	12	No	No	No	19 x 8 x 5 1/4	15	1500.00	
	DN27A	1	27	1/3	No	Yes	10	0.05	112	No	No	12	No	No	No	19 x 8 x 5 1/4	17	925.00	
L T SOUND	PEQ-2	2	4	1.6-2	No	No	7.5	0.007	92	Yes	Yes	15	No	No	No	19 x 7 1/2 x 3 1/2	7 1/2	595.00	Phone and RCA inputs.
	PEQ-1	1	4	1.6-2	No	Yes	7.5	0.007	92	Yes	Yes	15	No	No	No	19 x 7 1/2 x 1 3/4	5	349.00	As above.
	SA-1	1	1	1.6-2	No	Yes	7.5	0.007	90	Yes	Yes	15	Yes	Yes	No	19 x 7 1/2 x 1 3/4	5	395.00	
LUXMAN	GX-101	2	7	1	Yes	No	4	0.01	80	Yes	No	12		Yes	No	17 7/8 x 3 3/8 x 11 7/8	11.2	499.95	
MARANTZ	EQ140	2	10	1	Yes		5	0.008	100			10				16 1/2 x 4 1/4 x 8 5/8	6	199.95	
	EQ130	2	10	1			5	0.01	95			10				16 1/2 x 2 3/8 x 8	5 1/2	169.95	
McINTOSH	MQ107	2	7	1/3	Yes	Yes				Yes	Yes	18		No	Yes			650.00	Room measured by installing dealer.
	MQ104	2	4	1/3	Yes	No				Yes	Yes	18		No	Yes			500.00	As above.
MODULAR AUDIO PRODUCTS	3100	1	33		No	No		0.5	90	No	No	15		No	No	1 1/2 x 5 1/4 x 5 3/4	2	390.00	
	3550	1	21		No	No		0.3	82	No	No	12		No	No	1 1/2 x 5 1/4 x 5 3/4	2	410.00	
NEI	2711	1	27	1/3	No	Yes		0.01	82	No	No	12	No	No	No	19 x 3 1/2 x 9 1/2	9	549.00	
	2712	1	27	1/3	No	No		0.01	82	No	No	12	No	No	No	19 x 3 1/2 x 9 1/2	9	449.00	
	1021	2	10	1	No	Yes		0.01	90	No	No	12	No	No	No	19 x 3 1/2 x 9 1/2	9	435.00	
	1022	2	10	1	No	No		0.01	90	No	No	12	No	No	No	19 x 3 1/2 x 9 1/2	9	365.00	
	342	2	4	Var.	No	No		0.01	80	Yes	Yes	15	No	No	No	19 x 3 1/2 x 9 1/2	10	595.00	
	341	2	4	Var.	No	No		0.01	80	Yes	Yes	15	No	No	No	19 x 1 3/4 x 6 1/2	7	349.00	
NIKKO	EQ-20	2	10	1	Yes	Yes	1	0.007	100	No	No	12	No	No	No	19 x 3.6 x 13	11	300.00	
	EQ-500	2	6	1	Yes	No	1	0.01	100	No	No	12	No	No	No	17.3 x 3.8 x 13	9.2	155.00	
NUMARK	EQ2100	2	6		Yes	No	8	0.01	96		No	15	No	No	No	12 1/2 x 3 1/2 x 6 1/2	7 1/2	139.50	
	EQ2310	2	10	1	Yes	Yes	8	0.01	96		No	15	No	No	No	18 1/8 x 3 1/2 x 6 1/2	10 1/2	199.00	
	EQ2250	2	10	1	Yes	No	8	0.01	96		No	15	No	No	No	18 1/8 x 3 1/2 x 6 1/2	10 1/2	218.00	
	EQ2500D	2	10	1	Yes	Yes	8	0.01	102		No	15	No	No	No	18 1/8 x 3 1/2 x 6 1/2	11	250.00	
	EQ2600	2	10	1	Yes	Yes	8	0.01	102		No	15	Yes	No	No	18 1/8 x 3 1/2 x 10 1/2	11	320.00	
	EQ3000	2	10	1	Yes	Yes	2	0.1	78		No	14	No	No	No	17 7/8 x 4 x 10 1/4	12 1/2	695.00	
	EQ2650	2	10	1	Yes	Yes	8	0.01	102		No	15	Yes	P	Yes	18 1/8 x 3 1/2 x 10 1/4	11	450.00	Programmable; with remote.
ONKYD	EQ-08	2	10	1	Yes	No	1.5	0.06	100	No	No	12	No	No	No	16 1/2 x 3 3/8 x 10 1/4	7	189.95	
	EQ-35	2	12	1	Yes	Yes	1.5	0.01	100	No	No	12, 6	No	†	No	17 1/8 x 3 3/8 x 14 3/8	10	269.95	†Sweep or tone.
PANASONIC	SH-250	2	7					0.005	110	Yes						16 7/8 x 3 1/4 x 7 7/8	8 5/8	169.95	
PARASOUND	EQ100	2	5	1.4	No	No	6	0.01	100	No	No	12	No	No	No	10 1/2 x 3 1/8 x 6 1/4	6	99.95	
	EQ200	2	10	1	Yes	Yes	8	0.01	100	No	No	12	No	No	No	17 1/4 x 2 7/8 x 8 1/2	8	169.95	
	EQ300	2	12	1	Yes	Yes	8	0.01	100	No	No	12	Yes	No	No	17 1/4 x 3 1/4 x 8 1/2	12	249.95	Variable rumble filter.
	EQS-1	2	10	1	Yes	Yes	8	0.01	100	No	No	12	Yes	Yes	Yes	17 1/4 x 3 1/2 x 8 1/2	13	349.95	Peak hold.
PHOENIX SYSTEMS	P-94SRA	2	2	1.6-2	No	No	8	0.01	116	Yes	Yes	16†	No	No	No	11 x 2 3/4 x 5	5	179.00	†At 1/6 octave; kit, Model P-94SR, \$129.00.
PIONEER	SG-90	2	17	2/3	Yes	Yes	1	0.001	114	No	No	6, 12	No	No	No	5.2 x 16.5 x 13.8	15.4	390.00	Inverse EQ, auto fader.
	SG-50M	2	10	1	Yes	No		0.003		No	No	10	Yes	Yes	Yes	3.9 x 16.6 x 10.5	14	260.00	
	SG-60	2	12	1	Yes	Yes		0.003	114	No	No	12	No	No	No	5.2 x 16.6 x 13.8	15.5	250.00	Record EQ.
	SG-540	2	7	1	Yes	No	1	0.005	100	No	No	10	No	No	No	3.9 x 16.5 x 9.5	6.6	165.00	As above.
	MA-100	2	2	1	Yes	Yes	1.5	0.008	83	Yes	No	10	No	No	No	6.2 x 16.5 x 8.9	9.3	370.00	Six-channel mixer, four pan pots, built-in echo amp.
CA-100	2	7	1	Yes	Yes	1.5	0.01	90	No	No	10	No	No	No	6.2 x 16.5 x 8.9	9.3	270.00	Auto fader, pan pot, echo amp, and mike mixing.	
PLEXUS	ABE-1	2						0.02	80			+8, +12				3 x 5 x 2	2	150.00	Active bass EQ.
REALISTIC	31-2009	2	12		Yes	Yes		0.02	90	No	No	12	No	No	No	18 3/8 x 7 1/8 x 2 5/8		119.95	
	31-1989	2	7		Yes	Yes		0.5	90	No	No	12	No	No	No	10 1/4 x 6 x 4 1/2		59.95	
SAE	E101	2	2		Yes	Yes	2.5	0.02		Yes	Yes	16	No	No	No	19 x 3 1/2 x 12 1/2	20	650.00	
	EQ-10	2	3		Yes	Yes	1	0.03	90	Yes	Yes	16	No	No	No	3 1/2 x 18 1/4 x 14 3/8	13	299.00	
SANSUI	SE-9S	2	8		Yes	Yes		0.008	110	Yes	Yes	12		P	Yes	17 x 12 1/4 x 5 7/8	15	700.00	
	SE-9B	2	8		Yes	Yes		0.008	110	Yes	Yes	12		P	Yes	19 x 13 x 5 7/8	14.6	700.00	
	SE-8X	2	10		Yes	Yes		0.005	110	Yes	Yes	12		No	No	17 x 11 x 5 7/8	9.7	400.00	
	SE-77	2	12		Yes	Yes		0.005	110	Yes	Yes	12, 6		No	No	17 x 10 x 3	6	280.00	
	RG-710	2	†		Yes	Yes		0.05		Yes	Yes			No	No	17 x 8 7/8 x 3 3/8	6.2	250.00	
	SE-510	2	7		Yes	Yes		0.01	75	Yes	Yes	12, 6		No	No	17 x 8 7/8 x 3 3/8	4.9	160.00	†Three EQs with three, five, and five bands.
SHERWOOD	EQ-200	2	12	1	Yes	No	7	0.01	95	No	No	12	No	No	No	17 3/8 x 4 3/8 x 13 3/4	11	229.95	

EQUALIZERS

MANUFACTURER	Model	No. of Channels	No. of Bands per Channel	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?	Boost/Cut Range, ±dB	RTA?	Test Generator? Pink Noise = P, White Tone = W	Dimensions, Inches	Weight, Lbs.	Price, \$	Notes			
SONY	SEQ-11	2	10	1/3	Yes	No	2.45	0.006	90	No	Yes	12	No	No	No	No	17 x 4 1/4 x 11 1/8	8 3/8	310.00	
SONY ES	SEQ-555ES	2	10	1/3	Yes	No	2.45	0.006	97	No	Yes	12	Yes	P	Yes	Yes	17 x 4 1/4 x 10 7/8	11 1/2	900.00	Programmable memory presets; with remote.
SONY ESPRIT	SE-P900	2	3	0.15-1	Yes		1.5	0.05	84	Yes	Yes	12	No	No	No	No	18 7/8 x 3 1/8 x 15 7/8	22	1750.00	
SOUNDCRAFTSMEN	SE550	2	10	1	Yes	Yes	10	0.01	110	No	No	15	No	No	No	No	17 x 3 1/2 x 9	9	189.00	With test record. Differential comparator balancing LEDs. As above. As above. Differential comparator analyzer circuit. As above.
	DC2214	2	10	1	Yes	Yes	10	0.01	106	No	No	16	No	No	No	No	19 x 3 1/2 x 8 3/4	18	299.00	
	DC2215	2	10	1	Yes	Yes	10	0.01	114	No	No	22	No	No	No	No	19 x 5 1/4 x 11 1/4	21	399.00	
	DC4415	2	21	1/3, 2/3	Yes	Yes	10	0.01	114	No	No	22	No	No	No	No	19 x 5 1/4 x 11 1/4	23	649.00	
	AE2420	2	10	1	Yes	Yes	10	0.01	105	No	No	16	Yes	P	Opt.	Yes	19 x 5 1/4 x 11 1/4	20	499.00	
AE2000	2	10	1	Yes	Yes	10	0.01	114	No	No	22	Yes	P	Yes	Yes	19 x 5 1/4 x 11 1/4	23	699.00		
SYMMETRIC SOUND SYSTEMS	EQ-2	2	12	5/6	No	No	2	0.02	92	No	No	10	Opt.	Opt.	Opt.	Opt.	10 x 3 1/4 x 4 3/8	3	89.00	Kit. As above. As above; optional pink-noise generator kit, Model AN-1, \$60.00.
	EQ-3	2	24	0.4	No	No	2	0.02	88	No	No	10	No	No	Opt.	Opt.	10 x 3 1/4 x 4 3/8	6	200.00	
	EQ-4	2	13	0.5	No	No	0.5	0.02	82	No	No	10	Opt.	Opt.	Opt.	Opt.	10 x 3 1/4 x 4 3/8	3	100.00	
TEAC	EQA-10	2	10		Yes	No		0.03	80	No	No	12	No	No	No	No	16 1/2 x 2 1/4 x 6 3/8	5	149.00	
	EQA-20	2	10		Yes	Yes		0.03	80	No	No	12	No	No	No	No	16 1/2 x 2 5/8 x 6 1/2	5 6/8	249.00	
TECHNICS	SH-8025	2	7		Yes	Yes	1	0.005	110	No	No	12	No	No	No	No	17 x 3 3/8 x 7 7/8	7	150.00	
	SH-8044	2	7		Yes	Yes	1	0.005	110	No	No	12	Yes	No	No	No	17 x 3 3/8 x 9 1/8	7	250.00	
	SH-8055	2	12		Yes	Yes	1	0.003	110	No	No	12	Yes	Yes	Opt.	Opt.	17 x 4 1/4 x 10 3/4	10	340.00	
	SH-8045	2	12		Yes	Yes	8	0.005	110	No	No	12, 3	No	No	No	No	17 x 2 1/8 x 9 1/4	6	200.00	
	SH-8065	2	33	1/3	Yes	Yes	8	0.0025	110	No	No	12, 3	No	No	No	No	17 x 6 x 13	15	500.00	
TOSHIBA	EQE33	2	10		Yes	Yes		0.1	110	Yes		10			No	No	16 1/2 x 3 1/2 x 10 3/8	5.9	199.95	
VECTOR RESEARCH	VQ-110	2	10	1	Yes	No	1	0.009	108	No	No	12		No	No	Yes	17 x 11 1/2 x 4	10	109.95	Built-in spectrum analyzer.
	VQ-130	2	10	1	Yes	No	1	0.009	108	No	No	12		Yes	Yes	Yes	17 x 11 1/2 x 4 1/2	12	269.95	
YAMAHA	GE-3	2	10	1	Yes	Yes	0.15	0.005	92	No	No	10	No	No	No	No	17 1/8 x 9 x 3 5/8	6 1/8	150.00	
	GE-5	2	10	1	Yes	No	0.15	0.01	85	No	No	10	No	No	No	No	17 1/8 x 11 x 2 7/8	7 1/8	200.00	

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Control W = Woofer, M = Midrange, T = Tweeter, ST = Subwoofer.	Anechoic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Impedance Ohms		Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
							Nominal/Minimum	Maximum											
AAL	dr/S 800	Air Sus.	8			3 1/2	Cone			50-20	25	5k	8/	19 x 11 x 8	Wood Vinyl	Black Cloth	30 Pair	178.00	
	dr/S 1000	Air Sus.	8			3 1/2	Cone			45-20	30	5k	8/	23 x 11 x 8	Wood Vinyl	Black Cloth	32 Pair	198.00	
	dr/S 2000	Air Sus.	10	5	Cone	3 1/2	Cone			35-20	75	2.5k, 5k	8/	24 x 15 x 10	Wood Vinyl	Black Cloth	56 Pair	278.00	
	dr/S 3000	Air Sus.	12	5	Cone	3 1/2	Cone			40-20	40	2.5k, 5k	8/	24 x 15 x 10	Wood Vinyl	Black Cloth	52 Pair	198.00	
	dr/S 4000	Air Sus.	12	5	Cone	3 1/2	Cone			30-20	75	2.5k, 5k	8/	27 x 16 x 11	Wood Vinyl	Black Cloth	72 Pair	378.00	
	dr/S 5000	Bass Ref.	12	5	Cone	(2)3 1/2, 3	Cones, Piezo			25-22	100	1.5k, 5k	8/	27 x 16 x 11	Wood Vinyl	Black Cloth	74 Pair	438.00	
	dr/S 6000	Air Sus.	15	5	Cone	3 1/2, 3	Cone, Piezo	M, T		20-22	110	1.5k, 5k	8/	29 x 18 x 15	Wood Vinyl	Black Cloth	122 Pair	558.00	
	dr/S 7000	Bass Ref.	(2)10	5	Cone	3	Piezo	M, T		20-22	100	1k, 5k	8/	33 x 15 x 11	Wood Vinyl	Black Cloth	130 Pair	598.00	
	dr/S 8000	Air Sus.	15	(2)5	Cones	(4)3	Piezoes			17-40	150	1.5k, 5k	8/	29 x 18 x 15	Wood Vinyl	Black Cloth	136 Pair	798.00	
	dr/S II 82	Ac. Sus.	8			3	Cone			48-17 ±3	89	50	8/	18 x 11 x 8	Wood Vinyl	Black Cloth	30 Pair	199.90	
	dr/S II 123	Ac. Sus.	12	4	Cone	3	Cone			49-13 ±3	90	80	8/	24 x 15 x 10	Wood Vinyl	Black Cloth	32 Pair	259.90	
	dr/S II 124	Ac. Sus.	12	4	Cone	0.7	Dome			51-17.5 ±3	91	100	8/	27 x 15 x 10	Wood Vinyl	Black Cloth	30 Pair	339.90	
	dr/S II 3500	Ac. Sus.	8			0.7	Dome			49-18.5 ±3	90	60	8/	18 x 11 x 8	Wood Vinyl	Black Cloth	30 Pair	259.90	
	dr/S II 4500	Ac. Sus.	10	4	Cone	0.7	Dome			40-18.5 ±3	90.5	80	8/	24 x 15 x 10	Wood Vinyl	Black Cloth	30 Pair	399.90	
	dr/S II 5500	Ac. Sus.	12	4	Cone	1	Dome			44-22 ±3	90.5	150	8/	27 x 15 x 10	Wood Vinyl	Black Cloth	30 Pair	579.90	
dr/S II 9500	Ac. Sus.	12	4	Cone	1	Dome			45-22 ±3	91	150	8/	39 x 15 x 14	Wood Vinyl	Black Cloth	30 Pair	859.90		
AB SYSTEMS	CFR-180	Blamped B4 Vented	12			1 1/4	Horn			80-16 ±3	101	Inc.	800	26 x 15 x 13	Wal. Stain	Black Steel	68	1060.00	
	LBS 125	B4 Vented Subwoof.	18							30-250 ±3	96	Inc.	250 Max.	34 x 30 x 20	Wal. Stain	Black Steel	134	776.00	
ACCULAB	230	Ac. Sus.	8	3 3/8	Cone	2 3/4	Cone			50-18.5 ±4	90	5	2.5k, 10k	8/	11 x 21 x 7	Wal. Vinyl	Black Knit	34 Pair	238.00
	330	Ac. Sus.	10	3 3/8	Cone	2 3/4	Cone			40-18.5 ±4	91	5	2k, 10k	8/	13 x 22 x 11	Wal. Vinyl	Black Knit	52 Pair	298.00
	350	Ac. Sus.	12	3 3/8	Cone	2 3/4	Cone			36-18.5 ±4	92	5	1.5k, 10k	8/	14 x 25 x 11	Wal. Vinyl	Black Knit	68 Pair	398.00
	450	Ac. Sus.	12	3 3/8	Cone	3 3/8, 2 3/4	Cone, Piezo			32-25 ±3.5	92.5	5	1.5k, 7.5k, 10k	8/	14 x 32 x 11	Wal. Vinyl	Black Knit	88 Pair	498.00
	550	Pas. Rad.	12	3 3/8	Cone	3 3/8, 2 3/4	Cone, Piezo			30-25 ±3.5	92.5	5	48, 1.5k, 7.5k, 10k	8/	15 x 40 x 11	Wal. Vinyl	Black Knit	104 Pair	638.00
ACOUSTAT	One	ES Sat. & Subwoof.	10				ES	T		30-18 ±3	75	100	4/3	Three Pieces	Opt.	Opt.	180 Sys.	1195.00	
	One + One	ES					ES	T		30-20 ±2	70		4/3	93 x 11 x 4	Opt.	Opt.	144 Pair	1495.00	
	Three	ES					ES	T		30-20 ±2	70		4/3	72 x 28 x 4	Opt.	Opt.	196 Pair	1895.00	
	Two + Two	ES					ES	T		28-20 ±2	50		4/3	94 x 20 x 4	Opt.	Opt.	200 Pair	2295.00	
	Six	ES					ES	T		26-20 ±2			6/3	94 x 28 x 4	Opt.	Opt.	340 Pair	3950.00	
	Eight	ES					ES	T		24-20 ±2			6/3	94 x 36 x 4	Opt.	Opt.	440 Pair	4950.00	
ACOUSTICAL PHYSICS LABS	Acoustic Image II	Ac. Sus.	10			1	Dome	No		28-22 ±2	85	30	3.5k	8/8	13 x 14 x 36	Dyed Wal.	Black Knit	110 Pair	600.00 Pair, Kit, 400.00 Pair
ACOUSTIC DESIGN GROUP	Triad 70 System	Sat. & Subwoof.	6 1/2	3 1/2	Cone	3/4	Dome	W, T		24-20 ±4	87	10 Inc.	160, 4k	8/4	Three Pieces	Opt.	Black Knit	22 Sys.	575.00
	Triad 70 Woofer	Subwoof.	6 1/2							24-140 ±3	87	5 Inc.	1k	9 x 13 x 8	Opt.	Black Knit	15	350.00	
ACOUSTIC INTERFACE	Angstrom	Ac. Sus.	6 1/2			1	Dome			78-20 ±2.5	90	15	5k	8/6	13 x 7 x 6	Black Enam.	Black Cloth	10	110.00
	Tremor	Vented Subwoof.	(2)12					M, T		29-200 ±2.5	95	15	100	8/6	62 x 26 x 16	Oiled Wal.	Black Cloth	150	890.00
	Shadow	Ac. Sus.	8			1	Dome			69-20 ±2.5	91	15	5k	8/6	25 x 9 x 9	Black Cloth	Black Cloth	18	125.00
	Intimate	Ac. Sus.	10			1	Dome	T		49-20 ±2.5	93	15	5k	8/6	19 x 12 x 12	Black Cloth	Black Cloth	29	220.00
	Transcendant	Vented	12	1 1/4	Dome	1 1/4	Dome	M, T		38-20 ±2.5	94	15	1.9k	8/6	24 x 16 x 14	Oiled Wal.	Black Cloth	51	345.00
	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 Wal.	Black Cloth	80	790.00
	Studio Reference	Vented	12	4x15	Horn	2x5 1/2	Horn	M, T		22-20 ±2.5	98	15	880, 5k	8/6	48 x 16 x 19	Oiled Wal.	Black Cloth	102	1290.00
	Sound Portal	Vented 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	2500.00
Sound Prism	Vented Horn	24x52	13x22	Horn	3x7 1/4	Horn	M, T		10-20 ±1	105	Inc.	550, 5k	8/6	72 x 27 x 36	Oiled Wal.	None	500	19,000.00 Pair	

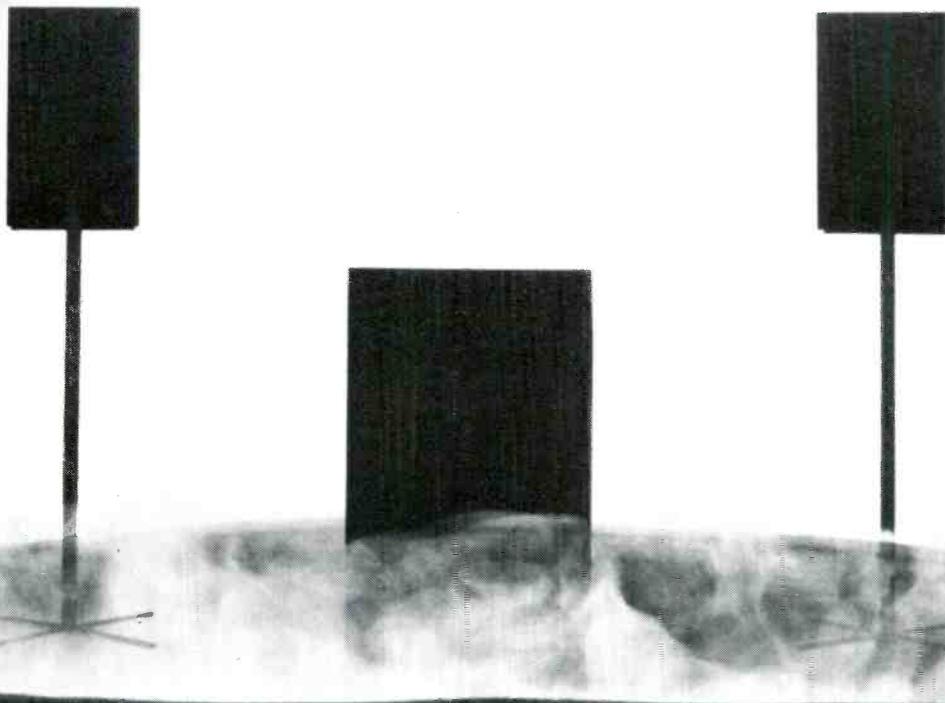
LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type				Tweeter Diameter, Inches	Tweeter Type	Separate level Control M-Midrange	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 Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches													
ADS	L200-B	Ac. Sus.	4			1	Dome		85-20 ±3	88	10	2.5k	4/3	7 x 4 x 5	Opt., Alum.	Black Steel	9 Pair	259.00	
	L300-B	Ac. Sus.	5¼			1	Dome		65-20 ±3	89	10	2.5k	4.3.2	9 x 6 x 6	Opt., Alum.	Black Steel	14 Pair	339.00	
	L300-W	Ac. Sus.	5¼			1	Dome		65-20 ±3	89	10	2.5k	4.3.2	9 x 6 x 7	Wal.	Black Steel	16 Pair	349.00	
	L400-W	Ac. Sus.	7			1	Dome		60-20 ±3	90	10	2k	4.3.2	12 x 8 x 8	Wal.	Black Steel	22 Pair	399.00	
	L400-O	Ac. Sus.	7			1	Dome		60-20 ±3	90	10	2k	4.3.2	12 x 8 x 8	Oak	Black Steel	22 Pair	399.00	
	L470-B	Ac. Sus.	7			1	Dome		50-20 ±3	88	15	2k	8.4.5	16 x 10 x 10	Black	Black Steel	37 Pair	319.00	
	L470-V	Ac. Sus.	7			1	Dome		50-20 ±3	88	15	2k	8.4.5	16 x 10 x 10	Wal.	Black Steel	37 Pair	319.00	
	L570-B	Ac. Sus.	8			1	Dome		46-20 ±3	88	15	1.8k	8/5	20 x 12 x 11	Black	Black Steel	50 Pair	399.00	
	L570-W	Ac. Sus.	8			1	Dome		46-20 ±3	88	15	1.8k	8/5	20 x 12 x 11	Wal.	Black Steel	50 Pair	439.00	
	L780-B	Ac. Sus.	8¼	1½	Dome	¾	Dome	T	42-27 ±3	88	15	650.5k	8/5	21 x 12 x 11	Black	Black Steel	64 Pair	599.00	
	L780-W	Ac. Sus.	8¼	1½	Dome	¾	Dome	T	42-27 ±3	88	15	650.5k	8/5	21 x 12 x 11	Wal.	Black Steel	64 Pair	639.00	
	L880-B	Ac. Sus.	10	2	Dome	¾	Dome	T	40-27 ±3	89	15	550.5k	8.4.5	23 x 13 x 12	Black	Black Steel	82 Pair	759.00	
	L880-W	Ac. Sus.	10	2	Dome	¾	Dome	T	40-27 ±3	89	15	550.5k	8.4.5	23 x 13 x 12	Wal.	Black Steel	82 Pair	799.00	
	L980-B	Ac. Sus.	12	2	Dome	¾	Dome	T	25-27 ±3	90	15	400.5k	8/5	27 x 15 x 13	Black	Black Steel	112 Pair	1059.00	
	L980-W	Ac. Sus.	12	2	Dome	¾	Dome	T	25-27 ±3	90	15	400.5k	8/5	27 x 15 x 13	Wal.	Black Steel	112 Pair	1099.00	
	L1090-B	Ac. Sus.	(2)7½	2	Dome	¾	Dome	T	44-27 ±3	89	15	550.5k	8/5	37 x 10 x 11	Black	Black Steel	110 Pair	999.00	
	L1090-W	Ac. Sus.	(2)7½	2	Dome	¾	Dome	T	44-27 ±3	89	15	550.5k	8/5	37 x 10 x 11	Wal.	Black Steel	110 Pair	1039.00	
	L1290-B	Ac. Sus.	(2)8¼	2	Dome	¾	Dome	T	40-27 ±3	90	15	500.5k	8/5	42 x 11 x 12	Black	Black Steel	146 Pair	1259.00	
	L1290-W	Ac. Sus.	(2)8¼	2	Dome	¾	Dome	T	40-27 ±3	90	15	500.5k	8/5	42 x 11 x 12	Wal.	Black Steel	146 Pair	1299.00	
	L1590-B	Ac. Sus.	(2)10	2	Dome	¾	Dome	T	28-27 ±3	90	15	350.5k	8/5	47 x 12 x 14	Black	Black Steel	206 Pair	1989.00	
L1590-W	Ac. Sus.	(2)10	2	Dome	¾	Dome	T	28-27 ±3	90	15	350.5k	8/5	47 x 12 x 14	Wal.	Black Steel	206 Pair	2099.00		
L1590-R	Ac. Sus.	(2)10	2	Dome	¾	Dome	T	28-27 ±3	90	15	350.5k	8/5	47 x 12 x 14	Rswd.	Black Steel & Cloth	206 Pair	2749.00		
ADVENT	Baby	Sealed	6½			1¾	Cone		60-25 ±3	87	10		8/6	11 x 16 x 6		Black Knit	26 Pair	198.00	
	2002	Sealed	8			1¾	Cone		50-23 ±3	88	10	3.2k	8/6	18 x 11 x 8	Wal.	Black Knit	33 Pair	240.00	
	3002	Sealed	8			1	Dome		48-23 ±3	88	10	2.8k	8/6	20 x 12 x 9	Wal.	Black Knit	42 Pair	300.00	
	4002	Sealed	8			1	Dome		46-23 ±3	87	10	1.8k	8/6	21 x 13 x 9	Wal.	Black Knit	64 Pair	420.00	
	5002	Sealed	8			1	Dome		40-23 ±2.5	87	10	1.8k	8/6	26 x 14 x 11	Wal.	Black Knit	80 Pair	500.00	
	5012	Sealed	8			1	Dome		40-23 ±2.5	87	10	1.8k	8/6	26 x 14 x 11	Vinyl Opt.	Black Knit	82 Pair	560.00	
	6003	Sealed	10	5.2	Cone, Dome	1	Dome		40-22 ±2.5	88.5	10	750	8/5	32 x 22 x 8	Wal.	Black Knit	110 Pair	760.00	
AIWA	SX-12	Ac. Sus.	8	2¼	Dome	1½	Dome	M,T	45-22	90			8/	17 x 10 x 10	Black Vinyl	Black Knit	39.6 Pair	300.00	
	SX-9	Ac. Sus.	7½			1½	Cone		50-20	90			8/	15 x 9 x 8	Black Vinyl	Black Knit	19.4 Pair	145.00	
	SX-6	Ac. Sus.	6¾			1½	Cone		50-20	90			8/	13 x 8 x 8	Black Vinyl	Black Knit	16.4 Pair	105.00	
AKAI	SR-CA3		8	4		2									Vinyl	Black		179.95	
	SR-CA4		10	4		2									Vinyl	Black		99.95	
	CW-T55		10	4		1¾									Vinyl	Black		139.95	
	SR-CA6		12	4		2								13 x 26 x 9	Vinyl	Black		159.95	
ALLISON ACOUSTICS	One	Ac. Sus.	(2)10	(2)3½	Cones	(2)1	Cones	M,T		87	30	350,3.75k	8/7	40 x 19 x 11	Oiled Wal.	Black Plas.	67	590.00	
	Two	Ac. Sus.	(2)8	(2)3½	Cones	(2)1	Cones	M,T		87	30	350,3.75k	8/7	36 x 16 x 9	Oiled Wal.	Black Plas.	57	510.00	
	Three	Ac. Sus.	10	3½	Cone	1	Cone	M,T		87	30	350,3.75k	4/3.5	40 x 15 x 10	Oiled Wal.	Black Plas.	45	395.00	
	Four	Ac. Sus.	8			(2)1	Cones	T		87	30	2k	8/6.5	11 x 19 x 10	Oiled Wal.	Black Plas.	23½	290.00	
	Five	Ac. Sus.	8			1	Cone	T		87	15	2k	4/3.5	11 x 18 x 10	Oiled Wal.	Black Plas.	21	195.00	
	Six (Trad.)	Ac. Sus.	8			1	Cone			87	15	2k	4/3.5	11 x 11 x 11	Oiled Wal.	Black Plas.	17	160.00	
	Six (Des.)	Ac. Sus.	8			1	Cone			87	15	2k	4/3.5	11 x 11 x 11	Oak Lacq.	Brown Plas.	17	172.00	
	Seven	Ac. Sus.	8			1	Cone			87	15	2k	4/3.5	28 x 10 x 10	Opt., Plas.	Black Plas.	22	225.00	
(Continued)	Eight	Ac. Sus.	8	3½	Cone	1	Cone	M,T		87	30	450,3.75k	4/3.5	12 x 20 x 10	Opt.	Black Plas.	29	345.00	

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type						SPL	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., 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	Speaker Level Control? W= Woofer, M= Midrange, T= Tweeter, ST= Super Tweeter											
		Aperiodic Frequency Response, Hz to kHz, ±dB		SPL, 1 Watt/1 Meter, dB		Crossover Frequencies, Hz		Impedance Ohms: Nominal/Minimum		Dimensions, Inches (To Nearest Inch)		Finish		Grille Color and Material		Weight, Lbs.		Price, \$	
ALLISON ACOUSTICS (Continued)	Nine	Ac. Sus.	10	3½	Cone	1	Cone	M, T	87	30	350, 3.75k	4/3.5	37 x 13 x 11	Opt.	Dpt., Plas. Black Plas.	56	495.00		
	110	Ac. Sus.	8			1	Cone		87	15	2k	6/3.5	18 x 12 x 8	Wal. Vinyl	Black Plas.	16½	130.00		
	120	Ac. Sus.	8			1	Cone		87	15	2k	6/3.5	22 x 14 x 8	Wal. Vinyl	Black Plas.	21¼	160.00		
	130	Ac. Sus.	10			1	Cone		87	15	2k	6/3.5	29 x 17 x 8	Wal. Vinyl	Black Plas.	34½	195.00		
APATURE	R-8a	Ported	8			1	Dome		42-22	92	10	5k	8/8	12 x 12 x 22	Opt.	Brown Knit	60	299.95	
	Pro-1	Trans. Line	10			2½	Cone		38-22	92	10	1.8k	8/4	11 x 12 x 33	Dak	Brown Knit	94	399.95	
	Sat	Ac. Sus.	5¼			2x½	Ribbon		56-34	92	10	5.4k	8/8	8 x 8 x 12	Koa	Brown Knit	30	259.95	
	BM	Ac. Sus. Subwoof.	(2)10						34-125	92	10	125	8/4	21 x 30 x 16	Koa	Brown Knit	60	289.95	
	Trident	Sat. & Subwoof.	(2)10	(2)5	Cones	(2) 2x½	Ribbons		34-34	92	10	125, 5.4k	8/4	Three Pieces	Koa	Brown Knit	100 Sys.	559.95 Sys.	
APOGEE ACOUSTICS	Scintilla	Ribbon Dipole	12x53	2x53	Ribbon	½x53	Ribbon		30-25 ±3	100	700.6k	4/	29 x 57 x 3	Suede Paint	Opt.	280	3500.00		
	Apogee	Ribbon Dipole	12x80	2x80	Ribbon	½x80	Ribbon		30-30 ±3	100	400, 3.5k	4/	35 x 80 x 4	Suede	Opt.	600	6600.00		
AR	AR9LS	Ac. Sus.	12, 10	8, 1½	Domes	¾	Dome		28-32	90	15	200, 1.1k, 5.5k	4/3.2	51 x 16 x 15	Oiled Wal.	Brown Knit	236	1800.00	
	AR98LS	Ac. Sus.	12	8, 1½	Domes	¾	Dome		39-32	90	15	200, 1.1k, 5.5k	4/3	30 x 16 x 11	Oiled Wal.	Brown Knit	126	1100.00	
	AR78LS	Ac. Sus.	12	1½	Dome	¾	Dome		39-32	87	15	700, 5k	4/3.6	27 x 15 x 12	Oiled Wal.	Brown Knit	104	900.00	
	AR58B	Ac. Sus.	12	4	Cone	¾	Dome		39-32	87	10	600, 4.5k	4/3.6	27 x 15 x 11	Oiled Wal.	Brown Knit	99	700.00	
	AR48B	Ac. Sus.	10	4	Cone	¾	Dome		45-32	87	10	400, 3.5k	6/4.5	26 x 14 x 11	Wal. Vinyl	Brown Knit	79	550.00	
	AR38B	Ac. Sus.	8	4	Cone	¾	Dome		52-32	87	10	650, 3.5k	6/4.5	22 x 12 x 8	Wal. Vinyl	Brown Knit	56	430.00	
	AR30B	Ac. Sus.	10			1	Dome		42-22	88	10	1.8k	8/5	23 x 14 x 11	Wal. Vinyl	Brown Knit	65	430.00	
	AR28B	Ac. Sus.	8			1¼	Cone		52-22	88	10	2k	8/	20 x 11 x 7	Wal. Vinyl	Brown Knit	38	330.00	
	AR18B	Ac. Sus.	8			1¼	Cone		62-22	88	10	2k	8/	17 x 11 x 6	Wal. Vinyl	Brown Knit	30	252.00	
	AR8B	Ac. Sus.	6			1¼	Cone		74-22	88	10	2k	8/	15 x 10 x 6	Wal. Vinyl	Brown Knit	21	192.00	
A&S SPEAKERS	J. Adamson CA-1	Sat.	5¼			1	Dome		60-20 ±3	86	15	3k	8/5	12 x 8 x 7	Oiled Wal.	Brown Knit	25	Kit, 240.00	
	J. Adamson CA-2	Subwoof.	9						38-150 ±3	90	15	150	8/5.5	19 x 12 x 10	Oiled Wal.	Brown Knit	40	Kit, 335.00	
	J. Caldwell MC-2	Inf. Baf.	6½			1	Dome		60-18	89	15	1.6k	8/6	16 x 10 x 8	Oiled Wal.	Brown Knit	40	Kit, 275.00	
	J. Caldwell SW-12	Subwoof.	12						38-60 ±3	89	15	60	4/	18 x 18 x 16	Oiled Wal.	Brown Knit	50	Kit, 190.00	
	B. Reed 6-02A	Vented	6½			1	Dome		40-20 ±3	86	20	3.5k	8/5	16 x 10 x 8	Wal.	Black Knit	40	Kit, 295.00	
Avery Dark-10	Inf. Baf.	10	2	Dome	¾	Dome		42-25 ±3	92	15	800, 4.5k	8/5	25 x 15 x 12	Wal.	Brown Knit	100	Kit, 600.00		
AUDIO CONCEPTS	JCCM	Aperiodic	6½			1	Dome		55-20 ±3	87	20	2.2k	8/6	16 x 10 x 8	Dpt.	Brown	36	389.00	
	Vanguard	Aperiodic	9			1	Dome		42-20 ±3	90	20	2.1k	8/6	29 x 14 x 13	Oiled Dak	Black	100	859.00	
	JCRS Subwoofer	Push-Pull	(2)12						20-400 ±3	90	40		4/3	21 x 34 x 20	Oiled Oak	Black	200	999.00	
	JCRS	Ribbon	(2)9	48 L	Ribbon				35-20 ±3	90	60	200	5/3	75 x 18 x 21	Oiled Oak	Black	310	3600.00	
AUDIOPHILE PRODUCTS	Modular Satellite-1	Aperiodic Sat.		6½	Cone	1½	Dome		40-16.5	91	40	2.4k	6/5	18 H Pyramid	Black Lacq.	Black Foam	34	1050.00	
	Modular Satellite-2	Aperiodic Sat.		8	Cone	1½	Dome		40-16.5	91	40	2.4k	6/5	18 H Pyramid	Black Lacq.	Black Foam	35	1150.00	
	CL-10	Laby. Subwoof.	10						22-200	90	100	120	6/5	25 x 31 x 14	Black Lacq.	Black Foam	96	1390.00	
	FR-1	Subwoof. Aperiodic	8			1½	Dome		35-16.5	91	40	2.4k	6/5	32 H Pyramid	Black Lacq.	Black Foam	63	1620.00	
	Super Tweeter-1					0.4	Dome		16.5-40	91		16.5k	5/4	3 x 3 x 4	Black	None	1	Pair w/ Xover 100.00	
AUDIO PRO (Continued)	A4-14	Biamped Subwoof.	(2)4	4½	Cone	1	Dome	W, M	30-20 +0, -3		Inc.	300, 2.5k		20 x 12 x 11	Opt.	Black Foam	75	795.00	
	2-25	Inf. Baf.	8			1	Dome		52-20 +0, -3	90	15	2k	6/4.5	20 x 11 x 11	Opt.	Black Foam	40	450.00	
	B2-40	Bass Ref. Subwoof.	(2)5½					W	30-200 +0, -3		Inc.	50-200		21 x 15 x 15	Dpt.	Black Foam	41	695.00	
	B2-50	Bass Ref. Subwoof.	(2)5½					W	20-200 +0, -3		Inc.	40-200		21 x 18 x 18	Opt.	Black Knit	74	995.00	
	B2-100	Bass Ref.	(2)8¼					W	20-200 +0, -3		Inc.	40-200		36 x 20 x 17	Dpt.	Black Knit	150	1495.00	

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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	Separable Lvl. Controls? W = Woofer, M = Midrange, T = Tweeter, S = Superwoofer	Impedance, Ohms	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
AUDIO PRO (Continued)	B4-200	Bass Ref. Subwoof.	(4)8 1/4					W	20-200 +0, -3	Inc.	40-200		44 x 22 x 22	Wal.	Black Knit	180	2750.00	
AUDIOSOURCE	LS-One	Ac. Sus.	4			1	Dome		100-20 ±3	83	5	2.5k	8/4	7 x 5 x 5	Alum.	Metal	5 1/2	99.95
	LS-One Walnut	Ac. Sus.	4			1	Dome		100-20 ±3	83	5	2.5k	8/4	8 x 5 x 5	Wal. Ven. Alum.	Cloth	3 1/2	99.95
	LS-Three	Ac. Sus.	5	1 3/8	Dome	1	Dome		80-20 ±3	85	5	1.2k, 5k	8/4	10 x 7 x 5	Alum.	Metal	9 1/4	159.95
	LS-Four	Ac. Sus.	4			1 3/8	Dome		100-20 ±3	87	5	2.5k	4/2	8 x 5 x 3	Plas.	Metal	2 1/2	84.95
	LS-Seven	Ac. Sus.	6 1/2			1	Dome		70-20 ±3	87	5	2k	8/4	14 x 9 x 7	Oiled Oak Plas.	Black Cloth	7	129.95
	LS-Eight	Ac. Sus.	3						150-20 ±3	86	3		8/4	6 x 4 x 4	Black Foam	Black Cloth	1 1/2	24.95
	LS-Nine	Ac. Sus.	8			1	Cone		65-20 ±3	88	5	3.5k	8/4	18 x 11 x 9	Oak Ven.	Black Cloth	16	149.95
AUDIRE	Image I	Bipolar					Ribbon		30-25 ±5	95	100	None	3.3	33 x 4 x 72	Oiled Wal.	Black Cloth	200	8500.00
	Image II	Bipolar					Ribbon		40-25 ±5	90	100	None	6.6	24 x 4 x 60	Oiled Wal.	Black Cloth	120	4500.00
AURATONE	T5	Inf. Baf.	5 1/4			1	Dome		90-20 ±3.5	87	10	2.7k	8/6.5	11 x 7 x 7	Wal. Vinyl	Black Knit	20	250.00
	T6	Bass Ref.	6 1/2			1	Dome		60-20 ±3	88	20	2.7k	8/6.5	15 x 10 x 10	Wal. Vinyl	Black Knit	36	325.00
	T66	Bass Ref.	(2)6 1/2			1 1/4	Dome		55-18 ±2.5	90	30	2.2k	8/6.5	12 x 18 x 13	Wal. Vinyl	Black Knit	66	595.00
	QC66	Bass Ref.	(2)6 1/2	1 1/4	Dome	3/4	Dome		50-20 ±2	90	30	2.2k, 2.7k	8/6.5	14 x 17 x 13	Wal. Vinyl	Black Knit	70	695.00
	RC66	Bass Ref.	(2)6 1/2			1 1/4	Dome		55-18 ±2.5	90	30	2.2k	8/6.5	25 x 15 x 15	Wal. Vinyl	Black Knit	70	795.00
	5C	Inf. Baf.	5							89	3		8/	7 x 7 x 7	Wal. Vinyl	Black Foam	10 3/4	95.00
	5C-B	Inf. Baf.	5							89	3		8/	7 x 7 x 7	Wal. Vinyl	Black Foam	10 3/4	95.00
	5S	Inf. Baf.	5							89	3		8/	11 x 7 x 5	Wal. Vinyl	Black Foam	11	100.00
	5W	Inf. Baf.	5							89	3		8/	8 x 8 x 5	Wal. Vinyl	Black Foam	10 1/2	100.00
	5RC	Inf. Baf.	5							89	3		8/	11 x 7 x 7	Wal. Vinyl	Black Plas.	10	135.00
AVID AUDIO	232 ab	Vented	10	4 1/2	Cone	1	Dome		40-20 ±3	90		650, 5k	8/	28 x 15 x 11	Wood Vinyl	Brown Knit	580.00	Pair
	102 ab	Ac. Sus.	10			1	Dome		43-20 ±3	89		2.5k	8/	25 x 15 x 10	Wood Vinyl	Brown Knit	400.00	Pair
	80 ab	Ac. Sus.	8			1	Dome		53-20 ±3	88		3k	8/	20 x 12 x 9	Vinyl	Brown Knit	300.00	Pair
	60 ab	Ac. Sus.	6 1/2			1	Dome		70-20 ±3	87		3.5k	8/	14 x 9 x 8	Vinyl	Brown Knit	240.00	Pair
BABB AUDIO	C14	Ac. Sus.	5 1/4	5 1/4	Cone	5 1/4	Cone	No	60-18 ±3	92	15	None	4/4	11 x 7 x 6	Black	Black Metal	21	320.00
BANG & OLUFSEN	MS 150.2	Bass Ref.	8, 10	3	Dome	1	Dome	No	30-22	92		150, 900, 3k	8/	14 x 33 x 13	Opt.	Black	160	1500.00
	MC 120.2	Bass Ref.	8	3	Dome	1	Dome	No	42-22	92		150, 900, 3k	8/	10 x 22 x 10	Rswd.	Black	64	898.00
	S-80.2	Ac. Sus.	8	4	Dome	1	Dome	No	50-22			700, 2.5k	8/	10 x 21 x 10	Rswd.	Black	48	598.00
	S-55	Ac. Sus.	8 1/4	4 1/2	Dome	1	Dome	No	80-20			800, 3k	8/	10 x 20 x 9	Rswd.	Black	41	495.00
	S-45	Ac. Sus.	8			1	Dome	No	55-20			2k	8/	10 x 20 x 8	Rswd.	Black	37	395.00
	S-2200	Ac. Sus.	6 1/4			2 1/2	Cone	No	55-20			3k	8/	9 x 16 x 6	Black	Black	26	200.00
	CX-100	Ac. Sus.	(2)4			1	Dome	No	50-20			2.5k	6/	4 x 12 x 8	Opt., Alum.	Black	27	298.00
	CX-50	Ac. Sus.	4			1	Dome	No	80-20			2.5k	6/	4 x 8 x 8	Black Alum.	Black	16	198.00
BECKER	IDS I	Tuned Port	8			3	Cone		50-19	91	15	3k	8/6	19 x 11 x 8	Vinyl	Black Knit		218.00
	IDS II	Tuned Port	10	5	Cone	3	Cone		45-19	91	25	2k, 6k	8/6	22 x 13 x 10	Vinyl	Black Knit		318.00
	IDS III	Tuned Port	10	5	Cone	3	Cone	M, T	40-20	91	25	1.5k, 6k	8/6	27 x 15 x 10	Vinyl	Black Knit		458.00
	IDS V	Tuned Port	(2)10	5	Cone	3	Cone	M, T	25-20	93	25	900, 5k	4/4	36 x 13 x 12	Vinyl	Black Knit		598.00
B.E.S.	SM100	Puls. Diaph. Puls.	850 Sq. In.				Puls. Diaph. Piezo		42-19 ±5	88	5	800	8/5.5	28 x 19 x 4	Oiled Oak	Brown Knit	26	460.00
	SM255 MKII	Puls. Diaph. Puls.	850 Sq. In.				Puls. Diaph. Piezo	M, T	35-22 ±5	91	10	800, 10k	8/5.5	30 x 20 x 6	Oiled Oak	Brown Knit	38 1/2	700.00
	SM275	Puls. Diaph. Puls.	1122 Sq. In.	270 Sq. In.			Puls. Diaph. Piezo	M, T	32-22 ±5	93	10	500, 10k	8/5.5	40 x 20 x 6	Oiled Oak	Brown Knit	58	950.00
	SM280	Puls. Diaph. Puls.	1344 Sq. In.	450 Sq. In.			Puls. Diaph. Piezo	M, T	32-22 ±5	93	10	500, 10k	8/5.5	44 x 21 x 6	Oiled Oak	Brown Knit	62	1100.00
	SM300	Puls. Diaph. Puls.	1750 Sq. In.	450 Sq. In.			Puls. Diaph. Piezo	M, T	30-22 ±3	93	10	500, 10k	8/5.5	54 x 22 x 7	Oiled Oak	Brown Knit	79	1500.00
	SM90	Puls. Diaph. Puls.	850 Sq. In.				Puls. Diaph. Piezo		42-19 ±5	88	5	800	8/5.5	28 x 19 x 4	Oiled Oak	Black Knit	20 1/2	760.00

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? H=Hooder, M=Midrange, T=Tweeter, S=Super tweeter	Anechoic Frequency Response, Hz to KHz, ±dB	SPL, 1 Watt 1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange	Tweeter																
BEVERIDGE	System 2SW-2	ES & Subwoof.	12			(3) 12x24	ES	W	27-20 ±3	110	Inc.	100	8 2	Three Pieces	Opt.	Black Foam	510 Sys.	10,000 Sys.			
	System 5	ES, Subwoof.	12			13x35	ES		33-20	106	50	200	8 2	18 Dia. x 63	Opt.	Black Foam	210 Pair	3295.00 Pair			
	System 6	ES & Subwoof.	12			(2) 13x35	ES		33-20	106	100	200	8 2	Four Pieces	Opt.	Black Foam	350 Pair	6450.00 Pair			
BLACKMAX	10.2	Vented	10			2 1/2	Cone		40-20	94	10	2.5k	4.4	26 x 13 x 11	Diled Wal.	Black Knit			249.95		
	10.3	Vented	10	4 1/2	Cone	3/4	Dome		35-20	94	10	1.5k, 4.5k	4.4	34 x 13 x 11	Oiled Wal.	Black Knit			349.95		
BML ELECTRONICS	Planar AM-III	B4 Vented	(2)8	3 1/2	Cone	1	Dome		22-22 ±3	90	45	450,5k	8/6	25 x 10 x 63	Diled Wal.	Black Knit	300 Pair	3400.00 Pair			
	Planar AM-II	B4 Vented	8,6			1	Dome		28-22 ±3	89	45	1k,5k	8/6	21 x 9 x 50	Oiled Wal.	Black Knit	150 Pair	2150.00 Pair			
	AM-I	Vented	8			1	Dome		32-19	88	45	2.5k	8/6	23 x 10 x 11	Oiled Wal.	Black Knit	80 Pair	1200.00 Pair			
BOSE	Room Mate System	Powered	4 1/2								Inc.			6 x 9 x 5	Black	Black	10 Pair	260.00 Sys.			
	101 Music Monitor	Ported	4 1/2								89	10	B/	6 x 9 x 5	Opt.	Opt.	9 Pair	210.00 Pair			
	201-II	Ported	6			3	Cone				5	1.5k, 2.5k	B/	15 x 8 x 9	Rswd.	Brown Knit	20 Pair	238.00 Pair			
	301-II	Ported	8			(2)3	Cones				10	1.5k, 2.5k	B/	10 x 17 x 10	Wal.	Brown Knit	38 Pair	395.00 Pair			
	501-IV	Ported	10			(2)3	Cones				20	1.5k, 2.5k	B/	16 x 14 x 25	Teak	Knit Opt.	40 Pair	684.00 Pair			
	601-II	Ported	(2)8			(4)3	Cones				20	1.5k, 2.5k	B/	30 x 14 x 13	Wal.	Brown	47	944.00 Pair			
	901-V	Ac. Matrix	(9)4 1/2								10		B/	21 x 13 x 13	Wal.	Cloth	35	1395.00 Pair w/EQ			
BOSTON ACOUSTICS	A40	Ac. Sus.	6 1/2			3/4	Dome		68-20 ±3	89	5	3.5k	8/5	13 x 8 x 8	Wal. Vinyl	Black Cloth	9	75.00			
	A60	Ac. Sus.	8			1 1/2	Cone		55-20 ±3	90	10	3k	8/6	18 x 11 x 8	Wal. Vinyl	Black Cloth	16	100.00			
	A70	Ac. Sus.	8			1	Dome		40-25 ±3	90	15	2k	6/4	24 x 14 x 8	Wal. Vinyl	Black Cloth	26	140.00			
	A100	Ac. Sus.	10			1	Dome		38-25 ±3	90	15	2k	8/5	32 x 16 x 8	Wal. Vinyl	Black Cloth	44	195.00			
	A150	Ac. Sus.	10	4 1/2	Cone	1	Dome		38-25 ±3	90	15	650,3k	8/5	32 x 16 x 8	Wal. Vinyl	Black Cloth Opt.	47	295.00			
	A400	Ac. Sus.	(2)8	6 1/2	Cone	1	Dome		36-25 ±3	90	15	300,3k	4/4	41 x 21 x 7	Opt.	Cloth Opt., Cloth	35	450.00			
BOZAK	LS-200A	Vented	8			1	Dome		45-20 ±3	89	15	2k	8/6	20 x 12 x 10	Wal. Vinyl	Brown Knit	32	379.00 Pair			
	LS-220A	Vented	8			1	Dome		45-20 ±3	89	15	2k	8/6	36 x 12 x 10	Wal. Vinyl	Brown Knit	46	519.00 Pair			
	LS-250A	Inf. Baf.	12	4	Cone	1	Dome		40-20 ±3	91	20	800, 2.5k	8/7	23 x 15 x 12	Wal. Vinyl	Brown Knit	45	639.00 Pair			
	LS-330A	Inf. Baf.	12	6	Cone	1	Dome		35-20 ±3	91	25	500, 2.5k	8/6	35 x 16 x 12	Wal. Vinyl	Brown Knit	65	1099.00 Pair			
	mss-1000	Sat. & Subwoof.	12	6	Cone	1	Dome		20-20 ±2	88	35	80, 1.6k	8/6	Three Pieces	Wood Ven.	Knit Opt., Knit	88 Sys.	949.00 Sys.			
	CS-400	Inf. Baf.	12	6	Cone	(2)2	Cones		40-18 ±4	91	20	800, 2.5k	8/6	26 x 18 x 13	Wood Ven.	Beige Weave	65	449.00			
	CS-501A	Inf. Baf.	12	6	Cone	(3)2	Cones		30-19 ±4	89	30	400, 2.5k	8/6	32 x 16 x 20	Wood Ven.	Beige Weave	90	749.00			
	CS-4000A	Inf. Baf.	(2)12	6	Cone	(8)2	Cones		25-19 ±4	91	50	400, 2.5k	8/6	45 x 16 x 26	Wood Ven.	Beige Weave	165	1199.00			
	CS-310B	Inf. Baf.	(4)12	(2)6	Cones	(8)2	Cones		16-20 ±4	91	50	400, 2.5k	8/6	52 x 19 x 36	Wood Ven.	Beige Weave	300	1899.00			
	B-1000 Outdoor	Inf. Baf.	8						50-12 ±4	90	30		8/6	21 x 18 x 12	Opt.	Opt.	20	219.50			
	B-1002 Outdoor	Inf. Baf.	8			2	Cone		50-18 ±4	90	30	3k	8/6	21 x 18 x 12	Opt.	Opt.	21	259.50			
	B-450-4 Outdoor	Inf. Baf.	(4)4						150-16 ±3	88	20		8/6	20 x 6 x 5	Opt.	Opt.	15	229.50			
	B-450-6 Outdoor	Inf. Baf.	(6)4						150-16 ±3	88	25		8/6	30 x 6 x 5	Opt.	Opt.	20	299.50			
BRANDENBURG	10	Ac. Sus.	8			1	Dome		30-20	89	27	3.5k	B/	15 x 12 x 10	Wal.	Brown Foam	17	119.00			
	25	Ac. Sus.	10			1	Dome		20-20	90	20	3.5k	B/	20 x 14 x 12	Wal.	Brown Foam	26	199.00			
	35	Inf. Baf.	(2)8			1	Dome		30-20	91	20	3.5k	B/	27 x 14 x 12	Wal.	Brown Foam	34	250.00			
	990	Tuned Port	10	2 1/2	Dome		Ribbon		20-40	90	20	700,5k	B/	30 x 15 x 15	Wal.	Cloth	50	349.00			
	1000	Inf. Baf.	(2)10	2 1/2	Dome		Ribbon		20-40	90	20	700,5k	B/	43 x 14 x 14	Wal.	Cloth	75	500.00			
	2000	Inf. Baf.	(2)10	2 1/2	Dome		Ribbon		14-40	90	20	700,5k	8/8	48 x 23 x 12	Wal.	Cloth	84	900.00			
BSC	Compusound 150	Inf. Baf.	(2)8	5 1/4	Cone	1	Dome	W.M. T	15-20 ±2	90	Inc.	195, 2.25k Elec.		Three Pieces	Oiled Oak Opt.	Brown Cloth Opt.	300 Sys.	3600.00 Sys.			
	Compusound 100	Inf. Baf.	(4)5 1/4			1	Dome	T.W.T	30-20 ±2	92	100	2k		Three Pieces	Opt.	Opt.	130 Sys.	1295.00 Sys.			
	Compusound SW100	Inf. Baf. Subwoof.	13						15-100	91	Inc.	100		15 x 23 x 16	Opt.	Opt., Knit	90 Sys.	845.00 Pair w Amp			

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: W = Woofer, M = Midrange, T = Tweeter, S = Super-tweeter	Angular Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt, 1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance Ohms, Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange																
BSR	153C	Ac. Sus.	15	4	Cone		Horn	M, T		20-20	91	1k,4k	8/7	11 x 18 x 29	Wal. Vinyl	Brown Cloth	45	199.95		
	123B	Ac. Sus.	12	4	Cone	3	Cone	T		20-20	90	1k,4k	8/7.6	11 x 15 x 27	Wal. Vinyl	Brown Cloth	35	129.95		
	103B	Ac. Sus.	10	4	Cone	3	Cone	T		20-20	90	1k,4k	8/7.6	10 x 13 x 23	Wal. Vinyl	Brown Cloth	23	99.95		
	82C	Ported	8			3	Cone			20-20	91	4k	8/7.9	10 x 11 x 19	Wal. Vinyl	Brown Cloth	14	69.95		
B & W	DM110	Bass Ref.	8			1	Dome			70-20 ±3	90	10	3k	8/6.4	19 x 10 x 10	Opt.	Opt., Cloth	38 Pair	298.00	
	DM220	Ac. Sus.	(2)8			1	Dome			53-20 ±3	90	10	3k	8/6.4	27 x 11 x 13	Opt.	Opt., Cloth	66½ Pair	498.00	
	DM330	Ac. Sus.	(2)8			1	Dome			48-20 ±3	91	10	3k	8/6.4	34 x 11 x 13	Opt.	Opt., Cloth	75½ Pair	698.00	
	DM1200	Ac. Sus.	6			1	Dome			85-20 ±3	85	30	3k	8/6.4	14 x 9 x 11	Opt.	Opt., Cloth	42 Pair	770.00	
	DM1400	Ac. Sus.	(2)6			1	Dome			80-20 ±2	86	30	500,3k	8/6.4	31 x 10 x 12	Opt.	Opt., Cloth	84 Pair	1090.00	
	DM17 LTD	Ac. Sus.	6			1	Dome			85-20 ±2	85	40	3k	8/6.4	14 x 9 x 11	Opt.	Opt., Cloth	42 Pair	900.00	
	DM2000	Pas. Rad.	6½			1	Dome			50-20 ±2	87	30	3k	8/6.4	32 x 12 x 15	Opt.	Opt., Cloth	110 Pair	1300.00	
	DM3000	Pas. Rad.	(2)6½			1	Dome			50-20 ±2	89	25	500,3k	8/6.4	38 x 12 x 15	Opt.	Opt., Cloth	154 Pair	1790.00	
	802FSP	Ac. Sus.	(2)6½	4	Cone	1	Dome	M, T		55-20 ±2	85	100	400,3k	8/6.4	41 x 12 x 15	Opt.	Opt., Cloth	141 Pair	2500.00	
	801F	Ac. Sus.	10½	4	Cone	1	Dome	M, T		45-20 ±2	85	100	400,3k	8/6.4	37 x 17 x 22	Opt.	Opt., Cloth	207 Pair	3500.00	
	808	Bass Ref.	(2)10½	(2)4	Cones	1½	Dome	M, T		30-20 ±2	91	100	400,3k	8/6.4	41 x 26 x 20	Opt.	Opt., Cloth	344 Pair	7500.00	
	LM1	Ac. Sus.	4			¾	Dome			95-25 ±4	81	20	Sel.	8/6.4	9 x 6 x 8	Opt.	Black Wire	23 Pair	498.00	
	VM1	Bass Ref.	8			1	Dome			70-20 ±2	90	5	3k		19 x 10 x 10	Opt.	Black Cloth	38 Pair	298.00	
	VM2	Ac. Sus.	(2)8			1	Dome			53-20 ±3	90	7	3k		27 x 11 x 13	Opt.	Black Cloth	66½ Pair	498.00	
CADAWAS ACOUSTICS	TC 3	Auto Damping	(2)8, 10, 12	5¼	Cone	1,2	Domes	W, M, T		20-20 ±5	87	60	100,250, 2.5k, 7k	8/6	52 x 15 x 11	Oiled Wal.	Brown Cloth	85	2500.00	
	TC 1	Auto Damping	8, 10, 12	5¼	Cone	1,2	Domes	M, T		20-20 ±5	87	25	250, 2.5k, 7k	10/6	25 x 15 x 11	Oiled Wal.	Brown Cloth	44	1195.00	
	Mobile Monitor One	Auto Damping	(2)5¼			1	Dome	T		20-20 ±10	87	15	2.5k	8/	14 x 8 x 8	Oiled Wal.	Brown Cloth	15	595.00	
	TC 2	Auto Damping Subwoof.	8, 12					W		20-125 ±5	87	25	125	8/	25 x 15 x 11	Oiled Wal.	Brown Cloth	40	650.00	
CAMBER LOUDSPEAKERS	1.5	Tuned Port	6½			¾	Dome			55-20 ±2	88	15	3.5k	8/6	16 x 9 x 11	Opt.	Black Knit	36 Pair	299.00	
	2.5	Tuned Port	6½			1	Dome			48-20 ±3	88	25	3.5k	8/6	24 x 9 x 11	Opt.	Black Knit	50 Pair	399.00	
	3.5	Tuned Port	8			1	Dome			45-20 ±3	89	30	3.5k	8/6	24 x 10 x 13	Opt.	Black Knit	60 Pair	549.00	
CANTON	HC 100	Ac. Sus.	4¾			1	Dome			48-30 ±6	10	1.7k	4/	5 x 8 x 6	Opt.	Opt., Metal	10 Pair	250.00		
	AC 200	Biamped Ac. Sus.	4¾			1	Dome			48-30 ±6	Inc.	1.7k		5 x 8 x 6	Black Lacq.	Black Metal	11 Pair	350.00		
	Pullman	Ac. Sus.	(4)4¾	1¼	Dome	1	Dome			43-30 ±6	10	800,4k	4/	37 x 4 x 5	Opt., Lacq.	Opt., Metal	18 Pair	450.00		
	Set 200	Ac. Sus. Sat. & Subwoof.	(2)4¾			(2)1¼	Domes			43-30 ±6	10	2.5k	4/	Four Pieces	Opt., Lacq.	Black Metal	8 Sys.	275.00		
	Set 300	Ac. Sus. Sat. & Subwoof.	(4)4¾			(2)1¼	Domes				10	2.5k	8/	Six Pieces	Black Plas.	Black Metal	12 Sys.	375.00		
	GL 260	Ac. Sus.	6¼			1	Dome			42-30 ±6	10	1.7k	4/	7 x 11 x 15	Opt., Lacq.	Opt., Metal	10 Pair	350.00		
	GL 300F	Ac. Sus.	6¼			1	Dome			48-30 ±6	10	1.7k	4/	12 x 9 x 3	Opt.	Opt., Metal	18 Pair	375.00		
	Plus S	Ac. Sus.	4¾			1	Dome			45-30 ±6	10	1.7k	4/	5 x 8 x 4	Opt.	Opt., Metal	11 Pair	250.00		
	Plus B	Triamped Subwoof.	12	4¾	Cone	1	Dome			20-130 ±6	Inc.	130		13 x 15 x 15	Opt.	Opt., Metal	48 Pair	1100.00		
	Plus Set	Triamped Subwoof. & Sat.	12	4¾	Cone	1	Dome	W		20-30 ±6	Inc.	130, 2.2k		Three Pieces	Opt.	Opt., Metal	59 Sys.	1450.00		
	Plus C	Ac. Sus. Subwoof.	12							22-120 ±6	10	120	4/	13 x 13 x 13	Opt.	Opt., Metal	28	400.00		
	Plus A	Triamped Subwoof.	(2)12					W		-6 dB @ 16 Hz	Inc.	90/110/130		31 x 23 x 7	Opt.	Opt., Metal	165	2500.00		
	Super Set	Triamped Subwoof. & Sat.	(2)12	8¾	Cone	1	Dome	W		16-30 ±6	Inc.	90/110/130 and 800,5k		Three Pieces	Opt.	Opt., Metal	180 Sys.	3150.00		
	Karat 100	Ac. Sus.	8	1¼	Dome	1	Dome			36-30 ±6	87.5	15	850,4.1k	4/	9 x 13 x 8	Opt.	Opt., Metal	30 Pair	500.00	
Karat 200	Ac. Sus.	8¾	1¼	Dome	1	Dome			28-30 ±6	88.5	15	850,5.1k	4/	11 x 17 x 10	Opt.	Opt., Metal	42 Pair	650.00		
Karat 300	Ac. Sus.	10¼	1½	Dome	1	Dome			25-30 ±6	89	15	800,4k	4/	12 x 20 x 11	Opt.	Opt., Metal	58 Pair	800.00		
CT 800	Ac. Sus.	10¼	4¾	Cone	1	Dome			22-30 ±6	90	20	450,3k	4/	14 x 23 x 13	Opt.	Opt., Metal	84 Pair	1000.00		
(Continued)	CT 1000	Ac. Sus.	12	4¾	Cone	1	Dome			20-30 ±6	20	450,3.1k	4/	14 x 26 x 13	Opt.	Opt., Metal	110 Pair	1350.00		

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 W = Woofer, M = Midrange, T = Tweeter, ST = Super-tweeter	Anechoic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms, Nominal/Minimum	Dimensions Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange	Tweeter																
CANTON (Continued)	CT 2000	Bass Ref.	12	4 3/4	Cone	1	Dome				18-30	20	450.3k	4/	14 x 39 x 14	Opt.	Opt., Metal	200 Pair	2000.00		
	Ergo P	Ac. Sus.	(2)10	4 3/4	Cone	1	Dome				20-30 ±6	20	450.3.1k	4/	15 x 39 x 15	Opt.	Opt., Metal	126 Pair	2000.00		
	Ergo A	Triamped Ac. Sus.	(2)10	4 3/4	Cone	1	Dome	W				20-30 ±6	Inc.	130.2.2k	4/	15 x 39 x 15	Opt.	Opt., Metal	164 Pair	3500.00	
CASTLE ACOUSTICS	Clyde	Bass Ref.	5			1 1/4	Cone	No			65-22	89	10		7/6.2	15 x 9 x 9	Opt.	Black Foam	19 1/2 Pair	295.00	
	Tyne	Bass Ref.	6			1 1/4	Cone	No			55-22	89	10		7.5/6.2	18 x 10 x 9	Rswd.	Black Foam	28 Pair	375.00	
	Avon	Bass Ref.	8			1 1/4	Cone	No			50-22	89	10		7.5/6.8	20 x 12 x 11	Rswd.	Black Foam	43 Pair	525.00	
	Lincoln	Bass Ref.	8			1 1/4	Cone	No			55-22	88	10		8/6.5	18 x 9 x 11	Rswd.	Black Foam	33 Pair	495.00	
	Pembroke	Bass Ref.	8			1 1/4	Cone	No			48-22	88	10		8/7.5	22 x 11 x 12	Rswd.	Black Foam	51 Pair	625.00	
	Dover	Pas. Rad.	(2)8			1 1/4	Cone	No				42-22	89	10		8/6.5	25 x 13 x 14	Rswd.	Black Foam	70 Pair	825.00
CELESTION	SL600	Ac. Sus.	6			1 1/4	Dome				60-20 ±1	82	60	2.3k	8/	15 x 8 x 10	Alum. Nxtl. Opt.	None	22 1/2 Pair	1500.00	
	SL6	Ac. Sus.	6			1 1/4	Dome				60-20 ±1	82	60	2.3k	8/	15 x 8 x 10	Opt.	Brown Cloth	34 Pair	1000.00	
	D-100	Ac. Sus.	6 1/2			1	Dome				78-20	87	10	2.3k	8/	13 x 8 x 8	Wal. Vinyl	Brown Cloth	19 1/2 Pair	260.00	
	D-110	Ac. Sus.	8			1	Dome				65-20	88	20	2.3k	8/	18 x 10 x 8	Wal. Vinyl	Brown Cloth	29 1/2 Pair	400.00	
	O-250	Ac. Sus.	8	5	Cone	1	Dome				45-20	87	30	500.3k	8/	23 x 12 x 9	Wal. Vinyl	Brown Cloth	48 Pair	600.00	
CERWIN-VEGA	2000-15	Line Array	15	(6)6	Cones	3	Dhorm	M,T			30-21 ±2.5	100	5	250.3.5k	4/4	50 x 24 x 13	Oiled Wal.	Black Cloth	116 Pair	1400.00	
	2000-12	Line Array	12	(4)6	Cones	3	Dhorm	M,T			30-21 ±2.5	98	5	250.3.5k	8/6	47 x 17 x 13	Oiled Wal.	Black Cloth	83 Pair	1100.00	
	2000-10	Line Array	10	(2)6	Cones	3	Dhorm	M,T			30-21 ±2.5	94	5	250.3.5k	8/6	34 x 15 x 11	Oiled Wal.	Black Cloth	55 Pair	800.00	
	D-9	Array Vented	15	(2)6	Cones	3	Dhorm	M,T			30-18 ±2.5	101	5	500.3.5k	4/4	36 x 18 x 17	Vinyl Ven.	Brown Cloth	85 Pair	950.00	
	D-5	Vented	12	6	Cone	3	Dhorm	T			32-18 ±2.5	96	5	700.3.5k	8/4.5	28 x 16 x 11	Vinyl Ven.	Brown Cloth	44 Pair	630.00	
	D-7	Vented	12	(2)6	Cones	(2)3	Dhorms	M,T			30-18 ±2.5	98	5	3k	4/4	34 x 16 x 15	Vinyl Ven.	Brown Cloth	70 Pair	790.00	
	D-3	Vented	10	6	Cone	3	Dhorm	T			30-18 ±4	94	5	3k	8/6	26 x 14 x 11	Vinyl Ven.	Brown Cloth	39 Pair	530.00	
	D-2	Vented	10			3	Dhorm	T			30-18 ±4	94	5	3k	8/6	23 x 14 x 10	Vinyl Ven.	Brown Cloth	34 1/2 Pair	410.00	
	D-1	Vented	8			3	Dhorm	T			30-18 ±4	92	5	3k	8/6	20 x 11 x 10	Vinyl Ven.	Brown Cloth	49 Pair	310.00	
CHAPMAN	T-4	Air Sus.	8		Cone	1	Dome	No			40-20 ±3	88	25	3k	4/3	23 x 11 x 8	Oiled Oak	Black Knit	70 Pair	795.00	
	T-7	Air Sus.	10	5	Cone	1	Dome	No			32-20 ±3	86	50	200.3k	4/3	39 x 13 x 10	Oiled Oak	Black Knit	140 Pair	1695.00	
CIZEK	SW-1	Sealed	6 1/2			2	Cone	No			100-17 ±3	90	15	120	4/	12 x 12 x 3	Opt.	Brown Foam	8 Pair	195.00	
	SW-SW	Pas. Rad. Subwoof.	10					No			58-120 ±3	90	15		4/	14 x 14 x 16	Opt.	Brown Foam	32 Pair	249.00	
CLEMENS AUDIO SYSTEMS	Little "O"	Compr. Line	5 1/4			5	Ribbon				42-25 ±3	87	20	1.8k	6/4	16 x 10 x 7	Black	Black Plas.	32 Pair	600.00	
	JR-8 Bookshelf	Compr. Line	6 1/2			7	Ribbon				38-25 ±3	87	20	2.2k	6/4	24 x 12 x 13	Oiled Wal.	Black Cloth	45 Pair	800.00	
	RT-7 Tower	Compr. Line	8			7	Ribbon				32-25	88	20	2.2k	6/4	37 x 19 x 9	Opt.	Black Foam	70 Pair	1400.00	
	RT-21 Tower	Compr. Line	8			21 L	Ribbon				28-25	88	20	1.8k	6/4	54 x 19 x 11	Opt.	Black Foam	100 Pair	2600.00	
CSI	MDM-4	Ported	(2)6 1/2			3 1/2	Cone				60-17 ±3	89	15	1.5k	8/5	19 x 13 x 10	Rswd. Lam.	Brown Cloth	50 Pair	840.00	
	MDM-TA2	Time Align	6 1/2			3/4	Dome	T			60-20 ±3	87	15	2.5k	8/5	16 x 12 x 9	Rswd. Lam.	Alum.	40 Pair	990.00	
	MDM-TA3	Time Align	(2)6 1/2	3 1/2	Cone	3/4	Dome	M,T			45-20 ±3	91	15	1.8k, 7k	8/4	19 x 16 x 12	Rswd. Lam.	None	70 Pair	1190.00	
DAHLQUIST	DQM-9 "N"	Tuned Port	11	5	Cone	1	Dome				28-22	95	25	450.3.5k	8/6	14 x 25 x 13	Gray Nxtl.	Black	65 Pair	600.00	
	DQM-9	Tuned Port	11	5	Cone	1	Dome				28-22	95	25	450.3.5k	8/6	14 x 25 x 13	Wal. Grain	Black	65 Pair	560.00	
	DQM-9 Compact "N"	Tuned Port	9	5	Cone	1	Dome				35-22	92	25	450.3.5k	8/6	14 x 22 x 11	Gray Nxtl.	Black	55 Pair	490.00	
	DQM-9 Compact "N"	Tuned Port	9	5	Cone	1	Dome				35-22	92	25	450.3.5k	8/6	14 x 22 x 11	Wal. Grain	Black	55 Pair	450.00	
	DQM-7 Compact "N"	Tuned Port	9			1	Dome				37-22	90	25	3k	8/6	13 x 21 x 11	Gray Nxtl.	Black	50 Pair	365.00	
	DQM-7 Compact "N"	Tuned Port	9			1	Dome				37-22	90	25	3k	8/6	13 x 21 x 11	Wal. Grain	Black	50 Pair	325.00	
	DQM-5 Compact "N"	Tuned Port	9			1	Dome				37-22	90	25	3k	8/6	12 x 21 x 11	Wal. Grain	Black	46 Pair	300.00	
	DQM-5	Tuned Port	9			1	Dome				37-22	90	25	3k	8/6	12 x 21 x 11	Wal. Grain	Black	46 Pair	260.00	
	DQM-3 Nextel	Ac. Sus.	8			1	Dome				50-20	89	20	2k	8/6	11 x 18 x 10	Gray Nxtl.	Black	35 Pair	225.00	
	(Continued)	DQM-3	Ac. Sus.	8			1	Dome				50-20	89	20	2k	8/6	11 x 18 x 10	Wal. Grain	Black	35 Pair	200.00

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate level Crossover? W = Woofer, M = Midrange, T = Tweeter	Frequency Response, Hz	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
DAHLQUIST (Continued)	DQ-10	Inf. Baf. Phased Array	10	5, 1 1/4	Cone, Dome	3/4, 1/4	Dome, Piezo	T, ST		40-27 ± 3	86	60	400.1k, 5k, 12.5k	8/5	31 x 32 x 9	Opt.	Opt.	60	600.00
	DQ-20	Inf. Baf. Phased Array													43 x 22 x 10	Opt.	Opt.	70	900.00
	DQ-1W	Inf. Baf. Subwoof.	13							20-100	87	60		8/	26 x 19 x 15	Opt.	Dpt.	70	395.00
DAYTON WRIGHT	LCM-1		7			1	Dome	No		40-18 ± 3	89	25	4k	5.5/4	20 x 11 x 14	Black Cloth	Black Knit	22	499.00
	XW-10	Subwoof.	(2)10					No		15-38 Hz ± 3	87	30	38	5.5/4	22 x 22 x 16	Black Cloth	Black Knit	47	548.00
	System C	Dipole ES & Subwoof.	(4)10				ES	T		15-28 ± 3	88	50	38.4.7k	6.4/2	Five Pieces	Black Cloth Opt.	Black Knit Opt.	346 Sys.	5500.00
DBX	Soundfield One	Ac. Sus.	(4)10	(4)4	Cones	(6)1/2	Domes	No		20-20 ± 3	90	40	450, 3.15k	4/2.5	42 x 15 x 15	Dpt.	Brown Cloth	170 Pair	2500.00
DCM	Time Window 3	Trans. Line	8	6 1/2	Cone	(2)3/4	Domes	M, T		40-18 ± 2	90	15		8/4	39 x 16 x 12	Oak	Brown Cloth	90 Pair	1397.00
	Time Window 1A	Trans. Line	(2)6 1/2			(2)3/4	Domes			45-18 ± 3	91	10	2.8k	8/4	36 x 15 x 12	Dak	Brown Cloth	64 Pair	877.00
	QED 1A	Trans. Line	8			3/4	Dome			50-18 ± 2	90	10	2.5k	8/4	36 x 12 x 9	Oak	Brown Cloth	74 Pair	657.00
	Image-Master	Trans. Line	6 1/2	6 1/2	Cone	3/4	Dome	T		55-18 ± 2	93	5	2.5k	8/5	24 x 13 x 15	Opt.	Black Cloth	72 Pair	597.00
	Microphone	Ported Bass Ref.	6 1/2			3/4	Dome	T		60-18 ± 2	89	10	2.5k	8/5	13 x 9 x 12	Opt.	Foam Black Foam	37 Pair	437.00
DENNESEN	DE1	Hybrid ES	10	5	Cone	(3)3 Sq. In.	ES			30-30 ± 2	87	25	200, 3.5k	8/6	Six Pieces	Oiled Wal.	Black Foam	75	2850.00
DESIGN ACOUSTICS	PS-5	Ac. Sus.	5 1/2			1	Dome	T		70-22	90	15	2.4k	8/5.8	11 x 7 x 5	Wal.	Brown Cloth	9	350.00
	PS-6	Ac. Sus.	6 1/2			3/4	Dome			50-20	88	10	3k	8/5.7	8 x 12 x 11	Wal. Vinyl	Brown Cloth	24	239.90
	PS-10		10	5	Cone	1	Dome	T		48-22	90	15	190, 2.4k	8/5.6	14 x 11 x 14	Wal. Vinyl	Brown Cloth	25	499.00
	PS-30	Ac. Sus. Sat. & Subwoof.	12	5	Cone	1	Dome	T		40-22	90	15	140, 2.4k	8/4.3	Three Pieces	Wal. Vinyl	Brown Cloth	68	695.00
	PS-LF	Ac. Sus. Subwoof.	12							40-140	90	15	140	8/4.3	22 x 16 x 16	Wal.	Brown Cloth	50	350.00
	OS-1 Outdoor		5			1 1/2	Cone			90-18	82	10	3k	8/6.4	10 Dia. x 7	PVC Resin	Black Nylon	13	259.90
DESKTOP LOUDSPEAKER SYSTEMS	DLS-1/1A	Sat. & Subwoof.	(2)6 1/2	2 3/8	Cone	7/8	Dome			55-19 ± 3	86	25	175, 3.1k	5.5/4.6	Three Pieces	Opt., Lacq.	Black Knit	28 Sys.	569.00
	DLS-2	Sat. & Subwoof.	(2)6 1/2, (4)6 1/2	2 3/8	Cone	7/8	Dome			39-20 ± 3	87	20	175, 3.1k	6/5	Four Pieces	Opt., Lacq.	Black Knit	37 Sys.	719.00
DLK	1	Pas. Rad.	6 1/2			2	Cone	T		55-20 ± 4	90	5	3k	8/7	18 x 11 x 9	Oiled Wal.	Brown Cloth	27	119.95
	1 1/2	Inf. Baf.	(2)8			1	Dome	T		40-20 ± 4	90	5	3k	8/7	25 x 15 x 12	Oiled Wal.	Brown Cloth	39	199.95
DOLPHIN	A	Inf. Baf.	10	4 1/2	Cone	1	Dome	No		33-20 ± 3	85	55	200, 3.5k	4/2.9	35 x 15 x 9	Oiled Oak	Brown Knit	130 Pair	1000.00
DOMUS	Q2 Cube Speaker	Inf. Baf.	5 1/4			2	Cone	No		60-20 ± 4	89	5	3k	8/7	8 x 8 x 8	Brown Vinyl	Brown Cloth	12	90.00
	Q3 Bass Pedestal	Inf. Baf. Subwoof.	6 1/2					No		40-140 ± 4	89	5	140	8/7	24 x 8 x 8	Brown Vinyl	Brown Cloth	25	90.00
	Bullfrog Subwoofer	Pas. Rad. Subwoof.	(2)6 1/2					No		40-140 ± 4	89	5	140	8/7	13 x 16 x 15	Wood	None	32	175.00
	Digital Series Two	Vented	(2)8			3x7	Horn	T		35-22 ± 4	93	2	230	8/7	38 x 14 x 11	Wood Vinyl	Brown Cloth	43	269.95
	Digital Series Monitor 3	Vented	12	2	Dome	3x7	Horn	T		25-22 ± 3	91	5	500, 5k	8/7	29 x 16 x 14	Wood Vinyl	Brown Cloth	67	479.95
	SP 102	Vented	12	2	Dome	1	Horn	T		25-22 ± 3	91	5	500, 5k	8/7	12 x 29 x 14	Oak	Brown Cloth	67	479.95
	SP 101	Vented	8			1	Horn	T		35-22 ± 4	93	2	2.3k	8/7	38 x 14 x 11	Dak	Brown Cloth	43	269.95
	SP 100	Pas. Rad.	6 1/2			1	Piezo	No		45-22 ± 4	91	5	4.5k	8/7	26 x 14 x 9	Dak	Brown Cloth	37	199.95
Finch	Inf. Baf.	5 1/4			1	Dome	No		60-20 ± 6	90	5	4.5k	8/7	7 x 11 x 6	Opt.	Black Opt.	15	259.90	
OUNTECH	PCL-3	Closed Box	6 1/2		Cone	3/4	Dome			55-20 ± 3	83	50	6k	8/6	24 x 17 x 4	Oiled Oak	Opt., Knit	32 Pair	850.00
	PCL-5	Closed Box	(2)6 1/2			3/4	Dome			45-20 ± 3	91	30	6k	8/6	33 x 24 x 4	Oiled Oak	Black	60 Pair	1675.00
	PCL-30	Closed Box	(2)6 1/2			3/4	Dome			50-20 ± 3	90	30	6k	8/6	28 x 14 x 14	Opt.	Black	110 Pair	1795.00
	The Subwoofer	Ported Subwoof. Bi or Omni	(8)6 1/2							22-100		100 Inc.			10 x 10 x 30	Oak	Black	70 Pair	525.00
	Omni w/Remote									20-20 ± 1.5			80, 6k	8/	68 x 24 x 24	Opt.		500 Pair	

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type			Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Low Cutoff? W= Woofer, M= Midrange, T= Tweeter, S= Superwoofer	Anechoic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange	Tweeter																
DYNACD	310	Pas. Rad.	10	5	Cone	2x5	Piezo	M, T	25-25 ±3	96	10	1k, 5k	6/2	25 x 15 x 12	Wal. Vinyl	Black Knit	66 Pair	398.00 Pair			
	312	Pas. Rad.	12	5	Cone	2x5	Piezo	M, T	23-30 ±3	96	12	1k, 5k	6/2	25 x 15 x 12	Wal. Vinyl	Black Knit	70 Pair	498.00 Pair			
	123C	Pas. Rad.	12	5	Cone	2x5	Piezo	M, T	20-30 ±3	96	12	1k, 5k	6/2	39 x 15 x 12	Wal. Vinyl	Black Knit	80 Pair	598.00 Pair			
DYNAMIC ACOUSTICS	2200	Inf. Baf. Sat.	5 1/4			1	Dome	T	60-20 ±3	87.5	10	2.6k	8/7	8 x 14 x 6	Dpt., Lacq.	Black Knit	30 Pair	320.00 Pair			
	2602	Inf. Baf. Subwoof.	(2)8						35-100 ±3	89	20	100	8.5/8	17 x 17 x 17	Dpt., Lacq.	None	48 Pair	320.00 Pair			
DYNAMIC ELECTRO ACOUSTICS	Ovation	Ported	8			1	Dome		34-20 ±3	86	30	2.7k	8/7	11 x 11 x 36	Dpt., Lam.	Dpt., Knit	90 Pair	990.00 Pair			
DYNAUDIO	DAK2-120	Aperiodic	9			1	Dome		45-30	92	20	1.5k	8/6	19 x 10 x 10	Rswd. Ven.	Black Knit	60 Pair	498.00 Pair; Kit, 339.00 Pair			
	DAK2-160	Aperiodic	9			1	Dome		35-30	94	20	1.5k	8/6	29 x 14 x 13	Rswd. Ven.	Black Knit	110 Pair	598.00 Pair; Kit, 438.00 Pair			
	DAK3-120 Kit	Aperiodic	9	2	Dome	3/4	Dome		40-40	92	20	1k, 5k	8/6	29 x 14 x 13		Black Knit	115 Pair	570.00 Pair; Kit, 570.00 Pair			
	DAK3-160	Aperiodic	9	2	Dome	3/4	Dome		35-40	94	20	800, 5k	8/6	29 x 14 x 13	Rswd. Ven.	Black Knit	120 Pair	1290.00 Pair; Kit, 675.00 Pair			
	DAK3-210	Aperiodic	12	2	Dome	3/4	Dome		28-40	94	20	800, 5k	8/6	34 x 16 x 15	Rswd. Ven.	Black Knit	150 Pair	1760.00 Pair; Kit, 845.00 Pair			
	DAK4-210 Kit	Aperiodic	12	2	Dome	1 3/4	Domes		28-40	94	20	800, 5k, 10k	8/6	34 x 16 x 15		Black Knit	160 Pair	935.00 Pair; Kit, 935.00 Pair			
	The Consequence	Compound	(2)12, 6 1/2	2	Dome	1.1, 0.8	Domes		20-40 ±3	94	100	100, 600, 3k, 4.6k	8/6	16 x 24 x 49	Rswd. Ven.	Black Knit	570 Pair	9800.00 Pair			
EGO LOUDSPEAKERS	Series II SE 6	Ported	6 1/2			1	Dome		50-21	93	10	3k	6/	14 x 9 x 8	Wal. Ven.	Black Knit	28 Pair	278.00 Pair			
	Series II SE 8	Ported	8	3	Cone	1	Dome		40-20	95	10	2k, 5k	6/4		Wal. Ven.	Black Knit	52 Pair	390.00 Pair			
	Series II SE 10	Ported	10	5	Cone	1	Dome		36-21	96	10	700, 6k	6/4		Wal. Ven.	Black Knit	72 Pair	590.00 Pair			
	Series II SE 12.3	Ported	12	5	Cone	1	Dome	M, T	30-21	97	10	700, 5k-8k	6/4		Wal. Ven.	Black Knit	96 Pair	790.00 Pair			
	Series II Super Tower	Pas. Rad.	(2)10	5	Cone	1	Dome	M, T	22-21	97	10	500, 5k-8k	6/4		Wal. Ven.	Black Knit	134 Pair	1190.00 Pair			
ELECTRO-VOICE	CD35	Vented	12	8		4			40-30 ±3	92	3	1.5k, 8k	6/5	32 x 23 x 11	Oak Ven.	Brown Cloth	65	550.00			
	CD35i	Vented	12	8		4		M, T	40-30 ±3	92	3	1.5k, 8k	6/5	32 x 23 x 11	Wal. Ven.	Brown Cloth	66	750.00			
	Interface 1, Series II	Vented		8	Cone	1 1/2	Dome	T	56-18 ±3	92	3.6	76, 1.5k	8/5	21 x 11 x 10	Wal. Vinyl	Brown Cloth	23	199.99			
	Interface 2, Series II	Pas. Rad.	10	8	Cone	1 1/2	Dome	T	47-18 ±3	92	3.6	66, 1.5k	8/5	24 x 14 x 11	Wal. Vinyl	Brown Cloth	25	259.99			
	Interface 3, Series II	Pas. Rad.	12	8	Cone	1 1/2	Dome	T	40-18 ±3	92	3.6	57, 1.5k	8/5	25 x 15 x 13	Wal. Vinyl	Brown Cloth	33	299.99			
	Interface A, Series IV	Pas. Rad.	12	8	Cone	1 1/2	Dome	T	46-18 ±2.5	90	6	64, 1.5k	8/5	25 x 15 x 8	Wal. Ven.	Brown Cloth	30	359.99			
ENCORE	3	Slot Loaded	10			2 1/2	Cone		40-20 ±3	94	10	2.5k	4/4	22 x 13 x 11	Oak	Black Knit		149.95			
	4	Slot Loaded	12	5	Cone	2 1/2	Cone		35-20 ±3	95	10	800, 4.5k	4/4	26 x 15 x 11	Oak	Black Knit		199.95			
	5	Slot Loaded	12	5	Cone	2x5	Piezo	M, T	35-20 ±3	95	10	800, 4.5k	4/4	26 x 15 x 11	Oak	Black Knit		239.95			
	7	Slot Loaded	12	(2)5	Cones	2x5	Piezo	M, T	35-20 ±3	95	10	800, 4.5k	4/4	38 x 15 x 11	Oak	Black Knit		299.95			
ENERGY	Reference	Bass Ref.	7			1 1/2	Dome		25-45 ±2	86	20	1.5k	8/4	35 x 11 x 14	Opt.	Opt., Knit	160 Pair	2500.00 Pair			
	Connoisseur	Bass Ref.	7			1 1/2	Dome		30-34 ±3	86	20	1.5k	8/4	25 x 11 x 12	Black Vinyl	Black Knit	68 Pair	1100.00 Pair w/ Stands			
	Reference	Bass Ref.	7			1 1/2	Dome		30-45 ±3	86	20	1.5k	8/4	26 x 11 x 12	Wal. Vinyl	Black Knit	68 Pair	800.00 Pair w/ Stands			
	Pro Monitor	Bass Ref.	7			1 1/2	Dome		35-23 ±3	86	15	1.8k	8/4	23 x 12 x 12	Wal. Vinyl	Black Knit	50 Pair	450.00 Pair w/ Stands			
(Continued)	ESM-2	Bass Ref.	8			1	Dome		34-22 ±3	86	12	2k	8/4	23 x 11 x 11	Wal. Vinyl	Black Knit	48 Pair	330.00 Pair			



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When auditioning speakers, it's best to use familiar material, preferably good clean recordings of acoustic instruments. Close your eyes. Do the speakers provide a realistic, wide sound stage with front to back depth? Does the sound have an open, airy quality? Do voices come through cleanly without nasality or boxiness? Are individual instruments clearly delineated and precisely focused in the stereo space defined by the speakers?



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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer			Midrange			Tweeter		Separate Level Controls: W = Woofer, M = Midrange, T = Tweeter, ST = Super Tweeter	Anechoic Frequency Response, Hz to Hz, ± dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	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													
ESTRANSLATOR (Continued)	310	Compr.	12	2	Cone	1	Dome		38-20	110	100	700,4k	8.5	38 x 17 x 10	Oiled Wal.	Black Knit	46 Pair	299.00		
	320	Compr.	(2)10	(2)2	Cones	(2)1	Domes		35-22	110	150	700,4k	8.5	44 x 21 x 10	Oiled Wal.	Black Knit	64 Pair	600.00		
EUPHONIC AUDIO	Nymph	Vented	6½			1	Dome		40-18 ±3	89	20	2k	6.4	22 x 10 x 15	Opt.	Brown Foam	62 Pair	895.00		
	EA-2	Vented	8			1	Dome		38-20 ±3	93	20	500,2.3k	6.4	32 x 12 x 12	Oiled Wal.	Brown Knit	88 Pair	695.00		
	EA-3	Ac. Sus.	8			1	Dome		55-20 ±3	93	20	2.3k	6.4	22 x 10 x 12	Oiled Wal.	Brown Knit	56 Pair	495.00		
FANFARE ACOUSTICS	Tempo	Tuned Port	8			1	Dome		45-20 ±3	90	20	1.5k	8.6	24 x 12 x 11	Opt.	Opt. Knit	35	479.00		
FAVORITE MUSIC SYSTEMS	FM-2	Inf. Baf.	6½			¾, 1½	Domes	No	50-35 ±2	87	35	2.2k, 14k	8/5.5	20 x 10 x 9	Opt.	Opt.	80 Pair	2450.00		
	FM-4	Inf. Baf.	8			1½	Dome	No	45-25 ±3	88	35	2.2k	8/6	20 x 12 x 10	Oiled Wal.	Black Knit	46 Pair	1250.00		
FISHER	ST-845	Bass Ref.	15	6	Cone	4	Horn		38-20	93	15	1.5k, 6k	8/	18 x 32 x 14	Hick Vinyl	Black Knit	96 Pair	329.95		
	ST-830	Bass Ref.	15	5	Cone	3	Cone		38-20	93	10	1.5k, 6k	8/	18 x 32 x 15	Hick Vinyl	Black Knit	89 Pair	249.95		
	DS-825	Bass Ref.	12	5	Cone	3	Cone		45-20	92	10	1.5k, 6k	8/	14 x 29 x 13	Hick Vinyl	Black Knit	58 Pair	199.95		
	DS-822	Bass Ref.	10	5	Cone	3	Cone		45-20	91	7.5	1.5k, 6k	8/	13 x 27 x 11	Hick Vinyl	Black Knit	48 Pair	149.95		
	DS-810	Bass Ref.	8	5	Cone	3	Cone		50-20	91	5	1.5k, 6k	8/	12 x 25 x 11	Hick Vinyl	Black Knit	37 Pair	129.95		
FOCAL	280 DB	Bass Ref.	6.5			1.2	Dome		55-20 ±3	90	30	300,3.7k	8/4	10 x 10 x 15	Oiled Wal.	Black Knit	38 Pair	450.00		
	The Egg	Ac. Sus.	6.5			1.2	Dome		58-20 ±3	90	30	250,3.2k	8/4	12 x 10 x 16	Fbgl.		45 Pair	300.00		
	300 DB	Bass Ref.	8			1.2	Dome		41-20 ±3	91	35	300,3.5k	8/4.2	11 x 13 x 33	Oiled Wal.	Black Knit	90 Pair	600.00		
	400	Trans. Line	8	5	Cone	1.2	Dome		35-20 ±3	91	50	450,5k	8/4.5	13 x 15 x 45	Nat. Oak	Brown Knit	138 Pair	485.00		
	600	Bass Ref.	10	6.5	Cone	1.2	Dome		50-20 ±3	95	50	350,4.1k	8/6	19 x 16 x 44	Oiled Wal.	Black Knit	148 Pair	900.00		
FOURIER SYSTEMS	1L	Vented	10	4¾	Cone	1	Dome		32-20 ±3	90	25	500,4k	4/3	16 x 11 x 40	Oiled Wal.	Black Knit	142 Pair	1675.00		
	8	Vented	8			1	Dome		41-20 ±3	90	25	2k	4/	11 x 12 x 22	Oiled Wal.	Black Foam	54 Pair	799.00		
	6	Vented	6½			1	Dome		55-20 ±3	90	25	3k	8/3.5	9 x 10 x 18	Oiled Wal.	Black Foam	42 Pair	499.00		
	44	Vented	(2)4½			¾	Dome		67-20 ±3	90	25	10k	4/	7 x 8 x 19	Oiled Wal.	Black Foam	32 Pair	349.00		
FRANKMANN RESEARCH	FR III	Inf. Baf.	(2)12	6	Cone		Horn	T	32-20	92	20	200,4k	8/5	Three Pieces	Opt.	Opt.		695.00		
	FR V	Inf. Baf.	(4)12	(2)6	Cones		Horn	T	28-20	94	20	200,4k, 10k	8/6	Three Pieces	Opt.	Opt.		995.00		
	FR IIB	Inf. Baf.	(2)12				Cone		32-200	92	20		8	29 x 20 x 20	Opt.	Opt.		395.00		
	FR IVB	Inf. Baf. Subwoof.	(4)12						28-200	94	20		8/	30 x 30 x 20	Opt.	Opt.		595.00		
	FR VIIIB	Inf. Baf. Subwoof.	(8)12						19-200	96	20		8/	50 x 34 x 25	Opt.	Opt.		1100.00		
FRAZIER	CAO-1	Tuned Port	8			3	Cone		50-14	93	5	3k	8/	19 x 11 x 11	Wal. Vinyl	Black Knit	40 Pair	240.00		
	Monte Carlo D	Tuned Port	8			1	Dome		50-22	94	5	4k	8/	19 x 11 x 12	Oiled Wal.	Black Knit	60 Pair	350.00		
	Mark IV D	Tuned Port	10			1	Dome	T	40-22	96	5	3k	8/	24 x 14 x 12	Oiled Wal.	Black Knit	90 Pair	550.00		
	Concerto D	Tuned Port	10	3x7	Horn	1	Dome	M,T	35-22	97	5	2k, 4k	8/	22 x 16 x 17	Oiled Wal.	Black Knit	110 Pair	750.00		
	Mark V D	Tuned Port	12	4½	Cone	1	Dome	M,T	35-22	97	5	500,4k	8/	26 x 14 x 13	Opt.	Black Knit	112 Pair	950.00		
	Seven D	Tuned Port	12	4½	Cone	1	Dome	M,T	25-22	98		500,4k	8/	29 x 19 x 17	Oiled Wal.	Black Knit	195 Pair	1200.00		
	Eleven	Tuned Port	12, 15	(2)4½	Cones	(2)3	Horns	M,T	16-25	107		400,4k	4/	55 x 30 x 18	Oiled Wal.	Black Knit	450 Pair	3800.00		

LOUDSPEAKERS

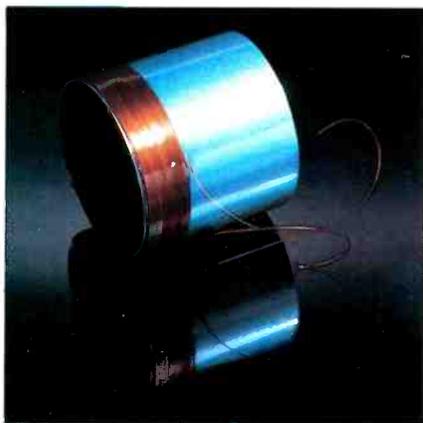
MANUFACTURER	Model	Design Principle	Enclosure or System Type			Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	SPL	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms	Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange	Tweeter																
FRIED PRODUCTS	Beta	Line Tun.	6½				2½	Cone/Dome	T	60-16 ±3	87	25	1.5k	8/6	8 x 8 x 14		Wal. Vinyl	Black	28 Pair	290.00	
	Q 3	Line Tun.	8				1	Dome	T	45-18 ±3	89	25	2k	8/6	11 x 9 x 20		Wal. Vinyl	Black	40 Pair	390.00	
	A/3	Line Tun.	8				1	Dome	T	40-18 ±3	90	25	2k	8/6	13 x 10 x 23		Wal. Vinyl	Black	35 Pair	580.00	
	Studio IV	Line Tun.	8				¾	Dome		26-22 ±3	91	20	2.7k	8/6	12 x 18 x 39		Wal. Vinyl	Black	80 Pair	1040.00	
	G/2A	Line Tun.	10	6½	Cone	¾	Dome			21-22 ±3	91	20	2.7k	8/6	16 x 18 x 44		Oiled Wal.	Black Foam	100 Pair	1840.00	
	C/2 Satellite	Press. Ref. Sat.	6½				¾	Dome		60-22 ±3	91	25	2.7k	8/6	10 x 9 x 13		Oiled Wal.	Black Foam	18 Pair	400.00	
	O/2	Trans. Line Subwoof.	10							20-100 ±3	92	25	100	8/6	24 x 13 x 31				45 Pair	700.00	
	SM/2	Trans. Line Subwoof.	12							20-100 ±3	92	25	100	8/6	29 x 15 x 38				50 Pair	800.00	
FULTON	Tempo	Oval Window	8	2¼	Cone	2¼	Cone			40-40 ±2	92	25	55, 1.4k, 9k	8/7	12 x 10 x 19		Sim. Wood	Black	90 Pair	595.00	
	Crescendo	Oval Window	(2)8	8	Cone	3½, 2¼	Cones			20-40 ±1.5	89	40	40, 122, 850, 4.5k, 9k	8/6	12 x 12 x 50		Oiled Wal.	Brown	290 Pair	2495.00	
	Symphony																		90 Pair	5995.00	
GABRIEL	Gabriel	Ported	12	(2)5	Cones	½x2	Leaf			30-50	90	15	500.5k	8/6	15 x 18 x 40		Koa	Black Knit	75 Pair	1100.00	
GENESIS PHYSICS	44	Pas. Rad.	8			0.8	Dome			27-25 +2, -4	88	30	1.1k	6/4.5	18 x 33 x 9		Wood Vinyl		84 Pair	600.00	
	G 210	Pas. Rad.	8			1	Dome			30-20 ±4	89	20	45, 1.8k	8/	31 x 17 x 11		Wood Vinyl		84 Pair	560.00	
	G 20	Pas. Rad.	8			1	Dome			34-20 ±4	89	20	45, 1.8k	8/	28 x 14 x 11		Wood Vinyl		84 Pair	450.00	
	G 10	Pas. Rad.	8			1	Dome			48-20 ±4	89	12	1.8k	8/	24 x 12 x 10		Wood Vinyl		84 Pair	340.00	
	G 1	Pas. Rad.	8			1	Dome			55-20 ±4	89	10	1.8k	8/	19 x 11 x 8		Wood Vinyl		84 Pair	260.00	
GOETZ SYSTEMS	MS-1	Vented	8	4	Cone	¾	Dome	No		35-25 ±3	90	25	600, 4.2k	8/	34 x 15 x 9		Opt.	Black Knit	58 Pair	1500.00	
	MS-2	Vented	10	5¼	Cone	¾	Dome	No		33-25 ±3	92	25	400, 4.2k	8/	37 x 16 x 10		Opt.	Black Knit	70 Pair	2000.00	
	MS-3	Vented	13	5¼	Cone	¾	Dome	No		30-25 ±3	92	25	400, 4.2k	8/	41 x 20 x 13		Opt.	Black Knit	85 Pair	2500.00	
GOLDMUND	Dialogue	Ported	(2)5	5	Cone	1	Dome			30-18	96		None	6.4	46 x 14 x 14		Lacq.	Black Knit	250 Pair	3500.00	
GOLD SOUND	Kit #1	Bass Ref.	6½			1	Dome			58-20 ±3	92	5	2.5k	4/	17 x 11 x 7		Opt.	Opt.	25 Pair	Kit, 99.00	
	Kit #2	Bass Ref.	8	5	Cone	1	Dome			46-20 ±3	91	5	200, 4k	4/	19 x 12 x 10		Opt.	Opt.	36 Pair	Kit, 149.00	
	Kit #3	Bass Ref.	10	5	Cone	1	Dome			42-20 ±3	92	5	200, 4k	4/	24 x 13 x 12		Opt.	Opt.	41 Pair	Kit, 179.00	
	Kit #4	Bass Ref.	12	5	Cone	1	Dome			38-20 ±3	93	5	200, 4k	4/	25 x 14 x 12		Opt.	Opt.	58 Pair	Kit, 198.00	
	Kit #5	Bass Ref.	15	6½	Cone	1¼	Dome			37-20 ±3	94	5	150, 3k	4/	30 x 18 x 16		Opt.	Opt.	88 Pair	Kit, 278.00	
	Kit #6	Bass Ref.	(2)10	6½	Cone	1¼, 4x5	Dome, Ribbon			37-30 ±3	94	5	150, 3k, 8k	8/	36 x 14 x 11		Opt.	Opt.	69 Pair	Kit, 348.00	
	Kit #7	Bass Ref.	(2)12	7½	Cone	1¼, 3½x4½	Dome, Ribbon	M		36-35 ±3	95	5	200, 2k, 8k	8/	46 x 15 x 11		Opt.	Opt.	89 Pair	Kit, 478.00	
	Kit #8	Bass Ref.	(2)15	7½	Cone	1¼, 3½x4½	Dome, Ribbon	M		34-35 ±3	97	5	200, 2k, 8k	8/	46 x 22 x 24		Opt.	Opt.	117 Pair	Kit, 518.00	
	Kit #9	Bass Ref.	10	3	Dome	¾, 4x5	Dome, Ribbon			36-30 ±3	90	10	700, 4k, 8k	8/	25 x 14 x 12		Opt.	Opt.	74 Pair	Kit, 398.00	
	Kit #10	Bass Ref.	12	5	Cone	1¼, 3½x4½	Dome, Ribbon	M, T		33-35 ±3	90	10	600, 2k, 8k	8/	36 x 14 x 11		Opt.	Opt.	76 Pair	Kit, 628.00	
	Kit #11	Bass Ref. Sat. & Subwoof.	15	7½	Cone	5x5	Horn	M, T		28-21 ±3	93	5	300, 6k	8/	Three Pieces		Opt.	Opt.	248 Sys.	Kit, 598.00	
	Kit #11 Pro	Bass Ref.	15	7½	Cone	5x5	Horn	M, T		45-21 ±3	97	5	300, 6k	8/	30 x 21 x 18		Opt.	Opt.	109 Pair	Kit, 828.00	
(Continued)	Kit #12	Bass Ref.	15	8x8	Horn	5x5	Horn	M, T		28-21 ±3	93	5	600, 5k	8/	36 x 24 x 18		Opt.	Opt.	132 Pair	Kit, 888.00	

MUSICAL COMPOSITION



If you'd like to understand what makes a Dahlquist DQM monitor loudspeaker so uncommonly musical, you'll have to examine its composition.

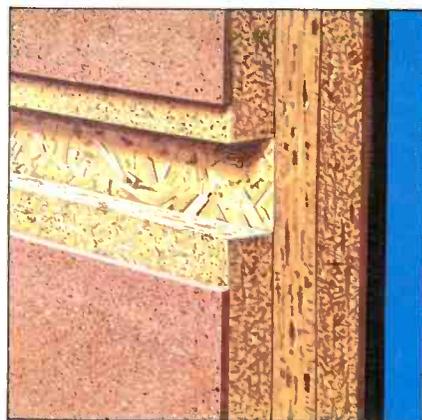
What you'll find is some very special technology—like drivers with flat-wound ribbon-wire voice coils (which make the drivers extremely precise and very fast), low coloration PVA impregnated cone materials and high rigidity chassis. DQM drivers track together across a wide dynamic range so balance and image remain intact regardless of power level.



Touch the baffle on which the drivers are mounted—notice that we've coated it with thousands of black, electrostatically aligned fibers. This anti-diffraction technique enhances accurate imaging and contributes to the open, spacious DQM sound.



Feel the side of a DQM system as you listen. The minimal vibration of the enclosure accounts for the lack of any "boxy" sound colorations. The unique "Un-box", as we call it, is engineered from a special graded-density cabinet material. Its five layers, ranging from rigid fine-particle outer surfaces to a softer large-particle center, absorb internal vibration, suppress spurious resonances and damp enclosure excitation.



Inspect the overall construction, detail and finishing. Every DQM, regardless of price, is built to the same uncompromising standard of workmanship and stands demonstrably at the top of its class. (Yet, surprisingly, DQM systems are priced most reasonably from \$200 to \$600 each.)

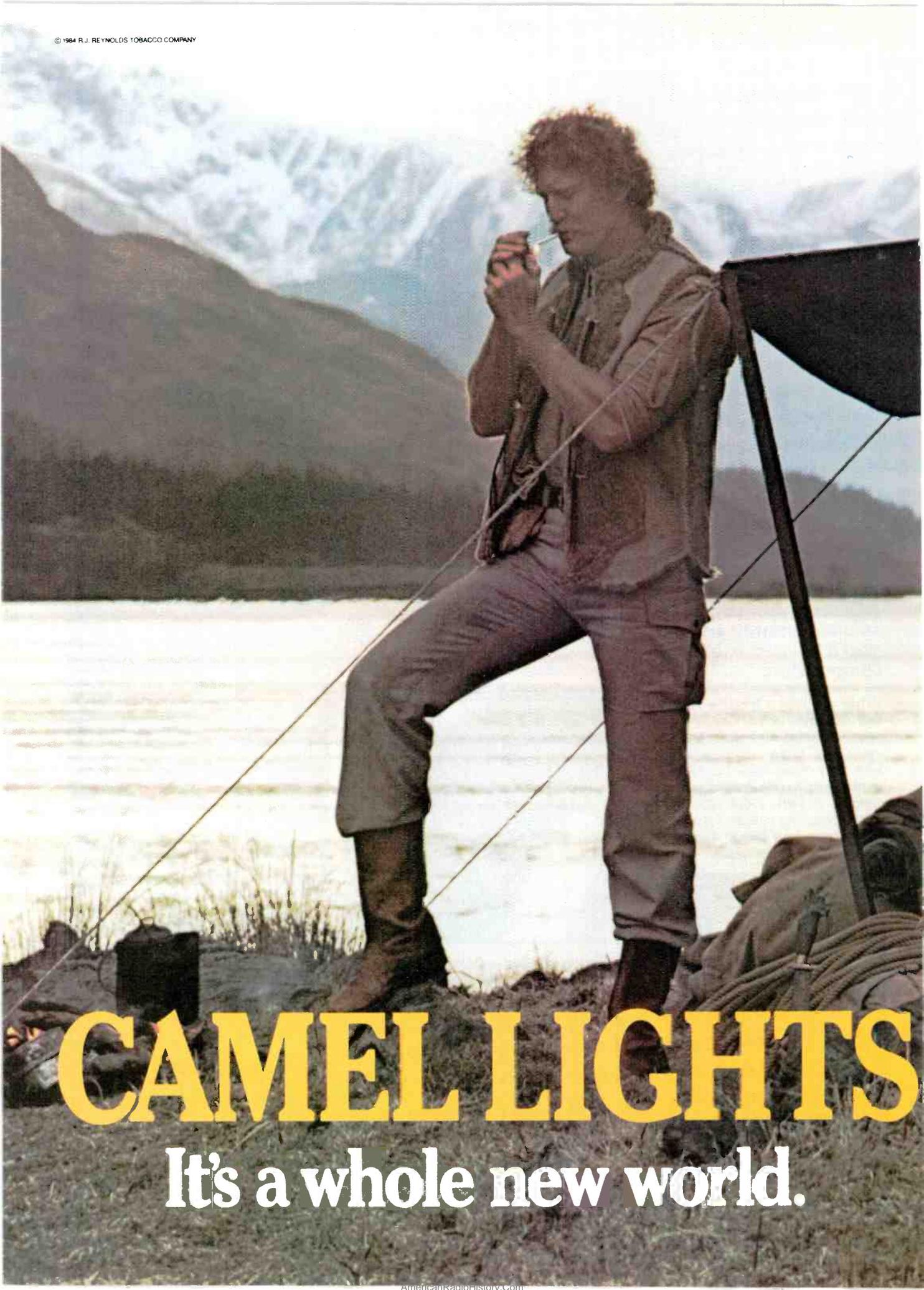
Take the time to discover Dahlquist's DQM monitors—their magnificent performance is the result of a very musical composition.

DQM SERIES
high performance monitors

Discover the energy

DAHLQUIST

Dahlquist, Inc., 601 Old Willets Path, Hauppauge, NY 10788
(516) 234-5757 In Canada: Evolution Audio, Ontario
Enter No. 24 on Reader Service Card

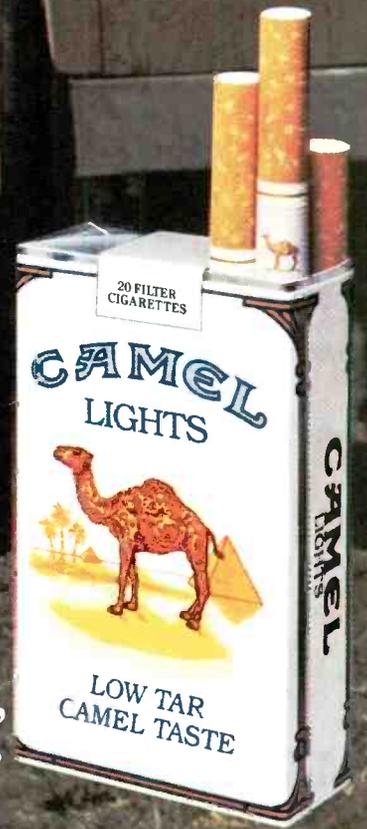


CAMEL LIGHTS

It's a whole new world.

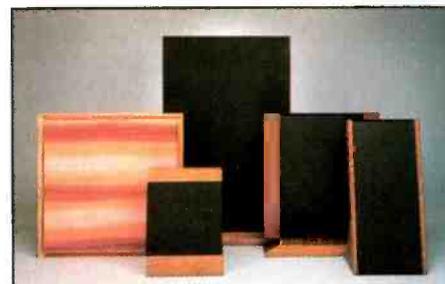
9 mg. "tar", 0.8 mg. nicotine av. per cigarette by FTC method.

Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.



Today's
Camel Lights,
unexpectedly mild.

WE DEVELOPED THE REFERENCE FOR THE DIGITAL AGE.



You can appreciate this unique technology in SFI's (left to right) Music Frame, Pyramid, Digital Reference System, Digital 20 and Digital 10 speaker systems.



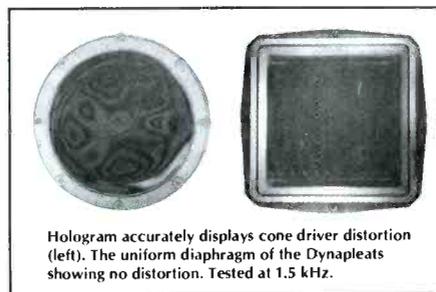
You may be reading about SFI technology for the first time. Actually, SFI's audio products are a culmination of technologies developed by Sawafuji, a brother company established in Japan in 1922.

Over the years, their research with flat wave transducers has led to a number of international transducer patents and contributed to the growth of this important company. Today, the company is renowned as a supplier of high technology designs and components to numerous worldwide firms.

The Digital Reference loudspeaker system has evolved out of SFI's extensive research, development and experience with high performance, high quality transducers.

Eschewing conventional cone drivers, the Digital Reference employs a completely new transducer technology to accurately reproduce sound. These revolutionary new dynamic drivers, called Dynapleats, allow sound to emit evenly and simultaneously from their entire surface, thereby avoiding the deformation

and uneven flexing characteristics of a conventional cone driver.



Hologram accurately displays cone driver distortion (left). The uniform diaphragm of the Dynapleats showing no distortion. Tested at 1.5 kHz.

What you hear is sound with improved transient and linear phase response with virtually no distortion.

Unlike electrostatics and other planar speakers with their inherent problems, the Dynapleats are capable of extremely accurate sound reproduction, full frequency response, extended bass and a wide dynamic range.

Because of the unique Dynapleats, sound is radiated equally from both the front and back sides of the Digital Reference. Aside from simplifying the problem of placement for proper stereo

imaging, the bipolar pattern contributes to an openness of sound, increased definition, localization and realism.

The real benefit of SFI's revolutionary technology is in the listening. The Digital Reference's natural spacious sound and superb imaging is unsurpassed. So are the aesthetics in this unique, ultra-thin loudspeaker system which accommodates any environment. And, due to distortion free sound, listening to the Digital Reference over many hours is never fatiguing.

The digital age is here. Enjoy it more with a Digital Reference. Contact SFI for complete details and information on the Digital Reference, other speakers incorporating Dynapleats, and other SFI audio products.

SFI

Sawafuji America Corp.

23440 Hawthorne Boulevard,
Suite 130, Torrance, CA 90505,
(213) 373-0620, Telex: 756921

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LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type			Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Sagittal Level Control? W = Woofer, M = Midrange, T = Tweeter, ST = Super-tweeter		Analogic Frequency Response, Hz to kHz, ± dB		SPL, 1 Watt/1 Meter, dB		Recommended Min. Amp. Pwr., 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	
HEYBROOK	HB-3	Inf. Baf.	10	4 1/2	Cone	3/4	Dome	No	35-20 ± 3	89	15	800,5k	8/6	14 x 12 x 25	Opt.	Black Foam	94 Pair	898.00 Pair; 998.00 Pair w/ Stands														
	HB-2	Bass Ref.	6 1/2			1	Dome	No	40-20 ± 3	84	20	3k	8/6	9 x 9 x 16	Opt.	Black Foam	40 Pair	489.00 Pair; 589.00 Pair w/ Stands														
	HB-1	Inf. Baf.	8			1	Dome	No	42-18 ± 3	89	10	4k	8/6	11 x 9 x 19	Opt.	Black Foam	40 Pair	339.00 Pair; 439.00 Pair w/ Stands														
HITACHI	HSA 2000	Pas. Rad.	10	4	Cone	2	Cone		45-20			2k,6k	8/	13 x 11 x 32	Hick.	Black Knit	52 Pair	140.00 Pair														
	HSA 2104	Inf. Baf.	10	5	Cone	2x3	Cone		45-20	90		6k	8/	13 x 12 x 23	Hick.	Black Knit	24	100.00														
	HSA 3104	Inf. Baf.	10	5	Cone	2x3	Cone		40-20	90		2k,6k	8/	14 x 12 x 24	Hick.	Black Knit	28	130.00														
	HSA 3124	Inf. Baf.	12	5	Cone	2x3	Cone		35-20	90		2k,6k	8/	15 x 13 x 26	Hick.	Black Knit	37	170.00														
	HSA 4122	Pas. Rad.	12	4 5/8	Cone	2 1/2 x 5 1/2	Piezo		30-30 ± 4	91		1.5k,5k	8/	14 x 11 x 40	Wal.	Black Knit	54	220.00														
H.L.X.	2C	Ported	8			3/4	Dome		42-22	92	10	5k	8/8	10 x 10 x 18	Opt.	Brown Knit	40 Pair	140.00 Pair														
	22	Ac. Sus.	(2)8			3/4	Dome		38-22	92	10	5k	4/4	12 x 12 x 22	Opt.	Brown Knit	52 Pair	200.00 Pair														
	5B	Trans. Line	10			2 1/2	Cone		34-22	92	10	4.3k	8/4	12 x 12 x 22	Opt.	Brown Knit	66 Pair	260.00 Pair														
	15	Trans. Line	10	5 1/4	Cone	1	Dome		34-24	92	10	700,5k	8/4	12 x 12 x 24	Opt.	Brown Knit	72 Pair	340.00 Pair														
	13	Ported	12	5 1/4	Cone	1	Dome		30-24	92	10	700,5k	8/4	16 x 12 x 28	Opt.	Brown Knit	84 Pair	400.00 Pair														
IMAGED STEREO	Imager	Interactive	(2)8			1 1/2	Dome	No	45-20 ± 3.5	93	10	None	4.4	14 x 11 x 25	Wal. Ven.	Brown Cloth	96 Pair	795.00 Pair														
IMAGE LABORATORIES	IL-800	Pas. Rad.	(2)8	(2)5	Cones	(2)1	Domes		35-20 ± 3	92	15	600,2.5k	4/3	14 x 14 x 36	Diled Wal.	Black Cloth	55	399.00														
	IL-600	Pas. Rad.	(2)6 1/2			(2)1	Domes		40-20 ± 3	91	15	2.5k	4/3	13 x 13 x 24	Wal. Lam. Wal.	Black Cloth	35	249.00														
	IL-500	Pas. Rad.	(2)5			(2)1	Domes		45-20 ± 3	90	10	2.5k	4/3	12 x 12 x 20	Wal. Lam. Wal.	Black Cloth	25	179.00														
INFINITE SLOPE	.6	Tuned Port	8			1	Dome	No	45-18 ± 3	90	20	2.5k	8/6	11 x 13 x 23	Opt.	Black Knit	70 Pair	579.00 Pair														
	1	Sealed	6 1/2, 8	6 1/2	Cone	1	Dome	No	38-20 ± 3	90	40	300,2k	8/6	13 x 15 x 31	Opt.	Black Knit	120 Pair	919.00 Pair														
	2	Sealed	10, 12	6 1/2, 2	Cone, Dome	3/4	Dome	No	30-25 ± 3	90	50	150,1k, 4k	8/6	18 x 17 x 47	Opt.	Black Knit	300 Pair	2195.00 Pair														
INFINITY	Reference Standard Series III RS 1B	Servo	(12)12	(24) 4x6x 1/2	EMIMs	(72) 1/2x2	EMITs	M, T, ST	16-40 ± 2	87	100	70,5k	4/3	Four Pieces	Rswd.	Brown Cloth	1200 Sys.	31,500 Sys.														
		Servo	(12)8	(14) 4x6x 1/2	EMIMs	(8) 1/2x2	EMITs	M, T, ST	25-32 ± 2	87	75	140,700, 3k,8k	6/4	Four Pieces	Oak	Brown Cloth	400 Sys.	5295.00 Sys.														
	RS 11B	Inf. Baf.	(4)10	(6) 4x6x 1/2	EMIMs	(6) 1/2x2	EMITs	M, T, ST	29-32 ± 2	86	60	150,800, 4k,8k	6/4	48 x 23 x 18	Oak	Brown Cloth	200 Sys.	3195.00 Sys.														
	RS 3B	Sealed Box	(2)10	1 1/2	Dome	1/2x2	EMIT	M, T	35-32 ± 3	88.5	50	600,4k	6/4	48 x 18 x 8	Oak	Brown Cloth	82	679.00														
	RS 4B	Sealed Box	(2)8	1 1/2	Dome	1/2x2	EMIT	M, T	40-32 ± 3	88.5	40	600,4k	6/4	42 x 15 x 11	Oak	Brown Cloth	55	519.00														
	RS 5B	Sealed Box	10	1 1/2	Dome	1/2x2	EMIT	M, T	43-32 ± 3	88.5	35	600,4k	6/4	25 x 16 x 10	Oak	Brown Cloth	44	399.00														
	RS 6B	Sealed Box	8	1 1/2	Dome	1/2x2	EMIT	M, T	45-32 ± 3	88.5	35	600,4k	6/4	22 x 14 x 10	Oak	Brown Cloth	34	299.00														
	RS 7B	Sealed Box	8	4	Cone	1/2x2	EMIT	M, T	45-32 ± 3	88	20	500,4k	6/4	22 x 13 x 10	Oak	Brown Cloth	32	218.00														
	RS 8B	Sealed Box	6 1/2	4	Cone	3/4	Dome		46-22 ± 3	88	20	500,4k	6/4	22 x 12 x 9	Oak	Brown Cloth	28	178.00														
	RS 9B	Sealed Box	6 1/2			1	Dome		48-22 ± 3	88.5	20	3k	6/4	18 x 12 x 9	Oak	Brown Cloth	23	110.00														
	RS 10B	Sealed Box	6 1/2			3/4	Dome		59-22 ± 3	88.5	15	3.5k	6/4	13 x 9 x 8	Oak	Brown Cloth	14	83.00														
	RS 11	Sealed Box	4			1 1/2	Cone		75-22 ± 3	87	8	3k	6/4	12 x 6 x 7	Oak	Brown Cloth	6 1/2	56.00														
	Infinitesimal III	Sealed Box	4 1/2			1/2x2	EMIT	T	65-32 ± 2	86	15	3.5k	6/4	12 x 7 x 6	Oak	Black Metal	12 1/2	199.00														
	Efficiency Standard 82	Pas. Rad.	8			1	Dome	T	60-22 ± 2	92	15	3k	8/6	27 x 14 x 6	Vinyl Wal.	Brown Cloth	30	169.00														
	Efficiency Standard 83	Pas. Rad.	8	1 1/2	Dome	1	Dome	T	50-22 ± 2, 5	92	15	600,3k	8/6	34 x 18 x 6	Vinyl Wal.	Brown Cloth	42	249.00														
Efficiency Standard 103	Pas. Rad.	10	1 1/2	Dome	1	Dome	T	45-22 ± 2	92	15	600,3k	8/6	38 x 18 x 6	Vinyl Wal.	Brown Cloth	47	299.00															

LOUDSPEAKERS

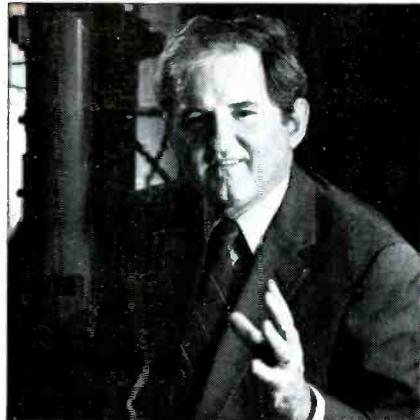
MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches			Separate Lower Crossover W = Woofer, M = Midrange, T = Tweeter, ST = Super Tweeter	Anechoic Frequency Response, Hz to kHz, ± dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			5 1/4	1 1/2	Dome	1	Dome	M, T	50-18 ± 3	86	40											
INNOVATIVE TECHNIQUES	ITC-1		5 1/4	1 1/2	Dome	1	Dome	M, T			50-18 ± 3	86	40	1.2k, 7.5k	8/7	7 x 7 x 12	Opt.	Brown Knit	32 Pair	800.00 Pair w/EQ		
	ITC-2	Inf. Bat.	8			1	Dome	T			45-18 ± 3	90	25	1.3k	8/6	10 x 10 x 31	Opt.	Brown Knit	56 Pair	595.00 Pair		
INTERAUDIO/BOSE	SA 200	Ported	6			3	Cone				90	10	1.9k	8/	14 x 9 x 7	Wal. Vinyl	Brown Knit	20 1/2 Pair	278.00 Pair			
	SA 300	Ported	8			3	Cone				90	15	1.1k	8/	18 x 11 x 9	Wal. Vinyl	Brown Knit	31 Pair	338.00 Pair			
	SA 500	Ported	10			3	Cone				90	15	1.3k	8/	22 x 13 x 11	Wal. Vinyl	Brown Knit	45 Pair	538.00 Pair			
	SA 1000	Ported	6, 10			3	Cone				90	15		8/	28 x 16 x 11	Wal. Vinyl	Brown Knit	45 Pair	858.00 Pair			
JAMD	SL60	Bass Ref.	6		Cone	3 1/2	Cone			45-20	91	2.8	2.5k	8/3	12 x 17 x 8	Brown Vinyl	Black Knit	17 Pair	151.90 Pair			
	SL70	Bass Ref.	6 1/2		Cone	1	Dome			35-20	91	2.8	2.5k	8/3	18 x 9 x 8	Brown Vinyl	Black Knit	19 Pair	199.90 Pair			
	SL90	Bass Ref.	6 1/2		Cone	1	Dome			35-20	92	2.4	1.5k, 4k	8/3	21 x 11 x 9	Brown Vinyl	Black Knit	31 Pair	259.90 Pair			
	SL130	Bas Ref.	8		Cone	1	Dome			30-20	92	2.2	1.4k, 4k	8/3	24 x 12 x 9	Brown Vinyl	Black Knit	36 Pair	339.90 Pair			
	SL180	Bass Ref.	10	5	Cone	1	Dome			25-20	92	2.2	1.5k, 4k	8/3	27 x 15 x 11	Brown Vinyl	Black Knit	50 Pair	439.90 Pair			
	PP2504	Bass Ref.	8	5	Cone	1	Dome			20-20	92	2.1	200, 1.4k, 4.5k	8/3	42 x 14 x 12	Brown Vinyl	Black Knit	134 Pair	879.90 Pair			
	P155	Bass Ref.	8 1/4		Cone	1	Dome			30-20	94	1.5	2.5k	8/3	20 x 12 x 9	Black Wal.	Black Knit	39.6 Pair	319.90 Pair			
	P255	Bass Ref.	8 1/4	1	Cone	1	Dome			25-20	95	1.2	1.4k, 4.8k	8/3	24 x 13 x 11	Black Wal.	Black Knit	66 Pair	519.90 Pair			
	P355	Bass Ref.	9 3/4	1	Cone	1	Dome	M, T		22-20	96	1	1.25k, 5k	8/3	27 x 15 x 12	Black Wal.	Black Knit	97 Pair	739.90 Pair			
	P555	Bass Ref.	12	2	Cone	(5)1	Domes	M, T		22-20	97	0.8	1.2k	8/3	30 x 18 x 14	Black Wal.	Black Knit	150 Pair	1199.90 Pair			
	504	Bass Ref.	9		Cone	1	Dome			34-20	92	2.3	1.8k	8/3	19 x 10 x 9	Black Wal.	Black Knit	33 Pair	299.90 Pair			
	704	Bass Ref.	9	4 1/2	Cone	1	Dome	T		32-20	93	2	3.5k	8/3	21 x 10 x 11	Opt.	Black Knit	44 Pair	439.90 Pair			
	804	Bass Ref.	5 1/2		Cone	1	Dome			37-20	92	2.4	1.8k	8/3	12 x 8 x 10	Dpt.	Black Knit	24 Pair	339.90 Pair			
	904	Bass Ref.	8 1/2	4 1/2	Cone	1	Dome	M, T		28-20	92	2.1	4.5k, 8.5k	8/3	24 x 12 x 11	Opt.	Black Knit	62 Pair	599.90 Pair			
	1304	Bass Ref.	11	4 1/2	Cone	1	Dome	M, T		24-22	93	1.8	750, 3.5k	8/3	28 x 14 x 13	Opt.	Black Knit	92 Pair	879.90 Pair			
	1704	Bass Ref.	13	2, 7	Dome, Cone	1	Dome	M, T		22-22	95	1.5	350, 1.5k, 5.5k	8/3	32 x 17 x 14	Opt.	Black Knit	136 Pair	1299.90 Pair			
	JANIS	W-1	Slot Loaded Subwoof.	15							30-100 ± 1	87	60	100	8/7	18 x 22 x 22	Oiled Wal.		100	750.00		
W-2		Slot Loaded Subwoof.	15							32-100 ± 1	87	60	100	8/7	18 x 22 x 22	Oiled Wal.		90	550.00			
System 3		Slot Loaded Subwoof.	12							30-100 ± 1	89	50	100	8/7	18 x 18 x 18	Oiled Wal.		67	500.00			
JBL	L46	Ducted Port	8			1	Dome				88	10	2.5k	8/	21 x 12 x 10	Oiled Wal.	Brown	60 Pair	398.00 Pair			
	L56	Ducted Port	10			1	Dome				90	10	2.2k	8/	22 x 14 x 12	Oiled Wal.	Brown	85 Pair	530.00 Pair			
	L86	Ducted Port	8	5	Cone	1	Dome				88	10	800, 3.7k	8/	21 x 13 x 10	Oiled Wal.	Brown	70 Pair	590.00 Pair			
	L96	Ducted Port	10	5	Cone	1	Dome	M, T			89	10	1.1k, 3.7k	8/	23 x 14 x 12	Oiled Wal.	Brown	100 Pair	850.00 Pair			
	L112	Ducted Port	12	5	Cone	1	Dome	M, T			89	10	1.1k, 3.7k	8/	24 x 14 x 13	Oiled Wal.	Brown	112 Pair	1100.00 Pair			
	B460	Subwoof.	18								94	200	Ext.	8/	25 x 38 x 24	Wal.	Brown	125 Pair	1250.00 Pair			
	B380	Subwoof.	15								90	200	Ext.	8/	21 x 27 x 17	Wal.	Brown	70 Pair	495.00 Pair			
	LT-1	Ducted Port	5 1/4			1	Dome				87	10	4k	8/6	10 x 6 x 5	Black Alum. Wal.	Black Metal	27 Pair	299.95 Pair			
	4312	Ducted Port	12	5	Cone	1.4	Cone	M, T			90	10	1.5k, 6k	8/	23 x 14 x 12	Wal.	Black	90 Pair	910.00 Pair			
	18Ti	Ducted Port	6 1/2			1	Dome				88	10	3k	8/	15 x 9 x 8	Teak	Brown Knit	35 Pair	500.00 Pair			
	120Ti	Ducted Port	12	5	Cone	1	Dome	M, T			89	10	900, 4k	8/	14 x 14 x 11	Teak	Brown Knit	112 Pair	1100.00 Pair			
	240Ti	Ducted Port	14	5	Cone	1	Dome	M, T			89	10	900, 4k	8/	37 x 18 x 12	Teak	Brown Knit	170 Pair	1500.00 Pair			
	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	300 Pair	3000.00 Pair			
	J216A	Ducted Port	6 1/2			1	Dome				89	10	3.6k	8/	15 x 10 x 9	Oak Vinyl	Brown Knit	39 Pair	199.90 Pair			
	J220A	Ducted Port	8			1	Dome				90	10	2.5k	8/	22 x 13 x 9	Oak Vinyl	Brown Knit	70 Pair	299.90 Pair			
	J320A	Ducted Port	8	5	Cone	1	Dome				91	10	1.1k, 3.4k	8/	23 x 13 x 9	Oak Vinyl	Brown Knit	72 Pair	379.90 Pair			
	J325A	Ducted Port	10	5	Cone	1	Dome				91	10	1.1k, 3.4k	8/	26 x 16 x 9	Oak Vinyl	Brown Knit	84 Pair	459.90 Pair			
J350A	Pas. Rad.	10	5	Cone	1	Dome				91	10	1.1k, 3.4k	8/	38 x 19 x 13	Dak Vinyl	Brown Knit	130 Pair	639.90 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? W = Woofer, M = Midrange, T = Tweeter		Anechoic Frequency Response, Hz to kHz, ± dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Woofer	Midrange	Tweeter																	
JENSEN	5250	Pas. Rad.	5 1/4				1	Dome				55-20 ± 3	88	10	2.8k	8/5	21 x 8 x 7	Silv.		34 Pair	230.00 Pair	
JRM	Transparency Subwoofer 1A	84 Vented Subwoof.	18						W			26-300 ± 3	91	150	150	8/5	24 x 26 x 37	Opt.	Opt.	150	450.00	
	Transparency Subwoofer 1B	QB3 Vented Subwoof.	18						W			25-300 ± 3	94	200	150	8/5	48 x 19 x 26	Opt.	Opt.	180	725.00	
	Transparency Subwoofer IIA	QB3 Vented Subwoof.	(2)12						W			25-300 ± 3	88	200	150	8/5	24 x 26 x 37	Opt.	Opt.	150	450.00	
	Transparency Sat. Tower	Triamped Inf. Baf. Sat.	(12)5	3x26	Horn	1 7/8	Horn	W, M, T				80-20 ± 3	98	150, (2)40	150,800, 7k	Sel.	50 x 15 x 8	Opt.	Opt.		1550.00	
JVC	SX-A5	Pas. Rad.	8	1 1/4, (2)3	Dome, Cones	1	Dome	M				89	40	50, 1.2k, 4k, 6.5k		15 x 32 x 10		Brown Knit	77.2 Pair	500.00 Pair		
	SK-S66	Bass Ref.	12	5	Cone	2 3/8	Cone	No				92	40			15 x 31 x 13		Black Knit	83.8 Pair	360.00 Pair		
	SK-S44	Bass Ref.	12	5	Cone	2 3/8	Cone	No				92	30			15 x 26 x 13		Black Knit	67.4 Pair	300.00 Pair		
	SK-S22	Bass Ref.	10	2 3/8	Cone	2	Cone	No				91	30			14 x 24 x 10		Black Knit	44.6 Pair	220.00 Pair		
	SK-S11	Bass Ref.	8	2 3/4	Cone	2	Cone	No				90	20			13 x 22 x 8		Black Knit	33 Pair	180.00 Pair		
KEF	101	Closed Box	5			3/4	Dome					90-30 ± 2	81	20	2.5k		13 x 7 x 8	Opt.	Black	12 1/2	590.00 Pair	
	103.2	Inf. Baf.	8			1	Dome					60-20 ± 2	86	20	2.5k		20 x 10 x 10	Opt.	Black	19	900.00 Pair	
	105.2	Coherent Phase	12	5	Cone	1 1/2	Dome					38-22 ± 2	85	20	400, 2.5k		38 x 16 x 18	Opt.	Black	80	1400.00	
	105.4	Coherent Phase	(2)8	5	Cone	1	Dome					55-20 ± 2	86	20	400, 2.5k		37 x 14 x 15	Opt.	Black	45	1850.00 Pair	
	104/2		8	4 1/2	Cone	1	Dome					55-20 ± 2	92	25			36 x 11 x 16	Opt.	Black	70 1/2	1600.00 Pair	
	Coda III	Closed Box	8			1	Dome					60-20 ± 3	87	10	3k		19 x 11 x 8	Opt.	Opt.	13	300.00 Pair	
	Carina II	Closed Box	8			1	Dome					55-20 ± 3		10	2.5k		24 x 12 x 10	Opt.	Opt.	20 3/4	500.00 Pair	
	Carlton III	Mech. Ref.	8			1	Dome					47-20 ± 3	86	15	3k		28 x 12 x 11	Opt.	Opt.	26 1/4	650.00 Pair	
	Chorale III	Closed Box	8			1	Dome					79-20 ± 3		10			15 x 9 x 7	Opt.	Opt.	10 1/4	225.00 Pair	
KENWOOD	JL-930W		12	4 3/8	Cone	2 3/8, 1 1/4	Cone, Dome					30-20	91		2k, 6k, 10k	8/	15 x 13 x 41	Wal.	Black Knit	108		
	JL-830W		12	4 3/8	Cone	2, 1 1/2	Cone, Dome					35-20	91		2k, 6.5k, 10k	8/	15 x 13 x 32	Wal.	Black Knit	76		
	JL-730W		12	4 3/8	Cone	2 3/8	Cone					40-20	91		2k, 8.5k	8/	15 x 11 x 28	Wal.	Black Knit	58		
	JL-630W		10	4 3/8	Cone	2 3/8	Cone					40-20	90		3k, 6k	8/	14 x 10 x 26	Wal.	Black Knit	50		
	LSK-700		12	4 3/8	Cone	2 3/8	Cone					40-20				8/	13 x 10 x 24	Wal.	Black Knit	44	375.00	
	LSK-500W		10	4 3/8	Cone	2 3/8	Cone					45-20 ± 5			1k, 5k	8/	12 x 10 x 22	Wal.	Black Knit	40	326.00	
	LSK-200D		8			2 3/8	Cone					50-20 ± 5				8/	11 x 9 x 21	Wal.	Black Knit	31	155.00	
	LS-P5000		8			(4)2	Cones					30-22 ± 5			3.5k	8/	14 x 13 x 30	Wal.	Black Knit	76	630.00	
	LS-P9000		10	5	Cone	(6)2	Cones					20-22 ± 5			2k, 7k	8/	17 x 13 x 45	Wal.	Black Knit	132	1100.00	
KEVEK LOUDSPEAKER TECHNOLOGY	ES.6	Inf. Baf.	6 1/2			3/4	Dome					60-20 ± 3	82	20	5k	8/6	20 x 13 x 8	Oiled Oak	Opt., Knit	34 Pair	595.00 Pair	
	ES.8	Bass Ref.	8			3/4	Dome					60-20 ± 3	87	20	2.5k	8/6	32 x 18 x 10	Oiled Oak	Opt., Knit	62 Pair	900.00 Pair	
	ES.10	Bass Ref.	10			3/4	Dome					50-20 ± 3	89	20	2.5k	8/6	40 x 21 x 11	Oiled Oak	Opt., Knit	86 Pair	1190.00 Pair	
KINDEL AUDIO	Phantasy 50	Closed Box	5 1/4			2	Cone	T				50-20 ± 3	83		2.5k		7 x 8 x 12	Oak	Opt.	14	215.00 Pair	
	Phantasy 100	Closed Box	6 1/2			2	Cone	T				50-20 ± 3	86		2.5k		9 x 10 x 17	Oak	Opt.	16	295.00 Pair	
	Phantasy 200	Closed Box	(2)6 1/2		Cone	3/4	Dome	T				40-20 ± 3	90		300, 1.5k, 7k		10 x 10 x 24	Oak	Opt.	28	555.00 Pair	
	Phantom	Thiele	(2)5 1/2, 8	1 1/2	Dome	1/2 x 2 1/2	Ribbon	T				40-25 ± 2	89		1.2k, 7k		6 x 18 x 41	Oak	Opt.	57	1460.00 Pair	
KINETIC AUDIO	Titan	TATL (Tap. Ac. Trap. Line)	(2)12	6 1/2	Cone	3, 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	2998.00 Pair	
	Trapezium	TATL	12	6 1/2	Cone	3, 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	2598.00 Pair	
	Labyrinth	TATL	12	6 1/2	Cone	3, 1	Domes	(2)M, T				16-22 ± 1.5	91	35	90, 350, 3.5k		16 x 18 x 48	Oiled Wal.	Black Knit	185	1998.00 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	1198.00 Pair	
	I/M Impulse Monitor Stat	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	798.00 Pair	
	(Continued)		TAL (Tap. Ac. Line)	6 1/2			1	Dome	T				38-22 ± 2	93	5	2k	8/6	9 x 9 x 15	Oiled Wal.	Black Knit	30	458.00 Pair

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches		Midrange Diameter, Inches		Tweeter Diameter, Inches		Separate Level Crossover? W = Woofer, M = Midrange, T = Tweeter, S = Super-tweeter	Angular Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms, Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
KINETIC AUDIO (Continued)	Stat S-W	TATL Subwoof.	12							18-2 ±2	93	15	90,2k	8/6	15 x 14 x 26	Oiled Wal.	Black Knit	80	298.00
	Trapezoid S-W	TATL Subwoof.	12							16-2 ±1.5	92	25	90,2k	8/6	16 x 14 x 40	Oiled Wal.	Black Knit	95	398.00
KIRKSAETER	Monitor 80	Inf. Baf.	8			1	Dome	M, T		35-20	88	2	2.2k	8/4	11 x 9 x 18	Opt.		44	500.00
	Monitor 100	Inf. Baf.	8	2		1	Dome	M, T		28-22	88	2	650,5k	8/4	11 x 9 x 18	Opt.		48	660.00
	Monitor 120	Inf. Baf.	10	2		1	Dome	M, T		26-22	88	2	650,5k	8/4	12 x 10 x 19	Opt.		53	800.00
	Monitor 130	Inf. Baf.	10	2		1	Dome	M, T		24-22	88	2	650,5k	8/4	13 x 10 x 21	Opt.		62	900.00
	Monitor 150	Inf. Baf.	12	2		1	Dome	M, T		22-22	88	2	650,5k	8/4	14 x 11 x 23	Opt.		64	1200.00
	Monitor 200	Inf. Baf.	12	2		1	Dome	M, T		20-22	88	2	650,5k	8/4	14 x 11 x 23	Opt.		66	1300.00
	Monitor 280	Inf. Baf.	(2)8	3		(3)1	Domes	M, T		20-22	88	2	650,5k	8/4	13 x 12 x 33	Opt.		110	2200.00
Monitor 450	Inf. Baf.	(4)8	3		(3)1	Domes	M, T		20-22	88	2	650,5k	8/4	13 x 12 x 49	Opt.		176	3300.00	
KLEIN & HUMMEL	O-98		8 1/4	1 1/2	Dome	3/4	Dome	W, M, T		50-16 ±2.5	97	Inc.	850,6k	4.7k	15 x 10 x 8	Brown Enam.	Brown Knit	26 1/2	770.00
KLH	608	Tuned Port	8			3	Cone			8-20 ±3	88	10	2.3k	8/6	12 x 10 x 21	Oiled Wal.	Black Knit	34	149.90
	610	Tuned Port	10	5	Cone	3	Cone	T		70-20 ±3	89	10	2k,5k	8/6	13 x 11 x 23	Oiled Wal.	Black Knit	48	219.90
	612	Tuned Port	12	5	Cone	3	Cone	M, T		60-20 ±3	92	10	1.5k,6k	8/6	15 x 14 x 26	Oiled Wal.	Black Knit	70	299.90
	620	Tuned Port	(2)10	5	Cone	3	Cone	M, T		65-20 ±3	90	10	600,6k	8/6	13 x 13 x 36	Oiled Wal.	Black Knit	84	399.90
KLIPSCH	Klipschorn	Folded Horn	15	1	Horn	1	Horn			35-17 ±5	104	20	400,6k	8/4	52 x 34 x 29	Opt.	Opt., Cloth	163	1388.00
	Belle Klipsch	Folded Horn	15	1	Horn	1	Horn			45-17 ±5	104	20	400,6k	8/4	36 x 30 x 19	Opt.	Opt., Cloth	133	1119.00
	LaScala	Folded Horn	15	1	Horn	1	Horn			45-17 ±5	101	20	400,6k	8/4	36 x 24 x 25	Birch	None	130	749.00
	Cornwall	Bass Ref.	15	1	Horn	1	Horn			38-17 ±5	98	20	700,6k	8/4	36 x 26 x 16	Opt.	Opt., Cloth	100	714.00
	Heresy	Inf. Baf.	12	1	Horn	1	Horn			50-17 ±5	96	20	700,6k	8/7	21 x 16 x 13	Opt.	Opt., Cloth	50	380.00
	KG2	Pas. Rad. Inf. Baf.	8			1	Dhorm			35-20 ±3	90.5	10	1.8k	4/4	19 x 12 x 13	Opt.	Opt., Cloth	25	420.00
KOSS	Kossfire 210	Ported	12	5	Cone	(2)1 1/4	Cones	M, T		30-20	92	10		8/	16 x 14 x 33	Oiled Pecan Oiled Wal.	Brown Cloth	52	550.00
	Kossfire 110	Ported	10	4 1/2	Cone	(2)1 1/4	Cones	T		30-20		10	2.5k,Bk		14 x 11 x 23	Oiled Wal.	Brown Cloth	37	299.90
	M-80	Ac. Sus.	(2)4 1/2			1	Dome			50-30	92	10	2.5k	6/4	5 x 5 x 13	Oiled Wal.	Brown Cloth	Pair	259.90
LAKESHORE IMPORTS	Kassel I	Ac. Sus.	(4)10	(2)6	Domes	(2)1	Domes	M, T		28-30 ±2	101	15	400,3.2k	4/	19 x 15 x 47	Opt.	Opt.	132	8900.00
	Hees V	Ac. Sus.	(3)8	(2)6	Domes	(3)1	Domes	M, T		34-32 ±2	98	20	400,3.2k	4/	19 x 12 x 38	Opt.	Opt.	119	7800.00
LAMBDA SYSTEMS	CAD 2.5	B4 Vented	12	6	Cone	1	Dome			34-20 ±3	91	30	200,3k	8/6.5	15 x 14 x 33	Oiled Oak	Brown Knit	106	900.00
	CAD 3	B4 Vented	(2)8			1	Dome			38-20 ±3	93	30	2.2k	8/6.8	15 x 14 x 33	Oiled Oak	Brown Knit	106	700.00
	CAO 4	B4 Vented	(2)6			1	Dome			42-20 ±3	92	30	2.2k	8/6.8	13 x 12 x 24	Oiled Oak	Brown Knit	68	550.00
	CAD 5	Vented	8			1	Dome			45-20 ±3	91	30	2.2k	8/6.5	13 x 12 x 24	Oiled Oak	Brown Knit	65	400.00
LANCER ELECTRONICS	LX-1	Ac. Sus.	6			3	Piezo			45-22	88	10	3k	8/6	14 x 9 x 9	Oiled Wal.	Black Knit	12	69.50
	LX-2	Ac. Sus.	8			3	Piezo			38-22	89	10	3k	8/6	19 x 11 x 8	Oiled Wal.	Black Knit	19	99.50
	LX-3	Ac. Sus.	12	5	Cone	3	Piezo			35-22	91	15	500,3k	8/7	25 x 14 x 12	Oiled Wal.	Brown Knit	34	149.50
	LX-4	Ac. Sus.	12	5	Cone	3	Piezo	M, T		33-22	91	15	500,4.5k	8/6	24 x 15 x 13	Oiled Wal.	Brown Knit	42	219.50
	LE-70	Ac. Sus.	10			1	Dome	T		44-20 ±3	89	15	2.5k	8/5	21 x 13 x 10	Oiled Oak	Brown Knit	30	199.50
	LE-90	Vented	10	4 1/2	Cone	1	Dome	T		41-20 ±3	90	15	700,5.5k	8/5	39 x 12 x 12	Oiled Oak	Brown Knit	48	279.50
	LE-100	Vented	12	4 1/2	Cone	1	Dome	T		32-20 ±3	90	15	500,5.5k	8/6	26 x 15 x 12	Oiled Oak	Black Knit	45	349.50
LE-110	Vented	12	4 1/2	Cone	1	Dome	M, T		32-21 ±3	93	15	450,4.8k	8/6	28 x 17 x 13	Oiled Oak	Black Knit	50	479.50	
LINN PRODUCTS	ØMS	Isobarik	(2)	(2)5	Cones	(2)1	Domes			25-20 ±3	88	50	375,3k	4/3	17 x 15 x 30	Teak	Black Foam	115	2995.00
	Isobarik Sara	Isobarik	(2)8			1	Dome			36-20 ±3	88	35	3k	4/3	17 x 14 x 10	Teak	Black Foam	33	1295.00
	KAN	Inf. Baf.	5			1	Dome			70-20 ±3	89	15	3k	8/6	8 x 6 x 12	Teak	Black Foam	11	495.00
LIRPA LABS	SOL I	Solar	3.14x 10 ⁹	3.14x 10 ³	Solar	3.14	Solar	Auto	O.C.-Light	-50	Inc.	None	10k 0	Varies with Season	Well Oiled	None	None	None	Free
MAGNEPAN (Continued)	SMGa	Bipolar	370 Sq. In.			58 Sq. In.	Diaph. Dipole			50-16 ±4	85	40	1k	4/	19 x 48 x 2	Opt.	Opt.	60	495.00



The Future of Audio.

The Cornerstone of Home Entertainment.

by John Geheran
Vice President, Sales and Marketing



Imagine yourself over the last 50 years. In the 1930s you listened to the radio. In the 1950s you began watching TV. In the 1970s you listened with pride to your component stereo.

Now it's 1984. The growth and development of video has provided an enormous increase in the number of choices available to you in both equipment and programming. You probably ask yourself questions like: "Do I want VHS or Beta?" "Should I watch my favorite program now, or videotape it while I watch the playoffs?" But maybe the question you really should ask first is: "How does my audio equipment fit into all this?" You can find the answer by turning down the volume on the nearest TV set.

While video brings new programs onto your TV screen, it's audio that pulls them off the screen and brings them to life in your home. Whether it's a bass drum beating through a classic rock concert, or a space ship whizzing through the latest movie, it's audio that creates the mood, generates the excitement, and sets the pace for what you see. The introduction of new technologies and products such as stereo TV and hi-fi VCRs emphasizes this fact.

The key to exciting, powerful home entertainment then, is an integrated audio-video system. But how can you logically start building a system which lets you enjoy all these new developments?

You know that the cornerstone of your system is the sound. You also know that

your speakers, more than any other component, determine the quality of the sound you hear. The right speakers, then, represent the logical base upon which to build a modern home entertainment system.

At Bose[®], we've invested 20 years and

millions of dollars to develop and manufacture speaker systems which deliver the impact and excitement of live performance. That investment can now bring movies, concerts, and specials to life in your own living room.

Experience the excitement available from a combined audio-video system. Ask your local Bose dealer to show you the Bose Music Video. Your dealer can also help you decide which components and formats offer you the enjoyment and convenience which best match your lifestyle.

Bose wants to help you learn more about the future of audio, and its contribution to home entertainment. To do so, we're using this year's advertising space to discuss and explain key issues. Knowledgeable experts will share information which helps you get maximum enjoyment from your home entertainment investment.

For more information on Bose products and a list of authorized Bose dealers, write: Bose Corporation, 10 Speen St., Dept. AU, Framingham, MA 01701.



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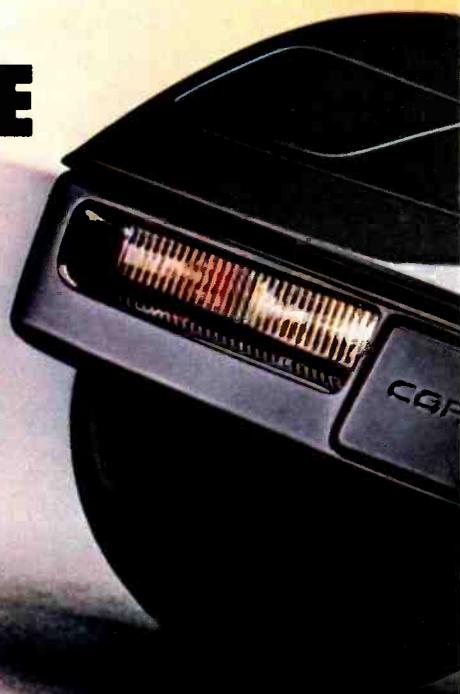


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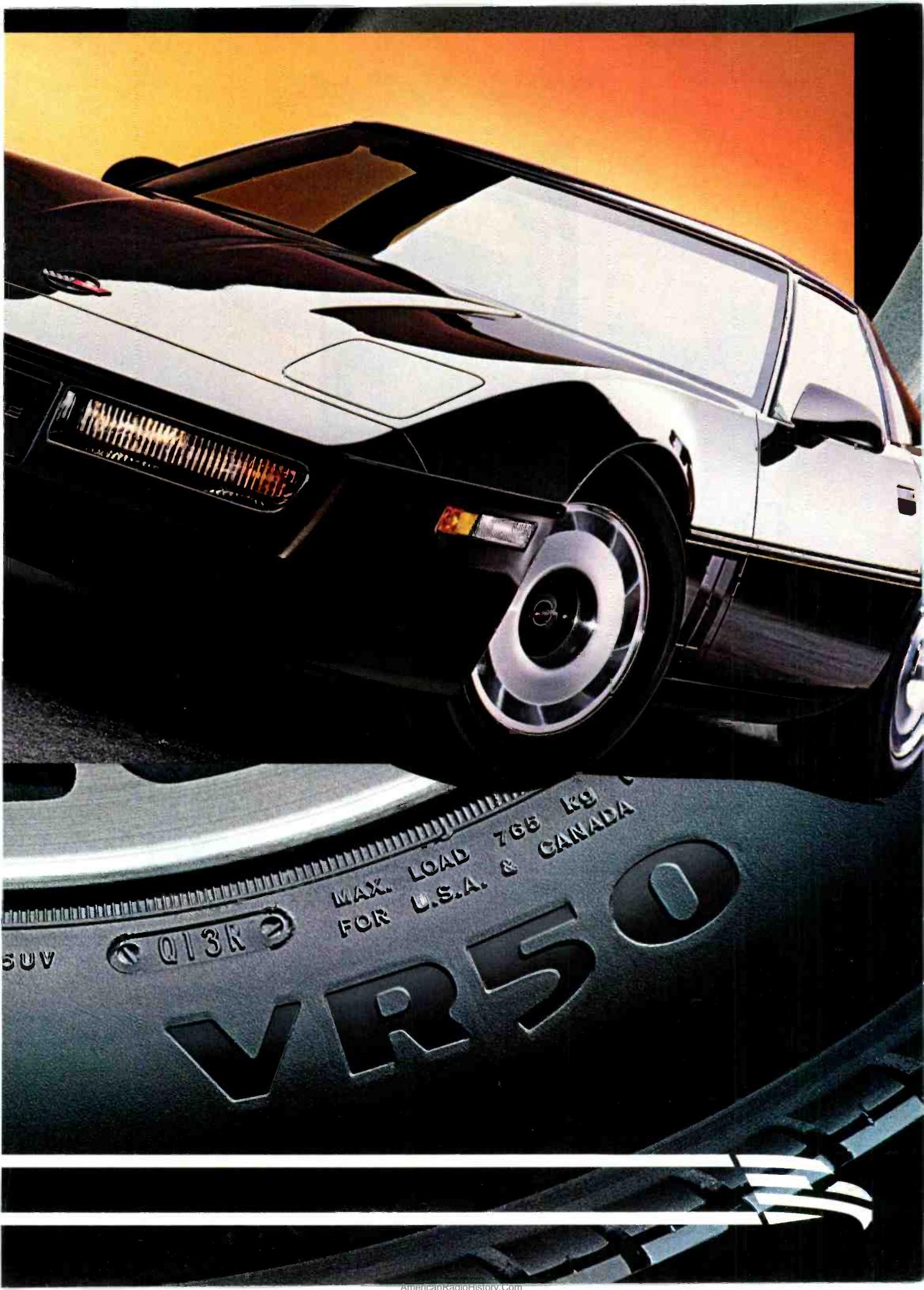
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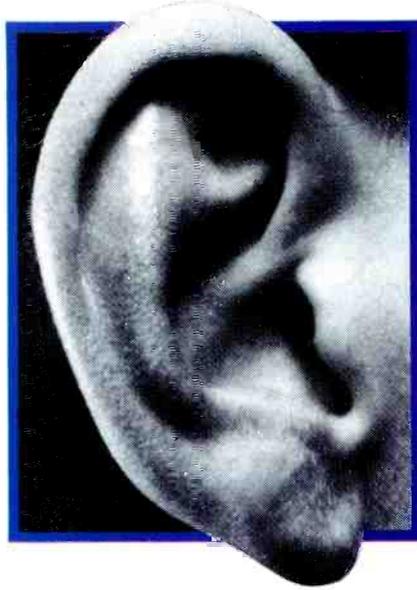
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LOUDSPEAKERS

Continued from page 286

MANUFACTURER	Model	Design Principle	Enclosure or System Type		Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls W = Woofer, M = Midrange, T = Tweeter, ST = Superwoofer	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
			Design Principle	Enclosure or System Type															
MAGNEPAN (Continued)	MG-Ib	Bipolar	428 Sq. In.				68 Sq. In.	Diaph.		45-20 ± 3	82	60	800,2k	5/	22 x 60 x 2	Nat. Oak	Ivory	70 Pair	825.00 Pair
	MG-IIb	Bipolar	500 Sq. In.				68 Sq. In.	Diaph.		40-18 ± 3	84	60	400,1.6k	5/	22 x 71 x 2	Nat. Oak	Ivory	92 Pair	1175.00 Pair
	MG-III	Bipolar	620 Sq. In.	170 Sq. In.	Dipole		14.25 Sq. In.	Ribbon		37-40 ± 4	85	100	300,800, 2k	4/	24 x 71 x 2	Dak Nat. Oak	Ivory	104 Pair	1950.00 Pair
	T-IV	Bipolar	1254 Sq. In.	135 Sq. In.	Dipole		14.25 Sq. In.	Ribbon Dipole		30-40 ± 3	86	100	250,800, 2k	4/	39 x 72 x 1	Oak	Ivory Cloth	200 Pair	2950.00 Pair
MAGNUS	Ten	Tuned Port	10				2 1/2	Horn	T	50-20	94	10	2.5k	8.6	23 x 13 x 10	Wood Vinyl	Black Cloth	50 Pair	319.90 Pair
	Eleven	Tuned Port	10	4	Cone	2 1/2	2 1/2	Horn	M,T	40-20	94	10	2k,5k	8.6	23 x 13 x 10	Wood Vinyl	Black Cloth	54 Pair	399.90 Pair
	Twelve	Tuned Port	12	4	Cone	2 1/2	2 1/2	Horn	M,T	35-20	94	10	2k,5k	8.6	26 x 16 x 10	Wood Vinyl	Black Cloth	68 Pair	499.90 Pair
MARANTZ	DR120	Ported	12				1	Dome		32-20	89	10		6/	29 x 15 x 11	Hick Vinyl	Brown Knit		520.00 Pair
	DR100	Ported	10	3	Cone	1	1	Dome	T	35-20	90	10		7/	26 x 15 x 11	Hick Vinyl	Brown Knit		430.00 Pair
	DR80	Ported	8	3	Cone	1	1	Dome	M,T	40-20	89	10		7/	23 x 12 x 9	Hick Vinyl	Brown Knit		300.00 Pair
	LM208	Ported	8				3	Cone		80-20	92	10		4/	19 x 11 x 8	Vinyl	Brown Knit		140.00 Pair
	HLM208	Ported	8				3	Cone		80-20	90	10		4/	19 x 11 x 8	Vinyl	Brown Knit		120.00 Pair
	HLM308	Pas. Rad.	8	4	Cone	2	2	Cone		50-20	93	10		4/	28 x 13 x 9	Vinyl	Brown Knit		200.00 Pair
MARIAH ACDUSTICS	LS 4	Ac. Sus.	8				1	Dome		45-20 ± 3	90	20	2k	6/	12 Dia. x 22	Oak	Black Knit	45 Pair	298.00 Pair
	LS 3	Bass Ref.	10				1	Dome		38-20 ± 2	88	30	1.8k		14 Dia. x 36	Oak	Black Knit	42	498.00 Pair
	LS 2	Bass Ref.	(2)8				1	Dome		35-20 ± 2	88	30	2.2k		14 Dia. x 38	Oak	Black Knit	48	698.00 Pair
MARTIN-LOGAN	The Monolith	ES and Subwoof.	12					ES		28-22 ± 1.5	90	50	100	8.4	6 x 25 x 14	Oak	Gray	320 Pair	4250.00 Pair
MASTERCRAFT AUDIO	Sound Panels SP-MK 2	Ac. Sus.	(2)8				1 1/4	Dome, Piezo	T,ST	40-27 ± 3	93	30	3k	4/	30 x 15 x 8	Black Lam.	Black Knit	80 Pair	749.00 Pair
	SP-MK 1	Ac. Sus.	8				1	Dome	T	40-22 ± 4	89	30	2.8k	8/	12 x 6 x 26	Black Lam.	Black Knit	52 Pair	549.00 Pair
	Black Box Graph	Ac. Sus.	8				1	Dome	T	45-22 ± 4	89	30	3k	8/	14 x 10 x 6	Black Lam.	Black Knit	44 Pair	449.00 Pair
	Black Box Walnut	Ac. Sus.	8				2	Cone		50-20 ± 3	94	10	2.8k	8/	14 x 10 x 6	Wal. Lam.	Brown Knit	34 Pair	199.00 Pair
	SW-1	Ac. Sus. Subwoof.	12						W	28-90 ± 3	89	50	89	8/	30 x 15 x 10	Lam. Opt., Lam.	None	42 Pair	359.00 Pair
MAVRICK AUDIO	MAM-I	Concrete Horn	60	(10)4 1/2 x 17	ES			Helium Plasma		12-100 ± 2		Inc.	40,700		Eleven Pieces w/Six Amps	Rswd.	Opt.	5000 Sys.	50,000. Sys.
	MAM-II	Dipole ES	(10) 4 1/2 x 17					Helium Plasma		35-100 ± 1		Inc.	700		Seven Pieces w/ Four Amps	Rswd.	Opt.	600 Sys.	20,000. Sys.
	MFMS	Res. Line Tunnel	(4)8	6 1/2	Cone	3/4		Dome		18-22 ± 3	92	30	99,2.7k	8/7	Three Pieces	Opt.	Opt.	120 Sys.	3000.00 Sys.
	MFM	Press. Rel	6 1/2				3/4	Dome		50-22 ± 3	92	20	2.7k	8/7	15 x 13 x 11	Opt.	Black Knit	22 Pair	975.00 Pair
McINTOSH	XRT20	Air Spring	(2)12	8	Cone	(24)1		Domes				30	250,1.5k	8/	Four Pieces	Oiled Wal.	Black	164	6200.00 Sys.
	XR19	Air Spring	(2)12	8	Cone	(12)1		Domes				30	100,250, 1.5k	8/	46 x 26 x 13	Oiled Wal.	Black	151	2649.00
	XR16	Air Spring	12	8,1 1/2	Cone, Dome	1		Dome				30	250,1.4k, 7k	8/	35 x 18 x 12	Oiled Wal.	Black	75	899.00
	XR14	Air Spring	10	5,1 1/2	Cone, Dome	1		Dome				30	700,1.4k, 7k	8/	30 x 15 x 10	Oiled Wal.	Black	54	699.00
	XR1051	Pas. Rad.	10	5	Cone	1		Dome	M,T	30-20	82	30	55,450, 1.3k	8/	47 x 16 x 11	Oiled Wal.	Black	83	1199.00
	XL-1	Ac. Sus.	6			1		Dome		70-20	85	30	1k	8/	13 x 8 x 7	Wal. Vinyl	Black Cloth	15	525.00 Pair
McINTYRE DESIGNS	Nebula	Closed Box	6 1/2				3/4	Dome		50-19 ± 3	86	20	2k	8.4	18 x 10 x 9	Opt.	Black Knit	34 Pair	200.00 Pair
	Voyager	Closed Box	8				3/4	Dome		45-19 ± 3	88	20	2k	8/4	22 x 12 x 11	Opt.	Black Knit	43 Pair	300.00 Pair
	Odyssey	Ported	6 1/2				3/4	Dome		45-19 ± 3	86	30	2k	8/4	18 x 9 x 10	Opt.	Black Knit	48 Pair	400.00 Pair
	Mystic	Ported	8				3/4	Dome		40-19 ± 3	88	25	2k	8/4	22 x 11 x 12	Opt.	Black Knit	75 Pair	600.00 Pair
	Legacy Reference Monitor	Bass Ref.	5				1	Dome		65-22 ± 3	87	25	3k	8/4	15 x 9 x 12	Rswd. Lam.	Black Knit	46 Pair	500.00 Pair
MCM SYSTEMS	Near Field Monitor .5	Tuned Port	8				1	Dome		55-20 ± 3	89	30		8/4.8	9 x 10 x 24	Oak	Foam	42 Pair	450.00 Pair
	.7	Tuned Port	8				1	Dome		45-20	90	30		8/4.8	12 x 12 x 19	Dak	Foam	56 Pair	600.00 Pair
	High Definition Monitor	Tuned Port	8				1	Dome		40-20 ± 2	90	30		8/4.8	12 x 12 x 28	Oak	Foam	64 Pair	750.00 Pair
		Tuned Port	8				1	Dome		36-20 ± 2	90	30		8/4.8	12 x 12 x 35	Oak	Foam	74 Pair	875.00 Pair

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type			Tweeter Diameter, Inches	Tweeter Type	Separate Level Controls W. Woof. M = Midrange, T = Tweeter, ST = Superwoofer	Anechoic Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., 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													
MELOS AUDIO	Point One	4Q Vented	8	1½x18	Ribbon	1½	Elec.	25-30 ±3	87	100	8.7	24 x 11 x 49	Oak	Black Knit	170 Pair	1995.00 Pair		
	Point One 3 M	4Q Vented	12	(3) 1½x18	Ribbons	1½	Elec.	16-30 ±3	92	100	6.6					3995.00 Pair		
MERIDIAN	M10	Triamped Pas. Rad. Biamped	(4)5	(2)5	Cones	2	Dome	33-20 +0,-3		190,2k	11k	40 x 16 x 18	Opt.	Black Knit		4995.00 Pair		
	M2	Biamped	(2)5			2	Dome	38-20 +0,-3		2k	11k	20 x 7 x 15	Opt.	Black Knit		1995.00 Pair		
	M3	Biamped	5			1¼	Dome	38-24 +0,-3		2k	11k	15 x 7 x 12	Opt.	Black Knit		1350.00 Pair		
MIRAGE ACOUSTICS	200	Inf. Baf.	6½			¾	Dome	60-20 ±3	89	10	5k	8.5	17 x 10 x 8	Wal. Vinyl	Brown Knit	25 Pair	229.00 Pair	
	350	Inf. Baf.	8			1	Dome	59-20 ±3	92	10	4k	4/4	18 x 12 x 9	Wal. Vinyl	Brown Knit	42 Pair	299.00 Pair	
	450	Inf. Baf.	8			1	Dome	56-20 ±2	90	15	4k	8/6	24 x 13 x 9	Wal. Vinyl	Brown Knit	50 Pair	399.00 Pair	
	550	Inf. Baf.	10			1	Dome	49-20 ±3	91	15	4k	8.6	32 x 12 x 9	Wal. Vinyl	Brown Knit	74 Pair	449.00 Pair	
	650	Inf. Baf.	10			1	Dome	44-20 ±3	90	20	4k	8/4	32 x 12 x 9	Wal. Vinyl	Brown Knit	78 Pair	549.00 Pair	
	750	Inf. Baf.	10	4½	Cone	¾	Dome	39-20 ±3	91	25	300,5k	8.6	32 x 12 x 9	Wal. Vinyl	Brown Knit	77 Pair	599.00 Pair	
	Subwoofer	Subwoof.	(2)10						91	20	300	8/6	20 x 25 x 15	Wal. Vinyl	Brown Knit	55 Pair	449.00 Pair	
MISSION ELECTRONICS	737 Renaissance	Bass Ref.	(2)8½			(2)¾	Domes	50-20 ±3	90	20	2.4k	8/	21 x 10 x 11	Opt.	Black Knit	43 Pair	599.00 Pair w/ Stands	
	700	Bass Ref.	(2)8¾			(2)¾	Domes	55-20 ±3	91	15	2.1k	8/	18 x 10 x 10	Opt.	Black Knit	14 Pair	299.00 Pair	
	770 Freedom	Bass Ref.	(2)8¾			(2)1	Domes	40-20 ±3	92	20	2k	8/	11 x 24 x 12	Opt.	Black Knit	55 Pair	799.00 Pair w/ Stands	
	7011	Inf. Baf.	(2)7			(2)¾	Domes	60-20 ±3	89	20	2.2k	8/	14 x 8 x 8	Opt.	Black Knit	17½ Pair	199.00 Pair	
	780 Argonaut	Inf. Baf.	(2)8¾			(2)1	Domes	35-20 ±3	94	50	1.8k	6/	11 x 28 x 12	Opt.	Black Knit	77 Pair	1199.00 Pair w/ Stands	
	707	Bass Ref.	(2)8¼			(2)¾	Domes	55-20 ±3	92	20	2.2k	8/	10 x 19 x 11	Opt.	Black Knit	35 Pair	399.00 Pair	
MITOM INDUSTRIES	FXT 8 MK 5	Pas. Rad.	8			1	Dome	40-20	90	15	3.5k	8/4	12 x 10 x 32	Birch	Black Knit	26¼		
	FXT 10 MK 5	Pas. Rad.	10			1	Dome	35-20	92	15	3k	8/4	14 x 10 x 32	Birch	Black Knit	28		
	R-100 MK 2	Bass Ref.	10	4½	Cone	1	Dome	T 30-20	91	15	1.25k,4.5k	8/4	15 x 9 x 23	Teak	Brown Knit	35		
	R-150 MK 2	Bass Ref.	12	4½	Cone	1	Dome	M.T 26-20	94	15	1.25k,4.5k	8/4	17 x 11 x 25	Teak	Brown Knit	46¾		
	Micro Monitor	Inf. Baf.	4½			1	Dome	55-20	87	15	5k	8/4	7 x 6 x 11	Birch	Black Knit	8		
	L-250	Bass Ref.	15	6	Cone	1	Dome	M.T 24-20	94	25	1.25k,4.5k	8/4	18 x 15 x 32	Rswd.	Black Knit	63		
	Series 2 MK 3	Bass Ref.	8			2½	Cone	48-18	91	15	4.5k	8/4	11 x 8 x 20	Hick.	Black Knit	13		
	Series 3 MK 3	Bass Ref.	8	3	Cone	2½	Cone	45-20	92	15	2k,6k	8/4	11 x 8 x 25	Hick.	Black Knit	15¼		
	Series 4 MK 3	Bass Ref.	10	3	Cone	2½	Cone	40-20	92	15	2k,6k	8/4	14 x 8 x 25	Hick.	Black Knit	17¼		
	Series 7 MK 3	Bass Ref.	12	4	Cone	2½	Cone	30-20	94	15	2k,5k	8/4	17 x 10 x 25	Hick.	Black Knit	27		
	Series 15 MK 3	Bass Ref.	15	6	Cone	1	Dome	28-20	96	15	1.5k,5k	8/4	18 x 15 x 30	Birch	Black Knit	48		
M & K	1B	Ac. Sus. Sat.		(2)5		(2)1	Domes	M,T 65-22 ±3	96	7.5	2k	4/4	21 x 8 x 8	Opt.	Black Knit	18	645.00 Pair	
	2B	Ac. Sus. Sat.		6½		1	Dome	M,T 65-22 ±3	93	10	2k	4/4	13 x 9 x 8	Opt.	Black Knit	15	495.00 Pair	
	3B	Ac. Sus. Sat.		5		1	Dome	M,T 85-22 ±3	93	10	2k	4/4	11 x 7 x 7	Opt.	Black Knit	9	395.00 Pair	
	SX-4	Ac. Sus. Sat.		(2)5		(2)1	Domes	M,T 65-22 ±3	96	7.5	2k	4/4	20 x 8 x 7	Hick. Vinyl	Black Foam	14	430.00 Pair	
	1B	Ac. Sus. Subwoof.	12					W 20-125 ±3		Inc.	50-125	600	18 x 19 x 17	Opt.	Black Knit	50	750.00 Pair	
	2B	Ac. Sus. Subwoof.	12					W 24-125 ±3		Inc.	50-125	600	18 x 19 x 17	Opt.	Black Knit	43	600.00 Pair	
	3B	Ac. Sus. Subwoof.	12					W 24-125 ±3		Inc.	50-125	600	18 x 18 x 15	Black	Black Knit	38	500.00 Pair	
	VX-4	Ac. Sus. Subwoof.	12					W 30-125 ±3		Inc.	50-125	600	19 x 18 x 14	Hick. Vinyl	Black Knit	38	365.00 Pair	
	SV-200	Ac. Sus.	12	6½	1	Dome	W,M,T 24-22 ±3	93	10	100,2k	4/4	41 x 16 x 16	Opt.	Black Knit	55	1650.00 Pair		
KEITH MONKS	LS1-8									20 Inc.							279.60	
	LS1-9									20 Inc.							312.90	

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Separate eye Coings? N=No; W=Woof; M=Midrange; T=Tweeter; S=Subwoofer	Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
MORDAUNT-SHORT	MS-20	Inf. Baf.	8			1/2	Dome		80-20 ±3	85.5	10	3.5k	8/6	10 x 8 x 17	Black Ash Wal.	Black Cloth	24 Pair	225.00
	MS-30	Bass Ref.	8			1	Dome		60-20 ±3	89	10	3.5k	8/6	10 x 11 x 20	Wal.	Brown Cloth	32 Pair	300.00
	MS-40	Bass Ref.	8			3/4	Dome		70-15 ±3	86.5	15	3.5k	8/6	10 x 9 x 21	Wal.	Brown Cloth	38 Pair	375.00
MOREL ACOUSTICS	MLP-201	Ac. Sus.	9			1.1	Dome		48-20 ±3	88	10	1.5k	8/6.3	10 x 16 x 10	Wal.	Black Cloth	16	248.00
	MLP-202II	Ac. Sus.	6			1.1	Dome		60-28 ±3	88	10	1.6k	6/4	8 x 13 x 10	Opt.	Black Cloth	14	395.00
	MLP-403II	Ported	9	3	Dome	1.1	Dome		38-25 ±3	90	10	500.5k	6.4/4	21 x 12 x 10	Dpt.	Black Cloth	26	600.00
MTX	MTX-6	Bass Ref.	6			1	Dome		50-20	45	6.4k	8/	23 x 11 x 8	Wood Vinyl	Black Cloth	30 Pair	198.00	
	MTX-8	Bass Ref.	8			1	Dome		45-20	45	2.5k	8/	24 x 15 x 10	Wood Vinyl	Black Cloth	60 Pair	258.00	
	MTX-10	Bass Ref.	10	5	Cone	1	Dome		40-20	60	1k,3k	8/	32 x 14 x 10	Wood Vinyl	Black Cloth	86 Pair	438.00	
	MTX-12	Bass Ref.	12	5	Cone	1	Dome		30-20	65	1k,3k	8/	29 x 18 x 14	Wood Vinyl	Black Cloth	104 Pair	478.00	
MUSIC & SOUND IMPORTS	MAS 925	Pas. Rad.	8			3/4	Dome	No	30-18 ±3	90	20	3.3k	8/5	12 x 12 x 24	Oak Ven.	Brown Cloth	34	599.00
	MAS 925-III	Pas. Rad.	8			(2)3/4	Domes	No	30-22 ±3	91	20	3.3k,11k	8/5	12 x 12 x 24	Oak Ven.	Brown Cloth	34	699.00
NAO	20	Ac. Sus.	8			1	Dome	No	35-25 ±5	88	10	2.5k	4/3.2	31 x 9 x 10	Black	Black Knit	24 1/4	448.00
NELSON-REED	5-02	Inf. Baf. Sat.	5			3/4	Dome	No	60-22 ±3	84	25	3.5k	8/6	8 x 6 x 12	Opt.	Brown Knit	12	450.00
	6-02/B	Vented	6 1/2			3/4	Dome	No	40-22 ±3	84	25	3.5k	8/6	12 x 10 x 19	Opt.	Brown Knit	25	550.00
	SW1201	Inf. Baf. Subwoof.	12				W	W	32-125 ±3	84	50	125	8/4	18 x 18 x 18	Opt.	Brown Knit	52	450.00
	TW1202	Inf. Baf. Subwoof.	12				W	W	32-160 ±3	84	50	160	12/8	25 x 15 x 12	Opt.	Brown Knit	45	650.00
	12-03	Inf. Baf.	12	5	Cone	3/4	Dome	W	32-22 ±3	84	50	160,3.5k	8/6	Four Pieces	Opt.	Brown Knit	57	1100.00
	Rn-Pro	Slot Loaded Inf. Baf. Subwoof.	(2)8	3	Dome	3/4	Dome	No	32-22 ±1.5	92	50	300,6k	12/8	40 x 12 x 15	Opt.	Opt.	90	Sys.
	Rn-Pro Woofer		(4)12				W	W	16-100			60		60 x 16 x 19	Opt.	Opt.	150	
NESTOROVIC LABS	Type 5AS	Nestorovic Sat.	8,10	4	Dome/Cone	4 1/2	Planar	M,T	28-40 +1,-3	91	50	1k,7k	8/5	36 x 15 x 15	Opt.	Black Cloth	75	2100.00
	Type 4A	Sat.	8	4	Cone/Dome/Cone	4 1/2	Planar	T	60-40 +1,-3	92	50	200,1k,7k	8/6	22 x 12 x 12	Opt.	Black Cloth	40	2200.00
	Type 8	Nestorovic Subwoof.	(2)12						18-250 +1,-3	92	75	250 Max.	8/5	22 x 26 x 26	Opt.	Black Cloth	125	1350.00
	System 12	(2) Type A,												Four Pieces			330 Sys.	4900.00
	System 16	(2) Type 8 (4) Type 4A, (2) Type 8												Six Pieces			410 Sys.	7100.00
NORMAN LABORATORIES	221	Ac. Sus.	10			1	Dome		51-20 ±3	89	15	1.5k	8/8	24 x 15 x 12	Oiled Oak	Brown Knit	70 Pair	400.00
	331	Ac. Sus.	10	2	Dome	1	Dome	T	51-20 ±3	90	20	800,3k	8/6	24 x 15 x 12	Oiled Wal.	Brown Knit	80 Pair	700.00
	431	Ac. Sus.	(2)10	2	Dome		Line	W,T	45-23 ±3	95	30	800,4k	4/4	40 x 15 x 12	Oiled Wal.	Brown Knit	120 Pair	1000.00
	631	Ac. Sus.	(3)10	2	Dome	(2)	(2) Line	W,T	40-23 ±3	96	35	800,4k	4/4	45 x 16 x 14	Oiled Wal.	Brown Knit	150 Pair	1500.00
	12B	Ac. Sus.	(2)10	2	Dome	(2)	Ribbons	M,T	35-40 ±3	88	60	800,4k	4/4	53 x 28 x 13	Oiled Wal.	Brown Knit	200 Pair	2000.00
	14B	Ac. Sus.	6			1	Dome	T	63-20 ±3	84	15	1.5k	8/8	12 x 8 x 6	Oiled Wal.	Brown Knit	25 Pair	350.00
NORTH AMERICAN SOUND	Monitor	Trans. Line	8			1	Dome		35-20.5 ±4	90	15	3.5k	8/6	36 x 13 x 12	Oiled Wal.	Black Knit	104 Pair	750.00
	Squire	Bass Ref.	12	6x15	Horn	2x5 1/2	Horn		40-20 ±3	93	15	500,6k	8/4	46 x 15 x 16	Oiled Wal.	Black Knit	225 Pair	1790.00
	Studio Monitor	Bass Ref.	15	6x15	Horn	2x5 1/2	Horn		36-20 ±3	96	15	500,6k	8/6	54 x 15 x 20	Oiled Wal.	Black Knit	330 Pair	2690.00
NOVAK	2	Ported	6 1/2			3/4	Dome		44-24 ±3	91.5	5			21 x 11 x 11	Opt.	Black Foam	48 Pair	329.95
	2B	Ported	6 1/2			3/4	Dome		44-24 ±3	91.5	5			21 x 11 x 11	Black Lam.	Black Foam	48 Pair	379.95
NUMARK	MS100A	Ac. Sus.	4			1	Dome		40-25	50		3k	6/	7 x 4 x 4	Alum.	Black Metal	9 Pair	134.95
	MS100B	Ac. Sus.	4			1	Dome		40-25	50		3k	6/	7 x 4 x 4	Alum.	Black Metal	9 Pair	149.95

Experts Experience Superb Sound of Ohm Walsh 4

Experience the Innovation

"As close to genuine innovation as anything we have seen in this broad class of (dynamic) speakers, is the cylindrical diaphragm devised by the late Lincoln Walsh (1903-1971). It resembles a megaphone standing on its wide end—a huge inverted ice cream cone, if you will—with the voice-coil perched at the apex.

Why this design? For one thing, it produces uniform power dispersion omnidirectionally, a technique that is credited with achieving excellent phase linearity and sonic 'coherence,' contributing both to clarity and to a good stereo image."

—Norman Eisenberg, *Ovation*

"Ohm claims that the Walsh driver does not operate as a piston—the usual design goal for a conventional speaker—but rather as a transmission line that progressively delays the propagation of different frequencies so that a coherent cylindrical sound field is radiated. Some years ago, when we tested the original, Ohm F speakers, we were able to verify that claim to our satisfaction. Although the Walsh 4 is a modified form of that system, it retains many of its qualities, with the added advantages of a reasonably high sensitivity, non-critical room placement, and a much lower price."

—Julian Hirsch, *Stereo Review*



with apparent ease even the most hair-raising sonic peaks contained on the new laser disks."

—Hans Fantel, *The New York Times*

Experience the Sound

"Listening to a pair of (Walsh) 4s reproducing music is the real clincher. You are hardly into a recording before you sense that you are listening to a performance rather than to one being reproduced by machinery. This impression—which one may get from a few other top-quality speakers—does not lessen with prolonged listening. The full musical spectrum is easily spanned with authority and fine tonal balance. Detailing of inner instrumental choirs is excellent, and so too are the fuller splashes of massed ensemble effects. Titanic dynamic impact comes across when required, yet there there is no tonal dropout of the subtle nuances of chamber music. Transients come across properly crisp and forceful, but not 'over-etched' to the point of unnaturalness."

—Norman Eisenberg, *Ovation*

"The Ohm Walsh 4 is as smooth and natural sounding as its excellent frequency-response measurement suggests. It provides a full stereo stage of sound at almost any position in the room, including a distinct quality of depth resulting (presumably) from sound reflections off the rear and side walls.

Ohm makes much of the imaging qualities of this speaker, and it certainly lives up to those claims. A demo record produced by Ohm provides convincing evidence that the Walsh 4, playing a variety of commercial music recordings, is capable of generating distinct spatial images that are apparent from almost any position in the room. For example, Leroy Anderson's musical typewriter moves with the impressive smoothness between the speakers, with not a trace of the vague, uncertain, or erratic position shifts that we observed with some other speakers.

In case I have not made the point sufficiently clear, this is a superb-sounding speaker—not inexpensive by any means, but worth every cent of its price.

—Julian Hirsch, *Stereo Review*

Experience the Power

"(Ohm) has now at last gone all the way with the new Ohm Walsh 4, which boasts all the notable virtues of the earlier model but extends the bass to 32 Hertz. This allows it to conjure up with almost tactile impact the deep shudder of a low C played on an organ pedal or the wallop of a bass drum. With a stupendous power capacity of 500 watts, the Ohm Walsh 4 accommodates

For information on Ohm Walsh speakers, and details on how you can buy directly from Ohm, write or call toll free, today.

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Brooklyn, New York 11205

Ohm Acoustics Corp.

We make loudspeakers correctly.



Specifications	Ohm Walsh 1	Ohm Walsh 2	Ohm Walsh 4
Frequency Response	48 Hz to 18kHz ± 4dB	45Hz to 16kHz ± 4dB	32Hz to 17kHz ± 4dB
Weight	24 lbs.	29 lbs.	63 lbs.
Sensitivity	87dB at 1 meter with a 2.83 volt input	87dB at 1 meter with a 2.83 volt input and all controls at maximum	87dB at 1 meter with a 2.83 volt input and all controls at maximum
Finish	Genuine walnut veneer	Genuine wood veneer, walnut and oak standard. Scandinavian rosewood and black or white lacquer on oak finishes available on special order.	Genuine wood veneer, walnut and oak Scandinavian rosewood and black or white lacquer on oak finishes available on special order.
Inputs	Press connectors accepting "banana plugs" or bare wire up to 12 gauge	Press connectors accepting "banana plugs" or bare wire up to 12 gauge	Press connectors accepting "banana plugs" or bare wire up to 12 gauge
Controls	None	2 — low and high frequency each with 3 positions	3 — low, high and perspective each with 3 positions
Power requirement on Music	20 watts minimum/90 watts maximum	30 watts minimum/120 watts maximum	50 watts minimum/500 watts maximum
Impedance	8 ohms	4 ohms	8 ohms
Price per Pair	Under \$595	Under \$995 Depending on finish	Under \$1895 Depending on finish

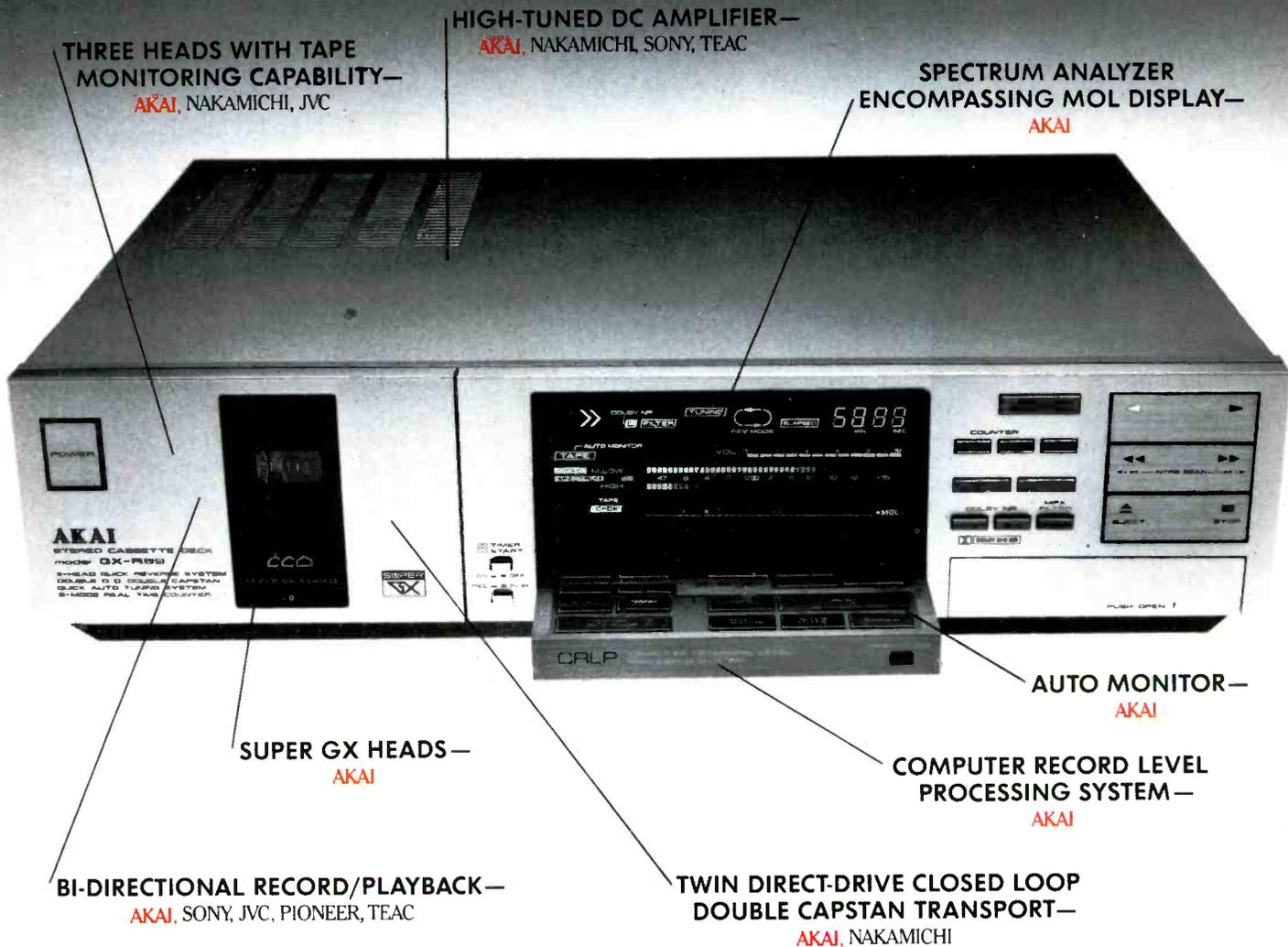
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YOU'RE LOOKING AT THE SIX BEST AUTO-REVERSING DECKS YOU CAN BUY.



Staying ahead of the competition in auto-reversing cassette decks has been an AKAI tradition for the past 14 years. Now we're introducing the all-new GX-R99, a deck that has so many advanced features you'd have to buy six other auto-reversing decks to get them all.

Features like our Computer Record Level Processing System, that sets a tape's bias, equalization and tape sensitivity, measures a tape's MOL, then sets the optimum recording level. A Spectrum Analyzer encompassing MOL

display, which displays frequency response with greater accuracy. AKAI's exclusive Auto Monitor. And our super GX heads. So super, they're guaranteed for 17½ years of continuous play.

It's easy to see why the GX-R99, just one of four great AKAI auto-reversing decks, is called the Dragon Slayer. And to find out why it's getting more praise than all the other guys combined, write to AKAI, P.O. Box 6010, Dept. A9, Compton, CA 90224.



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle	Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Series/Level	Woofer W. Woof.	Tweeter W. Tweeter	ST = Superwoofer	Hz to kHz	Response	SPL, 1 Meter/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
PIONEER	S-1010	Pas. Rad.	10 1/4	2 1/2	Cone		Ribbon	M, T	28-50	92.5			1.5k, 6k	6.3/	37 x 18 x 13	Wal. Ven. Vinyl	Black Cloth	82.7	680.00				
	S-910	Bass Ref.	12	4	Cone		Ribbon	M, T	30-50	92.5			1.3k, 5.8k	6.3/	26 x 15 x 15	Black Cloth	50.7	300.00					
	S-710	Bass Ref.	12	4	Cone		Ribbon	M	33-50	91.5			1.5, 12k	6.3/	26 x 15 x 13	Vinyl	Black Cloth	38.6	250.00				
	S-510	Bass Ref.	10	1 3/4	Cone		Ribbon	M	35-50	91			2k, 13k	6.3/	22 x 13 x 12	Vinyl	Black Cloth	26.4	180.00				
	CS-705	Bass Ref.	15 3/4	4 3/4	Cone		Ribbon Horn		20-40	98			1.5k, 5k, 8k	8/	28 x 18 x 10	Vinyl	Black Cloth	44.1	300.00				
	CS-605	Bass Ref.	12	4 3/4	Cone		Ribbon Horn		25-40	96			2k, 5k, 8k	8/	25 x 16 x 11	Vinyl	Black Cloth	35.3	250.00				
	CS-405	Bass Ref.	12	4	Cone		Ribbon		40-40	93			3k, 10k	8/	25 x 15 x 10	Vinyl	Black Cloth	24.3	150.00				
	S-T5	Ac. Sus.	6 1/2			1	Dome		45-20	89			2k	6.3/	10 x 7 x 7		Black Cloth	9.9	140.00				
	S-5PG	Sealed	5 1/2			2 1/2	Cone		50-20	90				6.3/	19 x 12 x 3	Glass	Black Cloth	9.7	90.00				
	S-5PC	Sealed	5 1/2			2 1/2	Cone		50-20	90				6.3/	19 x 12 x 3	Cork	Black Cloth	7.6	90.00				
	S-7MB/S-7MS	Sealed	8x3	4	Cone	2 1/2	Cone		50-20	92				6.3/	Six Pieces	Plas.	Black Cloth	16.6	160.00				
	CS-G301W	Bass Ref.	12	4 3/4	Cone	2 3/8	Cone		35-20	91.5			3k, 7k	6.3/	27 x 15 x 13	Vinyl	Black Cloth	29.8	130.00				
	CS-201W	Bass Ref.	10	3	Cone	2 3/8	Cone		40-20	90			7k, 9k	6.3/	24 x 14 x 12	Vinyl	Black Cloth	20.9	100.00				
	CS-G101W	Sealed	10			2 3/8	Cone		55-20	90			5.5k	6.3/	22 x 13 x B	Vinyl	Black Cloth	14.3	70.00				
PLASMA-TRONICS	Hill Type I	Plasma. Inf. Baf.	14	6 1/2	Cone		Plasma	T	18-100 ± 3	100	130,700		8.3	57 x 24 x 20	Opt.	Black Cloth	580 Pair	10,000.00					
PLEXUS	SWS-1	Ac. Sus. Subwoof.	(2)10					W	27-100 ± 2	93	25	100	8.8	22 x 12 x 26	Opt.	Black Knit	42	549.00					
POLK AUDIO	Mini Monitor II	Pas. Rad.	4 1/2	4 1/2	Cone	1	Dome		60-20.5 ± 2	92	5	100,3k	6/	14 x 6 x 5	Opt.	Black Cloth	23 Pair	249.90					
	Monitor 4A	Ported		6 1/2	Cone	1	Dome		40-21 ± 3	92	10	4.5k	4/	14 x 9 x 7	Opt.	Black Cloth	32 Pair	159.90					
	Monitor 5jr	Ported		6 1/2	Cone	1	Dome		38-21 ± 3	92	10	3k	4/	17 x 9 x 9	Opt.	Black Cloth	45 Pair	249.90					
	Monitor 5B	Pas. Rad.	8	6 1/2	Cone	1	Dome		36-21 ± 3	91	10	60,3k	4/	22 x 11 x 9	Opt.	Black Cloth	29 Pair	179.95					
	Monitor 7C	Pas. Rad.	10	6 1/2	Cone	1	Dome		33-21.5 ± 2	91	10	60,3k	4/	24 x 14 x 9	Opt.	Black Cloth	36	239.95					
	Monitor 10B	Pas. Rad.	10	(2)6 1/2	Cones	1	Dome		30-21 ± 2	92.5	10	60,3k	6/	28 x 16 x 12	Opt.	Black Cloth	50	324.95					
	RTA 12C	Pas. Rad.	12	(2)6 1/2	Cones	1	Dome		25-21 ± 2	94	10	50,2k	4/	39 x 16 x 12	Dpt.	Black Cloth	75	459.95					
	LF 14	Pas. Rad. Subwoof.	12	(2)6 1/2	Cones				32-150 ± 2	92	10	120,4.5k	4/	28 x 16 x 12	Opt.	Black Cloth	54	350.00					
	SDA-1A	Pas. Rad.	12	(4)6 1/2	Cones	1	Dome		15-21 ± 2	91	10	50,100, 2.5k	4/	44 x 16 x 12	Opt.	Black Cloth	85	849.95					
	SDA-II	Pas. Rad.	12	(3)6 1/2	Cones	1	Dome		16-21 ± 2	91	10	50,2.5k	4/	40 x 16 x 12	Opt.	Black Cloth	80	599.95					
	SDA-CRS	Pas. Rad.	10	(2)6 1/2	Cones	1	Dome		31-21 ± 2	91	10	100,3k	6/	20 x 13 x 10	Opt.	Black Cloth	38	395.00					
	Video Sound-12	Trans. Port		6 1/2	Cone	1	Dome		38-20.5 ± 2	93	3	3k	6/	15 x 9 x 11	Opt.	Black Cloth		99.95					
	VS-19	Trans. Port		6 1/2	Cone	1	Dome		37-20.5 ± 2	93	3	3k	6/	17 x 9 x 11	Opt.	Black Cloth		129.95					
VS-25	Pas. Rad.	6 1/2	6 1/2	Cone	1	Dome		35-21 ± 2	93	3	100,3k	6/	21 x 9 x 11	Dpt.	Black Cloth		169.95						
PROAC	EBS	Ported	10	3	Dome	3/4	Dome		25-20	86	100	450,5k	8/	33 x 12 x 13	Opt.	Opt.	85	3500.00					
	Studio 3	Ported	10	3	Dome	3/4	Dome		35-20	85	100	500,5k	8/	27 x 12 x 13	Opt.	Opt.	70	2970.00					
	Studio 2	Ported	8			1	Dome		50-20	86	50	2.7k	8/	25 x 11 x 12	Opt.	Opt.	50	1275.00					
	Doublette	Ported	(2)4			3/4	Dome		60-20	86	25	5k	8/	15 x 6 x 9	Opt.	Opt.	15	750.00					
	Tablette	Ported	4			3/4	Dome		70-20	84	25	5k	8/	10 x 6 x 9	Opt.	Opt.	10	550.00					
PROTON	P302		4 1/2		1 3/4	Cone			100-20 ± 5	90	5	2.5k	8.6	7 x 18 x 7	Black	Black Knit	22 Pair	125.00					
	P303		4 1/2		1 3/4	Cone			60-20 ± 5	90	5	2.5k	8.6		Black	Black Knit	27 Pair	150.00					
PYLE INDUSTRIES	HS100A	Sealed	4 1/2		1	Dome	No		50-20 ± 5	90	5	4k	8.4	7 x 5 x 5	Black	Black Metal	8 Pair	229.95					
	HS150P	Sealed	4 1/2		1	Dome	No		50-20 ± 5	90	5	4k	8.4	5 x 8 x 7	Black	Black Metal	8 Pair	222.95					
QUAD	ESL	ES Dipole							45-18	86	25				Wood	Black Metal	36	1780.00					
	ESL 63	ES Dipole							35-20	86.5	30			Wood	Brown	36	3310.00						
QUASAR	SW410WQ			3	Cone			M					3/	3 x 6 x 4	Silv.	Silv. Knit	3 Pair	59.95					

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 w/ W= Woofer, M= Midrange, T= Tweeter	Amplitude Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms, Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
RAUNA AB	Tyr	Ported	6½			1	Dome			40-20 ±3	90	50	2.6k	8.7	10 x 10 x 14		Black Foam	52 Pair	370.00
	Leira	Trans. Line	6½			1	Dome			35-20 ±3	86	60	2.6k	8.7	9 x 14 x 32	Paint	Black Foam	110 Pair	750.00
	Njord	Trans. Line	(2)6½			1	Dome			30-20 ±3	88	100	2.6k	8.7	10 x 16 x 36	Paint	Black Foam	154 Pair	1050.00
RAVEN ACOUSTICS	1	Inf. Baf.	6½			24 L	Ribbon			50-22 ±3	86	45	1.5k	8.5.2	50 x 20 x 17	Black Lacq.	Black Foam	175 Pair	1595.00
	2	Inf. Baf.	(3)6½			(2) 24 L	Ribbons			30-22 ±3	88	70	60.1.5k	8.5	72 x 24 x 26	Black Lacq.	Black Foam	320 Pair	7500.00 w/Xover
	.8	Inf. Baf.	6½			24 L 1½	Dome			50-20 ±3	86	40	1.5k	8.5.2	19 x 16 x 11	Black Lacq.	Black Foam	85 Pair	750.00 w/Stand
REALISTIC	Mach Two	Vented	15	5	Cone	4	Horn	M.T		25-40					28 x 18 x 12	Oiled Wal.			439.90
	Opt-400	Inf. Baf.	12	5	Cone		Leaf	M.T		40-40					27 x 14 x 11	Oiled Wal.			399.90
	Opt-500	Vented	12	4	Cone	2½	Cone	M.T		50-20					25 x 14 x 10	Wal.			319.90
	Opt-45	Vented	10	4	Cone	2½	Cone	M.T		50-20					23 x 13 x 10	Wal.			139.95
	T-120	Vented	10	5	Cone	1	Dome	M.T		50-20					36 x 13 x 11	Wood			99.95
	Optimus 30	Vented	10			2½				65-20					23 x 12 x 9	Wal. Ven.			79.95
	Nova 15	Vented				2½				60-20					19 x 17 x 8	Wal. Ven.			69.95
	MC-1600	Vented	8			2½				60-20					18 x 12 x 7	Wal. Ven.			59.95
	MC-1201	Ac. Sus.	8			2½									18 x 11 x 8	Wal. Ven.			39.95
	MC-600	Ac. Sus.	4			2½				100-18					14 x 9 x 5				49.95
	Minimus 7W	Ac. Sus.	4			1	Dome								8 x 5 x 4				49.95
Minimus 7	Ac. Sus.	4			1	Dome								7 x 5 x 4				79.95	
Minimus 12	Ac. Sus.	5			2	Horn			60-20					11 x 7 x 6				19.95	
Minimus 3.5	Ac. Sus.	3												6 x 4 x 3					
REINHART SOUND	D.A.M.	Bass Ref.	12	3	Dome	¾	Dome			25-20 ±3	91	30	700.5k	B/6.8		Opt.	Opt., Knit		2200.00
	RH-3	Bass Ref.	10	4	Cone	1	Dome			37-20 ±3	88	30	800.5k	B/6	23 x 15 x 13	Opt.	Black Knit		750.00
	RH-2	Bass Ref.	8			1	Dome			47-20 ±3	90	20	2.5k	B/6.8	22 x 14 x 13	Dpt.	Black Knit		400.00
	Small Wonder	Bass Ref.	5			¾	Dome			60-20 ±3	88	20	5k	B/6.5	15 x 10 x 8	Dpt.	Black Knit		275.00
REVOX	Agora B		(2)B	5	Cone	¾	Dome	W,T		30-21 ±3	Inc.	200,3.7k			17 x 29 x 17	Wal. Ven.	Brown Knit	137 Pair	2600.00
	Studio 3	Ac. Sus.	8			1	Dome			48-20 ±3	87	20	2.3k	4/4	16 x 10 x 9	Black Varn.	Black Metal	27 Pair	175.00
	Studio 4	Ac. Sus.	9	1½	Dome	¾	Dome			50-20 ±3	86	20	760,3.2k	4/4	19 x 12 x 12	Black Varn.	Black Metal	40 Pair	249.00
	Plenum B	Bass Ref.	12½	2	Dome	1	Dome			33-22 ±3	89	20	720,2.5k	4/	16 x 24 x 14	Oiled Wal.	Brown Cloth	96 Pair	599.00
	Forum B	Bass Ref.	10	1½	Dome	¾	Dome			33-24 ±3	85	20	820,2.6k	4/	13 x 20 x 13	Dried Wal.	Brown Cloth	64 Pair	399.00
	Symbol B	Pas. Rad.	12½	2	Dome	1	Dome	M,T		27-22 ±3	89	20	730,2.8k	4/	18 x 43 x 15	Oiled Wal.	Brown Cloth	111 Pair	1099.00
RH LABS	SB-3p	Subwoof.	12					W		25-120 ±3	89	50	80	B/7.1	24 x 16 x 18	Opt.	None	90	525.00
	SB-3b	Subwoof.	12							25-120 ±3	89	80		B/7.1	24 x 16 x 18	Opt.	None	82	425.00
	SB-4	Subwoof.	10							32-150 ±3	92	40	80	4/4	20 x 14 x 16	Dpt.	None	65	385.00
	Geist 12		12	3	Dome	1	Dome			23-22 ±4	95	25	395.7.4k	B/6.8	22 x 12 x 42	Opt.	Black Knit	140	1385.00
ROBERTSDN AUDIO	Eleven	Inf. Baf.	8			1½	Cone			40-22	90	20	1.5k	B/	21 x 12 x 11	Mahog	Black Knit	36	795.00
	Twenty One	Inf. Baf.	(2)B			1½	Cone			30-22	92.5	20	3.5k	4/	32 x 19 x 9	Mahog	Black Knit	54	1695.00
ROGERS	LS1	Bass Ref.	5			¾	Dome	No		80-20 ±3	85	15	4k	B/	8 x 7 x 13	Opt.	Black	20 Pair	399.00
	LS5	Bass Ref.	6			1	Dome	No		65-18 ±3	86	25	3k	B/	9 x 8 x 18	Opt.	Black	37 Pair	649.00
	LS7	Bass Ref.	8			1	Dome	No		55-18 ±3	88	25	3k	B/	11 x 11 x 22	Dpt.	Black	60 Pair	899.00
	LS3/5A	Inf. Baf.	5			¾	Dome	No		70-20 ±3	82	25	3k	15/	8 x 6 x 12	Dpt.	Black	24 Pair	499.00
	Studio I	Bass Ref.	8	¾	Dome	¾	Dome	No		40-28 ±3	88	25	3k,14k	B/	12 x 12 x 25	Dpt.	Black	62 Pair	1099.00
	Studio II	Bass Ref.	12	1½	Dome	¾	Dome	No		38-20 ±3	92	50	2k,8k	B/	15 x 17 x 32	Opt.	Black	200 Pair	2799.00
	LSB1	Inf. Baf. Subwoof.	(2)7					No		30-100 ±3	30	100		B/	27 x 21 x 18	Opt.	Black	58	599.00
ROGERSOUND LABS	Elans 3600 Studio Monitor	Pas. Rad. Ported	12 12	5 5	Cone Cone	1 1	Dome Dome	M.T M.T		20-22 35-22	88 87	15 15	1k,5k 800.5k	B/ B/	14 x 12 x 41 14 x 11 x 25	Oak Opt.	Brown Opt.	67 50	400.00 250.00
	Nevada XT Magnificent Outsider	Pas. Rad. Ac. Sus. Air Sus.	8,12 8 6½	5	Cone	1 1 1½	Horn Dome Cone	M.T T No		28-20 45-22 50-20	80 85 83	10 20 15	1k,4k 2.5k 2.4k	4/ 8/ 8/	17 x 13 x 25 10 x 9 x 17	Opt. Oak Opt.	Opt. Brown Opt.	63 21 17	385.00 125.00 169.95
(Continued)																			

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(818) 896-0777, Telex #662250



LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches	Midrange Diameter, Inches	Midrange Type	Tweeter Diameter, Inches	Tweeter Type	Surge Level Control? H=Hooder, W=Windage, T=Tweeter, ST=Super-tweeter	Range Hz to kHz, ±dB	Impedance, Ohms	SPL, 1 Watt/1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
ROGERSOUND LABS (Continued)	Forty Eighty Minicron	Bass Ref. Pas. Rad. Air Sus.	12 12 4	5 5	Cone Cone	2 1/2 1 1	Cone Dome Dome	M, T M, T No	40-20 32-22 70-20	88 88 94	10 10 10	1k, 4k 1k, 4k 2.5k	8/ 8/ 8/	14 x 11 x 25 15 x 11 x 38 7 x 5 x 4	Opt. Vinyl Black Metal	Opt. Brown Black Metal	40 58 5 1/2	165.00 Pair 189.00 Pair 125.00 Pair
	Coniston Rydal Derwent The Ribbon	Trans. Line Bass Ref. Bass Ref. Bass Ref.	3 1/2 4 3/4 6 6			3/4 3/4 3/4	Dome Dome Dome/Cone Ribbon		50-20 50-20 35-20 35-20	88 89 89 88	10 10 10 20	3k 2k 3k, 9k 3k	8/6.2 8/6.2 8/6.2 8/8	12 x 8 x 7 17 x 9 x 8 20 x 12 x 9 27 x 14 x 12	Opt. Black Opt. Black Opt. Black Opt. Black	8 10 17 44	220.00 Pair 260.00 Pair 390.00 Pair 890.00 Pair	
RTR	100	Ac. Sus.	8	4	Cone	(2)3	Cones		36-20	94	10	2.5k, 10k	8/	23 x 13 x 10	Wal. Vinyl	Black Knit	52 Pair	298.00 Pair
	200	Ac. Sus.	10	4	Cone	(2)3	Cones	T	32-20	94.5	10	2k, 10k	8/	14 x 26 x 11	Wal. Vinyl	Black Knit	68 Pair	398.00 Pair
	300	Ac. Sus.	12	(2)4	Cones	3, 2 1/2	Cone, Piezo	M, T	30-30	95	10	1.5k, 7.5k, 10k	8/	14 x 30 x 11	Wal. Vinyl	Black Knit	88 Pair	498.00 Pair
	400	Ac. Sus.	(2)10	(2)4	Cones	(2)2 1/2	Piezos	M, T	24-30	96.5	5	2k, 7.5k	4/	15 x 40 x 11	Wal. Vinyl	Black Knit	104 Pair	598.00 Pair
	500	Vented	15	(2)5	Cones	2x5, 2x6	Piezos	M, T	20-32	97	5	500, 5k, 10k	8/	18 x 38 x 11	Wal. Vinyl	Black Knit	130 Pair	798.00 Pair
	G-40B	Pas. Rad.	8			1	Dome	T	60-22 ± 2.5	90	10	2k	8/	12 x 23 x 10	Wal. Vinyl	Black Knit	56 Pair	318.00 Pair
	G-80B	Pas. Rad.	8			1	Dome	T	48-22 ± 2.5	90	10	2k	8/	14 x 26 x 11	Wal. Vinyl	Black Knit	70 Pair	398.00 Pair
	G-200B	Pas. Rad.	10			1	Dome	T	42-22 ± 2.5	91	10	2k	8/	14 x 36 x 12	Wal. Ven.	Black Knit	124 Pair	598.00 Pair
	G-350B	Pas. Rad.	10	1 1/2	Dome	1	Dome	M, T	36-22 ± 2.5	91.5	10	1.25k, 10k	8/	18 x 38 x 11	Wal. Ven.	Black Knit	148 Pair	798.00 Pair
	SANSUI	XL-900C	Inf. Baf.	12 3/4	2 3/4	Dome	1	Dome		30-40	93			6/	15 x 27 x 13	Black Sim. Wood	Black Cloth	117 Pair
PM-C200		Inf. Baf.	15	4 3/4	Cone	2	Cone	M, T	25-38	93			8/	18 x 30 x 13	Wal. Sim. Wood	Black Mesh	106 Pair	1000.00 Pair
PM-C100 MKII		Inf. Baf.	12	4 3/4	Cone	1 3/4	Cone	M, T	30-40	93			8/	15 x 27 x 13	Wal. Sim. Wood	Black Mesh	80.2 Pair	800.00 Pair
PM-C70 MKII		Inf. Baf.	10	4	Cone	2	Cone	M, T	35-35	91			6/	13 x 23 x 12	Wal. Sim. Wood	Black Mesh	57.4 Pair	600.00 Pair
PM-C50		Inf. Baf.	8			2	Cone	M, T	40-22	91			8/	10 x 20 x 9	Wal. Sim. Wood	Black Mesh	25.6 Pair	300.00 Pair
S-1117		Pas. Rad.	12	4	Cone	3/4	Dome		28-22	92			8/	15 x 41 x 13	Wal. Sim. Wood	Black Knit	91 Pair	600.00 Pair
S-917		Inf. Baf.	12	4	Cone	3/4	Dome		30-22	92			8/	15 x 27 x 13	Wal. Sim. Wood	Black Knit	65 Pair	380.00 Pair
S-717		Inf. Baf.	10	4	Cone	2	Cone		30-22	91			8/	13 x 25 x 12	Wal. Sim. Wood	Black Knit	46 Pair	290.00 Pair
S-517		Inf. Baf.	8	4	Cone	2	Cone		35-22	90			8/	12 x 24 x 10	Wal. Sim. Wood	Black Knit	35 Pair	180.00 Pair
SARAS	ST200A	Ac. Sus.	(2)10	5	Cone	1	Dome	No	30-18 ± 3	90	40	500, 5k		43 x 14 x 12	Oiled Wal.	Brown	80	1500.00 Pair
	ST100	Bass Ref.	10	5	Cone	1	Dome	No	30-18 ± 3	88	40	450, 5k		36 x 12 x 12	Oiled Wal.	Brown	70	1200.00 Pair
	44	Ac. Sus.	12	5	Cone	1	Dome	No	30-18 ± 3	90	40	500, 5k		25 x 12 x 15	Oiled Wal.	Brown	65	950.00 Pair
	33	Ac. Sus.	10	5	Cone	1	Dome	No	35-18 ± 3	88	40	500, 5k		24 x 14 x 12	Oiled Wal.	Brown	60	750.00 Pair
	22	Ac. Sus.	12			1	Dome	No	40-18 ± 3	90	40	2k		25 x 12 x 15	Oiled Wal.	Brown	55	600.00 Pair
	11	Ac. Sus.	10			1	Dome	No	40-18	88	40	1.8k		24 x 14 x 12	Oiled Wal.	Brown	47	500.00 Pair
S.C.D.	J.C. Mini	Sealed	5			2	Ribbon	No	90-24 ± 3	88	20	5k	8/4	10 x 9 x 8	Wood Vinyl	Black Knit	32 Pair	200.00 Pair
	G.C. Rock Monitor	Sealed	8	3	Dome	(2)2	Ribbons	No	50-24 ± 3	90	25	600, 4k	8/4	11 x 10 x 36	Wood Vinyl	Black Knit	80 Pair	799.00 Pair
	J.C. Classical Monitor	Sealed	12	3	Dome	(2)2	Ribbons	No	44-24 ± 3	93	10	600, 4k	8/3	14 x 14 x 40	Wood Vinyl	Black Knit	94 Pair	1195.00 Pair
H. H. SCDT (Continued)	PRO100BII	Air Sus.	15	(2)4 1/2	Cones	(3)1	Domes	M, T	36-20 ± 4	90	20	700, 3.5k	4/	33 x 20 x 13	Oiled Wal.	Brown Knit	134 Pair	1590.00 Pair
	199B	Air Sus.	12	4 1/2	Cone	1	Dome	M, T	38-20 ± 4	91.5	15	750, 3.5k	8/6.2	31 x 20 x 11	Wal. Vinyl	Brown Knit	94 Pair	700.00 Pair
	166B	Air Sus.	6 1/2			1	Dome		55-20 ± 4	89.5	10	2.2k	8/6.2	13 x 9 x 7	Wal. Vinyl	Brown Knit	22 Pair	290.00 Pair
	315D	Air Sus.	15	5	Cone	1	Dome	M, T	45-20 ± 4	90.5	10	1.1k, 3.5k	8/6.2	29 x 18 x 12	Wal. Vinyl	Brown Knit	84 Pair	760.00 Pair
	312D	Air Sus.	12	5	Cone	1 3/4	Cone	M, T	45-20 ± 4	92	10	1.1k, 3.5k	8/6.2	26 x 16 x 12	Wal. Vinyl	Brown Knit	70 Pair	660.00 Pair
	312DL	Air Sus.	12	5	Cone	1 3/4	Cone		45-20 ± 4	92	10	1.1k, 3.5k	8/6.2	27 x 16 x 11	Wal. Vinyl	Brown Knit	55 Pair	540.00 Pair
	3110C	Air Sus.	10	5	Cone	1 3/4	Cone	M, T	45-22 ± 4	92	10	1.1k, 3.5k	8/6.2	23 x 13 x 9	Wal. Vinyl	Brown Knit	46 Pair	550.00 Pair
	311D	Air Sus.	10	5	Cone	1 3/4	Cone		45-22 ± 4	92	10	1.1k, 3.5k	8/6.2	23 x 13 x 9	Wal. Vinyl	Brown Knit	46 Pair	520.00 Pair
	177DL	Air Sus.	8	5	Cone	1 3/4	Cone		55-22 ± 4	92	5	1.1k, 3.5k	8/6.2	23 x 13 x 9	Wal. Vinyl	Brown Knit	42 Pair	350.00 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: W = Woofer, M = Midrange, T = Tweeter, ST = Super-tweeter	Angular Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt 1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms: Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
H. H. SCOTT (Continued)	208D	Air Sus.	8			1 3/4	Cone		60-22 ± 4 65-22 ± 4	92.5	5	3.5k	8/6.2	22 x 12 x 8	Wal. Vinyl Wal. Vinyl	Brown Knit Brown Knit	31 Pair 17 Pair	260.00 Pair 220.00 Pair
	206D	Air Sus.	6 1/2			1 3/4	Cone			89	5	3.5k	8/6.2	13 x 9 x 7				
SFI	Digital Reference Music Frame Digital 20	Planar Bipolar Ac. Sus.	(16)6 1/4 x 6 1/4 x 1 (12)6 1/4 x 6 1/4 x 1	(4)6 1/4 x 6 1/4 x 1	Dynapleat Dynapleat	(8)1 1/2 (4)1 1/2	Ribbons	No		90	100	600,5k	4/4	35 x 56 x 2	Oiled Wal. Dak	Black Knit Dpt.		5000.00 Pair 2500.00 Pair
	Digital 10	Planar Bipolar Ac. Sus.	(8)6 1/4 x 6 1/4 x 1 (6)6 1/4 x 6 1/4 x 1	(8)3 3/4 x 6 1/4 x 1	Dynapleat Dynapleat	(4)1 1/2 1 1/2	Ribbons	No		90	50	600,5k	4/4	30 x 36 x 2	Oiled Wal. Oiled Wal.	Black Knit Black Knit		1800.00 Pair 1200.00 Pair
	Pyramid	Planar Bipolar Ac. Sus.	(4)6 1/4 x 6 1/4 x 1	6 1/4 x 6 1/4 x 1	Dynapleat	1 1/2	Ribbon	No		86	30	5k	4/4	18 x 24 x 12	Oiled Wal. Oiled Wal.	Black Knit Black Knit		600.00 Pair
SHAHINIAN ACOUSTICS	Obelisk	Trans. Line. Pas. Rad.	8	(2)1 3/8	Domes	(5)3/8	Domes		28-21 + 0, -3	90	30	1.8k,9k	6/4	14 x 12 x 27	Opt.	Opt., Cloth	47	1500.00 Pair
	Arc	Pas. Rad.	8	1 3/8	Dome	(2)3/8	Domes		30-21 + 0, -3	88	30	1.8k,9k	6/4	14 x 10 x 27	Oiled Oak Birch	Brown Cloth Brown Cloth	36 34	900.00 Pair 650.00 Pair
	The Box	Pas. Rad.	8			1	Dome	T	30-18 + 0, -3	91	25	3k	8/6	12 x 12 x 24	Oiled Oak Birch	Brown Cloth Brown Cloth	34 26	650.00 Pair 500.00 Pair
	Slant	Ported	6			1	Dome		38-18 + 0, -3	88	25	3.5k	8/6	10 x 11 x 24	Oiled Oak	Black Knit Black Knit	26	500.00 Pair
	Lark	Ported	5 1/4			3/8	Dome		55-21 + 0, -3	90	25	4.5k	6/4	7 x 8 x 13	Oiled Oak	Brown Cloth Brown Cloth	9 1/2	325.00 Pair
	Double Eagle	Subwoof.	(2)8						28-500 + 0, -3	88	30	Opt.	7/3.5	24 x 16 x 30	Oiled Oak Opt.	Brown Cloth Brown Cloth	90	600.00 Pair
	Contra-Bombarde	Slot Loaded Horn Subwoof.	(2)8						16-200 + 0, -3	89	50	Ext.	8/4	28 x 19 x 35	Opt.		188	1500.00 Pair
SHERWOOD	S-11	Subwoof.	8	6	Cone	2	Phen. Ring		50-20	90		70,3k	8/	23 x 12 x 10	Hick.	Black Knit Black Knit	38 Pair 52 Pair 64 Pair	199.90 Pair 279.90 Pair 379.90 Pair
	S-31		10	5	Cone	2	Phen. Ring		40-20	90		1k,4k	8/	24 x 14 x 11	Hick.	Black Knit Black Knit	52 Pair 64 Pair	279.90 Pair 379.90 Pair
	S-51		12	5	Cone	2	Phen. Ring		33-20	120		1k,4k	8/	26 x 16 x 13	Hick.	Black Knit Black Knit	64 Pair	379.90 Pair
SIDEREAL AKUSTIC	Four	Sealed Box	8	2	Cone	1/2 x 2	Ribbon	No	37-22 + 0, -3	86	50	400,4k	8/6	40 x 12 x 11	Opt.	Opt., Knit	60	1760.00 Pair w/ Stands
SIEFERT RESEARCH	Maxim III	Bass Ref.	6 1/2			1	Dome		42-24 ± 3	86	25	3.5k	8/8	13 x 9 x 11	Oiled Wal. Oiled Wal.	Black Knit Black Knit	36 Pair 56 Pair	499.00 Pair 649.00 Pair
	Magnum	Bass Ref.	6 1/2			1	Dome		36-24 ± 3	86	25	3.5k	8/8	30 x 9 x 11	Oiled Wal. Oiled Wal.	Black Knit Black Knit	56 Pair 84 Pair	649.00 Pair 1099.00 Pair
	Concert 3	Bass Ref.	6 1/2	1	Dome	1/2	Dome		36-28 ± 3	86	25	2.8k,8k	8/8	38 x 19 x 12	Oiled Wal. Oiled Wal.	Black Knit Black Knit	84 Pair 122 Sys.	1099.00 Pair 1399.00 Sys.
	Trapezoid	Bass Ref. Sat. & Subwoof.	8	4 1/2	Cone	1	Dome		33-25 ± 3	90	10	350,4.5k	8/8	Four Pieces	Oiled Wal. Oiled Wal.	Black Knit Black Knit	122 Sys.	1399.00 Sys.
SNELL ACOUSTICS	Type A/II	Sealed	12	4 1/2	Cone	1 3/4	Domes		38-20 ± 0.75	86	80	290,2.8k, 15k	4/4	24 x 14 x 51	Opt.	Opt.	325 Pair 160 Pair 96 Pair 76 Pair 52 Pair	3890.00 Pair 1800.00 Pair 975.00 Pair 680.00 Pair 450.00 Pair
	Type C	Ported	10	4 1/2	Cone	(2)3/4	Domes		35-22 ± 1.25	90	80	375,3.5k, 15k	4/4	15 x 13 x 44	Opt.	Opt.	160 Pair 96 Pair 76 Pair 52 Pair	1800.00 Pair 975.00 Pair 680.00 Pair 450.00 Pair
	Type E/II	Ported	8			1 3/4	Domes		39-22 ± 1.75	93	15	2.3k,15k	8/6	14 x 11 x 33	Opt.	Opt.	96 Pair 76 Pair 52 Pair	975.00 Pair 680.00 Pair 450.00 Pair
	Type J/II	Ported	8			1	Dome		49-22 ± 1.75	91	15	2.7k	8/6	13 x 10 x 23	Opt.	Opt.	76 Pair 52 Pair	680.00 Pair 450.00 Pair
	Type K	Sealed	8			3/4	Dome		70-20 ± 2.5	90	10	2.3k	8/6	11 x 9 x 18	Opt.	Opt.	52 Pair	450.00 Pair
SONY	APM-707	Pas. Rad.			Flat		Flat		40-20 ± 10	90	10	700,4.5k	6/	13 x 26 x 11	Wal. Vinyl	Brown Cloth	27 1/2 Pair	400.00 Pair
SONY ES	APM-33W	Bass Ref.			Flat		Flat	T	39-20 + 4, -8	91	30	2.2k	6/	13 x 21 x 13	Oiled Wal. Oiled Wal.	Brown Cloth Brown Cloth	31 3/4 60 1/2	800.00 Pair 1600.00 Pair
	APM-55W	Bass Ref.			Flat		Flat	M, T	31-30 + 4, -8	91	40	450,4.5k	6/	15 x 27 x 13	Oiled Wal. Oiled Wal.	Brown Cloth Brown Cloth	60 1/2 70 3/8	1600.00 Pair 2400.00 Pair
	APM-77W	Bass Ref.			Flat		Flat	M, T	28-30 + 4, -8	90	50	700,4.5k	6/	16 x 29 x 13	Oiled Wal. Oiled Wal.	Brown Cloth Brown Cloth	70 3/8	2400.00 Pair
SONY ESPRIT	APM-6	Bass Ref.			Flat		Flat	T	22-18 + 4, -8	88	80	1.2k	8/	22 x 33 x 15	Oiled Wal. Oiled Wal.	Blue Cloth Brown Cloth	106 203	8000.00 Pair 12,000.00 Pair
	APM-8	Bass Ref.			Flat		Flat	M, T	28-30 + 4, -8	92	100	320,1.5k, 4.5k	8/	26 x 44 x 18	Oiled Wal. Oiled Wal.	Blue Cloth Brown Cloth	203	12,000.00 Pair
SOUND DYNAMICS	Concert Monitor 50 CM	Sealed	4 1/2			3/4	Dome		50-20 ± 3	92	10	5k	4/4	9 x 5 x 6	Wal. Vinyl	Black Knit	20 Pair	250.00 Pair w/ Stands
	Concert Monitor 100 CM	Bass Ref.	6			1	Horn Load. Dome		38-23 ± 3	96	5	2.2k	8/4	17 x 9 x 10	Wal. Vinyl	Black Knit	40 Pair	300.00 Pair w/ Stands
(Continued)	Concert Monitor 150 CM	Vented	8			1	Dome		45-22 ± 3	89	10	2.5k	8/4	16 x 10 x 10	Wal. Vinyl	Black Knit	32 Pair	250.00 Pair w/ Stands

LOUDSPEAKERS

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SOUND DYNAMICS (Continued)	Concert Monitor 200 CM	Bass Ref.	10		1	Horn Load, Dome			36-22 ±3	99	8	2k	8/4	23 x 12 x 11	Wal. Vinyl	Black Knit	70 Pair	330.00 Pair w/ Stands
	Concert Monitor 500 CM	Bass Ref.	10		1	Horn Load, Dome			34-23 ±3	99	10	2k	8/4	28 x 12 x 12	Wal. Vinyl	Black Knit	76 Pair	400.00 Pair w/ Stands
	Concert Monitor 700 CM	Bass Ref.	12		1	Horn Load, Dome			32-23 ±3	101	15	1.9k	8/4	28 x 14 x 12	Wal. Vinyl	Black Knit	90 Pair	600.00 Pair w/ Stands
	Concert Monitor 1500 CM	Bass Ref.	15		1	Horn Load, Dome			28-23 ±3	102	20	1.8k	8/4	35 x 18 x 16	Wal. Vinyl	Black Knit	180 Pair	900.00 Pair
SOUND-LAB	A-2X	ES							35-20 ±2	88	100		6/4	28 x 57 x 3	Opt.	Opt.	176 Pair	2450.00 Pair
	A-4	ES							30-20 ±2	88	100		6/4	28 x 70 x 3	Opt.	Opt.	210 Pair	3450.00 Pair
	A-3	ES							28-20 ±2	88	100		6/4	31 x 75 x 9	Opt.	Opt.	290 Pair	5500.00 Pair
	A-1	ES							25-20 ±2	88	100		6/4	36 x 81 x 10	Opt.	Opt.	370 Pair	8000.00 Pair
SPEAKERLAB	ST	Pas. Rad.	(2)8		(2)3/4	Domes			36-30	94	10	4k	4/3	31 x 12 x 11	Oak	Black	88 Pair	458.00 Pair
	S19	Vented	10	4	Cone	3x5	Leaf		32-42	92	15	700.5k	8/6	31 x 12 x 11	Oak	Black	100 Pair	578.00 Pair
	S6	Inf. Baf.	8,10	4	Cone	3x5	Leaf		35-42	92	20	900.5k	4/3	35 x 14 x 12	Oak	Black	122 Pair	718.00 Pair
	S7	Inf. Baf.	10,12	6	Cone	4x4	Leaf		34-45	93	20	400.5k	4/3	38 x 16 x 14	Oak	Black	170 Pair	918.00 Pair
	SDT4	Hybrid Pas. Rad.	8,10	4	Cone	4x4	Leaf	M, T	33-45	92	35	700.5k	8/6	31 x 12 x 11	Oak	Black	110 Pair	1038.00 Pair
	S.1	Inf. Baf.	5			1	Dome		90-20 ±3	90	15	2.5k	6/5	11 x 7 x 5	Oak	Black	20 Pair	210.00 Pair
	S.1 Plus	Pas. Rad.	6			1	Dome		39-20 ±3	91	10	2.5k	8/6	20 x 8 x 7	Oak	Black	44 Pair	318.00 Pair
	S10	Pas. Rad. Subwoof.	10						34-180 ±3	91	15	180	6/5	18 x 18 x 18	Oak	Black	108 Pair	658.00 Pair
	SQ	Vented	8		3/4		Dome		40-30 ±3	91	10	3.8k	8/6	24 x 10 x 9	Oak	Black	54 Pair	258.00 Pair
	SR	Pas. Rad.	8		3/4		Dome		37-30 ±3	91	10	3.8k	8/6	28 x 12 x 10	Oak	Black	70 Pair	338.00 Pair
SDT5	Hybrid Pas. Rad.	10,12	6,1 1/2	Cone, Dome	4x4	Leaf	M, T	24-45	93	35	350,1.5k, 8k	4/3	46 x 16 x 13	Oak	Black	210 Pair	1780.00 Pair	
SPECTRUM LOUDSPEAKERS	108A	Bass Ref.	8		1 1/2				48-20 ±3	92	10	2.3k	8/8.5	14 x 11 x 9	Wal. Vinyl	Black Foam	36 Pair	195.00 Pair
	208A	Bass Ref.	8		1 1/2				38-20 ±3	91	10	2.3k	8/8.5	25 x 14 x 10	Wal. Vinyl	Black Foam	40 Pair	295.00 Pair
	Aurora 3A	Bass Ref.	8	2	Dome	3/8	Dome		33-30 ±1.5	90	20	600.6k	4/3.6	32 x 11 x 15	Wal. Vinyl Varn. Wal.	Black Foam	56	895.00 Pair
SPENDOR	Prelude	Bass Ref.	8		1	Dome			50-20 ±3	90	20	3k	8/7	20 x 10 x 11	Sim. Rswd. Opt.	Black Cloth	25	450.00 Pair
	LS 3/5A	Inf. Baf.	4 1/2		1	Dome			80-20 ±3	82.5	25	3k	15/8	12 x 7 x 7	Opt.	Black Cloth	12	450.00 Pair
	SA-1	Inf. Baf.	6		1	Dome			70-18 ±3	82	20	3k	8/7	12 x 9 x 9	Opt.	Black Cloth	16	525.00 Pair
	BC-1	Bass Ref.	8		3/4, 1 1/4	Domes			45-18 ±3	84.5	25	3k, 13k	8/7	25 x 12 x 12	Opt.	Black Cloth	31	775.00 Pair
	SP-1	Bass Ref.	8		3/4, 1 1/4	Domes			45-20 ±3	87	25	3k, 13k	8/7	25 x 12 x 12	Opt.	Black Cloth	34	900.00 Pair
	SA-3	Bass Ref.	12		1 1/2	Dome			38-20 ±2	90	40	2k	8/7	34 x 15 x 18	Opt.	Black Foam	80	1700.00 Pair
SPICA	TC-50	Sealed	6 1/2		1	Dome			56-15 ±3	83	30	2k	4/3.6	13 x 16 x 12	Opt.	Black Cloth	21	450.00 Pair
SPL	97	Bass Ref.	8		1	Horn			45-20 ±3	89	5	4k	8/4	23 x 12 x 10	Wal. Vinyl	Black Knit	36 Pair	150.00 Pair
	98	Bass Ref.	8	4 1/2	Cone	1 3/4	Cone		40-20 ±3	90	5	1.2k, 5k	8/4	23 x 12 x 9	Wal. Vinyl	Black Knit	40 Pair	200.00 Pair
	99	Bass Ref.	10	4 1/2	Cone	1 3/4	Cone		35-20 ±3	91	5	1.2k, 5k	8/4	24 x 14 x 9	Wal. Vinyl	Black Knit	50 Pair	275.00 Pair
	100	Bass Ref.	12	4 1/2	Cone	1 3/4	Cone		30-20 ±3	91	5	1k, 5k	8/4	26 x 15 x 11	Wal. Vinyl	Black Knit	60 Pair	350.00 Pair
	101	Bass Ref.	15	4 1/2	Cone	1 3/4	Cone		28-20 ±3	92	5	1k, 5k	8/4	32 x 17 x 15	Wal. Vinyl	Black Knit	130 Pair	550.00 Pair
STAX	ELS-FB1	ES					No		50-20	73	100	None	8.4	18 x 40 x 12	Teak	Tan	45	3100.00 Pair
	ELS-F83	ES					No		40-20	79	50	None	4.2	18 x 80 x 13	Teak	Tan	80	5800.00 Pair
	ESTA-4 Extra	ES Sat.					No		80-20	78	25	None	8.6	12 x 13 x 4	Black Alum.	Black	12	1100.00 Pair
SYMDEX AUDIO SYSTEMS	Sigma	Sealed Box	6 1/2		1	Dome			60-20	85		2.8k	8	10 x 22 x 6	Opt.	Opt.	25	795.00 Pair
	Omega	Sealed Box Subwoof.	10			Cone			40-200	85		200	8	13 x 31 x 13	Opt.	Opt.	65	1095.00 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 W = Woofer, M = Midrange, T = Tweeter, S = Super-tweeter	Amplifier Frequency Response, Hz to kHz, ±dB	SPL, 1 Watt 1 Meter, dB	Recommended Min. Amp. Pwr., Watts	Crossover Frequencies, Hz	Impedance, Ohms Nominal/Minimum	Dimensions, Inches (To Nearest Inch)	Finish	Grille Color and Material	Weight, Lbs.	Price, \$
TECHNICS (Continued)	SB-R100	Ac. Sus.	5½			1⅞	Cone		55-30	89	2k	8/	12 x 12 x 3	Zinc	Black Metal	10	260.00	
	SB-R200	Ac. Sus.	7			1⅞	Cone	T	55-30	87	2.7k	8/	24 x 15 x 4	Sim. Wal.	Black Knit	20	800.00	
THIEL	CS3	Elect.	10	4	Cone	1	Dome		24-18 ±1.5	89	400,3k	4/4	13 x 13 x 41	Opt.	Black	75	1950.00	
	03A	Elect.	10	5	Cone	1	Dome		30-20 ±2	90	400,4k	8/4	12 x 12 x 38	Teak	Black	62	1300.00	
	04A	Bass Ref.	6			1¼	Dome		50-15 ±2	87	2.5k	8/6	10 x 10 x 36	Teak	Black	35	750.00	
	02	Bass Ref.	6			1	Dome		45-20 ±3	90	2k	8/7	11 x 19 x 10	Teak	Black	22	350.00	
3D ACOUSTICS	3D Cube	Inf. Baf.	6			¾	Dome		70-20 ±2	87	15	2.5k	8/5	10 x 10 x 10	Oiled Wal.	Black Knit	30	195.00
	3D Legend 403	Pas. Rad.	8	6	Cone	1	Dome		45-20 ±1.5	87	30	2.3k	8.5.5	25 x 11 x 9	Oiled Wal.	Black Knit	34	440.00
	3D610B	Sat. & Subwoof.	10	6	Cone	1	Dome		32-20 ±3	87	30	100.2.k	8.4.5	Three Pieces	Oiled Wal.	Black Knit	74	495.00
ULTRAPHONICS	Ultramini	Ac. Sus.	5¼			1	Dome		60-20 ±4	89	20	2.5k	8/	12 x 8 x 7	Wood Lam.	Black	24	450.00
	U26 P	Vented	6½			1	Dome		40-22 ±3	92	15	2.8k	8/	14 x 8 x 9	Wood Lam.	Black	28	600.00
	U28 P	Ac. Sus.	8			1	Dome		50-22 ±4	89	20	2.5k	8/	22 x 12 x 8	Wood Lam.	Black	32	600.00
	U310 P	Ac. Sus.	10	5	Cone	1	Dome		40-22 ±3	91	20	700.4k	8/	25 x 14 x 11	Wood Lam.	Black	70	900.00
	U412 P	Vented	12	5	Cone	1.3	Dome, Piezo	ST	30-40 ±3	93	20	500.4k, 9k	8/	27 x 16 x 12	Wood Lam.	Black	80	1200.00
	U310 N	Vented	10	5	Cone	1	Dome		35-20 ±3	90	15	700.3k	8/	29 x 13 x 10	Wood Lam.	Black	90	1100.00
	U313 N	Vented	13	5	Cone	1	Dome		30-20 ±2.5	91	20	600.3k	8/	32 x 15 x 13	Wood Lam.	Black	120	1400.00
	Mesa II	Vented	12	5	Dome	2,1	Domes		26-25 ±2	91	50	400.3k, 10k	8/	34 x 12 x 11	Opt.	Black	140	3000.00
	Panels	Ac. Sus.	10	5	Cone	1	Dome		38-22 ±3	90	30	600.4k	8/	41 x 21 x 7	Wood Lam.	Black	80	1200.00
	U210 P	Ac. Sus.	10			1	Dome		40-20 ±3	89	20	2.8k	8/	25 x 14 x 11	Wood Lam.	Black	65	600.00
	U1212	Vented	(2)12	(2)18, 4½, 6½	Cones, Dome	1	Dome		22-22 ±3	90	40	200	8/	45 x 16 x 14	Opt.	Black	140	2500.00
	Subwoofer System	Sat. & Subwoof.	12		Cone	1	Dome		20-20 ±3	88	50	120,2.5k	4/	Three Pieces	Wood Lam.	Black	100	1200.00
UNITY AUDIO	4	Pas. Rad.	6½			1	Dome	No	50-18 ±2	89	20	1.8k	6/4	13 x 9 x 10	Rswd.	Black Knit	44	500.00
	7		(2)6½			1	Dome	No	35-18 ±1.5	89	30	1.8k	5/3	23 x 9 x 9	Opt.	Black Knit	102	1100.00
	DC II	Subwoof.	(2)10					No	29-180 ±2	90	75	85	4/4	30 x 13 x 12	Opt.	Black Knit	150	995.00
	Foundatton	Subwoof.	(2)18					No	19-120 ±1	98	150	60	5/5	36 x 24 x 24	Opt.	Black Knit	560	6500.00
	Parm		(2)6½			1	Dome	No	50-17 ±0.5	89	50	1.7k	5/5	9 x 10 x 22	Opt.	Black Knit	132	1700.00
VANDERSTEEN AUDIO	1B	Ported	8			1	Dome	T	20-40 ±2.5	90	20	3k	8.6	12 x 10 x 36	Opt.	Opt., Cloth	49	650.00
	2C	Pas. Rad.	8,10	4	Cone	1	Dome	M,T	29-20 ±3	88	40	500.5k	8.4	16 x 10 x 36	Opt.	Opt., Cloth	60	1125.00
	4	Inf. Baf.	8, (2)12	4	Cone	1⅞, ¾	Domes	M,T, ST	20-30 ±3	89	80	100,700, 4k, 12k	8.4	18 x 17 x 50	Opt.	Opt., Cloth	136	3250.00
VECTOR RESEARCH	VS-1	Tuned Port	8			1½				90			8.4	10 x 8 x 25	Hick.	Black		125.00
	VS-6	Tuned Port	12	4	Cone	1½	Dome			92			8.4	14 x 12 x 32	Hick.	Black		300.00
	VS-7	Inf. Baf.	(2)12	4	Cone	(2)1½	Cones			92			8.4	14 x 12 x 41	Hick.	Black		500.00
VELODYNE ACOUSTICS	ULD-18	Servo Subwoof.	18					W	5-165 ±3	98	350 inc.	85,120, 165	8/6	24 x 30 x 22	Oiled Wal. Lacq. Wat.	None	132	2500.00
	Mercury	Servo Subwoof.	18					W	20-150 ±3	97	350 inc.	150	8/6	20 x 28 x 14	Black	68	1299.00	
VIBE ACOUSTICS	M-1 Mini Monitor	Ac. Sus.	6½			1	Dome		70-20 ±3	87	15	3.5k	8.6	12 x 8 x 6	Oiled Wal.	Black Knit	30	175.00
	STD-1 Studio Monitor	Bass Ref.	12	2	Dome	1	Dome	M,T	38-20 ±3	91	15	700.4k	8.5	29 x 15 x 14	Oiled Wal.	Black Knit	50	770.00
	N-1 Nebula	Subwoof.	13						30-100 ±3	91	20	100	8/5	49 x 22 x 18	Oiled Wal.	Black Knit	90	450.00
VISONIK (Continued)	D5000	Ac. Sus.	4			1	Dome	No	110-17 ±2	90	10	2.5k	4/3	7 x 4 x 4	Black Nxtl. Opt.	Black	8	276.00
	D6000	Ac. Sus.	4			1	Dome	No	90-17 ±2	89	10	2.5k	4/3	8 x 5 x 5	Opt.	Opt.	10	330.00
	D7000	Ac. Sus.	5			1	Dome	No	70-17 ±2	89	10	2.5k	4/3	10 x 6 x 6	Opt.	Opt.	14	390.00
	D8000	Ac. Sus.	5	1¼	Dome	¾	Dome	No	65-17 ±2	89	15	1.1k,5k	4/3	10 x 6 x 6	Opt.	Opt.	18	460.00

LOUDSPEAKERS

MANUFACTURER	Model	Design Principle, Enclosure or System Type	Woofer Diameter, Inches			Midrange Diameter, Inches			Tweeter Diameter, Inches			SPL, 1 Watt/1 Meter, dB			Recommended Min. Amp. Pwr., Watts			Crossover Frequencies, Hz			Impedance, Ohms: Nominal/Minimum			Dimensions, Inches (To Nearest Inch)			Finish			Grille Color and Material			Weight, Lbs.			Price, \$		
			7	1 1/2	Dome	3/4	Dome	No	60-17 ±2	86	20	900,4.5k	4/3	14 x 9 x 10	Opt.	Opt.	20 Pair	660.00 Pair																				
VISONIK (Continued)	D9000	Ac. Sus.	7	1 1/2	Dome	3/4	Dome	No	60-17 ±2	86	20	900,4.5k	4/3	14 x 9 x 10	Opt.	Opt.	20 Pair	660.00 Pair																				
	SUB1	Subwoof.	12				No	25-150 +2,-4	86	30	150	4/3	24 x 17 x 14	Wal.	Brown Knit	37	430.00																					
	A60		5			1	Dome	No	40-25 +2,-4	86	30	2.5k	4/3	10 x 6 x 6	Wal.	Brown Knit	9	300.00 Pair																				
VMPS	404b	Ported	8			1	Dome	T	43-20 ±3	92	10	3.5k	8/6	18 x 12 x 8	Wal. Vinyl Oiled	Black Cloth	24	129.00																				
	606c	Ported	10			1	Dome	T	40-20 ±3	93	10	3.5k	8/6	23 x 12 x 12	Wal. Oiled	Black Cloth	30	199.00																				
	808 QSD	Ported	12	5	Cone	1	Dome	M,T	34-20 ±3	94	10	600,5k	8/6	26 x 15 x 12	Wal. Oiled	Black Cloth	50	315.00																				
	Mini Tower II QSD	Multiband Bass	(2)12	5	Cone	1,2	Dome, Piezo	M,T, ST	28-30 +0,-3	95	20	80,400, 4k,12k	8/6	35 x 15 x 15	Wal. Oiled	Black Cloth	65	439.00																				
	Tower II QSD	Multiband Bass	(3)12	5	Cone	1, 2	Dome, Piezo	M,T, ST	22-30 +0,-3	96	20	80,400, 4k,12k	8/6	43 x 15 x 15	Wal. Oiled	Black Cloth	90	599.00																				
	Super Tower/R QSD	Multiband Bass	(2)15, 12	(2)5	Cones	(2)1, (2)2	Domes, Ribbons	M,T, ST	20-50, 17-50 +0,-3	97	20	80,400, 4k,12k	8/6	49 x 21 x 17	Wal. Oiled	Black Cloth	140	969.00																				
	Super Tower IIa/R QSD	Multiband Bass	(3)15, (3)12	(4)5	Cones	(5)1, 2	Ribbons	M,T, ST	17-50 +0,-3	98	20	80,400, 4k,12k	6/6	76 x 21 x 17	Oiled Wal.	Black Cloth	300	1699.00																				
	Wide Range Ribbon QSD	Multiband Bass	15, (2)12, (2)8	69 L.	Ribbon	2	Ribbon	M,T	19-50 +0,-3	94	50	80,250, 15k	8/3	Five Pieces	Oiled Wal.	Black Cloth	700 Sys.	7500.00 Sys.																				
The Subwoofer	Multiband Bass	15, 12						19-600 +0,-3	94	20	Var.	8/6	27 x 21 x 17	Oiled Wal.	Black Cloth	90	375.00																					
WATKINS	WE-1		(3)8	(2)5	Cones	1 1/4	Dome	T	20-23 ±3	89	30	40,100, 1.5k	8/5	13 x 32 x 53	Opt.	Brown	258 Pair	3600.00 Pair																				
WESTLAKE AUDIO	BBSM-6F	Ported	(2)6 1/2	3 1/2	Cone	1	Dome	No	70-18 ±3	89	60	600,6k	4/2	11 x 22 x 13	Oiled Wal.	Brown Knit	100 Pair	1790.00 Pair																				
WHARFEDALE LOUDSPEAKERS	Option 1	Dipole & Subwoof. Bass Ref.	(6)8	(2)5	Cones	3/4	Dome		25-20 ±3			Elec.		12 x 53 x 31	White	Black Mesh	200 Pair	12,000.00 Pair																				
	Mach 3	Bass Ref.	8			1	Horn	T	65-17 ±3	94	15	5k	8/	23 x 13 x 9	Oiled Wal.	Black Knit	55 Pair	400.00 Pair																				
	Mach 5	Bass Ref.	8	4	Cone	1	Horn	T	62-17 ±3	94	15	1k,5k	8/	23 x 13 x 12	Oiled Wal.	Black Knit	64 Pair	800.00 Pair																				
	Mach 7	Bass Ref.	10	4	Cone	1	Horn	M,T	55-17 ±3	94	15	900,5k	8/	27 x 13 x 13	Oiled Wal.	Black Knit	94 Pair	1200.00 Pair																				
	Mach 9	Bass Ref.	10	(2)4	Cones	1	Horn	M,T	50-17 ±3	94	15	1k,5k	8/	33 x 13 x 13	Oiled Wal.	Black Knit	124 Pair	1500.00 Pair																				
	W10	Ac. Sus.	6			2	Cone		75-20	90	15	5k	8/	16 x 10 x 7	Wal. Vinyl	Black Knit	20 Pair	170.00 Pair																				
	W20	Pas. Rad.	6			2	Cone		48-20	90	15	4k	8/	22 x 10 x 8	Wal. Vinyl	Black Knit	31 Pair	310.00 Pair																				
	W30	Bass Ref.	(2)6			2	Cone	T	52-20	94	15	5k	8/	22 x 12 x 9	Wal. Vinyl	Black Knit	45 Pair	430.00 Pair																				
	W40	Bass Ref.	10	5	Cone	2	Cone	T	40-20	93	15	1k,5k	8/	26 x 14 x 11	Wal. Vinyl	Black Knit	92 Pair	620.00 Pair																				
	W50	Bass Ref.	10	(2)5	Cones	2	Cone	T	38-20	95	15	1k,5k	8/	32 x 14 x 11	Wal. Vinyl	Black Knit	106 Pair	830.00 Pair																				
	The Diamond	Bass Ref.	4 1/4			3/4	Dome		50-20	86	15	5k	8/	10 x 7 x 8	Wal. Vinyl	Black Knit	16 Pair	190.00 Pair																				
	Laser 90B	Ac. Sus.	8			3/4	Dome		65-20 ±3	88	15	4k	8/	19 x 11 x 9	Wal. Vinyl	Black Knit	33 Pair	250.00 Pair																				
	TSR102TC	B3	(2)4 1/4			3/4	Dome		75-20 ±3	83	25	300,3.5k	8/	16 x 7 x 8	Oiled Wal.	Black Foam	33 Pair	500.00 Pair																				
E90	Bass Ref.	(2)10	(2)5	Cones	1	Horn	M,T	43-18 ±3	95	15	150,800, 7k	8/	45 x 15 x 15	Oiled Wal.	Black Weave	220 Pair	1950.00 Pair																					
WILSON AUDIO	WAMM	Sat. & Subwoof.	18	(2)5, (2)8 1/4 x 11 1/2	Cones	(2)1, (9)5x5	Domes, ES	W,M,T,ST	17-30 +0,-3	97	50	55,400, 3k	4/3	Four Pieces	Opt.	Gray Foam	1650 Sys.	42,000.00 Sys.																				
WINGATE AUDIO	3000L	Closed Box	10	3 1/2	Cone	1	Dome		40-18 ±2	92	20	200,2.75k	8/3	18 x 8 x 44	Wal.	Brown Knit	95	1190.00 Pair																				
YAMAHA	NS-2000	Inf. Baf.	13	3 1/2	Dome	1 1/4	Dome	M,T	28-20 ±2	90	30	500,6k	6/5	18 x 16 x 30	Oiled Wal.	Brown Cloth	207 Pair	2900.00 Pair																				
	NS-70T	Inf. Baf.	10	2 3/8	Dome	1 3/8	Dome	M,T	40-20 ±3	88	20	800,6k	6/5	15 x 12 x 25	Oiled Wal.	Brown Cloth	88 Pair	718.00 Pair																				
	NS-50T	Inf. Baf.	10			1 3/8	Dome		45-20 ±3	89	30	1.5k	6/5	14 x 12 x 23	Wal. Vinyl	Brown Cloth	78 Pair	478.00 Pair																				
	NS-30	Inf. Baf.	8			1 3/8	Dome		45-20 ±3	89	30	1.5k	6/5	13 x 10 x 21	Wal. Vinyl	Brown Cloth	46 Pair	338.00 Pair																				
	NS-20T	Inf. Baf.	8			1 3/8	Dome		45-20 ±3	89	30	1.5k	6/5	11 x 9 x 19	Wal. Vinyl	Brown Cloth	36 Pair	258.00 Pair																				
	NS-10T	Inf. Baf.	6			1 3/8	Dome		50-20 ±3		20		6/	9 x 16 x 9	Wal. Vinyl	Black Cloth	30 Pair	198.00 Pair																				
	NS-W1	Inf. Baf. Subwoof.	10					W	40-200	111			6/	15 x 16 x 21	Wal. Vinyl	Black Cloth	39 Pair	275.00 Pair																				
	NS-1000M	Inf. Baf.	12	3 1/2	Dome	1 3/8	Dome	M,T	40-20	90	20		6/	15 x 13 x 27	Wal. Vinyl	Black Birch	170 Pair	1300.00 Pair																				
	NS-200M	Inf. Baf.	10	2 3/8	Dome	1 3/8	Dome	M,T	40-20	90	20	800,5k	6/	13 x 13 x 22	Wal. Vinyl	Black Cloth	82 Pair	570.00 Pair																				
	NS-500	Inf. Baf.	12	3 3/8	Dome	1 1/4	Dome	M,T	40-20	91	20	700,5k	6/	15 x 13 x 27	Wal. Vinyl	Black Cloth	112 Pair	770.00 Pair																				
	NS-10M	Inf. Baf.	7			1 3/8	Dome		60-20	90	20	2k	6/	15 x 8 x 9	Wal. Vinyl	Black Cloth	15 Pair	310.00 Pair																				

ORGONIC OREGON

Oregon
ECM 811 711-2.

What an inspiring CD! Oregon's music comes to vivid, pulsating life on this disc; aural textures slide and dance past each other, joining and separating in a brilliantly colored kaleidoscopic display for the ears. The quartet—Ralph Towner, Glen Moore, Paul McCandless, and Colin Walcott—explores sound, probing textural contrasts, playing with rhythm, experimenting with tone. As the cover art obliquely hints, the group's subject is *sound*, much as the subject of a modern abstract painting is actually paint and what can be done with it.

Oregon's palette is drawn from a wide variety of musical traditions which includes American jazz, European classical music, and Indian, African, and Latin sources. The band's brushstrokes are drawn with a staggering array of instruments: Each member of Oregon is a multi-instrumentalist, and the four have mastered 50 instruments among them. On this CD, Towner, known primarily as a guitarist, lays down layer upon layer of Prophet 5 synthesizer, acoustic piano, classical and 12-string guitar. Paul McCandless splashes the canvas with soprano saxophone, tin flute, English horn, bass clarinet, musette, and his principal instrument, the oboe. Acoustic bassist Glen Moore adds swirls of viola and piano as well as his rich, dark bass. Drummer Colin Walcott runs through a rainbow of exotic percussion instruments such as the tongue drum, takes an artful turn on sitar, and provides the only vocal, a Brazilian-influenced call-and-response on "Impending Bloom."

The mostly improvised pieces here will not be to everyone's taste. It is probing, repetitious, exploratory stuff. It can be breathtakingly beautiful or irritating and incomprehensible, often going from one to the other within moments during the course of a single cut.

The sheer sound is faultless. *Oregon* is one of the handful of CDs in the popular sector which originally was a digital recording, not an analog reprocessed for the digital format. Each note is clean, clear, and full. There is no extraneous noise at all. Producer Manfred Eicher has created a wonder-



fully transparent and sensitive piece of work. Few studio gimmicks were employed in this recording. Instruments are firmly rooted in space and not permitted to drift from channel to channel. There is a strong illusion of fore- to background movement, but this is created by the swelling and receding quality of the instrumentals themselves rather than by studio manipulation.

It's an intriguing footnote that this American group's CD was recorded in West Germany and first appeared on these shores as a Japanese import. The American CD has now been released but, like the original standard vinyl disc, it does not contain the extensive German liner notes. (Since there will be no English translation, I guess I'll never find out what Friedrich's "Fabelhaft!" meant.)

ECM is known for the outstanding technical quality of its standard recordings, and *Oregon* is no exception. The pressed vinyl version of the album is splendid. Surfaces are pristine, and the multiple hues of this eight-cut digital disc shine through as brightly as on its sister CD. The CD version should be purchased with longevity in mind; this is a piece of art to be savored and returned to time after time.

Paulette Weiss

Just One Night: Eric Clapton
RSO 800 093-2, two-CD set.

Need a healthy serving of guitar in your life? How about an hour and a half of guitar-master Eric Clapton? Not *enough* guitar, you say? Well, just add a dollop of Albert Lee, no slouch on the axe himself. *Just One Night* captures Clapton and company "live" in a December 1979 concert at Tokyo's renowned Budokan Theater. (The original double-disc RSO album was released in the U.S. in 1980.)

The spatial presence on this West German-manufactured digital recording is impressive. It is first noticeable in the positioning of the Budokan audience; this mass of humanity is so firmly located in aural space that the listener strongly experiences facing them from onstage with the band. You may quibble that, for an accurate aural experience, the listener should perceive the concert from the audience's perspective. However, I prefer the established conceptual distortion that permits me to hear the music minus the distraction of handclaps, sneezing, talking, and general fandemonium on all sides.

The clarity of this digital recording is equally impressive. Individual handclaps, hoots, and hollers from Clap-

ton's fans are neatly defined. The extraordinary sharpness of this disc is far superior to the average concert recording in which audience responses usually are heard as a great wash of sound. Onstage, where it counts, the sound is equally tasty. The easygoing, loose, incredibly fluid guitar style Clapton settled into in the early '70s is vibrantly translated from the Japanese stage to the international home market. Clapton has eased out of the "superstar" guitarist title pinned on him back in the '60s when he was a member of three of that era's most influential English blues groups—The Yardbirds, John Mayall's Bluesbreakers, and Cream. Although superstar status clung to him into the early '70s during his short stints with Blind Faith and his own Derek and the Dominoes, he has since opted to blend into an ensemble sound, and he has placed some emphasis on his own bluesy vocals. In this concert, Clapton's music retains his earliest blues influences, yet ambles along amiably with overtones of country, honky-tonk, and gospel.

This 14-cut set is not a greatest-hits package, although it does contain several Clapton chart toppers of the past decade, among them "Lay Down Sally," "Cocaine," "After Midnight," and "Blues Power." For the most part, the production is crisp and straightforward. Instrumentals and vocals are presented in their proper stage locations. The rare exceptions to this stand out, because they jar the listener's psychological perception of this performance as a live concert. On "Double Trouble," for instance, producer Jon Astley moves the aural location of a drum run from left to center to right channels. It's an interesting studio effect, but in the context of a concert recording, it is a puzzling production choice. I get a quick mental picture of the entire drum kit mysteriously drifting across the Budokan stage while the wide-eyed Japanese exclaim "Ah, so!"

This minor misjudgment is wiped out by the glorious, living presence of Clapton's guitar in the opening of this same cut, by the haze-free interplay of acoustic piano and guitar on "Blues Power," and by the exquisite sound balances that capture the heady audience participation in "Cocaine."

Just One Night is a nicely paced set,

moving smoothly from slow, tender ballads like "Wonderful Tonight" to up-tempo rockers like "If I Don't Be There By Morning," with plenty of bluesy, rambling, traditional or pseudo-traditional numbers peppered throughout.

The Budokan audience ate this stuff up like free tuna at a sushi festival, but I found the recording and some of the lengthy guitar solos a little more than I cared to consume at one sitting. Although a tasty little morsel like "Lay



Eric Clapton

Down Sally" went down smoothly, a long (8:23 minutes) and repetitious "Worried Life Blues" was pretty hard to swallow. In a sensitive response to this problem of length, this CD has been programmed to eliminate the extraneous time devoted to the audience ovations included to give this album the feel of a live concert. In the search and indexing modes, the laser returns to the point where the music actually begins, eliminating several seconds of audience brouhaha and Clapton's gracious but predictable "thank yous."

Treat this one like an Oriental feast; enjoy the beauty of the production, the sensual spread of sonic delights, but limit your sampling of individual selections. Too much of this laid-back fare at once just might lay you out.

Paulette Weiss

Schubert: Piano Trio No. 1. The Borodin Trio.

Chandos CHAN 8308.

As I have said before, the utter silence of CD recordings is especially valuable with chamber music. Here, in this fine performance of Schubert's *Piano Trio*, by the excellent Borodin Trio, the appreciation of the music and the details of the playing are greatly enhanced by the lack of noise.

The instruments are recorded quite close up, in what some people would regard as a too large and reverberant space for such intimate music. After all—this is music that could be played in many a living room. Be that as it may, the acoustics do lend a liveness to the sound, and the piano, violin and cello are very clean and tonally rich. Nothing earthshaking here, but a worthwhile recording nonetheless.

Bert Whyte

On the Line: Lee Ritenour
JVC VDP-6.

Here is one of the best pop recordings to appear thus far in CD format.

Take master guitarist Lee Ritenour, add such stalwarts as Dave and Don Grusin on keyboards, Ernie Watts on sax, Steve Forman on percussion, Harvey Mason on drums, and Anthony Jackson on bass guitars, mix in some exciting and colorfully orchestrated Lee Ritenour and Dave Grusin original works, and you've got a winner!

The sound is simply stunning. Recorded digitally, every orchestral element is "hound's tooth clean," with incredibly high definition and an impact that can be felt as well as heard. The opening drum whacks in "On the Line" will rattle your teeth. If you have the equipment to do it justice, the percussive transients and low-frequency synthesizer sounds that open "Heavenly Bodies" are just awesome in their clean delineation. The transients of Lee Ritenour's guitar have razor-sharp immediacy. The music is interesting and exciting, the playing is virtuosic and the sound spectacular. Add flawless CD processing from the new JVC plant and this becomes a prime example of the capabilities of CD. This has to rate as one of the best demonstration records in recent years.

Bert Whyte



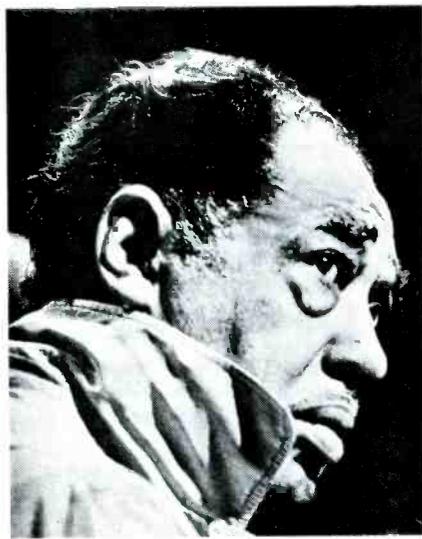
Louis Armstrong

Together for the First Time/The Great Reunion: Louis Armstrong and Duke Ellington.
Mobile Fidelity Sound Lab MFCD 2-807.

Years ago, Roulette Records brought together the great Louis "Satchmo" Armstrong and Duke Ellington and recorded them performing a potpourri of 17 of the Duke's most memorable songs. The double album was a great success, and now Mobile Fidelity has licensed the recording and has made an excellent transfer of the analog master tape to Compact Disc.

Louis sings a number of songs in his inimitable gravelly voice, but is mainly heard playing his distinctive-sounding

Duke Ellington



trumpet. The Duke plays piano with his usual élan and sophistication and in obvious rapport with Louis. Their musical collaboration makes memorable performances of such ballads of the Duke's as "Do Nothin' Till You Hear From Me," "It Don't Mean a Thing," "Don't Get Around Much Anymore," and "I've Got It Bad and That Aint Good."

In general, the sound is very clean. However, the stereo spread is somewhat exaggerated. Louis uses his small band, and a trombone is far left, a clarinet is far right, with the Duke's piano and Louis' voice and trumpet, and the drums set in the phantom center. The balance is somewhat compartmentalized, and selective reverberation puts Louis' voice in a slightly different acoustic space. But these are minor quibbles—the music making is great and if the Duke and Louis are among your favorite jazz folk, you'll get an extraordinary 68 minutes of them on this excellent Compact Disc.

Bert Whyte

Handel: Messiah Highlights. The Academy of Ancient Music, Christopher Hogwood, with the Choir of Christ Church Cathedral, Oxford.
L'Oiseau-Lyre 400 086-2.

I am stunned, bowled over, awed—you name it. This has to be one of the most glorious musical experiences available on a recording!

Everything is so right. The acoustic ambience is magnificent—so warm, so spacious, a reverb period of about

three seconds—yet all the forces remain completely articulate. Although the liner notes do not specify the recording locale, one presumes it must be Christ Church Cathedral in Oxford. The choir of this cathedral is used in this recording, along with five uncommonly good soloists.

The Academy of Ancient Music plays this wonderful Handel score on authentic instruments of the period. Conductor Christopher Hogwood furnishes a monumental performance of this beloved work. His tempi are just, if a shade on the fast side, and his handling of internal balances and choral/orchestral balances is masterful. The playing and execution of the orchestra is simply superb, while the choral work, and the soloists, enveloped in the warm embrace of the acoustics, are just glorious.

This was a prize-winning analog recording and the success of its transfer to CD proves beyond all measure just how great the sound of a master analog tape can be. Make no mistake—when you listen to this Compact Disc, you are literally listening to the analog master—not a tape copy! I repeat again—what a wealth of musical treasure is on countless thousands of master analog tapes in the vaults of the record companies.

You won't believe the incredible richness, the smoothness and natural sound of the strings—and pretty near everything else on this recording. It is great through loudspeakers and even under the merciless scrutiny of Stax Lambda professional phones. Do not miss it!

Bert Whyte

Led Zeppelin Atlantic 250 008.

Although merely labeled *Led Zeppelin*, this CD is actually *Led Zeppelin IV*, also known as the *Runes* album or ZOSO. It's the recording that finally brought the popular Zep critical recognition and gave the world the still high-flying "Stairway to Heaven," the raucous "Black Dog" and "Rock and Roll," and the all-acoustic number, "Going to California."

Of the Zep quartet—Jimmy Page, guitar; Robert Plant, vocals; John Bonham, drums; and John Paul Jones, bass and keyboards—Page was Led

The CD version of Led Zeppelin's 1971 album exposes the limitations and flaws of rock studio recordings of over a decade ago.



Zep's chief studio pilot, steering the heavy-metal craft through recording sessions with a deft flick of a switch or an experimental twist of a knob. His production work was sophisticated for its time, the very late '60s through the late '70s. It helped accelerate the weighty Led Zep up to the top of the charts at a time when fleets of contenders vied in the race to rock stardom. Although much of Page's studio work holds up today, this Compact Disc version of the 1971 album exposes the limitations and flaws typical of rock studio recordings of over a decade ago.

The overall sound is disappointingly flat and characterless, despite Page's brilliant use of studio electronics. Instead of clarifying the sound quality of this album, this West German-import CD merely emphasizes the murky and indistinct aspects of the original. The Zep may have been steered by Page's fancy navigation techniques, but there was still some pretty heavy fog to deal with in the studio.

For instance, the opening drums on "When the Levee Breaks" are obviously meant to blast you out of your seat; unfortunately, they are so lacking in presence, so thin at the bottom, that their first recorded appearance is unlikely to cause your eyes even to flicker from the in-flight magazine you've settled in with for the trip. The harmonica in the left channel is tinny, and as the mix fattens, it becomes far too indistinct. Although the instrumentation is not massive (under the harmonica is the Zep's basic three-instrument lineup—with overdubs, to be sure), individual instruments are lost in the mix. There is noticeable distortion throughout the recording, and not all of it is consciously applied by Page. Cymbal crashes and tambourine accents alike spread out in a foggy aural mist. In general, the clean, crisp reproduction of percussion instruments so common in modern heavy metal recordings is absent from this Zeppelin venture. Audible tape hiss further obscures the listener's enjoyment of this early metal flight.

This lack of clarity does not diminish Page's accomplishments in thrusting Led Zeppelin forward into advanced studio electronics. Again on "When the Levee Breaks," just listen to the neat

electronic stretching of Plant's vocal, to the subtle drifting of the wailing electric guitar from left to center channels, and to the way the final thumping clot of drum, bass, and guitar vaporizes into light reverb at the song's conclusion. Spatial balances throughout are handled expertly. Page radars in on the fore- or background at will, zooms the aural focus to left or right channels with ease, and creates a strong sense of depth and dimension over and above the fuzzily outlined individual instruments.

The production and arrangement of "Stairway to Heaven" have received accolades through the years, and they deserve them. The lovely acoustic guitar intro in the left channel with its oh-so subtle echo in the right sparkles like a runway beacon on a clear night. The gorgeous complementary response of overdubbed recorders in the right channel is equally defined, as is Plant's unenhanced vocal which taxis in at the center foreground. All remains clean and distinguishable until drums and electronics roar in, and the whole soars into a rock 'n' roll maelstrom. The energy is impressive, but the sound quality suffers. Running from its simple configuration of acoustic guitar, voice, and recorders to an all-out heavy metal assault, "Stairway" demonstrates that Page's obvious ability to achieve recorded clarity is somehow lessened when the mix grows more complex.

I wish there were some way to shine this baby up, oil it and revamp its engines to make it airworthy for the '80s. No such luck. Like Howard Hughes' incredibly huge all-wood airplane, this Led Zeppelin CD should remain in the hangar to be viewed by those with a bent toward history. *Paulette Weiss*

Broadway Brass: The Empire Brass Quintet.

Sine Qua Non 79002-2.

This is another Sine Qua Non CD recording and it is of truly extraordinary stereophonic sound quality.

The Empire Brass Quintet is one of the premier exponents of brass music and their virtuosity in this recording is breathtaking. Their arrangements for the "West Side Story" suite, and the "Porgy and Bess" suite are clever, euphonious and complex, yet never lose the essential melodic line.

The recording was made by a good friend of mine, John Newton. John used to be with Vanguard Records, and these days does a great deal of freelance digital recording. John uses the Corpus Christi Church in Housatonic, Massachusetts as a recording venue, because of its really superb, warm, spacious acoustics. It has a reverb period of about 2.5 seconds, with nary a trace of slapback.

John used a spaced array of Schoeps SKM-52U mikes and the Soundstream digital recorder. John had a trumpet and French horn on the left channel, trumpet and trombone on the right channel, and the tuba in the phantom center channel. He gets "you are there" presence from the instruments fairly close-up, with the broad acoustics lending a rich, resonant liveness to the sound. These brass instruments sound brazen indeed—brilliant trumpet, the noble mellowness of the French horn, the power of the trombone and the elephantine bass punctuations of the tuba.

The overall sound is pristine clean, and when the Quintet goes up the dynamic scale in a massive tutti, it has truly magnificent sonority. *Bert Whyte*

Bach: Unaccompanied Cello Suites Nos. 1 and 2; Nos. 3 and 6; Nos. 4 and 5. Yo-Yo Ma.
CBS/Sony 38DC 143, 38DC 110, and 38DC 144.

The six Bach "Unaccompanied Cello Suites" have always been display pieces for virtuoso cellists.

A cellist may give a bravura performance of any of the concertos in the cello literature, but his peers will judge him by how well he plays these Bach

Yo-Yo Ma's dazzling technique and tone get clean, fairly close-up sound, with warm ambience and nice perspective.



Suites. Yo-Yo Ma is certainly in the forefront of today's younger cello virtuosos. He may not yet have the insightfulness of a Pablo Casals or a Rostropovich, but his performances in these recordings are really quite outstanding. Certainly there is no doubt about his technical dexterity or tonal resources. Ma's bowing and fingering are utterly dazzling and he explores the tonal spectrum of his instrument, producing a lovely, rich, and sonorous sound.

The cello sound is very clean and fairly close-up, but given a nice perspective in the warm ambience of Vanguard's New York studio. Oddly enough, Suite No. 1 was recorded in February of 1982, and Suite No. 2 not until May of 1984. Suites No. 4 and No. 5 were recorded on successive days in April 1984, while no dates are furnished for Suites No. 3 and No. 6. No doubt the concertizing activities of an artist of Yo-Yo Ma's status accounts for the time span of the recording dates. As always with CD, the total lack of noise greatly heightens the appreciation of this kind of music.

Obviously, only the most dedicated devotees of Bach would listen continuously to all 128 minutes of these Suites. For my taste, they are to be savored in shorter segments. *Bert Whyte*

Bruckner: Symphony No. 9. Concertgebouw Orchestra, Bernard Haitink. **Philips 410 039-2.**

This is the sort of Compact Disc that makes you want to gnash your teeth in sheer frustration.

This Bruckner Ninth Symphony is

magnificent, awe-inspiring music, given a magnificent performance by that redoubtable Bruckner specialist, Bernard Haitink, played with tremendous conviction by the magnificent Concertgebouw Orchestra. It all should add up to a great musical experience—but, alas, there are negative aspects of the sound quality that ultimately diminish the enjoyment of this great work.

A puzzling thing is the acoustic perspective. By now, the Philips engineers have proven many times that they know how to cope with the acoustics of the Concertgebouw hall to obtain a good balance. Yet, in this recording, the perspective seems overly reverberant. Bruckner's scoring is usually quite massive—in fact in some areas even being a bit thick or even turgid. Combine this kind of scoring with the overly reverberant acoustics and the sound gets a bit bloated and amorphous. This is especially true in the louder sections. Where the scoring is a little more open, as in the opening of the Scherzo, with its insistent hammering tympani beats, detail is reasonably preserved. Unfortunately, in addition to the acoustic problems, the high strings have an unpleasant, steely edge, and some of the trumpets display some stridency. It is hard to fathom what went wrong, especially in light of the many fine Concertgebouw recordings made by Philips. *Bert Whyte*

Abbey Road: The Beatles
EMI/Odeon CP35-3016.

I've been ruining my health—keeping ungodly hours, eating poorly—trying to keep up with techno-pop, hip-hop, punk, funk, and all the other modern musics man is heir to. Imagine my delight at being prescribed 45 minutes of listening to those grand-old-men of pop, The Beatles. Back in 1969, when *Abbey Road* was originally released, The Beatles were mere baby boys despite the maturity of their music and the adult business and personal differences which were about to break the group up forever. Now Paul McCartney is an astonishingly successful businessman and performer, a well-married husband and daddy; Ringo Starr is an affable, middle-aged, married gent with an on-again, off-again film and recording career; George Harrison is the invisible man; and John Lennon—it's still hard to believe—John is dead.

The antidote to this bitter dose of reality is a good shot of almost any original Beatles recording. The youthful exuberance, the vitality, the happy sense of discovery are all there. *Abbey Road* is chock-full of familiar material, from classics like "Something," "She Came in Through the Bathroom Window," and "Come Together" to those wonderful cheeky numbers, "Maxwell's Silver Hammer" and "Her Majesty."

This Japanese import CD vividly displays the genius of producer/fifth Beatle George Martin. With an operational

Bernard Haitink



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The *Abbey Road* CD reveals delightful details. Spatial presence is remarkable. Yet there is a flatness, sound drained of oomph.

assist from the boys themselves, Martin experimented with what then were innovative studio techniques. Digital reprocessing has washed away much noise contamination and reveals delightful details of studio prowess. For instance, the almost inaudible left-channel echo of Paul's right channel solo vocal on "Her Majesty" comes

through clearly on this transparent CD; on my original, well-worn analog disc, I'd swear there *is* no such echo. The introduction of the second guitar on "Polythene Pam" creates an almost physical feeling of pressure on the eardrums when heard through headphones. This curious effect is not caused by increased volume levels,

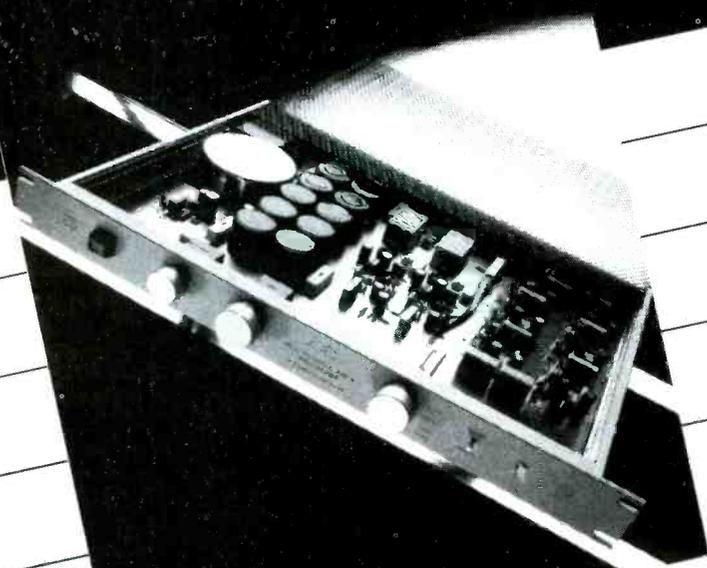
but by clever doctoring of the instrument with electronics.

Along with innumerable miraculous studio effects, most of the basics of modern recording were handled with skill back there at the turn of the decade. Spatial presencing is remarkable; a true sense of breadth and depth is established cut after cut. Martin and the boys have a good time with this, throwing vocals at us from mid-, fore- and background, left or right channels. Just for fun or just for effect, they shift these locations at will. Take the impudent "Her Majesty," a 25-second-long bit dangling off the tail end of the recording (do wait for it; there's a 15-second gap after the preceding song, deceptively titled "The End," that might lead you to believe the album is over). Here Paul's bouncy little vocal is tossed from right to phantom center channel just for the hell of it. Instrumentals are toyed with similarly. Ringo gets the rare opportunity to showcase his pedestrian but happy-go-lucky drumming on "The End" as Martin threads the tubby bass drum from right to center to left and back again. Balances between orchestral segments and individual instruments (and there are lots of orchestrated passages on this disc) are generally good, although too often when instruments are massed they lose some definition.

Unfortunately, it is necessary to put the scalpel to this disc and reveal its imperfections as well as its glories. This is another one of those digital cleanups that exposes the shortcomings of decade-old recordings. There is an overall flatness to the sound here. The natural oomph is drained from the bass and drums, and a gauze veil is laid over cymbals, pianos, and tambourine. Electric guitars and synthesizers manage to cut through this swathing, but acoustic instruments suffer; they sound muffled and enervated.

We've got a pretty bad prognosis on tape hiss as well. "I Want You" is the most grievously afflicted cut. Although there are gaps in the music on this selection, there are no truly silent spots; all pauses are audibly filled with the hiss of death. The pattern of tape hiss throughout this disc is quite strange. Although it is audible on many cuts, there are a few numbers containing significant quiet passages that ex-

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Ian G. Masters
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There is a deliberately creamy, almost primitive sound to much of the CD of *Beauty and the Beat*. It has real "radio" presence.

hibit no hiss whatsoever, notably the marvelously produced "Here Comes the Sun" and its companion piece, "Sun King." Then there are two songs, "Because" and "You Never Give Me Your Money," that start off with no significant extraneous noise until the right channel cuts in hissing like a snake afire. Most peculiar, mama.

There is no way to surgically remove many of the old imperfections the clarity of this digital disc reveals. Nevertheless, Dr. Weiss prescribes this CD for whatever ails you, whether it's a case of deadly *angst*, *weltschmerz*, or a simple Michael Jackson overdose. So take four—John, Paul, George, and Ringo—and *don't* call me in the morning; call a friend and tell him about the cure.

Paulette Weiss

Beauty and the Beat: The Go-Go's
I.R.S. CD70021.

Popular music history was made with the original analog release of the Go-Go's *Beauty and the Beat* in 1981. The album became the first effort by an all-girl rock band to become number one on the pop charts. American and British audiences simply gobbled up this candy-box recording, another prize in distributor A&M's Audio Master Plus series. The five Go-Go's—Belinda Carlisle, lead vocals; Jane Wiedlin, rhythm guitar and vocals; Gina Schock, drums and percussion; Kathy Valentine, bass and guitars; and Charlotte Caffey, lead guitar, vocals, and keyboards—and their bouncy pop-rock bonbons were packaged by girl-group producer *extraordinaire* Richard Gotteherer and his co-producer, Rob Freeman.

There is a deliberately creamy, almost primitive sound to much of this production. It is as though there were a conscious choice to give this recording "radio" presence, to have it sound a bit like the rock 'n' roll on radio airwaves in the '60s. It was said that Elvis Presley had this sensitivity to "radio" sound. He made it his business to listen to the final mix of his recordings on a crude little monitor and have the sound adjusted accordingly. He knew his fans would be listening to him, not on sophisticated hi-fi equipment, but on the box at home or, later, on portable transistorized models. Here, Gotte-

herer and Freeman achieve this quality by coating vocals and instrumentals in a rich layer of reverb. Carlisle's lead vocals are often double-tracked as well; when the echoing backup vocals of Wiedlin and Caffey are folded into the mix along with reverb-treated instrumentals, the result is often a delicious chocolate mess that melts in

your ears, not in your hand. This deliberate production choice is appropriate to both the teen sensibility of these lyrics which speak directly to modern, hip youth culture ("We Got the Beat," "Tonight," "Skidmarks on My Heart"), and to the slam-bang, pre-synthesizer rock 'n' roll spirit oozing out of every gcody here.

This unit will obviously crank out enough power for any reasonable use (it doesn't clip until 350 watts).



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Sonically, the *Petrouchka* CD is a mixed bag. When the scoring is open, with the instruments quite exposed, the sound is excellent.

That this choice is conscious becomes clear in the intros to each cut and throughout "Automatic," the only song without the creamy center. "Automatic" leaves enough internal space to hear the repetitious guitar figure running through in a distinct layer and to distinguish bass notes and drum beats individually. The intros in general sport full-bodied, crisp drum work, electric guitars that chime with bell-like precision, and Carlisle's voice, round, sweet, and clear despite the reverb. There is a fine sense of presence to instruments in these introductory passages, and occasionally this presence holds its own through the creamy center of the mix. The big-bottomed drums of "Skidmarks on My Heart," for instance, boom away with solidity throughout, and each rat-tat-tat of the guitar figure split cleanly into left and right channels on "This Town" comes across as dry and neat as an individually wrapped stick of Juicy Fruit gum.

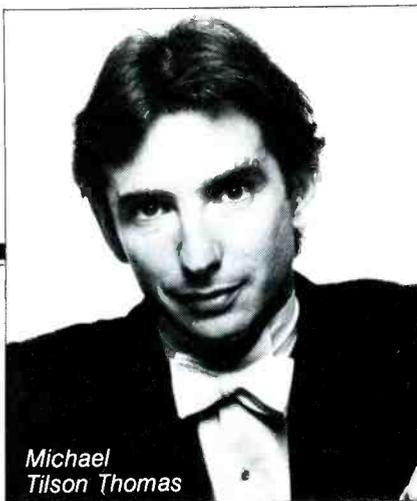
Outside of the goopy portions, the sense of depth and spatial presence is quite good. All aural planes and left-right channel locations are well used. The dynamic range of this CD is excellent, capturing the loudest raucous rock passages with no distortion while reproducing the very faint electronic repetition bitten out of Carlisle's vocal in "Automatic" with superb fidelity. (The latter, by the way, is one of the very few fancy studio effects in this fairly straightforward production.) This is a tasty little CD, a sonic snack for those with a sweet tooth for pop-rock.

Paulette Weiss

Stravinsky: *Petrouchka*. Philharmonia Orchestra, Michael Tilson Thomas. CBS MK 37271.

Conductor Michael Tilson Thomas is still a young man, but he is no longer the *enfant terrible* he was in the early days of his association with the Boston Symphony.

With maturity has come wisdom and a rein on his impetuosity. His approach to a score is more reasoned these days, as witness his performance of "Petrouchka." There are still some mannerisms—the reshaping of some phrases, and occasionally odd tem-



Michael
Tilson Thomas

pi—but for the most part this is a well-balanced, finely crafted reading, in which he is quite meticulous about inner detail. With Stravinsky's intricate and complex orchestration in so many sections, this is all to the good. Thomas elicits some exceptional playing from the splendid Philharmonia Orchestra, especially in the brass and woodwinds, in this difficult score.

Sonically, this recording is a mixed bag. When the scoring is open with instruments quite exposed, the sound is excellent—clean, smooth strings, with the biting brass that is so vital in this music. There is a bass drum of formidable weight, which remains articulate even when just softly stroked at pianissimo levels. Unfortunately, as the instrumentation and amplitude increase, by the time a full tutti is reached, the sound becomes very coarse-textured and grainy. Fortissimos can be "muddy" and the soundstage becomes amorphous, making instrumental localization difficult. Hall ambience is spacious, but when the sound gets thick, there is an odd mid-range coloration as well. The filler work, "Scherzo à la Russe," fares much better in matters of sound—

Alfred Brendel



probably due to the nature of its scoring. Thomas provides a high-spirited, ebullient performance of this delightful music, emphasizing the dance-like rhythmic aspects of the score.

As noted earlier, this is a recording with a lot of pluses, but also with flaws that are ultimately distracting.

Bert Whyte

Liszt: *Sonata*. Alfred Brendel, piano. Philips 410 040-2.

More of the incomparable Alfred Brendel, this time taking on the formidable Liszt B minor piano Sonata, plus fillers, "Légendes," and "La lugubre Gondola" No. 1 and No. 2.

The B minor Sonata is a well-known knuckle buster, a complex and fiendishly difficult work, not in the repertoire of many pianists. Brendel himself calls the Sonata "a mixture of liberation and white heat." It is, indeed, a piece that requires the utmost in technical skills as well as interpretive powers of the highest order.

Brendel has these qualities in abundance, and his traversal of this piece is well-nigh awesome. The Philips engineers have provided a splendid piano sound, with a wide dynamic range encompassing the massive chordal structures. The piano transients are razor sharp. The piano is recorded moderately close-up, with a lot of presence, in a fairly spacious acoustic space. This was an original digital recording and this certainly helps in the matters of dynamic range and total absence of noise. If you are a piano aficionado, this is a "must" CD.

Bert Whyte

Ravel: *Bolero; Pavane pour une Infante defunte; Rapsodie espagnole; La Valse*. The Minnesota Orchestra. Stanisław Skrowaczewski. Mobile Fidelity Sound Lab MFC D 802.

This CD from Mobile Fidelity is the result of a licensing agreement with Vox Records. These works are part of the complete works of Ravel recorded by Vox with Skrowaczewski and the Minnesota Orchestra. I am very familiar with them, as they were engineered by my good friend Marc Aubort, and I've heard the analog masters in his studio.

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Shades of Gray, by Billy Barber, is a good CD for speaker testing. Recorded slightly close-up, it is very natural and sounds like a real piano sounds!

they are superbly balanced. Marc always manages to maintain just the right ratio of orchestral definition with hall acoustics. In this case, the hall is a somewhat controversial design by Cyril Harris. Much touted as a super hall, there is, indeed, much that is very good, but there are also some problems, e.g. a bit of slapback below 100

Hz; a slight amount is evident in the "Bolero," but Marc has tamed it quite well. Throughout this piece, the hypnotically repetitive snare drum is very precise, clean, and articulate. In fact, throughout the "Rapsodie espagnole" and "La Valse," the cleanness, transient attack, and impact of the percussion is notable. String tone, always a

strong point with Marc Aubort recordings, is particularly smooth. Marc usually employs a pair of Schoeps omnidirectional microphones, with perhaps a few sweetener mikes depending on the score and the hall acoustics. He continues to favor the older, tube Schoeps, feeling they are more natural sounding than their solid-state counterparts. In spite of its analog origin, hiss level is quite low, and dynamic range fairly wide. There is plenty of punch and weight to the sound, as witness the finale of "La Valse." Skrowaczewski gets exemplary playing from his forces, and his performances throughout this series are quite exciting without sacrificing the sensual and atmospheric aspects so important in Ravel's music.

Bert Whyte

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Billy Barber

Shades of Gray: Billy Barber
Digital Music Products CD-445.
(Available from Digital Music Products,
Rockefeller Center Station, P.O. Box
2317, New York, N.Y. 10185.)

Engineer Tom Jung has another winner in this solo piano recording.

There are 12 selections on this CD composed by the pianist Billy Barber, and the final number is the great George Gershwin's "Someone to Watch Over Me." There is a vocal refrain on this which I presume is Mr. Barber.

Much of Barber's writing is eclectic—I hear echoes of several composers, especially Bartok, in the selection entitled "Beth."

Spacious acoustics enhance parts of Tchaikovsky's *Symphony No. 2*, but cut articulation in fortissimos. The room sounds large, yet too small.

Mr. Barber has a nice, light but sure touch and he can be quite expressive. As usual with Tom Jung recordings, the piano sound is superb. It is always ultra-clean, with very precise and fast transient attack. It is recorded just slightly close-up, but it is very natural and it sounds like a real piano sounds! Another good CD for speaker testing.

Bert Whyte

that although the reverberation suggests a large space, that the space is too small for this group.

On the plus side is fine playing from the Orchestra and a strong, well-paced performance from conductor Geoffrey Simon. Some lovely sounds—the french horn in the opening of the first movement, and some exciting

sounds—the clean, well-projected brass fanfares of the finale. Internal balances are nicely handled, and string sound is quite clean.

If you're more familiar with the endlessly performed Tchaikovsky Fourth, Fifth and Sixth Symphonies, you'll find this Second refreshing.

Bert Whyte

Rod Stewart: Greatest Hits Warner Bros. 03373-2

Performance: Stewart Recording: D
Source: Analog

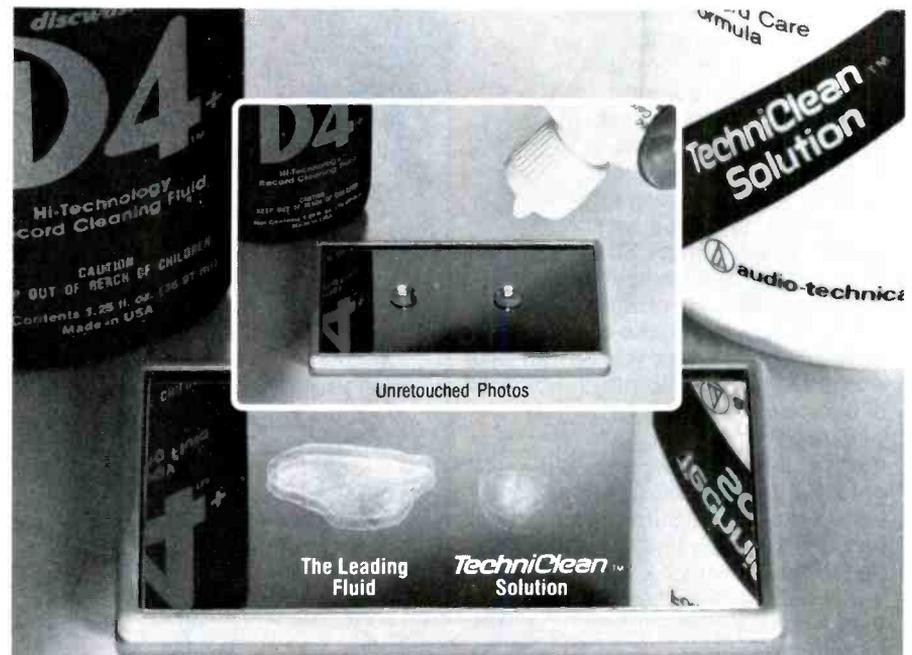
This CD is suggested for all Rod Stewart fans. The digital pressing presents recordings culled from Stewart's albums in pristine form. That is, the quality of the originals is preserved without the tracing and high-level distortion that plagued the analog versions. Unfortunately, some of the tracks that featured overequalized sibilants (which caused mistracking on the analog) here cause me penetrating, high-frequency pain. All in all, we can see through this CD to the original, two-dimensional, 15 dB-dynamic-range, hearing-aid-monitored initial production. It's up to you to determine if it's worth the price. Individual reviews of the songs are superfluous here, since they've been done to death already. Minimal (nonexistent) notes on a presentation originally formatted for analog and duplicated on CD.

C. Victor Campos

Tchaikovsky: Symphony No. 2. The London Symphony Orchestra, Geoffrey Simon.

Chandos CHAN 8304, digital. (Available from Harmonia Mundi, P.O. Box 64503, Los Angeles, Cal. 90064.)

This recording is full of contrasts. Recorded in a church, the reverberation period is perhaps a bit too long, but it works beautifully in the wonderful andante second movement of this early Tchaikovsky symphony where the open nature of the scoring is enhanced by the spacious acoustics. However, when the scoring gets more complex in the Scherzo and finale, and especially when the orchestra is playing at fortissimo levels, the sound becomes less articulate. You get the odd feeling



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JON & SALLY TIVEN
MICHAEL TEARSON

PRINCELY PLEASURES

Purple Rain: Prince and The Revolution

Warner Bros. 25110, \$8.98.

Sound: B- Performance: B+

Whether Prince is successful because of his image or in spite of it is an open question, but there is no questioning his success or his talent. He is guaranteed to provoke an extreme reaction—love him or hate him—based more upon image than music. Just about every pop music fan has been exposed to his songs, whether it be in covers by Mitch Ryder/Cyndi Lauper or outright plagiarism by Shalamar ("Dancing in the Sheets" from *Footloose* was an obvious cop from 1999). Prince has made a serious rep based on the premise that he can write a mighty tune and he plays almost all of the instruments on his records with verve. Okay, the guy's no dummy, he's talented, and he's got style, but is there any substance behind the noise? Surprisingly enough, the answer is yes. One had to be thrown for a loop early on in Prince's career when his junk food lyrics were an instant turnoff, but he has matured considerably as a craftsman. He is now a highly stylized creature, and the form of his work has become as important as the songs—the sparse, machine-driven "When Doves Cry," complete with breathy vocals, is more a creation of production than your typical hit song. In other words, Prince has integrated his approach to such a degree that any two portions of his three-pronged thrust (song, production, vocal) can carry if the third flags. Even one might do the work of putting the track over, in a pinch. While some of the tracks of *Purple Rain* seem below average, Prince has never made a whole album full of tunes like "When You Were Mine." *Purple Rain* is more consistent than 1999, but there isn't a song as obvious as "Little Red Corvette" on it, even though "When Doves Cry" has a mighty punch.



All these complaints are minor ones, and one should take into consideration that Prince is competing against Michael Jackson for a position in the marketplace. Prince definitely has the edge on all fronts when stacked up song for song against *Victory*, but whether he will be able to overcome Michael Jackson fever and become the next Superstar is yet to be seen. As is, *Purple Rain* is a highly enjoyable album with a great deal of depth by one of America's leading songwriters, and his ability to be judged as a contender without any qualifications is unchallenged. Now, let's see him make the album that's as good all the way through.

Jon & Sally Tiven

Spirit of '84: Spirit
Mercury 818 514-1 M-1, \$8.98.

Sound: C+ Performance: C+

It is always risky for a beloved band of yore to get back together to make an album which is mostly remakes of their classic material. The four albums by the original quintet, *Spirit*, were among the headiest of the late '60s and early '70s, among the best recorded as well. They fused jazz ideas into rock with more sincerity and success than most who tried that mix, due in no small part to Ed Casidy's jazz drumming background. Their songs on the early albums had a rare combination of a hard, biting edge and real sophistication to counterbalance it. There have been several re-generations of *Spirit*, but none have been very successful, either in the marketplace or aesthetically. *Spirit of '84* marks the first time the original five have worked together since 1971's *Twelve Dreams of Dr. Sardonicus*, and that alone is grounds for celebration. The vocal mix of Jay Ferguson with Randy California, a key to their early success, makes the new album an exciting event.

Seven of the 10 songs on the new album are remakes of classic *Spirit* material, including "Mr. Skin," "Mechanical World," "1984," "Uncle Jack," "Nature's Way," "Fresh Garbage" and their biggest hit, "I Got A Line On You." While the fellows can't quite capture that early edge, they generate some real sparks playing these chestnuts and bring them real freshness.

The three new songs run from forgettable to unfortunate. The unfortunate tag most belongs on the lead-off track "Black Satin Nights" which sounds like one that Journey would have passed on.

Good as it is to have the real *Spirit* back (and it is *real* good), I'd still urge you to search out those four originals. Like Dobie Gray sang in "The In Crowd," "The original is still the greatest." Of course, someone else sang how this would do "until the real thing comes around." Michael Tearson

Illustration: Rick Tulka

Difford & Tilbrook
A&M SP-4985, \$8.98.

Sound: B Performance: B+

Despite critical raves with clockwork regularity and the clever, brainy, adept songs of Chris Difford and Glenn Tilbrook, Squeeze finally broke up in frustration at not ever clicking for the string of hits so many people thought they deserved.

Happily, Difford & Tilbrook have kept their partnership alive with a sparkling new album. The songs are consistent with their work in Squeeze, which is to say that they are diverse stylistically, ranging from latter day Motown and soul to pure pop love songs. In addition, they retain that witty, bracing quality. However, I've got this nagging suspicion that they are still not very likely to become hitmakers with this album. It is too good, too intelligently composed and constructed. At a time when pose and formula rule the airwaves, it is hard to imagine quality goods chipping out a niche.



Difford & Tilbrook

For the album, Difford & Tilbrook have joined forces with producer Tony Visconti whose pedigree includes all kinds of quality music which is not necessarily mainstream stuff—people like David Bowie, T. Rex, Osibisa, Procol Harum, Ralph McTell, Tom Paxton and many others. Tony V also contributes brass or string charts for half the album. His touch is evident in little ways all through—things like the electronic

filtering on percussion and the multi-layered percussion which occasionally appears and the shimmering effect of his string chart which gives "Man for All Seasons" an other-worldly aura.

Still, the songs are the real stars here, just like they were on all the Squeeze albums. If you want pop songs with something to say and genuine wit besides, *Difford & Tilbrook* serves them up with the best. They have a gift for starting with a formula idea and twisting it into a whole new shape all their own. The more I hear their songs, the better I like them.

Michael Tearson

Warrior: Scandal, featuring Patti Smyth
Columbia FC 39173.

Sound: B+ Performance: B-

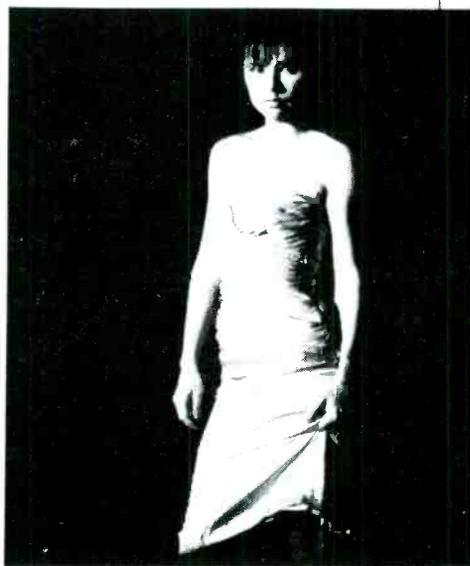
The scenario is familiar—guitarist who's also a songwriter and arranger starts group with singer, group gets famous, singer gets all the attention, singer fires group. What started out as the Zack Smith Band quickly became the Patti Smyth/Zack Smith battleground, and after some disastrous performances Scandal effectively disbanded and became the Patti Smyth Group. *Warrior* predates this, but only slightly, and given that this is the group being given the Big Push from its label, we've got a taste of what's to come. Which is no great shakes any way you mix it up.

Not to be misleading, the title track is one great single, despite lyrical rips from Dexys Midnight Runners (blame Nick Gilder and Holly Knight who wrote it, not the group), and there is a nice production sound from Mike Chapman. The rest of the album is decidedly inferior, almost unlistenable. Smyth is an effective singer only for a song or two, with a very limited repertoire of licks which she uses in practically every tune. Her range is small, and the result is a tiring and one-dimensional record.

There are six original songs and four covers, and the result is a hodgepodge of styles that spans the entire range of what is euphemistically called corporate rock. It is calculated, formulaic, and lacks personality and spirit. Mike Chapman is a very talented producer, but at his best he adds a commercial sensibility to artists who other-

wise explore fringe territories. Scandal's aesthetic leanings are straight down the middle, and the result is like adding sugar to coca cola. What Scandal needs is a little more weirdness and edge, not another coat of high gloss.

Only time will tell whether the "New" Scandal will be able to cut through the dross and come up with some songs of its own. "Love's Got A Line On You" (from their first EP) beats anything on



Patti Smyth

this album, but that shouldn't stop the group from getting a hit or two. But even fans will find *The Warrior* difficult to digest in its entirety, and we'd like to see this New York-based band become something more than another flash in the pan. *Jon & Sally Tiven*

No Brakes: John Waite
EMI America ST 17124, \$8.98.

Sound: B+ Performance: A-

As sequels go, this one is slicker and trendier than the original, and perhaps a bit of the originality has evaporated, but Waite lives up to most of the promise of *Ignition*. Unfortunately he's jettisoned the composer of most of the music on the last album, rhythm guitarist Ivan Kral, and this makes for a more standardized writing as Kral does have a distinctive approach. On the other hand, the musicianship of the band has improved with the addition of Gary

Depeche Mode's sound is very compact and streamlined. Their new album works equally well as a dance record or as cerebral listening.



Myrick on guitar, the vocals are better recorded, and Chas. Sandford (who wrote some of the better parts of the last LP) has been brought in to co-author the single, "Missing You."

More importantly, it seems that Waite is connecting with his audience, as "Missing You" looks like one of the smash singles of the summer. All of this is well and good, because Waite is an exceptional singer and is moving in the right direction—without this kind of affirmation, he could easily fall by the wayside artistically. We can only hope that he will not be distracted from making albums like this one which, although a bit calculated, is hardly short on substance. *Jon & Sally Tiven*

All Over The Place: The Bangles
Columbia BFC 39220.

Sound: C+ Performance: B-

After two very promising and fun albums on an independent label, The Bangles graduate to the major leagues. With David Kahne's smart, no-frills production, they have delivered their best album yet, both aesthetically and technically.

The Bangles' songs are firmly rooted in the flower music of the late '60s with more than a hint of Jefferson Airplane/Quicksilver streamlining. Still they remain ingenuous and totally unpretentious. Songs are the chief concern, not licks or attitude. Thus *All Over The Place* has a very comfortable pace.

Look for good-time music when you slap The Bangles on the turntable. You won't be let down. *Michael Tearson*

People Are People: Depeche Mode
Sire 25124, \$8.98.

Sound: B- Performance: B

Now that the great techno-pop scare of the early '80s is behind us, it is getting to be time to survey the survivors. Depeche Mode has persevered, and their *People Are People* is a testament. It combines some new material, most notably the title track, with the best of their output of the last three years, and somehow this set has more heart than their several previous albums have had. As a kind of "best of" album, I can recommend it.

They are very clean in their recording techniques, not depending very much on the cheap effects so many of their ilk have used as crutches. Thus, they sound very compact and streamlined. Their gift for real romance in their best songs shines here as well. *People Are People* works equally well as a dance record or as cerebral listening. *Michael Tearson*

Fine Fine Line: Andy Fraser
Island 90153, \$8.98.

Sound: B- Performance: A+

After an almost 10-year absence from the record industry, former Free bassist/songwriter Andy Fraser has returned with the proverbial vengeance. In his American solo debut, *Fine Fine Line*, a collection of his most recent songs arranged and produced for the straight-ahead rock 'n' roll audience, he easily blows away all competitors. His gruff 'n' tough vocal delivery, coupled with the best songs written for this genre in ages, make for the most powerful rock performance you're likely to hear until Fraser's next album. He has truly arrived.

A little background on the boy might be in order, as his name is not a household word. Following a brief tenure with the esteemed Alexis Korner, he formed Free at the age of 15 with mates Paul Rodgers, Simon Kirke, and Paul Kossoff. When Free finally broke up, Fraser released two exceptional solo LPs in Great Britain which attained critical recognition. His American record company refused to release them here, claiming they were "uncommercial"—a phrase, in this case, synonymous with "ahead of their time"—and Fraser retired from making records to concentrate on songwriting. Since then he's written hits for Robert Palmer ("Every Kinda People") and Frankie Miller ("Be Good to Yourself") and has had his tunes covered by artists with as wide a range as Joe Cocker, Ted Nugent, and Delbert McClinton.

During his sabbatical from performing, Fraser has developed as a singer and refined his approach. Although his

The Bangles



Andy Fraser is aiming straight for the heart of Middle America, and by all rights he'll own it this time next year.

initial solo outings were steeped solidly in the traditions of great R&B *auteurs* such as Marvin Gaye and Stevie Wonder, the new Andy Fraser sound is very much in a different mold. The two most obvious points of reference are The Police and Foreigner, both of which are heavily indebted to Fraser for the root of their sound, so turnabout is fair play. Fraser's new band incorporates the rhythm section and guitar chops of The Police with the synthesizer and vocal aggro of Foreigner, but they achieve a fresh sound by pushing the voice and drums way out front. Fraser's soulful delivery is rough and fragile at the same time, quite reminiscent of early Marvin Gaye. Though his voice is technically not as thick as some of his peers, it has an intelligence and vulnerability all its own.



Andy Fraser

The songs on *Fine Fine Line* are filled with a hopeful optimism, and at least half are downright classics. The title track, "A Million Miles Away," "One Night Love Affair," "Night to Last Forever," and "Living This Eternal Dream" could all be top-10 singles, either by this artist or anyone else with the good sense to record them. "Do You Love Me" (the old Contours/Dave Clark Five classic written by Berry Gordy) is given a Van Halen treatment which is amusing, and the rest of the originals are at least as good as the best cuts on recent albums by Loverboy, Journey, or Def Leppard. The only possible flaw is

the guitar work, which is not quite up to the rest of the songs/musicianship/vocals. The recording, which was produced by Fraser and mixed by Hugh Padgham, is impeccable.

This is *the* hard-rock record for soul/R&B fans, or vice versa. Whatever the case, Andy Fraser is aiming straight for the heart of Middle America, and by all rights he'll own it same time next year. He's simply the best thing to happen to rock 'n' roll since Mick Jagger. A 100% original talent, he brims with the kind of integrity and enthusiasm that no 15-year veteran of the record wars should have. Don't miss out.

Jon & Sally Tiven

Conflicting Emotions: Split Enz
A&M SP-4963, \$8.98.

Sound: B — Performance: C —

I keep rooting for Split Enz. They keep threatening to put out that perfectly wonderful record they've got trapped in them, but stuff keeps getting in the way.

Conflicting Emotions, an all-too-appropriate name, still isn't that album. They have done a lot right. Enlisting Hugh Padgham (Genesis, XTC, Peter Gabriel, among many others) as producer/engineer is a solid step. The technical end of the album is solidly done. The songs just aren't very memorable. They are off-hand enough to apparently lack heart, and they have even less in the way of hooks. Still, there's something likeable here.

Don't count these Australians out yet. There's still a classic straining inside them.

Michael Tearson

The Flat Earth: Thomas Dolby
Capitol ST-12309, \$8.98.

Sound: B — Performance: B

Less than a year ago, Thomas Dolby was the absolute personification of the New Music phenomenon. Here was the shining example of the combination of art and commercial appeal, a somewhat way-out musician who stole America's heart with an offbeat ditty called "Blinded Me with Science." He almost became a household word.

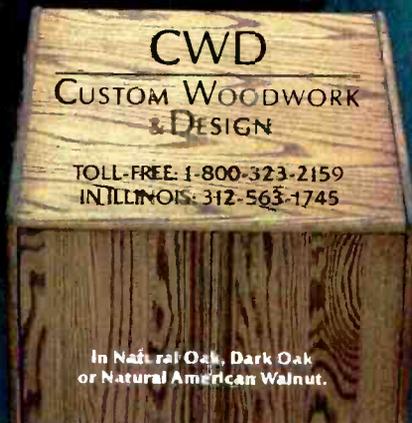
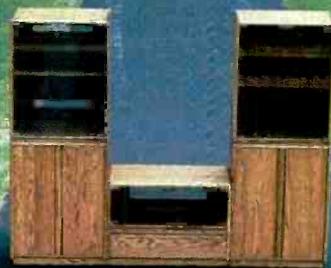
Almost, but not quite. His latest album is doing rather dismally with the public-at-large, and some find this dif-

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If Thomas Dolby is to reemerge as a potent musical force, a certain amount of career reevaluation may be in order.

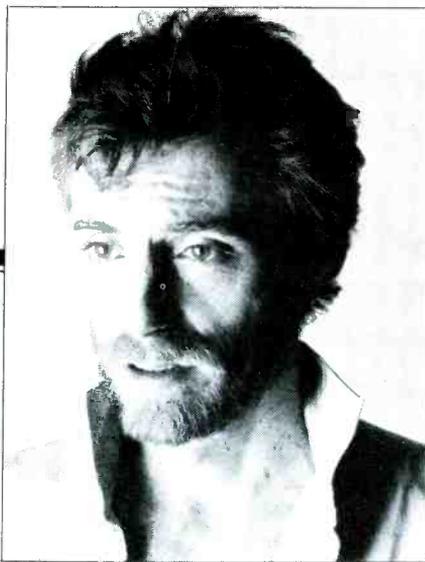
difficult to comprehend. The concept of someone on the brink of major stardom missing the mark entirely is perhaps obtuse, but then again, Dolby himself is hard to figure. Beyond his clever videos, nerdy image, and hip appeal lies a very strange artistic sensibility that may prove harder for Yanks to stomach than was initially imagined. In time, without a follow-up, his success may be seen as more of a fluke than his subsequent commercial failure, but this doesn't make *The Flat Earth* any less of an interesting LP.

Without that smash hit of "Science," people will look a bit further and wonder, "Who is this Thomas Dolby and what is he all about?" Next, they'll be quick to blame this record's lack of focus on the fact that it's produced by Dolby himself and not Tim Friese-Green, but the truth is this album isn't that much different from Dolby's last.



Aside from his propensity for longer songs this time around, he's no more off-the-wall. Certainly the sound quality is no worse, and is possibly better, but starting an album with a side full of 5- and 6-minute cuts is not the wisest move, radio-wise. Lyrically, Dolby is reaching further into self-examination and toward some truth beyond simple pop clichés, and for this he should be applauded. His imagery in "White City" is rather progressive, and the spiritual leanings of the title track have substance, but the Stateside masses tend to swallow up simple love goop, like "Science," more easily. There are no love songs as such on *The Flat Earth*, and the one cover tune Dolby has chosen to record is "I Scare Myself" by Dan Hicks—you can't get any more obscure.

It would appear that Dolby has either abandoned trying to make a readily



Sometimes sweet, sometimes soft, sometimes biting, J. D. Souther's *Home By Dawn* is an album of strong, sad songs.

accessible record, misjudged his audience, or assumed that his popularity was such that it really didn't matter what kind of a record he made. Whatever the case, the license he's exercised has alienated his audience, and even the quasi-Steve Wonderisms of his single, "Hyperactive," can't save him from being a casualty of the record wars. If Dolby is to reemerge as a potent musical force, a certain amount of career reevaluation may be in order. A new Englishman who sings a little like David Bowie comes along every six months or so nowadays, and one must use precious moments in the limelight for something besides indulgence, particularly if one wants to remain in the public eye.

Jon & Sally Tiven

The Allnighter: Glenn Frey
MCA 5501, \$8.98.

Sound: C+ Performance: C+

Glenn Frey might have left The Eagles behind him when they broke up, but he was such an integral part of their sound that its ghost haunts him still. *The Allnighter*, his second solo album, plays very much like a later, somewhat more sophisticated Eagles, as if elements of Steely Dan had been added. It also retains The Eagles' balance of fast and slow songs.

Frey cowrote all of the album with long-time buddy Jack Tempchin who wrote The Eagles' hit, "Peaceful Easy Feeling." Keyboardist Hawk Wolinski also helped write two songs.

The songs recorded with Barry Beckett coproducing in Muscle Shoals are noticeably funkier and dirtier sounding than the tracks cut in Los Angeles or Colorado, but it all makes for painless listening, with several songs, "Smuggler's Blues," "Living in Darkness" and "I Got Love," rising above the rest.

Michael Tearson

Home By Dawn: J. D. Souther
Warner Bros. 25081, \$8.98.

Sound: B- Performance: C+

J. D. Souther's *Home By Dawn* is an album of romantic, L.A. post-Eagles pop music. Souther's confidence in his songs strengthens them, as the album is a safe one, without much to surprise. The class that Souther invests in his work raises it in stature.

Anyway, old John David has always been as good as they come in designing vocal arrangements and layering in all of the parts himself; he does a lot of that here. Still, when he sings in tandem with old friends and former Eagles Don Henley and Timothy B. Schmit on "Bad News Travels Fast," some real electricity happens. His duet with Linda Ronstadt on "Say You Will" is another nice touch.

Sometimes sweet, sometimes soft, sometimes biting, *Home By Dawn* is an album of strong, sad songs.

Michael Tearson

Color Me Gone
A&M SP-12504, \$5.98.

Sound: C Performance: B+

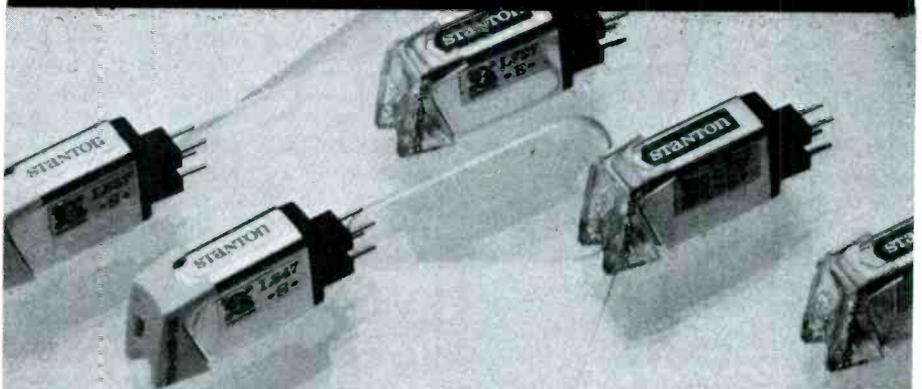
Color Me Gone is a young four-piece band from Akron, Ohio with a sound reminiscent of *Crown of Creation*-vintage Jefferson Airplane. They feature lively interplay between both vocal and guitar parts in that classic San Francisco band's tradition. Guitarist George Cabaness' songs also feature fine melodies. "Lose Control" is exceptionally haunting.

The lead voice is the rich alto of guitarist Marti Jones, who proves herself an excellent instrument for Cabaness' songs.

Production is noticeably punchier on the two tracks Barry Mraz cut in Hollywood than on the four Liam Steinberg/David Anderle tracks recorded back home in Ohio. But both sessions show a fresh, young band with fine song sense and lots of growth potential.

Michael Tearson

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Van Cliburn (left) & Kiril Kondrashin (right)

Rachmaninoff: Concerto No. 3. The Symphony of the Air, Kiril Kondrashin; Van Cliburn, piano.
RCA .5 ARP1 4688, \$9.98.

This is a quite remarkable restoration of a famous "live on tape" recording made at Van Cliburn's 1958 Carnegie Hall concert only a couple of days after his triumphant return from Russia. There may be some doubt today as to whether the later Cliburn lived up to his youthful promise, but this recording makes it absolutely clear that his sudden fame was no fake. Within the brilliant and narrow tradition of the "big pieces" of late concerto literature and a few related works, he was indeed a true, meteoric genius. You can hear it.

I do not think it takes a sophisticated classical listener to sense the amazing musical power of this performance—not only of the piano but the orchestra, under its Russian guest conductor. (The Symphony of the Air was formerly the NBC under Toscanini until the sponsoring powers abolished it.) This is high-level music making, sheer power in musical projection! No one could miss it for an instant.

Here also, I might add, is the very spirit of Rachmaninoff at its peak level—that craggy 20th century pianist-composer with the incongruously modern crew cut who combined the ultimate in Romantic passion with a 20th-century tension, unmistakable too, that is made astonishingly clear in this performance. It is possible, I think, that Cliburn gives us the real Rachmaninoff as the composer himself, a great pianist, could not do. His playing was more old-fashioned, a technique out of older times. It took a younger piano genius, out of a later generation, to give the music the 20th-century feel it must have.

This very concert, then, was the moment of truth for Rachmaninoff himself. It was the instant of his greatest public impact.

You will note many interesting features. This was May 1958, precisely at the dawning of the stereo LP, which mainly appeared in the market the following autumn. RCA had been releasing two-track, reel-to-reel stereo tapes but the new medium was still esoteric, mostly unknown to the record buyer. Thus the original disc release of this

recording must have been in mono only, though the tape was stereo. It is, you will hear, an early stereo sound, rather mild and quite unlike our present stereo; but it gives an adequate feel of the large hall, deadened as it was by a capacity audience.

The ".5" (half-speed-cutting) RCA technique is surely useful in this type of state-of-the-art restoration, combined with all sorts of distortion-free intermediate processing en route to the disc from the original master tape. The sound is nicely clean, especially for an "unrehearsed" recording made under chancy, unpredictable circumstances. There is very little tape noise left, after reprocessing, and the LP surfaces are extremely good—you mainly hear the natural rumble of the hall sound itself.

Audience sound is removed before and between movements, except at the end, via some rather close cutting at the opening and closing notes. A wise compromise and much better than running many seconds of audience noise between the musical segments. Somebody must have de-coughed the tape in later editing; there are coughs inevitably but these seem gentle and denatured. Do I sense a certain amount of careful, on-the-spot level adjustment in the original tape, made at the performance and hence difficult to readjust to "flat"? In the furiously loud parts the music does seem to recede a bit into distance, whereas in soft passages it is a bit louder and nearer than we expect. Minor problem.

At the very end the audience bursts out instantaneously—not with a blast of clapping but, astonishingly, an actual mass shout. It was indeed an electric occasion.

Handel's Top Tunes, Vol. I. Philharmonia Virtuosi of New York, Richard Kapp.
CBS RM 38910.

Here, on its not very classical green label, CBS serves us a stylish dish of high-tech baroque mood music, designed, as they say, for listening. Background listening, of course.

The conductor of the Handelian ensemble, Richard Kapp, makes much of the ancient 78-rpm discs of his childhood (which he says weighed "nearly a pound apiece") and the centuries-

old tradition of nice, short, five-minute tunes, just like on 78. Yes indeed, Handel wrote 'em and the traditional dozen cuts on this disc include famous items like "Handel's Largo" and "Where E'er You Walk" as well as a batch of lesser-known tunes of similar length. Voices, of course, are replaced by more mannerly solo instruments including the popular (today) trumpet as well as oboe, cello and more. Voices won't do at all for background listening, you'll understand, though all the originals were sung.

The record is slightly pretentious (being Handel) but it fills a sensible need. Most of us elderly classical high-brows learned our baroque from similar arrangements—back in 78 days. We don't regret it.

Klez! The Klezmer Conservatory Band; Judy Bressler, soloist.
Vanguard VSD 79449, \$8 98.

I'd call this, myself, a kind of folk music in the modern way—that is, a batch of young people reviving old traditions but freely making them more modern. Like, say, bluegrass. It's loud, slightly raucous music with lots of Near Eastern touches in melody and harmony, and the vocals, of course, in Yiddish. If you know German at all, you'll catch a lot of the drift even if you've never run into Yiddish before: it's a very expressive and wonderfully slangy language.

Is it "classical"? The klezmer revival (the music mostly died out after the 1940s) was sparked in the New England Conservatory of Music, no less, under professorial tutelage. "Classical" now means less and less—or rather, more and more—to the point of being almost any music around ex-



cept, maybe, the high-sale commercial stuff. We have full-tenured professors of jazz in university music; why not this kind of music too?

The best thing of all in this particular record is the contralto solo voice—she sings all the lyrics, with a break here and there for instrumental sound. Judy Bressler is the name, but she sounds like a heaven-sent Russian goddess of rich, throaty song. One of the most beautiful vocal organs I have ever heard and astonishingly musical too. It's worth the record just to hear her.

Mussorgsky: Pictures at an Exhibition; Borodin: Polovtsian Dances. The Philharmonic Orchestra, Vladimir Ashkenazy; the London Opera Chorus.
London Jubilee 410.121.1, digital, \$6.98.

Here's London's low-price digital, one of many albums, both digital and analog, in this mid-price series. ("Low" for digital is "mid" for analog, as things now stand.) This one is a new recording, by a year or so, and has much of interest, as well as some faults.

After Ravel's famous orchestral version of Mussorgsky, originally for piano, many another orchestration appeared, most of it vanity stuff, to enhance the rep of the arranger-conductor. Or, less admirably, to avoid still-extant copyright? None has displaced the superb Ravel version, and he had the original idea, too. Ashkenazy's new version, however, is more serious and quite legitimate. As a Russian pianist himself, he feels that for all its brilliance Ravel's "Pictures" are too French, missing many a Russian subtlety. He wanted to repatriate the music, restoring the Russian characteristics in the overall and in many interesting points of detail.

Curiously, and honestly, this involved reducing the brilliance of the piece, removing some of the memorable but stumpy combinations of instruments (including the very-French "classical" saxophone!) and even correcting a few basic mistakes in notation, passed on without question by other arrangers. This procedure, of course, is not unlike the slow restorations of Mussorgsky's other major works to their original form, after the much too extensive touching up given

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Proton (56)	133-120
RCA (57)	263
SAE (58)	3
Sansui (59, 60, 61)Cover II & 1,	196, 214
Sanyo (62)	195
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Stax (67)	259
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TDK (71)	135
Technics (72, 73)	Cover IV, 5
Wharfedale (74)	138
Yamaha (75)	100-104

them by that old master of the gilded sound, Rimsky-Korsakov. This reevaluation is good, and in line with changing thought, even since Ravel's day.

You won't find radical differences, as much of the new "Pictures" sounds not unlike the familiar Ravel, if with simpler instrumentation. But, and especially as the work goes on towards the end, there are indeed some marked changes, loud to soft, one instrumental sound to another very different. I even spotted one correction, sounding quite strange. This is definitely a worthwhile new version of "Pictures," and we can hope that others will take it up.

The ultra-familiar "Polovtsian Dances" are not very choral-minded, alas (says this ardent choral conductor). Might think there wasn't any chorus—it is not even mentioned on the jacket and appears only in tiny type on the disc label. The London Opera Chorus is *not* the one for such music—too bulbous and unmixed in the sound. And the whole thing rushes along in a way that does not allow the wonderful vocal music to make its impact. This, after all, is one of the great short works for chorus and orchestra and unique in its sweeping dance rhythms.

Rimsky-Korsakov: Scheherazade.
The Houston Symphony, Sergiu Comissiona.
Vanguard VA 25021, digital, \$8.98.

The first classical recording I ever heard, at an early age, was a splendidly aristocratic, 12-inch, 78-rpm Victor acoustic, "The Young Prince and the Young Princess," from this work. I listened in awe, via my uncle's brand-new, stand-up Victrola, as though before some new holy shrine. I can tell you nothing about that performance but this new one from Vanguard is excellent.

Scheherazade was, for years and years, a classical war horse, somewhat as "1812" and the Tchaikovsky "Piano Concerto" are in recent times. The music was taken very, very seriously, as no doubt Rimsky himself intended—and the resulting vast, overblown interpretations were staples of concert fare and early recording. What a relief to hear the music reduced to proper size, played artfully but with no bombast at all, like a fat lady reduced to a sylph! I

enjoyed every minute of this fresh, straightforward and limpidly clear rendition. There's all the meat of the music left. The superb orchestration, the glowing colors, the ingenious counterpoint of recurring melodies, all come through with a new persuasiveness. The tempi are often fast, but this—at least for our age—helps avoid pomposity. Maybe Rimsky would not entirely approve, but you and I are bound to enjoy the slimming down.

Although there are a few bursts of crackling on the LP surfaces (Vanguard could do better in this department), the overall quality is excellent. As I've often noted, Vanguard's audiophile recordings go back without a break to the founding of the company at the beginning of the LP, though there is very little fanfare concerning it. This is a fine, big, broad digital sound to my ears, and I like the simplicity of the microphoning, the expertly distant miking of the solo violin in a proper musical balance with the orchestra. Very up-to-date, but also timeless.

Sergiu Comissiona



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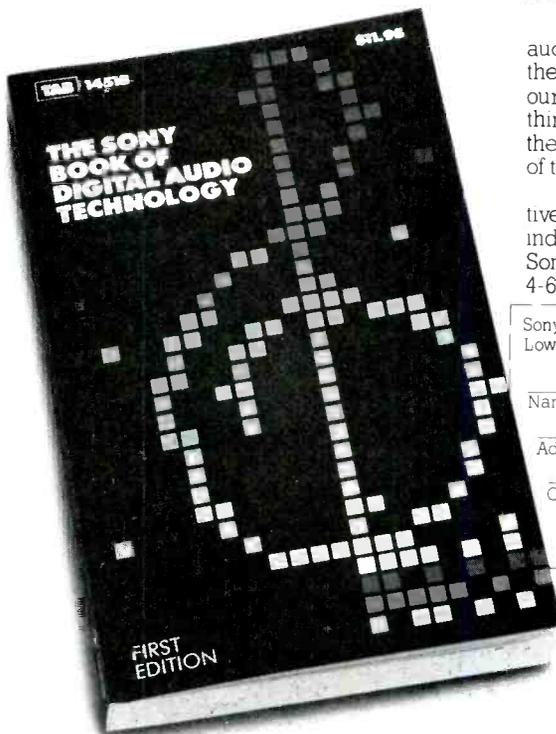
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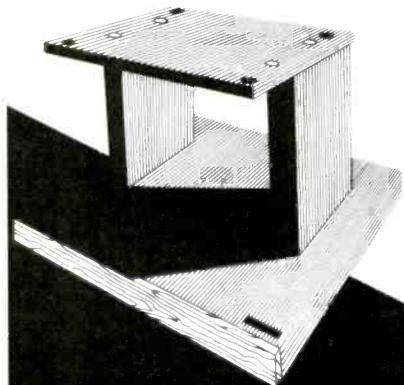
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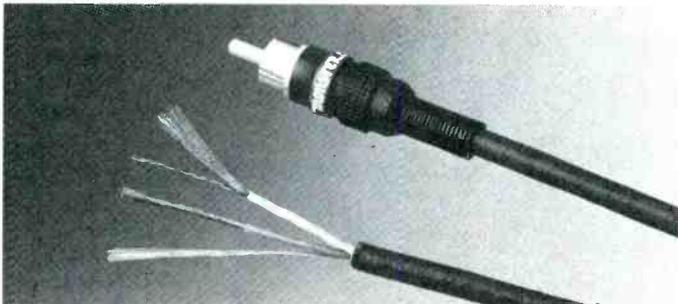
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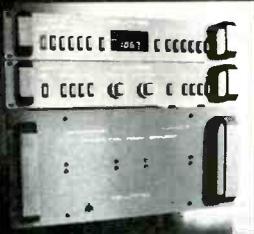
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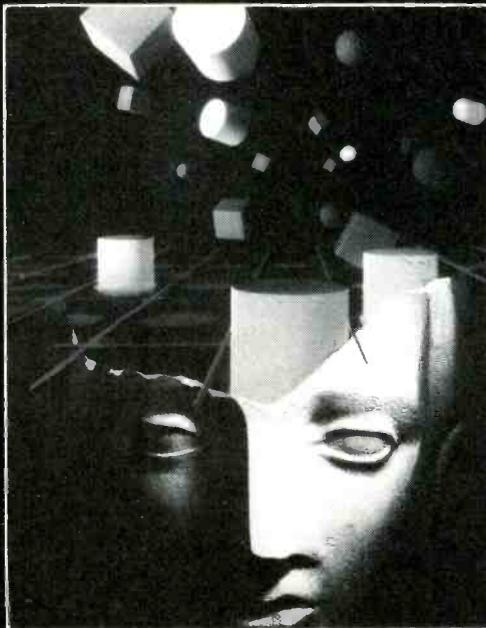
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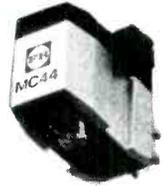


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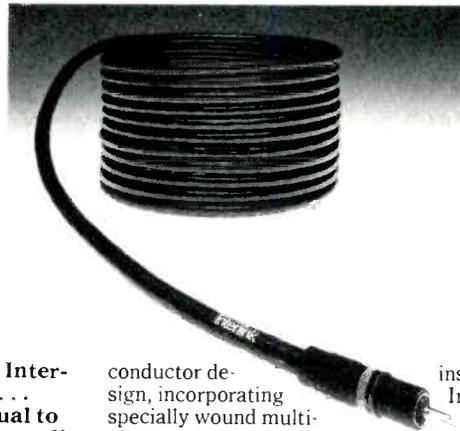
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SOUTHEAST

CUSTOM SOUND INVITES you to stop by and discover the missing octave—the truly deep bass that gives music its foundation. We feature JBL subwoofers—the world's best. JBL subwoofers restore that missing octave, and once you hear it you won't want to live without it. Custom Sound in Athens, GA (404) 549-4844; in Augusta (404) 738-8181; and in Montgomery, AL (205) 279-8940.

EVEN IF YOU HAVE exceptional full-range speakers, you're probably missing most of the lowest octave. It takes a JBL subwoofer to bring out the lowest notes in today's top recordings and let you hear them at proper volume levels. Hear what this remarkable JBL subwoofer can do—come to Mac's TV and Audio Showcase in Morganton, NC (704) 437-2494.

IF YOU DON'T HAVE a JBL subwoofer, you're missing your bottom octave. We didn't realize how much low frequency information is on today's top recordings until we hooked up our JBL subwoofer. This system made a tremendous difference, and once you've heard it, you won't live without it either. We have JBL on display at Todd's Stereo Center, Greenville, NC (919) 756-2257 or 756-2293.

LEE HARTMAN & SONS is the place to go when you want the best in bass. We have the JBL subwoofers, outstanding systems that reproduce the lowest octave with clarity and power. Even the best full-range systems can benefit—and the difference is dramatic. Hear for yourself at Lee Hartman & Sons, 3236 Cove Rd., Roanoke, VA.

ONCE YOU'VE HEARD a JBL subwoofer system, you won't want to live without it. A JBL B380 or B460 will let you hear the bottom octave, the octave missing from most full range speaker systems. And the sound is crisp and tight. Hear JBL subwoofers at Melton's Pro Sound in Atlanta (404) 873-4484. Also in Doraville, GA.

SOUTHWEST

HI-FI SALES OF MESA wants to introduce you to true low frequency reproduction, the kind you can't get from most full-range systems. But you can get it from a JBL subwoofer. The JBL B380 and B460 will let you hear the deep bass that's on today's top recordings, and hear it with clarity and accuracy. Hi-Fi Sales, 810 W. Main, Mesa, AZ.

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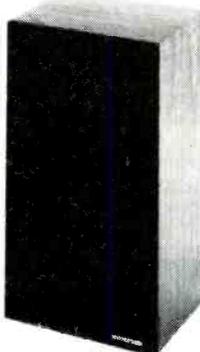
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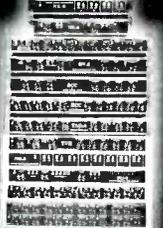
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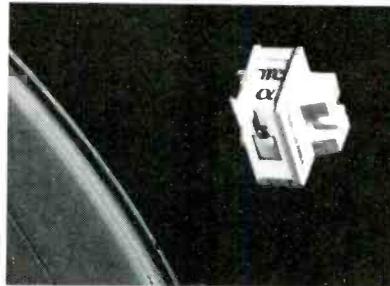
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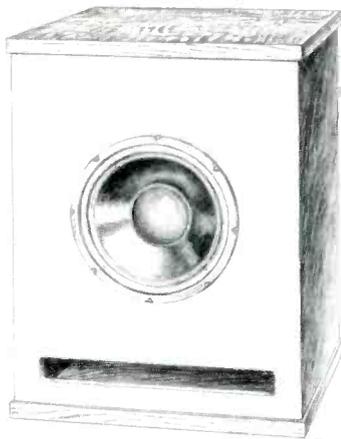
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QUITE A CHALLENGE, but there is a way to add the lowest octave to your stereo system. Hear a JBL subwoofer, and you'll be amazed at the clarity and power it adds to even the best full-range systems. Once you hear it, you won't want to be without it. Come to Stereo Center, Flint, MI (313) 239-9474.

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NORTHWEST

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MARK'S CUSTOM STEREO now features the world's best subwoofers—JBL! That's right—JBL! The JBL B460 and B380 restore the bottom octave that's missing from most stereo systems—and once you've heard true deep bass, you won't want to live without it. We wouldn't. Hear it all at Mark's Custom Stereo, Ontario, OR (503) 889-8855.

ROCKY MOUNTAIN HI-FI WANTS to help you find the missing octave in your stereo system—the lowest octave. Most full-range systems simply can't reach that low. But a JBL subwoofer can. These are the best subwoofers we've ever heard, and adding one to your system will make a dramatic difference. Rocky Mountain Hi-Fi in Great Falls, MT (406) 761-8683.

THE SOUND TRACK NOW OFFERS the world's best subwoofers—JBL! That's right, JBL. The B380 and B460 reproduce the lowest octave, the one missing from most systems. From thunderous crescendos to delicately played tympani, a JBL subwoofer brings out the best in your best recordings. The Sound Track, Boise, ID (208) 375-5530.

WEST

FIDELITY SOUND OF ORANGE wants you to hear low frequency sound so good you won't believe it's from a speaker system. But it is—and from a JBL subwoofer system. There's really no other way we know of to get true deep bass. The JBL subwoofers are the best around. Hear them at Fidelity Sound, Orange, CA (714) 997-3030.

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HARMONY STEREO CAN SHOW YOU how to take your stereo system to new lows—with a JBL subwoofer. Today's top recordings have lots of good low frequency information, and it takes a JBL subwoofer to let you hear it as it ought to be heard. So for clean, powerful bass, hear JBL at Harmony Stereo in San Francisco (415) 661-2525.

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THRIFTY ELECTRONICS CAN SHOW you how to take your stereo system to new lows—with a JBL subwoofer. The JBL subwoofers will reproduce the bottom octave of music, the octave that's missing from even the best full-range systems. JBL brings it to you cleanly and powerfully. Hear JBL at Thrifty Electronics in Van Nuys, CA (818) 786-1610, (819) 873-2976.

UNLESS YOU HAVE A JBL SUBWOOFER, you're probably missing out on hearing the lowest octave. From cannon to contrabassoon, there is a lot of music down there, and it takes a JBL subwoofer to reproduce it with the clarity and power of the original performance. Hear JBL at Metro Stereo, Fresno, CA (209) 221-0500. Also in Visalia.

WOODEN SHIP STEREO OF AUBURN wants to introduce you to the best low frequency reproduction you're likely to hear—a JBL subwoofer. That's right—JBL makes a superb subwoofer system that lets you hear the bottom octave that's missing from most setups. Hear what JBL can do for you at Wooden Ship Stereo in Auburn, CA (916) 823-1493.

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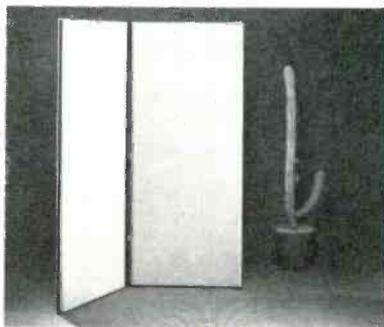
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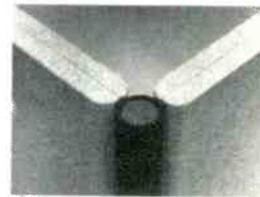
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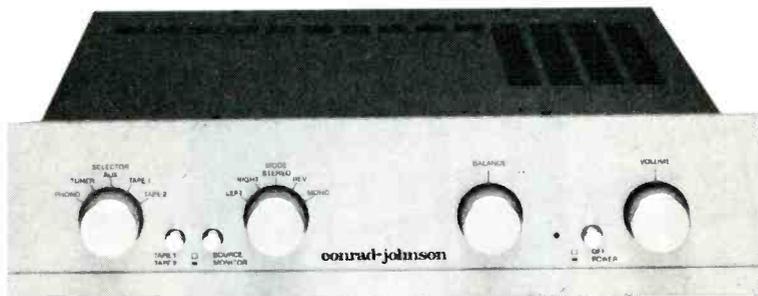
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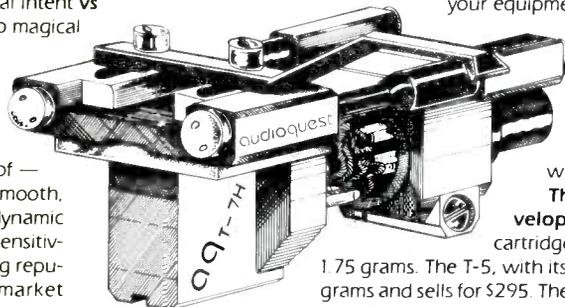
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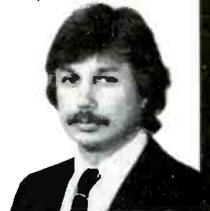
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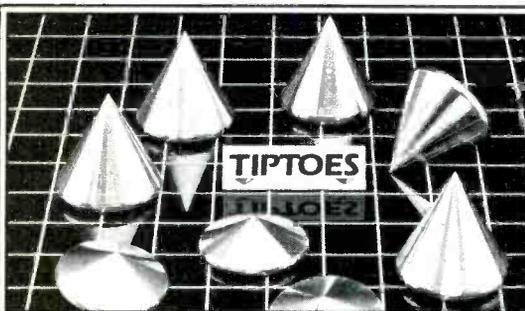
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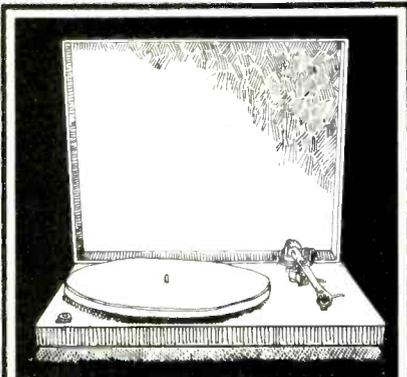
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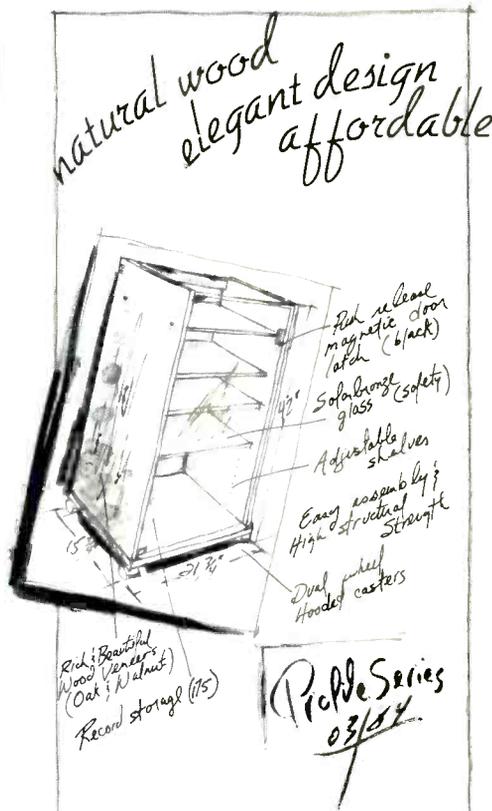
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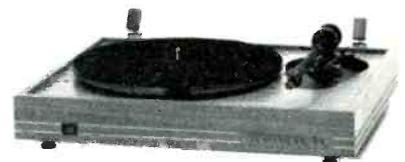
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In addition to the capacitor pack, the Mark II tables also include new **suspension components**, one of which is made of **SORBOTHANE**. Developed by Jacques Riendeau through exhaustive vibration analysis testing (computers and accelerometers at University of Sherbrooke laboratories were utilized), the new suspension achieves a substantially increased immunity to external shock as well as a notable increased clarity in music reproduction.

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Both the capacitor pack and the new suspension components will be incorporated into all Oracle models ("Alexandria", "Delphi", and "Premiere"). All three models will carry the "Mark II" designation. (The Mark II *Alexandria* also will incorporate the excellent **PRELUDE revised tonearm**.) Even the very earliest Oracles may be retrofitted to become exactly the same, in all aspects, as a Mark II table. **The Oracle Design Is Truly Classic: IT WILL READILY ACCEPT THE NEWEST DEVELOPMENTS, WITH NO NEED WHATSOEVER TO MAKE ANY CHANGE AT ALL, EVEN AFTER FOUR YEARS, IN THE DESIGN ITSELF.** By appointment (**PLEASE!**), retrofitting will be available at *AudioVisions* at surprisingly reasonable cost.

APRIL 26, 1984: HISTORY!

We had no idea, when Jacques Riendeau arrived, direct from Quebec, that we would be the very first persons in the U.S. to be given the opportunity to listen to & evaluate the Mark II developments. (After several hours, a few of our lucky customers were given the same opportunity.) After several more hours, M. Riendeau telephoned Quebec, and the order was given to put the Mark II developments into production.

INVITATION and CHALLENGE

Owners, manufacturers, and purveyors of other tables of retail value between \$1,300 and \$4,500 (including tonearm & cartridge) are invited (**BY APPOINTMENT, PLEASE!**) to bring their tables to *AudioVisions* for comparison, in public demonstration, against similarly priced Oracles. Comparisons to be based upon the following: **soundstage reproduction** (width and depth); **imaging** (specific placements within soundstage); **reduction of surface noise** (and pops and ticks, too!); **tracking** (yes, tracking is affected by the table, as well as by tonearm & cartridge); **bass reproduction** (effortlessness, tightness, impact); **definition & clarity**. **CONTEST "PLAYOFF" To Be Held, with PRIZES AWARDED for Best Tables:** Contact *AudioVisions* for further information.

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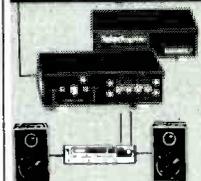
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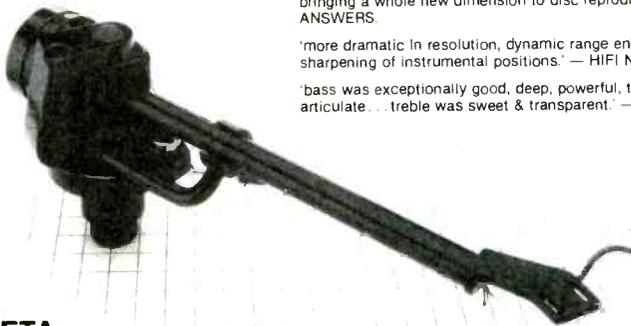


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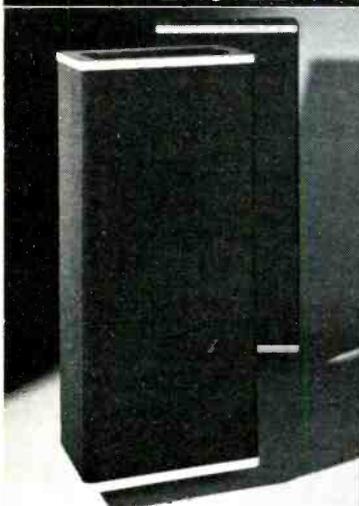
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