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AUDIOMAN

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Microphones

Miscellaneous

Electronic Organ Kit

Tape Guide—Equalization—Herman Burstein

Record Revue—Edward Tatwell Canby

Jazz and All That—Charles A. Robertson

About Music—Harold Lawrence

AUDIOMAN No. 1—James S. Swinehart

Advertising Index

COVER PHOTO—Living room stereo demonstration in the display of British Industries Corporation at the recent British Exhibition U.S.A. during June. The visitor entered the complete display at the lower right corner of the photo, climbed a few steps and proceeded along the raised passage seen at the left. While listening to properly reproduced stereo music from the equipment on display, he could observe a lucid description of each element of a home system as detailed on easy-to-read placards with suitable illustrations. As he passed out of the living-room area, he saw a display of the non-hi-fi products imported by British Industries Corporation. The equipment used in the display consisted of a Garrard 88 changer, Leak tuner and Leak amplifier installed in a River Edge chairside table, with two Wharfedale speakers opposite. The entire display was designed by Rex Frey of Lord & Taylor, New York.

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CONTENTS

Audioclinic—Joseph Giovanelli

Letters

Light Listening—Chester Santon

Audio ETC—Edward Tatwell Canby

Editor's Review

Microphone Calibration—Dan Peters

1.02 Cubic Feet and 45 cps.—Richard Sequerra

Start with Mono—Build up to Stereo—C. F. Barton

Audioclinic—Joseph Giovanelli

2

6

8

10

19

20

22

23

27

41

50

52

56

58

89

92

92

93

95

28

60

66

78

88

96

For complete specifications write Dept. A-N.
Grounding a Home Music System  
Q. (The following is a composite answer to two letters written on two different dates by the same reader. Each of these letters, of course, received a personal reply.)  
Letter 1—I am putting my equipment into a cabinet in which I will have to cut several holes in the back for power leads, audio leads, water, I have taken a Bud Minibox and arranged it for several power outlets. I have also taken another Bud Minibox and used other types for audio connections and antenna leads. My problem is that in using standard phono connectors I have used two wires, one from the center pin and one from the ground lug, Is there any danger of a ground loop because of the fact that the two phono connectors are connected on the ground side through the metal box itself?  
Letter 2—I have now converted my system to stereo, I would now like to know what is the proper and complete way to ground the entire system and how it should be grounded to the 110-volt outlet box or waterpipe ground.  
When I lift the tonearm to place it on a record, I get a hum until I remove my finger from the arm. Should the tonearm be grounded to the turntable? Will this get rid of the hum which occurs when the tonearm is lowered?  
I certainly would appreciate any help you can give me. I would like you to discuss this in your columns some time, as I imagine quite a few people would be interested in this important part of a system.  
Charles A. Hasek, Jr., Pittsburgh, Pa.

A. (1) After all your equipment has been properly mounted in the cabinet, link all chassises together with heavy bus wire, No. 10 or heavier. It should then be possible to mount all connectors to the Minibox and use both terminals on the connectors without getting into complications with ground loops. By so doing, hum conditions will be minimized and the shock hazard sometimes present when two chassises are touched simultaneously will be eliminated.  

(2) In general, it can be stated that the turntable and tonearm should be grounded to the Minibox, or which can be done by means of a phono connector plugged into one of the unused inputs, and the ground from the arm and table taken to the skirt of the tonearm. This will eliminate the hum which occurs when the tonearm is touched and will minimize the problem of static electricity.

Audio Clinic

JOSEPH GIOVANELLI

3. Since hum and its causes are sometimes quite complicated, the problem of grounding any type of home music system to a waterpipe or radiator depends on the amount of hum and upon the nature of the hum. If the system runs perfectly well, do nothing at all about such grounding. I cannot say just how far to go with grounding the entire system to waterpipes and the like since sometimes this will aggravate a hum condition rather than relieve it. If any of the equipment you plan to use is of the a.c.-d.c. variety, do not ground it or any associated components to a radiator. Failure to observe this precaution is almost certain to cause a blown fuse and damage to your equipment.

"Putter," Flutter and Tracking Force  
Q. My main problem is as follows: I have an odd difficulty in the turntable. There are two objectionable sounds. One is that it has apparently more flutter in pitch at the center of records, as compared to the edge (this one really is strange, as flutter should be uniform if the turntable causes it) and it has an odd, "puttering" sound for a small part of a revolution on many records. It sounds as if it shakes the record a little. This "puttering" is much worse at a cold start, reducing to a much lesser noticeable amount after the motor warms up. It is much worse near the center of the records. If one increases the stylus force, the noise is suppressed. But I feel that it should not exist at all.  
I will tell you what my investigation has shown: It is not caused by warped records. I proved this by putting a large rubber band under one side of the record, and no effect in pitch, no change in "puttering" took place. This nearly eliminated cartridge and arm as suspects. Also I turned the turntable with my finger, and at no speed did this "puttering" occur (I couldn't tell about the flutter here.) Since I never use the 45 speed, I interchanged the idler wheels. This also had no effect upon these two phenomena. The only things that I have not checked are the motor and idler rubber mounts. They may be too old. I cannot see how a motor of itself could cause these defects, since it runs so fast. If it runs at all, I should think that it would be satisfactory.  

The trouble with something of this sort is that it is just bad enough to notice. If something really went wrong, it could be seen and adjusted.  
Another, simpler question: How may one know if he is using enough tracking force? I presently use 4 grams. Three grams...
Progress Report #3 from Garrard Laboratories

THE FUTURE OF RECORD PLAYING HAS BEEN TURNING ON THIS MOTOR FOR THE PAST 8 MONTHS

It's true. Behind the locked doors of the Garrard laboratories, our engineers have been testing some significant new gramophone motors. Someday you can expect one of them to establish its own standard of quiet efficiency, just as the present Garrard motors are doing today. When it is finally released, it will reflect all the arduous months of creative engineering that went into it. Our designers developed it out of a 40-year tradition of experimentation, the perfectionist tradition that has enabled Garrard to produce and provide so many of the meaningful advances in the world's finest record playing equipment.
Only a few years ago, Sonotone invented the ceramic cartridge...and has been setting sales records ever since. And no wonder! Over the years, Sonotone has developed its fine cartridge line to the point where today it's the standard of the industry. Models available for virtually every type of phonograph...used as original equipment by over 70 manufacturers. In fact, Sonotone has already sold over 10,000,000 cartridges. You'll hear the difference when you change to Sonotone ceramic or new crystal cartridges.

Sonotone's 1960 census.............over 10,000,000 cartridges now in use!

(Yes, 10 million)

Seemed to sound just as good except on very heavy organ passages. More force does not seem to improve anything. Some records seem to be over-recorded.

Robert Tabony, Durham, N. C.

A. Sometimes a phenomenon which sounds like "flutter or putter" is caused by the stylus being in poor contact with the disc. This, in turn, can be caused by a defective cartridge, too low a tracking force, a worn stylus, or a tracking error in the arm.

You have not necessarily eliminated tracking force as a factor. You stated that the condition disappears with increased tracking force. This could mean that, prior to the increased tracking force, the records were tracked too lightly.

It could also mean that the cartridge is defective and hence requires a greater than normal tracking force for adequate sound reproduction.

It may also mean that the stylus has worn and that it maintains adequate contact with the grooves only because of the added force. This will, in addition, cause severe record wear.

It could mean that the turntable is involved, though no "puttering" was heard when the turntable was spun with your finger. This does not preclude the possibility that the turntable well is defective or is in need of cleaning and lubrication. Remember that the angle of force applied by your finger is not at all the angle of force applied by the motor and idler assembly. This last consists, in addition to its rotational components, of a lateral component tending to push the turntable away from the idler. It is this lateral component which may show up the noise from the well assembly. The added tracking weight may exert a force on the turntable in such a direction as to cancel some of this lateral component.

You want to know how to determine correct tracking force. First you should use the cartridge manufacturer's recommendation as a guide. The tonearm with which the cartridge is used, however, will have some effect. When making the tests, be sure that the cartridge and stylus are in good condition. Play a record starting with the cartridge manufacturer's recommended force. Adjust tracking force above and below this value until the sound reproduction is at its best. Use the minimum force which will bring about this result. When selecting a suitable test record, avoid one which is seriously over-recorded. Such a record is difficult and sometimes impossible to track cleanly.

Going back to the major problem, I tend to suspect tracking error or stylus wear in preference to some of the other possible causes listed earlier. Tracking error will cause the force applied to the needle to be transmitted to the cartridge at such an angle that it will not exert maximum force upon the cartridge elements. This is the same as saying that the compliance of the cartridge has been decreased which can cause distortion in various forms, in addition to record wear.

The stylus can influence the quality of reproduction. When a stylus wears, it makes contact with more and more of the groove's surface. This restricts the freedom of the stylus to move. This will cause considerable record wear and can cause some very strange-sounding distortion, similar to that which you have described. This is especially true when the turntable has a slight vertical warping.
A TRIO OF TIMELY TRIUMPHS FROM AKG

of Vienna, long acknowledged one of the world’s top designers and builders of professional transducers, who now bring to the quality-conscious amateur recordist Earwitness, Fidelity in two superb new mikes and a remarkable new headset, all priced far below the level of their performance.

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Specifications:
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Output voltage: 5mV 1,000c/s
5c/sec.
Channel isolation: 30 db
Channel balance: ± 1 db
1,000 c/s

LETTERS

Silicon Diodes

Sir:
After I submitted the manuscript for my article on Silicon Diodes in the July, 1960 issue, the Triad Transformer Company brought their S-144A output transformer which was designed for the 7189A's in the tapped screen node.

In designing this new transformer the Triad people have come up with a really fine unit, and I have been able to reduce the rolloff capacitor on the plate of the 3879 covered in Fig. 9 of the article to 21 nuf.

As far as size is concerned, the S-144A will fit on the same height-reducing bracket covered in the original article.

L. B. DALELL
1162 Fleetridge Drive
San Diego 6, Calif.

Sir:
Mr. Daleell's article, "The Silicon Diode in Audio Equipment," in the July issue was informative but he made an assumption which is not true nearly all of the time. That is, if one diode has a PIV of 600 volts, two in series will have a combined PIV of 1200 volts. This is true only if the reverse characteristics of the two diodes are the same, and they usually are not. It would not be unusual for the reverse leakage current to vary by 50 per cent about a typical value as given by the manufacturer. Thus if two 1N2071 diodes were picked off the shelf and 1200 volts applied to the pair in series, one might drop 400 volts while the other one would drop 800 volts, thus exceeding the manufacturer's maximum rating. I think that about 75 per cent of the PIV rating would be a safe figure to use for two diodes in series. 900 volts would thus be maximum for two 1N2071's.

All this depends on the difference between the diodes. A rating up to two times each PIV can be used if selected units are chosen. Probably most units will withstand about 110 to 120 per cent or more of the manufacturer's maximum rating. I personally prefer to operate a single diode at 75 per cent of its maximum ratings to ensure a safety margin for long, reliable operation. This is before any considerations of a pair in series.

Diodes can be checked and matched pretty well by using a variable d.c. supply and a protective series resistor to limit the reverse current so that power dissipation in the diode is kept under 200 milliwatts at room temperature. The resistor will prevent destruction of the diode if the Zener knee is passed. Raise the voltage until 0.2 ma reverse current flows. The voltage dropped across the diode will then be the maximum usable voltage and should usually be greater than 600 volts for a 1N2071. 600 volts should still be used as a maximum. Two units with the same leakage current at a specified voltage can be considered a matched pair.

BRUCE R. KAUFMAN
624½ S. Fifth St.,
Champaign, Ill.

This One is For the Birds

Sir:
We like your man Charles A. Robertson (JAZZ AND ALL THAT) very much, particularly for his attitude that Dixieland is still a vital part of Jazz, as contrasted with some of his contemporaries and their "let-the-simple-minded-cornball-have-their-fun" views.

Don't you think, however, that he missed the boat on his review of the Bye Bye Birdie (Columbia KOL 5510). LPT. The central character is not a take-off on Elvis, but of fellow rock-and-roller, Conway Twitty, Conway Twitty—Conway Birdie. Obvious, wot?

Jim Tannehill
P. O. Box 515
Fort Wayne, Indiana.

(If sure do seem obvious, friend—thanks, Ed.)
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AUDIO ■ AUGUST, 1960
The symbol O indicates the United Stereo Tapes 4-track 7½ ips tape number. When Mr. Santon has listened to the tape he'll list the tape number which is listed first. Otherwise, the corresponding tape number is furnished by United Stereo Tapes.

Fred Waring and the Pennsylvanians in Hi-Fi

I have been one of the few readers of the Waring brand of records. I usually listen to radio programs and have not considered the product serious enough to collect. This is my own view. The readers who do collect it have been for years using the product. They can tell me that they have been very pleased with the product. Waring's name is known throughout the world. The product is used for listening to radio and records.

Capitol's initial four-track releases are on the market and I made it a point to try this one first. The two-track version of Waring in Hi-Fi has been one of the few releases that I have been able to find. The Capitol two-track 7½ ips tape release is well worth listening to.

The two-track tape gives the illusion of about ten percent more liveliness in the studio and a mile placement about a foot closer. This difference is subtle enough to be apparent only when voices are not in the room. (This is being read, I assume, by more than one husband.) Forgetting the considerable disparity in the price of these two tapes, the four-track has given me the utmost enjoyment while the two-track had only eleven. One of the added items is a speciality of the Waring shows, Dry Bones. Tape's superiority in point-lowering a sound source gets a real workout as each phrase pops up in a different section of the glee club to the accompaniment of widely spaced sound effects by the orchestra. From the opening flourish of I Hear Music to the famous Waring sign-off, Sleep, this reel is equivalent to a well-paced stage production with all the brawn of the Jolson-Dubin brand of showmanship. Capitol has rolled up some heavy artillery to the pop music sector of tape's latest firing line.

Frank Chessfield: The Million Sellers

Richmond O PRL 45007

Frank Chessfield: Evening in Paris and Evening in Rome

London O LPM 70005

The Richmond tape reviewed this month is part of the first four-track release that brings the price of open reels to a figure just a shade above a dollar per track. At $1.95, these records from the Chessfield catalog are bound to win a good share of attention. This is the first UST has made available a standard length tape at this price. (A few demo tapes on the 5MB label have been around at $3.95.) It was easy to check the characteristics of this particular Richmond tape because the Chessfield orchestra has just been released by the parent firm on the London label. The results of such a comparison will come as no surprise to disc collectors who have encountered instances where an artist was issued by a record company at more than one price level. If the Richmond tape is played back, the bass response will appear to be virtually normal and the highs more or less acceptable. Switch to the Chessfield orchestra in the tunes from Paris and Rome and you can spot the difference quite quickly. The press note says that each tape is a maintenance unit. The bass is firmer on the London reel and encompasses lower frequencies. The upper end is sweeter although it takes in more territory. How much of the difference between these two reels is traceable to the master tapes is the secret of a few tax idioms at London but I find it difficult to believe that the masters are far apart in quality as these two reels would indicate. We may be witnessing here an application of a theory long used in the making of records. When an artist is put on the market by the same outfit in several price ranges, the lower-priced item cannot be permitted to enjoy a quality of sound equal to that of the higher-priced release. While hoping that this theory is not true the Fraser tape, The Evening in Rome tape has the better arrangements.

Palladini's C'est Paris has just the right atmosphere of the bustle of Parisian traffic to set the mood for favorites such as J'attendrai, La Vie en Rose, De Paris and a new treatment of Offenbach's Can Can. The woodwind section of the orchestra has its settings beautifully arranged. The Fraser orchestra in the same selections was not so subtle. The object featured in C'est Paris would not sound out of place in England's leading concert orchestra. If you go for continental stuff, this is top drawer.

Cesare Giovinni: Silk, Satin and Strings

Concertopet 41-3006

Rudolf Friml: Indian Love Call

Weinert O 41-107

Both of these tapes offer extra features in background music. The Concertopet reel is the more glamorous of the two. Strings thronging all over the place—enough to make a visitor an expert in the profession. The choice of tunes gives an idea of the producer's goal. Jalousie, Laura, Holiday For Strings are naturals for a full treatment by a large string orchestra and wedging with excellent morale. These are Mid-Western arrangements that recall the days when Chicago radio originated many network shows featuring sizable studio orchestras in light music. If any nostalgia is indulged by this reel, it will first overcome those who can remember when radio had the budget for such luxuries. The Weinert reel from the Westminster vaults is a tasty dish—one of the very few reels featuring a leading composer conducting his own music. Listeners restfulness is built into this one because Friml knows exactly what he wants in the interpretation and he gets it with a minimum of fuss. Whether you're dealing with records or tapes, I've found it a good rule of thumb to seek out what the composer on the podium whenever such a choice is possible. These performances of Dehors, Serenade, Rose Hunt and Giannina Fi have given many years of service as basic items in a tape library.

Dick Dia: Mondolinio Italiano

Audio Fidelity AFLP 1923

Audio Fidelity's latest addition to its list of their catalogue entrances is a valuable addition to the tonal possibilities of the mandolin. Impressario Sid Frey, never one to do things in half-hearted fashion, has hired a mandolinist who, for the past fifteen years, was musical director of New York's leading mandolin orchestra specializing in that instrument. Dick Dia arranged the tunes and plays them with a precision that reflects every year of his performing experience. The interest in "everyday" Italian music that more and more European travelers are bringing back every year has pushed the mandolin into the limelight. This record demonstrates that the instrument is capable of more than mere serenade strumming. In a time-lapse world program, he has laid bare the real strings with a marzuki and a tango. In a moment of abandon, he even tackles one of the virtuoso display pieces so beloved by wind instrumentalists—The Corinna of Venice. The AF person-to-person approach in solo picking gives, in the recording of more than average versatility. At full volume, it is rich and well-balanced. You can't be sure what the selection of the music selected by Dia becomes the key feature of the album.

Voices in Song . . . American Musical Theatre

Time 5/2003

Time Records has joined the other new outlets who are going in for the stereo separation that the major firms have never indulged in. I'm referring to the altogether desirable separation of signals that today's stereo cutters can manage in the record groove. It is their new philosophy of studio mike placement that has me wondering. There is a possibility that the newcomers are looking forward to wider acceptance of the compatible stereo disc proposed a few months ago in the Audio Fidelity catalogue. If the compatible stereo disc, rejected by the industry several years ago, the Design sampler record went for channel isolation to an alarming degree. I noticed that killing the left channel of the Design sampler during a recording littered the sound of the vocal solo. About five per cent of voice amplitude could be heard while the left channel was the right channel. Under such conditions of unorthodox separation, I daresay you could play this type of compatible disc for several months with a rusty nail file and still extract separate signals at the end of that time with any stereo pickup. In the songs from the musical theatre recorded by Time Records in the disc under consideration, the well-trained Gene Lowel Choir was split into two sections. The four young ladies far on the right—the six men on the left. With Hol Mooney's orchestra in the background, each group has good clarity when heard by listening together. However, when the two halves becomes muddy. They also remain separated by a distance proportionate to the spacing of the speakers. The high tones sometimes die away even when the loudspeakers are only six to eight feet apart. This is the first regret because the show tunes—in addition to the inevitable stuff from Music Man, "My Fair Lady" and "Oklahoma" and other musical comedies such as Friendship from Cole Porter's "The Derry Was A Lady" and Tomorrow Mountain of the Eddington-Latouche show "Leg- gar's Holiday."
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Edward Tatlall Canby

1. THREE WAYS TO THREE SPEAKERS

Before he ended his work for me, my ex-assistant Ray Prohaska had been busy on and off for months on a masterly all-in-one triple-play speaker system for my New York apartment. It was a system whereby three different means of achieving three player channels out of two inputs were combined and could be put into operation, each of the three, by the simple expedient of pulling out batches of plugs and inserting different ones.

These three systems were the result of my continuing curiosity as to the various means by which a practical three-speaker system might be set up in component form. I chose these three as being of fairly equal interest as well as of considerable diversity; Ray worked up the circuitry, checked the phasing and figured the probable and theoretical results we should get (as opposed to the actual, upon which we kept all our twenty fingers crossed) and, most important, he made the actual physical hook-ups for me, that gave form and substance to the fine theories.

Ray's enthusiasm sometimes carried him farther than I could have imagined. In this triple-threat installation, he made use literally of dozens of plugs and sockets on the various required speaker-amplifier connections (including a pair of remote-control phase-switch inserts for safety, one for the center speaker and another for one of the side speakers). When he had done, most of my floating supply of cables, connectors, and the like, were tied up in the system, the circuit and arrangements of several amplifiers had sprouted an appalling forest of female sockets—8-ohm, 4-ohm, 16-ohm—all screwed onto the terminals one on top of another; into the mire connect- ing plugs, variously for the three differing systems, all neatly polarized along with the females (but oh! how often do we still end up with a mysteriously reversed phase ... ) and the pay-off, the whole batch was marked cryptically as to function. Once put together, the system of course had to be marked up for reference—but how?

Round and about the plugs was an imposing tangle of brown shrubbery, the connective cables, and it was worth your life to trace any one of them from end to end; maybe Ray had the whole thing memorized by that time, but he did at least conceive of the idea of labeling the plugs and sockets via little loops of masking tape, marked with semi-legible letters and numbers, LA, RB and the like, which told him which speaker, which amplifier was involved. Fine idea, as of that particular moment—for him.

It worked, too, this triple system. If I remember rightly (I can't believe it now), we spent one entire evening during which I sat and listened, while he plugged and unplugged demonstrating each of our three-speaker arrangements in turn, one after the other with only minutes and a couple of phasing confusions between. Terrific! But he didn't even try to explain the plug-gings to me, that time.

Then, alas, Ray left. And about a week later I suddenly needed a stereo amplifier, quickly, to use in the field, and there was nothing to do but commit the ultimate in mayhem, grab dozens of plugs and cables, pull them all out and make off with the amplifier—which I did. To be sure, I made a feeble attempt to help myself later on: maybe I should put colored tape, red tape and blue tape and green tape, around the various matching connections as they oper- ating, in case I couldn't figure out the LA and A2 codes. So I stuck a lot of bits on tape, here and there, and hoped for the best, and in moments the whole thing was an unplugged shambles.

You can guess the rest. Some time many moons later I finally took a long, hard look at the remains of Ray's plug-together system, with a view to reconstruction. Not a chance! Ray, after all, unscrewed the whole forest of plugs and sockets, put all the connecting cords back on the shelf and left a note to my new assistant. Begin all over again and set things up, for one—just one—of the three-speaker arrange- ments. That'll be plenty to begin with, thank you.

Fortunately, though, Ray did leave me a fine sheaf of diagrams and layout patterns, most of which bore the label I really thought I understood. I even put a few helpful re- marks of my own on the margins—luckily, as I now see, I still have these diagrams and I did hear all three systems; I proved to myself that they did, indeed, work out, and heard also that there was no little dif- ference between them on actual musical comparison that I decided instantly I would leave all matters of possible dis- tortions to others and go no further than to reassure myself that I could, in fact, enjoy three-speaker stereo by any one of the three. That's what was important, as far as I was concerned.

I might interpolate here, for those who haven't read their back-issues, that last year to my surprise I found that what we were then innocently calling "three-chan- nel" home stereo reproduction was under certain conditions a decidedly workable and useful adjunct to the straight two-way ar- rangement.

In one of my regular listening spots, to be sure, "three-speaker" was unnecessary and, indeed, impractical; two speakers flanking a fireplace and an excellent listen- ing room combine there to give me all I need out of two speakers; there's no place for the third, anyhow. But in the other place, my eccentically shaped New York apartment, the three-speaker set-up (all three systems made for a decided im- provement in a rather bad listening situation. My two regular speakers, there, are placed at either end of a grand piano (the only possible location, as found by experiment) and at best are considera- bly too far apart.

There, the center speaker and its volume could give me a much more natural and useful spread of sound, plus a flexibility, via the volume control, that deals usefully with differing types of stereo material. I'm making a permanent set-up of it—as per- manent as any in my slightly unstable listening arrangements.

I've been studying those diagrams hard and, with some trepidation I hereby de- scribe the three ways in which we achieved useful center-speaker sound derived from the two regular stereo channels at the stereo amplifiers input. I remember all too well the simple-minded pitting of confusion into which Ray and I fell a second time, in respect to the actual workings of these circuits. (Especially do I remember a long session on the concept of "positive-going" and "negative-going," used to describe an instant of theoretical signal amounting to a half-wave and theoretically helpful in straightening out which parts of the cir- cuits—and the speakers—went which way simultaneously, given identical inputs.) It's all so utterly simple, this kind of thinking, that like many a great simplicity, the truth has a way of avoiding your finest efforts, and it's a little hard to admit to frequent moment and ditherhood, just when I thought all was clear.

Hence Ray's passel of diagrams, done up to convince himself as well as me; hence his elaborately simple set of battery analy- logies, using single cells as on-paper gen- erators of theoretical positive-going or negative-going signals.

"Pilot"

One of these systems I have already de- scribed at some length, and a technical paper appeared in this magazine on it awhile before that—what I called it the "Pilot" system because of that company's use of the principle, but we set it up in our own way, Pilotless, just to be objective. This three-speaker method is excellent—if it happens to work out with your particular amplifier (or if the amplifier is deliberately designed for it), but can get you into technical pickles in respect to amplifier performance. We were lucky, or Ray was cagey; the small Eico CSPA stereo amplifier that we altered to operate "Pilot" didn't show any noticeable change of response or installability.

This "Pilot" system involves some fairly drastic internal modifications of the stereo amplifier circuit and it is, therefore, the method recommended to the uninitiate—the guy like me, minus my assistant. If you buy it ready-made, fine, but handy. If you try it on your own amplifier, be sure you know your business, and have testing equipment on hand, to find out what's happening.

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Fig. 2

The diagram shows a circuit for the Continental '400' tape recorder, including amplifiers and associated components.

associated trouble. (We had none.) Our new center tap was at the original 4-ohm point; the central speaker took off from the original "0" on one amplifier, now become ~-4 ohms, and from the 16-ohm tap on the other, which would be +4 ohms. Net result, if you follow me, was a 16-ohm output of A plus B. The side speakers tapped from the ex-16-ohm (now +4) points on each amplifier to the ex-zero, as above now ~-4, the result being again 16 ohms of channel A and channel B respectively. Clear as mud, isn't it?

It works very nicely, once your amplifiers themselves have been checked out as OK in this new and slightly dizzily output arrangement. The feedback complications are strictly for the experienced pro to solve—if he can.

I note that in the "Pilot" battery analogy set up by Ray (Fig. 2), 3 volts into each channel measures three volts at each of the three speakers—i.e., the center speaker volume is the same as that of the outside speakers, given an equal signal. In practice, I've found, the center speaker should be cut down considerably below the outside pair for most stereo sound. Too much center volume weakens the stereo effect, tends to blend it into plain mono-in-the-middle.

EV ST-1

One of our three systems was commercial—an Electro-Voice transformer that takes the partial output of one amplifier and passes it on, 1:1 but isolated, in reversed phase as shown in Fig. 3. This is a tricky
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(Continued on page 83)
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DEPARTMENT OF CONFUSION

With practically everyone in the radio-phonograph business building stuff which he labels "stereo" and touting it by advertising in the public prints in words which imply that reproduction is superb, the average listener does not know which way to turn. "Should I buy 'hi-fi' or stereo?" seems to be the important question.

We have long felt that the high fidelity industry as a whole has erred in putting too much stress on stereo and not enough on high fidelity. Any $29.95 phonograph may be labeled "stereo," and no one will raise questions about it. But when a unit of the same quality is called "hi-fi," then someone is likely to raise an eyebrow or two, at least.

Without question, there are some good "stereo" sets available that are not assembled from components. However, most of them seem to put the two speakers in a cabinet with a spacing not exceeding three feet which makes the listener sit about the same distance from the cabinet as he would have to with a five-inch television set. Under normal listening conditions, there is no stereo effect at all.

We do not mean, by all this, to imply that it is not possible to obtain good stereo reproduction from a single cabinet—provided the cabinet is designed for that purpose. There are some very good single-cabinet stereo speakers on the market, and in certain rooms they are even better than the conventional pair of loudspeakers at a spacing of, say, six to ten feet. We are only referring to those units which may have an over-all length of four feet, with the speakers both facing forward, or nearly so, with a spacing of less than four feet. At normal listening distances, there is no dimensional quality to the reproduction at all.

All of which leads us to another word—dimensional reproduction. We suggested this possibility to Abraham Schwartzman, Executive Secretary of the Institute of High Fidelity Manufacturers, and his opinion was that it was likely to add more confusion to an already confused picture. Particularly since we now have reverberation, exhibited in depth at the recent meeting of the National Association of Music Merchants in Chicago. Hi-fi, stereo, component high fidelity, reverberation, and now Dimensional Sound—and we use the latter to specify a form of reproduction where the stereo effect is readily apparent. It is a suggestion, however, and we submit it for what it is worth.

One other item along these lines has long engaged our attention. We believe firmly that if a person can see two loudspeakers, he can hear two. In many of the larger cabinets which house two speaker systems, there will be a grille cloth over each one separately, with—a blank wooden panel between. In discussing this with one manufacturer and pointing out our belief, he explained that people like the two-speaker visibility because they want other people to know that they have stereo—the "status symbol" at work again.

No matter what other people want, this observer would prefer to have two well-spaced speakers behind a single grille so the actual location of the speakers was not readily apparent. That will give the best stereo illusion, in our opinion.

HIGH FIDELITY SHOWS

Only a month away is the New York High Fidelity Show—to be held in the N. Y. Trade Show Building. Over 100 American and foreign exhibits will be unveiled at 4:00 p.m. on September 7. As the time approaches we begin to anticipate the excitement of the annual event—we actually enjoy them.

In addition to the usual demonstrations with which we are all familiar, two exhibitors have planned some unusual features. Acoustic Research is staging a series of Tape vs. Recorded concerts in which the internationally famous Fine Arts Quartet will be compared directly with recordings of their playing. The sound of the actual instruments and the sound of the stereo playback system will be switched back and forth instantaneously, without losing the musical beat. These concerts are to be held four times each day (except Sunday, when there will be only two) in the New Orleans Room of Hotel New Yorker, just across the street from the Trade Show Building. The Quartet will play selections from Tchaikovsky, Bartok, and other composers.

Another interesting feature is the McIntosh Maintenance Clinic, which will be held in room 606 of the Trade Show Building. All McIntosh owners are invited to bring in their equipment for check and adjustment by factory technicians—absolutely free. There is no charge for parts or labor, and each unit will be checked thoroughly and put into brand-new condition. Visitors to the show may bring their equipment in and leave it while they are enjoying the four floors of exhibits, and on the way out they can pick it up in a completely new condition.

THE CHICAGO SHOW

While not everyone will be able to attend the New York High Fidelity Show, those who live in the Midwest may well plan on seeing the Chicago High Fidelity-Home Entertainment Show at the Palmer House, September 23-25. In addition to the usual exhibits, this show will feature a full-time FM broadcast all three days of the show. Station WXFM, Chicago, will set up broadcasting facilities at the show and will interview exhibitors both live and by tape during the show hours, with advance interviews being presented for some two weeks before the opening day. Exhibitors will be invited to discuss their own products, interior decorators will take part in discussions on how hi-fi stereo equipment can be placed to best advantage in the home, and visitors to the show will be interviewed and invited to view the broadcasts.

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"Without speculation there is no good and original observation"
—Charles Darwin, naturalist

Man's search for scientific knowledge and understanding has its taproots in the above thought expressed by Darwin in a letter to his distinguished contemporary, Alfred Russell Wallace, in 1857.

Speculation—intuitive contemplation guided by past discoveries—led Darwin to his famous observations set forth in Origin of Species. Similarly, it led Alexander Graham Bell to the invention of the telephone—and has since led to many major advances in electrical communications.

At Bell Telephone Laboratories, the puzzling flow of current in semiconductors provoked speculation which yielded the transistor—and a Nobel Prize. Speculation about the behavior of the electron led to experimental proof of its wave nature—and another Nobel Prize. "Brains" capable of guiding missiles and space probes first took form in the bold speculations of Bell Laboratories scientists.

Today, Bell Laboratories scientists and engineers are more keenly aware than ever of the importance of speculative thinking. The far-reaching scientific and technological developments of tomorrow are already the subject of advanced research. Among them are radically new materials and devices—basically new switching systems, transmission via satellites, and waveguide networks able to carry hundreds of thousands of voices simultaneously.

Through informed speculation about Nature's laws, Bell Laboratories will continue to search for the "good and original observations" which are so vital to the ever-improving Bell Telephone System.
Microphone Calibration

The author describes a system for calibrating microphones that does not require the use of a previously calibrated standard. No expensive equipment is required, making the system attractive to the audio enthusiast.

DAN PETERS*

You would certainly consider a man foolish if he spent several hundred dollars for a fine suit without having this suit properly fitted. Yet, many hi-fi enthusiasts perform a comparable act by spending considerable sums of money for audio equipment and never "fit" the system to its environment.

By the use of test records, and low-cost test equipment kits, the serious enthusiast has at his disposal economical means to adjust a system properly right up to the amplifier output. However, the loudspeaker, and the acoustic path between it and the listener's ear, generally go without quantitative measurements of any type. Instead, discussions of loudspeaker performance rely upon such vague descriptions as wide-range, boomy, vibrant, and so on.

Perhaps audio enthusiasts do not perform accurate checks upon loudspeakers and enclosures because such measurements require a calibrated microphone. Calibrated microphones are expensive, and the expense is hard to justify, considering the few times that they are necessary. It shall be the purpose of this article to describe a method of calibrating any microphone for use as a standard during frequency-response checks.

An expensive microphone is not necessary. In fact, in lieu of a microphone, a small loudspeaker will serve nicely. The irregularities in the frequency response are not important, since the calibration curve will indicate their location and magnitude, thereby enabling the proper allowance to be made.

The method used, the reciprocity principle, was described in a book entitled "Theory of Sound," by Lord Rayleigh in 1877; and apparently was not new then. In applying the principle to microphone calibration; two loudspeakers, one of which must be reversible, and the microphone to be calibrated are employed. The first step consists of setting up the equipment as shown in Fig. 1. Loudspeaker $L_A$ serves simply as a sound source. The loudspeaker of your sound system provides a convenient $L_A$, being already connected to an amplifier. The reversible loudspeaker $L_B$ and the microphone $M$, whose calibration is desired, are placed in juxtaposition a distance $d$ in front of $L_A$. Set distance $d$ the same as your intended test microphone-to-loudspeaker spacing, because the low-frequency response of many microphones will vary with the distance from the sound source. The distance will depend upon the information desired from the loudspeaker tests to follow. A microphone-to-speaker spacing of less than two feet will help to exclude the effect of room acoustics, while greater spacings provide a measure of effect of the room characteristics. Locate the microphone with its axis coincident with the axis of the sound source since the high-frequency response of most microphones changes for different angles of incidence.

Feeding an audio tone into $L_A$ will result in a sound pressure $p_o$ at $M$ and $L_B$ thereby generating open circuit voltages, $e_m$ and $e_e$, respectively. Measure and record these voltages at each frequency of interest, either by the use of a millivoltmeter, or by an audio amplifier followed by an a.c. voltmeter. If you make all measurements with the same meter, the frequency response and accuracy of the measuring instruments will not affect the results. Use sufficient signal into $L_A$ to mask any background noise, but keep the amplitude low enough to avoid overloading it. Otherwise the harmonics will give erroneous results.

Next, connect the equipment as shown in Fig. 2. Again supply power and measure voltages $e_m'$ and $e_e'$, using the same meter as used in the preceding steps. Actually, the current in $L_B$ is the quantity of interest and the 1-ohm resistor $R_I$ provides a 1-volt drop for every ampere of current, thereby allowing the use of the same voltmeter as used in the other measurements to make this measurement. Use a non-inductive resistor for $R_I$.

After completing the second set of measurements at the same frequencies as used in step 1 substitute the readings in the following formula to find the microphone sensitivity.

$$S_m = K\sqrt{\frac{e_m^2}{f_o e_e'^2}}$$

(Continued on page 79)

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* 171 Reservoir Drive, Boonton, N. J.
1.02 Cubic Feet and 45 cps.

A combination of design approaches makes it possible to achieve exceptionally good "listening" in an enclosure which is smaller than most of us would expect to be acceptable.

RICHARD SEQUERRA

In general the past ten or more years have given birth to at least a hundred articles describing revolutionary loudspeaker systems. Each one, we were told, was the harbinger of a new era in the reproduction of music. Even though there has been a constant improvement in the state of the art, and the aforementioned articles have been contemporary with the improvements, a great deal of confusion and question remains with the public at large.

Basically, these articles fall into two groups. The first is a product report, by the manufacturer, which establishes the technical validity of the loudspeaker system and supplements conventional advertising techniques. The second is the unusual application of acoustic principles by the home engineer or advanced audiofan, describing his own "one-of-a-kind" loudspeaker system. Both of these groups have been valuable to the high fidelity industry and I think that it is time to add a new dimension to these groups.

Let it be stated at the outset that in spite of any technical measurements and tests, (which in the writer's opinion show a design direction only), the yes or no judgment of any loudspeaker system is still subjective and it is suspected that all of the factors which determine preference are not yet known, while many that are known are not completely understood.

The prejudices involved in the Pilot PSV-3 loudspeaker system are as follows:

1. The frequency response of a loudspeaker system should be flat and completely free of any spurious noises or colorations.
2. The loudspeaker system should be capable of reproducing in the average-sized living room, 14 by 20 feet a 45-cps tone not more than 10 db down from the 1000-eps level.
3. The system should be capable of reproducing a sound pressure level of about 100 db three feet from the speaker when driven from a 10-watt amplifier. In this writer's opinion loudspeaker systems should work well from modest power amplifiers allowing adequate margin when used with the higher power amplifiers.
4. The loudspeaker system should be small enough to be placed anywhere, in any position, to allow for the maximum flexibility in loudspeaker placement.
5. Since these units are to be used in the living room, their styling and woodcraftsmanship must be in keeping with the finest in design and cabinetry.
6. The over-all sound quality must stand up under any reasonable A-B listening test comparison.
7. Lastly, the price must allow the use of these loudspeaker systems with even the most inexpensive stereo system.

The seven preceding points reflect the writer's opinion and judgment. Whenever possible, the PSV-3 was designed and developed with these points in mind.

Figure 1 shows the external appearance of the Pilot PSV-3 loudspeaker system. It measures 18 x 11 x 9 in. The wood paneling is 3/4-in. thick throughout, which completely eliminates cabinet vibration. The cabinet is finished in oiled walnut and the four corners have been given an unusual design treatment by cross veneering.

Figures 2, 3, and 4 show front, top, and back views of the speaker mounting module. Figure 2 shows a 6-in. midrange speaker which is front-surface mounted, and the 3 1/2-in. tweeter, which is front-
surface mounted coaxially with the 8-in. woofer. The edge roles of the midrange speaker have been especially treated to eliminate edge resonance. In Figs. 3 and 4 are shown the 8-in. woofer and the separate enclosure for the 6-in. midrange speaker. The components of the crossover network are mounted on the back of this compartment.

Figure 5 is a schematic of the electrical crossover network. The electrical networks are designed to work in conjunction with the acoustical mechanical crossovers which have the electrical characteristics of 12 db per octave, resulting in the frequency division shown in Fig. 6.

The combination works as follows: the low limit of the 8-in. woofer is set by its enclosed resonance. The high-frequency limit is set by the value of \( L \) and the mechanical crossover of the moving system. The low limit of the midrange speaker is set by the size of its enclosure and the value of the series capacitor. The upper frequency limit is set by the moving system mechanical crossover. The tweeter is the armoured type and its low limit is set by the enclosure and the value of the series capacitor. At the high-frequency end, the cone is designed to roll off smoothly from 16,000 eps up.

Development of the techniques of working out these electro-mechanical constants could not have been possible without the aid and cooperation of Mr. R. Shotterfield, Chief Engineer of Pilot Radio. This technique has been successful and is analogous to bandpass work at radio frequencies.

During the development of this system “white noise” testing was used extensively in eliminating spurious noises and colorations from this system. “White noise” is defined as an electrical wave whose spectrum is continuous and uniform as a function of frequency. Since “white noise” contains at one time all audio frequencies at equal amplitude when applied to a loudspeaker system, it shows up to the ear any peaks or holes in the response, as well as the on-off axis distribution of sound.

It is felt at Pilot that this test is the one that most corresponds to subjective evaluation, i.e., a loudspeaker system that sounds most uniform and peak free on “white noise” is the one that will be preferred in listening tests.

A word of explanation is necessary concerning the front surface mounting of the 6-in. midrange speaker and the 3½-in. tweeter. If these speakers are mounted behind a ¾-in.—or even a ¾-in.—panel, the defraction or scattering of sound twenty feet off axis is quite noticeable and tends to pin-point the sound at its source. However, when both are front-surface mounted, they have a wide open transparent quality with a greatly enlarged polar distribution.

The 8-in. woofer is a special unit which with a unique treatment is made to have a free-air resonance of less than 40 eps. When a woofer operates in a small closed-box baffle, the woofer produces rapid variations in the pressures of the enclosed air. The temperature of the gas rises when it is compressed and there is not enough time during the operation of the system for the heat to flow away. Hence, the apparent volume of the enclosure “looks” smaller to the speaker unit. However, when such an enclosure is filled with a soft, lightweight material such as orlon fluff, the heat is permitted to flow away because the speed of sound in the enclosure decreases from 344.8 meters per second to 292 meters per second. Therefore, the adiabatic or rapid compression characteristics are changed to isothermal or slow compression characteristics. This means that with orlon fluff the enclosure is made to "look" larger. The size of a small closed-box baffle determines the low-frequency system resonance—The larger the box, the lower the system response, the smaller the box, the higher.

An optimum enclosure may be made smaller and still keep identical acoustic characteristics by the use of orlon fluff. The low-frequency system resonance of this system is 66 eps with usable acoustic output down to 30 eps. The covering on the back of the 8-in. woofer is to prevent the orlon fluff from interfering with the speaker cone. The entire assembly is sealed.

We at Pilot feel that our design conditions have been met completely and the writer has personally carted two of the PSV-3 loudspeaker systems around, one under each arm, to give “on-the-spot” demonstrations. Up to this point, they have received unqualified raves in A-B listening tests by many hard-core professionals in the field.

![Fig. 3. Top view of the speaker panel to show the separate housing for the 6-in. midrange unit.](image)

![Fig. 4. Rear view of speaker panel. Cloth cover around woofer keeps orlon fluff filling from interfering with cone action.](image)

![Fig. 5. Schematic of electrical crossover networks.](image)

![Fig. 6. Approximate frequency responses of the electrical crossover networks.](image)
Start with Mono—Build up to Stereo

C. F. BARTON *

Although these suggestions come from a dealer and should be followed by every hi-fi specialist, they can be kept in mind by the individual who is planning a high fidelity system for himself.

While the trend of all advertising is directed towards selling Stereo, there are still many prospects who prefer to keep within their smaller budgets and be satisfied with monophonic installations. Our approach to these people is to sell a basic system with two speakers and a carefully selected group of components that will lend themselves readily to the later build-up into a quality stereo system. We keep in mind the cost of conversion to stereo and by careful selection minimize this cost when stereo is wanted. In this manner we still make a substantial sale and at the same time develop satisfied customers.

Custom cabinets are designed with additional component space for the later conversion to stereo, and the speakers are matched, with provision for expansion to three-way systems without rebuilding speaker enclosures.

Consideration is given to tape for the future, and in some instances it may be necessary to utilize the space presently provided for record storage. This is done to minimize size and cost of the components cabinet. Records and tape must of course be stored elsewhere. This is usually no great problem.

Frequently we incorporate the television chassis in the components cabinet and utilize the better sound qualities of the hi-fi system’s amplifier and speaker system. This reduces space requirements in the room and becomes a selling point especially appealing to the woman of the house.

As an example the custom built monophonic system shown is, at the present time, only a phonograph system with built-in TV. Space above the preamplifier is provided for a future FM tuner. Drawers are now installed in the space later to be used for a tape deck. Speaker enclosures are custom crafted to match the components cabinet, but are separate and can be placed elsewhere. However, as now placed they appear to be an integral part of the main cabinet. Provision is also made to increase the speaker system—at present a Bozak 207 in each cabinet—to a Bozak 302 system without any cutting or altering of the speaker enclosures. The Garrard RC88, with lift up top installation, is of course already wired for a stereo cartridge. The balance of the system is composed of a Leak TL50 Plus amplifier, and of course the Leak Vari-Slope III matching preamplifier.

To expand to stereo it is only necessary to change to a stereo phono cartridge and replace the preamplifier, which if done within a reasonable period will have definite resale or trade-in value, and add another Leak TL50 Plus amplifier, which completes the system. Tape may then be added, or even before the change to stereo, as can the FM tuner.

This method of selling provides an opportunity for the dealer to make repeat sales. The customer expands the system as he has the necessary extra money, and can choose several different ways of doing it, depending upon the cost and available money to be invested. For example:

1. Speaker system expansion
2. Tuner added
3. Tape added
4. Finally, stereo completed with necessary amplifiers.

These steps of expansion are more readily sold later than at the time of the original sale, particularly if cost is a deciding factor. I believe firmly that too much emphasis can be placed on stereo when a lesser approach such as this will result in more sales of better-quality components. The end result is a better satisfied customer due to minimized service interruptions and lower initial investment by the customer.

(Continued on page 81)
BUYER'S GUIDE SECTION

Along about the first of September, the serious audio fan begins to think about his planned improvements—converting to stereo, adding a tape recorder, or whatever. So that he may have an advance glimpse of the new merchandise which will be available with the start of the traditional buying season, we present the Annual Buyer's Guide Section.

With nearly two hundred separate items, along with prices of many more items which are not described, the second Annual Buyer's Guide is considerably larger than last year's, and is—we believe—more complete. In most instances, a single product is described in each category from each manufacturer. In many cases, this may be the only product of that manufacturer. When the manufacturer offers a wide variety of items—as do, for example, those who make loudspeakers—it is obviously impractical to list everything. However, for complete data, it is suggested that the reader write the manufacturer directly—or to us—for specific information. Because of the large number of manufacturers represented in this section, they are not coded in the usual fashion on the Readers' Service Card. If the manufacturers of interest happens to advertise in this issue, you may use the card and encircle the corresponding number. If there is room, you may write the name of any non-advertisers on the card and mail it. We will forward them your requests for further information.

Any compilation of this type is subject to omissions and errors. Any manufacturer not herein represented may be considered to have (1), not been asked for information (our mistake); (2), the information was misplaced (ours again), or (3), he didn't send it (his). If we find enough such omissions, we shall try to fill in later. Since this is a catalog-type presentation, it must be pointed out that the statements made about the various products are the specifications as furnished by the manufacturer and are not the results of our own measurements or tests.

We are sincerely grateful for the co-operation given us by all the manufacturers represented and by their advertising agencies. Without their concerted help we could not have prepared this material. We trust you will find it interesting and informative throughout the year.

AMPLIFIERS AND PREAMPLIFIERS

ACRO
- **Stereo Preamp Kit**, Designed as a mate for the superb line of ACRO amplifiers, the ACRO Stereo Preamplifier is an extremely versatile unit which incorporates every essential stereo function. Evidencing the advanced design engineering incorporated in the amplifier line, this unit features a related circuit board and modular design which make construction simple and enjoyable. Controls are clearly shown and uncluttered and include a selective audible and scratch filter, a mike dive in, phasing switch, input level, individual bass and treble in each channel which provide 16 db of boost and 20 db of cut, an input selector with 8 inputs including FM multiples and tape head, an output selector with 7 modes which are indicated on 6 panel-light matrix, and a loudness contour switch. D.C. filament supply on all tubes plus carefull align bring the equivalent noise level down to 2 microvolts at the input grid on the low-level input. Harmonic distortion is less than 0.05% at 2.5 volts output; Intermodulation distortion is 0.1% at 1.5 volts output. Acro Products, 269 Shura Lane, Philadelphia 28, Pa. Price at $195.00 for the kit; factory wired, $115.50; self-powered kit, $170.00.

- **Stereo 20-20, 36-w ster amp kit** ..... $69.50
  Ultra-Lineat II, 60-w pwr amp kit ..... $79.50

ALTEC
- **Stereo Amplifier-Preamp Kit**. This latest addition to the Altec-Lansing line of high fidelity equipment, Model 355-A, is a complete amplifying system, embodying two 25-watt stereo channels which may be combined for 50-watt monophonic operation when desired. Among its features is a matrixing network for "three-channel" stereo. Circuitry includes feedback-type equalization plus feedback around all tubes for minimum distortion. All low-level tubes have d.c. on heaters. Fourteen inputs include two each for magnetic cartridge, ceramic cartridge, tape head, tape recorder, tuner, microphone, and auxil. Frequency response is 20 to 20,000 cps ± 1.0 db at 25-watts output; 10 to 30,000 cps ± 0.5 db at 10 watts. Harmonic distortion is less than 1.0 per cent. Tone controls are grided and provide 14 db of boost or cut at 60 and 10,000 cps. Rumble filter attenuates at the rate of 12 db/octave below 30 cps. Silicon rectifiers are used in power supply. Engineered to the professional standards of other Altec-Lansing equipment, the 355-A meets every criterion of the most discerning music lover. Altec-Lansing Corporation, 1510 B, Manchester Ave., Anaheim, Calif. User net price $225.00. 355A "Quartet" 20-w mono amp. ..... $110.00
350A 100 w mono amp ..... $170.00
240C Mono preamp ..... $147.00
345 60-w stereo amp ..... $270.00
445A Stereo preamp ..... $189.00

BOGEN-PRESTO
- **Stereo Preamplifier-Amplifier**. Literally a home music center, lacking only program source the Bogen-Presto AP-40 is designed to channel either stereo or monophonic program sources to several places in the home simultaneously. Further, two different program sources can be handled at the same time. An illuminated indicator panel instantly identifies the program sources and channels being used. The power amplifier provides 20 watts per channel for stereo use or 40 watts for monophonic operation. Featuring many engineering refinements the AP-40 has two non-position rotary selectors for handling inputs from FM, AM, Multiplex, Phonograph (mag.), Phonograph (wire or ceramic), Tape, TV, Aux. A Mono/Stereo switch permits the use of stereo cartridges with mono records. The Speaker Selector switches operate with a double set of output terminals so that program may be directed to local or remote speakers. In addition there is a variable Blend control, inde-

DE WALD
- **Thirty-Watt Stereo Amplifier**. Less than $100 in cost, the Model 1120-8 "Concerto" embodies a complete stereo control system and two power output channels with a combined continuous-power rating of 30 watts. Included are a full complement of controls to permit full flexibility of operation. Tape-monitoring and tape-output jacks permit direct tape recording with complete control of volume and

www.americanradiohistory.com
tone. Bass and treble controls are included for each channel. Fourteen input jacks mounted in the rear of the amplifier are isolated from each other so any or all of them may be used at any time without interference or signal loss. Hum level is .05 db below full output for either channel and intermodulation distortion is approximately 1% at 12 watts. Deluxe Radio Division of United Scientific Laboratories, Inc., 90-15 87th Ave., Long Island City, N. Y. User net price, $95.00.

DYNAKIT

* "Stereo 70" Power Amplifier Kit. This amplifier is designed to meet the needs of the discriminating listener for a moderate-power high-performance amplifier. Engineered for both stereophonic and monophonic operation, the Stereo 70 incorporates 35-watt channels which can be paralleled by means of a four-position switch to provide 70 watts of single-channel output. The high power capability and low internal impedance of the amplifiers provide excellent damping for all types of high fidelity speaker systems, including the low-efficiency types, without need for individual adjustments. Frequency response is 0.5 db from 10 to 40,000 cps; power response—20 to 200,000 cps without exceeding 1.0 per cent distortion within 1 db of rated output. Average construction time is about five hours. Dynaco Inc., 817 N. 41st St., Philadelphia 4, Pa. User net price; $295.00. Also available, a copy, $11.95.

EICO

* Low-Cost Stereo Amplifier Kit. This new Eico amplifier brings full stereo performance to even the most budget-minded music lover. It is engineered to provide true hi-fi quality at power levels which are adequate for driving high-efficiency speakers to concert volume. The Eico Amplifier employs a rotary tone and level controls to impart complete flexibility of operation. The Amplifier employs a miniature single-ganged tone control so that available gain, released by this type of control, is converted into distortion-reducing negative feedback. The problem of distortion, created where available gain is excessive for severe bass and treble boost, is thereby avoided. The feedback level around each power amplifier is 27 db, which results in intermodulation and harmonic distortion figures, taken at average listening levels, which fall well within high-fidelity standards. The channel controls are: input selector, mode, level, tone, and on-off. Five pairs of input jacks are provided for low- and high-gain program sources. A service selector switch permits parallel or separate operation of the left and right amplifiers for stereo or monophonic use, respectively. Exact engineering specifications were not available at press time. Eico Electronics Corp., 83-60 Northern Blvd., Long Island City, N. Y. User price, $560.00; factory wired, $650.00.

EMI

* Forty-Watt Stereo Amplifier. Designed to a performance standard far surpassing its compact size, the EMI Stereophone Model 50S is an integrated preamplifier/amplifier delivering 20 watts (peak) per channel with less than 0.1% total harmonic distortion at 1000 cps. Features a built-in calibrated volume control which can be used to achieve precise balance between master volume level to speakers, or to check the frequency response of the amplifier. A seven-position rotary control is provided for each channel to select inputs from turntable, microphone, tape head, H14A, 78, old LP, tape preamp. A function switch permits selection of normal or reverse stereo, monophonic through one channel or combined output of both, and left or right channel only. Four lights indicate the mode selected. Tone and volume controls are separate for each channel while the scratch and rumble filters operate for both channels. Operating with the CBT are the output power monitor switch and the 60-cps tone injection switch. There is a speaker phase switch plus an output jack for a sum signal which provides a tone audio signal to drive a third amplifier and speaker. Uses 34 db of negative feedback and has a nominal harmonic distortion of 0.2% at rated output. Distributed in United States by Scope Electronics Corp., 10 Columbus Circle, New York 19, N. Y. User net price, $267.00.

ERIC

* Stereo Amplifier-Preamplifier. The new Model 2199 stereo amplifier employs two pairs of EL84's in the output stage to provide outputs of 20 watts per channel, with dual-triode amplifier and phase splitter preceding the output stages. Another dual triode serves as the preamp control section providing for two gain stages. The low-level inputs and three high-level inputs for each channel. Separate tone controls are provided for each channel, and the unit is further equipped with a grounded low-impedance, balance control switch, and stereo reverse switch. Eric Engineering Company, 1823 Colorado Ave., Santa Monica, Calif.

FISHER

* Stereo Audio Center and 15-Watt Amplifier. Extreme versatility plus solid 18 watt per channel power characterize the Fisher X-1000 stereo master amplifier. In stereo operation the X-1000 can drive two speaker systems as well as center sum-signal amplifier and speaker. In monophonic operation inputs to either channel drive both amplifiers and speaker outputs. Separate input jacks: six for low level, eight for high level, four magnetic (phono cartridge or tape head), and two for ceramic, provide sufficient flexibility for almost any combination of stereo or monophonic operation. Three output jacks plus seven controls and switches—including independent bass and treble controls for each channel—providing a range of adjustment to satisfy the most critical ear. Harmonic distortion is 0.3% at full rated output and frequency response is within 1 db from 20 to 20,000 cps. Hum and noise is more than 90 db below full rated output and channel separation is better than 50 db.

GOMMERS

* Stereophonic Amplifier. The new Groms 36PG is a stereophonic monophonic preamplifier and 80-watt power amplifier all in one compact unit. Featuring ganged controls, two separate loudness controls, sum-signal speaker output, and four rectifiers, Frequency response is ±0.5 db, 20 to 20,000 cps down 3 db. Harmonic distortion is less than 1% at 1 watt. Intermodulation distortion is less than 0.5% for 15 watts (1000 cps) and intermodulation distortion in channel...
HARMAN-KARDON

- Stereo "Citation" Preamplifier and Amplifier. A new concept in滋生者, the Harman-Kardon Citation line spares no expense to achieve superb quality of music reproduction. Indeed, we believe that the Citation II power amplifier (southern California audience can now experience any amplifier in the class, kit or not. In any case the top models in this line of kits, designed by Stewart Hegeman, are not inexpensive—they are obvious proof of the quality of equipment that a music lover expects. These models are the Citation I stereo preamplifier and the Citation II 120-watt stereo power amplifier, both priced at $195.95 without enclosure. Utilizing the same design concept but reduced in scale and price are the Citation IV stereo preamplifier and the Citation V 80-watt stereo power amplifier both to become available this fall. To give some feeling for the quality of these units we will list some of the performance specifications for the Citation II. Power output is 120 watts, or 60 watts per channel. Harmonic distortion at rated output is 0.3% at 20,000 cps; intermodulation distortion less than 0.005% at 6000-12,000 cps. Non-linearity is less than ±1 db at 60 watts; 2-20,000 cps. Hum and noise are better than 90 db below 60 watts. Harman-Kardon Inc., 520 Main Street, Weatogue, New York. Price list for the price of Citation IV will be $119.95 and for the Citation V is $119.95, both without enclosure. Walnut enclosure for Citation I and IV, $29.95; metal enclosure for Citation II and V, $79.95.

HEATHKIT

- Fifty-Watt Stereo Amplifier Kit. The top model in the Heath line of stereo amplifier-pramp kits, the AA-50 provides excellent performance at modest cost. With five switch-selected inputs for each channel—two low-level and three high-level—plus an additional low-level input for monophonic magnetic cartridge, the AA-50 is flexible enough to accommodate a wide variety of equipment. A four-position function switch permits any monophonic source to be played through either channel or through both channels simultaneously. Standard features are: a stereo reverse switch, separate balance control, special separation of the high and low-frequency ranges provided by silicon diodes, and use of new low-voltage, high-current output tubes (6CW3/EL90) for reduced distortion. Power output is 50 watts per channel at 1% total harmonic distortion at 1000cps. Frequency response is 20 to 20,000 cps ± 3 db at rated output. Hum and noise, 70 db below rated output with volume at maximum position at high-level inputs: 50 db down at low-level inputs. Channel separation greater than 55 db at 1000 cps. Lafayette Electronics Mfg. Corp., 104-46 Dunkirk St., Jamaica 12, N. Y. User net price, $74.95.

LEAK

- Newly-Styled "Point One" Stereo Preamp. Impressive new styling enhances the appearance of the latest version of the well-known Leak "Point One" stereo preamplifier. Designed to match the new Leak 22B, this new front panel offers changeable color panels for both faceplate and knobs, enabling the user to choose from ten colors. A motorized rotatable plate is interchangeable with the present one, 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. There are five dual inputs for virtually any type of stereo, mono, or monophonic, including microphone, tape, and phonograph. Bass and treble controls permit boost and cut of 15 db at 20 and 15,000 cps, respectively. All controls are of the dual-ganged, single-throw type, operated on both channels simultaneously. Distortion is less than 0.1% at 1200-watt output. A balance control allows for a great difference in sensitivity between speakers. This new kit has been expressly matched to all Leak power amplifiers. Johnson Industries Corporation, 80 Shore Road, Fort Washington, N. Y. User net price, $139.95. Stér 50 80-watt amplifier $190.00, 20 20-watt amplifier $149.00.

McINTOSH

- Power Amplifier Kit. In addition to factory-built units, the 30-watt unity-coupled amplifier is now available in kit form. When completed, the amplifier is identical to the regular factory-built MC250. Output is 30 watts with a frequency range of 15 to 50,000 cps ± 0.5 db, or 20 to 30,000 cps ± 0.1 db. From 10 to 100,000 cps at 15 watts, the output is ± 1 db over the range. Harmonic distortion is stated as less than 0.5% at 30 watts, with 1M distortion below 0.5% and hum and noise 90 db or more below rated output. McIntosh Laboratory, Inc., 2 Chambers St., Binghamton, N. Y. User net price, $120.00.

LAFAYETTE

- 50-Watt Stereo Amplifier Kit. The new Lafayette KT-250A offers remarkable versatility and distinctive styling in a low cost unit. Featuring a unique separation control, switch-mounted volume/balance control, independent bass and treble controls for each channel, hollow tone switch, phase reversing switch, plus five pairs of inputs (three high-level, two low-level), this kit is tailor-made for tape recording and stereo/siun-signal stereo. Special circuit features are individual bias and balance controls, d.c. applied to all preamp and tone-control tubes for low-hum operation, hum balance control, excellent low-frequency response, and a built-in bias and balance regulation provided by silicon diodes, and use of new low-voltage, high-current output tubes (6CW3/EL90) for reduced distortion. Power output is 50 watts per channel at 1% total harmonic distortion at 1000 cps. Frequency response is 20 to 20,000 cps ± 3 db at rated output. Hum and noise, 70 db below rated output with volume at maximum position at high-level inputs: 50 db down at low-level inputs. Channel separation greater than 55 db at 1000 cps. Lafayette Electronics Mfg. Corp., 104-46 Dunkirk St., Jamaica 12, N. Y. User net price, $74.95.

KNOTH-KIT

- Knight-Kit 16-Watt Stereo Amplifier. Both economy and impressive performance are combined in the Knight-Kit 40-watt stereo amplifier, a complete preamplifier and power amplifier all in one single chassis. Two 20-watt channels may be paralleled for monophonic operation when desired. Frequency response is 15 to 35,000 cps ± 1.0 db at 10 watts output. In addition to offering all conventional features for 2-channel stereo, this unit provides a unique third, or "center channel" output which permits feeding full-range program material to a center speaker for eliminating or reducing the effects of the room. It is particularly recommended for feeding an extension speaker for mono-multiplex listeners. Bass and treble controls are individual and are capable of providing "wider" than ±1 db at 60 watts; 2-20,000 cps. Hum and noise, 70 db below rated output with volume at maximum position at high-level inputs: 50 db down at low-level inputs. Channel separation greater than 55 db at 1000 cps. Lafayette Electronics Mfg. Corp., 104-46 Dunkirk St., Jamaica 12, N. Y. User net price, $74.95.
balance control permits complete cutoff of extreme frequency response is 20 to 20,000 cps ± 0.5 db. Intermodulation and harmonic distortion are reduced to negligible levels. Hum is far below thermal noise. Nine panels regulate positioning of each panel is wired on top of the stereo panel. The Model 1, while not inexpensive, offers a measure of performance well in keeping with its price. Marnntz Company, 20-14 Broadway, Long Island City 6, N. Y. At net price, less cabinet which includes black mahogany, or walnut or blond. $31.00.

PACO

Stereo Preamplifier Kit. The Pace Model SA-40 consists of two 20-watt amplifiers, each with its own preamplifier control system, on a single chassis. It is mounted in an attractive gold and satin black case, with plastic panel to blend harmoniously with all decor. The amplifiers deliver a true 20 watts output per channel due largely to a well-regulated low-impedance power supply. There is no clipping even at sustained high

level passages. Distortion is kept to a minimum because of the unique main feedback circuit which eliminates phase-shifting components. In addition to all the standard controls and switches the Model SA-40 includes: two direct input jacks to limit the control of both record changer and manual turntable, switch permits choice between operation of additional speaker systems anywhere in the home, and Balance and Light and Balance-Left tone selector for enhanced stereo sound. Frequency response is 20 to 20,000 cps ± 1.5 db. Intermodulation and harmonic distortion are less than 0.1 % and 0.2 % per cent, respectively, at full rated output. The SA-40 is supplied with step-by-step assembly instructions and giant-size wiring diagrams to ensure easy and successful assembly. D.J. Electronics, Comerica Inc., 70-31 84th St., Glendale 27, N. Y. User net price, $79.95.

PILOT

20-Watt Stereo Control Center Amplifier. The Pilot 248 is a fine stereo phonographic amplifier (harmonic distortion 0.5% from 20 to 20,000 cps at rated power) combined in a versatile control center. A total of 14 inputs for mono-outputs and 7 pairs for stereo. Fifteen controls include a scratch filter, a rumble filter, and a three-position input switch. Pilot's Stereo-PLUS Curtain-of-sound, an additional speaker connection which can be used for an extra turntable or for monitoring in another room. Output is 30 watts power output per channel. Intermodulation distortion is 0.2 % and Frequency response is 20-20,000 cps. Each Pilot 248 comes in a box with a certificate showing final test values for that particular instrument. In all cases, brass and black styling. Pilot Radio Corporation, 23-06 50th Ave., Long Island City 1, N. Y. User net price, $249.50.

H. H. SCOTT

Dynamic Stereo Amplifier. A new 88-watt complete stereo amplifier, the H. H. Scott Model 572 features the patented Dynamic Rumble Suppressor and a new scale of level control. Also included are a phone receiver with both low-level inputs and three high-level inputs are provided for each channel. The amplifier also features a membrane input, and a diode output. SR1040, 40-watt stereo amplifier... $189.50 SR2051, 100-watt stereo amplifier... 183.60 SR534, 40-watt stereo power amp... 106.60

REALISTIC

40-Watt Stereo Amplifier. A new amplifier in the Realistic line, the Stereolype-40 delivers 40 conservatively rated watts monophonically, or 20 watts per channel for stereo. Distortion at full power is only 0.3% at 400 ohms; frequency response is 20-20,000 cps ± 1.5 db. Hum and noise is better than 50 db down for low-level inputs and 78 db down for high-level inputs, referred to 20 watts out. Eight controls and two switches on the front panel provide sufficient flexibility to accommodate almost any program source. In addition there is a hum-adjust control on the rear panel. Comes complete with attractively styled gold-finish metal cabinet, trimmed in maroon and white. Radio Shack Corporation, 270 Commonwealth Ave., Boston 17, Mass. User net price, $78.50.

SARGENT-RAYMENT

168-Watt Stereo Control Amplifier. Designed for extreme audiophiles in operation, the S.R. 2001 features specially designed push-button switches which eliminate the need for the complex mode switch used on most stereo preamps. Included in the total of 12 push-buttons are switches for rumble and scratch filter, tape monitor, stereo/reverse, and loudness. In addition to the position there are individual bass and treble controls for each channel, a stereo channel-separation control, a no longer necessary. With stereo, rumble again becomes a problem, and here its re-introduction in this unit. The suppressor operates only when notes or in extremely soft passages where rumble becomes a nuisance. In loud passages the intensity of the rumble is reduced. Utilizing massive, 24-pound output transformers with 6CA7/PL45 output tubes. The 2020D has a power rating of 88 watts, or 44 watts per channel. Total harmonic distortion is only 0.2% and power bandwidth is down to 20 cps. H. H. Scott, Inc., 112 Powelltown Road, Maynard, Mass. User net price, $289.05.

2998, 50-w stereo amp... $209.95 2228, 30-w stereo amp... 144.95

SHELL

24-Watt Stereo Control Amplifier. A complete amplifier with a built-in two-stage filter, the Shell 2020D "Manhasset" features visual balance of the stereo channels by an electronic "eye" tube. Located on the front panel, with individual channel balance controls nearby, the "eye" permits precise dynamic balancing of the input signals. In addition a built-in signal generator provides a reference voltage for balancing. The "eye" is also useful as a monitor for recording. Controls are also provided for selecting mode, loudness control, monophonic channel 1, channel 2, or combined, and rumble filter. Bass and treble controls are separate within each channel. Power output is 40 watts, or 20 watts for each channel with individual regulation. Distortion at 20 watts, 20% harmonic distortion is less than 12% between 20 and 10,000 cps. Frequency response is 30 to 20,000 cps. Audio Limited output is 2 db. Volume control is used with a stability margin of 15 db. Hum and noise are down 80 db at the tuner and auxiliary inputs. 65 db at the tape inputs. The 2020D is a unique, low-priced instrument. Shell Electronics Mfg. Corp., 112 State St., Westbury, N. Y. User net price, $129.95.

SHERWOOD

16-Watt Basic Amplifier with Stereo Preamp. With the new S-4400, a person who now owns a basic amplifier of similar power capability or a mono amplifier-preamp can convert easily to stereo. This unit with its built-in control features essential to stereo operation, balance control, volume control, phase reverse switch, and function switch.

It also includes a presence-rise switch, phono level and rumble filters are "notch" type. Outputs include jack for sum-signal output, and separate outputs from each channel for tape recording. Power output is 20 watts total, or 50 watts to 8 ohms for two channels. Total harmonic distortion is 0.5%. The power output is 20 watts per channel. Distortion Frequency response is 20 to 20,000 cps plus 18 db at 20,000 cps. Select the channel desired by the output. In keeping with the design concept, eliminating phase shift and preserving signal integrity is the function of the amplifier. The S-4400 may be used with any other preamplifier for the second channel. It is also possible to use low-level inputs and three high-level inputs are provided for each channel. The amplifier also features a membrane input, and a diode output. SR1040, 40-watt stereo amplifier... $189.50 SR2051, 100-watt stereo amplifier... 183.60 SR534, 40-watt stereo power amp... 106.60

S-360, 36-w basic amp... $59.50

STROMBERG-CARLSON

64-Watt Stereo Control Amplifier. Stromberg-Carlson Model ASR-5 features a versatile amplifier which can be used for telephone, speakerphone, and direct input, and has been "human-engineered" for use by the less technical user. A built-in microphone, switch operation, enables switching controls provide flexibility to delight the most discriminating audiophile. Indicator lights show the program source in use. Each channel has a cutoff of 20,000 cps as a harmonic distortion...
of 0.9%. Intermodulation distortion is 1% at 20 watts. Frequency response is 10 to 20,000 cps. The exclusive "output in 0.5-cm signal" permits brightness and contrast control while maintaining the overall balance." 

...included the photograph of Altec, Kenmore, and others (Note: Rochester, N.Y.) Each channel has a high-pass filter. The discriminator, line preamp, and complete isolation between the tuner and amplifier are standard. The frequency response is 30-20,000 cps. Power consumption is 2.5 watts. 

The tuner controls are essential for selecting and detuning the AF circuits of two stages. The discriminator converts the a.f.c. into a 40-microvolt level. The output of the discriminator is fed into the second stage, which amplifies the signal. The discriminator is followed by a tuned circuit to select the desired channel.

The tuner is housed in a black, molded plastic case. The panel is marked "AM-FM" and "Stereo." The unit is designed for home use and is easy to install. The tuner is easily installed and can be used with any home audio system. The manual is included with the unit.

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**BOGEN-PRESTO**

- **Stereo Music Center.** The new Bogen-Presto Model HP-40 Stereo Receiver is a versatile combination stereo tuner, control center and 40-watt amplifier capable of channeling either mono or stereo broadcasts through several speakers in the home simultaneously. The tuners in the HP-40 are said to achieve a 1-microvolt sensitivity. The FM tuner uses a tuned r.f. stage, three-tuned l.f. circuits with two stages of amplification, dual limiters, and a detector, arranged to provide a predetermined level of interstation bussing and AVC on FM and AVC on AM. Separate tuning indicators provide a meter for each. The operation of the meter is as follows: The output of the tuner is fed into a discriminator, which converts the a.f.c. into a 40-microvolt level. The output of the discriminator is fed into the second stage, which amplifies the signal. The discriminator is followed by a tuned circuit to select the desired channel.

**DE WALD**

- **Stereo Tuner.** Most production-quality components are combined in the De Wald Model NT-1000-8. *Ambassador* FM AM stereo tuner. Included in the unit are the following: four-tube tuner and detector, with four stages of l.f. and five stages of r.f. Interstage coupling is 2.0 microvolts for 20-db quieting. Frequency response is 20 to 20,000 cps and bass level is 0.25% over the useful range.

**DYNAKIT**

- **FM Tuner Kit.** The Dynakit FM Tuner Kit is a complete printed circuit board for simple, virtual error-proof assembly by even the novice builder. Designed primarily for maximum linearity and stability, the Dynakit also maintains a tuned r.f. input utilizing a cathode-coupled triode triode amplifier. This provides 4-microvolt (FM) with excellent rejection of spurious signals and minimum cross-modulation. The l.f. coils are the same and can be assembled easily by simple peak methods, using the tuning eye to adjust the output. The use of mini- phase shift l.f.'s, wide-band detection, and linear design has led to a tuner of extremely low distortion. The intermodulation distortion is less than 0.25% of the normal range of operation and does not exceed 0.1% with a signal level as low as 10 microvolts.

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**FISHER**

- **Super-Sensitive FM Tuner.** Introduced by the Fisher Company as a "new" feature in their "G" series of radios, the Super-Sensitive FM Tuner is the latest addition to the Fisher line of radio receivers. According to Fisher, the tuner has a signal-to-noise ratio of 100 microvolt input, and distortion is less than 0.5% at full modulation. The wide-band detector, using a matched pair of germanium diodes, offers completely linear and distortion-free operation entirely free of hum. Instantaneous-sweeping dual dynamic limiters stages are highly effective on any signal, whether strong or weak, eliminating ignition interference and other noise elements. A Multiplexer Switch Control is included on the front panel, plus Main and M.S. channel positions on the selector switch; while power and electrical connections and spaces have been provided for simple plug-in installation of the Fisher.
Equalization

The fundamental facts about the elements which affect frequency response of tape recorders should be understood by any serious tape fan, along with the reasons for equalizing and the types of equalization required. Here they are—

HERMAN BURSTEIN

At various times in earlier articles we have touched upon the subject of equalization in tape recorders, for example in connection with frequency response, distortion, and signal-to-noise ratio. The purpose of the present article is to bring together the various aspects of the subject and present in one place a composite picture of this complex topic. Without an understanding of equalization the tape fan cannot have a full basic comprehension of the tape recorder.

Perhaps the best way to launch the discussion is to consider what the record-playback response of the tape recorder would be like if there were no frequency compensating circuits in it. A typical unequalized response curve appears in Fig. 1 for a machine operating at 7.5 ips, with bias current at a value normally used. The need for frequency-compensating circuits is instantly apparent, because in their absence there would be grave deficiencies both in bass and treble. In other words, bass boost and treble boost are needed.

The following discussion will deal with the factors responsible for the bass and treble losses; with losses that vary with wavelength and tape speed compared with those that vary purely with frequency; with the optimum location of compensating circuits as between record and playback; with the NAB equalization curve; with possible variations in equalization at a given speed; with changes in equalization as tape speed is changed; and with the basic types of equalization circuits employed (in elementary terms).

Record and Playback Losses

Following are the factors that account for the departure of the curve in Fig. 1 from flat response.

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Fig. 1. Unequalized record-playback response of tape recorder, 7.5 ips, .00025-in head gap.

Fig. 2. Output of an "ideal" playback head, assuming equal recorded flux on the tape at all frequencies.

1. Velocity Characteristic of the Playback Head. Assuming a tape is recorded so that it contains equal amounts of signal (magnetic flux) at all frequencies, the response of an ideal playback head would be as in Fig. 2, that is, rising steadily with frequency. A tape head is called a "velocity device" because its output depends upon how rapidly the magnetic field presented by the tape to the head changes, in other words upon the velocity of this field. The higher the frequency, the greater is the rate of change of the magnetic field on the tape—i.e., the more cycles there are per second—and therefore the greater is the output of the playback head. This accounts for the sloping portion of the left side of Fig. 1, which is a straight line. (The line is perfectly straight only in theory. In practice, the line tends to wiggle a bit (contour effect) at the very low end and to decline more than is shown (wrap effect) due to interactions between the tape and the entire head. However, the line is sufficiently close to straight to be described in that manner.)

The following factors account for the
The SONY/SUPERSCOPE commitment to perfection has led to revolutionary achievements in the audio electronics field. The STERECORDER 300, for example, is unquestionably the most versatile, perfectly performing stereo tape recorder on the market today.

The Sony-developed gold membrane in the C-37A Condenser Microphone is another example of Sony superiority.

The 262-SL sound-with-sound tape recorder at $199.50, the 262-D four track stereo recording and playback tape transport at $89.50, the 101 transistorized dual track monophonic recorder at $99.50, and the many other Sony/Superscope products are all remarkable achievements; the inevitable results of Sony/Superscope’s commitment to engineering perfection.

For literature, or the name of your nearest franchised dealer, write: Superscope, Inc., Dept. 2, Sun Valley, California.
sloping portion of the right side of Fig. 1.

2. **Demagnetization Loss in Recording.** When a signal is recorded on the tape, the magnetic particles of the coating arrange themselves to form the equivalent of small bar magnets along the length of the tape. Each such magnet has a south pole and a north pole. The higher the frequency, the larger the number of bar magnets formed in a given span of tape. That is, the shorter is each magnet. The north and south poles of a magnet tend to have a cancelling effect upon each other, and the closer the poles are to each other the greater is the cancelling effect, which is called demagnetization loss. Thus as frequency rises, demagnetization losses increase quite rapidly, resulting in treble losses such as shown in Fig. 3, based on a tape speed of 7.5 ips.

3. **Bias Erase in Recording.** Bias current, which is applied to the record head in order to reduce distortion and increase the amount of signal recorded on the tape, also causes this head to behave in the same manner, but to a lesser degree, as when the bias frequency current is applied (in much greater amount) to the erase head. In short, the record head behaves slightly as an erase head. The recorded frequencies most susceptible to erasure are the treble ones, because they do not penetrate the tape as deeply as the middle and low frequencies; that is, the high notes lie closer to the surface of the tape. The result is to produce a relative drop in treble response. Figure 4 shows typical treble loss at 7.5 ips due to the bias current normally employed at this speed.

4. **"Iron Losses" in the Record and Playback Heads.** The magnetic fields passing through the core of a tape head induce what are known as eddy currents in the head. Also, the core to an extent resists magnetization and demagnetization, this resistance being referred to as hysteresis. Both phenomena represent a dissipation of energy. This dissipation of energy increases with frequency, resulting in treble losses. However, in modern high-quality heads, the treble losses due to eddy currents and hysteresis—collectively termed iron losses—are quite small and often entirely negligible, perhaps 1 db or so at 15,000 cps.

5. **Gap Loss of the Playback Head.** The upper response limit of the playback head depends upon the width of its gap. The narrower the gap, the higher are the frequencies that the head is capable of reproducing at a given tape speed. Curve (A) in Fig. 5 shows the declining treble response at 7.5 ips for a playback head with a gap of .00025 in.) which used to be fairly standard. Curve (B) shows the virtually negligible loss at 7.5 ips with a modern head having a gap of 0.0009 in. On the other hand, even with a gap of .00009 in. there is a significant loss at 3.75 ips, as shown by Curve (C) in Fig. 5.

6. **Electrical Losses of the Playback Head.** The inductance of the playback head winding, together with capacitance across the head—capacitance of the winding itself, of the cable to the playback amplifier, and of the amplifier itself—can produce a significant drop in treble response, as illustrated in Fig. 6. Usually, however, in a well-constructed tape recorder the capacitances are kept low enough to avoid undesirable loss. Therefore it will be assumed in further discussion that treble loss due to this factor does not take place.

**Figure 7** presents a composite picture of the various losses described above. It may be seen that when the various losses are added up the final result is the unequalized response curve of Fig. 1.

**Wavelength Effect and Tape Speed**

The preceding description of losses that take place in recording and playback has been couched in terms of the
he loves the sound... ...she loves the style

The performance of the Medallion XII is incomparably smooth and musically rich throughout its phenomenal response range... virtually linear from 28 to 22,000 cps. This is skillfully accomplished by three outstanding loudspeaker components, all beautifully integrated within its precisely matched enclosure. Clean bass from the very threshold of feeling is reproduced by a special 12" high compliance woofer... the vital mid-range by a newly designed 8" cone speaker... the very highest frequencies by the fabulous new Sphericron Super Tweeter that actually reaches the supersonic range of 40,000 cps! And at your fingertips are network controls that assure perfect tonal balance whatever the acoustics of your room. Further, the highly efficient Medallion achieves ample output with any amplifier capable of delivering as little as ten clean watts.

YOU GET BOTH
with the new and excitingly different UNIVERSITY MEDALLION XII 3-way speaker system featuring the exclusive "Select-a-Style" snap-on grilles

The unique concept of Medallion XII cabinetry contributes still another important dimension to styling for sound... a choice of five distinctive grille styles: Contemporary, Colonial, Swedish Modern, French Provincial and Italian Provincial. Each grille is authentically interpreted, meticulously crafted and carefully hand-rubbed in a variety of glowing fine-furniture finishes. Simply "Select-a-Style" to match your decor... snap it on! It's that easy! Should your decorating scheme ever change, only the grille needs to be replaced. It's that economical! As for placement, the compact Medallion is so perfectly proportioned that it is equally handsome as either highboy or lowboy... whether you prefer it directly on the floor, or on its matching sculptured base. Here indeed is performance surpassed only by the Medallion paired for stereo!

FINISHES—Walnut, oiled walnut, fruitwood, mahogany. DIMENSIONS—24" x 17" x 28" d.
NET PRICES—System: $399.95. Grille: Contemporary, $99.95; Period, $149.95. Base: $149.95.
(Enclosure also available without speakers, finished or unfinished, and as a ready-to-assemble kit.)

Chair from Herman Miller.

For a truly exciting visual and aural treat, visit your University dealer. Or write for our latest high fidelity catalog containing the complete Medallion story. Desk R-5, University Loudspeakers, Inc., White Plains, N. Y.
A Division of Line-Altex Electronics, Inc.
The variation of the loss with frequency at a given tape speed. Actually, however, a number of these losses vary with the wavelength of the signal recorded on the tape—that is, with the distance along the tape occupied by one cycle of the audio signal. The shorter the wavelength, the greater is the loss. Inasmuch as the wavelength grows shorter as frequency rises, at a given tape speed, the loss also increases with rising frequency. On the other hand, if tape speed increases, which also increases the wavelength, the loss diminishes; and vice versa with a decrease in tape speed. We see, therefore, that the type of loss in question does not remain the same at a given frequency. The amount of loss depends on both the frequency and the tape speed.

Treble losses that vary with wavelength—that is, with frequency and tape speed—are (1) demagnetization loss in recording; (2) bias erase in recording; (3) gap loss of the playback head. On the other hand, the iron and electrical losses of the record and playback heads vary purely with frequency, regardless of the speed at which the tape machine is operating.

To make clear how treble losses vary with tape speed, Fig. 8 shows the unequalized record-playback response of a tape machine at 7.5 ips and at 15 ips. When the speed is doubled, a given wavelength represents a frequency twice as great, that is, an octave higher. Hence the treble loss that occurs at a given frequency at the lower speed occurs at twice that frequency at the higher speed.

All other things remaining the same, a doubling of tape speed can improve performance, so far as treble response is concerned, from fair to excellent. For example, it could extend the upper response limit from 8000 cps at 3.75 ips to 16,000 cps at 7.5 ips.

Figure 8 shows us two important things with respect to equalization requirements. (1) The lower the tape speed the greater is the required treble boost. (2) On the other hand, the lower the tape speed, the less is the required bass boost. It may be seen in Fig. 8 that the point at which bass boost should commence is an octave lower at 3.75 ips than at 7.5 ips. This fact should be kept in mind in later discussion.

**Location of Equalization Circuits**

The designer of a tape recorder has the choice of incorporating the necessary bass boost and treble boost in the record amplifier, in the playback amplifier, or in both. The proper choice is that which takes into account not only considerations of frequency response but also considerations of distortion and of signal-to-noise ratio. Sometimes economy becomes important enough a factor to alter the picture.

The most logical place for bass boost is in playback. At 7.5 ips, well over 30 db of bass equalization is needed to achieve flat response at this end of the audio spectrum. At lower speeds, the amounts of bass boost required are still in the vicinity of 20 db or higher. Such quantities of bass boost, if employed in recording, would greatly overload the tape and produce tremendous distortion.

On the other hand, a slight amount of bass boost in recording is usually tolerable, because in most music and speed there is a drop in audio energy at the very low end. Figure 9 shows a typical distribution of peak audio energy for an orchestra playing a typical symphonic composition. Hence it is desirable to taper off the playback bass boost at the extreme low end, and supply bass boost in this region in recording instead.

The most logical place for treble boost in recording. At 7.5 ips, over 20 db of treble boost is usually required to achieve flat response. As much or more is needed at lower tape speeds. If this were supplied in playback, it would inordinately accentuate tape hiss and noise of the playback amplifier. However, if considerable treble boost is used in recording, does this not overload the tape and cause distortion? The answer is that two factors permit substantial treble boost in recording before the overload point is reached. (1) As indicated in Fig. 9, there is a substantial drop in audio energy at the high end of the audio spectrum, offsetting the rise in recording level due to treble boost. (2) For the same amount of distortion, one
Fairchild Recording is proud to introduce the 440...a new precision turntable that is certain to set new standards for the serious record collector.

Based on the proven principles of the widely known Fairchild professional model 530G ($629.50) and the current 412-1 ($87.50), the 440 is truly a masterpiece. It combines famous Fairchild "know-how" in the field of superior electro-mechanical audio equipment with a design that is clean, modern and functional.

Note these exclusive features found in no other turntable even at much higher prices:

- Two speeds...33 1/3 and 45 RPM. Speed selected by automatic Push-Pull Selector; no belts to adjust, no "digging" under the chassis.
- Speed Sentinel Control permits speed variation of ±1 1/2% of specially selected Fairchild motor. Strobe disc supplied.
- Single endless belt drive that is self adjusting for proper belt tension. Thickness held to 2/10.000 of an inch by exclusive Fairchild process.
- Turntable platter is solid cast aluminum contoured for easy record handling. Main bearing is babbitt, rifle drilled for trouble free, noiseless operation.
- Handsome shock mounted walnut mounting board and matching walnut wrap-around...only $19.95.

Performance speaks for itself. Compare the graphic recordings made under identical test conditions of the Fairchild 440 and two competitively priced units. Note that wow and flutter of the Fairchild turntable is remarkably low—in fact, it exceeds professional NARTB standards by over 100%! Rumble, both vertical and lateral, is an impressive 56db below 7 cm/sec at 500 cycles. Unquestionably the new Fairchild 440 sets performance goals that make it the finest turntable in its class. See it, operate it. Your dealer will be pleased to demonstrate the precision Fairchild 440.

FAIRCHILD RECORDING EQUIPMENT CORPORATION
10-40 45th Avenue, Long Island City 1, N. Y.
provided equally between NAB in promise to recording excessive losses needed to compensate for gap loss and iron losses. The latter losses shall be compensated, if necessary, in playback.

NAB equalization does not provide for a specific record equalization (treble boost) curve. Instead, it simply states that record treble boost shall be such that, in conjunction with the playback equalization of Fig. 11, record-playback response shall fall within certain limits, as follows: flat within ±1 db between 100 and 7500 cps; not more than 1 db or 4 db down at 50 cps; and not more than 1 db up or 4 db down at 15,000 cps.

While the NAB standard does not provide for a specific equalization characteristic in recording, it does provide for a specific recording characteristic on the tape, assuming the signal fed into the tape recorder is of equal magnitude at all frequencies. This recording characteristic appears in Fig. 12. The characteristic of Fig. 12 and the playback equalization curve of Fig. 11 bear a complementary relationship to each other. That is, given one, the other can be deduced by allowing for the fact that output of the playback head rises 6 db per octave (per Fig. 2). Since it is much easier to measure playback equalization than the magnetic field on the tape, NAB equalization is stated as a playback equalization curve instead of in terms of the amount of magnetic flux to be recorded on the tape at each frequency.

NAB playback equalization was originally designated as a standard only for the 15 ips speed. However, with improvements in tape machines and in tapes, NAB equalization was also found practical at 7.5 ips, and by common acceptance it has become virtually standard for the latter speed as well. At speeds below 7.5 ips, it is desirable to employ less bass boost than specified by NAB. Thus at these lower speeds it is customary to find a similar playback bass boost curve, but commencing at a frequency that is substantially lower than in Fig. 11. At these lower speeds the principles of optimum equalization are followed for the most part, at least in the better tape recorders.

It would be possible for NAB equalization to be stated in terms of a specific recording equalization curve were it not for the following two factors: (1) At a given tape speed, the amount of bias current employed varies somewhat from one tape recorder to another. Accordingly, there is a variation in bias erase and in the amount of record treble boost that is needed. (2) Iron losses, if any, in the record head vary from one tape recorder to another. Since these are supposed to be compensated in the record amplifier, the amount of record treble boost that is required will vary from one tape machine to another.

In view of the fact that NAB equalization has been adopted for 7.5 ips, it becomes all the more difficult to prescribe a specific equalization characteristic for recording. At 7.5 ips the treble losses due to demagnetization and bias erase are much greater than at 15 ips, so that much more treble boost—at least 10 db more—is needed when recording at 7.5 ips than at 15 ips.

**Variations in Equalization at a Given Speed**

Referring to Fig. 1, it would appear that playback bass boost should start—i.e. attain a rise of 3 db—at about 1000 (Continued on page 71)
Late at night when your family as well as neighbors are fast asleep and if you want to enjoy music to your heart's content and do so with a booming sound coming out of your stereo, you are simply making yourself a nuisance to other people. Especially the dynamic sound of stereo penetrates far and wide, disturbing peaceful slumber of those already in bed. However to listen to music at almost inaudible sound renders even a splendid music entirely disappointing. This is, therefore, the very reason there have been persistent demands for a gadget that is capable of reproducing with excellent tone quality from low to high frequency ranges without becoming an annoyance to others.

STEREO-MIMMY, an earphone for stereo use, recently placed on the market by the PIONEER is a hi-fi earphone employing a specially designed speaker for the earpiece unit, and it has natural tone quality surpassing that of an ordinary hi-fi speaker. Particularly its low frequency characteristic is noteworthy, reproducing the low band better than a woofer of large caliber. Accordingly the above-mentioned difficulties are solved completely, and from now on you can enjoy all by yourself enchanting music to the fullest measure with that satisfying stereophonic feeling so familiar to every stereo enthusiast. In addition although conventional earphones have a common defect that they are apt to tire their users, the PIONEER's "STEREO-MIMMY" does not give a feeling of fatigue even after many hours' continuous use as it fits snugly into ear and is also very agreeable to the touch. It can be, of course, easily handled by a woman or a child. Besides stereophonic reproduction, "STEREO-MIMMY" has an extensive field of applications such as communications, monitoring reproduction equipments of all varieties, etc.

Model No. SE-1
Impedance 8-16 ohms
Frequency range 25-13,000 cps
Max. power input 0.5 watt
The distinguished components you see gathered here, under the Altec maestro's baton, are virtuosos in their field. Blending years of sound engineering skill with precision craftsmanship and devotion to quality, each Altec member performs in the highest tradition of high fidelity. When you add to your present equipment, converting to stereo, or building your own more advanced hi-fi system in mono or stereo, you cannot buy finer components and speakers nor achieve surer success than with components by Altec. Yet the costs are in remarkably reasonable range. Compare Altec advances and professional quality at your Altec dealer's. Altec offers you the most complete line of quality matched stereo and mono high fidelity components and systems in the world.

Components shown: Top row, left to right

4028 Bass Speaker, big speaker sound in compact 8" size. With controlled linear excursion. 14 watts power, 16 ohms impedance, 40-10,000 cycle range. 45 lb. magnet, 1.9 voice-coil diameter, 55 cycle resonant frequency, 3¾" deep. Weighs 12 lbs., 13 oz. $19.50

415 Biflex Full-range Speaker offers a guaranteed frequency range of 30-14,000 cycles. 25 watts power, 8 ohms impedance, 2.4 lb. magnet, 3" voice-coil diameter, maximum cone resonance of 45 cycles. 15¾" dia., 7" deep. Weighs about 20 lbs. $87.00

511B Sectoral Horn, smooth distribution at all frequencies. Use with 802D Driver, 500-cycle cross-over and 803B Speaker. LF cut-off: 500 cycles. 10¾" high, 23¾" wide, 18¾" deep. Weighs about 18 lbs. $39.60

412B Biflex Full-range Speaker, offering exceptionally smooth response over entire audible frequency range, in small size. Guaranteed range, 40-15,000 cycles, 20 watts power, 8 ohms impedance, 1.8 lb. magnet, 3" voice-coil diameter, maximum cone resonance of 50 cycles. 12¾" diameter, 5½" deep. Weighs about 14 lbs. $54.00

Bottom row, left to right

602C High Frequency Driver with tangential compliance delivers smooth response to 22,000 cycles. Power, 30 watts (nominal). Range: 500-22,000 cycles with N-500D network and 511B horn; or 800-22,000 cycles with N-800E network and 811B horn. 16 ohms impedance, 1.3 lb. magnet. 315° high, 4½" dia. Weighs about 8 lbs. $63.00

811B Sectoral Horn, for use with 802D driver and 800-cycle crossover, or to be combined with 803B bass speaker, or 415A Biflex. LF cutoff: 800 cycles. 800 to 22,000 cycle range, 90×45° distribution. 8½" high, 18½" wide, 14" deep. Weighs about 11 lbs. $30.00

755C Full-range Loudspeaker has new slim profile, ideal for built-in installations. Smooth response over audible range of 40-13,000 cycles. 15 watts power, 8 ohms impedance, 2" voice-coil diameter, 90° distribution. 8½" dia., 2½" deep. Weighs 3.75 lbs. $29.95

2000B High Frequency Speaker, a direct radiating tweeter with unique gap suspension. built-in cross-over network. 14 watts power, 8 ohms impedance, 1500-18,000 cycle range. 45 lb. magnet, 1.9 voice-coil diameter, 3¼" deep. Weighs 1 lb., 14 oz. $15.00

803B Bass Speaker, exceptional linearity over range of 30-1600 cycles. 20 watts power, 16 ohms impedance, 2.4 lb. magnet, 15¾" dia., 7" deep. Weighs about 19 lbs. $69.50

3000B High Frequency Compression Driver Speaker can be used to extend response of the Biflex to 22,000 cycles. 20 watts power, 8 ohms impedance, 3000-22,000 cycle range, 90×40° distribution. 3¾" high, 4½" wide, 4½" deep. Weighs about 1 lb. $42.00

Write for free catalogs: Address: Dept. AD-6D
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161 Sixth Avenue, New York 13, New York

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Big news of the year in microphones is Altec's recent introduction of a new concept in microphone design. From Altec's great experience in engineering and manufacturing broadcast equipment and extensive acoustical research, comes a breakthrough development which introduces notable improvements in microphone performance and styling. This unique design incorporates Altec's famous sintered bronze filter for unmatched protection against moisture, contaminants, and blast—and Altec's new rugged "golden" diaphragm with its remarkably smooth, wider response and output. Individual certified calibration curve chart is provided with models 684A and 685A. Make a comparison; it is convincing proof that—feature for feature—Altec offers the year's best value in microphones. True professional quality from Altec—the best you can buy, no matter what price you have in mind.

For more detailed technical information and specifications, write to Dept. ADM-2
HEATHKIT

**FM-AM Stereo Tuner Kit.** Outstanding features in both circuitry and styling in the PT-1, a 16-tube deluxe FM-AM combination. Includes: three circuit boards for easy construction and high stability; wired, prealigned 3-tube FM tuning unit; tuning meter; a.f.c. with on-off switch, and flywheel tuning. FM and AM circuits are separate and individually tuned.

Cathode-follower outputs with individual level controls are provided for both sections. Other features include variable AM bandwidth, 10-kc drop-in filter, i.f.-ended F.M. front end, FM a.g.c. and amplified a.c. for AM. Unique i.f. limiter design automatically provides the number of limiting and I.F. stages required for optimum rejection of weak or strong stations. Depending on signal strength anywhere from 2 I.F. stages to 5 I.F. stages may be automatically provided. FM sensitivity is 2.5 microvolts for 20-db quieting. Harmonic distortion is less than 0.1 percent. Frequency response is 20 to 20,000 cps ± 2 db on FM. A jack is provided for use of a multiple component tuner with virtually any receiver. Features: FM, AM, and tuning frequency 20,000 cps ± 1 db. Hum and noise with unmodulated 1000-microvolt signal is 65 db below full output. Audio output is 5 volts at 100% modulation for each channel. The dial is 10" long, calibrated every megacycle. High-dial ratio permits precise tuning. Muting controlled by switch on front panel. Twin audio channels give independent output signals for stereo. A third output is available—a non-de-emphasized detector output for use with any self-powered multiple amplifier. Karr Laboratories, Inc., 30 Meadow St., South Norwalk, Conn. User net price $139.95.

KARG

**Stereo F.M./A.M. Tuner.** A superior quality FM tuner with built-in protection against obsolescence, the Karg CT-2 is ready for multiplex FM with controls on the panel and special circuitry. Sensitivity of the i.f. is 1.5 microvolts for 30 db quieting.

**Stereo Tuner Kit.** Designed for flexibility, the Lafayette RT-200 stereo tuner kit fulfills virtually every function desired in a stereo receiver. Uses thoughtful circuitry at a moderate price. In addition, the kit makes in appearance the newly styled Leak "Point One" stereo preamplifier. Sensitivity of 1.5 microvolts for 20-db quieting makes practical the reception of FM stations on considerable distances. Cathode-follower output delivers 1.0 volt and facilitates the use of long output leads with negligible high-frequency attenuation. Automatic frequency control is included in the circuitry for drift-free tuning. A magic eye assures tuning of weak long-distance stations. A.f.c. of on-off, tuning, and local-distance chassis dimensions. Atna Corporation, 80 Shore Road, 2765. N. Y. User net price, less cabinet $149.00.

LEAK

**FM Tuner.** The new "Trough-Line II" tuner makes in appearance the newly styled Leak "Point One" stereo preamplifier. Sensitivity of 1.5 microvolts for 20-db quieting makes practical the reception of FM stations on considerable distances. Cathode-follower output delivers 1.0 volt and facilitates the use of long output leads with negligible high-frequency attenuation. Automatic frequency control is included in the circuitry for drift-free tuning. A magic eye assures tuning of weak long-distance stations. A.f.c. of on-off, tuning, and local-distance chassis dimensions. Atna Corporation, 80 Shore Road, 2765. N. Y. User net price, less cabinet $149.00.

MADISON-FIELDING

**Low-priced FM Tuner.** With high sensitivity—1.5 microvolts for 20 dB quieting—the 800M FM tuner features 30-kc bandwidth, an f.f. rejection of 65 db, a hum level 55 db below 100% modulation, and variable A.P.C. New type of dial uses a fixed indicator, with the dial scale moving behind it. The
Sensitivity is 1.5 microvolts for 20 db quieting and 10000 loaded with 1000 ohms.

Foster-Scooby FM tuner incorporates a separate stage before the final, and a Foster-Scooby discriminator.

The AM section utilizes a tuned f.r. stage, broadband tuned f.r. stage with a separate crystal diode detector, Sensitivity of the AM section is 50 microvolts per meter with a fer-rite loop. Frequency response of the FM section is 20 to 20000 c.p.s. ± 1 db; for the AM section 25 to 30000 c.p.s. ± 3 db. Distortion is respectively 0.3% and 0.5% at 80% modulation. Supplied in 2 cases, 600 watts, high quality, AM/FM tuner. $39.95

H. H. Scott

Wide Band FM Tuner. The H. H. Scott Model 514 is a new, moderately priced, FM tuner incorporating H. H. Scott's exclusive wide-band design. Sensitivity is 2.5 microvolts (1.5FM) with little distortion. The front end is silverplated and the chassis is copper bonded to aluminum in order to minimize circuit noise and to provide a high signal-to-noise ratio. Detector and limiter bandwidth are 2 megacycles. A multiplex output is pro-vided. The 514 is designed to match the appearance of H. H. Scott amplifiers such as the 222. An accessory speaker is available to match the 220. H. H. Scott, Inc., 111 Powdermill Rd., Maynard, Mass. User net price, $114.95.

SHERWOOD

FM/AM/HS Stereo Tuner. The Sherwood model S-2200 fulfills today's stereo requirements with separate reception of FM and AM anten-nas as well as on-board multiplexing of FM. Front panel controls and internal plug-in space are provided for a Sherwood model AMX multiplex plug-in adapter. Featuring a feature-packed set, Sherwood's model S-2200 is one of the most sensitive FM circuits ever developed. The new 20,000 c.p.s. FM sensitivity is 0.5 microvolts. This unusual sensitivity is 300% greater than practical beyond 160 miles. In addition, highly stable cell designed for main control, and Foster-Scooby type discriminators are preceded by the Scotchman, a minimum of distortion even with modulation over 100 per cent. The AM section features a selection of either a 15-kc wide "hi-fi" band-pass or a sharply selective 5-kc bandwidth for listening to weaker stations without noise and interference. A high-Q filter traps out 10-kc interstation whistles while reducing audio response less than 3 db at 8 kc. A multi-plex decoder is provided. The S-2200, 600 watts, power output, 20,000 c.p.s. within ± 0.5 db. Sherwood Electronics Laboratories, Inc., 4900 N. California Ave., Chicago 11, Ill. User net price, less case $175.50.

Sargent-Rayment

Stereo AM/FM Tuner and Control Center. A deluxe AM/FM tuner and control center, the SR-5000 offers every feature which could be imagined in an instrument. Sensitivity of 1.5 microvolts for 20 db quieting AM and 20 microvolts for 20,000 c.p.s. FM. Frequency response is ± 1 db, 20 to 20,000 c.p.s. Special steps taken to ensure the best are elimination of all power tubes and trans-formers. The front panel incorporates a high gain take-off from another unit or a separate power supply, and redesign of the front so that a diode mixer takes the place of a tube. The control center characteristics are exceeded only by SR-2000 stereo preamp. Sensitivity and controls being incorporated to give the most sensitive set. Distortion at 5 volts output is 0.5% intermodulation and 0.1% 2.5 kc bandwidth on high level input and 60 db below phonon chan-nels-

SHELL

FM Tuner. A sensitive fm tuner with low hum level. The Shell series 800 "Hampton" is a good value for the beginning enthusiast. FM sensitivity is 1.5 microvolts for 20 db quieting and hum level is 70 db below 1 volt output. A multiplex output is provided and multi-plex adapters are available. Frequency re-sponse is 20 to 20,000 c.p.s. ± 1 db. An electron power tube is provided for aid in tuning and AFC pull-in is 200 kc ± 15 kc with 1 volt at the detector. The edge-lighted side-dial unit is designed for easy reading. Four switches are provided including AF, def. output, defer, and multiplex. Shell Electronics Mfg., Corp., 112 State St., Westbury, N. Y. User net price. $75.95.

PILOT

80-Watt Stereophonic Receiver. The Pilot model 602 combines on a compact chassis a bi-amplifier circuit and a full AM/FM stereo receiver. Air is 80 watt stereophonic amplifier and a versatile control center. With the addition of speakers...
LOUDSPEAKERS AND SYSTEMS

ADVANCED ACOUSTICS

• Bi-Phonic Coupler. Radically different for a $40 Bi-Phonic Coupler is claimed to be an extension of the ancient practices of musical instrument design and construction. Musical instruments radiate low-frequency sounds from a flared, soundboard whose excursions are nowhere near the violent motion most speakers undergo to produce those noises. The Bi-Phonic Coupler emulates musical instruments by using a specially-designed, very free, 15-in. woofer and a sturdy wooden panel which is driven by a 20-pound magnet structure which is 7½-in. in diameter. Thus it can reproduce low notes with barely perceptible motion; achieving its maximum excursion intrans sistently so that hangover notes are eliminated. Being unobtrusive, the 40 produces a double-sided "Figure 8" radiation pattern extending on both sides of the board. Its 4½-inch depth simplifies the installation problem and lends itself to unusual placement—such as on the ceiling, on a wall, or even on a room divider. High frequencies are reproduced by a polar type, phenolic diaphragm tweeter. Frequency response is stated to be from 3 cps to beyond audibility and power handling capability 50 watts. Impedance 8 ohms. Available in mahogany, walnut, or ashed walnut. Advanced Acoustics Corp., 67 East Centre St., Nately 10, N. J. User net price, $134.50.

ACOUSTIC RESEARCH

• Low-Cost "Acoustic-Suspension" Speaker System with Super Tweeter. Selling for little over a hundred dollars, the AR-2a consists of an AR-2 speaker system in combination with a 1½-in. dome-type super-tweeter.

The AR-2 speaker system uses the AR patented acoustic-suspension principle in which a small enclosure provides improved rather than compromised reproduction quality. In the principle the woofer cone is mounted on very free suspensions, so compliant that they are unable to produce the usual radiation normally inherent in them. The missing elasticity is then restituted by the pneumatic spring formed by the air within the cabinet. The cone literally rides on air instead of on mechanical springs. The small enclosure size is necessary for optimum performance. The 1½-in. inch super-tweeter uses a very small, stiff, hemispherically shaped diaphragm as a direct radiator whose size is limited by the high treble range.

AR-2a is a 2-way speaker system consisting of a single 10-in. woofer, two 5-inch tweeters. Both units are in external appearance. Both are intended for bookshelf placement, and also may be used as floor units. Both systems use Audax "Parallels," speakers, a patented new design with many innovations, giving a sound quality which is smooth and even. Model ME-12 is available at $134.50. For AR-2a, $119.50.

Recommended for use with amplifiers having power output of 20 to 40 watts. Acoustic Research, Inc., 24 Thordike St., Cambridge.

ALTEC

• Economy Speaker System. The Monterey Jr. is a complete moderately-priced system without quality of reproduction equals that of some systems costing considerably more. A small ruggedly-built base reflex enclosure houses an Altec 4012 8-in. "controlled-linear-excursion" speaker. Impedance 8 ohms. Dimensions of the Monterey Jr. is stated by the manufacturer to be 20 x 18,000 cps, and power rating is 15 watts. Impedance is 8 ohms. A single 41, Mass. User net price mahogany or birch $122.00; unfinished price $100.00; walnut, cherry, or korina $128.00.

AR-1 full-range speaker system, mah... $127.00
AR-1W woofer only, mah... 145.00
AR-2 full-range speaker system, mah... 96.00
AR-2 full-range speaker system, walnut... 92.50
AR-3 full-range speaker system, walnut... 216.00
AR-31st-tweeter for AR-1... 35.00
AR-3 mid-range & super-tweeter for AR-1 or AR-1W... 92.00

Audiotech

• Wide-Range Speaker System. Although extremely compact, the AudioTech Model MB2 is a moderately-priced system whose excursion is of the order of those made for professional use. It consists of a 12-in. woofer and a 5-in. cone-type tweeter, which incorporates a special calibrated level control for high-frequency balance.

BOZAK

• Small Speaker System. The Spinet, a new, small speaker system has been introduced by Bozak to meet the needs of the "functionalist" who has a pronounced space problem. Measuring a compact 14 ½ x 23 ½ x 11 ½, it has a naturalness of response in its mid-range and treble which is compatible with the larger...

AUDAX

• Multi-Speaker Systems. Designed by George Nelson, one of the country's leading furniture and industrial designers, the new Audax speaker series brings a distinctive blend of beauty and functionality to component high fidelity. "The idea behind Audax speaker systems was to make it interesting, exciting furniture pieces, beautiful in appearance as well as sound," said Mr. Nelson. The Audax cabinets are finished on all four sides, to be used as wall units or free standing. Each model has definite legs and a new type of speaker grille, a three-dimensional "acoustic screen" which can be removed easily for cleaning. Model CA-80 contains two 8-in. intended-range speakers. Model CA-100 has two 10-in. woofers, plus two cone tweeters, both units are in external appearance. Both are intended for bookshelf placement, and also may be used as floor units. Both systems use Audax "Parallels" speakers, a patented new design with many innovations, giving a sound quality which is smooth and even. Model CA-80 is available at $134.50. For CA-100, $196.00.

Model ME12... $99.00
32A "Corona" corner spkr... 399.00
32A "Laguna" corner spkr... 329.00
60A Duplex 15" loudspeaker... 177.00

BRADFORD

• Compact Wide-Range Speaker Enclosure. The Bradford enclosure, made in four sizes for 8-, 10-, 12-, and 15-in. speakers, is only two inches larger than the speaker it contains. Its construction is based on a variable damping principle, in which speaker damping is varied automatically by a pressure relief valve in the rear of the cabinet. Operation of the valve is coordinated with cone excursion. This, in summation, is an "acoustic spring" acting uniformly over the entire rear surface of the cone. Boomyness and the effects of cabinet resonance are virtually eliminated. The Brad-

www.americanradiohistory.com
ford enclosure will enable the user to realize the potential of most any speaker, with or without a review.

The speaker is a coaxial type and features separate magnets for woofer and tweeter. This is to ensure complete absence of electromagnetic intermodulation. (Large signal current in the woofer voice coil can modulate the field in the tweeter voice coil.) The woofer cone is made of thick, soft paper so that it gives good performance up to its design limit of 2000 cps (crossover is 1700 cps) and falls off rapidly above that frequency. Its bass response is 32 cps and power handling capacity is 20 watts. The tweeter starts at the rest of the speaker, split at the beginning of the woofer cone, and terminates in two equal sections about 3 in. square which behave as two separate horns, giving excellent dispersion. It loads efficiently down to 1200 cps which is below crossover. The crossover is supplied with the New York 10. Frequency response of the speaker is 30-1500 cps. Manufactured in England and distributed in the United States by Gramercy Sound Associates.

**EICO**

- **5-Way Speaker System Semi-kit.** The EICO HFS-3 and HFS-4 provide extraordinarily pure reproduction of both bass and treble frequencies with an efficiency in an enclosure of only 2 1/2 cubic feet and average programs consisting of a 12" bellow-suspension woofer and an 8" closed back mid-range speaker. A 5 1/4" cone tweeter is supplied in the HFS-4 for those who prefer softer highs; a compression-driver horn tweeter is supplied in the HFS-3 for those who prefer more brilliance and projection in the higher frequencies. The HFS-3 and HFS-4 are identical. The impregnated cloth-bellow woofer surround underlies the influence of the bass reproduction. Built-in crossover networks (600 and 4000 cps) with a level control provided for the tweeter. The enclosure is tuned to 25 cps by a tubular ducted port. The tuned enclosure loads the woofer and reduces cone excursion and distortion in the 25 to 600 cps region. Phase-corrected terminals, frequency range 25 to 14,000 cps. Power handling capacity 20 watts; rated impedance 16 ohms. The cabinet is completely factory constructed (by EICO) from formica, plywood, and network. Available in walnut, mahogany, or unfin-ished birch. Electronic Instrument Co., 52-60 Northern Blvd., Long Island City 1, N. Y. Kit price HFS-3, mah $87.50; HFS-4, mah $98.50.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tr>
<td>HFS-2</td>
<td>$139.95</td>
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<tr>
<td>HFS-3 (speak)</td>
<td>$95.50</td>
</tr>
<tr>
<td>HFS-1, 2-way</td>
<td>$39.95</td>
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**ELECTRO-VOICE**

- **Thirty-Five Woofer.** This is the world's first mass-produced 30-in. loudspeaker. Engineered expressly for use in the well-known E.V. "National" T00. The Model 3002 is also highly recommended for use in custom installation equipment with a high input speaker fixture. It is a massive one-piece rigid casting which suits wide and 17-inches deep. Although these dimensions were chosen for the system's design function, as a studio monitor, it works out very well in a home. Three speakers are used in the column: a large elliptical cone woofer and two smaller units to cover mid- and high-frequencies. The axes of all speakers are vertically spaced 10 in. headroom, with further centering in the woofer. The voice coil is curved for start and for 10000 Hertz. It is intended to provide a high compliance plus high efficiency, and can be used with amplifiers rated at 15 and 20 watts. The unit contains a true piston formation cone. The cone in itself is revolutionary, being a one-piece bellows which is manufactured by a newly-developed injection-forming process. The 3002 is capable of reproducing bass for the range of 10 in. with earth-shaking reality. While these tones do not exist in pure form in commercially-recorded music, there are undertones and sub-harmonics in this area which add distinctly to realism in reproduction.

**FISHER**

- **Free-Plan Three-Speaker System.** Utilizing the unbalanced design of the Fisher XP-1, the new XP-2 is even more compact and easily out-performs many larger and larger-priced speakers. It offers high compliance plus high efficiency, and can be used with amplifiers rated as low as 16 watts. The unit contains two 8" woofers and one 5" tweeter, with a crossover set at 15000 Hertz. The cabinet is made of melamine-faced plywood. The box is sized to fit as a bookcase speaker. The system is made to order for stereo systems where space is at a premium. Fortunately this latest addition to the broad E.V. line of compact systems perform way beyond its minimal dimensions. Bass is delivered from a highly-compliant 12-in. woofer and a long-throw voice coil. Midrange and high frequencies are delivered by an 8-in. tweeter. The cabinet is designed to attain linear response over the required frequency range. The column is mounted on four large, concealed casters. Exclusive United States distributor, Scope Electronics Corp., 10 Columbus Circle, New York 10, N.Y. User net price, $525.00.

<table>
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<td>XP-1, 10-1/2&quot;</td>
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<tr>
<td>XP-1, aux spkr</td>
<td>$50.00</td>
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</tbody>
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**FRAZIER**

- **Compact Two-Way Speaker System.** The Monte Carlo is the newest and smallest Frazier twoway speaker system, is made to order for stereo. Measuring only 15%"w x 10%"d x 17%"h, it will sit poised in the window as a bookshelf type speaker, and it is the most economical of all Frazier models for starting a stereo sys-
HARLEY

- Compact Full-Range Speaker System. The Harley "Cnipri" comprises a full-range 10" speaker mounted in a handsome natural wood cabinet which measures 24" x 15 3/8" h x 12" d. The grill is made of bamboo, adding a note of distinction to the appearance. The driver is the new model 220 which is a paper polymerized adaptation of the model 230 chemical cone speaker. It has a 15,000-line needle, 8-ohm coil, one-piece molded plastic cone surround, large dome high-frequency propogator attached to the aluminum shorted-turn portion of the voice coil, which is in turn damped and separated from the wound portion of the coil by a polysiloxane coating. Harley Products Company, Inc., 921 E. 102nd St., New York, N. Y. User net price, $120.00.

- Wide-range Speaker System Kit. Taking a cue from the motion picture theater, the Heath "Legato" kit (model H7-2) features three-tier-type sound reproducers to produce the ultimate in listening realism. The system, a modified infinite baffle, uses two 10" Alto low-frequency drivers to cover frequencies from 25 to 20,000 cps. Alignment is attained through proper phasing of the high- and low-frequency drivers and using a well designed crossover network. Precisely determining the correct amount of phase shift permits transition to the high frequencies so smoothly that it cannot be measured. Power handling capacity of the system is 50 watts; voice-coil impedance is 16 ohms. Internal reflections are absorbed by the plywood back panel and a 3" lining of fiberglass. The African Mahogany enclosure emphasizes simplicity of line and form to blend with either modern or traditional settings. Health Company, Benton Harbor, Mich. User net price, $499.00.

- Air Coupled Speaker System. Economy and performance are main features of the I.H. "La Scala" Model LS-555. Using an air-core transformer of special design to match the impedance of the speaker to the amplifier also helps match the enclosure to the room. The result is sound which is hard to believe from a small speaker. The cabinet is a modest 9 x 9 x 16 inches and is handcrafted of genuine hardwoods—walnut, mahogany, or blond—and matching grille cloth. Frequency response is stated to be 50 to 15,000 cps. Power handling capability is 10 watts at an efficiency of 7% Impedance 4 ohms. I.H., Mfg. Co., Inc., 121 Greene Street, New York 12, N. Y. User net price, $34.00.

- Wide-Range Speaker System. The Z-400, an inexpensive wide-range speaker system, marks the first time that the well-known Janszen electrostatic tweeter has been available in a compact, shelf-mounted enclosure. In the Z-400...
The Z-400 is covered to the range from 20 to beyond 30,000 cps. The wide range of performance is uniformity and low distortion. Tweeter and woofer are integrally mounted in a totally-enclosed Fibreglas-sheeted enclosure. A built-in power supply and high-pass filter furnish power for the two push-pull electrostatic elements, and eliminate the need for external crossover networks and attenuators. The Z-400 uses 15"-18" woofers and 20-30 watts. Jensen Manufacturing Company, 1540 E. 17th St., Los Angeles 19. User net price, $195.00.


KLH

The Z-400 speaker system is designed for improved low-frequency response. The "Klippidox" enclosure achieves its high efficiency because of the elliptical port and a triangular-shaped diffusing ring mounted on the front of the baffle board. These features tend to broaden the frequency response, improve transient response, and create a "bend" effect, reducing relative particle velocities—and, consequently, phase relationships—so as to produce a smooth transition from front to rear radiation. These engineering advances are coupled with the Lafayette free edge SK-38 12" coaxial speaker with 8" cone tweeter, 1 4 pound magnet, and special 3/4" wide sheepskin suspension, and built-in crossover network level control. The "Klippidox" speaker system is finished in four styles in a variety of hardwood veneers for attractive room placement either horizontally or vertically. Lafayette Electronics Mfg. Corp., 1944 Banks St., L.A., 12, N.Y. User net price, $64.50.

JBL

"Minigon" Stereo Speaker System. Revolves around the well-known JBL-Ranger Minigon gives full stereo coverage with the potential range of the JBL system. Modern in size, the Minigon is not a simple misalignment of the larger JBL Ranger systems. It has been designed specifically to function with the JBL "Linear Efficiency" speaker systems which require sealed enclosures. All joints are lapped, wood sealed and carefully test for air leaks. The cabinet is the Minigon will vary in size of two cabinets with mirror-image symmetry. The cabinets are finished on all four sides so that either can be used as a pair or, in the center, or not, is the unusually attractive appearance of the Minigon. James H. Lansing Sound, Inc., Los Angeles 20, Calif. User net price, $249.00 each with 1/2"x10" tweeter, LE303 tweeter and LX3 dividing network.

MADISON FIELDING

Economical Bookshelf Speaker System. On a pair with speakers costing two to three times as much the Troubadour is a standard unit for budget systems or as a supplementary speaker. Only 9" high by 5" deep and 14" w.d.e. the Trou

LAFAYETTE

Bookshelf Speaker System, Featuring a unique enclosure (patent applied for), the

KLH

Full Range Two-Way Speaker System. Housed in a cabinet measuring 24 x 21 1/2 x 11" and designed 15 1/2" above the floor by runners, the volume of the Model 77 is 2.6 cu. ft. The speaker complement is a 12" acoustic suspension woofer and a 3 1/2" dome tweeter. The Special Efficiencies with the tweeter for varying room conditions. It also measures several refinements of Model Six. High St. Efficiency is identical with that of Model Six. KLH Research and Development Corp., 30 Cross St., Cambridge, Mass. User net prices: Model One, 2 woofers, $178.00; $190.00 Model Six, 1 woofer, $119.00. User net price, $229.50. Available unfinished at $185.00.

KNIGHT

12-Way Speaker System. This unusually rugged speaker, model KN-600HC, incorporates several refinements which provide performance of the highest caliber. In addition to the massive, one-piece, cast alloy frame, this speaker features a 4 1/4" thick polyethylene woofer cone which achieves a free air response of 25 cps with a power handling capacity of 50 watts. The cone suspension is woven
cence and decor dictate. Finish on all four sides allows vertical horizontal positioning. The Jensen Flatline 12-inch high-compliance woofer has unusually low resonance and is capable of total motion of 1-inch, providing clean bass as low as 20 cps. The small satellite units handle midrange and high frequencies. Their placement is not critical as long as they are placed to the left and right of the center unit. They may be spaced as much as 20 feet apart and still provide stereo sound within an acceptable 90-degree center. The Galaxy III system provides the equivalent of two complete 3-way speaker systems with the added feature of a "derived third channel" for the frequency range of the complete system is 20 cps to beyond audibility and power rating is 30 watts. Jensen Manufacturing Company, 6001 S. Laramie Ave., Chicago 35. User net price, $229.50. Available unfinished at $185.00.

KLIPSCH

3-Way Speaker System. The overall speaker system, engineered by the creator of the famous Klipschorn corner horn system, is designed to integrate with the Klipschorn to form a wide angle stereo system. The cornet is useful in combination with one large corner horn in a stereo set-up where a second corner horn is not available. Ideally, however, it is

used with two corner horns as the middle channel in a three-speaker stereo system using either independent or derived center channel. The Cornwall is a cube-corner enclosure housing the same driver units—base, midrange, and tweeter, as the Klipschorn and affords smooth effortless bass down to 30 cps. Klipsch and Associates, Inc., Hope, Arkansas.

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the MacKit 30
A 30-Watt Unity Coupled Amplifier Kit*

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AUDIO • AUGUST, 1960
NEAT

2-Way Speaker System. Unusual speaker system combining an electrostatic two-element tweeter with an 8-inch cone type woofer. The NEAT NE-20 system has a frequency range of 35 to 20,000 cps and power handling capability of 3 watts. Has built-in crossover network (crossover frequency 5000 cps) and a 117-volt a.c. power supply for the tweeter. NEAT Onyx Denki Co., Ltd. No. 4, 1-chome, Kanda Hatagocho, Chiyoda-ku, Tokyo, Japan.

PILOT

Compartment, 3-Way, Wide-Range Speaker System. Exceptional bass response and realism are featured in the Pilot PSV-1 "bookshelf" speaker system. It achieves extremely wide sound dispersion in horizontal or vertical positions by means of Pilot's "Acoustomatic Turret," an array of tweeters and midrange speakers that can be oriented from outside the cabinet. Solid bass is achieved by a 12" Air Gocho, Chiyodn

QUAD

Full-Range Electrostatic Speaker. Perhaps the first full-range electrostatic speaker in the world, this speaker may herald the future for the industry. Completely free standing and non-critical as to placement, it radiates from both sides in a figure-eight pattern which minimizes reflections from the walls and ceiling. Frequency range of the speaker is 45 to 18,000 cps and its Impedance is 16 ohms. Dimensions are 31" high, 34½” wide, 14½” deep at bottom. Manufactured in England, exclusive United States distributor is Lectrosonics City Line Center, 7644 City Line Ave., Philadelphia 31, Pa. User net price: $345.00.

R & A

Coaxial Speaker Series. Manufactured by a well-known British speaker manufacturer, the 700 series Mark III models are a group of high quality woofers/midrange speakers. Although they vary in fundamental resonance from 60 to 600 cps respectively for Model 700 (12-inch speaker) and 400 to 12,000 cps. are valves and tweeters and midrange speakers. They all provide smooth frequency response up to 10,000 cps. All feature Acoustic II Anisotropic magnet systems with a flux density of 12,000 Gauss. The magnet assembly is easily removable without demag-

POLYCOUSTIC

Small-Speaker-Array Wide-Range Speaker System RT. Perhaps the first speaker system using the small-speaker-array principle, the Polycoostic PC-2RT kit uses a large number of small speakers in series-parallel array. The array consists of 22 selected six-inch speakers and 6 three-inch hard-cone tweeters. The speakers are arranged to use all of the available front panel surface. Thus over 75% of the cabinet is a radiating piano. Low distortion and has zero external field. Power handling capacity is 15, 20, and 25 watts respectively for Model 780 (8”), Model 7100 (10”), and Model 7120 (12”) speakers. Voice coil impedance is 8 ohms for all models. Distributed in the United States by Etonal Corporation, 10 W. 51 St, New York 36, N. Y. User net price, Model 780 $139.95, Model 7100 $159.95, Model 7120 $179.95.

REALISTIC

Low-Cost Speaker System. The Realistic "Trio" is an impressive, performing 3-speaker system which combines well with similar systems costing considerably more. The Trio enclosure has a laminated mahogany finish on all four sides, permitting horizontal or vertical placement in any desired location. The two tweeters are mounted on a separate inner mounting board which can be rotated 90 degrees to permit full dispersion regardless of the position in which the speaker is used. The 8-in. woofer is equipped with a center-mounted acoustic cut-off filter to yield cleaner lows. A dual high-pass filter network gives smooth crossover, with overall frequency range of 35 to 17,000 cps. A pair of Trios is ideal for a stereo music system. Radio Shack Corporation, 730 Commonwealth Ave., Boston 17, Mass. User net price, $39.95.

PACO

8-Way Semi-Kit Speaker System. A compact 8-way speaker system, the Model L-8 kit features a factory-built and finished cabinet crafted of furniture-grade plywood. The integrated system incorporates a special design 10-inch Jensen long-exursion woofer and a horn-loaded compression tweeter. Low-frequency response is extended by a pre-tuned, tube-loaded port frequency. Frequency range is stated at 45 to 14,000 cps. Impedance is 8 ohms. The cabinet, 23" x 13" x 12", is available.
This is the only common sense when you buy a speaker system!

The knowledgeable audio-hobbyist demands that the components of his sound system achieve the reproduction of music which most closely represents his personal approach to perfection. He makes his choice of a speaker by one common sense—the sense of hearing—the one sensible way to evaluate the tonal qualities of a speaker. Yes, he buys by ear, by listening, by comparing to determine the sound of music which is most natural, most satisfying. His final selection is based upon a deeply personal judgment of the speaker which offers the greatest listening joy.

Because of its magnificent musical values the audio-hobbyist maintains an inflexible preference for Wharfedale. The name Wharfedale to him is synonymous with the world's finest speaker systems. When he purchases a new speaker system he does not desire, and cannot be sold, any speaker system except a Wharfedale. And, when the demand for Wharfedale speakers exceeds the supply, he will wait patiently, for months if necessary, for his Wharfedale speaker.

Now, for this man and for those who may profit by his special knowledge, sound judgment and good advice, England's G. A. Briggs has created the great new Wharfedale '60, the first full range shelf-size speaker system which incorporates the sand-filled principle. Its compactness has been achieved without a degree of compromise. The Wharfedale '60 brings you rich, non-stri fundamental high notes without electronic, mechanical or acoustical tonal coloration. The sand-filled panel, coupled with specifically designed speakers matched to each other and tuned to perform perfectly within the enclosure permits a full, rich, glowing bass completely free from any suggestion of false resonances. This is why, of all shelf-type speaker systems, the Wharfedale '60, in our sincere opinion, is the speaker system which achieves the closest approach to the perfect recreation of the live performance of music. Today, a great many people who enjoy the emotional experience of music are buying high fidelity components. It is unfortunate that competitive advertising claims—even though justified—far from being a helpful guide to selection, often offer a bewildering barrier to making an intelligent choice. But, of this you may be sure. The one way to buy a speaker system is to listen with your own ears. If the sound pleases you, it is the world's best for you.

And, no one can satisfactorily evaluate the characteristics of the speaker which will please you most by employing any visual device which purports to measure sound performance. We feel sure that your high fidelity dealer will advise you not to invest in any speaker system which may provide you with less listening pleasure until you have heard the sound of the Wharfedale '60. With the creation of the decorator designed Wharfedale '60 the commonplace look of ordinary stereo systems has been replaced by the perfect proportion of beauty.

Wharfedale '60

For illustrated brochure write Dept. WK10
Wharfedale Division, British Industries Corp., Port Washington, N.Y.
RJ

- **RJ/Wharfedale Speaker System.** Combining the RJ/8 enclosure with the Wharfedale Super S/9th/121 speaker, this compact assembly is ideally suited for stereo music systems. The RJ enclosure, when it was introduced six years ago, established an entire class of products. The RJ is distinguished from all other small-size speaker enclosures by a unique internal design, which is covered by two U.S. patents. Basically, the RJ enclosure has undistorted bass notes without compromise because of size. The RJ/Wharfedale system will fit handily into a single shelf of a bookcase. Dimensions are 11" x 21/2" x 10 1/2". RJ enclosed, with a 1400-watt, 70-Square Foot Room, Ridgefield, N. J. Used net price, $32.50.

- **SONOGRAF** - Wide-Dispersion Speaker System. Manufactured in Norway with typical Scandinavian feeling for wood, the Sonograft Model 253.88 is an unusually handsome speaker system featuring an almost uniform radiation pattern over 900 deg. The complete system consists of two C5 APS (acoustic phase shift) cabinets, two type 25 woofers and two type 23K tweeter assemblies. Each enclosure can be considered to be two separate cabinets coupled by means of the APS network. The rest of the mechanical drive actuates the air mass in the first chamber which in turn serves as the excitation for the APS network. The output of the network drives the second chamber. Outputs of both chambers are additive. Output of the cosmetic chamber is coupled to the air mass of the listening room by means of four slots, each slot separated by 90 degrees. The APS network improves both low-frequency and transient response. The type 23K tweeter assemblies match the rest of the system in appearance and have a frequency response of 2000 to 18,000 cps ± 2 db. Total system response is 20 to 20,000 cps within 6 db and power handling capacity is 160 watts. Impedance 4 ohms. Sonograft Electric Co., 37 East 28th St., New York 16, N. Y.

- **STENTORIAN** - 15-inch Extended-Range Speaker. Excellent performance is the key feature in this high-fidelity speaker manufactured by Whitley Electronic Radio Company in England. The model HF1214 has a frequency range of 25 to 14,000 cps with a cone resonance of 38 cps.

- **RFL** - Dual-Channel, Single-Cabinet Speaker System. "Special Fidelity" line of single cabinet speaker systems for stereo or monophonic systems. The line consists of six-decorator-styled models with designs by Petrucci and Drake-Smith. Unlike multiple cabinet stereo systems, these single-cabinet systems are non-critical as to location and eliminate the "hole-in-the-middle" effect. The deluxe series incorporates the Provincial, the Classic, the Contemporary (illustrated) and the Colonial.

- **UNIVERSITY** - Medallion XII Speaker System. Featuring an unusual "select-a-style" furniture concept wherein interchangeable speaker grilles will match Provincial, Modern and Contemporary furnishings are optional. Relatively compact for a designer-accent cabinet (24" x 17" W x 35 1/2" D), the Medallion XII is well suited for stereophonic speaker arrays. The 3-way speaker system includes a 12" high-compliance woofer with a long-throw voice coil; an 8" midrange speaker; and the Sierphonix super-tweeter. Frequency response is linear from 28 to 20,000 cps. Includes controls for adjusting system to room acoustics. User net price (cabinet only), $139.00. "Select-A-Style" frames, $89.95-14.95.

- **TANNOY** - 15-inch Dual-Concentric Speaker. Designed specifically for home systems where space is a problem, the Tannoy Dual-Concentric H12 can be "infinitely baffle mounted" in enclosures with a volume as small as 1 1/2 cubic feet. Like all Tannoy dual-concentric speakers, the H12 incorporates two completely separate speakers, a horn-loaded tweeter and a direct radiator woofer. The low leakage magnetic assembly uses the patented Tannoy "magnetic shunt," one of the notable developments in tweeter design within the last ten years. By the use of this device, magnetic leakage is reduced consider-ably, with resultant smoother response, better damping, improved transient response, and higher efficiency. The tweeter has a light alloy diaphragm working in conjunction with a precision phase-matching throat. The woofer has a curved cone, glass-impregnated, and resonant frequency of 27 cps. Power handling capacity is 20 watts and the impedance is x12 1/4", with a 13 1/4" high efficiency, 3-way crossover with $179.00.

- **12" Monitor Dual Concentric with** crossover ................................. $199.00
- **15" Monitor Dual Concentric with** crossover ................................. $138.00
- **12" Direct Radiator** ................................................... 78.75
- **15" woofer** ................................................... 73.75
- **Tweeter** ................................................... 86.00

- **AUGUST, 1960**

www.americanradiohistory.com
STEREO SYSTEM FOR A MILLIONAIRE: 4 SELECTIONS Gentlemen's Quarterly magazine asked James Lyons, editor of The American Record Guide (the oldest record review magazine in the United States), to poll hi-fi authorities on which audio components they would choose for the best possible stereo system, without any regard for price.

Three writers in the audio field and one audio consultant made up independent lists. The ideal systems they projected in the April, 1960 issue of Gentlemen's Quarterly are suitable for discriminating millionaires—one of the systems, using a professional tape machine, would cost about $4000.

ACOUSTIC RESEARCH AR-3 loudspeakers are included in three of the lists,* and these are moderate in price. (There are many speaker systems that currently sell for more than three times the AR-3’s $216.) AR speakers were chosen entirely on account of their musically natural quality.

Literature on Acoustic Research speaker systems is available for the asking.

*In two cases alternates are also listed. For the complete component lists see the April, 1960 Gentlemen's Quarterly, or write us.

ACOUSTIC RESEARCH, INC. 24 Thorndike Street Cambridge 41, Massachusetts
VITAVOX

- Hallmark Speaker System. Built by Vitavox, Ltd., of London, the new Hallmark speaker systems are based on a unique enclosure design, and incorporate the Vitavox DU120 duplex-coaxial full-range speaker. Nominal frequency range of the units is 30 to 15,000 cps and English power rating is 15 watts. A built-in control affords adjustment of the balance between bass and treble. The graceful appearance of the enclosures, which serves to enhance the decor of any room, conceals the detailed technical features of the interiors which are specifically designed to produce excellent results from cabinets of moderate dimensions. Hallmark speaker systems are available in Lowboy, illustrated, and Tallboy models in a wide range of finishes. Distributed exclusively in the United States by Ecrown Corporation, 12 W. 40th St., New York 36, N.Y. User net price, $199.50.

- DU120, 12" coax spkr $89.50

WEATHERS

- TriPhonic Stereo System. An unusual approach to stereo speaker design, the WeatherSystem speaker system consists of the non-directional Hideaway Bass and a pair of Harmony stereo speakers. No bigger than an unabridged dictionary (11 x 9 x 3 1/2 inches) the Harmony stereo speakers have a stated frequency range from 70 to 15,000 cps and have a power-handling capacity of 3 watts. The speaker is a full-range moving coil type with an impedance of 4 ohms. The Hideaway Bass may be hidden out-of-sight under a table, chair, sofa, or behind drapes because of its small size (15" x 15 1/2 x 6 1/2 inches) and its non-directional characteristic. Frequency range of the speaker is 30 to 80 cps and power handling capacity is 10 watts. Impedance is 8 ohms. Harmony speakers available in ebony or cordova. Hideaway Bass available in ebony, walnut, mahogany, or black, and $69.50. Harmony speakers, $29.75 each.

- Wharfedale 

- Compact 2-way Speaker System. Designed by G. A. Briggs, the Wharfedale '60 achieves a truly unique music quality, its small size notwithstanding. Employing the exclusive, non- resonant, sand-filled panel construction this system achieves an exceptionally clean bass down to 20 cps. This panel consists of two layers of wood with a completely inert filter of dry sand between them. Thus the enclosure, compact as it is, offers the smooth performance generally ascribed to an infinite baffle. The speakers are designed specifically for this system and are matched to each other as well as tuned for the enclosure. The 12" woofer has a fundamental free air resonance of 25 cps and utilizes an extra heavy cone which provides outstanding transient response and freedom from breakup. It has a 9 1/4 lb. magnet assembly and a rear-impregnated fabric surround. The 5" tweeter is sealed in a compartment isolated from the woofer. Both speakers have rigid die-cast chassis. Power handling capacity of the system is 30 watts and impedance is 8 ohms. Crossover network and precision wire-wound treble control are built-in. Available in walnut (oiled or polished), mahogany, lined oak, or unfinished birch. British Industries Corp., 80 Shore Rd., Port Washington, N.Y. User net price (finished), $199.50.

- SFB/3 Deluxe, 3-way spkr sys $279.00
- Coaxial 12", 12" dual concentric spkr $139.50
- Super 12/15/AL, wide-range 12" spkr $89.50
- W/10/95B, wide-range 10" spkr $47.50
- Super 8/15/AL, wide-range 8" spkr $26.50
- Super 3", 3" tweeter $26.50
- W/12/FS, 12" woofer $52.50
- W15/FS, 15" woofer $89.50

WICO

- Coaxial Speaker. The new Wico line of high-fidelity speakers was devised to eliminate technical overlap and filtration while retaining complete compatibility between the various components of the model CX212, illustrated, is a factory-assembled coaxial system comprising the model ERD-12 extended-range speaker, the model CX2 twin tweeter, and the FW2 3000-cps crossover network. Each item may be purchased separately. The ERD-12 is highly efficient and has a 40-cps cross-over response. Response range is 30 to 15,000 cps. A sturdy cast-aluminum frame supports the 6½" 13- oz. magnet assembly. Power rating is 30 watts. The CX2 coax-tweter array extends frequency response to beyond audiibility, at 30 watts. The CX2 twin-tweeter array extends frequency response to beyond audibility, at 30 watts. The CX2 twin-tweeter array extends frequency response to beyond audibility, at 30 watts. The CX2 operates automatically with stylus force as low as 1.5 grams. Operating at all four standard speeds, it incorporates a motor of unusually high power, assuring constancy of speed under any normal load condition. Field coils are tropicalized, and thorough shielding prevents hum. The lightweight tone arm is of one-piece construction and is equipped to accommodate interchange cartridges by means of a locking key snap-in arrangement. Direct set of ball bearings in both axes insures freedom of lateral and vertical motion. Finger-tip stylus force adjustment is mounted directly on the tone arm assembly. Patented roll-over guides in the tone-arm head permit the 100G to operate automatically and interchangeably regardless of record size. Past change-cycle time is constant irrespective of operating speed. A stereo needle which introduces a phase-canceling feedback circuit to remove vertical signal when stereo cartridge is used to play mono records. Notwithstanding its many features, the DUAL 1007 is simple to operate. Only three push buttons are used to govern start, stop, and repeat functions. A muting switch assures silence during changing cycle. United Audio Products, 202 E. 19th St., New York 3, N.Y. User net price, $60.05.

- EICO

- Stereo Changer/Player. The Eico-Dual 1007 is a luxury stereo changer/ player at a popular price: $49.50. 73C-740 change, $25.75. TP-59, man rec player, 29.95.

- Record Changers

- Colaro

- Stereo Transcription Changer. Deluxe 4-speed automatic-manual intermix changer with heavy-duty, precision balanced, shielded and triple interleaved 4-pole motor is equipped with 6 lb. non-magnetic turntable, 12" in diameter. Flatter is guaranteed below 0.05%. wow guaranteed below 0.15%. rumble guaranteed below 50 db. Each unit is packed with individual laboratory specification sheet. Permits manual operation when desired, and is provided with double muting switch and an R/C network to give absolute silence during change cycle. Unit plays 7", 10", and 12" records in any order. Arm has removable pickup head with 5-pin plug to accommodate all standard stereo and mono cartridges. Dimensions: 12" x 13", 5" above motor bored and 2¾" below. Rockhar Corporation, 630 Halstead Ave., Mamaroneck, N. Y. User net price, less turntable, $53.50. 4TR20 trans turntable $49.50. 7SC-740 change, $35.75. TP-59, man rec player, 29.95.

- Audio • August, 1960
PRESENTS A NEW HIGH FIDELITY COMPONENT TV RECEIVER

to increase the ways you can enjoy your precision audio equipment

Now you can experience the great moments of television with heightened realism through a combination of high fidelity video and high fidelity audio. The new Fleetwood Component TV Receiver makes use of broader bandwidths to bring you a picture of unsurpassed definition, sharpness, and detail. A ratio detector comparable in quality to your FM tuner delivers the audio signal to the pre-amplifier of your component system. There is also a built-in audio amplifier so that a loudspeaker may be directly driven from the receiver when you choose. The new Fleetwood component is built to professional monitor specifications and abounds with extraordinary new features. Model 1000 is equipped with a sonic, wireless remote control. Model 1010 is non-remote.

You pre-set the fine tuning for each channel and rarely need touch this control thereafter. Fleetwood definition control permits adjusting the picture to the degree of sharpness most pleasing to your eyes.

The 23", 110° deflection picture tube provides 282 square inches of viewing, and yet the depth of the set behind the frame is only 13¼". Custom installation has been made as simple as possible. Tube, mask, and frame are factory installed. Never before has a television receiver so superior in all respects, so complete in all details been made available to the non-professional.

Write for a complete description.

FLEETWOOD COMPONENT TELEVISION IS MANUFACTURED BY CONRAC, INC. GLENDORA, CALIFORNIA

FLEETWOOD COMPONENT TELEVISION IS MARKETED BY JBL INTERNATIONAL, LOS ANGELES 39, CALIFORNIA
price. Featuring unusually simple operation and extreme flexibility, the 1007 is ideal for the listener who enjoys convenience coupled with good performance. Utilizing a powerful two-pole induction motor with arm individually balanced, rumble is reduced to a minimum. The 0.1-mil and 3-mil turnover stylus (the 0.7-mil stylus is diamond in model 1007D and sapphire in model 1007S) achieve close to 4 grams stylus force with no appreciable variation due to height of record stack. Complete assembly of the 1007-D is 3 1/2 x 10 1/2 x 11 1/4 inches; 2 1/2 x 10 1/2 x 11 1/4 inches vertically. Channel separation is approximately 19 db at 1000 cps. Frequency range is 20 to 20,000 cps. Electrophono Corporation, Inc., 32-60 Northern Blvd., Long Island City 1, N. Y. User net price, $59.75 (model 1007D); $49.75 (model 1007S).

GARRARD

- 4-speed Interna-Phone Changer. The lowest priced Garrard changer, the Model 210 offers features and performance found in changers costing much more. Features include

a die cast tone arm with plug-in shell. 4-pole "Induction-Surge" Garrard motor, easy accessibility and operation of the side-side controls, complete wiring for stereo, and a full manual operating position. Sporting an attractive fawn and white color scheme, set off by satin black turntable, the 210 looks as well as it performs. Garrard Division of British Industries Corp., Port Washington, N. Y. User net price, with plug-in head less cartridge, $44.50.

4HF, transcription turntable and arm, $59.50
T/11, manual player kit 32.50

GLASER-STEERS

- Stereo Record Changer. The GS Seventy-Seven is precision-engineered, completely automatic in operation, and offers new features and refinements which enhance the enjoyment of stereo records at the same time allowing enjoyment of monophonic records to the utmost. Stylus force is variable over a wide range with easily adjustable vernier adjustment. Variation of stylus force between first and last record on a stack is less than 0.8 gram. The damped, acoustically isolated tone arm is not resonant within the audio range, and moves both laterally and vertically on plug-point bearings. Rumble, wow, and flutter have been reduced to insignificance by improved motor design. As in earlier Seventy Seven models, the turntable pauses during a change cycle, and resumes motion only after the stylus has been lowered to the next record to reduce stylus and record-surface wear. The idler mechanism is designed in "off" position to prevent wow caused by flat spots. A dual-channel muting switch, on or off, allows the user to maintain silence for both stereo channels during record change and at shut-off. Glaser-Steers Corporation, 150 Orton St., Newark, N. J. User net price, with cartridge and two cartridge shells, $59.50.

CSC cover for CS-77 9.75
CSC05 4-speed stereo changer 47.50

HEATHKIT

- Automatic Four-Speed Changer Kit. In reality a semi-kit, because most of the unit is pre-assembled, the Heath RP-3 series is available in several versions, the differences primarily consisting of the type of cartridge supplied. The RP-3 features a turntable which stops rotation during the change cycle thus eliminating the record wear associated with the fall of a record on a moving turntable. A removable plug-in head accommodates stereo or mono cartridges. Audiogersh Corporation, 514 Broadway, New York 12, N. Y. User net price, $67.50.

TORENS


LESAt

- Four-Speed Record Changer, Fully automatic. The Lesa Model CD2/21 record changer has only two controls for all operating cycles, speed selection, start, stop, reject. Up to eight records of any size may be played with automatic intermix. For manual operation, the record balance is simply moved to the side position. When operated manually, the tone arm is returned to rest automatically.

T/11, manual player kit 33.95

AD-10, manual player kit 33.95

GLASER-STEERS

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CSC cover for CS-77 9.75
CSC05 4-speed stereo changer 47.50

MIRACORD

- Push-Button Operated Changer. Recognized by now as an old stand-by, the Miracord has kept up with stereo requirements without major model changes. The XR-200 still employs a heavy-duty 4-pole motor, push-button operation, and the "Magic Wand" center spindle drop mechanism, but overall performance for stereo applications has been improved by the use of a heavy-duty turntable and additional motor shielding. Unit is finished with two output cables for stereo and after each record. A built-in click suppressor eliminates switching noises by means of an R-C network. A 4-pole, carefully balanced, heavy-duty motor drives the CD2/21's turntable which has an exceptionally high moment of inertia. The tone-arm mechanism is jum-proof, the arm comes out of being moved or handled at any time without damage to the mechanism. The record changing cycle time of 6 seconds is the same for all record sizes and speeds. Pre-wired for both monophonic and stereo operation, the Lesa changer is equipped with a universal plug-in shell which accommodates all standard cartridges.

Electrophono & Parts Corporation, 50 Canal St., New York 3, N. Y. User net price, $90.00

SMS/CD2 4-10 man rec player 29.95

TURNTABLES

- Stereo/Balance Turntable. Deriving its name from the dynamically-balanced hysteresis synchronous drive motor, the Audio Empire model 208 Turntable is a three-speed (33 1/3, 45, 78 rpm) belt-driven turntable. The precision-machined, heavy aluminum base plate and turntable are virtually vibration free because

- Auto EMPIRE

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stereo
in a
nutshell

The compact component has come of age. And in the vanguard of this trend is Crosby's new Madison Fielding 650 Receiver — AM and FM tuners, stereo preamp and powerful dual 14-watt amps (48 watts peak)—truly stereo in a nutshell. This exciting compact (a Lilliputian 14½" x 5¾" x 11¾") features exclusive pushbutton source selection, center channel stereo output, individual channel controls, mono-stereo blend and microbeam AM/FM tuning. Just add the changer and a couple of speakers. Then enjoy music to stir the soul. And the price barely stirs the purse . . . a compact $219.95.

model 650

madison fielding by crosby

Crosby Electronics, Inc., Syosset, L. I., N. Y.
Export: Microwave International Corp. - 36 West 44th Street, New York 36, N. Y.
Manufacturers and designers of stereophonic components, speakers and the Crosby Compatible Stereo FM Multiplex System.

AUDIO • AUGUST, 1960
EMT930ST

signal

Professional features include cueing amplifier, 46th mounted outside the Rumble is down precision ground noiseur, madeing Rumble homogeneous for all expensive turntables. The single-speed TT5 is driven by a microgroove belt, the other models employ idler wheel couplings, a separate idler being used for each speed. Bogen-Presto, a Division of the Singer Corp., Paramus, N. J. User net price: TT3, $59.95; TT4 (shown), $99.50; TT5, $129.50:

BOGEN

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CONNOISSEUR

-Eye Two-Speed Stereo Turntable. The new Connoisseur, two-speed turntable incorporates a hysteresis synchronous motor and features performance characteristics found in more expensive turntables. Operating speeds are 33 1/3 and 45 rpm from a single, constant-speed motor with speed change effected by a double-stepped gear, ground integrally on the motor shaft. The motor shaft is suspended in graphite nylon bearings and all revolving shafts are precision ground and lapped to a mirror finish. Rumble is down 50 db, referred to 7 cm/sec at 1000 cps. Wow is 0.10% and flutter is 0.1%: hum level is down 80 db. The turntable is 12 inches in diameter and is mounted on a non-ferrous material. The motor mechanism is mounted outside the turntable rim to reduce vibration induced in the pickup by about 12 db as compared with under-the-turntable mounting. Available with wood finish, formica-covered base at slight additional cost. Distributed in the United States by Ercona Corp., 16 West 40th St., N. Y. User net price, $35.50.

Type B, 3-speed turntable $119.50

EMT

Professional Integrated Playback Unit. Designed for the broadcast studio, the EMT 630 ST is a complete playback unit including preamplifier, arm, and moving coil cartridge. Professional features include cueing light, strobe disc and vernier speed control. Instant start-stop braking, and a remote control. The EMT 630 ST can be used as a high-quality phonograph and offers a choice of three speeds. Output is plus 6 VU; wow and flutter 0.15% peak-to-peak; signal-to-noise ratio is 60 db or better. Also available in a stereo version. Electronic Applications, Inc., 194 Hamilton Hill Ave., Stamford, Conn. User net price, $1150.00.

FAIRCHILD

-Belt-Driven, Two-Speed Turntable. The new Fairchild Model 440 features 2-speed operation (33 1/3 and 45 rpm) from a single belt drive plus a "Speed Sentry," control that varies turntable speed by a 1 1/2%. Speed change is effected by a "finger" system which controls the built-in stroboscope permit correcting turntable speed as necessary. The speed regulator has an adjustment range of 10-15% in pitch. The stroboscope marks on back of the turntable are illuminated by neon and reflected by a mirror to provide a speed indicating signal during operation. Neat Onkyo Denki Co., Ltd., No. 4 1-chome Randa Higashiguchi, Chiyoda-ku, Tokyo, Japan.

PICKERING

-Gyroposie Turntable. Engineered specifically for microgroove records—both monophonic and stereophonic—the Gyroposie 800 Stereotable is a single-speed machine operating at 33 1/3 rpm. It embodies a unique method of magnetic suspension, on which patents are pending, which eliminates vertical rumble to the point that it becomes inconsequential in the playing of stereo records. Vertical period of spring suspension is below 5 cps; compound vertical rumble attenuation is 12 db/octave below resonance; noise is 0.5 db below reference level; speed accuracy is ±0.2 per cent total variation. Picking & Company, Inc., Plainview, N. Y. User net price, chassis only, $59.90. Model 800C, complete base, in mahogany, walnut, or blond, $15.90.

REK-O-KUT

-Hystersis-Motor Turntable Kit. Meeting professional standards throughout, the Model K-33-H turntable kit can be assembled in 30 minutes or less, using only simple tools. A single-speed unit (33 1/3 rpm), it features a high-efficiency hysteresis synchronous motor built to Rek-O-Kut's exacting specifications.

GARRARD

-Three-Speed Transmission Turntable. Featuring a speed control and a built-in stroboscope, the Garrard Model 301 is designed for the professional and the high-quality enthusiast. In addition to speed accuracy, the 301 has less than 0.2% wow and less than 0.05% flutter. Quality workmanship, long associated with the Garrard name, is reflected in the accurately machined rotating parts. Comes complete with 45-rpm adapter and mounting hardware. Garrard, a Division of British Industries Corp., Port Washington, N. Y. User net price, $89.50.

NEAT

-Four-Speed Turntable. Featuring an illuminated stroboscope, the Neat Model P-68 is an attractive turntable with high-priced performance characteristics which belies its price tag. Driven by a 4-pole induction motor which is designed to reduce vibration and noise, the P-68 has wow and flutter of less than 0.25%. The heavy, die-cast turntable is 12 inches in diameter and is composed of a special aluminum alloy. The magnetic speed regulator and

54

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Whether your requirements are modest or magnificent, there is a fine-music Bozak Speaker System to satisfy every individual need.

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and are with 0.1%. Speed accuracy is ±0.0 with the stroboscope or ±0.1% not using the stroboscope. The built-in stroboscope is visible in daylight and may be used to adjust speed while the record is playing. Built-in provisions for levelling the turntable, plus a built-in bubble level, provide convenient installation and subsequent adjustment. The motor is a heavy-duty synchronous, capacitor-start type, which is double sprung for acoustic isolation. The speed control is magnetic. Built-in thumb release for adapter spindle, on/off switch, and a.c. "pop" suppressor. Sonograf Electronics Co., 31 East 28th St., New York 10, N. Y. User net price, $99.95.

PHONO ARMS

SONOGRAF

- Three-Speed Belt-Driven Turntable. A truly professional-quality turntable, the Sonograf Model 2500 features direct belt drive at all three speeds (33⅓, 45, 78 rpm) with a special, resilient "DB" belt that virtually eliminates the need for periodic adjustment. Vertical and lateral rumble is 50 db and flutter and wow are with 0.1%. Speed accuracy is ±0.0 with the stroboscope or ±0.1% not using the stroboscope. The built-in stroboscope is visible in daylight and may be used to adjust speed while the record is playing. Built-in provisions for levelling the turntable, plus a built-in bubble level, provide convenient installation and subsequent adjustment. The motor is a heavy-duty synchronous, capacitor-start type, which is double sprung for acoustic isolation. The speed control is magnetic. Built-in thumb release for adapter spindle, on/off switch, and a.c. "pop" suppressor. Sonograf Electronics Co., 31 East 28th St., New York 10, N. Y. User net price, $99.95.

FAIRCHILD

- 18-inch Stereo Tone Arm. Continuing the tradition of excellence exemplified by previous Fairchild arms, the SA-12 features low price, $19.95. A wire ground lead is carried through the assembly for connection to a terminal strip under the turntable base. Stylus force adjustable from zero up to 8 grams. Electro-Sonic Laboratories, Inc., 35-31 36th St., Long Island City 6, N. Y. User net price, $94.95.

PHONO ARMS

MAGNETIC PICKUPS. SONOGRAF's new three-speed belt-drive turntable employs the world-famous MARTIN TURNABLES turntable. The threesecond belt-drive turntable, the Sonograf Model 2500 features direct belt drive at all three speeds (33⅓, 45, 78 rpm) with a special, resilient "DB" belt that virtually eliminates the need for periodic adjustment. Vertical and lateral rumble is 50 db and flutter and wow are with 0.1%. Speed accuracy is ±0.0 with the stroboscope or ±0.1% not using the stroboscope. The built-in stroboscope is visible in daylight and may be used to adjust speed while the record is playing. Built-in provisions for levelling the turntable, plus a built-in bubble level, provide convenient installation and subsequent adjustment. The motor is a heavy-duty synchronous, capacitor-start type, which is double sprung for acoustic isolation. The speed control is magnetic. Built-in thumb release for adapter spindle, on/off switch, and a.c. "pop" suppressor. Sonograf Electronics Co., 31 East 28th St., New York 10, N. Y. User net price, $99.95.

THORENS

- transcription Turntable. Engineered for professional music systems, the Thorens Model TD-124 is a four-speed machine featuring a full 12-inch, 11¾-pound table for lowest wow and flutter. The main table is made of cast iron to provide shielding against hum pickup. A cover table made of aluminum, plus an attractive rubber mat, mitigates 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 accomplished by means of a built-in bubble level and easily accessible levelling screws. The precision 4-pole motor is equipped with a compliant belt-glissidier arrangement which provides excellent motor vibration isolation. The TD-124 operates on 50- or 60-cycles a.c. at any voltage from 100 to 250 volts. Thorens, New Hyde Park, N. Y. User net price, $89.75.

BOGEN-PRESTO

- Professional Quality Tone Arm. The Bogen-Presto PA1 tone arm is a precision unit built to professional standards. Bearing suspension plus a combination of spring balancing and counterweighting enable the PA1 to track at extremely low stylus forces. Adjustment of 12 and 8 cps respectively for the 98 and 99P indicates the level of performance. Calibrated stylus-force adjustment from zero to eight grams and counterweighting ensure perfect balance and an adjustment for any cartridge from 2 to 25 grams. Precision ball bearings used for vertical and lateral motions. Available in satin chrome or satin gold finishes. Dyna-Empire, Inc., 1075 Stewart Ave., Garden City, Long Island, N. Y. User net price, $34.50 (for model 99); $44.50 for model 99P; extra shells, $6.50.

WEATHERS

- Two-Speed Lightweight Turntable. Approaching the two-speed problem with the same ingenuity that resulted in the well-known Weather single-speed model, the Model ML-234 uses two separate synchronous motors, one for the 33⅓ rpm speed and one for 45 rpm. Each motor couples directly to the turntable by means of a small soft-steel roller wheel, and a simple speed-shift lever selects one motor and disengages the other. The Weather's method of reducing rumble and other rotational errors by reducing the mass of motors and transducers utilized in the ML-234 and is reflected in a rumble of -70 db. Wow and flutter are, respectively, 0.15% and 0.1%. The turntable mat is of special design which

eliminates transfer of dust from mat to rec-
ord. Weather Industries, 60 E. Gloucester
Pike, Barrington, N. J. User net price $74.00.
ML-1, one-speed turntable .......... $59.95
KL-1, ML-1 in kit form .......... 34.50
K601, 33 1/3 rpm rec player ........ 111.75

PHONO ARMS

- "Stereo/Balance" Arms. Precise in appearance and excellent in performance, the AUDIO EMPIRE "Stereo/Balance" models 98 (12") and 99P (14") are well suited for high fidelity monophonic and stereophonic systems. Maximum tracking error of 0.175 deg. for the 99 and ±0.6 deg. for the 98P plus arm resonances bearings for the turntable itself, the arm would play records upside down. Ball bearings are used throughout for all vertical and horizontal motions, assuring smoother operation, increased record life, and longer trouble-free performance. In operation, the spring force is reduced to zero by turning the two knurled knobs backward; the sliding weight at the back is then adjusted for perfect balance of the arm and cartridge. The knobs are then turned forward to obtain, the desired stylus force. The head is of molded plastic and is fitted with four terminations. A wire ground lead is carried through the assembly for connection to a terminal strip under the turntable base. Stylus force adjustable from zero up to 8 grams. Electro-Sonic Laboratories, Inc., 35-31 36th St., Long Island City 6, N. Y. User net price, $94.95.

E S L

- Gyro/Balance Tone Arm. Designed on the principle that an arm should be balanced in every plane, any tracking force provided by a spring, the ESL Gyro/Balance arm has many advantages. Because of this design, turntable leveling is unnecessary, and on demonstration the ESL arm is often shown playing records with the turntable in an absolutely vertical plane. In fact, if it were possible to keep the record and platter in place and provide proper

with any turntable, the TPA/12 is stereo-wired and plug-in type with built-in self-leveling electronics for a solid-state cartridge. A new simple weight adjustment is easy to use, and permits precise control of tracking force. The features of static balance, friction-free movement and high reliability have all been combined in the TPA/12 to give a remarkable measure of audio performance. Garrard Sales Corporation, Port Washington, N. Y. User net price, $19.05.

GENERAL ELECTRIC

- "Stereo Classic" Compatible Tone Arm. Every design feature of this tone arm is di-
rected toward optimum performance in mono and stereophonic records. These design features also give the General GE-2G outstanding mono-

phonic qualities. The arm was developed spe-
cifically for use with the GE-100 pickup system. The arm's primary feature for excellent stereo reproduction is its static balance. When adjusted, the arm maintains its lateral equilibrium at all times, even if the turntable is not the arm to zero tracking force, and (2) for making a

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NEW "DECORATOR GROUP" LOUDSPEAKERS

From the "style woods" of the world, Jensen chooses only the finest for their exclusive Decorator Group speaker cabinetry. The woods are mated with graceful furniture designs to fit the mood of your home—whatever it may be. You may choose from smart modern Danish in warm Walnut, subtle Contemporary in clean Limed Oak, elegant Traditional in rich Mahogany, authentic Provincial in lustrous Cherry, or a special unfinished utility model. Use as a shelf-type or as a diminutive console with matching base. Jensen's world-wide acceptance as the finest name in high fidelity speakers assures you of superior-quality components brilliantly matched and balanced to provide the finest home speaker systems ever produced. Visit your high fidelity center and see the Jensen TR-30 Tri-ette system soon. Hear a demonstration of the rich full-range sound. You will find it a rewarding experience.

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a style for every wood... a wood for every mood
precise tracking-force adjustment between zero and six grams. Among other features are a built-in, easily removable cartridge head, a terminal board with four stereo lead terminals and a precision built, linear tracking force arm, and precision built, linear tracking force arm. The arm is designed to be balanced statically with the cartridge in mounting most of the available cartridges on the market. Removable head is designed to hold cartridge in its mounting plate by single screw through a slot in top of head for overhang adjustment. Direct-reading stylus-force gauge has instant disconnect, and "microme-
ter" counterweight assembly permits visual sta-
tic balance check. Shure Brothers, Inc., 222 Hartley Ave., Evanston, Ill. User net prices: $252.50; $256.35. $31.50.

GRADO
- Laboratory Tone Arms. Engineered to accept all cartridges, but available with matched Grado cartridges and arms in the first in a series designated the "Laboratory Series." Features are: (1) Rigid, solid steel arm trim, modern styling with brushed aluminum and "micrometer" counterweight assembly, extendable to 12 ins. in diameter. Specialty Electronik Components, Dept. General Electric Company, West Genese St., Auburn, N. Y. User net price, $29.95.

SME
- Precision Pickup Arm. Featuring an arm mount that permits overhang adjustment without the need for changing original mount-
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“Accidental”
Tests Prove Superiority
of E-V Microphones

Electro-Voice conducts many microphone tests to determine durability. Occasionally, though, we hear of a field experience more effective than anything performed in our laboratories. Take, for instance, the time a local engineer, preparing for a game at a high school stadium, accidentally dropped a microphone. He was scheduled to hook up the one he dropped. His worry about failure proved unnecessary because the microphone performed without the slightest loss in quality.

Such unusual and unexpected circumstances come to our attention because we are asked to ascertain the condition of microphones after mishaps. We were not surprised at the durability exhibited because of our own unique method of testing every E-V microphone model. We drop it, we roast it, freeze it, drench it with salt water, explode guns near it, test for pressure at high altitudes, and subject it to abrasive wear and tear.

Now, we don’t suggest you abuse your E-V microphones as we do when testing. But, should an accident occur, it’s nice to know the chances of anything affecting performance are limited.

The cited example is only one of the many requests received to check over field equipment and provide consultation in the field when desired. Lou Burroughs, one of the founders of E-V, and Vice-President of Broadcast Engineering, has retained intensive contact with TV and Broadcast Engineers. His on-the-scene consultation has enabled him to help in the solution of many ticklish problems and has kept him abreast of situations which require special microphones.

The 30W — A Woofer for the Wildest Audiophile

The creation of a large, low-frequency speaker is not unique to Electro-Voice, nor is the 30W the largest speaker ever built. E-V, however, did bring the inherent advantages a woofer of this size could have over a smaller speaker. Such a woofer, because of its ability to reproduce efficiently the lowest bass frequencies without distortion — would offer the ultimate clarity desired by high-fidelity perfectionists.

Electro-Voice, committed for many years to ultra-rigidity in speaker construction, produces a complete line of speakers having rigid, one-piece, die-cast frames. There is no exception to this.

It was inconceivable that an exception could be made with a giant woofer just because of its size. And, as its great size demands extra rigid construction to insure smooth response. Regardless of the extensive and expensive testing required in shaping the die, core, and die frame, the 30W is now here. It is the world’s largest and finest woofer, complete with an absolutely rigid die-cast frame and super bass voice. The die press required to produce the frame is one of the largest in the industrial state of Michigan.

Equal care and design went into all phases of the 30W development. It includes a super-heavyweight (914 lbs.) ceramic magnet to increase efficiency and minimize distortion. The new, super-stiff cone of polystyrene foam was originally designed for the 30W. It has almost three times the cone area of an 18-inch woofer and moves an amazing column of air without extra demand on the amplifier. The true cone of this woofer is made possible by the die-cast frame and foam cone enables this speaker to perform beyond the demands of the most confirmed audiophile — absolutely distortion-free to below 25 cps.

FOAM CONE: Engineering Breakthrough for Better Bass

The “foam cone”, just recently introduced in super-quality Electro-Voice low-frequency woofers, represents a major breakthrough in loudspeaker design — and a marked improvement in the delivery of clear, transparent bass. Rigidity of the cone is essential for smooth response. Until the advent of foam, larger woofers were forced into some sort of compromise between acceptable weight and high rigidity. Conventional “paper” cones in smaller diameters can be thinned to the point of inflexibility without undue weight increase, but this is not true of cones with larger diameters — and it is in these larger cones that the resultant “muddy” sound is the most pronounced. Conventional material, in the thickness required for absolute rigidity, would be beyond the weight limitation which is fixed by vacuum size and available amplifier power (without expensive redesign of both components).

Exhaustive research turned up “foam”. Its correct name is polystyrene (a very hard plastic) — and the word “foam” is related to the form of the material in its final state. Air is entrained in it by agitation while it is liquid. When it cools in the mold, it retains the "foam" structure (internally) — along with its exceptional hardness and stiffness. Thus a thickness — and a stiffness — many times that of "paper" is possible with no increase in weight.

Furthermore, the ratio of stiffness to weight and thickness is completely predictable and calculable. The engineer can specify the proper thickness for the required rigidity. Weight will stay well within limits — and the molding of the cones can be controlled to sub-microscopic accuracy.

The result is a true inflexible cone — which operates as a piston. There is no distortion of shape and none in the resulting sound. It all sounds quite Electro-Voice is dedicated to achieving perfection demanded by the Audiophile — and has the engineering talent in quality and quantity to solve the problem.

DID YOU KNOW?

A phonograph needle (stylus) travels and tracks between 500 and 600 yards every time one side of an L.P. record is played and heat at the tip approaches 1000° F. This high temperature is the basic cause of needle wear. The diamond, with its resistance to heat and abrasive wear and its unequalled hardness, is the ideal stylus to keep record wear at a minimum. It lasts 20 times longer than a sapphire, too. Ask for Electro-Voice Power Point Needles and prolong your record life.

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Want more information on any of the items mentioned in the Sounding Board? Simply check the appropriate boxes below and mail the coupon to Dept. 80A, Electro-Voice, Inc., Buchanan, Michigan.

☐ Foam Cones
☐ Microphones
☐ 30 W
☐ Needles & Cartridges

NAME
ADDRESS

Electro-Voice, Inc.
Buchanan, Mich.
1. FOUR STEREO CLASSICS

Festival Casals de Puerto Rico 1959; Haydn: Symphony No. 45 ("Farewell"); Mozart: Symphony No. 36 ("Linens") Festival Casals Orch., Casals. Columbia MS 6122 stereo

Performance recording has always been a risky business, and phrases more so than the atmosphere of excitement generated at a musical festival. When the leading figure is world-famous, as with Toscanini in the long series of broadcasts or Casals in the more recent festivals under his direction, the atmosphere is so charged (Casals's own word for it) that a recording of the proceedings is apt to sound merely hysterical to the listener who merely listens at home. Far from the excitement of the living occasion. Numerous earlier Casals Festival recordings have shown this trait in unfortunate ways. It is a plain fact that no recording can reproduce the actual impact of such a performance on those present at the time—what comes through, instead, is the petty weakness of playing, born of too much excitement, the minor slips that are rightly lost in the general fervor of the actual occasion but which show up mercilessly in the cold beam of the cardiod microphones.

With that prelude as explanation, I can say at once that these two symphonies come through with remarkable success. Perhaps it is simply that Casals, having learned painfully, via a heart attack, the lesson of too great expenditure of physical energy, now is conducting with a minimum of outward drama and maximum of musical economy. (The rehearsal recordings made just before his heart attack of some years ago bears this out.) There is little, if any, excess here, only a few of the inevitable clichers that get through in a "live" performance, generally a warm sense of the music with all the proper intensity of the occasion channelled into the playing itself. Even the microphone pickup is good—and it was miserable in some of the earlier Casals recordings.

What is most interesting, I think, is the markedly "old-fashioned" approach of this elder statesman of music. Slow movements are really slow, the Romantic implications in Haydn's score are allowed full play, the minuets have a maximum of that white-wigged gentility that is so seldom heard in such music; for we younger musicians must make all musical expression over into the hard, tense expressiveness of our own day.

The famous "farewell," in which the musicians one by one blow out their candles, and leave the stage as the Hayda Symphony nears its end, was enacted in full for this performance. You can hear it—a series of busses and jiggles as the departing players knock into chairs and music stands on their way out.

Haydn: Symphony No. 94 ("Surprise"); No. 101 ("Clock"). Vienna Philharmonic, Monteux. RCA Victor LSC 2394 stereo

Papa Monteux, whether conducting in Boston or Venice, is a superb interpreter of Papa Haydn, Frenchman or no. I suggest that Monteux is the brightest conductorial light in the RCA roster, and perhaps the best of the old forms still alive. His Haydn is (with Viennese help) turgid and lyric, in the old-retail and not in any mannered way, less old-fashioned sounding by far than Casals's (Casals Festival 1959, on Columbia, well) wonderful Haydn. In this Columbia recording, this man with the walrus handlebar mustaches and the jolly walrus face, he can make any orchestra of any nationality sound musical.

Wagner: Das Rheingold (complete). Flagstaff, London, Svanholm, Kmett, etc. Vienna Philharmonic Salzburg. London OSA 1309 (3 stereo) 90006

It seems to me increasingly clear that opera on records must be judged on its own impact, quite separately from stage performance—and that this new form of opera listening brings tremendous new vitality to the operatic medium. In some ways—again, the larger the orchestra, the better the results, with the opera's sense of the opera itself. For the singers' benefit, the more of this sort of realism in recording session, the better the results, with wise microphoning.

Unlike many opera recordings, then, this one features the singers at "stage distance"—minus solo mike. In stereo, it works wonderfully well. In mono, the effect is less good, since close-up recording tends to make up for the lack of spatial literalness inherent in the mono medium. The stage motions are handled expertly here: not a trace of false or exaggerated movement, no singers seemingly squeezed in space (not even the swimming Rhine maidens!), none of the sea-sock stereo that sometimes comes forth in our less inhibited stereo operas. Indeed, I found the imaginative illusion actually more effective than the dated stage effects still promoted in most live performances.

To follow the actual text here, in German and English, the Wagnerian as opera-goer can do ever, unless he knows the music and the words by heart. I found it a gripping and in a master stroke with very few weaknesses and an abundance of strength.


I'd vote this the finest chamber music recording of the year—if I had heard all of them. It's the best I've heard myself, anywhere.

Here is a young French team playing German music, to perfection. Generally speaking, the French don't dig German art nor Germans in as their genuine "German" likes, they manage a real passion for Beethoven and a considerable preoccupation with Schumann and Brahms. Somehow, these super-Germanic musical leaders of the last century are now removed from politico and even from nationality in the French mind—they are true classics of the Western musical art, from the French viewpoint. Given the right place, given the right performers, French playing German music can be superb. This is it, right here.

Entremont, in his mid-twenties, is already a wonderfully imaginative pianist, enthusiastic in everything he plays, full of intense energy but every bit of it effortlessly controlled. You'll be aware immediately of his exciting personality here—be a Russian, a Rudolph Serkin, electric, dynamic, but gentle too. His entire output of Brahms is now available, going straight into Beethoven's musical expression, without a trace of the show-off virtuoso anywhere. Gendron is in comparison a somewhat restrained player on the cello, even less the showy virtuoso; but his technique, as well, goes efficiently into Beethoven's music and the teamwork between the pair is breathtakingly subtle in the smallest detail of phrasing or dynamics.

In Brahms, these two are excellent but not quite as much as at ease in the brilliant mid-eighty-period Brahms. For our time, tends to be overpoweringly heavy and, indeed, he requires a certain maestoso for good effect. The maestoso is here, outwardly, but I feel somehow that it is not entirely comfortable for these light-fingered and ebullient technicians. Nevertheless, sheer musicality, the deep understanding and expression of the musical language itself, carries the Brahms into the higher regions of fine playing.

The stereo version adds a nice sense of space around the piano and places the cello modestly to one side for a very natural illusion of living music in the making.

Netania Davrath sings Folk Songs of Russia. Orch. cond. Robert DeCormier. Vanguard VSD 2056 stereo


Folk music comes in sharply different categories these days—here is one recording in thoroughly classical style and another in a local popular manner, both musically top rank- ing for my ears, in the material and the delivery.

Netania Davrath, from Russia and then Israel, is said to be equally at home in Mozart. Verdi and Russian folk song—she is very much so in this folk song, which she sings with a notably good Russian style and to a typically cossack-style orchestra. Her voice has that peculiarly whispy, little-girl brightness that is so wonderful in popular Russian choirs, and a number of the songs are ultra-familiar and very beautiful, too. I've heard some such as "On ice" sung less conveniently by the great Piatinsky choir. Davrath is just a good. Leon Lishner sings his American Yiddish in the noble style of Schubert and Brahms—a prestige duet with piano accompaniment. No matter; the singing is beautifully done and the music is good too.

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AFL 1923/AFSD 5923

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Sing-Along in Yiddish with Marv Kurz.
Golden Crest 3076 mono

Here’s more Yiddish, but of an utterly different sort! The craze for the so-called sing-along (a sort of audience-participation kick) is spreading all over the place and here a genial New York popularizer named Marv weeps and shouts and antics his way through these very New-Yorkish old-country songs, with a batch of his friends to help him out. It’s raucous, loud, exaggerated, but heart-warming for plentty who know the old songs—the Sweet Adeline repertory of Yiddish—and amusing for many who don’t. Musically not exactly profound and not in the least bit Schubertian.

Songs of the Sabras. Karmon Israeli Folk Dancers and Singers.
Vanguard VSD 2059 stereo

And finally, the newest in Jewish musical expression, the budding Israeli folk-popular music. No question about it, the Israeli musicians are right when they say: our music is borrowed and not yet mature—but give us time. There is, indeed, already a recognizable Israeli style even to such distant eyes as mine, in spite of the divergent origins of a lot of Israeli material, its relatively oversimplified and unstable harmonies—sometimes sounding almost British or Scotch—and its unassimilated near-Eastern aspects.

In this recording, you’ll notice a peculiarly intense singing style, the voices childishly earnest (in the best sense) and without a trace of vibrato. Yiddish is clearly dominant; common purpose shines through the whole performance, malice of a sort both pleasing and, a bit, leads to aunneres. And yet these Hebrew-singing voices are haunting, even in their not-profound music: the relatively crude little canons and counterpoints, the girls against the boys, have a ring of newness and truth.

Especially, I like the vocal quality and the amazingly expressive effect of the absence of vibrato. What couldn’t we do with voices like this for Bach, for madrigals, chansons of Renaissance Europe! But these people wouldn’t be interested. They have their own musical job to do.

Behind the Great Wall. (Sounds and music of China, from the film of Robert Menegoz.)
Monitor MP 525

Here, if I’m right, is part of the sound track of what turned out to be the first snip—scents of old China and new, released straight into your nostrils as you watched. The picture wasn’t taken with that in mind, though, and the music as here presented doesn’t smell at all. It’s interesting and so are the sound effects.

The disc is of course only a brief excerpting of the complete film, but the job is well enough done as such things go. A Western-styled orchestra of native instruments play a “written-down” musical suite, here and there in the continuity, the movements of which are interspersed with other recordings as a sort of binder—the crudely Western harmonies of this music are revealing, with a strong feel of Russian pops music in them the one clear outside influence of “our” civilization in the record’s music. Against it, the purely native sounds of music and people give a frightening glimpse into the utter foreignness of this enormous and dynamic civilization, bursting its seams so ominously now, as well as enchantingly in the hearing. It doesn’t take much on-the-spot recording today to project flat China on the march in vivid fashion.

Non-musical sounds here include a children’s chanted reading lesson in Peking, some vigorous city street noises, (the new and the old dynamically jumbled together), an ancient marriage procession, river traffic in a Chinese gorge, the sound of the first train over a new railroad bridge and the people screaming for joy, railroad work chants, adapted straight from the Folk by former boatmen, and so on. The sounds are strung together a bit confusingly, with few breaks.

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Folk Songs of the Louisiana Arcadians. Recorded in Grand Momou, Louisiana. Collected by Dr. Harry Oster. Louisiana Folklore Soc. LFS A-4 (Folksong Recording Co., Baton Rouge, La.)

This is quite a fascinating record of still-existing French folk music in the deep south of the U.S. in spite of some rather crude editing of the on-the-spot documentary types. Like most such special recordings, an impressive roster of participants, editors, commentators is given but the sole source of the actual LFS is omitted—I give you the name of the commercial producer above, who should know where the darned thing is available.

The Arcadians ("Cajun" in modern slang) were French settlers in Nova Scotia who were mercilessly driven out a century after their arrival when the British took the place over—that would be around 1714. They ended up in Louisiana, which passed from the French to the Americans direct, and there they still are—amazingly enough—singing some French and singing it, too.

The Cajun folk songs are a bit like those of French Canada. French with superimposed modern influence, the French aspect reflecting the song and language of a forgotten age, preserved through the folk process of transmission. The music here is divided (by the editors—not the singers) into that dating from the nineteenth century and after, versus the Eighteenth century and earlier, though all of it, of course, is performed in its present-day living form. The mixture is a curious one, the distinctly French aspects of the songs blended into a good deal of equally plain American hill-billy style, as perhaps of the Quakers in the North. Harmonica and guitar are heard in force; this is not "reconstructed" nor "authentic" folk music in the scholarly sense but simply the music that still exists of its own accord in the small and relatively isolated town where it was taken down.

Editing problems involved two typical folk phenomena. First, many songs tend to go on and on, too long for the LFS requirements. Second, the singing is done at a sort of party affair, with much talking, laughing, applause. The editors have made uncomfortable fades in a few songs and have chosen to give a tantalizingly small segment of the always interesting after-comment that follows each performance. More would have been in order, surely.

The only proper solution to this problem is to arrange the original recording so that there can be clean breaks of silence after each piece—but this is more than most editors can pull off under the somewhat harrowing circumstances.

A book of background material and complete texts in English and French comes with the record.

3. BACH, HANDEL & CO.

Handel: Acis and Galatea. Joan Sutherland, Peter Pears, Owen Brannigan, David Galliver, St. Anthony Singers, Philomusica of London, Boult. L'Oiseau-Lyre SOL 60011/12 stereo

This is an early unique by Handel, charming and wonderful in its formalized mythological fairy-tale-beach, the giant Polyphemus, the hero's touching death and his conversion into a god. The whole thing is a series of fanciful tableaux, more or less in the Italian opera fashion—the action happens in fits and starts, followed by long musical commentary. Since the music is to what we are after, the convention is near-pleasant:

First listen to it, and it is particularly nice to bear the Collegium musicum's very thrilling, borrowing mightly from Henry Purcell of England and from his Italian friends on the continent too, skillfully pulling together the best of every style he had encountered in his traveling career.

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AUDIO • AUGUST, 1960 63
making sense of the story even when the words practically fall over themselves in confusion.

**Handel: Israel in Egypt. Miriam Burton, Betty Allen, Leslie Chaboy; Desoff Choirs, Symphony of the Air, Boeppl. Vox STPL 511.642 (2) stereo**

I have no hesitation in being partial to this recording of Handel's most dramatic and perhaps the greatest oratorio: this is without any question the best recorded performance of it so far, by a wide margin.

It isn't the solos, whose role is relatively small. It isn't the orchestra, which is large and was interestingly distributed to bring out the brass and woodwinds and the tympani. It is part the chorus, which is a double one in most of the work, one bank of singers on each side of the orchestra. The impact, via Paul Boeppe's conception, is mainly in the sheer cumulative drama of a work that obviously—once you hear it in this fashion—was not a done with exactitude or authenticity. Too many performances just let it ride along, in the old fashioned oratorio manner out of the Nineteenth century, degraded to a stodgy musical lip service.

The recording is one of those rare concert tapes that come out sounding like recording sessions, with the added alliveness of actual performance. There are almost no audible audience sounds, the balance and stereo effects (Carnegie Hall) are remarkably good, the musical boop-boos are few. (A few sections were done over after the performance, to correct faults.) Only one major slip got into the record: it is in a solo part and you'll need experienced ears to spot it.

The astonishing impact of the Handel music in the performance was somehow captured in the recording as well. I had my fingers crossed; I was amazed to hear how successfully it had been managed.

Note: The audience was asked to pause before clapping, so there are no sounds of applause to mar the endings.

**Handel: Concerti Grossi Op. 6, Nos. 1, 2, 3. Handel Festival Orch., Halle, Horst-Ton Margraf. Epic BC 1074 stereo**

Halle, in Saxony, was Handel's birthplace and Halle has a good claim on the composer who is usually known as the greatest of musical Englishmen. It is decidedly interesting to hear this remote German conception of these concerti, so very much a part of Handel's output, so clearly out of continental music of Handel's time, too, and this set of performed music is unusually rewarding in several respects.

First, there has seldom been such a clear presentation on records of the sound of the concerto grosso, with its larger body of "vulpines" or orchestral strings setting off the solo trio, two violin duets, solo violin, the harpsichord. In older performances the very shape of this contrast was garbled; the solos and harpsichord were often omitted. In many recordings of technically proper performances, the solo group of players is mistakenly so amplified and reverberated that the relationship is utterly falsified. Here the balance between the solos and the "tutti" is exactly right, the dramatic interchange between the two groups too, is perfectly achieved. Don't study music history—just listen to this! It tells its own story in seconds.

The solo fiddlers (the cello and harpsichord provide the bass and harmony) are sharp and clear, not loud, as fiddlers should in the live performances: the main orchestra's music is much louder and fuller, in contrast—which is obviously as it should be. (The intensity of the solo violins usually throws the balance the other way, with the solos louder than the orchestra.) Somebody in this recording crew knew his baroque music.

Next, the playing is notable for the pure, bright string tone, light and almost Italian in style, marvelously clear in the harmonies. It is a classic sound, readily, almost obviously, that there's even an indication of the vastness of such a blend in what Handel could write here. To hear it in the mind has been music fairly blossoms under such treatment.

And yet, I must note a characteristic mod-

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(Continued on page 61)
and all that

CHARLES A. ROBERTSON*

STEREO

Bill Russo: School Of Rebellion
Roulette SR52045

Stan Kenton: Standards In Silhouette
Capitol SR 1394

Since January of 1959, Bill Russo has scheduled weekly rehearsals of an orchestra which he calls a school for composers, musicians and listeners. Of the twenty-two members in attendance on its LP unveiling, about half stayed the full course and numbered among those are some of the top studio names in New York. Meanwhile, Stan Kenton plays a set arranged by Bill Mathieu, one of Russo's students and a fellow Chicagoan who helped in the planning of the orchestra. As Russo got his start as an arranger in January 1956, the interlocking influences of a decade are now brought full-circle.

Although attacking the established order, Russo's revolution is affirmative rather than destructive and will require considerable time to accomplish. Its immediate effects are a general lightening of orchestral textures, the absence of screaming brass, and a subtle control of dynamics. Four cellos add a colorful touch, and the percussive drive of Ed Shaughnessy keeps the ensembles from sagging. Whether Russo finally achieves all his goals or not, he now commands a remarkable orchestra and articulate soloists.

On display are several Russo compositions and a statement of musical intent: "Our music is American, but in a different way than most jazz today. America is a bit like Emerson, and Thoreau is better and stronger than the America of Norman Mailer and Tom Wolfe. This is the mainstream which attracts me—an America which is fresh and new and vital and strong. This is more to this country than the city dweller, the Negro slave, the machine. There are the farms of Illinois, the precise churches of New England, reminiscences of Spain in Tampa and Santa Fe, and beautiful horses. We use the traditions of Europe as we wish. Our credentials are not from Europe's institutions but we are not afraid to use anything the world offers us."

That seems like a tall order, and Russo would hardly claim to have filled it in the space of one LP. But he shows great promise since Kenton's days, retaining the best elements of the style while leaving brittle concertizing and Hollywood-free way jazz far behind. Today he stands closer to the syllacan reaches of Tanglewood, or the searching insight of an Esthetik On Clark Street. Included is a brilliant arrangement of Manteau, and cellist Seymour Barab solos on Fred Carlin's jaunty What The Difference. Other soloists are Frank Solosov, Dick Meldonian, Bill Elton, Larry Wilde, and Lou Levy.

One of Russo's theories of composition divides the orchestra into halves, allowing for questions and answers between members of the same section and making the whole less unwieldy. This he does with the rhythm section centered on the piano. Because Russo planned it that way, the effect is more pervasive than when arbitrarily contrived in the studio or on the arrange desk.

Stan Kenton is always sensitive to new jazz trends, especially when they come staked out for his band. Not that Bill Mathieu asks for anything in his arrangements that is unusual. But Kenton is often too pretentious in concert, overly romantic on ballads, or too frantic to give bass a turn to straight jazz. That calls for a bassist who assigns a tune exclusively to one of these categories. Mathieu's treatments bear the concert tag, but the point is never belabored. Instead, he strips away orchestral devices that once were considered modern and places emphasis on soloists, generalizing them off with melodic statements before building and resolving tensions. Proper tempering and superlative stereo makes this one of Kenton's best albums.

Hoff Elison's trumpet expresses the melancholy of Meaning Of The Blues, and trombonist Joe Solomon is featured on the soothing heard When Sunny Gets Blue. Charlie Mariano's alto sax ascends to a climax on Etiquette, while trumpeter Archie LeCoute and Bill Trullio on tenor sax, tell the story of Lonely Woman. This last title is a lovely Benny Carter tune, not the Ornithole Coleman original of the same name. When Kenton or Russo creates an orchestral background for the new alto-sax discovery, the millennium will be here.

Eddie Condon: Tiger Rag And All That Jazz
World Pacific 1292

Jack Teagarden: Jazz Meets The Huckleberry
Roulette SR25119

Two good reasons for the dominance of dixieland in New York's smart East Side clubs are set down here with due regard for tradition. Eddie Condon's classic twenty-seven piece, composed of both former and present employees at his emporium and the New-Jersey Band tunes. Rex Stewart, Cuddy Cutshall, Bud Freeman and Herb Hall make up the front line, while Gene Krupa provides a rhythmic propulsion on drums. Revises are Sexton, Orrick Wales, Lazy Dazy, and Reissues, John Snirtz, during his short stay with World Pacific, provided the date with the niceties of balance and stereo placement.

Jack Teagarden leads the band which he brought to The Roundtable, this time in a studio, and the audience response of his last release is replaced by a relaxed, more atmo-sphere. This is a program honest punchline, a bonbon sings A Hundred Years From Today, assisted only by Don Kenton on piano. Dewell contributes Roundable Bop, and a freshly conceived solo on Tin Roof Blues. Besides writing the tunes, Don Goldie displays increasing ability and an trumpet tone and style remarkably like King Oliver's. The leader also localization Ever Lovin' Baby, Ants Hugor, and Ain't 'Chad Glad. His trombone sounds especially golden in stereo.

Andre Previn: West Side Story
Contemporary S7572

Bill Evans: Portrait In Jazz
Riverside RLP1162

If the proof of jazz versions of show tunes is in the inventiveness, then concentrate here— and to some extent Leonard Bern-stein's West Side Story, what are three men, but Andre Previn and His Pals are experienced at handling musical cliffs. The pianist started the jazz career with Shelly Manne back in 1956, and the pair have alternated as leaders for a long series of best-sellers. With an assist from bassist Red Mitchell, they surmount their biggest obstacles in date. In the best of stereo, it makes pleasurable listening. Ben Shahn's painting "Handball" is reproduced on the inner cover.

Bill Evans engages in an attempt to gain wider public acceptance on his current LP. The fact that it comes a little late should not deter any of his admirers. Due to the success of previous efforts, the pianist recently completed a cross-country tour and his reputation is steadily growing. Accompanied by bassist Scott LaFaro and drummer Paul Motian, he offers melodic improvisations on When I Fall In Love, Spring Is Here, and That Is This Thing Called Love. Neither of two originals are quite equals Peace Piece, from his previous split, or the long list of best-sellers. With that in mind, the pianist offers on one side An Old Man With A Horn, and on the other side a trio with drummer and saxophonist.

Ray Bryant: Madison Time
Columbia CS8267

Wild Bill Davis: Dance The Madison
Everest SDBR1094

While part of the music industry is turning former rock-and-roll stars into balladeers in an attempt to keep teenage audiences, another section is capitalizing on the traditions of the market by gradually converting it to jazz. Credit for the deepest inroads goes to The Madison, a new dance steps in popular with Ray Bryant, the same pianist who accounted for the hit solo-Love For Sale. Now listed among the top sellers and on the other label, he accomplished the switch without compromising his high standards in the slightest. Of course, the beat is kept prominent for dancers, and the music faithful, unemotional traits which some others still use to attract the youngsters. Buddy Tate and his tenor sax, while an exception, and Urbie Green are the trombonists. Harry Edison plays trumpet, and among the numbers, stars in his Cigarette suite with The Huckleberry. Besides the title tune, two new duo compositions are included, with Ray Morrison calling off the directions for Split T, and Hot It!
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Just which Madison Street the step was named after is uncertain. But whether it originated in Detroit, Baltimore or Cleveland, there can be no doubt about its antecedents going back to the Chicago of Pine Top Smith and beyond. Wild Bill Davis moves it along a bit further on its new career by transferring the catchy rhythms to organ, aided by the essential drummer and a complement of Jassmen. Among other tunes given the same danceable treatment are *Soft Winds*, *Flying Home*, and *Intermission Riff*. Both liners provide dance charts, and the stereo in each case is unhurt by the obnoxious sounds which once soothed adolescent ears.

Gordon Jenkins: *Presents Marshall Royal*  
*Everest SDR1087*

George Shearing: *White Satin*  
*Capitol ST1334*

Listeners who like a modicum of jazz and a plethora of strings will find the experts on these albums creating a restful mood. Besides leading the Count Basie sax section, Marshall Royal keeps a watchful eye on other departments in the band. When one of his rare alto-sax choruses gets on record, jazz critics throw brickbats at the velvety tone. Musicians are more tolerant, especially since they know that only Benny Carter and Johnny Hodges can reveal the melodic possibilities of the instrument so thoroughly. More adventurous than when he provided Louis Armstrong with a string background, Jenkins alternates on piano with Hank Jones. The twenty-two members of the ensemble are spread across the stereo stage, while a fourteen-piece choral group and Basie's rhythm section splash colorful effects about on occasion. Jenkins revives *Bluejay*, and provides two fresh originals. Skip this one into an old Jackie McLean liner—and enjoy it.

George Shearing's profitable incursions into the mood world are looked upon with even greater disfavor in jazz circles. But the pianist always picks such gorgeous tunes as *That's A Small Hat*, *Old Folks*, and *There'll Be Another Spring*. Billy May's arrangements permit a covey of woodwinds to nestle among rustling strings. Better keep the liner, the photo on the cover is a collector's item.

Les Baxter: *Teen Drums*  
*Capitol ST1355*

Buddy Morrow: *Poe For Moderns*  
*RCA Victor LSP2208*

Should some organizations stamp approval on good records for teenagers, it might help parents make a suitable selection, yet drive young customers away in droves. While uncompromising in its rhythm, *Poe For Moderns* is likely to be too irksome for payol-wise elders or too cultural for the junior set. Les Baxter surrounds jazz-rummer Milt Holland with a battery of Afro-Cuban, Brazilian, and Puerto Rican percussionists, then lets the whole rhythmic gang loose in stereo. Only once does an electric guitar get out of hand, but Pins Johnson's tenor sax keeps temperatures on the rise. Plenty of side effects from hand cymbals, tambourines, and timbales, in addition to booming conga drum.

Buddy Morrow translates the writings of Edgar Allan Poe into stirring big-band performances—designed to shock, amuse and educate. Bernie Green, Ray Martin, Charles Grean, Norman Leyden, and Bob Dave are among the composers of the spine-shaking interpretations. The Skip-Jackma, one of the brightest new vocal groups around, sing *The Hilda*, and *The Revena*. Keith McKennis, a teacher of high-school English, recites *Ameisem Lee*, and Ulliano, just as he does for his students in Bellport, Long Island. Chances are they will play his versions for their youngsters.

The Windjammers: *RCA Victor LSP2196*

Oscar Brand: *Boating Songs And All That*  
*Billge*  
*Elektra EK57183*

Either of these albums is awash with enough hearty humor to buoy up the spirits of a roguish of boating enthusiasts on forced leave ashore. A vocal trio formed by Norwegians, the Windjammers hope to continue careers launched in the Louis de Rochemont film of their nine-month voyage on a three-masted square rigger. It must have taken Viking courage to invade a studio in Nashville, the stronghold of country music, but engineer Bill Porter repays the visit with good stereo treatment. Not are they afraid to take friendly digs at Harry Belafonte and the rival Kingston Trio. They are Harold Tuseberg, Karen Teriland and Sven Erik Lahnke, who appeared on the screen as pianist with the Boston Pops, and a broad Scandinavian accent suits each song. *Beastik Bill*, in fact, was anticipated with an extra syllable to fit *Hercules Bill*, but it turns out to be set to the tune of *Buffalo Gals*. Among sea faring songs included are *Banjo Man*, *Eddystone Light*, and the theme of the film.

Oscar Brand commissars a spanning new set of original tunes dedicated to the sail and power boat fraternity afloat on coastal and inland waterways. The log is complete with entries on boat shows, power squadrans, skin divers, the small boat mob, and the yacht club boys. Some of the lyrics are too risque to pass customs, while others are nautical but nice. The only one not penned by Brand happens to be one of the best, a fervent plea to *Give Me Home From Old Manhasset*, credited to Gene Raskin. Masquerading as a second group of accompanists called The Sea Wolves. They stride manfully about the deck, surrounding the singer in stereo engineered by Hoyt Hughes of Gotham Recording.

**MONO**

Jim Chapin and Bob Wilber: *Fun With Drumsticks*  
*Music Minus One MMO125*

Oronim Zabar Troupe: *Horo*  
*Elektra EKL186*

Either of these aids to self instruction should also come in handy to get rid of summer doldrums or as a refuge from campaign speeches. Acting as guiding spirits for novice

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A mediocre tube is like a mediocre singer!
An drummer, George bass on sock hand, keeping changes in to been enunciate than complicated "paint a brush," rather than notation. More complicated than the "monochromatic" style usually given beginners, it is still easier to enunciate than "pork chop and lye-soaked notation," the phrase which causes Gene Krupa's facial contortions. Anyone who has been raised out of bed to prepare a bottle and a howling infant in the middle of the night should be able to master it without too much trouble.

Advanced students will find plenty of scope to demonstrate their wares during open spots in the ensembles on Ellington's Cottontail, and the Rumble-styled Like Help! Brink exchanges with solo bass will sharpen techniques on The Lady Is A Trump and Wilber's Pink tee. Chapin remains at the drum throughout the session to lend a steadying hand, keeping time with barely audible brushes on rock-crusted and softly polished strokes on bass drum. Pianist Hank Jones and bassist Willmer Ware are allowed to operate with less restraint. Due to the large variety of drum passages, Wilber and his cohorts probably play a wider assortment of breaks than any group since Louis Armstrong's Hot Five. Jim Notting, Uzabe Green, Phil Woods, or George Dussey take turns with Wilber, who confines himself to tenor sax, at stepping into the breach, he is a true or sixteen-year-old gap.

As the kit includes a pair of drumstaves, aspiring drummers can begin practice on the nearest combination work at once. For that matter the box itself makes a nice bonny pad. When your students start checking for warped staves, record dealers may take some comfort in the knowledge that there are not the only goods so afflicted. The company which prevails upon Saul Goodman to do a parade band album and resume manufacturing staves to go with it will be doing drummers a real service. Off the market for several years, this product of the New York Philharmonic Percussionist now is especially valued and the drummer fortunate enough to own a pair possess all others.

The Oranim Zabar Troupe invites all those who are thrilled by Israeli folk dancers to simulate the performance means by means of a com bined sing-along, dance-along album. Fred Beck, who directs the dance division at the drill St. YM.VHA in Manhattan, describes the four basic steps and gives detailed information on linking them together in dances which fit the dance tunes. Some are rich in tradition and others are creations of the new Israel. All are stimulating and the zestful rhythms are a sure cure for that tired feeling. The booklet supplied also lists original lyrics and translations. A stereo version is available and Don Zeitser's arrangements give the benefit of not extra acclimation, plus other in instruments added to those of the Israeli troupe. But some unusual grooves are more likely to receive a trip to summer camp or school gym.

Singin The Blues

RCA Camden CAL588

Pete Johnson: Pete's Blues
Savoy MG14018

Because of the short life of war-time shellac many recordings on these LP's are harder to locate in good condition than collector's items of thirty-five years ago. To try, Leonard Feather goes one better, extracting from RCA Camden a whole series of sides not previously released. By not attempting to compress the whole subject into one album, he achieves a rare feat for blues enthusiasts and a few surprises for jazz historians. His only request is a good blues and performances of such caliber as Pete Walker, Lilie Miles, Wills Mannison, Jimmy Rushing, Jack Teagarden, Eddie Lang, Johnny Motley, and Hot Lips Page. The price is low and the quality high.

The Pete Johnson rushes first appeared on August, 1960.
Jimmy Mitchell suited his actions to the words, nearly taking flight in picturesque swoop about the stage. Thurmon Rith first organized the group in 1930 at St. Mary Church in Brooklyn. Since then it has traveled extensively. In the encore it enjoys at present is largely due to the addition of Mitchelle about a year ago. A mighty-voiced youngster from Norfolk, Virginia, he shows great stage powers and should be around for quite a while. Adequate recording, and the program includes Old Rugged Cross and Trouble In The Land.

Professor Alex Bradford boasts the singular distinction of having appeared at both the Newport Jazz Festival and the Newport Folk Festival. The present collection is made up of recent outstanding single-sided, all composed and arranged by the leader. A female group features Master Battle on Big Wind Blowing and a fantastic coloratura soprano, Carrie Williams, on the title song. Its masculine counterpart offers the tenor voice of Jonathan Jackson on His Precious Love. Either group whips up enough intensity and volume to exceed the groove capacity. According to the latest information, John Hammond combined the two, added voices to bring the total under one direction to the Columbia label, and will release the result on Columbia shortly. It should be quite something. Better take this opportunity to prepare for it.

Memphis Slim and the Real Hotky Tonk Favorites FG3533

Al Smith: Hear My Blues Prestige Bluesville 1001

Because of the revival of interest in authentic forms of the blues, record companies have been presenting the阔 examples in recent years than in the entire first ten years of LP. In this instance, collectors have a choice between the studies of the leaders of the country blues or meeting a young urban singer who creates his own material. Much of Memphis Slim's work seems somehow to be pared to older pianists, but the experts may want to decide whether Sam Jones Blues, a tune remembered from days in Memphis, supplies the missing link between Morton's "Spanish tinge" and the boogie-woogie train blues. His second ad-lib concert at Folkways finds him in a single mood and there are only two piano solos. His right hand rings out percussively on The Belle, a figured bass changes through Boogie After Midnight. His versions of familiar blues are highly individual, especially John Henry, How Long, and Redd G. Little Girl. The origins of the new dance step, Madison Time, are disclosed on Pike Top's Boogie.

Al Smith gained experience with the Gospel Clefs and various church groups before switching to the blues field at the insistence of Eddie Davis, the driving tenorist who lends support on the singer's first LP. In addition to his flexible tenor voice, Smith possesses the knack of writing original tunes in the new hybrid style that combines gospel and blues. The six heard show a deep blues feeling and are more worthy of attention than the work of the many gospel graduates who have climbed on the bit parade. Of course, that could be Smith's next step, so collector's are advised to listen to him now. Shirley Scott plays the organ, along with bassist Wendell Marshall and drummer Artie Edgertoll.

Freddie Redd Quartet: The Connection Blue Note 4027

If listeners to The Living Theatre's off-Broadway production of "Plague of the Drowning Men" are disappointed in not finding a sentimental exposé of narcotics addiction, apparently they are satisfied enough by the music. That is the word along to friends. In spite of mixed reviews, the play has just embarked on the second year of its run and Freddie Redd's music, which forms an integral part of the action, is now available as performed by the musicians in the cast. The composer took on the difficult task of describing the varying states of mind which Jack Gelber has his characters endure as the play progresses. At the same time, the music must seem improvised by jazz as well as theatrical standards. The result also is likely to disappoint the listener who expects melodramas. Nor will it please the cool, hip nightclub audience which results being carried below the surface of emotion. Forced to avoid outward manifestations of joy, anger, or hope, Redd relies on the blues to express inner truths that the author can only hint at in words. There can be no doubt that his work benefits greatly from Redd's sympathetic approach.

The restrictions imposed are not so stringent as to preclude humor on Wigglin', derision on Music Forever, and tenderness on Theme For Sister Carnation. Besides being an ideal choice for the alto-sax part, Jackie McLean still makes his solos seem freshly minted. Joining Redd at the piano in the rhythm section are bassist Michael Mattos and drummer Larry Biddle. As the music requires, all the personal involvement the listener can give, those unable to view a performance are urged to read the play, now readily accessible in a paperback edition.

Says Larry Zide in

about the DUAL-1006 combination turntable/changer

...compares favorably with the best manual tables in all respects.

Rumble, both lateral and vertical, was exceptionally low...It has, further, an arm that tracks exceptionally well at tracking forces equal to those of fine transcription arms. If you desire...automatic (changer) features...and also wish the finest turntable-arm performance, then the Dual is as close to this ideal as can be had.
eps. Yet, as shown in Fig. 11, NAB equalization calls for bass boost to start at 3150 cps. How does one reconcile this seeming contradiction? The answer, in broad terms, lies in the fact that, within a certain range, various playback equalization curves prove feasible at a given tape speed. In other words, the point at which bass boost reaches 3 db, known as the turnover frequency, can vary within a fair range and still permit relatively flat response through suitable adjustment of record equalization.

When the bass turnover frequency is changed, this in turn changes the requirements for record treble boost in order to achieve more or less flat response. If the bass turnover frequency is lowered, less record treble boost is needed. When the bass turnover frequency is increased, more record treble boost is required. In sum, the amounts of playback bass boost and record treble boost vary in the same directions. The advantage of more record treble boost is that more signal is recorded on the tape, resulting in a better signal-to-noise ratio; the disadvantage is that the greater amount of record treble boost raises the danger of excessive distortion.

Figures 13 and 14 serve to clarify how it is possible to employ various combinations of playback bass boost and record treble boost at a given tape speed. Figure 13 illustrates the situation where relatively little record treble boost and playback bass boost are employed. Curve A-A is the original, uncorrected record-playback response. Curve A-B represents record-playback response after application of treble boost in recording. The distance between Curves A-A and A-B represents the amount of treble boost that has been supplied. Curve B-B, which is a straight line, represents flat response after application of bass boost in playback. The distance between Curves B-B and A-B represents the amount of bass boost that has been supplied.

Now consider Fig. 14, where all the curves have the same meaning as in Fig. 13. Now, however, note that greater treble boost has been supplied in recording (distance between Curves A-A and A-B), so that more signal has been put on the tape, resulting in greater output at the high end in playback. And note that, in turn, greater bass boost is required in playback (distance between Curves B-B and A-B) in order to achieve flat response.

Change of Equalization with Speed

Possibly Fig. 13 or 14 or some intermediate combination of recording and playback equalization may be optimum in the sense of combining flat response with minimum distortion and maximum signal-to-noise ratio. At any given tape speed, however, the choice of record equalization must be made that gives the best overall performance.

Fig. 15. How Losser equalization works.

NOW...for the first time...a modestly priced professional stereo recorder that has exciting features found only in the finest instruments. You won't believe it until you see it!

FEATHER TOUCH PUSH-BUTTON OPERATION • 4 HEADS, INCLUDING SEPARATE 2-TRACK AND 4-TRACK PLAYBACK heads • 3 MOTORS, INCLUDING HYSTERESIS DRIVE • MECHANICAL FLUTTER FILTER • DYNAMICALY BALANCED CAPSTAN FLYWHEEL • INSTANT SOURCE/TAPE MONITORING • TWO RECORD/PLAYBACK PREAMPLIFIERS • INSTANT START/STOP • AUTOMATIC CUT-OFF SWITCH • 33½-7½ IPS SPEEDS • AUTOMATIC TAPE LIFTERS • TAPE LOCATION INDICATOR • SEPARATE MICROPHONE/LINE INPUTS, EACH CHANNEL.
speed there is only one optimum combination. Since a given playback curve implies complementary recording equalization that will achieve flat response, it may be stated simply that at each tape speed there is only one playback equalization curve which represents optimum performance.

The foregoing statement should not be taken too strictly. Thus it has been found that NAB playback equalization, considered ideal for 7.5 ips, can also be used very satisfactorily at 7.5 ips. True, a moderate departure from the NAB curve at 7.5 ips may yield better results in terms of distortion and noise; however, the improvement would be a slight one.

Going down the speed scale, namely to 3.75 ips and lower speeds, we arrive at situations where NAB equalization in playback would entail a serious sacrifice in performance. Thus a quality tape machine will accompany a change in tape speed with a change in playback equalization when the speed change entails going below 7.5 ips. In some tape machines, however, for reasons of economy, the same playback equalization is used for both 7.5 ips and 3.75 ips. The equalization employed may then be NAB or it may be an intermediate curve part way between the NAB one and the optimum curve for the 3.75 ips speed.

From earlier discussion it is obvious that as speed is reduced, greater treble boost is needed in recording to overcome the increased high-frequency losses. In other words, a reduction in tape speed also calls for a change in recording equalization. However, this is not always done. In some of the less expensive machines, the manufacturer may aim for response extending to about 15,000 or 16,000 at 7.5 ips, which means that without any change in record equalization response will extend to about 7500 or 8000 cps at 3.75 ips. Response extending to about 8000 cps surpasses the performance of most AM radios and permits a fairly good quality of reproduction, pleasing to many persons. Thus the manufacturer may consider that response to 8000 cps still gives the individual a good run for his money. (It hasn’t so many years since high-quality tape recorders offered response to only about 8000 cps at 7.5 ips.)

In a number of tape machines, despite their ability to extend response to 12,000 cps or better at 3.75 ips, there may be little or no change in record treble boost compared to that employed at 7.5 ips. Instead, these machines reduce the amount of bias current when the tape machine is shifted to the lower speed. This reduces the high-frequency loss due
to bias erase. Some tape machines employ a combination of methods, namely a change in record treble boost plus a change in bias current. Generally, it is sought to avoid treble boost at 3.75 ips substantially greater than that at 7.5 ips, for there is too much danger of running into tape overload.

Decreasing bias current entails an increase in distortion. Hence in recording at 3.75 ips with a machine that employs the latter technique it is advisable to reduce the recording level by several db. Experience will tell the operator how much to reduce level.

In machines which do not reduce bias current but rely on an increase in record treble boost to achieve extended response at 3.75 ips, it is similarly advisable to reduce recording level to avoid possible overload at the very high end.

**Equalization Circuits**

Equalization circuits are of two basic kinds: losser and feedback. Losser equalization, illustrated in Fig. 15, involves the principle of short-circuiting all frequencies to ground, but with some frequencies short-circuited to a greater degree than others, so that in relative terms bass boost or treble boost is achieved. Thus if treble boost is desired, a loss is produced at all frequencies, but with the loss growing progressively less as frequency rises. Conversely, if bass boost is desired, the losser circuitry produces more of a short-circuit at high frequencies than at low ones.

In the case of feedback equalization, the principle employed, as shown in Fig. 16, is to take the signal from one stage of an amplifier and apply it to an earlier stage, thereby cancelling part of the original signal, so that over-all amplification is reduced. The signal fed back to the earlier stage goes through a network that favors either the low frequencies or the high frequencies. If bass boost is desired, the network admits the high frequencies more easily, thereby cancelling the highs to a greater extent and achieving bass boost in relative terms. If treble boost is needed, then the network admits the bass frequencies more easily.

There are pros and cons for both losser and feedback equalization circuits. Feedback circuits are claimed to achieve less distortion. Sometimes they may also serve important ancillary purposes, such as reducing high-frequency losses. On the other hand, it is claimed that losser circuits, with suitable design, can be about as distortion-free. Above that, they can generally provide more exact equalization, and this equalization tends to be more immune from the effects of tube aging.
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**Features:**
- Small size and slim shape facilitate handling.
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**LIGHT LISTENING**

(from page 8)

sion albums that have been racking up enormous sales in the past few months. Such albums have replaced the train and the racing car we had in the early days of the stereo disc. Oddly enough, the pling pong antics devised by Chuck Mugie for the far-fung percussion section of this informal orchestra are less distracting than some of the side-to-side effects in this month’s choice dance band releases. The tunes are old reliables—Sheik of Araby, What’s wrong with you, Ma, Rangoon. The sound is easily the greatest excuse for buying the record. It is very clean in areas of the spectrum that most stereo discs do not attempt to enter.

Les Elgart: The Bond With That Sound
Columbia CS 8245

The dance orchestra directed a few years ago by Les and Larry Elgart was universally respected for the vigor of its individuality and the precision of its ensemble. Then the Elgarts decided there was talent enough with the group to form two orchestras. Larry went over to the RCA label with a band of his own while Les remained at Columbia. Several excellent stereo discs have been issued by Larry’s orchestra but this is the first stereo recording I’ve heard featuring the Les Elgart organization. Of the two bands, I must confess that Larry currently offers the more arresting arrangements for living room listening. It would seem that he had charge of the individualism in the old band. The relaxed heartiness of the Les Elgart beat is still there for dancing but the mixing and the arrangements heard on this record are far too channel-conscious for my taste. You can get away with anything these days if you’re turning out a novelty record for the stereo novice, but the toning of the melody gets here makes no more sense than it would in the ballroom. Unless your neck needs the exercise, get the mono version.

Guy Lombardo at Harrah’s Club
Capitol ST 1399

Sampled on a large and brassy stereo system, this release may stump a few listeners who haven’t paid much attention to Guy Lombardo’s stereo recordings. The average supper club often used for recording purposes, usually contains its livest sound at the customer’s tables. On the stage of Harrah’s Club at Lake Tahoe, Nevada, the Lombardo crew has chanced upon an acoustical environment that’s one of the surprises among the month’s releases. A swing band might present a problem if the same mikes were to be used in a room of this liveliness. In Lombardo’s case, this is the first recording in stereo that does justice to the brass foundation of the band’s lower reed and brass instruments. The lineup of tunes offers a wide sample of the music Guy is playing these days. The next time I put on the disc, (when introducing Aunt Hannah to the delights of stereo) I’ll skip the band with the two pianos in Humoresque and the group of songs contributed by the club audience. On the plus side, there are the newest additions to the Lombardo library—Love, Look Away from “Flower Drum Song” and Carmen Lombardo’s latest tune Return To Me.

Companeros de Mexico: The Sound of a Chorus
Medallion MS 7503 (Q 47003)

The Medallion label is a new product of Kapp Records. It is aimed, with elaborate packaging and good behavior in engineering practices, to the listener equipped to properly appreciate such behavior. Their first release shows promise as well as problems that should evaporate in future albums. This recording was made below the border in the studio of RCA Mexicana. A native male chorus and the noted Colombian baritone Carlos Ramirez, who won his greatest fame in Hollywood musicals, are the featured attractions. Since Senores Cardenal and Gonzales are top recording engineers in the production staff credits, we can assume that the singers had every reason to feel 2 feet tall in the stereo recording. The one Latin American country is represented but Mexican songs well known in the United States are the backbone of the album.

Devotees of folk music are bound to consider the style a bit too slick but local color will carry the day for the general listener. In my review copy, there was no sign of overdousing during loud passages—a blemish not found in the other Medallion discs.

Pat Suzuki: Looking At You
RCA Victor LSP 2186

The star of the recent Rogers and Hammerstein Broadway musical “Flower Drum Song” returns to the style of the opening phase of her career with this collection of ballads. Four years ago, as an unknown singer in a Seattle night club, Pat Suzuki was recommended to Larry Elgart by the help of Ralph Burns’ unassuming arrangements, the other half of Pat Suzuki’s personality has been represented by Mexican songs such as My Funny Valentine and I See Your Face Before Me.

Del Wood: Flivvers, Floppers and Fox Trots
RCA Victor LSP 2203

The major recording centers—New York and the West Coast—apparently do not dominate all facets of the art. If one feels compelled to produce an earthbound revival of the Twenties, the Nashiville studios of RCA Victor is a good place to start. Eclectic, there, under the custody of Del Wood, is a ten-tune recorded piano that can coax out the real flavor of Bye Bye Blackbird, Varsity Trot, and Tiger Rag. The small orchestra, selected for determination and precision, is loaded with snappy noise makers. If you’re a glutton for memories, the occasional intrusions by the chorus will seem far too few. These include such gems as When I was young and I thought of you.

The New Moon, White Horse Inn, and The Girl Friend
Epic BN 566

With very little fanfare, Epic’s light music division has been turning out a polished series of albums devoted to excerpts from the great musical comedies and operettas of the past. The tripartite company heard in the three records so far includes the Michael Sammes Singers and Johnny Gregory’s orchestra. The leading roles are sung by Doreen Home and Bruce Trent. Were these enthusiastic young performers less isolated than they are, these new productions would still be welcome because the catalogue has no recent sampling of Jerome Kern’s “The Cat and The Fiddle” or Vincent Youmans’ “No, No, Nanette” or “Show Boat.” The score from “Hit the Deck” is in the line light on the East Coast this summer. Among the open-air revival of the show at Jones Beach. The first two releases in this series were issued in March. In this third one, emphasizes the quaintness of show music of the Twenties.
DYNACO

- Stereodyne II Cartridge. Utilizing the variable reluctance principle, this cartridge made by Bang and Olufsen of Denmark is designed for superior reproduction from either monaural or stereo microgroove records. It has a frequency response from 30 to 15,000 cps ± 2 db, compliance of 5 x 10⁻⁶ cm/dyne, and an output of 7 mv per channel for a stylus velocity of 5 cm/sec. Channel separation is better than 22 db, and tracking force is from 2 to 4 grams. Recommended load is 47,000 ohms for rated frequency response. The unit employs an unusual construction, with the entire moving element being enclosed in a plastic cone permanently attached to a metal shell surrounding the body of the cartridge. It is mounted at an angle, as shown. The mechanism consists of a light muntz metal cross which is attached to a slender aluminum tube with the stylus affixed to the end. Four terminals. User net price, $29.50.

- J4-12 Universal Arm-Cartridge. A similar pickup to the Stereodyne II is unified with a novel arm for use with turntables or with minimum stylus force, which is adjustable. Unit mounted in a single hole. Distributed in the U. S. by Dynaco Inc., 617 N. 41st St., Philadelphia 4, Pa. User net price, $49.50.

ELECTRO-VOICE

- Magneramic 31MDS Stereo/Mono Cartridge. Employing ceramic elements in a pickup with a special printed circuit which is an integral part of the cartridge, the Magneramic 31MD-S is designed to be fed into the usual magnetic pickup inputs of stereo preamps. Frequency response is given as 20 to 20,000 cps ± 2 db, with a channel separation of 28 db at 1000 cps and an output of 10 mv. Compliance is 3.5 x 10⁻⁶ cm/dyne and the cartridge is available with either 0.5- or 0.7-mil stylus. The latter being recommended for use with transcription arms with a stylus force of 2-4 grams. The cartridge is also available for use in a steel input. Electro Voice, Inc., Ceci and Carroll Sts., Buchanan, Mich. User net prices: Magneramic 31MD-S, $24.99; same, for ceramic inputs, $22.56.

FAIRCILD

- Compatible Rotary-Magnet Cartridge. Model SM-1 is a moving-magnet pickup of unusual design. The stylus bar extends from a precision-ground rubber “ball” in which the

BUYER’S GUIDE

(from page 58)

You now have your choice of either quarter-track (Model SM-310-4) or half-track (Model SM-310) versions of the exciting new stereophonic tape recorder by Newcomb. Specifications for the two are identical. They are deeply satisfying to work with because they are cybernetically engineered. That is, controls are so arranged that the natural thing to do is the right thing to do. Tape movement is controlled by a central joystick...the easiest machines to operate you've ever tried...easiest on tape, too. Broken, spilled, stretched tape are things of the past when you work with a Newcomb recorder. And few, if any, machines include such a wealth of features. Newcomb recorders take any reel size—3" to 10". They have twin, illuminated recording level meters arranged pointer-to-pointer for instant comparison, four digit counters, mixing controls for “mike” and “line” for both channels, balance control, ganged volume control, two speeds—7½ or 3½ inches-per-second with automatic compensation for 3%. The Newcomb tape machine is designed to be an inseparable, dependable, indispensable companion for the serious recordist. Write for the complete story contained in Bulletin SM-3.


PORTABLE STEREO SPEAKER SYSTEMS—Four choices are offered, varying in size and efficiency. The model 60 speakers are used to reproduce big bass in a compact space and to achieve unprecedented sound coverage. Satin-wrapped 3-way networks, finished in black or white, are designed to blend with your decor. Arch brushes, grille cloths and covers are available in black or white. 

Model SA-60 portable 2-channel amplifier is a powerful and worthy companion to the Newcomb recorders...40 watts peak per channel...ganged controls—bas, treble, balance...rear store in cover.
For the discriminating audio enthusiast who has been searching for high quality at a moderate cost, the new PILOT "602" Stereo FM/AM Tuner-Preamplifier is a most logical choice. Here is extreme FM sensitivity—assured by the Amperex 6AQ5/ECC85 dual-triode. To reduce hum and noise to complete inaudibility (and to prevent microphonic) — 6-13AX7/ECC83's. For precise and effortless tuning—the 6F6G/EM84. For distortion-free power—4-6BQ6/EL34's. For absolute dependability—Amperex throughout!

These and many other Amperex 'preferred' tube types have proven their reliability and unique design advantages in the world's finest audio components.

Applications engineering assistance and detailed data are always available to equipment manufacturers. Write: Amperex Electronic Corp., Special Purpose Tube Division, 230 Duffy Ave., Hicksville, Long Island, New York.

AMPEREX TUBES FOR QUALITY HIGH-FIDELITY AUDIO APPLICATIONS

<table>
<thead>
<tr>
<th>POWER AMPLIFIERS</th>
<th>6CA7/EL34: 60 w. distributed load 7189: 20 w. push-pull 6AQ5/EL84: 17 w. push-pull 6F6G/EM84: 25 w. high current, low voltage 6845/EL32: Triode-pentode, 8 w. push-pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE AMPLIFIERS</td>
<td>6B5G/EL34: Sub-amp 12AT7/ECC81: Twin triodes, low 12AMT/ECC92: HighNoise 12AX7/ECC83: Microphonics 6BR/EC70: High gain, triode-pentode, low hum, noise and microphonics</td>
</tr>
<tr>
<td>RECTIFIERS</td>
<td>6V6G/6AS8: Indirectly heated, 90 ma 6CA4/E281: Indirectly heated, 150 ma 6A8G/E234: Indirectly heated, 250 ma</td>
</tr>
<tr>
<td>INDICATORS</td>
<td>6F6/E844: Bar pattern 1M3/6M79: Subminiature &quot;exclamation&quot; pattern</td>
</tr>
<tr>
<td>SEMICONDUCTORS</td>
<td>2N1517: RF transistor, 70 mc 2N1516: RF transistor, 70 mc 2N1515: RF transistor, 70 mc IN462: Matched pair discriminator diodes IN87A: Detector diode, subminiature</td>
</tr>
</tbody>
</table>

2 for the money circuit by tubes by Amperex

PILOT

For the better 5-7 grams. Frequency response: 20-20,000 cps ± 3 db for the VR225, and 20-17,000 cps ± 3 db for the VR227. Channel separation is up to 30 db at 1000 cps, and output is 9 mv for a stylus velocity of 5 cm/sec. Inductance of the unit is 420 milli-ohm, and resistance is 1600 ohms per channel. Recommended load resistance is 47- 000 ohms. Lateral compliances are 4 x 10^-4 cm/sec/gram and vertical compliances are 2.5 x 10^-4 and 2 x 10^-4 for the 225 and 227 respectively. Audio Components Section, General Electric Company, Auburn, N. Y. User net prices: VR225, $27.95; VR227, $24.95.

GOTHAM

Double Dynamic Stereo Cartridge. Said to be the first stereo cartridge, the Neumann Model DST features a low impedance (18 ohm) and is designed to work into a load of at least 50 ohms. Channel separation is over 30 db in the midrange and is greater than 12 db at 10,000 cps. Output is 1.05 mv for 5 cm/sec velocity, and the unit is intended to work at a gram's stylus force. Frequency range is from 30 to 15,000 cps, ± 2 db. This DST cannot be mounted in most arms, but will fit directly into SME arms. Gotham Audio Corporation, 2 West 46th St., New York 36, N. Y. User net price, $60.00.

GRADO

Moving-Coil Stereo Cartridges. Made in two models, the Custom for use in record changers and the Master for turntable use, these cartridges are similar in design. Both employ a moving element consisting of a hollow plastic cone on which are wound two coils and from which extends the stylus bar. This cone is supported in a rubber "grommet" which serves to hold the coils in the magnetic field as well as provide the necessary damping and alignment. The specifications given are for the Custom and Master series respectively. Frequency response, 10-24,000 cps and 10-30,000 cps. Interchannel output balance, 0.5 db on each; frequency balance, 0.5 db each; Output, 3.5 mv and 2.5 mv respectively at a stylus velocity of 5 cm/sec. Impedance, 1000 and 700 ohms; Tracking force, 3 grams each; Input load, any value over 5000 ohms for both models. Channel separation, in excess of 20 db and 25 db. In addition, the Master series is fitted with a radioactive element to reduce static accumulation on the record surface. Grado Laboratories, Inc., 2325 7th Ave., Brooklyn 29, N. Y. User net prices: Custom, $32.50; Master, $49.50.

PICKERING

Precision Pickup Cartridge. Designed for the discriminating record collector, the Model 350 is a moving magnet cartridge of excep-
tionally smooth response. It is fitted with a
removable stylus assembly, which comprises
the only moving element and which can be
replaced instantly without tools. Two types
are available, one for use with transcription-
type arms and the other for use in record-
 changers. Compliance is high, and the car-
tridge is practically insensitive to minor
record warp. Output is approximately 12 mv
per channel for 1 em diam. PICKERING & Co.
pany, Ltd., Fulham, N. Y. User net price
from $25.85, depending upon stylin.
Model 314 calibration standard ........ $48.00
Mk 111, Pro-Sound Series .......... $24.00

**PRIMO**

- Stereo Variable Reluctance Cartridge. The
  Primo variable reluctance cartridge model
  4506 is a hi-fidelity pickup with a single
  tracking force of 3 to 4 grams. Frequency
  range is 20 to 17,000 cps and channel sepa-
  ration is 34 db at 1000 cps. Compliance is
  1.4 x 10^-4 em diam both vertically and later
  ally. Supplied with a 0.3 mil diamond stylus.
  Power output is 0 milliwatts at a stylus
  velocity of 5 ems. PRIMO Co., Ltd., 1957
  Makuhari, Tokyo, Japan.

**H. H. SCOTT**

- Cartridge for Vintage '78 Records. Developed
  jointly by London Records and H. H. Scott
  Inc., the new 78 rpm cartridge has a 3 mil
  stylus and is interchangeable on the London-
  Scott arm with the Model 1000 stereo car-
 tridge. An ideal pickup for the owner of a
  collection of '78's, the new cartridge provides
  excellent sound from the older records. Stylus
  pressure is automatically adjusted when the
  78 horn is slipped on the London-Scott arm.
  Frequency range is 20 to 20,000 cps. H. H.
  Scott, Inc., 111 Powdermill Rd., Maynard,
  Model 1000, 78 rpm cartridge ...... $89.95

**SHURE**

- Professional, Custom and Standard Dynamic Model
  11V. The Shure Standard Dynamic model 11B-
  (Continued on page 88)

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The rehearsal was proceeding smoothly. The orchestra was one of England's leading musical organizations. Suddenly a passage containing descending chromatic runs for the violins slowed the section to a standstill. During several repetitions, the conductor sang, gesticulated, pleaded, but the expected results failed to materialize. Finally, the concertmaster, in the best tradition of English "leaders," came to the rescue: turning slightly in his chair, he directed the following words to the stands behind him—"If you can't play it, don't." The piece, proposed with such refreshing candor, was effective. At the next attempt, the violinist with the sticky fingers mimed his part when he reached the danger zone and the troublesome bars emerged clear as a Heifetz scale.

The preceding incident illustrates an especially happy relationship between conductor and players in which each recognizes the fact that there are times when, to paraphrase Ruggiero Ricci's remark to a violin class, "the hand runs cold." Co-operation of such a frank nature is possible, of course, only when there is mutual respect between the orchestra and its musical director. The ingredients which make up such a relationship are the subject of numerous books on the art and technique of conduct- ing. But much can be learned, too, from regular attendance at orchestral rehearsals.

The conductor's entrance into the hall at rehearsal time is always a revealing moment. If one were to calibrate the level of talk, random music and general hubbub of an orchestra settling down to work, one would surely discover that there is a correlation between discipline and noise. It is safe to predict that the conductor whose initial presence in the hall fails to bring about a sharp decline in chatter and clatter will have difficulty in shaping an effective performance. The rehearsal which begins on a note of quiet attention, on the other hand, is almost bound to be a healthy and fruitful one. There are many ways of evoking an alert response on the part of the players. Charles Munch tells of the conductor of an amateur orchestra in Strasbourg who hung a big bell from his stand and rang it furiously at the beginning of each rehearsal to let his presence be known. There are other methods. First and foremost, the conductor must inspire trust, not necessarily in what he is about interpretively, but in his ability to translate into succinct orchestral terms his concept of a given work.

For this purpose, a good voice is essential. It can be loud or soft, rough or gentle, demanding or coaxing; but, above all, it must be audible. There is a close analogy between conductor and singer here. One of the latter's principal concerns is to project his voice so that it carries to all parts of the hall, and yet retains a wide range of nuances and dynamics. The conductor, too, has a large area to encompass. Not surprisingly, the efficiency of his work is in direct proportion to the number of players reached by his voice. The conductor who has difficulty making himself heard beyond the inner ring of first desk musicians is in trouble, for the more remote player who is not addressed directly is not likely to raise his hand and ask the maestro to repeat his remarks or to speak louder. Instead, he will probably shrug his shoulders, converse with his colleague, or read the magazine or newspaper which he has propped up on his stand. When necessary, the concertmaster may repeat certain key instructions in a loud voice so as to avoid any ensemble catastrophes.

It is interesting, too, that an orchestra hears what it wants to hear. A soft spoken conductor of few words—Leopold Stokowski, for example, seldom has to compete with talk or other extra-musical sounds. His rehearsals are conducted with utmost economy: a few words directed toward an instrument or section to indicate color, phrasing, intensity, bowing, and the stamp of his personality is plainly felt. It is remarkable to note how the orchestra adjusts its noise level so that it can hear his softest comments. Antal Dorati is also audible at all times during rehearsals, although his voice is a cornet to Stokowski's viola. Of Dorati's voice, a member of the London Symphony Orchestra remarked, "You can't get away from it." And what a voice it is! Dorati's speech is rapid, articulate, and amazingly varied in expression. Neither conductor wastes words; every comment is meant to produce results. This is not to say that conductors who turn out great performances are always economical in their work methods. Shortly after World War I, William Mengelberg was rehearsing his famed Concertgebouw Orchestra in Beethoven's Coriolan Overture. After conducting the first two notes of the work, he rapped his baton and delivered a lengthy talk on the music of Beethoven. Once again, he began the work, stopped once more after the second note to add some further verbal notes on Beethoven. Following another repetition of the first two notes, Mengelberg then summoned the concertmaster to his side, and the two men pondered the significance of the opening bars. At least thirty minutes passed before the orchestra reached the third note of the overture. The performance at the concert was no doubt an excellent one, despite the
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**MICROPHONE CALIBRATION**

(from page 19)

where: \( f \) = frequency in cycles per second

\[ K \] = a constant

The constant \( K \), whose value is given in the derivation of the formula in the appendix, is not important if only a frequency-response curve is desired. Only if the absolute sensitivity of the microphone is required does \( K \) become necessary.

After the sensitivity has been found for all frequencies of interest, select one value considered an average and plot all the other points in db, using the selected point as 0 db.

**APPENDIX**

Derivation of formula used in the text. Referring to Fig. 1:

\[ e_v = S_E p_o \quad (1) \]
\[ e_m = S_M p_o \quad (2) \]

where \( S_E \) = sensitivity of \( L_E \) in volts per dyne per square centimeter.

\( S_M \) = sensitivity of \( M \)

\( p_o \) = pressure

However, since \( e_v \) is produced by a conductor cutting a magnetic field,

\[ e_v = B l v \quad (3) \]

where \( B \) = flux density of speaker gap, in gauss

\( l \) = length of the wire in the voice coil, in centimeters

\( v \) = velocity of the coil, in centimeters per second

From the “Ohm’s Law” of mechanical circuits,

\[ e = \frac{p_i A}{Z_m} \quad (4) \]
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535Kc/s~1605Kc/s x 2 for MW
3.5Mc/s~10Mc/s for SW

where $A =$ diaphragm area in square centimeters
$Z_m =$ mechanical impedance of the vibrating system, in mechanical ohms.

Combining Eqs. (1), (3), and (4):
$$S_m = \frac{e_m B_H A}{L_p Z_m}.$$  (5)

Referring now to Fig. 2, the pressure $p$ at $M$ caused by $L_p$ located $d$ centimeters away is given by:
$$p = \frac{rA v}{2d^2}.$$  (6)

where $r =$ acoustic impedance of the atmosphere, in mechanical ohms (41.5 for air).
$\lambda =$ wavelength in centimeters

The velocity $v$, for a current of $i$ amperes in $L$ is given by:
$$v = \frac{Bl i}{Z_m}.$$  (7)

Combining Eqs. (6) and (7):
$$p = \frac{rB_H A i}{2d^2 Z_m}.$$  (8)

From Eqs. (8) and (5):
$$p = \frac{riS_B}{2d^2}.$$  (9)

Now the pressure $p$ acting upon $M$ produces a voltage $e_m$ given by:
$$e_m' = S_m p.$$  (10)

Combining this with Eq. (9):
$$S_m = \frac{2d A e_m'}{S_B r i}.$$  (11)

Substituting for $S_B$ from Eqs. (1) and (2), we obtain, after eliminating $p$:
$$S_m = \sqrt{2d A e_m'/r e_i}.$$  (12)

However, since $i = e'_m$ by virtue of the 1-ohm resistor:
$$S_m = \sqrt{\frac{2d}{r} e_m' e_i}.$$  (13)

But $\lambda = v_f / f$, where $v_f =$ velocity of sound and $f =$ frequency in cycles per second. Thus:
$$S_m = \sqrt{\frac{2d v_f}{r} \left(\frac{e_m' e_i}{e_i^2}\right)}.$$  (14)

Thus a calibration curve for the sensitivity of $M$ can be obtained without the use of a previously calibrated standard.

REFERENCES
H. F. Olson, "Calibration of microphones by the principles of reciprocity and similarity." RCA Review, Vol. 6, July, 1941.
HI FI vs. STEREO
(from page 23)

Our policy is to advise and guide the customer into a decision which will provide the right quality of merchandise and satisfy his immediate and future needs at a price that is within his means, if possible. If he cannot afford the system as presented every possible substitution is considered with him, at the same time explaining the resultant compromise he must accept in going to lower priced components. Many times this approach results in selling the original proposed system even though it means straining the budget a little.

Honesty and a full explanation gains the confidence of the prospect in the majority of cases. The same interest in and consideration of the customer must be shown in delivering and installing his system just as carefully as though it were worth several times as much as he paid for it. Then follow up with a visit or two after installation to insure that all adjustments are right, and you have gained not only a customer but a friend as well, and possibly a prospect or two.

One more point in closing. We have confused the public by making such a concentrated issue of stereo. Many a prospect, wanting to be sure he gets the newest and latest in a music system, insists that it be Stereo rather than Hi Fidelity. There has been a sad lack of explanation to the uninstructed public that stereo is still high fidelity, only more of it in the way of components. In selling a system such as described above it takes some time to unself the idea that it is still made up of the same components with respect to quality as those used in stereo. Once done, is done, and sometimes it isn’t easy, the prospect sees the advantage of progressive build-up to stereo and the small difference in cost in the end. At the same time it appeals to many to be able to enjoy the benefits and pleasure of a good hi-fi system much sooner than waiting until it can be afforded as a complete one-time purchase.

RECORD REVUE
(from page 65)

Imagine that big-name artists are quite infallible, even in such an assembly as this. They aren’t. I could not play all of this record, frankly, though it has many powerful aspects inevitably, with such potent individual performers. The music simply is dose untold violence, in the blithely ignoring of current trends towards a taken-for-granted authenticity—the accompaniment is with piano, a “big-name” but wholly inappropriate, for all that—that’s even more importantly, in the sense of style, which is utterly at variance with Bach’s best interests as of today. Each of these singers, and each performer, renders his Bach in strictly modern high-power concert style.

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but what is worst for me is the unmusical, bouncy, hard, brassy, intractable rhythms, that drag the performers along against their better natures, and force all their pesty dis-agreeableness into the full play. This unsmiling and ugly ensemble must be attributed to the conductor, for here is the one who should be shaping and smoothing and blending the various personalities into a musical whole.

All in all, a dismaying bad recording in view of the potentially noble artistry available among these famous personalities, but I'll admit that the slow arias are good listening even so, for in them the hard rhythms are less able to assert themselves. Individual performers can take their own heads, so to speak, and express better what they know of the musical line—which is plenty. The fast arias are the intolerable ones.

I Solisti di Zagreb Play Telemann. (Four concerti, a sonata for strings.)

Vanguard BGS 5028 stereo

This excellent modern-style small orchestral attack is one of the many hundreds of works by the relatively facile Telemann, contemporaneous of Bach and much better known in his own day. The music, interestingly, borrows much of the then Italian style and is here played by an Italian-school orchestra of today; it sounds, to my ear, exactly like Vivaldi than it usually does. Somehow, the Italian aspects of the music are brought out here, whereas a German chamber orchestra would manage to make the very same music sound more German than Italian: (Telemann's influence on Telemann, too; it would be good to hear a French orchestra do these same works.) Thus do nationalistic influences continue to operate, even a couple of centuries after the fact.

The Zagreb players are about the best in the business and their styling is beautifully suited to Vanguard's rich but careful stereo mixing. Some particularly harmonic harmonies and drumming are here, marking Telemann for what he was, a facile composer who on occasion could do surprisingly profound. Two oboe concerti, one for violin and one for viola, plus a work for strings, all of them short and concise.

Reversed Cartridge

My favorite system of the three we tried for achieving three-speaker stereo sound is the one that I plan to make permanent, because of its utter simplicity and—let me face it—the ingenuity of it. No reflection on EC-V at all, but this one is more my own idea, for better or worse, and I've taken a fancy to it even though it has some very dangerous mental pitfalls as you think it through. I'll be in some of them still, for all I know.

This system has no transformers, no circuit changes in the amplifier at all, requires nothing extra other than the two leads to the third speaker. For convenience, I've added a cheapish pickup line as case I want to revert to conventional stereo, but you won't need even this if you stay faithful to this three-way arrangement.

All you have to do, for this system, is to hook your center speaker directly to two corresponding taps at the two amplifier outputs—one is hooked to the two 8-ohm taps. Volume control (an old rheostat, 50-ohms, did very well for all these systems) on the middle speaker goes without saying.

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Well, to tell the truth, I always get a bit nervous when I describe these simple things. Can I have made a ghastly mistake—am I utterly befuddled over something painfully elementary! Have I stuck my foot into my mouth?

Maybe, but I haven't finished yet. Two more minor changes—not additions—in the total circuitry. First, reverse the phasing of one outer speaker, and second, reverse the leads on one channel of your stereo cartridge—all as shown in Fig. 5.

WHAT! Doesn't that give you vertical response only? Fine thing. But—when—don't jump to conclusions. (I almost did myself, there.) It does not, because you are not parallelizing the two sides of the cartridge, reversed, which would indeed give you vertical-only response. Rather, you are still sending out two signals, to two amplifiers; you have merely reversed one set of leads before it reaches the amplifier input.

Now, if I am still on the straight and narrow track (I imagine I'm falling into another abyss at each stage in this argument), the amplifiers don't really know the difference, so to speak, when the cartridge signals are reversed. Yes, I know there are ominously subdued rumblings to be heard concerning common grounds and the like—but, as I plunge blindly onward I can state (faintly) that this doesn't seem to affect the case, or didn't when we tried it. Natch, I'm assuming a four-wire cartridge and arm harness. Any three-wire system will botch my idea for a fare-thee-well, useless to say.

Four wires, all independent (a fifth may be a protecting ground, as on some cartridges), and one pair reversed. At the other end of your amplifiers you come out with stereo in your two speakers, but out of phase; that's all. However, you've reversed the phase on one speaker, so it's in phase after all.

And as for the center speaker, it now gets not the difference but the sum signal—which, if I am right, is what we're looking for.

Simple, you see—so simple that I keep thinking, there must be something wrong somewhere; it can't be this easy.

Well, I got sound out of it, anyhow, and I liked it. My switch, next to the arm, converts to standard when I want to use the arm for two-speaker stereo, and I have been careful to mark things up so that this particular cartridge won't accidentally get into an ordinary system with its leads still reversed. Got to watch it, there. Other than that, I haven't done anything special and don't intend to. (But I can get all-vertical response very neatly, now, as well as lateral-only, by using my other permanent switch, the one that parallels the pickup leads. In that normal position, I get lateral mono, in the reversed position I get vertical mono. Fine for Edison discs and vertical cut radio transcription discs.)

Only one further item to note: according to the battery analogy, this system gives you double the voltage at the center speaker, as compared with the two side speakers. Feed three volts d.c. into the battery analogy circuit, Fig. 6, and you get six volts on the outside meters, six on the middle one.

No problem in practice. It's only a 3 db difference anyhow, and your volume control on the center speaker—alas necessary—takes it down to size. In fact I didn't even notice the difference when we tried our various systems; I merely saw it on paper. At most, it gives you a slightly more mono effect with the center speaker all the way up and an imperceptibly greater range of control.

P.S. It's mostly irrelevant, but the system we rigged in this fashion used a Shure M5D cartridge in a Dyna-Empire arm. The amplifier was, again, the Sherwood system as used with the E-V transformer. The two outer speakers were a convenient pair of KLH Sixes that I had on hand, the center speaker was practically the original AR2. I note, by the way, that whereas outer stereo speakers, any pair, should always be identical if this is humanly possible, the center speaker can be somewhat different in sound, as in this case. Mostly a matter of symmetry, I guess; your ears can "take" a difference in the middle better than a lopsided difference between one side and the other.

2. STereo FROM Mono?

This last winter I had a considerable running correspondence with none other than Prof. Doktor Hermann Scherchen, the eminent conductor who is also editor of the technical journal Acustica at Gravesano, Italian Switzerland. Many a reader will remember Dr. S. for the drum in that Westminster Haydn "Military" Symphony a hi-fi standby at the shows long before stereo came along . . . but his remarks to me had to do with his own work in approximating the impact of stereo via mono recording. His English was so delightful that for awhile I was not entirely clear as to where we were anyway, but in the end he went into German, which left me to cope with my own not-so-delightful know-

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**Fig. 5**

**Fig. 6**

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**AmericanRadioHistory.com**

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lack of that language.

Anyhow, he sent me over a small gadget of his designing, called the Stereophoner, licensed for manufacture in England, hailed by the magazine as a splendid answer to the challenge of better sound without recourse to stereo and doubled everything. Nothing quite like it, they all said, and their combined opinion was impressive.

Well, the Stereophoner came, and I liked stereo better. But, remember, I'm an American and American tastes in these matters are very significantly different from those in Europe.

The Stereophoner was a small box, three or four inches square and not at all heavy—clearly no transformers—which accepted a single speaker signal, two leads, and put forth two signals, four wires, labeled right speaker and left speaker. There was a volume control, a rheostat, and by the feel of it a very simple single, a single element and no more.

It was not proper for me to delive inside the stereophoner and I did not, the thing being well sealed up. But I did take it over to an engineer friend of mine and we set it up to see what happened.

Clearly minus transformers and inserted in the low-impedance speaker line, this gadget was not likely to be over-complex. We had it carefully analyzed and found that the volume control affected only one of the outputs. We played various signals through—no time delay was evident likely, at that)—no observable alterations other than the very simplest, which you can guess at yourself. To wit: one channel was attenuated and the lows, the other in the highs. That was all, as we figured it.

The "volume control" on one channel served to alter the relationship between these two.

We tried a few pieces of music on the Stereophoner and there was indeed a spread of effect between the two speakers that was distinctly more varied and less bunched-up in the center than the usual identical signals sent from a mono source into two stereo loudspeakers. This was clearly a technological improvement of a most signal, in a relatively narrow sense. The two speakers did not seem, as in two-speaker mono, to be tied together with a single common emitting source right in the middle between them.

And yet there were lacks, and falsehoods. Lacks as compared with real stereo, falsehoods in terms of musical integrity. I felt, most of all, the lack of stereo's finest value for me, the dynamic, a live stereo-reverberation or wall-bounce that does so much to place stereo music in a living sense of space. This simple dividing network circuit could do little to approximate that—nothing, would be a safer term. It did not provide any sense of highs alternately on both sides, reverberating, and it could not, by its nature.

Moreover, with the higher tones sent predominantly to one side and the lower tones to the other, a familiar effect was apparent—the dismemberment of instrumental sound. In such a situation, many instruments are bisected, the fundamental tones being sent to one side and the coloring overtones to the other. Thus you may hear the fundamental pitch of a clarinet to the right, but the characteristic tone color to the left, remotely.

Actually, the ears don't take the sound in that order at least, not consciously. Since every musical instrument changes its spectrum from tone to tone and often violently in middle registers, the audible effect may be obvious in the listening is a sort of erratic flutter, or jumping. The sound is first on one side, then the other, or flutters rapidly between, or seems oddly vaporous and indeterminate, not easily located in any direction yet, somehow, nervously on the move.

Granted that this poses interesting aesthetic questions as to what in the long run is desirable—granted that these effects are unusual and perhaps interesting in themselves, and even just possibly useful to the musical sense in terms of a more dynamic character to each sound. Could be, and would be—if we didn't already have stereo.

With mono alone on the scene, the Stereophoner and other gadgets of similar design could be quite useful as listening enhancers. The general idea is not new by any means, of course.

But we do have stereo—and stereo is so very much better, so much truer to the musical intention (when used rightly), so much more stable and reliable, so very much more accurate in its projection of whole instrumental sounds, that for my ear the Stereophoner and other such devices are obsolete, and poor substitutes at best.

(Readers may remember a similar idea proposed by Tenny Lode in the January, 1950, issue of Audio, Mr. Lode described, and marketed, too, at that time—a pair of complementary networks which introduced a peak in the response of one loudspeaker in the vicinity of 800 cps and a corresponding dip in the response of the other, with the total output being "flat" for the two speakers. Thus the midrange was boosted on one speaker, while the highs and lows predominated on the other—permitting the use of a relatively narrow-range speaker for the boosted-midrange output. There was a stereo effect, but as Mr. Canby says, it is not stereo. Ed.)

The American Way

Now all the above, I think, reflects an American viewpoint and is deliberately set forth as such, in view of our many Euro-

Experts disagree

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The American Way

Now all the above, I think, reflects an American viewpoint and is deliberately set forth as such, in view of our many European readers who may be following this argument.

There are two aspects that make my argument American. One, of course, is our economic opulence, our urge to spend more and more and make our home neighbors do it too, in the conviction that this leads to greater and greater prosperity for all. We sell stereo because it is new, it brings in cash, gives new sorts of satisfaction to an audience that can afford it, more or less. We have remarkably few inhibitions when it comes to launching new products and we do it precipitately, piling on the bad with the good! With us, it's all or nothing; no cautious innovations hereabouts.

In Europe, stereo is a more difficult economic proposition for most people, and its introduction is both cautious and careful. No all-out, clam-bang promotion over there—it would not be worth it. Mono still necessarily rules, just as for a long time the 78-rpm disc held on in Europe after our precipitate conversion to LP.

It is therefore of much greater interest to a European record collector, than to one of our people, to hear that a device is available that can create a sense of improved realism without the necessity for a dual stereo system throughout. To many a European collector, this sort of gadgetry is helpful and common-sense, avoiding the spendthrift luxury of the stereo system.

Considering some of the unfortunate stereo discs we've perpetrated for sensation, over here, and considering our outrageously bad mass-production stereo equipment and our outrageously over-exaggerated stereo publicity, we can commend the European for his common-sense caution and conserva-

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AUGUST, 1960

85

Audio
On the other hand, I can promote an opposite argument to equal effect. We may beazy, over here, given to wild claims, headstrong and undisciplined, advances, belter-skelter commercialism. We certainly are; but I can’t help thinking that in the long pull, we Americans often come out with the best, and quickly get rid of the worst after it has had its fling.

The noise of innovation, in all its crudity, is what the world hears from us. The subsequent slow bolling-down, the winnowing of the chaff, tends to be lost in the general enthusiasm—but it does average on, just the same. Give us time, and we end up with good judgment.

I think, thus, that we have a wider, more imaginative, less traditional, more open-minded viewpoint towards innovations in musical sound than is common in Europe. We promote the wildest, crudest, most exaggerated forms of sound, but we also experiment in a wide-swinging manner, we learn as listeners to like new sounds that were never heard before and to understand their new possibilities, even in the reinterpreting of the old in music; whereas Europeans—speaking generally—tend to be more absorbed in relatively conservative sounds, solid, impeccable, beautifully tailored, yet not so advanced, often.

I have noticed this again and again in European stereo versus American. Ours is cambayou, often crude and frequently downright awful. But we are right in the thick of intense development of the stereo medium, with liberal and splendid new sounds emerging that for all their naiveties are already proving immensely valuable in terms of musical projection.

In Europe, the average level of stereo quality is high, but the sound tends towards the conservative; the stereo tool is used carefully and precisely, to the point where for our ears some European stereo might as well be mono, so discreet is its impact. Within a conservative limitation, much European stereo is superbly beautiful. It is seldom radical.

Generalities, obviously, and I'm off my point, but not altogether. To return to the Stereophoner, my second point—the first being the matter of economics—is simply that in America we have moved generally beyond such devices as this in our expectations for reproduced sound. We have heard what we feel to be a more useful, more dramatic, more precise array of musical sounds in true stereo itself; we are disappointed by any compromise, and especially by any synthetic effort at spatial location.

Heaven knows, our stereo might well seem to be as synthetic as you can get! But, oddly, it has a real, progressive, constructive syntheticism, out of which musical art is being made in new forms. The two-channels-out-of-one synthetic effect is by comparison unconstructive, dead, limited, unprovocative, like so much synthetic orange juice.

Well ... perhaps I speak for a small minority hereabouts—who knows. But I'll bet you can't sell the Stereophoner and its electrical cousins over, no matter how hard you try.

Not to me, anyhow. I've gone back to my stereo discs and tapes. I should add, however, that there are interesting variants possible on the idea of a dual-channel decoded output derived from a single signal, among which is one once used by my friend Jan Syjuela, for a two-speaker ballet music on a round-the-world dance tour. (The entire orchestral repertory was taped ahead of time and went along for the dancing, via a pair of Ampex 350's and supporting equipment.) Jan's trick, which I trust is no secret, seems to me very sensible. Instead of a pair of channels with high roll-off in one and low roll-off in the other, we have two different sound systems, each side one effective.
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Audioman No 11

Young college professor finds time for music, hi-fi, organ building, swimming, sailing, and to become latest Audioman.

When he can find the time outside his activities at Wagner College where he is an Assistant Professor of Chemistry, Dr. James S. Swinehart puts together kits of various kinds, records and listens to music, and swims and sails when the weather permits. And being unmarried, he doesn’t have to get his equipment in decorator-approved cabinets before the quality of the equipment meets his demands. When he was selected as an Audioman, his cabinet work was not completed. It isn’t yet, but he is working on it.

But that doesn’t mean that he does not have good equipment—even in his 1960 Rambler he has a Becker FM radio with a 7-watt amplifier and an AR-2 so his traveling listening should not be appreciably less in quality than his fixed listening.

For equipment, Dr. Swinehart uses a Fisher FM-90X tuner, two Dynakits preamps with a Dynakit stereo adapter, and two Dynakits power amplifiers, Marks II and III. His turntable is Components Corporation, and he uses ESL and Grado arms with a Grado pickup for 78’s and a Grade Custom and a Shure M3D for mono and stereo LP’s. He listens through three AR-3’s, the third one to become a center speaker when he gets a living room large enough to need one. He has an Ampex 350 with extra electronics for stereo, and he uses two Sony microphones.

The cabinet shown below is fitted with movable shelves so he has been able to make any necessary accommodation for the various units of equipment (when the picture was taken, he still had a Fairchild amplifier for one channel). But the arrangement is acceptable to the serious audio-fan because it permits him to keep the system up to date without having to spend all of his time in modifying the cabinet. However, his new cabinetry is nearly complete, and then everything will be all set—for how long?

Like most Audiomen, Dr. Swinehart is continually being called upon by friends to help in the planning and installation of their systems, and he estimates that his advice is asked at least twice a week, and he has helped in the installation and design of more than thirty systems.

Activities around his college keep him from taking part in community activities, but Dr. Swinehart does find time to attend plays, operas, and concerts—at least one of them each week. And just to keep in practice with his listening, he has another AR—this time a 2—in his bedroom. Seems as though we might just like to go back to school again if one can find enough leisure for all these activities.

Flexible enough to permit easy servicing and the usual audioman’s proclivities for changing equipment.

BUYER’S GUIDE
(from page 77)

is a new, low-cost magnetic stereo cartridge especially designed for use with record changers. The Professional (M3D) and Custom (M7D) are designed for mounting in transcription tone arms and record changers respectively. The Standard has a frequency response of 20 to 15,000 cps and the Professional and Custom have a response of 20 to 15,000 cps. All have outputs of 5 mv per channel, and channel separations of more than 20 db at 1000 cps. Recommended load impedance is 47,000 ohms. The Professional has an inductance of 395 ohms, a d.c. resistance of 33 ohms and a compliance of 4 x 10⁻⁶ cm³/dyne. The Custom and Standard have an inductance of 400 mH and a d.c. resistance of 400 ohms. Compliance of the Custom is 3.5 x 10⁻⁶ cm³/dyne and of the Standard is 3.0 x 10⁻⁶ cm³/dyne. All have four terminals and fit standard mounting dimensions. Sonotone, Inc., 222 Hartrey Ave., Evanston, Illinois. User net prices: M3D, $45.00; M7D, $24.00; M10D, $16.50.

SONOTONE

- Series "12" Crystal Stereo Cartridge. Designed for high output at low cost, the new Sonotone crystal stereo cartridge models "12TH" and "12TL" are made entirely of plastic except for the stylus, crystal elements and mounting brackets. This construction makes them suitable for mass production, which in turn affects price reduction. Supplied with standard 0.7 mil and 3 mil turnover sapphire stylus, both cartridges come complete with mounting bracket and terminal plug. The "12TH" cartridge has an output of 2.5 volts and the "12TL" has an output of 1.0 volt. Stylus replacement is facilitated because the turnover lever need merely be snapped out by another turnover lever/stylus assembly, which can then be snapped back in. Sonotone Corporation, New York. User net price. $6.45 for either cartridge.

STEREOTWIN

- Moving Magnet Stereo Cartridge. Model 210D is completely bump free and features a rugged mounting clip which provides optimum position in either horizontal or vertical mounting. Stylus assembly may be changed instantly without tools. Output is approximately 12 mv for a 5 cm/sec stylus velocity, with separation of more than 22 db at 1000 cps, over 10 db at 10,000 cps. Vertical and lateral compliance is 3.5 x 10⁻⁶ cm³/dyne, and tracking force approximately 5 grams in changers, 3 to 4 grams in transcription arms. Audio-Technica Corporation, 514 Broadway, New York 12, N. Y. User net price. $94.50.

American Radio History
WEATHERS
FM Pickup System. Utilizing a different design principle than virtually all other pick-up designs, the WEATHERS is a non-operator which achieves extremely low stylus tracking force. This low tracking force is achieved because the motion of the stylus is not used to generate a voltage and thus an armature and compliant armature is possible. In addition, because the cartridge is an electronic device, it is not susceptible to hum pickup from turntable motor fields. Frequency response of the system is ± 2 db at 20,000 cps. Stylus tracking force in 1 to 1 1/2 grams; lateral compliance is 16.4 x 10^-4 cm/dyne and vertical compliance is 6.2 x 10^-5 cm/pound. TR net controls permit auxiliary inputs are provided. Four separate inputs are provided; four 2-track stereo and monophonic tapes and in addition can play back 4-track stereo and monophonic tapes. Featured in the 505 is a direct-drive capstan motor and capstan type induction reel motors. Manufacturing tolerances are stated to be within two millionths on some parts. Push button controls are solid state operated. Automatic reel-end cutoff switch prevents tape runaway. Self-energizing brakes insure smooth operation without tape stretch. Dual inputs are supplied for Microphones and auxiliary devices. Four separate level controls permit mixing of all inputs. Frequency response is 50 to 15,000 cps ± 2 db at 7/5 ips. Lightweight for easy portability, the 505 weighs only 36 lbs. including recording and playback preamplifiers. American Concertone division of American Electronics, Inc., 644 W. Jefferson Blvd., Culver City, Calif. User net price, $145.00 (less carrying case).

AMPEX
Portable Stereo Tape Recorder. The AMPEX model 970 is a new model of their portable stereo tape recorder. Featuring a self-contained matched pair of amplifiers/speakers for stereo playback monitoring. The new unit utilizes the same tape transport as the AMPEX model 960 portable deck, boasts in a longer portable case with a two-channel stereo amplifier and two 7" oral speakers which face outward from each end of the unit. Sound-directing panels are in front of each speaker thus permitting some directional control of the sound. Monitoring while recording can be done either through earphones or the unit's own speakers because the 970 has separate recording and monitoring outputs. It is also possible to keep the stylus tracking force below 0.01 lbs. to prevent tape runaway, and which achieves extremely low distortions. The AMPEX 400 series offers complete stereo recording and playback facilities as well as monophonic recording and playback. Both three and four-track models are available with 3% and 7% ips tape speeds. Portable models have matched outputs at low-level to feed a high fidelity system. Both models accommodate reels up to 3% % and have a flat frequency response (±2 db) of 40 to 15,000 cps at 15 ips; 50 to 10,000 cps at 7 1/2 ips and 50 to 8000 cps at 3% ips. Signal-to-noise ratio is better than 50 db. 200 to 12,000 cps: 45 db unweighted including hum. Three motors are used including one hysteresis-asynchronous drive motor for the capstan. Other features include recording VU meter, auto-switch cut-off, "Ferroducer" gear-driven type counter, and azimuth adjustment for heads. Distributed in United States by Ercona Corporation, 16 West 40th St., N. Y. User net price, either model $950.00.

FERROGRAPH
Professional Stereo Tape Recorder Series. The Ferrograph 808 series offers complete stereo recording and playback facilities as well as monophonic recording and playback. Both three and four-track stereo player 337.00 and monophonic models are available with 3% and 7% ips tape speeds. Portable models have matched outputs at low-level to feed a high fidelity system. Both models accommodate reels up to 3% % and have a flat frequency response (±2 db) of 40 to 15,000 cps at 15 ips; 50 to 10,000 cps at 7 1/2 ips and 50 to 8000 cps at 3% ips. Signal-to-noise ratio is better than 50 db. 200 to 12,000 cps: 45 db unweighted including hum. Three motors are used including one hysteresis-asynchronous drive motor for the capstan. Other features include recording VU meter, auto-switch cut-off, "Ferroducer" gear-driven type counter, and azimuth adjustment for heads. Distributed in United States by Ercona Corporation, 16 West 40th St., N. Y. User net price, either model $950.00.

HEATHKIT
Stereo-Mono Tape Recorder Kit. The Heath TR-1A series consists of three models: the two-track TR-1AH, the four-track TR-1AQ, and the two-track TR-1AQ. The TR-1A records and plays back monophonic tape only; both other models record and playback either stereo or monophonic tapes. The deck mechanism is extremely simple to assemble, freedom bearings and closing machining tolerances hold flutter and wow to less than 0.3%. Voltage is provided by a four-pole-2000 watt motor. One lever controls all tape path alignment functions of forward, fast-forward or rewind modes of operation. The deck handles up to 7" tape reels at 4% % or 3% ips as determined by the position. The TR-1A series decks may be mounted in either a vertical or horizontal position (mounting brackets included). The TR-1A Tape Electronics kit features NARTH equalization. Separate record

TAPE RECORDERS

AMERICAN CONCERTONE
Stereo Tape Recorder. Professional quality sound in a moderately priced instrument makes the Concertone 505 an ideal investment for the advanced non-professional. The 505 records and plays back 2-track stereo and monophonic tapes and in addition can play back 4-track stereo and monophonic tapes. Figured in the 505 is a direct-drive capstan motor and capstan type induction reel motors. Manufacturing tolerances are stated...
LAFAYETTE

- Two-Speed Tape Recorder. Though small in size, the Playette 9000A is a four-function tape recorder providing all the features and performance normally associated with larger tape units. Convenient operation provided by the single function control plus an on/off volume control. A simple capacitance adjustment changes speed from 7 1/2 to 3 1/2 ips. Frequency range is 60 to 4,500 cps at 1 1/2 ips. Record level indicated by light. Complete with crystal microphone. Finished in semi-resistant phenolic material. LAFAYETTE Electronics Mfg. Corp., 164-46 Dunkirk St., Jamaica 12, N.Y. User net price, $34.50.

MOVIC

- Two-Speed Stereo Tape Recorder. Manufactured by Philips of The Netherlands. The new Continental 400 features half-track stereo playback and quarter-track stereo and monophonic record and playback for tape economy. Three speeds—7 1/2, 3, and 1 1/2 ips—for versatility, and simple plug-in type controls. Two-speed playback: 7 1/2 and 3 1/2 ips. Response to 7500 cps is 0.15% at 7% and 0.25% at 15% ips. Frequency response at 7 1/2 & 3 1/2 ips is from normal to 7500 cps. Noise level is also 0.15% at 7% and 0.25% at 15% ips. Signal-to-noise ratio is 55 db or better. The recorder operates from 12-volt sources or from the self-contained flashlight batteries. Battery condition and level being indicated in accordance with NAB standards, and output is approximately 1.3 volts from cathode followers. Two input jacks are provided for each channel, one for microphone and one for high-level sources. Newcomb Audio Products Co., 6824 Lexington Ave., Richmond Hill, N.Y. User net prices: SM-310-A, $499.50; SM-310, $490.50.

MAGNECORDER

- Stereo Magnetofonette. The Series 100 Magnecorder is a portable professional-type tape recorder which holds records and plays back in-line stereo. A two-speed machine, operating at 7 1/2 and 3 1/2 ips, is also capable of standard monophonic recording and playback when desired. Separate VU meters and gain controls are incorporated for each channel, as well as a master gain control which operates on both channels simultaneously. Frequency response is 40 to 15,000 cps at 2.0 db at 7 1/2 ips; 50 to 7500 ± 2 db at 3 1/2 ips. Inputs are provided for two high-impedance microphones, as well as auxiliary devices such as turntables, phonograph cartridges, etc. Two-speed playback: 7 1/2 speed with booster flutter and wow to less than 0.3% per cent. Noise level is down more than 60 db (30 db natural mounting). A low-level playback amplifier is accomplished by means of a push-pull amplifier. The Vladetter output stages are cathode followers which deliver 1.0 volt from normal output levels. A two-speed recorder is a feature which the serious hobbyist who demands a high measure of audio quality as well as dependability of performance. Magnecord Division, Midwestern Instruments, Inc., 41st St. and Sheridan Road, Tulsa, Okla. User net price in portable carrying case, $440.95. 720-4k, prep stereo rec., last case...$179.00 Model-440M, prep. w/mics., cases...$194.50 P75-AC, prep rec/amp in case...$88.00

NAGRA

- Portable, Professional, Tape Recorder. The Nagra III B is a completely transistorized professional, 3-speed (7 1/2, 15, 15 ips) tape recorder. Incorporating three heads and a servo-controlled motor, the Nagra III B has a speed constancy of 0.2%. Wow and flutter is 0.15% at 15 ips and 0.02% at 7 1/2 ips. Signal-to-noise ratio is 56 db or better. The recorder operates from any 12-volt source or from the self-contained flashlight batteries; battery condition and level being indicated by the built-in meter. Output is 6 VU at 600 ohms balanced. A monitor-speaker is built in and an AEC circuit controls speech level during recording. All normal microphone inputs are incorporated in addition to two line mixers. Electronic Applications, Inc., 194 Richmond Hill Ave., Stamford, Conn. User net price, $1,045.00.

NEWCOMB

- Stereo Tape Recorder. Now available in the 1 1/2-track version as Model SN-310-D as well as SM-310-D. The Newcomb stereo tape recorder is "cybernetically controlled," according to Newcomb. Control of the tape transport is centered in a "chip" which is automatically moved to the left to rewind, to the right for fast forward, and toward the operator for record and playback. Both models operate either vertically or horizontally and take from 3" to 10 1/2" reels, as well as NAB bubs. Two speeds, 7 1/2 and 3 1/2 ips, are provided; and flutter is less than 0.2% at the higher speed, less than 0.25% at the lower speed. Output ranges from 30 to 15,000 cps at 2 db at 7 1/2 ips, and 40 to 10,000 cps at 3 1/2 ips. Equalization is provided with crystal microphone. Finished in semi-resistant phenolic material. LAFAYETTE Electronics Mfg. Corp., 164-46 Dunkirk St., Jamaica 12, N.Y. User net price, $34.50.
back of either track. Use of the second track can be accomplished wiout erasing the basic track. These features are especially valuable to musicians and vocalists in that they can record accompaniment and background music on the basic channel and record and re-record their own vocal or instrumental parts until they achieve the effect they desire. In addition to its dual recording feature, the STUZZI incorporates all the functions of a half-track monaural and 4-track stereophonic record play unit. Differences are identical to those of the Roberts 904-C recorder/ reproducer. Roberts Electronic Inc. 820 North Highland Avenue, Los Angeles 38, Calif. User net price including headphones and microphone, $349.50.

10,000 cps at 3% lps. Flutter and wow content are less than 0.15% at 75 lps and less than 0.25% at 3% lps. Stacked high-frequency erase head erases both channels when recording stereo, or one channel (half track) when recording monophonically. Individual level controls are provided for each channel to permit recording in stereo or monaural. Automatic tape lifters protect recording heads and tape during fast forward and rewind. Pushbutton operation is provided for on/off, and selection of stereophonic or monauronic mode. Designed for portable use, the CS-300 will satisfy the most fastidious user. SuperScope, Inc., San Valley, Calif. User net price, $350.50 including two F-7 microphones.

262-5L, 4-track mono/stereo rec $199.50
101, 1/2-track mono rec 99.50

SUPERSCOPE/SONY

- Stereo Recorfer/Playback System. Everything required for stereo recording and playback, including two VU meters and two power amplifiers and speakers, is incorporated in the Sony "Sterecorder" Model CS-300. A precision-built instrument in all respects, it incorporates a hysteresis-synchronous drive motor and affords instant selection of 7½ and 3½ speeds. Frequency response is 50 to 15,000 cps ± 2 db at 7½ lps; 50 to 20,000 cps at 3½ lps. Distributed in the United States by Record Corp., 16 West 46th St., N.Y. User net price, $299.50.

990, 4-track ster rec $450.00

TANDBERG

- Stereo Tape Deck. Feature for feature the Tandberg Model 21 Tape Deck represents a significant improvement in a compact, handily styled package. A three-speed machine (7½, 3½, 1½) in record 4-track both monophonically and stereophonically, and plays back 4-track. The unique 4-track stacked precision linear record head has double microphone and speaker is an automatic built-in re-recording system, 75 db. Built-in are four separate preamplifiers, provides push-button controls, a 3-digit counter, VU level and Magic-eye modulation indicators. Frequency range is 50 to 8600 cps at 7½ lps; 50 to 4000 cps at 3½ lps. Distributed in United States by Roberts Electronic Inc., 820 North Highland Avenue, Los Angeles 38, Calif. User net price, $399.50.

5-2, stereo rec/pcb sy $498.00
4 mono rec/ster pcb sy 349.50

TELECTRO

- Series 505 Tape Decks and TRP-21 Record/Play Amplifiers. The Series 505 offers a variety of facilities in a simple tape-transport mechanism without electronic equipment. For those who wish a complete recording system, including record and play amplifiers and the necessary bias oscillators, the Telescope line includes the Model TRP-21 record/play preamplifier, which provides for recording from low-level microphone input or from a high-level source such as a tuner, and in the play mode has an output of approximately 5.0 volts. Controls on the TRP-21 include a record/play selector, equalization switch, noise balance, and gain control. Recording level is shown by a VU meter. The tape transport itself is available in five forms, depending on the head complement. Model 500-1 is equipped for monophonic recording and playback and for 2- or 4-track stereo playback. 900-2 has three heads—monophonic erase and play/recording heads, and a 4-track stereo head which may be used as a monitor during monophonic recording, or for playing back mono and 4-track stereo tapes; 900-2 has two heads, one erase and 4-track stereo. The 900-3 is equipped only for playback, and has a single 4-track head which will play either mono or stereo tapes; 900-5 has three stereo heads, making it possible to monitor a tape during recording. All models are for 4-speed operation—7½, 3½ and 1½ lps. Flutter and wow content is less than 0.25% per cent. Signal-to-noise ratio is better than 40 db when used with the TRP-21. Speed accuracy is within ±0.02%. All models are distributed in the United States solely by Warren Weiss Associates, 1650 Broadway, New York 19, N. Y. User net price, $350.00 to $500.00. An electronic output meter, which provides voice operation and slide projector synchronization, $44.50.

Viking

- Two-Speed Stereo Integrated Tape Recorder. The new Viking Stereo-Pro is a high performance integrated tape recorder with dual recording and playback preamplifiers. This unit combines the Viking 85 deck and two Viking HP32 recording amplifiers. The Stereo-Pro is designed for quick set-up and utmost portability. Unit has tape-reel storage compartment.

STUZZI

- Portable Transistorized Tape Recorder. The Stuzzi Magnette is a fully transistorized, battery operated, completely portable tape recorder. Manufactured in Austria, the Magnette weighs only 8 pounds and achieves performance equal to more expensive, heavier units. The self-contained speaker system provides fine tone quality for both dictation, conference or conference recording. Vibration proof, the Magnette incorporates a 7 transistor, 2-diose amplifier which provides ample volume and reliable performance. Other features include a battery life indicator, 3% and 1½ lps tape speeds, usable as a portable PA system, separate motors for fast wind and capstan drive, and can be played through an external amplifier. Easy to load and operate, the Magnette provides push-button controls, a 3-digit counter, VU level and Magic-eye modulation indicators. Frequency range is 50 to 9000 cps at 3½ lps; 50 to 4000 cps at 1½ lps. Distributed in the United States by Record Corp., 16 West 46th St., N.Y. User net price, $299.50.

www.americanradiohistory.com
below amplifiers, front-panel mounted high level inputs, microphone jacks, and output jacks for monitoring and music system. The 80 is the finest Viking deck designed for the home music system. Containing two motors—one for record, the other for fast forward, rewind and footage counters—it uses a dual-concentric switch knob is designed to handle all mechanical operation. The inner knob controls forward, stop, and edit functions, while the outer ring controls fast-forward and rewinding. Universal head-mounting bracket permits changing or adding to the head complement at will. All models are equipped with long-wearing laminated heads, tape lifters, non-resonant pres-sure jacks and automatic tape run-out switch. Frequency response is 30 to 14,000 cps; ± 3 db. Signal to noise ratio is better than 65 dB, while less than 0.2% at 7½ ips. The R1002 record/preamplifier preamplifier is engineered to match the operating characteristics of the 85 deck. Bias oscillators may be synchronized for stereo recording. NARTB tape equalization is fixed in recording, variable in playback. Distortion is less than 0.1% at indicated normal recording level. Viking of Minneapolis, Inc., 9000 Aldrich Ave., South, Minneapolis, Minn. User net price: Stereo-Pro ES (14-track) $344.50, Stereo-Pro ESQ (5½-track, 2- or 4-track pks) $374.50, Stereo-Pro RMQ (14-track rec/pbk) $374.50.

Stereo-Compact, 85 deck, two RA72 preamps $229.75, 85 Series Decks $130.179.50, RP62, rec/pbk preamp $77.50, RA72, rec preamp $57.50.

TAPE ACCESSORIES

BIB

- Tape Splicer. An indispensable accessory for any tape recordist, this new British-made splicer is extremely simple to use and can be employed both for mendling broken tapes and for editing purposes. Made of nickel-plated brass, the BIB splicer comes mounted on a flock-sprayed base, or can be mounted directly on any tape deck. The body of the splicer has two pivoted clamps which lock the tape sections in a channel. Both vertical and diagonal nits are provided for either editing or mending. Horizontal nits are also provided for use in trimming off surplus mending tape. Distributed in the United States by Froncorporation, 16 W. 46th St., New York 36, N. Y. User net price, $5.06.

- Type K Professional Headphones. Actually two miniature high-quality speakers, the type K headphones can be connected to any sound system, tape recorder, or similar equipment. Frequency range is 50 to over 10,000 cps.

- Type K Professional Headphones. These are capable of being used with any sound system or tape recorder, or similar equipment. Frequency range is 50 to over 10,000 cps.

MICROPHONES

AKG

- Dynamic Stereo Microphone. Manufactured in Austria, the AKG Model D88 is a dynamic microphone suitable for X or ½-inch stereophonic recording, as well as for monophonic recording.

CHARACTERISTICS

Frequency range: 80-15,000 cycles (flat, stereo matched frequency response, falling slightly at the low frequency end). Sensitivity of each channel: 50 mV/1200 ohms, with transformer, 40,000 ohms. Directional characteristic for stereo recordings: double cardioid (the two systems are so arranged that their directions of maximum sensitivity (live side) rotate 90° to the horizontal). Directional characteristic for monophonic recordings: cardioid. Unchanged recording direction for stereo and monophonic recordings. Electronic Applications, Inc., 114 Richmond Hill Ave., Stamford, Conn. User net price D88/200, low impedance, $72.00; D88/211, high impedance with cube transformer, $77.50.

GO MTH

- Dynamic Audionmetry Headphones. Featuring a frequency range of 20 to 15,000 cps and a sensitivity of 23 mV for a sound pressure level of 100 phons the Beyer DT-48 dynamic headphone is mounted in an extra-heavy enclosure. Their resonance-free performance and the extreme frequency range, together with very low distortion—less than 0.1% from 20 to 15000 cps and less than 0.3% from 20 to 5000 cps—makes them ideal for audionmetry testing of the human ear, as well as for professional monitoring for recording or broadcasting. Extremely rugged, noise has been designed into the Beyer dynamic headphone. Resistor kit included with each pair makes connection to hi-fi equipment simple, and bridges transformers are available for broadcast monitoring across 500-ohm or 500-ohm line levels. 1960 Super Audio Corporation, 2 West 46th St., New York 36, N. Y. User net price, $78.60.

K O S S

- Stereo Headphones. Extremely useful for the tape recording enthusiast, Koss "Stereophones" model RP-3 provide complete separation of sound channels. Consisting of a specially designed ½-inch reproducer in each earpiece, the RP-3 has a frequency range from 50 to 15,000 cps. Usable in both stereo or monophonic systems, it comes complete with a plug and jack that connects easily to any amplifier or directly across speaker leads. Soft sponge foam ear and headpieces provide comfortable wearing and shut out 30% of outside noise. Impedance 4 ohms. Koss, Inc., 2227 North 31st St., Milwaukee 8, Wisconsin. User net price, $24.95.

utilizes a labeled conical diaphragm and a moving coil type driver. Wired for stereo, they may be utilized for a monophonic system. Sensitivity at 1000 cps is 25 db above 1 dynes/cm² for 1 mw input. Will handle inputs up to 1/4 watt. Type K headphones come complete with rubber ear cushions and a highly flexible, 6-foot, one-piece, nylon covered cable. British Industries Corp., Port Washington, N.Y. User net price, $28.95 (52 ohms); $34.50 (600 ohms); $36.50 (15,000 ohms).

Utilities a labeled conical diaphragm and a moving coil type driver. Wired for stereo, they may be utilized for a monophonic system. Sensitivity at 1000 cps is 25 db above 1 dynes/cm² for 1 mw input. Will handle inputs up to 1/4 watt. Type K headphones come complete with rubber ear cushions and a highly flexible, 6-foot, one-piece, nylon covered cable. British Industries Corp., Port Washington, N.Y. User net price, $28.95 (52 ohms); $34.50 (600 ohms); $36.50 (15,000 ohms).

92

AUDIO • AUGUST, 1960
AMERICAN


DYNACO

* Ribbon Microphones. Suitable for the highest quality recording and broadcasting applications, the Dynacord & O Model 53 microphone uses a replaceable duralumin ribbon only .0001 in. thick and weighing 1.5 milligrams. The extremely small mass eliminates resonances within the audible range. The unit is bidirectional, which allows controlled discrimination of the pick-up area and facilitates a natural balance of the primary pick-up with room acoustic. When used with the Stereospacer—an acoustically absorbent "partition" between the microphones—their nulls provide the effect of 10 ft. separation, while avoiding unnatural pin pointing effects typical of poor stereo. A 3-position switch provides music, speech, and off positions, and a built-in transformer enables operation at 60, 250, or high impedances. Model 50 is identical in all particulars except output impedance, which is fixed at 50 ohms.

CHARACTERISTICS

Frequency range: 30 to 15,000 cps. ± 2.5 db. Pattern: Bidirectional.
Output impedance: Model 53—50, 250, or high: Model 50—50 ohms.
Dimensions: 7/8" x 1 x 3/16" dia. Dynaco, Inc., 617 N. 41st St., Philadelphia 4, Pa. User net price, Model 53, $89.95; Model 50, $49.95.

ELECTRO-VOICE

* Sound Spot Microphone. A new concept in directional microphones, the Model 644 was designed to operate at considerable distances from the sound it is picking up. For this reason, it will permit a far greater degree of TV camera flexibility than has heretofore been possible, especially in intimate dialogue scenes where camera placement has been governed largely by the ability of the microphone to pick up voices of the performers. The 644 uses a combination cardioid and distributed front opening, enabling it to maintain proper response far away from a sound source. Its front effective acceptance angle is 45 deg. on each side of center. Random noise cancellation from the rear and sides exceeds 20 db. Frequency response is smooth from 40 to 12,000 cps. Weight is 2 lbs. 9 ozs. Electro-Voice, Inc., Buchanan, Mich. User net price, $110.00.

PRIMO

* Dynamic Microphone. Designed for use with portable transistorized tape recorders, the DM-16B microphone is a small sealed unit mounted in a molded plastic case and fitted with a remote control switch. Frequency response ranges from 100 to 9000 cps with a deviation of 8 db, making it particularly suitable for voice use. Output impedance is 600 or 50,000 ohms, and the switch contacts are capable of controlling 200 ma d.c. at 24 volts. Primo Co. Ltd., 2043 Mure, Mitaka-ashi, Tokyo, Japan.

SONY

* Variable-Directional-Pattern Condenser Microphone. The Sony C-37A is designed for professional recording and broadcast applications where utmost performance, dependability, and fidelity are essential. Frequency response is stated to be entirely free of resonant peaks and dips within the specified range of 20 to 18,000 cps. The C-37A is operated in conjunction with the Model CP-2 power supply unit. This power supply incorporates a variable switch permitting three different frequency characteristics for complete versatility in any acoustic surroundings. A small screw switch on the back of the microphone housing offers a choice of unidirectional cardiac pattern or conventional omnidirectional pattern. Microphone and power supply may be separated by as much as 240 feet without affecting performance characteristics.

CHARACTERISTICS

Frequency response: 20 to 18,000 cps ± 2.0 db. Pattern: Choice of cardioid or omnidirectional.

CR-4, wireless microphone system .... $250.00

TURNER

* Combination Impedance Dynamic Microphone. Specifically designed for AM, FM, and TV broadcast use, especially in媳 booming somewhat directional at the high frequencies. Combination output impedance of 50 ohms (35/50-ohm input) or 200 ohms (150/250-ohm input) selected at the terminal end of cable.

CHARACTERISTICS

Frequency range: 40 to 20,000 cps. Pattern: Omni-directional.
Output level: 50-ohm, -60 db; 200-ohm, -80 db.
Output impedance: 0 db = 1 volt per microfarad 50/200 ohm.
Finish: Non-reflecting neutral brown. The Turner Microphone Co., Cedar Rapids, Iowa. User net price, $125.00. This company makes a complete line of microphones. Write for information.

MISCELLANEOUS

CLAROVox

* Record Handler. Especially designed to prevent damage to records during handling, the Clarovox "Miragrip" enables any record to be picked up with ease and firmly held without leaving visible or audible marks, and with no danger of slipping. The piers-like design is such that the Miragrip can be conveniently used with one hand, as negligible effort is needed to hold the record absolutely firm. The metal handles are chrome-plated and the rubber gripping sleeves are available in a variety of colors. The Miragrip is manufactured by Clarovox Products of Coventry, Eng., and is distributed exclusively in the United States by Enrona Corporation, 16 W. 49th St., New York 16, N.Y. User net price, $4.95.
Yes, AUDIO is publishing a cookbook—not that we intend to extend the subject of gastronomy to include recipes in future pages of AUDIO.

You may ask...why?

And we would answer—Simply because we feel that people who read AUDIO, and enjoy the finest quality music reproduction also enjoy really good food on their tables.

Your next question may be...Is it a different kind of cookbook?

Of course our reply would be—Yes! Oh, it doesn’t have a revolutionary format and it appears to look like any ordinary cookbook. But, the secret of its goodness is the recipes that fill its 148 pages...recipes responsible for the heart warming, flavosome, homespun aromas experienced only in the kitchen of an Adirondack country home.

The name of the book is PLACID EATING, and it is chock full of palate-tempting recipes compiled by Climena M. Wikoff, owner of the Mirror Lake Inn...at (you guessed it) Lake Placid, New York.

Actually, the first edition (now out of print) was discovered by Mr. AUDIO (C. G. McProud) during his stay at Mrs. Wikoff’s Mirror Lake Inn, where, in Mr. McProud’s own words—“...every meal is so tasty that eating becomes a real joy, where each night’s dessert excels the one from the night before, where one has to push himself away from the table before upsetting the daily calorie count.”

Here is a cookbook that will enable you to recreate in your own homes superb dishes experienced only at the Mirror Lake Inn—dishes like Lake Trout Baked In Wine and Adirondack Apple Pies, recipes for which are reproduced below—

**LAKE TROUT BAKED IN WHITE WINE**

Remove heads and tails from a 2-pound fish. Split open down back and rinse well. Remove backbone and rib inside with lemon, salt, pepper and thyme to taste. Knead 1 tablespoon of butter and anchovy paste to the size of a large pea; placing mixture inside fish. Place fish in a greased baking pan and cover with 14 cups of white wine. Bake 25 to 30 minutes in moderate oven, 350 degrees. Base frequently. Garnish with parsley and tomatoes and serve with plain boiled potatoes.

**ADIRONDACK APPLE PIE**

1 c. sugar 3 tbsp. white corn syrup
2 c. sliced apples 2 tbsp. sliced flour
1/4 tsp. grated nutmeg 6 to 8 tart apples, thinly sliced
1/4 c. orange juice
1/4 c. melted butter

Mix together the sugar, flour, nutmeg, orange juice, corn syrup and melted butter. Add the sliced apples and mix thoroughly. Butter a pie pan heavily before putting in your pastry. Fill the pie shell with the apple mixture and make pastry strips for the top which should be dipped in melted butter before putting on the pie. Bake in 400 degree oven for 15 minutes; reduce heat to 350 degrees and bake 35 to 40 minutes longer.

This colorful book, plastic bound for easy handling, will contribute many wonderful adventures in food for everyone in the family. Order a copy today, the Lady-of-the-house will adore you for it. Incidentally...it makes a wonderful gift for anyone. PLACID EATING, 162 pages, Plastic Bound: $3.95.

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**CONRAC “FLEETWOOD”**

- **High-Quality TV Chassis.** The Fleetwood Model 1000 is a wall-hung or ceiling-mounting 23-inch TV receiver with remarkable audio and visual performance. The sonic wireless remote control tuning unit provided at-the-chair controls for channel changing, volume adjust, and on/off. The remote control unit is a fully transistorized transmitter and the receiver is a five-tube, delayed-action system. The Model 1000 uses a 23-inch, 110-degree picture tube which permits an etc.-at set depth of only 10.27-32 inches. A high-fidelity audio channel affords faithful reproduction. Two separate audio outputs are provided; one for connection to a loudspeaker, the other for connection to a high-fidelity system. Conrac, Inc., Glensford, Calif. Also available as non-remote, model 1010.

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**ELECTRODYNE**

- **Program Equalizer.** The model 251-A Equalizer is Electrodyne’s miniaturization of an instrument that has long been standard for corrective equalization in recording and reproduction of sound. The small size of the 251-A permits mounting close to mixer controls. Two sliding levers are provided—one for equalization and the other attenuation. The 251-A is a passive LCR, bridged-T network, which does not require a power supply and therefore can be inserted directly into a transmission line. Impedance is 600 ohms in and, insertion loss is 14 db. Electrodyne Corp., 503 South Grand Ave., Santa Ana, Calif. User net price, $260.00.

**GARRARD**

- **Stylus Pressure Gauge.** The Garrard Model SP85 is an easy-to-use stylus pressure gauge with an extremely modest price tag. It features a large, legible scale, visible through a clear plastic window, with wide spaced gram markings. It can be used either to check the weight of the tone arm or to set...
a pre-determined weight. It comes complete with a 5-gram brass weight, which is used as a standard so that the unit can be "zeroed" to insure utmost accuracy. The scale pan is plastic to avoid damaging delicate stylus. The SIG3 can be used with any cartridge or arm.

Garrard Division of British Industries Corp., Port Washington, N. Y.; User net price, $2.95.

HOMEWOOD INDUSTRIES

- Furniture Finishing Kit. Purn-A-Finish Kit is intended to aid the "do-it-yourselfer" who is constructing high-fidelity furniture and enclosures. Available in mahogany, oak, golden oak, fruitwood, maple, cherry, ebony, harvest wheat (blonde), and natural maple.

The kit comes complete with instructions for adding even the most inexperienced finisher. Enough material is supplied to finish 30 square feet with a double coat of top varnish. The kit consists of five containers of finishing material, brush, and three large sheets of 7/0 and 3/0 sandpaper. Homewood Industries, Inc., 24 Court Street, Brooklyn, N. Y. User net price, $3.88.

LAFAYETTE

- Dual channel VU Balance Meter. The Lafayette T2102 provides a solution to the problem of balancing stereo. Utilizing two separate coils in a single magnetic field, each stereo channel feeds a separate coil through a full-wave bridge rectifier. When the signals are equal and balanced the meter will not deflect. Individual channels can be measured separately. Lafayette Electronics Mfg. Corp., 104-46 Dunravey St., Jamaica 12, N. Y. User net price, $11.50.

ROBINS

- Complete Accessory Line. Everything the recordist or audiofan needs in the way of conveniences seems to be available from Robins Industries. Included are a bulk tape eraser, record changer covers in three colors, tape reel holders, spot tape eraser, and so on. The changer covers are model CC-6 in white, CC-7 in brown, and CC-8 in green, all with list prices of $6.00. The covers are 13/4 x 12 x 3 in. Tape reel holders are designed to hold reels on vertically mounted recorders and to hold warped reels steady. List price is 55c for a package of 2. Model SD-1 Strob-Disc provides a simple, easy, and inexpensive check of accuracy of turntable speed simply by viewing with 60-cps light. While the disc may be viewed by incondescant light, the complete kit of disc and neon viewing lamp gives a much easier-read indication. List price of disc and light, $1.00; disc alone, 50c. For turntable leveling, the ESK-4 kit will fill the bill. It consists of four adjustable rubber feet for mounting under the turntable base and four leveling screws for positioning the turntable plate. The feet are adjustable in height, allowing exact leveling. List price is $3.50. Robins Industries Corp., 36-27 Prince St., Flushing 54, N. Y.

SIGMA

- Professional 4-Channel Audio Mixer. The Sigma Model SA3701 is a professional audio mixer which provides mixing four different audio inputs and delivers a common output signal. It was designed expressly for broadcast studios and central sound systems. It will feed directly into the microphone input of Ampex Tape Recorder Models 402, 403, and 300 and, with an XLR terminal, into Models 400, 400A, 401, and 401A. The mixed contains four separate amplifiers with individual, professional-grade potentiometers, to adjust gain. The mixed introduces 8 db of gain with all controls at the maximum position. Frequency response is 50 to 15,000 cps ± 1 db. Total harmonic distortion is less than 0.2% with a 0.001-watt signal applied at a level of -50 dbm. Noise is at least 8 db below the signal level for an input of -50 dbm. Sigma Electric Co., 11 East 16th St., New York 3, N. Y.

STATICMASTER

- Record Brush. The Staticmaster record brush Model SH1000 employs a polystyrene strip as a static neutralizer to make cleaning records rapid and simple. The brush of the Staticmaster is made of genuine Jaguar hair which is both strong and soft. Nuclear Products Co., 1017 3 East Bash St., El Monte, Calif. User net price, $14.95.

ELECTRODEX

- Complete Radiofile. Not a new publication, but one which for over ten years has served engineers, libraries, experimenters, researchers, hobbyists, radio amateurs, radio and TV repairmen, and anyone else connected with radio or electronics. Covers radio, television, electronics, and related subjects, and published bi-monthly as a cumulative index throughout the year, with the last issue of the year an Annual which may be kept as a permanent record of all electronic periodical literature.

RADIO MAGAZINES, INC.

P.O. Box 629, Mineola, N. Y.

THE QUESTION: Do you know where you can find information about the current articles in magazines about microwaves, loudspeakers, television repairing, electronic musical instruments, traveling-wave tubes, transistor amplifiers, oscilloscopes, or any other electronic subject?

THE ANSWER:

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Professional Stereo Pre-Amp Master Control Center

"The Lafayette KT-600 is unquestionably one of the most flexible stereo control units available today. Its flexibility is complemented by overall performance comparable to manufactured units selling far more than its modest price."

HIGH FIDELITY MAGAZINE—Oct.'59

A 50 Watt Integrated Stereo Amplifier Kit

Simplicity, versatility and handsome styling have been integrated into this outstanding 50 watt stereo amplifier (25 watts each channel). A full range of controls and inputs assure complete flexibility. You build an amplifier comparable in every way to a factory wired unit.

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Allied Radio Corp. 36, 37, 38
Altec Lansing Corp. 71
American Electronics, Inc. 61
American Sound Co. 45
American Concourse Division 35
Ampex Electronic Corp. 87
Apparatus Development Corporation 87
Audio Bookshelf 67
Audio Devices, Inc. 13
Audio Fidelity Records 87
Audiolink Records 87
Audion 87
Bell Telephone Laboratories 18
Bogen Pre-Press Co. 84
Boston 55
British Industries Corporation 3, 47
Caterpillar Electronics Co., Inc. 87
Classified 83
Connoisseur 15
Dynaco, Inc. 78
EICO 11
Electronic Applications, Inc. 5
Electronic Organs Arts 85
Electronic Research Laboratories, Inc. 85
Electro-Voice, Inc. 65
Electro-Voice Sound Systems, Inc. 87
Enco Corporation 15
Fairchild Recording Equipment Corp. 33
Ferrougophone 15
Fisher Radio Corp. 87
Fukuin Electric (Pioneer) 35
Fukuin Sound Co., Ltd. (Coral) 87
General Electric 85
Gutham Sales, Inc. 87
Grado Laboratories, Inc. 72
International Electronics Corp. (U.S.A.) 63
Janszen Loudspeakers 83
Jensen Manufacturing Company 87
Key Electronics 87
Kierulf Sound Corporation 87
Klipsch Research & Development Corporation 62
Krof, Inc. 80
Lafayette Radio 96
Lansing, James B., Inc. 51
Madison Fielding by Crosby Electronics, Inc. 33
McIntosh Laboratories 79
Moffet Company, Inc. 79
Monroe Electronics Supply 73
Neat Onko Denki Co., Ltd. 35
Nash Electronics Corp. 83
Newcomb Audio Products Co. 75
Newman Electronics Co., Inc. 12
Northern Electronics Co., Inc. 51
Paco Electronics Co., Inc. 83
Picking & Company 17
Pilot Radio Corporation 85
Prime Company Limited 85
RCA 33
Radio Corporation of America 11
Reelto 13
Rider, John F., Publisher 87
Robert Electronics, Inc. 73
Sears 11
Sargent-Raymond Co. 81
Scott, H., Inc. 67, 69
Sherwood Electronics Laboratories 67
Shure Brothers, Inc. 67
Solenoid Corp. 4
Stereos-Parti 87
Superscope, Inc. 29
Tannoy (America) Ltd. 81
Trans-Tonics, Inc. 85
Tung-Sol 16
Uber 64
United Audio 74
University Loudspeakers, Inc. 61
Viking of Minneapolis 85
Vitchila 85
Weiss, Warren, Associates 64

Audio • August, 1960

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Professional Stereo Pre-Amp Master Control Center

"The Lafayette KT-600 is unquestionably one of the most flexible stereo control units available today. Its flexibility is complemented by overall performance comparable to manufactured units selling far more than its modest price."

HIGH FIDELITY MAGAZINE—Oct.'59

A 50 Watt Integrated Stereo Amplifier Kit

Simplicity, versatility and handsome styling have been integrated into this outstanding 50 watt stereo amplifier (25 watts each channel). A full range of controls and inputs assure complete flexibility. You build an amplifier comparable in every way to a factory wired unit.

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Allied Radio Corp. 36, 37, 38
Altec Lansing Corp. 71
American Electronics, Inc. 61
American Sound Co. 45
American Concourse Division 35
Ampex Electronic Corp. 87
Apparatus Development Corporation 87
Audio Bookshelf 67
Audio Devices, Inc. 13
Audio Fidelity Records 87
Audiolink Records 87
Audion 87
Bell Telephone Laboratories 18
Bogen Pre-Press Co. 84
Boston 55
British Industries Corporation 3, 47
Caterpillar Electronics Co., Inc. 87
Classified 83
Connoisseur 15
Dynaco, Inc. 78
EICO 11
Electronic Applications, Inc. 5
Electronic Organs Arts 85
Electronic Research Laboratories, Inc. 85
Electro-Voice, Inc. 65
Electro-Voice Sound Systems, Inc. 87
Enco Corporation 15
Fairchild Recording Equipment Corp. 33
Ferrougophone 15
Fisher Radio Corp. 87
Fukuin Electric (Pioneer) 35
Fukuin Sound Co., Ltd. (Coral) 87
General Electric 85
Gutham Sales, Inc. 87
Grado Laboratories, Inc. 72
International Electronics Corp. (U.S.A.) 63
Janszen Loudspeakers 83
Jensen Manufacturing Company 87
Key Electronics 87
Kierulf Sound Corporation 87
Klipsch Research & Development Corporation 62
Krof, Inc. 80
Lafayette Radio 96
Lansing, James B., Inc. 51
Madison Fielding by Crosby Electronics, Inc. 33
McIntosh Laboratories 79
Moffet Company, Inc. 79
Monroe Electronics Supply 73
Neat Onko Denki Co., Ltd. 35
Nash Electronics Corp. 83
Newcomb Audio Products Co. 75
Newman Electronics Co., Inc. 12
Northern Electronics Co., Inc. 51
Paco Electronics Co., Inc. 83
Picking & Company 17
Pilot Radio Corporation 85
Prime Company Limited 85
RCA 33
Radio Corporation of America 11
Reelto 13
Rider, John F., Publisher 87
Robert Electronics, Inc. 73
Sears 11
Sargent-Raymond Co. 81
Scott, H., Inc. 67, 69
Sherwood Electronics Laboratories 67
Shure Brothers, Inc. 67
Solenoid Corp. 4
Stereos-Parti 87
Superscope, Inc. 29
Tannoy (America) Ltd. 81
Trans-Tonics, Inc. 85
Tung-Sol 16
Uber 64
United Audio 74
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Viking of Minneapolis 85
Vitchila 85
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