AUDIO

AUGUST, 1963
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ANNUAL PRODUCT Preview ISSUE 1963

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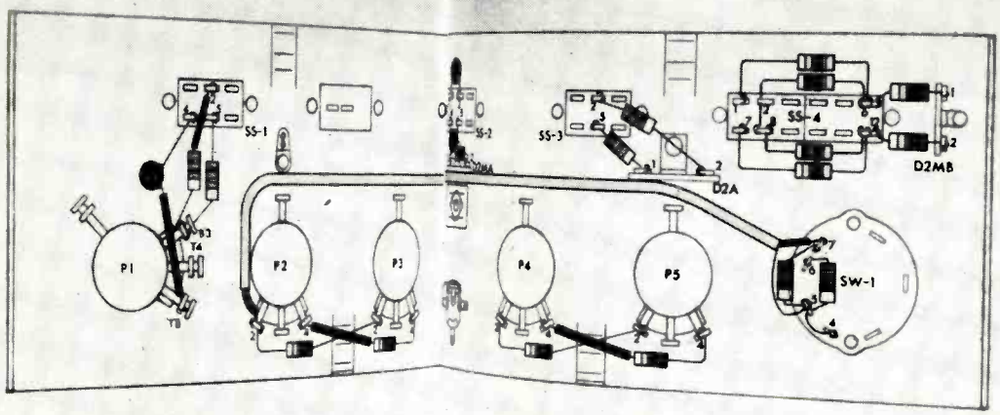
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Assembly Group BF-3

- ☐ BF3-1. Add a 1" piece of spaghetti to one end of a CC-47 NPO. Connect this end to pin 8, (top) P1. Connect the other end to pin 4, SS-1 (S1).
- ☐ BF3-2. Connect a 33K resistor (Orange, Orange, Orange) from pin 5, SS-1 (S2) thru pin 5 (brown) P1 (S2)* to pin 4 (top), P1.
- ☐ BF3-3. Add a ½" piece of spaghetti to one end of a 33K resistor (Orange, Orange, Orange). Connect this end to pin 2, SS-3. Connect the other end to pin 4 (top), P1.
- ☐ BF3-4. Connect a 33K resistor (Orange, Orange, Orange) from pin 2, SS-3 (S1) to pin 2, D2A (S2).
- ☐ BF3-5. Connect a 33K resistor (Orange, Orange, Orange) from pin 5, SS-1 (S1) to pin 1, D2A (S2).
- ☐ BF3-6. Connect a 680K resistor (Blue, Grey, Yellow) from pin 1, D2MA to pin 2, D2MA.
- ☐ BF3-7. Connect a 680K resistor (Blue, Grey, Yellow) from pin 1, D2MB to pin 6, SS-4.
- ☐ BF3-8. Connect a 680K resistor (Blue, Grey, Yellow) from pin 2, D2MB (S2) to pin 12, SS-4 (S1).
- ☐ BF3-9. Connect a CC-220 from pin 4, SS-2 (S2) to pin 5, SS-2 (S1).
- ☐ BF3-10. Connect a CC-220 from pin 1, SS-2 (S2) to pin 2, SS-2 (S1).
- ☐ BF3-11. Clip out the bare wire at one end of a 1¼" Yellow mic lapper** and connect the insulated wire to pin 2, P2. Connect the bare wire at the opposite end to pin 3, SW-1. Connect the insulated wire to pin 7, SW-1 (wire both terminals together).

*A wire passing thru a pin counts as two connections when adding up the total to be soldered.
**See Page 7 for a description of this wire.

12

Assembly Group BF-4

From here on you will be soldering pins that have several wires attached. When you solder these pins, make sure that all the wires connected to the pin are fully soldered.

- ☐ BF4-1. Connect a 4.7M resistor (Yellow, Purple, Green) from pin 6, SS-4 thru pin 2, SS-4 (S2)* to pin 8, SS-4.
- ☐ BF4-2. Connect a 4.7M resistor (Yellow, Purple, Green) from pin 12, SS-4 to pin 8, SS-4 (S1).
- ☐ BF4-3. Connect a 2.2M resistor (Red, Red, Green) from pin 7, SW-1 (S2) thru pin 3, SW-1 to pin 4, SW-1.
- ☐ BF4-4. Connect a 2.2M resistor (Red, Red, Green) from pin 6, SW-1 (S2) to pin 5, SW-1 (S1).
- ☐ BF4-5. Connect a 470K resistor (Yellow, Purple, Yellow) from pin 1, SS-4 to pin 6, SS-4 (S1).
- ☐ BF4-6. Connect a 470K resistor (Yellow, Purple, Yellow) from pin 7, SS-4 to pin 12, SS-4 (S1).
- ☐ BF4-7. Add a 1" piece of spaghetti to one end of a 100K resistor (Brown, Black, Yellow). Connect this end to pin 4, P4 (S2). Connect the other end to pin 4, P5.
- ☐ BF4-8. Connect a 100K resistor (Brown, Black, Yellow) from pin 2, P4 (S2) to pin 2, P5 (S2).
- ☐ BF4-9. Add a 1" piece of spaghetti to one end of a 100K resistor (Brown, Black, Yellow). Connect this end to pin 4, P2. Connect the other end to pin 4, P3 (S2).
- ☐ BF4-10. Connect a 100K resistor (Brown, Black, Yellow) from pin 2, P2 (S2) to pin 2, P3 (S2).

*A wire passing thru a pin counts as two connections when adding up the total to be soldered.

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AUGUST, 1963 VOL. 47, No. 8

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Coming NEXT Month

Construction—

● Mobile FM-stereo reception. North C. Ham. A thorough analysis of the problems of receiving FM-stereo on the move plus a thorough description of how to modify an existing car FM tuner with the addition of a multiplex adapter. Stereo speaker-placement problems in an automobile are also discussed.

Information—

● Vertical Tracking Distortion in Practice. Duane H. Cooper. The widespread use of conservative recording levels accounts for the little distortion actually heard, because of vertical tracking error, in many stereo discs. The author uses numbers to describe the levels he is talking about, and gives examples of discs which exhibit the problem.

And

Equipment profiles—

1. Fisher SA-1000 150-watt stereo power amplifier. We will compare the factory-wired unit with the kit (if it is available in time).
2. H. H. Scott 4310 FM-stereo tuner. The new top of the Scott tuner line.
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Playing of Acetate Discs

Q. I have quite a few old paper and acetate home-recording discs which are just about worn out. They all have a sentimental value to me, and I want to get them onto tape as soon as possible. I know all about how to dub, and so forth.

However, I've never dubbed from home recordings before and these have varying degrees of surface noise—anything from almost as good as they were originally to practically worn out.

I have heard of filters that can take out all or at least a lot of this extraneous noise. I seem to remember a buddy of mine having a little gizmo which was connected between the pickup and preamplifier and which had several settings, old 78's, new 78's, and so on. Are these still available? If so, what shall I ask for? If they are available, is it the best thing for me to use for the purpose? Maybe you can suggest something better.

Also, one other thing. Some of these records specify cactus needles. Will I be able to record right into my tape recorder directly from the cactus needle and arm or will I have to record from the output of my regular amplifier?

I just happened to think—maybe there is a special kind or size of needle that will cut some noise, too. Any suggestions on that? Ward G. Erwin, La Crescenta, California.

A. *Figure* 1 is a rumble and scratch filter which will remove the noise from the discs. I know of no commercial filter currently available which will do what you have in mind.

The filter here shown is one which was a portion of the Bogen PR-100-A preamplifier and has been reproduced here with the permission of the manufacturer.

Connect this filter between the preamplifier and the power amplifier. If you have trouble, you will have to connect it between two high-impedance stages.

I am surprised about the cactus needles which are to be used to play some of your records. Unless these discs are of the old, embossed type, etched on aluminum, there should be no need to play them with cactus needles. Of course, if they are embossed discs, this is the only method which will allow you to play them back without ruining them at the same time.

If the discs are acetate, they can be played with standard styli with better results than are obtainable with a cactus

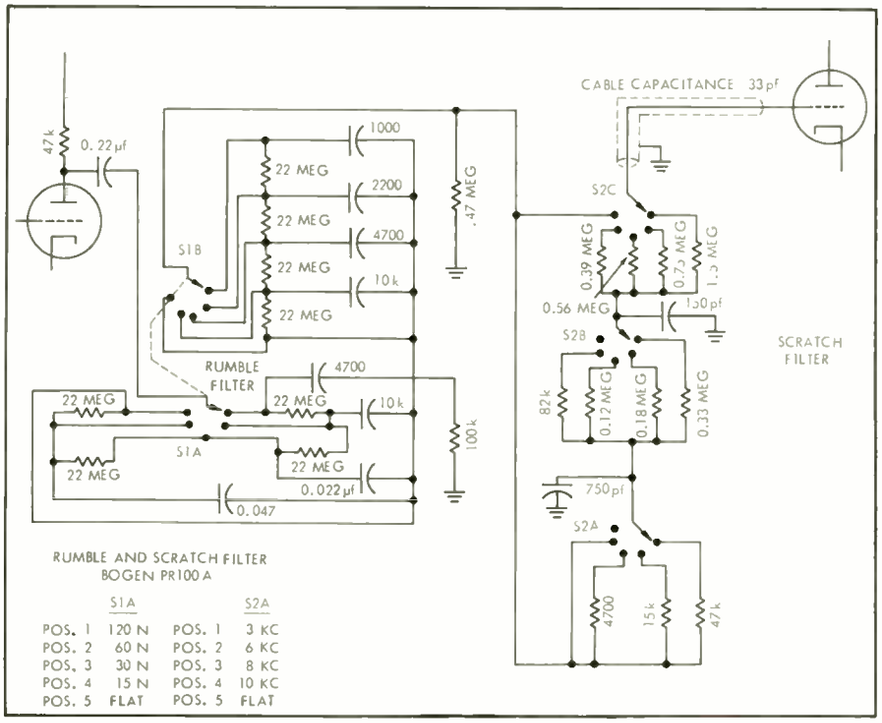


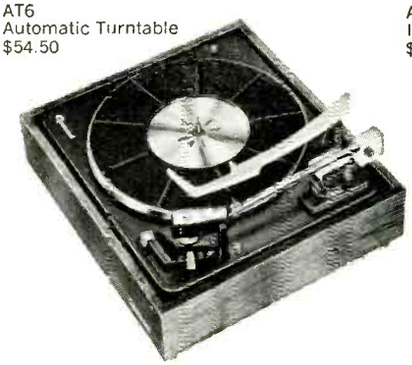
Fig. 1. Rumble and scratch filter.

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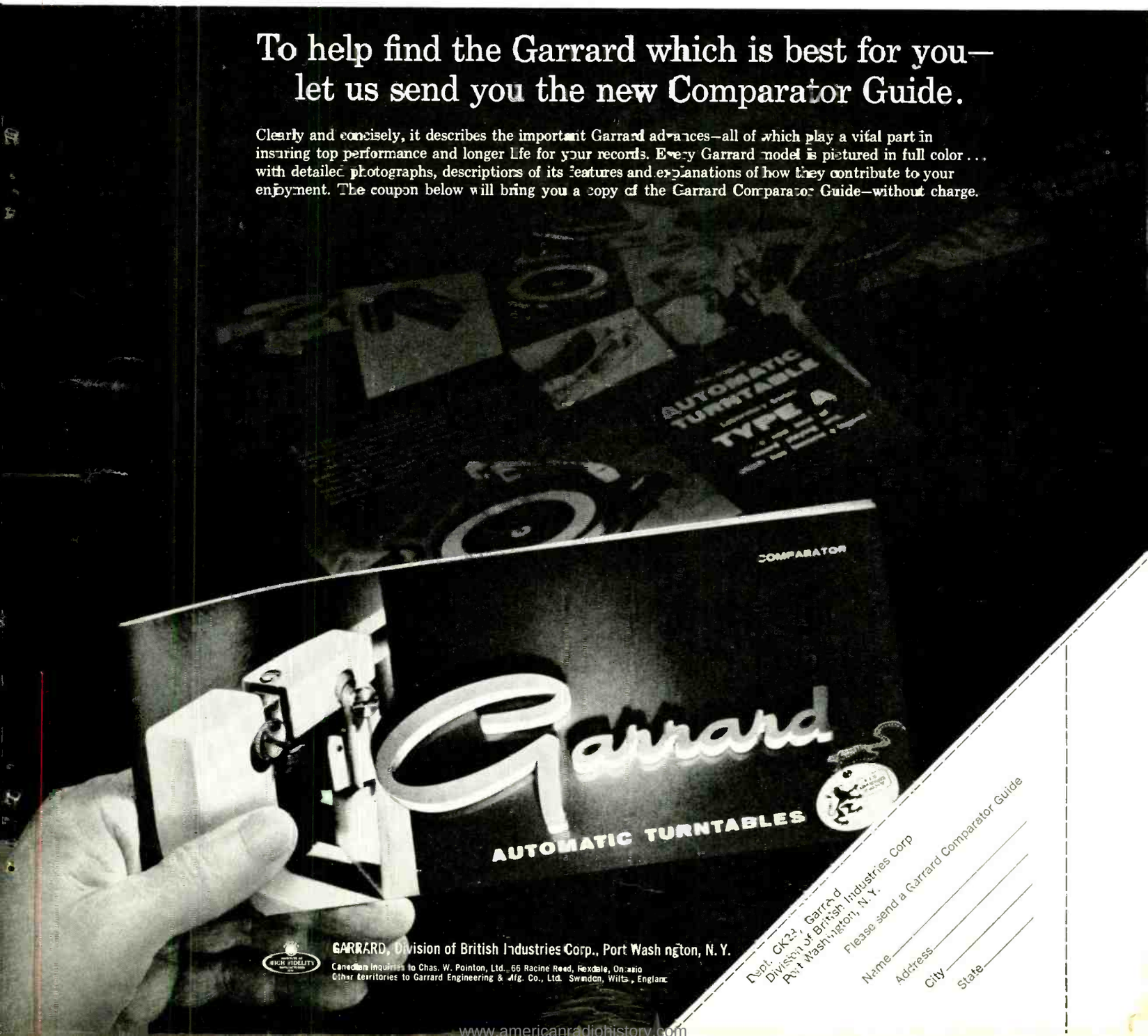
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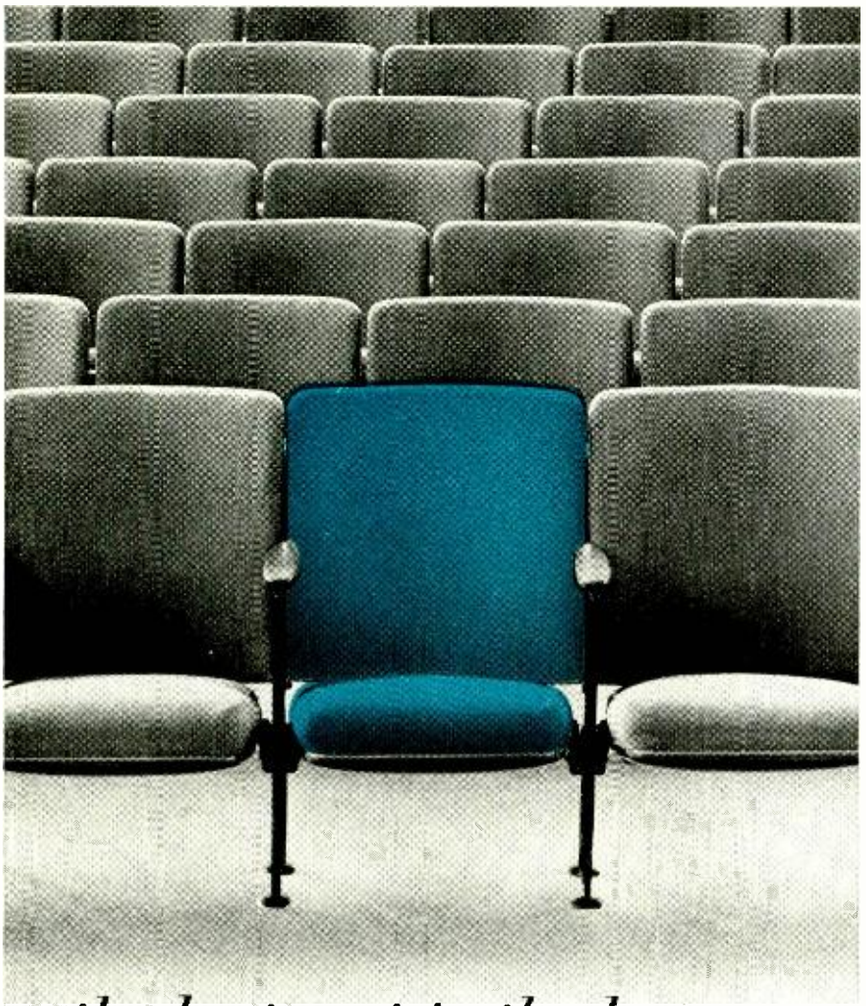
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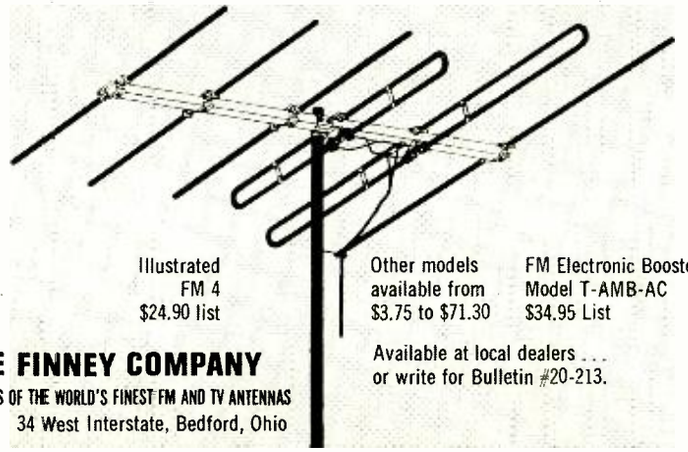
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needle. There was a time when cactus needles were the rage, even though it was demonstrable that such needles deposited foreign matter in the grooves. Perhaps some of your acetate discs were recorded at that time. This vogue was with us in the late 30's and early 40's, and perhaps was the reason for the use of cactus needles.

The exact radius of the stylus used to play back the records cannot be given, but you should be able to use a 3-mil stylus to play back most records unless some of them were made using LP techniques developed after 1948. The stylus you now use to play back 78-rpm discs will do nicely.

I should point out that the use of the proper size stylus as mentioned will reduce noise to a considerable extent. If you use an LP stylus to reproduce modulation from grooves which were recorded with a recording stylus of larger radius, you will add noise and you will contribute to the destruction of the disc.

One consideration which might enter the picture is that the output from the cartridge might be insufficient to drive the tape recorder properly. Another point to remember is that by connecting the output of the cartridge directly to the tape recorder you lose the ability to remove surface noise from the discs. This was something you wanted to be able to do.

If you do use a cactus needle, you will have to use another cartridge. If this cartridge is a crystal type, connect it to the proper input of your preamplifier and connect the filter shown here as already directed. This will eliminate surface noise and rumble if either is present. Further, you can adjust the tone controls to get the best sound from the discs. The discs were probably recorded with varying equalization, most of them haphazard, judging from my experience with home recordings. Of course, if some or all of them were recorded professionally, there will be a more uniform sound, but even here, equalization standards varied widely. Some tone compensation is welcome when you really sit down to do the job.

Amplifier Feedback Circuits

Q. Some amplifier circuits base the component values of the feedback circuit upon the impedance of the speaker system with which they are to be used, whereas other amplifier circuits maintain fixed component values regardless of the impedance of the two speakers. It appears to me that the more sound approach would be the first one. Am I correct in this assumption? E. X. Nucle, Bronx, New York.

A. Circuits with different feedback characteristics to suit the impedance of the speakers are designed around transformers which have just one impedance tap, say 8 ohms.

This approach is inflexible and is not preferable to the systems which have multiple output taps to meet many external load considerations. The slight improvement in performance which might be gained by using feedback to suit the particular speaker impedance is so slight that its superiority can hardly be measured, let alone be heard.

My own circuit which appeared in the July, 1962, issue of AUDIO, used the standard approach. I did consider the more inflexible arrangement, however, but found that it did not give better results. When you examine this circuit, you will see that the impedances are selectable by a switch, and I could have worked things out so that feedback could be changed along with the impedance, but I didn't feel that this would result in any real improvement. Æ

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LETTERS

Some Statistics

SIR:

We were pleased to see your review of the 350B FM Stereo Tuner in the July "Equipment Profile."

As you so aptly pointed out, the ingenuity (I believe you called it "daring") of the multiplex circuit in the 350 combined with the excellent sensitivity of the unit have made it one of the most value-packed tuners available. We feel it to be one of the finest FM-stereo tuners available at any price.

We feel, however, that clarification of one aspect of the review would prove helpful to many readers. Though reference is made to the fact that all Scott units tested by AUDIO have always met advertised specifications, those for this particular unit are not given.

So that those interested might more accurately evaluate the exceptional performance of the 350B, we wonder if it would not be possible for you to publish this particular unit's specifications.

PETER DYKE
Asst. Sales Manager
H. H. Scott, Inc.
111 Powder Mill Road
Maynard, Mass.

(The rating of a product must include not only the test performance but also an informed opinion as to how long it will stay that way—in essence the performance of the manufacturer. We believe the manufacturer's rating is very clear in this case, and that is why we did not give statistics. Anyhow, for those who must have some numbers—the 350B had a sensitivity of 2.0 μv (IHF), selectivity of 37 db, capture ratio of 5 db, AM suppression of better than 50 db. ED.)

Losses in FM-Stereo Transmission

SIR:

I have noticed that in your February, 1963, issue, and repeated again in your May, 1963, issue, that you had attributed the poor signal strength of stereo reception to FCC information which indicated "about a 30% loss." This magnitude of loss appears so low to me that I would like first to clarify our definitions of where the loss may occur. In monophonic and stereo transmissions, there are two signal-to-noise ratios of interest. One of these is the monophonic or main channel signal-to-noise ratio and the other is the signal-to-noise ratio which prevails during stereo reception. When multiplex stereo is added to an FM station, there is a degradation of the monophonic channel of a fairly small amount. The signal-to-noise ratio of the stereo reception is usually expressed in terms of a loss with respect to monophonic reception. This loss is a considerable amount, much higher than the 30% which you mentioned.

A very good source for data on the signal-to-noise ratio loss with stereo reception is the article entitled "Some Notes on the Calculation of the S/N Ratio for a FM System Employing a Double Sideband AM Multiplex" by Norman Parker, Motorola, Inc., and Donald W. Ruby, Zenith Radio Corporation, published in the April, 1962, issue of "IRE Transactions on Broadcast and Television Receivers." Norman Parker was chairman of the Signal-to-Noise Evaluation Committee on the National Stereophonic Radio Committee and developed the signal-to-noise ratio ratings which were passed on by that Committee.

Parker and Ruby calculated the signal-to-noise ratio loss obtained from stereophonic reception, as compared to monophonic as 23 db. This means that if the signal-to-noise ratio on the main channel is 40 db, the signal-to-noise ratio for multiplex stereo reception would be 40–23 or 17 db. A 23-db loss is a loss of 200 to 1 in power such that a 1000-watt FM broadcasting station becomes a 5-watt stereo broadcasting station. A 200-to-1 loss in power is a loss of 99.5% instead of 30%. In other words, the signal power has been reduced from 100% to 0.5%. This large loss is responsible for the very poor signal-to-noise conditions obtained with stereo reception. The only way that stereo reception can be brought up to the signal strength of monophonic reception would be with a directive antenna having a 23-db gain. That amount of antenna gain would call for quite a massive array.

MURRAY G. CROSBY
Director of Engineering
Mars Electronics
135 Eileen Way,
Syosset, L. I., N. Y.

(Actually we said the loss would be 50–66⅔% rather than 30%. We do agree, however, that losses are rather high and require corrective measures to ensure good stereo reception. We do not agree, as you intimate, that it is almost hopeless. We feel that the latest FM tuners have solved a good deal of the problem—in conjunction with an appropriate reasonable antenna. ED.)

We Were Wrong

SIR:

On page 58 of your April, 1963, issue, it said: "New Orleans studios were closed then *as now* to Negro performers." Just to set the records straight, this studio has been in operation for the better part of 15 years. In these years, I'd say that 85 to 90 per cent of our recording is done by Negro artists and musicians.

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Chief Audio Engineer
Cosimo Recording Studio
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Audio Clubs

SIR:

A few issues back you covered the subject of Audio clubs. If your magazine is acting as a clearing house for interested prospects, I would like to submit my name for contact by other like-minded people in the general San Jose area.

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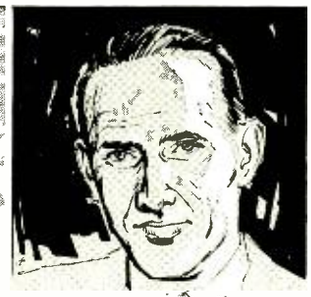
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Magnetic Products Division 3M COMPANY

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AUDIO ETC.

Edward Tatnall Canby



MIDSUMMER IN MINHATTIN

1. Times Squayah

Midsummer is the time when I tend to get fascinated with audio extremities—noises far from the hi-fi central area of loudspeakers, phono preamps, turntables, multiplex tuners which necessarily keeps me busy the rest of the long year. Vacation time. Not that my ears ever take a vacation, except when my highs are sealed off by a cold in the head. But those sounds which are purely marginal in the depths of winter suddenly, come midsummer, begin to intrude into my center of audible operations. I even begin to feel like writing about them, crazy as it may seem. Especially when I am in the Big City and must, necessarily trod the baking streets, the superheated subway, and the clammy, air-conditioned halls of the metropolis, come heat, come humidity, come anything. Somehow, the gentle sounds of winter are now louder and more raucous; the incidentals that do not even impinge on consciousness in December begin to whistle and screech and grate and groan as June wears wearily into July and even more doggedly on into August . . .

One needs to find a bit of humor in these doggy days of super-loudness on the streets. One looks for a philosophy, a moral, a silver lining, to make a point out of the pointless jargon of cruelty that jangles in the ears from the earliest morning to the latest hours of a breathlessly hot night. Ugh.

(To be sure, I'm writing this on a brisk, chilly country day, far from the subway, the only audible noise being the rustle of my furnace keeping the house warm . . . but I have imagination, don't I? I'm just thinking ahead, to Date of Publication.)

Take the public-address hi-fi that has lately been installed in the New York subway. It's on all the new cars and it makes me laugh aloud when I'm not cringing. Cybernetics! The best of our audio machinery still is at the mercy of the errant human being who runs it, not to speak of the individuals who project vocal quality through it! Yes, the idea of an audible subway guide, a train announcer on every train, was a bright one and I can just see the enthusiastic designer who figured how to install mikes and amplifiers in multiple-unit couplings, to match the multiple-unit control system of the subway cars. One motorman on each train. He keeps quiet. One conductor, to open the doors and shut them with due caution. And to talk into the mike. "TIMES SQUARE NEXT . . . CHANGE FOR THE BMT AND SHUTTLE TO GRAND CENTRAL." What a useful sort of audio!

Ah, but wait. Supposing we have speakers installed on every car, and a means by which they can be linked up to nine other cars, and assuming a mike ready at hand somewhere in every cab, so the man can grab it as he pushes his door-openers or closers, what sort of regulations do we set up for the required announcements—and what sort of audio controls? Who is the "station engineer," running gain on our friend the conductor?

And who trains him in the simple art of elocution, to speak properly into the all-potent mike, to project in dulcet tones, to pronounce impeccably in Webster-like syllables?

Somebody, for instance, trains the ladies who announce the weather into a tape recorder for our hourly pleasure via WE 6 1212; they all must learn to say, not "temperature," but "Tempera—tyoor," not humidity" but YOUmiditee", minus the H. And if we occasionally hear the magic word "Bavvometer" it is merely because even the phone company can't kill all traces of the delectable New York accent, the kind that murmers sweet thoughts about Minhattin and Long Gyland. At least the telephone people try to educate their sweet young things. Not the subway people.

Want to know where subway conductors come from? Just listen to them. The Irish would seem to have it all over the rest of us in those cars. Unmistakable Irishese, out of the big melting pot. But the other day I jumped a foot when a Seventh avenue conductor cheerily announced, in tones audible a half mile away down the tunnel, "TIMES SQUAYAH!" Why, the man must have been borrowed straight from the Boston system the day before! I half expected the next announcement from the speakers to be "PAHK STREET, SCOLLEH SQUAYAH," instead of 72nd Street.

But the local accent isn't the half of it. It's the psychology. After all, here we have a man with an Audience—one person, one mike and a crowd of thousands of souls before him. What an ego-builder, for the incipient crowd-tamer! Who ever heard of a mere train conductor speaking to the thousands who are his Flock, his charges, over whom he exercises a one-man responsibility only less great than that of his side-kick (silent), the ever-responsible motorman? It goes to some heads.

Other heads have mike fright and produce no more than a meaningless mumble. It is, after all, a huge audience. Many a conductor lapses into silence, if silence is the word for it. Not a sound from the overhead speakers, and let the lost souls find their own way. We have maps, after all.

But the enterprising conductors for whom an open mike is an open invitation often wax eloquent. The temptations to irrelevancy must be immense. Imagine the practical jokester, the story teller, the man of sarcastic side-comments, in charge of one of those all-potent subway mikes, holding his absolutely captive (captivated?) audience tighter than any politician at a political rally, pinned to their seats, rooted unsteadily to the swaying floor! Anything might happen, in stentorian tones. Yet the worst I've heard so far was merely an amiable, expressive, interminable listing of every conceivable transfer, connection, subconnection and possible destination to be envisioned at the upcoming stop, bar none. He loves his mike, such a man. But somebody has sensed danger; clearly, there are stringent Rules and Regulations concerning Permissible Topics spoken via Transit Authority Ambulatory Microphones. Gotta be careful with these micro-maniacs. There may be one on every other train, for all you know.

What really gets me, these hot days on the subway, is not the mike personalities but the audio system itself. Just suppose, now, you had to set up a public address arrangement of this sort, in a train already jammed with noise—and for untrained "announcers" of every conceivable vocal power and persuasion. Who sets the levels?

Well, I wish I knew. I do know, very precisely, that the levels are almost always dreadfully wrong. Painfully so.

On some trains you will hear, with luck, a faint mumble-jumble overhead that an alert passenger (like myself) might possibly recognize as a human voice. Mmbglzmplwhgvdr, it says apologetically, before being overwhelmed by the screetch of wheels on a curve.

On other occasions, though, if you are a hardened subway audioman you will sense a sure warning in time to clap your hands over your ears for protection—a harsh noise like a giant soda dispenser. "HAAAAAAAAAAA." It is merely the conductor blowing gently across his mike, to see if it is alive.

It is. There follows such an unimaginable roar as no Non-New Yorker could possibly anticipate nor ever has. "BLGARGHMBAAAHBNMAWK!!!" howl the speakers, up and down the tunnel for a mile, and the discrete sounds of ten loaded subway cars going at full speed are silenced by comparison. People getting off at the next (and unidentified) station find themselves shouting to one another. Some of them never get over it.

This last, alas, seems to be the P.A. mean on our trains these days. The unseemly blasts are common occurrences and no P.A. system on earth, least of all in a moving train, could resolve them into useful vowels and consonants. Too bad. Many an opportunity is thereby lost for genuine audio communication, straight from the one to the thousands. For what could be more delightful, as well as useful than that such a multitude should, all at the same moment, share that highly personalized, precisely inflected "TIMES SQUAYAH!." It's P.A. raised to an art.

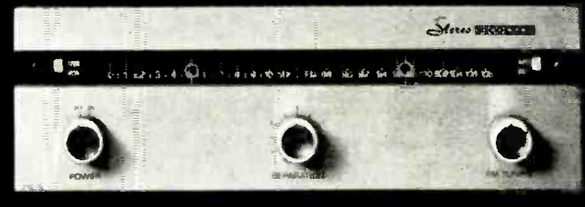
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ST70 DATA: As the center of your stereo system, the ST70 accommodates all program sources. It even has separate inputs for both turntable and record changer, preamplified tape signals and tape head with correct equalization for both fast and slow tape speeds. A center channel output feeds directly on a center channel speaker or, where desired, extension speakers throughout your house without any additional amplifier. Critical parts — filter capacitors, rectifiers, output tubes—all operate well below their ratings to assure long, trouble-free life. Oversize output transformers deliver full rated power all the way down to 30 cps. . . . And as a kit builder, you'll like the spacious layout. We got rid of all those tight places. Kit $99.95. Wired $149.95 (includes metal cover).

SPECIFICATIONS ST70 *Output Power:* 70 watts (continuous sine wave 35-watts per channel) *IM Distortion:* 1% at 70 watts. *Harmonic Distortion:* less than 1%. *Frequency Response:* ±½ db 10-50,000 cps. *Inverse Feedback:* 17 db. *Stability Margin:* 10 db. *Hum and Noise Level:* mag. phono —63 db; tape head —54 db; tuners, auxiliaries —78 db. (all measurements according to IHFM standards.)

ST97 DATA: Building the ST97 FM stereo tuner requires no instruments, no critical adjustments. The front end and IF stages are fully pre-wired and prealigned. The tunable coils of the stereo demodulator are factory-adjusted. With four IF stages plus a stable, sensitive front end, the ST97 pulls in clear stereo even under fringe conditions, and EICO's filterless zero-phase shift stereo detector (patents pending) maintains reliable channel separation. EICO's unique traveling tuning eye makes tuning simple and precise. Stereo stations are automatically identified by a pilot light. Semi-kit **$99.95**, Wired **$149.95**. (Includes metal cover and FET.)

SPECIFICATIONS ST97. *Sensitivity:* 3μv (30 db quieting), Sensitivity for phase-locking (synchronization) in stereo: 2.5μv. *Full limiting sensitivity:* 10μv. *Detector Bandwidth:* 1 megacycle. *Signal-to-Noise Ratio:* —55 db. *Harmonic Distortion:* 0.6%. *Stereo Harmonic Distortion:* less than 1.5%*. *IM Distortion:* 0.1%. *Frequency Response:* ±1 db 20 cps-15 kc. *Capture Ratio:* 3 db. *Channel Separation:* 30 db. *Controls:* Power, Separation, FM Tuning, Stereo-Mono, AFC-Defeat (all measurements to IHFM standards).

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2. Trash Can

Another bit of humorous P.A. in the Big City was revealed to us recently by the newspapers. A most-clever idea, with a worthy aim. The Talking Trash Can.

You see, a mere P.A. loudspeaker these days, no matter how hi the fi, is unlikely to gain more than marginal attention from our overworked city ears. If it isn't background music in restaurants and banks and supermarkets or squeaky rock and roll on tiny transistors (they are neither hi-fis, nor stereos), then it is endless public announcements of the sort one never listens to, corresponding to those unlikely signs in the subway entrances which warn us creaky-boned souls not to run or jump down the stairs. (As if those who *can* run and jump, the small kids, are ever going to read them!

A P.A. announcement is an invitation to studied deafness in Manhattan, even when it is actually intelligible. And none is worse than the endlessly repeated recorded message, droned out monotonously at passersby who never listen—or curse if they do. My favorite hate is the one in the 14th Street Union Square subway station, which bellows over and over, night and day, something about keeping back from the moving platforms when the train is in the station. A million times a week, and a million people hate it, I'm sure.

And so if you were to set up a talking trash can on the street with a recorded message about how you people are supposed to dispose of litter in the proper containers, not one in a thousand people would even take notice. Who listens to loudspeakers, and who likes public service warnings?

So somebody in New York had a really brilliant thought—let's devise a talking trash can that's Different. This one talks BACK. Wow, what a gas *that* will be!

Man with mike stations himself in second story window. Down below, trash can has speaker, plus mike, for two-way comunication.

Pretty gal drops her chewing gum wrapper on the street. Trash can says, *Hey—don't do that, lady!* She jumps at least a foot and crowds instantly materialize.

Don't you know you're not supposed to . . . ? The lady by this time is so stunned she can't move, let alone open her mouth. Trash basket gently coaxes her. And before you know it, she's talking. Right in front of all those passersby. A lively conversation ensues, while photographers snap the people of New York actually looking flabbergasted —which is something. Front page news.

Somehow, though, the best ideas go awry. *The New York Times* quoted verbatim a conversation between this lady and the trash can. It seems not to have stuck to the point, which is what really mattered. That chewing gum wrapper.

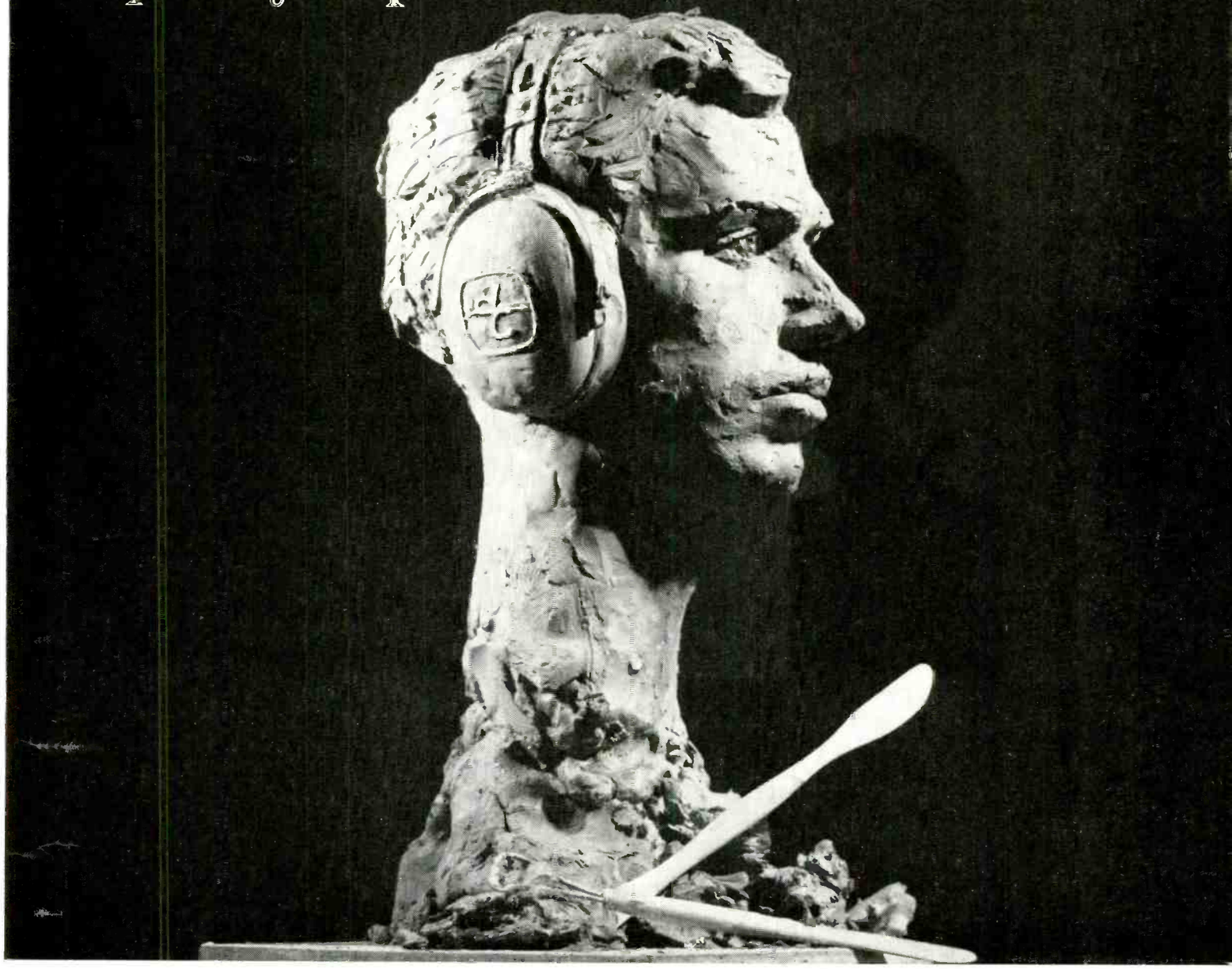
"Whats your name?" *The Times* said the box said. "My pen name?" "Any name," it answered patiently. "I don't talk to trash cans. I'm a writer and my work does not belong to you," says she. "What do you write?" it asked, going along with the irrelevancy. "Everything. Novels—everything."

The Times says that the trash can asked what was the name of her best novel. She answered *that* quickly enough. "'Surely

(*Continued on page 70*)

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David Clark Company announces a new plateau in the concept and performance quality of personal headset receivers...



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the beginning of a new quality standard for stereo

STEREO headsets will never replace stereo speakers—however, more and more people are now learning about the significance of a high quality headset as a component in a high fidelity system.

Perhaps you will soon be one of the many people who will pick up a stereo headset and try it—out of curiosity . . . to hear how it sounds . . . to feel how it fits . . . to think about the many ways the stereo headset will expand the benefits of your high fidelity system.

When that time comes—we suggest you take along the following check-list. Here are the meaningful features you should look for in a fine quality headset receiver.

☐ CONSTRUCTION ☐ COMFORT ☐ COUPLING ☐ PERFORMANCE

Be sure the **construction** of the headset is lightweight, and substantial to withstand continued use. Adjustment on the head should be almost automatic. Extreme **comfort** is essential for hours of personal listening enjoyment. **Coupling** of the receiver to the ear is a most important characteristic—**close, direct coupling** assures maximum abatement of external sounds and reinforcement of bass and treble frequencies. **Performance** must be equal to the best high quality speaker system. More important—try the DAVID CLARK/100 at the start. Exclusive **Direct Acoustical Coupling** brings the rich natural quality of music to your ears . . . gives you **a true quality standard**, a reference for judging the performance quality of all headset receivers.

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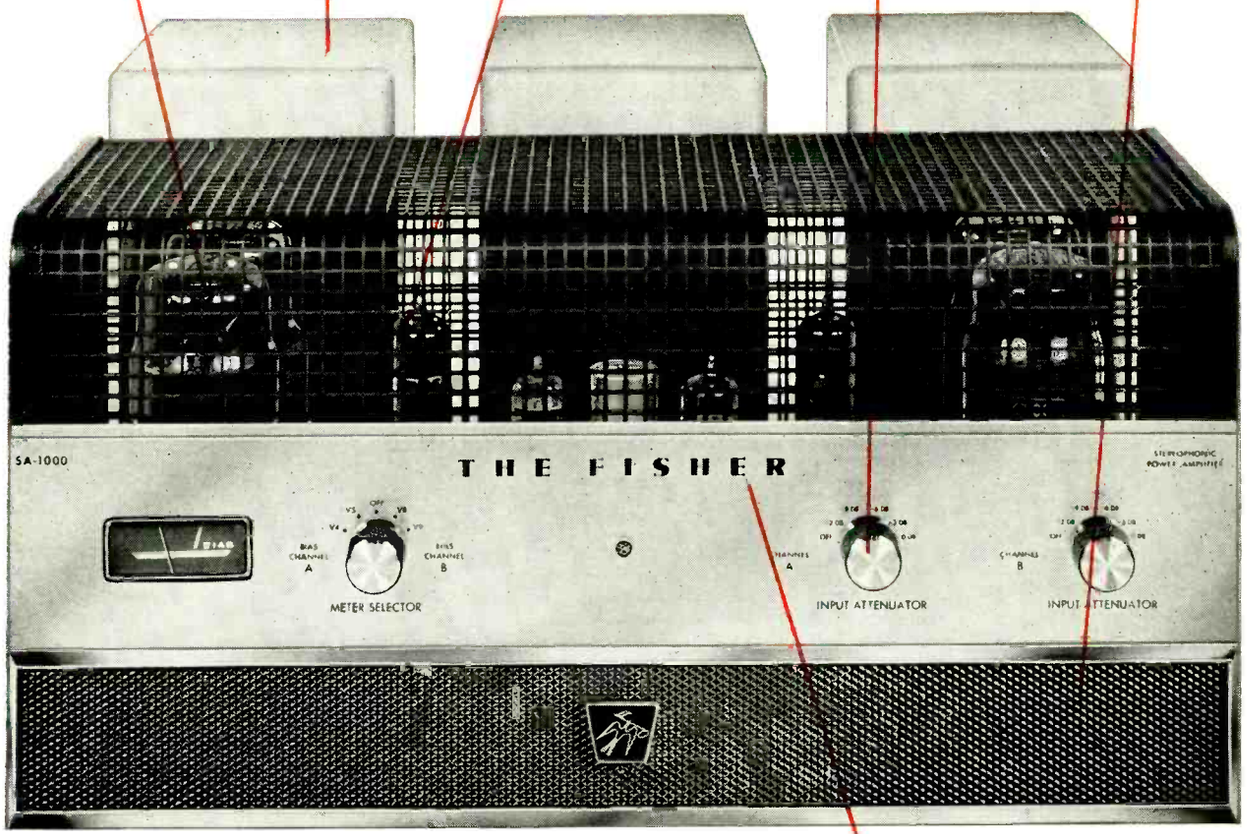
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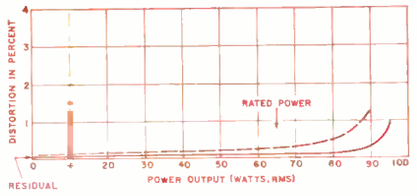
Introducing the 150-watt SA-1000 stereo power amplifier...by a maker who needs no introduction.

After more than 25 years of serving the high fidelity perfectionist's needs, Fisher still has the same policy on brand-new engineering projects: all-out or not at all. Nowhere is this uncompromising philosophy more eloquently demonstrated than in the case of the new Fisher SA-1000 stereo power amplifier.

The SA-1000 represents Fisher's first entry in the highly specialized class of extremely high-powered dual-channel basic amplifiers. There has been no scarcity of advanced equipment in this heavy-weight category; excellent high-wattage stereo power amplifiers of well-known makes have been available at prices starting in the $230-to-$270 range (for factory-wired kits) and rising all the way up to $648 (for a pair of single-channel models of very de luxe construction). What does it mean, then, when Fisher finally decides to match its own contender against such formidable competition and sets the price at $329.50?

To those who know Fisher, it can mean only one thing: Fisher has exhaustively tested, measured and evaluated all these other power amplifiers in its own laboratories and finds the SA-1000 to be distinctly superior to *all* of them, regardless of price. As for the price tag, it happens to be in the low 300's rather than the 400's or 500's solely as a result of Fisher's unusually large and technically unmatched manufacturing facilities, geared for heavy inital production in anticipation of demand.

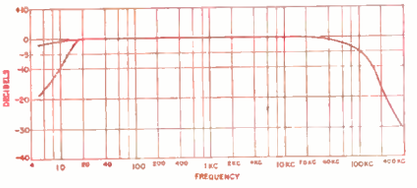
Total Harmonic Distortion at 1 kc: Solid Line
Intermodulation Distortion (60 cps/7 kc, 4:1): Dotted Line



The Fisher SA-1000 is a challenge to the severest critics and most discriminating judges of professional sound reproducing equipment, both as to specifications and listening quality. Its music power rating is 150 watts IHFM Standard, with *both* channels driven. The RMS power rating, again with both channels driven, is 130 watts (65 watts per channel). However, as a glance at the intermodulation curve will show, each channel will deliver 80 watts at 0.5% IM distortion, thus indicating the extreme conservativeness of the official rating.

The output stage of the SA-1000 is engineered around the newly developed 8417 beam power pentodes, *never before used in any electronic device.* Designed specifically for use in this amplifier, the 8417 offers extreme linearity, resulting in greatly reduced distortion, and has unusually low drive-voltage requirements, permitting the previous stages to 'coast' at their lowest possible distortion levels. The unique *cavity anode* design of the 8417 is an important factor of its superior performance characteristics.

Frequency Response (0 db = 4 watts)
Subsonic Filter: Dotted Line



Each pair of 8417's in the SA-1000 drives a giant output transformer via plate-cathode coupling — a modified and improved 'ultra-linear' configuration that provides 12 db of the most desirable and stable type of negative feedback in the output stage. The custom-wound output transformers are unlike all others in that their response rolls off below 5 cps and above 200 kc without the slightest peaks or dips. (See the frequency response curve.) This results in exceptional stability and superb square wave reproduction.

The driver stage, too, is entirely novel. A triode-connected 6UH8/ELL80 dual power pentode circuit developed by Fisher engineers is capable of delivering 40% more drive to the output stage than is required — and at a remarkably low impedance. The result is very low distortion, the fastest possible recovery time, great stability and hence outstanding transient response.

For the pre-driver and phase inverter stage, an ECC83/12AX7 dual triode is used in a DC-coupled cathodyne configuration characterized by extremely low distortion and phase shift. A feedback loop from the output transformer secondary to the pre-driver cathode provides 17 db of distortion-reducing feedback.

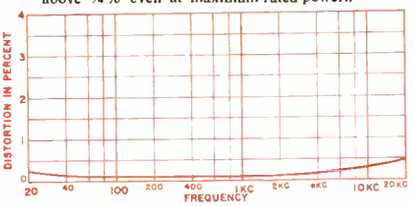
The input stage of the SA-1000 is of a type widely used in laboratory oscilloscopes but never before in high-fidelity amplifiers. A compensated input attenuator in conjunction with a cathode-follower circuit permits adjustment of the input signal from 0 db to — 12 db in closely calibrated 3 db steps without the slightest effect on input impedance and frequency response. This feature in effect provides five different input sensitivities, ranging from 0.7 to 2.75 volts (for full rated RMS output), so that the preamplifier volume control can be operated strictly within its optimum range.

A switchable subsonic filter has also been designed into the input stage, in keeping with the widely held engineering opinion that, for the majority of practical applications, response should be flat down to 20 cps only and then fall off as rapidly as possible. (See dotted part of frequency response curve.)

The power supply of the SA-1000 is one of the most elaborate ever used in a stereo power amplifier. Regulation and filtering are of the highest order and all silicon diodes as well as filter capacitors are most conservatively operated.

Bias and balance are readily adjustable on each channel by means of the built-in laboratory-type calibration meter, but the controls for these rarely needed adjustments are ingeniously concealed behind an attractive hinged cover — another Fisher exclusive.

Total Harmonic Distortion (One Channel) at 65 watts RMS
(Note that from 20 cps to 10 kc distortion does not rise above ¼% even at maximum rated power.)



These are the most important facts and figures. You cannot fully evaluate the Fisher SA-1000, however, simply by reading about it. A comparative listening test at your dealer is an absolute must in this case. *Then* you will know that, even in this exalted category, not all power amplifiers sound exactly alike—and that the most flawless of them all costs only **$329.50.***

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LIGHT LISTENING

Chester Santon

Aloha from Norman Luboff
RCA Victor LSP 2602

The RCA Victor recordings reviewed this month are not in the Dynagroove process. This is not to be taken as a sign that Victor has decided to drop Dynagroove. Thanks to a juggling of release dates on the part of RCA, listeners who prefer to take their sound straight have been granted an interval to do just that. This stereo disc by the Norman Luboff choir was one of several recordings that were moved back a month on the release schedule in order to get the Dynagroove products into dealers' stores at a time when the enormous d campaign on the process was set to roll. Coming after the stuffiness of Dynagroove's severely restricted dynamic range and frequency response, this virtually direct recreation of the sound of the Luboff choir is as invigorating as the breezes they sing about in this music of the islands of the central Pacific Ocean. Although the chorus is no closer to Polynesia than the Hollywood studios of RCA Victor, it turns in a virtuoso job in the exotic words and rhythms of Hawaii and Tahiti. Add to the native allure of this music the beautifully machined teamwork of this polished singing group and you end up with a Hawaiian album unique in the record industry. Taking one selection at random, the Hawaiian War Chant, a pulse-quickening affair in an average recording, becomes a truly novel experience in the perspective provided by the full-range stereo available in this release. Recording engineer Al Schmitt, RCA's top console man on the West Coast, has ample reason to be proud of his mike work at this session. In his handling of the male and female halves of the chorus, Schmitt has evolved a miking pattern that could serve as a model of stereo that has been applied in a mature fashion. He has maintained full identity of contrasting voices without introducing the gap between speakers frequently encountered whenever recording engineers strive for maximum contrast in a stereo choral session.

The World's Great Love Songs
London Tape LPM 70062

Encouraged by the success that other labels have been having in the assignment of operatic stars to programs of light music, London has decided to put out an album of popular love songs by tenor star, Mario Del Monaco. Had London left it at that, record dealers and customers around the world probably have paid no more attention than they do whenever any top operatic name invades the pop market. Instead, some unsung marketing genius on London's staff got the idea to combine the box office appeal of two best-selling names on his roster and brought Mantovani's famous orchestra into the Del Monaco recording session. Once the project reached that stage of planning, it was soon obvious that such a smash hit-to-be deserved the finest sound the label could give it. A logical starting point was the selection of the still unexcelled acoustics of Kingsway Hall, where many of London's finest classical recordings have been made.

For all these undeniable attractions, the one factor in this recording that arouses most of my curiosity is the very element that London itself had nothing to do with. I'm sure any tape fan will agree that it is the transfer to four-track tape (handled in this country by United Stereo Tapes) that is the greatest attraction on this Monaco/Mantovani reel. It would be foolhardy to suggest that the transfer process from master tape to the commercial four-track product can take all the credit for an exceptionally fine reel. There's very little, after all, that UST can do in its copying procedure to improve a lackluster master. The fortunate circumstance here is the fact that a very good master tape has been given one of the finest transfers I've encountered so far on a UST product. At a playback level that would bring in tape hiss on earlier releases, this reel preserves a very impressive background silence. Yet the tape is not loaded with a reckless amount of signal level as in past efforts to keep down the amount of background noise. There is no distortion here even when Del Monaco belts his way into the climax of a tenor specialty along the lines of *Be My Love* or the *Serenade* from Romberg's The Student Prince. His English lyrics, unfortunately, are more exotic than they are understandable. The tenor is far more at ease when handling Italian lyrics. One gets the impression in the English songs that Del Monaco's command of our language is just about enough to get him through a periodic discussion of the terms of his contract with London Records. As for the accompaniment accorded the star of the album, Mantovani turns in a very creditable job. He is too experienced a showman to intrude upon the soloist when the tenor is selling his style in a lyric yet the lush support is always at hand to turn this release into a highly listenable product.

Victory in Review
London Tape LPL 74024

In recent years, within the category of its Phase 4 Stereo Series, London Records has been making a specialty of parades that travel the distance between one's loudspeakers. When the idea was brand new, the components of the parades were made up of musical and non-musical units that you could expect to find in any self-respecting parade. The reviewing stand midway between your speakers was apt to be draped in British colors but the personnel parading past represented many nations, including our own. London's latest pass-in-review "spectacular" calls upon the listener to exercise more imagination. Some of the events depicted in this review of some 5,000 years of history are not the sort of things that one would expect to encounter on just any old corner. For all the new element of improbability, I am happy to report that this Phase 4 tape is considerably cleaner in sound than anything released so far in this particular series of tapes. Not only does it surpass other Phase 4 items, its response is superior to one of my favorite London tapes put out in their regular series—The Sounds of Victory by the Band of the Grenadier Guards on LPM 70052.

Victory in Review, directed by Eric Rogers, begins with a recreation of scenes of triumph in ancient Egypt and Israel as conceived by operatic composers. *The Triumphal March* from "Aida" and the *Chorus of Hebrew Slaves* from the opera "Nabucco" are two processions which, impressive though they may be in this kind of stereo recording, are hardly a daily occurrence on the streets of any metropolis. Ancient Rome is recalled in the tramp of Roman legions that the composer Respighi described in the final section of his "Pines of Rome." A hymn from the Crusades rounds out the segment of the parade devoted to the Old World. A collection of folk songs, anthems and popular ditties make up the section called Europe and the New World. The United States, France, Russia and Britain are represented by appropriate material designed to typify the period between the Crusades and World War I. The only significantly incongruous note is struck in the selection representing Spain. There, the producers settled for an excerpt from the movie score of "Captain from Castille," a Hollywood movie of our generation.

Side 2 of this reel takes us into the last two World Wars. The sound effects crew has a field day on this side of the reel as the parade resumes to a tattoo of bullets that precedes the first tune of World War One days, France's *Auprcs de ma Blonde*. Some of the more sophisticated sound effects that were a part of World War II are to be found in the air raid sirens, bombings and passing jets that accompany *Colonel Bogey, The Campbells are Coming* and *Marche Loraine*. London obviously had some of its thoughts on the American market because the lion's share of the program is devoted to American tunes and the finale itself is one of the more extravagant bits of Americana I've heard on a commercial release. In the final episode of this reel, the parade comes to a halt as the chorus and orchestra launch into a blazing arrangement of *When Johnny Comes Marching Home* delivered to the accompaniment of salvos of fireworks and artillery.

Freddy Powers and The Powerhouse IV
Warner Bros. Tape WSTC 1488

The entertainment world of today seems to have reached a point where an unusual act finds it difficult to maintain its obscurity. When NBC's "Today" show took its early morning cameras down to Dallas, Texas last July, it never expected to uncover an act such as the Powerhouse IV. The group headed by Freddy Powers was discovered by "Today's" crew while the foursome was playing at the Crestview Lounge, a Dallas nightclub little known outside te Lone Star State. What struck the visitors from New York was the decidedly out-of-the-way combination of instruments this singing quartet used as accompaniment to their ragtime favorites. It isn't every day that even New Yorkers stumble upon a group using three banjos and a tuba as instrumental ammunition. Two appearances on the "Today" show established Freddy Powers and the Powerhouse IV on the national scene. Other members of the group invited by Warner Bros. to make this tape album are Bill Hudson, Bobby Hollingsworth and Ralph Sanford. They hold nothing back in their ragtime attack on perennials such as *Bill Bailey, Toot Toot Tootsie, Roving Gambler and Bye, Bye, Blackbird*. The whole ball of wax, melting though it may be in some spots, is highly recommended for roistering relaxation.

Bye Bye Birdie (Original Sound Track)
RCA Victor LSO 1081

RCA'S promotion department appears to be operating under the impression that 1963 is going to contain less than the usual number of months. Although this record was released during the first weeks of April, it already carries a banner announcing that Bye Bye Birdie is the "Best Film Musical of the Year." Even if we accept the remote possibility that the other record labels have divulged to RCA their release schedule on film musicals for the rest of 1963, such an announcement on the cover of the album is still on the silly side. The contents alone are sufficient to challenge so sweeping a statement. In the first place, 'Bye Bye Birdie," in the original version that hit Broadway some three years ago, hardly ranked in a towering position among the musicals of its day. Of all its songs, only one—*Put On a Happy Face* —achieved any real recognition in the show world. The antics of a teenager's singing idol and the worshiping fans surrounding him offered only mildly amusing satire in the theater and on the Columbia Original Cast recording (KOS 2025). On the evidence of this record, whatever subtlety the cast displayed in the Broadway production has been completely lost in the transfer to the screen. Ann-Margret and Janet Leigh carry the distaff side of the Charles Strouse musical score with Dick Van Dyke and Jesse Pearson in the leading male roles. Pearson, who appeared in the "Bye Bye Birdie" road company, makes his first film appearance as the rock'n'roll singing star. The entire cast labors under a distinct handicap in the dated sound turned out for the soundtrack by Columbia Pictures.

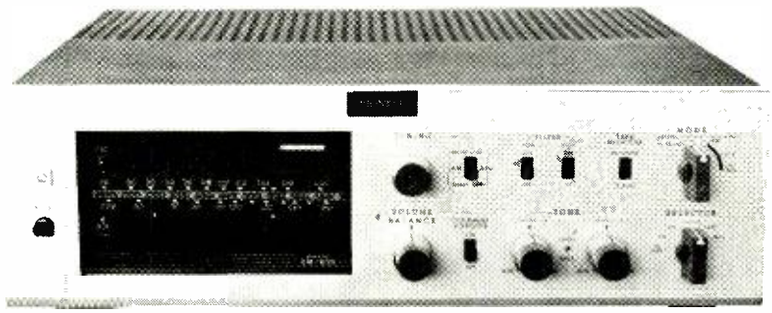
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EDITOR'S REVIEW

FM-STEREO TUNER STANDARDS

IN THIS ISSUE *we present* an article by a well-known engineer who discusses the relative importance of the various attributes of an FM-tuner. Amidst the technical verbiage a rather interesting fact emerges—stereo parameters are not standardized as are the mono FM-tuner parameters. There is a complete set of IHF measurement standards for mono FM tuners; there is not a comparable set for stereo FM tuners.

What does this mean?

First of all it means that most of the specifications issued for FM tuners are mono, even when the specifications refer to a stereo tuner. Secondly, it means that stereo tuners are being described as if they were mono tuners. The significance of this is revealed by the relative importance assigned to the various parameters by Mr. von Recklinghausen—he considers that mono tuner parameter, sensitivity, as much less important for stereo. In fact, the parameter he considers most important is one that is hardly ever mentioned in connection with mono tuners (although it is important for them too). Of course, there may be some difference of opinion as to the relative importance of the various technical characteristics of a stereo tuner. But there should be no difference of opinion about the need for the same kind of standards we now have for mono tuners.

We would like to point out that the existing standards have really been quite excellent in describing mono FM tuners. One need only examine lists of specifications, such as we present in this issue, to realize that when the magic letters IHF are added to a specification, we are in a position to compare—validly. For those consumers who care to take the trouble, outrageous claims based on "special" measurements can be deflated.

We need the same type of pin-prick for stereo tuners.

TO ERR IS HUMAN . . .

Not too long ago we presented an article describing the sound-reinforcement system at Philharmonic Hall. In the process of gathering the information we had occasion to visit the Hall several times, and to listen to performances. We tended to agree with the prevailing opinion that some deficiencies existed in the acoustics. In fact the acoustical designers admitted these deficiencies.

Unfortunately, from the first performance in this Hall, a hue and cry has been raised which finally culminated in a "committee of experts" reviewing the acoustical "condition" of the Hall and recommending changes. Frankly, we think the procedure in this area has been degrading and unethical.

We think that the performance of some segments of the press has been patently unfair in condemning a concert hall which was admittedly unfinished. Secondly, the relatively vicious attacks (all politely phrased of course) on the acoustical designers served little purpose but to fatten already fat egos. Thirdly, the learned but razor-sharp barbs of otherwise sedate engineers and scientists have been degrading.

Lest we be misunderstood, let it be clear that we are not defending the mistakes, or the acoustical engineer. We are defending the right of engineers, all engineers, to err and be given the opportunity to correct their admitted mistakes, without being denigrated. Especially when as in this case, the engineers had the humility to admit at the outset that they expected changes would be necessary after about a year.

Perhaps the saddest part of this whole episode is that unrelated forces have combined to obscure the fact that much important and creative thought went into the acoustical design of Philharmonic Hall. In spite of the mistakes, this design is one of the most successful to date for its purpose. One must consider that the intention was to achieve a large hall for multiple purposes. They succeeded.

Some have said it is a mistake to build concert halls as large as this one. Others say it is a mistake to build halls for the variety of functions required of Philharmonic. A few even say that we should build halls which are the exact duplicates of those which are known and loved. Perhaps all these proposers are right, we don't know. What we do know is that we must *encourage* those who are seriously attempting to create excellent concert halls, even if they are occassionally less than perfect. Aren't we all?

. . . TO FORGIVE DIVINE

Speaking about being less than perfect, we are taking the unusual step of casting ourselves on your mercy "before the fact," as it were. We apologize in advance for all those errors (in fact and fancy) which sharp-eyed readers will discover in the product preview section. Frankly, we don't think there are any errors. Certainly we spared no effort to make it error-free. Except for a few places.

By the way, we would appreciate hearing from you as to ways we might improve this section. As you know, we have previewed products in our August issue for several years now. Over this period of time we have gradually improved the method of presentation to provide maximum information with minimum time. Could we do better? *You* tell *us*.

NEW YORK HIGH-FIDELITY SHOW

This year, the New York High Fidelity Show will be held, as in previous years, at the New York Trade Show Building at 35 St. and 8th Ave. Dates of the Show are Sept. 11–15.

Naturally this is an excellent opportunity for audio-fans, and their friends, in the New York area to see the products listed in our product preview section.

If you wish to avoid standing on those inevitable and long lines waiting to buy tickets, we suggest you send your $1.25 admission fee to the Institute of High Fidelity, 516 5th Ave., New York, N.Y. They will mail you your ticket, plus other pertinent information.

By the way, we understand a special effort is being made this year to provide interesting exhibits for the female music lovers. Bring one with you.

OUR BEST WISHES—

Go this month to C. M. "Cliff" Edwards, Director of Advertising and Sales Promotion of Heath Company, who is retiring after almost 20 years of service. Well known throughout the industry and amongst kit builders, his smiling face will be missed at all future gatherings of the audio fraternity. Enjoy all that fishing and boating, Cliff, you've earned it.

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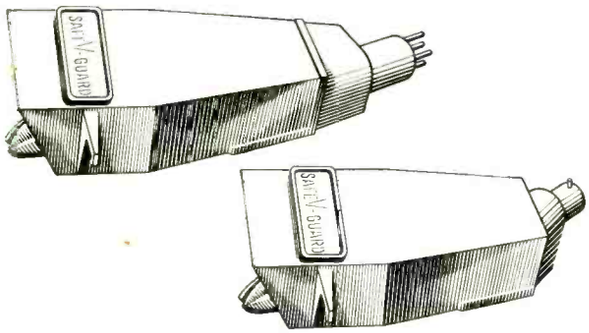
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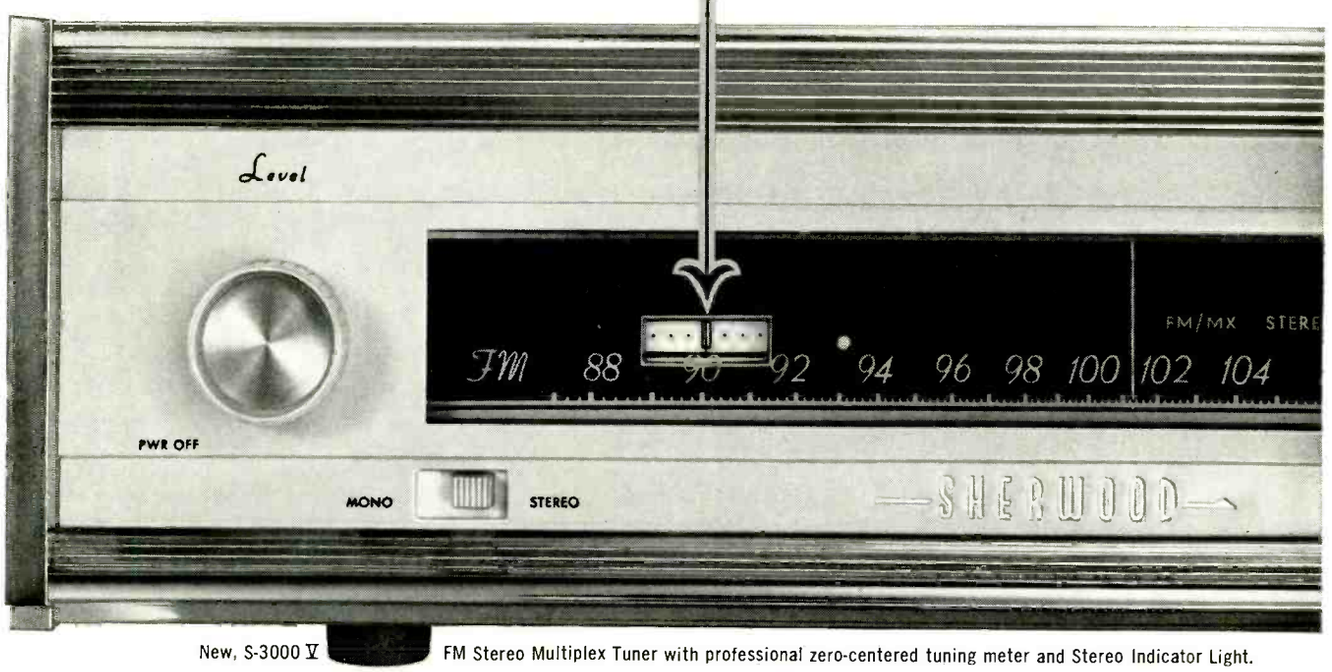
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FM Tuner Characteristics—and Their Relative Importance

DANIEL R. von RECKLINGHAUSEN*

The advent of FM-stereo broadcasting, the growing number of FM stations, plus new FCC rules, are changing the technical requirements of FM tuners. Our author, a leading FM-tuner designer, gives his opinion as to the technical specifications which are essential, and the relative weight of each. He contends that sensitivity, previously considered very important, is now a less important yardstick.

In Two Parts—Part I

WHEN ELECTRONIC EQUIPMENT is advertised for sale to the ultimate user, there is always the tendency to try to describe its over-all performance by applying a single number to one of the characteristics and letting it go at that—often for lack of space to describe the item more fully. The casual reader of advertisements is all too familiar with such descriptions as "the . . . television set with 20,000 volts of picture power," or "the . . . 2-microvolt FM tuner."

It is perhaps for this reason that such an undue amount of importance has been attached to the sensitivity of an FM tuner. Sensitivity is one aspect of a tuner's performance, but it is by no means the only important criterion—and certainly is not the *most* important. There are specifications that will prove far more meaningful insofar as actual performance is concerned. It will be one of the purposes of this discussion to indicate what these important points are, and thus place all major performance aspects of an FM tuner in their proper perspective.

The importance of other tuner characteristics becomes even more evident when dealing with tuners designed for FM-stereo reception. The necessity of handling subchannel modulation components requires a different tuner design than one for optimum monophonic reception. Further, if an attempt is made to optimize one single performance aspect (i.e., sensitivity), *serious degradation of more important performance aspects will result.*

The advent of FM stereo, and the continuing increase in both number and strength of FM signals, requires a tuner design which provides best performance on signal-handling requirements of the future rather than one which was optimized for conditions existing in the 1950's. On present-day high-quality tuners, optimum sensitivity is closely approached. (Theoretically it is not feasible to exceed a sensitivity figure better than 1.9 μv IHF for a mono tuner; 2.45 μv IHF for a stereo tuner—at all frequencies of the band.)

At this point, let us examine the conditions under which a tuner has to operate. At least 90 per cent of all FM tuners are used in urban and suburban areas where between 1 and 25 local stations provide a strong signal at the antenna. These signals may produce between 1000 microvolts and several volts (yes, several million microvolts) at the antenna terminals of the tuner. Any FM tuner sold for high-fidelity purposes will not have any particular difficulty receiving these local signals. In the near future, however, these signals are likely to increase rapidly in number in many areas (except congested metropolitan areas) because of the broadcasters' increasing interest in FM and the FCC's new FM station assignment table. These signals are also likely to increase in strength because of the recent ruling creating a new class of powerful FM stations and permitting a power increase for many existing stations.

1. Crossmodulation Rejection

The increase in power will increase the station's service area but also will make receiving conditions in its present area poorer because of "blanketing." Blanketing is a phenomenon by which a local station is received at more than one (the desired) spot of the dial, thereby obliterating or "blanketing" the signal of one or more weaker-signal stations. It is caused by a form of distortion originating in the front end of the tuner, known as "crossmodulation." Crossmodulation occurs when the signals from strong local stations and from the local oscillator of the tuner combine to form distortion and intermodulation products because of non-linearities in the front end. This can be counteracted to a large degree by designing the equipment for high crossmodulation rejection. As measured by IHF standards, the rated amount of crossmodulation rejection (for example 80 db) is a measure of the dynamic range of r.f. signals which a

Table 1. The author's listing of minimum performance standards in order of importance. It is his contention that the latter criteria may be sacrificed for the former. Thus, for stereo and future requirements, we can no longer rely on a single number such as sensitivity.

1. Crossmodulation rejection	70 db or more
2. Selectivity (alternate channel)	30 db or more
3. High-frequency distortion (subchannel)	3% or less
4. Detector bandwidth	800 kc or more
5. Capture ratio (mono)	Detector capture ratio plus 0.9 to 2.8 db
6. AM rejection	40 db or more
7. Pulse-noise rejection, off station and with strong signal	None audible
8. Shape of signal-to-noise ratio curve	Close to Fig. 9
9. Difference in signal between 30-db S/N to 30-db IHF	3.5 ± 0.5 db
10. IHF sensitivity (for stereo tuners)	2.45 μv or a little higher

* *Chief Engineer, H. H. Scott, Inc., Maynard, Mass.*

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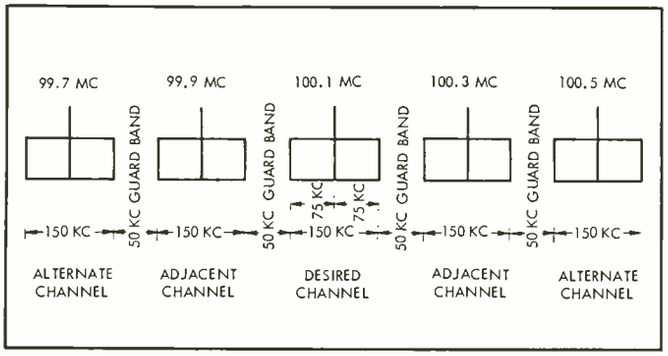


Fig. 1. FM channel assignments.

tuner can accommodate without difficulty.

A listener to FM programs frequently depends on signals of stations outside of his local area to provide him with programs of his choice. Any obliteration of such signals by crossmodulation (or blanketing) robs him of the advantages of a highly sensitive tuner; the tuner may be unable to pick up programs arriving with a signal strength many times stronger than required by the sensitivity of his tuner. In essence then, the amount of guaranteed *crossmodulation rejection is the most important specification of a tuner.* The larger the number the better, and every 2 db better is more important than a 0.5-microvolt improvment in sensitivity of a tuner.

2. Selectivity (Alternate Channel)

Local FM stations are usually assigned to channels 800 kc or more apart and the stations in adjacent cities are "dropped into the slots" in between. At times, these stations are assigned the adjacent channel (200 kc away) but usually they are in the alternate channel (400 kc away). To be able to receive the stations in the next city, the tuner has to be sufficiently selective to discriminate against the local station. Offhand, this would seem to be an easy thing to do since a station can modulate with 75 kc deviation from its assigned frequency, occupying apparently only 150 kc, leaving a 50 kc guard band between channels, as shown in *Fig.* 1. However, the spectrum space occupied by an FM signal is wider than twice the deviation as shown in *Fig.* 2. The FCC allows a total of 240 kc or 120 per cent of a channel although the usual spectrum occupancy is less than that.

In order to receive the desired signal with less than 1 per cent distortion at all monophonic and sterephonic modulating frequencies, all components to at least −40 db, or 1 per cent, must be preserved in their normal relative strength, and an i.f. bandwidth of at least 265 kc is required. Similarly, if 3 per cent distortion is permitted at certain frequencies, a 225-kc bandwidth is required. Special filtering techniques can reduce the required bandwidth a little, but the fact remains that sufficient selectivity to receive consistently all stations *adjacent* to local stations can be obtained only if distortion is allowed to rise unduly high when listening to any station, local or distant. Even with very wide i.f. bandwidth there will be attenuation of signals from alternate or further channels.

The IHF provides a test for alternate channel reception and again, the highest number shows best performance. This, then, is the *second most important specification.*

3. High-Frequency Distortion (Sub-channel)

It is not too difficult to obtain high selectivity in an FM tuner if other performance aspects are neglected. Perhaps the factor most readily affected is distortion, and particularly high-frequency distortion, and most particularly distortion of the signal components in the stereo sub-channel.

It is difficult to describe how distortion in a frequency modulated signal occurs and how the i.f. section of a tuner affects distortion. For the following analysis it is presumed that the limiter and detector sections of the tuner cause substantially less distortion than the i.f. section.

Whenever an FM signal generator or an FM transmitter is modulated by an audio-frequency signal, say 15 kc, to a deviation of 75 kc, the total power output of the transmitter remains exactly the same throughout the modulation cycle since only frequency has been changed. However, the total power now is distributed among the various sidebands spaced symmetrically in successive intervals (here, 15 kc) about the carrier frequency. These sidebands are actually infinite in number although their strength decreases quite rapidly the further they are removed from the carrier.

With a deviation of 75 kc, or "100 per cent," and an audio frequency of 15 kc, a modulation index (m) of 75/15 = 5 is reached. At the moment of peak deviation, the sidebands (known as Bessel sidebands) can be added to the carrier in vector form to show what happens. *Figure* 3 shows that for no modulation ($m = 0$) no sidebands are created and the total output is that of the carrier. While modulating 15 kc audio to ±3 kc deviation ($m = 0.2$) or "4 per cent" modulation, the first set of sidebands appear, causing the transmitter to shift ± 11.5 deg. in phase.

With as little as 7.5 kc deviation (15 kc audio, $m = 0.5$), the second set of sidebands occurs, ± 30 kc away from the carrier. When the transmitter is modulated 100 per cent or 75 kc deviation with 15-kc audio ($m = 5$), eight sets of sidebands occur. They are located 15, 30, 45, 60, 75, 90, 105, and 120 kc away from the carrier. It can also be seen that the sidebands are shifted successively 90 deg. in phase from each other and the carrier. Also, for $m = 5$, the carrier and the first set of sidebands are shifted 180

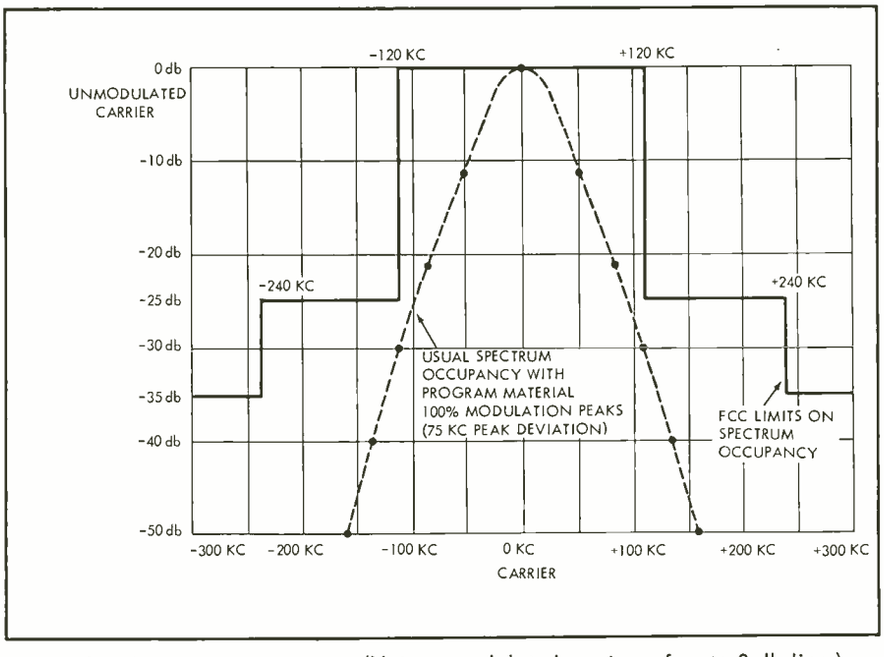


Fig. 2. FM spectrum occupancy. (Note unmodulated carrier refers to 0-db line.)

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deg. from their normal orientation because of negative Bessel values. It should be noted that the relative magnitudes of the sidebands and the carrier depend upon modulation index. In all cases, the resultant vector sum of the carrier and its sidebands will remain equal in magnitude to the unmodulated carrier because transmitter power has not changed.

When the modulated FM signal is passed through a filter, such as an FM tuner, the bandwidth must be sufficiently wide so that none of the sidebands are attenuated and there is no phase shift, if the signal is to remain undistorted. Also the signal would be unchanged if carrier and sidebands were passed through a sufficiently wide filter which has phase shift proportional to frequency ("linear" phase shift.) Here, carrier and sidebands would be delayed simultaneously by a constant amount, as they would be in a properly terminated transmission line.

If, however, the phase shift of the filter is not linear with frequency, the 90-deg. phase shift between successive sidebands would be altered; the value would be larger or smaller, depending upon the error. Then, because of vectorial addition of carrier and sidebands, the resultant would not be equal to the unmodulated carrier and incidental amplitude modulation at primarily 3rd, 5th, and higher odd harmonics of the modulating frequency will occur.

A good limiter will, of course, remove this amplitude modulation but will not be able to remove the phase shift which has occurred because the resultant is now at a different phase angle. This additional phase shift at the input to the FM detector varies throughout the modulation cycle and is, of course, frequency modulation, but at a harmonic of the modulating frequency. In simple words, non-linear phase shift causes harmonic distortion in FM which increases with modulating frequency and with deviation.

A way of showing the effect of non-linear phase shift without recourse to vector diagrams is to consider the non-linear phase shift of the filter as a linear portion (amounting to the carrier frequency delay of the filter) and a non-linear portion with a 0-deg. slope at the carrier frequency, as shown in *Fig.* 4. If the carrier is now considered to change in frequency due to modulation, the phase of the carrier is increased at the "positive" modulation peak from its center position and decreased at the "negative" peak. At higher modulating frequencies this phase-shift change occurs more rapidly, and at higher amounts of deviation it is more severe. Since a phase-shift change varying with time is frequency modulation, an additional amount of modulation has been created

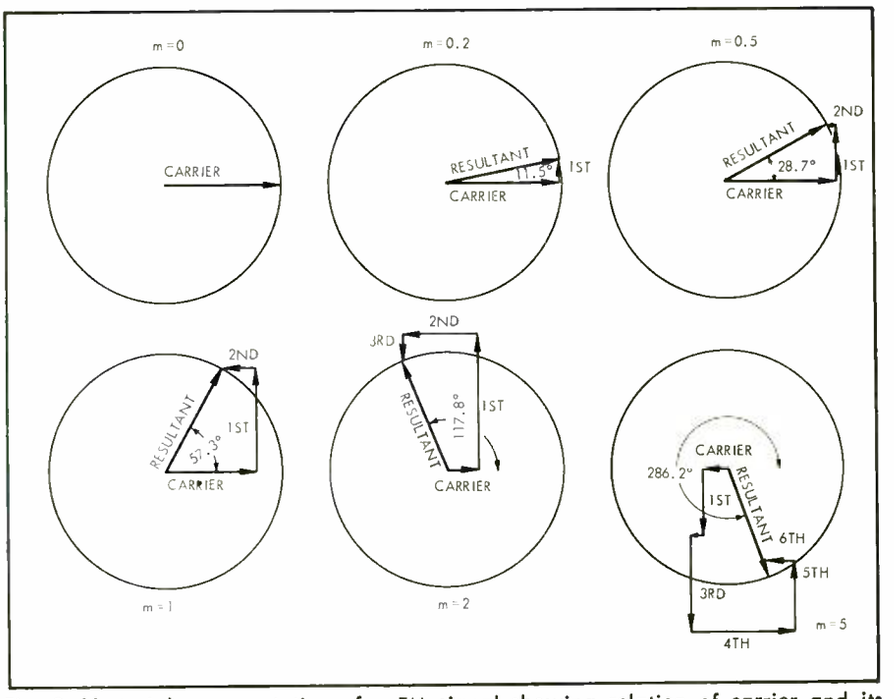


Fig. 3. Vectorial representation of a FM signal showing relation of carrier and its sidebands as a function of modulation index. (In representation of m = 5, the 7th and 8th sidebands have been omitted for clarity.)

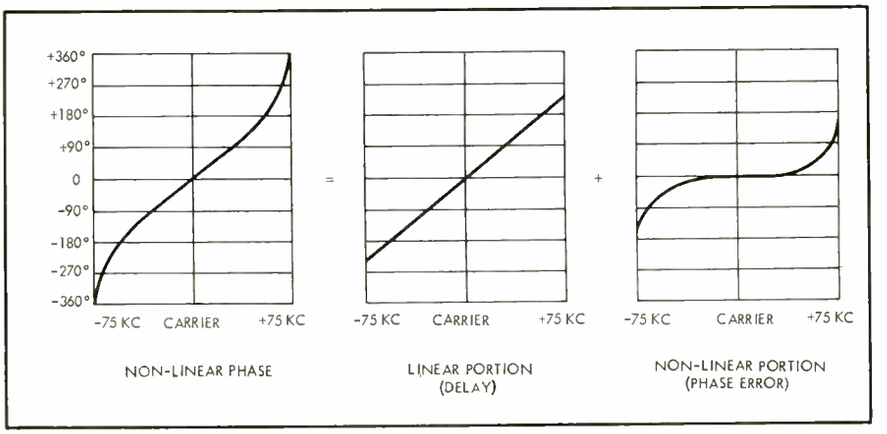


Fig. 4. Phase response of a non-linear phase filter.

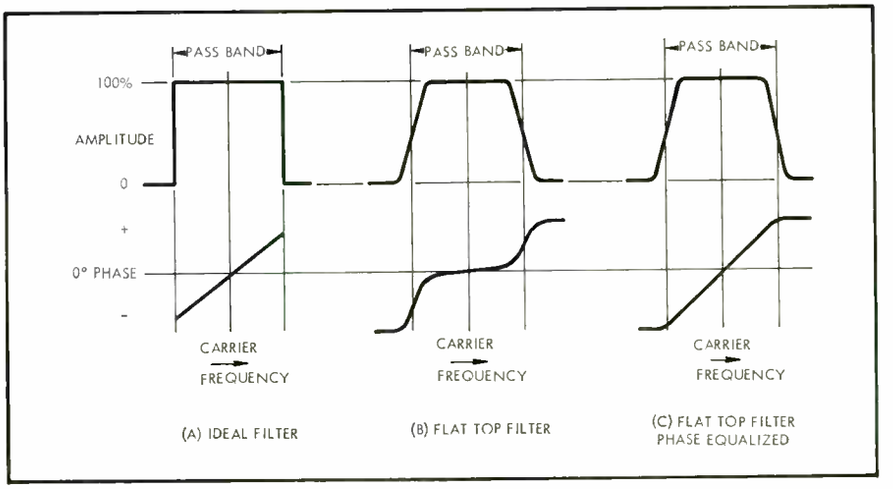


Fig. 5. Response of ideal and near-ideal filters.

at harmonics of the original modulating frequency—that is, distortion increasing with modulating frequency and deviation.

All this indicates the definite need for phase-linear i.f. filters in FM tuners, particularly those used for stereo reception since very high modulation percentages can occur at high frequencies.

A band-pass filter is supposed to pass

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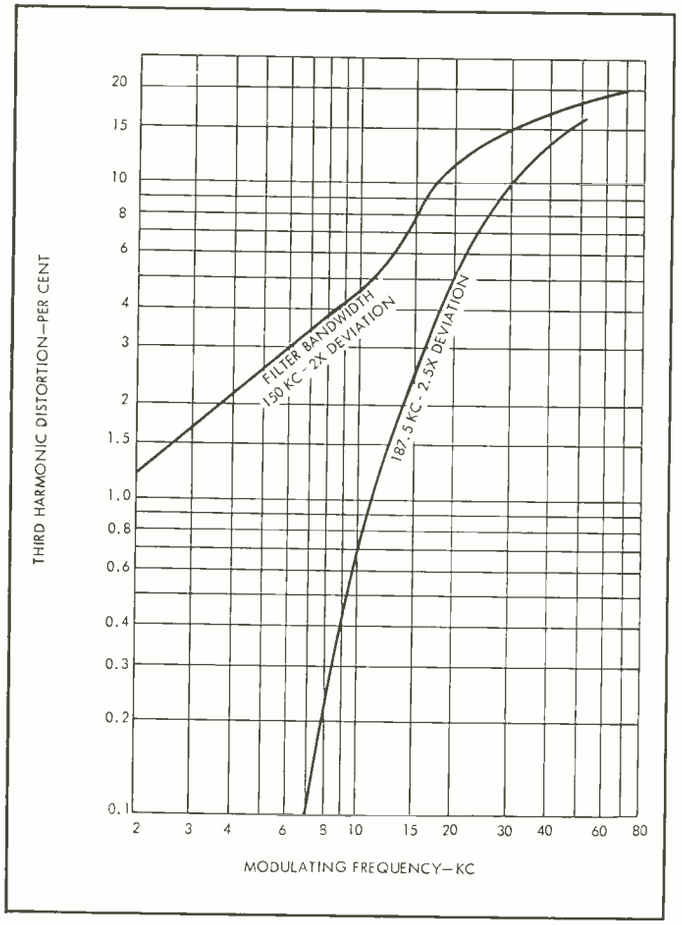


Fig. 6. Percentage third harmonic distortion of an FM carrier passing through an ideal filter as a function of modulating frequency, 75 kc deviation.

only desired frequencies and reject all others. An i.f. amplifier with its tuned circuits is one form of band-pass filter, selecting in this case a band of frequencies about the intermediate frequency of a tuner. What kind of response should such a filter have?

The previous discussion definitely indicates that this filter should be phase linear, and the examination of the vector diagrams of *Fig.* 3 would lead one to think that this filter should not attenuate the various sidebands encountered in FM and therefore have a flat top over at least twice the deviation, or 150 kc. The requirement for selectivity or suppression of signals outside the desired channel would indicate steep side slopes. This describes a filter which engineers and physicists have talked about for many a year, but have never constructed, the ideal filter shown in (A) of *Fig.* 5. This kind of filter has a perfectly flat top in its passband, infinite attenuation outside of it, and perfectly linear phase shift.

An ideal filter can be approximated by the flat top filter shown in (B) of *Fig.* 5, and such filters are used in AM and in communications with great success. However, for linear-phase operation, additional phase-equalizing sections of a complexity similar to the filter itself have to be used. The result is shown in (C) if *Fig.* 5. This filter is sufficiently close in characteristics to an ideal filter to satisfy a mathematical analysis.

The FM signal passing through such a filter will pass only the carrier and the sidebands within the passband of the filter. An examination of the vector diagrams of *Fig.* 5 shows that elimination of the higher order sidebands will produce harmonic distortion similar to that caused by non-linear phase shift. The mathematics of this analysis are rather complicated, but fortunately it has been carried out by engineers of the Zenith Radio Corporation in their comments on FCC Docket 13506. Their results shown in mathematical symbols only, are replotted in *Fig.* 6 with actual values of modulating frequency, deviation, and

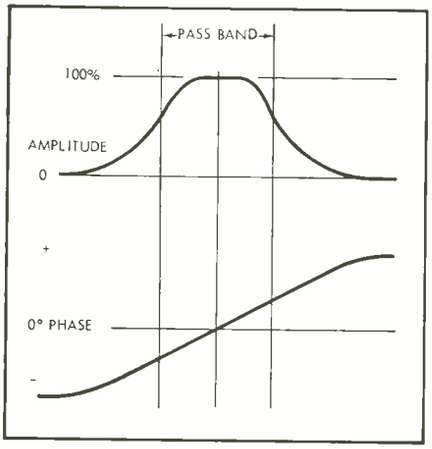


Fig. 7. Response of low-distortion filter. (Top of curve should be rounded instead of flat as shown.)

filter bandwidth. From this, it can be seen that a filter 25 per cent wider than peak-to-peak deviation will produce adequate results for monophonic FM operation if about 2 per cent harmonic distortion before de-emphasis is considered tolerable at 15 kc. This maximum distortion would be reduced to about 0.7 per cent due to attenuation of the harmonics by the de-emphasis network.

For stereophonic FM reception, such a filter is definitely inadequate because of the high distortion created in the stereophonic subcarrier range from 23 to 53 kc. Even a considerable increase in filter bandwidth will not reduce distortion substantially. Clearly, a different kind of filter is required for the proper combination of low distortion and high selectivity—a compromise filter.

From this discussion we see that the amount of high-frequecy distortion, particularly the distortion of the FM-stereo subchannel and its effect on high-frequency stereo separation, is the third most important specification for FM tuners, particularly when coupled with high selectivity. Unfortunately, because of a lack of standards covering FM-stereo measurements, this specification is usually not given. However, in standard separation measurements the ratio between left and right tuner outputs is given for single-channel signals. If separation is maintained at a minimum of 30 db over all audio frequencies between 50 cps and 15 kc, then distortion cannot be higher than about 3 per cent. Under these conditions, all other factors which can contribute to lack of separation must be close to zero. Since they are likely not to be, distortion therefore must be lower if separation is maintained at all audio frequencies.

Having established the need for i.f.-filter characteristics different from the "ideal" flat top filter, what kind should it be and how will it affect all the other tuner characteristics? As to "what," there seems to be a fair amount of agreement: First, the filter should be as phase linear as practical; second, it should be symmetrical; third, it should have only one peak (at the i.f. center frequency) and not two or more; fourth, toward the edges of the passband it should have progressively increasing attenuation and the attenuation slope should increase at frequencies farther removed from the i.f. center frequency; fifth, the bandwidth of this filter has to be wider for stereophonic operation than for monophonic operation.

In practice and in theory there is no ideal filter. Various types have been proposed based on a variety of mathematical models such as cosine, hyperbolic cosine, Bode, and Gaussian. Typically, they have the passband characteristics shown in *Fig.* 7 with individual varia-

(*Continued on page 75*)

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Class D Amplifiers

GEORGE FLETCHER COOPER

A closer look

IN TWO PARTS—PART 2

In *Fig.* 11 we have the classical picture of a transistor being switched on and off at the base. The collector current takes a finite time to rise, and when the base voltage is reversed the collector current remains fairly constant for the storage time and then falls smoothly. For a cheap power transistor these times are in the range of 10–40 microsecond, while for a computer transistor, if you have that sort of money, the times are around 1 microsecond. During this period we may say that the transistor is somewhere in the high dissipation region, passing some current and maintaining some voltage. If the peak current is I_c and the voltage supply is V_c, the worst point is at $(I_c/2)(V_c/2)$, or $V_cI_c/4$, although many circuits can, in fact, make matters even worse than this. Even so, this transition loss may be rather high. If we make $V_c = 10$v. and $I_c = 10$ A, we get a product of 25. Now the high loss period will occur 100,000 times per second if we have 50 kc switching, and even a 1-microsecond duration will give 2.5-watts loss, or just equal to the bottoming dissipation.

A look again at *Fig.* 11 will remind you that it is the turn-off which is the real problem. During the turn-on we meet a rather different problem, the very low input impedance at the base caused by the absence of any negative feedback effect in the emitter resistance until the collector current starts to flow. This must be dealt with by using a very low impedance source which can give a high initial current drive. To sweep out the stored charge in the base at turn-off we must reverse the base-emitter diode, and Mr. Birt recommends the use of a curbed pulse of the form shown in *Fig.* 12.

A way of avoiding this difficulty is to

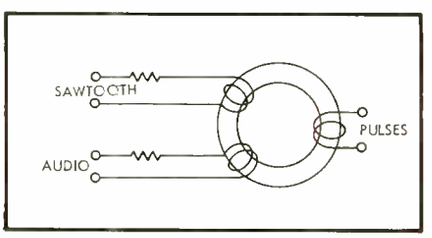


Fig. 10. This method gives short pulses, the 'sense' being opposite for the leading and trailing edges of the l-m pulses.

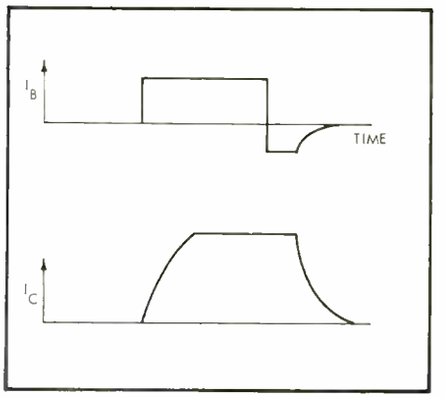


Fig. 11. "Classical" response of a transistor switched on and off at the base.

use a regenerative output stage. Any of the classic square-wave inverter circuits may be used here. I shall follow Mr. Birt in showing the circuit of *Fig.* 13. Left to itself this circuit will oscillate at a very low frequency determined by the saturation of the transformer primary, which makes the feedback effect collapse due to the reduction in load impedance. Roughly speaking this means that the transformer is an ordinary audio transformer suitable for the transistor used. Before this can happen, however, a pulse is applied to the *on* transistor at one of the two trigger points 1 and 2. As the transistor starts to cut off, the movement of the collector drives the other transistor on, thus bringing its collector down and increasing the cut-off drive to the first transistor. I have added speed-up capacitors across the feedback resistors to give compensation for the frequency limitation of the transistors.

As in inverter design, separate windings for the base feedback may be desirable in order to get rid of the steady bias from the collector supply and also to reduce the power absorbed in the feedback resistors. In a normal inverter circuit this can lead to a slowing-down of the switching operation, because there is some leakage inductance between the collector winding and the base winding. A trick which is useful here is to connect the speed-up capacitors from collectors to bases, instead of across the feedback resistor.

A regenerative output stage needs to be flicked from one side to the other and a suitable waveform for producing this action is obtained if we differentiate the length-modulated pulses. The result is a double train of very short pulses, as shown in *Fig.* 14. The regular upper train is applied to one of the transistors, the lower position-modulated train is inverted and applied to the other transistor. We may use an RL-differentiator, having a small inductance so that $\omega L \ll R$, in the circuit of *Fig.* 15, and then we can get the pulse inversion by using a center-tapped secondary. The diodes select only one sense of pulse. Birt suggests that these p.p.m. pulses are easier to handle than the length-modulated pulses, and thus by implication that they should be produced at the earliest possible stage in the system. His reasoning is, however, false, for there is an audio component even with position-modulated pulses. Nevertheless, a transistor amplifying this kind of pulse will need to dissipate relatively little energy: or will it? We have decreased the average current but we have doubled the number of transitions.

A conventional output stage, fed with the length-modulated pulses, might seem to raise few problems. It certainly seems to me to be the right way to start off your experiments, because it needs far fewer circuits. There are, in fact, some awkward details. Suppose that we use a normal low-pass filter to keep the 50 kc out of the loudspeaker. The stage is extremely efficient and so we must take power from the supply at an audio fre-

(*Continued on page 74*)

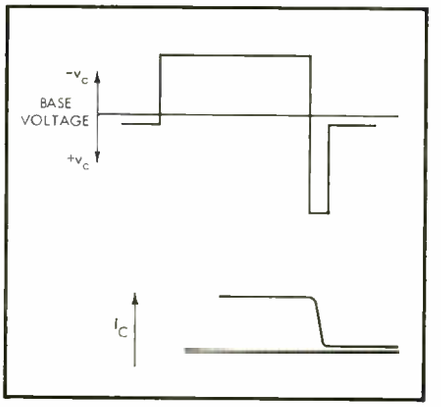


Fig. 12. The pulse recommended by Birt.

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Knobs: The Shame of it All

DON NORT*

The serious business of equipment evaluation often leaves itself open to errors—either of commission or of omission. Herein we endeavor to correct one of the latter and at the same time to cover an important subject which has heretofore been sadly neglected.

WE HESITATE TO MENTION, even in passing, the current *cause celebre* in magazine publishing. Though we have opinions—and strong ones—about the freedoms and responsibilities of the press, we see our role in the present controversy as that of an interested spectator. We refer, as you surely must know, to the seizure of the August *Consumer Militant* magazine by the Post Office Department.

Now whether or not *Consumer Militant's* comparative rating of stag films (plus a five-page foldout of the "good parts") falls within the legal definition of pornography is for the courts to decide. For the article itself—for the tested merits of *"Snowbound in a Cabin"* over *"Miss Jackboots Night School,"* we couldn't care less.

But we *were* disturbed by the at least temporary loss of another article in *CM's* ill-fated August number—the report, *"Sham and Shame: An Impartial Look at High-Fidelity Control Knobs." CM's* 3800 subscribers will remember that the knob report was promised for imminent completion in the winter of 1955. Needless to say it has been eagerly awaited by their patient readers. It was eventually completed, but only in time to reach print this month in the confiscated issue. Such are the misfortunes of publishing.

Our own readers know that we have, at times, expressed some skepticism regarding comparative testing, particularly in regard to its beauty-contest aspect. Well, we may have been critical, but we do feel that the buying public is entitled to every available bit of information from every available source. And the knob article, if nothing else from the August *CM, is* available. A few weeks ago, we met with *Consumer Militant's* Harvey L. Greenwillow (B.A., M.S., Ph.D., past president of the Mt. Ossa MG Club), and with him arranged for the publication, in our own pages, of the knob article. Here then is *Consumer Militant's* long-awaited report on high-fidelity control knobs . . .

Sham and Shame: An Impartial Look at High-Fidelity Control Knobs

. . . some models are good, some bad . . . some are better than others, some not . . .

Since the last years of the McKinley Administration, the American consumer has been faced with a bewildering proliferation of knobs. Knobs abound. Can anything be done to stem the swelling tide? At what point should the government step in? And what is the role of the informed consumer? *CM* wonders.

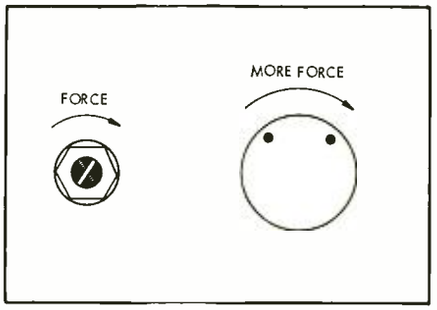


Fig. 1 Diagram showing the torque-amplifying characteristics of a properly chosen knob.

Knobs, Knobs, Knobs

In gentler times, the consumer needed few knobs. He used few. He bought few. But, as *CM's* consultants have repeatedly advised, times have changed.

Good and Bad

CM hastens to point out that it's positively no good to generalize about knobs: among knobs, as anything else, there are good and bad. But the choice before the consumer is quite clear—*he must choose the good and/or avoid the bad. CM* feels it cannot stress this last point too strongly.

Knobs For Hi-Fi

Knobs play a singularly important role in the use of high-fidelity components. In *CM's* opinion, a well-designed high-fidelity knob serves a two-fold purpose: (1) it amplifies (or "increases") the torque (or "twisting force") applied to the control shaft (*Fig.* 1); and (2) it also provides a convenient method of placing an indicator of the control shaft's position close to the panel lettering (*Fig.* 2).

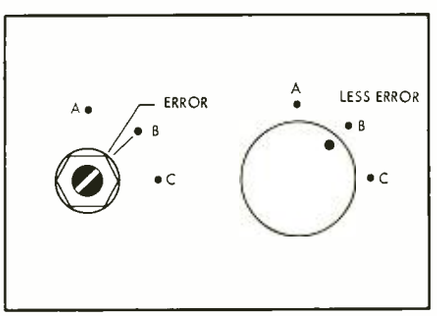


Fig. 2. Diagram showing how accuracy of resettability is increased by increasing the diameter of the indicating element of the torque-amplifying shaft turner.

Original Equipment Knobs: The Overview

CM's readers may wonder about the knobs so often included in the list prices of new components. Are these knobs adequate? In our view, they are not.

Original Equipment Knobs: Specifics

When *CM* tested control-amplifiers a few months ago, it made an appalling discovery. In case after case original equipment knobs could be detached inadvertently from their shafts—all the unwary user needed to do was *pull* instead of turn. More shocking was *CM's* discovery that in *no* case did the amplifier's operating instructions caution against pulling. Neither did the panel markings of *any* amplifier indicate that the knobs were to be turned, not pulled!

Worst of all, to *CM's* mind, were the manufacturers' refusals to "replace or repair" such palpably defective equipment. But that is a separate issue. (*CM* has placed its files in the hands of the appropriate regulatory agencies.)

A Ray of Hope

CM found that a very few amplifiers came equipped with knobs that could *not* be pulled off. We were, at first, elated.

The Light That Failed

But our joy was short-lived. One of our researchers discovered a tiny setscrew cunningly half-hidden in each of the knobs that had, at first, tested well. Our suspicions were aroused. We investigated and found that *if these screws were in any way loosened, the knobs then pulled free with frightening ease!*

A Good Knob is Hard to Find

Can nothing be done then? Must the consumer who has already bought one of *CM's* Provisionally OK tuners or amplifiers be reconciled to wrapping yards of friction tape around his control shafts? *CM* says no.

(*Continued on page 76*)

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The Definition Hassle

C. G. McPROUD

Worrying the average audiofan—not to mention the industry at large—is the proposal that the Federal Trade Commission establish a definition of high fidelity. This IHF proposal may provide a satisfactory solution for everyone.

WHEN IT WAS FIRST PROPOSED that the Federal Trade Commission should establish a binding definition of high fidelity in order to "protect" the buying public, there was considerable consternation in the ranks of component manufacturers and quite a bit of distress in the minds of the serious, dedicated audiofans. Since even the high fidelity component industry within itself has never been able to provide a valid *definition* of what actually constituted "high fidelity," how could a non-technical government agency do so?

In order to satisfy the mass producers of "hi fi" phonographs and radios, any such definition would necessarily have to be set so low down in the scale that almost anything above the quality level of the usual 6-transistor pocket radio set would pass. And so it began to appear.

A committee formed by the Electronic Industries Association actually came up with a definition—one in which distortion, hum and noise, and rumble received no consideration. The resulting hue and cry from the component industry was not unexpected, and a number of other organizations were offered the opportunity of improving on the proposed definition. With little result. It would now appear that the hue and cry has abated somewhat, and—possibly on the assumption that if we say nothing about it, the whole matter will become lost in some dusty pigeonhole.

Criticism Not a Solution

Criticism of the whole idea of a government sponsored—and presumably enforced—definition is not the proper solution, even though it happens to be a popular indoor sport. What is really needed is some constructive action, and some steps have been taken in this direction already by Raymond V. Pepe, presi- of the IHF. His recommendation is that the "definition" be revamped so that instead of setting minimum performance standards, the manufacturer need only provide "on the label," so to speak, a statement of the specifications of the product if he wishes to call it "High Fidelity" or "Hi-Fi" at all. This, we think, is the ideal solution.

There are similar parallels in other product industries. Throughout the food and candy industries, for example, it is obligatory that the manufacturer shall list the ingredients that go into the product. The consumer is no longer buying a "pig in a poke" when he goes to the store.

There are similar strict regulations about the labeling of whiskies, which are intended to inform the buyer as to what he is actually buying. Thus a "bottled in bond" whiskey must be at least four years old and of 100 proof. A "straight" whiskey must not contain any neutral spirits. A whiskey labeled "bourbon" must be made principally from corn, and so on. The rules and regulations governing the labeling of whiskey are elaborate and specific, and very well enforced. We can only hope that some similar and equally informative and intelligent result may come from this entire problem.

No one at all familiar with components is naive enough to believe that all of them are equally good. An amplifier, for example, with an output of 25 watts per channel, let us say, can be had for as little as $50 from one manufacturer, and for as much as $199.95 from another—a spread of four to one. No one actually believes that one is as good as the other, even though for some applications the less expensive unit may—and probably will—give completely satisfactory service. It is possible to buy a thoroughly nourishing and filling meal at one restaurant for a dollar or so, and at another for $20, but they may taste different.

Back to high fidelity again, we are all agreed that there are different degrees of performance, and that appearance and flexibility may also contribute to the appeal one product has over another. But to say that anything better than a specified minimum is "high-fidelity" can not help but be misleading to the consumer.

The Proposal

While it would be utopian if there could be a hard and fast dividing line between mediocre performance phonographs and top performance component equipment, no such line exists—nor would we actually want one. But if it were mandatory that any product labeled "high fidelity" must have its right to such a designation supported by the manufacturer's statement in advertising and in the literature accompanying the product of the actual specifications of the product itself. And that is the fundamental idea behind Mr. Pepe's proposal.

It is not to be expected that a complete set of specifications would have to appear in labels or advertisements of any such product that the manufacturer might choose to call "high fidelity." In the first place, it would defeat its purpose because no one would read it through except the knowledgeable audiofan (and he probably wouldn't be shopping for a fringe product anyhow), and even if the layman were to read the specs he would not understand much about them. Nor do we think it likely that it would be possible, even if it were thought to be desirable, to get such a ruling across.

There are, however, a few simple specifications which would serve to give the consumer a yardstick by which he could compare products other than by the artistic and lexicographical proficiency of the manufacturer's ad agency. It would seem likely that sufficiently effective results could be had with as few as three required specifications for each type of product. For example, amplifiers could be quite well described by three "numbers"—power output, frequency bandwidth, and hum and noise level. Power output would be stated as "*n* watts per channel at *p* per cent total harmonic distortion"; frequency bandwidth would be specified as the "limits of frequency at which response is 3 db down from the output at 1000 cps"; hum and noise should be specified as "*q* db below 1 watt." Similar, and equally simple required specifications can give the consumer some "numbers" by which he can compare the various products.

Even though the specs are somewhat technical and certainly unfamiliar to the layman, he would soon learn 20 watts per channel at 0.5 per cent distortion sounds as though it would be better than 12 watts per channel as 2 per cent distortion. It should not be hard to teach the consumer that a frequency bandwidth of 5 to 100,000 cps is better than one of 60 to 8000 cps, or that an amplifier with a hum and noise level of – 80 db is better than one of – 42.

Perhaps it would be possible to simplify the specs so as to get a Quality Factor in, say, seven digits—like a phone number. Suppose we divide the power output by the square of the distortion for the first two digits; for the bandwidth we subtract the lower figure from the upper and divide by 100; and for the third we simply use the number of db. Thus the better of the two amplifiers above would rate 80/999/80 and the poorer as 03/079/42.

Whatever the final solution, we do hope that it will give the hi-fi consumer some means of actually comparing performance, not claims. We couldn't ask for more than that. Æ

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PRODUCT PREVIEW SECTION

Presenting the annual compilation of the new—and some of the old standby —products that will be shown by your hi-fi dealer during the coming months, and at the New York High Fidelity Music Show in September.

WHEN THE HI-FI MANUFACTURERS bring forth their annual crop of new and improved products, they are understandably anxious that everyone should know all about them. We are in full sympathy with this desire to the extent that we employ the August issue as a Product Preview, and then—to continue the service—we make the entire section available later in a handy-sized book for continued reference. This book, to be published September 1, is known as the AUDIOGUIDE.

In an attempt to arrive at some sort of uniformity in the descriptions of the products shown, each manufacturer was furnished forms for each category of products, with spaces for the information we think is important to the potential purchaser.

We have continued the style of presentation, allowing a listing of up to five items in addition to the principal one, but without description in detail. Thus we have some 300 main listings plus an average of 2-plus subsidiary listings for each main one—giving us a total listing of almost 1000 products.

The specifications given are those provided by the manufacturer. Prices quoted may vary between East and West, but only one price is shown. In any instance, for further information about any product described or listed, just write to the manufacturer at the address given below —he will be glad to hear from you.

Acoustech, Inc.
139 Main St.,
Cambridge 42, Mass.
Acoustic Research, Inc.,
24 Thorndike St.,
Cambridge 41, Mass.
Allen, Richard, Sales Corp.,
P. O. Box 95,
Jericho, N. Y.
Allied Radio Corp.,
100 N. Western Ave.,
Chicago 80, Ill.
Altec Lansing Corp.,
1515 S. Manchester Ave.,
Anaheim, Calif.
American Concertone, Inc.
9449 West Jefferson Blvd.,
Culver City, Calif.
American Microphone Co.,
400 S. Wyman St.,
Rockford, Ill.
Ampex Corporation
934 Charter St.,
Redwood City, Calif.
Amplifier Corp. of America,
396 Broadway,
New York 13, N. Y.
Apparatus Development Co.,
Wethersfield, Conn.
Argos Products Co.,
Genoa, Ill.
Artisan Organs,
2476 N. Lake Ave.,
Altadena, Calif.
Audio Devices, Inc.,
444 Madison Ave.,
New York 22. N. Y.
Audio Dynamics Corp.,
Pickett District Road,
New Milford, Conn.
Audio Tech Laboratories,
2819 Newkirk Ave.,
Brooklyn 26, N. Y.

Barker Sales Co.,
339 Broad Ave.,
Ridgefield, N. J.
Barzilay Furniture Mfg. Co., Inc.,
17303 S. Western Ave.,
Gardena, Calif.
Bell Sound Division, Thompson
Ramo Wooldridge Inc.,
6325 Huntley Rd.,
Columbus, O.
Benjamin Electronic Sound Corp.,
80 Swalm St.,
Westbury, N. Y.
Bogen Communications Div.,
Lear Siegler, Inc.
Paramus, N. J.
Bozak Mfg. Company,
Box 1166,
Darien, Conn.
British Industries Corp.,
80 Shore Road,
Port Washington, N. Y.
Burgess Battery Co.,
Freeport, Ill.

CBS Laboratories,
277 High Ridge Rd.,
Stamford, Conn.
Cabinart Acoustical Dev. Corp.,
34 Geyer St.,
Haledon, N. J.
Clark, David, Co., Inc.,
36 Park Ave.,
Worcester, Mass.
Concord Electronics Corp.,
809 N. Cahuenga Blvd.,
Los Angeles 38, Calif.

Dukane Corp.,
St. Charles, Ill.
Dynaco, Inc.,
3916 Powelton Ave.,
Philadelphia 4, Pa.

Eastman Kodak Company,
Rochester, N. Y.
EICO Electronic Instr. Co.,
3300 Northern Blvd.,
Long Island City 1, N. Y.
Electro-Voice, Inc.,
Buchanan, Mich.
Elpa Marketing Industries,
New Hyde Park, N. Y.
Empire Scientific,
1025 Stewart Ave.,
Garden City, N. Y.
Ercona Corp.,
432 Park Ave. South.
New York 3. N. Y.
Estey Electronics, Inc.
201 W. John St.,
Hicksville, N. Y.

Fairchild Recording Equipment Corp.,
10-40 45th Ave.,
Long Island City 1, N. Y.
Ferrodynamics Corp.,
Lodi, N. J.
Finney Co.,
34 W. Interstate St.,
Bedford, Ohio
Fisher Radio Corp.,
21-29 44 Dr.,
Long Island City 1, N. Y.
Freeman Electronics Corp.,
729 N. Highland Ave.,
Los Angeles 38, Calif.
Fujiki Electric Co., Ltd.,
98 Kamiikegami-cho, Ota-ku.
Tokyo, Japan

General Electric Company,
2200 N. 22nd St.,
Decatur, Ill.
Gotham Audio Corp.,
2 W. 46 St.,
New York 19, N. Y.
Grado Laboratories, Inc.,
4614 Seventh Ave.,
Brooklyn 20, N. Y.
Gray Research and Development Co.,
Box 12, Elmwood, Conn.
Grommes Div. of Precision Electronics, Inc.,
9101 King St.,
Franklin Park, Ill.

Hadley Laboratories,
Claremont, Calif.
Harman-Kardon,
Plainview, N. Y.
Heath Company,
Benton Harbor, Mich.

International Electroacoustics, Inc.
333 Sixth Ave.,
New York 14, N. Y.
International Electronics Corp.,
81 Spring St..
New York 12. N.Y.

Jensen Manufacturing Co.,
6601 S. Laramie Ave.,
Chicago 38, Ill.

Karg Laboratories,
162 Ely Ave.,
S. Norwalk, Conn.
Kenwood Electronics, Inc.,
212 Fifth Ave.,
New York 10, N. Y.
Kersting Mfg. Co.,
504 S. Date St.,
Alhambra, Calif.
KLH Research and Development Corp.,
30 Cross St.,
Cambridge 39, Mass.
Klipsch and Associates,
Hope, Ark.
Koss Electronics,
2227 N. 31st St..
Milwaukee, Wisc.

Lafayette Radio Electronics,
P. O. Box 10, Syosset, N. Y.
Lansing, James B., Sound, Inc.
3249 Casitas Ave.,
Los Angeles 39, Calif.

Magna-Tech Electronic Co., Inc.,
630 Ninth Ave.,
New York 36, N. Y.
Martel Electronics,
645 N. Martel Ave.,
Hollywood 46, Calif.
Matsushita Electronic Corp. of America,
41 E. 42nd St.,
New York 17, N. Y.
Marantz Company,
25-14 Broadway,
Long Island City 1, N. Y.
McIntosh Laboratory, Inc.,
2 Chambers St.,
Binghamton, N. Y.
Micro Seiki Company, Ltd.,
7-925 Koenji, Suginami-ku,
Tokyo, Japan
Mitsumi Electric Co., Ltd.,
11 Broadway,
New York 4, N. Y.
Murray-Carson Corp.,
2424 E. 55 St.,
Indianapolis 20, Ind.

Neat Onkyo Denki Co. Ltd.,
c/o Harold Weiler
West St., Harrison, N.Y.
Neshaminy Electronic Corp.,
Edison-Furlong Road,
Furlong, Pa.
Newcomb Products Co.,
6824 Lexington Ave.,
Hollywood 38, Calif.
Nortronics Co., Inc.,
8101 W. 10 Ave. N.,
Minneapolis, Minn.
North American Philips Co. Inc.,
230 Duffy Ave.,
Hicksville, N. Y.

Paco Electronics Co. Inc.,
70-31 84th St.,
Glendale 27, N. Y.
Pickering & Company, Inc.,
Plainview, N. Y.
Pilot Radio Corp.,
100 Electra Lane,
Yonkers. N. Y.
Pioneer Electronic Corp.,
5 Otowacho 6-chome,
Bunkyo-ku, Tokyo, Japan
Permoflux Corp.,
4111 San Fernando Rd.,
Glendale, Calif.
Primo Co., Ltd.,
2043 Mure, Mitakashi,
Tokyo, Japan

RCA Electronic Components and Devices,
Harrison, N. J.
Reeves Soundcraft Corp.,
Great Pasture Rd.,
Danbury, Conn.
Roberts Electronics, Inc.,
5920 Bowcraft Ave.,
Los Angeles 16, Calif.
Robins Industries Corp.,
Flushing 56, N. Y.
Rockbar Corp.,
650 Halstead Ave.,
Mamaroneck, N. Y.
Rockford Special Furniture Co.,
2024 23rd Ave.,
Rockford, Ill.

Sarkes Tarzian, Inc.,
East Hillside Drive,
Bloomington, Ind.
Scope Electronics Corp.,
10 Columbus Circle,
New York 19, N. Y.
Scott, H. H., Inc.,
111 Powder Mill Road.
Maynard, Mass.
Sharpe (E. J.) Instruments, Inc.,
965 Maryvale Dr.,
Buffalo, N. Y.
Sherwood Electronic Laboratories, Inc.
4300 N. California Ave.,
Chicago 18, Ill.
Shure Brothers, Inc.,
222 Hartrey Ave.,
Evanston, Ill.
Sonotone Corp.,
Elmsford, N. Y.
Sonovox Co. Ltd..
101 Takiwamatsu-cho,
Shibuya, Tokyo, Japan
Stanford International.
569 Laurel St.,
San Carlos, Calif.
Stanton Magnetics,
Plainview, N.Y.
Stuart, Matthew, & Co.. Inc.,
156 Fifth Ave..
New York 11, N. Y.
Superscope, Inc.,
8150 Vineland Ave.,
Sun Valley, Calif.
Switchcraft, Inc..
5557 N. Elston Ave.,
Chicago 30, Ill.

Taco Div., Jerrold Electronics,
Taco Ave.,
Sherburne, N. Y.
Tandberg of America. Inc.,
P. O. Box 171,
Pelham, N. Y.
Tannoy (America) Ltd..
P. O. Box 177,
East Norwich, N. Y.

United Audio Products,
12 W. 18 St.,
New York 9. N. Y.
University Loudspeakers.
Oklahoma City, Okla.
Utah Electronics,
Huntington, Ind.

Vernon Audio Division,
144 E. Kingsbridge Rd..
Mt. Vernon, N. Y.
Viking of Minneapolis, Inc.,
9600 Aldrich Ave. South,
Minneapolis 20, Minn.

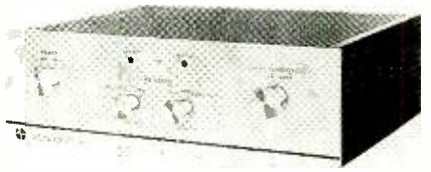
Weathers Div. of Teleprompter Corp.,
50 W. 44th St.,
New York 36, N. Y.
Wilder Engineering Products,
1253 Diversey Parkway,
Chicago, Ill.

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BASIC AMPLIFIERS

ACOUSTECH

● *Acoustech 1 Solid-State Stereo Power Amplifier.* A solid-state stereo power amplifier using silicon output stage (beta cutoff above one megacycle) combined with direct-coupled circuitry (no driver or output transformers) provides excellent transient response. Mil-spec glass-epoxy boards, computer-grade electrolytics, girder construction, cool running and conservative operation of all components. Extensive warranty.



Specifications: Freq. resp. 2.5 to 250k cps ±3 db at 5 watts output; power bandwidth, 20 to 20k cps; power output, rms, 40 watts per channel; harmonic distortion, 0.95% at 40 watts from 20 to 20k cps; IM distortion, 0.95% at 40 watts; hum and noise, 85 db below 40-watt output; sensitivity, input for rated output, 2.5 volts; damping factor, 25; direct-coupled, meets specs at 8, 16 ohms; controls: on-off, input sensitivity; switches: high and low rolloff; convenience outlets, 1; weight, 29 lbs; dimensions, 15¾" wide, 5" high, 12" deep; price, $395. Acoustech, Inc.

ALTEC

● *351B Solid-State Power Amplifier.* The 351B is an all transistor utility amplifier which is adaptable to a wide variety of applications. Being of solid-state design it is ideal for remote and unattended locations where an amplifier has to be stowed away on a shelf. Since the 351B draws only 6 watts from the power line at zero signal, it can be left on continuously. Its 70-volt output is for driving music distribution speakers. The 351B features a "flashguard" circuit which gives a visual warning should its output transistors become dangerously overloaded by accidental downward mismatch of output load or short-circuit.

Specifications: Freq. resp. 20 to 20,000 cps ±1 db; IHF music power output, 50 watts; harmonic distortion, 1.5% at 40 watts from 25 to 10,000 cps; hum and noise, 90 db below 50-watt output; sensitivity, input for rated output, 0.45 volts; damping factor, 7.5; output impedances, 4, 8, 16, 125 (70-v) ohms; controls, level; switches, protective circuit; weight, 15 lbs; dimensions, 9¾" wide, 5" high, 9¼" deep; price, $252.00. Altec-Lansing.

1. 356A power amp $117.00

DYNA

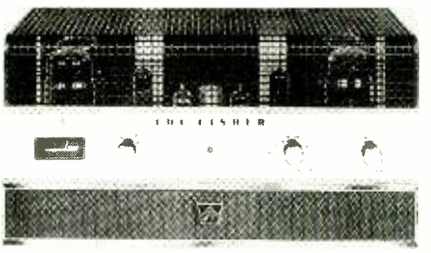
● *Stereo 70/A Stereo Power Amplifier.* Conservatively-operated, high-performance, moderate-power stereo amplifier featuring reliable operation, stability, and sound quality of the highest caliber. Fool-proof adjustment through patented Dyna "Biaset" assures long tube life, and lowest distortion.

Specifications: Freq. resp. 10 to 40k cps ±0.5 db at 1 watt output; power output, rms, 35 watts per channel; harmonic distortion, 1% at 35 watts, ±1 db from 20 to 20k cps; IM distortion, 1% at 35 watts; hum and noise, 90 db below 35-watt output; sensitivity, input for rated output, 1.3 volts; damping factor, 15; output impedances, 4, 8, 16 ohms; controls, dual bias adjust; switches, stereo-mono, power; weight, 32 lbs; dimensions, 13" wide, 6½" high, 9½" deep; price, $129.95. Dynaco, Inc.

1. Stereo 35/A, 17½ watts per channel rms $79.95
2. Mark III/A, 60-watt mono amp. $99.95
3. Mark IV/A, 40-watt mono amp. $79.95

FISHER

● *SA-1000 150-Watt Stereo Power Amplifier.* The Fisher SA-1000, a 150-watt ultra-linear power amplifier, utilizes the newly-developed 8417 cavity-anode beam power output tubes to provide large amounts of undistorted power throughout the audio spectrum. Excellent response, a high percentage of feedback, extensive (780 uf) filtering, and a low-impedance silicon-diode power supply help make the SA-



1000 a quality instrument. A professional type of metered balancing and adjustment circuit, and the Fisher hinged control cover, make the SA-1000 pleasing to the eyes and ears of the audiofan.

Specifications: Freq. resp. 8 to 50k cps ±1 db at 2 watts output; power bandwidth, 8 to 40k cps; IHF music power output, 75 watts per channel; power output, rms, 65 watts per channel; harmonic distortion, 0.25% at 75 watts at 1000 cps; IM distortion, 0.4%; hum and noise, 90 db below 75-watt output; sensitivity, input for rated output, adjustable 0.5–2.0, frequency compensated atten.; damping factor, 17; output impedances 4, 8, 16 ohms; controls, a.c. balance, bias; switches, subsonic filter, input attenuator; weight, 70 lbs; dimensions, 15⅛" wide, 7¾" high, 12" deep; price, $329.50. Fisher Radio Corp.

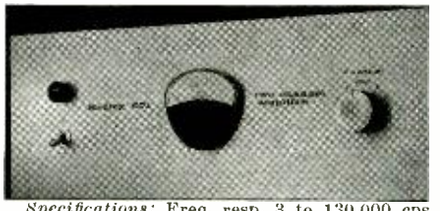
GOTHAM

● *PFB-150 WD.* The Model PFB 150 WD power amplifier employs 5 balanced push-pull stages. The output transformer is a specially-designed toroid. It is designed for any high-power low-distortion application. The PFB 150 WA variation is used with the Grampian head in the Gotham-Grampian disc-cutting system.

Specifications: Freq. resp. 20 to 40,000 cps ±0.5 db at 10 watts output; power bandwidth, 40 to 15,000 cps; harmonic distortion, 0.7% at 150 watts from 40 to 15,000 cps; IM distortion, 1.0% at 200 watts peak; hum and noise, 100 db below 150-watt output; gain 50 db; damping factor, 40+; output impedances, 8, 16, 32, 93 ohms; controls: gain, 2-db steps; switches: on-off, metering; weight, 107 lbs; dimensions, 19" wide, 10½" high, 11" deep (2 chassis); price, $615.00. Gotham Audio Corp.

HADLEY

● *Model 601 Stereo Amplifier.* The Hadley 601 amplifier is a dual amplifier designed for the discriminating listener. Each channel can deliver at least 40 watts from 13 cps to 30,000 cps with total harmonic distortion never exceeding 0.6%. The individual components are of the highest quality. Metallic-film resistors are used throughout, while the power supply embodies computer-grade electrolytic capacitors. All components are run at a fraction of their maximum ratings. Each output transformer weighs 17 lbs. and is encapsulated and sealed in a steel case for long life.



Specifications: Freq. resp. 3 to 130,000 cps ± 1 db at 1 watt output; power output, rms, 40 watts per channel; harmonic distortion, 0.6% at 40 watts from 20 to 20,000 cps; IM distortion, 0.5% at 40 watts; hum and noise, 80 db below 1 watt output; sensitivity, input for rated output, 1 volt; output impedances, 8, 16 ohms; weight, 55 lbs; dimensions, 15¾" wide, 6¼" high, 12" deep; price, $319.50 (West). Hadley Labs.

LEAK

● *Stereo 60 Amplifier.* Engineered for top-level performance, the Leak "Stereo 60" provides sufficient undistorted power to drive any modern speaker system.

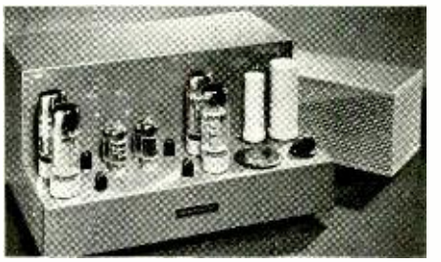
Specifications: Freq. resp. 20 to 20k cps ± 0.5 db at 30-watt output; power output, rms, 30 watts per channel; harmonic distortion, 0.1% at 30 watts; hum and noise, 80 db below 30-watt output; sensitivity, input for rated output, 125 mv; damping factor, 25; output impedances 4, 8, 16 ohms; convenience outlets 2; weight 29 lbs; dimensions, 10⅝" wide, 13⅛" high, 6⅞" deep; price, $219.00. Ercona Corp.

1. "Stereo 20" dual 10-watt rms amp. $149.00
2. "TL/50 Plus" mono 50-watt rms amp $149.00

MARANTZ

● *Model 8B Stereo Amplifier.* 35-watt-per-channel basic amplifier. Built-in metered test and adjust for plate-current ("bias") and dynamic balance. Exceptionally clean, stable circuit. Highest grade workmanship and parts.

Specifications: Freq. resp. 3 to 40,000 cps ±1 db at 1 watt output; power bandwidth ±1 db, 15 to 40,000 cps; power output, rms, 35 watts per channel; harmonic distortion, 0.5% at 35 watts from 20 to 20k cps; IM distortion, 0.5% at 35 watts; hum and noise, 100 db below 35-watt output; sensitivity, input for rated output, 1.3 volts; damping factor, 20; output impedances, 4, 8, 16 ohms; controls: bias, balance; switches; bias test; weight, 55 lbs; dimensions, 13½" wide, 7¼" high, 10½" deep; price, $264.00. Cover grille, $9.00. Marantz Co.



1. Model 9, 70-w single-channel amp... $384.00
2. Model 9R, same as above, rack panel mount $414.00
3. Model 970, 70-w 8-ohm, 16-ohm, 70.7V $384.00
4. Model 970R, same as above rack-panel mount $414.00

McINTOSH

● *MC 275 Dual 75-Watt Power Amplifier.* The MC 275 produces a full 75 watts rms continuous power from each channel simultaneously with total harmonic distortion guaranteed less than 0.5% at any frequency from 20 to 20,000 cps.

Specifications: Freq. resp. 16 to 60,000 cps +0, −0.5 db at 75 watts per channel output; power bandwidth, 16 to 60,000 cps; power output, rms, 75 watts per channel; harmonic distortion, 0.5% at 75 watts from 20 to 20,000 cps; IM distortion, 0.5% at 75 watts equiv. sine wave power; hum and noise, 90 db below 75-watt output; sensitivity, input for rated output, 0.5 volts; damping factor, 10; output impedances, 4, 8, 16, 600 ohms 25 volt, 70.7 volt; controls: volume; switches, stereo-mono; convenience outlets, 1; weight, 75 lbs; dimensions, 12¼" wide, 8" high, 17¼" deep; price, $444.00. McIntosh Laboratories.

1. MC 225 dual 25-watt stereo amp. $198.00
2. MC 240 dual 40-watt stereo amp. $288.00
3. MC 40, mono 40-watt amp. $159.00
4. MC 75, mono 75-watt amp. $229.50

PIONEER

● *MF-90 Monophonic Basic Amplifier.* The Pioneer Model HF-90M is a power amplifier with a maximum output of 100 watts. It uses a pair of EL34/6CA7 output tubes operating in an efficient Class-B push-pull circuit, to provide a large and stable output. The HF-90M is recommended for use in applications such as theaters or large auditoriums.



Specifications: Freq. resp. 20 to 30,000 cps ±1 db at 0.5 watts output; IHF music power output, 100 watts per channel; power output, rms, 70 watts per channel; harmonic distortion, 1% at 70 watts from 40 to 20,000 cps; IM distortion, 1% at 70 watts; hum and noise, 75 db below 70-watt output; sensitivity, input for rated output, 0.9 volts; output impedances, 4, 8, 16 ohms; level control; 1 convenience outlet; weight, 26½ lbs; dimensions, 14¾" wide, 7¼" high, 3¼" deep. Pioneer Electric Corp.

1. HF-90MH—Identical to above, except with 200-ohm output.

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BASIC AMPLIFIER KITS

DYNAKIT

● *Stereo-35 Power-Amplifier Kit.* A high-performance low-power amplifier with a circuit utilizing a combination of positive and negative feedback. The output transformers are of a caliber normally associated with much more expensive amplifiers. Easy to build, requiring only 3 hours, and requiring no instruments or adjustments. Preassembled etched circuit boards speed assembly and eliminate wiring errors. Compact, low profile design matches Dyna preamps and tuners.

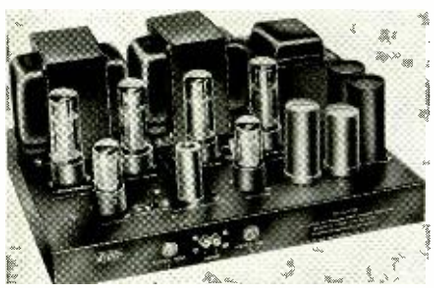


Specifications: Freq. resp. 20 to 20k cps ± 0.25 db at 1 watt output; power bandwidth, 15 to 35k cps; IHF music power output, 23 watts per channel; power output, rms, 17.5 watts per channel; harmonic distortion, 1% at 35 watts (± 1 db) from 20 to 20k cps; IM distortion, 1% at 35 watts; hum and noise, 80 db below 35-watt output; sensitivity, input for rated output, 1 volt; damping factor, 10; output impedances, 8, 16 ohms; weight, 16 lbs; dimensions, 13" wide, 4" high, 5½" deep; price $59.95. Dynaco, Inc.

1. Stereo 70, 35-watt rms each channel $99.95
2. Mark III, 60-watt rms mono amp ... $79.95
3 Mark IV, 40-watt rms mono amp ... $59.95

EICO

● *HF89A 100-watt Stereo Power Amplifier Kit.* Each power amplifier section of the HF89, employed cathode-coupled phase-inverter-driven circuit, preceded by a direct-coupled voltage amplifier. Fixed-biased, push-pull EL34's are used in the output stage and provision is made for both bias and d.c.-balance adjustments. Silicon diode rectifiers provide very good regulation.



Specifications: Freq. resp. 5 to 100k cps ± 0.5 db at 2 watts output; power bandwidth. 15 to 100k cps; power output, rms 50 watts per channel; harmonic distortion 1% at 50 watts from 20 to 20k cps; IM distortion, 0.5% at 100 watts; hum and noise 80 db below 1 watt output; sensitivity, input for rated output, 0.55 volts; damping factor, 12; output impedance, 4, 8, 16 ohms; controls, level set, bias, d.c. bal.; switches, on-off; convenience outlets, 2; weight 40 lbs; dimensions, 15" wide, 6" high, 11" deep; price, $99.50. Accessories, matching metal enclosure, E-8, $4.50. EICO Electronic Instrument Co.

1. HF-87A 70-w stereo amp kit $74.95

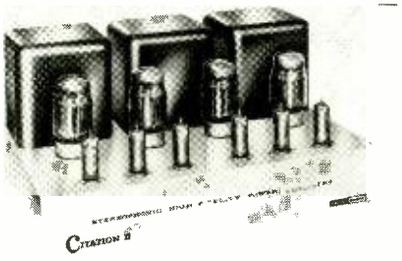
FISHER

● *K-1000 "Stratakit" 150-Watt Stereo Power Amplifier.* The K-1000 is the kit version of the SA-1000, and is in all respects the same. In spite of its engineering sophistication, the K-1000 is quickly and easily assembled, providing an opportunity for even the neophyte constructor to achieve success retaining the quality inherent in the design. Since a professional type of meter is supplied, adjustments can be made by the user without need for other instruments.

Specifications: See SA-1000 specifications, Basic Amplifier category. Price, $279.50. Fisher Radio Corp.

HARMAN-KARDON

● *Citation II 120-Watt Stereo Power Amplifier.* Providing a peak power of 260 watts, the Citation II can reproduce frequencies as low as 5 cps with very low phase shift; frequencies as high as 150,000 cps with no evidence of instability or ringing. Feature: video output pentodes to assure extremely wide response and low distortion; multiple feedback loops; power supply consisting of 4 silicon diode rectifiers, choke, heavy duty electrolytics and potted transformer; military-type terminal boards and special cable harness to assure kit builder that his unit will be exact duplicate of factory-built instrument.



Specifications: Freq. resp. 2 to 150,000 cps, + 0, −1.0 db at 10 watts output; power bandwidth, 18 to 60,000 cps; power output, rms, 60 watts per channel; harmonic distortion, 0.5% at 60 watts from 20 to 20,000 cps; IM distortion, 0.5% at 60 watts; hum and noise, 90 db below 60-watt output; sensitivity, input for rated output, 1.5 volts; damping factor, 18; output impedances, 4, 8, 16 ohms; controls: (4) d.c. bias adjust, (2) a.c. balance pots; switches: balance; convenience outlets, 1; weight, 75 lbs; dimensions, 16⅜" wide, 9" high, 11½" deep; price, $179.95. Metal enclosure, $7.95. Harman-Kardon, Inc.

1. Citation V, 80-watt stereo power amplifier kit $119.95

HEATHKIT

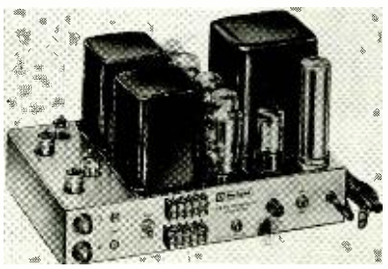
● *80-Watt Stereo Power Amplifier, Model AA-121.*

Specifications: Freq. resp. 6 to 25k cps ± 1 db at 1 watt output; power bandwidth, 10 to 40k cps; IHF music output, 49 watts per channel; power output, rms, 40 watts per channel; harmonic distortion, 1.5% at 80 watts from 20 to 20k cps; IM distortion, 0.5% at 80 watts; hum and noise, 85 db below 40-watt output; sensitivity, input for rated output, 1.0 volts; damping factor, 16; output impedances, 4, 8, 16, 32 ohms; controls: bias balance, bias voltage, level; switches; function, phase, on-off; convenience outlets, 2; weight, 39 lbs; dimensions, 15" wide, 7¼" high, 11" deep; price, $79.95. Heath Co.

1. AA-111, 28-watt stereo power amp. $44.95

KNIGHT-KIT

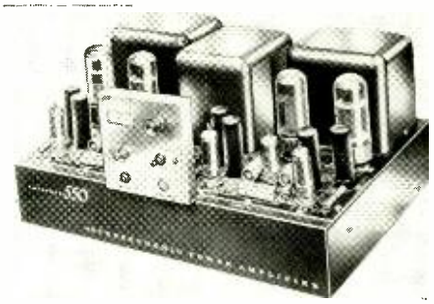
● *KB-85 70-Watt Stereo Basic Amplifier Kit.* Extremely wide frequency response at full rated power and a large amount of reserve power. Premium quality parts are used throughout. It is highly sensitive, 0.54 volts per channel, and utilizes printed circuit construction.



Specifications: Freq. resp. 15 to 31,000 cps ± 0.5 db at 70 watts output; power output, rms, 35 watts per channel; harmonic distortion, 0.25% at 70 watts; IM distortion, 0.15% at 70 watts; hum and noise, 90 db below rated output; sensitivity, input for rated output, 0.54 volts; output impedances, 4, 8, 16, and 32 ohms; controls; (2) level, (3) balance; switches: mono-stereo, off-on; convenience outlets, 2; weight, 39 lbs; dimensions, 14" wide, 8½" high, 9" deep; price, $69.95. Case, $6.50. Allied Radio.

LAFAYETTE

● *KT-550 100-Watt Stereo Amplifier Kit.* A high-quality high-powered amplifier utilizing military construction techniques. The kit is easy to assemble and contains bias and balancing provisions.



Specificatons: Freq. resp. 14 to 45,000 cps + 0, − 1 db at 50 watts output; power output, rms, 50 watts per channel; harmonic distortion, 0.75% at 50 watts from 20 to 20,000 cps; IM distortion, 0.5% at 50 watts; hum and noise, 90 db below 50-watt output; sensitivity, input for rated output, 1 volt; damping factor, 15; output impedances, 4, 8, 16 ohms; controls: bias, high-power balance; switches: on-off; convenience outlets, 1; weight 60 lb; dimensions, 17" wide, 8½" high, 12½" deep. Price, $134.50. Lafayette Radio.

H. H. SCOTT

● *LK-150 130-Watt Stereo Power Amplifier Kit.* Matched 6550 output tubes, rated at 100 watts, are used well below manufacturer's ratings to assure long operating life. Switchable subsonic filter permits the use of the LK-150 for laboratory applications where response below 5 cps is required. Input sensitivity is switchable between 2.5 volts (for the LC-21 and other Scott preamplifiers) and 1.5 volts for preamplifiers with lower output.

Specifications: Freq. resp. 4 to 65k cps ± 1 db at 10 watts output; power bandwidth, 19 to 25k cps; IHF music power output, 65 watts per channel; power output, rms, 60 watts per channel; harmonic distortion, 0.5% at 65 watts from 20 to 20k cps; IM distortion, 0.5% at 72 watts; hum and noise, 90 db below 1 watt output; sensitivity, input for rated output, 1.5 or 2.5 volts; damping factor, 16; output impedances, 4, 8, 16 ohms; controls: bias adjust with built in meter; switches: on/off, sensitivity, subsonic filter; convenience outlets, 1; dimensions, 15" wide, 6½" high, 11¼" deep; price, $179.95. Cover, $19.95. H. H. Scott, Inc.

PREAMPLIFIERS

ACOUSTECH

● *Acoustech II Solid-State Stereo Control Center.* High-quality performance and features are combined in a unit both easy to use and handsome in appearance. Features include a stepped decade level control which provides exact matching (within ¼ db) boost or cut. A micro-level allows fine adjustment within 2-db steps. Muting switch reduces sound level about 20 db when changing records manually, answering phone, and so on. Appearance similar to Acoustech 1.

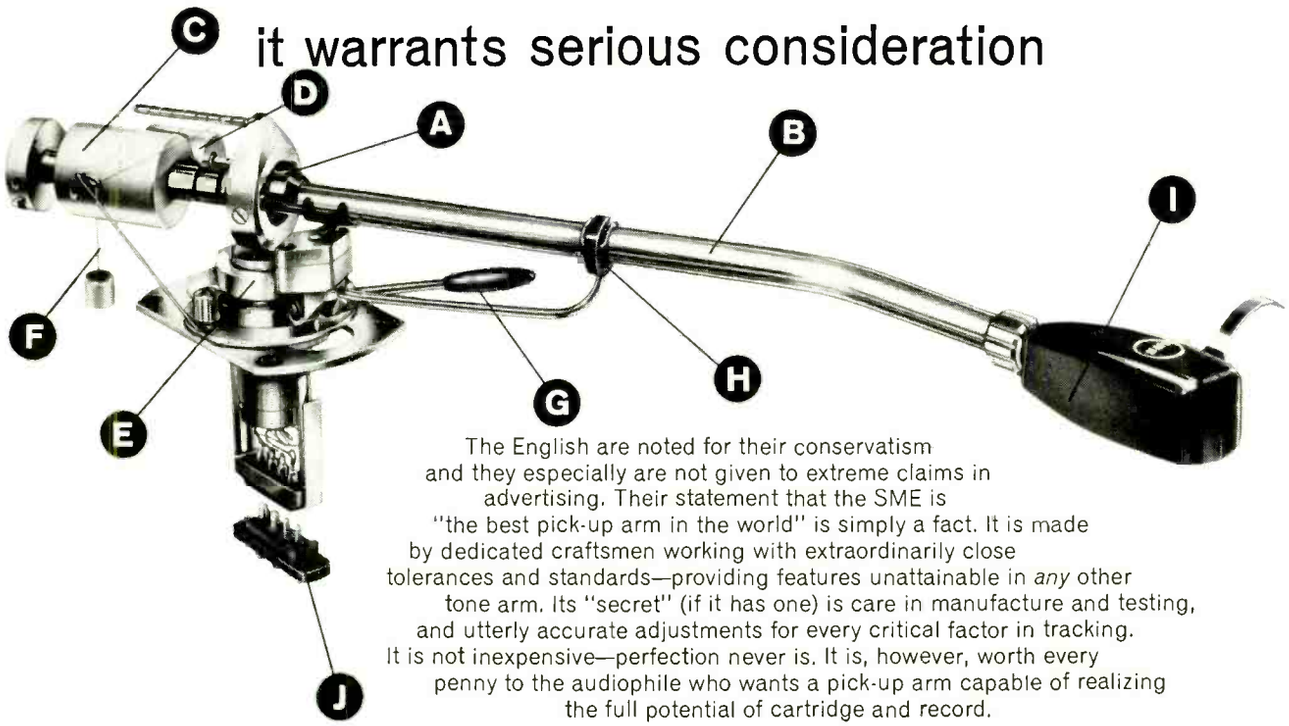
Specifications: Inputs: Mag 1, Mag 2, Lo Mag 2, Hi Mag 3, Tuner, Aux 1, Aux 2; controls: stepped level, input, dual-stepped tone, mode, balance; switches: Muting, Scratch, Rumble, Tape Monitor, Loudness, Power, Equalization, Speaker; outputs: two main, 100 ohms, 13 max. volts; recording, 1500 ohms, 0.4 volts; freq. resp. 1 to 100k cps at 2.5 volts; harmonic distortion, 0.2% at 2.5 volts from 20 to 20,000 cps; IM distortion, 0.2% at 2.5 volts; sensitivity, input for 1 volt output, phono, 0.28 mv, tuner, 0.45 volts; hum and noise, 65 db below 2.5-volt output. Weight, 18 lbs; dimensions, 15¾" wide, 5" high, 12" deep. Price, $348.00, includes cover, cables. Acoustech, Inc.

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when the British say

"the best pick-up arm in the world"

it warrants serious consideration



The English are noted for their conservatism and they especially are not given to extreme claims in advertising. Their statement that the SME is "the best pick-up arm in the world" is simply a fact. It is made by dedicated craftsmen working with extraordinarily close tolerances and standards—providing features unattainable in *any* other tone arm. Its "secret" (if it has one) is care in manufacture and testing, and utterly accurate adjustments for every critical factor in tracking. It is not inexpensive—perfection never is. It is, however, worth every penny to the audiophile who wants a pick-up arm capable of realizing the full potential of cartridge and record.

SHURE SME DESIGN FEATURES

A. Virtually frictionless knife-edge bearings. Pivot friction is less than 20 milligrams, horizontal and vertical!

B. Wood-lined stainless steel tube arm. Resonances are outside recorded range, of small amplitude, and damped.

C. Unique weight system statically balances arm longitudinally AND laterally.

D. Rider weight adjusts tracking force from ¼ to 5 grams, adjustable for ¼ or ½ gm. increments, as accurate as a fine stylus pressure gauge.

E. Sliding base offers alignment adjustment through 1 inch. Height is adjustable through ¾ inch. Fulfills optimum requirements of length, offset, overhang when adjusted with alignment protractor included.

F. "Anti-skating" bias adjuster counteracts tendency of the arm to move toward record center and "favor" inner groove.

G. Hydraulic lever-operated set-down for "slow-motion" feather-light lowering onto any part of the recording.

H. Nylon-jaw arm rest with stainless steel locking link.

I. International standard 4-pin socket. Cartridge shells fitted with detachable pillars and mounting screws at standard ½ inch spacing.

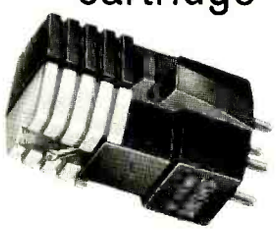
J. Output socket and plug provides a rigid junction for the "stiff wiring" and delicate pick-up lead, eliminating influence on free tone-arm movement.

PRICES:

Includes one shell, arm, template, alignment protractor, hardware

MODEL 3009 for 12″ recordings	$89.50 net
MODEL 3012 for 16″ recordings	$99.50 net
ADDITIONAL SHELL Model A30H	$5.50 each

the perfect companion cartridge



The Shure M33-5, of course. With the SME, provides absolute minimum tracking force . . . *without distortion.* Incredibly transparent sound. Peak-free high end, clean lows, astoundingly natural and clear in the middle range where most other cartridges suffer serious deficiencies. 22 x 10^{-6} cm per dyne compliance. $36.50 net.

SHURE SME series 2 pick-up arm

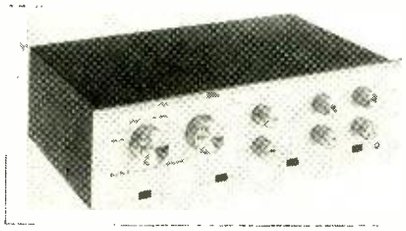
LITERATURE: SHURE BROTHERS, INC., 222 HARTREY AVE., EVANSTON, ILLINOIS

Manufactured under U.S. patents 3,055,988; 3,077,521; 3,077,522; D193,006; D193,934; other patents pending.

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DYNA

● *PAS-3/A Stereo Preamplifier.* A high-performance high-feedback stereo preamplifier having full flexibility for the hobbyist and exceptional ease of operation for the distaff side.

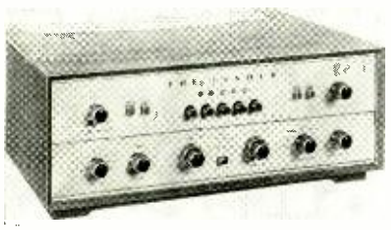


Specifications: Inputs: Special (low level), phono, tape head, tape FM-AM, monitor FM-MPX, Spare (high level); controls: selector, volume, balance, blend, bass and treble on each channel; switches: power, filter, monitor, loudness compensation; outputs; main, 5k ohms, 2 max. volts; recording 0.5 volts; freq. resp. 10 to 40k cps ±0.5 db at 2 volts; harmonic distortion, 0.05% at 2 volts from 20 to 20k cps; IM distortion, 0.05% at 2 volts; sensitivity, input for 1 volt output, phono, 1 mv, tuner, 0.1 volts; hum and noise, 74 db below 10 mv input. Weight, 12 lbs; dimensions, 13" wide, 4" high, 8" deep. Price, $109.95. Dynaco, Inc.

1. PAS-2/A stereo preamplifier $99.95
2. PAM-1/A mono preamplifier $59.95

FISHER

● *400-CX Stereo Master Audio Control.* The Fisher 400-CX is a high-quality preamplifier styled for the home. It provides wide flexibility, with 28 controls and 18 inputs. A stereo dimension control widens or narrows the apparent acoustic distance between stereo speakers. Included in the 400-CX are facilities for direct tape monitoring without changing cable connections, separate high and low input level controls, and provision for attaching remote control. A jewel light indicator system enables the listener to determine the input source.



Specifications: Inputs: Mag 1, Mag 2, Tape Hd., Tape Amp., Aux 1, Aux 2; controls: Master Volume, Center Chan. Volume, Balance, Treble (2), Bass (2), Stereo Dimension (separation); switches: Input Selector. Low-Level Equalizer, Hi Low Filters, Phase Rev, Loudness Contour, Mono-Stereo; outputs; main, 30 ohms, 2.5 max. volts; recording, 5k ohms; freq. resp. 20 to 20k cps ±0.5 db at 2.5 volts; harmonic distortion, less than 0.04% at 2.5 volts at 1 kc; IM distortion, 0.1% at 2.5 volts; sensitivity, input for 2.5-volt output, phono, 1.5 mv, tuner, 0.2 volts; hum and noise, 80 db below 2.5-volt output. Weight, 18 lbs; dimensions, 15⅛" wide, 4 13/16" high, 12" deep. Price, $199.50. Walnut and mahogany cabinets, $24.95; metal cabinet, $15.95. Fisher Radio Corp.

HARMAN-KARDON

● *Citation 1 Stereo Control Center.* Vacuum tube stereo preamplifier with extremely flat response to 80,000 cps and special feedback-loop circuitry. Results in low distortion and phase shift. Features: step-type tone controls; silicon diode power supply for B− and filament regulation; inputs and facilities for most stereo and mono applications.

Specifications: Inputs: (4) Phono, (2) Tape, (2) Tape Mon, (2) Aux, (2) Tuner, (2) Tape Head; controls: Blend, Separate Equalization, Separate Tone, Loudness, Balance; switches: Function, Phasing, Tape Monitor, third-channel, contour, hi & lo-cut filters; outputs: main, low ohms, 10 max. volts; recording, low ohms, 2 volts; freq. resp. 5 to 80,000 cps +0, −0.5 db at 1.75 volts; harmonic distortion, 0.05% at 2 volts from 20 to 20k cps; IM distortion, 0.05% at 2 volts; sensitivity, input for 1 volt output, phono, 2.5 mv, tuner 0.5 volts; hum and noise, 85 db below 2-volt output. Weight, 32 lbs; dimensions, 14⅞" wide, 6" high, 12¼" deep. Price, $249.95. Walnut enclosure, $29.95. Harman-Kardon.

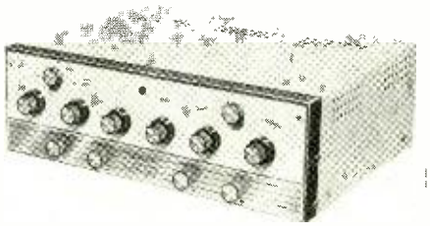
HADLEY

● *Model 621 Solid-State Preamp.* The Hadley Model 621 is a completely solid-state stereophonic preamplifier. All components are of the highest quality, including a triple shielded power transformer. Eleven-position switches are used in the tone control circuits to provide setting repeatability.

Specifications: Inputs: Mic, phono, tape-head, FM-mpx, FM-AM, TV, aux; controls: tone, bal, vol., sep. bass, sep. treble; switches: power, input sel., mode, equal.; outputs: (4) to amp, (2) to tape rec.; freq. resp. 5 to 100k cps ±0.5 db; harmonic distortion, 0.15% at 2 volts from 13 to 30,000 cps; IM distortion, 0.2% at 1.5 volts; sensitivity, input for 2 volt output, phono, 1.5 mv, tuner, 0.25 volts; hum and noise, 85 db below 2 volt output. Dimensions, 15" wide, 4½" high, 8" deep. Price, $319.50 (West). Hadley Labs.

LAFAYETTE

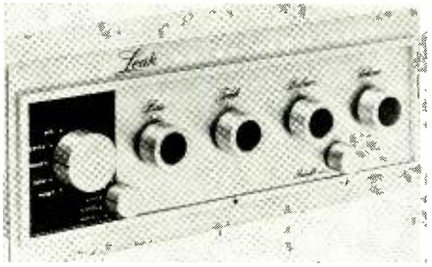
● *LA-600A Stereo Preamplifier.* The LA-600A is a "no-compromise" preamp with twelve input jacks (six pairs) for program sources of any type or level.



Specifications: Inputs: mag. phono, ceramic phono, tape head, tuner, aux; controls: rolloff, turnover, 2 pair bass and treble, bridge; switches: on-off, tape monitor, rumble filter, scratch filter, presence, loudness, function; outputs, main, 1500 ohms, 4 max. volts; recording. 2700 ohms, 2 volts; freq. resp. 5 to 40,000 cps ±1 db; harmonic distortion, 0.1% at 2 volts from 30 to 15,000 cps; IM distortion, 0.05% at 2 volts; sensitivity, input for 1-volt output, phono, 2.2 mv, tuner, 0.094 volts; hum and noise, 80 db below 2-volt output; weight, 16 lbs; dimensions, 14" wide, 4 13/16" high, 11½" deep. Price, $134.50. Lafayette Radio.

LEAK

● *"Point One" Stereo Preamp.* Decorator-designed, the front panel offers changeable color panels for both faceplate and knobs, enabling the user to match the color decor of any room. The escutcheon plate is interchangeable with the plate of older models, permitting owners the option of inexpensive conversion to the new styling. The "Point One" includes provisions for playing stereo, stereo reverse, left channel only, right channel only, and monophonically.



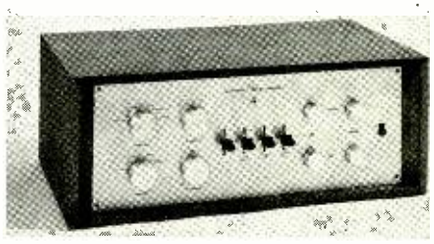
Specifications: Inputs: record, tape, mike, tuner, tape head; controls: bass, treble, balance, volume, rumble filter; switches: function (5 position), input; freq. resp. 20 to 20k cps; harmonic distortion 0.01% at 125 mv; IM distortion 0.01% at 125 mv; sensitivity, input for 125-mv output, phono 3.5 mv, tuner 35 mv; hum and noise, 60 db below 125 mv output; dimensions: 10½" wide, 3¾" high, 5" deep. Price $119.50. Ercona Corp.

1. Varislope II professional preamp ... $149.00

MARANTZ

● *Model 7 Stereo Console.* The Model 7 is a stereo control center with sufficient built-in flexibility to make it "up-to-date" for a long time to come. In addition it is built to last that long, using the professional cabling and other construction techniques common to Marantz products.

Specifications: Inputs: mike, phono 1 and 2, tape head, FM-AM, FM-mpx, tape, TV, aux; controls: mode, selector, vol., balance, treble, bass: switches: on-off, hi and low cut, boost, tape monitor, record equal.; outputs: main, cathode follower, 15 max. volts; freq. resp. 20 to 20k cps ±0.5 db at 15 volts; IM distortion, 0.15% at 10 volts; sensitivity, input for

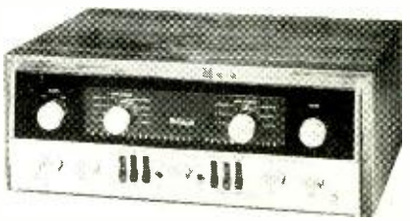


1 volt output, phono 0.5 mv, tuner, 0.075 volts; hum and noise, 80 db below 10 mv input. Weight, 15 lbs; dimensions, 15⅜" wide, 5¾" high, 7" deep. Price, $264.00, wooden cabinet, $24.00, Marantz Company.

McINTOSH

● *C22 Stereo Preamplifier.* The latest in McIntosh stereo control preamplifiers featuring the new McIntosh "PANLOC" mounting method

Specifications: Inputs: Mag Phono 1 & 2, Tuner 1 & 2, Aux, Tape Hd., Mike; controls: Vol, Mode, Input, Loudness, Bass and Treble, Tape Jack, Balance, High F & Low F Filters, Record Comp; outputs: main, 20 max. volts;



freq. resp. 20 to 20,000 cps ±0.5 db at 2.5 volts; harmonic distortion, 0.5% at 2.5 volts from 20 to 20,000 cps; IM distortion, 0.5% at 2.5 volts; sensitivity, input for 1 volt output, phono, 0.8 mv, tuner, 0.1 volts; hum and noise, 85 db below 2.5-volt output. Weight, 16 lbs; dimensions, 16" wide, 5 7/16" high, 13" deep. Price $179.00. McIntosh Labs.

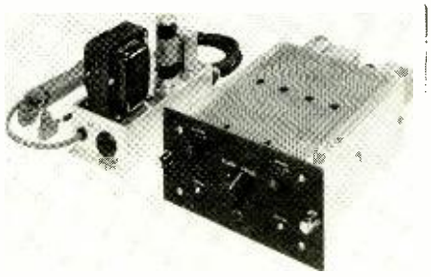
1. C11 stereo preamplifier $229.00
2. C20 stereo preamplifier $269.00

SHURE

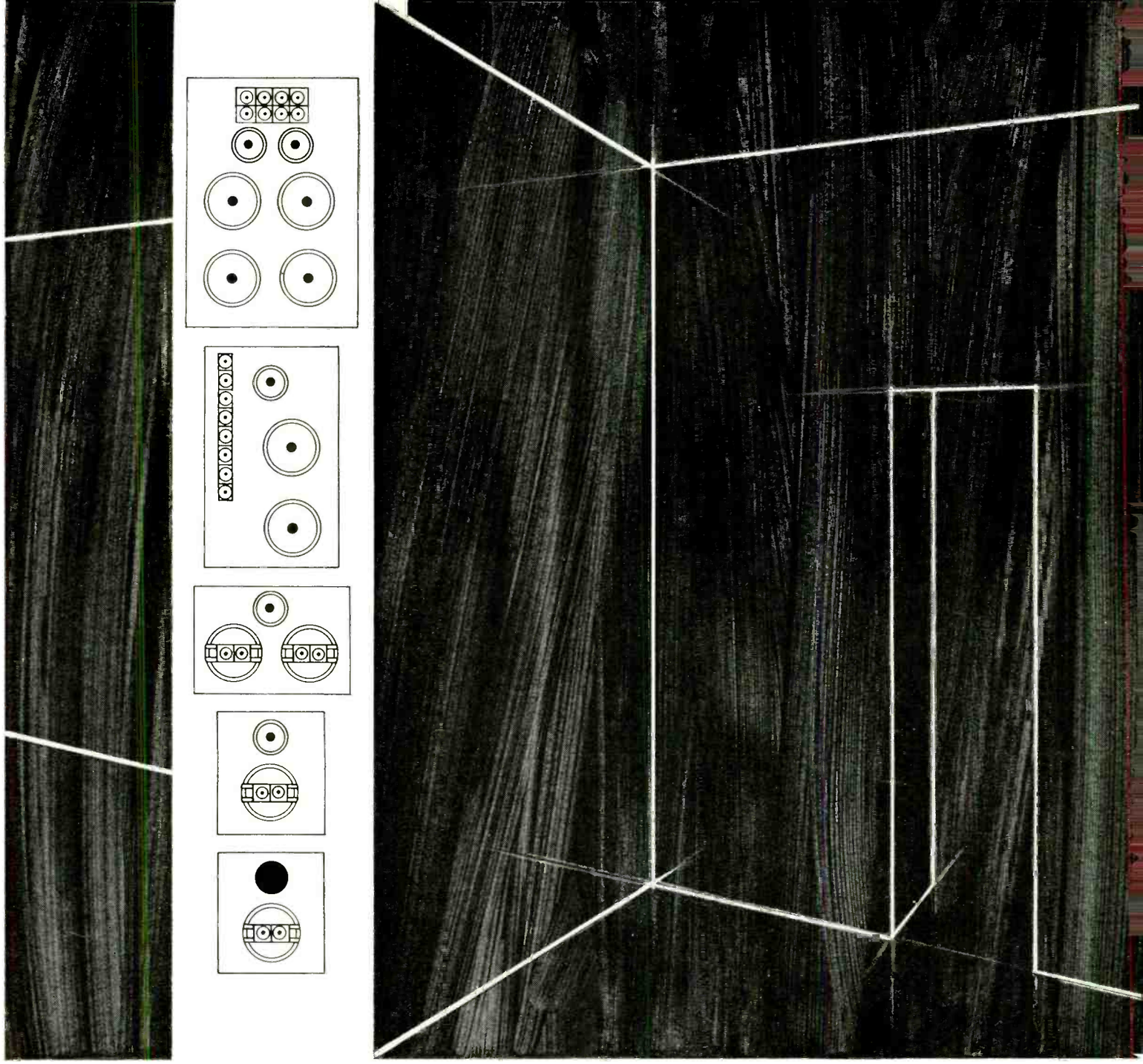
● *SE-1 Stereo Transcription Preamplifier.* Designed. especially for stereo broadcasting, recording studio, mastering room playback, and related applications where the highest quality of disc reproduction is required. The Model SE-1 provides precise RIAA equalization from magnetic phono reproducers at line levels. It features separate high- and low-frequency response trimmers on each channel and includes a flat position for calibration checks and special applications. Its performance meets the most critical standards with exceptionally low distortion, noise level, and susceptibility to stray r.f. fields.

Specifications: Inputs: 47,000-ohm phono input; controls: separate High and Low trimmers on each channel; switches: Hi-Pass, Low-Pass, Flat RIAA, on-off; outputs: main, 600 or 150 ohms; freq. resp. 30 to 15,000 cps ± 1 db at +15 dbm; harmonic distortion, 1% at +15 dbm from 50 to 10,000 cps; hum and noise, 64 db below 4 dbm output. Preamplifier requires an opening 7-in. long by 3⅜-in. wide by 11-in. deep. Power supply requires 6-in. wide by 11-in. long by 6-in. high. The on-off switch has a 3½-foot cable and can be located through a ½-in. mounting hole. Shure Bros.

(*Continued on page 34*)



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built-in bozaks solve problems

DECORATIVE / with Bozaks in the wall and the electronics in a cupboard, your whole floor is free and an established décor remains as you planned it.
MUSICAL / the overriding concern of the music lover: no other speakers, no other mounting, provide such deeply satisfying sound for the critical listener.
STRUCTURAL / no other speakers are so easy to install, for professional and home craftsman alike.
GROWTH / only with Bozak's Systematic Growth can you so easily expand a speaker system step by step, with such superb sound at every stage.

For simplicity, for the ability to enlarge your music system . . . above all, For The Grandeur of Great Music . . .
build-in Bozaks!

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HERMAN BURSTEIN*

(Note: To facilitate a prompt reply, please enclose a stamped, self-addressed envelope with your question.)

¼-Track vs. ½-Track

Q. I am trying to make up my mind as to which one of several tape machines to purchase. Would you recommend a machine with half-track heads over one with quarter-track heads?

A. Not necessarily, at least not for home use. Even for the critical user, machines with quarter-track heads can provide very high quality. The principle problem encountered in the use of quarter-track heads is that of a slightly reduced signal-to-noise ratio. Still, some quarter-track machines attain a ratio of 55 db, which is really excellent. Of course this isn't true of all quarter-track tape recorders; only of the best ones. Quarter-track heads have the advantage that azimuth alignment is less critical than for half-track heads. And of course they permit you to make a stereo recording in two directions of tape travel rather than one.

Converting to Low-Impedance Heads

*Q. I would like some advice on converting from high- to low-impedance record heads. I have a * * * deck and * * * preamp and desire to upgrade to 3-head operation providing monitoring through an additional preamp and incorporating a wide-gap record head. However, it seems that only low-impedance record-only heads are available. Can you provide a drive circuit for a low-impedance record head or suggest a source where such data can be found?*

A. So far as suppling audio current to the record head is concerned, the only difference in the drive circuit would be the omission or reduction of the constant-current resistor. When the record head is high impedance, the constant-current resistor between the driving tube and the head typically has a value between about 22k and 47k. When the head is low impedance, the resistor is either omitted altogether (the plate resistance of the driving tube is sufficient) or reduced to a value such as 5k. I would rather not attempt to provide a drive circuit inasmuch as record equalization is usually tied in with this stage. Accordingly, the circuit would vary with the equalization that is used.

I think that your chief problem in changing to a low-impedance record head is that of supplying the necessary amount of bias current. With this head you will need substantially more bias current, perhaps requiring a change in the oscillator design. Your best source of information in this respect is the manufacturer of the head you intend to use. I am sure he can supply you with data on drive circuitry and bias current supply.

More Buying Guidelines

*Q. I am planning to purchase a tape recorder in the very near future. My problem is whether the recorder I have chosen is a good choice. This is the * * * tape machine. Its specifications are: frequency response 50–14,000 cps; signal-to-noise ratio 45 db; harmonic distortion less than 0.1 per cent; wow and flutter less than 0.2 per cent; speed accurate within 1 per cent; operates at 3 speeds, provides mono recording and stereo playback, has quarter-track heads, and has self-contained speakers.*

*At present I have a phonograph, amplifier, and tuner of medium quality. I have always wanted a tape recorder but the prices were too high until I discovered the * * * machine. It has all the features I want and then some. I am now very confused as to what I should do.*

A. I cannot venture an opinion as to the merits and demerits of specific brands of equipment, especially since I do not have full and continuing access to every tape recorder on the market. However, I can comment on the specifications that you have listed. All look good, except that a signal-to-noise ratio of 45 db is somewhat on the low side. A top-quality machine achieves a ratio of about 55 db. A ratio around 50 db is still good. But a ratio of 45 db is only fair.

You state that harmonic distortion is rated as a mere 0.1 per cent. I find this very hard to believe. The finest home machines produce about 3 per cent harmonic distortion at maximum permissible recording level, and they still produce in the region of 1 per cent distortion at "normal" recording levels. Accordingly, if the machine you are considering does indeed claim 0.1 per cent distortion, the other claims made by this machine are thrown into question.

Recorder Specifications

*Q. In connection with the * * * tape recorder that I plan to buy, I would appreciate your answers to the following questions:*

1. The specifications state that the machine has three motors. Are all three of the hysteresis type?

2. Is the sound-on-sound button really what the name indicates, or is it a tricky imitation?

3. Where is the tape monitored, that is, at the head, at the input amplifier, or wherever?

A. I am unfamiliar with the machine you mention, which is made abroad. However, the following general information may be helpful to you.

Hysteresis-synchronous motors, which run at constant speed, are generally used only to drive the capstan. When additional motors are employed to drive the reels, they are usually induction motors, which operate at variable speed, depending on applied voltage.

For accurate sound-on-sound recording it is necessary that one can do the following simultaneously: (1) Monitor previously recorded material as it is played back; (2) record new material; (3) combine the old and new material on the same track. In the case of a mono tape recorder, this requires: (1) Separate record and playback tape amplifiers, permitting simultaneous record and playback; (2) that the playback head (usually an extra one) be positioned before the erase and record heads, so that one can listen to the first material before it is erased and a new recording (consisting of the original plus new material) is placed on the tape; (3) an external mixer that combines the original and new material. In the case of a stereo machine, it is not necessary to have separate record and playback heads. Since there are two channels, it becomes *possible* to use the upper gap for recording and the lower gap for playback (or vice versa). Whether the manufacturer has taken advantage of this possibility is another question. Assuming the same stereo head is used for record and playback, the following must take place to permit true sound-on-sound: (1) As the first record material is played back on channel 1, this signal is fed into channel 2, where it is recorded; (2) at the same time, new material can also be recorded on channel 2. As you can visualize, such a machine must have the flexibility of being able to play on one channel while recording on the other; and of being able to mix two signals when recording.

Possibly the sound-on-sound button in the tape recorder you mention does this. I don't know. I do know, however, that some tape machines only provide what you call a "tricky imitation" of sound-on-sound. When you push the button, all that happens is that the erase head is deactivated, permitting you to record the tape without erasing the prior recording. However, this does not permit you to listen simultaneously to the first recording so that you can synchronize the original material with the new material.

When a tape machine has separate record and playback heads, monitoring should take place at the final output in playback; you record and play simultaneously. Such a machine usually has an A-B switch so that you can compare the playback signal with the input signal. When a tape machine employs the same head for record and playback, monitoring takes place during the recording process, usually at a point prior to the record equalization circuit. This kind of monitoring tells you only that a signal is getting into the record amplifier. But you don't know what happens beyond that point until you listen to the tape playback at a later point of time. Æ

* *280 Twin Lane E., Wantagh, N. Y.*

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Headset by KOSS / tuner and preamp from DYNACO

CAPTURED BY CONCORD: SOUNDS FOR CONNOISSEURS

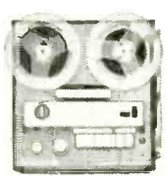
The magnificent Concord 880 (as do all professional tape recorders) has three separate heads—one record, one playback and one erase. To make professional quality stereo tape recordings from F.M. multiplex, stereo records, or live performances, your tape recorder must have three heads!

Operational conveniences include all push button controls, three speeds, two VU meters, and two professional full range dynamic microphones. The Concord 880 records 4-track mono or stereo, sound on sound, and sound with sound. *Priced less than $400!*

Other outstanding features • Trans-A-Track for sing-a-long or music and language instruction • Exclusive computerized channel indicator • 10 watt dual amplifiers • Separated full range 7" speakers for perfect stereo • Dual cathode follower outputs • Flutter-free salient pole drive motor • Built-in monitoring and P.A. facilities.

CONCORD 880

OTHER CONCORD MODELS



CONCORD 550—transistorized 4-track stereo record and playback: push button operation, three speeds, Trans-A-Track, sound-on-sound, dual amplifiers, two VU meters, separated 6" speakers for full stereo effect. *Priced less than $320!*

CONCORD 550D—tape deck version of transistorized Stereo 550. *Priced less than $230!*



CONCORD 220—Hi fidelity mono recorder, all push button, three speeds, varisync flutter-free drive motor, dynamic microphone, cue and edit button, magic eye record level indicator, plus Audio-Synctrol accessory for home movie sound. *Priced less than $150 plus Audio-Synctrol attachment.*

Prices slightly higher in Canada.

CONCORD® ELECTRONICS CORPORATION 809 North Cahuenga Boulevard, Dept. L., Los Angeles 38, Calif. / In Canada: Regal Industries Ltd., Montreal
Champagne Enterprises Ltd., Toronto

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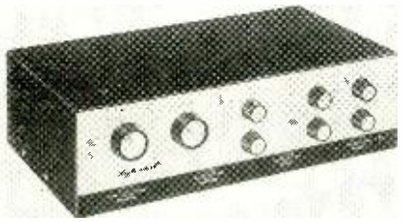
PRODUCT PREVIEW SECTION

(*from page 30*)

PREAMPLIFIER KITS

DYNAKIT

● *PAS-2 Stereo Preamplifier kit.* Low-cost, high-performance, highly-flexible feedback-design control center. Noteworthy for ease of construction through simplified circuitry and the use of preassembled etched circuit boards. Average construction time six hours.

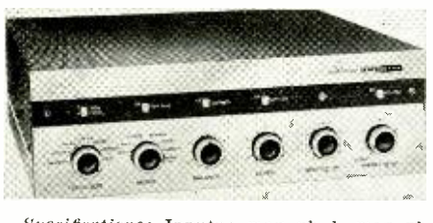


Specifications: Inputs; phono, tape head, FM-AM, special (low level), FM-MPX, Spare (high level); controls; selector, volume, balance, blend, individual left and right bass and treble; switches: power, filter, monitor, loudness compensation; outputs: main, 5000 ohms, 2 max. volts; recording, 0.5 volts; freq. resp. 10 to 40k cps ± 0.5 db at 2 volts; harmonic distortion, 0.05% at 2 volts from 20 to 20k cps; IM distortion, 0.05% at 2 volts; sensitivity, input for 1 volt output, phono, 1 mv, tuner, 0.1 volts; hum and noise, 74 db below 10-mv input. Weight, 11 lbs; dimensions, 13" wide, 4" high, 8" deep. Price, $59.95. PK-30 deluxe panel mount kit, $13.95. Dynaco, Inc.

1. PAS-3 stereo preamplifier kit $69.95
2. PAM-1 mono preamplifier kit $34.95

EICO

● *ST 84 Stereo Preamplifier Kit.* For all functions of the ST 84 all types of distortion are down to 0.05% at all levels. This is true not only at average input levels and when tone controls are set close to flat, but also at peak input levels and when tone controls are set at extreme positions.



Specifications: Inputs: mag ph l, mag ph r, tape hd, mic, tuner, (3) aux; controls: level, balance, bass chan 1, bass chan 2, treble chan 1, treble chan 2; switches; input, mode, tape mon. loudness, scratch filter, rumble filter; tape speed equal'n; outputs; main 8k ohms, 4 max. volts; recording, 1400 ohms, 4 volts; freq. resp. 5 to 25k cps ± 0.3 db at 2 volts; harmonic distortion, 0.05% at 2 volts from 20 to 20k cps; IM distortion 0.04% at 2 volts; sensitivity, input for 1 volt output, phono 1.6 mv, tuner, 0.17 volts; hum and noise 70 db below 1 volt output. Weight 8½ lbs; dimensions, 15⅞" wide, 5½" high, 8¾" deep. Price $59.95. EICO.

1. HF 85 stereo preamp $39.95

HARMAN-KARDON

● *Citation A Solid State Stereo Control Center.* The Citation A features response to 1 mc with unmeasurable distortion and excellent phase linearity; 7 stages of gain mounted on separate, slide-out glass epoxy modules stabilized against extreme temperature variations; excellent square wave response with a rise time of less than one microsecond; Zener diode power supply. Kit is supplied with modules completely wired and tested at the factory. Separate bass and treble controls for each channel are electrically out of the circuit in the "flat" position.



Specifications: Inputs; Tape Hd, Tape Amp, (3) Phono, Aux, Tuner; controls: Blend, Balance, Separate Bass and Treble, Center Channel; switches: on/off, Function, Mode, Contour, Reverse, Hi & Lo Filters, Tape Turnover, Record Turnover & Rolloff; outputs: main, low ohms, 6 max. volts; recording, low ohms, 2 volts; stereo headphones, 3 a.c. receptables; freq. resp. 1 cps to 1 mc ± 0, − 0.25 db at 2 volts; harmonic distortion, unmeasurable at 2 volts from 20 to 20,000 cps; IM distortion, 0.05% at 2 volts; sensitivity, input for 1 volt output, phono, 1.5 mv, tuner, 0.25 volts; hum and noise, 85 db below 2-volt output. Dimensions, 14⅞" wide, 5⅝" high, 7" deep. Price, $269.95. (Assembled, $350.00.) Walnut enclosure $20.00. Harman-Kardon, Inc.

1. Citation I stereo preamp kit $159.95
2. Citation IV stereo preamp kit $119.95

HEATHKIT

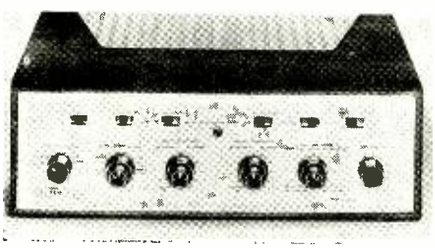
● *Stereo Preamplifier Model AA-11.* Nine push-buttons select basic functions on the front panel while secondary controls are out of sight behind fold-down panel.

Specifications: Inputs: Phono, Tapehead, Mic., mpx, Aux, AM; controls: Volume, Bass, Treble, Blend, Balance. Input level; switches: Scratch filter, rumble filter, stereo-mono, channel reverse, phase reverse, selector; Outputs: main, 4k ohms, 2.5 max. volts; recording 780 ohms, 0.5 volts; freq. resp. 10 to 30k cps ± 2 db at 2 volts; harmonic distortion, 0.05% at 2.5 volts from 20 to 20k cps; IM distortion, 0.09% at 2.5 volts; sensitivity, input for 2.5-volt output, phono, 2.5 mv, tuner 0.1 volts; hum and noise, 65 db below 2.5-volt output. Weight, 19 lbs; dimensions, 15⅝" wide, 5 5/16"high, 11⅞" deep. Price, $84.95. Heath Co.

1. AA-141A stereo preamplifier $34.95

H. H. SCOTT

● *LC-21 Stereo Control Center Kit.* Extremely low distortion and hum, even with magnetic inputs due to the all-aluminum chassis, shielded power supply, and d.c.-heated tubes. The LC-21 can be used for laboratory applications where frequency response below 10 cps is desired. Among the 16 front panel controls are complete tape monitor switching facilities, front panel derived-center-channel level control, and phase reverse switch.



Specifications: Inputs: Mag Hi, Mag Lo, Tape, Extra, Tuner, Mike; controls: Bass, Treble; Balance, Volume, Center, Ch., Level; switches: Input Selector, Stereo Selector, Rumble, Scratch, Monitor, Loudness, phase; outputs: main, 100k ohms, 10 max. volts; recording, 0.5 volts; freq. resp. 10 to 55k cps ± 1.0 db at 2.5 volts; harmonic distortion, 0.1% at 2.5 volts from 20 to 20k cps; IM distortion, 0.1% at 2.5 volts; sensitivity, input for rated output, phono, 0.3 mv, tuner, 0.5 volts; hum and noise, 85 db below 1 volt output. Weight, 13 lbs; dimensions, 15½" wide, 5¼" high, 13¼" deep. Price $99.95. Cases in various woods and metal from $13.95. H. H. Scott, Inc.

INTEGRATED AMPLIFIERS

ALTEC

● *360A Amplifier.* All solid-state circuitry, matrixing network for center-channel voltage output. Automatic reset circuit breakers for overcurrent protection of each channel and a.c. line. Dual microphone inputs for stereo recording. Diffused panel illumination plus daylight power indicator. Both headset and speaker monitoring for tape recording. Front panel dual-range gain switch. Variable-crossover-type bass tone control.



Specifications: Freq. resp. 20 to 20,000 cps ± 1 db; IHF music power output, 35 watts per channel; harmonic distortion, 1.5% at 25 watts from 20 to 10,000 cps; hum and noise, 84 db below 25 watts output; sensitivity, input for 25-watt output—phono, 4 mv, tuner, 400 mv; damping factor 10; output impedances, 4, 8, 16 ohms; input—phono, tape head, tape amp, mic; weight, 24 lbs. Dimensions, 15" wide, 5½" high, 11⅜" deep. Price $366.00 Altec-Lansing.

BELL

● *Model 2440 44-watt Stereo Amplifier.* This compact unit offers all the features anyone needs for the home reproduction of music from a wide variety of sources.

Specifications: Freq. resp. 20 to 20,000 cps ± 1 db at 1 watt output; power bandwidth, 35 to 20,000 cps; IHF music power output, 22 watts per channel; power output, rms, 20 watts per channel; harmonic distortion, 1% at 20 watts from 50 to 15,000 cps; IM distortion, 1% at 20 watts; hum and noise, 63 db below 1 watt output; sensitivity, input for rated output—phono, 3 mv, tuner, 0.1 volts; damping factor 4; output impedances, 4, 8, 16 ohms and high-Z for recorder; inputs—4 phono, 2 tape head, 2 tape amp, 2 aux, 2 ceramic phono; weight, 28 lbs. Dimensions: 17 3/16" wide, 5 7/16" high, 10⅝" deep. Bell Sound Division.

BOGEN

● *AP30 Stereo Amplifier.* A modestly priced unit whose performance and flexibility rivals amplifiers priced much higher. 30 watts of power (15 per channel). Switched stereo headphone outlet is one of many "plus" features. Simplicity of design and functional control panel make the AP30 a delight to use.

Specifications: Freq. resp. 20 to 20,000 cps ± 1 db at 30 watts output; power bandwidth, 50 to 15,000 cps; IHF music power output, 15 watts per channel; power output, rms, 12 watts per channel; harmonic distortion, 0.6% at rated output; IM distortion, 0.3% at 2.5 watts; hum and noise, 70 db below 1 watt output; sensitivity, input for rated output—phono, 4.5 mv, tuner, 0.5 volts; output impedances, 8, 16 ohms; inputs—phono, tape head, tape amp, aux, tuner; weight, 16 lbs. Dimensions, 15" wide, 4¾" high, 11⅝" deep. Price, $99.95, metal enclosure, $11.95, walnut cabinet $26.95. Bogen.

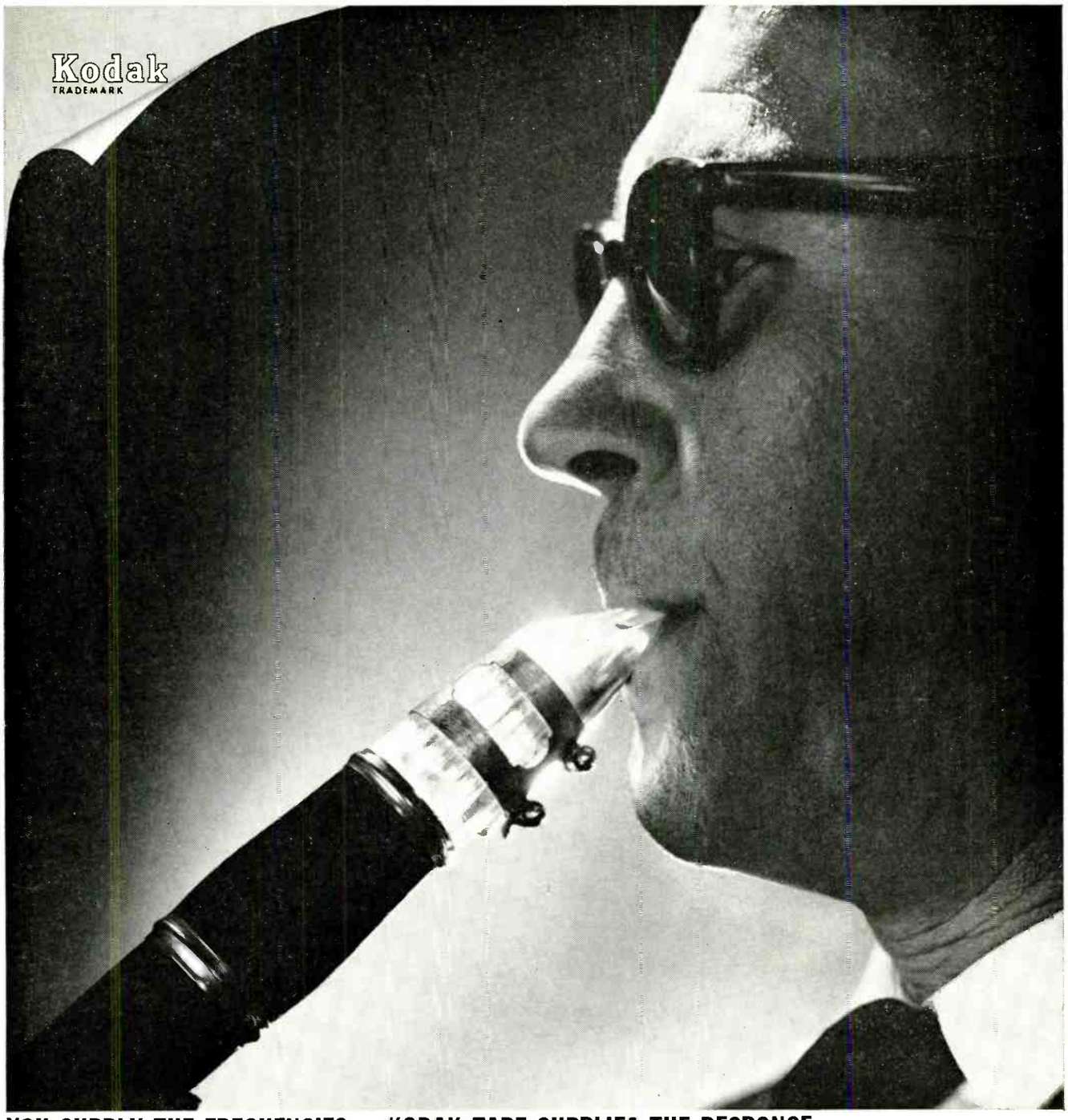
1. AP250, 50-watt stereo amp $154.95

DYNA

● *SC-35/A Stereo Control Amplifier.* High-performance low-power amplifier with integral easy-to-use control facilities. Excellent power response, stability with any load, and overload characteristics, which are all the result of its special circuit and output transformers. Provision for third-speaker output or connection for headphones on rear panel. Dyna bandpass filter for balanced response even with noisy discs or rumble-prone players.

Specifications: Freq. resp. 20 to 20k cps ± 0.25 db at 1 watt output; power bandwidth, 15 to 35k cps; IHF music power output, 23

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YOU SUPPLY THE FREQUENCIES... KODAK TAPE SUPPLIES THE RESPONSE

The timbre of a clarinet, or even a base viol, depends on high-frequency overtones for distinctive character. All these overtones are captured accurately on KODAK Sound Recording Tape. The reason? The oxide layer of KODAK Sound Recording Tape is formulated and applied with the same degree of precision as a Kodak film emulsion. That's just one reason why each and every roll of Kodak tape reproduces exactly what it hears.

And there's a convenience bonus! The 7-inch KODAK Thread-Easy Reel loads fast—you simply pull the tape through a slot. There's also a handy indexing scale and a tape splicer jig on each reel.

Enjoy the faithful response of KODAK Sound Recording Tape this week. It's sold by your Kodak dealer.



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watts per channel; power output, rms, 17.5 watts per channel; harmonic distortion, 1% at 35 watts ± 1 db from 20 to 20k cps; IM distortion, 1% at 35 watts; hum and noise, 80 db below 17-watt output; sensitivity, input for rated output—phono, 4 mv, tuner, 1 volt; damping factor 10; output impedances, 8, 16 ohms; inputs—6 phono, 2 tape head, 2 tape amp, 2 aux, 2 radio; weight, 20 lbs. Dimensions, 13" wide, 4" high, 10" deep. Price $139.95. Dynaco, Inc.

FISHER

● *X-202-B 80Watt Master Control Amplifier.* The Fisher X-202-B is a high-quality master control amplifier, providing versatile input and control facilities, as well as an 80-watt dual-channel power amplifier. Eighteen inputs and ten outputs accommodate every type of program source and recording instrument. Twenty controls make possible virtually complete control of sound by the listener. A power-derived center-channel output is furnished, providing three-speaker stereo without the need for an additional power amplifier. A front panel jack is provided for private listening with earphones, while the speakers are disabled.



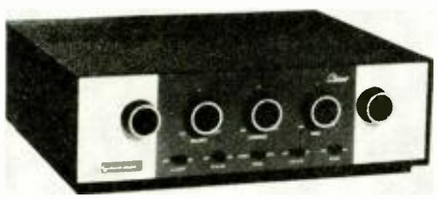
Specifications: Freq. resp. 20 to 20k cps ± 1 db at 2 watts output; power bandwidth, 25 to 25k cps; IHF music power output, 40 watts per channel; power output, rms, 35 watts per channel; harmonic distortion, 0.5% at 80 watts at 1 kc; IM distortion, 0.8% at 35 watts; hum and noise, 90 db below 80-watt output; sensitivity, input for rated output phono, 3.5 mv, tuner, 0.28 volts; damping factor 10; output impedances, 4, 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape amp, 2 aux, 2 tape monitor; weight, 30 lbs. Dimensions, 15¼" wide, 4 13/16" high, 12½" deep. Price $249.50. Cabinets (walnut & mahogany) $24.50, metal cabinet $15.95. Fisher Radio Corp.

1. X-100-B, 50-watt master control amp $169.50
2. X-101-C, 60-watt master control amp $199.50
3. X-1000, 110-watt master control amp $339.50

GROMMES

● *Model E-36 36-Watt Stereo Amplifier.* A high-quality low-cost amplifier complete with 5 stereo inputs, matched controls, high and low filters, contour switch and low-heat silicon power supply.

Specifications: Freq. resp. 20 to 20,000 cps ± 0.5 db at 1 watt output; power bandwidth, 30 to 20,000 cps; IHF music power output,



18 watts per channel; power output, rms, 15 watts per channel; harmonic distortion, 1% at 15 watts from 40 to 15,000 cps; IM distortion, 2% at 15 watts; hum and noise, 75 db below 15-watt output; sensitivity input for rated output—phono, 5 mv, tuner, 0.15 volts; damping factor 8; output impedances, 4, 8, 16 ohms; input—1 phono, 1 tape head, 1 tuner, 1 aux, 1 xtal. Dimensions, 13¾" wide, 4¾" high, 11" deep. Price $119.95. Grommes.

1. 70PG 70-watt amp. $199.95
2. E24 24-watt amp. ..... $ 79.95

HARMAN-KARDON

● *Model A-1000T Solid-State 70-Watt Integrated Stereo Amplifier.* Solid-state circuitry throughout eliminates tubes and audio transformers. Features: response well beyond the range of hearing; 70 watts of power, low distortion, assured by the use of industrial grade, fast-switching silicon semiconductors and carefully regulated power supply; virtually no hum or microphonics; military-type, hinged glass epoxy boards for ruggedness and easy accessibility.



Specifications: Freq. resp. 10 to 100,000 cps ± ½ db at 1 watt output; power bandwidth, 10 to 60k cps; IHF music power output, 40 watts (8 ohms) per channel; power output, rms, 35 watts per channel; harmonic distortion, 0.5% at 35 watts from 12 to 30k cps; IM distortion, 0.5% at 35 watts; hum and noise, 85 db below 35-watt output; sensitivity, input for rated output—phono, 2.5 mv, tuner, 200 mv; damping factor 50; output impedances, 4, 8, 16 ohms; input—4 phono, 2 tape head, 2 tape amp, 2 aux, 2 Tape Monitor; weight, 25 lbs. Dimensions, 14 1/16" wide, 3⅝" high, 10" deep. Price, $369.95. CW10 enclosure, $19.95. Harman-Kardon.

1. Award A700 integrated 70-watt stereo amp. $179.95
2. Award A300 integrated 30-watt stereo amp. ..... $ 99.95

KNIGHT

● *KN-999 100-Watt Stereo Amplifier.* 100-watt IHF rating (35-watt per channel sine wave power). All-transistor design; 19 transistors, 8 diodes. Tape monitor, scratch and rumble filter, phase, mode and stereo reverse switches; bass, treble, balance and volume controls; push button input selectors, tape phono, tuner, aux.



Specifications: Freq. resp. 20 to 25,000 cps ± 0.5 db; harmonic distortion, 1% hum and noise, 80 db below rated output. Dimensions, 13⅜" wide, 4½" high, 12¾" deep. Price $199.95. Walnut case $14.95, metal case $4.95. Allied Radio.

1. Knight KN-950 50-watt trans. stereo amp $119.95
2. KN-940, 44-watt stereo amp ..... $ 79.95
3. KN-924, 28-w stereo amp ..... $ 49.95

LAFAYETTE

● *Model LA-250A 50-Watt Integrated Stereo Amp.* A full range of controls including separation and volume balance; enabling the user to control the relationship between channels. Third channel output plus d.c. on the filaments of preamp and tone-control tubes.

Specifications: Freq. resp. 20 to 50,000 cps ± 1 db at 20 watts output; power bandwidth, 20 to 50,000 cps; IHF music power output, 25 watts per channel; power output, rms, 20 watts per channel; harmonic distortion, 0.25% at 1 watt from 20 to 20,000 cps; IM distortion, 0.5% at 1 watt; hum and noise, 77 db below 20-watt output; sensitivity, input for rated output—phono 3.5 mv, tuner, 0.5 volts; output impedances, 4, 8, 16 ohms; inputs—2



phono, 2 tape head, 2 aux, 2 tuner, weight, 28 lbs. Dimensions, 14½" wide, 5½" high, 12¾" deep. Price, $99.50. Lafayette Radio.

1. LA-240WX 40-watt integrated stereo amp ..... $ 79.95
2. LA-224WX 24-watt integrated stereo amp ..... $ 49.95
3. LA-200WX 44-watt transistor stereo amp $109.50

PILOT

● *Model 248B.* A high-quality integrated stereo amplifier with all modern features.

Specifications: Freq. resp. 5 to 50k cps ± 1 db at 1 watt output; power bandwidth, 16 to 27k cps; IHF music power output, 37 watts per channel; power output, rms, 30 watts per channel; harmonic distortion, 0.5% at 30 watts from 25 to 15k cps; IM distortion, 0.2% at 30 watts; hum and noise, 80 db below 30 watt output; sensitivity, input for rated output—phono, 3 mv, tuner, 0.12 volts; output impedances, 4, 8, 16 ohms; inputs—2 pr. phono, 1 pr. tape head, 1 pr. tape amp, 1 pr. aux, 1 pr. mic. Dimensions, 15¼" wide, 6¼" high, 12¾" deep. Price, $269.50. Oiled walnut enclosure, $22.50. Pilot Radio.

1. Model 230, 24-watt integrated stereo amp ..... $89.50 with cover
2. Model 240, 30-watt integrated stereo amp ..... $34.50 " "
3. Model 246, 60-watt integrated stereo amp ..... $99.50 " "

PIONEER

● *SM-500 Integrated Stereophonic Amplifier.* The Pioneer Model SM-500 is a stereophonic control amplifier with a maximum output of 36 watts per channel, which may be combined for a monophonic output of 72 watts. De-



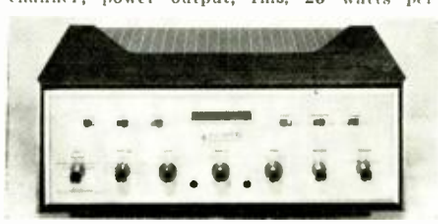
signed for maximum versatility, it is capable of accommodating all forms of inputs, including phono, tape head, tuner, and so on.

Specifications: Freq. resp. 5 to 100,000 cps ± 1 db at 0.5 watts output; IHF music power output, 36 watts per channel; power input, rms, 25 watts per channel; harmonic distortion, 1% at 25 watts from 40 to 12,000 cps; IM distortion, 1% at 25 watts; hum and noise, 80 db below 25-watt output; sensitivity, input for rated output—phono, 3 mv, tuner, 0.15 volts; damping factor 13; output impendances, 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape amp, 2 aux, 2 tuner, 2 mike; weight, 28 lbs. Dimensions, 15 11/32" wide, 5 29/32" high, 17 9/16" deep. Pioneer.

H. H. SCOTT

● *Model 4270, 60-Watt Transistorized Amplifier.* The 4270 is an all-transistor amplifier with the reliability, features, and freedom from trouble associated with the Scott name. The 4270 offers longer component life, cooler operation, lower power consumption, and faster warmup time.

Specifications: Freq. resp. 20 to 15k cps at 25 watts output; power bandwidth, 19 to 20k cps; IHF music power output, 30 watts per channel; power output, rms, 25 watts per



channel; harmonic distortion, 0.8% at 25 watts from 20 to 15k cps; IM distortion, 0.8% at 25 watts; hum and noise 70 db below 35-watt output; sensitivity, input for rated output—phono, 3 mv, tuner, 0.5 volts; damping factor 4; output impedances 4, 8, 16 ohms; inputs—2 phono, 1 tape head, 1 tape amp., 1 aux, monitor; weight, 35 lbs. Dimensions, 17½" wide, 6¼" high, 16¾" deep. Price, $295.00. Cases in various woods and metals from $17.95 to $29.95. H. H. Scott, Inc.

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MORE CLEAN, UNDISTORTED POWER, BANDWIDTH AND FEATURES THAN FAR COSTLIER INTEGRATED VACUUM TUBE STEREOPHONIC AMPLIFIERS

THE NEW AWARD A700



Let's consider the qualities that really make the difference in performance. Not "gingerbread."

The new Award A700 puts out a big, clean 70 watts of audio power. That's more than enough to drive any speaker—regardless of efficiency. No matter what speaker you use, chances are the A700 will be coasting most of the time.

Now consider the frequency response of the A700—12 – 70,000 cps ± 1 db! No other integrated vacuum tube amplifier—regardless of price—can approach it! What makes the difference? The A700's solid state power supply, plus its specially designed grain-oriented steel output transformers!

The A700's bandwidth superiority can be demonstrated visually with test instruments. More important, it can be heard in your living room! It is this extended bandwidth—octaves above and below the normal range of hearing—that assures flawless reproduction within the audible range... and at all power levels!

Run through the gamut of conventional controls on any fine integrated stereo amplifier—individual bass and treble tone controls, tape monitor switch, separate high and low cut filters, balance control, contour control, blend control—you name it, the A700 has them all and more!

But where the A700 really moves "out front" is where it counts—performance! For final proof, ask your dealer to demonstrate the A700 against other costlier amplifiers. Even against some of the so-called "world's-best." For anyone with highly critical standards—and a modest budget—the A700 is the only logical choice. Write Harman-Kardon, Dept. A-8, Plainview, N. Y., for more information on this superb integrated stereo amplifier.

The A700—$179.95. Prices slightly higher in the West.

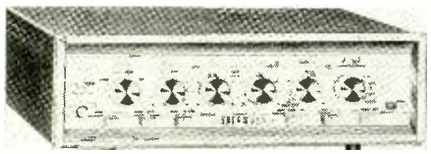
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SHERWOOD

● *S-5500III 80-Watt Amplifier and Preamplifier.* The S-5500III features all the important controls and facilities and was designed to offer full power requirements for most home music systems at economical cost. Controls include friction-locked bass and treble controls, scratch and rumble filters, stereo normal/reverse switch, phase-invert switch and tape-monitor switch. A total of 6 high-level and 4 low-level inputs are provided for maximum flexibility.



Specifications: Freq. resp. 20 to 20k cps ± ½ db at 36 watts output; IHF music power output, 40 watts per channel; power output, rms, 36 watts per channel; harmonic distortion, 0.5% at 36 watts from 26 to 20k cps; IM distortion, 1.5% at 36 watts; hum and noise, 75 db below 1 watt output; sensitivity, input for rated output—phono, 1.2 mv, tuner, 0.25 volts; damping factor 5; output impedances, 4, 8, 16 ohms; input—2 phono, 2 tape head, 2 tape amp, 2 aux, 2 tuner; weight, 27 lbs. Dimensions, 14″ wide, 4″ high, 13½″ deep. Price, $174.50. Accessories: case, $7.50. Sherwood Electronic Labs.

1. S-5000II, 80-watt amp-preamp $199.50

INTEGRATED AMPLIFIER KITS

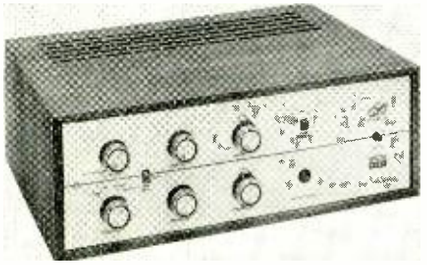
DYNAKIT

● *SCA-35 Stereo Control Amplifier.* Combined stereo preamplifier and power amplifier with the emphasis on performance and ease of operation. Designed to eliminate several tube stages with consequent reduction in noise and distortion and increased stability. Output transformers are of a quality level usually reserved only for much more costly equipment. Preassembled etched circuit boards make construction simple even for the novice. Provision for headphone or third speaker output on rear panel.

Specifications: Freq. resp. 20 to 20k cps ± 0.25 db at 1 watt output; power bandwidth, 15 to 35k cps; IHF music power output, 23 watts per channel; power output, rms, 17.5 watts per channel; harmonic distortion, 1% at 35 watts (± 1 db) from 20 to 20k cps; IM distortion, 1% at 35 watts; hum and noise, 80 db below 17-watt output; sensitivity, input for rated output—phono, 4 mv, tuner, 1 volt; damping factor 10; output impedances, 8, 16 ohms; inputs—6 phono, 2 tape head, 2 tape amp, 2 aux, 2 radio; weight 20 lbs. Dimensions, 13″ wide, 4″ high, 10″ deep. Price, $99.95. Dyuaco, Inc.

EICO CLASSIC SERIES

● *2036K 36-Watt Stereo Amplifier Kit.* Combines audio control preamp and power amplifiers.

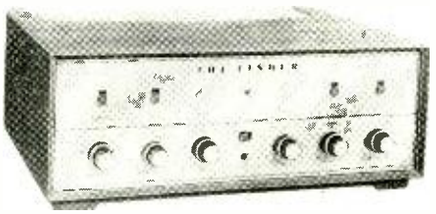


Specifications: Freq. resp. 20 to 60,000 cps ± 3 db; power bandwidth, 30 to 20,000 cps; IHF music power output, 18 watts per channel; harmonic distortion, 1% at 36 watts; IM distortion, 2% at 36 watts; hum and noise, 62 db; sensitivity, input for rated output—tuner, 10 mv. Price, $74.95. Eico.

1. 2050K 50-watt stereo amplifier $92.50
2. ST70K 70-watt stereo amplifier $99.95
3. ST40K 40-watt stereo amplifier $79.95

FISHER

● *KX-100 Stratakit 50-Watt Stereo Master Control Amplifier.* The Fisher KX-100 is a 50-watt master control amplifier kit, styled to match all other Fisher units. It combines simplicity of construction with maximum flexibility and high performance characteristics. A power-derived center-channel output is provided, obviating the need for an additional power amplifier. The preamplifier contains a full complement of controls and switches, including facilities for switched direct tape monitoring, without changing connections. An earphone jack is provided for private listening, while the speakers are disabled. Even the novice kit-builder will build this technically advanced amplifier with ease.

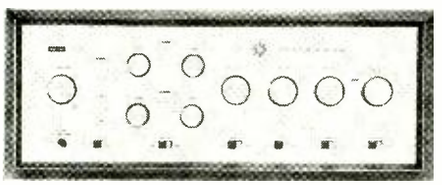


Specifications: Freq. resp. 20 to 20,000 cps ± 1 db at 2 watts output; power bandwidth, 28 to 20,000 cps; IHF music power output, 25 watts per channel; power output, rms, 24 watts per channel; harmonic distortion, 0.5% at 50 watts at 1 kc; IM distortion, 0.9% at 25 watts; hum and noise, 85 db below 25-watt output; sensitivity, input for rated output—phono, 3.5 mv, tuner, 0.3 volts; damping factor 8; output impedances, 4, 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape amp, 2 aux, 2 tuner; weight, 24 lbs. Dimensions, 15⅛″ wide, 5¼″ high, 12½″ deep. Price, $129.50. 10-UW, 10-UM; walnut and mahogany cabinents $24.95, MC-2; metal cabinet $15.95. Fisher Radio.

1. KX-200, 80-watt stereo master control amp $169.50

HARMAN-KARDON

● *Model A50K 50-Watt Integrated Stereo Amplifier Kit.* Performance at a moderate price, features; stereo headphone output on front panel; ambiance control for center channel; speaker phasing switch; illuminated push-button on-off switch; blend indicator; tape monitor; separate bass and treble; separate hi-cut and lo-cut filters; balance and stereo contour controls.



Specifications: Freq. resp. 12 to 70,000 cps ± 1 db at 1 watt output; power bandwidth, 20 to 20k cps; IHF music power output, 25 watts per channel; power output, rms, 20 watts per channel; harmonic distortion, 0.8% at 20 watts from 20 to 20k cps; IM distortion, 1% at 25 watts; hum and noise, 85 db below 25-watt output; sensitivity, inpnt for rated output—phono, 3 mv, tuner, 200 mv; damping factor 15; output impedances, 4, 8, 16 ohms; inputs—2 phono, 2 tape head, 2 tape amp, 2 tuner, 2 aux, 2 tape mon; weight, 32 lbs. Dimensions, 15¼″ wide, 5 7/16″ high, 12″ deep. Price, $119.95. Metal enclosure $12.95, walnut enclosure $29.95. Harman-Kardon

1. Award A30K, 30-watt integrated stereo amplifier $79.95

HEATHKIT

● *70-Watt Transistor Stereo Amplifier Model AA-21.* Featuring simplified operation with transistor performance, the AA-21 hides the secondary controls behind a hinged front panel, exposing only the necessary primary controls.

Specifications: Freq. resp. 13 to 25k cps ± 1 db at 70 watts output; power bandwidth, 8 to 40k cps; IHF music power output, 50 watts per channel; power output, rms, 35 watts per channel; harmonic distortion, 2% at 70 watts from 20 to 20k cps; IM distortion, 1.0% at 70 watts; hum and noise, 60 db below 1 watt output; sensitivity, input for rated output—phono, 2.5 mv, tuner, 0.3 volts; unity damping factor; output impedances, 4, 8, 16 ohms; inputs—2 phono, 2 tape head, 2 tape amp, 2 aux, 2 FM; weight, 28 lbs. Dimensions, 15¼″ wide, 5″ high, 14″ deep. Price, $134.95. Heath Co.

1. AA-100, 50-watt stereo amp $84.95
2. AA-22, 40-wat transistor stereo amp $99.95
3. AA-151, 28-watt stereo amp $59.95
4. AA-201, 6-watt stereo amp $31.95

KNIGHT-KIT

● *KG-870 Transistor 70-Watt Stereo Amplifier Kit.* Twenty-two transistor, four silicon diode circuit. Four predriver transistors are silicon for high stability. Instant warm-up, no microphonics. Virtually no hum or noise. Cool operation. Transistors plug into sockets. Fused power supply. Stereo headphone jack. Speaker phasing switch. Dual-concentric clutch-type bass and treble controls.

Specifications: Freq. resp. 20 to 25,000 cps ± 1 db at rated output; IHF music power output, 35 watts per channel; power output, rms, 28 watts per channel; harmonic distor-

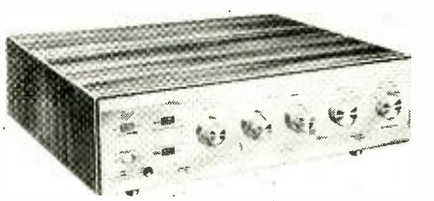


tion, 0.5% at rated output; IM distortion, 1% at rated output; hum and noise, 80 db below rated output; sensitivity, input for rated output—phono, 3 mv, tuner, 1.6 volts; output impedances, 4, 8, 16 ohms; inputs—1 phono, 1 tape head, 1 tape amp, (monitor), 2 aux, 1 tuner; weight, 12 lbs. Dimensions, 13″ wide, 2¾″ high, 11″ deep. Price, $99.95. Walnut case $12.95, metal case $5.95. Allied Radio.

1. KG-320, 32-watt trans. stereo amp. kit $59.95
2. KG-400, 32-watt stereo amp. kit $59.95
3. KA-55, 40-watt stereo amp. kit $79.95
4. KG-250, 20-watt stereo amp. kit $39.95
5. KA-95, 70-watt stereo amp. kit $99.95

LAFAYETTE

● *KT-900 Transistor Amplifier.* Individual concentric bass, treble, and volume controls, stereo selection of R channel, L channel, stereo, reverse. Rumble and scratch filters. Printed terminal board construction.

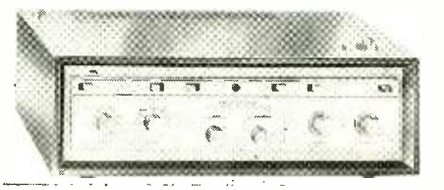


Specifications: Freq. resp. 5 to 25,000 cps ± 1 db at 60 watts output; IHF music power output, 60 watts per channel; harmonic distortion, 0.5% at 35 watts from 5 to 25,000 cps; IM distortion, 1%; hum and noise, 75 db below 35-watt output; sensitivity, input for rated output—phono, 2.8 mv, tuner, 200 mv; output impedances, 4, 8, 16 ohms; inputs—2 phono, 2 tape head, 2 aux, 2 tuner; weight, 25 lbs. Dimensions, 13¾″ wide 4″ high, 12⅜″ deep. Price, $134.50. Lafayette Radio.

1. KT-250AWX, 50-watt integ. amp ... $74.50
2. KT-236AWX, 36-watt integ. amp ... $59.50

PACO

● *Model SA-50 Integrated Amplifier.* The SA-50 features a two-position equalization switch, 7-position mode selector, tape monitor switch, contour switch, 2 speaker-system selector switches, 7-position input selector, calibrated balance control, dual bass and treble control.



Specifications: Freq. resp. 30 to 90,000 eps ± 1 db at 1 watt output; IHF music power output, 25 watts per channel; power output, rms, 20 watts per channel; harmonic distortion, 0.5% at 20 watts; IM distortion,

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All six speakers incorporate certain recent refinements which have made possible the task of creating the W90 system. A brief description will clarify what we mean:

The chassis (baskets) are exceptionally heavy and manufactured by casting. The purpose is to preserve absolute rigidity, maintaining the critical relationship between the moving voice coil and the fixed magnet. The stamped baskets found in ordinary loudspeakers are also designed to be rigid. However, this rigidity is often lost as soon as the speaker is mounted firmly against an inexact wooden front baffle. Some speaker designers have even eliminated the basket, weakening the entire speaker structure. Wharfedale baskets are of cast metal. They hold their shape perfectly in mounting, and are strong enough to permit sufficient openings to maintain absolutely correct airloading, essential for the full response of the speaker.



The Cone Surround is an exclusive rolled-rim design, the latest and most effective form of the traditional Wharfedale soft suspension. Earlier surrounds (porous foam or cloth) provided such superior bass damping that they became renowned as an outstanding physical characteristic of Wharfedale speakers. Now, more than ever before, the Wharfedale cone is capable of the long excursions required for true bass energy in a sophisticated tuned duct enclosure. The cone material is special. .compounded of long fibred wool (traditional to the North of England home of these speakers) and *soft* pulp! It achieves superior results from the start and its natural resilience assures continuing perfection over the years.



The Magnets are truly impressive, individually and totally. Because of its material, and the special design of the magnetic gap, each provides higher total flux in the gap field than has been true of the magnets in any prior speaker system. The six magnets together make the W90 a "high efficiency" speaker, achieving maximum performance at low amplifier power. All-too-many popular speaker systems are starved for power, depending upon exaggerated amounts of amplifier wattage. In the W90, therefore, the all-important transient bass response is excellent, even at low volume. This clean low end, at reasonable listening levels, is a major reason why all Wharfedales are so pleasant to "live with."



With its six speakers, the W90 is actually a dual 3-way system with all units designed for each other and crossover settings calibrated for undistorted response throughout the audio spectrum. The support effect of the tandem speaker systems results in a sound of exceptional authority, yet in balance over the entire range.

LOW RANGE. Two 12½" low frequency drivers handle the sound from 20 to 1,500 cycles. The listener can expect to enjoy the true, fundamental bass notes, so often masked. The two drivers total a cone area of 94 square inches.. thus the W90 tandem idea yields the same result as a single low frequency driver of such massive size and weight as to be impractical in the home.



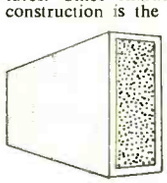
MID-RANGE. Two 5¼" mid-range speakers cover the relatively narrow but vital band of 1,500 to 6,000 cycles. The listener will be startled, for example, by the clarity of the baritone voice and the exceptional resolution of most solo instruments, permitted to stand in correct perspective. The handling of this "fill" range in the W90 is the recognizable key to its satisfying full-throated sound.



TREBLE. Two 3" treble speakers are the well-established Super 3's, much admired for their ability to present the clear treble without stridency...making them eminently listenable, unusual for tweeters. This is no accident. It is the result of cone-type rather than horn-type construction, and refinements such as low-mass aluminum voice coils ultrasonically tinned, powered by magnets so large that they are seldom found even in speakers four times the diameter!



THE W90 is the latest of the Achromatic speaker systems. The literal meaning of "achromatic" is: "Pure sound, uncolored by extraneous modulations." Such modulations, common even in luxury speaker systems, tend to alter the natural sound of music. The W90 enclosure has been designed to preserve the integrity of the speakers' performance, through certain constructional features. Chief characteristic of the Achromatic construction is the sand-filled technique, which consists of packing white sand densely between layers of hardwood. This creates an inert mass, incapable of resonating no matter how deep or strong the bass backwave projected against it. This exclusive technique is the result of years of development by G A. Briggs. While it costs considerably more than standard construction, it has proven so effective in preventing bass distortion that all Wharfedale Achromatic systems incorporate it. Each woofer is mounted in an individual tuned chamber for its own maximum effect, and isolated from the mid-range and tweeter arrays. Therefore, mechanical coupling, so disastrous in ordinary systems, is eliminated. The high and mid-range speakers are mounted from the rear, isolated from the face of the cabinet with front free-floating. This feature helps to eliminate phase distortion. As a final measure, to insure compatibility with the acoustics of the room, the W90 system incorporates a full control panel. Each range of speakers may be balanced and adjusted to the ear of the listener, the requirements of the particular listening area and the other components in the music system.



DECOR. The new W90 is neither a compact, nor a large speaker system. It is a new and highly versatile size, designed from the sound out. Ideally suited to be used in pairs for stereo, the W90 measures 32¼" x 27¾" x 13⅛". Housed in a meticulously crafted cabinet built to meet every requirement of perfection in sound, the W90 will fit with ease into the living room, and is elegant enough to join the most distinctive furnishings. Its acoustic design adds versatility . . . permitting horizontal or vertical use, as desired. The Wharfedale Universal Mounting Base makes it a superb free-standing unit. In oiled or polished Walnut hardwood, $259.50. Utility model in sanded Birch hardwood, without curved molding or dividers, $244.50. Universal Mounting Base to match, $9.95.

For illustrated literature, write Dept. WK13.

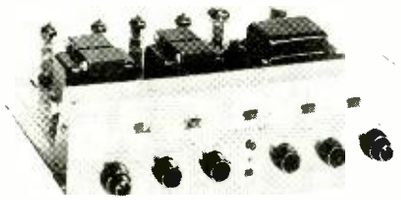
Wharfedale • Division of British Industries Corp., Port Washington, N.Y.

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1% at 20 watts; hum and noise, 80 db below 20-watt output; sensitivity, input for rated output—phono, 5 mv, tuner, 0.075 volts; damping factor 22; output impedances, 4, 8, 16 ohms; inputs—2 phono, 1 tape head, 1 tape amp, 1 aux, 1 Mic; weight, 25 lbs. Dimensions, 15⅜" wide, 5⅝" high, 11¾" deep. Price, $89.95. MC-5 metal enclosure $7.95. PACO.

H. H. SCOTT

● *LK-30—Dual 15-Watt Stereo Amplifier Kit.* A budget-priced amplifier kit, with power and features of amplifiers selling at much higher prices. Hefty output transformer gives power down to the lowest audible frequencies. This conservatively-rated stereo amplifier will drive even inefficient loudspeakers.



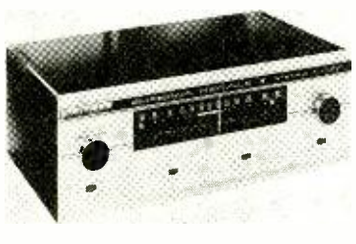
Specifications: Freq. resp. 20 to 20k cps ± 1 db at 7.5 watts output; power bandwidth, 25 to 15k cps; IHF music power output, 15 watts per channel; power output, rms, 12 watts per channel; harmonic distortion, 0.8% at 12 watts from 20 to 20k cps; IM distortion, 0.8% at 12 watts; hum and noise, 70 db below 15-watt output; sensitivity, input for rated output—phono, 5 mv, tuner, 0.5 volts; damping factor 10; output impedances, 4, 8, 16 ohms; inputs—2 phono, 2 tape amp, 2 aux, Monitor; weight, 20 lbs. Dimensions, 15½" wide, 5½" high, 13½" deep. Price, $99.95. Cases in various woods and metals from $13.95.

1. LK-48, dual 24-watt amp $129.95
2. LK-72, dual 40-watt amp $164.95

BASIC TUNERS

ALTEC

● *314A Emperor Royale FM-MPX Tuner.* Designed for FM-multiplex network relay and rebroadcast work and for off-the-air stereo monitoring, it utilizes wide-band circuitry. Automatic mpx all-electronic switching indicates stereo FM programming. Requires a 13811 panel for rack mounting.



Specifications: 12 tubes; cascode front end; horiz. bar tuning indicator; controls—tuning; switches—power, a.f.c. defeat, muting, mpx noise filter, stereo-mono; freq. resp. ± 1 db from 20 to 20,000 cps; sensitivity 1.2 μv for 20-db quieting with 300-ohm antenna; stereo separation 30 db; time division stereo circuit; dimensions; 15" wide, 5½" high, 11⅛" deep; weight. 12¼ lbs. Price $359.00. Altec-Lansing.

1. 315A $256.00

BELL

● *2441 S-1 Stereo FM-AM Tuner.* The 2441 S-1 is a sensitive tuner for reception in adverse locations as well as strong signal areas.

Specifications: **FM:** 8 tubes; cascode front end; 3 i.f. stages; ratio detector; 1 audio stage; meter tuning indicator; output signal 1.5 volts; 3 outputs; controls—AM tuning, FM tuning; switches—off-on, a.f.c., selector; freq. resp. ± 2 db from 30 to 53k cps; signal-to-noise ratio 55 db; IHF volume sensitivity 1.2 μv; capture ratio 4 db; selectivity 250 kc −6 db; IHF usable sensitivity 1.8 μv; harmonic distortion (100% mod.) 0.4%; stereo separation 28 db; switching stereo circuit; reactance tube a.f.c. circuit; drift ± 5 kc; dimensions of set: 10⅝" wide, 5 7/16" high. 10⅝" deep; weight, 18 lbs. **AM:** 4 tubes; superhet circuit; 3-gang tuning capacitor; ratio detector; 3 i.f. stages; meter tuning indicator; IHF usable sensitivity 3 μv; IHF volume sensitivity 2 μv; freq. resp. ± 3 db from 30 to 8k cps; harm. dist. 1%. Price $189.95. Bell Sound.

1. 2421 S-1 stereo FM-AM tuner $159.95
2. 2419 stereo FM tuner $149.95

BOGEN

● *TP250 FM-Stereo Tuner.* The TP250 FM tuner features design simplicity in the "Simple Scanner" dial, the "Stereo-Minder" indicator, quick-acting electronic tuning eye, and tape recording filter, the TP250 compares with tuners costing much more.

Specifications: 10 tubes + 3 crystal diodes; grounded-grid front end: 3 i.f. stages; ratio detector; electronic eye tuning indicator; output signal 0.75 volts; 2 outputs; controls—mode, tuning; switches—a.f.c., power; freq. resp. ± .5 db from 30 to 15,000 cps; signal-to-noise ratio 60 db; IHF volume sensitivity 0.5 μv; capture ratio 4 db; selectivity 40 db; IHF usable sensitivity 2.5 μv; AM suppression 50 db; harmonic distortion (100% mod.) 0.5%; stereo separation 28 db; matrix stereo circuit; reactance tube a.f.c. circuit; drift 20 kc; dimensions: 12⅞" wide, 4¾" high, 11" deep; weight, 16 lbs. Price $159.95. Bogen.

DYNA

● *FM3/A Multiplex FM Tuner.* Stereo multiplex FM tuner providing automatic electronic switching from mono to stereo, center-of-channel tuning for minimum distortion and maximum separation. A front panel volume control adds convenience for the tape recordist, and provides manual muting. The exclusive "stereocator" beam indicates stereo or mono broadcasts as the station is tuned.



Specifications: 11 tubes, cath. cpld. front end; 4 i.f. stages; bal. bridge detector; 2 audio stages; EMM801 tuning indicator; output signal 2 volts; 2 outputs; controls—tuning, volume; switches—on-off; freq. resp. ± 0.5 db from 30 to 15,000 cps; signal-to-noise ratio 67 db; IHF volume sensitivity 0 μv; capture ratio 5 db; selectivity 54 db; IHF usable sensitivity 6 μv (in stereo operation). 4 μv mono; AM suppression 63 db; harmonic distortion (100% mod.) 0.5%; stereo separation 30 db; env. det. stereo circuit; drift 30kc max.; dimensions: 13" wide, 4" high 8" deep; weight, 13 lbs. Price $169.95. Dynaco, Inc.

FISHER

● *MF-300 Remote Control FM-Stereo Tuner.* The Fisher MF-300 combines the ease of motor tuning with excellent performance characteristics. The MF-300 automatically stops the tuner at the point of maximum fidelity. "Stereo Beacon" ® automatically indicates the



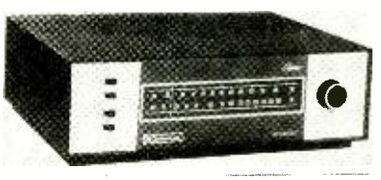
presence of stereo broadcasts. The tuner automatically switches between stereo and monophonic modes of operation. A stereo filter reduces noise on stereo programs from weak stations. Remote control of the tuner is possible by using the RK-20, enabling the audiofan to control the tuning process, volume, and power on-off.

Specifications: 16 tubes, 24 diodes, cascode front end; 5 i.f. stages; ratio detector; 4 audio stages; "Stereo Beacon" ® tuning indicator; output signal 2.0 volts; 4 outputs; controls—manual and automatic tuning; switches—stereo filter, mode selector, muting, afc, antenna; freq. resp. ± 1 db from 20 to 15,000 cps (after de-emphasis); signal-to-noise ratio 70 db; IHF volume sensitivity. below noise level; capture ratio 1.5 db; selectivity 65 db; IHF usable sensitivity 1.6 μv; AM suppression better than 50 db; harmonic distortion (100% mod.) 0.4%; stereo separation 35 db; time-switching multiplex stereo circuit; varactor diode a.f.c. circuit; drift 0.01% without a.f.c. Dimensions; 15⅛" wide, 4 13/16" high, 13" deep; weight 17¾ lbs. Price, $359.50. Fisher Radio.

1. FM-50-B, FM-stereo tuner "Stereo Beam"® $199.50
2. FM-100-B, FM-stereo tuner with "Stereo Beacon"® $249.50
3. FM-200-B, FM-stereo tuner with "Stereo Beacon"® $299.50
4. FM-1000, FM-stereo tuner with "Stereo Beacon"® (relay quality) .. $429.50
5. FMR-1, same as FM-1000, but rack-mounted $439.50

GROMMES

● *E-105 FM-AM Stereo Tuner.* Features fine FM-stereo reception, flywheel tuning, "Stereo Sentry" that actuates bar-type tuning indicator, wide-band drift-free circuitry and low-heat silicon power supply.



Specifications: **FM:** 9 tubes + 9 diodes; grounded-grid front end; 3 i.f. stages; bal. ratio detector; 2 audio stages; bar tube tuning indicator; output signal 1 volt; 2 outputs; controls—tuning; switches—FM or AM, a.f.c., stereo-mono, power; freq. resp. ± 0.5 db from 20 to 20,000 cps; signal-to-noise ratio 60 db; capture ratio 5 db; selectivity 300 kc; IHF usable sensitivity 4 μv; AM suppression 50 db; harmonic distortion (100% mod.) 0.5%; stereo separation 35 db; switching stereo circuit; tube a.f.c. circuit; drift 10 kc; dimensions; 13¾" wide. 4¾" high. 11" deep. **AM:** superhet circuit; 2-gang tuning capacitor; diode detector; 1 i.f. stage; bar tube tuning indicator; IHF usable sensitivity 10 μv; freq. resp. ± 3 db from 20 to 6500 cps; harm. dist. 1.0%. Price $139.95. Grommes.

1. 102M, FM-AM stereo tuner $159.95
2. 101M, FM-stereo tuner $139.95
3. E-104, FM-AM stereo tuner $129.95

HARMAN-KARDON

● *Model F-1000T Solid-State FM-Stereo Tuner.* Wideband solid-state circuitry throughout. Features; "Stereo Logic" circuit (automatically switches tuner to stereo when station broadcasts stereo). solid state a.f.c., mesa alloy-diffused junction transistors in quadra-tuned front end. D'Arsonval tuning meter, 3-position range selector.



Specifications: 18 transistors, 8 diodes; Quadra-Tuned front end; 4 i.f. stages; wide-band detector; 2 audio stages; D-Arsonval tuning indicator; output signal 1.75 volts; 4 outputs; controls—"Stereo Logic," muting, tuning; switches—a.f.c.-defeat, stereo-defeat, local-suburban-distance, on-off; freq. resp. ± ¾ db from 5 to 50,000 cps; signal-to-noise ratio 70 db; IHF volume sensitivity 0 μv; capture ratio 4 db; selectivity 250 kc at 3 db; IHF usable sensitivity 2.0 μv; AM suppression 60 db; harmonic distortion (100% mod.) 0.1%; stereo separation 30 db; switching stereo circuit; solid-state a.f.c. circuit; drift ± 5 kc; dimensions; 14 1/16" wide, 3⅝" high, 8" deep; weight, 20 lbs. Price $299.95. Enclosure $19.95. Harman-Kardon.

1. Award Model T300X, AM/FM-stereo tuner $149.95
2. Citation IIIX, FM-stereo tuner $315.00
3. Award F500X, FM-stereo tuner $179.95

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Buyer's Guide and Condensed Applications Chart—*Norelco*® 'CONTINENTAL' Tape Recorders

This condensed guide, prepared by the High Fidelity Products Division of North American Philips Company, Inc., offers the consumer the factual data he needs to select the tape recorder best suited to his specific requirements.











	Continental '100' Model EL 3585	**Continental '200'** Model EL 3541	**Continental '300'** Model EL 3542	**Continental '301'** Model EL 3549	**Continental '401'** Model EL 3534
PRIMARY USERS	The entire family—at work, at play, at home or away.	Serious music lovers with limited budgets.	Schools, churches, teachers of voice and music. Psychiatrists, speech therapists and recreation directors.	Collectors of pre-recorded stereo tapes and those who record extremely lengthy program material, in addition to those listed for the Continental '300'.	Professional musicians, studio recordists, serious music lovers, high fidelity enthusiasts, doctors, dentists, industrial sound installation contractors.
ESPECIALLY SUITABLE FOR	On-the-go, on-the-shoulder recording and playback—anything, anytime, everywhere.	Portable, high fidelity tape-deck applications. Portable public address.	Audio-visual and all specialized teaching applications; music program source for factory, office and home; portable P.A.	All applications where equipment ruggedness is a prime consideration; (on location, travelling, transportation, etc.), in addition to those listed for the Continental '300'.	Professional-quality stereo recording, live or broadcast; space-saving hi-fi system control center and background music.
SPECIAL FEATURES	Battery-operated, 100% transistorized, feather-light. Records from any source. Tapes interchangeable with all 2-track 1⅞ ips recorders. Dynamic microphone. Constant-speed motor and capstan drive.	Stereo head output direct to external stereo preamp. Records sound-on-sound. Mixing facilities. Compact, lightweight, inexpensive.	3 speeds. Stereo head output for playback through external stereo preamp. Records sound-on sound. Mixing facilities. Headphone monitoring.	100% transistorized. Self-contained dual preamps for 4-track stereo playback through radio, phono or TV. Dynamic microphone. 4 speeds. Facilities for headphone monitoring and mixing. Parallel switch for simultaneous playback of 2-tracks through speaker.	100% transistorized. Completely self-contained for stereo recording and playback at all speeds. Dynamic stereo microphone. Multiplay permits sound-on-sound recording. 4th speed provides up to 32 hours recording time.
RECORDING CAPABILITIES	Monophonic 2-Track	Monophonic 4-Track	Monophonic 4-Track	Monophonic 4-Track	Stereo and Mono 4-Track
PLAYBACK CAPABILITIES	Monophonic 2-Track	Stereo† and Mono 4-Track	Stereo† and Mono 4-Track	‡Stereo and Mono, 4-Track	Stereo and Mono 4-Track
SPEEDS	1⅞ ips	7½ ips	7½, 3¾, 1⅞ ips	7½, 3¾, 1⅞ and 15/16 ips	7½, 3¾, 1⅞, 15/16 ips
PLAYING TIME PER REEL	Up to 2 hrs. on a 4" reel	Up to 4 hrs. on a 7" reel	Up to 16 hrs. on a 7" reel	Up to 32 hrs. on a 7" reel	Up to 32 hours on a 7" reel.
WEIGHT	7 lbs.	18 lbs.	30 lbs.	29 lbs.	38 lbs.
MANUFACTURER'S SUGGESTED LIST PRICE*	$129.50*	$179.50*	$239.50*	$299.50*	$399.50*

†tape head output to external/stereo system ‡dual preamp output to external amplifier and speaker

For complete technical data and detailed descriptions of Norelco 'Continental' Tape Recorders, write:

NORTH AMERICAN PHILIPS COMPANY, INC., High Fidelity Products Division, **100 East 42nd Street, New York 17, New York**

**The unit prices stated above are for identification only and are not necessarily the regular or usual retail prices and are not to be represented as such.*

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KARG

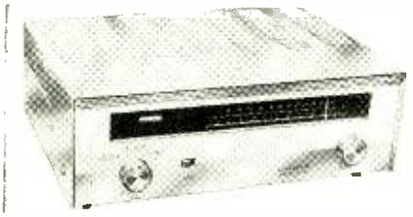
● *Model SXT-1A Crystal-controlled Stereo FM Tuner.* 12 crystal-controlled FM channels, customer's choice. Dial marked in call letters of stations selected. Low distortion level not dependent on operator's tuning skill. No microphonics. Extreme simplicity of controls (Station Selector, volume, Stereo-Mono). Stereo signal indicator light. Remote tuning control optional. Twin 19-kc filters in audio outputs. Gated-beam limiter with threshold adjustment. Faraday-screened input balun.

Specifications: 9-tubes, cascode front end; 2 i.f. stages; Foster-Seely detector; 1 audio stage per channel; output signal 3 volts; 3 outputs; controls—Station Selector, Volume; switches—Stereo-Mono; freq. resp. ± ½ db from 30 to 15k cps; signal-to-noise ratio 65 db; capture ratio 3 db; IHF usable sensitivity 2.2 μv; AM suppression 34 db; harmonic distortion (100% mod.) 0.5%; stereo separation 33 db; Time Div. stereo circuit; drift 0.025% max.; dimensions: 15⅜" wide, 5" high, 5½" deep; weight, 13 lbs. Price $329.95. Karg Labs.

1. Model FMX-9, ster. FM tuner $199.95
2. Model FMX-10, ster. FM tuner $229.95
3. Model SXT-3A, crystal stereo FM tuner, prof. $390.00
4. Model SXT-4A, crystal single-chan. ster. monitor $335.00
5. Model XT-1A, crystal mono FM tuner $229.95

LAFAYETTE

● *LT-81C FM-Stereo Tuner.* Stereo tuning indicator, built-in multiplex circuit, 3-gang tuning capacitor.



Specifications: 10 tubes, 8 diodes; grounded grid front end; 4 i.f. stages; Ratio detector; 1 audio stage; EM-84 tuning indicator; output signal 1 volt; 2 outputs; control—tuning; switches—selector, a.f.c. on/off; freq. resp. ± 2 db from 20 to 20,000 cps; capture ratio 8 db; harmonic distortion (100% mod.) 1%; stereo separation 30 db; matrix stereo circuit; reactance a.f.c. circuit; dimensions; 13½" wide, 5¾" high, 9⅛" deep; weight, 12 lbs. Price $76.50. Lafayette Radio.

1. LT-78C, AM-FM-stereo tuner $89.50

LEAK

● *"Trough Line II" FM-Stereo Tuner.* An ideal companion for the "Point One" stereo preamplifier.

Specifications: FM: Tube complement (2) ECF80, ECC84, ECC85, EF80, EM84, EZ80 (2) OA79 cascode front end; no. of i.f. stages 3; type of detector Foster Seely; type of tuning indicator maximum closure; output signal 1 volt; no. of outputs 2; controls—tune, volume, on-off; switches—a.f.c., local-distance; IHF usable sensitivity 2μv; drift 15 kc without a.f.c. (3 kc with); dimensions: 10½" wide, 3¾" high, 7¾" deep; weight, 11 lbs. Other features: cathode follower—sensitivity switch for locations of high signal strength. Accessories: Supplied with color inserts to match room decor. Price $149.00. Ercona Corp.

MARANTZ

● *Model 10 FM-Stereo Tuner.* A no-compromise tuner incorporating an unusual visual-display tuning and multipath indicator. New i.f. circuit eliminates alignment problems.

Specifications: 22 tubes plus CRT; 6 i.f. stages; Foster-Seely detector; CRT tuning indicator; controls—scope centering, tuning; switches—stereo test, automatic-mono, muting, power, panel dim; freq. resp. ±1 db from 20 to 15,000 cps; signal-to-noise 70 db; IHF volume sensitivity 0 μv; adj. channel rejection, 100 db; alt. channel rej. 135 db; IHF usable sensitivity 1.5 μv; AM suppression 70 db; harmonic distortion (100% mod.) 0.5%; stereo separation 30 db, 20 to 15,000 cps; dimensions: 15⅜" wide, 5¾" high, 15" deep; weight, 30 lbs. Price $555.00 ($565 West). Marantz Co.

McINTOSH

● *MR67 FM-Stereo Tuner.* A sensitive FM multiplex stereo tuner having the new McIntosh "PANLOC" mounting method and a front panel MULTIPATH indicator.

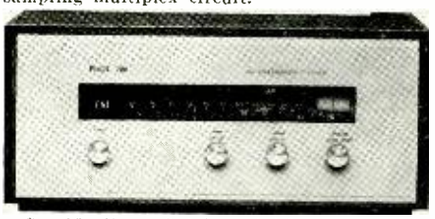


Specifications: 13 tubes/12 semiconductors; Nuvistor front end; 4 i.f. stages; 2 audio stages; electronic tuning indicator; output signal 2.5 volts; 4 outputs; controls—tuning, volume; switches—Mode, Power, Muting, Multipath-signal strength; freq. resp. ± ½ db from 20 to 20,000 cps; signal-to-noise ratio 70 db; capture ratio 1.7 db; IHF usable sensitivity 2.5 μv; harmonic distortion (100% mod.) 0.5%; stereo separation 30 db; peak detecting—self matrixing stereo circuit; drift 25 kc; dimensions: 16" wide, 5 7/16" high, 13" deep, weight, 24½ lbs. Price $299.00. McIntosh Lab.

1. MX110, FM-stereo tuner-Preamplifier $399.00
2. MR65B, FM-stereo tuner $329.00

PILOT

● *Model 780.* High performance FM/FM-stereo tuner. Excellent capture ratio and signal-sampling multiplex circuit.

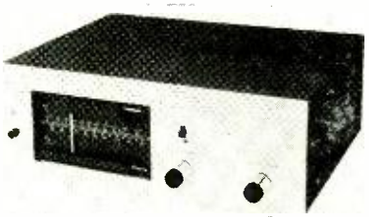


Specifications: 9 tubes; 4 i.f. stages; ratio detector; 2 audio stages; center-zero meter tuning indicator; output signal 1.5 volts; 2 outputs; controls—tuning, output level; switches—power, selector, muting (FM); freq. resp. ±1 db from 20 to 20k cps; capture ratio 1 db; selectivity 44 db, alt. channel; IHF usable sensitivity 1.8 μv; harmonic distortion (100% mod.) 0.25%; stereo separation 30 db; synchronous switching stereo circuit; drift 30 kc max.; dimensions: 15¼" wide, 6¼" high, 12¾" deep. Price $199.50 (oiled walnut enclosure, $22.50 addit.) Pilot Radio.

1. 285, FM-AM stereo tuner $159.50
2. 280B, FM-stereo tuner ..... $ 99.95
3. Mark III, Basic FM tuner ..... $ 49.95

PIONEER

● *AFT-15 AM-FM-Multiplex Tuner.* The Pioneer AFT-15 is a precision-engineered tuner that is a companion unit to the Pioneer SM-500 integrated stereophonic amplifier. It incorporates a cascode r.f. tuning circuit using the latest Nuvistor.



Specifications: **FM:** 10 tube; cascode front end; 3 i.f. stages; Foster-Seely detector; eye-tube tuning indicator; output signal 1 volt; 2 outputs; switches—afc on-off, sensitivity, selector, distant-local; freq. resp. ±1 db from 30 to 15,000 cps; signal-to-noise ratio 50 db; IHF usable sensitivity 1.5 μv; AM suppression 60 db; harmonic distortion (100% mod.) 0.5%; stereo separation 30 db; time-division switching stereo circuit; reactance tube a.f.c. circuit; drift less than 10 kc; dimensions: 15 11/32" wide, 5 20/32" high, 13 37/64" deep; weight, 19 lbs. **AM:** 3 tube Super-heterodyne circuit; 3-gang tuning capacitor; 1 i.f. stage; eye-tube tuning indicator; switches: i.f. bandwidth selector; IHF usable sensitivity 6.3 μv; freq. resp. ±1 db from 30 to 15,000 cps; harm. dist. 0.5%. Pioneer.

H. H. SCOTT

● *310E FM/MPX Tuner.* Features are: 1. "Auto-Sensor" circuitry for fully automatic operation; 2. Inter-station noise suppressor; 3. Convenient front-panel recorder output jack; 4. Stereo Threshold; 5. Three limiting stages.

Specifications: 13 diodes, 15 tube; cascode front end; 4 i.f. stages; ratio detector; 2 audio stages; meter tuning indicator; output signal 1.2-2 volts; 2 sets of outputs; controls "Dynaural," squelch, stereo threshold, tuning; switches: selector, a.g.c., function; freq. resp. ±1 db from 30 to 15k cps; signal-to-noise ratio 65 db; IHF volume sensitivity 0 μv; capture ratio 2.2 db; sensitivity 50 db;

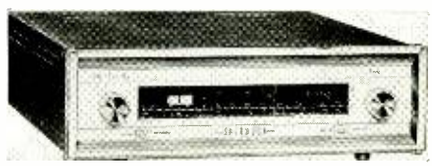


IHF usable sensitivity 1.9 μv; AM suppression 60 db; harmonic distortion (100% mod.) 0.5%; stereo separation 30+ db; time-switching stereo circuit; drift 20 kc; dimensions in case: 15½" wide, 15¼" high, 13¼" deep; weight, 14 lbs. Price $279.95. H. H. Scott, Inc.

1. 4312 transistor FM/mpx tuner $265.00
2. 4310 FM/mpx tuner $475.00

SHERWOOD

● *S2100II FM-MPX-AM Stereo Tuner.* The Model S2100II enables you to enjoy modern stereocasts via FM multiplex. Front-panel controls and complete FM-multiplex stereo circuitry are furnished to provide low-distortion stereo reception. The S2100II also features the reception of AM broadcasts with the excellent fidelity afforded by the 15-kc-wide "hi-fi" band



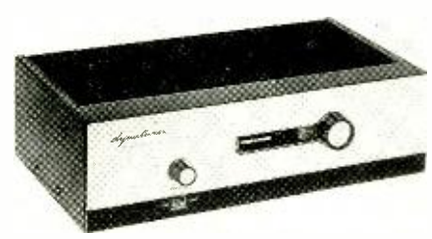
pass. A sharply selective 5-kc pass-band is also selectable on the front panel for "pulling-in" weaker AM broadcasts. Stereo-MX programs are each identified on the S2100II by the instant indication on Sherwood's new Stereo-lite.

Specifications: FM: tube complement 12 tubes, 9 diodes, rectifier; type of front end cascode r.f. amp; no. of i.f. stages 2; type of detector balanced; zero-center meter tuning indicator; output signal 1.2 volts; controls tuning, selector; switches off-on, hush; freq. resp. ± 0.5 db from 20 to 20,000 cps; signal-to-noise ratio 60 db; selectivity 200 kc at −3 db; IHF usable sensitivity 1.8 μv; harmonic distortion (100% mod.) ⅓%; drift 15 kc; dimensions: 14" wide, 4" high, 12½" deep; weight, 24 lbs. AM; type of circuit superhet; type of detector diode; no. of i.f. stages 1; meter tuning indicator; usable sensitivity 2 μv at 60% mod. for 0.5 v. out, 6 db S/N; freq. resp. (wide) −6 db from 20 to 7500 cps. Price, $209.50. Sherwood Electronic Labs.

BASIC TUNER KITS

DYNAKIT

● *FM-1 Tuner Kit plus FMX-3 Multiplex Integrator Kit.* The FM-1 is a high performance mono tuner, with provision for adding the FMX-3 multiplex integrator at any time, which converts it to a fully-automatic stereo FM tuner.



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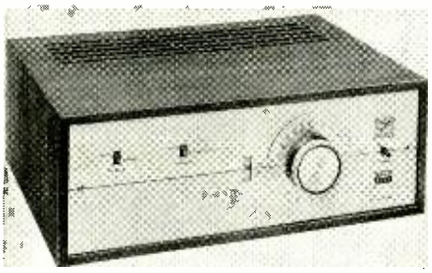
In Canada: Tri-Tel Associates Ltd., Willowdale, Ont.

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Specifications: 9 tubes; cathode-coupled front end; 4 i.f. stages; balanced bridge detector; 2 audio stages; EM-84 tuning indicator; output signal 2 volts; 2 outputs; controls—tuning; volume; switches—on-off; freq. resp. ± 0.5 db from 10 to 40,000 cps; signal-to-noise ratio 70 db; IHF volume sensitivity 0 μv; capture ratio 5 db; selectiviey 54 db; IHF usable sensitivity 4 μv; AM suppression 63 db; harmonic distortion (100% mod.) 0.25%; stereo separation 30 db; envelope detection stereo circuit; drift less than 30kc; dimensions: 13" wide, 4" high, 8" deep; weight, 12 lbs. Other features—fully automatic electronic switching from mono to stereo with indicator light. Price, $109.90. Dynaco, Inc.

EICO

● *2200K FM-Stereo Tuner Kit.* A new design featuring new styling and top performance in an easy-to-build kit.



Specifications: 11 tubes; 4 i.f. stages; ratio detector; eye tube tuning indicator; output signal 1 volt; signal-to-noise ratio 55 db; capture ratio 3 db; IHF usable sensitivity 3 μv; harmonic distortion (100% mod.) 0.6%; stereo separation 30 db; dimensions: 15⅞" wide, 5⅝" high, 11⅝" deep; weight, 12 lbs. Price. $92.50. Eico.

1. ST97 FM-stereo tuner $99.95
2. ST96 FM-AM stereo tuner $89.95
3. HFT90A FM tuner $39.95
4. HFT94 AM tuner $39.95
5. HFT92 FM-AM tuner $59.95

FISHER

● *KM-60 FM-Stereo Tuner.* The KM-60 is a quality tuner which features "Stereo Beam" (indicates the presence of stereo programming), a stereo noise filter, and the ease of construction which characterizes the Strata-Kit line. Critical stages are prealigned at the factory, and the final touch-up for perfect alignment is easily accomplished with the aid of the built-in tuning meter. Level controls are provided for the precise balancing of the two channels, and an input attenuator is included to prevent overloading of the front end by nearby stations. The tuner is designed to be the equivalent of a factory-wired Fisher tuner.

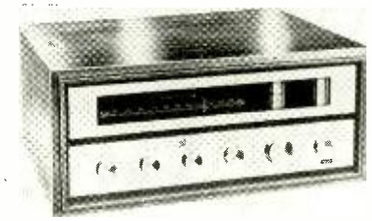


Specifications: 11 tubes, 12 diodes; cascode front end; 4 i.f. stages; ratio detector; 2 audio stages; meter tuning indicator; output signal 2.0 volts; 4 outputs; controls—tuning; switches—selector, stereo filter, power; freq. resp. ± 1 db from 20 to 15,000 cps (after de-emphasis); signal-to-noise ratio 70 db; IHF volume sensitivity below noise level; capture ratio 2.5 db; selectivity 60 db; IHF usable sensitivity 1.8 μv; AM suppression 50 db; harmonic distortion (100% mod.) 0.5%; stereo separation 35 db; time-division multiplex stereo circuit; drift 0.01%; dimensions: 15⅛" wide, 4 13/18" high, 13" deep; weight, 18 lbs. Price, $169.50. Fisher Radio.

HARMAN-KARDON

● *Citation IIIX FM-Stereo Tuner.* All the complex stages pre-aligned and adjusted at the factory. Features: wide-band circuitry, excellent sound quality, built-in multiplex adapter, and high stability.

Specifications: 7 tubes; Nuvistor front end; 3 i.f. stages; Foster-Seely detector; 2 audio stages; Level & Balance tuning meters; output signal 2 volts; 3 outputs; controls—



a.f.c., loudness, tuning; switches—on/off, range selector, function, muting; freq. resp. ± 0.5 db from 1 to 52,000 cps; signal-to-noise ratio 75 db; IHF volume sensitivity 0 μv; capture ratio 3.5 db; IHF usable sensitivity 1.65 μv; AM Suppression 70 db; harmonic distortion (100% mod.) 0.1%; stereo separation 30 db; switching stereo circuit; solid-state a.f.c. circuit; drift ± 5 kc; dimensions: 14⅞" wide, 6" high, 12¼" deep; weight, 35 lbs. Other features: Completely assembled FM cartridge eliminates problems of i.f. alignment, oscillator adjustment, and lead length. Price, $230.00. Harman-Kardon.

1. Award F50XK, FM-stereo tuner kit.. $129.95

HEATHKIT

● *Transistor AM/FM-Stereo Tuner Model AJ-43.*

Specifications: **FM:** 7 transistors; grounded base r.f. stage front end; 4 i.f. stages; ratio detector; meter tuning indicator; output signal 0.5 volts; 2 outputs; controls—tuning, squelch, level, meter; switches—a.f.c., mode, signal strength, on-off; freq. resp. ± 1 db from 20 to 20,000 cps; signal-to-noise ratio 40 db; IHF volume sensitivity 1.0 μv; capture ratio 7.5 db; selectivity 30 db; IHF usable sensitivity 2.5 μv; AM suppression 35 db; harmonic distortion (100% mod.) 1.0%; stereo separation 40 db; automatic switching stereo circuit; diode a.f.c. circuit; dimensions: 15½" wide, 5¼" high, 14¼" deep; weight, 18 lbs. **AM:** 4 transistors; r.f. amp superhet circuit; 3-gang tuning capacitor; diode detector; 1 i.f. stage; meter tuning indicator; controls—tuning, level, meter; switches—mode; IHF usable sensitivity 5 μv; IHF volume sensitivity 3.0 μv; freq. resp. ± 3 db from 20 to 5000 cps; harm. dist. 1.0%. Other features 10 kc whistle filter. Price, $119.95. Heath Co.

1. Deluxe AM/FM-stereo tuner, model AJ-41 ..... $119.95
2. Transistor AM/FM-stereo tuner, model AJ-33 ..... $ 99.95
3. AM/FM-stereo tuner, model AJ-32 $ 89.95
4. FM-stereo tuner, model AJ-12 ..... $ 69.95

KNIGHT-KIT

● *KG-70 Transistor AM-FM-Stereo Tuner Kit.* All-transistor construction. Factory wired and aligned FM front end and i.f. FM-AM signal-strength tuning meter. Edge illuminated dial. Automatic stereo indicator light.

Specifications: **FM:** 15 trans., 15 diodes; 2 i.f. stages; ratio detector; 3 audio stages; meter tuning indicator; output signal 1 volt; 4 outputs; controls—selector, tune; switches—power, a.f.c.; freq. resp. ± 1 db from 20 to 20,000 cps; signal-to-noise ratio 30 db; selectivity 3 db; IHF usable sensitivity 2 μv; AM Suppression 50 db; harmonic distortion (100% mod.) 1%; stereo separation 30 db; envelope detection stereo circuit; dimensions: 11" wide, 2¾" high, 9¼" deep; weight, 8 lbs. **AM:** 3-gang tuning capacitor; diode detector; 2 i.f. stages; meter tuning indicator; IHF usable sensitivity 3 μv. Other features: Built-in ferrite loopstick AM-FM 300-ohm folded dipole. Price, $99.95 less case. Walnut case, $12.95, metal case, $5.95. Allied Radio.

1. KG-50, AM-FM-stereo tuner kit $69.95
2. KF-90, AM-FM-stereo tuner kit $99.95
3. KG-65, AM-FM tuner $49.95
4. KG-35, FM tuner $35.95

LAFAYETTE

● *KT-650.* Multiplex output, low distortion, silicon rectifier.

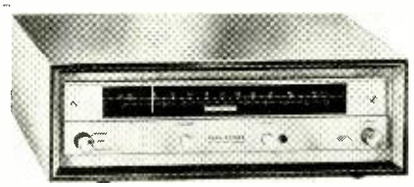
Specifications: 8 tubes; grounded grid front end; 4 i.f. stages; Foster-Seely detector; 1



audio stage; EM-84 tuning indicator; output signal 1.75 volts; controls—variable a.f.c., level, tuning; switches—power; freq. resp. ± ½ db from 15 to 35,000 cps; signal-to-noise ratio 57 db; capture ratio 8 db; IHF usable sensitivity 3 μv; AM suppression 48 db; harmonic distortion (100% mod.) 0.15%; reactance tube a.f.c. circuit; dimensions: 14" wide, 5" high, 11" deep; weight, 13½ lbs. Price. $54.50. Lafayette Radio.

PACO

● *Model ST-55MX FM-Stereo Multiplex Tuner.* Multiplex noise filter cancels high-frequency noise without distorting the full frequency range of the audio signal. EM84 tuning eye indicator for accurate station tuning and signal strength indication. Soft Gold, Solid Aluminum Control Panel.

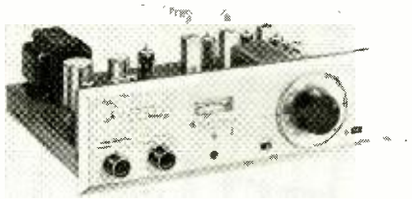


Specifications: 12 tubes; grounded-grid front end; 4 i.f. stages; Foster-Seely detector; eye tube tuning indicator; output signal 1.5 volts; 2 outputs; controls—tuning; switches—power, a.f.c., function sel; freq. resp. ± 1 db from 20 to 15k cps; IHF usable sensitivity 2.5 μv; harmonic distortion (100% mod.) 1%; stereo separation 30 db; matrixing stereo circuit; reactance tube a.f.c. circuit; dimensions: 15⅜" wide, 5⅝" high, 11¾" deep; weight, 23 lbs. Price, $109.95 (less enclosure). Paco.

1. ST-55MXK, semi-kit $139.95
2. ST-25MX, FM-stereo tuner kit ..... $ 69.95 (less enclosure)

H. H. SCOTT

● *LT-110 FM/mpx Tuner Kit.* The new LT-110 utilizes the same front end used in the famous Scott 310D "Broadcast Monitor" tuner. The front end and multiplex sections are prewired and pre-aligned at the factory eliminating the need for elaborate test equipment in alignment. The silver-plated front end, copper-bonded-to-aluminum chassis and Wide-Band design all contribute to an IHF sensitivity of 2.2 microvolts. The LT-110 uses a simplified Ez-A-Line method. Foolproof stereo indicator.



Specifications: 9 tubes, 12 diodes; cascode front end; 3 i.f. stages; ratio detector; 2 audio stages; meter tuning indicator; output signal 1.2-2 volts; 4 outputs; controls—"Sonic Monitor" selector; switches—stereo noise filter, age, "Sonic Monitor," Pwr/Mono/Stereo/Filter in; freq. resp. ± 1 db from 30 to 15k cps; signal-to-noise ratio 60 db; IHF volume sensitivity 0 μv; capture ratio 6.0 db; selectivity 35 db; IHF usable sensitivity 2.2 μv; AM Suppression 55 db; harmonic distortion (100% mod.) 0.8%; stereo separation 30+ db; time-switching stereo circuit; drift 20 kc; dimensions in case: 15½" wide, 5¼" high, 13¼" deep; weight, 12 lbs. Price, $164.95. H. H. Scott, Inc.

1. LT-111, FM/mpx tuner $119.95

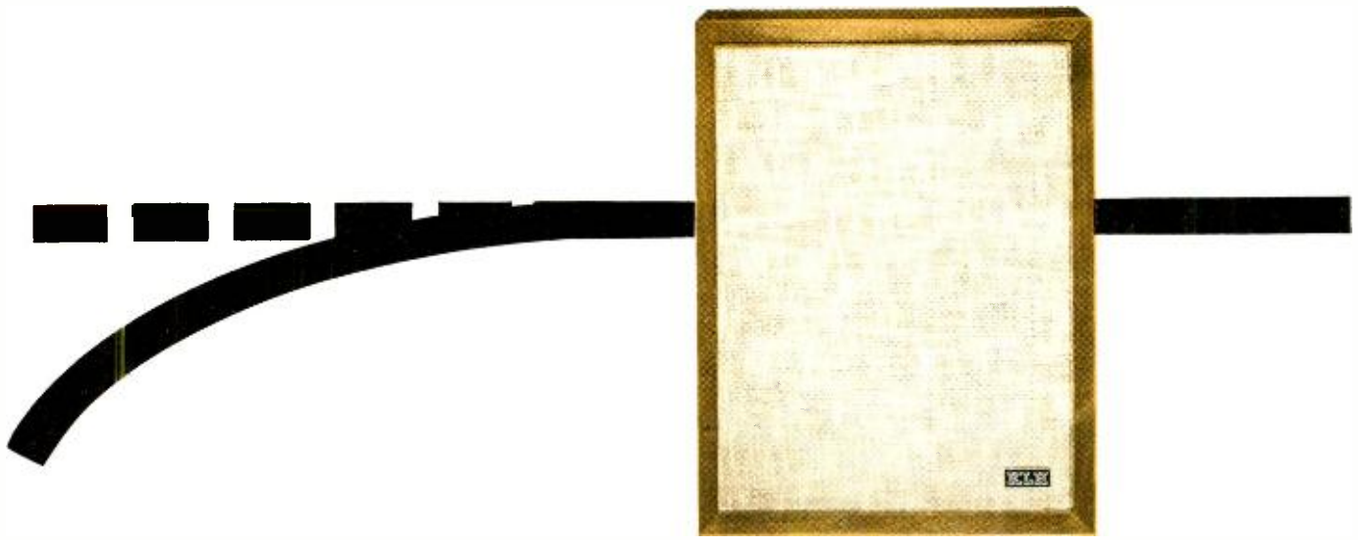
TUNER—AMPLIFIERS

ALTEC

● *708A Astro, AM-FM Stereo Tuner-Amplifier.* This tuner-amplifier is typical of the best grade of equipment that can be found in the home and thus serves ideally for checking the broadcast or recorded product in the exact manner in which it will be heard by the final listener-customer. It features power transis-

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Now you know why you waited



KLH has just introduced a new speaker system — the Model Fourteen — designed to accomplish two objectives — to reproduce music (1) with less distortion and (2) with more bass than has heretofore been possible for a small speaker system. Inside the compact enclosure of this new speaker are a number of vital departures from any speaker system ever produced before.

The Model Fourteen employs two extremely compliant *full-range* speakers. The diameter of their cones is only 3". Their maximum excursion is ⅜". This excursion is controlled by the highest ratio of magnet power to cone lightness ever engineered into a loudspeaker.

There are a series of problems involved in achieving good bass response in a small speaker system. First, all speakers roll off in the bass region. Small speakers have higher resonant frequencies and roll off at higher frequencies than large speakers. But a large speaker is not effective in a compact enclosure. The conventional small speaker is no better, since it cannot move enough air to produce respectable bass.

In the Model Fourteen, part of the answer is a small speaker with a very powerful magnet and long excursion. This provides two great advantages — the ability to move large volumes of air, and the precise control over cone movement necessary for freedom from distortion. It also provides a problem, however, since the damping effect of the heavy magnet increases at the lower frequencies. This reduces the bass output of the speaker.

The rest of the answer is the first use, in a small multi-speaker system, of a revolutionary technique which we call *frequency contouring*. This technique was pioneered by KLH in the now famous Model Eight FM Receiving System and Model Eleven Portable Stereophonic Phonograph — each generally conceded to be the finest example of its class yet produced. Incorporated in the Model Fourteen is a passive electronic network which reshapes the power output of any conventional amplifier to match exactly the low frequency power requirements of the speakers, so that their response curve remains flat far below its normal roll-off point.

This technique can only be applied successfully with speakers whose low frequency response is held precisely to a profile of certain specific characteristics. Only because the speakers used in the Model Fourteen — including their impregnated paper cones — are designed and manufactured in our own plant can they be held to the rigid uniformity required for the use of frequency contouring. No commercially supplied cones have the necessary uniformity. No other manufacturer of small full-range speakers produces its own cones.

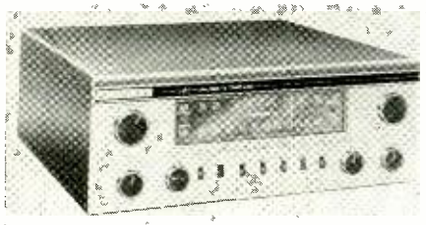
The result is a range and quality of reproduction you have never heard before in a compact speaker. The Model Fourteen, at any given level of overall loudness, will deliver more bass power, at lower frequencies, with less distortion than any other speaker system in the same range of cost or size.

The Model Fourteen's dimensions are 18" x 14" x 3¾". The price is about $50. Wait no longer.

KLH RESEARCH AND DEVELOPMENT CORPORATION

30 CROSS STREET, CAMBRIDGE 39, MASSACHUSETTS

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tors in the output stage to provide transient response as well as 55 watts output with low heat generation, allowing the unit to be mounted safely in fine executive cabinetry.

Specifications: **FM:** Total of 18 tubes, 12 transistors, 5 diodes for set; cascode front end; eye tube tuning indicator; IHF usable sensitivity 2 μv; stereo separation 30 db; time division stereo circuit. **AM:** eye tube tuning indicator; sensitivity 2.9 μv. **AMPLIFIER:** Freq. resp. 20 to 20,000 cps ± 1 db; IHF music power output 27.5 watts per channel; harmonic distortion, 1% at 20 watts from 25 to 10,000 cps; sensitivity, input for 20-watt output at 1000 cps—phono, 4 mv, aux, 450 mv; damping factor 10; output impedances 4, 8, 16 ohms; dimensions, 15" wide, 5⅛" high, 14¼" deep; weight, 28 lbs. Price $579.00. Altec-Lansing.

BELL

● *2445-S2 Stereo Receiver.* The 2445-S2 face plate is brushed-gold finish, and the case is finished in walnut-color vinyl-clad steel. Amplifiers have individual bass and treble controls. The tuner has meters for tuning and antenna orientation.

Specifications: **FM:** 8 tubes; cascode front end; 3 i.f. stages; ratio detector; 1 audio stage; meter tuning indicator; output signal 1.5 volts; 3 outputs; switches—mono-stereo tape monitor, a.f.c., filter, contour; freq. resp. ± 2 db from 30 to 53k cps; signal-to-noise ratio 55 db; IHF volume sensitivity 1.2 μv; capture ratio 4 db; sensitivity 250kc — 6 db; IHF usable sensitivity 1.8 μv; harmonic distortion (100% mod.) 0.4%; stereo separation 28 db; switching stereo circuit; reactance tube a.f.c. circuit; drift ± 5 kc; **AM:** 4 tubes; superhet circuit; 3-gang tuning capacitor; 2 i.f. stages; meter tuning indicator; IHF usable sensitivity 3 μv; IHF volume sensitivity 2 μv; freq. resp. ± 3 db from 30 to 8k cps; harm. dist. 1%. **AMPLIFIER:** Freq. resp. 35 to 20k cps ± 1 db at 1 watt output; power bandwidth, 50 to 20k cps; IHF music power output 22 watts per channel; power output, rms, 18 watts per channel; harmonic distortion, 1% at 1 watt from 35 to 20k cps; IM distortion 0.8% at 5 watts; hum and noise, 76 db below 22-watt output; sensitivity, input for rated output—phono, 3 mv, aux. 0.1 volts; damping factor 4; output impedances 4, 8, 16 ohms; inputs—3 phono, 1 tape head, 1 tape amp, 1 aux; dimensions, 17 3/16" wide, 5 7/16" high, 13¾" deep; weight, 35 lbs. Price $319.95. Bell Sound.

1. 2425-S2 30 watt AM-FM stereo receiver $269.95

BOGEN

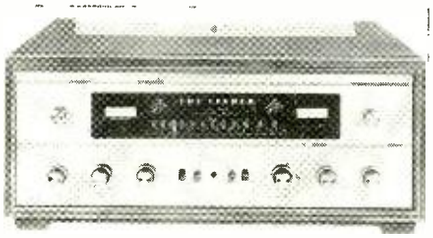
● *RP60 FM/AM Stereo Receiver.* Combining an FM/AM stereo tuner with an integrated stereo preamplifier and 60-watt amplifier, the RP60, heart of the home music system, represents flexibility in a single unit. For FM broadcasts, the RP60 is equipped with a "Stereo-Minder" indicator that lights up when a station is transmitting in FM stereo. For private enjoyment of stereo, the RP60 has been designed with an outlet on the front panel for stereo headphones. Brushed gold finish adds decorator look.

Specifications: **FM:** 10 tubes + 6 diodes; grounded-grid front end; 3 i.f. stages; ratio detector; electronic eye tuning indicator; 5 outputs; controls—program sel, mode, volume, balance, bass treble, power, tuning; switches—rumble filter, scratch filter, loudness, tape monitor, a.f.c., stereo filter; freq. resp. ± 1 db from 20 to 20,000 cps; signal-to-noise ratio 60 db; IHF volume sensitivity ± 5 μv; capture ratio 4 db; selectivity 40 db; IHF usable sensitivity 2.5 μv; AM suppression 50 db; harmonic distortion (100% mod.) 0.5%; stereo separation 30 db; time division stereo circuit; reactance tube a.f.c. circuit; drift 20 kc; dimensions: 15 15/16" wide, 5¼" high, 15" deep; weight, 28 lbs. **AM:** 4 tubes + 1 diode; superhet circuit; 3-gang tuning capacitor; 2 i.f. stages; electronic eye tuning indicator; IHF usable sensitivity 10 μv; IHF volume sensitivity 10 μv; freq. resp. ± 3 db from 30 to 5000 cps; harm. dist. 1%. **AMPLIFIER:** Freq. resp. 20 to 30,000 cps ± 1 db at 60 watts output; power bandwidth, 50 to 15,000 cps; IHF music power output 30 watts per channel; power output, rms, 27 watts per channel; harmonic distortion, 0.6% at rated output; IM distortion 0.3% at 2.5 watts; hum and noise, 50 db below 1 watt output; sensitivity, input for rated output—phono, 4.5 mv, aux. 0.5 volts; output impedances 4, 8, 16 ohms; inputs—2 phono, 2 tape head, 2 tape amp, 2 aux. Price $314.95. Bogen.

1. RPF60 FM-stereo rec., 60-w. amp. .. $279.95
2. RP100-BM FM-AM mono rec., 15-w $186.60

FISHER

● *500-C 75-Watt Stereo Multiplex Receiver.* The FISHER 500-C consists of an FM-multiplex tuner, a master audio control center, and a 75-watt dual-channel power amplifier combined on the same chassis. Featuring four wide-band i.f. stages, three short-time-constant limiters, and a 1-mc-wide detector bandwidth. Multiplex is derived by the use of a synchronous oscillator in conjunction with two balanced diode bridges. The control center provides facilities for tape monitoring, a full complement of controls and filters, and an earphone jack. "Stereo Beacon" automatically switches the receiver between the stereo- and monophonic modes of operation.



Specifications: **FM:** 24 tubes, 6 diodes, sil. rect.; golden synchrode front end; 4 i.f. stages; ratio detector; "Stereo Beacon" and meter tuning indicator; signal-to-noise ratio 80 db; IHF volume sensitivity below noise level; capture ratio 2.5 db; selectivity 60 db; IHF usable sensitivity 1.8 μv; AM suppression better than 50 db; harmonic distortion (100% mod.) 0.5%; stereo separation 35 db; time-division multiplex stereo circuit; drift 0.01%. **AMPLIFIER:** Freq. resp. 25 to 25,000 cps ± 1.5 db at 2 watts output; power bandwidth, 20 to 20,000 cps; IHF music power output 37.5 watts per channel; power output, rms, 33 watts per channel; harmonic distortion, 0.5% at 75 watts at 1 kc; IM distortion 0.7% at 70 watts; hum and noise, 80 db below 75 watt output; sensitivity, input for rated output-phono, 3.3 mv, aux. 0.23 volts; damping factor 10; output impedances 4, 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape monitor, 2 aux; dimensions, 17½" wide, 5¾" high, 13½" deep; weight, 36½ lbs. Price $389.50. Walnut and mahogany cabinets available. Fisher Radio.

1. 400, 60-watt FM-stereo rec $329.50
2. 800-C, 75-watt AM-FM-stereo rec . $449.50

GROMMES

● *502M 30-Watt FM/AM Stereo Receiver.* A compact FM/AM receiver requiring only two speakers to complete the system. FM section has flywheel tuning, "stereo-sentry" tuning indicator and a.f.c. Matched-ganged controls simplify operation.

Specifications: **FM:** 17 tubes + 11 diodes; grounded-grid front end; 3 i.f. stages; bal. ratio detector; bar tube tuning indicator; controls—tuning, selector, loudness, balance, bass treble; switches—stereo-mono, contour, a.f.c., power; freq. resp. ± 1 db from 20 to 20,000 cps; signal-to-noise ratio 60 db; capture ratio 5 db; selectivity 300 kc; IHF usable sensitivity 4 μv; AM suppression 50 db; harmonic distortion (100% mod.) 0.5%; stereo separation 35 db; switching stereo circuit; reactance tube a.f.c. circuit; drift 10 kc; dimensions: 13¼" wide, 4 15/16" high, 13¼" deep. **AM:** superhet circuit; 2-gang tuning capacitor; 1 i.f. stage; bar tube tuning indicator; IHF usable sensitivity 10 μv; freq. resp. ± 3 db from 20 to 6500 cps; harm. dist. 1.0%. **AMPLIFIER:** Freq. resp. 20 to 20,000 cps ± 1 db at 1 watt output; power bandwidth, 30 to 20,000 cps; IHF music power output 15 watts per channel; power output, rms, 15 watts per channel; harmonic distortion, 1% at 10 watts from 40 to 15,000 cps; IM distortion 2% at 15 watts; hum and noise, 72 db below 15 watt output; sensitivity, input for rated output-phono, 6 mv, aux, 0.25 volts; damping factor 4.5; output impedances 4, 8, 16 ohms; inputs—1 phono, 1 tape head, 1 aux. Price $199.95. Cover, $7.50. Grommes.

1. 500M 70-watt stereo rec. $299.95

HARMAN-KARDON

● *Model TA7000X 70-Watt AM/FM, FM-Stereo Receiver.* AM/FM and FM-stereo tuner, stereo preamp with input facilities and controls for every purpose, plus 70-watt amplifier capable of driving modern speaker systems. Special features: "Stereo Logic" circuit automatically switches tuner to stereo; stereo light, stereo headphone, tape monitor, solid-state power supply, massive output transformers.

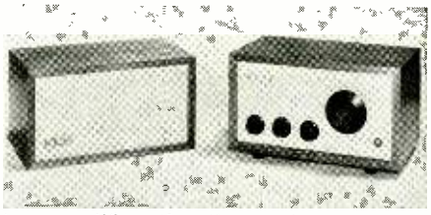


Specifications: **FM:** 9 tube sections; low-noise triode front end; 4 i.f. stages; solid-state Foster-Seely detector; D'Arsonval meter tuning indicator; output signal 1 volt; 2 tape outputs; controls—gain, blend, balance, tuning, tone, function; switches—stereo normal/reverse, lo-cut, hi-cut, equal., contour, mode, on/off; freq. resp. ± 1 db from 15 to 70,000 cps; signal-to-noise ratio 70 db; IHF volume sensitivity 0 μv; capture ratio 5 db; IHF usable sensitivity 3.2 μv; AM suppression 50 db; harmonic distortion (100% mod.) 0.1%; stereo separation 30 db; switching stereo circuit; reactance tube a.f.c. circuit; drift ± 10 kc. **AM:** 4 tube; superhetrodyne circuit; 3-gang tuning capacitor; 2 i.f. stages; level meter tuning indicator; IHF usable sensitivity 80 μv; freq. resp. ± 3 db from 50 to 5000 cps; harm. dist. 1%. **AMPLIFIER:** Freq. resp. 12 to 70,000 cps ± 1 db at 1 watt output; power bandwidth, 40 to 30k cps; IHF music power output 35 watts per channel; power output, rms, 30 watts per channel; harmonic distortion, 1% at 30 watts from 40 to 20k cps; IM distortion 1% at 30 watts; hum and noise, 85 db below 30-watt output; sensitivity, input for rated output—phono, 2.0 mv, aux. 200 mv; damping factor 15; output impedances 4, 8, 16 ohms; inputs—2 phono, 2 tape head, 2 tape amp, 2 aux; dimensions, 16" wide, 6¼" high, 13½" deep; weight, 40 lbs. Price $339.95. Metal enclos., $12.95, walnut enclos., $29.95. Harman-Kardon.

1. TA3000X 30-watt stereo FM-AM rec. $249.95

KLH

● *Model Eight FM Recording System.* A complete FM receiving system housed in two walnut cabinets, each of which measures 10⅝" w × 5⅞" h × 6⅝" d. One section consists of a

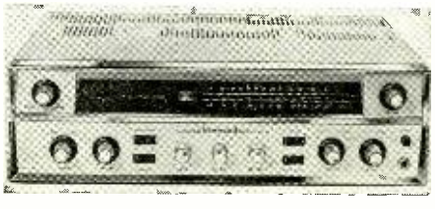


tuner-amplifier; the other section contains a wide-range speaker system. Jacks are provided to permit the use of the tuner section with other equipment and for the addition of a multiplex adapter. Weight 15 lbs. $159. Aux. speaker $54. Stereo adapter, $104.00. KLH.

KENWOOD

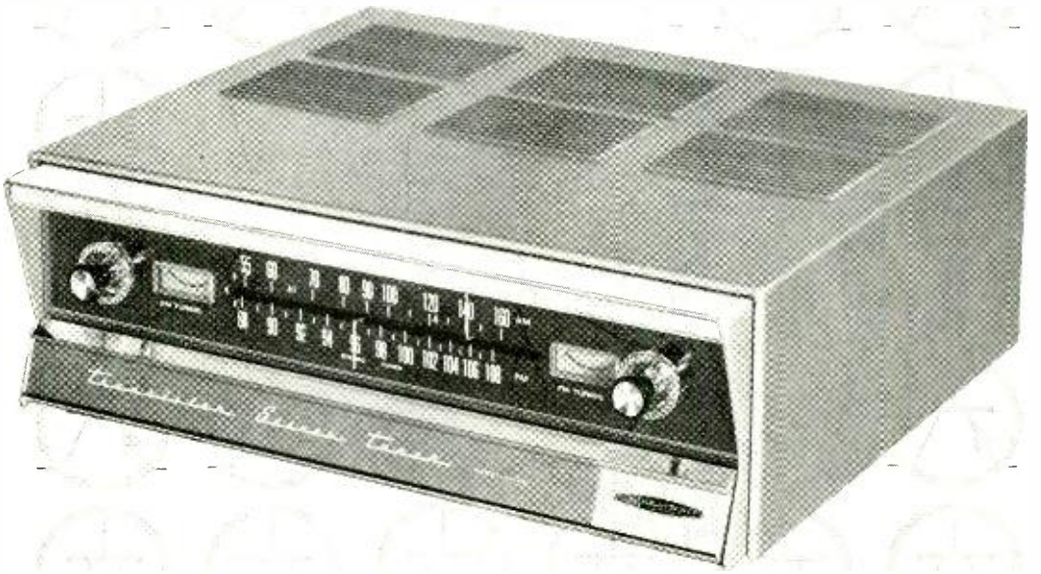
● *KW-40, 40-Watt Stereo Receiver.* A complete receiving system in a compact package including AM, FM, FM-stereo, amplifier, and audio control center.

Specifications: **FM:** 10 tubes, 4 diodes; 4 i.f. stages; ratio detector; 1 audio stage; meter tuning indicator; output signal 2 volts; 2 outputs; controls—dimension; switches—selector, a.f.c.; freq. resp. ± ½ db from 20 to 20,000 cps; IHF usable sensitivity 1.9 μv;

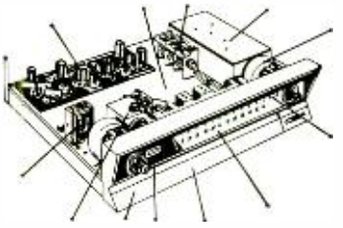


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harmonic distortion (100% mod.) 1%; stereo separation 38 db; matrix stereo circuit; **AM:** 3 tubes, 1 diode, superhet circuit; 3-gang tuning capacitor; 1 i.f. stage; meter tuning indicator; switches—selector, a.v.c.; IHF usable sensitivity 20 μv; freq. resp. ± ½ db from 50 to 15,000 cps. **AMPLIFIER:** freq. resp. 20 to 30,000 ± ½ db; IHF music power output 20 watts per channel; power output, rms, 18 watts per channel; harmonic distortion, 1%; sensitivity, input for rated output—phono, 3 mv, aux, 0.03 volts; output inpedances 8, 16 ohms; inputs—phono, tape head, tape amp, aux, crystal; dimensions, 17¾" wide, 5⅛" high, 14" deep; weight, 31 lbs. Kenwood Elect.

LAFAYETTE

● *LA-226C 40-Watt FM/AM Stereo Receiver.* "Pilot Monitor" Stereo indicator shows when station is tuned to FM stereo multiplex broadcast. 2 3-gang tuning capacitors, front panel stereo headphone receptacle.



Specifications: **FM:** 20 tube/7 diodes; ratio detector; EM-84 tuning indicator; freq. resp. ±0.5 db from 20 to 20,000 cps; IHF usable sensitivity 3.5 μv; harmonic distortion (100% mod.) 0.7%; stereo separation 30 db; matrix stereo circuit; reactance a.f.c. circuit; dimensions: 17½" wide, 5¼" high, 15" deep; weight, 45 lbs. **AM:** 3-gang tuning capacitor; EM-84 tuning indicator; controls—concentric bass/treble, blend volume, balance, dimension, hum balance; switches—5-position program selector, mode, FM noise filter, rumble filter, speaker/headphone switch, phase, loudness, on-off, a.f.c., spk. impedance. **AMPLIFIER:** Freq. resp. 20 to 20,000 cps ± 2 db at 40 watts output; IHF music power output 20 watts per channel; power output, rms, 18 watts per channel; harmonic distortion, 1.5% at 20 watts from 20 to 20,000 cps; hum and noise, 65 db below 1 watt output; sensitivity, input for rated output-phono 2 mv, aux. 0.1 volts; output impedances 8, 16 ohms; inputs—4 phono, 2 tape head. Price $189.95. Lafayette Radio.

PILOT

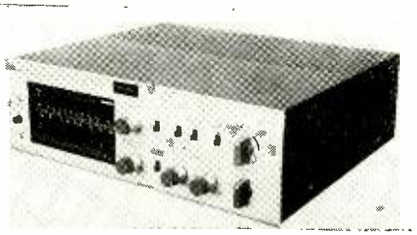
● *Model 746.* Integrated, high performance AM/FM/FM-stereo receiver. Excellent capture ratio, extremely low distortion. Center-speaker output, headphone jack, flywheel tuning, built-in AM and FM antenna.

Specifications: **FM:** 9 tubes; cascode front end; 4 i.f. stages; ratio detector; 2 audio stages; center-zero meter tuning indicator; output signal 1.5 volts; 2 outputs; controls—tuning, volume, balance, bass, treble; switches—phono input selector, FM muting, loudness, tape mon., rumble, funct. selector, mode, power (auto shutoff), spkr. selector, scratch; freq. resp. ± 1 db from 20 to 20,000 cps; IHF volume sensitivity 1.8 μv; capture ratio 1 db; selectivity 44 db alt. channel; IHF usable sensitivity 1.8 μv; harmonic distortion (100% mod.) 0.25%; stereo separation 30 db; synchronous switching stereo circuit; drift 30 kc; dimensions: 17⅝" wide, 6¼" high, 13 5/16" deep. **AM:** 5 tubes; 3-gang tuning capacitor; 2 i.f. stages; meter tuning indicator; IHF usable sensitivity 3 μv; IHF volume sensitivity 5 μv; freq. resp. ±3 db from 20 to 6000 cps; harm. dist. 0.5%. **AMPLIFIER:** Freq. resp. 10 to 40,000 cps ± 1 db at 1 watt output; power bandwidth, 22 to 23k cps; IHF music power output 30 watts per channel; power output, rms, 22 watts per channel; harmonic distortion, 0.5% at 22 watts from 30 to 15k cps; IM distortion 0.25% at 22 watts; hum and noise, 80 db below 22-watt output; sensitivity, input for rated output—phono, 3.5 mv, aux. 0.12 volts; output impedances 4, 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape amp; dimensions, 17⅝" wide, 6¼" high, 13 5/16" deep. Price $399.50. Oiled walnut enclosure, $27.50. Pilot Radio.

1. 610 FM-stereo 24-watt rec. ..... $199.50 with cover
2. 602MA FM-stereo 30-watt rec. .... $249.50 with cover
3. 602SA AM-FM-stereo 30-watt rec. .. $299.50 with cover
4. 654MA FM-stereo 60-watt rec. .... $329.50 with cover

PIONEER

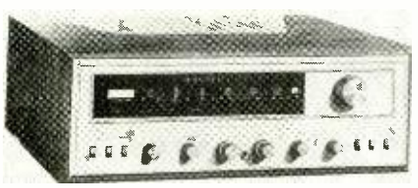
● *SM-600 Tuner-Amplifier.* The Pioneer SM-600 tuner-amplifier is a complete stereophonic receiver with an output of 40 watts per channel. It provides reception of all radio broadcasts, including AM, FM, and FM multiplex stereo. The preamplifier section is designed for maximum versatility and is capable of accommodating all forms of inputs.



Specifications: **FM:** 10 tube; cascode front end; 3 i.f. stages; Foster Seely detector; eye-tube tuning indicator; output signal 1 volt; 1 output; controls—tuning; switches—a.f.c. defeat, distant/local; freq. resp. ± 1 db from 30 to 15,000 cps; signal-to-noise ratio 50 db; IHF usable sensitivity 1.5 μv; AM suppression 60 db; harmonic distortion (100% mod.) 0.5%; stereo separation 30 db; time-division switching stereo circuit; reactance tube a.f.c. circuit; drift 10 kc; **AM:** 3 tube; superheterodyne circuit; 3-gang tuning capacitor; 1 i.f. stage; eye-tube tuning indicator; switches—bandwidth selector; IHF usable sensitivity 6.3 μv; freq. resp. ± 1 db from 30 to 15,000 cps; harm. dist. 0.5%. **AMPLIFIER:** Freq. resp. 15 to 100,000 cps ± 1 db at 0.5 watts output; IHF music power output 40 watts per channel; power output, rms, 27 watts per channel; harmonic distortion, 1% at 27 watts from 40 to 12,000 cps; IM distortion 3% at 25 watts; hum and noise, 80 db below 27 watts output; sensitivity, input for rated output—phono, 2.3 mv, aux. 0.16 volts; damping factor 9; output impedances 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape amp, 2 aux; dimensions, 17 45/64" wide, 5 5/64" high, 17 9/32" deep; weight, 37 lbs. Pioneer.

H. H. SCOTT

● *340B FM/MPX Tuner/Amplifier.* The 340B features: 1. Complete tape monitoring facilities, all controls operate on playback; 2. Powered third channel for direct connection of remote speakers or for a three-speaker system; 3. "Auto-Sensor" circuitry for fully automatic operation; 4. Indicator lights prevent inadvertent use of Tape Monitor control; 5. Convenient front-panel earphone receptacle for private listening.



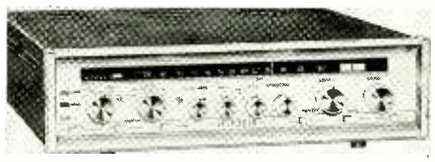
Specifications: **FM:** 19 tubes, 22 diodes; cascode front end; 3 i.f. stages; ratio detector; meter tuning indicator; output signal 1.0 volts; recorder output; controls—input, selector, bass, treble, balance, loudness, tuning; switches—rumble, scratch, monitor, comp., speakers, power; freq. resp. ± 1 db from 30 to 15k cps; signal-to-noise ratio 60 db; IHF volume sensitivity 0 μv; capture ratio 6.0 db; selectivity 35 db; IHF usable sensitivity 2.2 μv; AM suppression 55 db; harmonic distortion (100% mod.) 0.8%; stereo separation 30+ db; time-switching stereo circuit; drift 20 kc. **AMPLIFIER:** Freq. resp. 20 to 20k cps ± 1 db at ½-power output; power bandwidth, 20 to 20k cps; IHF music power output 35 watts per channel; power output, rms, 30 watts per channel; harmonic distortion, 0.8% at rated power from 20 to 20k cps; hum and noise, 80 db below 30 watt output; sensitivity, input for rated output—phono, 3, 9, 180 mv, aux. 0.5 volts; damping factor 8:1; output impedances 4, 8, 16 ohms: inputs—3 phono, 1 tape amp, 1 aux, 1 center-channel out; dimensions, 16¾" wide, 5½" high, 13⅝" deep; weight, 35 lbs. Price $399.95. H. H. Scott, Inc.

1. 380 same as 340B but with AM $459.95

SHERWOOD

● *S-8000 III FM-Stereo 80-Watt Receiver.* This unit contains all of the electronics for a complete home-music system on a single compact chassis. The S-8000 **III** features two 40-watt amplifiers, complete with dual preamplifiers for phono and tape plus a highly sensitive FM tuner with complete wired-in circuitry for receiving FCC-approved FM multiplexed stereocasts. Just add speakers to complete your stereo home hi-fi music system.

Specifications: **FM:** 20 tubes, 3 silicon rect., 9 diodes; cascode front end; 2 i.f. stages; ratio detector; 2 audio stages; meter type of tuning indicator; output signal 1.5 volts; no. of outputs, stereo pair; controls—FM-tuning, loudness, stereo balance, hush, bass, treble, phono gain; switches—off-on, hi-filter, lo-filter, phase rev, tape monitor, loudness contour; freq. resp. ± ½ db from 20 to 20k cps; signal-to-noise ratio 55 db; capture ratio 2.4 db; IHF usable sensitivity 1.9 μv; harmonic

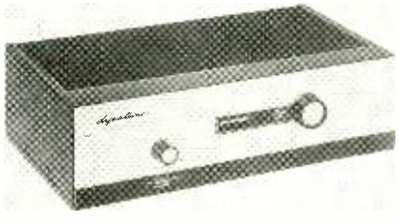


distortion (100% mod.) ⅓%; stereo separation 40 db; type of stereo circuit phase loaded osc. and bal. synch. detector; drift 15 kc. Other features, "interchannel hush" or noise squelch, flywheel tuning. **AMPLIFIER:** Freq. resp. 20 to 20k cps ± ½ db at 36 watts output; IHF music power output 40 watts per channel; power output, rms, 36 watts per channel; harmonic distortion, ½% at 36 watts; hum and noise, 75 db below 1 watt output; sensitivity, input for rated output—phono, 1.2 mv, aux. ¼ volt; damping factor 5; output impedances 4, 8, 16 ohms; inputs—stereo phono, stereo tape head, stereo tape amp, stereo aux. Dimensions, 16¼" wide, 4" high, 14" deep; weight, 34 lbs. Price $319.50. Case, $9.50. Sherwood Electronic Labs.

TUNER AMPLIFIER KITS

DYNAKIT

● *FM-1 Tuner Kit plus FMA-2 Amplifier Kit.* Combination of two kits provides a 10-watt mono tuner-amplifier for background listening, or as an auxiliary system for portable or outdoor use. The FMA-2 fits into the space on the tuner which may alternately house a multiplex adapter. The sole controls on this unit are volume, tuning, and on-off switch. The normal tuner outputs are unaffected.



Specifications: **FM:** 9 tubes; cathode-coupled front end; 4 i.f. stages; balanced-bridge detector; 2 audio stages; eye tuning indicator; output signal 2 volts; 2 outputs; controls—volume, tuning; switches—on-off; freq. resp. ± 0.5 db from 10 to 40k cps; signal-to-noise ratio 70 db; IHF volume sensitivity 0 μv; capture ratio 5 db; selectivity 54 db; IHF usable sensitivity 4 μv; AM Suppression 63 db; harmonic distortion (100% mod.) 0.25%; drift 30 kc max.; dimensions: 13" wide, 4" high, 8" deep; weight, 13 lbs. **AMPLIFIER:** Freq. resp. 12 to 35k cps ± 1 db; power bandwidth, 20 to 20k cps; power output, rms, 10 watts; harmonic distortion, 1% at 10 watts from 30 to 15k cps; IM distortion 1% at 10 watts; hum and noise, 70 db below 10-watt output; damping factor 10; output impedances 8, 16 ohms. Price $109.90. Dynaco, Inc.

EICO

● *2536 FM-Stereo Receiver Kit.* An FM-stereo tuner and a 36-watt stereo amplifier on one chassis.

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NEUMANN MICROPHONES



NEW! U-67 CONDENSER STUDIO MICROPHONE

CULMINATION OF OVER 30 YEARS OF ELECTRONIC LEADERSHIP!

Contains the following advanced features:

1. Electronically switched directional characteristics: Cardioid, Omni-directional, Figure-8.
2. Frequency response with virtually no peak at the high end.
3. Separate "Voice-Music" switch raises the roll-off starting point from 40 cps to 100 cps.
4. Sensitivity switch on microphone prevents overload of amplifier from close placement to sound source.
5. "Calibrating input" permits direct testing of microphone preamplifier with oscillator.
6. Uses regular EF-86 tube, readily replaceable.

Complete system includes: Microphone, Power supply, Interconnect cable and stand mount.



NEUMANN M-49b CONTINUOUSLY ELECTRONICALLY VARIABLE DIRECTIONAL PATTERN MICROPHONE SYSTEM

This microphone permits remote control of the directional characteristic. A smooth, continuous fader-control selects any of the basic directional patterns (non-directional, bi-directional, and cardioid) and any intermediate pattern. Wide frequency response with extremely low distortion—0.6% 40-15 kc up to 110 db absolute.

Complete microphone system consists of microphone, power supply and MZ-49 Swivel mounting harness.



NEUMANN KM-54a/KM-53a

The KM-54a is a super cardioid miniature microphone that has been designed with tv and film in mind. This 7/8" diameter by 5" long, 3½ ounce marvel, when mounted in the Z-38 full elastic suspension, can be aimed at the sound and provide more than 25db rejection of extraneous sounds in the studio.

Complete microphone system consists of microphone, power supply, inter-connect cable, output connector.



NEUMANN KM-56 MINIATURE CONDENSER MICROPHONE SYSTEM

The KM-56 satisfies a great demand for a microphone of modern, miniature styling of unexcelled reliability and performance. It is a true self-contained condenser microphone incorporating electronic switching of the directional characteristic (U.S. Pat. No. 2.678,967) to all three patterns: omni-directional, bi-directional, and cardioid. It uses a pure nickel double diaphragm capsule offering high resistance to temperature and humidity effects.

Complete microphone system consists of microphone, power supply, inter-connect cable, output connector.

EMT 140 SERIES REVERBERATION UNITS

Demanded by discriminating Radio, TV and Recording Studios everywhere for the most natural sounding artificial reverberation.

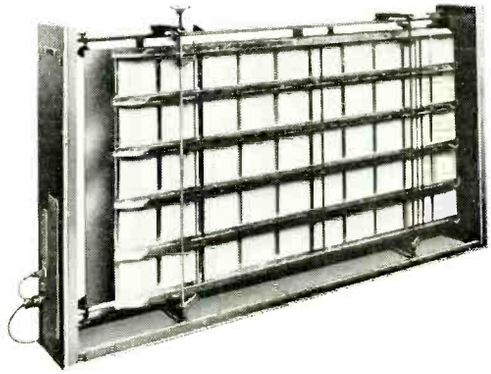
Decay period variable from 0.5 to 5.50 seconds, hand wheel adjusted or by optional remote control. Suspended steel plate creates high spectrum density decay.

Complete with amplifiers, moving coil driver and two contact pick-up microphones (prepared for Stereo conversion).

EMT 140 st. stereo unit slightly higher. A natural for Stereo recording, "Stereoizing" Mono Recordings and FM Stereocasters.

Space requirements: 1'x 4'–6"x 8'.

Information concerning all other EMT products available on request.

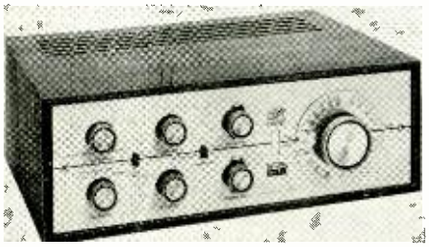


COMPLETE TECHNICAL SPECIFICATIONS WILL BE PROMPTLY FURNISHED UPON PROFESSIONAL REQUEST.

GOTHAM AUDIO CORPORATION

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Specifications: **FM:** ratio detector; signal-to-noise ratio 55 db; capture ratio 3 db; IHF usable sensitivity 3 μv; harmonic distortion (100% mod.) 0.6%; stereo separation 30 db. **AMPLIFIER:** Freq. resp. 15 to 40,000 cps ±1 db; power bandwidth, 30 to 20,000 cps; IHF music power output 36 watts per channel; power output, rms, 28 watts per channel; harmonic distortion, 0.2% at 1 watt from 30 to 20,000 cps; IM distortion 0.2% at 1 watt; output impedances, 8, 16 ohms; inputs—mag. phono, tape head, tape amp, aux; dimensions, 15⅞" wide, 5⅝" high, 13⅝" deep. Price $154.95. EICO.

HARMAN-KARDON

● *Model FA30XK 30-Watt FM-Stereo Receiver Kit.* Sensitive FM tuner with r.f. and oscillator stage pre-assembled and factory aligned, stable stereo adapter; 30-watt amplifier featuring output transformers with special grain-oriented cores; silicon-diode solid-state supply; all input and control facilities.

Specifications: **FM:** 7 tube sections; triode/tetrode front end; 3 i.f. stages; ratio detector; output signal 1 volt; 2 outputs; controls—tuning, ganged bass & treble, blend, balance, loudness, function; switches—on/off, equalization, contour, rumble, scratch, FM-AFC; freq. resp. ±1 db from 20 to 35,000 cps; sig-

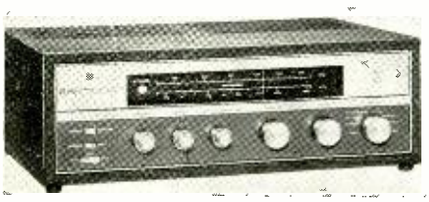


nal-to-noise ratio 70 db; IHF volume sensitivity 2 μv; capture ratio 6 db; IHF usable sensitivity 3.5 μv; AM Suppression 50 db; harmonic distortion (100% mod.) 1%; stereo separation 30 db; switched stereo circuit; solid-state a.f.c. circuit; drift ±10 kc. **AMPLIFIER:** Freq. resp. 15 to 70,000 cps ±1 db at 1 watt output; power bandwidth, 50 to 20k cps; IHF music power output 15 watts per channel; power output, rms, 12 watts per channel; harmonic distortion, 1% at 12 watts from 20 to 20k cps; IM distortion 1% at 12 watts; hum and noise, 85 db below 12 watt output; sensitivity, input for rated output-phono, 2.0 mv, aux, 0.125 volt; damping factor 10; output impedances 8, 16 ohms; inputs—4 phono, 2 tape head, 2 tape amp, 2 aux; dimensions, 15¼" wide, 5 7/16" high, 11½" deep; weight, 35 lbs. Price $169.95. Metal enclosure, $12.95, walnut enclosure $29.95. Harman-Kardon.

KNIGHT-KIT

● *KU-45A AM-FM-Stereo Receiver Kit.* All-in-one AM-FM-stereo receiver kit with pre-assembled and prealigned FM front end. Push-button on-off, 32-watts continuous sine wave power. Stereo indicator light. Complete with AM and FM antennas.

Specifications: **FM:** 17 tubes; tuned r.f. front end; 3 i.f. stages; ratio detector; eye tube tuning indicator; controls—bass, treble, selector, volume, tune, separation, balance; switches—stereo reverse, stereo-mono, a.f.c., dsr, on-off; freq. resp. 20 to 20,000 cps; IHF usable sensitivity 2.5 μv; stereo separation 30 db. **AMPLIFIER:** Freq. resp. 30 to 16,000 cps ±1 db at rated output; power output,



rms, 16 watts per channel; harmonic distortion, 1% at rated output; hum and noise, 75 db below rated output; sensitivity, input for rated output-phono, 2 mv; output impedances 4, 8, 16 ohms; dimensions, 16½" wide, 4¾" high, 13" deep; weight, 39 lbs. Price $139.95. Walnut case $14.95, metal case $7.95. Allied Radio.

PACO

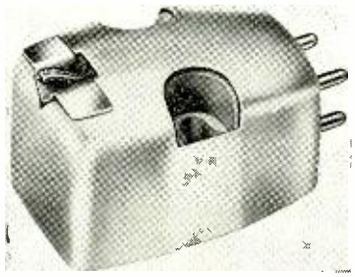
● *Model ST-26 FM Tuner-Amplifier.* The ST-26 features: Flywheel tuning, built-in multiplex jack to accommodate multiplex adapter, switched ceramic cartridge, switched bass boost.

Specifications: **FM:** 7 tubes; grounded-grid front end; 3 i.f. stages; ratio detector; 1 audio stage; eye tube tuning indicator; output signal 1 volt; 2 outputs; controls—tuning, volume; switches—on-off, a.f.c., function, mode; IHF usable sensitivity 4 μv; AM Suppression 25 db; varicap semiconductor a.f.c. circuit; drift 30 kc. **AMPLIFIER:** Freq. resp. 60 to 15k cps ±2 db harmonic distortion, 1.5% at 1 kc; output impedances 4, 8 ohms; inputs—1 phono; dimensions, 13" wide, 3⅞" high, 8¾" deep; weight, 7 lbs. Price $54.95. Metal enclosure, $4.95, walnut finish enclosure, $14.95. Paco.

PHONO CARTRIDGES

ADC

● *ADC-1.* Designed for use with tone arms and turntables of the highest quality, the ADC-1 is individually calibrated and comes with complete performance report card. The stylus can be replaced in less than 10 seconds and comes out with a flick of your finger—no tools or special skill are required.



Specifications: Moving magnet; freq. resp. 10 to 20,000 cps ±2 db; output, 1.25 mv/cm rec. velocity; channel separation, 33 db at 1 kc, 29 db at 10 kc; recommended load, 47k ohms; recommended tracking force—professional arms, 0.75–1.5 gms, effective stylus mass, 0.5 mg; compliance—lateral, 20×10^{-6} cm/dyne, vertical, 20×10^{-6} cm/dyne; no. of terminals, 4; mounting dimensions, std; weight, 6.8 gms, stylus radius, 0.6 mil. Price, $49.50. Audio Dynamics.

1. ADC-2, ... $46.50
2. ADC-3 ..... $37.50

BENJAMIN ELAC

● *ELAC 322 with 0.52-mil Diamond Stylus.* The new ELAC 322 magnetic cartridge is specifically designed for stereo records and utilizes a 0.52-mil diamond stylus. Maximum compliance has been obtained by reducing moving mass without sacrificing stylus shank rigidity. This has been achieved by employing magnesium, which is lighter and more rigid than aluminum. The resultant low distortion achieved in the ELAC 322 (less than 2% IM and less than 1% harmonic distortion) has rarely been feasible in electro-mechanical transducers.

Specifications: Freq. response 20 to 20,000 cps ±2 db; output, 7 mv/cm rec. velocity; channel separation, 25 db at 1 kc, 20 db at 10 kc; recommended load, 33–50k ohms; recommended tracking force—professional arms, 1.5 gms, changers, 2.5 gms, effective stylus mass, 1.2 mg; compliance—lateral, 14×10^{-6} cm/dyne, vertical, 14×10^{-6} cm/dyne; inductance, 650 mh; 4 terminals; mounting dimensions, std.; weight, 11 gms, including brackets. Additional features; Mu-metal Shielded Case. Stylus assembly is removable and can be replaced without tools. Price, diamond, $49.50; replacement styli, $25.00. Benjamin.

1. ELAC stereo/mono cartridge model 222 $39.50

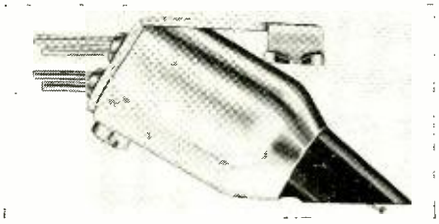
DUAL

● *DMS-900 Magnetic Stereo Cartridge.* Featuring excellent performance with tracking force of less than 2 grams, the Dual DMS-900 is constructed so that stylus can be easily replaced—just lift out the easily grasped assembly.

Specifications: Variable reluctance; freq. resp. 20 to 20,000 cps ±3 db; output, 1 mv/cm rec. velocity; channel separation, 28 db at 1 kc; recommended load, 12–47 k ohms; recommended tracking force—professional arms, 1.5–5 gms, changers 2–5 gms; compliance—lateral 4×10^{-6} cm/dyne, vertical, 3×10^{-6} cm/dyne; inductance, 250 mh, d.c. resistance 800 ohms/channel; no. of terminals, 4; mounting dimensions, std.; weight 14 gms. Price, diamond, $34.50; replacement styli, $17.25. United Audio.

DYNACO—B&O

● *Stereodyne II.* Magnetic moving-iron stereo cartridge featuring a symmetrical design utilizing a quadri-coil push-pull circuit providing low impedance, a hum-bucking push-pull system, and complete mumetal shielding for near-zero hum pickup under any conditions. High output ensures a superior signal-to-noise ratio. Exceptional tracking, high compliance, and low moving mass for prolonged record and stylus life.



Specifications: Freq. response 30 to 15k cps ±2 db; output, 1.5 mv/cm rec. velocity; channel separation, 30 db at 1 kc, 15 db at 10 kc; recommended load, 47k ohms; recommended tracking force—professional arms, 1–2.5 gms, changers, 2–4 gms, effective stylus mass, 1 mg; compliance—lateral, 7×10^{-6} cm/dyne, vertical, 7×10^{-6} cm/dyne; inductance, 185 mh; d.c. resistance, 1200 ohms; 4 terminals; mounting dimensions, ½"; weight, 10 gms. Additional features: extremely low hum pickup; replaceable stylus; built-in stylus protection feature (retractable within nose cone). Price, diamond, $29.95; replacement styll, $14.95. Dynaco.

EMPIRE

● *Model 880P.* "Dyna-Life" stylus, one of the lightest, hand polished diamond 0.6-mil radius tip.

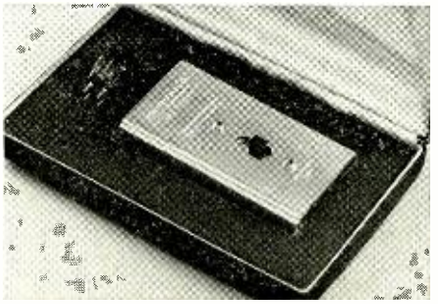
Specifications: Freq. response 8 to 20,000 cps ±2 db; output, 8 mv; channel separation, 30 db at 1 kc, 20 db at 10 kc; recommended load, 47k ohms, recommended tracking force—professional arms, 0.5–3 gms, changers, 1.5–5 gms, effective stylus mass, 0.5 mg; compliance—lateral, 20×10^{-6} cm/dyne, vertical, 20×10^{-6} cm/dyne; d.c. resistance, 500 ohms; mounting dimensions, std.; weight, 12 gms.

Additional features: No magnetic attraction, virtually indestructible "Dyna-Life" stylus. Price, diamond, $19.95; replacement diamond styli, $12.95. Empire Scientific.

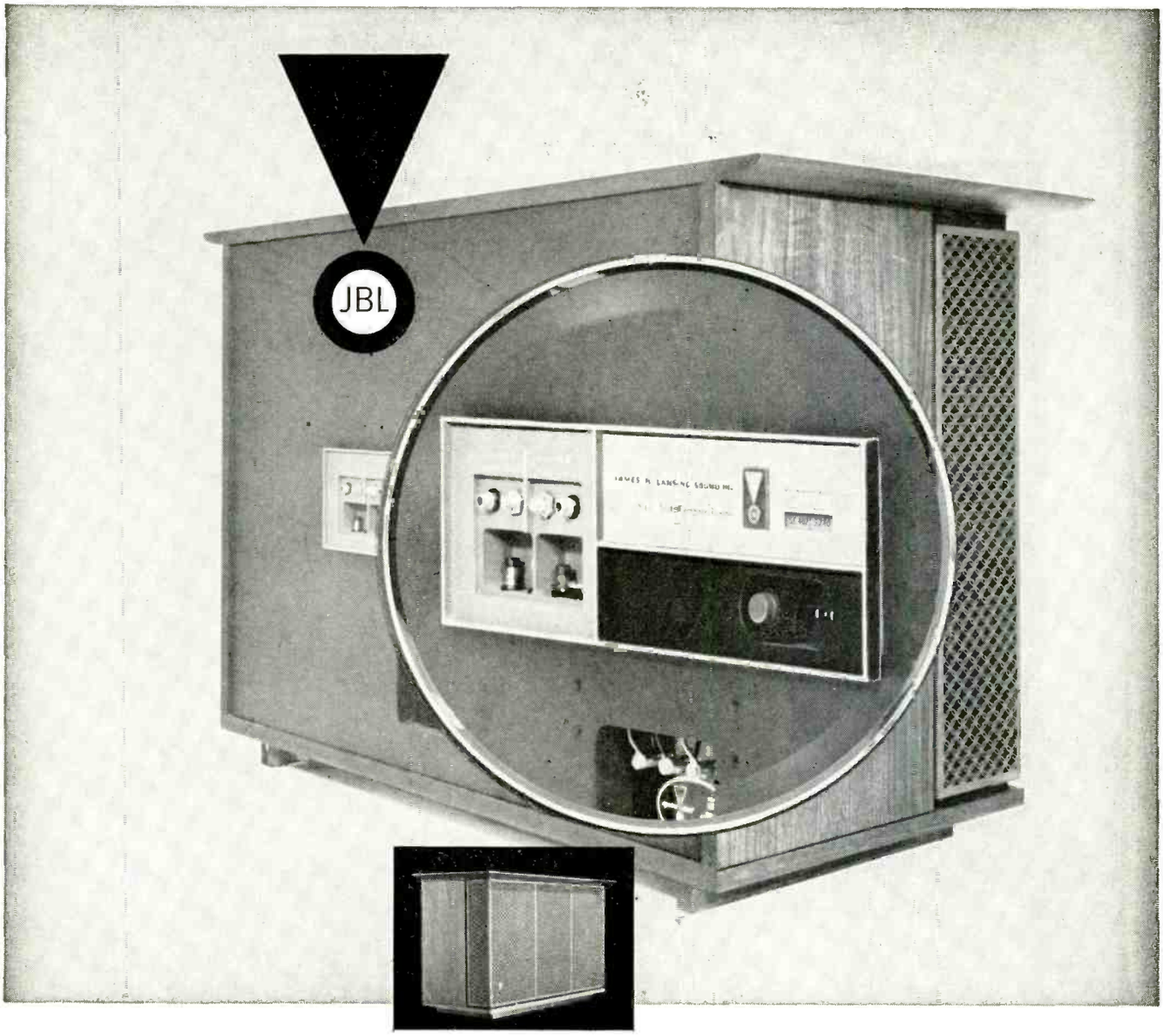
1. Model 880 same as above except lower compliance, 0.7-mil stylus.

FAIRCHILD

● *F-7 Stereo Cartridge System.* Low output stereo cartridge, moving-coil design, in combination with transistorized pre-preamplifier. Preamp has own long-life power supply which brings up output of F-7 to usable level. Through this combination of low-mass low-output cartridge and self-contained pre-pre-



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JBL PRESENTS THE SOLID STATE ***ENERGIZER/TRANSDUCER***

With the Energizer/Transducer, JBL brings you another giant stride closer to perfect audio realism. Now you can have a JBL precision transducer with its own built-in power mate. By engineering the transducers, power source, and enclosure as an indivisible entity, the designers have complete control over every facet of the reproduction system. They have discretion over any band of frequencies, can govern the size and shape of a single cycle if they so will. Consequently, in the JBL Energizer/Transducer the amplified signal is precisely tailored to the requirements of the entire system. The music you hear is the most exact replica of the original performance yet achieved. Built entirely of solid state devices, the energizer is devoid of microphonics, produces negligible heat, and therefore can be mounted within the acoustical enclosure. Due to their tight electrical and mechanical coupling, JBL transducers reproduce the steepest musical wave fronts with an accuracy, alacrity, and facility that is unique among loudspeakers. The energizer has the ability to amplify square waves perfectly. The combination of these two features results in system transient response that has never been equalled. Hum is extinguished. Distortion in any form approaches the vanishing point. Frequency response is flat. Sound pressure reserves are available that you will never use even in your most avid listening sessions. Initially, JBL self-powered loudspeakers are offered in E/T Olympus, E/T Apollo, and E/T Lancer 66 models. Telephone the JBL Franchised Audio Specialist in your community; arrange for a protracted audition; be sure to compare what you hear with conventional loudspeaker and amplifier systems. Write for complete information.

JAMES B. LANSING SOUND, INC., LOS ANGELES 39, CALIFORNIA

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amplifier the F-7 has low distortion and prolongs life of record collection through use of low tracking forces.

Specifications: Freq. response 20 to 20,000 cps; output, cartridge 0.5 mv; output of pre-preamp 10 mv (1 kc 5 cm/sec); channel separation, 25 db 20 to 6000, 15 db 6000 to 20,000 cps range; recommended load, above 8k ohms; recommended tracking force—½ to 2 grams, effective stylus mass, 0.3 mg; compliance—lateral, 23×10^{-6} cm/dyne, vertical, 20×10^{-6} cm/dyne; inductance, 2.5 mh; d.c. resistance, 30 ohms; 4 terminals; mounting dimensions, std.; weight, 7 gms.

Additional features: Low impedance of F-7 cartridge allows use of long cables between cartridge and pre-preamp, up to 50 ft., output impedance of F-7 pre-preamp is 8000 ohms allowing use of up to 25 ft. of lead to main amplifying equipment. Price, diamond, $85.00. Fairchild.

1. SM-2 stereo cartridge, removable 0.7-mil stylus $37.50
2. 225A mono moving-coil cartridge 1.0 mil $37.50
3. 225B mono moving-coil cartridge 2.5 mil $37.50

GENERAL ELECTRIC

● *VR-1000-7 Orthonetic Stereo Cartridge.* A 0.7-mil diamond stereo cartridge utilizing the variable reluctance principle of operation. The wide frequency response, 20–20,000 cps, permits the reproduction of more of the subtle overtones as originally recorded.

Specifications: Freq. response 20 to 20,000 cps ±3 db; output, 1 mv/cm rec. velocity; channel separation, 20 db at 1 kc; recommended load, 47k ohms; recommended tracking force—professional arms, 3 gms min., changers, 7 gms; compliance—lateral, 4.5×10^{-6} cm/dyne, vertical, 4×10^{-6} cm/dyne; inductance, 400 mh; d.c. resistance, 1100 ohms; 4 terminals; mounting dimensions, ½ in; weight, 13½ gms. Price, diamond $24.95; replacement styli, $9.95. General Electric.

1. VR-1000-5 0.5 mil stylus $29.95
2. VR-227 stereo cartridge $16.95
3. 4G-052 mono cartridge $16.95
4. 4GD-01D-02D mono broadcast cartridge $19.95

GRADO

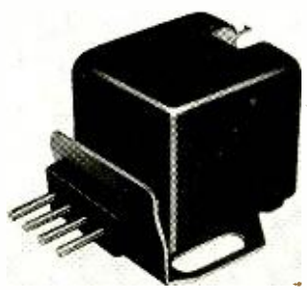
● *"Classic" Stereo Cartridge.* The Classic cartridge uses the same basic design as the Laboratory Series cartridge, and is manufactured on a small assembly line basis with extremely close tolerances. The bass response in the Laboratory and Classic Series is identical. The midrange is very close, and the high frequency response differs but slightly.

Specifications: moving coil; freq. resp. 15 to 28,000 cps ±1 db; output, 0.9 mv/cm rec. velocity; channel separation, 25 db at 1 kc; recommended load, above 5,000 ohms; recommended tracking force—professional arms, 3 gms; effective stylus mass, 0.5 mg; compliance, 12×10^{-6} cm/dyne; d.c. resistance, 1100 ohms; no. of terminals, 4. Additional features: one year unconditional guarantee, plus four additional years for stylus against normal wear. Price, diamond, $37.50. Grado Laboratories.

1. "Senator" cartridge $24.95
2. "Laboratory" cartridge 49.50

MICRO

● *M-1007 Stereo Cartridge.* Moving-magnet cartridge with unusual magnet structure which reduces stylus mass.



Specifications: Freq. response 20 to 20,000 cps; output, 1 mv/cm rec. velocity; channel separation, 22 db at 1 kc; recommended load, 100k ohms; recommended tracking force—professional arms, 1.5–3 gms; compliance—lateral and vertical, 4.5×10^{-6} cm/dyne; d.c. resistance, 600 ohms; 4 terminals; mounting dimensions, std; weight, 12 gms. Micro Seiki Ltd.

NEAT

● *NS-1000, Moving-Coil Cartridge.* A high quality moving-coil cartridge featuring easily replaceable stylus assembly. The output is relatively high for a moving coil and the frequency range is relatively wide.

Specifications: Type, moving coil; freq. resp. 10 to 20,000 cps ±3 db; output, 5 mv; channel separation, 30 db at 1 kc, 20 db at 10 kc; recommended load, 100—100k ohms; recommended tracking force—professional arms, 2 gm; compliance—lateral, 10×10^{-6} cm/dyne, vertical, 10×10^{-6} cm/dyne; d.c. resistance, 80 ohms; no. of terminals, 4; mounting dimensions, 12.7 mm; weight, 13.5 gms. $49.50 (0.7-mil), $59.50 (0.5-mil). Neat.

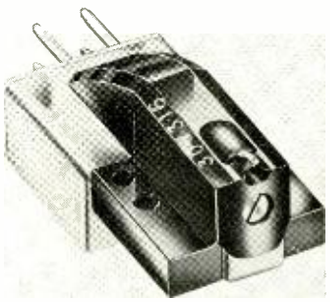
NEUMANN

● *NEUMANN DST 62 Double Dynamic Stereo Cartridge.* This is the latest model and development of the well-known DST unit. Improvements include elimination of rubber membrane, complete enclosure of cartridge bottom. Torsion bar re-enforced, making misalignment impossible even after a long time.

Specifications: Freq. response 30 to 15k cps ±2 db; output, 1 mv/cm rec. velocity; channel separation, 25 db at 1 kc, 25 db at 10 kc; recommended load, 50 ohms; recommended tracking force—professional arms, 6 gms, effective stylus mass, 1 mg; compliance—lateral, 3.6×10^{-6} cm/dyne, vertical, 3.6×10^{-6} cm/dyne; d.c. resistance, 18 ohms; capacitance, 0 pf; 5 terminals; mounting dimensions, special; weight, 30 gms. Price, diamond, $79.50; replacement styli, $20.00. Gotham Audio.

ORTOFON

● *SPU-T Cartridge.* The Ortofon stereo cartridge, Model SPU, has extremely high compliance and low inertia of the stylus armature. The electromagnetic elements are wound with an extra pure copper wire into long thin coils. Thus, the inertia and directional forces are reduced to a minimum and consequently the force required for tracking at both ends of the audio spectrum is very small. The stylus arm is composed of a special thin and light alloy strip to ensure compliance in both planes. "Prime diamonds" are used for the stylus.

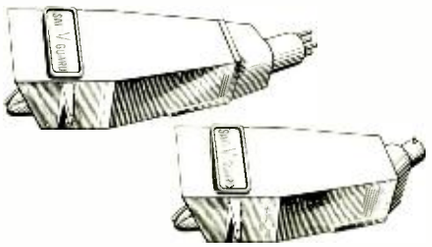


Specifications: Freq. response 20 to 20,000 cps ± 2 db; output, 14 mv; channel separation, 25 db at 1 kc, 20 db at 10 kc; recommended load, 50k ohms; recommended tracking force—professional arms, 1–2 gms, effective stylus mass, 1 mg; compliance—lateral, 10×10^{-6} cm/dyne, vertical, 10×10^{-6} cm/dyne; d.c. resistance, 1,8 ohms; 4 terminals; mounting dimensions, std.; weight, 17 gms with transformers. Additional features: Minimum of 20-db channel separation is maintained thruout audible range. Price, diamond, $49.95; replacement styli, $15.00. Elpa Ind.

1. SPU/GT Mounted in shell for Ortofon & SME $49.95
2. SPU/ESH Mounted in shell for ESL arms $49.95
3. A new model with an elliptical stylus will be introduced shortly $75.00

PICKERING

● *Model GA/38ATG Stereo Fluxvalve.* Model U38/AT cartridge with the D3807ATG "Safe V-Guard" "Floating Stylus" mounted in a plug-in head for the Garrard Type A turntable.



Specifications: Freq. response 20 to 17,000 cps ± 2 db; output, 2 mv; channel separation, 35 db at 1 kc; recommended load, 47k–100k ohms; recommended tracking force—professional arms, 1–3 gms, changers, 3 gms; inductance, 245 mh; d.c. resistance, 410 ohms; capacitance, 250 pf; 4 terminals; mounting dimensions, ½"; weight, 14 gms. Price, diamond, $52.50; replacement styli, $17.00. Pickering and Co.

1. Model U38/AT (cartridge with D3807AT stylus not in shell) $46.50
2. Model G6/38ATG (U38/AT with D3807ATG stylus mounted in plug-in shell for Garrard AT6 Turntable) $52.50

SHURE

● *Model M33 Stereo Dynetic Cartridge.* Shure's finest cartridge. Available with either 0.5- or 0.7-mil stylus. Compliance of 0.5-mil stylus permits tracking at less than one gram; 0.7-mil at from 1.5 to 3 grams. Completely new, super-rugged stylus assembly is encased in plastic "grip," making stylus changing as easy as plugging in an electric cord. Mumetal shielding prevents pick-up of hum.



Specifications: Freq. response 20 to 20,000 cps ± 2.5 db; output, 1 mv/cm rec. velocity; channel separation, 22.5 db at 1 kc, 10 db at 10 kc; recommended load, 47,000 ohms; effective stylus mass, 1.3 mg; compliance—lateral, 22×10^{-6} cm/dyne, vertical, 22×10^{-6} cm/dyne; inductance, 600 mh; d.c. resistance, 750 ohms; capacitance, 70 pf; 4 terminals; mounting dimensions, std. Shure Bros.

1. M77 (for tracking at 3–6 grams) .. $27.50
2. M99/A scratchproof "Gard-A-Matic" for Garrard Type A
3. M99/AT6 scratchproof "Gard-A-Matic" for Garrard Type AT6
4. M99/M10 scratchproof "Gard-A-Matic" for Miracord
5. M3D stereo dynetic cartridge

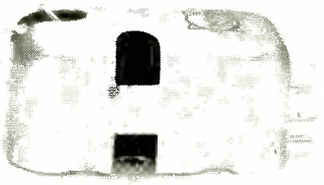
SONOTONE

● *"Velocitone" Mark III.* Designed for superior velocity, magnetic or ceramic input systems. Produces signals free of magnetic hum. Mark III version utilizes new "Sono-Flex" stylus virtually eliminating broken needles and increasing compliance.

Specifications: Freq. response 20 to 20,000 cps ± 2 db; output, 2.8 mv; channel separation, 30 db at 1 kc, 8 db at 10 kc; recommended load, 47–100k ohms; recommended tracking force—professional arms, 2–4 gms, changers, 3–5 gms, effective stylus mass, 4 mg; compliance—lateral, 6×10^{-6} cm/dyne, vertical, 6×10^{-6} cm/dyne; capacitance, 490 pf; 4 terminals; mounting dimensions, std.; weight 3.2 gms. Price, dual diamond, $22.25; sapphire-diamond, $19.25; replacement styli, $6.00; $9.50. Sonotone.

SONOVOX

● *SX-1 Stereo Cartridge.* The Sonovox SX-1 represents a refinement in moving-magnet cartridges. The magnet is spherical in shape thus



achieving a uniform field. Extremely low mass and high compliance of the vibrating system produce minimum record wear.

Specifications: Moving magnet; freq. resp. 20 to 20,000 cps ± 1 db; output, 4 mv; channel separation, 20 db at 1 kc, 20 db at 10 kc;

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EVEN THE MOST DEMANDING MUSIC LOVERS FIND WHAT THEY ARE LISTENING FOR IN THE REMARKABLE NEW KENWOOD KW-70 AM/FM STEREO MULTIPLEX RECEIVER



(PARTICULARLY WHEN THEY HEAR THE PRICE)

The new Kenwood KW-70 Receiver is a combination tuner preamplifier and amplifier. It receives AM broadcasts, FM broadcasts, stereo records, monaural records, taped stereo, and even TV sound. The works.

Turn the KW-70's tuning dial. The Stereo Indicator tells you when you've got a stereo broadcast in your sights.

Listen.

The KW-70's sensitivity (1.9 mv. for 20 db. quieting) makes weak stations strong.

Amazing separation (38 db. at 400 c.p.s.) keeps the KW-70's channels from striking up disturbing conversations with one another.

If you hear buzzing, there's a bee in the room. If you hear rumble, there's an earthquake in the neighborhood. The KW-70's noise filtering circuits allow no such unmusical intrusions.

Acoustics not right? The separate tone controls for each channel make the KW-70's tone fit the room like wallpaper.

Turn up the volume. 65 watts of musical power comes booming through – 32.5 watts in each stereo channel with a harmonic distortion of only 1% – sound that's big enough for Beethoven, himself.

Want to capture all the beauty of the broadcast on tape? Nothing to it. The Tape Monitor* lets you listen to the recording and judge its quality as you tape it.

Now listen to the KW-70's price. Only $269.95.

Have you ever heard such a beautiful sound?

And if you need tuning alone, here's a new tuner that's right at home in the world's finest stereo systems – the Kenwood KW-100-T AM/FM Multiplex Tuner.



The advanced technology that puts the KW-70 Receiver out in front makes Kenwood's new KW-100-T Tuner a superb musical instrument.

Once you hear the KW-100-T, you won't be satisfied with ordinary tuners. Only $139.95. Kenwood Electronics, Inc., 212 Fifth Ave., N.Y. 10, N.Y.; 3700 S. Broadway Pl., Los Angeles 7, Calif.

Kenwood

THE SOUND IS PRICELESS...THE PRICE IS LESS

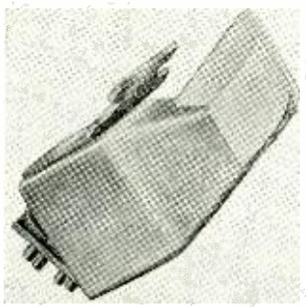
*U. S. PATENT PENDING

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recommended load, 50k ohms; recommended tracking force—professional arms, 3 gms; compliance—vertical, 3×10^{-6} cm/dyne; d.c resistance, 150 ohms; no. of terminals, 4; weight, 12.5 gms. Price, diamond, $30.00. Sonovox Co.

STANTON

● *Model 481AA Stanton "Calibration Standard" Stereo Fluxvalve.* For use with ultra-lightweight tone arms capable of tracking within the range from ¼ to 3 grams. Supplied with the D4005AA "V-Guard" diamond stylus assembly.



Specifications: Freq. response 20 to 10,000 cps ± 1 db; output, 0.5 mv/cm rec. velocity; channel separation, 35 db at 1 kc; recommended load, 47k ohms; recommended tracking force—professional arms, ¼–3 gms; inductance, 640 mh; d.c. resistance, 3200 ohms; capacitance, 250 pf; 4 terminals; mounting dimensions, ½"; weight, 11 gms. Price, diamond, $49.50; replacement styli, $19.50. Stanton Magnetics.

WEATHERS

● *C-66, LDM Stereo Cartridge.* Stress-generator design, 0.7-mil diamond stylus, 0.3 milligram tip mass. Compliance more than 30×10^{-6} cm/dyne at ¼-gram tracking force, 15×10^{-6} cm/dyne at 1.2-gram tracking force. Matching networks (included) to low-level mag. input.

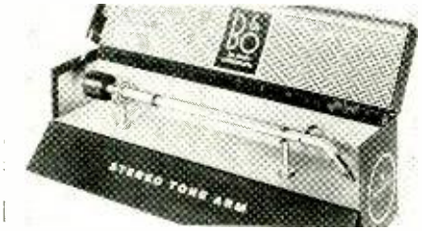
Specifications: Freq. response 20 to 20,000 cps ± 2 db; output, 5–7 mv; channel separation, 35 db at 1 kc, 25 db at 10 kc; recommended load, 47,000 ohms; recommended tracking force—professional arms, 1 gm; effective stylus mass, 0.3 mg; compliance—lateral, 18×10^{-6} cm/dyne, vertical, 18×10^{-6} cm/dyne; capacitance, 300 pf; 4 terminals; mounting dimensions, std.; weight, 4 gms. Price, diamond, $39.50. Weathers Industries.

1. PS-11 stereo pickup system, complete $129.50
2. PS-11-K conversion kit for all Weathers viscous-damped arms .... $ 99.00

PHONO ARMS

DYNACO—B&O

● *TA-12.* Integrated arm and cartridge of symmetrical design providing exceptional tracking with low distortion, readily adjustable stylus pressure, plug-in cartridge, single-hole mounting, stylus azimuth adjustment, and "Isodyne" dynamic equilibrium (even when playing an uncut disc, the arm has no tendency to skate towards the center of the record). Easily adjusted height of both arm and rest.



Specifications: Over-all length of arm, 12"; distance from arm axis to turntable spindle, 8¼"; height range of turntable, 0" to 2"; gimbal suspension; stylus force range, 0 to 4 gms; arm material, aluminum; pickup mounting, plug-in; overhang, ½"; over-all weight, 1 lb. Price $49.95. Dynaco.

1. TA-16 16" version of above $59.95

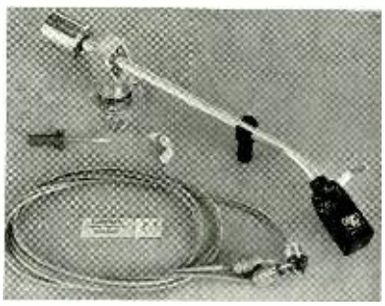
EMPIRE

● *Model 980 Dynamically-Balanced Arm.* Dynamic balance achieved by means of offset pivot design. Calibrated gram scale, ((accurate to ± 0.1 gram). Stylus overhang adjustment. Vertical height adjustment for both arm & arm rest. Easy plug-in installation—no wiring or soldering. Automatic "Dyna Lift"—lifts arm from record at end of music.

Specifications: Over-all length of arm, 12⅜"; distance from arm axis to turntable spindle, 9"; height range of turntable, ½" to 2"; ball bearing suspension vert & lateral; stylus force range, 0 to 8 gms; aluminum pickup head; arm material, aluminum and brass; pickup mounting, nylon; screw spacing, ½"; offset angle, 23.8 deg; overhang, ¾"; range of cartridge weights for zero adjustment, 2 to 25 gms; maximum tracking error, ± 0.65 deg; additional features, plug-in cable (5 wire); arm resonance—8 cps, lateral; 8 cps, vertical. Price $50.00; cartridge brackets, $1.95. Empire Scientific.

FAIRCHILD

● *500 Anti-Skating Arm and SM-2 Stereo Cartridge Combination.* Integrated arm-cartridge with "anti-skating" that counteracts tendency of an arm to "skate" toward center of record. Model 500 is free from erratic and improper stylus tracking and resulting tracing distortion. SM-2 cartridge integrated into arm provides high compliance and high separation over a wide frequency range.



Specifications: Over-all length of arm, 12"; distance from arm axis to turntable spindle, 8⅛"; height range of turntable, 2⅜" to 4"; point bearing suspension; stylus force range, 2.5 to 3 gms; arm material, alum.; pickup mounting, 3–48 screws RETMA; screw spacing, ½"; offset angle, 23½ deg; overhang, ⅝"; range of cartridge weights for zero adjustment, 2 to 12 gms; maximum tracking error, 1.2°; additional features, fixed dynamic balance; arm resonance—12 cps, lateral; 14 cps, vertical; mounting dimensions, ¾" hole, 3 screws. Price $58.00; extra pickup heads for Model 500A/501 only $4.90. Fairchild Rec.

1. 500A anti-skating arm only w/removable head $29.95
2. 501 16" anti-skating arm w/removable head $37.50

GRADO

● *Laboratory Tone Arm.* The Grado tone arm incorporates separate balance adjustments for the vertical and lateral planes of arm movement, regardless of weight and mass vibrations. The result of balance is a reduced susceptibility to mechanical shock and acoustic feedback.

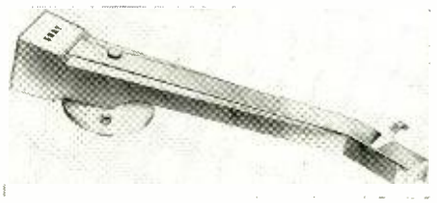
Specifications: Over-all length of arm, 10¼"; distance from arm axis to turntable spindle, 8 5/16"; type of suspension, balance, with spring; stylus force, ½ gm min.; type of pickup head, slide mounts; arm material, walnut; pickup mounting, standard on slide; overhang, ¾"; maximum tracking error, ± 0.5 deg; additional features, stylus overhang adjustable, interchangeable cartridge slides; arm resonance—11 cps. Price, $39.50; extra cartridge slides, $2.95. Grado Laboratories.

1. Same, w Laboratory cartridge $85.00
2. Same, w Classic cartridge $75.00
3. Same, w Senator cartridge $63.00

GRAY

● *Broadcast Type Tone Arm, Model 208-S.* Transcription tone arm for high fidelity, broadcasting, disc calibration, commercial sound, dubbing, and pressing inspection.

Specifications: Over-all length of arm, 15"; distance from arm axis to turntable spindle, 10⅝"; height range of turntable, 1" to 2"; stylus force range, 0.5 to 12 gms; arm material, aluminum; pickup mounting, on removable slide; screw spacing, ½"; overhang, 0.533"; range of cartridge weight for zero adjustment, 5 to 15 gms; maximum tracking



error, 1° 55'; additional features, plug-in cartridge slide; arm resonance—6 cps, lateral; 6 cps, vertical; over-all weight, 2 lbs. Price $49.50; extra pickup heads, $6.40. Gray Div.

1. Model 208-S/G, as above plus slot for G.E. turn-around cartridge $49.50
2. 212 Series 12" transcription tone arm $35.50

NEUMANN

● *STA-12.* Designed for use with Neumann DST-12 cartridge. An integral part of the Neumann stereo disc-cutting lathe.



Specifications: Over-all length of arm, 12"; distance from arm axis to turntable spindle, 8-5/16"; height range of turntable, 1" to 3"; stylus force range, 0 to 7 gms; arm material, metal; pickup mounting, 4 pins, diamond config.; offset angle, 22.7 deg; range maximum tracking error, 1.19 deg; additional features, rubber isolated counterweight, dynamic balance; arm resonance—8 cps, lateral; 8 cps, vertical; over-all weight, 1 lb. 1½ oz.; mounting dimensions, center hole ⅞", 3 screw holes. Price $79.50. Gotham Audio.

ORTOFON

● *RMG-212 Tone Arm.* Precision ball bearings are used for both horizontal and vertical planes assuring perfect tracking at even minimum stylus force. Lateral balance by the special shape of the Duralumin tube arm enables perfect record tracking even up to 30° out of level. The counterweight is calibrated in grams from 0 to 10. The plug-in shell accepts any cartridge and is adjustable for cartridge overhang.



Specifications: Over-all length of arm, 12"; distance from arm axis to turntable spindle, 9⅛"; height range of turntable, 2⅜" to 3⅞"; gimbal suspension; stylus force range, 0 to 7 gms; plug-in pickup head; arm material, duralum; pickup mounting adjustable; screw spacing, std.; offset angle, 22.7 deg; overhang, ⅝"; cartridge weight for zero adjustment preset 31 grams; maximum tracking error, 1.19 deg; additional features, plug-in audio cables; arm resonance—8 cps, lateral; 8 cps, vertical; over-all weight, 1 lb.; mounting dimensions, 3 hole, 1½" centers. Price $54.95; extra pickup heads, $5.00. Elpa Ind.

1. RMG-212T with predrilled Thorens arm board $59.95
2. RMG-309 16" arm $59.95
3. SMG-212 12" arm $29.95
4. SKG-212 12" arm $19.95

SHURE

● *Model 3009 Shure-SME Series 2.* Extraordinarily close tolerance and standards. Its "secret" (if it has one) is care in manufacturing and testing and utterly accurate adjustments for every critical factor in tracking.

Specifications: Over-all length of arm, 12¼"; distance from arm axis to turntable spindle, 8.43"; height range of turntable, 2⅜" to 3¼"; knife-edge suspension; stylus force range, ¼ to 5 gms; removable, locking collar pickup head; arm material, wood-lined stainless steel; pickup mounting, standard; screw

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TWO NEW BRILLIANT CONTRIBUTIONS FOR COMMERCIAL SOUND BY JENSEN



H-970 COAXIAL

with Compression-Driver Horn-Tweeter.

Here at long last is a genuine coaxial loudspeaker in 8-inch size with compression-driver horn-tweeter. Tweeter horn passes through the woofer core terminating in a circular horn inside and concentric with the woofer diaphragm. This design thus yields a circular (symmetrical) radiation pattern at all frequencies ideal for higher-power high-ceiling distributed sound. Excellent speech intelligibility with high quality reproduction for industrial areas, heavy-duty portable, and central speaker system use.

List Price $45.00



F-858 FLEXAIR*

DUAL-CONE—with Super-Low Resonance

Here for the first time is a loudspeaker with super-low resonant frequency designed in the popular 8-inch size with high efficiency and with dual-cone radiating system for unusual response capability at the higher frequencies. Ideal for those too-small speaker enclosures and backboxes in distributed sound systems. Big-speaker lows in compact acoustic enclosures. Available in handy 10-pack with optional pre-attached 70-volt or 25-volt transformer. Jensen KWIKON* Instant Connectors are standard.

List Price $20.50

*T. M.

TECHNICAL SPECIFICATIONS

H-970		F-858*
8-inch	Nom. Size (Diam.)	8-inch
8 ohms	Nom. V.C. Impedance	8 ohms
20 watts	Power Rating[1]	12 watts
30—15,000 cps	Response Range	30—18,000 cps
115°	Angular Coverage	95°
60 cps	Resonant Frequency	50 cps
2000 cps	Crossover Frequency	—
16.0 oz.[2]	Magnet Weight	10.0 oz.
1½"	Nom. V.C. Diam.	1"
8⅛" x 4¾"	Dimensions (OD x Depth)	8⅛" x 3"
8 @ 45°	Mounting Holes	8 @ 45°
3 13/16"	Mtg. Hole Circle (Diam.)	3 13/16"
6¾"	Baffle Opening (Diam.)	6¾"
5 lb., 3 oz.	Net Weight	2 lb., 6 oz.

Sensitivity Table[3]

10'	30'	Input Power, Watts	10'	30'
57.0	47.5	.001	55.5	46.0
78.0	68.5	⅛	76.5	67.0
81.0	71.5	¼	79.5	70.0
84.0	74.5	½	82.5	73.0
87.0	77.5	1	85.5	76.0
90.0	80.5	2	88.5	79.0
93.0	83.5	4	91.5	82.0
98.0	88.5	12	96.5	87.0
100.0	90.5	20	98.5	89.0

[1] Maximum speech and music level as indicated by VU meter. (Peak power is substantially higher.)

[2] Woofer magnet weight only.

[3] Axial free field sound pressure level at listed distance (db above .000204 dynes/sq. cm.) in 800-1250 cps warble frequency band.

Write for Specification Sheets
CSP-119 on H-970
CSP-120 on F-858

JENSEN LOUDSPEAKERS

JENSEN MANUFACTURING COMPANY / DIVISION OF THE MUTER COMPANY / 6601 SOUTH LARAMIE AVENUE, CHICAGO 38, ILLINOIS
Canada: Radio Speakers of Canada, Ltd., Toronto • Argentina: UCOA, S.A., Buenos Aires • Mexico: Fapartel, S.A., Naucalpan, Mex.

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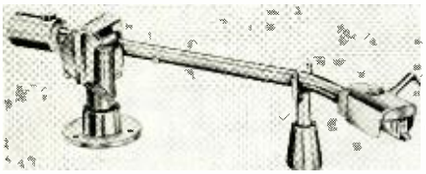


spacing, ½"; range of cartridge weights for zero adjustment, 5 to 20 gms; additional features, complete with output socket & plug; arm resonance—15 cps, lateral; 15 cps, vertical; over-all weight, 1 lb. 5 ozs. Price $89.50; extra pickup heads, $5.50. Shure Bros.

1. Model 3012 Shure-SME Series 2 (longer version) $99.50
2. Model 222 "Studio Dynetic" 12" integrated arm and cartridge $89.50
3. Model 226 "Studio Dynetic" 16" integrated arm and cartridge $89.50
4. Model 232 (12") tone arm $29.95
5. Model 236 (16") tone arm $31.95

STANTON

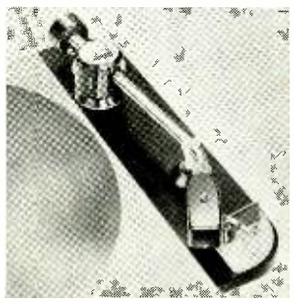
● *Model 200 Stanton Unipoise Arm.* Patented Stanton "Unipoise" single-pivot bearing for friction-free motion in all planes. Lightweight construction gives low mass for tracking mono and stereo records at only ¼ gram.



Specifications: Over-all length of arm, 11⅜"; distance from arm axis to turntable spindle, 8 3/16"; height range of turntable, 1" to 2½"; single-pivot bearing suspension; stylus force range, 0 to 3 gms; arm material, aluminum and steel; pickup mounting, ½ inch; screw spacing, ½"; offset angle, 21 deg; overhang, 17/32"; range of cartridge weights for zero adjustment, 7 to 15 gms; maximum tracking error, 1 deg; over-all weight, 7 oz. Price $36.00. Stanton Magnetics.

THORENS

● *BTD-12S Tone Arm.* This tone arm has been built to match perfectly the high performance of Thorens precision turntables for which it is specially adapted. It will give equally outstanding results on any other turntable presenting a sufficiently low vibration level.



Specifications: Over-all length of arm, 12⅝"; distance from arm axis to turntable spindle, 7½"; height range of turntable 2" to 3½"; bearing suspension; stylus force range, 0 to 8 gms; plug-in pickup head; arm material, alum.; pickup mounting, adjustable; screw spacing, std.; offset angle, 25.15 deg; overhang, 11/16"; range of cartridge weights for zero adjustment, 0 to 19 gms; maximum tracking error, 0.5 deg; additional features, stylus remains in vertical plane for any height adjustment; built-in cueing device for remote raising and lowering arm; arm resonance—16 cps, lateral; 16 cps, vertical; over-all weight, 1 lb.; mounting dimensions, 3-hole, 1½-inch. Price $50.00; extra pickup heads, $5.00. Elpa Ind.

WEATHERS

● *MT-66 Universal Stereo Tone Arm.* Mounts on any make turntable, accepts any make cartridge, by virture of interchangeable "plug-in" head. Ideal for cartridges capable of tracking at 3 grams or less. Full-time vertical and lateral viscous damping as employed in famous Weathers "Professional" integrated system. Micrometer tracking force adjustment. No skating. No spring biasing. Rubber shock mount isolates arm from mechanical vibration. Non-resonant walnut wood in oiled finish. Rubber tone arm rest included.

Specifications: Over-all length of arm, 11½"; distance from arm axis to turntable spindle, 8⅜"; height range of turntable, ¾" to 1⅜"; viscous damped suspension; stylus force range, 0 to 10 gms; arm material, wood; pickup mounting, standard; screw spacing,



standard; offset angle, 20 deg; overhang, ½ × ⅝"; range of cartridge weights for zero adjustment, 0 to 17 gms; maximum tracking error, 3 deg; additional features, 5½ gr additional balance weight supplied; over-all weight, 260 gr.; head adapter weight, 9½ gr. Price $31.50; extra pickup heads, $2.95. Weathers Industries.

TURNTABLES WITHOUT ARMS

EMT

● *940.* The EMT 940 is a high-precision professional turntable for use with any arm and cartridge combination. Light Plexiglas strobe-calibrated secondary turntable allows accurate cuing to a musical beat, operating by a mechanical brake. Back-up angles are indicated for all speeds. Tonearm lift and lowering device. Electronic remote control of turntable brake. Optional accessory kit.



Specifications: Speeds—16⅔, 45, 33⅓, 78 rpm; rim drive; synchronous motor; turntable diameter, 13"; turntable weight, 8 lbs.; shaft diameter, ½"; turntable material, cast iron; felt mat; wow and flutter 0.3% peak-to-peak or 0.1% rms; dimensions of chassis, 15½" × 19¾"; clearance required above mounting board, 2"; below 7"; controls on/off, stereo selector; over-all weight, 22 lbs. Price, $595.00. Accessories, electronic brake $89.50. Gotham Audio.

FAIRCHILD

● *412-1B.* Quality turntable with time-proven double-belt drive and self-lubricating synchronous motor; provides professional performance. Non-magnetic, dynamically-balanced turntable rests on rotating ball-thrust bearing in nylon seat. Motor suspension system eliminates vibration. Exceeds NAB specifications. Supplied with heavy gage steel mounting board; requires only wraparound base.

Specifications: Speed—33⅓ rpm; double-belt drive; synchronous motor; turntable diameter, 12"; turntable weight, 8 lbs; shaft diameter, ½"; turntable material, aluminum and densite; wow, 0.10%; flutter, 0.02%; dimensions of chassis, 14" × 16⅝"; clearance required above mounting board, 1"; below, 5½"; type of mounting, drop-in assy; controls, on-off; provision for arm mounting, arm mounting plate. Price, $99.00 assembled; $79.95 kit. Walnut base $19.95. Fairchild Rec.



1. Model 440 two-speed single-belt drive $69.95
2. Model 440K—kit version of above .. $58.00

GRADO

● *Laboratory Series Turntable.* A new patented turntable designed for playing stereo records. Features large flywheel separate from platter, belt drive, and unusual bearing system.



Specifications: Speeds—33⅓ rpm; belt drive; hysteresis-synchronous motors; urethane mat. Price, $99.50 with base. Grado Labs.

GRAY

● *Stereo Turntable Kit, Model PK 33.* Features polyurethane belt, hysteresis-synchronous drive motor, heavy duty oilite bearing, and design to optimize audio quality at minimum consumer cost.

Specifications: Speeds—33⅓ rpm; belt drive; hysteresis-synchronous motor; turntable diameter, 12"; turntable weight, 4 lbs.; shaft diameter, 1"; turntable material, aluminum; neoprene-cork mat; wow, 0.2%; flutter, 0.08%; dimensions of chassis, 12¼ × 12¼"; clearance required above mounting board, 1¾"; below, 3½"; over-all weight, 8¾ lbs. Price, $49.50 kit. Gray Res.

1. PT 316, assembled turntable on base $89.50

LAFAYETTE

● *PK-240W 4-Speed Transcription Player.* Well suited for stereo, the PK-240W is a 4-speed transcription player with a rim-weighted turntable and a rumble and noise figure 50 db below average recorded level. Each speed is variable within 7% of the nominal value through a magnetic eddy-current brake.



Specifications: Speeds—16⅔, 33⅓, 45, 78 rpm; rim drive; 4-pole induction motor; turntable diameter, 12"; turntable weight, 3 lbs; turntable material, aluminum; mat, rubber; wow, 0.2%; flutter 0.2%; dimensions of chassis, 12¼" × 10½"; clearance required above mounting board, 1½"; below, 4"; controls, speed, power; provision for arm mounting, none; over-all weight, 14 lbs. Price, $37.50. Lafayette Radio.

THORENS

● *Transcription Turntable.* Engineered for the finest music systems, the Thorens Model TD-124 is a four-speed machine featuring a 12-inch, 11½-lb. table. The main table is made of cast iron to provide shielding against hum pickup. A cover table made of aluminum, plus a rubber mat, reduces the attraction of magnetic pickups. Precision-machined, the Thorens Roto-Drive is adjustable ± 3.0 per cent for exact musical pitch. A built-in illuminated strobe allows setting to exact speed while record is playing. Easy levelling is accom-

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plished by means of a built-in level-bubble and easily accessible levelling screws.

Specifications: Speeds—16, 33, 45, 78 rpm; belt and idler wheel drive; induction 4-pole motor; turntable diameter, 12"; turntable weight, 11½ lbs.; shaft diameter, 9/16" turntable material, cast iron, aluminum cover; mat, rubber; wow and flutter below NAB specs; dimensions of chassis, 15 × 12⅞"; clearance required above mounting board, 2½"; below, 3"; type of mounting, rubber grommets; controls, 3; provision for arm mounting, replaceable board; over-all weight, 22 lbs. Price $125.00. Accessories: Wood bases $10.00 to $40.00. Elpa Ind.

1. TD-121 ..... $85.00
2. TD-111 ..... $60.00

WEATHERS

● *Synchromatic Turntable—ML-1.* A traditionally-styled high-performance turntable for rumble-free constant-speed reproduction of stereophonic and conventional LP records. Synchronous drive motor, direct drive, and smooth, low-friction platter bearings hold wow, flutter, and rumble (10 cps) well below audibility. Entire lightweight system is shock-mounted on 3-cycle suspension system to prevent acoustic feedback or groove skiping due to floor-borne vibrations. Accommodates any lightweight tone arm of average length.



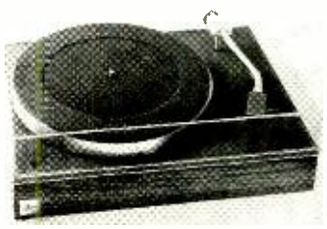
Specifications: Speeds—33⅓ rpm; rim drive; hysteresis-synchronous motor; turntable diameter, 12"; turntable weight, 12 oz.; turntable material, aluminum; Ring support mat; wow and flutter 0.1%; dimensions including base, 16½ × 15 × 3; provision for arm mounting, 2¼" internal clearance. Price, $59.95. Weathers Ind.

1. ML-234 two-speed (33 1/3 & 45 rpm) version of ML-1 ..... $74.50

TURNTABLES WITH ARMS

ACOUSTIC RESEARCH

● *Two-Speed Turntable.* A two-speed (33⅓ and 45 rpm) turntable, it comes complete with arm, oiled-walnut base, transparent dust cover, cables, and even an overhang adjustment device and stylus-force gauge. Manufacturer states that a condition of sale is that these turntables meet NAB specifications for broadcast equipment on wow, flutter, rumble, and speed accuracy.



Listening Tests Prove DYNACO BEST

Specifications are important, but present measurement standards do not fully define how equipment *sounds.* High fidelity equipment has achieved its ultimate goal when it delivers sound so realistic that skilled listeners cannot distinguish the difference between "live" and "recorded" music in a side by side comparison. This test has been performed dozens of times before thousands of people in programs sponsored by Dynaco, Inc. and AR, Inc. with "live" portions performed by the Fine Arts Quartet. In these comparisons, Dynakit's superlative performance was amply demonstrated, since the vast majority of the audiences readily admitted that they could not tell the difference between the electronic reproduction using Dyna Mark III amplifiers and the PAS-2 preamplifier, and the "live" music by the Fine Arts Quartet.

Such perfection in reproduction means that listeners at home can have a degree of fidelity which cannot be improved regardless of how much more money were to be spent on the components used. All Dyna components are of a quality level which permits reproduction indistinguishable from the original. The unique engineering in all Dynakits makes them fully reproducible, so that everyone can hear the full quality of which the inherent design is capable. Dynakits are the easiest of all kits to build—yet they provide the ultimate in sonic realism.



FM-3—An outstanding stereo FM tuner featuring automatic transition to stereo with the visual Stereocator. The FM-3 is a super-sensitive drift-free tuner with less than 0.5% distortion at all useable signal levels, four IF stages, wide-band balanced bridge discriminator, and time-switching multiplex system.
FM-3 kit **$109.95**; assembled **$169.95**



SCA-35—Combined stereo preamp and amplifier with low noise, lower distortion, and 17.5 watts continuous power per channel. Distortion less than 1% at full power from 20 to 20,000 cycles. Unique feedback circuitry throughout.
SCA-35 kit **$99.95**; assembled **$139.95**



PAS-3—The famous "no distortion" PAS-2 stereo preamplifier with a new look. Wide band, lowest noise, with every necessary feature for superb reproduction. Less than 0.1% distortion at any frequency.
PAS-3 kit **$69.95**; assembled **$109.95**



STEREO 35—A basic power amplifier similar to that used in the SCA-35. Inaudible hum, superior transient response, outstanding overload characteristic, and extremely low distortion at all power levels. Fits behind PAS-3 or FM-3.
ST 35 kit **$59.95**; assembled **$79.95**



STEREO 70—A superlative power amplifier — continuous 35 watts per channel with unconditional stability and near-perfect transient response. Frequency response extends below 10 cps and above 40,000 cycles without loss of stability.
ST 70 kit **$99.95**; assembled **$129.95**

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Write for detailed specifications and descriptive literature

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Cable: DYNACO Philadelphia

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Specifications: Speeds 33⅓ and 45 rpm, belt drive, synchronous motor; turntable diameter, 11 11/16"; turntable weight, 3.3 lbs; shaft diameter ⅜"; turntable material aluminum; polyurethane mat; wow, 0.15% flutter, 0.05%; dimensions of chassis, 12¾ × 16⅝"; clearance required above mounting board, 2 9/32"; below, 2¾"; type of mounting, spring; controls, on-off; pickup head, universal; material, Acrylic; number of mounting screws for cartridge, 2; mounting dimensions, adjustable; number of leads to head, 4; number of leads to chassis, 5. Price $68.00. Acoustic Research.

BENJAMIN MIRACORD

● *PW-10H.* Pushbutton operation for damage-free records and styli. Coupled to this are the design concepts that are found in the best transcription turntables—heavy balanced 12" turntable, hysteresis motor, quality tone arm with frictionless bearings, very low rumble level and many other extras.



Specifications: Speeds—16, 33, 45, 78 rpm; idler drive; hysteresis-syn. motor; turntable diameter 12"; turntable weight, 6 lbs; shaft diameter, 9/16"; turntable material, non-ferrous; rubber mat; wow, 0.1%; dimensions of chassis, 14½" × 12½"; clearance required above mounting board, 5⅝"; below, 3¾"; type of mounting, spring; controls, pushbutton; automatic cycling time, 10 secs at 33⅓ rpm, 5 secs at 78 rpm; type of pickup head, plug-in; material, high-impact plastic; mounting dimensions, standard; number of leads to head, 5; number of leads to chassis, 4; accommodation for 7", 10" and 12" records. Price, $99.50. Accessories: extra heads, $5.00, base and cover avail. Benjamin Elect.

BOGEN

● *B61 Turntable.* Precision made for Bogen by Lenco® of Switzerland. Complete with integrated tone arm, tracks at as low as 1.5 grams. Precise, automatic cueing and continously variable speed are just two features that make the B61 outstanding.

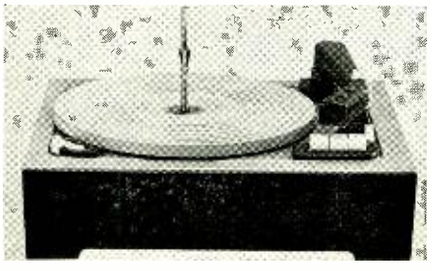
Specifications: Speed—33⅓ rpm; rim rpm plus continuously variable 29–86 rpm; four-pole motor; turntable diameter, 12"; turntable weight, 7¾ lbs; turntable material, zinc alloy; rubber mat; wow and flutter, 0.2%; dimensions of chassis, 15¼" × 13¼"; clearance required above mounting board, 2½"; below, 2¼"; type of mounting, spring; controls, speed on-off, play; plug-in pickup head; aluminum; 4 pins to head, 3 leads to chassis; over-all weight, 19 lbs. Price, $64.95. Accessories, base $5.25, dust guard, $5.50. Bogen.

1. B51 turntable $49.90

DUAL

● *Four-Speed Changer-Turntable.* The Dual-1006 "Custom" is a combination record changer and turntable offering four-speed operation. The "roller-feeler" record indexing action permits intermixing of any size records for completely automatic operation. The platter is laminated and concentrically girdered for increased rigidity. The one-piece tone arm tracks and trips at 2 grams and is adjustable for a wide range of tracking forces. The arm has a built-in tracking-force gauge. A lock-in cartridge holder is provided for use with all standard cartridges. Built-in stereo-mono switch.

Specifications: Speeds—16⅔, 33⅓, 45, 78 rpm; idler drive; 4-pole motor; turntable diameter, 10.6"; turntable weight, 3.75 lbs; shaft diameter ⅜"; turntable material steel; wow, 0.25%; flutter 0.25%; dimensions of chassis, 13¼" × 10⅞"; clearance required above mounting boards, 3⅝"; below 3"; type of mounting, spring; controls, (3) pushbuttons; automatic cycling time, 12 secs at 33⅓ rpm, 12 secs at 78 rpm; cartridge holder bracket; material plastic; 2 mounting screws for cartridge; mounting dimensions, std.; number of leads to head, 4; number of leads to chassis, 4; all record sizes intermixed. Price $89.95, extra cartridge holders, $2.10, 45-rpm auto spindle $4.80. United Audio.



EMPIRE

● *Troubador Model 398.* Consists of 208 turntable, 980 arm, walnut base. Motor and turntable individually adjusted to dynamic balance. Rumble isolation provided by motor suspension, flexible belt drive, and resilient nylon seat which supports and cushions the thrust of the main bearing. Lapped-steel shaft—micro-honed bearing well. Rumble less than −63 db.

Specifications: Speeds—33⅓, 45, 78 rpm; belt drive; hysteresis motor; turntable diameter, 12"; turntable weight, 6 lbs; turntable material, aluminum; rubber mat; wow and flutter, 0.02%; dimensions of chassis, 17" × 15"; clearance required above mounting board, 3"; below, 4". Price, $175.00. Accessories: cartridge mount, $1.95. Empire Scientific.

1. Model 388, same as above less base $160.00

GARRARD

● *Type A, Laboratory Series Automatic Turntable.* A dynamically balanced tone arm with a turntable, the Garrard Type A Automatic Turntable provides the convenience of a changer. The turntable platter is cast, weighted, and polished. The tone arm is adjustable by means of a sliding counterweight. At this point the arm is in gyroscopic balance. Tracking force is adjusted by means of a calibrated gauge on the side of the arm. Utilizing the pusher-platform changing mechanism exclusive with Garrard, the Type A operates as a fully automatic changer when desired.



Specifications: Speeds—33, 45, 78, 16⅔ rpm; rim drive; shaded 4-pole motor; turntable diameter, 10½"; turntable weight, 6 lbs; turntable material, aluminum; rubber-ribbed with chrome insert mat; dimensions of chassis, 16¾" × 14⅛"; clearance required above mounting board, 6"; below, 2⅞"; type of mounting, barrel springs; controls, manual and auto on/off; automatic cycling time, 10 secs at 33⅓ rpm, 3½ secs at 78 rps; type of pickup head, plug-in 4 pin; material, plastic; mounting dimensions, ½" number of leads to head, 4; number of leads to chassis, 5; accommodation for different record sizes. Price, $79.50. Accessories: extra heads, $1.50; base, walnut, $4.55. British Ind.

1. AT6 automatic turntable, 4-speed, dynamically balanced tone arm $54.50
2. Autoslim/P auto-manual, intermix changer $39.50

KNIGHT

● *KN-990 Automatic Turntable.* Quality automatic turntable, 4 speeds, tone arm accurately adjustable from 0 to 8 grams.



Specifications: Speeds—16⅔, 33⅓, 45, 78 rpm; rim drive; 4-pole motor; turntable diameter, 11"; rubber mat; dimensions of chassis, 13⅝" × 12"; clearance required above mounting board, 4⅜"", below, 3"; type of mounting, leveling shock nuts, controls, speed, function, tracking weight; type of pickup head, plug in; material, plastic; number of leads to head, 4; number of leads to chassis, 2 cables. Price, $49.95. Allied Radio.

PIONEER

● *PL-4U Turntable with Arm.* The PL-4U turntable with tone arm is a well-designed unit designed to meet professional requirements. It uses a precision-engineered four-



pole hysteresis-synchronous motor with a sturdy die-cast turntable adjusted to perfect dynamic balance, and features a precise automatic cueing system. The tone-arm is tubular and is manufactured to rigid specifications for minimum tracking error and no resonances.

Specifications: Speeds—33, 45, 78 rpm; rim drive; 4-pole hysteresis-sychronous motor; 12" turntable; light metal alloy; wow and flutter—less than 0.17%, ± 0.05%; dimensions—17" × 13½" × 8½"; total weight—12 lbs. Pioneer.

STANTON

● *Model 800B Stereotable.* Gyropoise action, the only turntable with magnetic suspension, the platter actually floats on air, eliminating vertical rumble. Unified arm and platter suspension eliminates mechanical feedback. Rigidly mounted motor allowing the base to dissipate vibration. Separate arm mounting board allowing easy access to tone arm receptacles. Unique magnetic arm-board mounting.

Specifications: Speeds—33 rpm; puck drive; synchronous motor; turntable diameter, 11 27/64"; turntable weight, 2 lb. 7 oz.; shaft diameter, 9/32"; turntable material, alum.; rubber mat; wow, 0.04%; flutter, 0.05%; dimensions of chassis, 14⅞ × 11⅞"; clearance required above mounting board, 1⅝"; below, 3"; controls, on-off; Stanton 400A cartridge; mounting dimensions, ½"; number of leads to head, 4; number of cables to chassis, 2. Price, $129.95. Stanton Magnetics.

THORENS

● *TD-224.* Here is the ultimate in high fidelity quality and convenience—a fine 2-in-1 Swiss instrument that combines all the benefits of a professional turntable with all the conveniences of an automatic record changer. More than five years in development, the TD-224 meets the standards of the most ardent and discriminating perfectionist. It combines the essence of a TD-124 with an automatic changing mechanism of unusual design.

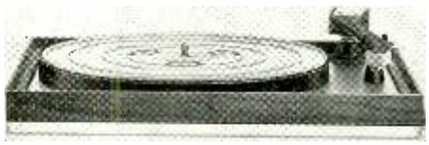


Specifications: Speeds—16, 33⅓, 45, 78 rpm; belt and idler drive; 4-pole motor; turntable diameter, 12"; turntable weight, 8 lbs; shaft diameter, ⅜"; turntable material, non-ferrous; rubber mat; wow and flutter below NAB; type of mounting, rubber grommet; controls, 4; type of pickup head, plug-in; material, aluminum; std. cartridge; mounting dimensions, std.; number of leads to head, 4; number of leads to chassis, 5; automatic intermix for 7", 10", 12" records. Price, $250.00. Accessories: extra heads, $5.00; bases, $30/45. Elpa Ind.

WEATHERS

● *Low-Silhouette Turntable Series, ML-66-A.* Low-silhouette turntable complete with vis-

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cous-damped universal tone arm. "Plug-in head accepts any make cartridge, micrometer adjustment for normal range tracking forces. Base and tone arm of non-resonant walnut in oiled or ebony finish.

Specifications: Speeds—33⅓ rpm; rim drive; 2 hysteresis-synchronous motors; turntable diameter, 12" turntable weight, 11 oz.; turntable material, aluminum; ring-support mat; wow and flutter, 0.04%; dimensions, 15 15/16" × 14 1/16"; type of mounting, self-contained cabinet; number of leads to head, 4; number of leads to chassis, 5. Price, $99.50. Weathers Ind.

1. K-66 turntable with integ. arm and LDM cartridge $129.50
2. K-66 pickup system with preamp .. $195.50
3. K-803 pickup system with preamp.. $189.45
4. K-834 two-speed (33-1/3 & 45 rpm) version of K-803 ..... $204.00

LOUDSPEAKER MECHANISMS

RICHARD ALLAN

● *Slim-Line Loudspeaker, Model CG 12T.* A quality English import crafted with care and finesse. Suited for building into popular "slim-line" cabinets. This is part of a new range of loudspeakers incorporating the latest advances



in magnetic design. The use of ceramic magnets in these speakers results in a considerable reduction in weight and depth. Flux density 14,000 lines per square cm, magnet type Ferrobar, total flux 82,000 Maxwells, freq. response 25 to 15,000 cps. Price $53.99. Richard Allen Sales.

1. Model 860 8" ..... $ 5.49
2. Bronze 8" with whizzer $19.99
3. Bronze 10" $31.99
4. 410T tweeter ..... $ 5.99
5. 1214 ..... $51.99

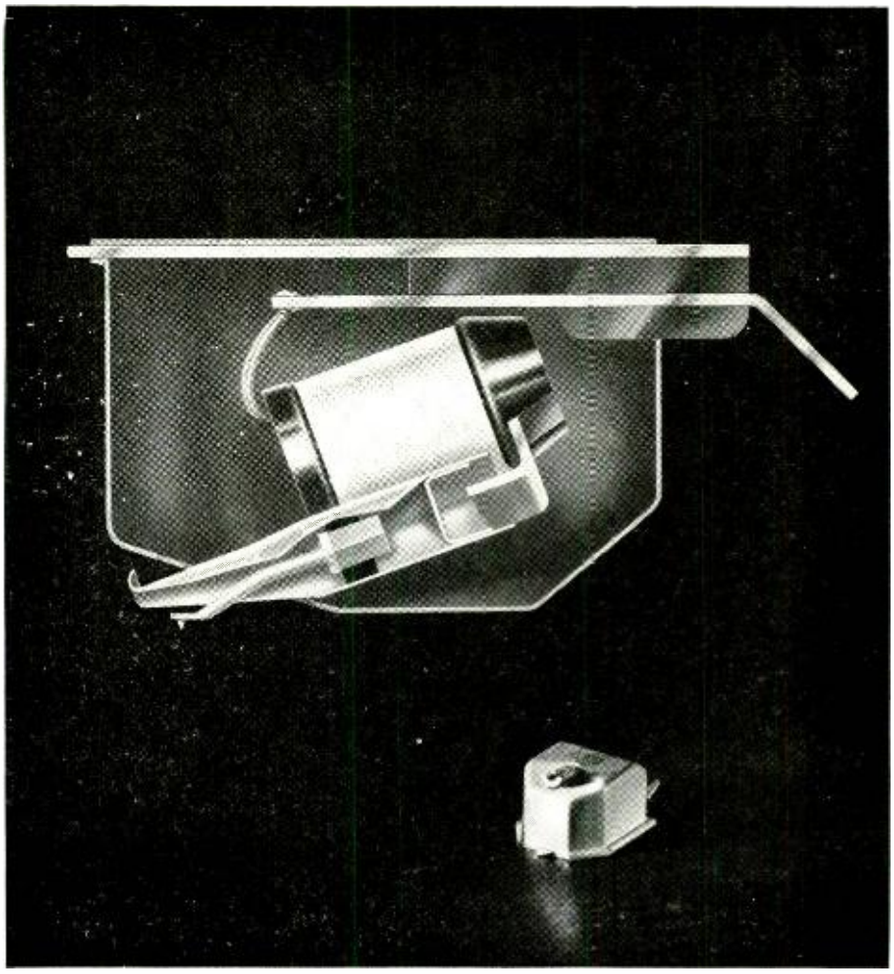
ALTEC

● *605A Duplex Loudspeaker.* An improved version of the famous 604 series, the new 605A provides unusually smooth response in the highs, extremely high linearity, and clean transient response in the lows.



Specifications: Type, duplex; power handling capacity 35 watts; impedance 16 ohms; frequency response, from 20 to 22,000 cps; magnet weight, l.f., 40 oz., h.f., 8 oz.; voice coil diameter, l.f., 3", h.f., 1¾"; free air resonance frequency 25 cps. Dimensions: 15 5/16" dia. 10" deep; weight, 37 lbs. with network. Price $168.00. Altec Lansing Corp.

1. 601C $108.00
2. 602C $132.00
3. 415C ..... $ 63.00
4. 803B ..... $ 60.00
5. 755C ..... $ 29.95



less than 2% i/m distortion but...

this alone is not enough. For optimum stereo performance, a cartridge must have stereo integrity as well as fidelity—spatial quality as well as sound quality.

The new Elac 322, with less than 2% intermodulation distortion, and less than 1% harmonic distortion, is capable of producing an almost perfect waveform replica of the sound groove—from 20 to 20,000 cycles, ±2 db. Moreover, it provides effective crosstalk damping over the most directional frequencies of the spectrum—way out to 20,000 cycles. Channel separation is practically complete: better than 25 db at 1000 cycles, 20 db at 10,000, and an astonishing 12 db at 20,000 cycles.

The 322 tracks at from 1.5 to 3 grams with most arms (1 gram with some). Price with .52 mil diamond stylus and universal mounting bracket is $49.50.

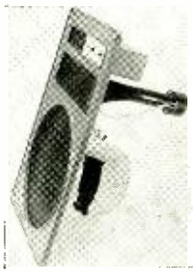
Also hear the new, compatible mono/stereo Elac 222, $39.50 with .7 mil diamond.

At your hi-fi dealer now. For complete details, write to: BENJAMIN ELECTRONIC SOUND CORP. 80 Swalm Street, Westbury, N.Y./U.S. distributor for Miracord and other Electroacustic (Elac)® Record Playing Components.

BENJAMIN ELAC

NEW ELAC 322 STEREO CARTRIDGE

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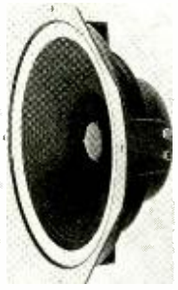


Electro-Voice

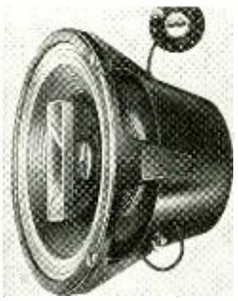


Goodman

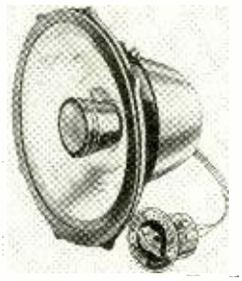




JBL



Knight



Lafayette

BOZAK

● *B-207A Coaxial Speaker.* The B-207A is a 2-way speaker intended for infinite-baffle enclosures and "large" sound. It is capable of handling modern, high-powered amplifiers.

Specifications: 2-way; power handling capacity 20–60 watts; impedance 8 ohms; frequency response ± 3 db from 40 to 20,000 cps; magnet weight 40 oz; voice coil diameter 1½"; free-air resonance frequency 36 cps; recommended enclosure volume 5 cu ft minimum. Dimensions 15" diameter 7" deep; mounting dimensions, (8) ¼-in. holes on 14½" circle; cutout diameter 12¼"; weight 13 lbs. Price $89.50. Other features: Designed for infinite-baffle mounting. R. T. Bozak Co.

1. B-199A woofer, 12-inch $52.00
2. B-209B midrange speaker, 6½ inch. $51.00
3. B-200Y dual tweeter $32.00
4. B-800 8-inch wide-range speaker ... $45.00

ELECTRO-VOICE

● *120TRX Triaxis Three-Way Reproducer.* A complete three-way loudspeaker system offering the installation ease and convenience of a single component. Consists of a 12-inch woofer with ceramic magnet and die-cast frame, special horn-loaded, compression-operated mid-range driver with ring diaphragm, and compression-operated diffraction horn tweeter. Three-way crossover network featuring acoustical balance controls. Units are mounted on a panel of rigid aluminum. Ideal for custom built-in installations. Finished in neutral gray with contrasting machined aluminum trim.

Specifications: Three-way; power handling capacity 30-watts program, 60 watts peak; impedance 8 ohms; frequency response, ± 5 db from 40 to 20k cps; sensitivity (watts input for + 85-db level 10 feet on axis) 1 watt; magnet weight 22 oz. woofer, 1.5 oz. mf, 3.0 oz, hf; voice-coil diameter 2" (woofer) 1" (m.f.,) 1" (h.f.); free-air resonance frequency 43 cps; recommended enclosure volume 8 cu. ft. Dimensions 13" wide, 20" high x 12" deep. Price $100.00. Other features AK7 grille cloth trim kit available as an accessory. Electro-Voice.

1. SP12B 12-in. Radax® coaxial speaker $ 37.50
2. 12TRXB 12-in. 3-way loudspeaker . $ 70.00
3. SP8B 8-in. Radax® coaxial speaker . $ 32.00
4. 15TRX 15-in. 3-way loudspeaker .. $155.00
5. BB1 VHF kit w/tweeter, crossover, wiring harness and level control ... $ 45.00

GOODMANS

● *Trutriaxiom Model 900C, 12" Loudspeaker.* The "Trutriaxiom" series of loudspeakers incorporate three separate voice coils.

Specifications: Triaxiom; power handling capacity 20 watts; impedance 16 ohms; frequency response, ± 3 db from 40 to 15,000 cps; sensitivity (watts input for + 85-db level 10 feet on axis) ¼ watt; magnet weight 16 oz; voice-coil diameter 1¾ in.; free-air resonance frequency 40 cps; recommended enclosure volume 4 cu. ft. Dimensions 12" dia. 5½" deep; mounting dimensions, (4) ¼-in. holes on 11¼" circle; cutout diameter 11"; weight, 9½ lbs. Price $49.95. Rockbar Corp.

1. 12" Trutriaxiom model 902C $59.95
2. 15" Trutriaxiom model 905C $69.95

JBL

● *LE 14C Composite Transducer.* Consists of two completely independent concentrically-mounted JBL precision transducers. The large 4" voice coil of the low-frequency unit permits the high-frequency transducer to be mounted on the same plane. Acoustic radiating area is equal to that of many 15" units, yet the LE14C may be installed in enclosures which ordinarily would accept nothing larger than a 12" speaker. A separate crossover network, mounted in a black die-cast aluminum case, is supplied as part of the composite transducer.

Specifications: Composite 2-way; power handling capacity 30 watts; impedance 16 ohms; voice-coil diameter LF 4"; free-air resonance frequency 25 cps; recommended enclosure volume 1.6 cu. ft. or more. Dimensions 14" max. dia. 5⅛" deep; cutout diameter 12 7/16"; weight, 24 lbs. Price $150.00. Other features Lans-a-loy cone suspension, variable high frequency control. James B. Lansing.

KNIGHT

● *KN-612HC Three-Way Speaker.* High compliance 12" woofer cone, 4.6 lb ceramic magnet, whizzer cone for mid-range, and a compression tweeter for highs.

Specifications: 3-way; power handling capacity 50 watts; impedance 9 ohms; frequency response, 30 to 19,000 cps; magnet weight 4.6 lb; free-air resonance frequency 35–45 cps. Dimensions 12" dia. 7½" deep; weight, 32 lbs. Price $59.95. Allied Radio.

1. KN-839 8" 3-way speaker $19.95
2. KN-830 12" 3-way speaker $26.95
3. KN-800 HC 3-way speaker $39.95

LAFAYETTE

● *SK-58 12-inch 2-Way Speaker.* The SK-58 is a 2-way speaker with a 12-in. free-edge woofer plus a 3-in. cone-type tweeter, with the tweeter mounted on the same axis as the woofer. A built-in LC network distributes the frequencies to the appropriate speaker. The free edge of the woofer is connected to the speaker basket by a sheepskin surround.

Specifications: Type, coaxial; power handling capacity 20 watts; impedance 8 ohms; frequency response, from 30 to 15,000 cps; magnet weight 20 oz; free air resonance frequency 40 cps; recommended enclosure volume 6 cu. ft. Dimensions: 12½" dia., 6⅛" deep; cutout diameter 10½"; weight 11 lbs. Price $27.00. Other features: brilliance level control, 3" cone tweeter. Lafayette Radio.

1. SK-180 10" 3-way $32.50
2. SK-215 15" 3-way $64.50
3. SK-216 12" 3-way $54.50
4. SK-217W 12" 3-way $39.95
5. SK-128 8" biaxial $19.50

NESHAMINY

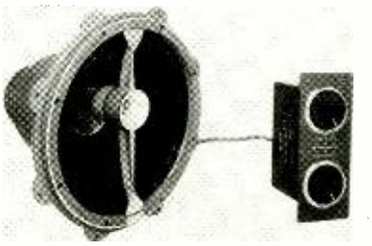
●-*Model 350 Woofer.* The model 350 can achieve fine bass response in a totally closed cabinet of small size. This long-travel dynamic woofer perfectly complements the mid/high range electrostatic. Its very light cone with slight apex weighting and specially treated cloth suspension achieve piston action without breakup or doubling. Recommended for use in Fiberglas-filled cabinet.

Specifications: 11" dynamic; power-handling capacity 100 watts; impedance 8 ohms; frequency response, ± 3 db from 30 to 2000 cps; magnet weight 18 oz; voice-coil diameter 1.3 in.; free-air resonance frequency 40 cps; recommended enclosure volume 2.2 cu. ft. Dimensions: 11¼" dia. 5" deep; mounting dimensions, (6) holes on 10 13/16" circle; cutout diameter 11 5/16"; weight, 10 lbs. Price $37.00. Neshaminy.

PIONEER

● *PAT-30X 12-inch 3-way Loudspeaker.* The Pioneer PAT-30X is a deluxe 3-way loudspeaker comprised of a cloth-edged woofer, and two speakers for mid- and high-frequency reproduction. Exponential horn type speakers are used for mid- and high-frequency reproduction. The PAT-30X provides smooth wide-range reproduction without peaks or dips over the entire audio spectrum.

Specifications: 3-way; power handling capacity 60 watts; impedance 16 ohms; frequency response, ± 10 db from 20 to 20,000 cps; sensitivity (watts input for + 85-db level 10 feet on axis) 0.75 watts; magnet weight 87 oz; voice-coil diameter 3 1/16 in.; free air resonance frequency 23–32 cps; recommended enclosure volume 8½ cu. ft. Dimensions 13⅜" dia. 9 13/16" deep; mounting dimensions, (8) ¼-in. holes on 12 13/16" circle; cut out diameter 11⅝"; weight 24 lbs.

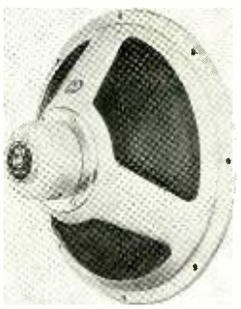


Other features: Uses an external independent crossover network and level controls. Pioneer.

1. PAX-30M 12" 2-way speaker
2. PAX-30L 12" 2-way speaker with exponential horn type tweeter
3. PIM-30L 12" dual-cone 2-way speaker
4. PAX-20F 8" 2-way speaker
5. PAX-25F 10" 2-way speaker

R & A

● *700 Series MK IV Models.* The latest models from this well-known British speaker manufacturer. The fundamental resonances of the speakers vary according to their size. Frequency response to 18,000 cps. Power handling capacity 10, 20, 25, and 30 watts respectively for Model 750 (5"), Model 780 (8"), Model 7100 (10"), and Model 7120 (12") speakers. Voice-coil impedance 8 ohms for all models. Price, $9.95–$18.95. Ercona Corp.



ROYAL

● *"Royal" Speaker Line.* The Permoflux "Royal" Speaker line includes 8- and 12-inch speakers in deluxe and standard configurations. The speaker cone in this series is flexible, slotted, thin at the edge, and coated with a permanently soft and resilient formula which together with an extra-large low-resonance suspension at the cone apex gives very high compliance. The stiffened cone apex and special voice coil provide a smooth distribution of high frequencies. Minimum baffle requirements.

Specifications: 12"; power handling capacity 20 watts; impedance 8 ohms; frequency response, 30 to 12,000 cps; magnet weight 16 oz; Dimensions 12 7/32" dia. 6⅛" deep; weight, 5¾" lbs. Price $32.50. Permaflux Corp.

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1. Royal Standard 12 ..... $25.00
2. Royal Deluxe 8 ..... $22.50
3. Royal Standard 8 ..... $17.50
4. Royal 8 ..... $15.00

SONOTONE

● *WR8-BH 8" Coax.* Provides smooth response over entire frequency range. Uses high-frequency cone radiator to extend range to 20,000 cps. Highly efficient. Terminals color coded to simplify correct phasing in multiple speaker systems. Power handling capacity 20 watts; impedance 8 ohms; frequency response, 45 to 20,000 cps. Price $13.50. Sonotone Corp.

1. CA-12A 12" coax w. built-in crossover network $31.00
2. W-12 12" woofer $19.00
3. T-64 6 x 4 elliptical-cone tweeter ... $12.00

STENTORIAN

● *10" Full-Range Loudspeaker.* Designed for use in wide range systems.

Specifications: dynamic; power handling capacity 10 watts; impedance 4, 8, & 12 ohms; frequency response, ±3 db from 30 to 14,000 cps; magnet weight 32 oz; voice-coil diameter 1 in.; free air resonance frequency 35 cps; recommended enclosure volume 4–6 cu. ft. Dimensions 11¼" dia. 4½" deep; mounting dimensions, (4) 3/16-in. holes on 10 25/32" circle; cutout diameter 9¼"; weight, 6½" lbs. Price $18.95. Other features: universal voice coil, cambric cone. Barker Sales.

1. 8" model HF812 ..... $ 14.95
2. 12" model HF1214 ..... $ 52.50
3. Duplex 12" (concentric) $119.00
4. Duplex 15" (concentric) $159.50
5. Tweeter T359 ..... $ 14.95

TANNOY

● *10" Monitor Dual-Concentric Loudspeaker.* This is the smallest and most compact of the "Monitor Dual-Concentric" line of Tannoy speakers. There is, in addition, a 12" and 15" model. The principle incorporates a horn-loaded high-frequency tweeter, closely integrated with the curvilinear LF diaphragm and voice-coil assembly. The units come complete with their individual crossover network system.



Specifications: dual concentric; power handling capacity 20 watts; impedance 16 ohms; frequency response, ±3 db from 27 to 20k cps; magnet assembly 6¼ lbs; L.F. voice-coil diameter 2½" (HF, 2"); free air resonance frequency 27 cps; recommended enclosure volume 1½ cu. ft. minimum. Dimensions 15⅝" dia. 6½" deep; mounting dimensions, (4) ¼-in. holes on 11" circle; cutout diameter 9"; weight, 9 lbs. Price $112.75. Other features: Crossover weight 2¼ lbs.; finish, hard enamel. Tannoy of America.

1. 15" Monitor Dual Concentric $179.00
2. 12" Monitor Dual Concentric $138.00

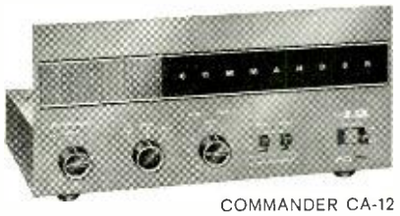
UTAH

● *8-in. Unit Drive Speaker, Model D8LA.* An 8-in. speaker with good performance at a moderate price.

Specifications: Dual-cone type, 18-w power handling capacity, 8-ohm impedance; frequency response, 40 to 16k cps; 10-oz. magnet. Dimensions: 8 3/32" dia., 4" deep; mounting dimensions, (8) ¼" holes on 7 11/16" circle; cutout diameter, 7 3/16"; weight, 4 lbs. Price, $14.25. Utah Electronics.

1. D8J, 8" 5.8-oz. magnet, 1" v.c. $10.50
2. D12J, 12", 6.8-oz. magnet, 1" v.c. .. 12.33
3. D12LA, 12" 10-oz. magnet, 1¼" v.c. 16.20
4. D12P, 12" 21.5-oz. magnet, 1½" v.c. 24.00

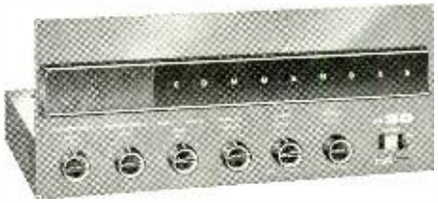
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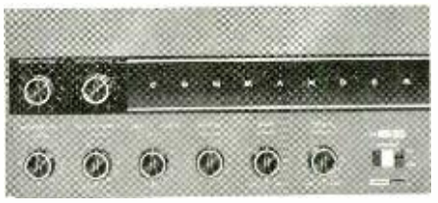
COMMANDER CA-12



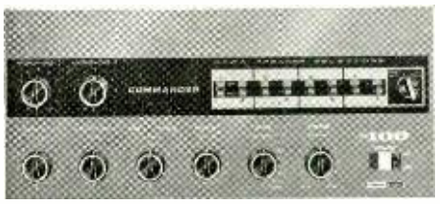
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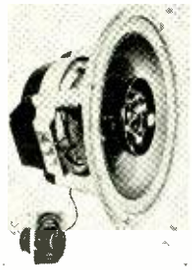
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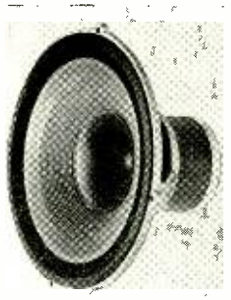
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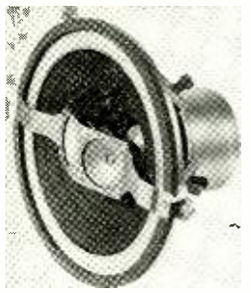
University



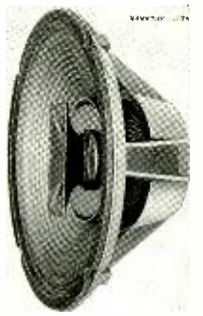
Vitavox



Wharfedale



Wigo



Wolverine

UNIVERSITY

● *Model 312 Series 200.* Wide-range, 3-way speaker using the University "diffusicone" principle and the Sphericon super-tweeter. Specially damped cloth surround and exceptionally rigid cone afford rich bass response. Efficiency is high.

Specifications: 3-way; power handling capacity 35 watts; impedance 8–16 ohms; frequency response, 28 to 40k cps; recommended enclosure volume 4 cu. ft. (minimum). Dimensions 13" dia. 6⅝" deep; mounting dimensions, 8 7/32 in. holes on 11 9/16" circle; cutout diameter 11". Price, $73.00. University.

1. Model 315-C, 15" 3-way..... $156.00
2. C-15HC 15" woofer ..... $ 89.50
3. Model 6201 Series 200 12" 2-way . $ 57.75
4. Sphericon T-202 super-tweeter .... $ 24.95
5. Mode C-8M 8" midrange ..... $ 16.95

VITAVOX

● *DU120 Duplex-Coaxial Loudspeaker.* Balanced full-range reproduction. Designed specifically for listening in the home. Incorporates mechanically and electrically independent low- and high-frequency units. Both units are of the direct radiator moving-coil type. Magnets are made of high-efficiency materials. Price, $89.50. Ercona Corp.

1. AK121 (12" low resonance) ..... $ 79.95
2. AK120 (12" full range) ..... $ 69.95
3. K15/40 (15" full range) $109.50
4. K15/40 (15" low resonance) $119.50
5. S2 Pressure Unit $149.50

WHARFEDALE

● *Super 12 RS/DD Full-Range 12" Loudspeaker.* A full-range 12" speaker with an unusually powerful magnet system.

Specifications: Full-range; power-handling capacity 40 watts; impedance 12–15 ohms; frequency response, 25 to 15,000 cps; magnet weight 256 oz; voice-coil diameter 1¾ in.; free-air resonance frequency 28–33 cps; recommended enclosure volume 2 cu. ft. or more. Dimensions 12¾" dia. 7" deep; mounting dimensions, (4) 3/16"-in. holes on 12¾" circle; cutout diameter 10¾"; weight, 22 lbs. Price $89.50. Other features 190,000 gauss total flux; density, 17,000 gauss; roll surround for small enclosures, cast basket, aluminum voice coil. British Ind.

1. Super 8/RS/DD 8" full-range speaker $26.50
2. Super 10/RS/DD 10" full-range speaker $47.50
3. Super 3 treble speaker $26.50
4. W12/RS Woofer $52.50
5. W15/RS Woofer $89.50

WIGO

● *Model CX-212 12" Coaxial.* The CX-212 consists of a 12" extended range woofer, plus a twin-tweeter array with a built-in crossover network.

Specifications: 2-way; power handling capacity 30 watts; impedauce 16 ohms; frequency response from 30 to 15,000 cps; magnet weight 29 oz.; free air resonance frequency 40 cps. Price $79.50. Other features: flux density 12,500 gauss. United Audio Products.

1. ERD-12 extended range (12") ..... $ 59.50
2. CX-2 twin-tweeter array ..... $ 20.00
3. ER-85 extended-range (8") ..... $ 21.00
4. TW-400 tweeter (4") ..... $ 12.50
5. WD-155 super woofer (16") $169.50

WILDER

● *Twin-Stereo, Model 808-A Loudspeaker.* An 8-in. speaker sold in matched pairs for stereo. The 808-A has a rugged die-cast basket and close-tolerance cone.

Specifications: 8" with whizzer; power handling capacity 25 watts; impedance 8 ohms; frequency response from 30 to 17,000 cps; magnet weight 16 oz; voice coil diameter 2 in.; free-air resonance frequency 44 cps; recommended enclosure volume 3 cu. ft. Dimensions: 8½" dia. 4¾" deep; mounting dimensions, ¼-in. holes on 7⅝" circle; cutout diameter 6¾"; weight, 11½ lbs. Price $98.00 pr. Wilder Engineering Products.

1. 1208-A, 12" twin stereo spkrs. $121.27
2. 12200-A, 12" biaxial ..... $ 60.00
3. 12145, 12" biaxial ..... $ 45.00
4. 8172-A, 8" biaxial ..... $ 28.00

WOLVERINE

● *LT12 Three-way Speaker.* The Wolverine 3-way speakers feature concentric mounting of all reproducing elemeuts. The LT12 incorporates in the high-frequency section. the Sonophase® throat design. The high-frequeucy section also incorporates a diffraction horn for proper dispersion. An adjustable "brilliance" control is incorporated to allow matching of respouse to room acoustics. Includes a two-way crossover network. edge-wise wound aluminum voice coil, a ceramic magnet, and rigid die-cast frame.

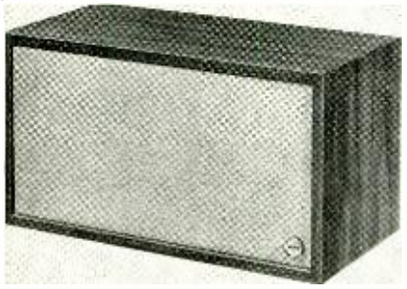
Specifications: 3-way; power handling capacity 20 watts; impedance 8 ohms; frequency response, 40 to 18,000 cps; sensitivity (watts input for +85-db level 10 feet on axis) 1 watt; magnet weight, woofer 12 oz. tweeter, 1.47 oz.; voice-coil diameter woofer 2", tweeter 1"; free-air resonance frequency 60 cps; recommended enclosure volume 4 cu. ft. minimum. Dimensions 12⅛" dia. 5 15/32" deep; mounting dimensions, (4) ¼-in. holes on 11½" circle; cutout diameter 10½"; weight, 11 lbs. Price $32.00. Other features—step-type acoustical balance control. Electro-Voice.

1. LS12 12" Radax® speaker $21.00
2. LS8 8" Radax speaker $19.50
3. LS15 15" Radax speaker $26.50
4. HF1 high-frequency kit $25.00
5. MF1 mid-range kit $29.00

LOUDSPEAKERS IN SMALL ENCLOSURES

ADC

● *ADC-12 Bookshelf Speaker System.* An unusually good buy in a compact speaker system. Uses rectangular woofer. Measures

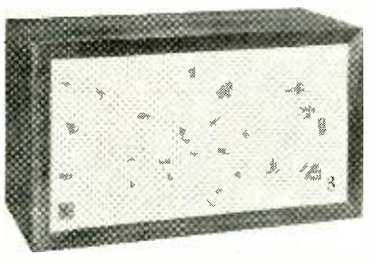


23¾" x 13" x 11¾" in a handsome walnut cabinet. Response from 38 to 20,000 cps. $139.50. Audio Dynamics Corp.

1. ADC-14 ..... $175.00
2. ADC-16 ..... $220.00

ACOUSTIC RESEARCH

● *AR-3.* The AR-3 is a three-speaker full-range system utilizing the acoustic-suspension principle. Both the 2-in. mid-range and



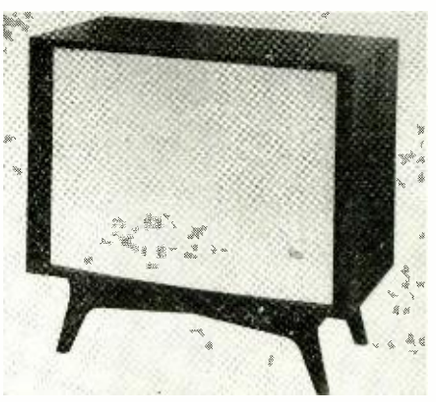
the 1⅜-in. tweeter utilize hemispherically shaped diaphragms as direct rediators.

Specifications: Type of enclosure, sealed; speakers 12" l.f., 2" m.f., 1⅜" h.f.; type of crossover network, L-C; impedance 4 ohms; sensitivity (watts input for + 85-db level 10 feet on axis) 1.39 watts; magnet weights; l.f., 53 oz.; m.f., 53 oz.; h.f. 17 oz.; voice coil diameters: l.f., 2" m.f. 2" h.f. 1⅜"; Dimensions: 25" wide, 14" high, 11⅜" deep; weight, 52.5 lbs; various finishes available. Prices, $203–$225. Accessories: Speaker stand $30.00; speaker base $7.50, Acoustic Research.

1. AR-2a, mahogany or birch $122.00
2. AR-2, mahogany or birch ..... $ 96.00

ALTEC

● *841A "Coronado."* The 841A "Coronado" is styled to match a pair of "Carmels" or "Avalons" when used as the center speaker in a three-channel stereo system. or can be used in pairs, or monophonically. Housing a 414 12" woofer and a 3000 sectoral horn and driver with the new Altec Mylar diaphragm, the "Coronado" provides a full 40-22,000 cps frequency response with 20 watts maximum input power. The 841A cabinet is furnished in either walnut or mahogany and measures 30"



H x 19" W x 14" D and is lined with fiberglas. Price, $199.50. Altec-Lansing.

1. 834A "Monterey" $174.00
2. 835B "Monterey, Jr." ..... $ 85.50
3. 836A "Lido" $117.00

ARGOS

● *PHF-18 Petite.* The Petite is a very small, slim profile (only 3¾" deep) two-speaker system. It incorporates a new Jensen high-com-

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pliance woofer, designed especially for Argos. The Petite may be used anywhere—shelf, table, wall, or floor.

Specifications: speakers 1 l.f., 1 h.f.; power handling capacity 10 watts; type of crossover network, capacitor; impedance, 8 ohms; frequency response ± 5 db from 50 to 15,000 cps; volume control, hanger brackets for wall, solid brass attachable legs. Dimensions: 18" wide.



12" high, 3¾" deep; weight 8½ lbs.; finishes available and prices: hand rubbed oiled walnut, $24.95; Argos Products.

1.	AD-1AS	$39.95
2.	TSE-1S	$24.95
3.	TSE-3AS	$39.95
4.	HFWB-8S	$17.95

AUDIO-TECH

● *ME-12 Loudspeaker System.* Continuously adjustable tweeter output. Color-coded binding posts for easy stereo connection. Guaranteed for 2 years against defective materials and for workmanship.

Specifications: Type of enclosure, infinite baffle; speakers 12" l.f., 3" h.f.; power handling capacity 30 watts; type of crossover network, capacitor; impedance 16 ohms; frequency response from 40 to 20,000 cps; magnet weights: l.f., 32 oz.; h.f., 1.47 oz.; voice coil diameters; l.f., 2"; h.f., ½"; fused to protect against overload. Dimensions: 14" wide, 24" high, 12" deep; weight, 35 lbs.; oiled walnut, $129.00. Audio Tech Laboratories.

1.	JA-15 loudspeaker system	$250.00

BOZAK

● *B-302A Urban Speaker System.* Although small in size, the Bozak B-302A possesses the same musical sensitivity featured by all Bozak speaker systems. It is ideal for small listening rooms or in pairs for stereo. The B-302A contains one Bozak 207A two-way speaker, one B-209B midrange speaker and one 10102 crossover network to provide crossover at 800 cps.



Specifications: infinite baffle; speakers: one l.f., one m.f., two h.f.; power handling capacity, 20–60 watts; crossover network: three-way LC, 6 db/octave at 800 and 2500 cps; impedance 8 ohms; freq. resp. ± 3 db from 40 to 20,000 cps; magnet weights: l.f., 24 oz.; m.f., 24 oz.; h.f., 16 oz.; voice-coil diameters: l.f., 1½"; m.f., 1½"; h.f., ¾". Dimensions: 24" wide, 30" high, 20" deep; weight 80 lbs.; walnut, mahogany, ebony $254.50; French Provincial cherry $290.00. C-305U matching equipment cabinet $285.00. R. T. Bozak Mfg. Co.

1.	B-305 Urban speaker system	$397.50
2.	B-305 Provincial speaker system	$440.00
3.	B-4000 speaker system	$495.00
4.	B-310A speaker system	$770.00

CABINART

● *Mark 3.* An 8" extended-range loudspeaker system using the bass-reflex principle of operation with a unique horn coupling. This principle enables the total back radiation to be used effectively thus maintaining critical damping while increasing the bass response.

(Continued on page 78)



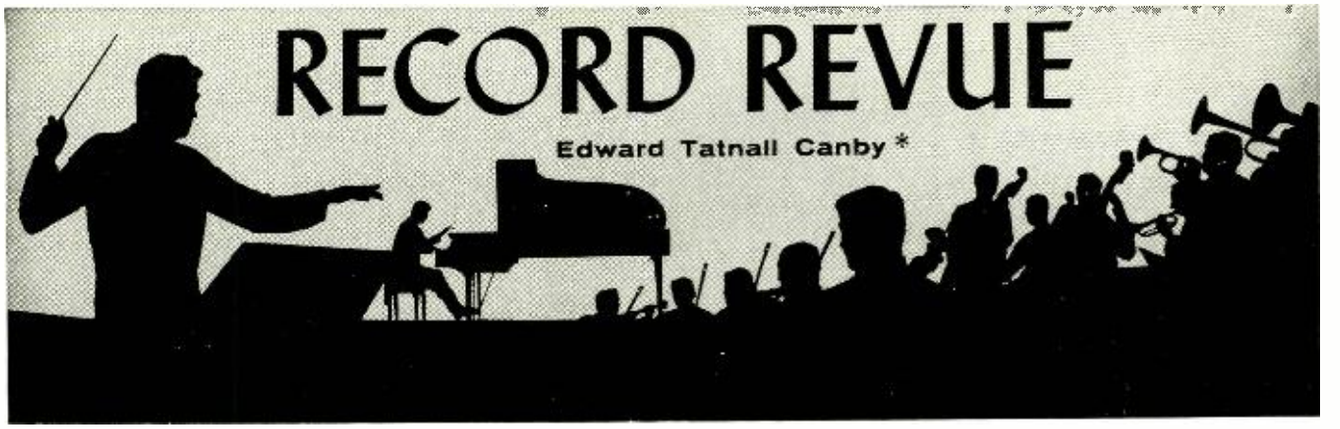
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HERITAGE OF THE BAROQUE

Purcell: Come ye Sons of Art (1694); The Bell Anthem; My Beloved Spake (early 1680s). Alfred Deller, Mark Deller, soloists of the Deller Consort, Oriana Concert Choir and Orch.

Vanguard BGS 5947 stereo

Magnificent Purcell! The great Birthday Ode for Queen Mary, ("Come ye Sons of Art") one of Purcell's grandest works and cast on a Bach-like scale of richness and profoundity, gets its second Deller recording here. The famed duet for pair of countertenors, "Sound the Trumpet" is sung this time by Alfred Deller and his son Mark. The son's voice is remarkably like the father's, though fresher, younger and more precise; the two sing a superb duet and once again, surely, the tones of this duet will be sounding forth wherever singing amateurs get together the world over! It's catchy.

The other two works are earlier anthems, of quite a different style, less varied in scope, much closer to Monteverdi than to Bach, altogether of a more remote time though ever so clearly from the same unique British mind. The "Bell Anthem" is well known for one chorus—here is the whole of it; "My Beloved Spake" is a companion anthem of the same period.

Bach Cantatas. (1) Nos. 80, 87; (2) No. 76; (3) Nos. 6, 65. Soloists, Heinrich Schütz Chorale, Pforzheim Chamber Orch., Fritz Werner.

Epic BC 1257, 1251, 1261 stereo

Here are three separate LPs in a splendid series of Bach cantata recordings, for my ear the most satisfactory of any to date. They all share the same performers, including the famous Helmut Krebs as tenor—scaling astonomical heights with remarkably few flubs in pitch—a pompous but friendly basso, excellent and paternal, named Franz Kelch, plus an ardent soprano, Ingeborg Reichelt and a rich contralto, Hertha Töpper. The chorus is of top quality, lean, accurate, expressive and in tune, and the orchestra and solo instruments are equally fine.

Two things seem to me outstanding here. First, these performances are *musical*—they avoid the too-frequent hard, pounding rhythms that mar so many Bach performances, both in Germany and elsewhere. Phrasing and pacing throughout is plastic, intelligently shaped, the diction is excellent and the dramatic impact beautifully calculated.

Second, the recording itself emphasizes the spacious yet highly colored sounds that were Bach's special interest, even to a relatively close-up miking of the featured *obbligato* instruments along with their matched vocal solo partners—the nasal oboe d'amore, for instance. This, of course, highlights the Bach revolution of our time, whereby the thick, monotonous "modernized" symphonic orchestrations of the recent past have been retired in favor of Bach's original instrumentations, so perfectly calculated for their colorful sonic impacts.

The Cantatas here seem to have been chosen both for unusual brilliance and for their striking contrasts of approach. "Eine Fest Burg" (No. 80), for instance, based on the familiar "A Mighty Fortress is Our God" throughout, is the biggest of big-Bach works, complete with immense choruses and a splendid Bach trumpet; "Die Himmel Erzahlen Die Ehre Gottes" (No. 76) is a relatively early double work of brilliantly contrasted solo pieces, each half taking up an LP side.

Note that the cantata numbering system is not chronological. The later works, revived the soonest, now have low numbers, whereas most of the earlier cantatas with their colorful and varied drama have been given higher numbers. Quite arbitrary.

Concertos by Bach, Vivaldi, Handel. Yehudi Menuhin, vl., Leon Goossens, oboe; Bath Festival Chamber Orch., Manuhin.

This record continues the gracious music-making that Yehudi Menuhin has been providing in a series of English releases on Angel. The performances offer unique qualities; their somewhat old fashioned elegance of phrasing and tempo is matched by a scrupulously modern regard for "authentic" instrumentation and ornament—a rare and persuasive combination. Angel's suave stereo sound brings out the richness of color and presence in this music without being unpleasantly "hi fi".

Menuhin here teams with the dean of British oboists, Leon Goossens, for a Bach double concerto, oboe and violin, reconstructed as the original of the Bach Concerto for Two Harpsichords (the original version is lost); Goossens plays the four Handel Oboe Concerti and Menuhin teams with three colleagues in the Vivaldi Concerto for Four Violins, original of another Bach harpsichord work, the Concerto for Four Harpsichords.

Bach: Six Sonatas for Violin and Harpsichord (with Viola da Gamba). Yehudi Menuhin, George Malcolm, Ambrose Gauntlett.

Angel 36298 stereo

This album teams Menuhin with another British musical leader, the virtuoso harpsichordist George Malcolm. According to a suggestion attributed to Bach himself, the bass line is reinforced by a viola da gamba—though these are works for obbligato harpsichord (the keyboard part written out and the right hand playing a melodic line in duet with the violin) and there is no continuo.

Mr. Malcolm's lively playing balances Menuhin's somewhat old fashioned violin sound plus the solid bass added by the gamba for a somewhat heavy-handed but moving series of performances—these artists already have the impressiveness of elder statesmen of the art.

Bach: Six Violin Sonatas. Robert Gerle, vl., Albert Fuller, hps.

Decca DXA 168(2) mono

—And here we have a younger, New York styled rendering of the same works, done in the manner of a newer generation. The music flies along, faster and much more lightly than in the Menuhin-Malcolm versions. The harpsichord, on its own without added viola da gamba bass, moves quickly and cleanly through the music; the violin, fleeter than Menuhin's, speeds along with only a rare off-note in spite of the fleetness. Good teamwork.

Most noticeable, though, is the new and modern playing attitude—dead-pan accurate in sound, leaving the expression, so to speak, to the notes themselves. Generally the results are excellent, for these two are good musicians. And yet in the presence of this anonymous sort of playing, one somehow misses the old performer individuality that shines through the more old fashioned playing of Menuhin and Malcolm—though perhaps it is to the detriment of well-oiled perfection. I would not want to argue flatly for either approach; but here, in any case, is a fundamental difference that says much about our time, which is moving so rapidly away from the past—even the merely middle-aged past.

P.S. Decca has put its foot in its mouth. The elaborate notes on each sonata by Mr. Fuller are lacking their headings—each paragraph begins "this sonata" without further identification. You can figure out which one he means if you work at it.

Handel: Trio Sonatas for Oboe and Flute, Sonatas for Oboe, Recorder. Baroque Trio of Montreal.

Vox STPL 500.930 stereo

What a superb artist was old Handel! Next to other works in these now-familiar forms, how strong sinewy, forceful, are these Handelian Baroque sonatas!

These Montreal players, from various musical backgrounds—Geneva, Paris, Hartford, Conn.—strike an interesting balance between American and European performance. They are above all a vigorous group, excellent in rhythmic drive and phrasing. The Trio Sonata in G Major on the second side, for oboe, flute and harpsichord, is enough to make you dance all over the floor, it comes through with such superb vigor. The American quality of bounce and vigor is offset by a European carefulness of style that is too often sadly lacking in our Baroque groups over here. (Many of them have turned Baroque overnight, to satisfy the new market.)

Note that the flutist Mario Duschenes (trained in Switzerland) is of the new generation who also play the recorder—a thing unthinkable for most standard symphonic-solo flutists. His recorder isn't as fluent as his flute, but he has an excellent grasp and appreciation of the instrument's powers.

Heritage of the Baroque, Vol. II (French composers). The Telemann Society.

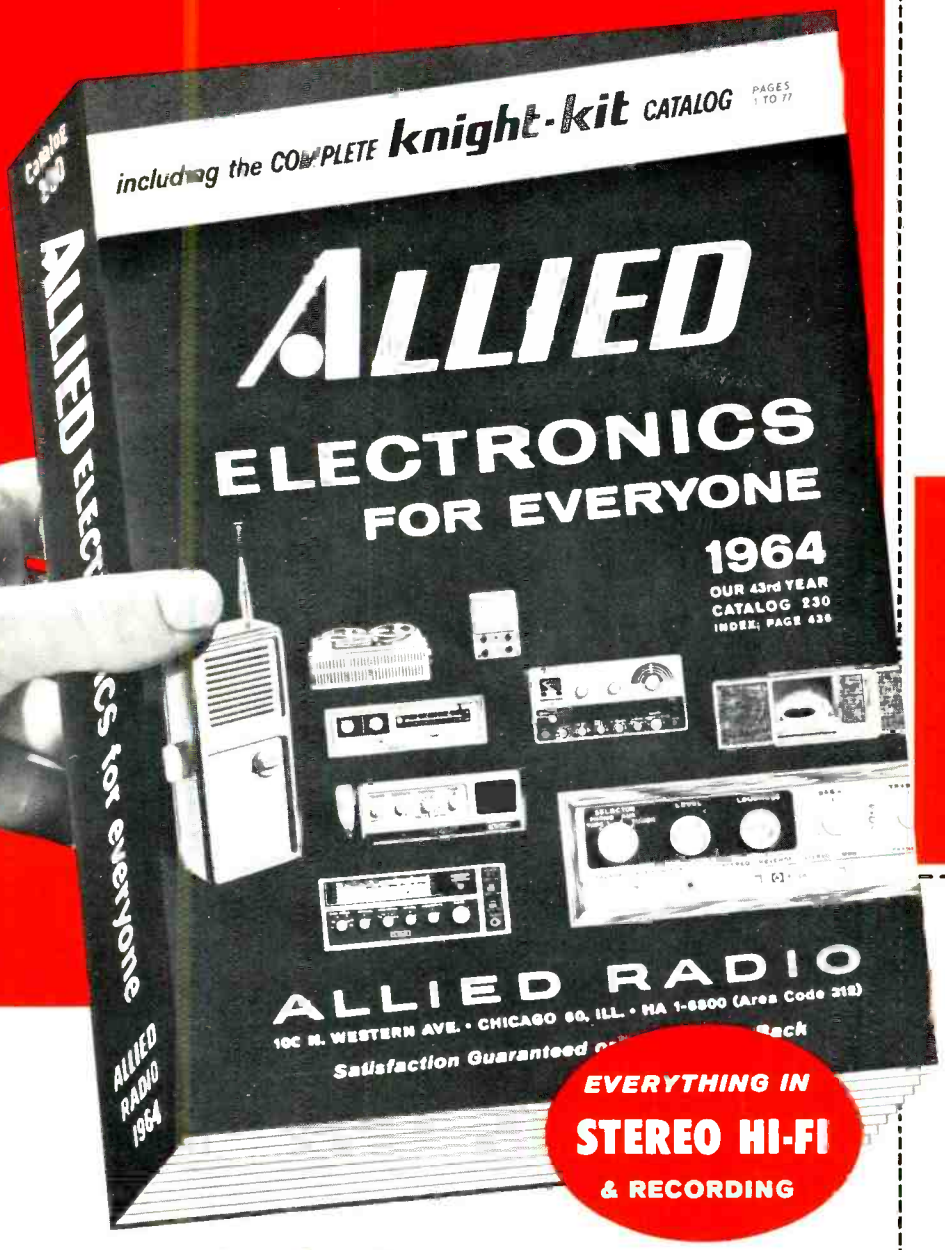
Vox STLP 514.000 stereo

"Bach-Handel-style" music from France, the French Baroque, is a new re-discovery in our time and there is a wealth of it to be brought forward in all forms. This Telemann Society disc explores five French composers only two of whom are even moderately known—Leclair and Loeillet—and the

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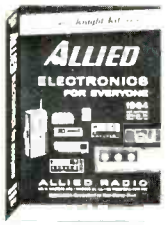
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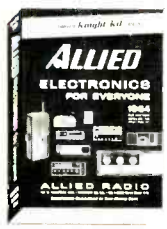
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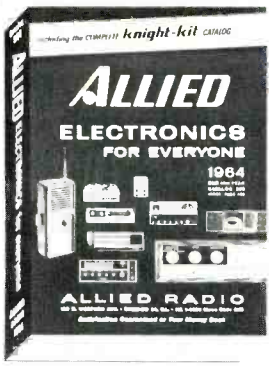
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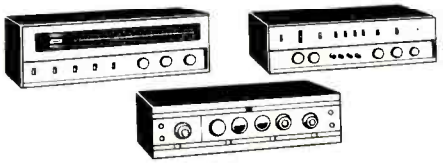
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feature work of the recording is not by either, a gay little solo cantata on the subject of coffee's charms by one Bernier. It is an excellent piece and most intelligently sung by Janet Wheeler; the type is familiar, a series of brief recitatives followed by lively arias in the manner of the small Italian operettas such as "La Serva Padrona," the accompaniment only a harpsichord and violin but the richness of the musical fabric sounding like a lot more. Coffee was a new sensation; this work has intrinsically more worth than the similar "Coffee Cantata" of Bach and should be investigated by singers looking for nice new material.

The other works here are instrumental sonatas and trio-sonatas, for oboe, flute, recorder, violins, with harpsichord. The material is worthwhile and the playing is too, though still somewhat marred by the roughness and didactic mannerisms that has characterized the Telemann Society under the Schulzes. (Why, for instance, the hiccup-like break before every final cadence, imposed on all the Telemann Society performers? And why the monotonously pounding harpsichord accompaniments, solid chords unvaried and metrical?)

Loeillet: Sonatas, Trio Sonatas. Pierre Poulteau, recorder, Andre Chevalet, oboe, Yvonne Schmit, harps.
Music Guild S-38 stereo

Loeillet was the eclectic professional of his day in France; his music is polished, solid, more nearly international sounding than most French work, closer to Telemann and Handel than other Frenchman. All in all, it tends to be competently predictable, as in most of these sonatas and trio sonatas—two for the pair of soloists, one for each of them alone, plus one keyboard "Lesson" (Suite) for harpsichord solo. Nice French playing, if a bit unfluent; Poulteau plays a slow but very musical recorder as the apparent leader of the group. The stereo recording is done close in a dead studio, but is well balanced and clear.

MASSES

Pope John XXIII. (Excerpts from "Sounds of the Vatican").
Mercury RS 600 stereo

Though this disc is not regularly for sale, some broadcasters will encounter it and the longer complete Vatican-State-Authorized version is available from Martin Haley Prods., Degree of Honor Bldg., St. Paul 1, Minn., for $24.50 mono or stereo.

As a memorial to the late Pope, these excerpts are not too effective for the general listener, though of great importance for Catholics. Of recent Popes, John was the first to appeal widely to the world at large outside of his own flock. The sounds here presented are, so to speak, academic, intramural, professional, detailing not so much the Pope's larger views as known to us all but, rather, some of the technical aspects of his daily life as leader of the immense Catholic religious organization. Mostly, we hear the Pope's tenor voice reading or reciting Latin in various portions of services, audiences, appearances on the famous balcony over St. Peter's Square, accompanied by mass responses according to formula. The immense echoes of St. Peter's and the vastnesses of the Square outside contribute to general unintelligibility for the listener who does not know what is going on. All in all, in spite of the clear, friendly voice of the Pope himself (so much less familiar than his benign and portly figure), these proceedings are more likely to intimidate than to inspire those non-Catholics who may listen in. After all (these sounds say), the Pope was the Head of a very specialized and complex organization whose inner workings are mostly beyond the understanding of those on the outside.

This is surely unintended. Nevertheless, it shows an all-too-familiar lack of imagination among the professionals who have so devotedly prepared this material. A few more words of casual explanation, a few more side-comments on unfamiliar "local customs," could have immensely increased the intended air of solemnity and grandeur, reinforcing the universal appeal of the Pope's own personality.

Sudden loud bursts of handclapping applause in the midst of prayers, for instance, are surely the accepted thing in Rome but may cause unintentional offense to those used to other attitudes. The persistent loud blowing of auto horns by "drive-in" listeners to the Pope's outdoor appearances may seem rude, too, though part of local reverence. These minor differences in our world-wide customs are wholesome, but need always to be placed in context if they are to take a proper "back seat" in favor of grander concepts.

I must add, alas, that the musical aspects of these top-level proceedings are pretty sad. The Pope himself, we are glad to discover, had a pleasant singing voice and a good sense of pitch and style. But the choir in St. Peter's basilica—the choir of choirs, after all—produces the rattiest singing you've ever heard, like tired Italian opera, at one point in a few moments sagging so flat of the pitch that the organ comes in dismally out of tune. And this at the canonization of a new Saint! Gregorian chant is sung enthusiastically but—by the church's own standards—in very poor style, again full of opera. Some of it is accompanied by loud organ harmony. Enough to embarrass any music-minded listener and not a happy advertisement for the proceedings. Remember that in the past the Church laid the foundation for our whole Western music. For centuries the Vatican music itself was the inspiration for the best in religious music-making everywhere.

Missa Luba (Congolese Catholic Mass); Native Songs of the Congo. Les Troubadours du Roi Baudouin, Haazen.
Philips PCC 606
(reprocessed for stereo)

The big item on this already-sensational new release is the "Missa Luba," a setting of the familiar words of the Catholic Mass—Kyrie, Gloria, Credo, Sanctus, Agnus Dei—in contemporary Congolese idiom, complete with pounding drums and repetitive chanting.

It was put together by an enterprising group of Congolese teen-agers under the leadership of a Father Guido Haazen, who went to the Congo a good many years before the current troubles broke forth. This music is thus roughly comparable, in its native idiom, to the American spiritual and the assorted gospel music of our South, modifications of the Protestant Christian service as this is of the Catholic.

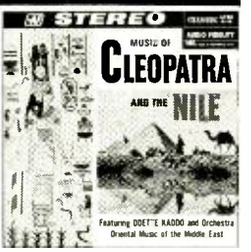
The magic name of the Congo has already given the disc a brush-fire success. It is appropriately got up for that and, with handsome dedications and assorted eulogies bound into the good looking album. This is indeed unusual material and the singing and playing youngsters do a highly precise and very "pro" job with honest enthusiasm. Beyond that, though, the stuff is not as earth-shaking as might seem the case from the accompanying commentary.

Both the Mass and the very similar nonsacred songs on the first record side are, to be sure, "pure Congolese," in the sense of being purely the music of the Congo in its present-day state. But that hardly means, as the notes so optimistically say, that it is devoid of any trace of Western influence. Instead, like much of the African music we hear today, this is a clear mixture, the native traditions overlaid with a certain shy, naive touch of Westernism, a kind of "missionary" feeling, easily heard in the simple harmonies that now and then blend into the drum rhythms and the leader-and-chorus chant-like repetitions.

The notes also claim, paradoxically, that the music is *not* primitive. I disagree. If you will admit that primitive music can be highly complex and evolved, then this is surely of the type—for it is based mainly on brief melodic and rhythmic ideas endlessly repeated and elaborated, the principle of variety within monotony. Jazz in this sense is also primitive—though Beethoven is not.

Don't let me stop you. Go right out and buy the Luba Mass. You'll enjoy it. AE

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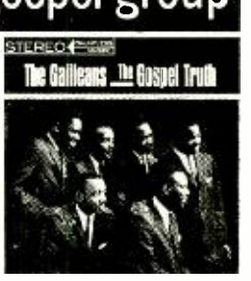
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JAZZ and all that

CHARLES A. ROBERTSON



STEREO

Prince Lasha: The Cry!
Contemporary Stereo S7610

While avant-gardists constantly scan the jazz harizon in hope of being the first to discover a successor to Ornette Coleman, the rest of the world might prefer at least one lucid exposition of his theories before anything more puzzling comes along. Prince Lasha, who plays flute and heads the quintet in this debut, was born six months earlier than Coleman in Fort Worth, Texas, where they grew up together and worked in the same local bands during a period of eight or nine years. They both left home about a decade ago, but set out in opposite directions and never happened to meet professionally again. Instead, Lasha formed an alliance in Oakland, California, with Sonny Simmons, an alto saxist with propensities similar to those of his boyhood companion. After two years of preparation, they went to Contemporary and auditioned for Lester Koenig, the producer foresighted enough to give Coleman a chance to record for the first time.

Always a writer of informative liner notes, Mr. Koenig nearly does his new finds an injustice by stating that a discussion of Coleman's music is a necessary preface to their music, which might be construed in some quarters as meaning merely the arrival of two more imitators. No clasification of any sort is assigned either man, however, and individual groups of listeners can argue at will about the relevance of such terms as consolidators, followers, communicators, or something else again. Many undoubtedly will be guided to a better understanding of Coleman's intentions, due to the special insight enjoyed by Lasha and the avoidance of too abrupt flights in abstract directions. For the purposes of this introductory set, all eight numbers are joint collaborations with attractive and easily remembered themes. Pursuit of the blues cry often begins with an earthy riff that any big band would regard as delightfully uncomplicated, and the spirit of early Basie groups is recaptured more than once, most notably during a visit to the late Bill Robinson on *Bojangles*.

Even though the avant-garde fails to take Simmons under its wing, ordinary listeners of all persuasions should hasten to discover for themselves the most promising alto saxist to ride the crest of the new wave. Besides safely negotiating the currents of atonalism and free form, he darts through calmer waters with greater control and purity of tone than any of his contemporaries. Lasha (pronounced with terminal y Cajun style) solos well on flute and excels in the brilliant sounding ensemble passages. Gene Stone, who recently did his flying in the Air Force, plays drums. Full quintet strength is heard on only five titles, when second bassist Mark Proctor joins Gary Peacock to occupy the other channel and provide an extra stereo treat.

Lambert, Hendricks And Bavan: At Basin Street East
RCA Victor Stereo LSP2635

Like long-distance runners gaining a second wind, Dave Lambert and Jon Hendricks enter a new stage in their partnership with this appearance at Basin Street East, introducing a new trio member and recording before an audience for the first time. The spotlight centers on Yolande Bavan, the beauteous and exotic Ceylonese replacement for an ailing Annie Ross, as everyone wants to know if she can duplicate the founding female member's uncanny knack of vocalizing instrumental phrases. Not only do the circumstances preclude dubbing in high notes afterward, but the trio's recent shift to Victor permits the revival of two or three numbers previously released on other labels. If she suffers somewhat when direct comparisons are made, she more than holds her own on newer items, including *Cousin Mary, Desafinado,* and *One Note Samba*.

Hendricks might do well to try matching her slightly lower range with the flugelhorn solos of such master as Art Farmer, Clark Terry and Miles Davis. As an encore, the male division plunges once again into improvisations in style of Oscar Pettiford, Slam Stewart, Ray Brown, Charlie Mingus and other noted bassists. The supporting Gildo Mahones trio fills out the stereo stage, but Pony Poindexter solos on soprano sax exactly like a fourth voice. Admirers of Miss Ross will be glad to learn of her return to action in England, recording an album of Christopher Logue's satirical songs with the Tony Kinsey quintet. The sooner it crosses the Atlantic the better.

Stan Kenton: Adventures In Time
Capitol Stereo ST1844

This album tells only half the story, as composer-arranger Johnny Richards couples an exploration of unusual time signatures with space flights and planetary stopovers. The eight adventures are part serious composition and part stereo spectacular, with very little room remaining for jazz. All Stan Kenton needs to do is get his hand on something like this and not even the men at Cape Canaveral can equal his concentration and purposeful intent. When not driving the orchestra with controlled fury, he coaxes it along with lyrical piano passages dedicated to moon goddesses and promising untold delights. If the Russians had known that Kenton was planning to join the space race, they might never have started the whole business.

Richards seems to base his rhythm patterns on astrology rather than the dance floor, perhaps thinking to put a hex on rival voyagers with the magic formulas concealed on *Artemis, March To Polaris,* and *Septuar From Antares*. Ray Starling, Gabe Baltazar, Don Menza and Marv Stramm soar through excellent solos, apparently taking inspiration from newspaper stories about astronauts instead of anything in jazz. Carson Taylor's engineering is truly celestial, with angelic mellophoniums moving gracefully through stereo orbits. Khrushchev might not cancel Russia's space program if the State Department sent the orchestra over on tour, but a corps of mellophoniums would be ordered for every brass band in the country.

Cisco Houston: Songs Of Woody Guthrie
Vanguard VTC 1656 (4-track UST)
Pernell Roberts: Come All Ye Fair And Tender Ladies
RCA Victor Stereo LSP2662

If the deluge of new faces and youthful comedy groups threatens to drown some established folk names, other veteran performers only stand that much further above the crowd. Word of Cisco Houston in a program of eighteen Woody Guthrie songs should be more than enough to bring all the faithful rallying around. Quite a few former Dust Bowlers are feeling the effects of an affluent society by now, owning tape recorders and buying four-track stereo tapes, so they can ride in complete sonic comfort when once again the time comes to go *Blowing Down That Old Dusty Road*. If the opinion of someone who once saw part of Kansas suspended in the sky obscuring the sun's rays means anything, the song has excellent possibilities as a constant reminder of tape's dustproof qualities. The realistic performance, at least, is such that even audiophiles in air-conditioned rooms may automatically start to reach in the direction of materials for groove cleaning. Houston's guitar receives the breezy support of Eric Weisberg on banjo, mandolin and fiddle.

Pernell Roberts would never be mentioned in this company, except that the handsome and robust lead of a television western called "Bonanza" makes a debut full of good intentions and a great deal of charm. Six months of traveling and exchanging songs with Houston away from Hollywood might turn him into a folk singer. Instead, he will be lucky to take a quick trip to Nashville, just to record next time Chet Atkins in different surroundings. A gift for understatement goes along with a modest demeanor, which compels him to believe only television viewers will buy his first attempts, and the change is refreshing after so many youngsters who simply sing loud. Unfortunately, arranger Dick Rosmini and conductor Perry Botkin, Jr., aim their efforts at a mass audience and strive too hard at bolstering the singer's confidence. A little coaching from Atkins on the country style of Jimmie Rodgers, the Singing Brakeman, should work wonders.

BOSSA NOVA ROUNDUP

Oscar Castro-Neves: Big Band Bossa Nova
Audio Fidelity Stereo AFSD5983

Big-band attempts at bossa nova in this country always seem to involve modern ideas of arranging and the younger jazzman, but Oscar Castro-Neves and company hark back to the swing era when playing for dancers. Experience has apparently taught the Brazilian pianist and composer to reserve advanced theories for small groups and intimate surroundings. This time he works at pleasing the paying customers with melodic arrangements and persuasive tempos in a program which lists four of his tunes among other native compositions. The solos are short and bright in the swing tradition, with a trombonist billed only as Norato performing some remarkable feats. Extra stereo effects are provided by a trio of percussionists augmenting the regular rhythm section.

Caterina Valente & Stanley Black: I Wish You Love
London Stereo PS275

If nobody knows exactly where or when bossa nova first sprang into life, apparently the spirit has been around longer than anyone imagines. One thing certain is that no female vocalist has turned out a bossa nova album approaching such male guitarists and vocalists as Luis Bonfa or Joao Gilberto. Evidently the artist must play an instrument as well, or possess the talented Caterina Valente displays with Stanley Black's orchestra in this program of love songs from various countries. In among items from France, England, Scandinavia, Italy and Spain are three numbers with a Latin beat. Without trying, Miss Valente comes closer than others of her sex to the true feeling and spirit of bossa nova on *Melodie D'Amour, Volare,* and *April In Portugal*. London should put her to work on the real thing before the current demand is over. Meanwhile, enjoy an exceptional singer and a splendid group of songs.

Bud Shank & Clare Fischer: Bossa Nova Jazz Samba
World Pacific C1020 (4-Track UST)

After wrapping up three bossa nova albums partnered by Laurindo Almeida to start the new Brazilian rhythm on the way, Bud Shank forms an alliance with Clare Fischer, the brilliant young pianist and composer, to continue an intimate survey of the idiom. Except for Errol Garner's *Misty*, all the songs were written by Fischer with the idea of showing off several types of bossa nova, ranging from the delicate *Wistful Samba*, and concluding with the boldly rhythmic *Samba Guapo*. With recently acquired muscularity on alto sax,

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Shank is well equipped for a thoughtful *Pensativa*, or the demanding *Que Mais?* Spread out in stereo are percussionists Larry Bunker, Bob Neel, Milt Holland and Frank Guerrero, assisted by bassist Ralph Pena, and they also operate with supreme confidence at low or high pressure. The four-tack stereo tape delivers subdued rhythms with all the fragrance of freshly roasted coffee.

Dick Schory: Supercussion
RCA Victor Stereo LSP2613

So many reams of promotional material have poured forth about Dynagroove that it would be hard to say whether the publicity or engineering department at RCA Victor made the more spectacular communications breakthrough. If the publicity men are ahead at the moment, they enjoyed the extra advantage of controversial remarks issuing from the press rooms at Columbia and Capitol. Anyone still not thoroughly informed about the new system will find on the inner sleeve of each release a full listing of the claims made regarding refinements in recording techniques. About the only important point omitted is the running of master tapes at speeds of 30 instead of 15 ips, and it might be reasonable to assume that the practice now extends to all company products. If so, the engineers at least have won a consolation prize in the greater ease of making splices when editing.

Consumer response is reported to be good, as nothing helps sales like controversy and curiosity. Listener reaction is apt to be mixed, according to individual tastes and the nature of the playback equipment. Many owners of packaged sets and portables are discovering that Dynagroove is the next best thing to stereo earphones for improving sound quality. Investors in component parts may be more critical and harder to please, but they are certainly no less inquisitive about anything new. They also will be inclined to make the A-B comparison test outlined on the sleeve as a suggestion for "professionals." Instead of following the advice to select releases from rival companies for comparison, the audio enthusiast may find it more convenient to take a favorite Victor album from the shelf. Dick Schory's Percussion Pops Orchestra makes an ideal subject for uncovering the characteristics of Dynagroove quickly, particularly if one of his Stereo Action productions is available for study. Whatever the verdict, this sort of jury duty is bound to be fascinating.

Schory favors the smooth highs of Dynagroove by assigning featured guest roles to vibist Gary Burton and the crisp sound of Joe Morello's drums. The big bass drum is heard less often than in previous outings at Chicago's Symphony Hall, but a few good whacks at the end state the case for reduced inner-groove distortion. Even so, some ears will find impact in bass regions smaller than before, and the equilibrium of any good playback array should remain steady. Engineer Ron Steele drew the job of trying to keep up with the publicity claims.

MONO

Huddie Ledbetter: Leadbelly
Capitol T1821

Folk music may be big business today, but there is nothing new about impecunious folk artists seeing their creations become a commercial success at the hands of other performers. Huddie Ledbetter lived long enough to witness the slow growth of several of his numbers to hit proportions and the transformation of many of the melodies into jazz standards. Meanwhile, John and Alan Lomax were introducing him as Leadbelly to audiences at Harvard and other colleges, launching a concert career that was to extend from coast to coast and to Europe. They also recorded his songs for the Library of Congress, and a major portion of his repertoire was made available to folk enthusiasts by Moses Asch of Folkways. None of these activities made much of an impression on the large and lucrative jukebox market, so Leadbelly set out to remedy the situation in 1944 at the studios of Capitol Records in Hollywood. Drawing copiously from early experiences in the barrelhouses of East Dallas, he recorded a dozen titles designed to collect spare coins from the patrons of similar establishments.

Folk purists never fully approved of this less reputable side of Leadbelly's musical per-



AR-3 REPORT FROM LONDON: R. L. West writes in the March, 1963 *Hi-Fi News,* "This is the first time in his life that the reviewer has ever heard 20 c/s from a commercial loudspeaker. Feeling is perhaps a better word. Above 25 c/s it [the AR-3] will take enough power to make really impressive organ pedal tone without obvious harmonic generation.

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DIZZY GILLESPIE ON THE AR-2*a*: In the January, 1963 *Jazz,* Charles Graham reports, "Dizzy chose Acoustic Research AR-2a loudspeakers... on the evidence of the bass fiddle beat of his own recordings. In addition he said it was important to him to get extremely clean middle- and high-frequency sounds."

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sonality, even though tales of his prison terms and other hardships drew sympathetic comment. Time, that universal curative, works its wonders again with the release of the complete set on LP, as no other examples of Leadbelly in quite the same carefree mood are being pressed at present. A copy belongs in any representative folk or blues collection. Eight titles were reissued in the days of the 10-inch LP, and the new additions include two rare and irreplaceable samples of his honky-tonk piano style. Among the classics reclaimed are *Ella Speed*, *Rock Island Line*, and *Goodnight, Irene*.

AUDIO ETC

(*from page 10*)

Tomorrow'," she said, "but I want to sell it today."

She probably didn't. Nor did she stop tossing chewing gum wrappers on the pavement, I suspect, knowing my lady novelists. Which merely proves that audio isn't all-powerful, even two-way in a trash can.

3. Old Lady of Forty Second Street

This summer marks a year's time since I first tried out one of Minhattin's widely publicized transit innovations, the famous Automated Subway Train, that runs without a motorman. I tried it again last week and maybe it was the heat, or the train's inimitable mode of operation, that prompted me to name it. Hit me like a revelation. Of course! The Old Lady of Forty-Second Street. (She runs back and forth, in case you didn't know, directly underneath that well known thoroughfare as part of the Times Square-to-Grand Central shuttle service.) An Old Lady, Indeed. Just try her one of these days.

The relevance to audio in this account is less obscure than you might think. Feedback. This automated train is no mere mechanical monster that starts up and stops again like an automaton, always the same. Far from it! The thing has to *think*, to plan ahead, to calculate its moves and adjust its actions to suit circumstances, always changing. I.e., it has to act like a human motorman. It needs a human-style feedback system.

It must, your see, not only start up (that's easy) and accelerate to full speed, but then must slow down carefully, enter the station and stop properly at the right place. All this, of course, while transporting not only its own impressive mass but the ever-varying weight of hundreds of precious people, who must be preserved, so to speak, like human canned goods.

It can't stop too fast, in case of overshooting. Might shake up the cargo. It can't, alternatively, just go on a bit further, because there's a large bumper at the end of the track, to squash the cargo most unpleasantly. A very delicate operation, this one. After all, the train runs mostly in the rush hour and its passengers are no better than human sardines, supported upright mainly by their own two feet and the yielding flesh of their immediate neighbors. Gotta be careful. *Very* careful.

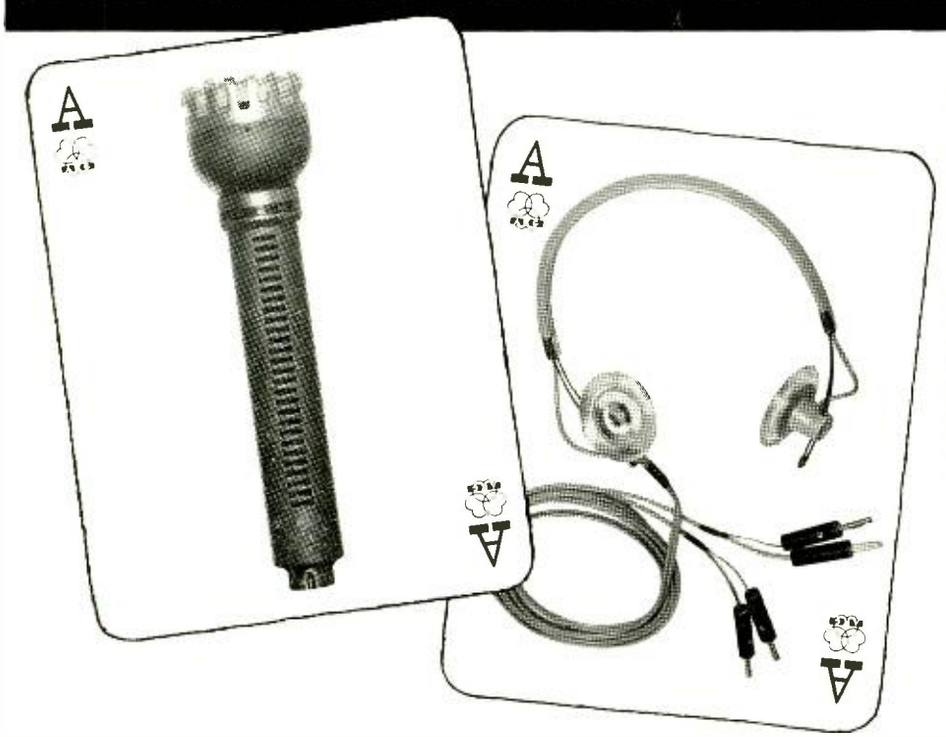
Now if you've traveled in an ordinary, non-animated subway, you'll understand how marvelous is the human feedback system as applied to such heavy-mass engineering. With utter nonchalance, most subway motormen roar into a station at nearly full speed, all that vast mass of humanity and steel and aluminum hurtling forward with an inertia that is dangerous to think about. But the trained human feedback-sense is incredibly accurate; most trains slow smoothly to a measured stop without so much as a noticeable correction in the deceleration curve, hauling up neatly within a foot of the indicator sign ("10" means a ten-car train must stop here.") Good auto drivers do the same on a small scale at every traffic light.

The curves are works of art on such stops, and the means to that art is no other than the immensely quick and subtle feedback mechanism of the human machine, applied to the controls. These are, indeed, advance calculations, rather than actual corrections—the man senses his speed, the distance, the weight, the braking power, and coordinates the whole into a pattern that is as neat as a ballistic curve —and almost as precisely pre-ordained. What skill! What computer-subtlety!

Well, the Old Lady of Forty-Second Street has a motorman on board, but he's a mere co-pilot, for emergencies. He stands in the middle car of the train, looking bored. The Lady herself is in complete control, aided by the most ingenious of trackside computers that the Transit Authority had been able to concoct over a long and exacting spell of development and testing. The train is its own boss, and must stop itself.

The first time I rode in the Automated Lady I nearly burst out laughing. You've

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never felt such an old-lady personality in all your days!

She started off with a brave rush, then instantly thought better of the idea and snatched off her power halfway through the acceleration. After a timid coast of a moment, she tried again, but got scared even quicker. From then on, the trip was a series of lurches, until with a burst of caution the train stopped almost dead—outside the station. Then we proceeded to dock, with a series of hysterical little jerks, power on, brakes on, power on, brakes . . . and the final stop almost tipped me off my feet. Right on a dime. But what a lamentable performance! At least it was very, very safe.

Months later I tried again. Well, I must say, things had improved. This time, after so long, the Old Lady had more confidence in her feedback reflexes. She started right in and swept up to full speed without a pause—only then snatching off the power with a popping of her circuit breakers. We kept going this time at a good speed, though with more ungainly corrections than a beginner motorman on his first trip out. Still—we stopped once more just short of the platform. Like a little girl (or an old lady) holding her nose at the end of a diving board. Then once more we edged nervously forward into the station, making the same series of tentative stops and renewed starts, all of a flutter, until with a gusty sigh of relief the Old Lady locked her brakes for the ten-thousandth time, no wiser than before. Some automation!

The last time I tried her, after something like a year's operation, she had been retired from active duty except in the rush hours. Too much strain on her automated nerves, I guess. After all this time, I thought, she should have found out how to make a graceful and dignified entrance into her stations. But no. She still had no sense of distance; she hadn't any idea, even now, when to cut her power and coast, when she should begin applying a smooth, steady braking power to land her evenly and precisely at the platform, without a jerk in a carload. No vision. No intuition. No subtlety at all in her driving sense. She might as well have been blind; she couldn't see beyond the short length of her own cars (half that of a main line express train). She wasn't using her automated head one little bit. What an Old Lady! I had to laugh.

I'd sure hate to see likes of her try to sail into Times Square with a majestic ten-car express under her automated control. She'd probably take minutes to make up her mind where to stop, tying up train after train behind her. And then, who knows, in an excess of caution she might back up a few feet, just to be really cordect. Like an old lady at a traffic light.

Well, boys, get back to your feedback loops and your audio signals, flat. They're the best examples on earth in any non-human, non-living System, of accurate self-correction, automatic. But don't ever try to run a subway train with your micro-outputs. That's a man's job.

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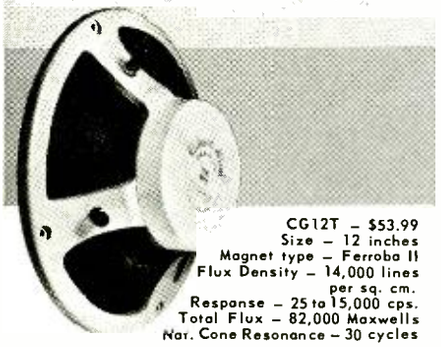
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ABOUT MUSIC

Harold Lawrence

Pianists, Move Over

WHAT MAKES AN INSTRUMENT "POPULAR"? Is it the repertoire, the artist, or a combination of both?

The king of the recital stage is, of course, the pianist; after him comes the violinist. Next follows the *demi-monde* of instrumentalists: violinists, cellists, harpists, oboists, clarinetists, and so forth, all of whom are faced with a relatively narrow range of repertoire. The artist who stakes his career on an "unpopular" instrument would appear to be flirting with danger. But he is not as impractical as he seems.

While it is true that most concert managers prefer to groom a new pianist than a new cellist (given comparable talents), the dedicated artist has the right to regard this as a timid approach, unmindful of past and present musical achievements. Living refutation of traditional managerial attitudes are the cases of Pablo Casals, William Primrose, Leon Goosens, and Adolf Scherbaum, to mention a few.

Hungarian-born Janos Starker is one of the most popular players of "unpopular" instruments. Like the artists mentioned, he has overcome a traditional resistance to his instrument with the sheer force of his musical ability. Part of the reason for his success must be chalked up to the many recordings he has made during the past dozen years.

It can safely be said that Starker is the most frequently recorded cellist of our LP age. Here is a word-picture of Starker at work in the recording studio, promoting the cause of the cello, and of cello music.

After the last notes of the Bach *Allegro* had faded, he rose from his chair, gently laid aside his Lord Aylesworth Stradivarius, inserted a fresh cigarette into a long holder, and walked swiftly towards the control room. He entered just as the engineer was rewinding the tape and, above the garbled high-frequency sounds, asked, "What was the timing of this movement?" Three minutes and fifty seconds," I replied. Lifting his black eyebrows, he told us that he played it slightly faster nowadays. "It sounds lighter this way . . . and it dances." Having cued the tape, the engineer pressed the start button, and, from the three monitor loudspeakers mounted on the wall above the studio's double window, music filled the room.

During the playback, Starker mentally ticked off the details that required adjustment: a stronger accent for the top note of a phrase, a "wolf" tone needing replacement, a 32nd-note figure that could be clearer, and an A-string note that was a bit sharp. In rapid-fire Hungarian, Starker discussed ensemble and balance problems with his colleague, pianist Gyorgy Sebok, then turned to us for a final consultation before going out into the hall for the second "take."

The atmosphere at a Starker session is one of efficiency—*sotto voce*. Starker is no stranger to the recording process. In the early Fifties he made a series of recordings in which he not only played the cello, but also supervised the sessions and edited the tapes. He performed all these tasks not because he aspired to become a musical Orson Welles, but simply because the small company for whom he recorded lacked the necessary skilled personnel. This experience on both sides of the "glass panel" left Starker with a high degree of sophistication about what he calls the "new art of recording." He knows intimately the technical jargon of the recording director, is quick to point out the slighest deviation in the microphone placement from one session to the next, and works hand in glove with the engineer and producer in achieving maximum presence and faithful representation of the timbre of his superb instrument.

Probably this is why Starker has developed an immunity to a disease common to even the most seasoned artist—mike fright. There is something about the mute electronic device suspended a few feet above the instrument in a lonely recording hall that casts a chilling spell over the majority of musicians. It is a spell that can be broken only after several takes, at which time the microphones and the lack of audience are somehow forgotten in the excitement of the performance. Not so with Starker. A realist, he accepts the microphone and usually is able to produce his "basic takes" after only a single run-through.

This absence of "temperament" in the

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ordinary sense might be regarded as the sign of an easy-going personality. Between takes, Starker responds with charm and quick wit to people around him, is a vivid raconteur, and loves nothing better than to engage in a brisk and lively exchange of ideas on politics or contemporary literature. But he is no dilettante. Springing from the roots of his nature is a significant trait: the enjoyment of mastery.

Born in Budapest into a musical family, Starker began to study the cello soon after he was six. With his two violin-playing brothers, he explored the basic works in the chamber music repertoire. At ten he made his first solo public appearance, and, four years later, he obtained his first orchestral post. Upon graduating from the Franz Liszt Academy (where Gyorgy Sebok was his fellow student), he became principal cellist of the Budapest Opera and Philharmonic Orchestras. Between concerts, he practiced, built up his large repertoire, and, for income—and amusement—played in jazz bands and gypsy ensembles. He still remembers the potted-palm pieces he used to play in Hungarian cafes, and will occasionally delight his friends by performing some of them, using a wide vibrato and soulful slides.

At the war's end, Starker left home and a secure livelihood to travel west. He settled in Paris where, faced with a scarcity of jobs, he once worked as a movie extra. In an international competition in Geneva, Starker made little more than a respectable showing. At this point, he took a long, hard look at his artistic and technical achievements and decided to completely revise his technique—a risky procedure for a cellist with fifteen years of training behind him. During the winter of 1946, he isolated himself in Cannes to work and study. Music lovers throughout the world are familiar with the results of those crucial months in Starker's career.

Starker employs the utmost economy of technical means: a narrow-range vibrato; a tightly controlled but marvelously relaxed bow; and a straightforward handling of the melodic line, free of excessive slides, those shortcuts to "expression" favored by so many string players. In different hands, such an approach might lead to performances of a cool and introspective nature. But Starker strips down to technical essentials only to intensify his playing.

By 1948 Starker had begun to make his mark on the European concert scene when his friend, Antal Dorati, offered him the post of first cellist with the Dallas Symphony. Starker accepted. After Dallas came first chair posts with the Metropolitan Opera House orchestra and the Chicago Symphony. In 1958 Starker became a full-time soloist and champion of his instrument. Æ

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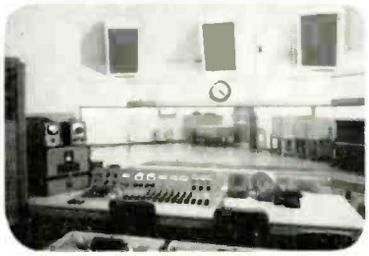
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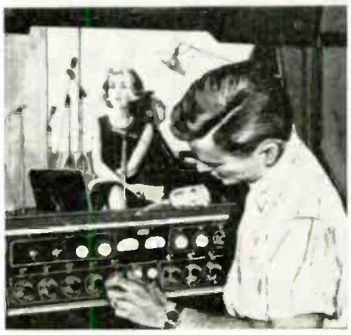
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AMPLIFIERS

(*from page 23*)

quency rate. We need a supply impedance of a fraction of an ohm even at the lowest audio frequencies. A good battery can be used, but if we wish to run from the line supply we must provide a well-regulated power supply unit and this, I think, will need to contain a transistor amplifier system like, though not as large as, the one I described in AUDIO some time ago. This gets rid of supply lead impedance, because the feedback voltage can be taken back from the terminals of the amplifier itself. This supply problem is not easy, for the comparator will probably be sensitive to supply voltage: so may the oscillator. If audio gets on the supply line you may find you have that long-lost effect, motorboating.

There is a second problem here, too. If the filter begins with an inductance we shall get a very high voltage induced across it when we try to reverse the current. In Johnson's circuit, the half-bridge, diodes are used to catch this. We cannot make the first element of the filter a capacitance without careful thought, because the current at the switch-on moment would not be limited in any way.

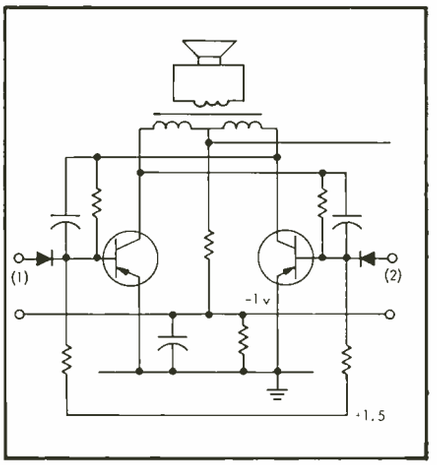


Fig. 13. Regenerative output stage.

My own feeling is that there is a lot to be said for providing speed-up capacitors giving positive feedback during the transition and at the same time using up some of the stored energy in the inductor.

Birt kills two birds with one stone. He suggests that we use an RC circuit across the filter input to turn the load into a constant-resistance network. All the carrier and sideband energy will be dissipated in this resistance, and the current taken by the amplifier will be constant.

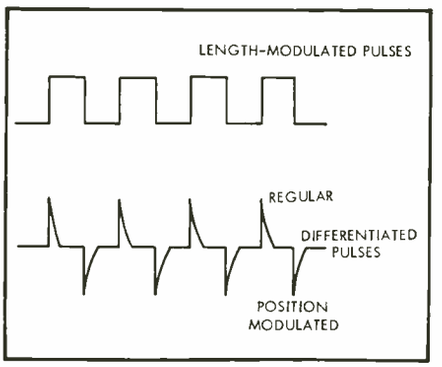


Fig. 14. Differentiated waveform needed to switch regenerative output stage.

The heat will all be in the resistor, of course, but I do not like this idea of throwing away efficiency just for convenience, and a big hot resistor is really rather a nuisance. There is no point, by the way, in wondering if you can use a full bridge to balance out the audio term. If the over-all system is 100 per cent efficient you must be taking power in as fast as, and no faster then, you use it.

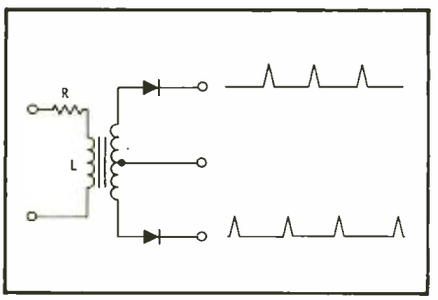
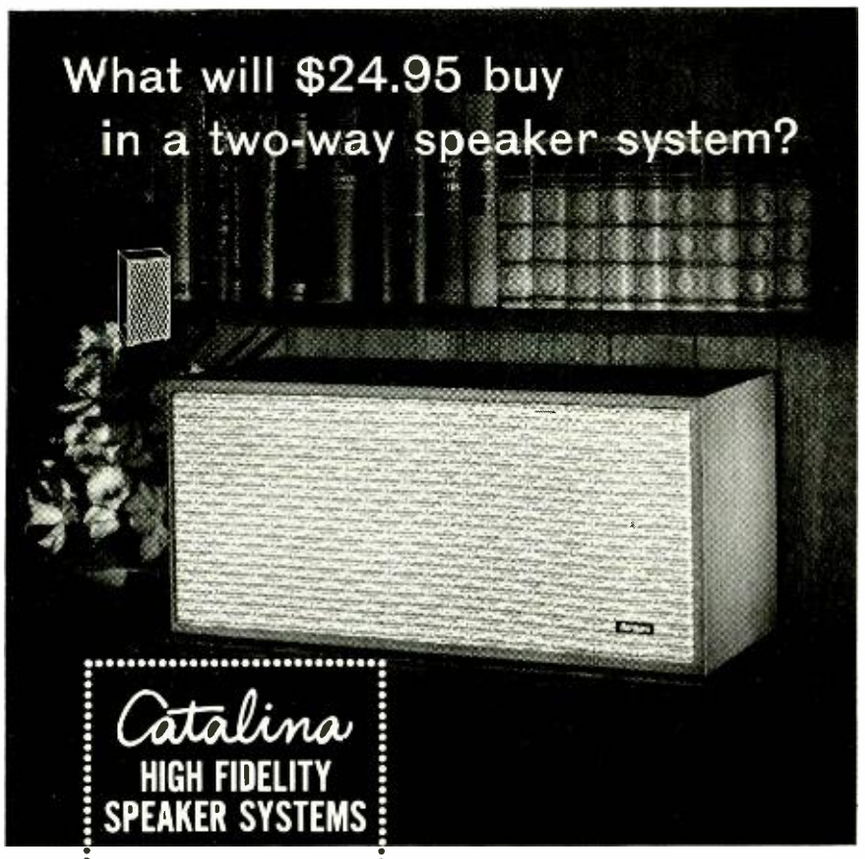


Fig. 15. Differentiator-sorter.



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My present feeling is towards the use of small rechargeable cells floated across a power supply with normal regulation.

I am not at all happy about the problem of providing negative feedback round this sort of amplifier. Mr. Birt suggests that we should be able to provide motional feedback by using a more complicated waveform in which the loudspeaker is left free, by keeping the output stage transistors both off, for a short inter-pulse period, during which the back e.m.f., the motional voltage, is examined with a gating pulse. I do not think we have space here to discuss this. It seems rather complex.

There is quite another problem to be considered. When we put feedback round an amplifier we need to examine the amplitude and phase response well outside the working band. We have no low-frequency problem, for the kind of circuit we are discussing will operate down to zero frequency. The high-frequency end is very difficult to examine because once we get to one-half the sampling frequency I just cannot see an easy way of interpreting the amplitude and phase shift. Behind this difficulty there is, in reality, the appearance of the lower sideband of the first carrier frequency. We cannot easily take the feedback at a point after the low-pass filter, because of the phase shift, and also because this could give us a reduction in filtering action, which we can hardly afford. It may be that we only need feedback in our sampling-wave generator, which is why we use the elaborated Miller circuits.

The use of a pulse system opens the door to the application of other semiconductor devices for audio amplification. Silicon controlled rectifiers, pnpn switches, double-base diodes, avalanche transistors and I don't know what else may all be considered. Since we can get a good few hundred watts of public address quality with existing transistors I cannot imagine why we should go to bigger devices. However, there is the story of a British Foreign Secretary whose neighbor enquired why he was making such a noise. He was told "Mr. Bevin is speaking to Washington, Sir." "Couldn't he use the telephone?" Æ

FM-TUNER

(from page 22)

tions of the characteristics mentioned above.

Normally, the monophonic FM broadcasting method used is spoken of as a wideband FM system because the maximum deviation (75 kc) is large compared to the maximum audio frequency (15 kc) resulting in a modulation index of 5. For stereophonic FM broadcasting, higher frequencies (23 to 53 kc) have to be transmitted with a total transmitter deviation not exceeding 75 kc. For example, when a low-frequency audio signal modulates the 38-kc stereo subchannel fully, this is equivalent to 75 kc deviation at 38 kc resulting in a modulation index of approximately 2. This is not wideband FM anymore and is very close to narrowband FM. To receive this with low distortion, all significant sidebands have to be handled by the tuner. Referring back to *Fig.* 3, omission of the fourth and higher pairs of sidebands at $m = 2$ causes a somewhat larger relative change in phase shift (or distortion) of the resultant than the omission of the seventh and higher pairs of sidebands at $m = 5$. Therefore, at least three pairs of sidebands have to be handled for the low-frequency stereo components resulting in a bandwidth of $2 \times 3 \times 38$ kc or 228 kc. The high-frequency stereo components require a still larger bandwidth because of a still lower modulation index. This should be compared with a bandwidth of $2 \times 6 \times 15$ kc or 180 kc for good quality monophonic reception. With these bandwidths, distortion in the order of 3 per cent would result for low-frequency stereo signals and approximately 2.5 per cent for a 15-kc monophonic signal (and less than 1 per cent for monophonic frequencies 10 kc and lower).

(*To Be Concluded*)



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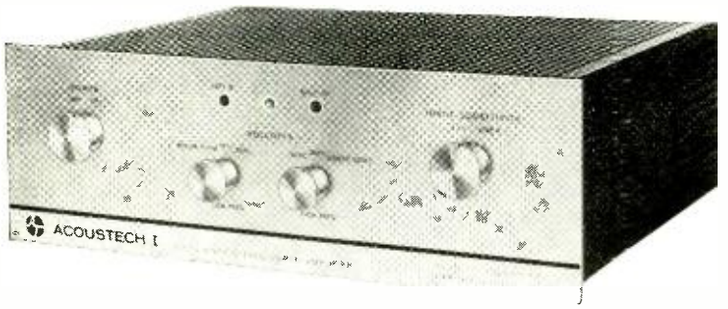
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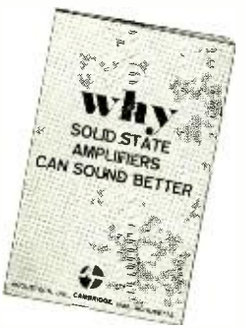
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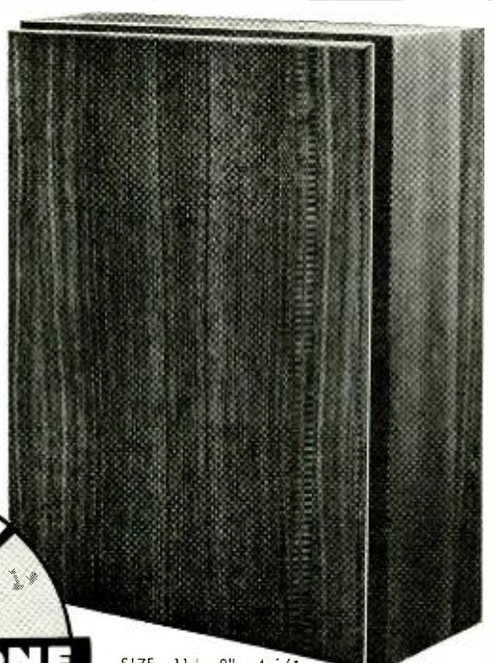
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FOR LITERATURE AND DEALER INFORMATION WRITE

Murray-Carson Corporation

2424 E. 55th STREET, DEPT. 3A, INDIANAPOLIS 20, INDIANA

NEW LISTENING PLEASURE NEW PRINCIPLE

CIRCLE 78

KNOBS

(*from page 24*)

Chin Up

Safe, attractive, easy-to-use knobs *can* be had, although such knobs will have to be made, not bought. *CM* regrets that it cannot recommend any commercially available knob, but the project of building one's own is within the capabilities of the average do-it-yourselfer. Those disinclined to home construction of the at least four to possibly dozens of knobs required (*CM's* Price-Wise combination of a Browning LV-10 tuner plus a Brook 12A amplifier uses eight) will have to seek the services of their neighborhood tool-and-die works.

A Knob CM Can Endorse

What, exactly, *is* a good knob? To *CM's* thinking, the best of all possible knobs would be, like Caesar's Gaul, divided into three parts. First, the part of the knob that bears the marker—either a dot or an arrow—should be thin and coin-like. This is so that the marker lies as close as possible to the panel lettering. (Again, see *Fig.* 2.) Second, the part that will be held for the actual job of turning ought to be soft and rounded for safety, and, if possible, pleasing to the touch. The third is unimportant. (It was only mentioned so we could make the classical reference.)

So far, so good. But where, *CM* wondered, to find a suitably-shaped object that could be adapted to service as a truly adequate high-fidelity knob?

Research Pays Off

Once again, *CM's* staff marched anonymously onward to a solution. "Pacifiers!" a researcher cried out. "Pacifiers!" The word cut the air like a sword.

Stunned at first—fearing that one of our staff was making a partisan political judgement—we chided him. But *CM* erred and is happy to admit it. Our chide was unjustified, and we herewith retract it.

Our researcher meant "pacifiers," not "appeasers." Realizing this, we were as thrilled as our grandfathers had been by Newton's[1] "Eureka!" We had found the answer.

Pacifiers, as *CM's* subscribers know, are infant (or "baby") pacifiers. These pacifiers are rubber or soft vinyl nipples fastened, for safety, to coin-like plastic discs; these discs, in turn, are fixed to a loop. (The loop is used to pluck the device from between—to quote Ophelia[2]—baby's "toothless gums.")

[1] Another *CM* division has determined, after considerable research, that it wasn't really Archimedes, after all.

[2] Again *CM* research goes against common knowledge—it wasnt Lady Macbeth.

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Here was the answer we sought. All that need be done to modify an infant's pacifier to an ideal hi-fi knob is the removal of the plucking loop.

Putting the Pacifier in Service

With the plucking loop gone, the pacifier can then be drilled out to accommodate the control shaft. *CM* recommends that it be drilled to fit loosely on its shaft, and then glued firmly and permanently in place with an epoxy-resin cement.

With this done, the only problem still remaining is the addition of the marker dot or arrow. *CM* regrets that it cannot make a definitive choice among markers; it must be content to suggest—trusting, albeit fearfully, in the judgement of its readers. *CM* will merely point out that excellent, eminently usable arrows may be found in the meter mechanisms (the glass-faced portions) of most test instruments— VTVM's and VOM's, for example. If high cost is desired. VU meters—or any other simple meters—may be cannibalized with good, though by no means excellent, results.

Truly economy-minded consumers who choose the simpler, and frequently satisfactory, dot-type markers may affix any small brilliant-cut semi-precious stones they fancy. The unhardened cement left over from the initial fastening may be used to effect still another economy.

Fifty Words About Buying

Pacifiers like those recommended by *CM* are generally available, like records, from the local pharmacy. They usually come twelve to a handy, reusable cardboard display panel. Buying an entire cardful, *CM* feels, should entitle the buyer to a considerable discount from the advertised unit price (plus a singular show of respect from the sales-clerk!).

RATINGS OF PACIFIERS

GRADING: Good ratings suggest only *CM's* conviction that the particular manufacturer has not, as yet, been caught. Bad ratings prove that he has.

GOOD TO BETTER

NUMMY #301 (Gumcraft, Inc.; Suckling, Vt.) 39¢ Excellent over-all adaptability. Vinyl nipple, nylon disc. Disc smooth and flat with just a trace of rounding at the rim; nipple soft and well-contoured. Pink and blue only. Best of all pacifiers tested. **A Price-Wise**

NUMMY #501 (Gumcraft) 59¢ Excellent adaptability, but some discs were marred somewhat by "flash"—a more or less pronounced seam caused, at times, by less than perfect matching of dies in the casting process and elsewhere. Check before buying. Available in pink, blue, and Decorator Ambivalent. Otherwise identical with **NUMMY #301.**

FAIR TO MIDDLING

Booby "Joy BJ-109E" (E. Shafmaul, GmbH; Wetzlar, Germany) 49¢ Good adaptability. Polished brass disc, soft rubber nipple with truly amazing resiliency. Would have been rated higher except for excessively verbose instructions (874 pages) dealing with child-rearing, duty, honor, and the vicissitudes of history.

* * *

A Caution

CM feels bound to mention a shortcoming inherent in its recommended knobs. They are inordinately attractive to young animals and small children. Any piece of equipment using *CM*-type knobs should be mounted out of the reach of the unweaned, human and otherwise.

And a Warning

Beginning with its October issue, *CM* will cost 75¢ the copy. A steady increase in our production costs makes a rise from *CM's* traditional 15¢ inevitable. The yearly subscription rate will increase from $4.00 to $12.00 (fair-trade). No discounts are available. Æ

A *NEW* CONCEPT IN TAPE RECORDER DESIGN the UHER 8000 ROYAL STEREO



Never before have so many outstanding features been combined in one ultra-high-performance tape recorder. The *Uher Royal Stereo 8000* is the finest and most versatile recorder to be offered in this country. It is capable of truly professional quality 4-track stereo and monaural recording and playback. Two separate recording heads, with built-in mixer controls for both channels, monitor before or after recording head.

Completely transistorized, problems of heat, weight and electrical stability have been eliminated. Other features include echo effect, built-in automatic slide projector control, 3 microphone inputs, sound-on-sound and sound-with-sound, and much more. *Weighs only 23 pounds.*

■ 7½, 3¾, 1⅞ and 1516 ips. tape speeds; ■ 50 to 20,000 cps. at 7½ ips. ±3 db. ■ 50 db. channel separation ■ Wow and flutter ±0.15% @ 7½ ips.

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PRODUCT PREVIEW SECTION

(from page 63)

Specifications: bass-reflex/horn enclosure; 8" extended-range speaker; power handling capacity 10 watts; impedance 8 ohms; frequency response ±7 db from 70 to 19,000 eps; sensitivity (watts input for +85-db level 10 feet on axis) ¼ watts; magnet weight, 6.8 oz. voice-coil diameter 1"; other features: 3" whizzer cone 65 cps resonant freq. (free air) annulus cone, dual diameter Alnico 5 magnet: Dimensions: 23" wide, 11" high, 9½" deep; weight, 26 lbs.; finishes available and prices: unfinished birch $19.50; Oiled Walnut $30.00. Cabinart.

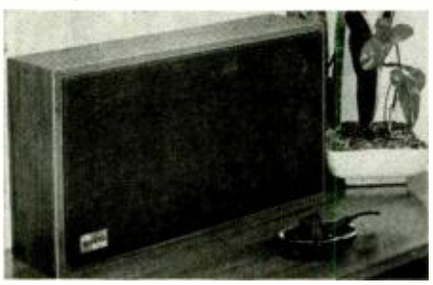
DUKANE

● *Ionovac Speaker System.* Utilizing ionized air instead of the conventional speaker diaphragm for converting electrical pulsations into sound, the "Ionovac" high-frequency speakers are available either separately or as part of a complete speaker system such as the Duke-20 full-range system. The "Iono-vac" section has a frequency range from 3500 to 20,000 cps. The Duke-20 includes two mid-range speakers and a 12-in. high-compliance woofer in addition to the "Ionovac." Price. $187.50. Dukane Corp.

1. Duke-10 tweeter ..... $ 79.50
2. Duke-30 wide-range system $199.50
3. Duke-40 wide-range system $149.50
4. Duke-50 bookshelf system $139.50

EICO

● *HFS-6 3-Way 3-Speaker System.* The new EICO HFS-6 can be set into a bookshelf, mounted on a wall, placed on a table, or concealed behind curtains or drawdrapes. It is the practical system in pairs for stereo, especially where space is restricted.

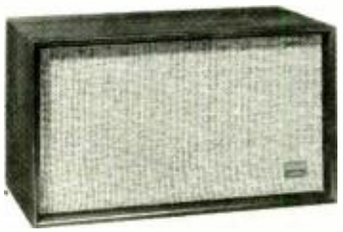


Specifications: ducted-port enclosure; speakers—10" l.f., 8" m.f., dome-radiator h.f.; power handling capacity 25 watts; L-C crossover network; impedance 8 ohms; frequency response 50 to 20,000 eps; magnet weights: l.f. 12 oz.; dimensions: 23¼" wide, 13½" high, 5¾" deep; weight, 25 lbs. Kit, $52.50, wired $62.50. EICO.

1. HFS-10 2-way speaker system $29.95
2. HFS-1 2-way speaker system $47.95

ELECTRO-VOICE

● *E-V Four. Three-Way High-Compliance System.* Three-way system with 12-inch ceramic magnet woofer, compression driver and diffraction horn combination for mid-range, and 5-inch dynamic cone tweeter. Three-way etched circuit board crossover at 800 and 3500 cps. Two step-type level controls for listening room balance. Mid-range unit is new driver-horn combination utilizing a ring-type diaphragm. Tweeter makes use of special polyurethane foam suspension to damping and compliance. Completely sealed enclosure.

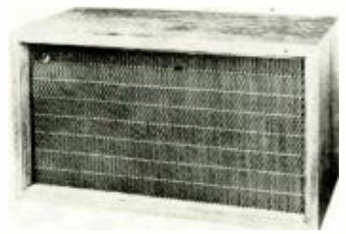


Specifications: acoustically-sealed enclosure; speakers—12" l.f., horn-loaded compression driver m.f., 5" h.f.; power handling capacity 30 watts; three-way etched circuit board crossover network; impedance 8 ohms; frequency response 30 to 20,000 eps; sensitivity (watts input for +85-db level 10 feet on axis) 4 watts; magnet weights: l.f., 1 lb. 6 oz.; m.f., 1.5 oz.; h.f., 6.8 oz.; voice coil diameters: l.f.. 2"; m.f., 1"; h.f., 1"; other features: complete instructions for installation printed on back panel, finished on all four sides. Dimensions: 25" wide, 14" high, 13½" deep; weight, 44 lbs. Electro-Voice.

1. E-V Six, 4-way high-compliance system $300.00
2. E-V Two, 2-way high-compliance bookshelf system ..... $ 96.00
3. Regina 200, 2-way slim-line high compliance system ..... $ 89.50
4. Marquis 300, 3-way direct radiator. $190.00
5. Coronet I, 8" pre-finished loudspeaker system kit ..... $ 39.00

EMI

● *DLS529—Bookshelf Speaker System.* Woofer has patented elliptical aluminum-center cone and polyvinyl chloride cone suspension, resulting in a smooth mid-frequency response and greatly reduced transient distortion. Tweeters have curved diaphragms.



Specifications: infinite baffle enclosure; speakers—13⅛" × 8⅛" l.f., and m.f., (2) 3½" h.f., power handling capacity 20 watts rms; L-C crossover network; impedance 4 ohms; frequency response ±3 db from 40 to 15,000 eps; finishes available and prices: walnut $159.00; unfinished walnut $154.00. Scope Electronics.

1. Model 711, 3-way bookshelf $249.00
2. Model 319, 2-way bookshelf ..... $ 99.75
3. Model 630, 2-way bookshelf ..... $ 69.75
4. Baffle No. 1, 2-way $115.00

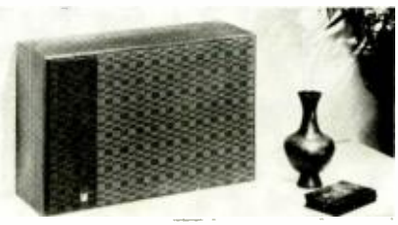


GRADO

● *Lab. "Jr." Speaker System.* Utilizes a speaker-cone loading scheme which tends to improve frequency response. Dimensions: 16" wide, 16" high, 10" deep; weight, 22 lbs.; finishes available and prices: walnut $89.50. Grado Labs.

JENSEN

● *TF-4 5-Speaker 4-way Slender Loudspeaker System.* This Jensen system combines 5-speaker 4-way sound with a new full-size but slender format. Choice of grille fabric; a custom-woven two-tone pattern, or all-over rattan.



Specifications: "Bass-Superflex" enclosure; speakers—1 l.f., 1 m.f., 3 h.f.; power handling capacity 25 watts; impedance 8 ohms; frequency response 25 cps to beyond audibility. Dimensions: 25½" wide, 16" high, 8½" deep; weight, 42 lbs.; finishes available prices: oiled walnut $114.50; unfinished gum hardwood $97.50. Jansen.

1. X-11 compact 2-spkr 2-way system $ 29.75
2. X-20 compact 3-spkr 2-way system $ 39.95
3. TR-9 slim 3-spkr 3-way system ... $ 89.50
4. TF-3 shelf 4-spkr 3-way system ... $ 99.50
5. 3-P/1 slim 5-spkr 4-way system ... $119.50

JBL

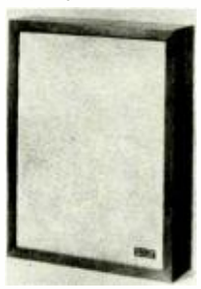
● *Trimline 54.* The JBL "Trimline 54" couples an LE8T full-range transducer with a passive low-frequency radiator. Both units are installed in a matching acoustical enclosure of slim design. The passive radiator effectively doubles the acoustic radiating area at low frequencies, providing improved performance, lower distortion, and increased power handling capacity.



Specifications: modified reflex enclosure: speakers—1 l.f. (passive), 1 full range; power handling capacity 25 watts; impedance 16 ohms; voice coil diameters: full range, 2". Comes equipped with hanging brackets. Brass legs optional. Dimensions: 20" wide, 23¾" high, 5⅛" deep; weight 34 lbs.; Oiled walnut $117.00; C54-150 brass legs $12.00. James B. Lansing.

KLH

● *Model Fourteen.* The KLH Model Fourteen is a newly developed compact loudspeaker system incorporating two small highly compliant full-range direct radiators and a passive electronic network which reshapes the power output of any conventional amplifier so that it exactly matches the low-frequency power requirements of the Model Fourteen. Impedance, 8 ohms; power handling capacity, 12 watts. Dimensions: 14" wide, 18" high, 3¾" deep; weight 14 lbs. Oil or satin walnut, $49.50. KLH.



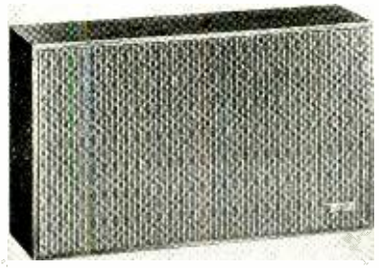
1. Model Four, oil walnut $231.00
2. Model Six, oil walnut $134.00
3. Model Ten, oil walnut ..... $ 99.00

KNIGHT

● *KN-2275 Four-Way Four-Speaker System.* Four-way four-speaker system with 10" woofer, 8" mid range, 3½" closed-back cone-type upper range speaker, and compression-type tweeter with adjustable level control.

Specifications: power handling capacity 50 watts; impedance 8 ohms; frequency response ±1 db from 30 to 20,000 cps; magnet weights: l.f., 16 oz.; voice coil diameters; l.f., 1½"; electrical crossovers at 600, 4000 and 10,000 cps. Dimensions: 24" wide, 13½" high, 6"½ deep; weight, 35 lbs.; finishes available and prices: Walnut veneer $79.95. Allied Radio.

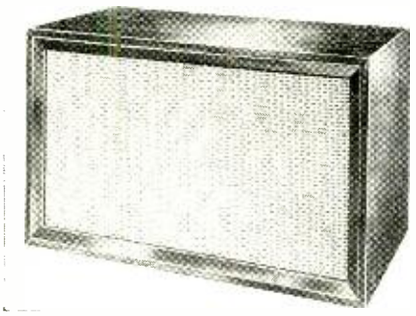
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1. KN-2250 12" 3-way speaker sys. assem. $69.95
2. KN-2210 2-way speaker sys. $19.95
3. KN-1286 3" speaker sys. $29.95
4. KN-1284 3" speaker sys. $19.95
5. KN-2222 3-way speaker sys. $29.95

LAFAYETTE

● *Elliptoflex" Enclosure with SK-58 Speaker.* The Elliptoflex enclosure is a ducted-port system wherein the port is eliptical in shape and is located directly in front of the speaker. This system is designed to improve low-frequency by providing a smooth transition from front to rear (cone) radiation.



Specifications: Type of enclosure ducted port; speakers—12" l.f., 3" h.f.; power handling capacity 20 watts; type of crossover network LC; impedance 8 ohms; frequency response from 40 to 15,000 cps; magnet weight: l.f., 20 oz. Dimensions: 23 7/16" wide, 14" high, 13 5/16" deep; weight, 35 lbs; finishes available and prices: mahogany, walnut, blonde $64.50; oil walnut, unfin. birch $59.50. Lafayette Radio Electronics.

1. SK-270 "Decorette II" thinline $59.95
2. SK-235 "Slenderette" thinline $39.95
3. SK-236 "Senderette II" thinline ... $29.95
4. SK-265 "Slenderette III" thinline ... $19.50
5. SK-404 "Miniduct" bookshelf $39.50

LEAK

● *"Piston Action Sandwich."* "Sandwich" cone construction eliminates break-up and its associated distortions. The result is a smooth frequency response. This invention carries U. S. Patent protection.

Specifications: sealed enclosure; speakers—1 l.f., 1 h.f; power handling capacity 50 watts; six-element half-section crossover network impedance 15 ohms; frequency response ±2 db from 35 to 18,500 cps; sensitivity (watts input for ±8-db level 10 feet on axis) 0.5 watts; voice coil diameters: l.f., 2"; h.f., 1". Dimensions: 15" wide, 26" high, 12" deep; weight, 49.5 lbs. Scandinavian walnut $199.00; unfinished utility $189.00. Ercona Corp.



MURRAY-TONE

● *Camille Series CG Speaker System.* Embodying a spherical radiating "cavity-generator" principle. Extremely small in size.

Specifications: "cavity-generator" enclosure; speakers—8" power handling capacity 8 watts; impedance 8 ohms; frequency response 30 to 17,000 cps; dimensions: 11" wide, 8" high, 4¼" deep; weight, 5 lbs.; maple, walnut or oak $39.95. Murray-Carson Corp.

NESHAMINY

● *Model Z-500 Compact Shelf Speaker.* The Z-500 incorporates the JansZen Electrostatic reproducer in a moderately-priced unit of absolute minimum dimensions. The Z-500 uses a single JansZen Electrostatic radiator that has been acoustically "curved" to do the work of two—and does it in less space, at less cost, but with still the same distortion-free clarity of larger multiple-radiator JansZen units.

Specifications: power handling capacity 100 watts; built-in high-pass filter crossover network; impedance 8 ohms; frequency, response ±3 db from 30 to 22,000 cps; magnet weights: l.f. 18 oz.; h.f., electrostatic; voice coil diameters: l.f., 1.3". Dimensions: 24¾ wide, 13½" high, 11⅜" deep; weight, 40 lbs.; finishes available and prices: Walnut, mahogany, or maple $134.95; utility $124.95. Neshaminy Elect.

1. Model Z-400 ..... $159.50

PACO

● *Model L-4 Slim Silhouette Speaker System.* Incorporates three 6-inch woofer-mid-range speakers in close configuration and a highly efficient cone tweeter. Special ball diffuser bonded to voice coil of each 6" cone has three struts bonded to it and to each diffuser to produce a rigid diaphragm.

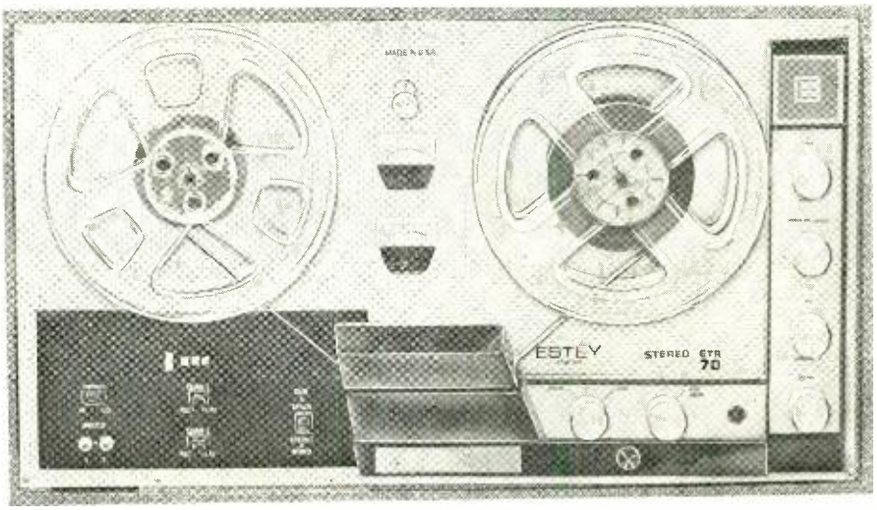
Specifications: bass reflex enclosure; R/C/L crossover network; impedance 8 ohms; frequency response 45 to 18k cps. Dimensions: 20" wide, 26¾" high, 6 3/16" deep; weight, 30 lbs.; walnut $79.95. Paco.

PANASONIC

● *MF-800 Stereo Speaker System.* Combines a pair of speakers and a 34-watt amplifier and uses motional feedback from the speakers to reduce distortion. The amplifiers accepts inputs from low-level cartridges as well as tuners, and its distortion is less than 0.3 per cent.

Specifications: speaker—8" special l.f., 3" m.f., horn h.f.; power handling capacity 34

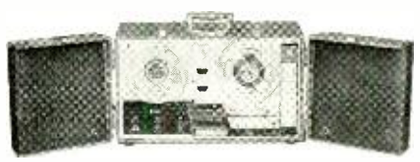
THE TAPE RECORDER MIRACLE THAT BEGAN IN 1846...



That was the year Jacob Estey made his first organ. His heritage of golden sound production continues to inspire the electronics pioneers who create Estey Organs, Amplifiers, Cinebox and Tape Recorders.

Made in America for American audiophiles, Stereo 70 offers such advanced professional features as:

AUDIO OUTPUT POWER: 40 watts peak (20 per channel) • FREQUENCY RESPONSE: 50-15,000 cps at 7½ ips, 50-10,000 cps at 3¾ ips • SIGNAL-TO-NOISE RATIO: Better than —42db. • WOW & FLUTTER: Less than 0.25% rms. • BIAS AND ERASE OSCILLATOR: 75 kc., push-pull for low distortion • AUTOMATIC SHUT-OFF: Shuts off AC power when tape runs out or breaks, in all modes of operation. Provides a unique "sleep-switch" shut-off for safety • RECORDING FACILITIES: Sound-ON-sound, sound-WITH-sound, 4-track monaural, dual-track monaural, 4-track stereo • STEREO—DUB A TRACK SWITCH: Involved in sound-with-sound, sound-on-sound, etc. • COUNTER: Digital type, 3 digits, resettable.

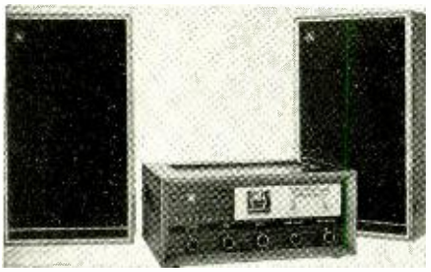


An unusual recorder for home entertainment at an unusually low price—$339.95 list. Other models start at $99.95.

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watts; impedance 8 ohms; over-all frequency response including amplifier ±2 db from 30 to 20,000 cps. Speaker dimensions: 20" wide, 12" high, 6" deep; weight, 13.3 lbs.; amplifier 15" wide, 5½" high, 11½" deep; weight 23.2 lbs. Matsushita.

PILOT

● *PSV-2.* Infinite baffle enclosure filled with Orlon fibers to increase effective volume. Free-air cone resonance of l.f. speaker, 35 cps.

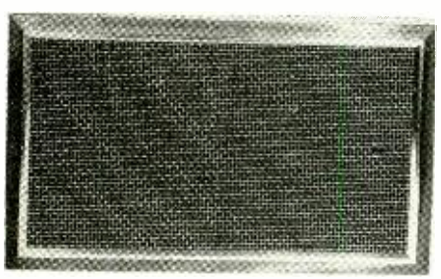
Specifications: infinite baffle enclosure; speakers—(1) 12" l.f., (1) 6" m.f., (1) 3" h.f.; power handling capacity 30 watts; L-C 12 db/octave crossover network; impedance 16 ohms; frequency response ±4 db from 50 to 16k cps; magnet weights: l.f., 10 oz.; m.f., 1.47 oz.; h.f., 1.47 oz.; voice coil diameters: l.f., 1½"; m.f., ⅞"; h.f., ⅞". Dimensions: 15⅜" wide, 18" high, 9¾" deep. Walnut $69.50. Pilot Radio.

1. PSV-3A, 3-spkr. system ..... $ 64.50
2. PSV-4, 4-spkr. system $119.50

PIONEER

● *CS-A50 Loudspeaker System.* The CS-A50 is a brand-new speaker system that provides big bass response despite its small enclosure. It is a 3-way system mounting a 12-inch woofer, a 4-inch mid-range unit, and three tweeters including one exponential horn unit and two cone-type units.

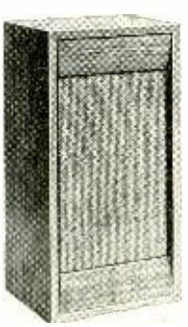
Specifications: bookshelf enclosure; speakers —1 l.f., 1 m.f., 3 h.f.; power handling capacity 60 watts; 12-db/octave crossover networks; impedance 8 ohms; frequency response ±10 db from 30 to 20,000 cps; magnet weights: l.f., 33⅞" oz.; m.f., 6¾" oz.; h.f., 5 oz.; voice coil diameters: l.f., 3"; m.f., 1"; h.f., 1" & 21/32"; other features: walnut-finished enclosure. Dimensions: 15⅜" wide, 26" high, 12⅛" deep; weight 45 lbs. Pioneer.



1. CS-A22 8" spkr. 2-way system
2. CS-A31 12" spkr. 2-way system
3. CS-20A 8" 2-way system
4. CS-20B 8" 2-way system
5. CS-30A 12" 2-way system

H. H. SCOTT

● *S-3 3-way Loudspeaker System.* Only 9¾" deep, it is of true bookshelf size. The S-3 consists of a 10" low-resonance high-excursion woofer, and separate wide-dispersion mid-range tweeter units, all contained within a handsome cabinet. The 3-way crossover network blends the separate speakers into a single sound source. Testing techniques pioneered by H. H. Scott assure matching from speaker to speaker for exact stereo balance.



Specifications: Type of enclosure, bookshelf; speakers—10" l.f., 5" m.f., 1" h.f.; power handling capacity 50 watts; type of crossover networks, air-coil 3-way; impedance 16 ohms. Dimensions 23½" wide, 11¾" high, 9¾" deep; weight, 37 lbs.; unf. pine, $119.95; unf. hardwood, $129.95; walnut or mahogany, $134.95. H. H. Scott, Inc.

1. S-2 3-way loudspeaker system $179.95

SHERWOOD

● *Ravinia 3-way System.* The Ravinia 3-way speaker system is based on a rigidly constructed enclosure, fabricated of one-inch, solid-core veneered side walls and one-inch resin-filled flakeboard speaker baffle. A front-to-back reinforcement strut eliminates possibility of panel vibration. All speakers are replaceable from the front, and the crossover network is accessible through speaker openings.

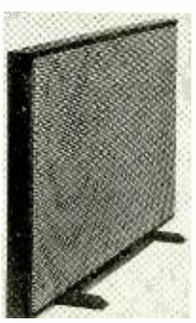
Specifications: Type of enclosure, tube port; speakers 12" l.f., 8" m.f., 3" h.f.; power handling capacity 60 watts; type of crossover network 12-db/octave at 600 cps and 3500 cps; impedance 8 ohms; frequency response ±2½ db from 48 to 17,500 cps; magnet weights: l.f., 1.66 lb; m.f., 6.8 oz.; h.f., 9.0 oz.; voice coil diameters: l.f., 1½"; m.f., 1"; h.f., 1"; high-compliance woofer annulus. Dimensions: 26¼" wide, 15" high, 13¼" deep; weight, 55 lbs.; finishes available and prices: walnut $139.50; birch unfin. $129.50; fir, $119.50. Accessories: consolette legs $19.95. Sherwood Electronic Labs.



1. Berkshire, walnut $99.50

UNIVERSITY

● *Tri-Planar.* Ultra-thin system featuring 234 square inches of woofer piston area. Bi-directional doublet radiator utilizes complementary transfer characteristic design to hold bottom-octave distortion to a minimum.



Specifications: doublet enclosure; speakers (1)10×12 l.f., (1)10×10" m.f., (1)2¾" h.f.; power handling capacity 20 watts; electrical 6 db/octave crossover network; impedance 4–8 ohms; frequency response 45 to 17k cps; Dimensions: 23" wide, 15" high, 13¾" deep; weight, 9 lbs. Oiled walnut $79.95. University.

1. Medallion XII, 12" 3-way compact . $139.95
2. Senior II, RRL 3-speaker bookshelf. $ 99.50
3. Mini-Flex, ultra-compact ..... $ 69.95
4. Syl-O-Ette, ultra-thin "picture-frame" ..... $ 95.95

UTAH

● *SH-4 Thin Bookshelf "Sorcerer."* A handsome, compact, good-sounding speaker system.

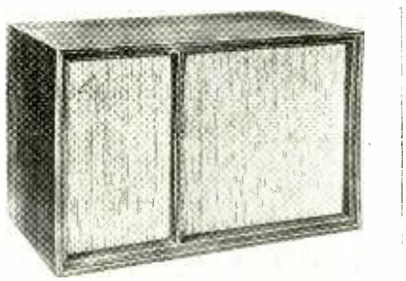
Specifications: Bass reflex type with 8" l.f. and h.f. 3½" speakers; power handling capacity, 12 watts; capacitor crossover; impedance, 8 ohms; frequency response, 45 to 17k cps; magnet weights, l.f. 6.8 oz. h.f. 1.47 oz.; voice-coil diameters: l.f. 1", h.f. 9/16". Dimensions, 20" wide, 12" high, 4 15/16" deep. Price, 29.97, walnut finish. Utah Electronics.

WEATHERS

● *SE-200 "Sound Studio" Loudspeaker System.* Less than one cubic foot, enclosure measures 12"×20"×7". 10" woofer, 5" upper range speakers employing Weathers variable mass damping in air-sealed compartments. Response from 50 to 15,000 cps. 3-position acoustic switch allows user to adjust response of the electro-mechanical system to suit acoustics of listening area. 10-watt amplifier provides ample sound power in most home installations. For larger areas, 35 watts is recommended for full music-power output. Genuine oiled walnut. Infinite baffle enclosure; speakers—1 l.f., 1 h.f.; LC crossover network, impedance 8 ohms. Dimensions: 12" wide, 20" high, 7" deep; weight, 20½ lbs.; oiled walnut $99.50. Weathers.

WHARFEDALE

● *W60 Achromatic Full-Range 2-speaker System and Sand-filled Enclosure.* The original Achromatic unit. Though built to the dimensions of a "compact" system, it is an integrated full-range speaker system in all respects.



Specifications: Sand-filled ported duct enclosure; speakers –12½" l.f., 5" m.f. and h.f.; power handling capacity 60 peak watts; LC (1500 cps) crossover network; impedance, 8 ohms; magnet weights: l.f., 152 oz. (9.5 lbs); m.f., and h.f., 20 oz. (1¼ lbs); voice coil diameters: l.f., 2"; m.f., and h.f., ¾"; other features—sand-filled panel to eliminate cabinet resonance, wire wound "L" pad to balance high frequencies. Dimensions: 24" wide, 14¼" high, 13" deep; weight, 50 lbs.; finishes available and prices: walnut & mahogany $116.50; polished fruitwood $134.50; unfinished sanded birch $101.50. Accessories: B67 universal mounting base, finished as above $9.95. British Ind.

1. W40 2-speaker system, wal. & mah. $ 79.50
2. W70 3-speaker system, wal. & mah. $164.50
3. W90 6-speaker system, walnut $259.50

WILDER

● *The "Playmate" Speaker System.* The Wilder "Playmate" is a 2-way speaker system in a compact enclosure finished on all sides in furniture-grade veneers.

Specifications: Speakers—(2) 6" l.f., (1) 4" h.f.; power handling capacity 25 watts; input impedance 8 ohms; frequency response from 40 to 18,000 cps. Dimensions: 18" wide, 10" high, 8" deep; weight, 14 lbs.; walnut $39.75. Wilder Engineering.

1. ES-81, walnut or blond ..... $79.75 net

LOUDSPEAKERS IN LARGE ENCLOSURES

ALTEC

● *838A Carmel.* The Altec "Carmel" balances size, appearance, and audio quality to please the most discriminating professional user both visually and acoustically. The mid-range or presence region of the Carmel system is particularly fine, a very distinct "feeling" of the actual performance. The "Carmel" is a two-way, bass reflex system with a frequency range from 30–22,000 cycles. Power rating: 30 watts. Two high-compliance 414A bass speakers. An Altec 804A driver mounted on an 811B horn covers the highs to 22,000 cycles. An N-800E network provides the necessary crossover at 800 cps. Dimensions: 29¾" H×35" L×17¾" D. Price: $324.00. Altec-Lansing.

1. 837A Avalon $261.00
2. 831A Capistrano $399.00

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ELECTRO-VOICE

● *Patrician 800.* Latest in a series of four-way loudspeaker systems utilizing a 30-inch foam-cone woofer a 12-inch mid-bass driver, diffraction horn treble, and very high frequency drivers. Crossover network 12-db-per-octave with crossover frequencies of 100, 800, and 3500 cps. The superiority of the Patrician 800 over its predecessors is due in large part to the use of the 30-inch woofer, giving it efficiency and extended bass response. Although designed for corner operation, the Patrician 800 can be placed in almost any room location without seriously hampering its performance. Its bass enclosure, of an entirely new design, consists of an airtight chamber behind the 30-inch woofer and a straight axis horn, the mouth area of which leads from the front of the woofer into the corner of the room. Distortion is minimized by the use of four separate drivers, each operating in the specific range to which it is best suited.



Specifications: infinite baffle enclosure; speakers—30" l.f., 12" m.f., horn-loaded compression driver plus VHF driver; power handling capacity 70 watts; crossover 12-db-per octave at 100, 800, and 3500 cps; impedance 16 ohms; frequency response 15 to 23,000 cps; magnet weights; l.f., 9 lbs., 4 oz.; m.f., 3 lbs.; h.f., 3 lbs.; VHF driver, 1 lb; voice coil diameters: l.f., 2½"; m.f., 2½"; h.f., 2"; VHF, 1"; Dimensions: 33" wide, 51" high, 27¾" deep; weight, 305 lbs.; mahogany, satin walnut, cherry $875.00; Accessories Stereon 850 stereo companion unit; identical characteristics to Patrician 800 above 100 cps $375.00. Electro-Voice.

1. Georgian 400 4-way reproducer ... $495.00

FISHER

● *XP-10 Consolette Three-Way Speaker System.* The Fisher XP-10 "Consolette" incorporates three high-compliance transducers with massive, high flux-density magnet asemblies. The 15" woofer has eddy-current damping and a butyl-impregnated half-roll surround—its open-air resonance is below 20 cps. The mid-range speaker is an 8" unit, enabling a crossover of 200 cps. It is sealed in its own sub-enclosure. The tweeter is of a radical design, utilizing a peripherially-driven soft-mass hemispherical cotton dome, which achieves a 120 deg dispersion.

Specifications: infinite baffle enclosure; speakers—15" l.f., 8" m.f., 2" h.f.; power handling capacity 65 watts; crossover network L-C air-core coils, continuously variable presence & brilliance controls. Impedance 8 ohms; frequency response ±2.5 db from 34 to 18k cps; magnet structure weight: l.f., 96 oz.; m.f., 88 oz.; h.f., 88 oz.; voice coil diameters: l.f., 2"; m.f., 1.5"; h.f., 2". Dimensions: 24⅜" wide, 30¼" high, 14⅜" deep; weight, 80 lbs.; scandinavian walnut $249.50. Fisher Radio.



1. XP-1A, 3-way speaker system $129.50
2. XP-2A, 3-way speaker system .... $ 84.50
3. XP-4A, 3-way speaker system $199.50
4. KS-1A, 3-way slim-line speaker system ..... $ 84.50
5. KS-2A, 3-way slim-line speaker system $119.50

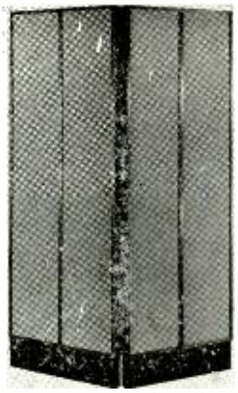
EMI

● *Model DLS1—Studio Monitor.* Includes 25-watt basic amplifier with four adjustable frequency-correcting networks. The amplifier has been pre-tuned and prematched to each enclosure so that the response from each DLS1 is identical.

Specifications: infinite baffle enclosure; speakers—13½ × 8⅛ l.f., (2) 3½" h.f.; power handling capacity 25 watts rms; impedance 8 ohms; frequency response ±2 db from 30 to 15,000 cps. Dimensions: 13¾" wide, 50" high, 17" deep; weight, 110 lbs. Satin walnut or mahogany $594.00. Scope Elect.

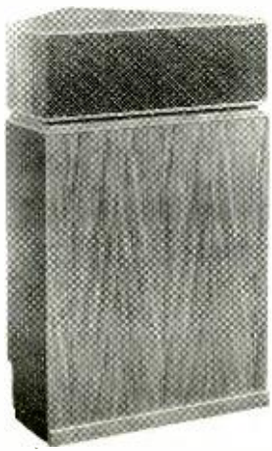
KLH

● *Model Nine.* A speaker system that uses the electrostatic principle to reproduce the entire audio range. To ensure adequate reproduction of very low frequencies, a total radiating area of 28 square feet is used (14 square feet in front and 14 square feet in the rear; radiation fore and aft is equal). Each Model Nine loudspeaker system consists of two complete full-range loudspeakers with built-in power supplies and step-up transformers. The two sections can be joined or separated completely for use in stereo systems. Impedance is nominally 16 ohms, and is primarily resistive in audio range; max. 30 ohms, min. 16 ohms. Recommended amplifier power per section: 30 to 75 watts. Size 70" × 23½" × 27⅝" each section. Weight, 155 lbs; Oil wal., mahog., wal. $1140.00; support plates, $30.00. KLH.



KLIPSCH

● *Klipschorn K-357.* Three-way speaker employing close electro-acoustic coupling by means of horns. Features very high efficiency, and transient peak power output capacity at



2000 REASONS WHY YOU SHOULD INSTALL UNIVERSITY COMPONENT SPEAKERS

To get right into them...there are the Brandenburg Concertos, the Prague Symphony, Eroica, Petrouchka, La Boheme, the Benny Goodman '38 concert, Jazz at the Philharmonic, Ella singing Gershwin, West Side Story, the soundtrack from Breakfast at Tiffany's, T. S. Eliot reading Prufrock, Waiting for Godot, Lester Lanin's music for dancing—but why not complete the list yourself according to your own tastes and needs? You may even come up with more than 2,000 reasons why University component speakers are the finest you can buy today. They are recognized as the prestige speakers in the popular price range. Anything on record or tape shows you why!



THE 312 INTEGRATED TRIAXIAL SYSTEM—a high compliance 12" woofer, patented Diffusicone mid-range and Sphericon super tweeter, all in one. Frequency response: 28-40,000 cps. **$73.00 net.**



SPECIALIZED INDIVIDUAL 3-WAY SYSTEM—consisting of the C-12HC 12" high compliance woofer, C-8M mid-range and Sphericon super tweeter. Frequency response: 20-40,000 cps. **$91.40 net.**

Write for free catalog, Desk R-8

UNIVERSITY LOUDSPEAKERS
Division of Ling-Temco-Vought,
Oklahoma City, Oklahoma U-27

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extremely low distortion.

Specifications: multi-horn enclosure; speakers—all horns; power capacity 3 watts output at 0.1% frequency-modulation distortion, 30 watt output at 1%. Impedance 16 ohms; frequency response ± 4 db from 30 to 16,000 cps; sensitivity (watts input for +85-db level 10 feet on axis) 0.05 watts input. Dimensions: 31¼" wide, 52½" high, 28½" deep; weight, 180 lbs. Walnut, etc from $514.00 to $852.00. Accessories: 2–3 stereo control $54.00. Klipsch & Assoc.

1. Cornwall ..... from $311.00 to $408.00
2. Model H ..... from $188.00 to $221.00
3. Shorthorn ..... from $259.00 to $366.00

TANNOY

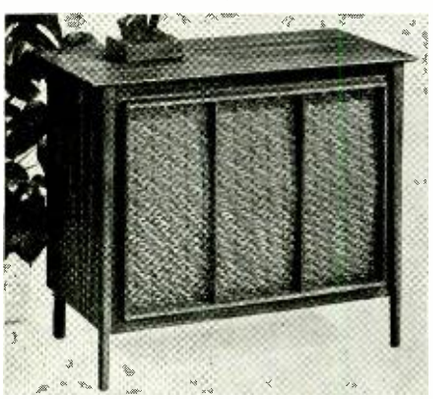
● *GRF Speaker System.* The "GRF" system provides a compound expanding sound source, a Tannoy exclusive feature: the effect of this is that the wave front area varies with frequency, giving an outstanding illusion of realism to both solo and orchestral music. The system incorporates the Tannoy 15" Monitor Dual Concentric loudspeaker.

Specifications: horn loaded enclosure; power handling capacity 50 watts; RLC crossover network; impedance 16 ohms; frequency response ± 3 db from 30 to 20k cps; magnet assembly weight: 13 lbs.; voice coil diameters: l.f., 2"; h.f., 2"; other features horn-loaded high-frequency tweeter feeds through curvilinear diaphragm of LF assembly. Dimensions: 23½" wide, 42" high, 17½" deep; weight, 130 lbs.; oiled walnut $385.00. Tannoy of America.

1. 'Belvedere Senior' with 15" Dual Concentric Monitor $268.50
2. 'Belvedere Senior' with 12" Dual Concentric Monitor $231.00
3. 'Dalton' with 12" Dual Concentric Monitor $215.00
4. 'Berkeley' with 10" Dual Concentric Monitor $199.75
5. 'Cadet' with 10" Dual Concentric Monitor $159.75

UNIVERSITY

● *Classic Mark II.* Simplicity of line and styling permits perfect integration with other fine furniture of any period. Three-way system composed of heavy-duty high-compliance 15-inch woofer, specially designed 8-inch midrange, and Sphericon super-tweeter. Crossovers at 150 and 5000 cps. Wide-range brilliance and presence controls adjustable without having to walk behind the unit.



Specifications: ducted port enclosure; speakers—(1) 15" l.f., (1) 8" m.f., (1) ¾" h.f.; power handling capacity 60 watts; electrical crossover networks; impedance 4–8 ohms; frequency response 20 to 40k cps; voice coil diameters: l.f., 2"; m.f., 2"; h.f., ¾". Dimensions: 35" wide, 28¼" high, 17½" deep; oiled walnut $295.00. University Loudspeakers.

TAPE RECORDERS

AMERICAN CONCERTONE

● *Model 605-4R.* An advanced machine for the serious recordist. Incorporates flexibility features such as plug-in head assembly, all-electric pushbutton operation, and automatic reverse.

Specifications: Speeds—3¾, 7½ ips; heads—4 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 3 motors; timing accuracy 99.75%; freq. resp.—7½ ips, ± 2 db from 50 to 15k cps; 3¾ ips, ± 2 db from 50 to 12k cps;



signal-to-noise ratio, 50 db; wow and flutter, 0.2% at 7½ ips, 0.25% at 3¾ ips; rewind time, 1200-ft. reel, 40 secs. Inputs—2 microphone, high impedance, sensitivity 1 mv; 2 high level, high impedance, sensitivity 0.1 volts; amplifier outputs—2, cathode follower phone output. Dimensions, 16¼" wide, 7¾" high, 14" deep; weight 44 lbs. American Concertone.

1. Model 400—"Cosmopolitan" $197.50
2. Model CS505-4RK $679.50
3. Model S505 2- or 4-track w/case .. $549.50
4. Model 607 ..... $845.00
5. Model 508 ..... $520.00

AMPEX

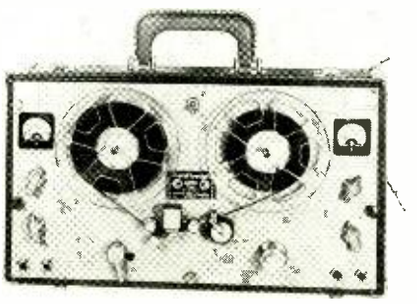
● *Model 1260.* A portable 4-track stereo and mono recorder player in attractive grey luggage—with record electronics and playback preamplifiers. The 1260 is ideal for semi-professional recording and long-life service in education, businesss, theater, church, or audio-visual systems.



Specifications: Speeds 7½, 3¾ ips; heads 2 ¼-track; records 4 track stereo, 4 track mono; plays 4 track stereo, 4 track mono; reel size 7 in.; no. of motors 1; timing accuracy ⅛ of a half tone; freq. resp. 7½ ips, ± 2 db from 50 to 15,000 cps; 3¾ ips ± 2 db from 50 to 8000 cps; signal-to-noise ratio 55 db; wow and flutter, 0.2% at 7½ ips (ASA standards), 0.3% at 3¾ ips (ASA standards); rewind time, 1200 ft. reel, 90 secs. Inputs 2 microphone, impedance 2.2 megohms, sensitivity 600 mv; 2 high level, impedance 250k ohms, sensitivity 0.25 volts; amplifier outputs 2, type cathode follower, to feed into 250k or more ohms. Dimensions, 17½" wide, 9¼" high, 14" deep; weight, 36 lbs. Other features: 3 separate heads in mumetal cases, die cast frame, auto-set shut-off. Price $545.00. Accessories: 2012 Amplifier-Speaker $199.50. Ampex.

AMPLIFIER CORP.

● *Stereo-TransFlyweight, Series 312-ST.* Battery-operated, portable, "Stereo-TransFlyweight" Series 312-ST, includes several models which meet NAB standards. Designed to meet need for compact, lightweight professional stereophonic recorders for unrestricted field use. Also usable for single channel recording and playback. Ruggedly constructed. Fully transistorized (20 transistors).

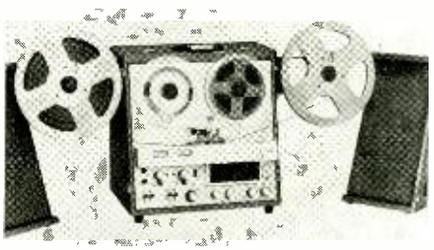


Specifications: Speeds—15/16 through 15 ips; heads—1 full track, 1 ½-track; records 2-track stereo, plays 2-track stereo; reel size 5 in.; 2 motors; freq. resp.—7½ ips, ± 2 db from 50 to 10,000 cps; 3¾ ips, ± 2 db from 50 to 7500 cps; signal-to-noise ratio, 55 db; wow and flutter, 0.1% at 7½ ips, 0.15% at 3¾ ips; rewind time, 900-ft. reel, 180 secs. Inputs—2 microphone, impedance 50/200 ohms, sensitivity 4 μv; 2 high level, impedance 15,000 ohms; amplifier outputs—(1), high impedance; output power 2.5 volts. Dimensions, 15½" wide, 5½" high, 9" deep; weight, 11½ lbs. 2 VU meters, self-contained rechargeable batteries. Price, $624–684. Accessories: 110 V a.c. power pack $30.00. Amplifier Corp.

1. TransFlyweight, Series 312 ..... $438–$529
2. TransMagnemite, Series 612 .... $445–$505
3. Weathertite TransMagnemite, Series W-612 ..... $365–$475
4. Secret Recorder, Series 212 ..... $475–$535

BELL

● *RT-360 Stereo Tape Recorder.* Features, with DK-1 accessory, duplicate stereo or mono tapes, record sound-on-sound in stereo.



Specifications: Speeds—3¾, 7½ ips; heads, ¼-track; records 4-track stereo, 4-track mono; plays 2- and 4-track stereo, 2- and 4-track mono; reel size 7 in.; 3 motors; timing accuracy 99%; freq. resp.—7½ ips, ± 3 db from 40 to 16k cps; 3¾ ips, ± 3 db from 40 to 12k cps; signal-to-noise ratio, 50 db; wow and flutter, 0.2% at 7½ ips, 0.25% at 3¾ ips; rewind time, 1200-ft. reel, 50 secs. Inputs—2 microphone, sensitivity 3 mv; 2 high level, impedance 500k ohms, sensitivity variable 3 mv to 300 mv; amplifier outputs—1, headphone; speaker outputs 4, impedance 8 ohms; output power 16 watts. Dimensions, 15⅞" wide, 16" high, 11⅝" deep; weight, 48 lbs. Other features: handles 10" reels; duplicates stereo or mono tapes; records stereo sound-on-sound with DK-1. Price, $449.95. Accessories: DK-1 10½" reel and duplicating accessory, $49.95. Bell Sound.

1. T-347 tape transport $319.95

BENJAMIN TRUVOX

● *PD-96 4-Track Stereo Tape Deck.* The PD-96 utilizes a capstan drive motor, a 6½" balanced flywheel, and two rewind motors to assure speed accuracy, even rewind, and highly responsive performance. Pushbuttons simplify the various modes of operation. Some are coupled to colored signal lights for easy and quick identification. Precision tolerances and heavy duty components provide trouble-free operation and longevity. The deck is a one piece, ribbed heavy casting.



Specifications: Speeds—7½, 3¾, 1⅞ ips; heads—3 ¼-track; records ¼-track stereo, ¼-track mono; plays ¼-track stereo, ¼-track mono; reel size 7 in.; 3 motors; timing accuracy 1% freq. resp.—7½ ips, ± 3 db from 30 to 20k cps; 3¾ ips, ± 3 db from 30 to 12k cps; signal-to-noise ratio, 50 db; wow and flutter, 0.1% at 7½ ips, 0.15% at 3¾ ips; rewind time, 1200-ft. reel, 55 secs. Inputs—2 microphone, impedance 2 meg, sensitivity 1.0 mv; high level, impedance 0.5 meg, sensitivity 150 mv. Dimensions, 14½" wide, 16¼" high, 7¾" deep; weight, 30 lbs. Other features: "Hubloc" spindle holds reels in any position; dual VU

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meter; built-in record & playback stereo preamps. Price $375.00. Oil-finished walnut base $20.00. Benjamin Elect.

BUTOBA

● *MT-7.* Portable transistorized 2-speed 2-track mono design, product of West Germany. Record-level indicator, operates from four flashlight batteries, accessories available for other power sources; complete with dynamic microphone and carrying handle; full line of accessories available.

Specifications: Speeds—3.75, 1⅞ ips; heads—2 half track; records 2-track mono; plays 2-track mono; reel size 3 in.; 1 motor; timing accuracy 0.05% freq. resp.—3¾ ips, ±3 db from 100 to 12,000 cps; signal-to-noise ratio, 50 db, wow and flutter, 0.5% at 3¾ ips. Inputs—2 microphone, impedance 200 ohms; amplifier outputs—1, impedance 200 ohms; speaker outputs 1, impedance 4 ohms; output power 2 watts. Dimensions, 12" wide, 3" high, 8" deep; weight, 7 lbs. Other features: 4 × 6 speaker, ball-bearing motor, transistor-speed control. Price, $149.95. Stanford Int'l.

1. MT-5 ..... $249.95
2. MT-5S $285.95
3. MT-7F $159.95

CONCORD

● *550 Stereo Recorder.* The Model 550 recorder features transistorized preamplifiers, "Trans-A-Track" plus sound-on-sound, separated 6" speakers, all pushbutton interlocked control, cue and edit button, public address or internal speaker monitoring, 2 VU meters, automatic pressure roller disengagement when the lid is closed, tone control, automatic record-equalization shifting, and 2 dynamic microphones. 1 full year warranty on parts, 90 days labor.



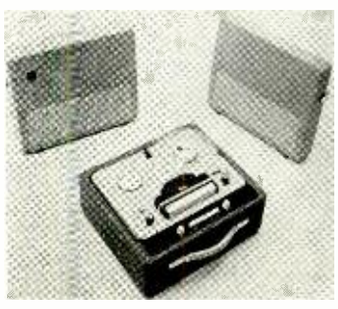
Specifications: Speeds—7½, 3¾, 1⅞ ips; heads—2 ¼-track; records 4-track stereo, 4-track mono; plays 2&4-track stereo, 2&4-track mono; reel size 7 in.; 1 motor; freq. resp.—7½ ips, ±2 db from 40 to 16,000 cps; 3¾ ips, ±2 db from 40 to 12,000 cps; signal-to-noise ratio, 50 db; wow and flutter, 0.2% at 7½ ips, 0.25% at 3¾ ips. Inputs—2 microphone; amplifier outputs—2; speaker outputs 2, impedance 8 ohms; output power 10 watts. Dimensions, 13⅜" wide, 9⅜" high, 14" deep; weight, 34½ lbs. Price, $319.95. Concord Elect.

1. Model 880 ..... $399.95
2. Model 550-D $219.95
3. Model 220 ..... $149.95
4. Model 104 ..... $ 99.95

DUAL

● *TG12 Tape Deck.* Four-track stereo/mono record and playback, smooth and positive tape handling, mechanical pushbutton controls. No pressure pads.

Specifications: Speeds—1⅞, 3¾, 7½ ips; heads—(2) ¼-track; records 4-track stereo, 4-track mono; plays 2- and 4-track stereo, 2- and 4-track mono; reel size 7 in.; 1 motor; freq. resp.—7½ ips, 40 to 20k cps; 3¾ ips, 40 to 16k cps; signal-to-noise ratio, 52 db; wow and flutter, 0.15% at 7½ ips, 0.25% at 3¾ ips; rewind time. Inputs—2 microphone, impedance 10 meg, sensitivity 2 mv; 1 high level, impedance 22k ohms, sensitivity 2 mv; amplifier outputs—1, impedance 18k ohms; speaker outputs, 1, impedance 8 ohms. Dimensions, 13½" wide, 6" high, 10¼" deep. Price, $245.00. United Audio.



1. TG12A 4-track stereo recorder with speakers $349.95

EICO

● *2400 4-Track Stereo/Mono Deck.* Compact 4-track stereo and mono recorder-player incorporating a 3-motor tape transport with electro-dynamic braking. Record and playback equalization on both 7½ and 3¾ ips tape speeds. Mixing mic. and line-level controls. Eye-tube level indicators. No pressure pads and precision tape guidance. Top-of-deck jam-proof speed shift. Digital turns counter. Automatic end-of-tape stop switch.



Specifications: Speeds—7½, 3¾ ips; heads—3 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 3 motors; freq. resp.—7½ ips, ±3 db from 30 to 17,000 cps; 3¾ ips, ±3 db from 30 to 12,000 cps; signal-to-noise ratio, 45 db; wow and flutter, 0.2% at 7½ ips, 0.3% at 3¾ ips; rewind time, 1200-ft. reel, 45 secs. Inputs—microphone, impedance 5.6 meg, sensitivity 5 mv; high level, impedance 500k ohms, sensitivity 0.1 volts; amplifier outputs—0.7v, impedance 5k ohms. Dimensions, 12 9/16" wide, 12¾" deep, 6½" high; weight, 22 lbs. Price, $269.95 wired, $199.95 kit. EICO.

1. RP100 4-track stereo/mono deck $299.95 kit, $349.00 wired

ESTEY

● *Stereo 700 Tape Recorder.* Vertical mount complete 4-track record/play stereo with sound-on-sound, sound-with-sound. Wing speakers. Has recording-level meters, digital counter.

Specifications: Speeds—3¾, 7½ ips; heads—(3) ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 1 motor; timing accuracy 98%; freq. resp.—7½ ips ±3 db from 50 to 15,000 cps; 3¾ ips, ±3 db from 50 to 10k cps; signal-to-noise ratio, −42 db; wow and flutter, 0.25% at 7½ ips; rewind time, 1200-ft. reel, 90 secs. Inputs—2 microphone, impedance 1 meg, sensitivity 5 mv; 2 high level, impedance 0.47 meg, sensitivity 0.1 volts; speaker outputs 2, impedance 8 ohms; output power 20 watts peak per channel. Dimensions, 21" wide, 12" high, 11 9/16" deep; weight, 24 lbs. Price, $339.95. Estey.

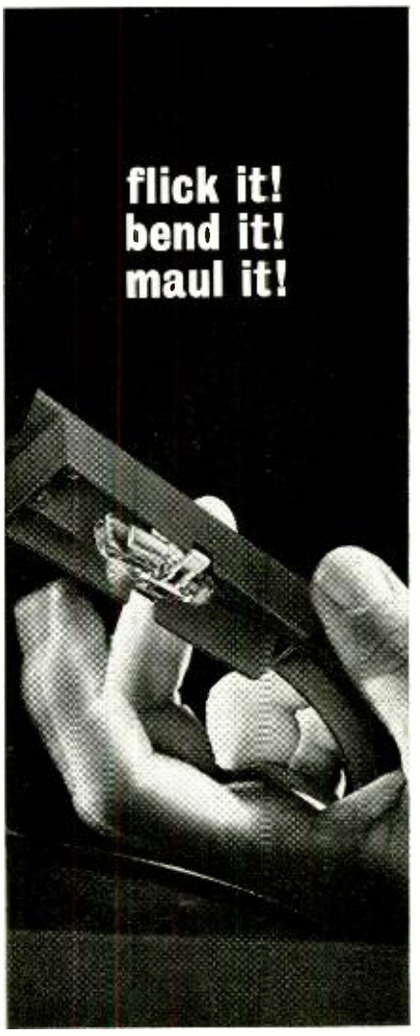
1. Model 20 7" mono recorder ..... $ 99.95
2. Model 30 7" mono recorder $119.95
3. Model 50 4-track stereo recorder... $299.95

FERROGRAPH

● *5/424 Stereo Tape Recorder.* The 5/424 is an all-purpose mono and stereo recording instrument. Mono recording and playback in forward direction with continuous monitoring in either channel; playback of one channel while recording the other; re-recording track-to-track; echo effects.

Specifications: Speeds—3¾, 7½ ips; heads—(3) ½-track; records 2-track stereo, 2-track mono; plays 2 and 4-track stereo, 2-track mono; reel size 8¼ in.; 3 motors; timing accuracy 99.8%; freq. resp.—7½ ips, ±2 db from 40 to 15,000 cps; 3¾ ips, ±3 db from 50 to 10,000 cps; signal-to-noise ratio, 52 db; wow and flutter, 0.15% at 7½ ips, 0.2% at 3¾ ips; rewind time, 1200-ft. reel, 45 secs. Inputs—microphone, impedance 1 meg, sensitivity 2 mv; high level, impedance 0.5 meg, sensitivity 0.35 volts; amplifier outputs—impedance 5k ohms. Dimensions, 17½" wide, 9¾" high, 18" deep; weight 48 lbs. Price, $595.00. Ercona Corp.

1. 5AN (mono) $425.00



it still provides superb performance

The new Sono-Flex® needle incorporated in the Velocitone Mark III and other Sonotone cartridges brings new pleasure to music lovers. Not only does it overcome the problem of broken needle shanks, but it increases music listening pleasure by providing higher compliance, wider and flatter frequency response, lower distortion, less needle and record wear.

Make sure the next cartridge you buy is the Sonotone Velocitone Mark III with Sono-Flex needle. And, if you're one of 14 million phonograph owners with a phonograph equipped with a Sonotone cartridge, replace your current needle with a Sono-Flex. You'll notice a marked improvement in performance.
Available at all leading hi-fi dealers.

NEW SONOTONE SONO-FLEX® NEEDLE

SONOTONE CORPORATION, ELMSFORD, N. Y.

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FREEMAN

● *Professional Studio Model 200.* Automatic reverse and/or automatic continuous play in both directions. Automatic shutoff in manual modes; four double-shielded heads; source or tape monitoring while recording; sound-on-sound or sound-with-sound; built-in echo effect; transistorized; hysteresis motors; two flutter filters; professional touch button controls; four-channel mixer with four input-level controls; OTL amplifier design for extremely wide frequency response.



Specifications: Speeds—15, 7½, 3¾ ips; heads—4 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 3 motors; timing accuracy 99.9% freq. resp.—7½ ips, ± 2 db from 35 to 18,000 cps; 3¾ ips, ± 2 db from 35 to 13,000 cps; signal-to-noise ratio, 50 db; wow and flutter, 0.12% at 7½ ips, 0.16% at 3¾ ips; rewind time, 1200-ft. reel, 20 secs. Inputs—2 microphone, high impedance, sensitivity 1 mv; 2 high level, impedance 600 ohms, sensitivity 0.25 volts; amplifier outputs—4, phone plug, impedance 600 ohms; speaker outputs 2, impedance 8 ohms; output power 40 watts. Dimensions, 17″ wide, 17½″ high, 7¼″ deep; weight, 75 lbs. Other features: self-contained wide-range co-ax speakers; front panel oilers; variable speed fast forward and rewind; 600-ohm balanced output. Price, $995.00. Accessories: DM166 broadcast dynamic microphone $29.95. Freeman Elect.

1. Model 600 stereophonic recorder .. $399.50
2. Model 660 portable recorder $159.50
3. Model 550 lecture report recorder.. $139.50

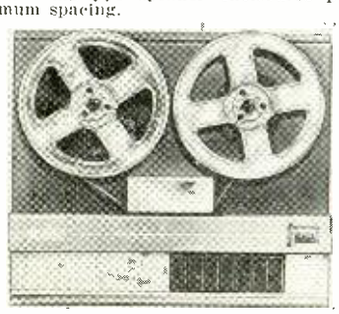
HEATHKIT

● *Model AD-22 4-Track Stereo Tape Recorder.* The new Heathkit AD-22 4-track stereo tape recorder is easy to assemble and simple to operate. The simplicity of the precision-machined mechanism and circuit-board construction assures fast, easy assembly and stable circuit performance. Features push-pull bias/erase oscillator, individual bias adjust and meter calibrate controls. VU-type meters, record interlock, input mixing controls.

Specifications: Speeds 7½ and 3¾ ips; heads—(2) ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; no. of motors 1; freq. resp.—7½ ips. ± 3 db from 40 to 15,000 cps; 3¾ ips, ± 3 db from 40 to 10,000 cps; signal-to-noise ratio, 45 db; wow and flutter 0.2% at 7½ ips, 0.3 at 3¾ ips; rewind time, 1200-ft. reel, 100 secs. Inputs—2 microphone, impedance 1 meg, sensitivity 5 mv; 2 high level, impedance 250k ohms, sensitivity 160 mv; amplifier outputs—2 cathode follower, impedance 600 ohms; output level, 1 volt. Dimensions, 12″ wide, 8″ high, 15″ deep; weight, 23 lbs. Price, $179.95. Heath Company.

KNIGHT

● *KN-4120 Tape Recorder.* Records and plays monophonically at 2 speeds. Plays 4-track stereo tapes through self-contained speakers and amplifiers. "Simultrack" sound-with-sound. Wing-type speaker enclosures permit optimum spacing.



Specifications: Speeds—7½, 3¾ ips; heads—2 ¼-track; records 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 1 motor; timing accuracy 98% freq. res.—7½ ips, ± 3 db from 50 to 10k cps; 3¾ ips, ± 3 db from 50 to 8k cps; signal-to-noise ratio, 45 db; wow and flutter, 0.2% at 7½ ips, 0.3% at 3¾ ips; rewind time, 1200-ft. reel, 90 secs. Inputs—1 microphone, high impedance, sensitivity 1 mv; 1 high level, impedance 500 ohms, sensitivity 100 mv; amplifier outputs—2, high impedance; speaker outputs 2, impedance 3.2 ohms; output power 6 watts. Dimensions, 21¼″ wide, 8½″ high, 14¼″ deep; weight, 28 lbs. Price, $134.95. Allied Radio.

1. KN-4035 2-speed portable tape recorder ..... $ 69.95
2. KN-4000 4-track stereo tape deck.. $129.95

KORTING

● *Model 4000.* Four-track self-contained stereo recorder. Simple pushbutton operation for synchronized dubbing, monitoring, and variable echo or reverb effects. Separate bass and treble controls. Transistorized. Separate recording-level indicators. Remote pause. Hysteresis motor.

Specifications: Speeds—7½, 3¾, 1⅞ ips; heads—4 ¼-track; records 4-track stereo, 4-track mono; plays 2&4-track stereo, 4-track



mono; reel size 7 in.; 1 motor; timing accuracy 98%; freq. resp.—7½ ips, ± 2 db from 30 to 18,000 cps; 3¾ ips, ± 2 db from 40 to 14,000 cps; signal-to-noise ratio, 54 db; wow and flutter, 0.12% at 7½ ips, 0.2% at 3¾ ips; rewind time, 1200-ft. reel, 120 secs. Inputs—microphone, impedance 200 ohms, sensitivity 150 mv; high level, impedance 2k ohms, sensitivity 300 mv; speaker outputs 2, impedance 8 ohms; output power 10 watts. Dimensions, 20¾″ wide, 14″ high, 8″ deep; weight, 33 lbs. Price, $339.95. Matthew Stuart.

1. 158S with 2 lo-Z dyn. mics $369.50
2. TR 3000 with 2 lo-Z dyn. mics $299.95
3. 2000 with 1 lo-Z dyn. mic $199.95
4. 270DC deck with case $229.95
5. 260 deck $219.95

LAFAYETTE

● *RK-155WX 4-Track Stereo Recorder.* Both speeds automatically equalized. Pause control; sound-on-sound; automatic stop at end of tape; two 4×6″ speakers; transistorized stereo preamps; two recording-level meters; 3-digit index counter.

Specifications: Speeds—3¾, 7½ ips; heads—2 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 1 motor; freq. resp.—7½ ips, ± 3 db from 40 to 18,000 cps; 3¾ ips; ± 4 db from 40 to 12,000 cps; signal-to-noise ratio, 45 db; wow and flutter, 0.25% at 7½ ips, 0.4% at 3¾ ips; rewind time, 1200-ft. reel, under 4 min. Inputs—2 microphone, impedance 50k ohms; 2 high level; amplifier outputs—2 to external amp., 50k ohms; speaker outputs 2, impedance 4 ohms; output power 2 watts per channel. Dimensions, 15¾″ wide, 7½″ high, 11¼″ deep; weight, 34 lbs. Other features: Includes 2 microphones, output cables, empty reel and 1200 feet of tape. Price, $169.95. Lafayette Radio.

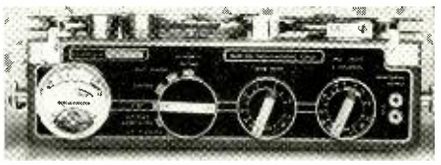


1. RK-140WX 4-track stereo tape deck. $99.50
2. RK-137WX 4-track portable recorder. $89.50
3. RK-141WX 4-track stereo/mono playback deck $59.50
4. RK-142WX ½-track portable recorder $59.95

NAGRA

● *Nagra IIIB Tape Recorder.* The Nagra III is a portable self-contained tape recorder assuring professional standard of performance, reliability, and ease of use.

Specifications: Speeds: 15, 7½, 3¾ ips; heads: 3 full track; records, 1-track mono; plays, 1-track mono; reel size 5 in., 7-in. with cover open; 1 motor; timing accuracy 0.1%



freq. resp. 15″ ips, ± 1½ db from 30 to 16,000 cps; 7½ ips ± 1½ db from 50 to 12,000 cps; signal-to-noise ratio, 62.5 db; wow and flutter, 0.1% at 7½ ips. Inputs—1 microphone, impedance 50 ohms, sensitivity 1 to 5 mv; 1 high level, impedance 100k ohms, sensitivity 15 to 10 volts; amplifier outputs—1, balanced, impedance 600k ohms, earphone outputs 1, impedance 50 ohms. Dimensions, 14″ wide, 9.5″ high, 4.3″ deep, weight, 15 lbs. Other features: built-in speaker with amp. power output 1 to 2 watts. Price $1,045.00. Magna-Tech.

1. Nagra IIIP with neo-pilottone sync head $1,095.00
2. Nagra IIIPH with neo-pilottone head & H amp $1,135.00

NEWCOMB

● *Model SM-310-4B Stereo ¼-Track Tape Recorder.* The ¼-track Model SM-310-4B as well as the earlier ½-track Model SM-310, is "cybernetically engineered for intuitive operation." Control of the tape transport is centered in a "joy stick." Both models will operate either vertically or horizontally and take from 3″ to 10½″ reels, as well as NAB hubs.



Specifications: Speeds 3¾, 7½ ips; heads—¼-track; records 4-track stereo, 4-track mono; plays 4 or 2-track stereo or mono; reel size 10½″; no. of motors 1; timing accuracy 99.5%; freq. resp. 7½ ips, ± 2 db from 30 to 15,000 cps; 3¾ ips, ± 3 db from 40 to 10,000 cps; signal-to-noise ratio, 50 db; wow and flutter, 0.2% at 7½ ips, 0.25% at 3¾ ips; rewind time, 3600-ft. reel, 120 secs. Inputs—2 microphone, impedance hi or lo by use of plug-in transformer, sensitivity ½ mv; 2 high level, impedance 0.5 meg, sensitivity 29 mv; amplifier output—2 cathode follower. Dimensions: 16¾″ wire, 9½″ high, 12¾″ deep; weight, 34 lbs. Price, $569.50. Newcomb Products.

NORELCO

● *Continental 301 (Model EL3549).* Fully transistorized 4-track, 4-speed tape recorder featuring two preamps for stereo playback through any radio, TV, or hi-fi system. Features new superslow fourth speed of 15/16 ips for up to 32 hours of recording on a standard 7-inch reel. Contains facilities for stereo playback and mono record/playback and includes two preamplifiers, power amplifier and speaker and comes with dynamic cardioid-pattern microphone.

Specifications: Frequency response, 7½ ips; 60–16,000 cps; signal-to-noise ratio better than 40 db; wow and flutter (rms): 7½ ips—0.14%. Inputs (3): microphone, radio/phono, and foot pedal. Outputs (3): external speaker, stereo line, headphones. A parallel operation

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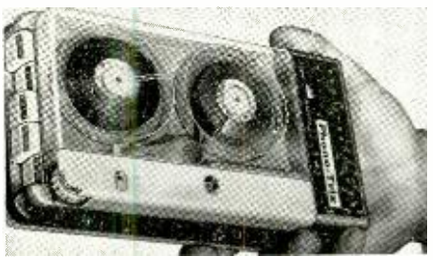


feature permits tracks 1 and 3, or 2 and 4 to be played back simultaneously so that prerecorded stereo tapes can be played back monophonically without loss through the built-in speaker. Price $299.50. North American Philips.

1. Norelco "Continental 100" (Model EL3585) $129.50
2. Norelco "Continental 200" (Model EL3541) $179.50
3. Norelco "Continental 300" (Model EL3542) $239.50
4. Norelco "Continental 401" (Model EL3534) $399.50

PHONO TRIX

● *Executive 88-B.* Miniature recorder and sound system complete with desk top amplifier, leather carrying case, telephone adapter. It can be used as a miniature recorder, portable public address system, telephone amplifier and recorder.



Specifications: Speeds—1⅞ ips; heads—2 ½-track, records 2-track mono; plays 2-track mono; reel size 2½ in.; 1 motor; freq. resp. 1⅞ ips, ±3 db from 100 to 6000 cps; rewind time, 600-ft. reel, 30.1 secs. Inputs—microphone, impedance 200 ohms; amplifier outputs—1; speaker outputs 1, impedance 1k ohms; output power 10 mw. Dimensions, 17⅛" wide, 4½" high, 7½" deep; weight, 2¾ lbs. Price, $99.95. Matthew Stuart.

ROBERTS

● *Model 1055 Stereophonic Tape Recorder.* The new 1055 4-track tape recorder features a self-contained stereophonic playback system. Other features: Edit guide, automatic shut-off, built-in head demagnetizer.

Specifications: Speeds—7½, 3¾ ips; heads—2 ¼-track, records 4-track stereo, 2-track mono; plays 4-track stereo, 2-track mono; reel size 7 in.; 1 motor; timing accuracy 0.5% freq. resp.—7½ ips, ±3 db from 50 to 15k cps;



3¾ ips, ±3 db from 70 to 10k cps; signal-to-noise ratio, 42 db; wow and flutter, 0.2% at 7½ ips; rewind time, 1200-ft. reel, 90 secs. Inputs—2 microphone, impedance 2.2 meg, sensitivity 3 mv; high level, impedance 2.2 meg, sensitivity 0.15 volts; amplifier outputs—2, single-ended, impedance 4/8 ohms; speaker outputs 2, impedance 4/8 ohms; output power 10 watts peak. Dimensions, 13¼" wide, 13¼" high, 9 1/16" deep; weight, 25 lbs. Other features: electronic muting, interlocked controls. Price, $269.95. Roberts Elect.

1. Model 1057 stereo tape recorder .. $339.95
2. Model 1057-P.S.—photo sync $369.95
3. Model 997 stereo tape recorder $449.95
4. Model 440 stereo tape recorder $649.50
5. Model 192 full-track mono recorder $349.50

SONY

● *Model 600 Stereorecorder.* The Sony Model 600 Stereorecorder is a 4-track stereo and monophonic recording and playback deck with sound-on-sound and sound-with-sound (stereo mike and line mixing), monitor of "source" or "tape," VU meters, separate record, playback, and monitor amplifiers, earphone monitor, high-level line outputs, and vertical or horizontal operation. Comes complete with carrying case and two Sony F-87 dynamic, cardioid pattern mikes.

Specifications: Speeds—7½, 3¾ ips; heads—3 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 1 motor; freq. resp.—7½ ips, ±2 db from 50 to 15,000 cps; 3¾ ips, 30 to



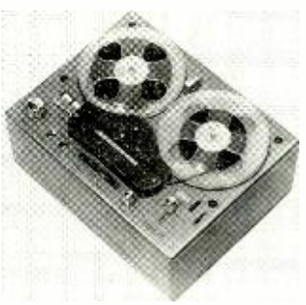
13,000 cps; signal-to-noise ratio, 50 db; wow and flutter, 0.17% at 7½ ips. Inputs—2 microphone, low impedance, sensitivity—72 db; 2 high level, impedance 100k ohms, sensitivity —20 db; amplifier outputs—2, preamp, high impedance. Price, $450.00. Accessories: Model MX-600 3-line mike mixer $22.50, Model DR-1C high impedance earphones $22.50. Superscope, Inc.

1. Model 500 Sterecorder $399.50
2. Model 464-L Sterecorder $219.50
3. Model 464-D Sterecorder $199.50
4. Model 263-D stereo tape deck $115.50
5. Model 801-A battery-operated portable $250.00

TANDBERG

● *MODEL 64.* Three-speed, four-track, stereo record/playback tape deck with automatic stop. Multiplex filter built-in.

Specifications: Speeds—7½, 3¾, 1⅞ ips; heads—3 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo 4-track mono; reel size 7 in.; 1 motor; timing accu-



racy 99.8% freq. resp.—7½ ips, ±2 db from 30 to 16,000 cps; 3¾ ips, ±2 db from 40 to 11,000 cps; signal-to-noise ratio, 55 db; wow and flutter, 0.1% at 7½ ips, 0.2% at 3¾ ips. Inputs—2 microphone, impedance 5 meg, sensitivity 1.25 mv; 2 high level, impedance 1 meg, sensitivity 50 mv; output power 1.5 v. cathode follower. Dimensions, 12" wide, 6" high, 16" long; weight, 25 lbs. Price, $498.00. Accessories: TC56 carrying case $24.50. Tandberg of America.

1. 74 3-speed, 4-track $399.50
2. Model 8 series 2-speed, 2 and 4-track mono ..... $219.50–$287.50

UHER

● *Royal Stereo 8000.* Lightweight, built-in "echo effect," 4-speeds, colored-light identification of recording or playing position, sound-on-sound, built-in mixer.

Specifications: Speeds—7½, 3¾, 1⅞, 15/16 ips; heads—3 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 1 motor; timing accu-

ALTEC SOUND TALK

THE RISE AND FALL OF A FAMOUS ADJECTIVE

The word "professional" used to be the ultimate adjective in the world of audio. When applied to a speaker, amplifier or other piece of equipment, it meant that this equipment was widely used professionally; that is, by recording and broadcast engineers, the entertainment industry, theatres and concert halls. In such uses, the quality of audio equipment can easily determine the difference between profit and loss in heavy production budgets as well as the rise or fall of valued reputations. Hence, each audio component selected has to meet the most critical professional and artistic standards.

During the past few years, however, a growing host of exploiters have attached the term "professional" to every conceivable audio product from cheap amplifiers and tape recorders to half-pint "bookshelf" speakers, dishonestly implying wide professional acceptance and use of these products. The fact that no professional engineer or musical producer would tolerate such substandard equipment has not deterred the manufacturers of these products from claiming professional acceptance. As a result, thousands of music lovers are enticed to spend their money on inferior components represented as "professional" hi fi equipment.

HOW CAN YOU BE SURE OF THE GENUINE ARTICLE?

Obviously, the best audio components are made by companies actually selling the major proportion of their products to the professional sound fields because these products consistently meet critical standards far beyond those established for ordinary hi fi equipment. That's why studio PLAYBACK equipment by Altec Lansing is so frequently found in homes of leading musical conductors, artists and recording or broadcast engineers. These professionals, whose income depends on quality of sound, know the genuine item from day-to-day experience, and accept nothing less.

JUST FOR THE RECORD

Although Altec did not coin the term "high fidelity," there is little doubt that we were the commercial originators of the concept. For one thing, our management and engineering staffs were engaged—as part of Western Electric Co.—in the first serious search for fidelity as early as 1927 when the first "talkies" were coming into their own. In the Thirties, Altec became an autonomous company engaged solely in fields of professional sound.

We were the first ones to advertise studio PLAYBACK equipment for the home in national publications, under the quaint classification: "Custom-In-Built Music Systems for the Home." That was well before the term "hi fi" was born. Even in those days, some pioneer enthusiasts—mostly from the ranks of audio professionals—fussed about the price... but none complained about the sound!

ALTEC'S PRIMARY PURPOSE IS YOUR GREATEST GUARANTEE

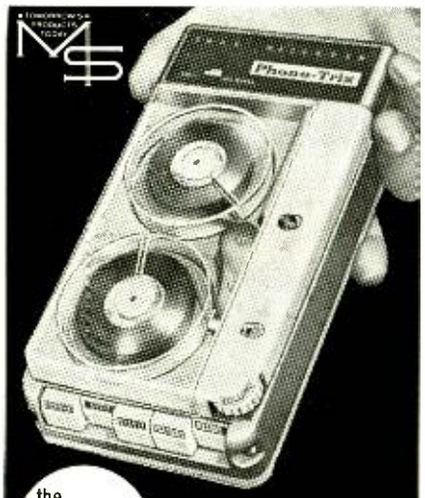
Today, eighty percent of Altec's production is specified by professionals for broadcast and recording studios, motion picture theatres, and for various musical, commercial, and military applications.

Consequently, it is vital to us that every product bearing the name Altec supports our reputation for excellence among professionals. This reputation and our intention to protect it are your continuing assurance that any Altec component you buy for your home is a genuine PLAYBACK product that honestly meets or exceeds its specifications. A product which is legitimately entitled to wear the adjective "professional."

Altec Lansing Corporation
Anaheim, California

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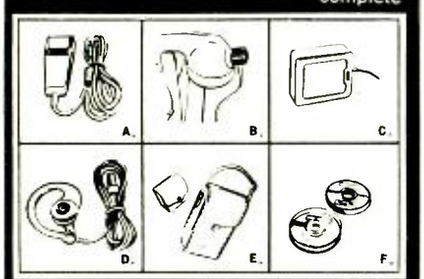
the confidential tape recorder

executive 88B miniature

Phono-trix sound system

This mighty mite records anything . . . anywhere. Only 2¾ pounds light (including batteries), push button operation, transistorized for instant recording, instant playback through microphone, amplifier or headphone. Plus fast rewind, automatic erase. Plays a full 70 minutes on a standard ¼" tape. Use it at home, in classroom or office. Can even be used as a portable P.A. system.

ALL THE FEATURES OF A FULL SIZE RECORDER FOR ONLY **$99.95** complete



All these accessories included FREE **A.** Remote control stop-start speaker-microphone **B.** Telephone amplifier adapter **C.** Miniature P.A. system **D.** Playback earphone **E.** Leather carrying cases **F.** Reels and tape.

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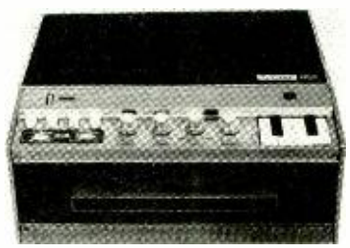
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racy 99.9% freq. resp.—7½ ips, ± 3 db from 50 to 20,000 cps; 3¾ ips, ± 3 db from 50 to 16,000 cps; signal-to-noise ratio, 50 db; wow and flutter, 0.15% at 7½ ips, 0.15% at 3¾ ips; rewind time, 1200-ft. reel, 90 secs. Inputs—3 microphone, impedance 2k ohms, sensitivity 150 mv; 2 high level, impedance 50k ohms, sensitivity 5 mv; speaker outputs 2, impedance 4 ohms; output power 2.2 watts. Dimensions, 14" wide, 13" high, 7" deep; weight, 23½ lbs. Other features: transistorized, may be played with top down and 7" reels, built-in system to synchronize auto. projector with tape. Accessories: sound actuated switch (Akustomat) #817 $44.95. Martel Elect.

VERNON

● *47/26 Stereo Tape Recorder.* The name of the recorder comes from its complement of 47 transistors and 26 diodes in its all-transistorized circuitry. This instrument is competely self-contained, with dual recording and playback amplifiers and built-in monitoring speakers. Among its features are: three motors; three heads; all-electronic switching; three controls for each channel (tone, record level, playback level); automatic rewind, replay, and shutoff; three inputs per channel with simul-

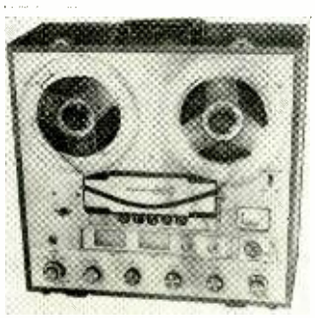


taneous intermix; sound-on-sound and echo effects; remote control; pause switch for editing; and monitoring from either the recorded tape or the preamplifier input. It can also serve as an audio center for a high fidelity or a PA system.

Specifications: Speeds—7½, 3¾ ips; heads—(3) ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 3 motors; freq. resp. 7½ ips, ± 3 db from 30 to 20,000 cps; signal-to-noise ratio 50 db; wow and flutter, 0.15% at 7½ ips, 0.25% at 3¼ ips; rewind time, 1200-ft. reel, 45 secs. Inputs—microphone; high level; output power 10 watts. Dimensions, 16" wide, 7" high, 13" deep. Price, $600.00. Vernon Audio Div.

VIKING

● *Retro-Matic 220.* Two-speed quarter-track stereo tape recorder. Two-directional automatic or manual playback. Remote control, all electric feather-touch pushbuttons. Solenoid controlled differential braking, fail safe in case of power failure. Integrated 12-watt solid-state power amplifier, vacuum tube record circuitry. Illuminated VU meters, independent channel controls, digital counter, photoelectric run-out sensor, record indicator



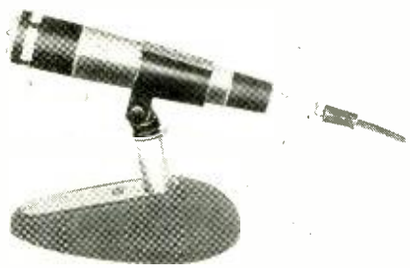
lights. Stainless steel face plate, vertical or horizontal operation.

Specifications: Speeds—3¾, 7½ ips; heads—4 ¼-track; records 4-track stereo, 4-track mono; plays 4-track stereo, 4-track mono; reel size 7 in.; 3 motors; freq. resp.—7½ ips, ± 3 db from 20 to 25,000 cps; 3¾ ips, ± 3 db from 20 to 15,000 cps; signal-to-noise ratio, 55 db; wow and flutter, 0.2% at 7½ ips, 0.3% at 3¾ ips; rewind time, 1200-ft. reel, 60 secs. Inputs—2 microphone, impedance 2 meg, sensitivity 1 mv; 2 high level, impedance 250k ohms; sensitivity 0.1 volts; amplifier outputs—(1) stereophones impedance 4–600 ohms, (2) 1 v. amp., out., imp. 1k ohms; speaker outputs 2, impedance 4 to 8 ohms; output power 6 watts. Dimensions, 16" wide, 15" high, 9 1/16" deep; weight, 45 lbs. Other features: audio-controlled reversing, remote control, bias metering and adj. on front panel, photoelectric shut-off, index counter. Price, $860.00. Viking of Minneapolis.

MICROPHONES

ALTEC

● *683 Cardioid Dynamic Microphone.* The 683A Cardioid Dynamic is a modest-priced version of the 685A. It has the same essential features including the sintered-bronze filter, but does not come with an individually measured Bruel and Kjaer response curve. The 683A is more than adequate for the small broadcast or television station, and for most recording uses.



Specifications: dynamic; cardioid dir. pattern; baked enamel finish; output impedance 30/50, 150/250, 20k ohms; freq. resp. 45 to 15,000 cps; length of cable furnished 15 ft.; dimensions—1½" dia., 7¼" long; weight 11 oz. Slip-on adapter mounting. Price, $72.00. Altec-Lansing.

1. 682 omni dynamic $54.00
2. 681 omni dynamic $42.00

AMERICAN

● *D55.* For public address, home recording, and theater-stage applications.



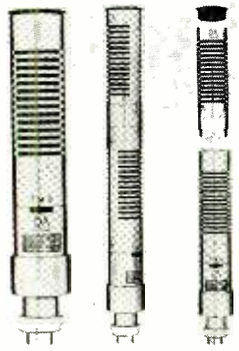
Specifications: dynamic; cardioid pattern; Mylar diaphragm material; aluminum case; anodized finish; output impedance variable; freq. resp. ± 3 db from 50 to 12,000 cps; sensitivity −55 db; cable connection 3-pin; length of cable furnished 18 ft.; Cannon XLR-3-11 plug; dimensions—7½" by 1⅜"; weight, 11 ozs.; standard ⅝-27 mounting; other features: quick-detach microphone stand connector. Price, $85.00. American Microphone.

1. Model D76 dynamic unidirectional .. $195.00
2. Model D33 dynamic omni $130.00
3. Model D22 PA dynamic omni ..... $ 99.50
4. Model D12 lavalier dynamic omni .. $ 59.50
5. Model D10 dynamic omni ..... $ 29.50

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DYNACO—B&O

● *Model 200 Stereo Microphone.* Dual-ribbon stereo microphone designed for broadcast and professional recording applications. The top section (which is rotatable through 90° with respect to the lower section) can be removed for monophonic use. The phase characteristics of the 200 make it unusually well suited to the requirements of multiplex broadcasting, with optimum reproduction and accurate source localization in playback. The 200 is suitable for recording in stereo by either the AB or MS techniques.



Specifications: ribbon; figure 8 (each element) dir. pattern; duraluminum diaphragm material; steel case; chrome finish; output impedance 200 ohms; freq. resp. ± 2 db from 30 to 13,000 cps; sensitivity Gm = 156 db; 5-pin connector; length of cable furnished 20 feet; dimensions—10½" × 1 3/16"; weight 1 lb.; quick-clip adapter to standard thread mounting; other features: talk-music-off switch, phase switch. Price, $149.95. Accessories MT-2 stereo matching transformer 2 × 200 to 40k ohms, $24.95. Dynaco.

1. Model 50 50-ohm mono $59.95
2. Model 53 50/250/Hi-Z mono $69.95
3. Model 100 200-ohm mono $89.95
4. Model 150 conversion element to make Model 200 from 100 ..... $69.95

ELECTRO-VOICE

● *676 Dynamic Cardioid.* A cardioid dynamic microphone offering continuously variable-D which permits extremely wide response and smooth, symmetrical cardioid pattern at all frequencies. Bass-tilt switch provides increased control over feedback and eliminates unwanted low frequencies. Three-position bass-tilt switch allows selection of degree of bass noise discrimination. Wired for high impedance unless 150-ohm impedance is specified. High pressure die-cast case withstands shock and abuse. May be held in hand or used on desk or floor stand. Rich satin chrome finish. Complete line of professional studio and broadcast microphones also available.



Specifications: dynamic; cardioid pattern; Acoustalloy® diaphragm material; die cast case; chrome finish; output impedance hi or 150-ohm; freq. resp. ± 5 db from 50 to 15,000 cps; sensitivity; – 57 db (1 v/dyne/cm²); cable connection 91-MC4M Amphenol or equivalent; length of cable furnished 18 ft.; dimensions—7⅜" × 1¼" dia.; weight 12 ozs.; slip mounting. Price, $100.00. Accessories: Model 420 desk stand $20.00; Model 355 Windscreen; $11.00: Electro-Voice.

1. Model 600F dynamic (handheld) ... $ 39.00
2. Model 717 ceramic close-talk cardioid (Mobile) ..... $ 19.50
3. Model 602E close-talk noise-cancelling dynamic (handheld) ..... $ 57.50
4. Model 641 unidirectional dynamic .. $ 35.00
5. Model 644 unidirectioal line dynamic $110.00

FREEMAN

● *Model DM-166 Dynamic Microphone.* Built-in matching transformer to match any high-impedance input; die-cast housing; wind screen. Comes complete with two 5-ft. line cords to fit standard phone jack or mini jack. Die cast desk stand. In beautiful fitted walnut case.

Specifications: dynamic; omni dir. pattern; Mylar diaphragm material; die cast case; enamel finish; output impedance 2000 ohms; freq. resp. ± 5 db from 35 to 22,000 cps; sensitivity – 55 db; cable connection, standard & mini plug; length of cable furnished, (2) 4 ft.; dimensions—1½" dia., 5" long; weight 12 oz.; yoke mount. Price, $29.95. Freeman Elect.

KNIGHT

● *KN-4500.* Economy dynamic microphone with desk stand. Usable with 90 per cent of tape recorders.

Specifications: dynamic; omnidirectional pattern; Acoustalloy® diaphragm material; metal case; gold and blk. finish; output impedance high or low; freq. resp. 60 to 12,000 cps; cable connection MC 4; length of cable furnished 10 ft.; phone plug; dimensions—7½ × 1 5/16; weight 4 lbs. incl. stand; std. mounting. Price, $23.95. Allied Radio.

1. KN-4550 cardioid dynamic $34.50
2. KN-4510 ceramic slim ..... $ 7.95
3. economy crystal hand-held ..... $ 2.59

LAFAYETTE

● *PA-263 Dynamic Stereo Microphone.* Featuring two microphone elements in a single case, with their axes at right angles to each other.

Specifications: dynamic; dir. pattern (2) omni, 90° apart; case metal; finish satin



chrome; output impedance 50k ohms; freq. resp. from 50 to 15,000 cps; weight 6 lbs; type of mounting, gland-type swivel joint; other features: switch for either mono or stereo operation. Price, $17.95. Lafayette Radio.

1. PA-43 "Dyna-Slim" ..... $ 6.95
2. PA-46 dual-impedance dynamic $11.95
3. PA-49 omni dynamic $11.95
4. PA-105 dual-impedance dynamic ... $ 9.75

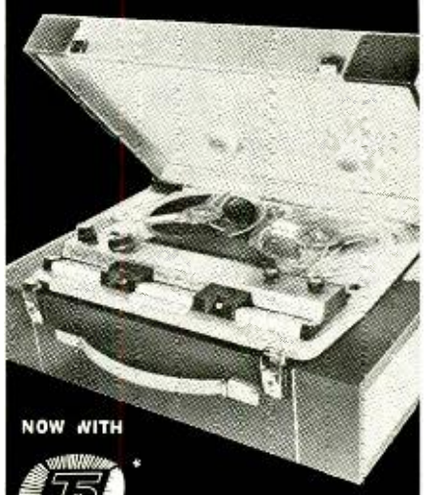
NEUMANN

● *Model U 67 Condenser Microphone.* This newest Neumann condenser microphone was especially designed to be a studio recording microphone adaptable to different situations and particularly close microphone pickups. Its "voice-music" switch and overload protection switch make it ideally suitable to multiple



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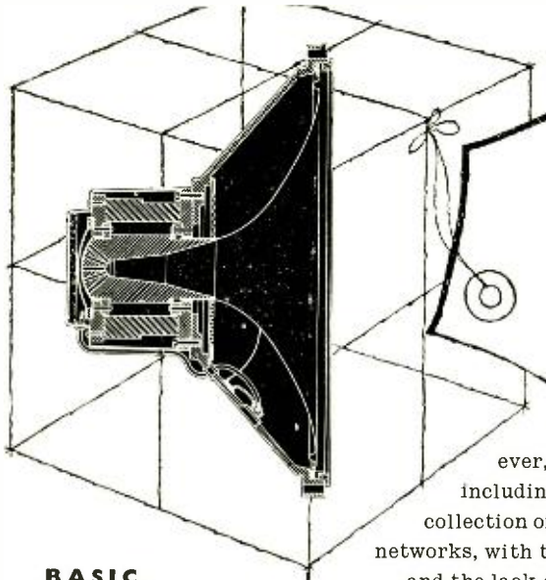
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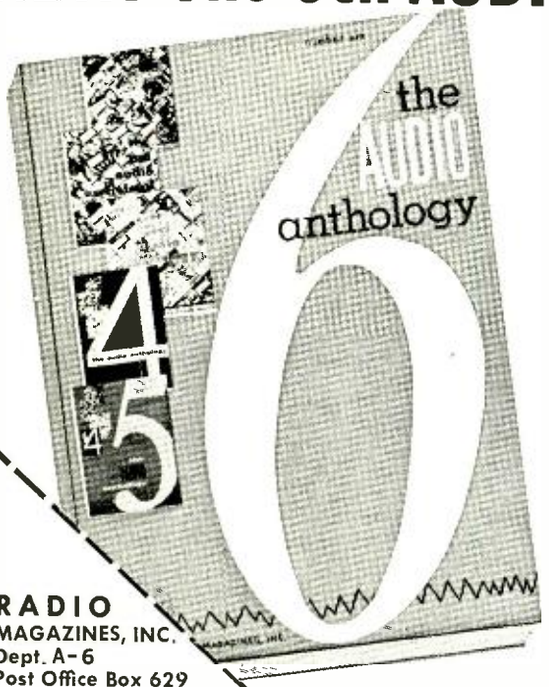
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CIRCLE 88

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mike techniques. It uses an EF86 tube. The Model M 269 is identical to the U 67 except that it offers the possibility of remote control and infinite resolution between patterns.

Specifications: condenser; omni, cardioid, figure-8 dir. pattern; Mylar diaphragm material; brass case; chrome sanded finish; output impedance 50/200 ohms; freq. resp. ±2 db from 8 to 20,000 cps; sensitivity 2.2 mv/bar; cable connection 7-pole male Tuchel; length of cable furnished 25 ft.; Cannon XLR 3-32 on output of power supply plug; dimensions—7⅞" × 2¼"; weight 1 lb; Swivel stand or elastic suspension mounting; other features: fully r.f. protected. Price, $435.00. Accessories Z 48 full elastic suspension, Z 67 wind and close talking guard, each $32.50. Gotham Audio.

1. M269 condenser $495.00
2. SM2 stereo M-S—remote controlled $795.00
3. KM56 miniature—3-pattern condenser $435.00
4. KM54a miniature — highly-cardioid condenser $435.00
5. M49b remote controlled pattern ... $495.00

P. M. L.

● *EK-61 "Super-Min" Condenser Microphone.* Swedish precision engineering. The top-quality performance of the PML gives you professional characteristics with smooth performance over a wide frequency range, maintaining a high sensitivity with extremely low noise level. Battery power supply is a self-contained case which can be clipped to a belt for greater mobility.

Specifications: Condenser; omni dir. pattern; Mylar diaphragm; satin-anodized finish; choice of output impedances 30/50, 150/200, 600, hi-z ohms; freq. resp. ±2.5 db from 30 to 18,000 cps; sensitivity 52 db; cable connections 5 and 4-pin male Tuchel; length of cable furnished 10 ft.; dimensions—¾" o.d. × 2⅝" length; weight 1¼ oz. Supplied with ⅝-27 adapter. Price, $99.50. Accessories: Battery-operated power supply $29.50. a.c. power supply $49.50. Ercona Corp.

1. EC 61 cardioid $109.50
2. C-2 omni $250.00
3. C-8 cardioid and bi-directional $269.00
4. C-K cardioid and omni $259.00
5. ST-6 stereo $695.00

PRIMO

● *Model UD-802 Dynamic Microphone.* A unidirectional microphone which is intended for applications where background noise must be excluded, such as in theatres.



Specifications: dynamic; uni-directional pattern; output impedance 600/50k ohms; freq. resp. ±1.5 db from 100 to 14,000 cps; sensitivity, −75 ±3 db (600 ohm); dimensions—1¼" × 6 7/16". Primo Co.

RCA

● *MA2314 Uniaxial Ribbon Microphone.* The Type BK-5B is a unidirectional microphone in which the moving element is a thin corrugated metallic ribbon clamped under light tension to cause it to vibrate at its own resonant frequency. The ribbon is placed between the pole pieces of a magnetic circuit. One side of the ribbon is open to the atmosphere and the other opens on an acoustical labyrinth which has phase-shift openings giving the instrument its improved unidirectional characteristic. The labyrinth of the microphone houses an impedance matching transformer and switch for selecting response characteristics for voice or music.

Specifications: ribbon; unidirectional cardioid pattern; steel case; crackle finish; output impedance 30/150/250 ohms; freq. resp. 50 to 15,000 cps; sensitivity −150 mv/bar; cable connection integral; length of cable furnished 30 ft.; dimensions—7" L, 2¾" H, 2⅞" W; weight 1 lb. 11 oz.; desk stand mounting; other features: 3-position voice-music switch, blast filter protection against loud noises, op-

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erates in high hum fields, shock mounted. Price, $146.50. Accessories: Boom Mount (MA 2324) Windscreen (MA 2325). RCA Elect. Components and Devices.

1. MA 2311 polydirectional ribbon (Chrome) $206.00
2. MA 2313 Non-directional pressure . $ 73.50
3. MA 2315 direct pressure lavalier .. $ 86.00
4. MA 2316 bi-directional ribbon $131.25
5. MA 2319 bi-directional ribbon ..... $ 49.00

ROBERTS

● *Model 90-03 Ceramic Microphone.* Ceramic microphone engineered for use with Roberts recorder. Each microphone includes lavalier and desk stand.



Specifications: omni dir. pattern; die cast case; matte black & satin chrome finish; sensitivity −55 db; length of cable furnished 8 ft.; phone plug. Price, $17.95. Roberts Elect.

SCHOEPS

● *Professional Condenser Microphone.* The Schoeps CM-66 is designed with a patented multiple pattern single diaphragm made of metal; pattern switching is achieved by altering the acoustical chambers behind the diaphragm. The switchable 15-db attenuator between the capsule and the preamplifier prevents overloading and distortion.

Specifications: Type condenser; dir. pattern cardioid, omni, figure 8; diaphragm material solid nickel; case matte satin chrome; output impedance selectable 30/50, 150/250 ohms; output level, −45 dbm/ubar; freq. resp. 30 to 19,000 cps; cable connection Cannon XLR-3; length of cable furnished 33 ft. Price, $450.00, with A-60 elastic suspension $470.00. International Electroacoustics, Inc.

1. M221/26 condenser mic $460.00
2. CM 640 condenser mic $415.00
3. M221/24 condenser mic $440.00

SHURE

● *Model 576 Omnidirectional Dynamic Microphone.* A new dynamic probe microphone designed for television and radio broadcasting and critical public address applications. Slim ¾"-inch diameter provides maximum view of performance for on-camera use. Comes complete with Model A57S slip-in swivel adapter that permits tilting the microphone 90 deg. from vertical to horizontal. Rugged steel case provides effective magnetic shielding as well as good looks. Finished in non-reflecting gray with stainless steel grille. Available in matched pairs for stereo, broadcasting, and recording.



Specifications: dynamic; omnidirectional pattern; steel case; non-reflecting gray finish; output impedance 50 or 150 ohms; freq. resp. 40 to 20,000 cps; sensitivity 0.050 (50 ohms), 0.095 (150 ohms) mv/bar; length of cable furnished 25 ft.; dimensions—¾" dia., 8⅜" long; weight 7 ozs. Slip-in swivel stand adapter. Price, $175.00. Shure Bros.

1. Model 570 small dynamic lavalier List $95.00
2. Model 578 dynamic omni PA probe List $82.50
3. Model 561 tamperproof dynamic. List $32.50
4. Model 450 adjustable height ... List $49.50
5. Model 444 adjustable height "Ham" mic ..... List $42.50

SONOTONE

● *Ceramike CM-T10A (matched twin).* Sensitive, yet selective enough to screen out unwelcome background noises. Rugged to withstand almost any abuse. Rubber-encased ceramic transducer. Immune to extremes of temperature and humidity. Ideal for stereo applications. Every set electronically matched at factory to tolerance of ±2 db.



Specifications: ceramic; omni dir. pattern; aluminum diaphragm material; die cast metal case; brush chrome finish; output impedance, 3-meg load; freq. resp. ±3 db from 50 to 11,000 cps; sensitivity—63 db ±2 db; length of cable furnished 7 ft.; phone plug; optional swivel desk stand mounting. Price $35.50 per pair. Accessories: matching table stand $5.00. Sonotone.

1. CM 40 tape recorder microphone ... $ 9.90
2. CM 41 tape recorder microphone ... $11.90
3. CMT-11A matched twin hi-z pair $35.50

SONY

● *C-17B Condenser Microphone.* The Sony C-17B condenser microphone has unidirectional cardioid pattern making it ideal for stereo recording, as well as TV, night club and public address applications where background rejection and freedom from acoustical feedback is desired. The frequency response of the C-17B is identical to the well-known Sony C-37A.



Specifications: condenser; cardioid dir. pattern; Mylar diaphragm material; chrome case; satin finish; output impedance 250 ohms; freq. resp. ±2 db from 20 to 18,000 cps; output level −50 db mv/bar at 250 ω; length of cable furnished 30 ft.; dimensions—⅝" dia. × 3¾"; other features: includes power supply, carrying case, and cable. Price, $275.00. Superscope.

1. C-37A condenser $295.00
2. F-81 cardioid dynamic $29.50
3. F-32 dynamic omni $27.50
4. F-87 cardioid dynamic $22.50

UNIVERSITY

● *Model 502S Cardioid Modular Dynamic Microphone.* Shock-mounted cardioid modular dynamic microphone for maximum rejection of spurious sound pickup and extraneous noises. Modular features provide flexibility of mounting and of impedance level. Finished in acrylic silver-gray and non-reflecting black.

Specifications: dynamic; cardioid pattern; polyester diaphragm material; aluminum case; output impedance 30/50, 150/250, 20k ohms; freq. resp. 30 to 16,000 cps; sensitivity 1.7 mv/microbar at 20k impedance; cable connection via 1 of 4 modular adapters; length of cable furnished 18 ft.; dimensions—1¾ max dia; 7⅜" L; weight 2½ lbs; mounting depends on adapter; other features: hum reference −120 db/0.001 gauss; −147 db EIA sensitivity rating. Price, $87.00. University.



1. Model 401 modular omni $43.50
2. Model 402S modular omni shock mounted $47.50
3. Model 501 modular cardioid $75.00
4. Model 404L omni broadcast (not modular) $57.00
5. Model 70 general purpose dynamic .. $29.95

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● *Model 100 Headset.* The David Clark Model 100 headset receivers are of the highest quality in design and performance. The



drivers in the acoustic chambers are of moving-coil type with plastic diaphragms. Reduction of extraneous sound and noise is achieved by the ear seals—assuring maximum personal listening pleasure.

Specifications: dynamic; freq. resp. 20 to 10,000 cps ± 3 db; impedance 8 ohms; sensitivity—1 mv at 1000 cps produces 100 db ref. 0.0002 microbar; maximum power handling 1-watt per phone; stereo plug; 8-ft cord. Price $39.50. David Clark Co.



ELEGA

● *Dynamic Stereo Headphones.* Light headphones with soft headband to reduce fatigue.

Specifications: dynamic; freq. resp. 25 to 17,000 cps; impedance 8, 16 ohms; power handling ability, 0.5 watt; cord 6 ft; Fujiki Electric Co.



FREEMAN

● *Stereo Head Phones, Model SEP-100.* The Freman SEP-100 can be worn under the chin or over the head. Built-in control over volume and a stereo-mono selector switch.

Specifications: freq. resp. 35 to 20,000 cps ± 2 db; impedance 8 ohms; plug stereo; cord 6 ft.; net weight 12 oz. Price, $24.95. Freeman Elect.

JENSEN

● *HS-1 Stereo Headphones.* Contoured ear cushions for perfect seal. High-compliance, curvilinear, moisture resistant diaphragms. Aluminum voice coils and sintered magnetic circuits with efficient, powerful Alnico magnets.



Specifications: dynamic; freq. resp. 20 to 15,000 cps; impedance 4, 8, 16 ohms; sensitivity 95 db at 1 mw; maximum power handling 1 watt; 3 contact plug; cord 8 ft; net weight 1 lb. Price $24.95. Jensen Mfg. Co.

1. HS-1L HS-1 with 4 spade-lug terminals $22.50
2. CFN-1 Space-Perspective® cross-feed network $19.50
3. CC-1 stereo headphone control center $39.75



KNIGHT

● *KN848 Deluxe Stereo Headphones.* Lightweight stereo headphones with liquid-filled ear cushions to eliminate ambient noise to an attenuation of – 40 db at 1000 cps. Earcups and head band are removable for cleaning. Charcoal black and blue-gray trim. Freq. resp 20 to 20,000 cps. $29.95. Allied Radio.

1. KN-845 stereo headset $19.95
2. KN-846 remote control unit for KN-845 ..... $ 7.95

KOSS

● *SP-3X.* Extremely sensitive 3½" sound reproducers mounted in each earpiece. Soft, sponge foam ear and head cushions and adjustable headband. Comes complete with T-2 adapter plate that connects to any system that will play speakers.



Specifications: dynamic; freq. resp. 10 to 15,000 cps; impedance 4 ohms; sensitivity 1 volt at 400 cps; will develop 127 db of sound pressure referred to 0.0002 dynes/cm²; maximum power handling 10 watts; 3 conductor plug; cord 8 ft; net weight 12 ozs. Price $24.95. Accessories: T-5 remote control listening station. Price $8.95. Koss Elect.

1. PRO-4 headset $45.00
2. PRO-600 headset (600 ohms imp.) .. $50.00
3. SP-5NS dual-mode stereophones $24.95
4. SP-5SM stereo/mono phones $24.95
5. SP-5VW dual-input stereophones ... $24.95

LAFAYETTE

● *F-770 Stereo Headphones.* Adjustable headband, foam ear cushions, 2½" dynamic speakers.

Specifications: dynamic; freq. resp. 25 to 15,000 cps; impedance 8 ohms; maximum power handling 500 mw; plug standard; cord

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6 ft; net weight 12 ½ oz. Price, $19.95. Accessories: Speaker/Headphone Switch box. Price, $4.95. Lafayette Radio.

1. F-767 stereo headphone $11.88

PERMOFLUX

● *B-DHS-28 Stereo-Fones.* All units carefully sealed against moisture and dust intrusion. Headband of nickel-plated flexible spring steel, covered with top-grade leather. Earcushion designed for close firm fitting to ears. Molded neoprene cable, with multi-strand cadmium-bronze conductors.



Specifications: freq. resp. 20 to 20,000 cps; impedance 12/12 ohms; sensitivity 112 db at 1000 cps; plug PJ055/3; cord, 5 ft; net wt. 15 oz; Price, $45.00. Accessories: Stereo-Mono Adaptor, 10 ft. cable (AD-250-55/3) $8.50. Permoflux Corp.

1. B-DHS-17 stereo-fones (300/300) .. $52.50
2. B-DHS-600 stereo-fones (600/600) .. $52.50
3. B-DHS-4m stereo-fones (4M/4M) ... $52.50
4. B-DHS-15M stereo-fones (15M/15M) $52.50
5. DHS-28 dimensi-fones (25 ohms) ... $42.50

P.M.L.

● *D-42 Headphones.* Dynamic headphones built to meet the highest requirements for mono or stereo applications. Series wiring for mono provides 400 ohms whereas parallel gives 100 ohms. Soft rubber earpads.

Specifications: dynamic; freq. resp. 30 to 20,000 cps ± 3 db; impedance 200/200 ohms; maximum power handling 50 mw at 2% distortion; cord 6 ft; net weight 7½ oz. Price $24.50. Ercona Corp.

ROBERTS

● *Model 54-55 Stereo Headphones.* Stereo master control offers mono-stereo selector and 2-channel control for adjusting volume and



stereo balance to individual taste. Foam rubber is used on the headband and each ear piece. "Y" cable adapter is included with each unit.

Specifications: dynamic; impedance 8 ohms; maximum power handling 1000 mw; phone plug. Price $29.95. Roberts Elect.

SHARPE

● *HA-10 Stereo Phones.* The HA-10 stereo headphones are solidly constructed and have liquid-filled earpads.

Specifications: dynamic; freq. resp. 30 to 15,000 cps ± 3 db; impedance 8 ohms; sensitivity 115 db; maximum power handling 2 watts; plug std. 3-cond.; cord 6 ft. Price $43.50. Sharpe.

1. HA-10-B $43.50
2. HA-10-C $43.50
3. HA-8 ..... $24.50



SONOTONE

● *Sono/Com SHM-1000.* Rugged headset and boom mike features high intelligibility for language lab and hi-fi applications.

Specifications: crystal; freq. resp. 50 to 10,000 cps; impedance 50k ohms; phone plug; cord 52"; net weight 13 oz. Price $40.75 (w. ceramic boom mike). Sonotone.

MISCELLANEOUS

AMPLIFIER CORP.

● *"Magneraser" Models 200C and 220C.* Light, portable bulk tape eraser for all types of sound recording tape. The "Magneraser" serves a dual purpose: Completely erases tape on the reel without rewinding; also demagnetizes record-playback and erase heads. Can also be used to demagnetize tools.

Specifications: switch—momentary push-button; field intensity, 750 gauss (rms); line voltage, 117 volts (nominal); power consumption, 60 watts; current, 3.05 amps; power factor, 0.12; size, 2½" high, 4" diam.; weight, 3½ lbs. Model 200C, 100 to 130 volts, 50–60 cps; Model 220C, 200–260 v, 50–60 cps. Either model Price $18.00. Amplifier Corp.

1. "Magneraser" model 300A, 100 to 130v $24.95
2. "Magneraser" model 300B, 200 to 240v $24.95

ARTISAN

● *"Empress" Model Organ.* Full size A.G.O. console with 32-note pedal and two 61-note manuals. All printed-circuit tone generators. Factory assembled manuals, pedals, and console. Plays through mono or stereo systems. Tone similar to pipe organ. One of 14 models available on a pay-as-you-build basis. Con-



sole will hold from 85 to 251 independent oscillators, up to 26 preamps, up to 21 couplers. Audio output from console up to one volt. All oscillators dormant until keyed. Separate volume controls for each manual. Wiring time 100 to 300 hours, depending on number of stops. Kit price ranges from $1550 to $3350. Artisan Organs.

1. "Orchestra bells" $145.00
2. "Band Box" $475.00
3. "Electro-Vibe" $350.00

AUDIO DEVICES

● *Audiotape for Magnetic Recording:* Audiotape has an improved, bright new package design with eight distinct colors being used to identify all eight types of Audiotape. Simple and direct product descriptions are combined

IF WE SAID THIS, YOU'D NEVER BELIEVE US*

(unless you already own an ADC speaker system)

"Audio Dynamics, known for the ADC cartridges and the Pritchard tone arm, has introduced a line of high quality loudspeakers that incorporate novel design features such as the use of a rectangular-shape woofer... It is a very smooth, natural-sounding speaker system that strikes us as one of the finest presently available . . .

The ADC-18 in particular appears to be an outstanding reproducer from any standpoint, one that is suited for the finest of home music systems . . .

The initial impression of listening to music through the ADC-18 was one of immediate acceptance, and this impression has been strengthened after weeks of listening. The speaker does not favor one type of music, or one family of instruments, over another. It is an impartial, honest, transparent reproducer that seems to render no more or less than what is fed into it . . . The ADC-18, in sum, is very easy to listen to and live with, and is a worthy complement to the ADC cartridge itself."

Now you be the judge! Audition the ADC-18 speaker system at your hi-fi dealer.

**excerpts from the Equipment Report section of the April 1963 issue of HIGH FIDELITY magazine. Write for the full report.*

SPECIFICATIONS
Freq. Response . . . 20-20,000 cps
Power Handling . . . to 65 watts
Min. Power Req. . . . 10 watts
BASS UNIT MAGNETIC STRUCTURE
Flux Density . . . 12,700 Oersteds
Total Flux . . . 165,000 Maxwells
TREBLE UNIT MAGNETIC STRUCTURE
Flux Density . . . 15,000 Oersteds
Total Flux . . . 53,500 Maxwells
Impedance . . . 8 to 16 ohms
Net Consumer Price . . . $250



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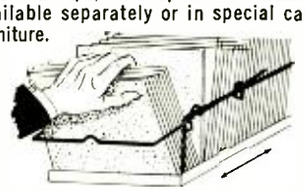
CIRCLE 92

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Stop stooping, squinting, straining, to find albums stacked on edge. Quick-See units glide in and out of cabinet or wall for fast, simple selection . . . you see the full face of your album without removing it. Ends jacket-bottom wear, too. Installs anywhere in five minutes. Sturdy welded steel and ball-bearing construction, brass finish. Nine models for LP's and tape, hold up to 125 albums . . . available separately or in special cabinet furniture.



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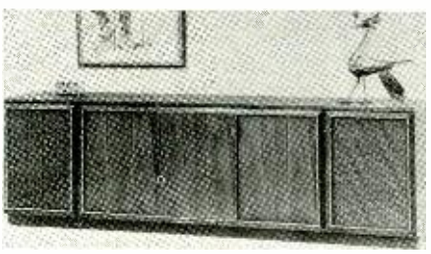
CIRCLE 82



with the color-coding technique making Audiotape type selection easier than ever before. New Audiotape nomenclature includes: Standard Recording for 1½-mil base materials; Longer Recording, for the 1-mil base materials; Double Recording for the ½-mil base materials; and Master Recording for tapes with special low-print-through oxide formulations. New products added to the Audiotape line include packaging on 5¾-in. reels and tapes with Colored Leader Reversal Strips for use on automatic stop-reversal machines. Audio Devices, Inc.

BARZILAY

● *Design "One" Stereo Ensemble Kit.* The Design "One" is a three piece contemporary stereo ensemble in kit form. Premium grade American black walnut is utilized throughout. All sections are pre-assembled with precision-fit pre-drilled connections. The Design "One" ensemble kit can be assembled in less than six hours with no more than a



Phillips-head screwdriver. The surfaces are pre-polished for ease in finishing. When ordered as a complete ensemble the tops are cut from one piece of walnut to assure a continous matching grain pattern. Over-all dimensions are 96" W × 18½" D × 28¾" H; the equipment cabinet measures 57" W × 18½" D × 28¾" H; and the speaker enclosures are 19" W × 18½" D × 28¾" H. Complete ensemble, $269.50; K61 equipment cabinet, $161.50; K-62 speaker enclosures, $54.00 ea.; 100E Ensemble factory assembled and finished, $432.00. Barzilay.



BURGESS

● *Magnetic Recording Tape No. 290–36.* A new Burgess formulation makes possible a thinner oxide coating to reduce tape thickness, thus allowing 3600 feet of tape to be included on a 7-inch reel. Extra strong DuPont Mylar, half-mil tensilized polyester is used for the backing. Price $11.95. Burgess Battery Company.

CBS LABORATORIES

● *STR-100 Stereophonic Frequency Test Record.* STR-100 frequency test record tests pickups and systems for sweep and spot-frequency response with voice announcements, channel separation, wavelength loss, stylus wear, compliance, phasing, vertical and lateral tracking, tone arm resonance. $8.50. Audio Products, CBS Laboratories.



1.	STR 110	$10.00
2.	STR 111	$10.00
3.	STR 120	$10.00
4.	STR 130	$10.00
5.	STR 140	$10.00

EMT

● *140 Series Reverberation Units.* A precision-manufactured steel plate develops high spectral-energy delay of sound for natural-sounding artificial reverberation. Delay period is variable from 0.5 to 5.0 seconds manually or by optical remote control. Stereo version, EMT 140st, ideal for FM-MX stations and stereo recording. Steel plate in mounting suspension driver and pickup microphone and associated amplifiers. Occupies 8′ × 1′ × 4′ 6″. Weight 374 lbs. Operates with 200/600 ohm sources and loads. Price: $2450.00 mono, $2690 stereo. Gotham Audio.

1.	Remote control conversion kit	$ 710.00
2.	140FB mono, remote control	$3250.00
3.	140FBst stereo, remote control	$3490.00

FAIRCHILD

● *Model 510 Compander.* Self-powered automatic sensing device that restores original full range dynamics eliminated due to various recording techniques. The Compander with automatic gain increase provides dynamic expansion of high levels to compensate for controls placed on original recording of disk, tape, or FM transmission. Not an amplifier; does not introduce distortion. May be switched for use as compressor for pleasant background music or overload protection in home tape recording and PA systems. A stereo device, may also be used monophonically.



Specifications: 100k ohms to both channels input impedance; output impedance 57k to 470k ohms; power amplifier output needed 40 to 16 ohms; min. control circuit voltage for Compander action 0.25v a.c.; expansion 6 db per channel; compression 20 db max/channel; attack time 10 m/sec; distortion none; frequency response flat ± 1 db thru entire audio range; a.c. power required none. Price $75.00. Fairchild Recording.

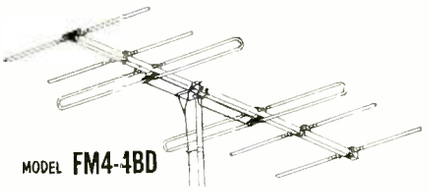
1.	510K kit version of the Compander	$59.95

FERRODYNAMICS

● *TK7, 7" Tape Kit.* Contains: Two 3" reels, two 3¼" reels, two 5" reels, two 7" reels, two reels tape, 1200′ acetate, 1 splicer, 1 splicing tape, 2 leader tapes, 1 strobe tape, 6 tape clips, 1 book—"How to Make Better Tape Recordings," 1 marking pencil. In a functional carrying case. $13.95. Ferrodynamics Corp.



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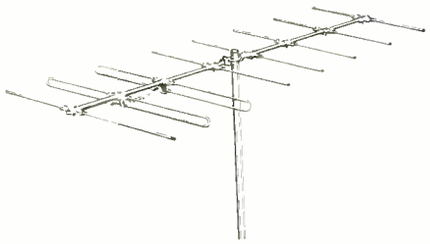
FINCO

● *FM 4-4BD Gold Corodized Bi-Directional FM Antenna.* Bi-directional FM antenna to receive FM off either end up to 75 miles from station. Gold corodized for beauty and corrosion protection. Heavy-duty construction, completely assembled snaps open, 4-active elements in each direction, twin driven. Price $28.95. Finney Co.

1. FM3-3BD 3-active elements each dir. $16.50
2. FM2-2BD 2-active elements each dir. $11.50

FM/Q

● *Dynaplex Wideband FM Yagi Antenna.* Features all stainless steel fasteners and hardware, positive mortise retention brackets to ensure low-loss electro-mechanical circuit symmetry. All aluminum is burnished, seamless drawn extrusion, extra heavy wall thickness throughout. Stainless steel "U" bolt for attachment to mast. High F/B ratio for optimum rejection of adjacent and co-channel interference. Antenna may be stacked to form a two-bay array for an additional 35% signal gain. Eight element dual-driven yagi yielding 8–9 db gain. 300-ohm impedance standard termination. Price $32.50. Apparatus Dev.



1. FM/Q Junior, 5-element broadband yagi ..... $ 19.96
2. FM/Q Super Mark I, 12-element broadband yagi $49.96
3. FM/Q Super Mark II, 2-bay stacked array $149.96
4. FM/Q "Metropolitan," economy 5-element yagi ..... $ 14.95

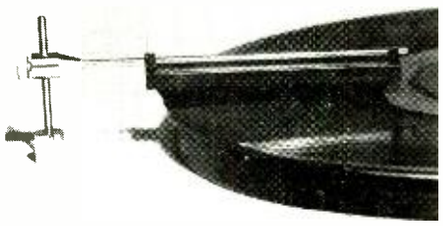
FREEMAN

● *C-246 Tape System Console.* Accepts all Freeman stereo models, all Ampex stand-up models, all Concertone 505 models, all Roberts models, and all other stand-up recorders 17½" or less in width. Sonic deflecters bring the full range of high fidelity sound out through the special grill on the front of the cabinet. Price, $149.50. Freeman Elect.

1. BT 100 bulk tape eraser in portable case $24.95
2. HD 100 head demagnetizer ..... $ 4.95

GRADO

● *"Dustat" Record Cleaner.* This cleaner substantially reduces the electrostatic charge in records and removes dirt and girt. The Dustat



is easy to install and is fully adjustable for any turntable. The device does not contain radioactive materials, nor does it use any fluids. Price, $6.95. Grado Labs.

GENERAL ELECTRIC

● *MA-2G FM-Stereo Adaptor.* The General Electric model MA-2G stereo adaptor is a self-contained, self-powered unit used to deliver a stereo signal, from a tuner having suitable characteristics, to the input of a stereo amplifying source for reproduction.

Specifications: Input signal level: 1–2 volts rms sine value corresponding to 75 kc deviation (5.8 peak-to-peak volts maximum) (2.8 peak-to-peak volts minimum); gain unity ±3 db; input impedance 2 megohm and 50 pf; output impedance 12,000 ohm; separation 20 db at 1 kc; Hum and Noise −60 db; Frequency Response 50 to 15,000 cps ±3 db referred to standard de-emphasis curve; dimensions—mounting base 10" long, 2¼" wide, with mounting holes spaced 2¼". Clearance of 3" is required for capacitor and tubes. Adequate ventilation for heat dissipation must be provided. Power 115v, 60 cps, 9 watts. $39.95. General Electric Co.

GRAY

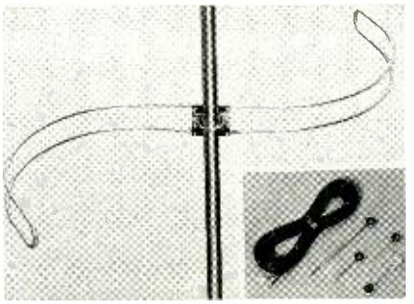
● *Broadcast Record Equalizer, Model 604-M/S.* A passive record equalizer for stereo or mono records. Dual-balanced 150-ohm outputs to match low-impedance microphone inputs in professional audio equipment. Compatible with most high-impedance stereo and low-impedance mono magnetic cartridges.

Specifications: Input impedance 2000 ohms; output impedance 150 ohms; equalization curves, flat, RIAA, −7 db at 10kc, −15 db at 10kc; unit will work into standard mike preamp. Price $137.50. Gray Mfg. Co.

1. 602-C mono passive equalizer $59.50
2. 404 tone arm switch $37.05

JERROLD-TACO

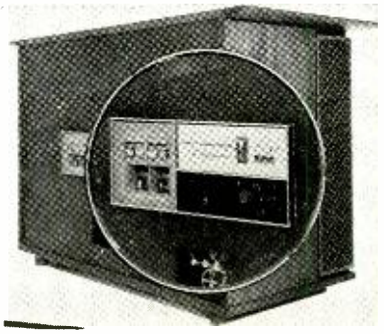
● *"Lark" FM Antenna, Model KG626A.* For FM-stereo high-fidelity systems. Kit contains Model G626A gold anodized "Lark," 50 feet of lead-in, 1 snap-on standoff, and 3 screw-eye standoff insulators. Installs on an existing TV antenna mast, or mounted to attic beam. "S" configuration of dipole makes it sensitive to signals from every direction up to 25 miles away. Price, $8.95. Taco Div. Jerrold Elect.



1. Omni-directional model C677M $10.95
2. Bi-directional yagi, model 615 ..... $12.95
3. S-type "Lark" (without attachments) $ 6.95
4. Omni-directional turnstile, model KC677M $17.95
5. Dipole-reflector (metropolitan and suburban) model 650M ..... $ 9.75

JBL

● *SE402 Stereo Energizer for JBL Loudspeaker Systems.* The JBL "Stereo Energizer" is a solid-state device which replaces the conventional power amplifier when used to drive a pair of JBL loudspeaker systems. The energizer can be installed directly in one of the speaker enclosures—there are no microphonic



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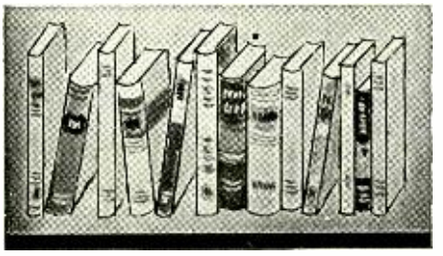
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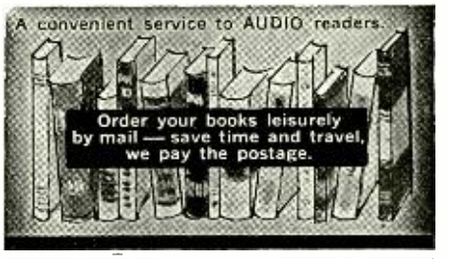
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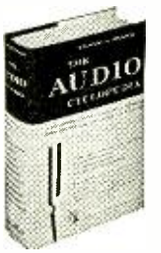
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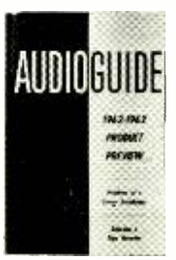
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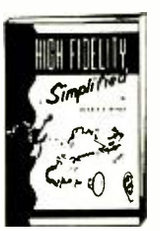


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Herman Burstein



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or heat problems—and affords an ideally intimate relationship between loudspeakers and audio power source. Individual complementary circuit boards precisely match the characteristics of the energizer to the specific JBL speaker systems with which it is used. Entire chassis and front panel is a single heavy aluminum casting providing heat sink area far in excess of that required for perfect safety in any mode of operation. Military specification epoxy glass circuit boards used throughout, with special bonded damping material to eliminate joint fatigue. Unit is short-circuit-proof, eliminating fuse changes or damaged transistors. Price, $216.00, matched to any JBL loudspeaker system. James B. Lansing.

KLH

● *Model Eleven.* A portable stereo phonograph housed in a luggage-styled case of vinyl clad 'Contourlite,' 24¾" L×14¼" W×7⅝" D. Speakers are completely detachable from record changer/amplifier section. Components include: Garrard AT-6 4-speed record changer with automatic shutoff, Pickering 380C mag-



netic pickup with diamond stylus. 2 newly-designed KLH speaker systems (supplied with 40 ft. cable), and a 15-watt-music-power, 30-watt-peak, all-transistorized stereo amplifier designed by KLH. The controls include: bass, treble, volume, balance, mono-stereo switch and phono-aux switch. Auxiliary inputs are provided so that mono or stereo music sources, such as an FM tuner or tape recorder may be played through the Model Eleven. The Model Eleven is guaranteed for 5 years (parts and labor). Normal repairs free for 2 years; for the next 3 years maximum service charge per servicing will be $12. Price, $199.00. KLH.

KERSTING

● *Quick-See Retractable Album File Model A 85.* The Quick-See album file gives you a front-view flip-through selection of record albums and tapes. Record albums and tapes are safely nestled in the file which rolls



smoothly forward on lifetime ball bearings, eliminating bottom jacket wear. The Quick-See is all steel and welded. It has a capacity of 85 records. Includes adjustable back rest & has drop front for easy browsing. Price $12.95. Kersting Co.

1. A70 holds 70 12" LP's	$11.95
2. A-100 holds 100 12" LP's	$13.95
3. A-125 holds 125 12" LP's	$16.95
4. T-15 holds 75 45's or 15 tapes	$ 7.95
5. T-30 holds 150 45's or 30 tapes	$11.95

KNIGHT-KIT

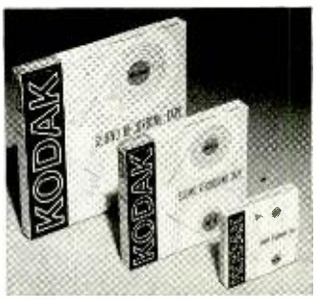
● *KP-70 Stereo Tape Record/Playback Preamplifier.* Provides high-quality playback and recording with any stereo tape transport. Can be used for 2- or 3-head operation. Separate dual channel record and play preamps. "Sound-on-Sound" and "Echo Chamber" effects. Response (independent of transport): ±2 db, 18–22,000 cps, harmonic distortion: recording sections, 0.3% at max. recording level; playback sections, 0.3% at 2v. output. Input sens. (for max. record level): 0.5 mv at mike inputs; 80 mv at aux inputs. Equalization NAB at 7½ ips (playback). Internal adjustment permits matching any recording head



to produce NAB equalized tapes. Separate equalization for 3¾ ips recordings. Bias Oscillator: 65 kc (voltage or current internally adjustable to match any head). Record head current: adjustable to match any head. Price $89.95. kit. Allied Radio.

KODAK

● *Sound Recording Tape.* Kodak sound recording tape is a general-purpose magnetic tape featuring low noise, high sensitivity, high output, full audio-frequency range, and consistent uniformity, both within each roll and from roll to roll. These properties enhance



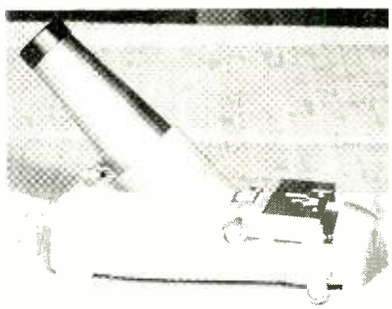
the performance of any tape recorder and permit recordings of highest fidelity with fine recording equipment. Available in five popular sizes: 1.5-mil Triacetate, standard play, in 1200-, 600- and 150-ft. reels of 7-, 5-, and 3-in. diameter, respectively, and in 1-mil Triacetate Extra Play in 1800- and 900-ft. reels of 7- and 5-in. diameter. A special "splicing slot" is provided on the face of the Thread-Easy Reel. Eastman Kodak Co.

LAFAYETTE

● *TM-66 Stereo Analyst.* Single-needle, dual-channel VU balance meter; seven ranges of meter sensitivity lets you balance stereo speakers and amplifiers properly. Can also be used as tape recorder VU Meter.

Specifications: Sensitivity: 1.2 volts for 0 VU at 100% modulation. Two-coil galvanometer-type meter movement. Max. meter sensitivity 120 μA. Slide switches for each channel. Size: 4⅜ l.×5½ h.×4 3/16 w. with legs. Shpg. wt., 2 lbs. Finished in satin gold. Lafayette Radio.

1. PK-634 stylus inspector	$ 3.29
2. PK-223 stylus pressure gauge	$ .99
3. MS-785 tone arm control	$ 1.95
4. ML-120 bulk tape eraser	$18.95
5. PK-238 tape head demagnetizer	$ 3.95



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● *Stylus Scope.* A self-contained scope system for examining phono styli. The stylus can be examined in the arm. Magnification of the system is 230x, sufficient to bring even the new 0.3-mil stylus tips into clear view. Requires two D cells. Micro Seiki Co.

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6AQ5; ECL82MP/6BM8; EL84MP/6BQ6; 7189MP; EL34MP/6CA7; EL86MP/6CW5; EL95MP/6DL5; ECL86MP/6GW8; EL37MP; UL84MP/45B5; UCL82MP/50BM8. International Electronics.

NORTRONICS

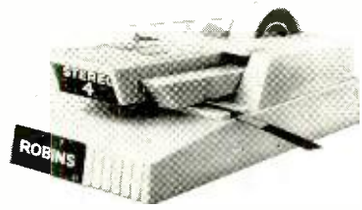
● *1000 Series Record-Play Heads.* Four-track stereo; laminated core; premium quality with full metal face construction; replaces older CSQ, TLB and TLD-L styles. 1000, high-impedance, 750 mhy. inductance, 100 μ-in. gap, for use with vacuum-tube circuits, no-mount type. 1001, medium-impedance, 350 mhy. inductance, 100 μ-in. gap, for use with vacuum-tube or transistor circuits, no-mount type. 1002, low-impedance, 100 mhy. inductance, 100 μ-in. gap, for use with transistor circuits no-mount type. 1003, special record-only head, 60 mhy. inductance, 500 μ-in gap, for use with vacuum-tube or transistor circuits, no-mount type. Price, each $21.00. Nortronics, Inc.

ORTOFON

● *Hi-Jack.* Hi-Jack gives manual tone arm remote raising, safe cueing, remote lowering of stylus with adjustable, air-damped descent of stylus to record surface. With Hi-Jack, even the most "ham-handed" can now safely use the most delicate pickup. Economical, easily installed on turntable—no drilling required on Thorens TD-124 or 121. $10.00. Elpa Ind.

ROBINS

● *Gibson Girl Stereo-4 Deluxe Tape Splicer.* Precision engineered tape splicer meets requirements of splicing 4-track stereo tapes without sacrificing program material on the outside tracks. Works equally well on single and 2-track tapes. Features blade-centering adjustment for lifetime maintenance of accuracy, and replaceable cutter cartridges. Cuts tape diagonally and trims minute "Gibson



Girl" wastes on the sides of the splice to prevent adhesive from contacting critical parts of the recorder. The unit features: "See-through" windows, indicating "Cut" and "Trim" positions for ease of operation. Tape guide and fingers secure tape during splicing. Easy threading integral tape dispenser with roll of ½"×100" splicing tape. Safety lock to prevent accidents when not in use. Model TS-8D; $11.50. Robins Industries.

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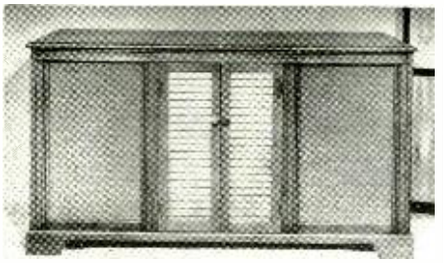
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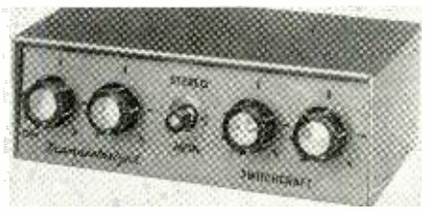
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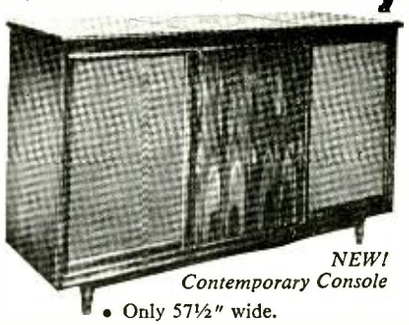
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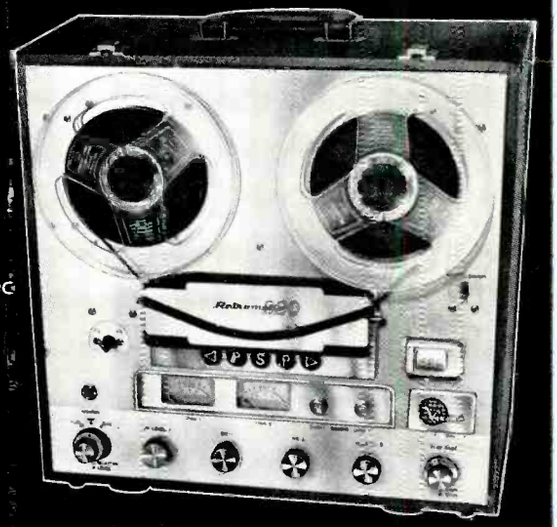
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Basis of the CV-D™ design is a slotted tube, coupled to the back of the 676 diaphragm. The CV-D tube appears to vary in length—acoustically (and automatically)—so that low tones "see" a long tube, while high tones "see" a short tube. The apparent length of the tube is always just right to phase out sound arriving at the back—for maximum front-to-back cancellation.

Modern styling by noted designer Lute Wassman adds grace and beauty to 676 practicality. The one-inch case fits all present E-V slip-on stand mounts, and its balanced weight distribution is just right for hand-held use.

But there's more to the 676 than just new features—built into it are the many characteristics that make E-V the choice of more professional sound engineers than any other brand: high output level, exclusive E-V Acoustalloy® diaphragm, dual impedance selection, efficient dust and magnetic filters, and the most important ingredients of all—fine materials and quality workmanship.

Accept our invitation to try the 676 soon—and the more difficult the job, the better. We guarantee you'll find the 676 will outperform any other PA cardioid microphone you are now using . . . or your money back!

Model 676—$100.00 list (less normal trade discounts). Complete specifications available at your E-V sound specialist's or write to: ELECTRO-VOICE, INC., Dept. 832A, Buchanan, Michigan.

*Some of the E-V microphone firsts include: The Differential, Mechanophase, Variable-D®, Cardioline and Sound Spot®, plus slim dynamic and lavalier microphone designs, Acoustalloy® and Acoustifoam®. And the E-V Model 642 has earned the first Academy Award microphone citation in 22 years, for its contribution to motion picture sound.

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