STEREO HI-FI PREVIEW ISSUE

the authoritative magazine about high fidelity

AUDIO

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☐ RECORD REVIEWS ☐ TAPE GUIDE

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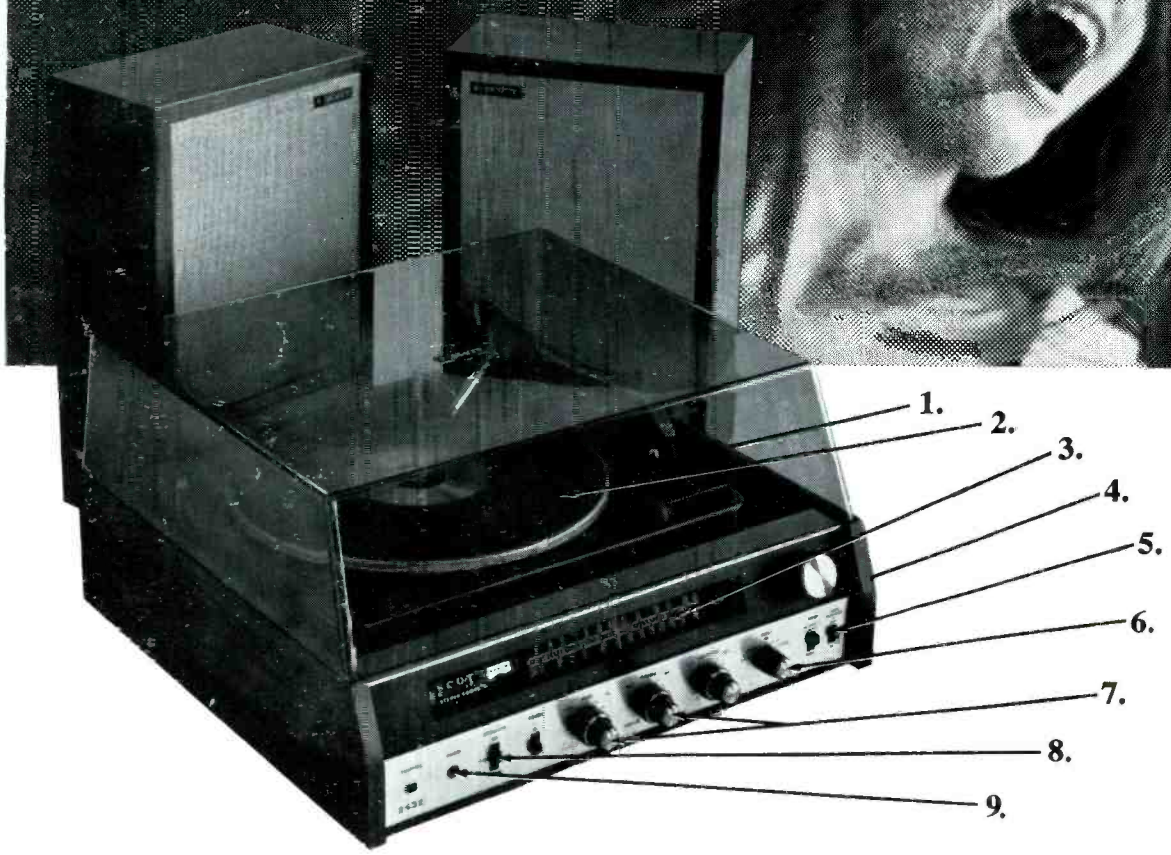

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August, 1967 Vol. 51, No. 8

AUDIO

Successor to RADIO, Est. 1917

AUDIO ARTICLES

ANNUAL PRODUCT PREVIEW SECTION

AUDIO IN GENERAL

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Coming in September

FEATURE ARTICLES:

Build a Solid-State Limiter— Wayne B. Denny presents plans for building a transistorized limiter to improve tape recording quality.

Sound Reinforcement— Martin Borish examines the need for electronic sound reinforcement in concert halls, using a practical example of how it is accomplished.

The New NAB Magnetic Tape Standards—Herman Burstein discusses equalization curves, comparing NAB and RIAA reproducing characteristics for magnetic tape.

EQUIPMENT PROFILES:

Ortofon SL15T stereo phono cartridge

Miracord PW50H automatic changer

Concertone 770 a.c./battery-powered stereo tape recorder.

Plus: ABZ's of FM, Audioclinic, Tape Guide, Record and Music reviews, and more.

ABOUT THE COVER: Shopping for stereo hi-fi components can be fun. It can also be a study in confusion when faced with making a choice from among an array of excellent equipment. AUDIO's annual Product Preview in this issue promises to make the experience a little easier by listing components and specifications in easy to compare tabular form. (The color photograph featured on the front cover was taken at Barnett Brothers Radio Co., Philadelphia, Pa.)

AUDIOCLINIC

JOSEPH GIOVANELLI

If you have a problem or question on audio, write to Mr. Joseph Giovanelli at AUDIO, 134 North Thirteenth Street, Philadelphia, Pa. 19107. All letters are answered. Please enclose a stamped, self-addressed envelope.

Power Output Versus Impedance

Q. When an amplifier is rated at, say 100 Watts, 4 Ohms, what will the same amplifier's wattage be at an impedance of 15 Ohms?—Alfred R. Halpern, Ottawa, Ontario, Canada.

A. The question of power ratings of amplifiers versus their impedance in Ohms is difficult to give in terms of a specific answer. If the amplifier under consideration is a tube-operated device, the power output will be substantially unchanged because you can select the proper impedance match from an output transformer tap.

The solid-state amplifier, however, does not have a similar selection of output taps available. It has one "basic" impedance. When the impedance of the load (the device to which the output of the amplifier is connected) is above or below this impedance, the power output will decrease from what appears at maximum efficiency—a correct impedance match. The amount of power loss is partially dependent upon the amount of feedback employed in the amplifier. I would not want to state this as an absolute constant of nature, but an impedance change of 100 per cent above or below the optimum impedance of a solid-state amplifier will decrease power by about 25 to 35 per cent.

Coaxial Cables, Connectors and Switches

Q. I would like to know what type and/or make of coaxial cables, connectors and switches provide the least insertion losses when used in audio hook-ups.

Further, what is the essential difference between a shorting and non-shorting rotary switch?—Major T. A. Seely, Jr., Fort Bragg, N. C.

A. For information on coaxial cable I refer you to *Audioclinic*, AUDIO Magazine, Jan. 1967.

Insertion losses of coaxial cables, connectors and switches are considered only when these components are used at radio frequencies.

To explain the operation of a shorting versus a non-shorting switch, consider a SPDT rotary switch. If this switch is of the so-called, non-shorting variety, the following will happen when the switch is moved from one position to the other. As the shaft moves, the wiper will leave the contact on which it was resting. It will move a short distance before touching the remaining contact of the switch.

The so-called shorting type has a similar action. Here, however, as the shaft turns, the contacting arm, or wiper, starts to leave the terminal on which it has been resting. Before leaving, it has touched the remaining contact on the switch. Thus, for a brief period during the time the shaft is turning, both contacts are energized. If there was a third contact associated with the switch, a similar shorting action would take place between the second and third contact; the first contact would not be involved in the action.

Though many people refer to the above switch as a shorting switch, it is more properly called a "make-before-break" switch.

A true shorting switch is something quite different. To illustrate, assume that this component is a single pole, four-position unit. In position one, the wiper (contacting arm) touches one switch contact. In position two, the wiper is in contact with the first and second terminals. When the shaft is moved to position three, the wiper shorts the first three terminals together. The final position of the switch has all of its contacts shorted together by the wiper. Such switches often contain a blank position in which no contacts are made to the wiper.

Other switches are equipped with what are known as shorting decks. These are usually conventional "make-before-break" switches. However, any unused contacts are designed to be shorted to a common terminal. A short on any individual contact is removed when engaged by the wiper, but returned to a shorted condition when disengaged from it.

Switches of this type are found in preamplifier input-selector switches. The shorting feature is designed to prevent leakage, or crosstalk, from entering the preamplifier via unused inputs. For example, such leakage could occur when playing a phonograph record while the FM tuner is turned on and tuned into a station.

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Automatic anti-skating assembly neutralizes side pressure on stylus ... prevents distortion and uneven record wear.

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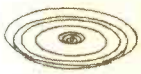
(a)



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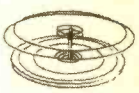

Two interchangeable spindles for sure, safe, gentle handling of records (a) short—for single record play (b) long—for intermix automatic play when desired.

ABZ's of FM

LEONARD FELDMAN

ON JANUARY 24, 1933, THE late Major Edwin H. Armstrong applied to the United States Patent Office for a patent covering a system of broadcasting which he simply titled, "Radiosignaling." The resulting patent—#1,941,069—was issued December 26 of that same year. (Technology in the electronic field had not yet reached the level of complexity that requires the patent office to spend approximately five years before a patent is issued today!)

The patent called "Radiosignaling" was, in fact, the beginning of "wideband" FM broadcasting as we know it today. Actually, FM broadcasting principles were known long before 1933, but it took Armstrong to divorce the techniques from those so long employed in AM broadcasting, so that FM might realize its inherent advantages of low-interference, high fidelity performance. Today, some thirty-four years later, nearly thirty million FM receivers are in use in the United States alone. Of these, some ten million are capable of reproducing "Stereo FM" via the multiplexing techniques also conceived by Major Armstrong and refined primarily by another important inventor in the FM field, Murray G. Crosby.

Readers of AUDIO have more reason than most to appreciate FM and FM Stereo, for here is a broadcast signal source worthy of high-quality audio amplifiers and transducers.

To many of you, FM techniques and circuitry are quite familiar. Others, though equally appreciative of FM's virtues in terms of sound reproduced in the home, may be totally unfamiliar with the principles of FM broadcasting and reception. We expect that this new series, beginning in this issue, will serve the needs and stimulate the interests of both categories of readers. We plan to cover FM radio in the very broadest sense—from underlying propagation principles all the way through the receivers themselves and, finally, on to the new FM Stereo circuitry. Readers who join us in this series should, by the time of its conclusion, have a much clearer understanding of just what FM is all about, what makes it work, and what it is that makes it the ideal medium for high fidelity speech and music radio transmission.

AM vs FM

An unmodulated radio frequency carrier wave (with no intelligence or audio information imparted to it) looks the same whether it is radiated from the antenna of an FM transmitter or an AM transmitter. Such a carrier wave may be represented as shown in Fig. 1. Unless we are told the frequency

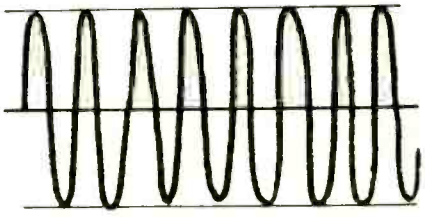

Fig. 1—Representation of unmodulated carrier wave. Without knowing frequency or repetition rate of the sine waves, we don't know whether it is AM or FM.

or number of alternations of the wave per second, there is no way to determine the type of transmitter which produced it—AM or FM. In the United States, AM broadcasting is confined to frequencies between 540 kHz (540,000 sinusoidal alternations per second) through 1640 kHz (1,640,000 alternations per second). This rather

(Continued on page 6)

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Wharfedale
Achromatic Systems

ABZ's of FM

(Continued from page 4)

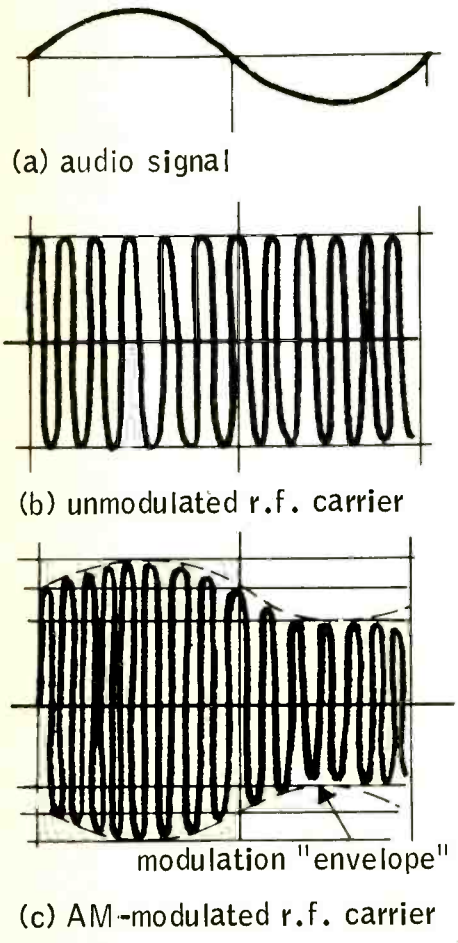
narrow spectrum refers to public broadcasting only. Other services such as police radio, marine telephone, amateur radio and the like are also assigned frequencies below and above the broadcast band.

Nestled between TV Channel 6 and TV Channel 7 is the band of frequencies allocated to public FM broadcasting—from 88 MHz to 108 MHz. Thus, if the waveform of an unmodulated FM transmitter could be observed on an oscilloscope, it would look just about like the representation in Fig. 1, except that many, many more alternations would appear in the same time span due to the much higher frequency of transmission.

AM Modulation

For a complete understanding of how FM is so effective in reducing interference, we might well begin by considering the effects on a carrier wave when it is subjected to amplitude modulation and frequency modulation. In Fig. 2, the "A" diagram represents a low-frequency (audio) voltage while the "B" diagram represents the unmodulated r.f. carrier. An amplitude-modulated carrier, shown in Fig. 2C, can be obtained with proper circuitry. The variations now present represent the audio intelligence. That is, the variations of r.f. amplitude trace out the pattern of the original audio information. An imaginary line (shown dotted) encompassing this tracing is often referred to as the "modulation envelope."

Fig. 2–Development of an AM-modulated r.f. carrier.



In AM modulation, there are physical limits imposed upon the amount of modulation possible. Fig. 3 illustrates this clearly. In Fig. 3A we see a degree of modulation which causes the overall amplitude of the r.f. carrier to vary plus and minus 50% of its original amplitude. Fig. 3B illustrates an example of 100% amplitude modulation. Here, amplitude of the r.f. carrier varies plus and minus 100% of its original value. Note that on the "minus" portion of the cycle the carrier amplitude reaches zero instantaneously. If one were to exceed this degree of modulation (Fig. 3), the entire carrier would be "cut-off" for a significant portion of each audio cycle. Such a cut-off condition must result in distortion at the receiver, for the "modulation envelope" is no longer an exact replica of the original modulating (audio) information. Therefore, it could not be accurately reproduced by the "demodulator" or detector in the AM receiver.

Sidebands

Before analyzing FM modulation, one more important factor about AM modulation must be understood. The process of amplitude modulation creates frequencies other than that of the fundamental carrier. For example, if a 1000 kHz carrier were to be modulated by an audio tone of 2000 Hz we would find (either by mathematical analysis or by direct observation) that the resultant waveform contains the 1000 kHz carrier *plus* frequencies of 1002 kHz and 998 kHz. These new frequencies are called sidebands. The extra power used in modulating an r.f. carrier in amplitude goes into the sidebands. The basic r.f. carrier is left untouched.

As pointed out earlier, the AM broadcast band is rather limited in spectrum. As a result of the inherent generation of a pair of sidebands above and below the carrier, the Federal Communications Commission (FCC) had to set limits on the highest audio frequency that might be used to modulate an r.f. carrier in the AM domain. This limit is generally 5 kHz for most AM stations. Thus, when a 5 kHz audio note is transmitted, a total of 10 kHz (5 kHz above and 5 kHz below the center r.f. frequency) must be reserved for a given station if the sidebands of one station are not to "spill over" into the next. This sets a theoretical limitation on the number of stations possible on the dial in a given locality to a maximum of 100 (1640 kHz − 640 kHz = 1000 kHz. 1000 kHz/10 kHz = 100). In actual practice, the FCC would not allocate station frequencies 10 kHz apart in one locality because most commercially-made receivers would not be sufficiently selective to "tune out" the adjacent station. Thus, 20 kHz separation is the usual practice. This limits the number of stations in an area to about 50.

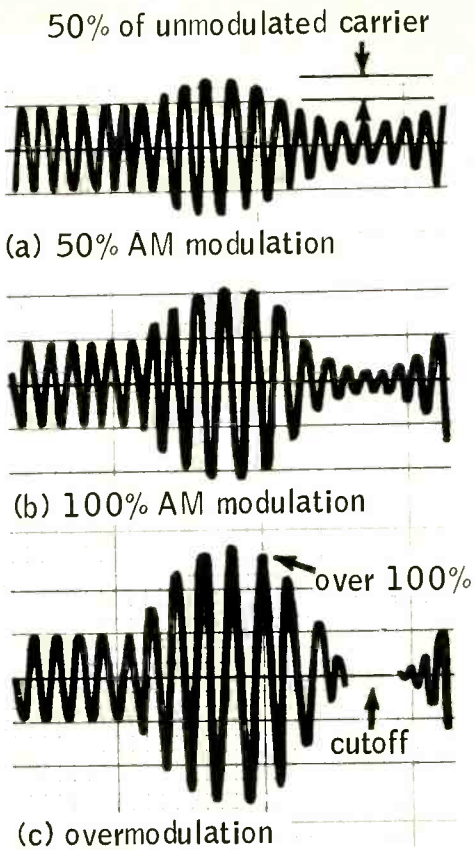


Fig 3–Various degrees of AM modulation.

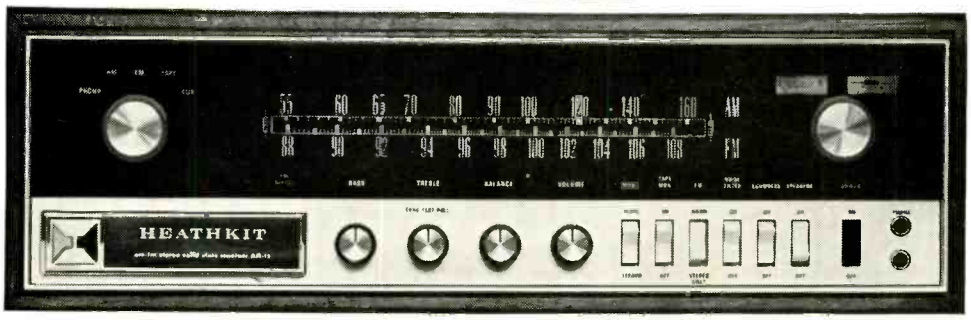
(Continued next month)

"Heath In Their Literature Implies Strongly That The AR-15 Represents A New High In Advanced Performance And Circuit Concepts. After Testing And Living With The AR-15 For Awhile, We Must Concur."

Julian Hirsch, noted audio critic, and author of the "Technical Talk" column in Hi-Fi/Stereo Review (May '67 Issue).

"... The Entire Unit Performs Considerably Better Than The Published Specifications"

C. G. McProud, editor and publisher of Audio Magazine (May '67 Issue).



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Mr. Hirsch Went On To Say: *"In most respects, it is superior to any manufactured receiver we have tested, and in several respects its FM tuner outperforms any other we know of."*

"The FM tuner's front end uses field-effect transistors (FET's) for high sensitivity and freedom from cross-modulation. The FM i.f. amplifier is unique and marks the first use of integrated circuits in a kit receiver. Each IC, about the size of a transistor, contains ten transistors, seven diodes and eleven resistors. Instead of the usual i.f. transformers, which require periodic alignment and have less-than-ideal response characteristics, the Heath AR-15 uses two crystal-lattice filters. Though costly, these have a virtually ideal flat-topped response characteristic, with extremely steep skirts which offer a degree of adjacent channel selectivity unobtainable with conventional i.f. transformers."

"This is the most sensitive FM tuner we have ever tested, and it has by far the best limiting characteristic. Its IHF sensitivity was 1.45 microvolts and limiting was complete at about 2 microvolts. We could not find any stations that did not limit fully, with silent backgrounds. We were also able to receive stereo broadcasts from a distance of 70 miles, only 200 kHz from a powerful local station, without interference, a feat not matched by any other tuner in our experience."

"We found the Heath AR-15 a very easy receiver to use and to listen to. Its enormous reserves of clean power make for effortless listening at any level, and the FM tuner brought in more listenable FM broadcasts (as many as fifteen to twenty on a single sweep of the dial) than we had realized existed in our area."

"We know of only a few amplifiers that can match or surpass the AR-15 in power or ultra-low distortion, and most of them cost considerably more than the entire AR-15 receiver. No other tuner we have used can compare with it in sensitivity. Considering these facts, the AR-15 is a remarkable value at $329.95 in kit form. Several people have commented to us that, for the price of the AR-15 kit, they could buy a very good manufactured receiver. So they could — but not one that would match the superb overall performance of the Heath AR-15."

Mr. McProud Went On To Say: *"The amplifier provides a continuous average power of slightly better than 60 watts per channel with both channels operating into 8-ohm loads and distortion measuring 0.3 percent; with 4 and 16 ohm loads, the output at the same distortion measured 54 and 47 watts, respectively. At 50 watts output, distortion is less than 0.2 percent at 1000 Hz, and less than 0.5 percent from 8 Hz to 40 kHz; at the 1-watt level, THD is less than 0.1 percent at 1000 kHz, and less than 0.25 percent from 8 Hz to 27 kHz. At full output, IM distortion is less than 0.5 percent, and at 1 watt it is only 0.15 percent."*

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AUDIO ETC.

EDWARD TATNALL CANBY

Plug in the Positive

I don't remember exactly how many years back it was that I wrote an abortive article for this department—it was never published—on a question of electrical ionization and its remarkable relationship to (a) health and well being, and (b) tweeters. I am now somewhat stunned to discover, at this late date, the ramifications of the subject in which I almost entangled myself. There were even matters of national security involved. Phew! Little did I know.

Well, the security wraps are entirely off now and I'm in the clear. It's OK.

You see, at that point, which might have been around 1961, there was an implication in what I had written that a certain type of loudspeaker just might be a minor health problem—though I really didn't know for sure. (It isn't.)

Now this sort of implication isn't to be made casually in a fun article, I had to admit. Especially in view of my fogginess as to the electrical details involved, which seemed to me so very odd, so bizarre, that I was afraid someone was pulling my leg.

Now the whole business is suddenly all over the place, as of early this last spring. I have a fine account of it before me right now: *Business Week*, May 6th. If *they* can talk about it, I guess I can. So—feeling like a man who walks where a mine has recently been de-fused—here I go, gingerly. It's about those positive and negative ions in the air.

What an anticlimax—is *that* all?? You mean that guff about one kind inducing a state of well being and the other a sense of malaise? How trivial can you get? (That's what some readers may be thinking.)

Well, it's not trivial at all. And there are some lovely mind-twisting complications for us here, right down at the fundamental electronic level. And of course there's that business of the tweeter.

First, let's get clear on the health part. I could have sworn (from the old article I wrote) that *negative* ions were healthful. But no! It seems that the positive variety are on the plus side for health. If the ambient air around you has a positive charge, so the story goes, your sense of well being and general body tone is positive. You feel good. You work well. You tire slowly. You stay wide awake. (OK, you grammarians—you feel *well*.)

Conversely, if there is a negative charge hanging around in the air, your style is cramped, you become defeatist, your efficiency goes down, your fatigue rate increases sharply, you get drowsy. All too familiar, that description.

Cristjo Cristofv

The man who seems first to have discovered this extraordinary principle and to have realized (do you?) its fantastic significance, was named Cristjo Cristofv. That's Bulgarian. It was back in the early years of World War II and he was on the wrong side of the fence. He was a refugee; he fled Bulgaria for —Germany. Aha! The plot thickens, militarily.

What could he do about it? I mean the principle, not the plot.

Well, first more theory. It surprised me mightily, in doing research in 1962 for my short *History of Electricity* (Hawthorne), to find that the open air, outdoors, generally has a considerable charge in relation to the ground. If I am right, it is normally positive. That is, there is an excess of ionized gas atoms, each one minus an electron or two in its outer shell . . . Oh-oh. I see that the article before me in *Business Week* is positively off the beam—it says that positive ions are those which carry "an extra electron." Not true! Positive ions *lack* electrons.

Now, you see, we're already down to fundamentals, and it's me against a national magazine. I'm right, I think.

Franklin

Remember that ever since Ben Franklin's discovery in the middle 1750s (see my book) of opposite charges, we have been using the names in reverse. It was a 50-50 choice for Franklin, who had no way of knowing which charge was which, nor in what direction a current flowed. Indeed, the electric *current* had not been discovered then, and there weren't any currents, man-made (except instantaneous static discharges), until a half century later. Even old Volta didn't understand what he had discovered, in the Voltaic pile or cell, around 1800.

Before Franklin, it had been discovered that there were two different kinds of static electricity, and such odd names as "vitreous" had been applied (after the glassy charging materials) to distinguish between the two so-called electrical fluids.

Franklin's was the brilliant mind that, at last, and without very strong proof, realized the two were phases of the same thing, and that an electrical charge was an *excess* of one or the other of the two complementary electrical qualities. An uncharged body, he said, contained equal amounts of both. Darned ingenious hypothesis under the circumstances! He named them positive and negative—and got them wrong way around.

Yes, it all ties in. I recall the astonishing discoveries of these air charges in mid-eighteenth century, after the Leyden jar began to get around and there was a way to store up an electrical charge of large size. It was also the time of the lightning rod and metal points that collected charges out of the air. Experimenters set them up all over the place and ran their crude wires (often they were chains or bars, wire being scarce) into their studies and to banks of Leyden jar capacitors. To everyone's amazement, it was found that even on a clear, sunny day, there might be enough charge in the air above the ground to cause violent explosions when the Leyden jars were discharged to ground. So you see, more than 200 years ago they knew about these floating air charges.

The normal, average air potential only a few feet above the ground (and even in rainy weather) runs up to a steady several hundred volts. It's a semi-permanent charge, too, not a temporary phenomenon. Only the extreme electrical violence of the passing thunderstorm throws it off balance.

That semi-permanent charge, it now appears, is *positive*. An excess of positive gas ions, lacking electrons (they are knocked loose, for one thing, during lightning discharges) as compared to negative-charge free electrons.

Using this as a base, we'll continue next month with Mr. Cristofv's development of an "ion box" and a story on a "new" ionic speaker.

If you understand why this model train derailed . . .

you'll understand the importance of high trackability in your phono cartridge

Breathes there a man who's never seen a model engine attempt to negotiate a too-sharp bend, too fast? The train derails. This is kid stuff when compared to the wildly undulating grooves that the phono cartridge stylus encounters in many modern recordings . . . especially if the recording is cut at a sufficiently high velocity to deliver precise and definitive intonation, full dynamic range, and optimum signal-to-noise ratio. Ordinary "good" quality cartridge styli invariably lose contact with these demanding high-velocity grooves . . . in effect, the stylus "derails". Increasing tracking weight to force the stylus to stay in the grooves will ruin the record. Only the Super Trackability Shure V-15 Type II Super-Track® cartridge will consistently and effectively track all the grooves in today's records at record-saving, less-than-one-gram force . . . even the cymbals, drums, orchestral bells, maracas and other difficult-to-track instruments. It will make all of your records, old and new, sound better. Independent experts who've tested the Super-Track agree.

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Tape Guide

HERMAN BURSTEIN

Recorder output

Q. I have noticed a recorder which advertises a 5-volt output. Is this reasonable? Do many recorders provide this much output?

A. Five volts output for a tape recorder is rather unusual. Most machines deliver about 1 or 2 volts. Audio preamps, integrated amplifiers, and receivers seldom require as much as 1 volt to be driven to full output. If a tape recorder has a VU meter that indicates output level, and if the meter is properly connected and calibrated, a 0-VU indication on a steady tone signifies an output of 1.228 volts.

Distortion check

Q. Is the record-playback head likely to be a source of distortion? If so, how can I check it? Are shielded test leads required for connections to the head?

A. Usually the heads are not significant sources of distortion. However, a poorly designed head may be overloaded at low frequencies, particularly in recording. You can check the recording quality of the head by playing the recorded tape on another machine known to be of good quality. You can check distortion by a distortion meter or by observing the playback waveform on an oscilloscope. Connections to and from the tape heads should be via shielded leads to avoid hum. Shielded leads should also be used to feed a signal to the tape amplifier, unless the audio source is of very low impedance.

Extra oscillator lead

*Q. The secondary of the oscillator coil in my **** tape recorder has an extra lead which passes through a diode and a potentiometer and connects to the grid of a tube (not the oscillator tube). Could you explain this connection?*

A. My *guess* is that some of the current from the oscillator is rectified by the diode, and this varies the current drawn by the tube in question, which acts as a voltage regulator to stabilize the amount of oscillator current.

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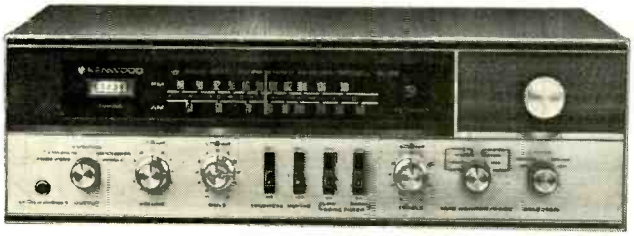

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Letters from Readers

Loudspeaker design texts

■ In your answer to Mr. Ray V. Child's inquiry in the May 1967 20th Year issue, you neglected to mention what are perhaps two of the most basic books available covering loudspeaker design. These are "Acoustics" by Leon L. Beranek (McGraw-Hill, Publishing) and "Electroacoustics" by Frederick V. Hunt (Harvard University Press, John Wiley and Sons, Inc.).

C. VICTOR CAMPOS
Brookline, Mass.

Hartsfield not "Palladin"

■ I enjoyed being reminded of some of those early component pieces illustrated in your May article, *20 Years of Audio.*

As a recording engineer for the U.S. Air Force Band, I met a gentleman dedicated to the audio arts by the name of Bill Hartsfield [designer of the J.B.L. "Hartsfield" speaker system] who developed some interesting condensor microphones and speaker systems. However, he didn't resemble movie actor Richard Boone. Are you or I out of phase on this one?

R. ALAN CAMPBELL
Cape May, N. J.

■ Bill Hartsfield, indeed! Anyone who knows his Muntz from his Conrac can tell you that the person in the picture is Palladin of "Have Gun, Will Travel," minus his costume. Or was Palladin actually Bill Hartsfield in mufti?

J. GORDON HOLT
Wallingford, Pa.

He not only looks like Richard Boone, he is *Richard Boone, confirms the James B. Lansing people. But they do not have a picture of Bill Hartsfield to send us for comparison purposes.—Ed.*

Is it legal?

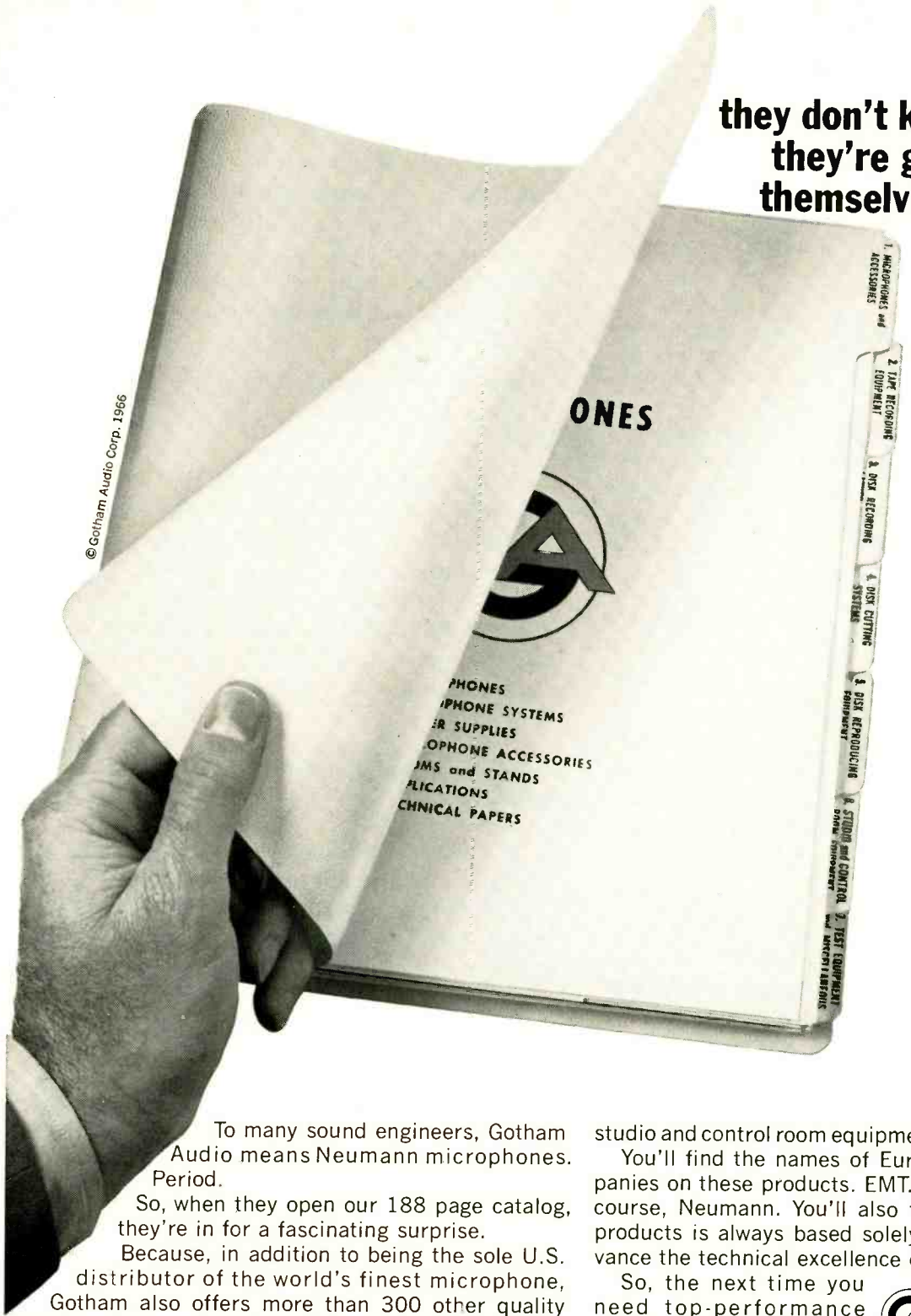
■ I recently built a sound-actuated color display, as described in AUDIO Magazine, September 1966. A friend who saw it wants me to build one for him, paying me for parts and labor. He wants to use it for psychadelic lighting effects for rock and roll bands. I wonder if I would meet any legal complications due to patent or copyright holdings?

GENE SAMPSON
Bristow, Okla.

We cannot say the coast is clear without hesitation when the end use is for commercial purposes. Suggest you obtain a legal opinion on this.—Ed.

When engineers open our catalog to select a Neumann microphone,

they don't know what they're getting themselves into.



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EDITOR'S REVIEW

Fresh Coat of Paint

You'll notice that AUDIO has been restyled for easier readability. We hope, too, that you find our new, contemporary "look" refreshing.

The change in graphics reflects the comments we received from readers who responded to our invitation in June to let us know what they like, what they don't like, and what they wish to read about in future issues of AUDIO MAGAZINE. The response was overwhelming both in number and content.

The tally will be in shortly, but some things are already evident. Everyone has different views which are based on personal experience and inclinations. Obviously, some articles or departments are received more heartily than others, depending upon background. In a publication which covers the audio spectrum—audio through radio-frequency equipment—this is expected. There's a lot to choose from, however.

Where other magazines devote most of their space to music, AUDIO focuses on equipment. In fact, AUDIO *features more than twice as many pages on hi-fi equipment than other leading magazines.* From basics to advanced technology; from consumer hi-fi to professional audio. So there's plenty for everybody.

With nearly 38 per cent of AUDIO's readership being professionally involved with audio and electronics (based on hundreds of respondents to our June "Hot Line to the Editor" card), a substantial part of our editorial content will continue to cover this area. Many readers in the non-professional group share similar leanings. With subsidiary occupations and interests such as E.E. professor, amateur radio, experimenter, and other technical orientations, this is not surprising.

Not all AUDIO readers are technically-inclined or hobbyists, by any means. The "non-pro" group includes a significant number who are music lovers first and merely wish to keep abreast of hi-fi equipment trends, gather buying information, learn how to correct equipment faults, overcome tape recording problems, etc. Records indicate that many in this category develop a high interest in audio equipment after a period of time and become hi-fi buffs, eventually able to enjoy the more technical aspects of AUDIO; others become hi-fi "drop-outs" who are replaced by new readers. This group will be served much editorial fare, too, to foster their interest in hi-fi. And in this age of specialization, we anticipate that many "pro's" will welcome such information. We know audio engineers, for example, who absolutely flounder in the r.f. end of things and, consequently, will find basic information on the subject invaluable.

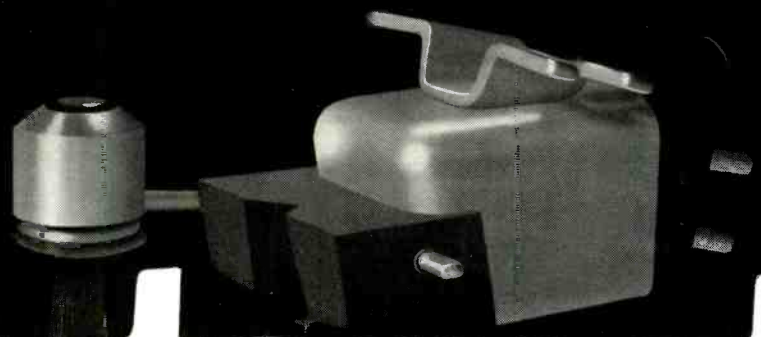
AUDIO will feature selective reviews and analyses of records and recorded tapes, as it has over the years.

In sum, the entire audio (including FM and video) field will be covered in the pages of AUDIO with an eye toward our sophisticated following as well as on less knowledgeable readers. In the works for future issues are a variety of meaningful, in-depth articles. New, exciting audio departments will debut shortly, too. As issues unfold over the months, we'd be pleased to hear your comments. After all, AUDIO is edited for you.

Consumer Electronics Trade Show Rings Bell

The Electronic Industries Association's first consumer electronics show, held in New York City at the end of June, was a resounding success. Exhibitors ran the gamut of consumer electronic product manufacturers, including TV, transistor radios, phonographs, and, scattered among them, some hi-fi components.

Some exciting developments point toward 1968 as a hi-fi action year. For example, Sony Superscope demonstrated a reel-to-reel tape recorder that features stacked tape reels à la record changer, and automatic threading. KLH announced they reached an agreement with Dolby Laboratories for exclusive use of the Dolby System in consumer products. This is the noise-reduction system used by some record manufacturers to produce original master tape recordings. (See AUDIO ETC., March and April 1967.) And tape cartridge equipment manufacturers jockey for position with 2-track, 4-track, 8-track, and cassette types as contenders, with the latter coming up fast on the outside. *A. P. S.*



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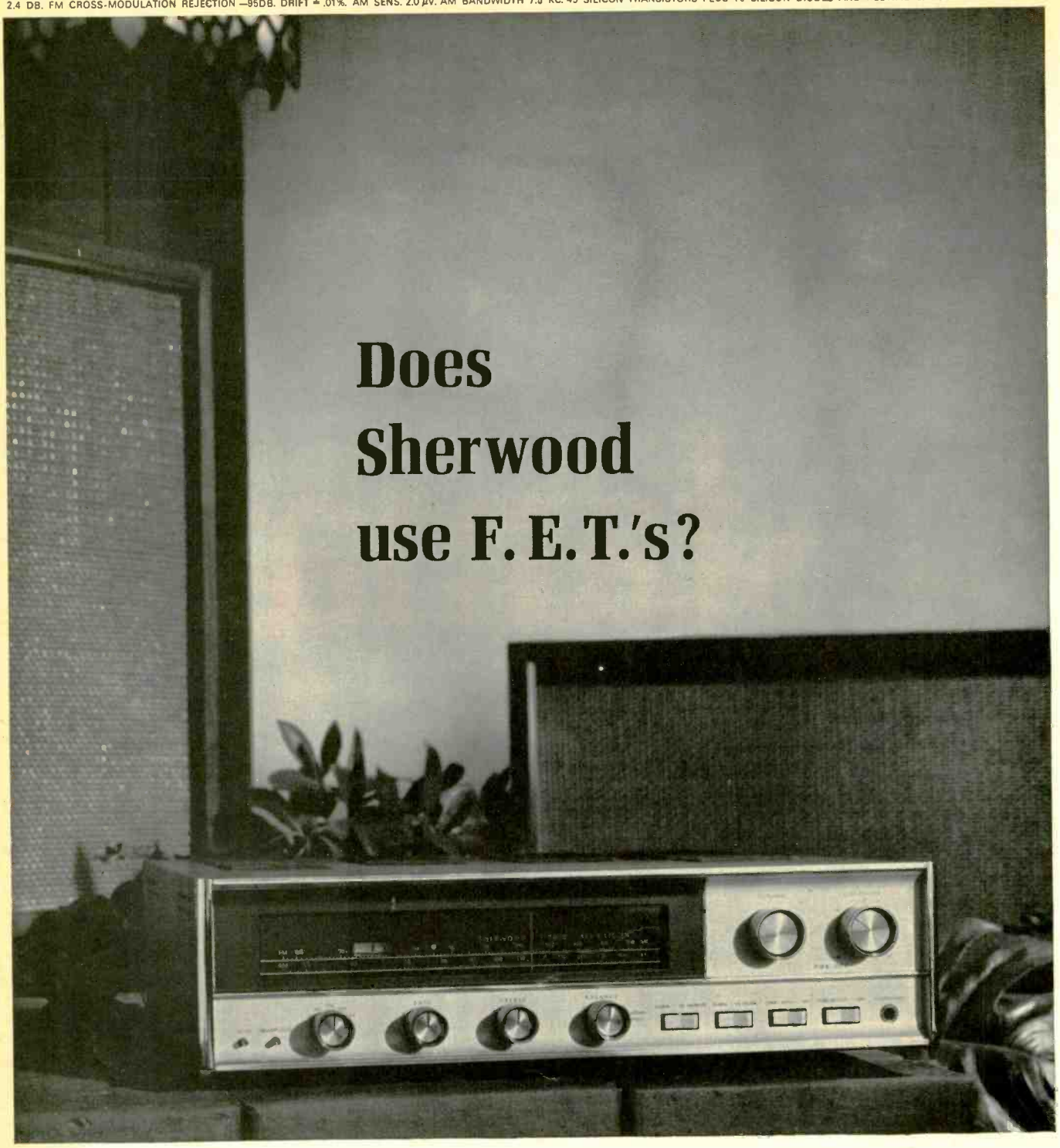

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FORUM ON

Microphones & Headphones

ARTHUR P. SALSBERG

Continuing last month's discussion with hi-fi manufacturers on characteristics of microphones and stereo headphones, this concluding article examines specifications and how to evaluate these important components.

PARTICIPATING MANUFACTURERS

ALTEC LANSING
DAVID CLARK
DYNACO
ELECTRO-VOICE
ELPA MARKETING
GOTHAM AUDIO
JENSEN MANUFACTURING
KOSS ELECTRONICS
NORELCO
SENNHEISER
SHARPE INSTRUMENTS
SHURE BROTHERS
UNIVERSITY SOUND

MICROPHONES

Last month, we concluded with an examination of microphone polar response characteristics.

3. Impedance. To assure the most efficient transfer of a microphone signal to an amplifier, the impedance (opposition to the flow of alternating current) of each should be properly matched. Using a low-impedance (25 Ohms to 600 Ohms) microphone with a high-impedance input amplifier will generally result in a poor signal-to-noise ratio, with lower signal level. Conversely, using a high-impedance (over 1,000 Ohms) microphone with a low-impedance amplifier may overdrive the amplifier or adversely affect frequency response.

Steve Temmer gives this sagacious advice: "In purchasing a microphone, determine the input impedance of the device into which it is to operate and then buy a microphone meant to be operated into that impedance. Small differences such as between 150 Ohms and 250 Ohms can be neglected." Microphone matching transformers are available which enable a low-impedance microphone to be used with a high-impedance input, and vice-versa. In addition, there are many microphones which feature dual impedance: high and low.

If long microphone cables are to be used, that is, where you intend to utilize a microphone more than 20 feet from the tape recorder, all manufacturers agree that a low-impedance microphone should be used. This will avoid significant signal loss, especially of high frequencies, and minimize hum.

4. Output Level. Manufacturers employ different reference levels to determine output level. The ratings are expressed in negative decibels, −55 dB, for example. This is the dB rating below an established zero reference; the smaller the negative number, the higher the output level of the microphone. The Electronic Industries Association (EIA) suggests a standard which has a power reference of 1 milliwatt with a 600-ohm load and a specific sound pressure. But few manufacturers follow this method.

Is Shock-mounting Necessary?

There are a variety of accessories available to counter external forces that might be detrimental to the performance of a microphone, and to protect the mike against environmental conditions.

Perhaps one of the most important "extras"—and in some instances, it's an integral part of the microphone—is a shock mount. William Hayes, *Altec Lansing*, points out, "In general, the mechanical mount influ-

ences the mike's performance only by transmitting mechanical noises such as floor noises caused by people walking." *University Sound* agreed that movement of performers can be minimized by using a sturdy mike stand and shock-mounted microphone. Jim Kogen, *Shure*, mentions the use of a shock mount to make the microphone "insensitive to thumping of the microphone stand and other structure-borne noise."

William Phillips, *Dynaco*, made a strong point about the bad effects that vibrations can exhibit on a sensitive microphone. "How often has a recording been botched," he asks, "because the vibrations from the bass instruments in the ensemble passed through the wood floor, up the mike stand, to the mike and the recording?" And he offers some hints: "The rule is, use a mike stand when you're on cement floors. With anything else, either sling the mike from overhead, or isolate the mike and its stand with sponge padding, a pillow or anything that will absorb low-frequency energy. Slinging a mike," he continued, "is often overlooked and is easy to accomplish with ordinary clothesline — secure the mike to its cable and attach the cable to the clothesline, taking great care to 'aim' the mike if it has other than an omnidirectional pattern."

Microphones, while not being especially delicate, are susceptible to damage just as any reasonably fragile piece of equipment is. Microphones are more rugged today than ever before, though certain types are more robust than others. (We discuss the merits and demerits of different types in following paragraphs.)

A variety of accessories are available to prevent mikes from environmental damage as well as enabling them to eliminate some external problems. Pop screens may be used to prevent moisture from entering a microphone element, for example, though many microphone elements are relatively impervious to such small amounts of moisture. Wind and pop screens may be used to reject interference. Grilles or screens made up of fine mesh screen, silk and filters are used by some manufacturers to prevent damage from external forces. Some microphone diaphragms are constructed with non-corroding metals such as gold.

How to Judge Qualities of Microphones

In general, manufacturers are agreed that judging the quality of one microphone against another in the same category is beyond the scope of the consumer. Various suggestions are offered: "Manufacturer's reputation," "Watch the TV screen and see what the pro's use," "Study the specs and weigh these against cost," "Ask a professional whose judgment you trust," "Check product reviews in AUDIO Magazine" (Honest!), and similar suggestions. Many manufacturers expressed the same views for selecting *any* good quality mike.

For narrowing down a choice, however, there were many suggestions tendered. Aside from listening tests, the limitations set down by your recording needs, your "pocketbook," and the suggestions previously mentioned, manufacturers were near-unanimous in choosing two characteristics which affect the sound quality of a microphone more than others: frequency response and polar response. Sure, one manufacturer felt that, all things being equal, faithfulness of directional characteristics had the most influence on sound quality; another pointed to the apparent effects of severe peaks and valleys in a frequency response curve, especially extreme deviations at the low end and high end of the frequency spectrum; but, by and large, it came down to frequency and polar responses as the real key to a mike's sound performance.

Brakhan of *Norelco (AKG)*, for example, stated, "The first step for any microphone user interested in improving his recordings would be to obtain a cardioid microphone." He noted that a microphone featuring rejection starting at 90° off axis will eliminate poor room acoustics and reflections. "Secondly," he opined, "the microphone should have at least a frequency response of 50 to 15,000 Hz. For amateur applications, it would be desirable to have a slightly rolled-off response since in close-up work a microphone will have the so-called 'proximity effect,' that is, a rise of low-frequency response. A rise of 4 to 6 dB at around 7,000 Hz would add desirable presence to the recording," he observes.

When it came down to microphone *types*, however, there were apparent differences of opinion, no doubt colored by each person's experience and company affiliation, if only subconsciously.

A battery of questions were thrown at interviewees: What importance should be attached to the method of transduction? Do different types of mikes — condenser, dynamic, ribbon, ceramic—limit performance capabilities? Is one type preferred over the other?

We got a potpourri of responses, as you may well imagine. Manufacturers were split on whether or not the method of transduction is important, depending on their reactions to the other questions.

Most of the manufacturers or distributors of condenser microphones said that this type of mike exhibited the best performance. One in this group commented that the fact that it is a condenser unit is not a guaranty of its excellence; there are good and bad ones, adding that many good dynamics exceed in quality many poor condensers. Another in the group included ribbon microphones. A few condenser manufacturers or distributors conceded that dynamics are more "reliable" than condenser types. Further, that condenser mikes are bulkier than dynamic mikes. Others in the group called out the fact that there are some condenser mikes which, using transistor power supplies and long-life batteries, are as small and light as the better ribbon mikes. In addition, it was noted that though condenser mikes are generally extremely expensive, there are some lower-cost condenser mikes available. One manufacturer pointed out

that some of the highly-expensive condensers used by major recording studios feature pickup patterns which can be changed at the flick of a switch from cardioid to bidirectional to omnidirectional.

Manufacturers of dynamic and ribbon microphones by and large compared the relative attributes of all three types. One manufacturer in this group observed that a condenser is *generally* considered the optimum type for professional use because of its flatter response and better transient characteristics, though noting that this is not a fast rule because there are many excellent dynamic and ribbon microphones to choose from.

Most of the others observed that each of the types exhibit inherent advantages and limitations. The cumbersomeness (because of its low output, amplifying equipment and a power supply are required) and high cost of condenser microphones were called out by all other manufacturers in this group. Some cited the sensitivity of a few condenser units to moisture. Concerning ribbon microphones, they were faulted on fragility, need to use indoors only due to susceptibility to noise caused by wind, large size, and high cost (generally higher than dynamics but less than condensers). Manufacturers agreed, however, that ribbons yield excellent frequency response, with one comment on their "good low-frequency response and generally soft sound."

Dynamic microphones, said one manufacturer, are the most ideal for best performance results and ruggedness combined. They're available in all price ranges, offering quality response from mediocre to excellent, observed another. Good response for most purposes, practically indestructible, available in compact size and light weight, said another manufacturer. In short, the dynamic microphones were deemed by this group to be the most practical and economical of the microphone types, while being able to provide excellent performance. Even for studio and professional use, adds one manufacturer. Æ

STEREO HEADPHONES

Last month, we concluded with an exploration of headphone impedance requirements.

Earphone Measurements

Here we'll have to put the cart before the horse. Before we discuss which earphone specifications are significant, which are less vital, it is important to understand some of the measurement techniques used to accumulate data.

"Measurements are made with the headphone attached to a coupler which defines the volume into which the headphone is operating," says *Jensen Manufacturing's* Hohmann. The most-frequently used coupler has a volume of 6 cubic centimeters. The headphone is fixed in position on one side of the coupler and a microphone is located opposite the headphone on the other side. The electrical input to the headphone is normally a sine wave." Hohmann also says that he has used wide-range white noise input and made 1/3- and 1/10-octave bandpass measurements as another method of obtaining frequency-response measurements.

Horst Ankermann, *Sennheiser*, observes that, "Opinions vary wildly about the best way a frequency response should be determined." Besides laboratory measurements, "... our factory uses a subjective listening test with at least 30 people, comparing free-field sound emerging from a speaker with the volume impression with headphones. These tests are rather complicated," he adds, "but result in judgment of earphones ... considering the human anatomy."

Koss says, "...generally measured on a flat-plate coupler. Relative measurement only is possible by this method. More accurate measurements are obtained by comparing phone response with field response in an anechoic chamber."

"Very difficult question," counters Temmer of *Gotham Audio*. "We feel that there are no meaningful comparison measurements which can be given to any but scientific users when it comes to response. The standard indicates a 'coupler' measurement which results in a completely nonlinear curve *not* related to subjective impression on the listener.... We know of no way to measure subjective response."

"The use of probe tubes [a system where a probe microphone is placed "under the earphone cap" or near the ear canal] is technically hazardous," volunteers Campbell of *David Clark*, "... attended by variations in termination impedance, calibration, damping, position, and undesired sound paths other than through the end. The best method for frequency-response measurement is loudness balance.... First, it is a real ear measurement and, secondly, it represents the net judgment of a large population of real ears. It is analogous to the aspirin manufacturer that advertised his pill was not designed for people with glass stomachs.... I have recently had the pleasure of lively discussion with several engineers who were assigned the task in their respective companies to advise the Purchasing Department on which stereo headset to buy. Each resorted to the listening test, having more or less given up on their sophisticated, elaborate acoustical apparatus to predict what they will hear."

Sharpe measures headphones with an assortment of equipment, including: an artificial ear and a microphone amplifier; Bruel & Kjaer audio oscillator, and a Hewlett-Packard distortion analyzer.

Earphone Specifications

Examine a catalog or other literature on headphones and you'll be amazed at the vague specifications often given. Some indicate sensitivity, frequency response with a tolerance figure, maximum input power, percent distortion, and impedance. More often, you won't find many of these specifications, if any.

Starting with Sharpe, let us see

(Continued from page 19)

what specifications our experts feel are applicable to headphones. Ross Pfaff indicates the following: (1) frequency response, (2) harmonic distortion, (3) maximum input power, (4) maximum acoustical output, (5) attenuation of ambient noise, (6) impedance, (7) sensitivity in sound pressure level (SPL) and the voltage to attain this SPL.

Steve Temmer, *Gotham Audio*, says that no data should be given beyond the following: "Decibels SPL per mW input, required input voltage, and peak power demand in mW." He explains, "We do not feel that there are any other meaningful data for earphones."

Ankermann of *Sennheiser:* "...subjective frequency response, power requirements, distortion."

Hohmann, *Jensen Manufacturing:* "... frequency response, output sound pressure level, harmonic distortion."

Koss, *Koss:* "Frequency response, impedance, sensitivity, maximum input, distortion."

Campbell, *Clark:* "Sound pressure level at the ear canal for 1% distortion, as a function of frequency; frequency response, including method of measurement; sensitivity in dB SPL per milliwatt at a specified frequency; input power above which there is danger of earphone failure."

Without accepted standards of measurement, it is clear that, as with other transducers, direct comparison of one manufacturer's specs with another's is like comparing apples with peaches. "How, then, can a hi-fier evaluate headphones?" we asked our experts.

How to Evaluate Headphone Performance

Anyone who has listened to stereophonic music via stereo headphones readily agrees that the headphone perspective is a unique one. The sound seems to originate inside the head, an experience disturbing to some listeners, fascinating to others. Of course there are some headphones which can provide a somewhat different perspective by interchanging earphones; that is, by turning the headphones around so that the left earphone is over the right ear, the right one over the left ear. A phase difference causes the sound to project forward a bit. The Bauer-CBS crossfeed network,[1] as you might know, makes it possible to convert stereo information into binaural information. The circuit[2] allows headphone users to control localization of sound.

Campbell, of *Clark*, points out that headphones are more properly used for binaural reproduction. "... This implies two microphones closely-spaced rather than the conventional wide-space recording techniques now used. The best indication I have seen for determining the stereo quality of a program is to observe the long time, average ratio of the A − B to A + B signal. In true binaural recording this ratio almost never exceeds 0.5. In wide-space microphone recording, 0.8 is not uncommon. When one plays back a 0.8 recording through a system (earphones) designed for 0.5 recordings, the results are truly spectacular and certainly not objectionable. The converse applies, of course, and a true binaural recording is quite disappointing played on loudspeakers." Campbell holds that, "The finest sound reproduction that can meet our ears is a true binaural recording played on high-quality earphones."

There is no doubt among headphone manufacturers that the subjective art of listening to music reproduced through headphones is the single most important act in trying to judge performance quality.

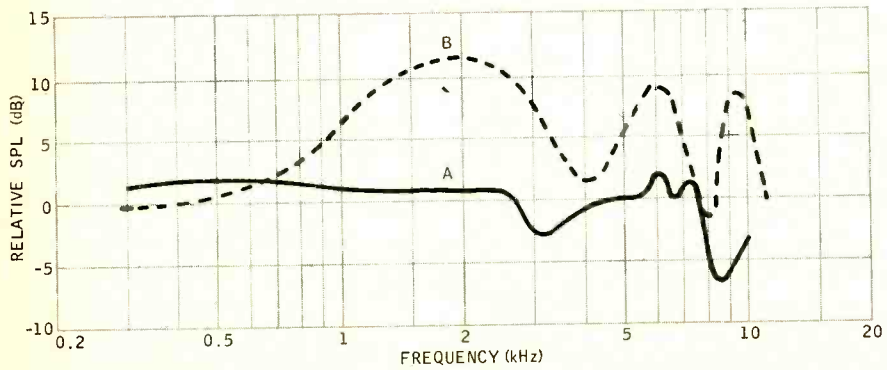
Printed specifications might provide some basis for comparison, but subjective evaluation—personal listening tests—should be the deciding factor in making a buying decision, manufacturers agree.

Steve Temmer suggests, "... listening for smoothness or lack of harshness in sound" as guideposts to personal listening tests. Further, he suggests, "... note cleanliness of low-frequency tones at fairly high volume ... not fall for boosted high-end response or 'thumpy' lows."

In Charles Hohmann's opinion, "While a good seal to the ear is desirable for good low-frequency performance, we have found considerable discomfort from phones which give a very good seal with a sacrifice in wearer comfort." He notes, "A short-time evaluation in a store may not point out the possible discomfort which may come from more extended listening times of use at home, after purchase. We feel that a compromise between low-frequency performance and wearer comfort dictates use of a headphone cushion which allows controlled air-leakage."

It might be best to do your headphone shopping in the morning, implies *Norelco's (AKG)* product manager, Andrew Brakhan. He notes that his company found that the "... response of the human ear, when listening to headphones, is best in the morning and decreases as the day goes on." Since this phenomenon was not found to occur when

Two average real-ear responses, using 7 to 8 subjects, are shown. Curve A is plotted against a response with a standard 6-cc coupler. Curve B is plotted versus a flat-plate-coupler response for the same earphones. Curves were obtained with a probe microphone placed inside the ear orifice. Note that the real-ear response is generally higher that the coupler response. With the earphone used to obtain curve B, it averages 6 dB higher above 1 kHz. The dip at 4 kHz is attributed to the fundamental ear-canal resonance.



listening to a free-field source (speaker system), he believes that this proves that headphone listening is not done by the ear alone.

There were some differences expressed by manufacturers on types of drivers used in earphones. Many employ dynamic drivers, giving various reasons for making this choice: broad response, imperviousness to humidity, dependability, among them. Some utilize conventional paper-cone miniature speakers, with one manufacturer using woofer-tweeter combinations with crossover networks.

A variety of accessories are available to heighten enjoyment of stereo-music headphone listening. Shure Brothers, for example, offers a headphone amplifier, the "Solo-Phone," which provides separate, clutched volume controls for each channel, and provision for two stereo headphone sets. Jensen Manufacturing has a Headset Stereo Control Center, featuring crossfeed between channels. Koss includes a stereo headphone adapter for use with an automobile cartridge tape player among its headphone accessories. Multiple listening stations, remote volume controls, and many other accessories provide added convenience for headphone users.

The growing popularity of stereo headphones is evident from the large number of manufacturers engaged in manufacturing them and the great number of models to choose from.

Aside from the exciting sensation of stereo sound experienced in and around the head, and elimination of room resonances in one fell swoop, there are other cogent reasons which explain headphone popularity: (1) elimination of ambient noise, which includes screaming children, TV sound, and other interferences, and (2) being able to listen to "stereo" without disturbing neighbors or family, even in the still of the night. With so many distinct benefits, it is no wonder that stereo headphones have grown up to become full-fledged components. Æ

1. *A Headphone Control Center for Monaural, Diotic, Binaural Listening*, AUDIO Magazine, November 1962.
2. Licensed by Jensen Manufacturing Co.

PART 2

The New NAB Magnetic Tape Standards

HERMAN BURSTEIN

IN THE FOLLOWING discussion we are largely concerned with NAB reel-to-reel, magnetic tape performance specifications. These principally apply "to all high quality magnetic recording and reproducing equipment used for music and speech programs where superior performance is of primary importance." There is also a brief section applying to "special purpose limited performance systems."

Tape Speeds

Of key interest, reflecting progress of the tape art, is the new, preferred tape speed.

"It shall be standard that the preferred tape speed be 7½ inches per second."

This contrasts with the 1953 NAB standard, which designated 15 ips as the "primary standard" and 7½ ips as the "secondary standard."

The 1965 standard designates 15 ips as a "supplementary tape speed."

In 1953, 30 ips played the same role.

The 1965 standard further designates 3¾ ips as a "supplementary tape speed."

No mention of 3¾ ips appeared in the 1953 standard.

Tape speed tolerance is ±0.2%, applying to any portion of the reel of tape in use.

The RIAA standard permits a slightly greater tolerance, ±0.3%. The 1953 NAB standard said nothing on this point.

At the risk of repetition, it is necessary to anticipate our discussion of signal-to-noise ratio to help make clear why 7½ ips has become the preferred speed and 3¾ ips has risen to the status of a supplementary tape speed. The NAB S/N specifications are just as high at 7½ as at 15 ips on an unweighted basis (giving equal weight to all frequencies in the audio spectrum when measuring noise). In fact, on a weighted basis (reflecting normal hearing characteristics at low volume and, therefore, greatly deemphasizing noise in the bass region and moderately deemphasizing noise in the treble region), slightly higher S/N is specified for 7½ than for 15 ips.

On a weighted basis, 7½ ips permits a higher S/N ratio because playback equalization "remains the same for both speeds while the tape noise increases with tape speed."

For 3¾ ips the NAB standard specifies S/N that, on a two-track or four-track basis, is overall nearly as high as for 7½ ips. In fact, for two-track operation, specified S/N is 1 dB higher for 3¾ ips than for either 7½ or 15 ips when noise is unweighted; and 1 dB higher than for 15 ips when noise is weighted. Only on a full-track basis is specified S/N significantly less for 3¾ ips than for the higher speeds.

Tape speeds, and playback-recording characteristics outlined in NAB standards are examined in this installment

Playback and Recording Characteristics

The tape playback head is a "velocity" device, responding to rate of change of signal; the lower the frequency, that is, rate of change, the lower the head output voltage. Thus for constant magnetic flux (equal level of recorded signals) on the tape, head output voltage essentially declines in proportion to frequency —bass loss. In recording, there are serious treble losses owing to various magnetic phenomena. Altogether, the record-playback response of a tape system in the absence of equalization is a camel hump: high in the middle and low at the bass and treble ends. Therefore the tape amplifier must provide bass boost and treble boost to restore flat response. But the amount of boost can vary in two ways:

(1) It can be provided either in recording or in playback or in a combination of the two. (2) The machine may contain the minimum amount of equalization necessary for flat response; or, to get as much signal on the tape as is consistent with tolerable distortion and thus improve the S/N ratio, the manufacturer can increase recording boost above the minimum amount required. Because equalization at any given speed can therefore vary all over the lot, it is eminently desirable to have standard recording and playback equalization to permit interchangeability of tape among machines and to achieve optimum practice (best compromise among the conflicting requirements of wide frequency response, low distortion, and high S/N ratio).

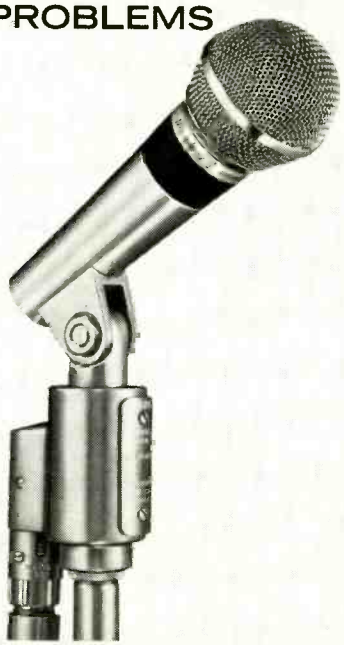
If one specifies a playback characteristic and at the same time specifies flat record-playback response, the recording characteristic is implicitly defined. Such is the practice in tape recording, because it is easier to measure the playback characteristic (boost or cut applied to a signal coming off the tape) than the recording characteristic (boost or cut in the magnetic flux actually recorded on the tape).

Next month the author will examine equalization curves.

CONTROL WIND NOISE, "POP" & FEEDBACK

...PLUS:

VIBRATION PROBLEMS



SHOCK-MOUNTED UNISPHERE™ I

Model 566. All the superb feedback and pop-control characteristics of the famed Shure Unisphere I, plus built-in vibration-isolation shock-mount which prevents pickup of mechanical vibrations and handling noise. $140.00 List.

QUICK CUT-OFF PROBLEMS

SWITCH-MOUNTED UNISPHERE™ I

Model 565S. Now, a built-in on-off switch and permanent swivel mounting are added to the premium-quality Unisphere I—already famous for its uniform pick-up pattern at all frequencies, in all planes, and built-in wind-noise and explosive breath "pop" protection. $100.00 List.

Model 565SC. $102.00 List.*

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ADJUSTABLE VOLUME UNISPHERE™ A

Model 585SAV. One of the most ingenious microphones ever! Volume control right on the Unisphere enables the user to reduce output if audio break-up due to overload occurs. Also, enables a speaker or singer to control his own volume for dramatic effects. $72.50 List.

3 NEW CARDIOIDS FROM

SHURE

Write for Complete Data Sheets / Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Illinois 60204

*Same as 565S, but with "C" series (3-in-1) connector attached.

THE 1967-1968

PRODUCT PREVIEW

This year's product preview of hi-fi equipment features the tabular format used in AUDIO for the past few years. It simplifies direct comparison of specifications between models in each category.

A variety of abbreviated words are employed to conserve space. For example, S/S stands for solid state; K for kit; card. for cardioid, and so on. Blank spaces in columns indicate that characteristics do not apply to the product; a dash indicates that manufacturers omitted information.

All specifications have been supplied by respective manufacturers. For more information, a circled number under a manufacturer's name directs you to the page on which his advertisement appears. Further information may be obtained by writing directly to the manufacturer. A directory of manufacturers' names and addresses is included at the end of the Preview to assist you.

Readers familiar with AUDIO Magazine's annual Product Preview will observe that stereo hi-fi receivers and speaker systems continue to grow in number of models available, while preamplifiers and basic power amplifiers barely hold their own.

This Product Preview issue is designed to be used through the year as a comparison reference to assist you in making a buying decision. It takes more than specs to arrive at a conclusion, we know, but having specs at hand is an immense help. AUDIO will supplement the Product Preview from time to time through the year when new equipment is announced.

Sony 1120

Marantz 15

McIntosh MC2505

AMPLIFIERS
BASIC & INTEGRATED

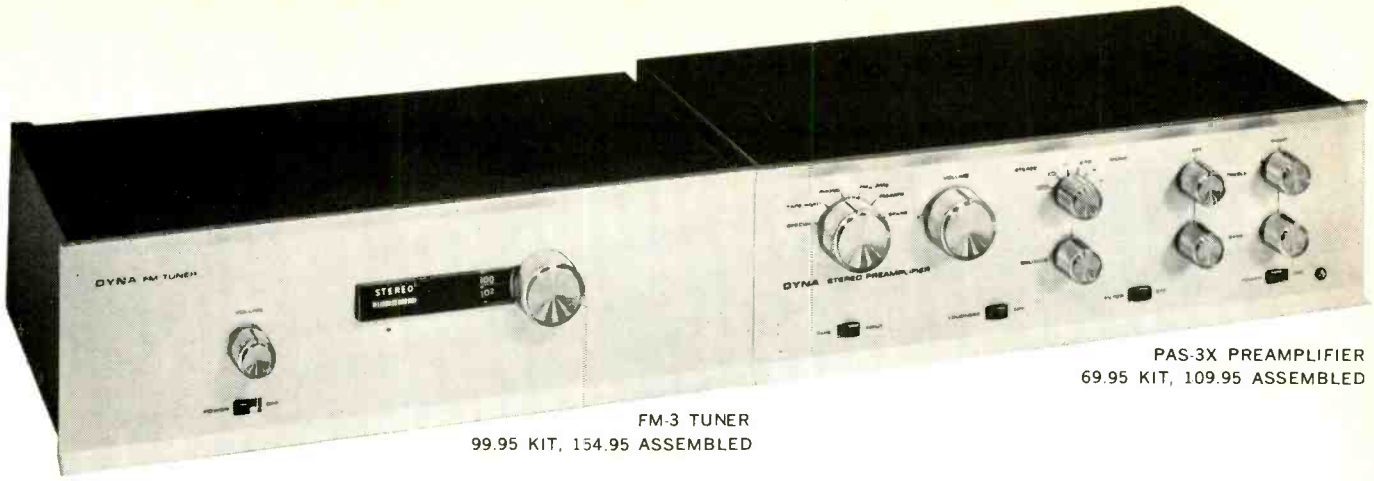
ANUFACTURER rc ed number icates ad page)	Model	IHF power per chan, W.	RMS power per chan, W.	THD full power, %	THD 1 watt, %	IM full power, %	IM 1 watt, %	Power bandwidth, Hz	1-watt Frequency Response, ± dB	Hum and Noise below Rated Output	Input Sensitivity-phono, mV	Input Overload-phono, mV	Tape Head Input, mV	High Level Input, V.	Output Impedances	Damping Factor	Dimensions – W x D x H, in.	Weight, lbs.	Price	SPECIAL FEATURES
C	Sixty	30	22	0.5	0.1	0.8	0.4	20-20k	10-60k ±2	78	3	80	-	0.1V	4,8, 16	50	14¼ 8½ 3¼	11	149.50	Will accommodate two sets of speakers, which can be used either together or independently.
OUSTECH	I-A	250 4Ω	125 8Ω	0.25	0.1	0.25	0.1	20-20k	3-125k ±3	95	-	-	-	1.2V	4-16	100	15 10 5	30	395.00	Power amp – has headphone output.
	XII	100 4Ω	50 8Ω	0.45	0.1	0.45	0.1	20-20kc	3-125k ±3	90	-	-	-	1.2V	4-16	100	15 10 5	22	159.50 K	Power amp kit – Add-A-Kit – just add P/M kit for complete amp
	VA	100 4Ω	50 8Ω	0.45	0.1	0.45	0.1	20-20kc	3-125k ±3	75	3	100	-	0.4V	4-16	100	15 10 5	25	399.00	Complete wired unit.
GEN	TA100	30	25	1.0	0.5	1.0	0.75	20-20k	20-20k ±1	70	3.5	50	-	0.15	4,8, 16	35	15 11¾ 3¾	11	129.95	Complete with walnut textured metal enclosure. Headphone output. All-silicon transistors. Modular ckts. Optional wood cabinet.
	102	30	40	.8	.2	.5	.8	30-20k ±2	10-30 ±1	-65 MV	2	90	22 MV	.2V	4,8, 16 500	10	15 12 6	30	269.95	
M. LABS.	911	-	100	< 0.5	< 0.5	< 0.5	< 0.5	10-30k +0–3	1-100k ±3	70	-	-	-	1-1.6	4,8, 16	200	14¾ 8⅛ 11⅝	40	477.00	Distortion specs max. guaranteed typical < .25 % at max. power almost immeasurable at 1 watt total peak power, greater than 1 kilowatt.
	35D	-	50	< 0.5	< 0.5	< 0.5	< 0.5	10-30k +0-3	1-100k ±3	70	-	-	-	.65 to 1.3	4,8, 16	200	10⅛ 6⅛ 12¼	25	285.00	Same as above except total peak power, greater than 350 watt.
	CC-50S	-	50	< 0.5	< 0.5	< 0.5	< 0.5	10-30k +0-3	5-60k ±3	70	3-5 Var.	90	6-30 Var.	0.25	4,8, 16	200	17 6 13	40	387.00	Same power section as 35D.
	80MRM	-	80	< 0.5	< 0.5	< 0.5	< 0.5	20-20k ±1	1-100k ±3	80	-	-	-	1.5 .75V	4,8, 16 70V	200	19Rk 5¼ 13	32	293.00	Mono Rack mounted amplifier for professional studio monitor and sound reinforcement systems optional accessories available.
WN (71)	SA30-30	45	30	0.1	0.05	0.5	1.0	12-60k ±2	8-100k ±1	90	-	-	-	0.8	4-16	200	19 9 1¾	7½	199.00	Low-silhouette, double in and out jacks on each chan; concentric-clutched input volume control, all-silicon transistors, case available. (specs at 8Ω)
	D-150	To be announced		0.1	0.05	0.5	1.0	-	0-100k ±1	95	-	-	-	1.8	4-16	200	19 9 8¾	50	*	Precision input-output gain, massive 1-kw power supply, fail-safe protection of outputs, 26 db voltage gain. * Price to be announced.
ACO (27) (85)	Stereo 120	60	60	0.5	0.1	0.5	0.1	5-50k -3	5-100k ±0.5	- 95	-	-	-	1.5	8 rtd. 4-16	40	13 10½ 4	20	159.95 K 199.95 Assmbld.	15 transistors (all silicon) and 15 diodes – regulated power supply – complete electronic protection.
	Stereo 70	45	35	1.0	0.05	1.0	0.05	20-20k -1	10-40k ±0.5	- 90	-	-	-	1.3	4,8, 16	15	13 9½ 6½	32	99.95 K 129.95 Asmbld.	4 EL-348 / provision for 70 watt mono operation.
	Stereo 35	22.5	17.5	1.0	0.1	1.0	0.1	20-20k -1	10-40k ±1	- 80	-	-	-	1.0	8,16	10	13 5½ 4	16	59.95 K 79.95 Asmbld.	
	SCA-35	22.5	17.5	1.0	0.2	1.0	0.2	20-20k -1	20-20k ±0.25	- 80	4	150	2.5	1.0	8,16	10	13 10 4	20	99.95 K 139.95 Asmbld.	Combined amp and preamp.
)	CORTINA 3070	70 4Ω	40 4Ω	0.75	0.11	2	0.6	10-40k ±2.5	10-50k ±0.5	72	4.2	90	-	270	4,8, 16	30	12 7¾ 3⅛	7½	129.95 89.95 K	All silicon s/s. incorporates contour, balance conts; hi and lo filters; includes Danish wal. vinyl cov. steel case.
CTRO-ICE Cover (4) (1)	E-V1122	15	10	1.5	1.0	-	-	-	20-20k ±1.5	65	4	60	-	0.1	4-16	20	15¾ 8½ 4¼	10	94.00	Smart, hefty amplifier with performance and features not expected in its price class.
	E-V1144	32.5	18	1.0	0.5	-	-	-	20-30k ±1.5	70	3	50	-	0.15	4-16	35	8⅜ 10¼ 3⅜	9½	125.00	Value-packed 65 watt solid-state stereo amplifier. Includes walnut paneled case, input indicator lights, headphone jack, speaker mute, and tape monitor switches.

AMPLIFIERS

Dynaco Stereo 120

JBL SA600

MANUFACTURER (Circled number indicates ad page)	Model	IHF Power Per Chan, W.	RMS power per chan, W.	THD full power, %	THD 1 Watt, %	IM Full Power, %	IM 1 Watt, %	Power Bandwidth, Hz	1-Watt Frequency Response, ± dB	Hum and Noise Below Rated Output	Input Sensitivity-phono, mV	Input Overload-phono, mV	Tape Head Input, mV	High Level Input, V.	Output Impedances	Damping Factor	Dimensions – W x D x H, in.	Weight, lbs.	Price	SPECIAL FEATURES
GROMMES	C41B	30	25	0.5	0.1	0.5	0.2	20-20k	15-50k ±1	75	3	60	1	0.15	4,8, 16	30	13½ 4¾ 11	-	179.95	All-silicon, s/s. overload protection
HEATH (7)	AA-210	50	35	0.5	0.5	1.0	1.0	13-25k ±1	13-25k ±1	60	3	-	2	0.25	4,8, 16	-	15½ 14 5¼	25	137.00 K	All s/s; OTL cct, mult FB loops. Secondary conts. concealed unde hinged lower front panel; preamp ccts prewired, epoxy sealed; opt. cabs.
	AA-22	33	20	0.3	0.3	1.0	1.0	15-30k ±1	15-30k ±1	65	6	-	-	0.25	4,8, 16	20	15 11⅜ 3 7/16	14	99.95 K	All s/s; 5 stereo input; secondary controls concealed.
	AA-14	15	10	0.5	0.5	1.0	1.0	15-50k ±1	12-60k ±1	63	4	-	-	0.3	4,8, 16	50	12½ 9⅝ 3½	8½	59.95 K	All s/s; OTL cct; edge lighted panel; fast 10-hr. const. Opt. cal
JBL (61)	SA600	-	40	*	*	*	*	10-130k ±1.5	10-130k ±1.5	85	4	250	2	0.25	4-16	27	15 13¾ 5	25	345.00	Aural-null bal. sys. Dir-cpld. "T cct; phono sens. sw; sep. "trim" bal. cont. for phono.
	SE400S	-	40	*	*	*	*	3-175k ±1.5	3-175 ±1.5	90	-	-	-	0.8	4-16	**	15¼ 7¾ 4⅝	22	285.00	Free standing Energizer; plug-in eqlzr. board sets damping & freq. resp. corr. to match specific spk used.
	SE408S	-	40	*		*	*	3-175k ±1.5	3-175k ±1.5	90	-	-	-	0.8	4-16	**	15¼ 6¾ 4⅝	20	270.00	Same as above except mounts on speaker enclosure. * too low to specify accurately ** set by plug-in equalizer board match requirements of spkrs.
KLH	16	50	35	< 2.0	< 0.5	-	-	-	-	-	-	-	-	-	-	-	11¾ 10½ 4½	14	219.95	Inputs for Mag. phono; tuners; 2 tape. outputs to recorder and he phones. Wal. veneer cab. 19.95
KNIGHT (35)	KG-895	60	40	< 0.5	0.5	< 1.0	0.7	20-20k 1	18-30k 1	75	2.5	100	2.0	0.25	4,8, 16	6* 11	16¾ 15 5	28	149.95 K	Solid-State. * for 8/16 ohms.
	KG-870	35	28	< 0.5	0.3	< 1.0	0.7	25-18k 1	20-25k 1	80	3.0	-	2.0	1.0	8,16	* 12.5 17.5	13 11 2¾	15	99.95 K	Solid-State. * for 8/16 ohms.
	KG-854	27	17	< 0.5	0.5	< 1.5	0.8	25-20k 1	20-25k 1	75	3.0	-	2.5	0.5	8,16	10* 17	13 11 2¾	14	79.95 K	Solid-State. * for 8/16 ohms.
	KG-865	25	17	1.0	.25	1.0	0.7	20-20k	15-50k ±1	60	5	45	-	400 MV	4-16	50	13 10 3½	10	69.95 K	All Silicon transistors complem tary symmetry output.
FISHER (39)	TX100	32.5	20	0.5	0.2	0.8	0.2	16-36k +0 -2	25-35k ±2	75	3.5 LO 7.5 HI	30	2.5	0.4	4,8, 16	14	15⅛ 13⅝ 4 13/16	17	189.50	Stereo control amplifier with ta monitor, high filter, loudness contour, speakers main/remote switches.
	TX1000	60	50	0.5	0.2	0.8	0.2	22-24k +0-2	20-40k ±1.5	90	2 LO 7.5 HI	40	1.8	0.2	4,8, 16	10	15⅛ 13⅝ 4 13/16	24	329.95	Pushbutton stereo control ampl with hi and low filters. and hi filters, latter at 4kHz or 8 kHz switching for main, center, rem dual bass and treble conts. (81 loudness, switches, speakers; center, main.



PAS-3X PREAMPLIFIER
69.95 KIT, 109.95 ASSEMBLED

FM-3 TUNER
99.95 KIT, 154.95 ASSEMBLED

UNCOMPROMISED QUALITY

This combination of PAS-3X preamplifier, FM-3 tuner, and Stereo 120 amplifier represents the highest level of quality which can be attained with high fidelity components. It combines the virtues of both tubes and transistors in a flexible modular system without skimping to squeeze it into one unit.

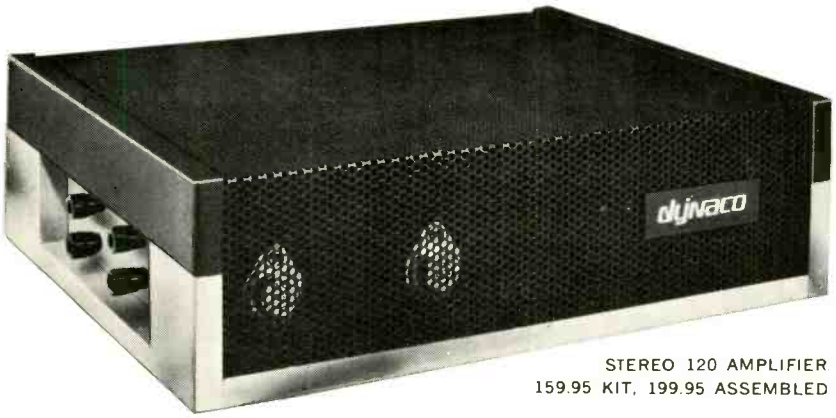
Two of these components have passed the test of time — years of increasing public acceptance. The Stereo 120 is an all new design. All have been engineered and produced with the same underlying Dynaco philosophy of offering superlative performance at the lowest possible cost—when you buy it, and as long as you own it. Everyone recognizes that Dynaco is "best for the money." **We** know that it should be judged regardless of price—Dynaco quality has never been compromised by cost considerations.

Our sole concern is sonic perfection. We don't follow the herd in engineering, styling or promotion. Fads, status and "revolutionary new sounds" never enter our planning. We avoid regular model changes and the planned obsolescence they engender. We take the extra time to do things **right the first time.** That probably explains why our limited product line has become increasingly popular each year. It's why our kits are so easy to build; why maintenance is so easy; and service problems so few. We constantly strive to improve our products though, and when we do, these changes are available to our customers to update existing equipment at low cost.

Our detailed literature, available on request, gives the full specifications which help to explain why the Dynaco components illustrated (PAS-3X, FM-3 and Stereo 120) will provide the finest sound possible. Specifications are important, but the most complete specifications cannot define truly superb sound. Go to your dealer, and compare Dynaco with the most expensive alternatives, using the very best speakers and source material you can find. Be just as critical, within their power limitations, of our best-selling Stereo 70, Stereo 35 and SCA-35.

Of course, if you are now a Dyna owner, don't expect us to convince you to replace what you already have.

But your friends might benefit!



STEREO 120 AMPLIFIER
159.95 KIT, 199.95 ASSEMBLED

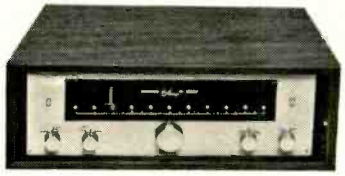
dynaco inc. **3912 Powelton Ave. Philadelphia, Pa. 19104 U.S.A.**

Check No. 115 on Reader Service Card

AMPLIFIERS

MANUFACTURER (Circled number indicates ad page)	Model	IHF Power Per Chan, W.	RMS Power Per Chan, W.	THD Full Power, %	THD 1 Watt, %	IM Full Power, %	IM 1 Watt, %	Power Bandwidth, Hz	1-Watt Frequency Response, ± dB	Hum and Noise Below Rated Output	Input Sensitivity-phono, mV	Input Overload-phono, mV	Tape Head Input, mV	High Level Input, V.	Output Impedances	Damping Factor	Dimensions – W x D x H, in.	Weight, lbs.	Price	SPECIAL FEATURES
SHERWOOD	S-9000a	80	65	0.25	0.1	0.25	0.1	15-30k	12-25k	80	1.6	100	1.2	0.25	4-16	40	14 12½ 4	24	309.50	All-silicon s/s; 160 w. at 8 ohms;
(16)	S-9900a	70	60	0.33	0.1	1.0	0.15	15-30k	12-25k	80	1.6	100	1.2	0.25	4-16	40	14 12½ 4	19	229.50	All-silicon s/s; Main and/or rem. spkr. switching.
	S-9500a	35	25	0.33	0.1	1.0	0.15	15-30k	12-25k	80	1.6	100	1.2	0.25	4-16	40	14 10½ 4	16	179.50	All-silicon s/s; Main and/or rem. spkr. switching.
SONY	TA-3120	60	50	0.1	.05	0.3	.07	10-100k +0,-1	10-100k +0,-1	-	-	-	-	1.0	4,8, 16	70	7⅛ 17½ 5¾	17.5	249.50	2-chan basic s/s ampl; output transistors protected against overload or shorts by SCR circuit.
(33) (77)	TA-1120	60	50	0.1	.05	0.3	.07	10-100k +0,-1	10-100k +0,-1	100	1.5	100	1	0.2	4,8, 16	70	15¾ 12¼ 5¾	24.2	399.50	Integrated amp/preamp; stepped tone controls; same protection for output transistors as above.
TRANSTECH (90)	S-200	150	100	0.1	-	< 0.1	-	-	2-60k	105	-	-	-	-	4,8, 16	-	Panel 17 4¾	-	985.00	5 reg. pwr. supplies, 2 VU meters Attenuators for 1,10, 100 W. model cabinet, 65.00. Rack or custom mtg.
LAFAYETTE	LA-125T	62.5	-	0.8	0.15	1.0	0.3	20-40k ±3	20-20k ±1	65	1.8 7.0	35 110	2.5	0.27	4,8, 16	25	13 9 3⅞	13½	129.95	Fused transistor output; remote spkr. terms; front and rear rcdr. jks lo- and hi-cut filters; incls. case.
	LA-85T	42.5	-	0.8	0.15	1.0	0.3	20-40k ±3	20-20k ±1	65	2.2	40	2.5	0.27	4,8, 16	25	13 9 3⅞	11	99.95	Main/remote speaker sw. Fused output transistors; incls. case.
LEAK	Stereo 20	20	11	-	-	-	-	-	20-20k ±0.5	80	-	-	-	125	4,8, 16	25	10½ 12¼ 6⅞	22½	149.00	Basic Stereo Amplifier
	Stereo 60	60	30	-	-	-	-	-	20-20k ±0.5	80	-	-	-	125	4,8, 16	25	10⅝ 13⅛ 6⅞	29¼	219.00	Basic Stereo Amplifier.
	TL/50 Plus	100	50	-	-	-	-	-	20-20k ±0.5	85	-	-	-	125	4,8, 16	25	11½ 9 6⅛	28	159.50	Basic Mono Amplifier, can be paired for stereo.
	TL/25 Plus	60	30	-	-	-	-	-	20-20k ±0.5	85	-	-	-	125	4,8, 16	25	10 7⅞ 6¾	17	119.50	Same as above.
	Stereo 30	15	10	-	-	-	-	-	20-20k ±0.5	80	3.5	-	3	125	4,8, 16	60	13 4¼ 9	14	249.50	s/s int. amp./preamp.
MARANTZ (29)	15	85	70	0.1	.015	.05	.03	8-60k	20-20k ±0.15	100	-	-	-	1.0	4-16	150	15⅜ 8 5¾	30	395.00	Separation and cross talk – below noise level.
MATTES	SSP/200	125	100	0.1	0.2	0.1	0.25	20-20k ±1	15-30k ±1	90	-	-	-	1.0	4,8, 16	125	14⅜ 10 5½	23	425.00	Basic power amplifier, all s/s.
	SSA/200	125	100	0.1	0.2	0.1	0.25	20-20k ±1	15-30k ±1	80	3.5	200	3.0	0.3	4,8, 16	125	14¾ 13 5	33	675.00	Integrated amp/preamp, all s/s.
MC INTOSH	MC-2505	-	50	< 0.2	-	< 0.2	-	10-100k ±3	10-100k +0,-1	> 90	-	-	-	-	4,8, 16 25V.	10	16 13 5 7/16	38	449.00	Front-panel peak-rdg meters; panel mounting.
	MC-250	-	50	< 0.2	-	< 0.2	-	10-100k ±3	10-100k +0,-1	> 90	-	-	-	-	4,8, 16 25V.	10	10⅝ 15⅝ 7 1/16	33	379.00	
(88)	MC-275	-	75	< 0.5	-	< 0.5	-	10-100k ±3	10-100k +0,-1	> 90	-	-	-	-	-	-	12¼ 17¼ 8	67½	444.00	Output Z: 4, 8, 16, 600, stereo; 2, 4, 8, 16, 32, 62, 300 mono 25-V, 140-V; 70.7-V.
	MC-240	-	40	< 0.5	-	< 0.5	-	10-100k ±3	10-100k +0,-1	> 90	-	-	-	-	-	-	10¾ 17¼ 8	56	288.00	Same as MC-275.
	MA-5100	-	45	< 0.25	-	< 0.25	-	12-80k ±3	-	> 75	2	-	2	0.2	4,8, 16	-	16 13 5 7/16	25	449.00	Integrated amp/preamp.

Marantz components are too good for most people.



Are you one of the exceptions? For the most astonishing set of specifications you've ever read, write "Exceptions," Marantz, Inc., 37-04 57th St., Woodside, New York 11377, Department A-17.

marantz
A SUBSIDIARY OF SUPERSCOPE, INC.

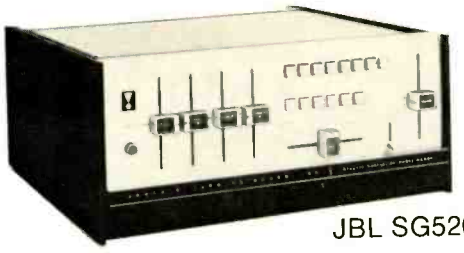
The Marantz components illustrated, top to bottom: SLT-12 Straight-Line Tracking Playback System • Model 15 solid-state 120-watt Stereo Power Amplifier • Model 7T solid-state Stereo Pre-amplifier Console • Model 10B Stereo FM Tuner

Check No. 116 on Reader Service Card

PREAMPLIFIERS

Marantz 7T

Dyna PAS-3X



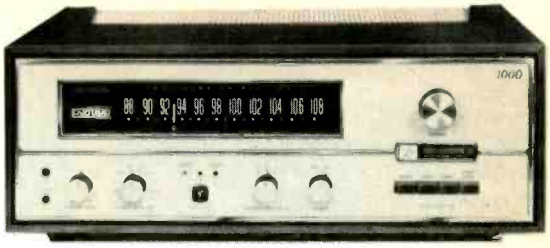
JBL SG520

McIntosh C22

MANUFACTURER (Circled number indicates ad page)	Model	Freq. Resp, Hz. dB	Rated output, ms V.	Rated Output THD, %	Rated Output IM, %	Rated Output S/n. dB Below 10 mV phono: h.l.	Phono Sens, mV.	Phono Overload, mV.	Tape Sens, mV.	High Level Sens, V.	Tape Mon. Imp, ohms	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
ACOUSTECH	VI	2–1M ±3	2	0.1	0.1	80	3.0	110	1.8	0.4	1000	15 8 5	15	249.00	Factory-wired. stepped tone controls. Output for Acoustech X electrostatic system.
	IV	2-400k ±3	2	0.1	0.1	75	3.0	90	-	0.4	1000	15 8 5	14	149.00	Kit.
C-M	CC-1	2-100k +0, -3	2 8 max.	0.1	0.1	80	1.5 5	150	2	0.2	-	15¾ 12 5½	17	315.00	Mixing ability; step tone conts; sep. loudness cont; blend cont; ctr-chan. output.
	CC-2	1-100k +0, -3	2 10 max.	<0.25 at 10V. & 0.1	<0.25 at 10V. & 0.1	80	3-8 var.	90-250 var.	-	0.1	-	12½ 4 9	10	225.00	Performance same as above; simplified control functions.
DYNACO	PAS-3X	10-40k ±0.5	2	<.05	.05	74	2	200	1.5	0.2	Source ph, 1000	13 8 4	11	109.95 69.95K	Assmbld; matches Dynatuner; blend con 7 kHz hi filter
(27)	PAT-4	5-100k ±0.5	2	.03	.06	72 91	4	80-400	2.0	0.2	Source ph, 1000	13 8 4	10	129.95 89.95K	Assmbld; front panel guitar and tape jks 600-Ω phone jk. 4-pos. scratch filter; rumble filter; s/s.
(85)	PAM-1	10-40k ±0.5	2	<.05	.05	70	4	200-1.0 V.	-	0.2	Source ph, 1000	12 6 3	7	59.95 34.95K	Assmbld; reqs. ext. pwr. supply; mono. pre-amp; 3 eq. pos; d.c. htrs.
	PAS-2X	10-40k ±0.5	2	<.05	.05	74	2	200	1.5	0.2	Source ph, 1000	13 8 4	11	99.95 59.95K	Assmbld; different panel and knobs.
JBL (61)	SG520	20-20k ±0.25	3	*	*	90	2.0 **	110	1.0 **	0.15 **	40k	15½ 13 6½	20 Shp	450.00	Aural-null bal. sys; linear conts; illum. p.b. switches; sec'dry. conts behind hinged front panel. *too low to specify accurately; **for 1.5-V. output.
LEAK	Varislope 2 Stereo	20-20k ±0.5	0.125	0.1	-	60	3.5	-	3	-	-	10½ 6½ 3¾	6½	129.50	Takes all power required from any Leak ampl.
MARANTZ (29)	7T	20-20k ±0.25	10	.05	0.15	103	7	100	7	0.8	470	15⅜ 8 5¾	11	325.00	Hi and Lo-cut filters, two freq. each. Three phono eq. settings; recorder, headphones, front-panel jacks.
MC INTOSH (88)	C22	20-20k ±0.5	3V	<0.1	-	-	2.0	-	2.0	0.2	-	16 5 7/16 11	17	279.00	
	C24	20-20k +0.0 -0.5	3V	<0.1	-	-	2.0	-	2.0	0.2	-	16 5 7/16 11	16	249.00	

TUNERS

Dyna FM-3



Fisher TFM-1000

MANUFACTURER (circled number indicates ad page)	Model	IHF Sens, μV.	Usable Sens, μV.	THD, 100% Mod, %	Capture Ratio, dB	Drift, kHz	Alt. Chan. Sel., dB	Freq. Response, Hz ± dB	AFC ?	AM Suppression, dB	Stereo Sep. 1 kHz, dB	Stereo Sep. 10 kHz, dB	Stereo THD, %	Tuning Indicator	Stereo Indicator	Auto Switching ?	Dimensions – In. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
OUSTECH	VIII	2	-	0.5	2	10	55	30-15k ±1	No	-	35	20	1.0	meter	light	Yes	15 10 5	14	349.00	Includes stereo headphone amp., see-thru panel, interstation muting.
	VIIIk	2	-	0.5	2	10	55	30-15k ±1	No	-	35	20	1.0	meter	light	Yes	15 10 5	14	249.00	Kit of above. AM module and headphone ampl. module can be added later.
GEN	TT 100	2.7	2.0	0.75	3	20	45	50-15k ±1	No	50	35	20	1.0	meter	light	Yes	15 11¾ 3¾	8	149.95	AM/FM-Stereo; All-silicon S/S. modular circuitry, opt. wood cab.
NACO (27) (85)	FM-3	4	∞	0.5	5	30	54	10-15k ±0.5	No	63	30	17	1.0	Eye	Eye	Yes	13 8 4	13	154.95 99.95 K	Assmbld. front-panel volume control and stereo defeat switch.
	FM-1	4	∞	0.5	5	30	54	10-40k ±0.5	No	63	-	-	-	Eye	-	-	13 8 4	12	109.95 74.95 K	Assmbld. mono tuner.
O	CORTINA 3200	2.4	1.7	0.5	4.5	12k	45	20-15k ±1	Yes	40	40	30	0.75	meter	light	Yes	12 7¾ 3⅛	7	129.95 89.95 K	Assmbld. Mcl. vinyl-clad metal cab; pre-wired r.f., i.f., mpx sects. Matches cortina 3070 ampl.
ECTRO-DICE (over 4) (1)	E-V1155	2	-	1.0	2.5	<20	60	30-15k ±1	Yes	40	30	-	1.0	meter	light	Yes	8⅜ 10¼ 3⅜	6	160.00	S/S station markers for favorite stations; zero-center tuning meter; incl. case with walnut finish panels. matches E-V1144 amplifier.
	E-V1156	2	-	1.0	2.5	<20	60	30-15k ±1	Yes	40	30	-	1.0	meter	light	Yes	8⅜ 10¼ 3⅜	6½	195.00	Same as E-V1155 but with AM section added. AM sens. 250 μV/-meter for 15db S/N. matches E-V1144 amplifier.
	E-V1159	3	-	2.5	2.5	<20	50	30-15k ±1	Yes	40	22	-	2.5	meter	light	Yes	15¾ 8½ 4¼	8	94.00	Matches E-V1122 amplifier. Includes walnut case with die-cast end panels.
HER (39)	TFM1000	1.8	below noise	0.2	0.6	10	70	20-15 kc	No	60	>40	35	1.5	meter	1 amp	Yes	16¾ 12⅜ 5⅛	18	499.50	FET front end, 5 i.f. stages, 4 limiters and counter detector de-modulator; clear-signal indicator, overload suppressor, muting indicator. Bal. 600-ohm outputs. Calibrated step atten.
	R-200-B	1.8	below noise	0.4	2.5	10	50	20-15 kc	No	50	35	30	1.5	meter	1 amp	Yes	15⅛ 11⅞ 4 13/16	18.5	349.50	5-band AM/FM stereo tuner with long, medium, and short wave bands. 3 pos. muting control; AM bandwidth control.
THAM (13)	SE-200	1.3	-	-	-	-	60	30-15k ±1	No	50	40	27	0.6	meter	light and meter	Yes	19 12 8¾	30	1200.00	Prof. BC monitor; all s/s; coax ant. inp; 600-ohm audio output, 22 dbm; rack mtg; conts: tuning, audio gain L & R; noise supp; pilot filter; sens; headphone jack output.
IMMES	C107B	2	-	0.3	3	10	45	20-20k ±.5	No	50	35	25	0.3	meter	lamp	Yes	13½ 4¾ 11	-	199.95	Cascade FET r.f. all silicon S/S. Incldes. AM.
TH (7)	AJ-430	2	-	1.0 1	3	-	-	20-20k ±3	Yes	40	35	30	1.0	2 meters	lamp	Yes	15¾ 14¾ 5½	15	109.00	All s/s; incls. AM; filtered outputs for dir. rcdg; stereo phase control for max sep., min. dist; agc flywheel tuning; opt. wal. cab., 12.95, metal, 6.95.
	AJ-33A	3	-	1.0 1	4	-	-	20-20k ±3	Yes	35	30	25	1.0	meter	lamp	No	15⅝ 11½ 3¾	12	94.50	As above, plus regulated pwr. supply; adj. squelch cont. Incls. wal. cab., with gold anodized front panel.
	AJ-14	5	-	1.0 1	3	-	-	20-15k ±3	Yes	40	30	-	-	-	lamp	No	12½ 9⅝ 3½	5	49.95	FM only, all s/s. Assembles in 4-6 hrs; 4 i.f.'s, stereo phase cont; flt. rcdr. outputs; preassmbld. and aligned front end; opt. cabs: wal., 7.95; mtl., 3.50.

TUNERS

Sherwood S-2300

McIntosh MR 71

Marantz 10B

MANUFACTURER (Circled number indicates ad page)	Model	IHF Sens, μV.	Vol. Sens, μV.	THD, 100% Mod, %	Capture Ratio, dB	Drift, kHz	Alt. Chan. Sel., dB	Freq. Response, Hz ± dB	AFC ?	AM Suppression, dB	Stereo Sep. 1 kHz, dB	Stereo Sep. 10 kHz, dB	Stereo THD, %	Tuning Indicator	Stereo Indicator	Auto Switching ?	Dimensions – in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
KLH	18	2.2	-	0.5	4	10	35	20-15k ±1	No	50	35	20	0.8	meter	light	Yes	9 5⅜ 4¼	5	116.95	All s/s, FET front end mono-stere switch; MX-noise filter; two sets o outputs, both can be used at once;
KNIGHT	KG-790	2.5	3.5	0.75	2	-	-	50-15k ±2	Yes	50	>40	-	0.75	meter	light	Yes	16¾ 15 5	20	149.95	
	KG-765A	2.5	-	Less Than <1.0	9	-	30	20-20k ±1	Yes	30	30	20	<1.0	meter	light	Yes	13 11 2¾	13	99.95	
(35)	KG-795	3	1.0	1.0	3	20	45	30-15k ±1	Yes	30	30	15	1.5	meter	light	Yes	13 10 3 5/16	7	69.95	All silicon transistors. 2 t.r.f. stages.
	KN265B	3	3.0	0.5	3	25	45	20-25k ±.5	Yes	48	30	25	0.5	meter	light	Yes	13 7/8 4½ 12	14	149.95	S/S
LAFAYETTE	LT-425	1.5	1.2	0.4	1.5	15	50	50-15k ±1	No	50	40	24	0.7	2 meters	light	Yes	13 9 3⅞	9.5	99.95	AM/FM, all s/s; 2 FET's in front end; 3-gang tuning cap; 4 IC's; built-in FM and AM antennas; front and rear tape output.
LEAK	Trough Line 3	2.0	1.0	1.0	-	3	-	20-20k ±1	Yes	45	-	-	-	EM84	-	-	11½ 8¼ 4¼	13	159.00	FM Mono.
	Trough Line Stereo	2.5	1.5	1.0	-	3	-	20-20k ±3	Yes	45	26	20	1.5	EM84	No	No	11½ 8¼ 4¼	13½	199.00	FM Stereo.
MARANTZ (29)	10B	2	0.8	0.2	1.75	10	150	20-15k ±0.5	No	70	48	33	0.2	CRT	light	Yes	15⅜ 15 5¼	38	750.00	Balanced solid-state 1st detector 6 i.f. stages, coupled by passive filters. CRT display shows tuni multipath, phasing.
MC INTOSH	MR67	2.5	-	<0.5	1.7	<25	>60	20-20k ±0.5	No	-	>30	-	<0.5	meter *	light	No	16 13 5 1/16	24½	299.00	* for ctr. chan. tuning; eye sig. strength and multipath incl.
(88)	MR71	2.5	-	<0.5	1.5	-	>80	20-20k ±0.5	Yes	-	>30	-	<0.5	meters *	light	Yes	16 13 5 1/16	27	399.00	* 2 meters – ctr. chan. and sig. strength; tube multipath ind.
	MX110	2.5	-	<0.5	1.7	-	-	20-20k ±0.5	No	-	>30	-	<0.5	eye	light	No	16 13 5 1/16	27½	399.00	FM tuner, phono and cont. pream
SHERWOOD	S-3300	1.8	-	0.75	2.2	±10	50	20-15k ±½	No	56	35	24	0.25	meter	light	Yes	14 10½ 4	10	167.50	All silicon s/s; zero-ctr. tng. mt high-blend stereo noise filter.
	S-2300-FET	1.8	-	0.25	2.2	±10	50	20-15k ±½	No	56	35	24	0.15	meter	light	Yes	14 10½ 4	13	209.50	All silicon s/s; FET's in r.f. an mixer stages; cross mod. rejecti 95 db; zero-ctr. tng. meter; in-cludes AM, sens, 2 μV.
(16)	S-3500	1.8	-	0.25	2.2	±10	50	20-20k ±½	Yes	56	-	-	-	meter	-	-	14 10½ 4	9	129.50	All silicon s/s; AFC follows portable wireless microphones; meter switchable to indicate zer center tuning or signal strength; mono.
	S-2000IV	1.8	-	0.25	2.4	±10	50	20-20k ±½	No	55	-	-	-	meter	-	-	10 10½ 4	15	162.50	Vacuum-tube type, mono; incls. AM, sens. 2 μV; wide/narrow band selection on AM.
SONY (33) (77)	ST-5000W	2.5	-	0.3	1.5	20	60	20-15k ±0.5	Yes	50	40	30	0.3	meter	light	Yes	15⅜ 12¼ 5¾	18	399.50	Bandpass r.f. atten. to prevent cross mod.; zero-cent. tun. mtr; linear slide-rule dial; 75- or 300 ohm antenna.
WOLLENSAK (3M CO.)	5810	10	-	-	-	-	-	40-12k Stereo	-	30	>25	-	-	eye	light	-	-	-	169.95	Matches 5800 Recorder includes AM sect.

Check No. 117 on Reader Service Card →

Chances are that many of your favorite FM stations are not the ones closest to where you live. Their signals are a bit weaker and subject to blanketing by stronger signals from a nearby station. Thus, all the advantages of a high-priced, highly sensitive tuner can go down the drain if performance on weak stations is marred by interference from strong local signals.

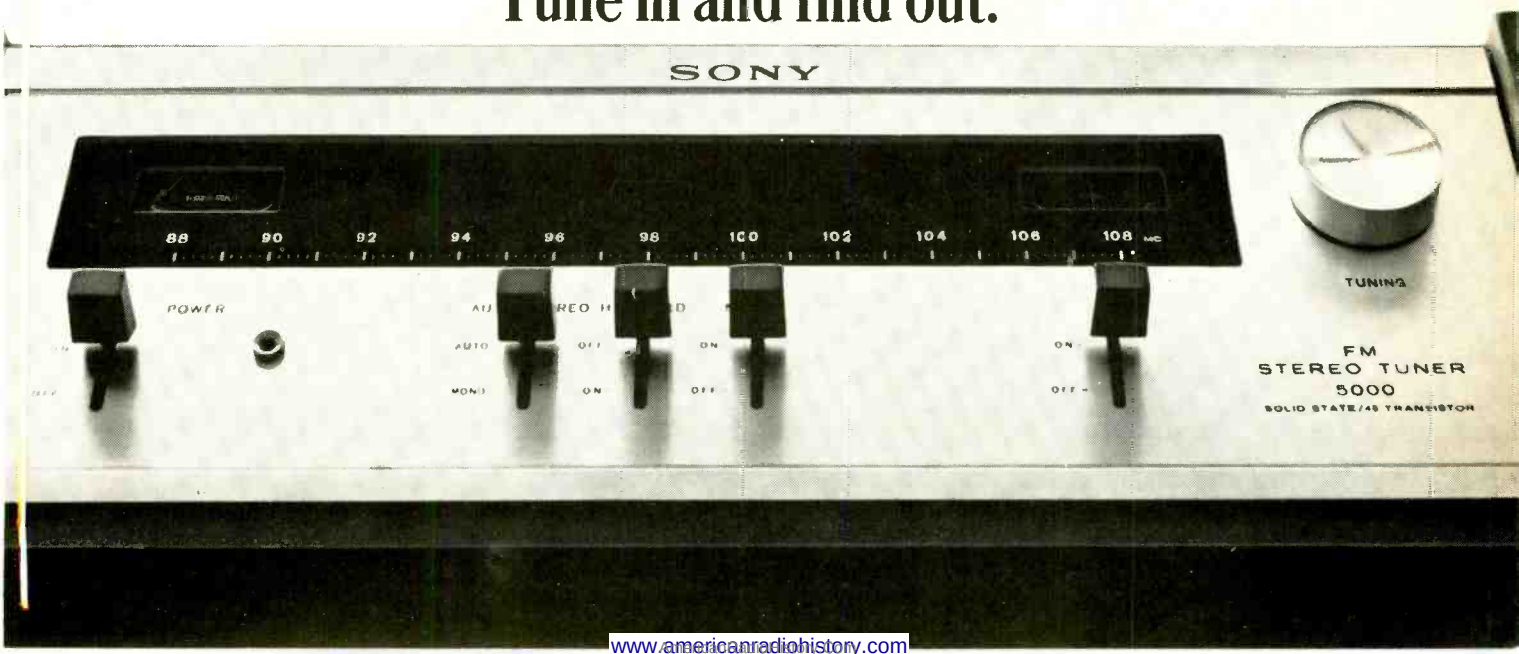
The new Sony FM stereo tuner is highly sensitive (2 microvolts) so that it can pull in the weakest stations. For all its sensitivity, the ST-5000W is unusually insensitive to cross-modulation. An ingenious new cadmium-sulfide (CdS) bandpass RF attenuator prevents cross-modulation caused by weak stations being blanketed by strong signals. This automatic and continuously variable attenuator reacts appropriately to the strength of the signal coming down the antenna lead and simultaneously refuses to pass any signal outside the FM band.

There's so much to recommend the ST-5000W. 45 transistors and 30 diodes are employed—Sony transistors. Double-tuning IF transformers at all 8 stages of the IF section reject spurious signals and noise. A 5-gang, high-precision, silver-plated tuning capacitor contributes to excellent selectivity and accurate tuning. The slide-rule dial, probably the longest and most accurate used in any tuner, is absolutely linear. When you dial 96.3, you're on 96.3. And the center of any channel can be pinpointed visually with the tuning meter. Another meter helps adjust the antenna for maximum signal pick-up. A stereo switch automatically selects the correct mode—stereo or mono. There's also a foolproof stereo indicator light. An adjustable CdS muting switch supresses interstation noise, but not weak stations. A hi-blend switch assures good stereo reception, even on stations with weak, noisy signals. An AFC circuit can be switched in under extreme operating conditions.

Hear why the sensitive Sony ST-5000W is so insensitive. Tune it in at your favorite dealer. The supreme pleasure of owning this fine instrument is well worth $399.50. (Suggested list.) For details write: Sony Corporation of America, Dept. H., 47-47 Van Dam Street, Long Island City, N.Y. 11101.

SONY®

How can such a sensitive FM stereo tuner be so insensitive? Tune in and find out.



RECEIVERS

ADC-606

Acoustech XV

MANUFACTURER (Circled number indicates ad page)	Model	IHF Power per Chan, W.	THD Full Power, %	IM Full Power, %	IM 1 Watt, %	Power Bandwidth, Hz, ±dB	1 Watt Freq. Resp, Hz.	S/N Below Rated Pwr. dB	Phono Sens, mV.	Phono Overload, mV.	FM/IHF Usable Sens, μV.	THD at 100% Mod., %	Capture Ratio, dB	Stereo Sep. at 1 kHz, dB	Tuning Indicator	Auto Switching ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
ADC	600	30	22	0.8	0.4	20-20k	10-60k 2	78	3	80	2	0.8	3	35	meter	Yes	14 1/4 8 1/2 5	16	219.95	Accommodates 2 sets of speakers, used together or independently.
	800	40	28	0.6	0.3	10-20k	10-60k 1	78	3	90	2	0.8	3	35	meter	Yes	14 1/4 8 1/2 5	16	249.95	Accommodates 2 sets of speakers, used together or independently.
	606	45	32	0.4	0.2	10-25k	10-60k 1	78	3	90	1-6	0.5	3	35	meter	Yes	17 9 5	15	279.95	Accommodates 2 sets of speakers, used together or independently.
ACOUSTECH	XV	110*	0.45	0.45	0.1	20-20k	4-100k ±3	80	3	150	2	0.5	2	35	meter	Yes	16 3/4 14 6	40	675.00	AM-FM. Controls behind flip lid, tuneamatic dial. Incls. wood sides. *4 ohm
ALLIED RADIO (35)	399	61	0.5	0.7	-	15-40k	18-60k ±1	65	2.5	-	1.5	0.5	2.2	35	meter	Yes	16 12 5	30	299.95	S/s; incls. metal case incl
	365	32 1/2	1.0	1.0	-	15-30k	20-50k ±1	65	3.0	-	2	0.6	2.5	35	meter	Yes	16 12 5	28	229.95	S/S, incls. metal case.
	355	22 1/2	1.0	2.0	-	-	20-30k +1	-	2.5	-	3	0.8	2.7	35	meter	Yes	16 12 1/2 5	27	179.95	S/S; incls. metal case.
	333	16	1.0	2.0	-	-	20-30k ±2	-	2.5	-	3	1.0	-	30	eye	No	15 3/16 13 9/16 5 3/8	28	149.95	S/S; incls. metal case.
ALTEC	711B	50	0.5	0.9	0.6	15-25k	15-30k ±1	88	2	25	1.9	0.3	1.5	35	meter	Yes	5 3/8 16 3/8 12	19	399.50	FET front end, newly designed i.f. strip W/IC's. All silicon s/s. Center channel output; main-remote spkr. switches.
BOGEN	TR100X	30	1.0	1.0	0.75	20-20k	20-20k 1	70	3.5	50	2.7	0.75	3	35	meter	Yes	16 11 3/4 4 1/2	17	249.95	Incl. AM. All-silicon s/s Spkr. switching (local, remote, both, phones) Opt. wood cab.
	TF100	30	1.0	1.0	0.75	20-20k	20-20k 1	70	3.5	50	2.7	0.75	3	35	meter	Yes	16 11 3/4 4 1/2	16	234.95	All-silicon s/s; spkr. switching (as above) opt. wood cab.
	RT8000	35	1.0	1.0	1.0	20-20k 3	20-50k 1	70	3.0	50	2.3	0.75	3	25	meter	Yes	16 14 4 1/2	20	319.95	Incls. AM; S/S; Tape Mon Switch, spkr. switching (a above) opt. wood cab.
	RT7000	32.5	1.0	1.0	1.0	20-20k 3	15-40k 1	70	3.0	50	2.5	0.75	3	25	meter	Yes	16 14 4 1/2	19	279.95	S/S; Tape Mon. Switch, o wood cab.
EICO	CORTINA 3570	70 *	0.75	2.0	0.6	10-40k 2.5	10-50k 0.5	60	4.2	90	2.4	0.5	4.5	40	meter	Yes	16 9 4 1/16	14	239.95 Asmbld. 159.95 Kit	S/s; kit incls. wired & ali r.f., i.f., MPX circuits; vinyl-clad cabinet. * at 4 ohms.

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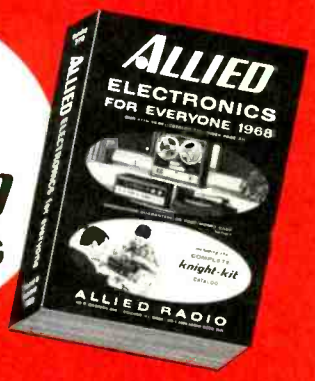

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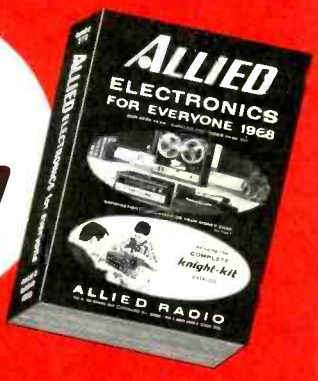

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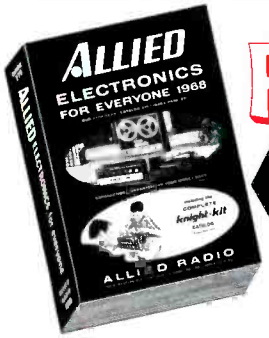

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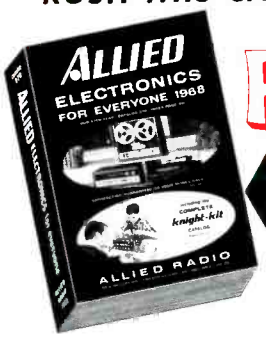

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As the world's largest supplier of electronics, Allied can afford to stock thousands of items not available elsewhere. In addition, many products are specially-designed and built to our specifications.

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Among all electronics supply houses, only Allied has a continuous program of quality-testing to assure you that everything you buy meets the highest standards.

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Shopping's easy at Allied. More accurate, too! You always know *exactly* what you get. And *what a choice!* A selection of merchandise so vast that no store could ever assemble and stock it all.

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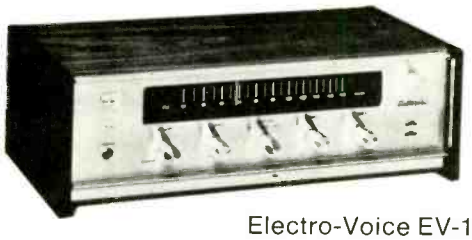
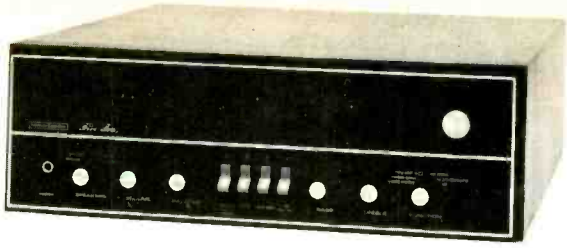
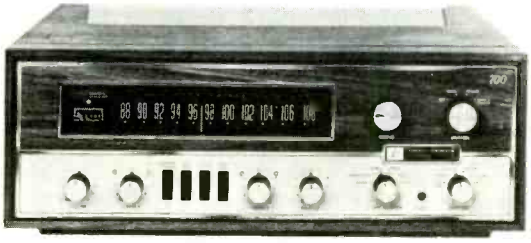


Electro-Voice EV-1180



Harman-Kardon "Five Ten"



Fisher 700-T

Altec 711B

MANUFACTURER (circled number indicates ad page)	Model	IHF Power Per Chan, W.	THD Full Power, %	IM Full Power, %	IM 1 Watt, %	Power Bandwidth, Hz, ± dB	1 Watt Freq. Resp., Hz.	S/N Below Rated Pwr. dB	Phono Sens., mV.	Phono Overload, mV.	FM/HF Usable Sens., μV.	THD at 100% Mod., %	Capture Ratio, dB	Stereo Sep. at 1 kHz, dB	Tuning Indicator	Auto Switching ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
ELECTRO-VOICE (Cover 4) (1)	E-V1177	32.5	1.0	-	-	-	20-30k 1.5	70	3	50	2	1.0	2.5	30	meter	Yes	15⅞ 10¼ 3⅜	15	280.00	All S/S. Color light bars indicate input; connections concealed; headphone jack, tape mon. switch spkr. mute switch. Incls. walnut case.
	E-V1178	32.5	1.0	-	-	-	20-30k 1.5	70	3	50	2	1.0	2.5	30	meter	Yes	15⅞ 10¼ 3⅜	15½	315.00	As above with AM-250 μV/meter for 15 dB S/N.
	E-V1179	27.5	1.3	-	-	-	20-30k 1.5	68	4	60	3	2.5	2.5	25	meter	Yes	9½ 10 4⅛	14	210.00	S/s; incls. walnut case, color-coded input lights.
	E-V1180	15	1.5	-	-	-	20-20k 1.5	65	4	60	3	2.5	2.5	22	meter	Yes	15¾ 8½ 5	14	176.00	Incls. walnut case w/die-cast end panels.
FISHER (39)	200T	35	0.8	1.0	0.2	22-30k +0, -2	25-20k 2	80	3.5 11	40	2	0.4	2.5	>35	meter	Yes	15⅛ 13⅝ 4 13/16	22	299.95	FM, FET front end; IC i.f. ampl; sws. for tape mon, muting, contour; 3-pos. spkr. sw.; dual tone conts; spkr. ovld. protect.
	220T	27.5	0.8	1.0	0.2	28-30k +0, -2	30-20k ±1	80	3.6 9.5	40	2.5	<0.5	2.5	35	meter	Yes	15⅛ 13⅝ 4 13/16	17.5	329.50	AM/FM; FET front end; sws and conts as above; hi filter; spkr ovld. protect.
	550T	45	0.8	0.8	0.2	20-24k +0, -2	22-30k 1	85	2.5 9.0	40	1.8	0.5	2.0	>35	meter	Yes	16¾ 12¾ 5⅛	29	449.95	AM/FM; same features as 200T, plus lo and hi filters; center-chan. output.
	700T	60	0.8	0.8	0.2	20-24k +0, -2	20-25k 1	80	3.5 10	40	1.8	0.5	2.0	40	meter	Yes	16¾ 12¾ 5⅛	24	499.50	FM only; same features as 220T, plus center- channel output, lo and hi filters.
SOMMES	C503	30	0.5	0.5	0.1	20-20k	15-50k 1	75	3	60	2	0.3	3	35	meter	Yes	16 12 4¾	-	349.95	Cascode FET. Rf; all silicon s/s; Incls. AM; ovld/short-circ. protect.
HARMAN-KARDON	200	25	0.4	0.5	0.1	10-23k	8-25k	90	-	-	2.7	0.6	-	30	meter	Yes	14¾ 13¼ 4½	20	239.50	2 sets spkr. switching. MOSFET Front end; Headphone jack.
	210	25	0.4	0.5	0.1	10-23k	8-25k	90	-	-	2.7	0.6	-	30	meter	Yes	14¾ 13¼ 4½	20	269.50	Same as above plus AM section, sensitivity 50μV/meter.
	720	40	0.3	0.4	.08	8-40k	5-60k	90	-	-	1.8	0.5	-	35	meter	Yes	16¼ 11¾ 5	26	369.50	Optional walnut enclosure, $29.95.
	520	70	0.3	0.3	.08	8-40k	5-60k	90	-	-	1.95	0.5	-	35	meter	Yes	15 9/16 12½ 4⅝	21	315.00	W/AM, model 530, $349.00.

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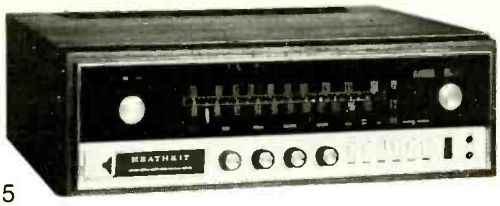
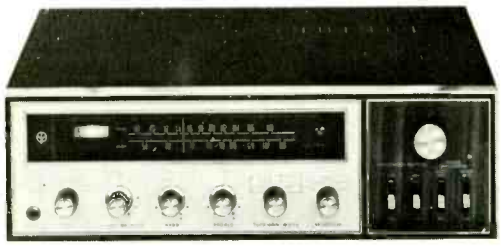
RECEIVERS



Heathkit AR-15

Knight KG-964

Lafayette LR-1000T



Kenwood TK-88

MANUFACTURER (Circled number indicates ad page)	Model	IHF Power Per Chan, W.	THD Full Power, %	IM Full Power, %	IM 1 Watt, %	Power Bandwidth, Hz, ±dB	1 Watt Freq. Resp. Hz.	S/N Below Rated Pwr. dB	Phono Sens, mV.	Phono Overload, mV.	FM/HF Usable Sens., μV.	THD at 100% Mod., %	Capture Ratio, dB	Stereo Sep. at 1 kHz, dB	Tuning Indicator	Auto Switching ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
HEATH	AR-15	75	0.2	0.5	0.2	6-25k	6-50k 1	60	2.2	155	1.8	0.5	1.5	40	meter	Yes	16⅞ 14½ 4¾	28	329.95 Kit	FM/AM; FET front end; 2 IC's 2 crystal filters in i.f., all silicon s/s; ckt. protect squelch; opt. wal. cab. $19
(7)	AR-13A	33	0.3	1.0	1.0	15-30k	15-30k 1	50	6	-	2.0	1.0	3	30	meter	Yes	17 14¾ 5½	24	184.00 Kit	AM/FM; flt. outputs for rcdr; loc.-dist. sw; seconda contls. under hinged panel; incls. wal. fin. cabinet.
	AR-14	15	0.5	1.0	1.0	15-50k	12-60k 1	50	4	-	5.0	1.0	3	30	-	No	15¼ 12 3⅞	14	99.95 Kit	Filt. outputs, OTL output ckts; front-panel headphon jacks; 20-hr. assbly. Opt. met. cab. $3.95; Walnut, $9
KENWOOD	TK-40	30	0.8	1	0.3	20-20k -3	20-50k 2	70	2	100	2.5	0.6	2.5	38	meter	Yes	16⅛ 12 5	19.8	189.95	Available as model TKS-40 w/two S-40 spkr. systems $249.95.
	TK-66	60	0.8	1	0.3	20-20k 3	20-50k 2	70	2	100	2	0.6	2.5	38	meter	Yes	16½ 12 5	23	239.95	
(11)	TK-88	90	0.8	1	0.3	20-20k 3	20-50k 2	70	2	100	2	0.6	2.5	38	meter	Yes	16½ 12¼ 5	24	289.95	
	TK-140	130	0.8	1	0.3	20-20k 3	20-50k 2	70	2	100	2	0.6	2.5	38	meter	Yes	16⅛ 5 14	31	339.95	
KNIGHT	KG964	32	<1.0	<1.5	-	20-20k 1	20-50k 1	65	3.0	-	2.5	<1.0	8	35	meter	Yes	16¾ 15 5	26	189.95	S/S. W/AM; SCA Filter.
(35)	KG980	25	1	1	0.7	20-20k	15-50k	65	5	45	3	1.0	3	30	meter	Yes	15½ 13½ 4⅛	18	149.95	All-Silicon S/s. two tuned r.f. stages compl. sym. output.
LAFAYETTE	LR-1500T	75	0.8	0.8	0.3	12-40k 3	20-20k 0.5	68	1.8 4.5 12	30 75 200	1.5	0.3	1.25	40	meter	Yes	16¾ 14¼ 4⅝	32	279.95	All S/S. 4 IC's; 2 front-en FET'S main-remote spkr. oper. front-rear panel tape output, Var. interst. mutir
	LR-1000T	60	0.8	0.8	0.3	20-40k 3	20-20k 1.0	68	1.8 7	30 120	1.65	0.4	1.5	38	meter	Yes	15⅞ 11⅜ 4⅜	29	219.95	All S/S. 4 IC'S; 2 front-en FET's interst. muting; ta mon. main-remote spkr. op
	LR-500T	30	0.8	0.8	0.3	25-40k 3	22-20k 1.0	67	2.3	40	1.8	0.3	1.25	35	meter	Yes	15¼ 10⅝ 4⅜	15	179.95	All S/S 4 IC'S; 2 front-en FET'S. Main-remote spkr switch; tuning/signal strength meter.
	LR-99	15	1.0	-	-	40-17k 3	20-20k 2	55	3 80	-	3	0.5	3.5	32	-	-	13 13/16 10 4 7/16	-	119.95	
MARANTZ (29)	18	35	0.1	Below residual		8-40k	20-20k 0.5	80 (1 μV eq.)	0.75	80	2.5	0.15	-	45	meter	Yes	18¼ 16 6	40	595.00	Scope for multipath indic Front panel jacks for recorder, phones. Alt. ch select. 80 d.B.

This ad is supposed to give you a reason for listening to the Fisher 700-T solid state receiver.

We decided to give you several:

Amplifier section:

Music power (IHF)	
4 ohms	120 watts
8 ohms	90 watts
Harmonic distortion (1 kHz)	
At rated output	0.8%
3 db below rated output	0.3%
IM distortion (60:7000/4:1)	
At rated output	0.8%
3 db below rated output	0.3%
Frequency response 10-70,000 Hz	+0, −1 db
Hum and noise	
Volume control (min.)	−80 db
Phono input (6 mV ref.)	−55 db
Aux. input (400 mV ref.)	−65 db
Input sensitivities (at 1 kHz, for rated power at 4 ohms)	
Phono (low)	3.5 mV
Phono (high)	10 mV
Tape Head	2.5 mV
Auxiliary (low)	200 mV
(high)	400 mV

Tuner section:

Usable sensitivity (IHF)	1.8μV
Harmonic distortion (100% mod. and 400 Hz)	0.4%
Stereo separation (400 Hz)	40 db
Signal-to-noise ratio (100% mod.)	70 db
Selectivity (alternate channel)	50 db
Capture ratio (at 1 mV)	2.0 db
Spurious response rejection (100 M Hz)	90 db

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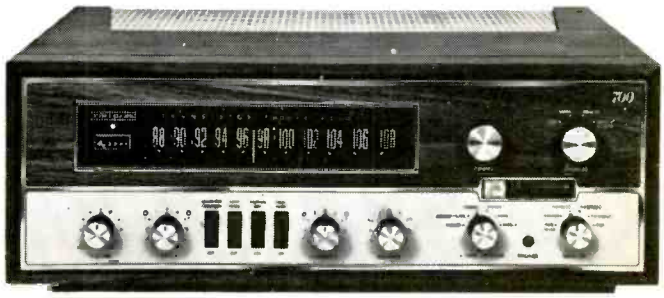

The Fisher

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RECEIVERS

Sansui TR700

Pioneer SX-1000TA

Sherwood S-8600

MANUFACTURER (Circled number indicates ad page)	Model	IHF Power Per Chan., W.	THD Full Power, %	IM Full Power, %	IM 1 Watt, %	Power Bandwidth, Hz, -dB	1 Watt Freq. Resp., Hz.	S/N Below Rated Pwr., dB	Phono Sens., mV.	Phono Overload, mV.	FM/HF Usable Sens., μV.	THD at 100% Mod., %	Capture Ratio, dB	Stereo Sep. at 1 kHz, dB	Tuning Indicator	Auto Switching ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
MARTEL	220	20	0.5	-	-	-	40-20k +3	70	6	-	2	<0.7	-	>30	meter	Yes	16 9½ 5¼	13	170.00	AM sens., 20 μV.
	600	50	<0.5	-	-	-	10-25k ±0.5	70	2	-	2	<0.5	-	>35	meter	Yes	16¼ 11½ 4¾	15	299.00	AM sens., 10 μV.
	800	75	<0.5	-	-	-	10-25k ±0.5	70	2.5	-	2	<0.5	-	>35	meter	Yes	17 12 5¼	17	349.50	AM sens., 10 μV.
	Martel dorado	50	1.0	-	-	-	18-20k ±1.5	-	2	-	2.5	0.5	-	>30	2 meters	Yes	17 13¾ 8	19	329.50	AM sens., 28 μV. PB switching.
MC INTOSH (88)	MAC 1700	40	<0.25 *	<0.25 *	-	10-80k +0, -3	-	75 **	2.4	-	2.5	<0.5	2.0	>30	meter	Yes	16 14½ 5½	34	599.00	* when peak pwr. does not exceed twice pwr. rating for any comb. of freqs. from 30-20 kHz ** high-level inputs.
PIONEER (86)	SX-1000 TA	60	0.5	0.5	0.3	15-40k	20-60k	70	2.5	70	1.8	1.0	3.0	38	meter	Yes	16 13 13/16 5 7/16	25	360.00	Xsist. protect. ckt. incls. AM.
	SX-600 TA	30	1.0	0.5	0.3	15-30k	25-50k	75	3.0	7	2.2	1.0	3.0	35	meter	Yes	16 13 13/16 5 7/16	26	-	Incls. AM. Aux. Spkr. Sw.
	SX300T	20	1.0	1.0	0.5	30-15k	20-20k	70	2.6	70	3	1.0	3.5	35	meter	Yes	16 12⅞ 5 7/16	25	199.95	Incls. AM. Xsist. protect. ckt.
	SX800	45	1.0	1.0	0.3	35-25k	20-20k	70	3	70	2.2	1.0	3.0	30	meter	Yes	17½ 17 5/16 5⅞	40	270.00	Incls. AM Tube-type rcvr.
SANSUI (41)	3000	55	0.8	-	-	20-20k	20-20k 1.5	75	2.5	-	1.8	1.0	-	35	meter	Yes	18 5/16 15 6 4/5	34.4	379.95	Incls. AM. 53 transistors, 40 diodes.
	TR-700	30	1.0	-	-	30-20k	20-20k 1	75	3	-	1.8	1.0	-	35	meter	Yes	18 3/10 15 6 4/5	24.6	239.95	Interstation muting switch.
	TR-707A	25	1.0	-	-	32-25k	20-20k 1	70	2.4	-	2.5	1.0	-	35	meter	No	17 7/8 14 3/16 5⅛	33.1	259.95	Incls. AM.
	1000A	50	1.0	-	-	20-20k	10-80k 1	90	1.5	-	1.8	1.0	-	35	meter	No	17 7/8 14 3/16 5½	44.7	269.95	20 Transistors/diodes, 21 tubes
SHERWOOD (16)	S-7800-FET	70 *	0.6	1.0	0.10	12-30k	12-30k	70	1.5 6.2	22 100	1.8	0.25	2.2	35	meter	Yes	16½ 14 4½	27	409.50	All-silicon S/S. W/AM – 2 sens. FET'S IN RF & Mixe FM cross mod. reject., 95 c Main remote spkr. switch.
	S-8800	70 *	0.6	1.0	0.10	12-30k	12-30k	70	1.5 6.2	22 100	1.8	0.25	2.2	35	meter	Yes	10½ 14 4½	22	359.50	All-silicon S/S, main-remot spkr. switch.
	S-7600-FET	40 *	1.0	1.0	0.15	12-30k	12-30k	70	1.5 12	19 146	1.8	0.15	2.6	35	meter	Yes	16½ 12 4½	27	339.50	All-silicon S/S. W/AM, 2 μ Sensit. FET'S in RF & Mix FM Cross Mod. Reject. 9 Main remote spkr. switch.
	S-8600	40 *	1.0	1.0	0.15	12-30k	12-30k	70	1.6 15	19 183	1.8	0.25	2.6	35	meter	Yes	16½ 12 4½	21	289.50	All silicon S/S. Main-remo spkr. switch. * All power ratings at 4 ohi

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SANSUI MODEL TR-700: SOLID STATE FM MULT PLEX STEREO, MUSIC POWER: 60 WATTS ± 1 db /FM USABLE SENSITIVITY: 1.8 μV ± 3 db (IHF)—PRICE $239.95

Stereofidelity© by Sansui . . .

For all those features that make a Hi-Fi Stereo System truly great—sensitivity, beautiful never failing balance, crystal-clear selectivity, unmatched sound reproduction—the Sansui TR-700 offers you a new experience in stereo listening. Only Sansui ingenuity could bring you that new sound in sound engineering—*Stereofidelity*©

Ask your audio dealer for a demonstration.

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Sansui Electric Company, Ltd. Tokyo, Japan • Electronic Distributors (Canada), British Columbia

MODULAR SYSTEMS

MANUFACTURER (Circled number indicates ad page)	Model	AMPLIFIER: IHF Power per chan., W.	AMPLIFIER: THD Full Pwr., %	AMPLIFIER: IM Full Pwr., %	AMPLIFIER: IM 1 Watt, %	AMPLIFIER: Power Bandwidth, Hz	AMPLIFIER: 1 Watt Freq. Resp., Hz-dB	AMPLIFIER: Rated Output S/N, dB	AMPLIFIER: IHF Usable Sens., μV	AMPLIFIER: THD, 100% Mod, %	TUNER: Freq. Response, Hz.	TUNER: Stereo Sep. at 1 kHz, dB	TUNER: Stereo THD, %	TUNER: Tuning Indicator	TUNER: Auto Switching?	TUNER: Changer Type	SPEAKERS: Woofer Size, in.	SPEAKERS: Woofer Type	SPEAKERS: Tweeter Size, in.	SPEAKERS: Tweeter Type	SPEAKERS: Enclosure Type	SPEAKERS: Enclosure Size – W x D x H, in.	System Wt., lbs.	Price	SPECIAL FEATURES
BENJAMIN (12)	1030	22	<1	-	-	-	15-25k 1 dB	75	3.5	-	-	30	-	Meter	Yes	Miracord 50 4-pole	el-lip.	High Compl.	3⅜	Armor Cone	Inf. Baffle	20½ 13⅛ 10	-	399.95	Incls. AM. Instr. & mike mixing. Sold w/EMI spkrs. Opt. play-record Philips tape cartr. w/slideout base.
	1050	22	<1	-	-	-	15-25k 1 dB	75	3	-	-	35	-	Meter	Yes	Miracord 620 4-pole	el-lip.	High Compl.	3⅜	Armor Cone	Inf. Baffle	23⅛ 11 5/16 10¾	-	499.95	Same as above, but incls. FET front end.
BOGEN	MSR-1	30	1	1	0.75	20-20k	20-20k 1 db	70	3.5	0.75	50-15k ±1 db	35	1	Meter	Yes	Garrard 4 Speed	10	High Compl.	3¼	Cone	Sealed Box	17¼ 17 9½	95	444.90	AM/FM-Stereo. All Silicon, S/S, Opt. Vinyl Cover.
	MSC-1	30	1	1	0.75	20-20k	20-20k 1 db	70	3.5	0.75	50-15k ±1 db	35	1	Meter	Yes	Garrard 4 Speed	10	High Compl.	3¼	Cone	Sealed Box	25¾ 17 10	100	521.95	Stereo 8-Track Tape Cartr. Player AM/FM-Stereo. All Silicon, Modular S/S, Opt. Vinyl Cover.
COMPASS	Triphonic 7	25	0.2 -3 dB	<2	<1	3-20k	10-20k	70	2.2	1	50-15k	40	1	Meter	Yes	None	8 < 100 Hz	10 14 4¾	14 3⅜ 7	(2) full-range 5	Spec.	rec'r 13¾ 9½ 4⅛	28	399.95	Sys. consists of rcvr. w/3 25 W. ampls, 2 full-range spkrs, 1 common-bass woofer. Recvr. cab. avail.
FISHER (39)	105	17.5	0.8	1.0	0.2	30-20k +0, -2 db	40-15k 1.5 db	-80	2.0	0.5	20-15k	>35	0.5	Meter	Yes	BSR μA70	-	-	-	-	-	-	25.5	329.95	FM, FET front end; IC i.f. ampl; 3-pos. speaker sw; Pickering cartridge.
	110	17.5	0.8	1.0	0.2	30-20k +0, −2db	40-15kc 1.5 db	-80	2.0	0.5	20-15k	>35	0.5	Meter	Yes	BSR μA70	-	-	-	-	-	-	25.5	349.95	As above, plus AM.
	50-B	15	0.5	0.8	0.3	30-20k +0, −2db	30-15kc 1.5db	-80	-	-	-	-	-	-	-	Garrard 50	6	Full Range Cone Free Piston			Sealed Box	13½ 4 8½	35	299.50	Portable stereo phono; aux inputs for tuner or tape recorder.
	150	17.5	1.0	1.0	0.3	30-20 k +0, −2dB	40-15kc 1.5 db	-80	2.5	0.8	20-15k	30	0.8	Meter	Yes	-	6	Free Piston	2½	Cone	Sealed Box	14⅛ 7¾ 6¾	30	299.50	FM stereo sys. with push-button speaker. Selector; Inputs for Phono and Tape Recorder.
HARMAN-KARDON	SC-430	25	<1	0.5	0.1	17-23k	20-23k 1	90	2.9	<1.0	-	30	-	Meter	Yes	Garrard AT60	8	Acoust. Susp.	3	Phenolic Cone	Sealed Box	16½ 18 11⅛	45	419.00	Changeable Grille cloth. AM sens., 50 μV.
	SC-440	25	<1	0.5	0.1	17-23k	20-23k 1	90	2.9	<1.0	-	30	-	Meter	Yes	Garrard AT 60	10	Acoust. Susp.	3	Phenolic Cone	Sealed Box	22⅞ 8 13⅜	50	449.00	As above.
	SC-6	25	<1	0.5	0.1	17-23k	20-23k 1	90	-	<1.0	-	30	-	Meter	Yes	BSR	-	Acoust. Susp.	-	-	-	-	30	339.00	BSR 4-spd. Empire. 808 w/diamond AM sens., 50 μV. Optional dust cover.
	SC-7	30	<1	0.5	0.1	-	8-25k	90	2.5	<1.0	-	35	-	Meter	Yes	Dual 1009 SK	-	Acoust. Susp.	-	-	-	-	33	465.00	Dual 1009/Shure. AM sens., 35 μV.
	SC-220	15	<1	0.8	0.3	-	15-25k	85	2.9	<1.0	-	30	-	-	Yes	Garrard 3000	8	Acoust. Susp.	3	Phenolic Cone	Sealed Box	16½ 18 11⅛	45	329.00	4 versions: Garrard/Grado phono only; cassette player; 4-8-trk tape cart. player; reel-to-reel recorder. AM sens., 50 μV.
KARG	X-8 MAC	18	2	1	1	55-14k 3 db	32-22k 3 db	65	-	-	-	-	-	-	-	BSR MCD 500	-	-	-	-	-	-	25	129.95	Extremely compact. No larger than standard turntable base.
	SX-82M	18	2	1	1	55-14k 3 db	32-22k 3 db	65	-	-	-	-	-	-	-	BSR MCD 500	5	Air Susp.	-	Concentric Dome	Sealed Box	14 9 6	50	179.95	Grado Btr. cartridge Phono Jack. Spkr. sw Aux inputs for tuner or tape.
KLH	20	25	Not Applicable See Features						4	0.5	20-15k ±1db	35	0.8	Meter	Yes	Garrard Custom	10	Acoust. Susp.	1¾	Stiff Paper	Sealed Box	23⅛ 9 11¾	81	399.95	Speakers & Ampl. critical matched for opt. perf. & max. acous. output. Phone jack, tape in & out jacks; comes with legs for ctr. sect. Avail. w/AM, $439.9
	24	17½	Not Applicable See Features						4	0.5	20-15k ±1db	35	0.8	-	Yes	Garrard Custom	8	Acoust. Susp.	2	Stiff Paper	Sealed Box	18 10¼ 7⅜	65	300.00	Speakers & Ampl. critical matched for opt. perf. & max. acous. output. Tape inputs & outputs.
	11W	7½	Not Applicable See Features						-	-	-	-	-	-	-	Garrard Custom	Single Full-Range 3-In. Speaker W/ ⅜-in. Cone Excursion				Sealed Box	8 4 14	32	199.95	Same as above. Available as portable at same price. No tuner.
	15	7½	Not Applicable See Features						-	-	-	-	-	-	-	Garrard Custom	2 Full-Range 3-in. Speakers w/ ⅜-in. cone Excursion				Ducted Port	8 8½ 14	51	229.95	Same as above. Tape inputs and outputs. No tuner.
SONY (33) (77)	HP-450A	15	1	1	0.5	-	20-50k +0 −2	60	-	-	-	-	-	-	-	Garrard 60 MK2	5	Full range			Wal.	18⅛ 16⅝ 8⅝	60	249.95	

MODULAR SYSTEMS

Benjamin 1050

Harman-Kardon SC-7

Fisher 110

Bogen MSC

RECORD CHANGERS

MANUFACTURER (circled number indicates ad page)	Model	Speeds	Platter Diameter, in.	Wow at 33-1/3, rms %	Flutter at 33-1/3, rms %	Arm Pivot to Stylus, in.	Max. Tracking Error, deg.	Arm Type	Stylus-Force Range, gms.	Arm Resonance, Hz	Max. Stack Records	Change Cycle at 33-1/3, sec.	Clearance - below board, in.	Clearance - above board, in.	Overall W x D, in.	Overall Height, in.	Weight, lbs.	Price	SPECIAL FEATURES
ALLIED (35)	919	4	11	0.12	.05	7.5	2	Low Mass Sprg.	0-6	20	8	7	2½	4	13 1/8 11¼	6 19/64	7½	49.95	Made in Britain.
	466	4	8½	0.2	.06	7.25	2.5	Sprg.	5-10	-	7	7.5	2¼	3⅝	13⅛ 11¼	5⅞	9¼	19.95	Made in Britain.
BSR (45)	600	4	11	0.1	.04	7.5	2	Bal.	0-6	15	7	7	4	3	13 1/8 11¼	6 19/64	9⅜	74.50	Anti-skating cont; self-locking arm rest; clip-in head; cast TT; muting sw. & pop filter; avail. as pkg. w/cartri., base, and cover.
	500A	4	11	0.12	.05	7.5	2	Bal.	0-6	15	7	7	4	3	13 1/8 11¼	6 19/64	7½	59.50	Same as above.
	400	4	11	0.12	.05	7.5	2	Low Mass Sprg.	0-6	20	7	7	4	3	13 1/8 11¼	6 19/64	7½	49.50	Same as above.
GLAC/-MIRACORD (12)	50H	4	12	.06	.02	8¾	0.5	Dyn. Bal.	0.5 to 6.5	8	10	12	3¾	7½	14½ 12	7¾	20	149.50	Hys-syn. motor. Push-button operation - 4 modes, stylus overhang adj. screw and gauges, illuminated speed ind., cueing and anti-skating.
	40H	4	12	<0.1	<0.1	8½	0.8	Dyn. Bal.	0.5 to 6	15	10	12	3¾	7½	14½ 12	7¾	18	110.00	Hys-syn. motor. Push-button operation all modes; auto repeat, cueing opt.
	40A	4	12	<0.1	<0.1	8½	0.8	Dyn. Bal.	0.5 to 6	15	10	12	3¾	7½	14½ 12	7¾	18	99.50	Push-button operation all modes. Auto repeat.

RECORD CHANGERS

Miracord 50H

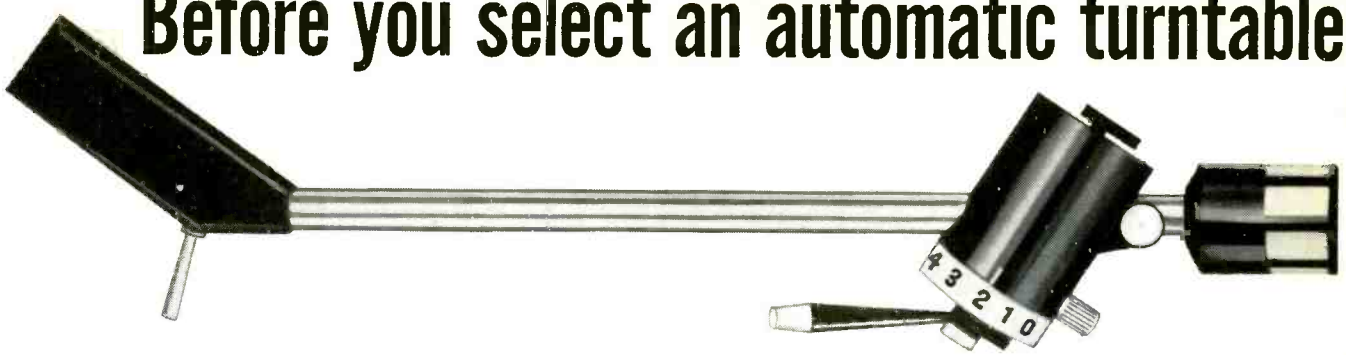
Garrard 60 MkII

BSR 600

Dual 1015

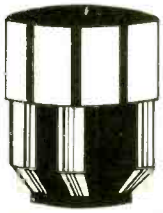
MANUFACTURER (Circled number indicates ad page)	Model	Speeds	Platter Diameter, in.	Wow at 33-1/3, rms %	Flutter at 33-1/3, rms %	Arm Pivot to Stylus, in.	Max. Tracking Error, deg.	Arm Type	Stylus-Force Range, gms.	Arm Resonance, Hz	Max. Stack Records	Change Cycle at 33-1/3, sec.	Clearance - below board, in.	Clearance - above board, in.	Overall W x D, in.	Overall Height, in.	Weight, lbs.	Price	SPECIAL FEATURES
DUAL (47)	1010A	4	10⅝	.09	.09	8	1.25	Unbal.	0-7	12	10	13	2⅝	6	12¾ 10½	8⅝	10½	69.50	Fully automatic & manual, sgl. play & chgr; feathertouch slide switch conts; magnesium head; ½-gm. click-stop tkg. force adj; adj. stylus overhang.
	1015	4	10⅝	.05	.03	8	1.25	Bal.	0-5	8	10	13	2⅝	6	12¾ 10½	8⅝	12½	89.50	Cont. var. tkg. force & anti-skating controls; auto/manual cueing system 4-lb platter; elevator-action chgr. spindle; geared bal. adj. w/set screw
	10095K	4	10⅝	.05	.03	8	1.25	Bal.	0-5	8	10	13	3	6	12¾ 10½	9	10½	109.50	Same, but with rotating single-play spindle; fine-adjust arm counter-balance.
	1019	4	10⅝	.04	.02	8	1.25	Bal.	0-5	8	10	13	3	6	12¾ 10½	9	16	129.50	Same, but with 7½-lb. platter; 6% var. speed adjustment; rapid & fine-adjust arm counterbalance.
GARRARD (3)	Lab 80 MK II	2	12	0.10	.02	9	-	Bal.	¼-5	10	8	10	3½	5½	17 14¾	9	16½	99.50	Anti-skate cont., ¼-gm. click stop tkg hydraulic cueing, wood arm.
	Lab 70 MK II	4	10½	0.12	.05	8.5	-	Bal.	¼-5	15	8	10	2⅞	6	16¾ 14⅛	8⅞	16	84.50	Anti-skate cont., ¼-gm. click stop tkg.
	Lab 60 MK II	4	10½	0.14	.05	7.5	-	Bal.	¼-5	15	7	10	2⅞	4	15⅜ 13⅛	6⅞	10	74.50	Same as above
	Lab 50 MK II	4	10½	0.14	.05	7.5	-	Spg.	¼-14	15	7	10	2⅞	4	15⅜ 13⅛	6⅞	9	54.50	
	Lab 40 MK II	4	10½	0.14	.05	7.5	-	Sprg.	½-8	20	7	10	2⅞	4	14⅞ 12½	6⅞	9	44.50	
KNIGHT (12)	990A	4	11	0.25	0.1	7.4	-	Bal. & Sprg.	2.5	-	10	10	3½	5	14 12	8½	10	29.88	Less Cartridge.
SEEBURG	AP-1	33	-	0.15	.03	-	0.8	dyn. bal.	2.5	16	50	8	-	-	31⅜ 23¾	21½	140	795.00	Incls Pickering cartr., pre-amp, twin auto. stylus-cleaning brush. Freq. resp. 25-16k, ±0.5 db. Telephone-dial select of 100 sides. Cab. mounted.

Before you select an automatic turntable

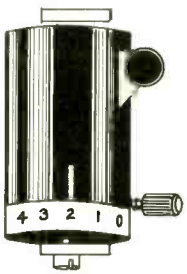


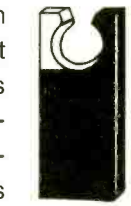
let us arm you with the facts.

Probably the most critical way to evaluate the quality of any changer is by closely inspecting the tone arm and its capabilities. Let's examine



the tone arm of the BSR McDonald 500 automatic turntable. This is the resiliently mounted coarse and fine vernier adjustable counterweight. It counter-balances the tone arm both horizontally and vertically and assures sensitive and accurate tracking. Here you see the micrometer stylus pressure adjustment that permits ⅓ gram settings all the way from 0 to 6 grams. This assures perfect stylus pressure in accordance with cartridge specifications. Here's another unique and valuable feature . . . the cueing and pause control lever that lets you select the exact band on the record, without fear of ever damaging the record or the cartridge. It even permits pausing at any point and then gently floats the tone arm down into the very same groove! Whenever the turntable is in the "off" position the arm automatically returns and securely locks in this cradle to protect it and keep it from movement. This is the low-mass tubular aluminum pick-up arm . . . perfectly counter-balanced both horizontally and vertically to make it less susceptible to external shock. Of course, there are many other quality features on the BSR McDonald, just as you would find on other fine turntables that sell for $74.50 and higher. The big difference is that the BSR McDonald 500 sells for much less. Now are you interested? . . . Write us for free literature . . . or see it at your nearest dealer.





BSR McDONALD 500

Precision crafted in Great Britain
BSR (USA) Ltd., Blauvelt, N.Y. 10913

Check No. 121 on Reader Service Card

TURNTABLES & ARMS

AR-XA

Shure-SME 3012

Empire 498

Marantz SLT-12

MANUFACTURER (Circled number indicates ad page)	Model	TURNTABLES Speeds	Wow at 33-1/3, %	Flutter at 33-1/3, %	Motor Type	Drive	Platter Diameter, in.	Platter Weight, Lbs.	Platter Material	Arm Mounting Provision	Dimensions, in. W x D x H	Weight, lbs.	ARMS Model	Overall Length, in.	Pivot-Stylus Dist., in.	Vertical Bearing	Lateral Bearing	Stylus Force Method	Max. Tracking Error, deg.	Arm Resonance, Hz.	Stylus Force Range, gms.	Weight (if sep.), lbs.	Price	SPECIAL FEATURES
ACOUSTIC RESEARCH (59)	XA	33 45	0.1	.05	18-p PM	belt	11	3.3	alum.	integ.	16¾ 12¾ 5¼	13	-	12	9	nyl.	ball sleeve	rear weight	0.5	10-15	0.5-8.0	-	78.00	
	TA	33	0.1	.05	24-p PM	belt	11	3.3	alum.	integ.	16¾ 12¾ 5¼	13	-	12	9	nyl.	ball sleeve	rear weight	0.5	10-15	0.5-8.0	-	75.00	
AUDIO & DESIGN													M9 BA	11.5	9	uni-pivot into ball race viscous damped		bal.	1.2	10-20	0-3	-	150.00	Mercury contact; magnetic bias anti-skating.
													M12 BA	14.5	12.5	Same		bal.	1.0	10-20	0-3	-	170.00	For transcription use.
BOGEN	B62	4	0.2	0.2	4-p	idler	12	7¾	-	integ.	15 13 3½	23											67.95	Integral arm. Opt. wal. base & vinyl cover. Speed variable 29-86 RPM.
	B52-S	4	0.1	0.1	4-p	idler	12	3	form steel	integ.	14¾ 11½ 3½	12											49.95	Same as above.
CASTAGNA													-	13⁷/₁₆	9⅛	sap-phire	sap-phire	sprg.	1	8	0-5	-	125.00	Opposing magnet susp.; no weight on vert. or lat. bearings. 16-in. arm also avail.
EMT	930 STU	33 45 78	Less than .03 RMS		Sing. phse. sync.	idler	13	8⅜	cast iron	integ.	19.7 15.4 6.9	51	RMA 229	12.5	9	ball race	ball race	bal. and sprg.	1	7	0-8	-	1275. less cart.	Remote cont. stop/start. Backup for cueing to music beat or syllable; s/s preamp eqlzr; line outputs; stylus illumination; built-in strob
EMPIRE (12)	208	33 45 78	-	-	hys. sync.	belt	12	6	alum.	-	-	-											125.00	Turntable only.
	398	33 45 78	-	-	hys. sync.	belt	12	6	alum.	integ.	-	-											190.00	Incls. 980 arm.
	498	33 45 78	-	-	hys. sync.	belt	12	6	-	integ.	-	-											180.00	Incls. 980 arm; floating suspension, platter and arm.
													980	12⅜	9	ball race	ball race	cal. spg. adj.	0.6	6	0-8	-	50.00	
EUPHONICS (92)													TA-15	11	8¼	knife edge	ball	sprg. bal.	0.75	12	0.5-1.5	12	32.50	Accepts Euphonics cart. only TK-15-LS. W/cartr. & pwr. source, $87.50
													-	12	8¼	knife edge	ball	sprg. bal.	0.75	12	0.75-3.0	-	71.50	Incls. TK-15-P cartr. & pwr. source.
													TA-16	13½	11½	knife edge	ball	sprg. bal.	0.25	10	0.5-1.5	14	42.50	AcceptsEuphonics cart. only. TK-15-LS. w/cart. & pwr. source, $97.50.
													-	13½	11½	knife edge	ball	sprg. bal.	0.25	10	0.75-3.0	14	-	Incls. TK-15-P cartr. & pwr. source.

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Which three Duals won't you buy?

To some of you, buying a Dual automatic turntable may pose somewhat of a problem. Not that it was our intention to create one.

We simply wanted to make Dual precision engineering available to everyone, in every price range and for every application.

But we outdid ourselves.

We made four automatic turntables (from $69.50 to $129.50) that are, in every respect, Duals. For example: all four have a low-mass tonearm, a constant-speed motor, feather-touch slide switches, a heavy platter, and an elevator-action changer spindle. And all four have performance that rivals the best manual turntables.

This means that when you buy a Dual at $69.50, you don't get more rumble. You simply get fewer features. Features that nobody else has anyway.

Like the variable pitch control, the single-play spindle that rotates with the record to eliminate any possibility of record slip or bind, the cue-control that operates on automatic as well as manual play, and the direct-dial anti-skating control for totally accurate skating compensation.

So, if buying a Dual automatic turntable does present a problem, it's simply because it may take you a little more time to select the one Dual with the features you'd want for your system.

But don't get angry with us.

After all, by making it a little more difficult for you to choose one, we've at least made it possible for you to own one.

A Dual.

United Audio Products, Inc., 535 Madison Avenue, New York, N.Y. 10022. Dual

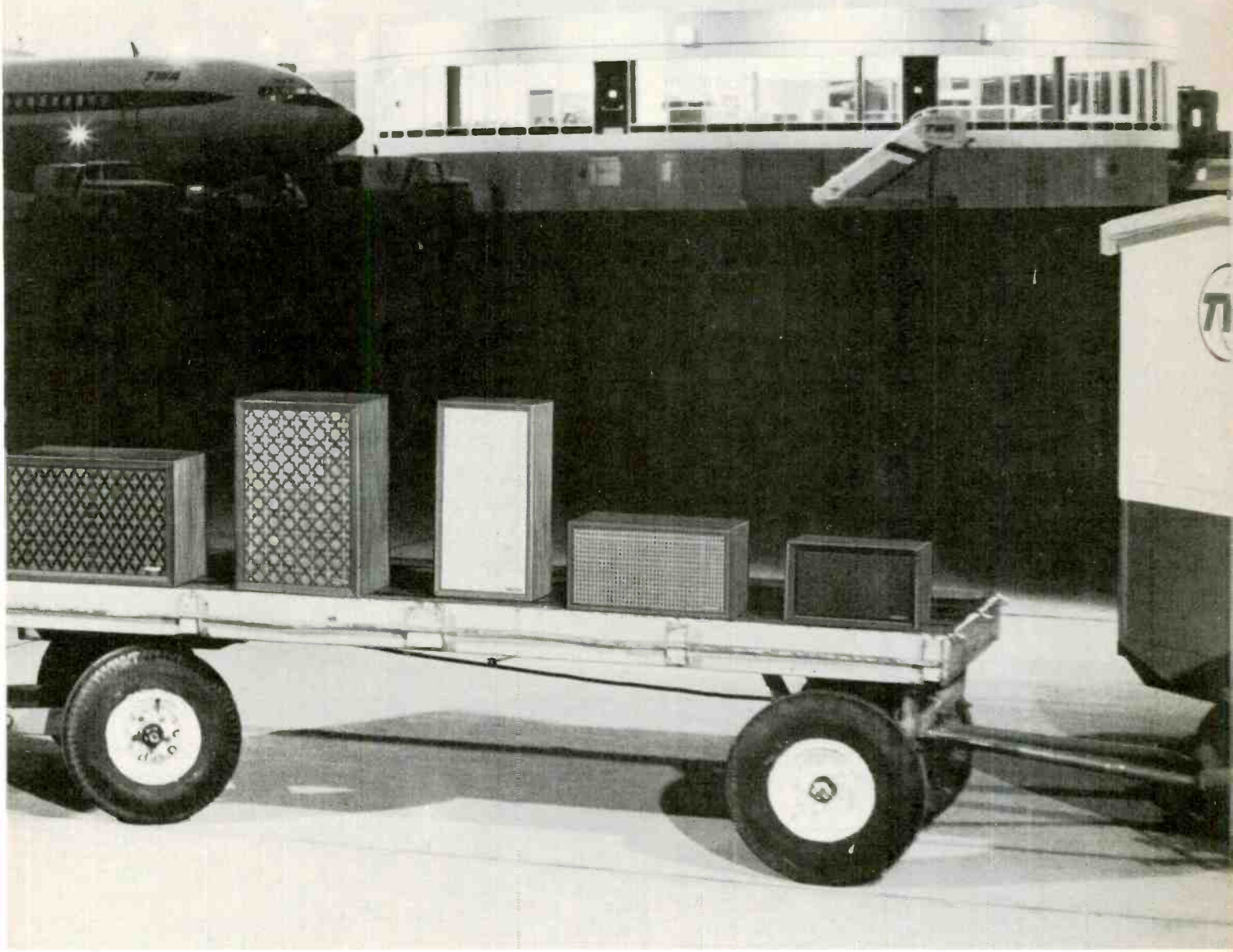
Left to right: *Sorrento II:* Three-speaker — four-way — acoustic suspension system in Spanish modern styling — Seville blue with slate top — $289 — matching mirror optional at extra cost ☐ *Mediterranean:* Three-speaker high compliance system with a graceful Mediterranean flair — in antique butternut — $269.50 ☐ *Estoril:* Four-way aerodynamic bass energized system — oiled walnut finish in contemporary styling — $164.50 ☐ *Laredo:* Three-speaker — four way — multi-chamber system — dramatic Moorish styling — hand-rubbed walnut finish — $109.50 ☐ *Cantada:* Three-speaker radiation resistance loaded system — styled in the continental manner — oiled walnut finish — $145. ☐ *Debonaire:* Three-speaker radiation resistance loaded system — contemporary American styling — oiled walnut finish — $124.95 ☐ *Ultra-D:* Three-speaker high

Trim, grille cloth, finish, dimensions and specifications subject to change without notice.

In stereo high fidelity----

UNIVERSITY DELIVERS THE SOUND!

University Sound is one of the world's largest manufacturers of quality speakers. That didn't happen overnight. It took more than 30 years of hard work, painstaking attention to detail, and constant research. During those years, University has built an impeccable reputation for quality around this premise: set the highest possible standards, then do your level best to meet them. Listen to the result in any University dealer's showroom. Discover for yourself what thousands like you already know.



efficiency acoustic suspension system — contemporary Scandanavian styling — oiled walnut finish — $69.95 ☐ *UR-4:* Two-speaker high compliance system in hackberry with oiled walnut finish — $58.95 ☐ *Mini-ette:* Two-speaker high efficiency acoustic suspension system — contemporary Scandanavian styling — oiled walnut finish — $49.50

For complete information write Desk H-73

Listen—University Sounds Better

UNIVERSITY SOUND

A DIVISION OF LTV LING ALTEC, INC

P.O. Box 26105 Oklahoma City, Okla. 73126

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TURNTABLES & ARMS

Sony TTS-3000

Pioneer PL-41F

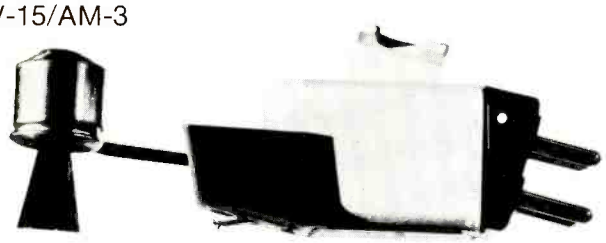
Thorens TD-124

Rek-O-Kut B-12H

MANUFACTURER (Circled number indicates ad page)	Model	TURNTABLES Speeds	Wow at 33-1/3, %	Flutter at 33-1/3, %	Motor Type	Drive	Platter Diameter, in.	Platter Weight, Lbs.	Platter Material	Arm Mounting Provision	Dimensions, in. W x D x H	Weight, lbs.	ARMS Model	Overall Length, in.	Pivot-Stylus Dist., in.	Vertical Bearing	Lateral Bearing	Stylus Force Method	Max. Tracking Error, deg.	Arm Resonance, Hz.	Stylus Force Range, gms.	Weight (if sep.), lbs.	Price	SPECIAL FEATURES
MARANTZ (29)	SLT-12	33 45	.04	.04	hys. sync.	belt	12	12	alum.	integ.	18 14 6½	27	-	-	-	ball race	ball race	-	0	-	-	-	295.00	Straight-line-tracking arm with integral cartr.
	SLT-12U	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Same as above, but accept most standard cartridges.
ORTOFON (21)	-	-	-	-	-	-	-	-	-	-	-	-	RS-212	11 13/16	8⅜	-	-	bal. & sprg.	1.19	8	0-4.5	15/16	90.00	Stylus-force indicator, bal. anti-skating force, adj; cueing device.
PIONEER (86)	PL-41	33 45	0.08	0.08	hys. sync.	belt	12	4	alum.	integ.	20 16 7¾	24½	12	13	9.6	ball race	ball race	rear weight	1.0	7	0-4	-	199.95	Combines base, hinged dust cover, turntable, arm.
REK-O-KUT	B-12H	33 45 78	.085	.08	hys. sync.	idler	12	5	alum.	hole in deck	18 16 10	19	-	-	-	-	-	-	-	-	-	-	165.00	High-torque motor for cueing.
	B-126 H	33 45 78	.09	.09	hys. sync.	idler	12	5	alum.	hole in deck	18 16 8	17	-	-	-	-	-	-	-	-	-	-	109.95	
	B-16H	33 45 78	.08	.08	hys. sync.	idler	16	9	alum.	hole in deck	20 19 8	34	-	-	-	-	-	-	-	-	-	-	275.00	
	-	-	-	-	-	-	-	-	-	-	-	-	S-320	12	9	ball	ball	bal. & sprg.	1.0	9-12	0-2-5.0	-	34.95	
SHURE (9) (23)	-	-	-	-	-	-	-	-	-	-	-	-	3009 Ser. II	-	9	knife edge	ball	rear weights	-	-	¼-5	1¾	106.50	Adjust. anti-skating; visco damped cueing.
	-	-	-	-	-	-	-	-	-	-	-	-	3012 Ser. II	-	12	knife edge	ball	rear weights	-	-	¼-5	2 1/16	116.50	Same as above.
SONY (33) (77)	TTS-3000	33 45	.05	.03	d.c. servo	belt	12	3	alum.	-	14 9/16 15 5⅛	12.5	-	-	-	-	-	-	-	-	-	-	149.50	Motor speed monitored by servo-control ampl.
	-	-	-	-	-	-	-	-	-	-	-	-	PUA 237	13⅜	9 11/32	prec. ball	prec. ball	bal.	-	V-9 L-11	0-3	-	85.00	Integral cueing device, si cone-damped; anti-skate device; micro-ball bearing
	-	-	-	-	-	-	-	-	-	-	-	-	PUA 286	15⅜	11¼	prec. ball	prec. ball	bal.	1	V-8 L-10	0-3	-	99.50	
THORENS (21)	TD-124 Ser. II	4	0.1 p-p	.05 p-p	sync.	belt idler	12	8½	non-ferrous	blank arm board	16⅞ 14* 3½	-	-	-	-	-	-	-	-	-	-	-	149.50	Var. speed adj. ±3%; sep. alum. shell cover on table belt/idler drive. * on base.
	TD-150 AB	33 45	-	-	sync.	belt	12	7½	non-ferrous	integ.	15⅜ 12⅞ 2½	14¾	TP-13	12	8⅜	ball race	ball race	static	0.5	10	0-4	-	99.75	Integ. arm/table; table onl avail. TD-150, $85.00
	-	-	-	-	-	-	-	-	-	-	-	-	TP-14	12⅝	7½	ball race	ball race	bal. & sprg.	0.5	8	0-4	-	59.50	Low-mass plug-in shell; p adjust. for 15-deg. tkg. ar on most cartrs.

PHONO CARTRIDGES

Pickering V-15/AM-3

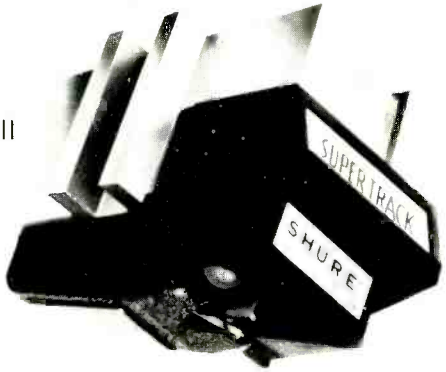


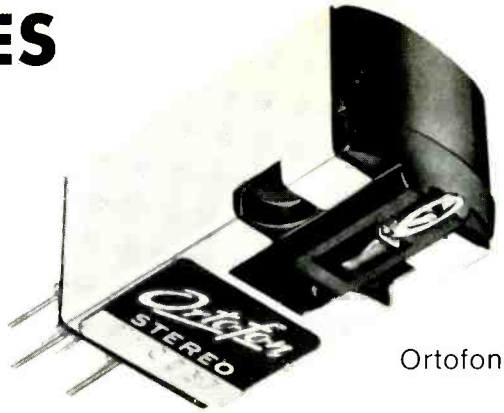
Empire 999VE

MANUFACTURER (Circled number indicates ad page)	Model	IM Distortion, %	1 kHz Sep. dB	10 kHz Sep. dB	Output – mV. at 3.54 cm/sec	Tracking Force, gms	Eff. Moving Mass, mg	Lat. Compliance x 10^{-6} cm/dyne	Vert. Compliance x 10^{-6}	Stylus Type	Stylus Radius, mils	Replacement	Max. Shunt Cap. pF.	Weight, gms	Price	SPECIAL FEATURES
ADC	ADC-10E MK II	<0.5	30	30	2.6	½-1½	-	35		ellip.	0.3 x 0.7	User	-	-	59.50	15° vert. tracking angle.
	ADC Point 4/E	<1.0	30	30 at 8000	3.2	¾-1½	-		30	ellip.	0.3 x 0.7	User	-	-	49.50	15° vert. tracking angle.
	ADC 660E	<1.0	30	30 at 8000	5.0	1½ 3	-		20	ellip.	-	User	-	-	39.50	
	ADC 990E	-	20	20 at 8000	3.2	1½ 4	-		18	ellip.	0.3 x 0.7	User	-	-	19.95	
EMPIRE	808	-	28	20	5.5	1½-4.0	1.0	8*	8*	spherical	0.7	User	400	7.5	19.95	Popular series; *808E, same except with 0.4 x 0.9 ellip. stylus, compliance, 12 x 10^{-6} $29.95
(12)	888	-	30	23	5.0	1.5-4	0.7	10	10	spherical	0.7	User	400	7.0	24.95	Deluxe series; *888P, same except with 0.6-mil stylus; tkg. force 1-3; $29.95.
	888E	-	30	23	5.0	1-3*	0.7	15	15	ellip.	0.4 x 0.9	User	400	7.0	39.95	Deluxe series;* 888SE, same except with 0.3 x 0.7 stylus; Tkg. force 3/4-2; 888 TE 0.¾-2 Tkg.force.
	999VE	-	30	25	4.5	0.5-1.5	0.5	-	25	ellip.	0.2 x 0.7	User	400	6.5	-	Super series.
FUPHONICS	CK-15-LS	1.0	30	20	8 or 0.5 V.	0.75	0.6	25	25	ellip.	0.2 x 0.7	User	-	1.5	55.00	Lab. Std. kit – cartr. & pwr. source. Sil. semicond. Freq. resp. 10-50k.
(92)	CK-15-P	1.0	30	20	8 or 0.5 V.	1.3	0.7	15	15	sph	0.5	User	-	1.5	30.00	Prof. series kit – cartr. & pwr. source. Sil. semicond. Freq. resp. 10-50k.
GOLDRING	800	-	25	20	3.54	1-3	1.0	20	20	spherical	0.5	User	-	8	30.00	"Free Field" design – very low stylus mass.
GRADO	BE	<1.0	>20	10	6.0	2.0	-	-	-	ellip.	0.6 x 0.3	User	-	3.5	45.00	Avail. w/light-mass stylus, BCR/LM, $30.00; w/"Mini-Duster" brush, BED, $47.50.
	BCR	<1.0	>20	10	6.0	2.5	-	-	-	spherical	0.6	User	-	3.5	25.00	
	BCE	<1.0	>20	10	6.0	2.0	-	-	-	ellip.	0.6 x 0.3	User	-	3.5		
	BTR	<1.0	>20	10	6.0	2.0	-	-	-	spherical	0.7	User	-	3.5		
GROVE-ELECTRO-VOICE Jensen Industries Cover (4) (1)	149D	1.5	25	-	350	1.5	-	10	10	spherical	0.7	User	200	3.5	12.00	
	157D	3.0	25	-	700	5	-	4	4	spherical	0.7	User	200	3.5	12.50	
	280D	2.0	25	-	500	3	-	6	6	spherical	0.7	User	200	3.5	10.00	
	MA-2	-	-	-	-	-	-	-	-	-	-	-	-	-	8.00 Pr.	Plug-in adapter for ceramic cartr. into mag. phono input.
HEAK	MK IV	-	25	15	5.0	2	1.0	10	10	ellip.	0.3 x 0.7	User	200	10	75.00	

PHONO CARTRIDGES

Shure V-15 Type II





Ortofon S-15T

MANUFACTURER (Circled number indicates ad page)	Model	IM Distortion, %	1 kHz Sep. dB	10 kHz Sep. dB	Output – mV. at 3.54 cm/sec	Tracking Force, gms	Eff. Moving Mass, mg	Lat. Compliance x 10⁻⁶ cm/dyne	Vert. Compliance x 10⁻⁶	Stylus Type	Stylus Radius, mils	Replacement	Max. Shunt Cap, pF.	Weight, gms	Price	SPECIAL FEATURES
ORTOFON (21)	SL-15 SL-15T	-	25	25	0.04 6 mV w/transf.	1-2	0.9	10	10	ellip.	0.3 x 0.7	Factory	-	7	60.00	Des. for auto turntables; external stereo in-line xformers for hi-Z mag inputs, $15.00.
	S-15T	-	25	25	6 V	1-2	0.9	10	10	ellip.	0.3 x 0.7	Factory	-	18.5	80.00	Avail. as S-15MT, in Ortofon plug-in shell, $85.00
PICKERING (15)	V-15/ ATE-2	1.0	35	20	5.32	2.0-5.0	1	16	15	ellip.	0.5 x 1.0	User	275	5	34.95	
	V-15/ AME-3	1.0	35	20	3.54	0.75-1.5	1	26	24	ellip.	0.3 x 0.9	User	275	6	44.95	Self-supporting 1-gram "Dustamatic" stylus assembly
	V15/ AM-3	1.0	35	20	3.54	0.75-3.0	1	24	22	spherical	0.7	User	275	6	34.95	
	V15/ ATE-3	1.0	35	20	5.32	2.0-5.0	1	16	15	ellip.	0.5 x 1.0	User	275	6	39.95	
SHURE (9) (23)	V-15 Type II	-	>25	>20	3.5	0.75-1.5	-	-	-	ellip.	0.2 x 0.7	User	-	6.8	67.50	Analog computer-designed.
	M75E	-	>25	>20	5.7	0.75-1.5	-	-	-	ellip.	0.2 x 0.7	User	-	6.0	39.50	
	M55E	-	>25	>20	6.6	0.75-1.5	-	25	25	ellip.	0.2 x 0.7	User U	-	7.0	35.50	
	M44E	-	>25	>20	9.3	1.75-4.0	-	15	15	ellip.	0.4 x 0.7	User	-	7.0	34.50	
STANTON (53)	581A	1.0	35	20	2.48	2.0-5.0	<1.0	16	14	spherical	0.7	User	275	6	49.50	Incl. self-supporting "Longhair" brush incl; weight, 1 gm.
	581EL	1.0	35	20	2.48	0.75-1.5	<1.0	26	24	ellip.	0.3 x 0.9	User	275	6	49.50	Same as above.
	581AA	1.0	35	20	2.48	0.75-1.5	<1.0	26	24	spherical	0.5	User	275	6	49.50	Same as above.
	500A	1.0	35	20	5.3	2-5	1.0	16	16	spherical	0.7	User	275	5	25.00	With ellip. 0.4 x 0.9. Model 500E, $35.00.
SONOTONE	9TAFHC-SDV MK IV	4	27	5	6.0	2-4	3.5	13	13	spherical	0.7	User	780	3.2	23.15	Uses "Sono-Flex" flexible stylus avail. w/dual 0.7 diam., as 9TAFHC-D77V, $27.75.
	100TD7V MK V	2	27	15	6.0	1.5-3	1.8	15	15	spherical	0.7	User	1000	1.5	25.50	"Sono-Flex" stylus; avail. w/0.5 mil or ellip. stylus as 100TD5V, $26.50; 100TDEV, $28.50
	24TASD	4	25	10	*280	1-7	10	3	3	spherical	0.7	User	4800	3.5	13.95	* Into hi-Z input, electr. load 1 Meg in parallel with 100 pF.
	40765MP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Plug-in equalzrs. to replace mag. cartrs. in low-Z inputs.
SONY (33)	VC-8E	-	30	20	3.0	½-2	-	30	30	ellip.	0.2 x 0.8	User	-	15.5	65.00	Moving-coil type; 15-deg. vert. tkg. angle.

Check No. 124 on Reader Service Card →

When engineers get together, the conversation turns to pickups.

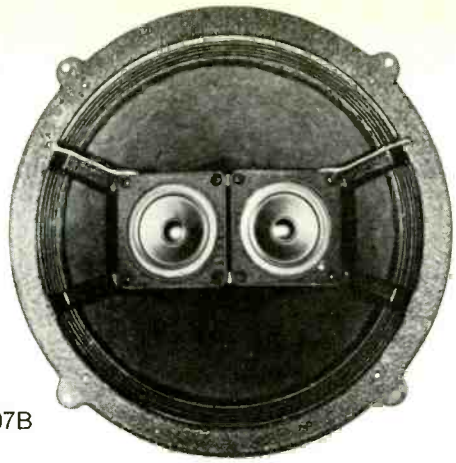
PHOTOGRAPHED BY FRANZ EDSON AT THE CAPITOL TOWER, HOLLYWOOD.

It's an irresistible topic.
Especially since Stanton came out with the Model 500 stereo cartridge.
That's an engineer's pickup, if there ever was one.
Beautiful curve–within 1 db from 20 to 10,000 Hz, 2 db from 10,000 to 20,000 Hz.
Fantastically small moving system to trace the wildest twists in the groove.
Light weight (only 5 grams!) to take advantage of low-mass tone arms.
And, of course, Stanton's legendary quality control.
No wonder engineers use the Stanton 500 for critical broadcasting and auditioning applications.
And to impress other engineers with their pickupmanship.
(Available with 0.7 or 0.5-mil diamond, $30; with elliptical diamond, $35.
For free literature, write to Stanton Magnetics, Inc., Plainview, L.I., N.Y.)

STANTON

SPEAKER MECHANISMS

Altec 604E



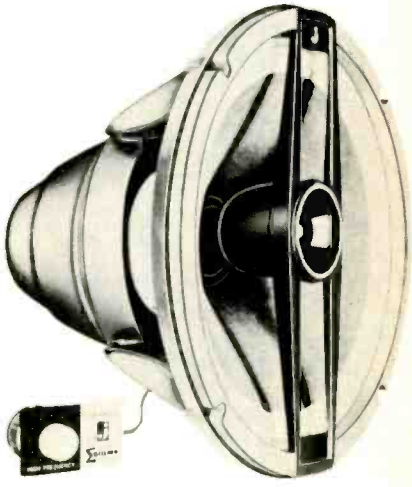
Bozak B-207B

MANUFACTURER (Circled number indicates ad page)	Model	Diameter, in.	Freq. Response, Hz.	Resonance, Hz.	Cone Material	Suspension Compliance	Type of Suspension	Magnet Type	Voice-coil Material	Voice-coil Diameter	Max. Power Capacity	Depth, in.	Impedance, Ohms	Weight, lbs	EIA Efficiency, dB	Price	SPECIAL FEATURES
RICHARD ALLAN	CB4	4	2500-17K		-	-	-	-	-	-	-	-	-	-	-	-	Tweeter for large system.
	Mid-range Module	5, 4	500-17k	-	-	-	-	-	-	-	20	8-15	2½	5	-	-	Baffle with 5-in. mid-range, 4-in. tweeter, crossover 6½ x 11 in.
	CB12T	12	25-15k	-	Paper	Med.	doped cloth	-	-	-	8	8-15	4¼	6½	-	-	Twin-cone.
	CG15	15	20-5k	-	Paper	High	doped cloth	-	-	-	20	8-15	6¼	16	-	-	Woofer.
ALTEC LANSING	604E	15	20-22k	25	Paper	Med.	Cloth	Al. V	LF-copper HF-A1 ribbon	LF-3 HF-¾	50	8	11⅛	34	54	199.00	
	605B	15	20-22k	25	Paper	Med.	cloth	Al. V	LF-copper HF-A1 ribbon	LF-3 HF-¾	50	16	10	28	50	168.00	Duplex coaxial types; includes compl 2-section network and a tenuator control.
	601C	12	30-22k	39	Paper	Med.	cloth	Al. V	A1-ribbon	LF-3 HF-¾	30	8	5⅝	15	52	114.00	
	755C	8	40-15k	50	Paper	Med.	cloth	Index V	Copper wire	2	15	8	2¼	3¾	48.5	32.25	Full-range speaker with widest dispersion pattern .deep; ideal for mounting between studs in wall installation. 2¼-in. depth permits installation in wall between studs.
BOZAK	B-207B	12	40-20k	40	felted paper	Med.	cloth	Al. V	Cu.rib.	1½	25	8	7	15	-	95.00	Coaxial.
	B-209C	6	200-3.5k	-	rigid metal	Med.	rubber	Al. V	Cu. rib.	1½	25	8-16	3½	7	-	54.50	Mid-range.
(63)	B-800	8	50-10k	-	rigid metal	Med.	rubber	Al. V	Cu. rib.	1½	25	8-16	3¾	7	-	49.50	Wide Range.
	B-200Y	2½	1.5k-20k	-	rigid metal	Med.	rubber	Al. V	Cu.	¾	25	8	2½	2½	-	35.00	Treble Pair.
	B-199A	12	40 4.5k	40	felted paper	Med.	cloth	Al. V	Cu. rib.	1½	25	8-16	5⅞	9	-	56.50	Woofer only.
ELECTRO-VOICE	SP8B	8	35-15k	60	paper	Med.	cloth	Cer.	Alum. Wire	2	20	16	4¾	7	47	32.50	Excellent for restricted space applications. 1 lb 6 oz. magnet.
	SP12B	12	35-15k	50	Paper	Med.	Cloth	Cer.	Alum. Wire	2	30	16	6¾	11½	49	39.00	Famous full-range incorporating Radax dual-cone design.
Cover (4)	12TRXB	12	35-20k	50	Paper/ Phen.	Med.	cloth	Cer./ Al. V	Alum. Wire	2/1	30	16	7	14	52	69.00	As above with Sono-phase VHF tweeter and level control. Single hole mounting.
(1)	15TRX	15	25-20k	25	Paper/ Phen.	High	cloth	Cer./ Al. V	Alum. Wire	2½/1	40	16	8¼	27	55	130.00	High-efficiency three-way for deluxe systems.
	30W	30	15-300	18	Foam Polystyrene	High	cloth	Cer.	Cu. rib. Copper ribbon	2½	100	16	13 13/32	34	54	250.00	Massive woofer unequalled as the foundation of a superlative system. has a 9 lb. 4 oz. magnet. in a 23 lb. magnet. structure.
EMPIRE	8000/ 12W	12	25-450	25	Paper	High	cloth	Index	Copper	4	60	8	3¾	21	-	74.95	12-in. woofer.
(12)	9000/ 15W	15	20-450	20	Paper	High	cloth	Index	Copper	4	60	8	5½	23	-	89.95	15-in. woofer.
	9000/ MHX	4 ± 1½	450-20000	-	Phen.	Med.	Phen.	Al. V	Alum.	4/1½	40	8	3½	12	-	94.95	Mid-Hi drivers with acoustic lens and built-in crossovers.

MANUFACTURER (circled number indicates ad page)	Model	Diameter, in.	Freq. Response, Hz.	Resonance, Hz.	Cone Material	Suspension Compliance	Type of Suspension	Magnet Type	Voice-coil Material	Voice-coil Diameter	Max. Power Capacity	Depth, in.	Impedance, Ohms	Weight, lbs	EIA Efficiency, dB	Price	SPECIAL FEATURES
ARTLEY (89)	224MS	24	±3db 16-4000	8	Poly.	Med.	Mag.	Al. III	Copper	1½	60	16	9	20	-	250.00	Woofer, impervious to moisture; low distortion.
	218MS	18	16-4000 ±3	17	Poly.	Med.	Mag.	Al. III	Copper	1½	60	16	8	18	-	195.00	Woofer, impervious to moisture; low distortion.
	210MS	10	20-4000 ±5	28	Poly.	Med.	Mag.	Al. II	Copper	1	50	8	5½	8	-	115.00	Woofer, impervious to moisture; extremely low distortion.
	220MS	10	20-25k ±5	28	Poly.	Med.	Mag.	Al. II	Copper	1	50	8	5½	8	-	135.00	Full-range co-axial, impervious to moisture, low distortion. Pat. dual cone, dual v.c. and Mag. Suspension.
NSEN	G-610B	15	Below 25-beyond 20k	50	Paper	stiff	Paper	DP Al. V	Copper Copper Alum.	3 2 1	40	16	10¾	46	57	346.50	Triaxial ®
	SG-300	12	20-20k	25	Paper	highly flexible	Flexair ®	Syntox -6 ®	Copper Copper Alum.	1½ 1½ 1	25	8	8⅛	15*	48	125.00	Triax ®
	SG-222	12	30-20k	50	Paper	Med.	Paper	Syntox -6 ®	Copper Alum.	1½ 1	25	8	7⅛	14*	-	80.50	Coaxial.
	DL-220	12	25-17k	25	Paper	highly flexible	Flexair ®	Syntox -6 ®	Copper Copper	1⅓ 1	20	8	5½	10*	-	44.50	3-element coaxial.
	SG-223	12	20-20000	25	Paper	highly flexible	Flexair ®	Syntox -6 ®	Copper Alum.	1½ 1½	25	8	6½	15*	-	88.75	Coaxial. * Shipping Weight.
IGHT (35)	KN-615HC	15	20-20k	25	Paper	High	cloth susp.	Cer.	Copper ribbon Al. rib.	2½/1	50	16	8¼	28	53	74.95	
	KN-612HC	12	22-20k	40	Paper	High	cloth susp.	Cer.	Copper ribbon Al. rib.	2½/1	35	16	7½	27	53	64.95	
	KN-888HC	12	25-19k	25	Paper	High	cloth susp.	Cer.	-	1½/1	25	8	6⅜	11½	53	39.95	
	KN-839	8	45-18k	65	Paper	Med.	Paper Susp.	Cer.	-	2/1	20	8	3⅞	6¾	45	19.95	
FAYETTE	SK-215	15	20-20k	25	Paper	-	Free Edge	Cer.	-	3/1	50	16	15¼	30	-	64.50	High frequency level control.
	SK-216	12	20-20k	35	Paper	-	Free Edge	Ceramic	-	3/1	50	16	12¼	25	-	54.50	High Frequency level control.
	SK-500	12	25-20k	22-27	Paper	-	Rigid-Flex Free Edge	Ceramic	-	1¾/1	30	8-16	6½	18	-	37.95	High frequency l-pad control.
	SK-128	8	20 20k	45-65	Paper	-	Free Edge	Ceramic	-	3/2	20	8	5 17/32	5	-	16.95	Adjustable brilliance control.

Michigan MC8

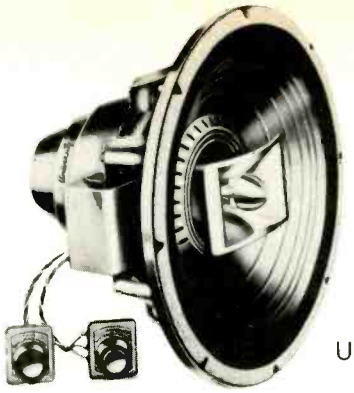
Electro-Voice 12TRXB



Jensen SG-300

SPEAKER MECHANISMS

JBL LE15A



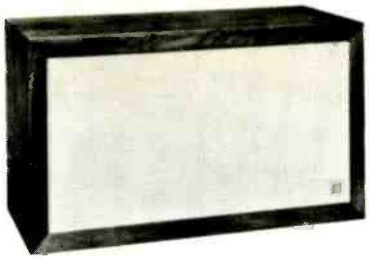
University 315-C

MANUFACTURER (Circled number indicates ad page)	Model	Diameter, in.	Freq. Response, Hz.	Resonance, Hz.	Cone Material	Suspension Compliance	Type of Suspension	Magnet Type	Voice-coil Material	Voice-coil Diameter	Max. Power Capacity	Depth, in.	Impedance, Ohms	Weight, lbs	EIA Efficiency, dB	Price	SPECIAL FEATURES
JBL (61)	LE12C HF	1.7	3000 cps Up	-	Paper Felt Damp.	-	-	Al. V	Copper	6/10	30	8	4¼	16 *	43	108.00	Two-way system. l.f. controlled cone susp. makes enclosure size non-critical. *Shipping weight.
	LE12C LF	12	3000 cps down	35	Paper Lans-A-Plas	High	cloth	Al. V	Copper ribbon	3	-	-	-	-	-	-	
	LE8T	8	Full range	35	Paper Lans-A-Plas Al.	High	Lans-A Loy	Al. V	Al. ribbon	2	20	8	3⅞	11 *	40	66.00	Silver impedance-controlling ring increases efficiency fourfold at 20,000 Hz linear cone travel more than ½-inch.
	LE15A	15	1000 cps down	20	Paper	High	Lans-A Loy	Al. V	Copper ribbon	4	60	8	5¾	26 *	45	129.00	For use in 6-8 cu. ft. enclosures with JBL PR15 passive radiator
	LE85	1 Th-roat	5000 cps up	-	Al. Diaph.	-	-	Al. V	Al. ribbon	2	60W w/net-work	8	3⅞	15 *	55	144.00	H.F. Driver, Silver impedance-con trolling ring for smooth response beyond upper limit of audibility.
MICHIGAN Cover (4) (1)	MC8	8	50-13k	75	Paper	Med.	1-pc. cone	Cer.	Alum. Wire	1	12	8	3 3/16	4	46	14.00	Value packed line made possible bringing production line technique to a traditionally hand-made produ tion without reducing quality. Di cast baskets and other "high fidelity" features at the price of "radio-set" speakers.
	MC12	12	40-14k	60	Paper	Med.	1-pc. cone	Al. V	Alum. Wire	2	20	8	3½	5½	46	17.50	
	MT12	12	40-18k	60	Paper/ Phenolic	Med.	1-pc. cone	Al. V	Alum. Wire	2/1	20	8	5½	7	46	29.50	
PIONEER Cover (4) (86)	PAX25F	10	27-18k ±5	27-37	Paper & Mylar	High	Cloth	Al. V	Alum. & Copper	2.1/ 0.95	20	8-16	8⅝	11½	-	53.35	Co-Axial.
	PAX-30F	12	23-18k ±5	23-32	Paper & Mylar	High	Cloth	Al. V	Alum. & Copper	3.1/ 0.95	35	8-16	9 13/16	9	-	72.25	Co-Axial.
	PW-30F	12	18-4000	18-28	Paper	High	Rolled Neo-prene	Al. V	Alum.	3.1	40	8-16	7⅜	12	-	49.50	Woofer.
	PT-7	-	3000-20k	-	Alum.	-	-	Al. V	Copper	1	25	8-16	5	3	-	20.85	Tweeter for internal or external mounting includes chrome stand.
R&A	Dual 1262	12 +5	35-18k	45	Paper	great rigid	Chem. trtd.	Al. III	Copper	1¾	30	8	6	4¾	-	39.93	Includes inbuilt electronic crosso system. Compatible to any type of enclosure.
	Del. 9120	12	40-16k	60	Paper	Med.	As above	Al. III	As above	1	25	8	5½	3½	-	13.95	Compatible to any type of enclosure.
	980 Del.	8	60-14k	65	Paper	Med.	As above	Al. III	As above	1	15	8	4	2¼	-	9.95	Same as above.
	880 Del.	8	60-14k	70	Paper	Med.	-	Al. III	As Above	1	10	8	3¾	1½	-	7.95	Same as above.
ROLA CELESTION	CX2012	12	30-18k ±5	35	Paper Phenolic	Med.	Plastic Roll Form	Cer.	Cu. Alum.	1¾/1	20 RMS	4,8 16	5½	16 5/8	-		Full-range coax with h.f. control horn tweeter
	CX1512	12	30-15k ±5	35	Paper Phenolic	Med.	Paper	Cer.	Cu. Cu.	1¾ ¾	15 RMS	4,8, 16	5½	12⅛	-		Full-range coax with wide treble dispersion.
	HF1300 Mk 2	1½	2k -15k	-	Phenolic	-	-	Al. II	Cu.	¾	Sys. Rat.20 RMS	4,8, 16	3½	1 1/16	-		Flat response; excellent polar characteristics.
	Studio 12 Bass	12	30-5k	20	Paper Phenolic	High	Synth. rubber	Cer.	Cu.	1¾	15 RMS	4,16	5½	9	-		Compliant rubber surround; LO3K crossover recommended when use with HF 1300, Mk. 2.

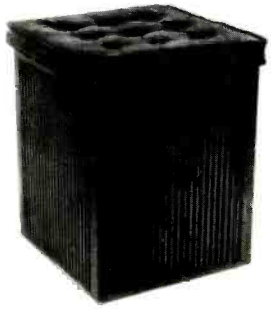
MANUFACTURER (Circled number indicates ad page)	Model	Diameter, in.	Freq. Response, Hz.	Resonance, Hz.	Cone Material	Suspension Compliance	Type of Suspension	Magnet Type	Voice-coil Material	Voice-coil Diameter	Max. Power Capacity	Depth, in.	Impedance, Ohms	Weight, lbs	EIA Efficiency, dB	Price	SPECIAL FEATURES
ANNOY	10" Dual Concentric	10	27-20k ±3	27	Paper Dura-Lumin	Med.	Impreg. Paper; Plastic	Ticonal G	Copper Al.	2½/2	20	16	-	9	High	112.75	Coaxial.
	12" Dual Con.	12	25-20k ±3	35	Paper Dura-Lumin	Med.	Impreg. Paper; Plastic	Ticonal G	Copper Alum.	2/2	30	16	-	10	High	138.00	Coaxial.
	15" Monitor Dual Con.	15	23-20k ±3	32	Paper Dura-Lumin	Med.	Impreg-nated Paper; Plastic	Ticonal G	Copper Alum.	2/2	50	16	-	21	High	179.00	Coaxial.
	Audio-metric	12	30-20k ±4	20	Paper Fiber Plastic	Loose High	Latex Type	Plastic	Copper Fiber Plastic	2/1	20	16	-	6½	High	76.00	Separate Tweeter - Woofer.
NIVERSITY SOUND	M15D	15	28-15k	30	Paper/ Paper	Med.	Paper	Cer.	Copper Wire	2	35	8	5½	12	-	32.50	2-way speaker with secondary free-edge h.f. cone 5-yr. warranty, all spkrs.
(48)	315C	15	25-20k	32	Paper/ Paper/ Phenolic	High	Cloth	Al. VB	Copper Wire	2/0.78	50	8-16	12	34½	-	175.00	3-way thru-axial with patd. Diffusicone midrange, recip. – flare tweeter
(49)	312	12	28-40k	30	Paper/ Paper/ Phenolic	High	Cloth	Al. V	Copper/ Alum. Wire	2/0.78	35	8-16	6⅝	10¼	-	84.50	3-way, with patd. Diffusicone midrange and –2-db Sphericon super-tweeter.
(91)	M12T	12	35-40k	45	Paper/ Paper/ Phenolic	Med.	Paper	Cer.	Copper Wire	2/0.78	30	8	3⅞	9	54.1	39.50	3-way with free-edge subsidiary cone midrange, Sphericon super tweeter.
	6201	12	28-18.5k	36	Paper/ Phenolic	High	Cloth	Al. V	Copper Wire	2/.78	35	8-16	6⅝	10¼	-	69.50	2-way thru-axial with patd. recip. flare tweeter, brilliance control.
UTAH	C8JC-3A	8	35/ 20k	55	Paper	Soft	Cloth	Cer.	Copper Wire	1	30	8	3 9/16	5	-	33.25	3-way
(84)	C12JC-2	12	30/ 17.5k	45	Paper	Med.	Regular	Cer.	Copper Wire	1	35	8	5 11/16	10	-	33.25	2-way
	C12PC-2A	12	25/ 19k	25	Paper	Soft	Cloth	Cer.	Copper Wire	1½	45	8	5 11/16	11	-	44.15	2-way
	C12PC-HF	12	25/ 20k	25	Paper	Soft	Cloth	Cer.	Copper Wire	1½	45	8	5 11/16	12	-	58.25	3-way - horn tweeter.
VITAVOX	K15/40	15	30-5000	30	Molded Paper	High	Chem. trtd.	Tichonal G	Copper	2¼	50	15	8¼	23	-	135.00	Woofer, also available in full-range model at $10 less.
	DU 121	12	30-16000	30	Paper/ Polyester	High	Chem. trtd.	Feroba II Tichonal G	Copper	1¾/¾	30	15	6	16	-	95.00	Full-range coax; compatible to both large and small enclosures.
	AK 124	12	30-13000	35	Paper	Med.	Chem. trtd.	Feroba II	Copper	1¾	30	15	6	15	-	85.00	Same as above.
	S2	-	200-16000	-	Alum. Alloy	-	-	Aniso-tropic	-	1¾	10	15	5¼	13½	-	160.00	Designed to operate with multi-cell or dispersive Horn. Requires 500-Hz crossover.
WHARFEDALE	Super 8/RS/ DD	8	40-20k	50 60	Paper	-	Roll Surround	Cer.	Al.	1	6W RMS	10-15	3½	4½	-	26.50	Double-diaphragm.
	Super 10/RS/ DD	10	30-20k	36 40	Paper	-	Roll Surround	Cer.	Al.	1	10W RMS	10-15	5¾	10½	-	47.50	Same as above.
(5)	Super 12/RS DD	12	25-20k	26 30	Paper	-	Roll Surround	Cer.	Al.	1¾	20W RMS	12-15	7	18¾	-	89.50	Same as above.
	Super 3	3	1000 20k	N. A.	bakelized cone	-	Cloth	Cer.	Al.	1	6W RMS	8	2¾	3½	-	26.50	
	W12/ RS	12	25-4k	25 30	Paper	-	Roll Surround	Cer.	Copper Cu.	1¾	15W RMS	12-15	5¼	12	-	52.50	
	W15/ RS	15	25-1.5k	24 28	Paper	-	Roll Surround	Alco-max	Cu.	2	20W RMS	12-15	7⅝	13½	-	89.50	
WOLVERINE	LS8	8	45-14k	75	Paper	-	1-pc. Cone	Al. V	Al. Wire	2	20	8	3½	4	43	20.00	A favorite for sound conditioning the home or office. Shallow basket allows mounting between studs in a wall.
Cover (4) (1)	LS12A	12	40-14k	60	Paper	-	1-pc. cone	Cer.	Al. Wire	2	20	8	3 15/16	6	46	22.00	Excellent choice for full-range remote speaker. Easily converts to multi-way system with HF1 and MF1 step-up kits.
	LS15	15	35-14k	50	Paper	-	1-pc. Cone	Cer.	Al. Wire	2	20	8	6 1/32	9	47	29.50	15-inch speaker ideal for use with Wolverine HF-1 and MF-1 tweeter and mid-range step-up kits.
	LT8	8	45-18k	65	Paper/ Plastic	-	1-pc. cone	Cer./ Al. V	Al. Wire	2/1	20	8	3 15/16	6½	45	33.00	Unique tweeter has ring diaphragm. Variable brilliance control.
	LT12	12	40-18k	60	Paper/ Phenolic	-	1-pc. cone	Cer./ Al. V	Al. Wire	2/1	20	8	5¼	8	47	39.00	Tweeter incorporates exclusive Sono-phase design. Variable brilliance control.

SPEAKER SYSTEMS

Altec 846A

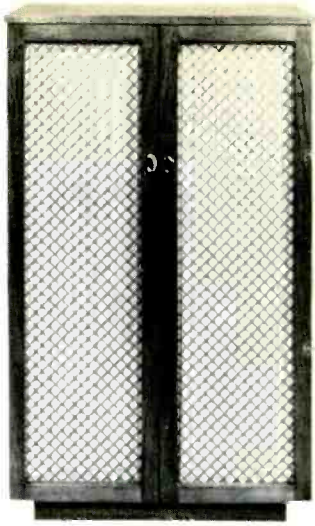


AR-1



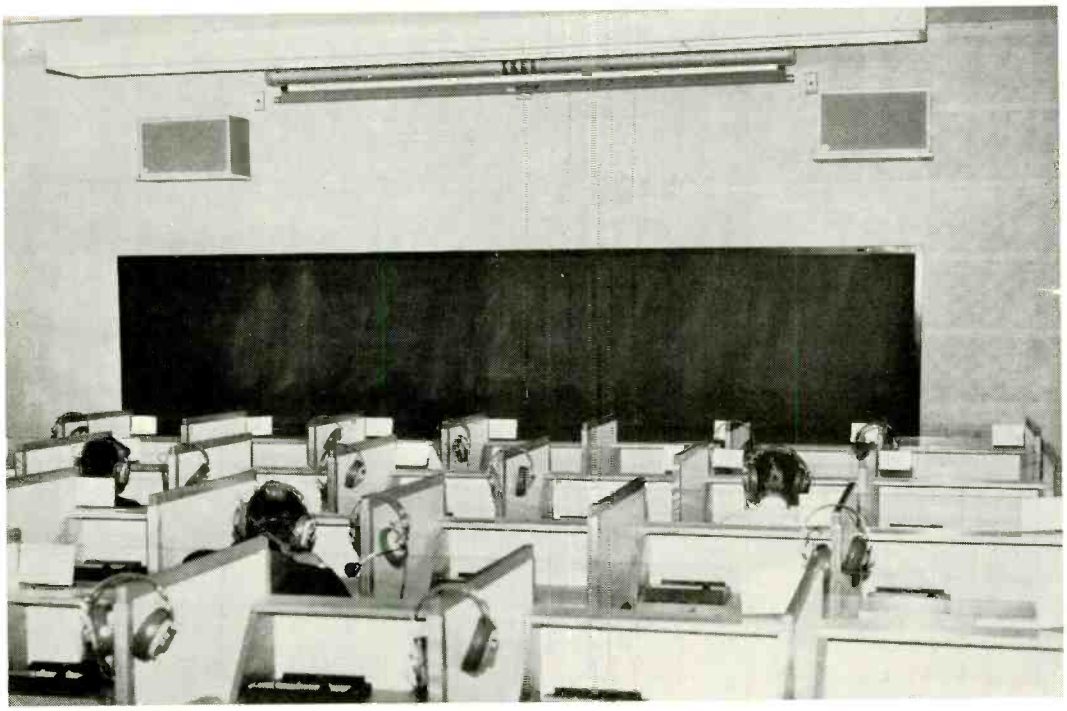
Empire 2000K

Bozak B-4000



MANUFACTURER (Circled number indicates ad page)	Model	WOOFER Diameter, In.	WOOFER Resonance	WOOFER Cone Material	MID-RANGE Diameter, In.	MID-RANGE Diaphragm Material	TWEETER Diameter, In.	TWEETER Diaphragm Material	Enclosure Dimen. in. W x D x H	Wood Finish	Grille Material, Color	Overall Frequency Response, Hz, ± dB	Crossover Freq's, Hz	Impedance, Ohms	Weight, lbs.	Price	SPECIAL FEATURES
ADC	404	6	–	paper	–	–	1½	Mylar dome	7¾ 8¼ 11⅞	oil walnut	cloth light	45-20k ±3	1000-4000	8	22	$ 56.00	
	200	6	–	paper	–	–	1½	Mylar dome	10½ 8 19	oil walnut	cloth light	40-20k ±3	1000-4000	8	18	79.50	
	303A	8	–	paper	–	–	1½	Mylar dome	11¾ 13 22¾	oil walnut	cloth light or dark	35-20k ±3	1000-4000	8	34	99.95	
	18	12 x 16	–	poly-styrene	–	–	1½	Mylar dome	17 12½ 40	oil walnut	cloth light or dark	20-20k ±3	1000-4000	8	80	195.00	
ACOUSTECH	X	All Electrostatic Stereo System							30 4 72	walnut	gray	30-30k	1300	–	175	1690.00	Incls. 4 built-in s/s ampls 500W music power; electr. crossover.
ACOUSTIC RESEARCH (59)	AR-3	12	44	Paper	2	Phen. dome	1⅜	Phen dome	25 11⅜ 14	Var.	Saran off white	–	1000 7500	4	50	203.00 225.00	Price depends on wood fi Walnut highest, unfinished lowest.
	AR-2a[X]	10	57	Paper	3	Paper cone	1⅜	Phen dome	24 11½ 13½	Var.	Burlap beige	–	1750 7500	8	36	109.00 128.00	Same as above.
	AR-2[X]	10	57	Paper	–	–	2½	Paper cone	24 11½ 13½	Var.	Burlap beige	–	1500	8	32	89.00 102.00	Same as above.
	AR-4[X]	8	68	Paper	–	–	2½	Paper cone	19 9 10	Var.	Burlap beige	–	1200	8	17	51.00 57.00	Same as above
RICHARD ALLAN	Min-ette	5	–	Paper	–	–	4	–	7 6¼ 11½	Teak	–	–	–	5, 8, or 15	–		
	SC 12 Mk. 11	12	–	Paper	8	–	4	–	19½ 7¾ 30	Teak	–	–	–	5, 8, or 15			
	Sara-bande	15	–	Paper	–	–	4	–	20 14 34	Teak	–	–	–	5, 8, or 15			
ALTEC	846A	15	25	Paper	Horn	Alum.	–	–	29¾ 27½ 19	Walnut	Fret-work Brown	35-22k	800	8-16	100	333.00	A7 "Voice of the Theatre" Components; fretwork grill
	A7-500 W-1	15	25	Paper	Horn	Alum.	–	–	42 32 25	Walnut	Fret-work Brown	30-22k	500	8-16	170	498.00	A7-500 "Voice of the Thea Components; fretwork grill
	847A	12	32	Paper	–	–	Horn	Mylar	26 19 14	Walnut	Fret-work Brown	40-22k	3k	8-16	60	231.00	Fretwork grille.
	890B	10	25	Paper	–	–	Horn	Mylar	25¾ 12 14½	Walnut	Fabric snap-on Neutral	40-22k	3k	8	30	169.00	Incls 10-in. free-suspensi phase inverter for low-end resp.

When the only consideration is natural sound, AR INC. speakers are used in professional systems—



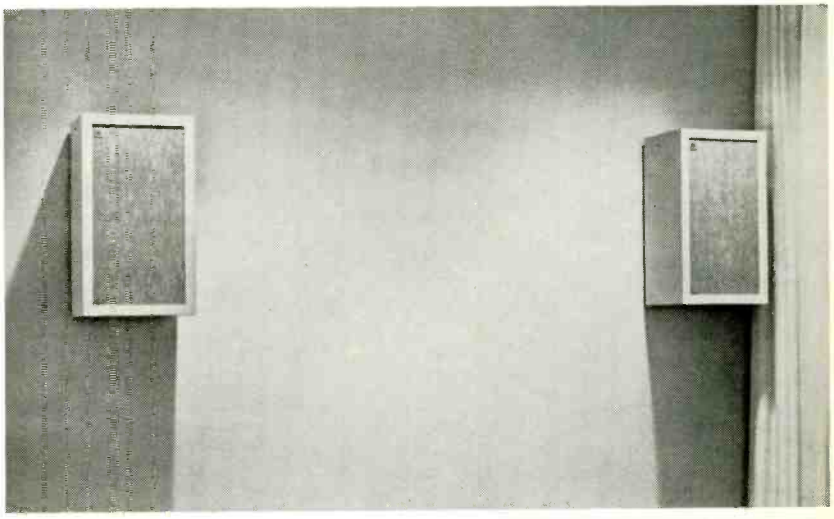
COURTESY LAVAL UNIVERSITY

for speech

Language laboratory of the Department of Linguistics, Laval University, Canada. Natural, uncolored reproduction of speech is one of the most exacting tasks for a loudspeaker; AR-2a[x]'s were chosen.

or for music.

One of the five listening rooms in the Library & Museum of the Performing Arts at New York City's Lincoln Center. AR-3 speakers were chosen (for all five rooms) because of their non-electronic, musical quality. The goal was to achieve an absolute minimum of artificial coloration.



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AR speakers are often used professionally, but they were designed primarily for the home. The price range is $51 to $225. A catalog of AR products—speakers and turntables—will be sent free on request.

ACOUSTIC RESEARCH, INC., 24 THORNDIKE STREET, CAMBRIDGE, MASSACHUSETTS 02141

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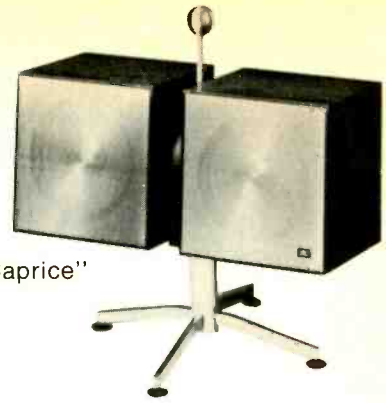
SPEAKER SYSTEMS

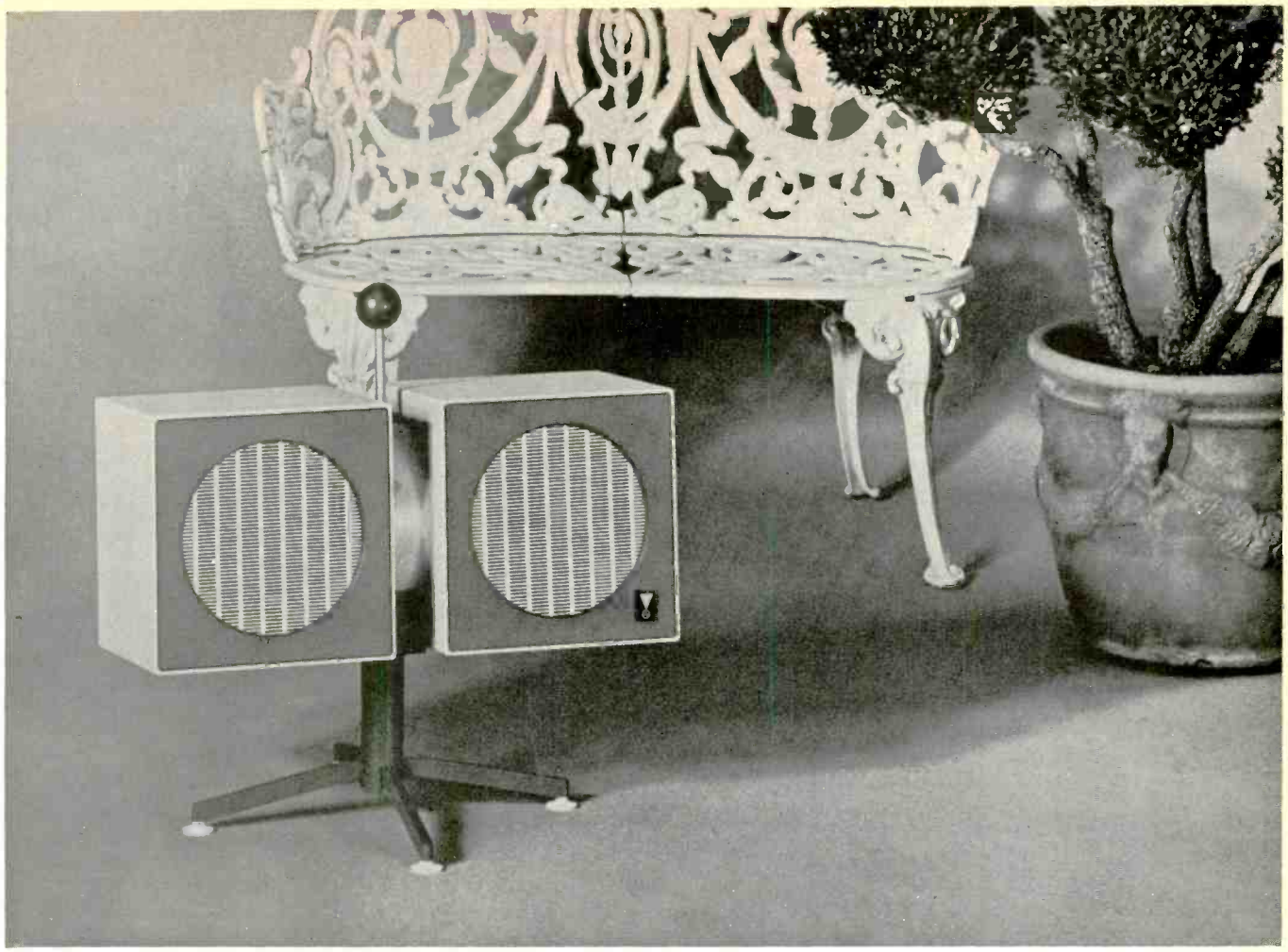
EMI 92

Electro-Voice EV-6



JBL "Caprice"

MANUFACTURER (Circled number indicates ad page)	Model	WOOFER Diameter, In.	WOOFER Resonance	WOOFER Cone Material	MID-RANGE Diameter, in.	MID-RANGE Diaphragm Material	TWEETER Diameter, in.	TWEETER Diaphragm Material	Enclosure Dimen, In. W x D x H	Wood Finish	Grille Material, Color	Overall Frequency Response, Hz, ± dB	Crossover Freq's, Hz	Impedance, Ohms	Weight, lbs.	Price	SPECIAL FEATURES
AMPEX	813	–	–	→	6x9 Dual Cone	Paper	–	–	9 5 7	Molded Cycolac	Fabric Brown	100-10k	–	8Ω	10 pr	29.95 pr	Slide on and fastens to Amp tape recorder.
	815	6	70	Paper	–	–	3½	Paper Cone	9½ 13½ 7½	Walnut	Fabric Tan	50-15k	1500	8Ω	22 pr	59.95 pr	
	830	8	62	Paper	–	–	3½	Paper Cone	15⅞ 13½ 8½	Walnut	Fabric Eggsh. White	45-15k	1500	8Ω	42 pr	99.95 pr	
	4010	12	55	Vinyl Paper	(2)-3	Paper	4	Horn	24 14 12	Walnut	Fabric Eggsh. White	30-15k	1800-8k	8-16Ω	58 pr	189.95 ea	
BENJAMIN (EMI)	62	10¾ x 6⅝	30	Alum.	–	–	3⅜	Paper	20½ 11⅛ 10	Oiled Walnut	Plas. Black	60-20k 3	5000	8	30	79.95	Alum. center-cone PVC edg suspension.
(12)	92	13½ x 8⅛	25	Alum.	–	–	3⅜	Paper	23⅛ 11 13/16 10¾	Oiled Walnut	Plas. Black	50-20k ±3	4500	8	36	109.95	Same as above.
	DLS 529N	13½ x 8⅛	20	Alum.	–	–	(2) 3⅜	Paper	24 13 12¼	Oiled Walnut	Plas. Black	40-20k 3	4500	8	43	169.95	Same as above.
	102	13½ x 8⅛	15	Alum.	–	–	(2) 3½	Paper	25 14 13¼	Oiled Walnut	Plas. Black	30-20k 3	4500	8	50	199.50	Same as above.
BOGEN	SS250	10	20	Paper	–	–	3¼	Paper Cone	23 10 13	Walnut	Cloth Beige	30-20k 3	1200	8	27	79.95	
BOZAK	B-4000 Clas-sic	12 (2)	40	Felted Paper	8	Metal Cone	2½ (8)	Metal Cone	26¼ 15⅝ 44½	Var.	Cloth w/met. grille Light	35-20k	200-1500	8	150	521.00	Two woofers, 1 mid-range, 8 tweeters, interchangeable grille.
	B-305	12 (2)	40	Felted Paper	8	Metal Cone	2½ (4)	Metal Cone	28 36 20	Var.	Cloth	35-20k	800-2500	16	140	406.50	Two woofers, 1 mid-range, tweeters, interchangeable grille.
(63)	B-302A	12	40	Felted Paper	8	Metal Cone	2½ (2)	Metal Cone	31 28 19	Var.	Cloth w/met. grille	40-20k	800-2500	8	100	321.50	One woofer, 1 mid-range, 2 tweeters, interchangeable grille.
	B-313	12	40	Felted Paper	8	Metal Cone	2½ (2)	Metal Cone	24½ 17¼ 12½	Wal.	Linen	45-16k	800-2500	8	76	217.50	1 woofer, 1 mid-range, 2 tweeters.
	B-410	12 (4)	40	Felted Paper	8 (2)	Metal Cone	2½ (8)	Metal Cone	36 52 19	Wal.	Cloth w/met. grille	28-20k	400-2500	8	225	824.00	4 woofers, 2 mid-range, 8 tweeters, interchangeable cloth.
ELECTRO-VOICE	E-V Eight	6	33	Paper	–	–	2½	Paper Cone	15¼ 6½ 8¼	Wal.	Cloth White	60-20k	2000	8	16	44.00	Gen. walnut veneer w/poly coating. Double-damped tweeter.
	E-V Seven-A	8	30	Paper	–	–	3½	Paper Cone	19 10 8½	Wal.	Cane Nat.	50-20k	2000	8	19	66.50	Cab. finish as above. Cane grille with black border. Brilliance control.
Cover (4)	E-V Five-A	10	24	Paper	–	–	2½	Paper Cone	21¾ 10⅜ 12¼	Wal.	Cloth White	30-20k	1000	8	22	88.00	Cab. finish as above. 4-lay woofer voice coil.
(1)	E-V Four	12	17	Paper	Horn	Mylar	5	Paper Cone	25 13½ 14	Wal.	Cane Nat.	30-20k	800-3500	8	39	138.00	Etched-circuit crossover w step-type level controls.
	E-V Six	18	15	Foam Polysty-rene	8 Cone & Horn	Paper Mylar	Horn	Phen.	32 17½ 30	Oil. Wal.	Cane Nat.	30-20k	250-800-3500	8	107	333.00	Woofer has 4 lb. 10 oz. cera mag.



For the first time...

Full-Range, Full-Fidelity Sound Indoors or Outdoors with the JBL FESTIVAL!

Until the introduction of the JBL Festival, the high fidelity listener had to be content with compromised sound for outdoor applications.

No further compromise is necessary. JBL has taken the famous LE8T and PR8 (so popular in JBL's Lancer 44 and Trimline 54 indoor systems) and has housed them in a decorator enclosure of tremendous flexibility. The JBL Festival is totally portable, water-resistant, and delivers the full spectrum of sound to patio, porch, pool-side, or lawn. It can be tilted to face the optimum area of sound coverage and locked with a twist of its convenient carrying handle. It can even be mounted to eaves or ceiling beams by using the hangers supplied.

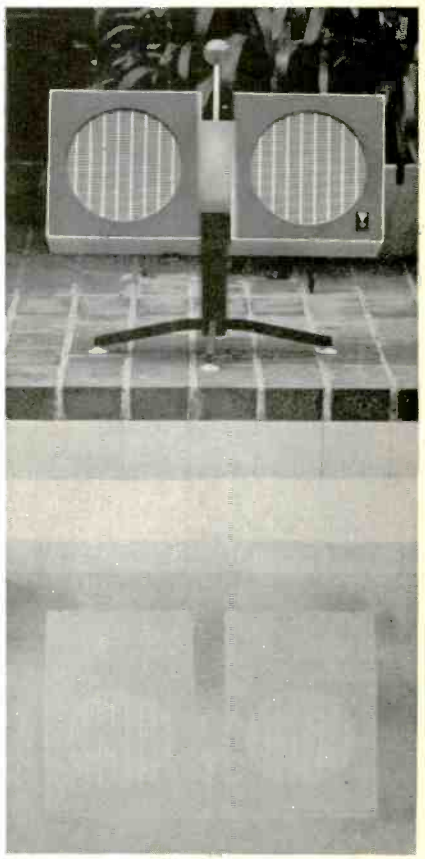
The JBL LE8T is undoubtedly the world's finest full-range transducer, a 6½ pound magnetic assembly, larger and more powerful than those used in most 15-inch loudspeakers...a highly sophisticated suspension for linear cone travel up to ½-inch...an exclusive pure silver impedance-controlling ring that increases the speaker's efficiency more than fourfold in the 20,000 cps region...JBL precision tolerances and hand craftsmanship throughout.

JBL's PR8 Passive Radiator effectively doubles the LE8T's bass radiating area to deliver solid low frequency fundamentals, even out of doors where bass tends to "fade". At the same time, the PR8 maintains the sealed, weather-proof character of the L59 enclosure.

JBL

The JBL Festival is a superb loudspeaker system for indoor use. It is the only loudspeaker system designed to deliver full-range fidelity outdoors as well!

3249 Casitas Avenue, Los Angeles, California 90039



SPEAKER SYSTEMS

MANUFACTURER (Circled number indicates ad page)	Model	WOOFER Diameter, In.	WOOFER Resonance	WOOFER Cone Material	MID-RANGE Diameter, In.	MID-RANGE Diaphragm Material	TWEETER Diameter, In.	TWEETER Diaphragm Material	Enclosure Dimen. In. W x D x H	Wood Finish	Grille Material, Color	Overall Frequency Response, Hz, ± dB	Crossover Freq's, Hz	Impedance, Ohms	Weight, lbs.	Price	SPECIAL FEATURES
EMPIRE (12)	8000 P	12	25	Paper Cone	4-in Comp	Phen.	1	Comp.	16 D x 29	Satin Wal.	None	25-20k	450-5000	8	85	249.95	Pedestal encl. w/wide-ang acoustic lens & marble top
	9000 M	15	20	Paper	4-in. Comp	Phen.	1	Comp.	22 D x 29	Satin Wal.	None	20-20k	450-5000	8	120	299.95	Same as above.
	8400	12	25	Paper	4-in. Comp	Phen.	1	Comp.	13 7/8 12 3/4 25	Satin Wal.	None	25-20k	450-5000	8	70	219.95	Front-loaded hyperbolic ho w/wide-angle acoustic lens
	8500	12	25	Paper	4-in. Comp	Phen.	1	Comp.	18 3 30	Satin Wal.	None	30-20k	450-5000	8	60	174.95	Built-in wall unit.
	4000 M	10	30	Paper	3-in. Comp	Phen.	1		18 D x 25 H	Satin Wal.	None	30-18k	1500	8	75	159.95	Pedestal encl. w/wide-angl lens, comb. mid/tweeter, marble top.
	2000 M	10	30	Paper	3-in. Comp	Phen.			18 1/2 12 12	Satin Wal.	—	35-18k	1500	8	44	109.95	Marble top or cushion top; comb. mid/tweeter.
FISHER (39)	XP-33	6	35	Paper	—	—	2 1/2	Poly Cone	13 6 7	Wal.	Woven Cloth Wal.	38-18.5k	2000	8	10	99.00 pair	Compact, half-roll surround woofer; plasticized surroun urethane ctrd. on tweeter.
	XP-55	8	33	Paper	—	—	2 1/2	Poly Cone	20 9 10	Wal.	Woven Cloth Wal.	37-19k	1000	8	20	59.50 ea.	Compact, long-throw, wide e cursion, half-roll surround. on woofer. Tweeter uses lo mass poly. foam.
	XP-7	12	16-18	Paper	5 (2)	Paper	1 1/2	Soft Cotton Dome	24 1/2 12 14	Wal.	Woven Cloth Wal.	30-20k	300-2500	8	45	149.50 ea.	3-way system w/2 mid-rang drivers. Woofer has outside surround. butyl impregnated Tweeter of soft-cloth dome
	XP-15	12 (2)	15-17	Paper	(2) 6 (2) 5	Paper Paper	1 1/2	Soft Cotton	27 14 27	Wal.	Woven Cloth Wal.	26 to beyond aud.	300-1000-2500	8	90	299.50 ea.	4-way consolette sys. w/7 Eddy-crnt. damped woofer. S low-mid, upper-mid, and tre bal. controls.
FRAZIER	Espana I	12	25	Paper	8	Paper Cone	(2) 3 1/4	Paper Cone	27 1/4 16 1/2 30	Dark Oak	Linen Off White	28-19k	1200 3300	8	100	239.95	Matching equip. Cab. avail. $199.95; w/Tape platform $224.95.
	Espana II	10	32	Paper	—	—	(2) 3 1/4	Paper Cone	14 12 24	Dark Oak	Linen Off White	32-19k	3300	8	36	w/base 139.95	w/o base $129.95.
	F12-4-T Mark V	12	25	Paper	(2) 5 1/4	Paper Cone	Horn	Metal	14 12 26 1/2	Wal. Black Util.	Linen Off White	30-17k	800 3300	16	55	174.50 144.50	Oil Walnut or Black Utility
	F8-3-M Manhat-tan	8	80	Paper	—	—	3 1/4	Paper Cone	23 7/8 19	Oil. Wal.	Linen Off White	40-15k	3300	8	45	99.50 94.50	w/base w/o base
HARMAN-KARDON	HK 40	10	26	Paper	—	—	3 1/2	Phen. Cone	13 5/8 8 22 7/8	Oil. Wal.	White	30-18k	2500	4	30	70.00	
	HK 30	8	29	Paper	—	—	3	Phen. Cone	16 1/2 18 11 1/8		White	40-18k	2500	4	23	100.00	
HARTLEY (89)	V Concert-Master	24	8	Poly-mer	10	Poly.	3	Poly.	39 29 18	Oil. Wal.	Cloth Brown	16-25k	350 2000	16	100	600.00	Uses similar materials in cones for smooth crossove
	III & IV Concert-Masters	18	17	Poly.	10	Poly.	3	Poly.	38 29 16	Oil. Wal.	Cloth Brown	16-25k	350 2000	16	90	495.00 525.00	
	Jr. Concert-Master	10	28	Poly.	7	Poly.	2	Poly.	34 24 14	Oil. Wal.	Cloth Brown	20-25k	1500	8	75	395.00	
	Holton A & B	10	28	Poly.	—	—	3	Poly.	34 24 14	Oil. Wal.	Plain Light Tan	20-25k	2000	8	70	245.00	Full-range coax; auto. cros dual cone - dual vc.
HEATH (7)	AS-10	10	58	—	(2) 3 1/2	Paper Cone	—	—	24 11 1/2 13 1/2	Unf. or Wal.		30-15k ±5	2250	16	28	59.95 64.95	Acous. susp, handles 10-4
	AS-15	12	25	—	2	Plas. Dome	1	Plas. Dome	18 1/2 19 32 3/8	Wal.		40-20k	1000-10k	8	69	134.95	Avail. w/o cab., $89.50. 5 2 level conts., kit.
	AS-16	8	31	—	3 1/2	Cone	—	—	19 9 10	Wal.		45-20k ±5	1500	8			
	AS-21	(2) 12	—	—	Horn with Driver		—	Alum. diaph.	32 19 32 1/2	Wal.		30-22k	800	16	98	239.95	Altec Lansing mechanisms work & cab. completely as

Full-Sized Bozak Speakers Don't Cost More

They Just Look and Sound Better

For instance, your Bozak dealer can show you how to own a Model B-300 full-size, two-way system, like those shown, for as little as $152.50*. Ask him about the many ways Bozak makes it easy for you to enjoy natural music reproduction for a modest investment.

Bozak

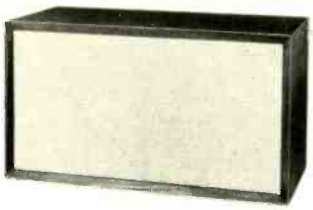
DARIEN, CONNECTICUT

*Slightly higher in the Deep South and Far West.

Check No. 126 on Reader Service Card

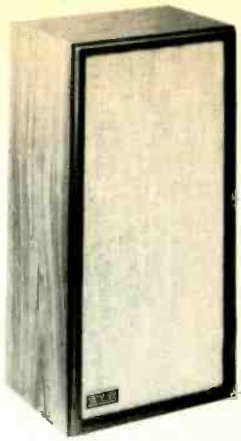
SPEAKER SYSTEMS

Leak Mark II



Rectilinear VI

UTC Maximus 33



KLH 17

MANUFACTURER (Circled number indicates ad page)	Model	WOOFER Diameter, In.	WOOFER Resonance	WOOFER Cone Material	MID-RANGE Diameter, In.	MID-RANGE Diaphragm Material	TWEETER Diameter, In.	TWEETER Diaphragm Material	Enclosure Dimen., In. W x D x H	Wood Finish	Grille Material, Color	Overall Frequency Response, Hz, ± dB	Crossover Freq's, Hz	Impedance, Ohms	Weight, lbs.	Price	SPECIAL FEATURES
IMF	TLS	13x 9	25	Alum and Plas	2½	Plas	¾	Plas	24 16½ 40	Wal.	White	20-30k 2	250-4000	8-16	90	400.00	Transm. line of 33 In. on mid-range; transm. line on bass u
	IFB	13x 9	25	Alum and Plas	2½	Plas	¾	Plas	20 14 35	Wal.	White	40-30k 5	250-4000	8-16	60	295.00	Transm. line on mid-range; infinite baffled bass.
	Ditton 15	8	–	Impreg. paper	–	–	1½	Pressure Fabric	9½ 9¼ 21	Teak	White	30-15k	3000	8	20	99.00	Aux. bass radiator.
JBL	JBL88	12	28	Paper & Lans-a-plas	–	–	1.7	Paper Cone	23½ 13⅜ 14¼	Oil. Wal.	Fabric Brown	–	2000	8	46 *	180.00	Avail. w/SE408S energizer. * Shipping weights.
	Caprice	8	–	Passive rad	8 full range	Paper & Lans-a-plas	–	–	22 10 22	Oil.Wal. Rose-wood	Perf. Alum.	–	–	8	46 *	165.00	Tilts for optimum coverage. "FESTIVAL" is similar, but w/proof for outdoor use, $135
	Sover-eign II S7	15	20	Paper	–	–	Horn	Acous lens	26½ 20 26½	Pecan Oak	Fabric Gold	–	500	8	100 *	648.00	Avail. w/SE408S Energizer.
(61)	Lancer 101	14	25	Paper/ Lans-a-plas	–	–	Horn	Acous lens	17½ 12⅜ 23	Oil.Wal.	Wood Fretwrk. Walnut	–	1500	8	88 *	354.00	Imported marble top; compact
	Lancer 77	10	20	Paper/ Lans-a-plas	–	–	1.7	Paper Cone	22½ 11¾ 14	Oil. Wal.	Fabric Dk.Brn.	–	2500	8	42 *	156.00	JBL passive radiator; 14-ele HF lens.
	Olym-pus S7R	15	20	Paper	–	–	Horn	Acous lens	40 20 26½	Oil. Wal.	Wood Fretwrk. Walnut	–	500	8	165 *	666.00	JBL passive radiator; slant-plate treble lens.
JENSEN	TF-4	10	30	Paper	8	Paper	(2) 3½ 1	Cone Sono-Dome®	25½ 8¾ 16	Oil.Wal. or Unf.	Pleated Cloth Olv.Gry.	25-20k	600 4000 9000	8	38 *	142.00	5-spkr, 4-way, slender book s * Shipping weights.
	PR-400	15	20	Paper	5½	Sono-Dome®	1	Sono-Dome®	34 14¼ 29½	Oil. Wal.	Cloth Brown	20-20k	1000 5000	8	89 *	335.00	3-spkr, 3-way console.
	PR-300	12	25	Paper	5½	Sono-Dome®	1	Sono-Dome®	26½ 14 5/16 19¼	Oil. Wal.	Cloth Brown	20-20k	2000 9000	8	65 *	237.00	3-spkr, 3-way hi-boy/lo-boy.
KARLSON	X-15A	15	–	Paper	–	–	Spec. Horn	–	20½ 14 28	Dark Wal.	Plastic Henna & Blk.	12-20k ±2	3500	16	90	299.00	Blk. walnut; resp. 20-1000, ±1 1000-6000, ±1.5 dB; unfin. birc $279; util.mon., $249.
	APX-10	10	40	Paper	–	–	–	–	14¾ 30 11	Vinyl Fabric	Plastic Blk. & Silver	35-15k	–	8	35	249.00	New type projector for hi-leve uniform covrge. of large audiences.
KNIGHT	KN 2360	12	–	Paper	10 Pass. rad.	Paper	2	Comp. Driver	23½ 12¼ 14	Oil. Wal.	Cloth White	25-> aud.	2000	8	46 *	159.95	* Shipping weights.
	KN 2380	15	–	Paper	Horn	–	–	Dome	20½ 14 30¼	Oil. Wal.	Cane Straw	20-> aud.	2000 10k	8	55 *	149.95	
(35)	KN2300 LK	12	–	Paper	Horn	–	–	Dome	25 13½ 14	Wal. Ven.	Cloth Choc. Brown	25-20k	1000-5000	8	46 *	89.95 69.95 K	Assembled Kit
	KN2260 K	12	–	Paper	8	Paper Cone	–	Horn	25 8 17	Wal. Ven.	Cane Straw	30-20k	3000 8000	8	40 *	74.95 59.95 K	Assembled Kit
	KN 2310 K	4	–	Cloth Roll	–	–	3	Paper Cone	10⅜ 7 5⅜	Oil. Wal.	Cane Brown	50-18k	4500	8	10 *	39.95 29.95 K	Assembled; extremely compa Kit

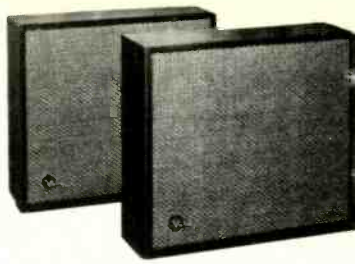
UFACTURER led number ates ad page)	Model	WOOFER Diameter, in.	WOOFER Resonance	WOOFER Cone Material	MID-RANGE Diameter, in.	MID-RANGE Diaphragm Material	TWEETER Diameter, in.	TWEETER Diaphragm Material	Enclosure Dimen. in. W x D x H	Wood Finish	Grille Material, Color	Overall Frequency Response, Hz, ± dB	Crossover Freq's, Hz	Impedance, Ohms	Weight, lbs.	Price	SPECIAL FEATURES
'SCH	Klipschorn K-347	15 Horn	–	Paper	2 Horn	Phen.	1 Horn	Phen.	31¼ 28½ 52	Oil.Wal. Mahog. Blond	Several	30-19k	400 6000	16	180	519.00/ 875.00	Depending on finish.
	Cornwall	15 Horn	–	Paper	2 Horn	Phen.	1 Horn	Phen.	24 18 36	Maple Birch Unf.Fir	Several	30-19k	600 6000	16	105	311.00/ 415.00	Depending on finish.
	Model H	12 Horn	–	Paper	2 Horn	Phen.	1 Horn	Phen.	15 13⅛ 21½	Same as above	Several	45-19k	700 6000	16	47	188.00/ 225.00	Depending on finish.
	Rebel 7	12	–	Paper	–	–	1 Horn	Phen.	15 13⅛ 21½	Oil. Wal.	Cloth White	45-13.5k	650 6000	16	40	174.00	
	22	8	65	Paper	–	–	2	Stiff Paper	18 7¼ 10¾	Oil. Wal.	Cloth Lt.Brn.	–	800 nom.	8	18	54.95	Finished 4 sides; efficient acous. susp. design.
	17	10	60	Paper	–	–	1¾	Stiff Paper	23⅛ 9 11¾	Oil. Wal.	Cloth Off White	–	1500	8	27	69.95	Finished 4 sides; 3-pos tweeter cont.; acous. susp. woofer; min. of 12 W.
	6	12	55	Paper	–	–	1¾	Stiff Paper	23½ 11⅞ 12⅝	Several	Boucle Clth.off White	–	1500	8	34	122.00/ 134.00	Acous. Susp. woofer; 3-pos tweeter cont. Finished 4 sides; avail. in unf.bir,mahog,cherry,wal,& oil wal.
	5	12	44	Paper	3	Stiff Paper	1¾	Stiff Paper	26 11½ 13¾	Oil. Wal.	Cloth Light Brown	–	500, 4000	8	51	180.00	Finished 4 sides; acous. susp. woofer; (2)-3-pos level conts. changeable grille cloth.
	12	12	35	Paper	3	Stiff Paper	1¾	Stiff Paper	22¼ 15 29	Oil. Wal.	Boucle Clth.off white	–	500, 4000	8	109	275.00	Sep. contour cont. w/4 switched level conts.
	6	10	30	Paper	3½	Paper Cone	3½	Paper Cone	21 12 12½	Oil. Wal.	Blk.Vnyl. Clth.Blk. & Gold	38-18k 4	650, 3000	4	28	130.00	Full-freq. dispersion over 90-deg.; THD less than 5%.
	8	6½	25	Paper (cloro susp.)	–	–	3½	Paper	14 12 10	Oil. Wal.	Vinyl Clth.Blk. & Gold	48-18k 3	1500	4	20	55.00	Option of 360-deg. dispersion; ultra-low har. dist.
AYETTE	Criterion 3X	12	30	Plastic Coated Paper	6½ Cone	Paper	3 Dome	Alum.	22½ 11¾ 13¼	Oil. Wal.	Cloth White	20-25k	1200, 6k	8	–	89.95	Acous. susp. HF & mid-range conts. Finished 4 sides.
	Criterion 200A	12	40	Foam Treated Paper	8 Cone	Paper	3 Dome	Alum.	24 12 14	Oil. Wal.	White & Gold	20-25k	700, 5k	8	30	69.95	As above, but no acous. susp.
	Criterion 100A	10	45	Paper	–	–	4 Cone	Paper	21½ 10½ 11¾	Oil. Wal.	White & Gold	20-19k	2800	8	25	44.95	HF brilliance cont. Finished 4 sides.
	Criterion 50	8	45	Paper	–	–	4 Cone	Paper	19 8⅝ 10¾	Oil. Wal.	White & Gold	35-18k	3000	8	9	29.95	Finished 4 sides.
	Sandwich MK. II	13	-	*	-	-	3½	*	15 12 26	Wal.	Boucle Brn.	3-18k 3	900	15	49½	199.00	*Cones are "sandwiches" of polystyrene foam between alum. foil skins.
	Mini-Sandwich	12 8	-	*	-	-	3½	*	18½ 7 11	Teak	Woven Plas. Brn.	50-18k 3	900	15	22	135.00	*As above.
AMINY	Z-900	2-11	-	Paper Cone	4 Janszen Model 130 Electrostatic Radiators				31¼ 15½ 28	Oil Wal.	Cloth	27-30k	1200*	8	110 **	399.95	*Mechanical crossover on woofer, elec. on mid/high radiator. Reqs. 117 V, 60 Hz 5-ply, 4 W. ** Shipping weights.
	Z-600	11	-	Paper Cone	2 Janszen Model 130 Electrostatic Radiators				20 13 26⅝	Oil Wal.	Cloth	30-30k	1200*	8	65	208.95	Equals ½ of above system.
	Z-700	11	-	Paper Cone	Same as above				26 13¾ 15	-	Cloth	-	1200*	8	54	154.95	Bookshelf style; similar to above in componentry.
	Jan Kit 41	11	-	Paper Cone	Same as above				16 7½ 19½	User's Choice	User's Choice	30-30k	1200*	-	18	114.95	Component ass'y same as Z-600; for installation in user's cab. of approx. 2 cu.ft. vol. Mtd. on ½-in. panel.
ER	CS-20	5	70	Paper	-	-	2	-	8 8½ 13¼	Oil Wal.	Cloth Black	70-20k 5	2500	8	7½	35.00	High efficiency. Matched-grain cabinet.
	CS-24	8	70	Dual Paper Cone	-	-	-	-	16⅛ 4¾ 10⅝	Wal.	Metal Black or Silver	70-15k 5	-	8	7½	27.50	Slim-line design, spun metal grille.
	CS-61	12	15	Paper	5	Paper	(2)2½ and Horn	Paper	16½ 13 24⅞	Oil Wal.	Cloth Brn.	30-20k 5	600 4000	8	40½	175.00	5-speaker, 3-way system.
	CS-63	15	15	Paper	6½ plus Horn	Paper	2½	Paper	19¼ 13¼ 28⅞	Oil Wal.	Cloth	25-20k 5	700 3000 12000	8	75	246.25	Complete 4-way bookshelf system w/15-in. woofer.

SPEAKER SYSTEMS

University "Cantada"

Wharfedale W70D

Viking 4400



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RECTI-LINEAR	Recti-linear III	12	22	Paper	5	Paper	2½	Paper	12 18 35	Varnish Nat'l. Wal.	Fibre-glass White	22-18.5k 4	250 3000 11000	8	65	279.00	Light-moving-mass componer and high sensitivity.
	Recti-linear VI	10	26	Paper	5	Paper	2½	Paper	11⅜ 14 25	Varnish Nat'l. Wal.	Fibre-glass White	26-18.5k 4	250 3000 11000	8	40	239.00	Same as above.
ROLA CELESTION	Ditton 15	8	8	Plastic	8	Paper Plastic	¾	Phen.	21 9¼ 9½	Teak Wal.	Cloth Blk. & Gold	30-15k	60 3000	4	20		Aux. bass radiator, 30-60Hz. Handles 30 watts peak at 30
	Ditton	5	30	Paper	-	-	¾	Phen.	12¾ 6¼ 6¼	Teak Wal.	Perf. Alum. Pale Gold	35-15k	3500	4 16	13		Compact monitor system.
SANSUI (41)	SP-100	10	-	Paper	5	Paper	2 Horn	Mylar	14 3/32 11 45/64 24 7/16	Oil Wal.	Fret. Work Walnut	45-20k	1500 5000	8	34.6	139.95	Hand-carved grille, three-po tion level cont.
	SP-200	12	-	Paper	(2) 5	Paper	(2)2 Horn	Mylar	14 15/16 12 19/32 25 25/32	Oil Wal.	Fret. Work Walnut	35-20k	1500 5000	8	40.6	179.95	As above with 5 speakers.
SONY (33) (77)	SS-3300	12	27	Paper	5	Paper	2	Plastic	22 7/8 14½ 31½	Oil Teak	Black	30-20k	500, 3000	16	82	349.50	Sep. sw. for multi-channel u
SHERWOOD (16)	SR-1	10	23	Paper	-	-	4	Paper	24 9½ 13	Oil Wal.	Plastic Cane Brown	53-17k 2.5	1800	8	33	84.50	Birch and utility models ava air-susp. woofer.
	SR-2	10	23	Paper	8	Paper	3½	Paper	24 9½ 13	Oil Wal.	Plastic Cane Brown	53-18k 2.5	800 3000	8	36	99.50	As above.
	SR-3	12	21	Paper	8	Paper	3½	Paper	26¼ 13¼ 15	Oil Wal.	Plastic Cane Brown	48-18k 2.5	800 3000	8	55	139.50	As above, w/omni-polar tweeter.
	SR-4	(2) 10	19	Paper	8	Paper	3½	Paper	24 13 31½	Oil Wal.	Plastic Cane Brown	38-18k 2.5	200, 800, 3000	8	73	219.50	As above, w/omni-polar tweeter, 2 air-susp. woofers
TANDBERG	112-7	10 x6	-	-	-	-	2	-	20½ 10 10¼	Teak or Rose-wood	Teak	60-16k	-	3.2	-	74.50	
	114/ 116-8	10	-	-	-	-	2½	-	27½ 11 13¾	Teak or Rose-wood	Teak	45-16k	-	4	-	99.50	
	113/ 106-10	6½	-	-	-	-	2	-	7⅛ 9⅛ 9⅛	Teak or Rose-wood	Teak	60-16k	-	4	-	49.50	113/106-11 same specs. w/12⅝x 6 x 8½ dimen.
TANNOY	GRF	15	32	Paper	–	–	2 Horn	Dura-lumin	23¾ 17 42	Oil. Wal.	Woven Plastic Nat.	35-20k 3	1000 350	16	120	$385.00	Rear horn - loaded; 15-in. concentric.
	DAL-TON	12	35	Paper	–	–	2 Horn	Dura-lumin	22 15 23¾	Oil. Wal.	Woven Plastic Nat.	35-20k 3	1700	16	70	215.00	Bass reflex; 12-in. dual c tric.
	CADET	10	27	Paper	–	–	2 Horn	Dura-lumin	23¾ 11 13½	Oil. Wal.	Woven Plastic Nat.	35-20k 5	1800	16	43	149.75	Infinite baffle bookshelf; dual concentric.
	AUDIO-METRIC TOWNS-MAN	12	20	Paper	–	–	1	Fiber Plastic	23 10½ 13½	Oil. Wal.	Woven Plastic Nat.	38-20k 6	2000	16	26	110.00	Separate tweeter and woof Finished 4 sides

SPEAKER SYSTEMS

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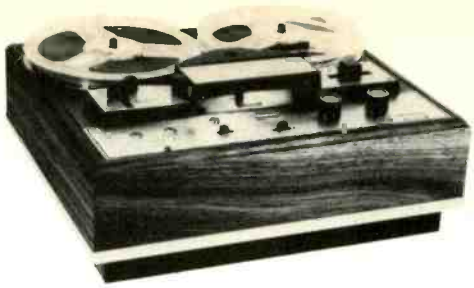
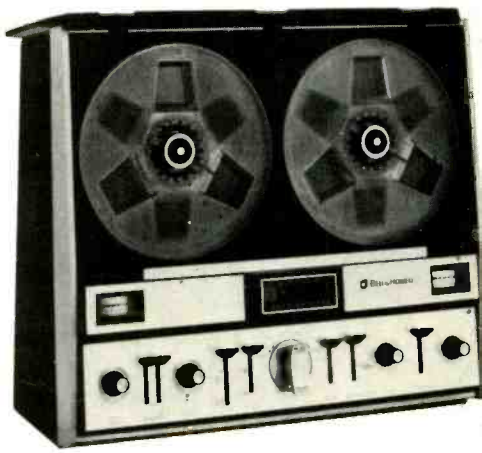
EFUNKEN	086	(3) 5½	–	–	(2) 4	–	–	–	19 12 6.5	Oil. Wal.	Cloth Gray	50-16k 2	800	4 4000	26	520.00	Built-in 30-W s/s ampl.; 1.f. eq./s sw; a.c. or batt. oper; designed as prof. mon. skr.
SOUND	Maximus 33	8	35	Paper	–	–	4	Paper	18 9 11	Oil. Wal.	Boucle Cloth White	35-15k	2k	8	26	56.00	
	Maximus 55	12	35	Paper	6	Paper	4	Paper	24 12 14	Oil. Wal.	Boucle Cloth White	30-20k	2k 5k	8	33	99.50	
	Maximus 5	12	28	Vinyl Paper	4	–	4	Paper	24 12 14	Oil. Wal.	Pattern Olive & blk.	30-20k	1.8k 5k	8-16	52	129.00	
ERSITY UND	Ultra D	10	16	Stiff Paper	4	Stiff Paper	3½	Stiff Paper Cone	23 13/16 11 7/8 9¾	Oil. Wal.	Cloth Egg Shell	30 >Aud	1000 5000	8-16	24	69.95	Air susp. brll./pres. con. 5-yr. warranty, all speakers.
	Mediter-ranean	12	18	Stiff Paper	8	Stiff Paper	Horn	Phen	24 3/8 dia. 22½	Butter-nut	Cloth Beige	20 >Aud	800 5000	8	74	269.50	Mediterranean commode doubles as end table - 3-way elect. conts.
	Cantada	12	25	Stiff Paper	8	Stiff Paper	Dome	Phen	23½ 15¾ 12¼	Oil Wal.	Cloth Applique Beige, Br.	23-40k	600, 4000	8-16	40	145.00	Applique grille cloth rrl encl. Brll. pres. cont., tweeter ±2db to 22kHz.
(48)	Hombre	12	45	Stiff Paper	8	Stiff Paper	Dome	Phen	25¾ 20¾ 12½	Oil Wal.	Plastic Cloth Beige, Br.	30-40k	3000	8	44	125.00	RRL enclosure – patented Sphericon tweeter – brilliance control.
(49)	UR-4	8	-	Stiff Paper	-	-	2½	Stiff Paper Cone	19 10½ 9	Oil Wal.	Cloth Beige Gold	35- >Aud.	2000	8	14	58.95	RRL enclosure.
(91)	Laredo	12	-	Paper	8	Paper Cone	-	Spher-icon	15 12 24	Oil. Wal.	Cloth Brn.	35-40k 4	600 1500* 3000	8	38	109.50	*Mechanical crossover between main 8-in. cone and subsidiary free-edge radiator.
	Estoril	12	-	Paper	-	-	-	Spher-icon	14 12 26½	Oil. Wal.	Cloth Brn.	25-40k	1000* 3000	8	40	164.50	*Mech. crossover; sep. 12-in. "Aerodynamic Bass energizer" non-elect. mass-loaded cone reinforces l. f. range.
	Sorrento II	12	-	Paper	8	Paper	-	Horn	26⅛ 16⅜ 22½	Sev-ille Blue	Cloth Lt.	20- >aud. 3	800 3000* 5000	8	60	289.00	*Mech. crossover in mid-range unit. Slate top, brass screen in front of grille cloth.
TRONICS	HS1A	12	45	Paper	-	-	5	Paper Cone	25¾ 14 15	Oil Wal.	Cane Beige	30-18500	4500	8	46	79.95	3 spkr., 2-way, bass reflex.
	HS3	12	45	Paper	8	Paper Cone	5	Paper Cone	33 18¾ 30½	Oil Wal.	Cane Beige	20-20k	400, 2500	8	120	229.95	8 spkr., 3-way ducted port.
(84)	PT4C	8	65	Paper	-	-	3½	Paper Cone	18 3⅛ 12	Herculex	Cane Beige	60-13.5k	4500	8	7	24.95	Extra thin for wall mtg.
	PRO1	10	20	Paper	-	-	3½	Paper Cone	24 12 12	Oil Wal.	Cane Beige	30-19,5k	2500	8	41	94.95	2-way, acous. susp.
G	4400	8	80	Paper	-	-	3½	Paper	16 14 5	Oil Wal.	Cloth Brown Cane	20-20k	2500	8	25*	120.00*	Sold as system – 2 encls w/ built-in pwr. ampl; ster phone jack, on/off switch, vol cont, bass boost sw. *price and weight for pair.
FEDALE	W90D (4-way)	12½ 12½	20 22	Poly. Paper/ Cloth Cmpd.	(2) 5	Bake-lized	(2) 3	Mylar Dome	30 13½ 23¾	Oil Wal. Pol. Wal. Unf. Bir.	-	20-Aud.	75, 1000, 4000	4-8	115	294.00 315.00 279.00	Oiled Wal. Polished Walnut Unfinished
	W70D (4-way)	12½	22	paper/ cloth Cmpd.	8 5	Paper/ Cloth Bake-lized	3	Mylar Dome	22¾ 13⅝ 24	Same as Above	-	25-20k	175, 1250, 3500	4-8	74	188.00 203.00 175.00	Oiled Walnut Polished Walnut Unfinished
(5)	W60D (3-way)	12½	22	Paper/ Cloth Cmpd.	5	Bake-lized	3	Mylar Dome	24 13 14¼	Same as Above	-	30-20k	1000, 3500	4-8	52	135.25 146.75 123.00	Oiled Walnut Polished Walnut Unfinished
	W40D (3-way)	10	35	Paper/ Cloth Cmpd.	5	Bake-lized	3	Mylar Dome	23½ 10⅛ 12⅛	Same as Above	-	35-20k	1250, 3500	4-8	40	94.00 98.70 86.00	Oiled Walnut Polished Walnut Unfinished
	W30D (2-way)	8	35	Paper/ Cloth Cmpd.	-	-	3	Mylar Dome	10 9¼ 19	Oil Wal.	-	40-18.5k	2000	4-8	22	59.95	Oiled Walnut
	W20D (2-way)	8	35	Paper/ Cloth Cmpd.	-	-	3	Mylar Dome	14 8½ 9¾	Oil Wal.	-	45-18k	1600	4-8	14	49.95	Oiled Walnut.

TAPE RECORDERS



BSR TD1020

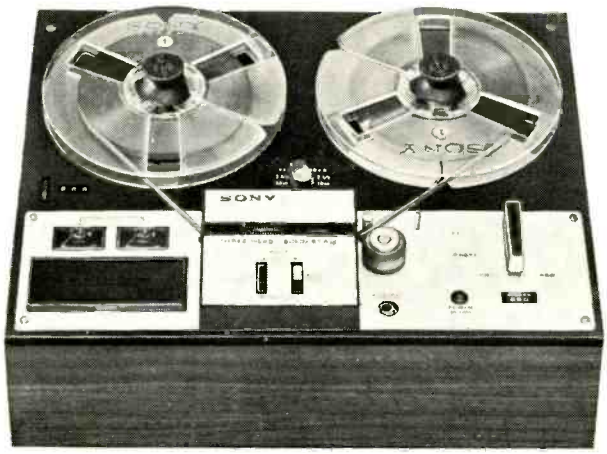
Concertone 302



Bell & Howell 2297

MANUFACTURER (Circled number indicates ad page)	Model	Speeds	No. of Heads	Tracks	No. of Motors	Drive Motor Type	Reel Motors - Type	Drive to Capstan	Rew. & F. Forward Drive	Max. Reel Size, in.	Wow and Flutter at 7½, %	Wow and Flutter at 3¾, %	Timing Accuracy, %	Rewind 1200 ft., sec.	Built-in Power Amps ?	Mic Input Sens, mV.	Mic Input Imp, ohms	High Level Imp, ohms	Mixing Facility ?	Vol. Indicator Type	Line Feed Output ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
ALLIED RADIO (35)	TP 1030	1⅞ 3¾ 7½	2	4	1	4-p	-	Belt	Belt	7	0.15	0.25	99.7	90	No	2	10k	600	No	2 VU Meter	Yes	15½ 13 7	24	129.95	Headphone output w/vol. control.
	TR 1040	1⅞ 3¾ 7½	2	4	1	4-p	-	Belt	Belt	7	0.15	0.25	99.7	90	Yes	2	10k	600	No	2 VU Meter	Yes	15½ 17 7	36	169.95	Speakers Detach.
AMPEX	800	1⅞ 3¾ 7½	2	4	1	Induc.	-	Belt	Belt	7	0.15	0.2	99	160	860 Yes	3	280k	220k	No	Dual VU Meter	Yes	19 13½ 7½	33	289.95	Deck only for $199.50
	1100	1⅞ 3¾ 7½	3	4	1	Hys. Sync.	-	Belt	Belt	7	0.15	0.2	99	160	1160 Yes	3	280k	220k	No	Dual VU Meter	Yes	19 13½ 7½	33	389.95	Auto. Reverse. also avail. in deck only.
	2100	1⅞ 3¾ 7½	4	4	1	Hys. Sync.	-	Belt	Belt	7	0.15	0.2	99	130	2160 Yes	2	110k	200k min.	Yes	Dual VU Meter	Yes	18¼ 13⅝ 7⅞	33	599.95	Auto. Reverse, Reverse Record.
	AG-500	3¾ 7½ 15	3	4 2	3	Hys. Sync.	-	Belt	Belt	7	0.18	0.25	99.75 at 15 7½	-	Yes	-	-	bal/ Un-bal. Brdg.	No	Dual VU	-	20 14 9	42	1202.	Professional Recorders.
BELL & HOWELL	2291	15/16 1⅞ 3¾ 7½	-	-	-	-	-	-	-	-	<.09	-	-	-	No	-	-	-	-	2 Meter	-	-	-	349.95	Auto. loading; auto revers., s/s; plays records in both dire tions. PB tone con
	2295	11/16 1⅞ 3¾ 7½	-	-	-	-	-	-	-	-	<.09	-	-	-	Yes	-	-	-	-	2 Meters	-	-	-	399.95	Same as above. but incls. stereo pwr. ampl; 8.4 w./chan., 50-15,000 Hz.
	2297	1⅛ 1⅞ 3¾ 7½	-	-	-	-	-	-	-	-	<.09	-	-	-	Yes	-	-	-	-	2 Meters	-	-	-	449.95	Same as above, except pwr. ampl. is 15 w/chan. 50-20,0 Hz.
BSR (45)	TD 1020	1⅞ 3¾ 7½	2	4	1	Induc.	-	Drive Wheel	Direct	7	0.15	0.25	99.8	180	No	0.6	High	High	No	VU Meter	Yes Lo Z	14¾ 12¾ 6	18	129.95	S/S, Illum. VU mete Pause pos. walnut base.
CONCERTONE	700	15/16 1⅞ 3¾ 7½	2	2	1	4-p	-	Belt	Idler	7	0.25	0.25	-	-	Yes	-	-	-	No	VU Meter	Yes	10⅝ 11¾ 5 9/16	12	189.95	Mono. only.
	727	Same	3	4	1	4-p	-	Belt	Idler	5	0.25	0.25	-	-	Yes	-	-	-	No	2 VU Meter	Yes	12½ 18½ 5½	16	199.95	
	770	Same	3	4	1	4-p	-	Belt	Idler	7	0.25	0.25	-	-	Yes	-	-	-	-	2 VU	Yes	12½ 18½ 5½	16	239.95	a.c. or battery

Perfect Playmates



The new Sony Solid State 350 adds professional performance to home entertainment systems

Selecting the brilliant new Sony Solid State 350 to fulfill the stereo tape recording and playback functions of your professional component music system will also enduringly compliment your impeccable taste and passion for music at its finest. With an instant connection to your other stereo components, the versatile two-speed Sony 350 places at your pleasure a full array of professional features, including: 3 heads for tape and source monitoring. Vertical or horizontal operation. Belt-free, true capstan drive. Stereo recording amplifiers and playback pre-amps. Dual V U meters. Automatic sentinel switch. Frequency response 50-15,000 cps ± 2db. S.N. ratio plus 50db. Flutter and wow under 0.15%. Richly handsome gold and black decor with luxurious walnut grained low profile base. This remarkable instrument is yours at the equally remarkable price of less than $199.50. Should you want to add portability to all this, there's the Model 350C, mounted in handsome dark gray and satin-chrome carrying case, at less than $219.50. *For information write Superscope, Inc., Sun Valley, Calif.*

SONY'S PROOF OF QUALITY — A FULL ONE YEAR WARRANTY

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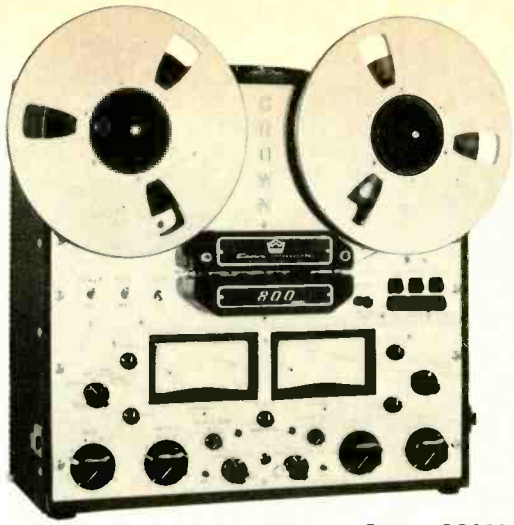
TAPE RECORDERS

Magnecord 1028



Crown SS822

MANUFACTURER (Circled number indicates ad page)	Model	Speeds	No. of Heads	No. of Tracks	No. of Motors	Drive Motor Type	Reel Motors - Type	Drive to Capstan	Rew. & F. Forward Drive	Max. Reel Size, in.	Wow and Flutter at 7½, %	Wow and Flutter at 3¾, %	Timing Accuracy, %	Rewind 1200 ft., sec.	Built-in Power Amps ?	Mic Input Sens, mV.	Mic Input Imp, ohms	High Level Imp, ohms	Mixing Facility ?	Vol. Indicator Type	Line Feed Output ?	Dimensions, In. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
CONCORD	501-D Deck	1⅞ 3¾ 7½	2	4	-	-	-	Belt	Direct	7	<0.17	<0.22	-	-	No	-	Lo	-	Yes	Dual VU Meter	Yes	12½ 14⅜ 4¾	19½	Under 150.00	Auto shut-off.
	776-D Deck	3¾ 7½	3	4	-	-	-	Belt	Auto	7	<0.15	<0.18	-	-	No	-	Lo	-	Yes	Dual VU Meter	Yes	20 13½ 7	29½	Under 250.00	Auto reverse. Auto shut-off.
	727	3¾ 7½	2	4	-	-	-	Belt	Direct	7	<0.15	<0.18	-	-	Yes	-	Lo	-	Yes	Dual VU Meter	Yes	13 13 20	40	Under 300.00	Auto shut-off.
	776	3¾ 7½	3	4	-	-	-	Belt	Auto	7	<0.15	<0.18	-	-	Yes	-	Lo	-	Yes	Dual VU Meter	Yes	13 13 20	40	Under 350.00	Auto reverse. Auto shut-off.
CROWN	SX 724	7½ 3¾	3	4	3	Hys. Sync.	Torq.	Belt	Direct	10½	0.09	0.18	99.8	45	No	0.4	100k	100k	Yes	Dual VU Meter	600	19 9 15¾	45	995.00	Dual mic or line m ing, 2-tr. play opt., 5" meters, sil. s/s SA30-30 ampl. opt.
	SX 824	7½ 3¾	3	4	3	Hys. Sync.	Torq.	Belt	Direct	10½	0.09	0.18	99.8	45	No	0.4	100k	100k	Yes	Dual VU Meter	600	19 9 15¾	48	1495.	Pro-800 transp. w/ logic-computer ope electr. as above; full remote opt.
(71)	CX 724	7½ 3¾ 1⅞	3	4	3	Hys. Sync.	Torq.	Belt	Direct	10½	0.09	0.18	99.8	45	No	0.25	100k	100k	Yes	Dual VU Meter	500	19 9 17½	50	1385.	250Ω Lo-Z mics opt. plug-in modul mixing, tone contr echo prov. remote stop and 600Ω out opt.
	CI 844	15 7½ 3¾	3	4	3	Hys. Sync.	Torq.	Belt	Direct	10½	0.09	0.09	99.8	45	No	0.08	250	100k	No	4 VU Meters	600	19 9 24½	70	3700.	Studio mastering, t sync. opt., cal. st input, output atten electronics, pro-80 transport.
DYNACO (27) (85)	2000	1⅞ 3¾ 7½	3	4	1	Hys. Sync.	-	Idler	Idler	7	.075	0.11	99.8	100	Yes	.05	200	-	Yes	Dual Meter	Yes	18 14½ 9	38	498.00	Slide-type mixing trols/ / plug-in cir / / interchange mi inputs.
HEATH (7)	AD-16	3¾ 7½	3	4	3	Hys. Sync.	Cap. Ind.	Belt	Direct	8¼	0.18	0.25	99	80	No	.28	50k	50k	Yes	2 VU Meters	Yes	17⅝ 13⅛ 8¼	35	399.50	All s/s; kit versio Magnecord 1020; p solenoid oper. dig cntr.
KNIGHT (35)	KG 415	3¾ 7½	3	4	2	4-p	Cap.	Belt	F.Fwd Direct Rew. Pulys.	7	<0.2	<0.3	98	90	No	1.5	3000	5000	Yes	2 VU Meters	-	14 9⅝ 14½	30	269.95	Stereo Headphone module; Viking tra factory-assembled Electronics, Kit.
LAFAYETTE	RK-960	1⅞ 3¾ 7½	4	4	2	Hys. Sync.	-	Belt	-	7	-	0.25	99	-	Yes	-	10k	500k	-	2 VU Meters	-	22 15½ 8¼	44	299.95	3 Auto. oper. mod Reverse.
	RK-880	1⅞ 3¾ 7½	3	4	1	Hys. Sync.	-	Belt	-	7	0.15	0.25	98.8	-	No	0.4	10k	500k	-	2 VU Meters	-	11¾ 7 11¾	22	249.95	Dual Ind. bias adj eq. adjust; headph jack, S-O-S.
	RK-860	1⅞ 3¾ 7½	2	4	1	4-pole	-	Belt	-	7	0.15	0.03	99	-	Yes	1.6	-	-	-	2 VU Meters	-	15¾ 7⅝ 14	25	219.95	S-o-S; S-W-S; two spkrs. direct phon pickup.
	RK-840	1⅞ 3¾ 7½	2	4	1	4-pole	-	Belt	-	7	0.2	0.3	98.6	-	Yes	0.2	10k	500k	-	2 VU Meters	-	15¾ 7⅝ 14	24	169.95	Two 5-in. spkrs. Direct Mag-Phono up; S/S.

Crown Leadership presents the

MODEL CX 822
For the studio where flexibility means creative productions.

MODEL CI 844
Four channel recorder for perfect mastering.

NEW

Computer Logic Control Pro 800 Transport

In the league of nimble-fingered tape-handlers there exists a recurrent problem. It has been demonstrated time and again that anyone can ruin a valuable tape by absentmindedly outsmarting the interlock system of an otherwise safe tape recorder.

In answer to this problem and similar problems arising in automated and remote control applications, the *CROWN Pro 800* was designed. This recorder has a computer logic system using IC's which prohibit all such destructive operations.

The CROWN computer stores the last command given it in its memory (forgetting all previous commands) and by a continuous knowledge of the operating state of the machine (motion and direction), it takes all the necessary measures and executes the command. This is all done *without* time-wasting delay mechanisms.

Computer logic control brings to you rapid error-free tape handling. It is actually impossible to accidentally break a tape. Call your CROWN dealer NOW!

MOST PERFECT REPRODUCTION

- Performance as yet unequalled
- Four years proven Solid State circuitry
- Extremely low noise electronics

FINEST TAPE HANDLING

- Computer smooth operation
- True straight line threading
- Patented Electro-Magnetic brakes never need adjusting

THE HALLMARK OF CROWN — QUALITY CRAFTSMANSHIP THROUGHOUT

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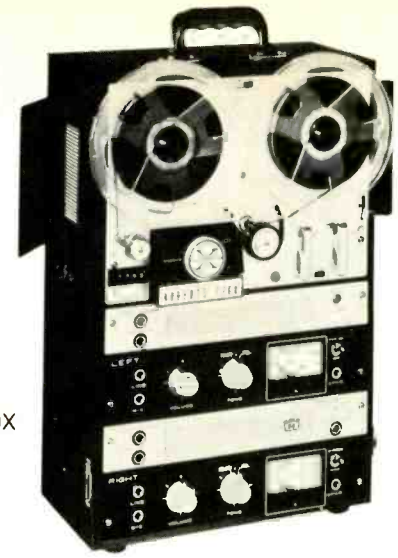
TAPE RECORDERS

Revox G-36W



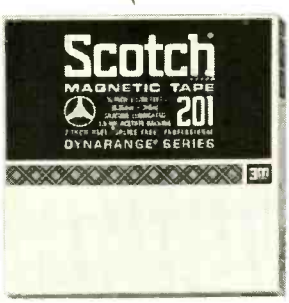
Roberts 770X

MANUFACTURER (Circled number indicates ad page)	Model	Speeds	No. of Heads	Tracks	No. of Motors	Drive Motor Type	Reel Motors - Type	Drive to Capstan	Rew. & F. Forward Drive	Max. Reel Size, in.	Wow and Flutter at 7½ ips, %	Wow and Flutter at 3¾ ips, %	Timing Accuracy, %	Rewind 1200 ft., sec.	Built-in Power Amps ?	Mic Input Sens., mV.	Mic Input Imp. ohms	High Level Imp. ohms	Mixing Facility ?	Vol. Indicator Type	Line Feed Output ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURE
MAGNECORD	1020	3¾ 7½	3	4	3	hys. sync.	Split Ph.	Belt	Direct	8¼	0.17	0.22	99	80	No	0.27	50k	HiZ	Yes	2 VU Meters	Emit. foll.	17 9/16 13 33/64 6 5/8	35	570.00	
	1024	3¾ 7½	3	4	3	hys. sync.	Split Phs.	Belt	Direct	8¼	0.17	0.22	99.8	80	No	0.32	50k	HiZ	Yes	2 VU Meters	Emitt. foll.	19 12 15¾	48	648.00	
	1021	3¾ 7½	3	1	3	hys. sync.	split phs.	Belt	Direct	8¼	0.17	0.22	99.8	80	Yes	.038	150	HiZ	Yes	One VU Meter	600 bal.	19 15¾ 12	48	708.00	Mono
	1028	7½ 15	3	2	3	hys. sync.	split phs.	Dir-ect	Direct	10½	0.1	-	99.8	50	No	-	50k	160k	No	2 VU Meters	Cath. foll.	17 5/8 11 3/16 14 1/8	47	995.00	
NORELCO	150	1 7/8	2	2	1	d.c.	-	-	-	cass-ette	-	-	-	-	Yes	-	-	-	No	Meter	-	4½ 7¾ 2¼	3	89.50	Mono Cassette por "Carry-Corder," ir spkr, mic.
(79)	350	1 7/8	2	2	1	-	-	-	-	cass-ette	-	-	-	-	Yes	-	-	-	-	Meter	-			149.50	Home version of C sette rcdr/player i spkr, mic.
	450	1 7/8	2	4	1	d.c.	-	-	-	cass-ette	-	-	-	-	Yes	-	-	-	No					199.50	Home stereo versic Cassette recdr/pla Incls. mics, sep. sp
ROBERTS	1719	3¾ 7½	2	4	1	4-p	-	Belt	Idler	7	0.25	0.30-0.33	-	150	Yes	0.5	50k	1 Meg.	No	Dual VU	I V. 500Ω	15 1/8 x 9 x 14 5/8	25	199.95	15 ips opt. no pre pads, auto tape lif
	1720	3¾ 7½	2	4	1	4-p	-	Belt	Idler	7	0.25	0.30-0.33	97	150	Yes	0.5	50k	1 Meg.	No	Dual VU	I V. 500Ω	15 1/8 9 14 5/8	26	219.95	15 ips optional.
	1721	3¾ 7½	2	4	1	4-p	-	Belt	Idler	7	0.25	0.30-0.33	97	150	Yes	0.5	50k	1 Meg.	No	Dual VU	I V. 500Ω	15 1/8 6½ 14 5/8	23	179.95	
	770X	1 7/8 3¾ 7½ 15	3	4	-	Hys. sync.	-	Belt	Idler	7	0.15	0.2	98	75	Yes	1.5	500k	1 Meg.	No	2 VU Meters	Yes Lo Z	20 14 9	48	399.95	Cross-field head.
REVOX	G-36 Mk III	3¾ 7½	3	4	3	hys. sync.	direct	Dir-ect	Direct	10½	0.1	0.15	-	-	6 W Mono	3	0.5 Meg.	47k Adj.	Yes	2 VU Meters	Cath. Foll.	18½ 12¼ 11½	45	549.00	3 Papst motors, n belts, dir.drive; a in various track/s combs. In satin nut cab. $36.00 a
SUPERSCOPE (Sony)	250A	7½ 3¾	2	4	1	4 p Ind.	-	Idler	Idler	7	<0.19	<0.25	-	-	No	-	-	-	No	2 Meters	Em fol	14¼ 11⅜ 6½	15¾	149.50	Auto shut-off auto lifter, dig. ctr.
	350	7½ 3¾	3	4	1	4 p Ind.	-	Idler	Idler	7	<0.19	<0.25	-	-	No	-	-	-	No	2 Meters	Em fol	-	-	199.50	As above, plus ver or hor. oper. pos. W port. case $219.50
(29)	530	7½ 3¾ 1 7/8	-	4	1	4 p Ind.	-	Idler	Idler	7	0.1	0.12 0.16	-	-	Yes	-	-	-	No	2 Meters	Em fol	-	38	399.50	As above, plus 20 W Amp. Quadri spkrs.
(69)	660	7½ 3¾	-	4	1	Syn.	-	Idler	Idler	7	<.06	<0.1	-	-	Yes	-	-	-	No	2 Meters	-	17 17 10¾	55	575.00	Auto reverse, 50 w/amp/chan.
	777	7½ 3¾	3	2 or 4	3	Syn.	-	Idler	Dir.	7	<.06	<0.1	-	-	No	-	-	-	Yes	2 Meters	-	-	-	695.00	2 or 4 track pb re op. conts., incls. rem cont.

Build a world of your own on "Scotch" Brand Dynarange® Tape.

Great moments in music . . . happy times at home and away—capture whatever sound you want to save on "Scotch" Brand "Dynarange" Recording Tape. "Dynarange" delivers true, clear, faithful reproduction across the entire sound range. Makes all music come clearer . . . cuts background noise . . . gives you fidelity you didn't know your recorder had.

And "Dynarange" saves you money, too! Delivers the same full fidelity at a slow 3¾ speed that you ordinarily expect only at 7½ ips. The result: You record twice the music per foot . . . use half as much tape . . . save 25% or more in tape costs! Lifetime silicone lubrication protects against head wear, assures smooth tape travel and extends tape life. Isn't it time you built your own private world of sound on "Scotch" Brand "Dynarange" Recording Tape?



Magnetic Products Division 3M COMPANY

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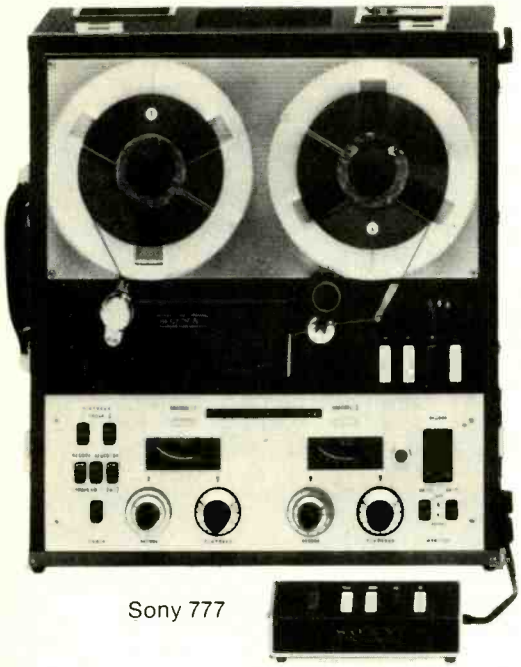
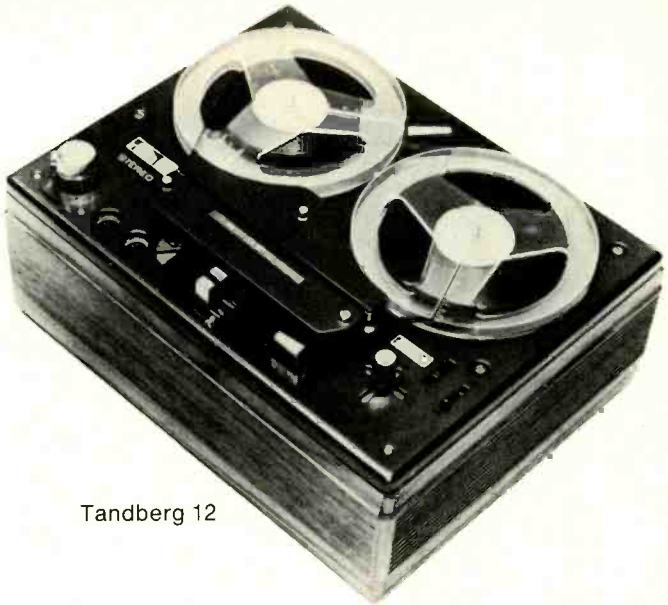
TAPE RECORDERS



Sony 777



Tandberg 12

MANUFACTURER	Model	Speeds	No. of Heads	Tracks	No. of Motors	Drive Motor Type	Reel Motors - Type	Drive to Capstan	Rew. & F. Forward Drive	Max. Reel Size, in.	Wow and Flutter at 7½", %	Wow and Flutter at 3¾", %	Timing Accuracy, %	Rewind 1200 ft., sec.	Built-in Power Amps?	Mic Input Sens, mV.	Mic Input Imp, ohms	High Level Imp, ohms	Mixing Facility?	Vol. Indicator Type	Line Feed Output?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
TANDBERG	64X	3¾ 7½ 17/8	4	4	1	hys. sync.	-	Spd. Tran. Wheel	Belt	7	<0.1	<0.15	99.8	2	No	50	5 Meg.	1 Meg.	Yes	Eye	Yes cath. foll.	15⅜ 11 13/16 6 11/16	23	549.00	Freq. resp, ±2 dB: 7 30-20k; 3¾, 30-15k; 1⅞, 40-9k.
	12	3¾ 7½ 1⅞	2	4	1	Asyn-Chronus	-	Spd. Tran. Wheel	Belt	7	<0.15	<0.2	99.8	2	Yes	0.15	1 Meg.	1 Meg.	Yes	Eye	Pwr. Amp	15⅜ 11 13/16 5⅞	23	498.00	Sound on Sound Freq. resp, ±2 dB: 7½, 40-16k; 3¾, 60- 1⅞, 80-5k.
	11	3¾ 7½ 1⅞	3	2	1	9 Volt DC Motor	-	Spd. Tran. Wheel	Belt	7	<0.2	<0.3	99.8	2	Yes	45	200	-	No	VU Meters	-	13 10 4	7	Tentative 695.00	S/N, >56 db Freq. resp., ±2 dB: 7½, 40-16k; 3¾, 60- 1⅞, 80-5k.
	923	3¾ 7½ 1⅞	2	2	1	Asyn. Chronus	-	Spd. Tran. Wheel	Belt	7	<0.15	<0.2	99.8	2	1	1.5-7.5	1 Meg.	0.5 Meg.	No	Eye	Pwr. Amp	15 11⅝ 6¾	22	273.50	S/N 56 db, Freq. resp., ±2 dB: 7½, 30-16k; 3¾ 40 1⅞, 55-5k.
TAPESONIC	70-TRSQ	3¾ 7½ 15	3	4	3	Hys. sync.	Cap.	Dir-ect	Direct	10½	0.12	0.23	99.8	45	No	-	-	-	Yes	4½ VU Mtr.ea. Chan.	Yes Emit. fol.	19 8½ 21	69 w/ case	615.00	Port. case for all models, $34.50 ex
	70-TRSH	3¾ 7½ 15	3	2	3	Hys. sync.	Cap.	Dir-ect	Direct	10½	0.12	0.23	99.8	45	No	-	-	-	Yes	4½ VU Mtr.ea. Chan.	Yes Emit. fol.	19 8½ 21	69 w/ case	615.00	Port. case for all models, $34.50 e
	70-TRH	3¾ 7½ 15	3	2	3	Hys. sync.	Cap.	Dir-ect	Direct	10½	0.12	0.23	99.8	45	No	-	-	-	Yes	4½ VU Meter	Yes Emit. fol.	19 8½ 21	69	480.00	Port. case for all models, $34.50 e
	70-TRF	3¾ 7½ 15	3	1	3	Hys. sync.	Cap.	Dir-ect	Direct	10½	0.12	0.23	99.8	45	No	-	-	-	Yes	4½ VU Meter	Yes Emit. fol.	19 8½ 21	69	542.00	Port. case for all models, $34.50 e
TEAC	A-1200	7½ 3¾	3	4	3	Hys. syn.	2 eddy cur	-	Direct	7	0.12	0.15	99.5	100	No	1.0	10k	100k	Yes	Dual Mtr.	1.0 V 10k	17⅛ 16 13/16 11½	46	349.50	2-spd. capstan mo pushbutton oper; t source mon.
	A-3010	7½ 3¾ 1⅞	2 x 2	4	3	Hys. syn.	2 eddy cur	-	Direct	7	0.15	0.2	99.0	90	No	0.5	10k	100k	No	2 Mtrs	0.5 V 50k	17 15½ 7¾	36	399.50	Auto reverse; tape tension cont, auto off; 8-ohm phone n ampl, tone cont.
	A-1500	7½ 3¾	4	4 or 2 or 1	3	Hys. syn.	2 eddy cur	-	Direct	7	0.12	0.15	99.5	100	No	1.0	10k	100k	Yes	Dual Mtr.	1.0 V 10k	16 13/16 15⅛ 11½	42	449.50	Playback auto rev 2-spd. capstan mt button oper; remot cont. avail.
	A-6010	7½ 3¾	4	4 or 2 or 1	3	Hys. syn.	2 eddy cur	-	Direct	7	.08	0.12	99.5	90	No	0.5	10k	100k	Yes	2 Mtrs	1.0 V 10k	20¾ 17⅜ 6⅞	46	699.50	As above, plus pl head assy; 8-ohm mon. ampl; tape-te cont.

UFACTURER	Model	Speeds	No. of Heads	Tracks	No. of Motors	Drive Motor Type	Reel Motors Type	Drive to Capstan	Rew. & F. Forward Drive	Max. Reel Size, in.	Wow and Flutter at 7½, %	Wow and Flutter at 3¾, %	Timing Accuracy, %	Rewind 1200 ft., sec.	Built-in Power Amps ?	Mic Input Sens, mV.	Mic Input Imp, ohms	High Level Imp, ohms	Mixing Facility ?	Vol. Indicator Type	Line Feed Output ?	Dimensions, in. W x D x H	Weight, lbs.	Price	SPECIAL FEATURES
NG	423	1⅞ 3¾ 7½	2	4	3	Ind.	Ind.	Belt	Direct	7	0.2	-	99.5	70	No	550	Med.	120k	No	Dual Meter	Emit. Fol.	12⅝ 8¾ 15¾	29	249.00	
	433	1⅞ 3¾ 7½	3	4	3	Ind.	Ind.	Belt	Direct	7	0.2	-	99.5	70	No	550	HiZ	120k	Yes	Dual Meter	Emit. Fol.	12⅝ 8¾ 15¾	31	369.95	
	88	3¾ 7½	3	2 & 4	2	Ind.	Ind.	Belt	Direct & Puck	7	0.2	-	99.5	90	No	1	HiZ	100k	No	Dual Meter	HiZ	13 13 6⅝	22	339.95	
	880	3¾ 7½	3	2 & 4	2	Ind.	Ind.	Belt	Direct & Puck	7	0.2	-	99.5	90	Yes	1	HiZ	100k	No	Dual Meter	HiZ	19⅜ 9¼ 21½	44	439.95	
	807	3¾ 7½	1	2 & 4	2	Ind.	Ind.	Belt	Direct & Puck	7	0.2	-	99.5	90	No	None	None	None	No	None	None	6½ 10 13½	15	124.95	Playback only . Half or quarter track.
LENSAK Co.)	5800	1⅞ 3¾ 7½	2	4	1	-	-	-	-	7	<0.25	<0.3	-	-	Yes	-	-	-	No	VU Meter	-	41 9 11	45	299.95	AM/FM. Tuner. Opt.
	5750	1⅞ 3¾ 7½	2	4	1	-	-	-	-	7	<0.25	<0.3	-	-	Yes	-	-	-	No	VU Meter	-	42 10 6	28¼	249.95	Wood trim.
	5740	1⅞ 3¾ 7½	2	4	1	-	-	-	-	7	<0.25	<0.3	-	-	Yes	-	-	-	No	VU Meter	-	42 6⅜ 10	27¼	229.95	Vinyl trim.
	4200	1⅞ 3¾ 7½	2	2	1	-	-	-	-	-	<0.25	<0.3	-	-	Yes	-	-	-	No	VU Meter	-	4½ 2¼ 7⅞	4	74.95	Mono. cassette recorder
R	4000L	7½ 3¾ 1⅞ 1 15/16	2	2	1	Sync. D.C. Motor	-	Belt to Fly-wheel	Belt	5	.08	.10	99.0	120	Yes	0.1	2000	4700 or 1 Meg.	No	VU Meter	Emit. Foll.	11 9 3½	7	440.00	Professional Quality. Batt. oper.
	7000 Deck	7½ 3¾	2	4	1	Sync. Type	-	Idler	Belt	7	.07	.08	99.0	120	No	0.35	2000	4700 or 1 Meg.	No	VU Meter	Emit. Fol.	15 14 7	15	149.50	40-18000 Hz ±2.5 db (7½ ips)
	9000L	7½ 3¾	3	4	1	Hyst. Sync.	-	Idler	Belt	7	.04	.06	99.5	120	No	0.15	5000	4700 or 1 Meg.	No	VU Meter	Emit. Fol.	15 14 7	23	400.00	20-20000 Hz ±2 db (7½ ips)
	1000 report Pilot	7½	4	1	1	Sync. DC. Motor	-	Belt to Fly-wheel	Belt	5	.08	.10	99.	120	Yes	0.2	8000	4700 or 1 Meg.	No	VU Meter	Emit. Fol.	11 9 3½	7½	695.00	Mono portable for lip sync. recording

Teac A-3010

Viking 433

VIDEO RECORDERS

Panasonic NV-8100

Concord VTR-600

Sony CV-2000

MANUFACTURER	Model	Scan System	Tape Width, in.	Tape Speed, ips	Equiv. Tape Speed, ips.	Video Bandwidth Hz/MHz/±dB	Lines Resolution	Audio Freq. Resp. Hz	Weight, lbs.	Price	SPECIAL FEATURES
AMPEX	VR-6175	helical	1	9.6	1000	30-2.5 ±3	250	90-9k ±4 db	186*	1795.00	Includes Video recorder in walnut case, and TR-821 large screen TV receiver.
	VR-6000	helical	1	9.6	1000	30-2.5 ±3	250	90-9kc ±4 db	78*	1595.00	All recorders, both color and black and white, are guaranteed tape-interchangeable
	VR-7000	helical	1	9.6	1000	30/3.5 ±3	350	50-12kc ±4 db	100*	3450.00	Maximum recording time, all recorders, one hour.
	VR-7500	helical	1	9.6	1000	Hi-Band 30/4.2 Lo-Band 30/3.5	350	50-12kc	100*	3995.00	Four-minute fast forward. Low-band audio, 250-5000 Hz.
	VR-7500-C	helical	1	9.6	1000	Hi-Band 30/4.2 Lo-Band 30/3.5	350	50-12k	110*	4495.00	Color Recorder. Low-band audio, 250-5000 Hz. * Shipping weights
CONCORD	VTR-600	helical	½	12	484	30/2.5	250	80-10,000	52	1150.00	Built-in head cleaning, portability.
3M (73)	VTR-150	helical	½	7½	180	50/2	200	50-10k	50	1495.00	Special head design incorporates 3M—improved ferrite for long life.
	VTR-150 MC	-	-	-	-	-	-	-	200	2995.00	Same as above, but is console model, including camera, monitor, etc. mounted in movable console.
PANASONIC	NV-8000	helical	½	12	480	30-2	>200	80-10k	54½	1050.00	Home type, 40 min recording time (2400 ft.); rewind and fast forward, 5½ min. S/N, both video and audio, 40 db camera, monitor, other accessories available.
	NV-8100	-	-	-	-	-	-	-	-	1100.00	Same as NV-8000 but in portable case.
	NV-204	helical	1	8.57	630	10-3	350	80-8k ±2db	97	3750.00	Industrial model, color compatible; rewind and fast forward, 2¾ min. 67 min. rec. time (2900 ft.) S/N: video – 43 db; audio – 46 db Camera, tripod, remote control, etc. available.
SONY (33) (77)	CV-2000	helical	½	7½	450	-	200	80-10k	46	730.00	Light weight portable, one motor slow tape speed, durable and used very widely for over two years by business, industry, schools and individuals.
	CV-2000D	helical	½	7½	450	-	200	80-10k	42.5	695.00	Least expensive, walnut base, with same features as CV-2000.
	TCV-2010	helical	½	7½	450	-	200	80-10k	66	995.00	Built-in Monitor, portable. Same features as CV-2000
	TCV-2020	helical	½	7½	450	-	200	80-10k	70	1150.00	Built-in Monitor, Walnut cabinet, built-in timer to record in your absence. Same features as CV-2000.

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University Sound

MICROPHONES

MANUFACTURER	Model	Directional Pattern	Operating Principle	Diaphragm Material	Case Material	External Finish	Impedance, ohms	Frequency Response, Hz	EIA Sensitivity, dB	Mic Connection	Cable Length, ft.	Cable Plug Type	Dimensions, in., ℓ x dia.	Weight, oz.	Mounting Method	Price	SPECIAL FEATURES
AKG	D-202E	Card.	Dyn.	Mylar	Sintered bronze/ plastic	Black	200	30-15k	-147	Cannon	15	None	8½ x 2½	10	⅝-27	130.00	Two-way w/crossover netw
(79)	D-109	Omni.	Dyn.	Mylar	Steel	Satin	200	50-15k	-150	non-detach-able cable	30	None	2¾ x ⅝	1.5	-	49.00	Lavalier.
	D-58E	Fig.8	differ-ential	Mylar	Steel	Satin	200	50-15k	-149	Cannon	15	None	1⅝ x 13/16	1.1	-	43.00	Noise-cancelling.
	C-12A	Var.	Con-denser	Gold/ Mylar	Steel	Satin	200	20-20k	-138	Cannon	66	None	7⅞ x 1⅝	16	-	480.00	Multiple pattern, remote select.
ALTEC-	650A	Card.	Dyn.	Mylar	Steel	Satin Chrome	200 & 20k Change-able	50-14k	-150	3 Pin Cannon	15	3-Pin Can.	1¾ x 6 13/16	10	⅝-27	-	Built-in wind/pop screen, on-off switch.
	651A	Card.	Dyn.	Mylar	Steel	Satin Chrome	20k	60-14k	-151	Cable securd. to MIC.	15	Phone Plug	6 13/16 1¾	11 Incl. Cable	⅝-27	-	Same as above.
	681B	Omni.	Dyn.	Mylar	Die Cast Zinc	Green Enamel	150/250 or 20k	50-18k	-149	Cable securd. to MIC.	15	None Supld.	7⅜ 1⅛	10 Incl. Cable	⅝-27	-	Extremely flat response.
	683B	Card.	Dyn.	Mylar	Die Cast Zinc	Green Enamel	150/200	45-15k	-148	3 Pin Cannon	15	3 Pin Can.	7¼ 1½	11	⅝-27	120.00	Extremely flat response.
AMERICAN	D-20	Omni.	Dyn.	Mylar	Die Cast	Black	Hi or Lo	80-12000	-	None	16	None	6⅜ 1 5/16	5½	⅝-27	12.00* Adapt.	Incls. desk stand. lavalier cord. floor-stand coupler. * Prices are net.
Cover (4)	D-30	Omni.	Dyn.	Mylar	Die Cast	Black	Hi or Lo	100-10000	-	None	16	None	3¼ 13/16	4	-	12.00*	Lavalier. Incls. neck cord floor stand
(1)	D-40	Omni.	Dyn.	Mylar	Die Cast	Chrome	Dual Hi & Lo	60-12000	-	2 Pin Con-nector	6	None	8¼ 1¼	14½	⅝-27	24.00*	Dual impedance, selectabl
	D-50	Card.	Dyn.	Mylar	Die Cast	Black	Dual Hi & Lo	80-10000	-	None	6	None	5½ 1	3	⅝-27	36.00*	Dual impedance, selectabl
AMPEX	702	Omni.	Dyn.	Alum. Mylar	Die Cast Zinc	Satin Brown	40k	100-10k	-154	-	6	Mold-ed Phone	3½ 1	4¼	-	9.95	Incls. lavalier cord, stand.
	1101	Omni.	Dyn.	Alum. Mylar	Die-Cast Zinc	Metallic Brn. & Brt. Polish	40k	70-12k	-154 typ.	-	9	Mold-ed Phone	4¼ 1½	11½	-	19.95	Built-in stand; rubber base
	2001	Omni	Dyn.	Mylar	Alum. & Cycolac	Black & Satin	40k	50-14k	-149	-	9	Mold-ed Phone	7½ 1½	7½	Std. Pipe w/ Adapt.	29.95	Incls. stand adapter, satin-chrome base.
	3001	Card.	Dyn.	Lam. Mylar	Die Cast Zinc	Black & Satin	Lo or Hi	50-15k	-151	Amph-enol 91MC4M	18	Switch craft 280	7¾ 1⅜	22 w/ Cable	Std. Pipe w/ Adapt.	59.95	Dual—impedance. Incls. c cealed MIC. connector, stand adapter. * ODB = 1 volt per microba
BEYER	M-69E	Card.	Dyn.	Alum.	Steel	Enamel	200	50-16k	-147	Hirsch. plug	-	-	6¾ 15/16	8½	Clamp	65.00	
	M-610E	Card.	Dyn.	Alum.	Steel	Enamel	200	50-15k	-148	Hirsch. plug	-	-	6½ 15/16	8½	Clamp	60.00	Voice/music switch.
	M808	Card.	Dyn.	Alum.	Stainless Steel	Enamel	80k	50-16k	-146	Internal	15	PI-8 Phone	1¼ x 1¼ x 5⅛	10	Clamp	65.00	Incls. 2 matched mics. w/ connecting bar.
	M-260E	Super Card.	Dyn. Rib-bon	Alum.	Steel	Enamel	200	50-18k	-158	Hirsch plug	-	-	6½ 1 11/16	9	Clamp	55.00	

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MICROPHONES

Norelco (AKG) D-202ES

Neumann U67

Electro-Voice RE15

MANUFACTURER (Circled number indicates ad page)	Model	Directional Pattern	Operating Principle	Diaphragm Material	Case Material	External Finish	Impedance, ohms	Frequency Response, Hz	EIA Sensitivity, dB	Mic Connection	Cable Length, ft.	Cable Plug Type	Dimensions, in. ″ x dia.	Weight, oz.	Mounting Method	Price	SPECIAL FEATURES
DYNACO (27) (85)	200	dual Fig. 8	Veloc-ity	rib-bon	Brass	Satin Chrome	200	30-13k 2	-156	DIN Plug	20	None	10 1¼	16	Adapt. to ⅝ x 27	149.95	Stereo mic. with adjust. element separation.
	100	Fig. 8	Veloc-ity	rib-bon	Brass	Satin Chrome	200	30-13k 2	-156	DIN Plug	20	None	6 1¼	10	Adapt. to ⅝ x 27	89.95	Single unit.
ELECTRO-VOICE Professional Cover (4) (1)	RE15	Super Card.	Dyn.	Acou-st-Alloy	Steel	Matte Satin Nickel	150	80-15k	-150	Cannon	18	None	6 7/16 1⅜ ¾	6	310 Adapt.	153.00 *	Super card. – Max. rej. 15 deg. from major axis. unif resp. all angles. * all prices net.
	635A	Omni	Dyn.	Acou-st-Alloy	Steel	Matte Satin Nickel	150	80-13k	-149	Cannon	18	None	5 15/16 1 13/16	6	310 Adapt.	49.20*	4-stage integral windblas pop-filter, internal shock absorber.
	649B	Omni.	Dyn.	Acou-st-Alloy	Alum.	Non-Reflect Gray	150	70-8k	-154	None	30	None	2¼ ¾	1.1	Neck Cord & 310 Adapt.	63.00*	Lavalier.
	642	Card. Line	Dyn.	Acou-st-Alloy	Alum.	Non-Reflect Gray	50-150, 250	20-10k	-142	Cannon	20	None	17⅞ 3 3/16	4 52	356 Shock Mount	234.00 *	Card-i-line; combines card for L.F. with line above 500 Hz. Highly direction
	668	Card.	Dyn.	Acou-st-Alloy	Alum.	Non-Reflect Gray	50, 150, 250	90-10k	-145	Cannon	20	None	9 5/8 6½	27	Boom-Floor Stand Adapt.	297.00 *	Boom and floor stand. card recdg; 36 var. of resp. for adj. to room acoustics by computer-panel selector.
ELECTRO-VOICE General Purpose Cover (4) (1)	631	Omni.	Dyn.	Acou-st-Alloy	Zinc Die Cast	Chrome or Matte Satin Nickel	150 or Hi	80-13k	-151 **	Amph-enol	15	None	6 31/32 1 25/64	6	310 Adapt.	36.00*	4 stage pop-blast filter bu in uses magnetic "On-Off switch with removable actuator. * all prices net ** 2 dB lower at Lo Z.
	627	Card.	Dyn.	Acou-st-Alloy	Zinc Die Cast	Chrome Gray or Gold	150 or Hi	80-11k	-153*	Amph-enol	15	None	6 7/16 1 19/32	6	310 Adapt.	36.00*	Bass Resp. varies with di 10 dB resp. diff. at 100 H between sound from 2 in. from 24 in.
	664	Card.	Dyn.	Acou-st-Alloy	Zinc Die Cast	Chrome, Gray or Gold	Dual Hi & Lo	60-15k	-151	Amph-enol MC4F	15	None	7 3/16 1 7/8	28	Std. Mnt. Stud. ⅝-27	51.00*	Var.-D Dynamic; resp. in of dist.
	674	Card.	Dyn.	Acou-st-Alloy	Zinc Die Cast	Chrome, Gray or Gold	Dual 150 & Hi	60-15k	-152	Amph-enol MC4F	15	None	7 7/8 1 1/4	12	⅝-27	60.00*	Var. "D" resp. indep. of dist. 3-pos. bass-tilt switch. "ON-OFF" Sw.
	676	Card.	Dyn.	Acou-st-Alloy	Zinc Die Cast	Chrome Gray or Gold	Dual 150 & Hi	60-15k	-152	Amph-enol MC4F	15	None	8¾ 1¼	14	300 Adapt.	60.00*	Var. "D". resp. indep. of dist. 3-pos. bass-tilt swit
LAFAYETTE	99-4597	Omni.	Dyn.	Mylar	Zinc	Black Satin & Chrome	50k	50-15k	-	Att.	4½	None	6⅛ 1¾	48	Adapt.	19.95	Incls. On-Off sw. desk st
	99-4588	Omni.	Dyn.	Mylar	Zinc	Black & Silver	10k	80-12k	-	Att.	8½	Phone	5½ 1	5	Adapt.	14.95	Incl. stand.
	99-4593	Omni.	Dyn.	Mylar	Zinc	Brushed Silver	50k, 250	50-11.5k	-	Att.	19½	None	9 1⅜	18	Std.	11.95	Incls. On-Off Switch.
	99-4603	Omni.	Dyn.	Mylar	Alum.	Satin Black	50k, 250	100-10k	-	Att.	18	None	7 1⅜	8	Adapt.	9.95	Incls. On-Off sw. clamp mount.
	99-4591	Card.	Dyn.	Mylar	Alum.	Satin	50k	100-15k	-	Att.	5	None	7⅛ 4½	5½	Adapt.	7.95	Incls. stand

MICROPHONES

NUFACTURER cied number cates ad page)	Model	Directional Pattern	Operating Principle	Diaphragm Material	Case Material	External Finish	Impedance, ohms	Frequency Response, Hz	EIA Sensitivity, dB	Mic Connection	Cable Length, ft.	Cable Plug Type	Dimensions, in. ℓ x dia.	Weight, oz.	Mounting Method	Price	SPECIAL FEATURES
JMANN	U87	fig. 8, Omni, Card.	Cond.	Mylar	Metal	Satin Chrome	-	40-16k	-140	Furn.	25	Cannon	8.25 2.25	19.2	Std.	-	Specs. same as U-67, KM66, KM64, KM63; New ser. using a.f. ckts.
(13)	KM86	fig. 8 Omni. Card.	Cond.	Mylar	Metal	Satin Chrome	-	40-16k	-141	furn.	25	Cannon	6.9 1.81 0.83	7	Std.	-	Silicon FETS; Operates from 40-54V; dc. ripple v. not critical; acces. battery a.c. pwrd.
	KM84	Card.	Cond.	Mylar	Metal	Satin Chrome	-	40-16k	-144	furn.	25	Cannon	4 0.83	3	Std.	-	Access. avail. To be marketed Oct. 1967; Prices to be established.
	KM83	Omni.	Cond.	Mylar	Metal	Satin Chrome	-	40-16k	-144	furn.	25	Cannon	4 0.83	3	Std.	-	Operation from 7.5-13 V. Avail. at increased price.
-	D-44	Card.	Dyn.	PVC	Metal	Black Chrome Plated Grid	200 Unbal.	60-16 ±5	-165	att.	12	None	5	4.7	furn.	34.95	Avail. as D-44BS with on/off sw. 30 ft. cable 200-ohms. bal. or Hi-Z at $39.95.
	RD-34WS	Card.	Dyn.	PVC	Metal	Black & Silver Gray	200 bal.	30-20k ±3	-168	Cannon	18	None	4 1/8 1 1/4	5	furn. with stand.	75.00	Studio, FET Mic, regs. pwr. sply. pwr.
	EK-71	Omni.	Cond.	Polyester	Metal	Satin Chrome	30-50 200 600	40-18k ±3	-164	Att.	12	None	2 11/16 11/16	1 1/4	Adapt.	99.50	S/S. Micro-Min. Cond. Req. pwr. suply.
	TC-4	Card.	Cond.	Polyester	Metal	Black Matte	200 bal.	42-20k ±2	-172	Tuchel	20 1	None	5 5/8 1 1/16	5	5/8-27	275.00	Studio FET Micr. reqs. pwr. supply.
	BK-1A	Omni.	Dyn.	Plastic	Alum.	Gray Sat.Chr.	30-150 250	50-15k	-146	Att.	30	None	7 3/4 1 7/8	18	Std. 1/2 - in. pipe	73.50	
	BK6B	Semi-dir.	Dyn.	Plastic	-	Low Luster Gray	30-150 250	60-15k	-159	Att.	30	None	2 9/16 15/16	2.3	clamp	86.00	Lavalier; MA2307 Clamp for stand.
	SK46	fig.8	Rib.	Alum.	-	-	200-15k	40-15k	-152	Att.	25	None	5 1/8 1 29/32 1 3/8	13	5/8-27 Swivel	49.00	
	77DX	3 pos. adj.	Rib.	Alum.	Satin or LL gray	-	-	-	-	-	-	-	-	-	-	-	Voice-Music sw. 3-pos. pattern switch. satin finish, MA-2311; low luster gray MA2312.
HEISER	MD420	Card.	Dyn.	Plas.	Metal	Satin Chrome	200	200-10k	-147	Tuchel	None	Tuchel	5 1 3/8	3.8	Goose Neck of Clamp	52.00	Noise-cancel.
	MD411 HLM	Card.	Dyn.	Plas.	Plastic and Metal	Gray & Chrome	Lo Med. Hi	50-12k	-150	Att.	5	Phone Plug	5 1 1/2 1 1/2	8	desk stand	44.50	Incls. 3 impedances
	MD611	Omni.	Dyn.	Plas.	Plastic and Metal	Gray & Chrome	Med.	60-12k	-150	Att.	5	None	6 1.0	-	desk stand	19.20	Medium Z for transistor TR's.
	MD722	Card.	Dyn.	Plas.	Plastic and Metal	Gray & Chrome	Med.	80-12k	-150	Att.	5	None	6 1	-	desk stand	28.75	Medium Z for transistor TR's.
OTONE	CDM-80	Card.	Dyn.	Polyester	Die Cast Metal	Brushed Chrome	200-50k	80-10k	-155	Three Cond. Cable	15	None	5 1/4 1 1/4	7	-	43.50	Front-to-back rej., 16 to 20 dB three freq. range, avail. in matched pairs; incls. on-off sw.
	DM-10 550	Omni.	Dyn.	Polyester	Die Cast Metal	Brushed Chrome	200	40-16k	-152	Two-Cond. Cable	15	None	5 1 1/2	8 1/4	-	25.50	Cartridge cup mounted in rubber sleeve. Incls. on/off switch.
	DM-70-550	Omni.	Dyn.	Polyester	Die Cast Metal	Brushed Chrome	200	40-16k	-156	Two-Cond.	15	None	4 1/2 15/16	5	-	29.50	Slim design; floor or table stand incls. lavalier, on/off sw.
	CM-10A	Omni.	Cer.	Alum.	Die Cast Metal	Brushed Chrome	400 pF	40-12k	-150	Sgl. cond. Shld'd. cable	8	Phone Plug	5 1 1/2 at top	7 1/2	-	18.40	

MICROPHONES

MANUFACTURER (Circled number indicates ad page)	Model	Directional Pattern	Operating Principle	Diaphragm Material	Case Material	External Finish	Impedance, ohms	Frequency Response, Hz	EIA Sensitivity, dB	Mic Connection	Cable Length, ft.	Cable Plug Type	Dimensions, in. ℓ x dia.	Weight, oz.	Mounting Method	Price	SPECIAL FEATURES
SHURE	545S	Uni-direc. Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi & Lo	40-15k	-151	Amph-enol	18	None	6 1/2 1 3/4	14	Std.	89.95	Slim Card. On-off sw. • swivel mt.
	565S	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi & Lo	40-15k	-150.5	Amph-enol	18	None	6 11/64 2	16	Std.	100.00	Integ. Filters. On-Off sw.
	585SA	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi	50-15k	-152.5	Amph-enol	15	None	6 3/4 2 1/16	14	Adapt.	65.00	Integral Filters. On-Off s
(9)	55SW	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi Med & Lo	50-15k	-151.5	Amph-enol	18	None	7 3/8 2 3/16 3 1/16	26	Std.	85.00	Built-In Z Sw; On-Off Sw.
(23)	566	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Med. & Lo	40-15k	-148	Cannon	None	None	6 1/2 2 1/32	20	Std.	140.00	Integral Filters and Shock Mount.
	585 SAV	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi	50-15k	-152.5	Amph-enol	None	None	6 3/4 2 1/16	14	Adapt.	72.50	Integral Filters and Vol. Cont.
	545L	Card.	Dyn.	Poly-ester	Alum.	Satin Chrome	Lo	40-15k	-151.5	None	None	None	5 1/8 1 1/4	7	Adapt.	70.00	Use as Lavalier, Hand, Stand Mounted, or Goosen
	580SA	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi	50-15k	-151	None	None	None	6 5/8 1 13/16	22	Adapt.	59.00	Unidirect.
	533SA	Card.	Dyn.	Poly-ester	Steel	Satin Chrome	Hi	40-11k	-151	Amph-enol	None	None	6 5/8 2 1/16	11	Adapt.	50.00	Integral Filters and Omni-directional.
SUPERSCOPE (Sony)	F-96	Card.	Dyn.	-	-	Lt. Gray	-	-	-	-	-	-	-	-	-	17.50	Removable stand.
	F-121	Card.	Dyn.	-	-	Satin	-	70-12k	-	-	-	-	-	-	-	99.50	
(69)	C-37	Card.	Cond.	-	-	-	50, 250, or 600	-	-	-	-	-	-	-	-	325.00	FET, self-contained batte pwr. a.c. pwr. sply. adapt avail.
	CR-6	Card.	-	-	-	Med. Gray	-	-	-	-	-	-	3 3/4 1	-	-	450.00	Wireless, incls. rcvr. 42.9 35.02, or 33.14 MHz oper. dist.-300 pt w/squelch. Bty. case 5 x 1 1/2. Use hand held or Lavalie
SYNCRON (See Vega Syncron)																	
UNIVERSITY SOUND	5020	Super Card.	Dyn.	Unilar	Alum.	Satin Chrome	250-20k	25-20k	-147	Amph-enol	15	None	8 5/16 2 3/16	14	Stand. Adapt.	56.95	Golf-ball type super-card; shock mtd. 5 yr. warranty
	5050	Super Card.	Dyn.	Unilar	Alum.	Satin Chrome	250-20k	25-20k	-147	Amph-enol	15	None	9 5/8 2 3/16	16	Swivel Stand Adapt.	59.95	As above, but with swivel stand adapt. on/off sw. 5 warranty.
(48)	2040	Omni.	Dyn.	Unilar	Zamak 3	Silver Gray & Black	50, 20k	50-14k	-143	Cannon	15	None	8 5/8 1 5/32	9	Stand Adapt.	30.60	On/off sw; 5-yr. warranty
(49)	6000	Card.	Dyn.	Unilar	Alum.	Chrome & Black	150	50-15k	-151	None	15	None	3 5/8 1 1/16	5	Lava-lier	39.75	Min. Lav. card; incls. ne cord, spg. loaded cable entrance; 5-yr. warranty.
(91)	8100	Card.	Dyn.	Unilar	Zamak 3	Chrome & Black	250-20k	70-15k	-154	Cannon	15	None	6 3/8 1 23/32	8	Adapt.	37.95	Shock mtd; on/off sw; 5-y warranty.
VEGA	105	Omni.	Dyn.	Poly-ester	Alum.	Matte Beige	-	80-14k	-140	-	-	-	5 3/4 1	7	-	300.00	Wireless, incls. s/s rcvr. Avail. hand-held, Lavalie or pocket-transmitter styl
	20	Omni.	Cond.	Spec.	Alum.	Matte Beige	50-200 50k	20-20k	-157	None	20	Cannon	5 7/8	6	-	185.00	Sep. pwr. suply; switchal Z, L.F. Filter.
	40	Omni.	Cond.	Spec.	Alum.	Matte Beige	50 200 50k	20-20k	-157	Cannon	20	Cannon	6 7/8	7	-	240.00	No ext. pwr. suply. req. s contained batt. supply.
VEGA-SYNCRON	S10	Card.	Cond.	Mylar	Alum.	Beige	50-Hi Z	40-20k	-147	Cannon	20	None	7 3/8 7/8	9	Adapt.	260.00	Transistorized, self-cont battery. A.C. pwr. suply avail.
	S10B	Omni.	Cond.	Mylar	Alum.	Beige	50-Hi Z	40-20k	-147	Cannon	20	None	7 3/8 7/8	9	Adapt.	240.00	Same as above except fo pattern.

HEADPHONES

MANUFACTURER (Circled number indicates ad page)	Model	Type	Frequency Response, Hz	Impedance, Ohms	Sensitivity, mV.	Max. Output, dBm	Max. Input, W.	Distortion, %	Plug Type	Cord Length, ft.	Weight, oz.	Price	SPECIAL FEATURES
EYER	DT-48S	dyn.	16-18k ±2 db	5+5	10	-	0.4	0.3	Std. Stereo	9	12	85.00	Accessories: TR-48 Transformers for 600 Ohm line, $17.40. UG-8 Speaker/phone sw. box, $7.70. CV-1 Circumaural Vinyl Ear Cushions, $3.45.
	DT-48SN	dyn.	16-18k ±2 db	25+25	20	-	0.4	0.3	Special NAGRA	9	12	85.00	For NAGRA Tape Recorder only – Monophonic
LARK	100	dyn.	10-20k	8	1.0	110	2	<0.5	Std. Stereo	8	16	39.50	Model 103, 300 ohms, $39.50 Model 112, 1200 ohms, $44.50
	200	mag.	20-17k	8	1.0	105	2	-	Std. Stereo	6	17	26.95	
ISHER (39)	HP-50	dyn.	30-17k	8-16	-	-	1.0	-	Std. Stereo	6½	-	29.95	Full foam-cushioned cups of high impact Cycolac plastic; fully adjustable vinyl-covered headband.
ENSEN	HS-2	dyn.	20 to 17,000	4	103 db @ 1 mW	-	-	1	Std. Stereo	8	16	24.95	
NIGHT (35)	KN875	dyn.	30-15k	4-16	105	120	0.5	1.0	Std. Stereo	8	16	11.95	Removable ear cushions.
	KN876	dyn.	16-16k	4-16	105	120	0.5	1.0	Std. Stereo	8	24	19.95	Vol. Control on each cup.
	KN885	dyn.	15-20k	4-16	105	120	0.75	0.5	Std. Stereo	8	32	34.50	Vol. and tone control on each cup.
OSS	KO-727	dyn.	10-15k	4	-	143	10	< 1	Std. Stereo	8 Coiled	15	34.95	Fully adjustable; removable cushions.
	PRO-4A	dyn.	30-20k	50	-	120	1	< 1	Std. Stereo	8	19	50.00	Fluid-filled cushions.
	SP-3XC	dyn.	10-15k	4	-	143	10	< 1	Std. Stereo	8	15	24.95	Extremely sensitive.
	SP-5NS	dyn.	10-15k	5.3 and 100	-	143	10	< 1	Std. Stereo + 2-cct	8	15	-	Switched lavalier for dual mode.
AFAYETTE	F-767	dyn.	30-15k	8	-	-	-	-	Std. Stereo	5	11¼	11.88	Air cushioned headband. Soft foam rubber ear cushions.
	F-770	dyn.	25-15k	8	-	-	0.5	-	Std. Stereo	5	12	17.95	Soft foam rubber ear pads 2½" dyn. speaker in each earcup.
	8X	dyn.	35-15k	8 or 16	100	-	-	-	Std. Stereo	5	11	7.95	Soft rubber cushion earcups. Vinyl covered headband. 2" transducers in each earcup.
ONEER (86)	SE-2P	dyn.	25-16k	8	-	-	0.5	1.0	Std. Stereo	6⅓	13	15.00	Lightweight.
	SE-21	dyn.	30-18k	16	-	-	1.25	1.0	Std. Stereo	6⅓	13	18.00	Lightweight plus full 2-speaker system (Woofer and Tweeter) with separate tweeter controls.
	SE-30	dyn.	20-20k	8	-	-	0.5	1.0	Std. Stereo	8	14	29.95	Lightweight plus extra soft cushioning in headband and ear pieces.
IARPE	HA-660/PRO	dyn.	15-35k	4-16 or 500	95 db	110 db	1.0	< 0.8	Std. Stereo	6	24	60.00	Extremely flat freq. resp.; fuses protect patented drive assy; liq.–filled seals, tinsel cable. 660/PRO-VC vol. controls (opt. $65.00)
	HA-10 MK II	dyn.	15-30k	8	115 db S.P.L. at 1V	130 db S.P.L.	2.0 Watt	< 0.8	Std. Stereo	6	23	45.00	Meets audiometric lab. specs. Extreme sensitivity; liq.–filled seals.
	HA-9	dyn.	30-15k	8	90 db S.P.L. at 1V	120 db S.P.L.	2.0	< 0.9	Std. Stereo	10	20	24.50	"Cycolac" plastic molded circumaural ear cups.
	AV-9-LM	dyn.	30-15k	500	90 db S.P.L. at 1V	120 db	2.0	< 0.8	2 Std. Console	6	30	38.50	Phone-mike. combination; broadcast quality, mike, 200 ohms; detachable cords.

HEADPHONES

MANUFACTURER (Circled number indicates ad page)	Model	Type	Frequency Response, Hz	Impedance, Ohms	Sensitivity, mV.	Max. Output, dBm	Max. Input, W.	Distortion, %	Plug Type	Cord Length, ft.	Weight, oz.	Price	SPECIAL FEATURES
SENNHEISER	HD110	dyn.	20-20k	2x8, 2x25 or 2x200	500 μb per $\sqrt{VA}$	120	0.160	1	Std. Stereo or Tinned Leads	6	10	64.00	Special versions available for Hi-Fi Listening, Monitoring.
(SONY) SUPERSCOPE (69)	DR-3A	dyn.	-	8	-	-	-	-	Std. Stereo	-	-	22.50	Vinyl-covered foam ear cushions.
	DR-3C	dyn.	-	10,000	-	-	-	-	Std. Stereo	-	-	27.50	As above.
SUPEREX	ST-PRO-B	Coax dyn.	18-22k	8-16	-	-	2.0	0.75	Std. Stereo	7	14	50.00	Dyn. woofer-ceramic tweeter, cross-over network. Avail: high Z; Replaceable vinyl foam cushions.
	ST-M	Coax dyn.	20-20k	8-16	-	-	2.0	1.0	Std. Stereo	7	15	29.95	Same as above plus tweeter conts.
	ST-S	dyn.	-	-	-	-	2.0	1.0	Std. Stereo	7	12	24.95	Volume controls. Replaceable vinyl foam cushions. Avail: high Z
	SW-1	dyn.	50-16k	8-16	-	-	1.0	1.0	Std. Stereo	7	10	19.95	Two-tone color motif. Red and white.
TELEX	Serenata	dyn.	20-20k	3-16	92	-	2.0	0.5	Std. Stereo	8	12	59.95	Tone Control, Comfort Control. Detachable Cord. Liquid Filled Ear Cushions.
	Adjusta-tone	dyn.	10-15k	3-16	100	-	10	1.0	Std. Stereo	8	12	15.95	"Forward Sound" Acoustic effect by reversing left & right ear cups.
	Combo	dyn.	10-15k	3-16	100	-	10	1.0	Std. Stereo	8	12	19.95	3½" speaker, vinyl ear cushions.
	ST-20	dyn.	16-15k	3-16	95	-	2	2.0	Std. Stereo	8	12	34.95	Deep cavity speakers. Volume control each channel.

Check No. 133 on Reader Service Card

MISCELLANEOUS

Altec Lansing

Bass Energizer—Improves sound balance on speaker systems lacking in bass response. Boosts response below 150 Hz; 6 dB boost at 8 ohms. Additional power not required. $22.50.

Audio Devices

Continuous-loop tape cartridge—Blank 4- and 8-track continuous loop "Audiopak" tape cartridges. Type A/4,300 ft., $4.15. Type A/8, 150 ft., $3.85.
New Formula 10 tape on 8¼-in. reel—All-purpose Formula 10 magnetic tape; 2400 ft. of 1-mil Mylar on 8¼-in. reel, $9.45. Empty reel, $2.90.
Blank recording discs—Master Audiodiscs for master recordings; Red Label for professional use; Yellow Label for general use; Blue Label for amateur use.

Audio Originals

Equipment cabinet—Model 101D component cabinet/room divider. Provides pull-out changer-turntable shelf. Adjustable shelf allows for combinations of components, record shelf, and mock

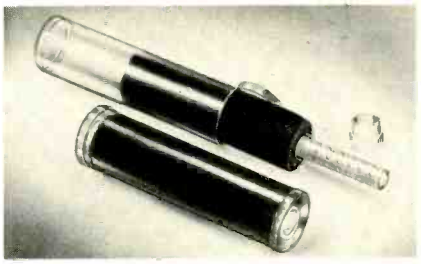
drawer shelf for record storage and objects of art. Genuine walnut veneers and hardwoods with satin walnut finish. 43½ in. W x 60 in. H x 17 in. D. $144.50.

BASF/Computron

A complete line of tensilized magnetic recording tape with polyvinyl chloride base and polyester base backing. Available in all popular reel sizes and tape thicknesses. Line includes C-60 cassettes with 60 minutes recording time, $3.19; C-90 cassettes with 90 minutes recording time, $5.75.

Elpa Marketing

Watts record-cleaning equipment—The "Preener" is a roller of special nylon pile with a wick which is wetted with water. Removes dust and grit. $3.50.



The "Parastat" is a manual device to remove dust, grit, and residue deep in record grooves. Includes an antistatic agent. $15.00 *EdiTall tape editing and splicing system* — Model KP-2 kit includes tape-splicing block, 30 EdiTab splicing tapes, demagnetized razor blade, grease pencil, instruction booklet. $3.50.

Fairchild Recording

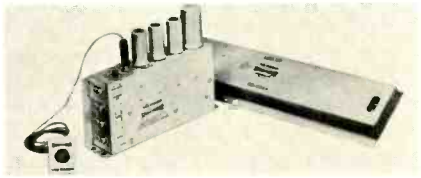
Dynamic reverberation system—Solid-state / electro-mechanical system for natural-sounding reverberation for recording studio and broadcast station use. Uses six electro-mechanical delay lines, each tuned differently. Called the "Reverbertron," it's a compact, two-section system which measures 24½ in. high x 19 in. wide.

The Finney Company

FM antennas—"Finney" offers a line of broadband FM antennas, preassembled with snap-out self-aligning elements. Models include a six-element antenna, $24.90; 10-element, $36.35; 12-element, $44.95. An FM signal amplifier, model 65-7, provides 20 dB amplification. The high-gain, low-noise transistor amplifier features outputs for one or two sets. $24.95.

Fisher

Dynamic Spacexpander — Fisher Radio's Model K-10 reverberation device may be used with records, radio, or tape, either mono or stereo, to create



controlled reverberation. Delay time: 33 msec; decay time: 2 seconds at 300 Hz. Front-panel control. $79.50.

IMC Magnetics

Hi-fi "Boxer" fan—Low-noise cooling fan kit circulates air two to three times per minute in average cabinet. Mounting hardware is supplied. $14.85.

Irish Tape

Magnetic recording tape—Popularly-priced tape in 3-in. through 7-in. reel sizes include a 30-in. color-coded leader and trailer plus a metal reversing strip at no added cost.

JFD Electronics

FM outdoor antenna line—Four-element through 10-element "Log Periodic" design antennas, ranging in price from $19.95 to $49.95. Outdoor FM amplifiers, for fringe reception areas, models FT-1 and FT-175, both solid-state, are $31.95 and $34.95, respectively. Indoor FM amplifiers, also solid-state, are the EF-1 and HF-1; $17.95 and $24.95, respectively.

Kersting

Record storage cabinet — Model E-1 features "Quick-See" album file which slides out of cabinet with a drop gate to give flip-through view of record albums. 22¼ in. H x 32 in. W x 16 in. D. $59.95.

Nortronics

Magnetic tape heads—Premium ¼-in. tape head replacements for over 1800 recorders, both foreign and domestic, in all track styles. Constructed with hyperbolic face for intimate tape-to-head-gap contact, laminated core, deposited quartz gap. $8 to $105. Professional heads for ¼-in., ½-in. and 1-in. tape are available for Ampex, Crown, Magnecord, RCA, Presto, Scully, and Tape-A-Thon. $18 to $350.

Alignment tape—Model AT-100 is an azimuth and amplifier alignment tape for full-track, two-track, and four-track mono and stereo recorders. Recorded full track at 7½ ips. 7500 Hz azimuth tone; NAB amplifier equalization tones. Completed directions recorded on tape plus printed instruction sheet. $4.95.

Reeves Soundcraft

Magnetic recording tape—Type PL-2, 1-mil Mylar on 3-in. reel in mailer. Ideal for letters, business, etc. $1.00 ea. *Tape index*—30 press-on Mylar tabs in five colors for instant location of selections on magnetic tape. Incls. matching subject identification labels. $1.25.

Sennheiser

Wireless microphone system—Mikroport model SM1008 has carrier frequencies of 36.7 and 37.1 MHz. Receiver is fully transistorized. Operates on a.c. and batteries. Full line of accessories available. $706.

Shure

Microphone mixer model M68—Five-channel, completely transistorized mixer for use with tape recorders and public address systems. Features four microphone inputs and one high-level auxiliary input for tape or tuner. Individual balance controls to balance each input; master volume control for simultaneous control of all inputs. Has high- or low-impedance microphone level output, a high-impedance auxiliary output. Two or more mixers can be connected together for additional microphone inputs. $125.00.

Stereo headphone amplifier — Model SA-1 Solo-Phone is designed for hi-fi listening with headphones. Provides sufficient amplification and equalization for magnetic cartridge, plus inputs for FM stereo tuner or tape playback unit. $45. Model SA-10, with an automatic changer, $99.95.

Test record — Model TTR-101, "An Audio Obstacle Course" test record, includes tests of cartridge trackability as well as channel balance, phasing, and anti-skating. $3.95.

Sony

Electronic crossover—Model TA-4300 is an electronic crossover network that is placed between the preamplifier stage and the power amplifier stage. (An exclusive power amplifier is used for each speaker in the multi-channel amplification system recommended here.) Among the attributes of the TA-4300 are: accurate crossover points; only resistors and capacitors are used in the crossover network; level control is independent in each frequency range; damping factor is not affected. The solid-state device is priced at $199.50.

Vega

Volume compressor — Level-compressor/limiter automatically controls level when placed between microphone and amplifier. Prevents overloading, reduces feedback effects. The single-channel model 212 is priced at $125;

a more sophisticated dual-channel device, model 222, for rack mount, is $660. Attack time for both is 1 msec for 6 dB reduction; release time of 2 seconds; distortion under 0.1% under 20 dB compression.

Toujay

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AUDIO RECORD REVIEW

EDWARD TATNALL CANBY

Bach: The Sonatas for Violin and Harpsichord. Josef Suk, violin, Susannah Rouvickova, piano.
Epic BSC 160 (2) stereo

Columbia-Epic is not above borrowing from the lowlier Crossroads label, out of Czechoslovakia, when the material seems opportune. That puts this release in the higher-priced category, but it is probably worth it to you in terms of the impact of an important musical collection by a big composer. The source is the same as Crossroads, and the quality in every respect identical.

As lined up against other versions of these lovely Bach works, you will find these sonatas to be of an ever-so-slightly old-fashioned quality, even though the harpsichord is used for an impeccably modern performance. (We used to hear them via the piano as a matter of course.) It is mainly Josef Suk, of the famous musical Suk family, whose violin has a bit of the old, unctuous quality we know so well in Heifetz, Mischa Elman and (if you are old enough) Fritz Kreisler. This seems to be in line with the general "feel" of Czech music, which is on the conservative side in terms of style of performance.

It's nice, and musical too. Plenty of listeners will prefer this Bach to the more linear, brilliant, blending style of the new younger fiddlers who do this music. E.T.C.

Dvorak: Symphony No. 7 in D Minor. Czech Philharmonic Orch., Kosler.
Crossroads 22 16 0098 stereo

Here's a good recording. One can feel (or so it seems to me) the pride of ownership on the part of this Czech national orchestra in a property that ranks in value among the great Romantic symphonies.

They play it with less bounce and a lot less tension than the big American orchestras, the strings are less precise than they might be and the "effects" could be more telling in detail under a top-rank conductor. No matter—this performance has what it takes to project the music, which is Dvorak's best (and a lot more interesting than the too-well-known "New World" Symphony).

This music is not particularly Czech in style; in fact it is the least nationalistic of his big works and could in many places be confused with, say, the Brahms Third by the casually listening ear. More's the pleasure for most of us. E.T.C.

(Hindemith: Symphonic Metamorphoses) Kodaly: Variations on a Hungarian Folk Song. Brno State Philharmonic, (Vogel), Ferencsik.
Crosssroads 22 16 0096 stereo

WARNING! The parentheses above are deliberate. Imagine my surprise, first, to find that Side 1, marked with one of my favorite Hindemith pieces (it has jazz in it), was instead the much less interesting and rather bombastic Kodaly work. Labels reversed?

Imagine my further surprise when I flipped the disc, to find that the other side was Kodaly too. Identical to Side 1.

It takes a really big company to make a monumental blooper like that! Even the stampers are incorrectly marked. Better Czech your copy before you buy it. E.T.C.

La Fete de Saint Michel. (Gregorian chant). Choeur des Moniales de l'Abbaye Notre-Dame d'Argentan, dir. Dom Joseph Gajard O.S.B.
Soc. Francaise du Son SXL 20.146 stereo (via London)

Surprise! This long record of Gregorian chant is all-female; not monks but nuns. Normally it is the monks who sing Gregorian, in the male vocal range; but in some institutions it is regularly sung by sopranos and altos, as here.

All unaccompanied, of course, a complete portrayal of the festival of Saint Michael, first via a Mass, then on Side 2 the Office plus certain added Gregorian pieces of kindred nature. For those who know the Catholic procedures in detail, all this should be of great interest; for others, the lovely, floating vocal quality of the singing nuns just goes on and on.

They do extremely well, notably in the great accuracy of their pitch. It is not easy to sing this music so high without flatting. Their sense of the relaxed long line and the word-shape phrasing is excellent. E.T.C.

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