

AUDIO

JANUARY, 1961
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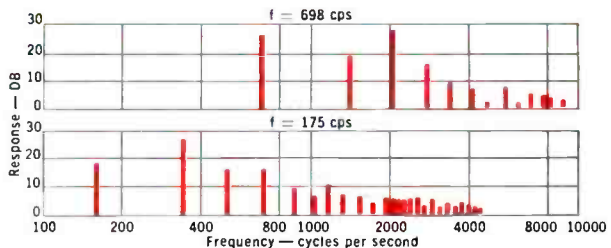


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COVER PHOTO—Room display at Los Angeles Decorator Show in the Pan-Pacific Auditorium October 6-16 by Kierulff Sound Corporation, and featuring their Tanganyika music system. This cabinetry is strongly African in motif, and is of American Walnut with African Zebra wood panels finished in blue pumice. The room decoration is by Lawrence Goulet.

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S/N : 45 db minimum

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AUDIO clinic



JOSEPH GIOVANELLI*

Center Speaker Control

Q. I have a 12-cubic-foot stereo single enclosure, containing two coaxial speaker systems, with each speaker facing outward at an angle. In addition, I use two shelf-sized speaker systems approximately 12 feet apart. Each right speaker is parallel to the right central speaker and vice versa. The shelf speakers are of lower efficiency than my central speakers, but they give a good spread of sound for small-room listening. For listening at greater distance, however, stereo is considerably diminished because the outside shelf-speakers do not have the bulk of the output.

I would, therefore, like to install a remote control unit to perform the following functions: I want to divide the output between the two left speakers and the two right speakers, variably, in order to increase or decrease the apparent spread of sound. I know this can be done by merely attenuating the louder speaker, thereby creating a loss necessitating raising the over-all volume of sound. Instead, I would like some sort of a variable pot which can serve as a divider, which would apportion more or less of the output to the inboard or the outboard speakers. In addition, I would like to gang these controls in order to affect both left and right channels simultaneously. J. Pushkin, Hempstead, New York.

A. The electronic work you propose for your stereo system is possible in theory but probably not achievable in practice.

Your result could be obtained by a stack of four L-pads. (L-pads A and B are to be used with the left channel. L-pads C and D are to be associated with the right channel.)

1. L-pad A would be so wired that when the common shaft was rotated clockwise, the volume of the left shelf speaker would be raised.
2. L-pad B would be associated with the left central speaker. When the shaft which is common to all four pads is rotated in a clockwise direction, the volume of this speaker would be attenuated. (Notice that when the common shaft is rotated in the counterclockwise direction, the gain of the left central speaker will be at maximum and that of the left shelf speaker will be at zero. When the shaft is rotated fully clockwise, the reverse situation will exist. Somewhere between the two extremes

of rotation, the acoustical power developed by the left outside speaker will be equal to that developed by the left central speaker.)

L-pads C and D are associated with the right channel.

3. L-pad C works in accordance with L-pad A.
4. L-pad D works in accordance with L-pad B.

There will be a power loss when using L-pads in this way. In your theoretical setup, therefore, your amplifier must supply more power than it now supplies in your present hookup, in order to achieve the same acoustical output that you now enjoy.

In practice, this theoretical system will not prove feasible, even though the power loss can be made up by using a more powerful amplifier.

The real problem lies in the tracking of the various L-pads in the stack. (It is not easy to obtain L-pads with a high degree of tracking accuracy.) In order to understand the result of poor tracking, let us consider the action of L-pads A and C. Assume that the common shaft is rotated midway between the two extremes. Stereophonic sound is adjusted for proper balance by means of appropriate controls on the preamplifier. Now turn the common shaft slightly counterclockwise. (L-pads A and C do not track properly. Hence, a given amount of shaft rotation will not cause equal attenuation.) Let us assume that the power to the left speaker has been attenuated by 50 per cent, and that the power to the right speaker has been attenuated by 25 per cent. The stereo program will no longer be in proper balance because the right speaker is producing more sound than the left speaker is. Clearly the result is undesirable. It should be readily apparent that the tracking error between L-pads B and D will produce equally unfortunate results. Just to show how bad things can get, L-pad D might attenuate to a greater extent than L-pad B when the common shaft is rotated in a counterclockwise direction. The over-all sound would shift to the left central speaker and to the right outside speaker. Your stereo system would be out of balance, to say the least.

If I had a similar setup, I would attenuate the louder speaker of each channel. After that I would never touch the attenuator controls again. I believe the resulting stereophonic sound would be superior to expectations.

* 3420 Newkirk Ave., Brooklyn 3, N. Y.

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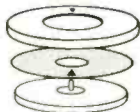
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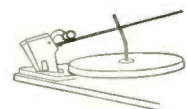
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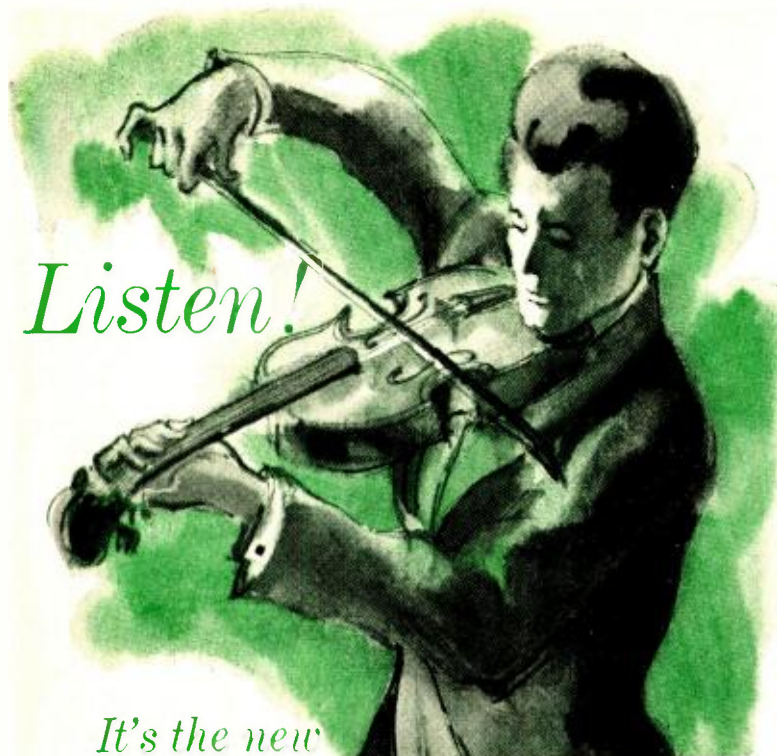


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Video Buzz

Q. What causes video buzz and how may it be eliminated? J. Pushkin, Hempstead, New York.

A. There are several reasons for video hum or buzz.

1. The sound i.f. strip may not be in proper alignment.
2. The fine tuning control may not be utilized properly.
3. The traps may be badly adjusted.
4. The video i.f.'s may be out of alignment.

These four causes are based on the assumption that your TV receiver is *not* of the intercarrier type.

If your receiver is of the intercarrier type (one which uses the same i.f. strip for both the sound and picture until just before detection), there is little to be done about this hum or video buzz.

To eliminate video buzz, simply check the possible causes and make the needed corrections. (If your receiver is of the intercarrier type, and is well designed, critical adjustment of all tuned circuits can result in a dramatic reduction of this annoying buzz. Do not count on this reduction.)

Acoustical Feedback

Q. I have a problem which does not make too much sense to me. My rig is almost perfectly silent except in phono when the cartridge is engaged. Now this isn't hum because I can turn the volume full-on with the cartridge at rest without a whisper of hum. Nor is it rumble because it will sound-off with the cartridge engaged on the record with the turntable turned off.

This noise sounds almost like hum except that it occurs suddenly at approximately one-half to three-quarters of the rotation of the level control. I believe that the pitch is lower than 60-cycle hum.

By process of elimination, I figure that it must be the cartridge, although I've never heard of any cartridge trouble like this before.

I could sure use some help on this one. C. Kuell, Long Beach, California.

A. Your problem is one which has troubled people since stereo discs came into use. It will probably get worse as equipment improves. What you are going through is the battle of acoustic feedback. There are various steps which can be taken to win this battle:

1. If the speakers are mounted in the same cabinet which houses the equipment, they should be removed and placed some distance from the cabinet.
2. If the turntable is not shockmounted in the cabinet, try doing so. Such shockmounting can be achieved by mounting heavy foam rubber—at least an inch thick—and placing the turntable base on this rubber.
3. In addition it may be necessary to place shockmounts under the equipment cabinet.
4. Also under the speaker cabinets. (Be sure that the rubber you use is thick enough so that it cannot be completely compressed by the weight of the cabinet or turntable base.)

(Continued on page 57)

A NEW LINEAR EFFICIENCY SYSTEM

with 15" low frequency unit



MODEL D50S6



This is the new JBL S6 Linear Efficiency System with a new 15" low frequency unit, new dividing network, new high frequency driver, and new horn and acoustical lens. The new LE15 is made with a 4" edge-wound copper ribbon voice coil, long-throw Lans-a-Loy suspension, rigid, cast frame designed for mounting from either the front or the rear of the baffle. This is the only 15" unit on the market capable of linear cone excursion of $\frac{3}{4}$ inch. Free air cone resonance is approximately 20 c.p.s. The new LX5 Dividing Network matches the LE15 perfectly to either the new LE75 (in S6 Kit) or the new LE85 (in S7 Kit). Crossover is 500 cycles. The LE75 and LE85 are laboratory standard high frequency drivers with silver impedance compensating rings; voice coil and pole piece assemblies are held to previously unattainable tolerances. The new HL91 Horn-Lens Assembly, specifically designed for the new drivers achieves completely uniform dispersion over a 120° horizontal X 45° vertical pattern through its full range from 500 c.p.s. to beyond the limits of human hearing.



THE OLYMPUS

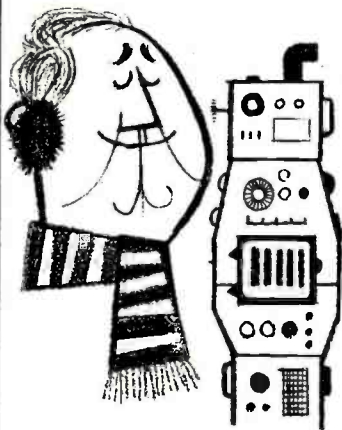
A sensational sight with sensational sound, the new JBL Olympus has been enthusiastically acclaimed at every preview for its unprecedented flat, accurate reproduction of the entire audio spectrum. The Olympus has remarkable bass response... goes all the way down smoothly clean. It reproduces the lowest fundamental in all its rich, original power. And does it in the JBL manner— with precision articulation, accurate delineation. The new slant-plate acoustical lens refracts equally all frequencies which pass through it. Not only does this heighten realism from any listening point, but permits a new latitude in speaker placement in stereophonic installations.

The C50 enclosure is styled with timeless elegance. Top edges are tapered to slim the cabinet's proportions. The wrap-around grille disguises the sturdy, heavily braced sides. Though the C50 is a six cubic foot enclosure, its bulk is comparatively small when the magnitude of the system's performance is taken into consideration, and the D50S6 might be accurately described as "a compact system." The new wood grille is shown above. Also, you have your choice of a fabric grille.

Production of the new systems is underway. To reserve a proximate place on the backlog, it might be advisable to get your name on the list without delay.

PRODUCTS OF JAMES B. LANSING SOUND, INC., ARE MARKETED BY JBL INTERNATIONAL, LOS ANGELES 39, CALIFORNIA

ACRO SOUNDINGS



THE DURABLE AMPLIFIER

An embarrassingly long time ago, Acro Products announced a new super-quality stereo amplifier for the perfectionist. This announcement was greeted by yawns and ho-hums from the perfectionist who already owned a super-quality stereo amplifier that suited him just fine. It helped heat his home in winter, and it burned up a set of output tubes every six months, but by Golly it sounded good when the tubes were new.

WE WERE IMPRESSED WITH THIS REASONING. There are already several excellent amplifiers available—amplifiers with unmeasurable distortion, rock-solid stability and so on. But one respect in which they do differ is the length of time they stay that way. Far too many of them get their high power and low distortion by driving their output tubes right up to the limit of their ratings. So they work fine for a few months, and then start to lose power and gain distortion as their tubes wear out.

SO, WE DECIDED TO DELAY PRODUCTION OF OUR STEREO 120 amplifier while we investigated a new European output tube with a high output rating (in Ultra-Linear operation). Since all we needed was 60 watts continuous per channel, we could run the tubes far below their maximum ratings, to give what is probably the most durable, dependable, high-powered stereo amplifier that has ever been built.

We're aware that the production delay has cost us some sales. But we also know that buyers who appreciate the kind of dependability that we're building into the new Stereo 120 amplifier will bear with us a while longer until we get it into production.

ACRO PRODUCTS CO.
410 Shurs Lane, Phila. 28, Pa.

LETTERS

Correction

SIR:

Between my own re-reading of my article, "A Transistorized Stereophonic Control Unit," (October, 1960) and the letters of several sharp-eyed readers, I have found two corrections which should be made to reduce confusion.

(1) The correct value for R_3 is 120 k ohms, and the value shown on the schematic is in error.

(2) It is important that the filter choke L_1 in the power supply schematic have a d.c. resistance of approximately 900 ohms. If this is not the case, the voltage may not turn out to be close enough to 30 volts for satisfactory adjustment. If a choke with less than 900 ohms resistance is used, additional resistance should be added to R_1 ; similarly, if the choke used has more than 900 ohms resistance, R_1 should be reduced proportionately.

One additional point of interest—it would be quite possible to use ¼-watt resistors throughout the control unit circuitry except for the low-noise deposited-carbon resistors R_2 and R_{106} , of course. This would be advantageous in cases where extreme miniaturization is desired.

RICHARD Y. MOSES, II,
1721 Woodland Ave., #3,
Palo Alto, California

Multiple Speakers

SIR:

Since the appearance of my article "The Series-Parallel Speaker Array," (November, 1960) I have been swamped with phone calls and letters from your readers. From all indications it looks like most everyone is going to build a system using this idea.

I would like to inform your readers that I am not the originator of this idea. Perhaps I am one of the first to write about it, but certainly not the first to try the idea. You may recall that Oliver Read, in his book "The Recording and Reproduction of Sound," (1952) made brief mention of a multiple system using a bank of small 6-in. speakers.

The photograph showing the cabinet of the system unfortunately did not show the 2-in. legs on the bottom. Perhaps the picture was cut too close. Those readers who wondered how the bottom speakers would work facing into the floor will be glad to hear that there are legs on the cabinet.

Also, I wish to clarify another point not mentioned in the article. The back of the cabinet is open. Because of the small size of this cabinet design it was not possible to enclose the back completely. We could not afford a compressed air mass behind the speakers to restrict the fractional cone movement. However, two layers of fiberglass were hung across the opening to attenuate the rear wave. This proved to be very effective. For maximum bass response it is best to keep the cabinet about two inches from the wall.

CHARLES F. MAHLER, JR.
958 Arguello Drive,
San Leandro, California

Loudspeakers and Gravity

SIR:

I should like to report on a case of loudspeaker deterioration from a cause which, as far as I am aware, has not been described and which may be of interest to your readers.

The speaker in question is a low-cost 8-in.

unit purchased about two years ago. It was mounted in an R-J type of enclosure of home manufacture, and initially gave quite remarkable results considering its size and cost. After one year of intermittent use, the speaker was put away for a year. The conditions of storage were good, with no extremes of temperature or humidity, and with complete freedom from handling or mechanical shock. The position was as in normal use—within the enclosure with the cone in a vertical plane.

Recently the speaker was put back into service, and it was found that its response had deteriorated badly. I can best describe its performance as being equivalent to a 1-in. speaker in a transistor radio with respect to frequency response, with somewhat less efficiency and vastly greater distortion. On superficial inspection, it was found that the voice-coil travel was impeded mechanically, and all efforts to free it were fruitless. A post mortem found the trouble—the pole piece had been attached to the magnet proper by an adhesive which was subjected to cold flow. In storage, the pole-piece had drifted about a half millimeter; sufficient to pinch one side of the voice coil against the outer ring. A simple boss or stud to retain the parts in alignment would have prevented the trouble.

For the consumer who has a speaker of this construction, I suppose the moral of this story has to do with periodic 180-deg. (or *more periodic 90-deg.*) rotation of the unit, or prolonged storage in a flat position. For the prospective consumer, *caveat emptor*. And for the manufacturer, perhaps a more critical look at the long-term properties of materials.

JOHN H. TAYLOR,
1229 Via Barranca,
La Jolla, California

Earphones

SIR:

Since reading Mr. Canby's articles in the September and November issues, I've purchased a pair of stereo phones, and have since experimented with different types of music and methods of recording and playback.

These experiments have led me to the following conclusions: earphone listening to monophonic, stereophonic, or binaural recording is better than loudspeaker listening because realistic volume levels may be maintained as well as friendly neighbors, and small-room acoustics do not detract from the recording-room acoustics.

Earphone listening to stereo is better than loudspeaker listening for the foregoing reasons plus the advantage of being able to control one's "position" in relation to the musicians from the back of the hall to the midst of the group by means of the blend, presence, and tone controls of the preamplifier.

I have yet to hear a binaural recording really satisfactorily unless listened to with earphones.

My only objections are the feel of the phones on the head and ears (although I am rapidly becoming accustomed to that), and the lack of feeling produced by a heavy organ passage using some of the 16' stops on a large pipe organ. I refer to the feeling that the body picks up, not the ears.

One final word: if you haven't tried earphones, don't knock them.

ROY V. CHILDS,
1589 Sacramento St.,
San Francisco 9, California



Plug-in reliability with ALTEC professional audio equipment

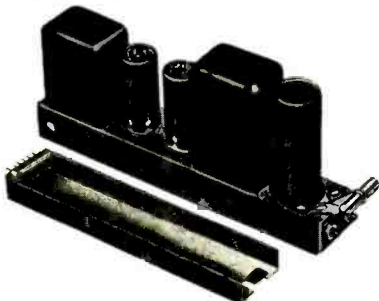
250 SU CONSOLE Combining compact simplicity with maximum flexibility through Altec advanced design, the new 250 SU Altec has proven to be the ultimate in control consoles for TV, AM, FM, recording studio or sound system use. Newly designed miniature plug-in preamplifiers, and utility input devices of uniform size and interchangeability permit free range in number and type of amplifiers used per console.

Characterized by single unit construction for simplicity (amplifiers and controls within same housing) and economical installation, Altec's 250 SU features an externally mounted power supply for cool operation and isolation of strong magnetic fields.

Providing complete circuitry for all stereo or universal operating functions, there is no finer, more reliable control console serving the audio industry. Individual components are available complete with plug-in trays for custom and rack installation.

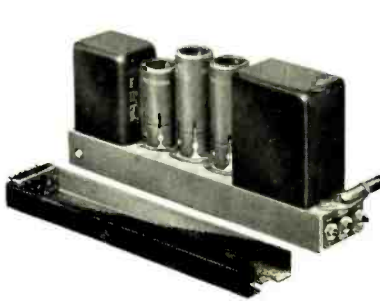
THE 250 SU FEATURES:

- Meets NAB, EIA, and recording requirements
- "Plug-in" units completely interchangeable
- Low impedance mixing
- Speech-music filter
- D.C. heater supply
- Utility input devices for tape-disc-line-networks, etc.
- Tube testing provisions
- Expandable to jack fields, equalizers, etc.
- Up to 10 mixing channels
- Single channel operation
- Two channel operation
- Two channel/three channel operation
- "Stereo" operation
- Illuminated meters
- Color coded controls
- 16 connected inputs
- Microphone level or "high level" on any input



458A "PLUG-IN" PREAMPLIFIER An extremely simple, highly reliable, low noise preamplifier, the 458A incorporates a single stage push-pull cross-neutralized vacuum tube circuit, transformer coupled to source and load. Maximum reliability with unflinching performance are achieved through simplified design featuring fewer components, extremely accurate balance of input and output transformers, and premium quality pre-aged, shielded tubes. The failure of either tube will not cause loss of program.

SPECIFICATIONS GAIN: 40db untermated input, 34 db terminated. **POWER OUTPUT:** +20 dbm at less than .5% THD 50 to 15,000 cps. +25 dbm at less than 1% THD at 1 KC. **FREQUENCY RESPONSE:** ± 1 db 20 to 20,000 cps. **SOURCE IMPEDANCE:** 150 or 600 ohms (centertap for 600 ohms). **LOAD IMPEDANCE:** 150 to 600 ohms (centertap for 600 ohms). **OUTPUT IMPEDANCE:** Equal to load impedance. **NOISE LEVEL:** Equivalent input noise: -126 dbm. **POWER SUPPLY:** 15ma at 275vdc and .7a at 6.3vdc. **TUBES:** 2-6072/12AY7. **DIMENSIONS:** 1 3/4" W x 3 15/16" H and 9 11/16" L. **COLOR:** Cad plate, dichromate dip. **WEIGHT:** 3 1/2 lbs. (including tray). **SPECIAL FEATURES:** Push buttons for individual tube test. 40ma dc can be applied to center taps for simplxing. **ACCESSORIES:** 13225 Rack Mounting Assembly (for 9 units), 13401 Mounting Tray Assembly, 5981 Tube Test Meter, 535A Power Supply.



459A "PLUG-IN" PROGRAM AMPLIFIER A highly reliable, low noise program amplifier with exceptionally large power capability, the 459A consists of a 2-stage push-pull circuit with a balanced negative feedback loop. Push-pull operation of all stages provides reliability, interchangeability with preamplifiers for added gain and power. Superior overall performance results from special input and output transformer design of ultrafine balance combined with premium quality pre-aged shielded tubes. Program transmission is not interrupted by failure of either output tube.

SPECIFICATIONS GAIN: 56 db untermated input, 50 db terminated. **POWER OUTPUT:** +30 dbm at less than .5% THD 30 to 20,000 cps. +35 dbm at less than 1% THD at 1 KC. **FREQUENCY RESPONSE:** ± 1 db. 20 to 20,000 cps. **SOURCE IMPEDANCE:** 150 or 600 ohms (centertap for 600 ohms). **LOAD IMPEDANCE:** 150 or 600 ohms (centertap for 600 ohms). **NOISE LEVEL:** Equivalent input noise: -126 dbm. **POWER SUPPLY:** 40ma at 275 vdc and 1.6a at 6.3vdc. **TUBES:** 1-6072/12AY7, 2-12BH7. **DIMENSIONS:** 1 3/4" W x 3 15/16" H x 9 11/16" L. **COLOR:** Cad plate, dichromate dip. **WEIGHT:** 3 1/2 lbs. (including tray). **SPECIAL FEATURES:** Push buttons for individual tube test. 40ma dc can be applied to center taps for simplxing. **ACCESSORIES:** 13225 Rack Mounting Assembly (for 9 units), 13401 Mounting Tray Assembly, 5981 Tube Test Meter, 535A Power Supply.



535A POWER SUPPLY Compact, highly reliable, the 535A is the DC power supply for furnishing the operating voltages to the Altec 458A and 459A amplifiers used together with the Altec 250 SU Console. Externally mounted to preclude hum, the 535A employs silicon rectifiers in both the filament and "B" supplies. The 535A connects to the 250 SU by means of a 4-foot multiple conductor cable terminated in a type P306CCT Jones plug which "mates" with a Jones receptacle in the 250 SU Console. A single screw frees the power supply unit from its mounting bracket for inspection.

SPECIFICATIONS **POWER OUTPUT:** 275vdc at 275ma. At 275ma ripple is .02v peak to peak max. 6.3vdc at 13a. At 13a evc ripple is 1.5v peak to peak max. **POWER INPUT:** 117v 50-60 cps 245 watts at full load. **RECTIFIERS:** Silicon. **CONTROLS:** 1. Power Switch, 2. Circuit Breaker (Push to reset), 3. 4 Position tap switch (provides adjustment of voltage by autotransformer action to accommodate 2 to 1 range of loads). **COLOR:** Dark Green. **WEIGHT:** 16 pounds. **SIZE AND MOUNTING:** 7 3/16" W x 9 5/8" H x 7" D overall.

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Fortissimo Series (Pipe Organ)
Riverside XK 8002
Fortissimo Series (Jets)
Riverside XK 8001

This special series by Riverside is the best one yet. The first feature you'll notice in these stereo discs is the fact that they play from the inside out. But that's only a very small part of the story. The tone arm starts right next to the label with a short band containing a 400-cycle test tone for channel balancing. Once the locked groove at the end of this band is hurdled, the pickup then proceeds toward the outer edge of the record.

Cutting the master disc from the inside out has long been advocated as a solution to the problem now encountered in classical recordings wherever a symphonic work closes with a loud finale at the end of a lengthy side. Unfortunately, the four initial releases in this series do not contain classical material. We won't know how the theory works until some one puts out a stereo disc with an "1812 Overture" that starts next to the label. The Fortissimo series anticipates playback equipment considerably better than what we have today. Their master tapes are recorded at 60 inches per second with the heads oriented horizontally. Of even greater significance to the record fan are the measures that have been taken to improve the transfer from tape to disc. These include a 92,000 cps tone superimposed over the regular signal while cutting the master disc. It seems that the conventional hot stylus technique cannot do as good a job in the harder material they are using for this series. The finished pressings contain a new and harder compound called Polymax. All these steps produce a stereo disc unlike any I've heard before.

Of the four translucent discs released so far, these two records offer the most convincing evidence of the changes this series could make within the industry. Conventional surface noise is totally absent and response is phenomenal. The pipe organ played by Paul Renard is the second Wurlitzer located in the Radio City Music Hall building. This smaller version of the main theatre organ is located in a studio atop the building that was originally intended for radio broadcasts. Miked at extremely close quarters, the sound of the studio organ has a gleam impossible to capture in the vast auditorium. The music is sure-fire stuff by George M. Cohan. The 27-year old Paul Renard doesn't have the polish and poise of the veteran theatre organists but he sells into these show stoppers with a complete quota of enthusiasm. This record won't be studied for the performance of the music. The attraction is the sound just as it is in the companion release of jet planes and a helicopter recorded at Eglin Air Force Base in Florida. In high and low fly-by, take-off and landing, these jets have the "live" quality formerly available only on 15 ips professional tapes. Once the word gets around, these will be the best records in the months ahead.

* 12 Forest Ave., Hastings-on-Hudson, N. Y.

Clebanoff: More Songs From Great Films
Mercury  STC 60162

This tape sustains a miking theory that's been kicking around for some years. If you work close enough to the sound source, it is possible to get similar results with the same orchestra in more than one recording studio. Clebanoff's string orchestra, with muted brass added for this album, recorded these movie tunes in two sessions, using studios in Chicago and Hollywood. The violins, violas and cellos, in each case, worked under the portable bandshell used by Clebanoff to bring out the richly commercial throb in his string tone. The program of songs is not the best one that Clebanoff has put together to date. The tempo is varied from time-to-time but the motion pictures represented are not world-beaters. About one-third of the tunes sound pretty much alike.

Knuckles O'Toole: All-Time Ragtime Hits
Grand Award  4T 209

A few minutes with this reel should convince the most finicky fan of the honky-tonk piano that tape has something special to offer. The glib-fingered Mr. O'Toole has enjoyed good circulation of his disc releases so there should be ample opportunity among his followers to compare this tape with his previous efforts. The discs have been telling only part of the story. The tape lets you know that the miking of the piano and accompaniment had been carefully worked out to hit the listener in the breadbasket. There's another dividend that should be evident to most listeners. The ease with which a stereo tape can spot the location of a sound source points up a quirk that the average stereo pickup does not reveal on discs. The placement of the piano was not exactly the same in all the selections heard on the tape. In some of the tunes it's slightly to the right of center. In others, it's a few inches to the left. Far from being a problem, I daresay that most chaps with a bona fide stereo system will be quite happy to point this out to their next visitor. The contents of the reel offer a fairly comprehensive course in the development of ragtime but the stellar attraction is still the impact of that piano's lower strings.

Mantovani: Concert Encores/Music From The Films
London  LPK 70025
Ornadel: Musical World of Rodgers and Hammerstein
MGM  STC 3817

Here are two tapes to prove that there's more to the business of being a top attraction in light music than the ability to drop one's first name. The former Cyril Ornadel, while making no attempt to copy the virtually-patented Mantovani use of strings, offers arrangements that are refreshingly adult in their avoidance of cuteness. His major problem in these excerpts from the major Rodgers and Hammerstein shows lies in the simple fact that his orchestra is not being recorded by London's engineering staff. Played in succession, it's hard to believe that the Mantovani recording is two years older than Ornadel's. London's sound is superior in every respect despite the fact that slight treble roll off is required to bring the highs in line with the general run of today's tapes. Stereo depth is almost double that of the MGM reel. The album titles are self-explanatory. The

Mantovani encores aim no higher in the concert category than *Clair de Lune* and *Song of India* but, within that sphere, the glamour market is pretty well cornered.

Irma La Douce (Original Broadway Cast)
Columbia OS 2029
Jo Basile: Songs from Irma La Douce
Audio Fidelity 5949

The first major musical of the 1960-61 Broadway season is an import from Paris by way of London. In the journey, a great deal of its original atmosphere of the Parisian underworld has been shaken loose with most of the loss taking place in the Channel crossing. Starting life in Paris in 1956 with an unpretentious score by Marguerite Monnot (*Poor People of Paris* and many Edith Piaf songs), Irma La Douce mirrored the life of the tarts and pimps of Pigalle in somewhat the same manner that Weill's "Threepenny Opera" covered London's Soho. When Irma La Douce opened in London two years ago, the lyrics were adapted somewhat and new ones written for English audiences. The American producer, David Merrick, brought over Elizabeth Seal, the star of the London production, to play the leading role. With her came most of the elements of the British version. Under the circumstances, on records at least, the Parisian atmosphere doesn't have a chance. Without scenery to set the mood, we are asked to follow a plot that unfolds in an essentially British accent. The Audio Fidelity recording featuring Jo Basile's accordion and small orchestra supplies a good segment of the ingredient missing in the original cast album—the "gutter"-al qualities of Pigalle. His group has cobblestones beneath it instead of the stageboards of London. However, it must be admitted that, even when presented in the style of a cafe orchestra, most of the tunes do not rise much above the status of background music. The title song and several others have enough distinction to be recalled when heard a third or fourth time. So far as the rest of the score is concerned, the current Broadway season is off to a slow start.

Raoul Poliakin: Fly With Me
Everest SDBR 8003

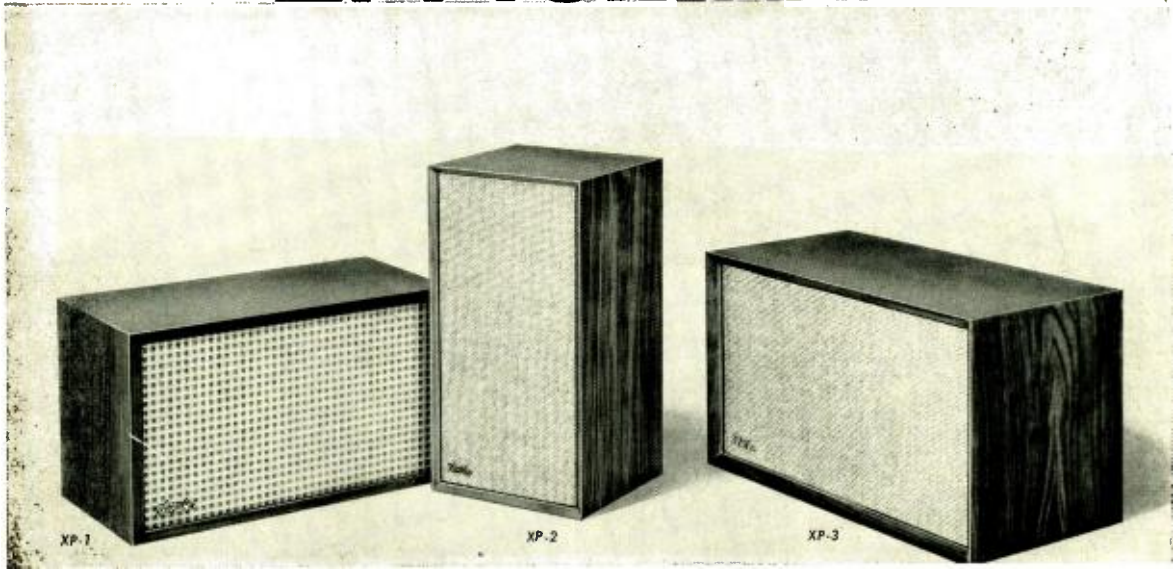
In their light releases, Everest has been putting extra effort into recent sessions with Paliakin's 55-piece orchestra and chorus of 20. If this latest recording is any indication, they expect him to take over a key position in their nonclassical catalog. The sound given the conductor here is certainly noteworthy. In my current reckoning, Everest is tied with Columbia for first place in the audio quality of orchestral stereo discs made in normal studios without recourse to stunts in miking and recording. I'm talking about reasonably flat and truly wide-range recording that asks nothing more than honest playback facilities to prove its virtue. More than half the stereo records now being released have been beefed up to sound linear on only so-so components. (Even this reflects some degree of progress since most of us can still remember LP's that were engineered to sound "Hi Fi" on the typical console phonograph of ten years ago.) It's true that the beefed-up jobs sound impressive as all get out on any rig but, on my setup, they never let you forget that you're listening to a record. The best of the "straight" records do just that. This is one of them. The theme of the disc is the old "trip" formula that covers the light music of an assortment of countries. The engineering makes it sound like a brand new idea.

Ray Vasquez: In the Still of the Night
Tropicana 2212

This stereo disc was produced by Oberline, Inc., under the personal supervision of Oliver Berliner. It carries out his latest theories on the best way to cope with a large battery of studio mikes. Thirteen Neumann microphones with individual echo and equalization were used at this session to handle the voice of Ray Vasquez and a large Latin orchestra under the direction of George Hernandez. The size of the studio and orchestra may have dictated the number of microphones.

Ray Vasquez, following two years of study at the Los Angeles Music Conservatory, played trombone in the orchestras of Horace Heidt,

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Charlie Barnet, and Bobby Sherwood before branching out as a singing leader of his own group. George Hernandez, a native of Cuba, has worked with Tony Martin and Johnny Mathis. His arrangements rely on the fifteen-piece string section to support the full-voice Latin Vasquez style. Since the vocalist does not believe in attenuating his own peaks in the manner of some of our vocal stars, there is some excuse for the use of a Fairchild limiter. Enough reverb is introduced to keep matters lively within the dynamics inevitably imposed by a limiter.

The Authentic Sound of Glenn Miller

—Yesterday

RCA Victor SP 33-90

The Authentic Sound of the New

Glenn Miller Orchestra—Today

RCA Victor LSP 2270

This two-volume package goes in for comparison in a big way. The first half of the set is a mono disc containing a dozen of the greatest Glenn Miller hits played by the original crew. The other record has exactly the same tunes—played in the same sequence—with Ray McKinley leading the Glenn Miller orchestra of today in a stereo recording. With the combination being marketed at a reduced price, RCA is doing every thing it can to induce the record fan who hasn't done so to convert to stereo. Those who already own a no-compromise stereo system can have a field day demonstrating these two discs to friends who are familiar with the old Miller recordings. The original arrangements, which date from April 1939 to July 1942 when the band made its final commercial recording, have been altered only slightly in their present-day performances by Ray McKinley. Whether you select a tune at random or choose one of the big production numbers such as *St. Louis Blues March*, the combination of stereo and Webster Hall acoustics provide a contrast that is sure to unsettle the most blasé listener.

Exodus (Original Sound Track)

RCA Victor LSO 1058

Perhaps to a greater extent than most film producers, Otto Preminger has devoted extra attention to the musical scores of his pictures. The "Man with the Golden Arm" featured exceptionally effective use of music by Elmer Bernstein and the more recent "Anatomy of a Murder" included the first film score by Duke Ellington. As part of the project that brings the Leon Uris best-selling novel to the screen, Preminger engaged the services of Ernest Gold whose music for "On The Beach" received wide attention. In this instance, the composer accompanied the cast and production crew on location in Israel on the assumption that his pen would absorb as much local color as the lens of the cameras. This approach certainly gives the musician more opportunity for stimulus than a study of the completed footage and the high content of Israeli and Arab themes bears out the original theory. A welcome side-light is the bass response of the disc itself. It's one of the very rare soundtrack albums with fundamentals left intact.

The Sound of 8 Hands on 4 Pianos

Medallion MS 7510

Now they've taken to tossing the sound of four pianos from channel-to-channel. Even the fame of the performers has been balanced between the stereo channels. Two of the four pianists, Bernie Layton and Buddy Weed, are well known in the record world. In the studio setup, Leighton is assisted by Moe Wechsler in the left channel and Buddy Weed has Warner Shilkret in his court. If your stereo collection lacks a four-piano novelty record seasoned with xylophone, bells, and drums—and that fact has been preying upon your mind—this disc should fill the bill for some time to come. Distortion is impressively low and room has been allowed for advancement of the listening taste of the neophyte customer. When he tires of *Ebb Tide* or *Wrong Note Rag*, he can move on to the *Sabre Dance*, *Slaughter on 10th Ave.*, and De Falla's *Ritual Fire Dance*. Unless you happen to be a four-piano fan of far-ranging tastes, one item such as this should do for the average collection.

(Continued on page 59)

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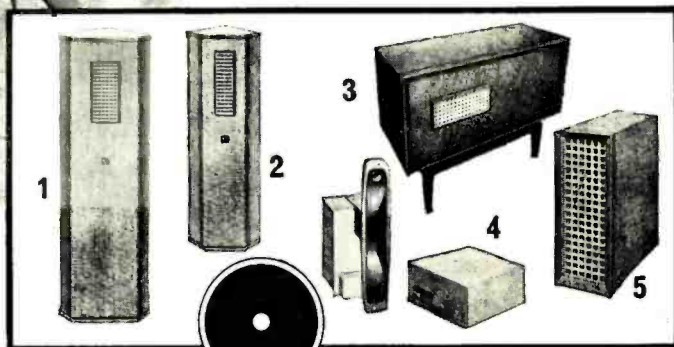
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- 4 ... IONOVAC 14A430: Basic IONOVAC High Frequency Speaker.* Includes horn (9" high) modulator and power supply.
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AUDIO ETC.

Edward Tatnall Canby

1. BACK TO BINAURAL

I suppose it's a sign of advancing age when a writer starts rereading his works, as of the past. Though I'm no longer counting myself of the younger generation, I'm not half as old as audio and, I must say, I am both surprised and amused to go back and read some of the things I had on my mind in this magazine's earlier days. (AUDIO ENGINEERING, as we used to call ourselves, began life in the spring of 1947, and I was there.)

The question is, is it worse to find how good you were in the old days (and so conclude that you're slipping), or to find how silly your stuff could be—and conclude that you're still growing?

Actually, I think most of us enjoy both sides of the rereading process. It's fun to read the punk stuff, the mistakes, the naive things, and to conclude comfortably that you've come a long, long way. It's also fun to read the good, along with the bad—for who can resist falling for his own good material, even if it does hit one's present elderly self a bit below the belt!

The occasion for this "look-see" backwards was partly a filing cabinet cleanup. Just had to throw something out, to make room for more, and in no time I was delving back into the categories and the folders, fascinated. (It takes me months to clean out a file. I keep getting sidetracked, just the way I do when I get hold of a volume of the encyclopedia.) Also on my mind, however, was the business of stereo and its related phenomenon, binaural hearing, brought into focus by the recent discussions on "stereo" earphones.

As you'll remember, I said that earphones weren't stereo but binaural. The Bauer circuit makes them stereo, more or less. Back eight or ten years ago, just as vehemently, I was insisting (along with other faithful purists) that "binaural" through loudspeakers wasn't binaural but stereo! True, true, you'll have to admit. In case you've forgotten, the only reason that the word stereophonic ever got into the popular public usage it now enjoys was that 3-D movies came along in '52 for a brief (and dreadful) splurge and we got used to "stereo" movies with "stereo" sound. Otherwise, I'll bet, it would still be "binaural," in spite of the prior claims of the correct term.

Anyhow, I have begun to get curious as to when this stereo-binaural stuff first began to reach me—i.e., when it first had a measurable impact upon the burgeoning high fidelity area. (I'll say, as an aside, that I've discovered long letters on high fidelity between myself and various readers of the *Saturday Review* back in 1946. We were already hipped on that subject then.) In the strictly professional world of acoustics and phonography the study of binaural hearing goes of course back and back. Stereophonic sound in experimental form dates from the early thirties and, not

long after in public entertainment via the Disney-Stokowski "Fantasia" of happy memory. But these things had no impact on us who were in other professions, except via the special demonstrations and entertainments. No "hi fi" implications at all.

Well, I did a lot of amateurish but surprisingly prophetic work with my own private binaural and stereo sound back in the winter of 1952-53 at Washington University in Saint Louis. That was the first opportunity I had had to use a "binaural" recorder, the then inevitable "binaural Maggie," a staggered-head two-channel Magnecorder. I duly wrote up my conclusions in a long report, immediately assigned by the Washington Music Department to a dead file; I never heard of it again. Fortunately, I also wrote it all up for AUDIO, in three installments, more or less. The first was before I got my work underway, in the January, 1953 issue—more than a year after I had first heard "binaural," via those pioneer Magnecorder tapes that started all the excitement (many of them recorded by Bert Whyte, then with Magnecorder).

By the end of 1952, I had fallen heavily for—no, not stereo, with which I was a bit impatient, but for true-binaural, i.e., two-channel recording for headphones via close-spaced mikes.

I spent a good part of that winter experimenting to my heart's content with the headphone type of two-channel sound, regardless of its impracticality in any commercial sense. I really loved it, and still do. There is nothing in recording remotely like it. (In photography, of course, the close analogy is color stereo, my oldest continuing hobby.) Its peculiar properties, so dizzily life-like, had me fascinated and led me on from experiment to experiment in recording. I did plenty of "loudspeaker binaural" too (and played my tapes both ways for all experiments), but what we now called stereo took second place.

We were all of us already involved in a familiar terminological mess then as to what to call these different facets of two-channel recording—and, of course, as to what their differences actually were. Too many people thought they were interchangeable, applied the word "binaural" to any old two-channel sound, whether played via phones or speakers. It was during those long experiments of mine, on my own and by myself, that I found how truly and fundamentally different the two really are, whatever you may call them.

I was much exorcised by all the confusion and laid about me with all my might, trying to untangle things. Remember, we had 3-D then, and such startling innovations as three-channel loudspeaker "binaural," for movie theatres. The word binaural was beginning to become ridiculous in such situations, you'll have to admit; for what in the name of Heaven is "two-eared" sound via three channels?

Well, you *hear* it with two ears. But then you always did hear your movie sound with two ears. . . . Anyhow, my righteous attempts to straighten things out for the layman were surely justified. We are still as confused as ever now, eight years later, even if the terminology is different!

By April 1953 I had got so annoyed at the word-muddle that I headed a paragraph of comment with a new suggestion—why not call the whole d— business *bistereonauralphonic* and get it over with? Nevertheless, I solemnly went through (in January) the explanation of layman's two-channel sound for loudspeakers and for earphones, as I have many a time since, and I opined, while I was at it, that I thought "binaural" for loudspeakers was not yet quite perfected.

That, you'll remember if your beard is gray, was the year when the AES went in for binaural at the annual banquet, with two mikes a foot apart and two enormous speaker systems a half-mile on either side; the honorable audio engineers who spoke that night were heard screaming through the air like rockets at semi-supersonic speed, a half mile at a time. I was not impressed.

Nor was I overwhelmed by the famous ping-pong recording from Magnecorder, the original for the now widely accepted technical term "ping-pong," referring to an exaggerated right-and-left separation in stereo. Those ping-pong balls were ten feet across and the ping-pong court was in proportion. So were the players. No, "binaural" didn't impress me much. Not that season.

But, you know, I covered myself fairly well—now I see (with some relief). I think I was right in suggesting that in its then state of happy anarchism, "loudspeaker binaural" was mostly very loud publicity. Most of it, indeed, was just plain outrageous. Some of our present stereo still is. But I crossed my fingers.

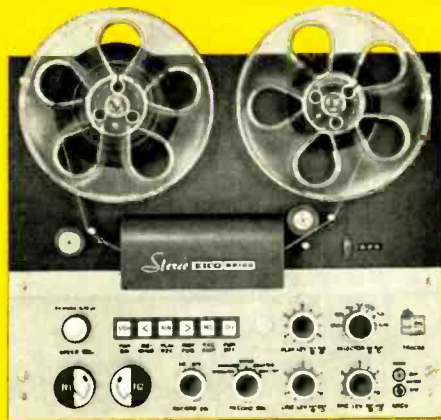
"Don't be misled—in the wrong direction—by all this 'binaural' excitement, in case you've already discounted two-channel recording as one more publicity stunt," I wrote. Maybe it isn't perfection, I suggested, but "there is definitely something in it, behind the big-gun stuff now going on. The trouble with 'binaural' (loudspeaker) music right now is that it is scarcely begun to be developed for practical use. A fine big chocolate cake but somebody took it out of the oven quarter-baked."

In spite of some excellent results, I felt that there were, in the large, "confusions, contradictions, false and faulty effects, happily swallowed up in the general excitement. Perhaps this is as it should be . . . but somebody has got to untangle things sooner or later or the fine little "binaural" boomlet will collapse . . . well, like a quarter-baked chocolate cake."

Well, it didn't collapse, though it came close to it several times even after it had become stereo instead of "binaural." Somebody did do something about it and presently, mainly through the work of RCA Victor, we had some real stereo music available, on tape. That took two or three years. RCA launched the first large-scale symphonic tapes, if I remember rightly, and RCA should get much credit for practical stereo microphoning techniques, at least in this country.

My biggest question, in early 1953, seems an odd one—how did you make a single soloist play his music "binaurally" without there being two of him in the two speakers? Doubling, I dubbed it, and I was still worrying about that several years later. I needn't have. We now are aware that with good stereo miking and a good, well-bal-

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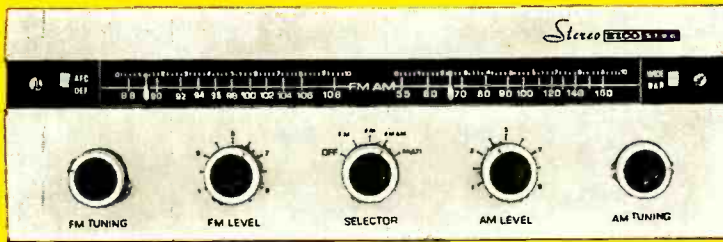
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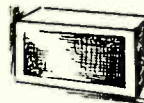
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anced listening place, doubling of the soloist is no problem at all. You don't even need a third recording channel, though that has been a helpful aid to many American recording technicians.

"Is it possible, then, to get a *binaural* effect in any degree with two speakers—i.e., an effect that is independent of the actual position of the two speakers themselves? To put it concretely, can you record a single person's voice, say, two-channel via closely spaced mikes, then play him back through two speakers widely spaced—say 20 feet apart—and have just one of him appear, midway in space between the two speakers?" That was my "\$10,000 question" and, you see, I showed my then ignorance.

Of course you can. And if you use only one channel, through two speakers, you can do it even more convincingly! I was not then very clear (how many of us are now!) as to how the stereo ("binaural") effect worked, when it worked. I kept trying to relate it to the much more positive and much simpler earphone binaural effect, the two channels completely separated right up to the two ears.

It was at Washington University that somebody finally let me in on the gist of stereophonic theory, including the lovely idea of the curtain of mikes and loudspeakers, an infinite number of mikes on one side and an equally infinite number of loudspeakers on the other side, the whole "transparent" to sound. Move the speakers to another location (as in the original 3-channel stereo demonstration with the Philadelphia Orchestra) and you have a stereo transmission, ideal and infinite.

Use fewer channels and you get a less precise effect—but even two channels are enormously better than just one, adding at least some definition of solid, real space where there is none at all in mono sound except as an illusion.

I worked out a highly significant reversal of my earlier ideas on "loudspeaker binaural" during my many weeks of personal experiment that year, and I was mostly right, where before I had been very positively wrong. Before! Oh yes, 1953 wasn't, it turned out the beginning of my experience with two-channel sound. In the January 1952 issue (January seems to be my binaural month) I had a piece entitled "Monaural and Binaural—Interim Thoughts." And its first words were "Just two years ago, in the January, 1950 issue of AE, I wrote out a set of thoughts upon a vexing and yet very interesting subject. . . ."—the subject was the relationship between monaural and binaural hearing, one eared (as in mono miking) and two-eared.

Anyhow, in early 1952 I was 'way off the beam. At that point (as of late 1951) I had just heard my first two-channel sound, and I was stunned. Not by earphones, but by loudspeakers! You see, it all depends on what you hear. One lucky good sample of stereo recording had set me up so far that it took a year—and those ping-pong balls—to bring me down again to a healthy skepticism.

My 1951 boner was really vital: it concerned liveness. Wrongly, very wrongly, I concluded after my first stereo listening that stereo liveness, via loudspeakers, was the same as earphone binaural, i.e. *the same as that via two human ears*. That is, if you used two channels and two loudspeakers, you could move your mikes 'way back, literally to the best seat in the house, say 100 feet from the stage. You could do everything with two loudspeakers that you could with two ears. And consequently, recording technique was going to be revolutionized when "binaural" (stereo) came in. I was wrong, enthusiastically wrong.

Well, nobody challenged me. Not a soul. It wasn't until that next year, in Saint Louis, that I found for myself, by painful and patient listening to my own two-channel recordings, that stereo did not produce a two-eared liveness. Sad, but very important.

In my April, 1953 report I first described in great detail the astonishing effects of true-binaural (that was my new name for it) sound via earphones and mikes a foot or so apart, like ears. Then I came to the acid test of the stereo loudspeaker effect, and I ended the long account of their workings with an acid question, and its new answer.

"Do these true-binaural (earphone) effects occur when two loudspeakers are used?"

"I have tried and tried and tried, comparing one-channel and two-channel sound via speakers. The answer, in my experience, is a dramatic NO.

"Off-mike voices remain off-mike when reproduced via two channels on speakers—though the source of the voices can definitely be heard in space between the speakers. (Now I was getting things clear, you see.) The liveness, however, does not change.

"Confused recorded conversation is just as confused via two-track sound as via one-track—though the placement in space and the realism is heightened."

And so it went. I found, this time, that an off-mike, too-distant mike placement in mono remained off-mike and too-distant in stereo, though the placement and realism of sound was dramatically improved. Generally speaking, I think present-time stereo recording engineers will agree that I was on the right track. Stereo liveness is *not* like binaural, earphone liveness. It is, relatively, very near to that of monaural sound. You most certainly cannot put your stereo mikes any old place, as we all now understand.

I summed up my comparison of stereo versus mono through loudspeakers in a wonderfully anti-climactic phrase, but one that seems to me remarkably accurate. Off the cuff, out of my own private experience at that time, I observed that for me "loudspeaker binaural" was merely a "moderate improvement" over mono sound! That was my objective, non-commercial evaluation as of 1953, of what we now have in commercial stereo.

It was based, of course, on limited knowledge. There weren't any commercial stereo recordings then, no tapes except the few experimental ones I had heard from such as Magnecord and the necessarily bungling ones I made myself as well as I could manage, with hit-or-miss mike techniques. But essentially I think the term was correct. Moderate.

As of now, I'd modify two aspects of that 1953 account. First, stereo is still definitely a "moderate" improvement over mono. But many of us have learned to treasure that moderate improvement enormously, as audio men treasure the slight differences between excellent and outstanding equipment. In terms of thousands of stereo records heard, of hundreds of hours of stereo music, that "moderate" stereo improvement has now come to be a matter of musical life and death for me. I am all for stereo, and I believe its very greatest values are in that very moderation—i.e., subtlety.

Secondly, on the technical plane I think it is clear now that stereo liveness is slightly different in impact from mono. It does share a moderate bit, at least, of the binaural adaptability. Yes, for stereo you can move your mikes back a bit, moderately. If I am correct, it is often done. In

(Continued on page 35)

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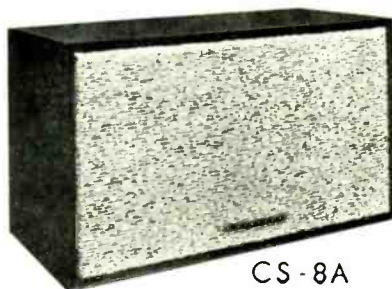
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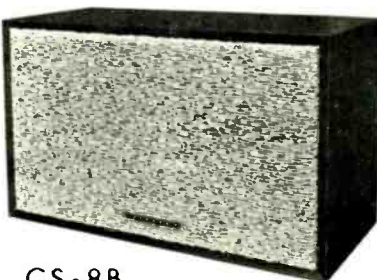
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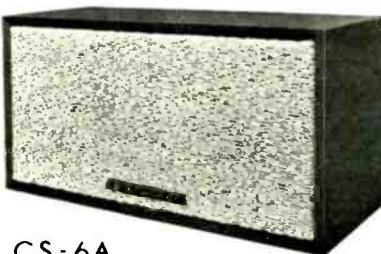
CS-12A



CS-8A



CS-8B



CS-6A

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Mounted speaker : 12" coaxial
Impedance : 16 Ohms
Frequency response : 45-16,000 cps
Power input : 20 watts
Sensitivity : 101 db/watt
Dimension : 15 1/2" (H) x 23 1/2" (W) x 10" (D)
Finish : Cherry

Model No. CS-8A

Type : Closed enclosure
Mounted speaker : 8" mechanical
2-way
Impedance : 16 ohms
Frequency response : 50-16,000 cps
Power input : 6 watts
Sensitivity : 99 db/watt
Dimension : 12 1/2" (H) x 20 1/2" (W) x 11" (D)
Finish : Cherry

Model No. CS-8B

Type : Closed enclosure
Mounted speaker : 8" coaxial
Impedance : 16 ohms
Frequency response : 60-16,000 cps
Power input : 8 watts
Sensitivity : 99 db/watt
Dimension : 11 1/2" (H) x 22 1/2" (W) x 9 7/8" (D)
Finish : Cherry

Model No. CS-6A

Type : Bass-Reflex type
Mounted speaker : 6 1/2" mechanical
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Impedance : 16 ohms
Frequency response : 80-16,000 cps
Power input : 3 watts
Sensitivity : 96 db/watt
Dimension : 11" (H) x 19" (W) x 9" (D)
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EDITOR'S REVIEW

THE NEW YEAR

IT IS THE CUSTOM in January for those who conduct pages like this one to prognosticate about a variety of subjects ranging from those with which they are familiar to those which have no bearing on the balance of the magazine in which the words of wisdom appear. We do not feel constrained to follow this custom slavishly, since we lay no claims to being oracles regarding the business and economic aspects of our industry.

We do feel, however, that some of our thoughts may be of slight interest, at least, to those who determine what products we should have made available to us and possibly to our readers who are the principal customers of those same manufacturers. We often receive letters from readers, who are also customers, with a wide range of complaints about equipment. Some are vitriolic, and in many cases the complaints are aimed to start us on a campaign against something or other that happens to be at that moment a pet hate of the complainant. Such cudgels we do not intend to take up, since we are more inclined to take what is to us a more reasonable view of the entire problem.

To be sure, there are occasions where a piece of equipment arrives in the customer's hands with some minor defect which, in any other industry and under methods of distribution common to dry goods, groceries, and so on, would have been corrected by the retailer. Only in the discount houses do we normally buy appliances, for example, in sealed boxes without the opportunity of examining and trying out the product before we part with our hard-earned cash. We know that these conditions happen occasionally, but we do not feel that they are caused by any fault of the manufacturer. He, of all people, is anxious that his products get into the hands of the consumer in perfect working condition, for each complaint that reaches the manufacturer undoubtedly costs him the profit on one of the products if he has to make something good by replacement or by individual work in finding out what the trouble is.

In most instances, the problem is something caused by shipping and handling, and if the consumer were to ask the dealer to open up the particular unit and try it out, the dealer with his greater experience could probably correct the difficulty with little or no trouble. Most of us, however, prefer to buy our various products "in a sealed carton" as though we suspected the dealer of trying to put something over on us. Then, too, there are those outlets where the sealed carton is the normal selling procedure, and no service offered or even available. You pay your money and hope you're lucky. That's a chance you gotta take.

In so many instances, the experienced audiofan with a little technical know-how can fix the trouble in no time at all. Suppose a tube has gone bad or a wire broken off. The technically inclined hobbyist thinks

nothing of fixing it himself—and the dealer is glad to replace the tube at no cost because it has saved him the work of finding the trouble. But what does the novice do? He does not know how to find the trouble, let alone fix it.

We submit that the dealer should, in every case, try out any piece of equipment before it goes out of his store. He does not need to give it a life test, but if he were to put it on a bench and hook it up to a test system and let it "cook" for an hour or so he would spot those little troubles before they ever came to the attention of the customer.

When we buy a "package" set, the dealer generally delivers it and installs it; if it happens to be a TV set, he may sell us a service contract. In any case he is sure that it works before he leaves it to our tender mercies.

Hi-fi equipment is a rather specialized and highly developed group of products, and most people know little about electronic devices. Some precaution on the part of the dealer, some hand holding and a few encouraging words should help to make an enthusiastic customer out of what might have been an embittered griper.

And if you don't agree with this suggestion, we would like to hear about it.

HI-FI SHOWS

Three major shows are scheduled for the first few months of this year—Washington, San Francisco, and Los Angeles. The first one will be at the Shoreham Hotel in Washington on February 10, 11, and 12, and already more than half the available exhibit rooms are reserved. The show is being produced independently by Music Productions, Inc., with an Industry Committee composed of Charles W. Lineau, chairman, William C. Shrader, and Gene Rosen. Show hours are from 6 to 10 on Friday, February 10, and 1 to 10 p.m. on Saturday and Sunday.

The San Francisco event is to be a combined Home and High Fidelity Show, and is claimed to be the first such combination to be held in the U. S. James Logan, director of the show, has announced the dates as March 15 to 19, and the location as the Cow Palace. The Magnetic Recording Industry Association is sponsoring the event.

The Los Angeles show will be at the Ambassador Hotel April 5 to 9, inclusive, for the public, and is produced by the Institute of High Fidelity Manufacturers.

Then, of course, there is the 1961 International Audio Festival at Hotel Russell in London from April 6 to 9. And in Chicago, the dates are September 8-10 at the Palmer House.

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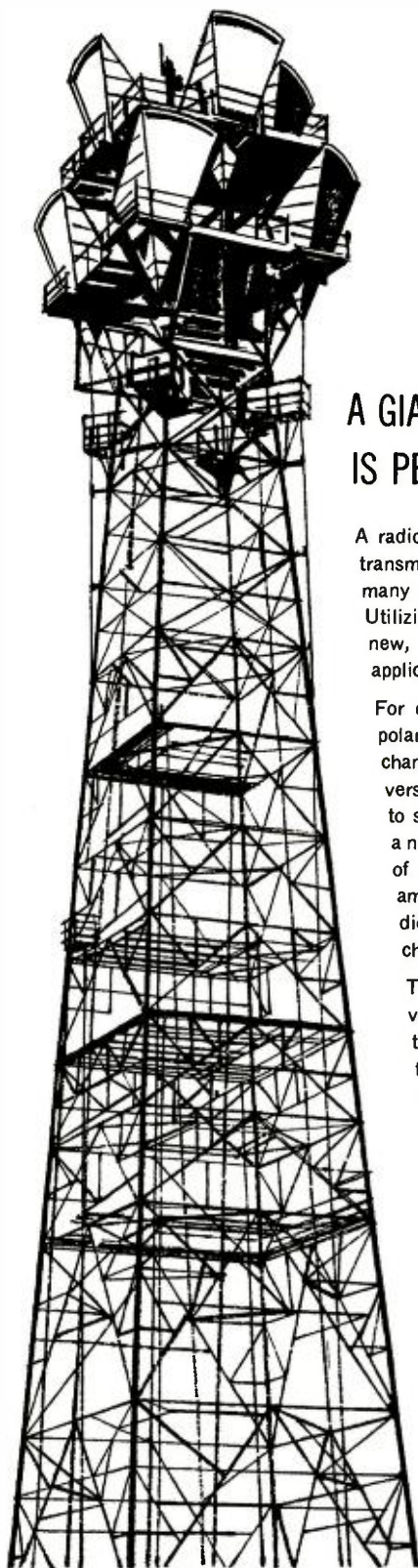
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For example, they arranged for the waves in adjacent channels to be polarized 90 degrees apart, thus cutting down interference between channels and permitting the transmission of many more telephone conversations in the same frequency space. They developed ferrite isolators to suppress interfering wave reflections in the waveguide circuits; and a new traveling wave tube that has ten times the power handling capacity of previous amplifiers and provides uniform and almost distortionless amplification of FM signals. They devised and applied a new high-speed diode switching system which instantly switches service to a protection channel when trouble threatens.

To transmit and receive the waves, the engineers applied their invention, the horn-reflector antenna. Elsewhere, this versatile antenna type is brilliantly aiding space communication research in the reception of radio signals from satellites. For radio relay, a single horn-reflector antenna can efficiently handle both polarizations of the 6000 megacycle waves of the new system; at the same time it can handle 4000 and 11,000 megacycle waves used for existing radio relay systems. Thus it enables all three systems to share economically the same radio towers and routes.

Produced by the Bell System's manufacturing unit, Western Electric, the new system is now in operation between Denver and Salt Lake City, and will gradually be extended from coast to coast. This new advance in radio technology is another example of how Bell Telephone Laboratories works to improve your Bell communication services.



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#4, 80 Pounds, a Super 8, and The Shim Method

JOHN L. GRAUER*

Out of adversity, and much trial and error, this author devised an ingenious and simple reflex enclosure—and an equally ingenious and simple method of tuning it.

THE PRESENT AUTHOR has owned, for about the last year and a half, one particular loudspeaker which has been a more or less continuous problem over this time. The unit has been installed in four different enclosures, and has become a tweeter during those periods when the author was most aggravated with it. From it has been heard good sound, bad sound, and mediocre sound. The total number of hours which have been spent in constructing its four cabinets is estimated at being well beyond 60, which does not include the time put in by various friends who happened to be caught while visiting. The author is afraid to think of the time spent studying audio magazines and books in order to work out a cabinet design which would allow the speaker to do its best. In

* 8 Garden St., Great Neck, N. Y.

spite of all this, however, he has rarely considered selling or demolishing the unit, and as a matter of fact has actually grown quite fond of it in recent months.

The unit in question is a Wharfedale Super 8 loudspeaker. For purposes of lucidity, details of the aforementioned tweeter episodes will be omitted in this article. What follows, then, will be a brief history of cabinets #1, 2, and 3, and an exposé of cabinet #4, which turned out to be a very good solution to the problem of housing the unit, and pleasing a few ears at the same time.

Cabinet #1 was a large sand-filled open baffle, weighing some 45 or 50 pounds. Reproduction quality was considered good for about two months, when the lack of bass, and low power handling capacity of the system instigated the first tweeter episode. Cabinet

#2, a small baffle measuring about one foot square, was a product of this, and had a life of about two more months, at which time it was decided that a tweeter was really not necessary in the author's loudspeaker system.

Baffle #3 then came into being. The idea had been to build a Hartley baffle (a small, open-backed box with heavy internal damping), but the acoustic filter screens called for in this design turned out to be too complicated to construct. Instead, drapes (consisting of old towels, scraps of Kimsul, and rags) were hung vertically in the box to simulate the filters of the baffle. Baffle #3 lived for perhaps another month, for the author disliked what he found himself repeatedly doing: rearranging the drapes in the box so as to "make things better." Finally, because the results of all this never made much of a difference to the sound, and because the sound was never outstanding, out came the towels, Kimsul and rags, in went a crossover network, and the Super 8 became a tweeter again in cabinet #3. And here it stayed, until July of this year.

At this time the author had again come around to the feeling that a tweeter was no real necessity in his system. Various ideas about what to do with the 8 from this point on had come to mind, but none had crystallized sufficiently. After some consideration of literature on the subject, it was decided to go "all out" with the 8 as a full-range unit by building an infinite box baffle of six cubic feet for it. Cabinet #1, which had been in storage in the basement since its supplantation by cabinets 2 and 3, would be used as the front panel of #4, for such a nicely constructed baffle (3/8" plywood frame, filled with 1/2" of sand) certainly deserved a better fate than to remain noiseless by the furnace indefinitely!

Construction started, and several weekends later the box was near completion. It now measured 5.2 cubic feet, weighed an estimated 80 pounds (at least), and had no bottom. The bottom

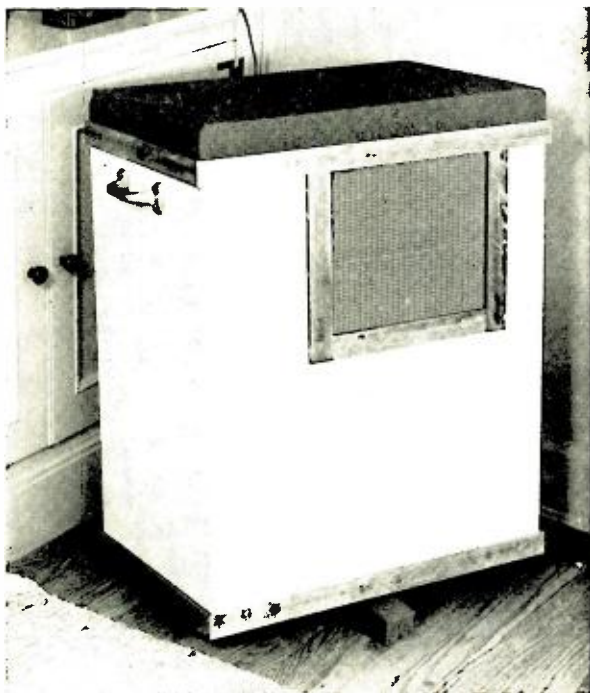


Fig. 1. #4—note the shim!

had been left off because it had been planned to either set #4 on a thick rug, or line the bottom panel edges with thick felt, to preserve the infinite baffle idea. When the glue and paint had dried, #4 was hauled upstairs; the speaker mounted, the back put on, and some audio fed through it.

After no more than half-a-dozen bars of music, the author began wondering if he had not perhaps misread somebody's infinite baffle theory. Highs, lows, and midrange all came out of the speaker, but none of them sounded very inviting. Another record was tried. Results were still poor. The tuner was switched in. Had all the signal sources suddenly given up the cause? The position of #4 in the room was changed, with no improvement. The author was just a bit puzzled, as he had heard the 8 sound good, bad, and indifferent before, but could not recall having heard it sound quite as unhappy as now. The unit seemed to be working harder than ever before, and sounded it. The system was run for about an hour more, the author sizzling all the while, and was then turned off.

Results being what they were, it was felt that a new approach must be in order. A short but agitated session with selected textbooks provided what might be some sort of solution. #4 could be turned into a bass-reflex cabinet. Now a bass-reflex cabinet is a closed box, with one hole cut in it for the speaker, and one for the port. The majority of such enclosures have both these holes positioned on the same (front) panel. With #4, mainly because one does not cut holes in already-built sand-filled panels, this would not suffice. Other designs use a port on the bottom panel of the box, with legs or runners supporting the box so that the port does not rest on the floor. But #4 had no bottom panel, and the author did not at this moment desire to build a bottom, port it, tune it (which can be a nuisance with such a port), or even make up a set of runners, for that matter. He had also run out of wood—the top panel of #4 having been built with the last few scraps of plywood, securely fastened together, which were obtainable on a Sunday—so several of these things were impossible, at least this weekend. During this ragged state of affairs he had begun thinking of a horn-loaded Super 8 (#5?), but as the facts reshuffled themselves slightly, an answer seemed to show itself among them. #4 could be converted to a bass-reflex because the box had not been fitted with a bottom. Easily, in fact, for all that would be required would be to tilt the cabinet back and insert a book underneath the front panel, thus providing the port!

A book was found and placed under the front panel. The hi-fi set was warmed

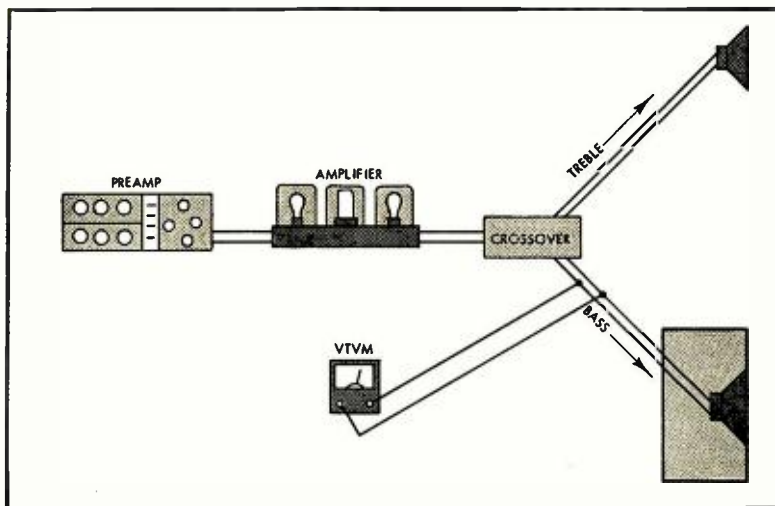


Fig. 2. Arrangement for using hum to tune bass-reflex enclosure to 60 cps. The pre-amp hum-balance potentiometer is adjusted for maximum hum, the bass control turned full up, and the treble control to minimum. Hum is fed to the speaker, the voltmeter then providing an indication of when the cabinet is tuned.

up once more, and a record put on. The author, who had been rather discouraged the hour before, was now somewhat surprised. #4 did not sound half as bad as it had a few minutes ago. Listening continued, and #4 almost sounded reasonably good. It is rare that one book¹ can solve so many problems at once nowadays, but that is what seemed to be happening. Bass was firm and clean. Treble (after some excess padding in the cabinet had been removed), was good. Midrange was remarkably transparent. Best of all, the speaker seemed to be "taking it easy," which had been hoped for, and which is always desirable in a loudspeaker system.

Why all this had happened is probably well known to the reader who is familiar with this speaker and bass-reflex vs. infinite-baffle design. These facts will not be reiterated here because the author's Super 8 was now sounding better than it ever had before, and plans were not being changed so that he might wind up with a non-resonant system! It was felt, however, that a further improvement might be possible by tuning the cabinet a little more in accord with standard bass-reflex theory, so this was undertaken next.

The author prefers to tune a bass-reflex cabinet using an audio oscillator and voltmeter. The speaker resonant frequency is first ascertained, and the cabinet is then tuned to this frequency. Since an oscillator was not available, the problem was one of finding another signal source that would be satisfactory. The enclosure would in this case have to be tuned between 55 and 65 cps, this being the resonant frequency range of the Super 8. The exact resonant frequency

¹ Not even an audio book, as a matter of fact!

of this particular speaker was not known, so the mean resonant frequency, 60 cps, was selected. Since absolute tuning accuracy is not required, and because a large reflex cabinet is much less critical of tuning than a small one, a 60 cps approximation was felt to be close enough. This frequency also turned out to be a very convenient one, for it is the frequency of most of the hum to be found in audio amplifying equipment. For the purpose of generating hum, the author's preamplifier was temporarily misadjusted by means of the filament supply's hum-balance potentiometer. All signal sources were turned off, the preamp turned to the phono input, the bass control set full up, and the volume control set to a high level. What was heard through the speaker at this point was considerable hum and wideband noise. Reduction of higher frequency noises, which might disturb the operation of the test setup, was accomplished by connecting a crossover network into the circuit so as to feed the 8 bass only, and turning the preamplifier treble control to minimum. What was heard now was mainly 60-cycle hum. A voltmeter was connected across the voice coil (see Fig. 2), and #4 was rocked back and forth, raising and lowering the front of the enclosure from the floor. As the cabinet was rocked, the meter reading fluctuated between about 3 and 4 volts; when the minimum appeared, the cabinet was tuned to 60 cps.² A shim, this time a scrap of wood of proper height

² The author wonders if it is necessary to warn British audiofans that it may be rather difficult for them to get their amplifiers humming at 60 cps when the power line frequency is 50 cps (or something else). Any interested Britishers are advised to try out hum-tuning with speakers having resonant frequencies close to 50 cycles!

so as to preserve the tuning, was fabricated and inserted where the book had been.

The author has not seen this particular method of porting a bass-reflex cabinet in use before. As is usual with loudspeaker enclosure design, there are advantages and disadvantages associated with the shim device. Perhaps the most obvious advantage is the ease and simplicity with which tuning adjustments are carried out. All that is required for tuning is an adjustment of the height of the shim which props up the front panel. As the resonant frequency of the loudspeaker drops, because of increasing freedom of the suspension system with time and use, the cabinet may be tuned accordingly, although for a frequency higher or lower than 60 cps, a signal source other than amplifier hum would be required. A second advantage is that absolute airtightness of joints in the cabinet is not necessary. This is an aid for the home constructor, and arises from the fact that the port size may easily be adjusted after the cabinet is finished; in other words, if an air leak (other than the port) exists, it may be allowed for by adjusting the shim. This leaves a condition where there are essentially two (or more) ports, which should not normally affect results, provided that the system is tuned to the proper frequency. Furthermore, the great majority of the Wharfedale speakers of different sizes that the author has seen are constructed in such a way so as not to yield an airtight seal in the suspension system; these units have an open slit in the foam where one end of the foam suspension strip meets the other. This results in one more small air leak in the system which will automatically be allowed for in tuning with the shim. A third advantage is that, because of the shim, the speaker is facing slightly upwards, which in many rooms may be an aid in getting the beaming high frequencies out to the listener, where they are wanted.

It is also interesting to note that this port design turned out, quite by chance, to be similar to the recommended port placement and configuration to be found in figure IX-2, in part nine of Mr. P. G. A. H. Voigt's article, "All About the Reflex Enclosure," published in *Radio-Electronics* magazine, November 1959. In this drawing Mr. Voigt shows one port running along the whole of the bottom edge of the front panel, and one extra port at the bottom rear of each side panel. Because the port of #4 looks very similar to this, it is suspected that #4 possesses some of the theoretical (and audible) advantages which Mr. Voigt outlines for his design in this article. And at the same time, the port arrangement of #4 results in a reflex sys-

tem which is easier to tune than Mr. Voigt's design, because any necessary port adjustments can be effected without modifying the cabinet proper.

On the other hand, disadvantages of porting by this method are several. It is not possible to damp the port of the enclosure with a sheet or two of suitable cloth, as is frequently done. With large reflex enclosures tuned to frequencies below 50 cps or so, this is not seen as a very great liability, but for enclosures measuring 3 cubic feet or less, especially those employing larger speakers, some sort of damping is usually necessary, and this shim method might well prove wanting. In addition, very heavy construction is required when the shim is used, to hold down panel resonance. In #4, the front panel is sand-filled, and the two sides and back are 1¼" solid pine (the top of an old desk). Because there is no bottom to the cabinet, three of these sides have one essentially free and undamped edge. And damping these edges calls for the rather solid construction. Last, but perhaps most important for married audiofans, is the fact that the finished enclosure is tilted slightly backwards,³ which may be unacceptable from a decorative standpoint.

#4 was finished in a simple but pleasing manner using various types of cloth, and flat molding for trim. By a vote of the family—not unanimous, by the way—it had found its way into the living room, where it became the subject of leisurely but extended listening tests. To determine approximately what had been accomplished, another Super 8, mounted in a standard RJ cabinet, was procured, and set up in the author's home for an A-B comparison. This RJ system was several years old, and the speaker fitted was the Super 8/CS/AL, differing from present models in having a cloth rather than foam suspension. This difference in speakers might possibly account for some of the results obtained in this test, but it is felt that what was found was due mainly to the size difference of the enclosures. Several known modern recordings were played, and the following was noted. In quality and quantity of bass response, #4 shamed the RJ system. Below 85 or 90 cps, the RJ unit was completely out of the running, sounding very sick compared to #4. The midrange of the RJ system sounded a bit smoother than #4, but not necessarily cleaner, because the broader air resonance (lower Q) obtained in #4 resulted in better loading on the cone at bass fre-

³ A level cabinet may be obtained by replacing the single front shim with 4 shims of equal height, one under each panel, but in this case tuning procedure would become more difficult, both because of the lesser height of the shims, and because of the necessity for adjusting four of them simultaneously during tuning, instead of one.

quencies more remote from the vent resonance, less consequent harmonic generation at the low end, and in turn less IM produced higher up. This was especially evident during louder full-range passages, #4 being much more facile in handling such material. In addition, the high end of #4 was superior, because of the smaller amounts of damping used in the cabinet. All told, #4 was a more pleasant and open-sounding system; indeed, the comparison almost forced one to conclude that one good system was being played, and one bad one. But then again, #4 does occupy four or five times as much space as the RJ system.

Since this A-B test was run, several experienced listeners have auditioned #4, with mostly favorable comments. One proud owner of an acoustic suspension system loudspeaker liked the bass quality, and was amazed when he was informed that a \$26 loudspeaker was making all that pleasant sound. Another, the owner of a similar speaker, thought #4 essentially equal in performance to his own unit. The reader will kindly note, however, that there was no acoustic suspension system speaker on hand to defend itself!

Time has further proved the merits of #4. In the room in which it is used—measuring 24×13×8 and mildly on the live side—#4 produces a full and firm bass down to about 60 cps, with some fairly clean, if attenuated, output to be had slightly below. Midrange response, though bright, is sufficiently clean, and high-frequency response is also satisfactory, though doubtless a suitable supertweeter could improve matters. In practice, however, #4's overall response and balance seem adequate for very nearly all but the heaviest organ and orchestral music, on which it, like most other 8-inch speakers, begins to strain a little. Smaller groups are its forte, and on such music as jazz combos and string quartets, reproduction is very pleasing. The piano also comes through well, though credit here must properly be given to this particular speaker, which is surprisingly adept at handling heavy transients. More often than not, it is felt that #4 performs in a way which would please many music lovers, and perhaps even a few audiofans too.

The author suspects that there are many owners of high-quality eight-inch speakers mounted in small enclosures who—perhaps not fully realizing the performance these units are capable of—may be thinking of switching to more elaborate speaker systems, for stereo or otherwise. As an alternative, some of these listeners might be advised to give serious consideration to the building of a larger cabinet for their present speaker. In a box of 5 or 6 cubic feet,

(Continued on page 61)

Tape Indexing Nomograph

JERRY LERNER*

The index counter is a useful device for conveniently locating a specific section of tape. Unfortunately it does not indicate either elapsed time or time remaining on the reel—unless used with the following nomograph.

FOR ANYONE MAKING serious use of a tape recorder, an index counter is unquestionably a great convenience. It enables the operator to locate desired sections of tape easily and rapidly, without the bother of either attaching a marker to the tape itself or going through endless repetitions of the stop-listen-rewind cycle. The value of this device is best measured by noting that all of the professional and semi-professional tape recorders come equipped with an index counter, and even the less expensive machines usually have one.

While serving perfectly well for location of the various selections on a length of tape, on most machines the reading of the index counter is *not* proportional to the amount of tape used. This means it does not directly measure either elapsed time or time remaining on the reel. In general, the index counter reading is proportional to the number of revolutions of the feed reel. Since the effective diameter of this reel changes with time as the tape runs out, the effective circumference of the reel also changes, so that one revolution of the supply reel does not necessarily correspond to a fixed length of tape. In fact, the amount of tape used per revolution varies by a factor of about three-to-one between the beginning and the end of the reel for the conventional 5- and 7-inch sizes. Correspondingly, towards the end of a reel of tape the index counter is going three times as fast as it was at the beginning, even though the tape speed is constant.

Offhand it might seem that the engineers in charge of designing tape machines hooked up the index counter at the wrong place. There is good reason, however, for connecting the counter to the reel drive rather than to the tape drive. In record or playback position there is a precise mechanism for pulling the tape past the heads at constant speed. In fast forward or fast rewind this mechanism is generally disconnected from the tape. Instead, power is applied directly to the reels. If a footage

counter is to be useful under all circumstances it would have to be connected to the tape at all times and operate without slipping even when the tape is running at high speed. This would surely be very hard on the tape.

The nomograph on the opposite page enables the operator to convert the index counter readings into "elapsed time" or "time remaining" with little effort. It is based on the assumption that the conventional 5- or 7-inch reels are used, though it is appropriate for any reel in which the ratio of full diameter to empty diameter is about three-to-one. For reels with other ratios a formula is given below. Assuming that the counter is reset to zero at the beginning, the operator need only know the index counter reading for the full reel and the total duration of the reel.

A straight line connecting the index counter reading for the full reel (left scale) and passing through the existing index counter reading (center scale) intersects the right hand scale in a point that gives the percentage of the total time used up and the percentage of the total time still remaining on the reel. For example, on some tape recorders an 1800-foot reel of tape (1½ hours at 3¾ ips) totals 1200 on the index counter. If the index counter is reset to zero at the start and reads 600 after a selection has been recorded, then 63 per cent (about 57 minutes) has been used up and there is a little over one-half hour of tape remaining. An operator who expects that only about half of the tape has been consumed is in for a surprise. In fact, if 1200 is the full tape reading, then 450 on the index counter corresponds to the midpoint of the tape.

The nomograph can be useful in many situations. It's most obvious function is to determine directly such things as the duration of a selection, the time required to reach a certain passage, the amount of time remaining on a roll of tape, etc. The nomograph also has other, less obvious applications.

Suppose you borrow a tape from a friend, and want to locate a particular

selection. On his machine the index reading is 650-930, with a reading of 1800 for the entire reel. Where does it begin on your machine? From the nomograph you determine that at 650 (with a total of 1800) the percentage of tape used is 48. Draw a line from 48 per cent to the point on the left scale corresponding to the full tape index counter reading for your tape recorder. Since the running time is the same on both machines, the place where this line crosses the center scale is the index counter reading for the beginning of the selection on your machine.

Another common situation is the following. You have a two-track tape recorder and wish to play the section 550-720 of Side 1 on a reel whose total reading is 800 on the index counter. Naturally, the reel is wound so that it is all ready to play Side 2. You could rewind the entire reel, then interchange the full and empty reels, re-thread the tape, reset the index counter, and then run it up to 550. A faster method is to determine from the chart that 550 corresponds to 80 per cent of the full reel. The complement of 80 per cent is 20 per cent, which corresponds to an index reading of 110. Reset the index counter to zero, run the tape until the counter reads 110, then interchange the partly loaded reels and you are at the correct place.

For those who do a lot of recording it might be a good idea to prepare a chart from the nomograph (or the formula) giving the direct correspondence between index counter reading and actual playing time for your particular machine and the tape length and speed you use most frequently. Pasted on the inside of your tape recorder cover, this table provides pertinent playing-time information at a glance.

In using the nomograph, the tape length, tape speed and tape thickness are quite immaterial. The only pertinent factors are the full reel and partly-full reel index counter readings, the total tape time, and the 3:1 ratio of full to empty reel diameters. For other reels or for pre-recorded tape the ratios of di-

* 348 Niagara, Park Forest, Ill.

ameters may be different. The appropriate formula is then:

$$t/T = n \left[\frac{2 - n(1 - r)}{1 + r} \right]$$

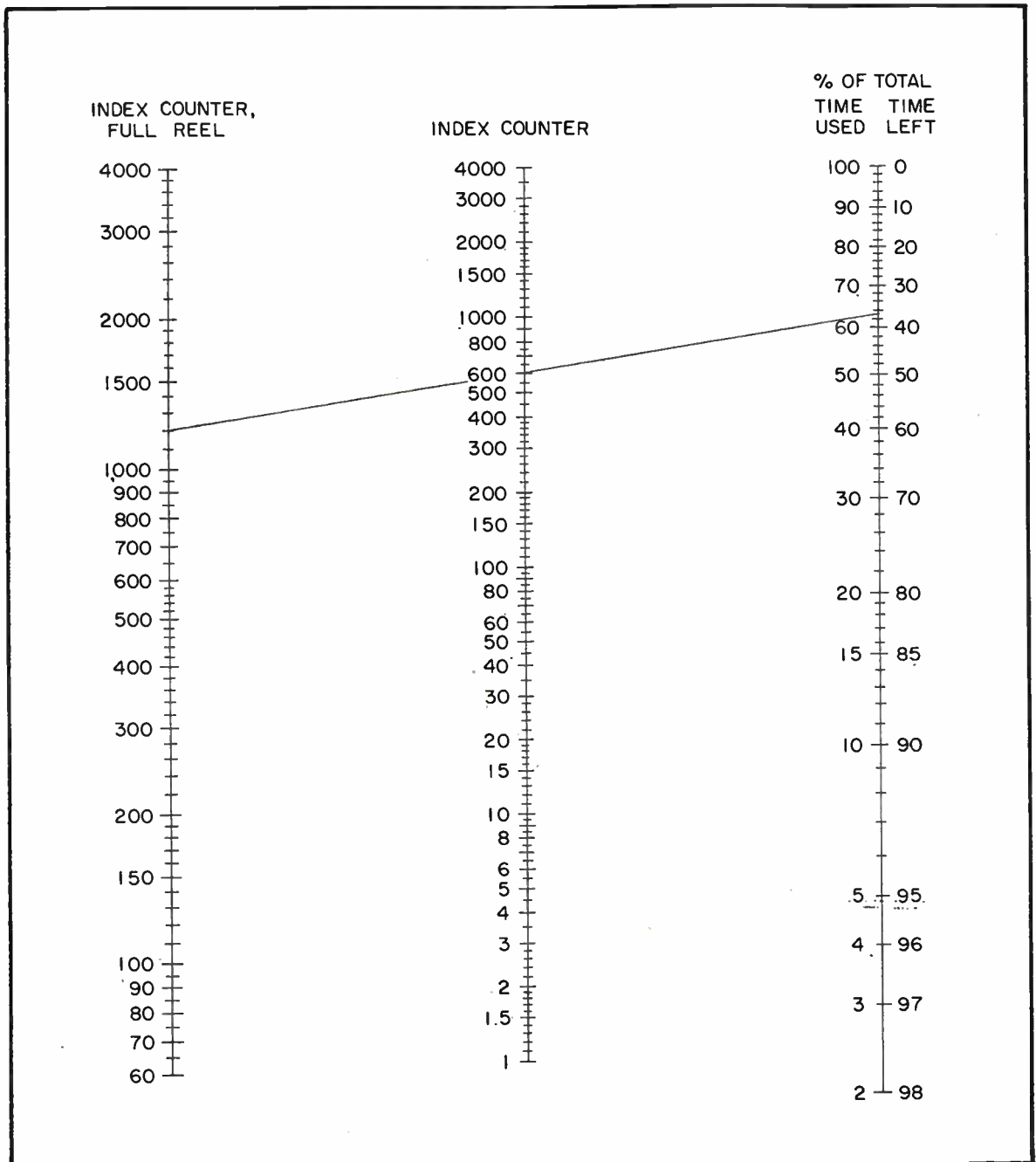
where t = elapsed time,
 T = total time,
 n = ratio of present index counter reading to total index counter reading,
and r = ratio of inner diameter to

outer diameter (both n and r are always less than one).

There are a few tape recorders in which the index counter is connected to the take-up reel rather than to the feed reel. The nomograph can be used for these machines with a slight modification. The index counter reading is subtracted from the full tape index reading and used for the scale reading on the center line. Also, the calibrations of the

"Tape Used" and "Tape Left" scales are interchanged.

It should be noted that values for the playing-time obtained from the nomograph are at best approximate. The index counter readings are generally not accurately reproducible, primarily because the tape is not always wound with uniform tightness. Other factors, such as slippage of the counter drive, fluctuations in tape thickness, etc., also influence the index counter readings. Æ



Nomograph for determining elapsed and remaining time on reel

Designing A Transistorized Preamp

R. J. BOSSELAERS*

On the surface, transistors are ideally suited for use in preamplifiers—which makes one wonder why they are not widely used. If the reason is lack of familiarity with their properties—this design example may help shed some light on those transistor procedures which differ from tube procedures.

THE TRANSISTOR has advantages over vacuum tubes especially for an application such as the hi-fi preamplifier because:

1. There is no hum problem.
2. The transistor is non-microphonic.
3. The noise figure of low noise transistors is better than that of the average vacuum tube.

However, the behavior of a transistor is different from that of a vacuum tube in many respects. This means that one cannot simply replace the tubes in a circuit by transistors and have a good design. Therefore designers not familiar with the peculiarities of a transistor are faced with problems they cannot solve. This may be the reason why the transistor has not yet acquired the place it deserves in the audio field.

These notes are written to provide guidance for the design of a high-quality transistor preamplifier.

Distortion and Feedback

To keep distortion within limits suitable for hi-fi purposes large feedback factors are required—together with low levels to maintain a low modulation per-

* Raytheon Company, Semiconductor Division, Needham, Mass.

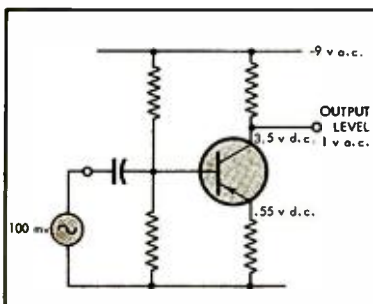


Fig. 1. Feedback obtained by an unbypassed resistor in the emitter lead.

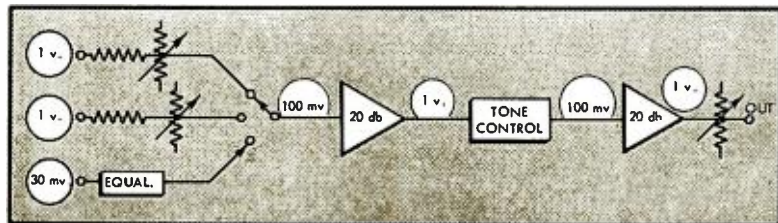


Fig. 2. Block diagram of preamplifier.

centage. With a 20-volt supply the maximum level that is practical is 1 volt rms.

To understand what feedback factors are required we can calculate the second harmonic distortion caused by the exponential relationship between base voltage and collector. (See Appendix.) The result is:

$$d_2 = \frac{q\hat{V}}{kT} \times \frac{1}{4N^2} = \frac{10\hat{V}}{N^2}$$

Where

$$\hat{V} = \text{peak input voltage}$$

$$N = \text{feedback factor}$$

Since this is not the only cause of distortion we will set it at .2 per cent.

For $\hat{V} = .1$ volt and $d_2 = .002$ we find $N = 22.4$. If the feedback is obtained by an unbypassed resistor in the emitter lead as in Fig. 1, the d.c. voltage drop will be $N \times kT/q = .55$ volts. The drop in the collector resistor for an amplification of 10 times will consequently be 5.5 volts. With 3 volts between collector and emitter, the required supply voltage is 9 volts.

Block Diagram

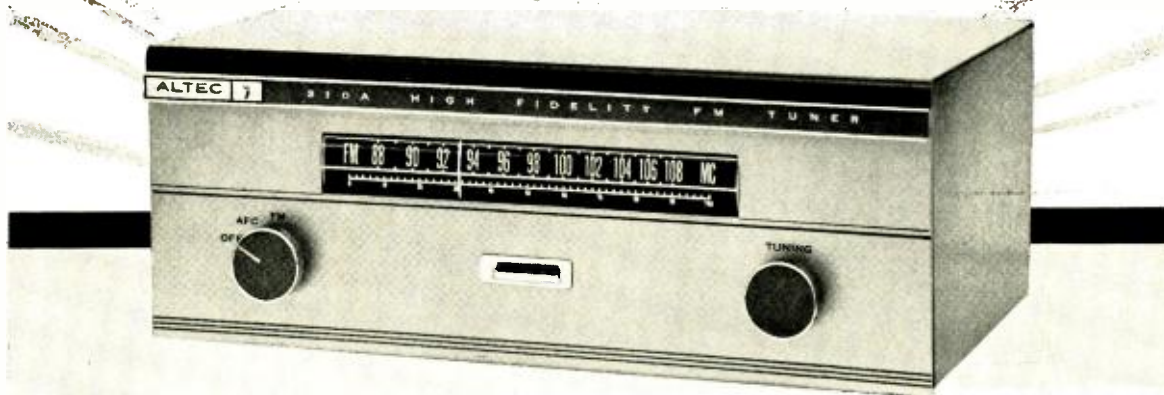
From the calculations above it follows that the maximum input level at the base is about 100 mv. The minimum level is determined by the required signal-to-noise ratio. The noise figure of a transistor is minimum when it is connected to a source with a resistance in the order

of 500 ohms. If the input resistance is considerably higher the noise level will increase with the square root of this resistance. Therefore input levels of 30 mv (maximum program peak) may not cause noise problems at the low impedance equalizer input, but the same level at the high-impedance tone-control stages could indeed give noise problems. For this reason the minimum required input level for a high impedance stage is also about 100 mv. Apparently a change of level means either distortion or noise and consequently there is no place for a volume control anywhere but across the output.

Since the required maximum output voltage is 1 volt and the maximum available level is also 1 volt, the tone control cannot immediately precede the volume control. An amplification of 20 db is required to make up for the loss in the tone control. Furthermore the input impedance of a tone control is generally not high enough and an extra amplifier stage is necessary to obtain this. These considerations lead to the block diagram of Fig. 2.

The circled voltages indicate the level for maximum program peak. Because of the distortion we cannot allow the level to be higher than 1 volt rms consequently the volume control will have to be turned up all the way for full power output of the power amplifier and any differences in input levels will have to be compen-

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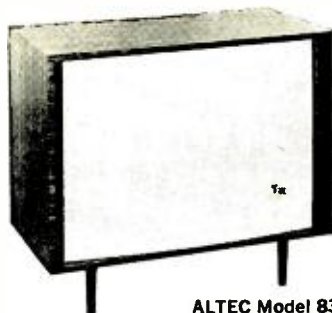


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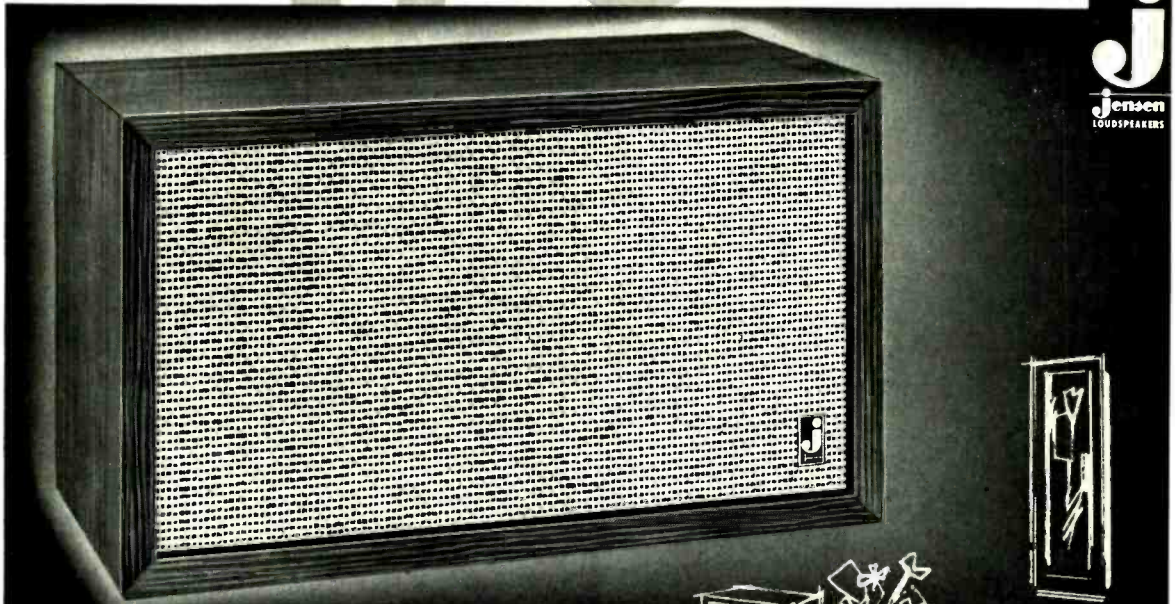


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Regulate That Voltage!

WILLIAM G. DILLEY*

For the critical or sophisticated application a well-regulated power supply is a necessity. Here's how you can design your own

CONVENTIONAL POWER SUPPLIES utilizing electronic rectifiers with appropriate filter sections provide d.c. power with an a.c. ripple content depending upon the type of filtering employed. Such power supplies may be entirely adequate for some purposes, but exhibit certain characteristics which limit their effectiveness in critical or sophisticated applications. The output from such a supply depends, of course, upon the input, and fluctuations in the line source will be inevitably reflected in a poorly regulated output. From the other end, changes in load current cause resulting changes in output voltage since the output impedance of the power supply is usually quite high. It can be seen immediately that attempts to lower a.c. ripple content by adding more d.c. resistance to the power supply circuit is at odds with voltage regulation requirements for reduced power supply impedance. The ability to employ heavy a.c. filtering while still maintaining a constant supply voltage is, of course, just one of the many advantages of a voltage regulated supply.

The design of voltage regulated supplies for all possible applications can become quite a complex and expensive task, but where current requirements are low, the voltage regulator tube of the cold cathode, glow discharge type, offers a simple and economical approach to the problem.

Principles of Operation

The basic voltage regulator circuit is illustrated in Fig. 3. The regulator tube, in parallel with the load, acts as a variable resistor, to maintain a constant tube voltage drop (independent of the current) within its design limits.

In order for the tube to function as indicated, it is necessary to ionize the gas within the tube by increasing the voltage until the gas molecules become ionized. This voltage is usually referred to as the "starting", "firing", or "striking" voltage. Once the tube is ionized, ionization is maintained by the flow of electrons from cathode to plate and the voltage drops across the tube because of reduced tube resistance. This voltage during ionization is called the regulation voltage. Ionization must be sustained to



Fig. 1 Regulated power supply built by author. Unit provides heavily filtered and regulated voltage to bias oscillator and recording amplifier of tape recorder.

effect regulation and this condition is listed as the minimum current requirement of the tube. The maximum current is dictated by excessive heat dissipation or cathode damage because of positive ion bombardment, and is controlled by the selection of the proper value of the



Fig. 2. Typical voltage regulator tubes.

current limiting resistor in series with the VR tube.

The maximum value of the series resistance can be determined from the following equation:

$$R_{MAX} = \frac{V_{MIN} - V_{TMAX}}{I_{TMIN} + I_{LMAX}} \times 1000 \quad (1)$$

where:

I_{LMAX} = maximum value of load current in milliamperes

V_{MIN} = minimum value of d.c. supply voltage (filtered and unregulated)

V_{TMAX} = maximum value of anode voltage drop (see Characteristic Range Values)

I_{TMIN} = minimum value of d.c. cathode current in milliamperes (see Ratings)

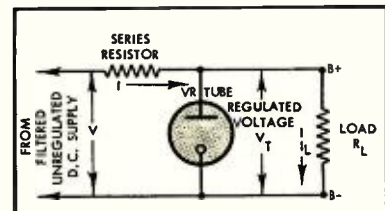


Fig. 3 Basic voltage regulator circuit.

The minimum value of this series resistance can be determined from the following equation:

$$R_{MIN} = \frac{V_{MAX} - V_{TMIN}}{I_{TMAX} - I_{LMIN}} \times 1000 \quad (2)$$

where:

V_{MAX} = maximum value of d.c. supply voltage (filtered and unregulated)

V_{TMIN} = minimum value of anode voltage drop (see Characteristic Range Values)

I_{TMAX} = maximum value of d.c. cathode current in milliamperes (see Ratings)

I_{LMIN} = minimum value of load current in milliamperes

From the two foregoing equations it would appear that, when provided with the tube characteristic data, all information essential to proper design is available. However, these equations provide

(Continued on page 32)

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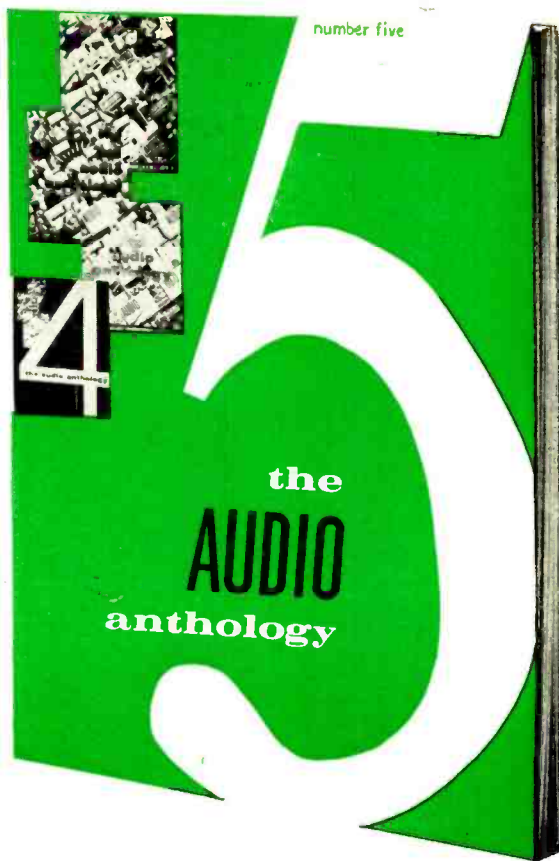
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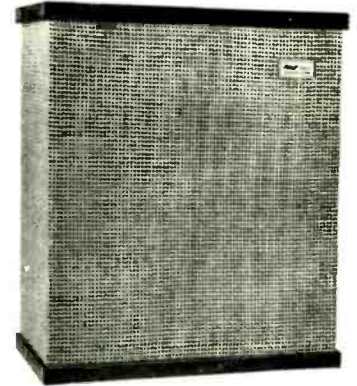
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PILOT 602: A complete stereophonic receiver combining on one ultra-compact chassis—a highly sensitive FM tuner, a superb AM tuner, a 30 watt stereo amplifier and a versatile control center. Complete, \$249.50.



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PSV-2: A 3-way system perfect for use on a table, shelf, floor. 3 speakers in Orlon fiber filled enclosure provide a frequency response of 50 cycles to over 16KC. Dimensions: 18"H x 15 $\frac{3}{4}$ "W x 9 $\frac{3}{4}$ "D. Walnut trim. \$69.50.



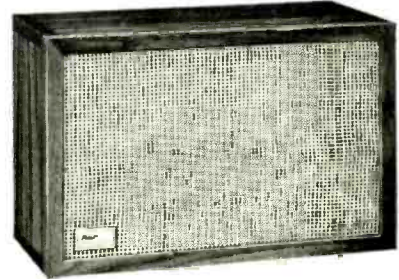
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LONG ISLAND CITY, NEW YORK

VOLTAGE

(from page 28)

for current limits *during operation only* and we must further insure that adequate voltage exists for starting under all conditions. The value of starting voltage will vary with supply voltage changes and, since VR tubes are light-sensitive, their ionization characteristics are dependent upon the ambient light conditions. Therefore to provide for adequate starting voltage the following equation is provided:

$$R'_{MAX} = \frac{V_{MIN} - V_{BOMAX}}{I_{LMAX}} \times 1000 \quad (3)$$

where:

V_{MIN} = minimum value of d.c. anode supply voltage (filtered and unregulated)

V_{BOMAX} = maximum value of anode breakdown voltage (see Characteristic Range Values)

I_L = value of load current in milliamperes

The designer should then select the *lowest* value of series resistance calculated from equations (1) and (3) as the

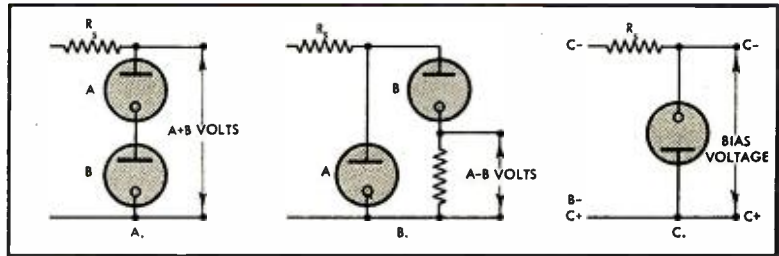


Fig. 5. Various configurations for achieving fixed or bias voltages.

required maximum value of series resistance.

Design Example

Let us assume that we wish to determine the circuit parameters for a regulator which will deliver approximately 150 volts to a load in which the current varies between 25 and 30 ma. The regulator circuit is to operate from a supply voltage which varies between 450 and 525 volts and the regulator tube selected is an OA2. Using the tube characteristics as listed in *Table 1*, we can calculate the minimum series resistance required using equation (1) as follows:

$$\frac{525 - 140}{30 + 25} \times 1000 = 7000 \text{ ohms (min)}$$

Using equation (2) the maximum value will be:

$$\frac{450 - 168}{5 + 30} \times 1000 = 8050 \text{ ohms (max)}$$

The choice of any resistor value between 7000 and 8050 ohms will insure operation of the OA2 within the published minimum and maximum ratings, taking into consideration maximum variations in line voltage, load current, and anode voltage drop. However, to insure proper starting under poor ambient light conditions and low supply voltage, equation (3) must be utilized¹:

Maximum value for series resistance:

$$R'_{MAX} = \frac{450 - 185}{30} \times 1000 = 8030 \text{ ohms}$$

Selecting the lowest calculated value for the maximum value of the resistor, the final selection to insure both starting and operating limits will be between 7000 and 8030 ohms.

The current (in milliamperes) through the tube may be calculated from the following equation:

$$I_T = \frac{V - V_T}{R} \times 1000 - I_L$$

where:

V = value of d.c. supply voltage (filtered, and unregulated)

¹ Where the tube manufacturer lists a higher value of starting voltage for conditions of total darkness, this figure should be used. For example, the OC2 requires 145 volts for starting in total darkness.

(Continued on page 60)

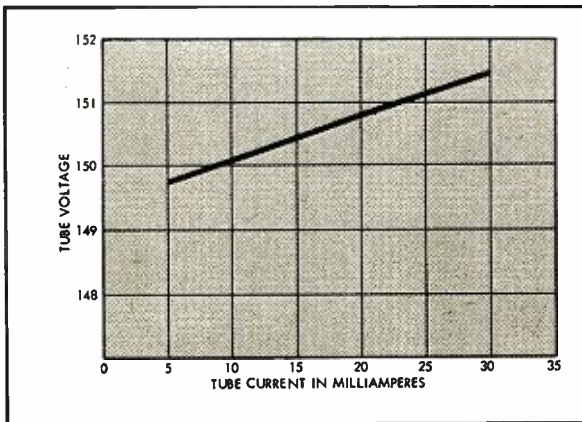


Fig. 4. Measured characteristics of sample OA2.

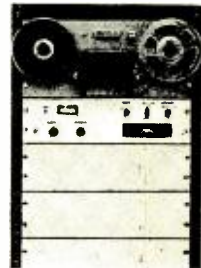
TABLE 1

Type	Description	Max. Dimensions Inches	Max. Starting Current Ma.	DC Operating Current Ma.		Ambient Temperature Range °C	Operating Conditions					Type		
				Max.	Min.		Approx. DC Starting Volts	Min. DC Anode- Supply Volts	Approx. DC Operating Volts	Regulation				
										Current Range Ma.	Volts			
VOLTAGE-REGULATOR TYPES							VOLTAGE-REGULATOR TYPES							
OA2	Intended for use in applications where it is necessary to maintain a constant dc output voltage across a load, independent of load current and moderate line-voltage variations.	Miniature button 7-pin base.	2 5/8	3/8	75	30	5	-55 to +90	156	185	151	5 to 30	2	OA2
OA3		Octal 6-pin base.	4 1/2	1 1/8	100	40	5	-55 to +90	100	105	75	5 to 40	5	OA3
OB2		Miniature button 7-pin base.	2 5/8	3/8	75	30	5	-55 to +90	115	133	108	5 to 30	1	OB2
OC2		Miniature button 7-pin base.	2.63	3/8	75	30	5	-55 to +90	105	115	75	5 to 30	3	OC2
OC3		Octal 6-pin base.	4 1/2	1 1/8	100	40	5	-55 to +90	115	133	108	5 to 40	2	OC3
OD3		Octal 6-pin base.	4 1/2	1 1/8	100	40	5	-55 to +90	160	185	153	5 to 40	4	OD3

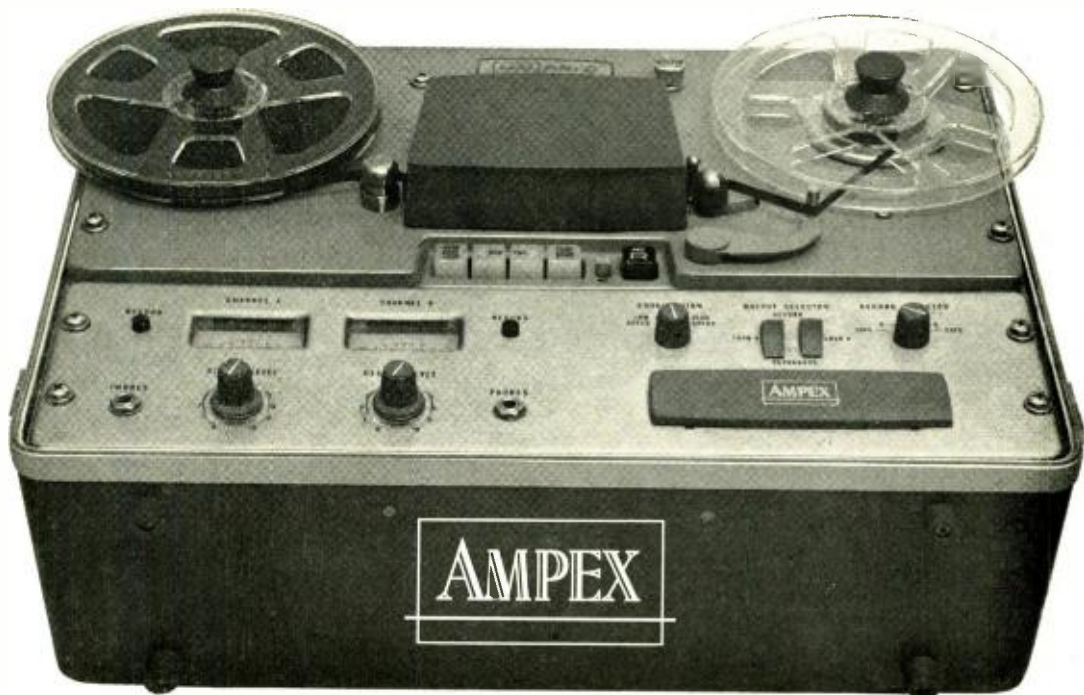
...FEATURES YOU NEED AND CAN AFFORD

Here in an Ampex under \$1000 are all the features broadcasters have requested—combined in a professional recorder so compact it fits just 14 inches of rack space. The Ampex PR-10 offers complete remote control, full monitoring facilities, two professional speeds, optional self-threading, all-electric pushbutton controls, and new frictionless clutch system for gentle tape handling. Alignment controls are all accessible from the front panel, permitting simple installation and adjustment. All parts have been thoroughly life-tested to give broadcasters assurance of studio quality performance and low maintenance over a long life of continuous daily operation.

FEATURES AND ESSENTIAL DATA PR-10-1 Monophonic model (\$845) available full track or half track—PR-10-2 Stereo/Monophonic model (\$945) records and plays stereophonic, monophonic, sound-on-sound, cue track, selective track and two-microphone sound • Pushbutton controls of professional relay/solenoid type • Full remote control provisions and accessory remote unit • New automatic 2-second threading accessory, optional • All new compact electronics • Professional monitoring includes A-8 switches, VU meters, and 600 ohm output circuits • Separate erase, record and play heads on individual mounts • Open fourth head position for optional 4-track or other playback head • Two speeds: 15 and 7½ ips or 7½ and 3¾ ips • Hysteresis synchronous motor • Proved electrodynamic clutch system for lowest flutter ever in a portable/compact recorder • Plug-in modules for flexibility of equalization and input characteristics • Portable or rack mount • Dimensions for both models: 19" w by 14" h permitting easy replacement of many older rack recorders • Associated equipment includes a four-position stereo/mono mixer (MX-10) and a new 40 watt speaker-amplifier system (SA-10).



PR-10



Literature including specifications, features, benefits and applications available from Ampex. Write Dept. A-4

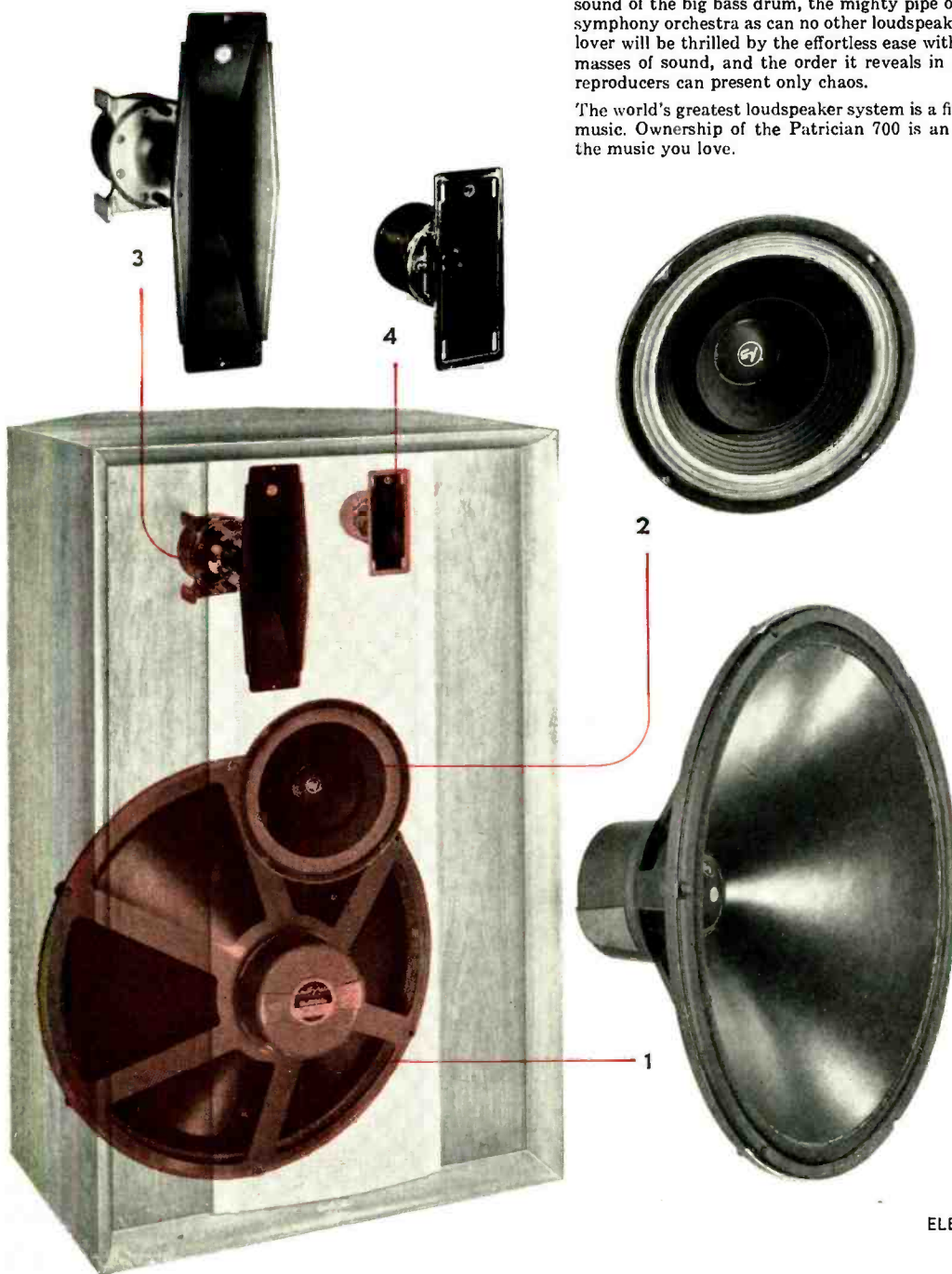
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ENGINEER'S MASTERPIECE

music lover's dream

The Patrician 700 is the most effective recreator of great music that has ever been made. And, while the exciting aspects of its physical design and performance are interesting to many, they should not and need not be misunderstood by those whose backgrounds lie in the creation and appreciation of music rather than in the means of reproducing it. For, if the Patrician 700 can reproduce with distinction the more esoteric sounds of earthquake, railroad train or thunderstorm, so can it recreate the sound of the big bass drum, the mighty pipe organ and the majestic sweep of the full symphony orchestra as can no other loudspeaker. It is for this reason that every music lover will be thrilled by the effortless ease with which the Patrician 700 handles large masses of sound, and the order it reveals in complex sonic tapestries—where lesser reproducers can present only chaos.

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Menlo Park, McDaniels Hi Fi, Division of Santa Clara Properties, 935 El Camino Real
Pasadena, High Fidelity House, 536 South Fair Oaks Avenue
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Riverside, Custom Music, 3890 Main Street
San Diego, Wright's House of Hi Fi, 5140 Cajon Blvd.
San Jose, Alco-Paramount Electronic Corp., 79 South Third St.
San Francisco, Lakeshore Hi Fi, Inc., 222 West Portal Avenue
San Francisco, San Francisco Radio & Supply, 1284 Market St.
San Francisco, Zack Radio Supply Co., 1422 Market St.
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- GEORGIA**
Atlanta, High Fidelity SSS, 608 Peachtree St., NE
- ILLINOIS**
Chicago, Allied Radio Corp., 100 N. Western Ave.
Chicago, Musicraft, 48 East Oak Street
- INDIANA**
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Indianapolis, Graham Electronics, 122 S. Senate
South Bend, Hi-Fi House, 731 South Michigan
- KENTUCKY**
Louisville, Hi-Fi Trading Post, 1024 S. Third St.
- LOUISIANA**
Baton Rouge, Ogdan Park Record Shop, 618 North Third Street
- MARYLAND**
Baltimore, Henry O. Berman, 12 East Lombard
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Boston, Radio Shack Corporation, 730 Commonwealth Avenue
- MINNESOTA**
Minneapolis, Lew Bonn Co., 1211 LaSalle Avenue
- MISSOURI**
St. Louis, Van Sickles Radio Co., 1113 Pine
- NEBRASKA**
Omaha, House of Hi-Fi, 7001 Dodge Street
- NEW MEXICO**
Albuquerque, Sound Equipment Co., 3011 Monte Vista, NE
- NEW YORK**
Buffalo, Buffalo Audio Center, 161 Genesee St.
New York, Hudson Radio & TV Corp., 212 Fulton St.
New York, Leonard Radio, 69 Corliland Street
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Fargo, Walter Electronics, 402 North "P" Avenue
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Dayton, Custom Electronics, Inc., 1918 South Brown Street
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Houston, Houston High Fidelity, 3727 Westheimer
Houston, Wrye Co., Ltd., 2410 West Alabama
San Antonio, Vandergriff Audio Co., 4106 San Pedro
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Salt Lake City, O'Loughlin's Radio Supply, 133 East Third Street, South
- WASHINGTON**
Seattle, Audio Sales, 2405 Broadway
- WISCONSIN**
Milwaukee, Jax Hi-Fi House, Inc., 523 E. Silver Spring Drive
- CANADA**
Toronto, Electro-Voice Sound Systems, 126 Dundas St., West
Montreal, Payette Radio Ltd., 730 St. James St., W.

For location of Patrician 700 units outside of continental United States, write Telesco International Corporation, 36 West 40th St., New York 18, N. Y.

AUDIO ETC

(from page 14)

many a mono-stereo recording session the mono mikes are placed somewhat closer to the sound source than the stereo mikes. But the difference, again, is *moderate*. Nothing at all like the astounding things you can do with binaural earphone mikes.

Moderation, in all things, is the essence of stereo, for better or worse. You'd never know it from the ads, and, indeed, this is the great fault of stereo's promotion over these intervening years: too much, too loud, too crude, too dramatic! Stereo's true and subtle values have not yet won out, though they are making new headway every year now by sheer weight of our continuing experience.

I recommend that article in our April, 1953 issue, even if it is my own, for it strikes me still as a solid exposition of the whole stereo-binaural set of values, not technical, but not for the layman either; somewhere in between, as this column usually has been. Think you'll enjoy it as a whole—I can't quite a tenth of it here.

Its end, I think, made the difference between earphone binaural and multi-channel stereo *very* clear, in a few choice words: Theoretically, I said, we need as many loudspeaker channels as we can get for an ideal stereo—*N* of them. Even three would help a lot. "But never, never will we need three ears."

Well, I've traced my own binaural experience back to 1953 and 1952 and then to the January, 1950 article, which shall remain unquoted (it had to do with binaural and monaural liveness equivalents and was quite thoroughly impractical, I'm afraid). But I see that I must move back further still—and I note that maybe I lost a fine fortune by not seeking protection for an idea I displayed in the September, 1949 issue of *AUDIO ENGINEERING*.

After a graphic account of some on-the-spot monaural earphone listening I'd been doing, walking around my kitchen with a mike and big (mono) earphones on, tapping china, rattling glasses, running water, I found myself bemused by the similarity of these dreadfully unnatural mono sounds to those that a deaf person must experience via a hearing aid in one ear (assuming the other ear doesn't hear). The contrast between two-eared hearing and one-eared was astonishing to me as I explored it directly, and it explained to me for the first time there in 1949, the full meaning of mono microphoning techniques—to compensate for this truly enormous lack of two ears.

"Now I haven't consulted anybody about this little idea," I wrote, but "I have yet to lay eyes upon a dual hearing aid, which is what I'm wondering about. A two-channel, two-miked, two-eared hearing device that would give a good approximation of binaural, i.e. normal, hearing."

Well there you have it, September 1949, in so many words. As I said then, I didn't know whether anybody else had thought about the idea before me (and I was dumb enough not to go and find out). But it wasn't, in any case, a very commercial sort of plan then. What—a vacuum tube amplifier doubled, plus two long, black cords and two big earpieces, not to mention two mikes fastened to the chest? Impractical, if interesting.

Well, as you must know, it's happened. I have, for instance, a Beltone hearing aid catalogue of recent date. You can get Bel-

tone hearing aid glasses complete with two complete audio systems, one in each arm of the glasses. True binaural hearing, without cords or other inconveniences at all. Amazing! And I guarantee there's nobody, aside from those who have benefited from it, who can appreciate better than myself the enormous value of this development for the restoring of virtually normal *binaural* hearing.

Only one minor trouble with the Beltone hearing aid write-up—and you can guess precisely what it is. Yep, the glasses are called stereophonic. Shall we begin all over again. . . ?

2. DYNAKIT STEREO

For a good number of months now, I have been alternating between two stereo preamplifier-control units for my voluminous record listening. They are in many respects interchangeable in my system, as any well-provided preamps should be these days. But their philosophies, so to speak, differ widely and quite interestingly. One is designed as a kit and its entire look and structure is based upon this primary intention, the now-standard Dynakit PAS 2 preamp. The other could never be a kit and no reason why it should be—the Fisher 400 CX, which I reported upon some time ago.

My Dynakit came to me factory-wired and I am not in a position to expound on the virtues or pitfalls involved in actual assembly of this unit, though I have heard plenty by indirection, and what I have heard is all to the good. Yet a lot can be deduced just from use of the instrument in actual practice and good working familiarity with its operational characteristics (to use a bit of lingo).

One can tell that this is a kit by its simplicity, both outward and inward. One can sense sensible economy, the aim of a good kit, in its dress and accoutrements, a plain metal enclosure with bent-over edges and exposed screws, sprayed in pebble-grain brown, a batch of unobtrusive knobs and slide switches, fluted for solid grip, a simple face plate, gold with a brown stripe on it. Familiar to most of us from its wide usage in high fidelity demonstrations and the like, as well as its presence in many a home, this kit preamp could scarcely be set up in any simpler dress short of a skeleton chassis format.

The controls are in some ways pared down from opulence, omitting a few of the fancier items available elsewhere in favor of plenty of those most often needed—lots of inputs, outputs, for instance. I quibble a wee bit over some points of decision here—no phase reverse, for instance. I have not yet seen a hi-fi system that could safely get along without means to change stereo phase somewhere in the circuitry, and short of my own special gadget, the remote phase switch (off the speaker line on one side) the preamplifier is the place to have it, along with other controls. And I find the reverse-stereo switch, not available here, an often useful aid in lieu of hauling speakers across the floor to get those fiddles over on the left side! It's surprising how often you'll find them on the right, for reasons not always very clear.

But you can't have everything, nor do you want everything, in an ultra-high-performance kit that is nevertheless very inexpensive. For the money, I'd be only too glad to give up these occasionally useful controls in favor of basic high performance.

One whole end of the Dynakit control panel is given over to four knobs that are, I'd suggest, a realistic and sad commentary upon present expectations in the way

of speaker uniformity. In an economical preamplifier like this, the designers still have felt it imperative to provide four separate tone controls, bass and treble on each channel. There can only be one use for such diversity, and that is to attempt, at least, to balance the coloration of very unlike speakers. What else?

Now I find myself merely fussed up by these four knobs, each of which must be set individually, because I am not in the habit of using violently unmatched speakers, and would have little faith in the possibility for good stereo sound if my speakers were, indeed, so unmatched as to require any very extensive use of this sort of unilateral dual tone control.

Yes—that sounds pretty hoity-toity, and you can say, of course, that I don't have to live with my "old" speaker as half of my stereo set-up the way other people do. True. But I feel strongly, nonetheless, that if my old speaker were so out of balance with my new one as to require tone control doctoring, the chances would be extremely poor that any lasting good might come from roll-offs or boosts alone. No roll-off on any amplifier will remove a jagged response contour in your speaker; it will merely mute it. That isn't enough.

Why, for goodness' sake, buy the extremely high performance of this Dynakit preamp if you are going to use it with mismatched, unfaithful speakers? The very quality of this unit should dictate a further economy here—simple ganged tone controls, operating upon both channels equally.

(But of course it may be that it costs virtually no more to set them up separately, as in this preamp, than to gang them together. If so, then Dyna is probably quite right. And maybe four little knobs, four "pots," are simpler to use and, especially, to wire up, than a set of space-saving ganged controls. This, I can speculate, might have been Dyna's thinking.)

On the Dynakit preamp's rear is an imposing battery of closely-spaced RCA plugs. Well I remember the day when our standard preamps had only two, for radio and phono; Dyna has 18, in two rows. Maybe a suggestion of mine concerning the earlier mono Dynakit preamp has something to do with the simple and improved labeling of these. The earlier model had a chart that was all but illegible in most lights—and if you looked over the top of the unit, was upside down. Here, the chart for the 18 sockets and four service outlets (two of them switched) is printed black on white paper and faces to one side; you can sneak around the left end of the unit and read it without breaking your neck. I had to add a big red line to divide one block of eight sockets from the other of ten—when that was done, I had little trouble in locating the right place for my inputs and outputs.

No point in describing all the Dyna controls; they include the standard sorts, with phono, two radio inputs and a spare, plus tape head (and a tape monitor switch that is professionally invaluable—I've seen it in use in more than one professional installation), a stereo control giving four degrees of stereo blending, from none to a full A-plus-B mono, and channel A or channel B alone into both outputs. A notable absence, for economy, is the level-set on some input channels; but each level-set involves an added "volume control" inside and more wiring for the kit man, so the omission is perhaps wise. I note at once, in mitigation, that it is very hard to overload this preamp. My Ampex 350 output, which has swamped many a preamp into high distortion, goes into this one without a bit of trouble, though the main volume control must be set back almost to the off position to keep the volume right. The lack of level sets is, then, no more than

a minor inconvenience, again well worth it in view of that sought-after basic high performance.

I'll pick some minor bones with Dyna before I end up in a blaze of praise—what else, after all, for such a carefully reasoned job of economy in the face of stereo's innate complexity. I distrust the slide-switch loudness control here, as I do all that are inflexibly geared to the prevailing input level, high or low. It'll work OK for very soft music (and that's the only way it should be used anyhow). But the switch can easily be left at the on position, for heavy, unpleasant bass. I have my doubts, too, as to whether the average user will be able to distinguish between four degrees of blend from stereo to mono—when a lot of us can't even tell mono from stereo without any in-between mixtures! But one intermediate step surely is worthwhile, to pull together those violently left-right pops-style stereo recordings. (I'm assuming your speakers are properly spaced, i.e. not three feet apart.)

Finally, an oddity of the "on-off" facility that causes me considerable frustration. The "on-off" is the slide switch furthest to the right at the bottom of the panel and it must be pushed sidewise towards the center, for power-on. Darn it, the preamp is so lightweight that the whole unit slides away when I push that switch—so I must brace my finger against the nearest knob, which happens to be the right channel bass; invariably, it turns, and usually so do several others of the four tone controls, thanks to stray fingers. The four controls are thus always off-center and constantly needing to be set back to normal, four of them, one at a time. Silly detail, but worth mentioning. Those slide switches are not my idea of an easy and reliable control. They come apart, and are often unduly stiff, or make poor contacts. (And yet they do save valuable space, as Dyna knows. So I am probably talking out of turn.)

Yes, it stands up to its high reputation, this Dynakit preamplifier, in spite of my small reservations in detail. Of its type, it is not only a leader and top value but a unit that in basic performance can stand up to others, not kits, in much higher price brackets. And it goes together well too, or so I hear, considering that the preamp is decidedly the most touchy element in the hi-fi chain of sound when it comes to construction—the magnification is enormous, and mistakes are simply not allowable. For details on Dyna construction ask somebody else; I'm enthusing about the finished product.

Yes, I have had a Dynakit 70 stereo amplifier on hand, too, joined to various preamplifiers including Dyna's own, as above. There is, today, practically nothing I can say about a really respectable basic amplifier because, with almost all controls centered elsewhere, the power amp just amplifies. And if it is indeed respectable, my normal musical listening is not going to allow it to intrude at all unless something else goes wrong. It shouldn't and seldom does.

Dynakit 70, pre-wired again, didn't get to work for me for awhile because of one of those same slide switches. It has a switch on the base panel that slides from stereo to mono, joining the two stereo amplifiers for mono use. This one had "popped" and was hanging loose, stuck in the mono position. Probably caught in something during shipment. Couldn't play with the machine until we got inside and forced it back into place again. Nope, I do not like slide switches, space-saving or no. Not this type, anyhow.

The Dyna 70 is a big, powerful brute, heavy and imposing in its brown cage,

same as those on the familiar Mark III but larger, to house the dual units. This is no delicate apartment-size affair; it likes current (175 watts) and it puts out plenty of audio for anybody's 70-foot living room. Warm, too, necessarily, and you'd be wise to give it air, and to refrain from dropping sweaters and such on top of it. They'll burn. All of which is part of any hi-power machine of this sort and nothing unexpected—what counts here, again, is top-rated audio quality at a low kit price. It's Dyna's specialty and in this basic amplifier simplicity is an even easier virtue than in the preamp, with its required complications.

I demur on only one small point, so far, in respect to this impressive Dyna 70, and that is an old subject with me—acoustic hum. Not much this time; but there's just enough to affect my super-sensitive ears. Acoustic hum, in case I'm using an unfamiliar term, is simply that which is produced directly by physical vibration, notably of transformers (and associated resonant bodies). It's not electrical, except of course in origin—60-cps a.c. It radiates directly from whatever is causing it, in the fashion of an electric razor or a noisy relay or an a.c. buzzer.

Let me generalize. Why, O why, in circuit after circuit producing the most gorgeous electronic amplifier silence, are there transformers that hum aloud, loudly? Dyna's present hum is nothing to what I've heard elsewhere, and various letters from readers attest to a general annoyance among many who have suffered from this unpleasantness.

Some amplifiers are silent. Some hum. It's hard to pin the thing down. An amplifier that appears to be utterly silent in one spot will produce loud hum in another situation, another room, another resting place. Nearby associated acoustic conditions obviously have very much to do with it. (Just try picking up a humming amplifier and note the instant reduction of the hum, as the resonating floor or shelf is separated from the source.)

Still—some amplifiers seem prone to this trouble and others just plain do not. The mechanical problem involved in fastening down all that transformer metal to complete rigidity has often been solved. It can be done. But it is not solved far too frequently in equipment that is otherwise, i.e., electronically, of the highest performanceability.

The trouble, I fear, is that acoustic hum is out of the electronic engineer's province, and so technically is none of his business. He just doesn't hear it, or doesn't mind so long as his internal circuitry is measurably hum-free.

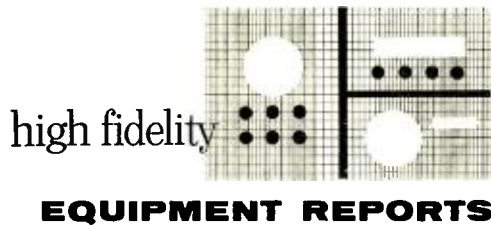
Measurement via testing instruments is what convinces him and this unpleasant sort of hum just doesn't lend itself to measurement, except via a microphone. Or by a musical ear.

It shows up there, all right, and I hereby suggest as strongly as I can that every amplifier maker should take heed and listen to the musical ear. Musical-minded listeners usually find radiated acoustic hum even more unpleasant than electronic hum, the kind heard through the loudspeakers. Acoustic hum has a peculiar kind of pervasiveness, an irritating persistence, that easily outdoes ordinary hum, volume for volume, in its power to annoy and distract.

Perhaps this has to do with its spatial diffuseness. Acoustic hum just *is*—it seems to exist in an oddly spaceless manner. Most people can't figure where it is coming from. It's like that horrid faint sound of a nighttime mosquito—somewhere in the room,

(Continued on page 56)

**Quoted from*



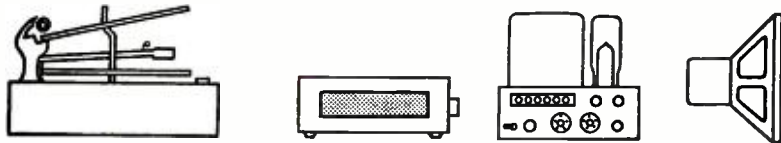
terial will soon reveal the almost total absence of coloration introduced by the AR-3. The sounds produced by this speaker are probably more true to the original program than those of any other commercially manufactured speaker system we have heard. On the other hand, the absence of

**A reprint of the complete Hirsch-Houck Laboratories' report on the AR-3 speaker system, as it appeared in High Fidelity magazine, will be sent on request.*

AR-3's (and other models of AR speakers) are on demonstration at AR Music Rooms, at Grand Central Terminal in New York City, and at 52 Brattle Street in Cambridge, Massachusetts.

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EQUIPMENT



PROFILE

HARMAN-KARDON CITATION III TUNER KIT

After first reading the specifications for the Citation III FM tuner kit some months ago, we awaited anxiously for the arrival of the physical embodiment of those specs—for any tuner that could live up to that promise could only be outstanding. And it is.

A scant twenty hours of assembly and wiring time after we received one of the first kits out of the factory, we were listening to it. There was nothing difficult about the construction, although some wiring experience is desirable to ensure that leads to the components in the r.f. and i.f. sections are satisfactorily short. The whole assembly job is much simpler than the Citation I, for example.

We were particularly impressed with one feature of the instructions—for each group of operations all the necessary parts, soldering lugs, cable clamps, or what not, are packed in one or two polyethylene bags so that one does not have to keep sorting out the individual bits and pieces from the over-all hardware stock to do a certain job. Whenever you open up one of the bags, you use all of the parts in it immediately.

Figure 1 is the top view of the tuner in completed form except for the housings over the pre-selector (small panel at right center on which the variable capacitor is mounted) and over the dial mechanism. The Nuvistor is just beyond the pre-selector panel. The long panel visible just over the front plate is the first detector-i.f.-a.f.c. cartridge which is furnished completely assembled and aligned. The two tubes at the left along with the two i.f.-type transformer cans are the 6BN6 limiters, and the discriminator diodes are in one of the cans. The two tubes with shields are the audio section and squelch tube. The multiplex power socket is seen to the right of the output jacks.

Circuit Description

The circuit sequence begins with a tuned antenna circuit which is loosely coupled to the tuned grid circuit of the 6CW4 Nuvistor r.f. amplifier stage, which is also tuned. The tiny Nuvistor incorporates many of the advantages of both transistors and tubes. It is small, so the elements are not positioned on long stems, thus eliminating vibration. It is made of ceramic materials and various metals, requires no spot welding or mica spacers in its construction, and offers a very high gain with a low noise figure. The output of the r.f. stage is fed to the i.f. cartridge which uses half of an ECC85 as a grounded-grid amplifier with the sound

half a tuned mixer stage. The oscillator is the triode section of an ECF80, and the pentode section is the first i.f. stage. The 2nd and 3rd i.f. stages use 6AU6's. A.f.c. is provided by a voltage-sensitive diode-capacitor combination controlled by the discriminator. The i.f. output is fed to two 6BN6 dynamic limiters, the second feeding a pair of diodes as the discriminator. Signal level is indicated by a meter in the grid circuit of the first limiter, and the d.c. voltage at the discriminator output is fed to the balance meter. The discriminator is followed by a cathode follower to maintain a constant load across it for minimum distortion. The other half of this tube is the interstation muting control. The loudness control is after the cathode follower and feeds the 12AX7 feedback-pair anode follower similar to the circuits used in the Citation I. The output impedance is around 1500 ohms. Plate supply is from a 6CA4/EZ81 rectifier followed by an effective filter.

The front panel controls are, from left to right: power switch, loudness, a.f.c. on-off switch, interchannel muting switch, tuning, and range switch—the latter reducing the gain of the pre-selector stage for local reception. The balance and level meters are above the last two controls. The muting adjustment control is located on the top of the chassis at the rear. The tuning dial and

the plastic-cased meters are illuminated. The main panel is charcoal brown, and the lower dress panel is in a pale gold finish which matches the other units in the Citation line.

The main panel is drilled for two additional controls which will undoubtedly be required when multiplex finally arrives. When the adapter kit becomes available, a new dress panel will be part of it, and the necessary panel designations will be in the proper places. Knobs are anodized aluminum to match the panel.

Alignment

One of the problems that worries the tuner kit builder is the alignment after the unit is built. There is certainly no problem with this one, for the entire alignment job can be done in less than five minutes with no external generators, oscilloscopes, or meters—and that five minutes is generous. One simply detunes the slug in the top of the discriminator can, adjusts the slugs at the bottom of the discriminator can and the top of the limiter can for maximum positive deflection of the balance meter, and then finally adjusts the slug at the top of the discriminator can for a center or zero indication of the balance meter. That is all there is to the i.f. and discriminator adjustment. The antenna and r.f. circuits are adjusted for maximum deflection of the level meter on stations near the two ends of the dial, with several repeats to peak both ends up together. Absolute dial calibration is ensured by setting the pointer exactly at the frequency of a known station when the station is correctly tuned in. After that, the dial is as accurate as though it had been hand calibrated.

This method of aligning the discriminator works because of the factory alignment of the finished i.f. cartridge. Thus the tuning of the discriminator and limiter circuits is done to match accurately with the pass band of the i.f. amplifier, which ensures exactness. And since the r.f. adjustments cannot affect the high-frequency oscillator nor the adjustment of the mixer grid circuit (it is isolated from the pre-selector by the grounded-grid stage) there is only a peaking required. With both slug adjustments for the low-frequency end of the band and trimmer capacitors for the high-frequency end, maximum sensitivity is obtained.

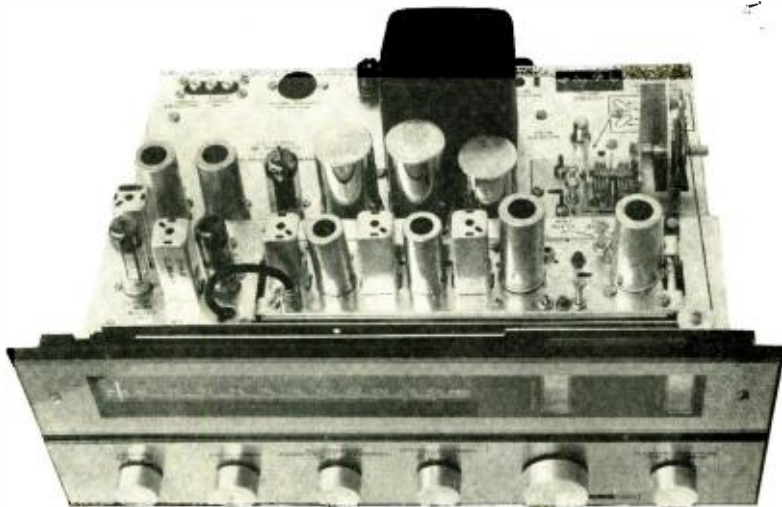


Fig. 1. Top view of the Citation III chassis from the front. Note the tiny Nuvistor just behind the tuning copocitor.

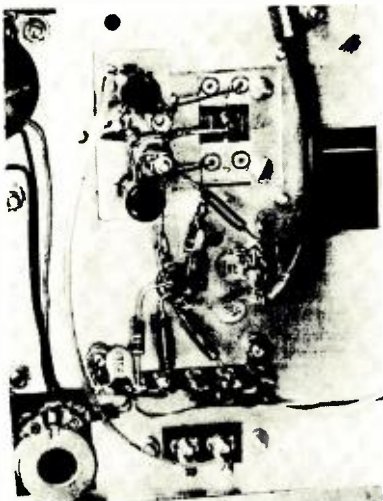


Fig. 2. Underside view of pre-selector section showing the wiring to the Nuvistor socket.

Performance

The important parameters by which a FM tuner are judged are: sound quality (which means frequency response and distortion), sensitivity, selectivity, and freedom from noise. The appearance and the smoothness of handling place the Citation III in a *de luxe* class, but these are not as important as the performance features.

Sound quality is superb. Frequency response is claimed by the manufacturer to extend three octaves above and below the hearing range, and to be within -0.5 db from 1 to 52,000 cps. Distortion is claimed to be less 0.1 per cent at 100% modulation and unmeasurable at 30%. This we can well believe, since this tuner shows immediately that the limiting factor of reproduction from FM stations has heretofore been the tuner. One listener said about the Citation III that, "It is the only time I ever heard a symphony on the radio and felt that I could lean over and kiss the conductor." The difference between this tuner and the average is definitely noticeable. Some listeners have long believed that phonograph reproduction was better than radio reproduction of the same records,

but this need be no longer true with the Citation III.

As soon as we completed our tuner we listened all over the band for a while, and then found a station at New Haven on a frequency of 99.1 mc, directly between WBAI and WOR in New York at 99.5 and 98.7 mc respectively. Both New York stations (20 miles away) pushed the level meter over 8 on the scale, whereas the New Haven station (75 miles) registered only 1.5, yet there was no interference from the two stronger stations. And the New Haven station was being received off the end of the dipole antenna which was lying on the floor about 18 inches above ground level.

The interstation muting circuit cuts out all noise while tuning, if desired, and does it quietly and without any thumps as it shuts off—a trouble with many others we have observed. The a.f.c. works perfectly, although the maximum drift without it is extremely small—not enough to affect quality from a cold start, for example. With the high sensitivity of the tuner, limiting takes place on practically any station that can be heard at all. For example, the New Haven station mentioned before at a distance of 75 miles presents a perfect program signal consistently with only the dipole lying on the floor. The tuner plays nothing at all with no wire on the antenna terminal strip; with a 4-inch wire connected to one terminal it plays any station in the New York area and limits on most of them.

Construction

Figure 2 shows the underside of the pre-selector portion of the tuner and the Nuvistor socket with associated wiring. Note the neatness of the arrangement and the open construction. In Fig. 3, which is the underside of the limiter section, the construction becomes a little more compressed, but the order in which the steps are arranged simplifies the construction so that you will have completed this section before you even notice that it seems complicated. Figure 4 shows the entire underside of the chassis, with the audio section assembled on the terminal board at the lower left side.

Great care was taken throughout to ensure that any noise entering the chassis by way of the power line would be filtered out. All high-voltage a.c. leads are well shielded in Kupfrian flexible metallic tubing, as are certain of the audio circuits, and many of the remaining audio circuits are wired with

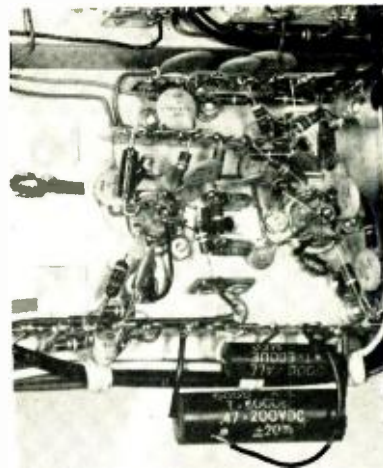


Fig. 3. Underside view of the limiter section of the chassis. I.f. cartridge mounts at left.

conventional shielded wire. The drum at the right end of the i.f. cartridge drives the second 2-gang capacitor for the first detector and oscillator circuits.

The instruction book is plastic bound, and is well illustrated for accurate construction because tuner performance depends so greatly on parts placement, length of leads, and so on. We believe that anyone who can handle long-nose pliers, diagonals, and a soldering iron with even average proficiency can easily end up with a fine instrument of which he will be proud.

A-20

ELECTRO-VOICE PATRICIAN 700 AND STEREON 200 LOUDSPEAKERS

In this day of stereo, all but the extreme purists have almost deserted the good large loudspeaker in favor of the good small loudspeaker, but there are still some who feel that the larger a good loudspeaker enclosure is, the better it is likely to be. With the exception of a few special cabinet designs which make it possible to employ one loudspeaker cabinet for both channels of a stereo speaker system, two are almost universally required, and the size and decor of many living rooms rules out two large loudspeaker systems.

It is generally agreed, however, that two-, three-, or four-way loudspeaker systems, even for monophonic use, are better than a single loudspeaker mechanism because of the channelling of smaller portions of the audio spectrum to speakers which are designed especially for the frequency range they are required to handle. When a single mechanism must handle the full nine octaves of the audio spectrum, some compromises have to be made. Good low-frequency reproduction demands that a large amount of air must be set into motion, but a large cone is heavy and can not be moved effectively at the very high frequencies.

In the Electro-Voice Patrician 700, for example, the frequency spectrum is broken up into four bands. The range below 100 cps is handled—but well—by a 30-in. cone speaker employing a $9\frac{1}{4}$ -lb. magnet. The $2\frac{1}{2}$ -in. voice coil is wound with 26-ga. copper wire for low resistance, and the cone itself is made of polystyrene foam and supported around the edge by a polyurethane foam surround. Its resonant frequency is

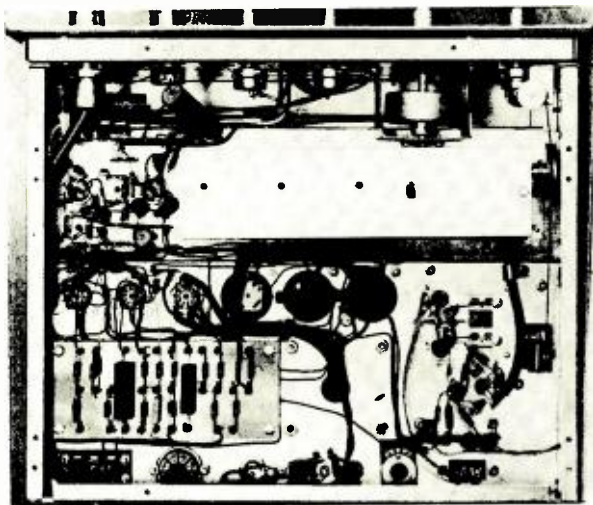


Fig. 4. Underside view of the complete tuner.

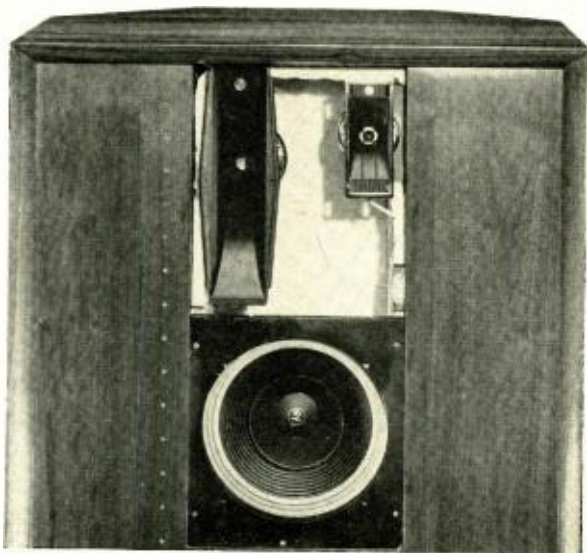


Fig. 5 (left). The Electro-Voice Patrician 700 is a typical setting. Fig. 6 (above). View of the upper portion of the front with the grille removed.

around 20 cps, and it is capable of handling 35 watts continuously at any frequency above 40 cps with less than 2 per cent distortion. This speaker radiates into the corner from the rear of the cabinet and thence around the sides as a large horn.

The mid-bass region from 100 to 700 cps is handled by a 12-in. Radax SP-12 cone unit having a 3-lb. magnet and a 2½-in. voice coil which is edgewise wound with aluminum ribbon. The range from 700 to 3500 cps is handled by a T250 driver unit on an 8HD horn, which is the larger of the two horns seen in Fig. 6 above the cone unit. The range above 3500 cps is carried by a T350 super-tweeter (driver and horn)—the smaller of the two in Fig. 6. The voice coil of this unit is 1 in. in diameter and is wound with silver-plated 38-ga. aluminum wire and operates in a magnetic field of 19,000 gauss.

The complete Patrician 700, shown in Fig. 5, is not small by any means—obviously an enclosure which can accommodate a 30-in. cone speaker must be large. But the performance is also “big.” The cabinet itself measures xx in. high, xx in. across the front, and xx in. from front to back. The rear corners are cut off, and the cabinet is intended to be positioned in a corner with the cutoff corners 6 in. from the walls. Thus the front is xx in. from the actual corner of the room, measured on the line bisecting the corner.

The left “outoff” is equipped with the connection and control panel shown in Fig. 7. Two terminals accept the input leads, and another two give access directly to the woofer, while the remaining six connect the three other channels to their respective cross-over networks. This arrangement makes it possible to gain access to the woofer for arrangements in which the very low range of both channels is carried by one 30-in. cone, while the remainder of the spectrum is carried by the three smaller speakers in the Patrician 700 for one channel, and by another speaker for the second channel. The Stereon 200 is designed especially for this purpose, and consists of the same components as the Patrician 700 except for the woofer, with a consequent reduction in size. The Stereon 200 is still not

“small” for it measures 17 in. wide, 30 in. high, and 16½ in. deep. Thus two Stereon 200’s, for example, could flank a larger cabinet in the general form of a break-front which contained a 30-in. woofer in a modified theatre-type “bathtub” horn. The principal use to which the smaller units are put, however, is as a second speaker with one Patrician. A more elaborate system suggested by Electro-Voice consists of two Patricians on the two channels and a Stereon 200 as a derived center-channel speaker between them. Still another possibility employs two Stereons with one Patrician in the center. The ultimate would be, we suppose, to use three Patrician 700’s.

Performance

Since we at AUDIO feel that it is practically impossible to offer absolute response curves on any loudspeaker—(1) we do not have an anechoic chamber, and (2) if we did we do not feel that many of our readers would be listening to loudspeakers in anechoic chambers—we must resort to subjective analyses of loudspeakers. We can only say that the Patrician 700 is far too impressive to be acceptable in the average living room except for those who may feel that living consists of hearing good sound. We have had the pleasure of living with a Patrician for the last two months and we feel that—even under limited-volume conditions—there is considerably more to be had from a Patrician 700 than from any other loudspeaker to which we have ever listened. There is a solidity to the bass that is not approached by any other loudspeaker system on the market, and that is, we believe, due to the massive 30-in. woofer. This is largely due to the fact that a 30-in. loudspeaker cone just barely moves to put out an adequate sound level, while the 15-in. cone, for example, has to move nearly four times as much for the same output. Actual figures for the same sound output show a movement of .09 in. for the 30-in. cone will give an acoustic output of one-fourth acoustic watt, while a movement of 0.3 in. is required for the same output from a 15-in. cone, 0.48 in. for a 12-in. cone, and more than 1 in. for a 10-in. cone. Similarly, when it comes to that intangible frequency modulation distortion caused by the movement of the low-frequency cone which also reproduces high frequencies, the 12-in. woofer will produce 7.5 times as much as the 30-in. cone.

We have been accustomed to living with high-quality loudspeakers—one employs a 15-in. woofer and another has two 12-in.

(Continued on page 56)

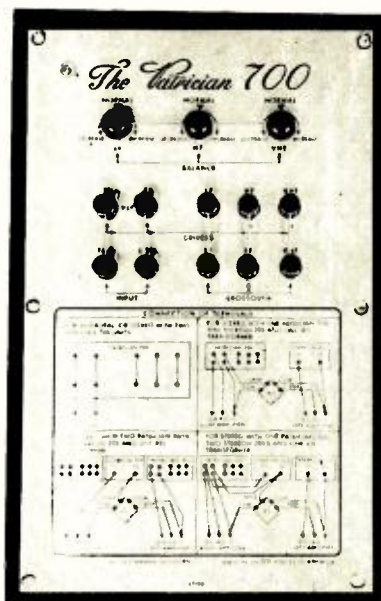
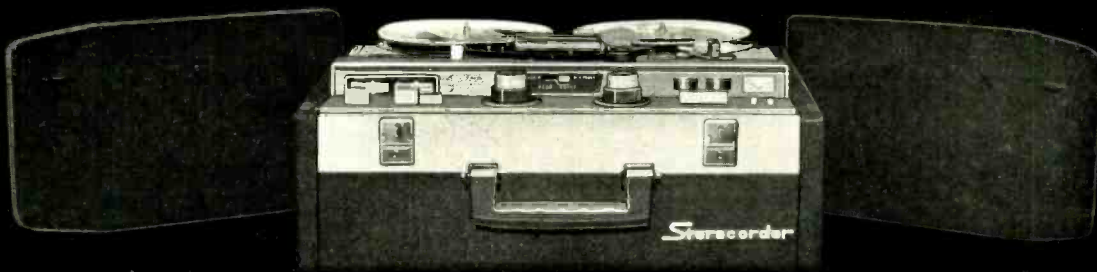


Fig. 7. Terminal board of the Patrician 700 showing flexibility of connections and control.



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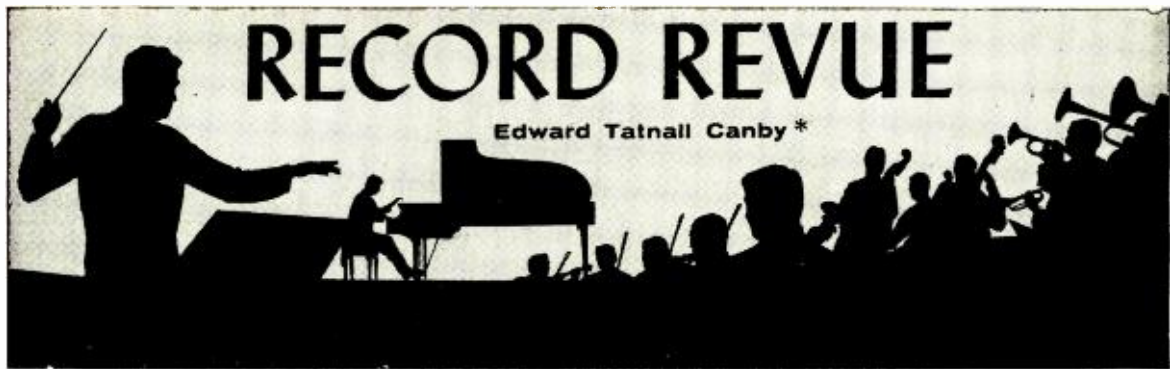
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BIG ORCHESTRA

Klemperer Conducts Wagner. The Philharmonia Orch., Klemperer.

Angel 3610B (2) stereo

On first hearing, for the first few moments, you may find this Wagner unspectacular. But if you have half an ear for musical drama, in a few moments more you'll begin to be swept along, and by the end of any record side you'll rave.

I've raved already over the Klemperer Beethoven; this album starts it all over again upon a new plane. I have seldom felt such sustained interest and power, such serious purpose and constant freshness of impact in a set of such warhorses of the repertory as we have here—the familiar overtures, "Rienzi," "Flying Dutchman," "Tannhäuser" (played, you'll note, in chronological order) and on through the standard "Lohengrin" and "Meistersinger" excerpts, the usual "Tristan" and finally the usual "Götterdämmerung."

It's all very well to say that Klemperer exudes greatness in his person (as the notes observe); we phonograph listeners depend on the final musical product, sight unseen. Personal magnetism means not a thing to us except in musical terms. It is, then, in purely musical terms that Klemperer and his top-notch orchestra perform these familiar items so compellingly. And the best part of it is careful understatement, minus stunts, minus overt dramatics, depending wholly on the shape and spau of the music itself to build its own drama, thanks to beautifully exact and musically intelligent playing.

Thus, Klemperer's beat is surprisingly regular, for Wagner; his pauses are mild, his dynamics unspectacular. He moves rapidly, too, dispensing with souped-up soft-soap, if I may sash a few metaphors. The opening of the "Tristan" prelude, for instance—you've never heard it in such strict time. Shades of early Stokowsky! This is the opposite extreme, business-like and straightforward.

But this steady beat, this strict rhythm, is far from the mechanical, pile-driving modernity that is too often in fashion nowadays. Klemperer is miles ahead of, say, the pile-driving Mr. Reiner, who pushes Wagner inexorably, if musically, into a taut, impatient modern mold. Klemperer's Wagner, like his Beethoven, closely follows the score's literal indications, but remains plastic nevertheless, with the sense of easy tension, so to speak, the appreciation for the changes of mood, the relaxations especially, that shape the whole drama of either Wagner or Beethoven's music.

Enough said, in words; if you want Wagner at his finest, his most timeless, choose these instrumental excerpts above all others presently available.

Bruckner: Symphony No. 9. Columbia Symphony, Walter.

**Columbia MS 6171 stereo
(mono: ML 5571)**

The people who are called Brucknerites will welcome this recording—the rest of us (and I am not a Brucknerite) will want to play it because it is the last of the big Bruckner symphonies and because it is conducted by Bruno

Walter, who is a Mahlerite. Mahler and Bruckner were long paired as the two masters of the German symphonic giantism—but they are increasingly separated today and rightly, I think. Those who worship at the Bruckner shrine find him heavenly on the grandest scale; those who do not tend to find him not only very long but too often repetitive and redundant. I include myself there, as you can guess! I love Bruckner's ideas, but I grow dreadfully impatient at his one-track peasant elaboration of them by sheer cumulative, sequential big-orchestra repetition. My most common mental phrase, listening to Bruckner, is "what—not again!"

Now that I've alienated all Brucknerites, let me say that this Ninth is distinguished, in its completed portion, by ideas and harmonic treatment of considerably greater subtlety and complication than that in the earlier works, though the "approach"—and the repetition—is similar. If anyone can make inspiring sense of this huge music, Bruno Walter can.

Brahms: Symphony No. 4. Pittsburgh Symphony, Steinberg.

Everest SDBR 3066 stereo

I once did a broadcast, called "Waves and Planes," that compared two versions of this symphony, with the elderly Bruno Walter and the young Leonard Bernstein at the musical controls. Bruno Walter's Brahms was all Romantic waves, building up, dying down; Bernstein's was cast in terms of 18th century-style planes, that also being a strong tendency in modern music of many types. Not good for Brahms, who is a "wave" man through and through.

Well, Steinberg takes over for Bernstein here. This is a performance in planes, understated but, more important, under-waved. The music simply cannot, for my ear, be modernized in this fashion and I find the same ineffectiveness here as in the old (and since withdrawn) Bernstein recording. The intentions are good and the forces at work are musical, decidedly. Steinberg's orchestra has turned out some of the finest recordings of the last few years in other areas. Not here.

Brahms seems thin and weak, and the stereo sound seems to abet the effect—it is curiously dead. Perhaps acoustics, microphoning, and interpretation combined? I wish I could say something better, but I can't.

Brahms: Double Concerto for Violin and Cello; Tragic Overture. Francescatti, Fournier; Columbia Symphony, Bruno Walter.

**Columbia MS 6158 stereo
(mono: ML 5493)**

This is what is commonly called a labor of love and, indeed, it comes off handsomely. The idea for recording the "Concerto" came after Walter and Francescatti had worked together on some Mozart recordings.

The "Concerto" is one of Brahms' most imposingly heavyweight productions, his last big orchestral work, and today it is increasingly beyond the understanding of many conductors and orchestras, who avoid it when possible. It can sound terribly dated and as thick as mud—it is one of those Brahms pieces I like to call dark-brown. Fortunately for us, Bruno Walter is around to put this noble work back into its proper frame of impassioned sincerity. I sus-

pect that the two collaborating Frenchmen might not succeed here on their own, for all their excellent musicianship; but with Walter at the helm their superior musical gifts come through for some very fine Brahms.

It's a temptation in recording a work like this for stereo to put one solo in the right speaker and the other in the left, for maximum separation. It is to Columbia's credit that this is not done, for the two soloists should play as in the concert hall, separately but in close ensemble together. That's what they do here.

The "Tragic Overture," another "dark brown" piece, gets a sterling performance here and a rarely communicative one, taut, economical and very expressive. It, too, can be dismal when wrongly done.

Schumann: Piano Concerto in A Minor. Eugene Istomin; Columbia Symphony, Bruno Walter.

Chopin: Piano Concerto No. 2. Istomin; Phila. Orch., Ormandy.

**Columbia MS 6159 stereo
(mono: ML 5494)**

Here's an odd one. Bruno Walter has seldom been tempted, in recent years, to move into Schumann, away from his favorite Brahms, Mahler and Beethoven interpretations, nor does he often accompany a concerto. He did it in this case because of his appreciation for Istomin, and after listening to this performance I thoroughly agree. Istomin is a most rewarding pianist to listen to. Such an intelligent, careful, alive musical mind! Such a courteous piano touch—in contrast to so much modern banging—such maturity, in contrast to so much brilliant youthfulness. He's jes' fine (as Pogo's small bug candidate for President, Fremont, always said) and he's fine in both the Schumann and the Chopin.

It's odd, then, to have to report that for some inscrutable reason the orchestral accompaniment to the Schumann, Bruno Walter or no, seems strangely perfunctory and weak. I can't imagine why, but this is the way I heard it. The piano carries all. In the Chopin, of course, the orchestra scarcely does anything except in an occasional *tutti*, and the Philadelphia group could manage that with no conductor and blindfolded. It plays jes' fine, too.

Beethoven: Piano Concerto No. 3. (a) Gary Graffman; Chicago Symphony, Hendl. RCA Victor LSC 2396 stereo (b) Clara Haskil; Orch. des Concerts Lamoureux, Markevitch.

**Epic BC 1097 stereo
(mono: LC 3726)**

Often it is plain difficult to find any useful words with which to compare two audible performances of a piece of music (especially when there are five or six more discs of it in the offing, waiting to get in on the act). I played these two (putting aside the others—two at a time is my maximum, mostly) and I enjoyed both. Neither one is in any way bad, or even substandard.

But the young Graffman is better than one would expect—since he was the prizewinning type a few seasons ago and subject to all the pressures and publicity that this implies. He is, nevertheless, an excellent young musician

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- RAILROAD TELEGRAPH
- RADIO CODE SIGNALS
- PHONE—DIAL TONE, DIALING, BUSY SIGNAL
- GRINDING WHEEL
- GAS ENGINE STARTING
- HAMMERING NAIL ELECTRIC SAW
- ROYAL TYPEWRITER
- FIRE ENGINE

and seems particularly comfortable and at home in this classic Beethoven. RCA does a fine job of balancing and recording his piano, too. Why the orchestra is under Walter Hendl instead of the regular Chicago conductor, Reiner, I don't know; maybe Reiner was somewhere else. Just as well, perhaps, for Hendl's accompaniment is just what it should be and not more, as it could be under the potent Reiner leadership.

As for the divine Clara Haskil, of a much older generation, I found her for some reason, a bit less convincing than in her superb and, indeed, inimitable Mozart and Beethoven chamber music. She is not a large-scale pianist, I'd say, for one thing; her strong points are in the greater subtlety of small-scale ensemble, where she is a true queen. I wonder, too, whether that frail little creature just isn't up to the rigors of a full-scale Beethoven concerto these days? It could be. In any case, her piano has a somewhat coarser tone in the recording than has Grafman's and is recorded rather uncomfortably close for a concerto.

On the whole, to my surprise, I think I prefer the Grafman.

Haydn: Symphonies Nos. 103 ("Drum Roll"), 104 ("London"). Orch des Concert Lamoureux, Markevitch.

Epic BC 1096 stereo
(mono: LC 3725)

The brooding, intense Markevitch, a conductor who is always honest and never does a potboiler job of any sort, is no man for Haydn. His Tchaikowsky, judging from the recent "Romeo and Juliet," is terrific, because of the combination of discipline and driving intensity—no slap-happy sentiment for Markevitch.

But Haydn is an altogether different composer. Scherchen has shown us that Haydn can take much Romantic intensity of a sort. Beecham knows the peculiarly quizzical, half-humorous, saintly seriousness of this master. Markevitch is all impatience and furor, intense outwardly where Haydn's intensity is an inner one, a part of that ineffable calmness of spirit which is so profoundly reflected in his musical expression.

I'm an ardent Markevitch fan—but not

here. I'm an ardent fan, too, of French orchestral playing, in its rightful place. (So they play out of tune? Part of the French style!) French Haydn, again, is somehow nervous, superficial, un-serene, even without the added Markevitch intensity. Nobody really knows how it actually sounded, of course, in Haydn's day. But we can estimate, in terms of our own expression. It shouldn't sound like this.

RECITAL

Aksel Schiøtz singing Schubert, Bellman, Wolf, Brahms. Paul Ulanowsky, pf., Richard Dyer-Bennet, guitar.

Dyer-Bennet stereo (1)

The self-styled modern minstrel, Richard Dyer Bennet, has produced nine of his own records with the assistance of engineer J. Gordon Holt, well known at *High Fidelity* magazine and, now, *Veathers Industries*. Here Mr. Dyer-Bennet for the first time goes afield, to accommodate the greatest Danish singer of the last twenty years, Aksel Schiøtz, who lost his tenor voice after a brain disease and has found a new voice again as a baritone, here in the U. S. The earlier Schiøtz recordings have been collectors' items for years.

The present Schiøtz is, of course, primarily a wonderful musician, who conveys the sense of Schubert and Wolf via an expressive but now small baritone, edging into uncomfortable sound in the high notes. Doesn't matter, if you know the music and can appreciate this artistry. The superb accompanist Paul Ulanowsky is an equal partner on the top level here.

The Bellman songs are a sort of Swedish Stephen Foster type, ultra-popular in Scandinavia. Dyer-Bennet does the accompaniments on his guitar. As for the Holt stereo sound, it is ultra-real and as of an intimate concert stage. Well done, if almost clinical in its analysis of the present Schiøtz vocal powers.

Dupré at St. Sulpice, Vol. 4: Bach. (Six Schuebler Chorales, Fantasias in C Minor, G Minor).

Mercury SR 90230 stereo

This continues the stereo organ records Mercury has made of the great French organ at Saint-Sulpice in Paris with the well-known Marcel Dupré, one of the last of the old school of French organists. The sound is really lovely of its sort and—thanks to ingenious miking—probably clearer, more intelligible musically, than this very same organ can ever sound in the "live" situation. That is because the mikes were hung up in the vast space of the church at an optimum point, where no human being could ever listen, out in front of the organ pipes in mid-air. It would be nice to listen up there, hung in a basket; but for most of us the height would prove entirely too terrifying. Mercury's stereo substitute is easier, by far.

Bach on these big French monster organs, in the French style, is not very satisfactory for those of us who have heard the composer on his own style of organ, the so-called classic or Baroque. This sound is too big, too blurred, too heavy. But in some of the music the dignity and solemnity is excellent—the *Fantasia in C Minor*, first on the record, for example. Very fine stereo pickup, definitely optimum in stereo terms.

Malcolm Frager, Pianist. (Prokofiev: Concerto No. 2, Op. 16. Haydn: Sonata No. 35 in E Flat.) With Paris Conservatory Orch., Leibowitz.

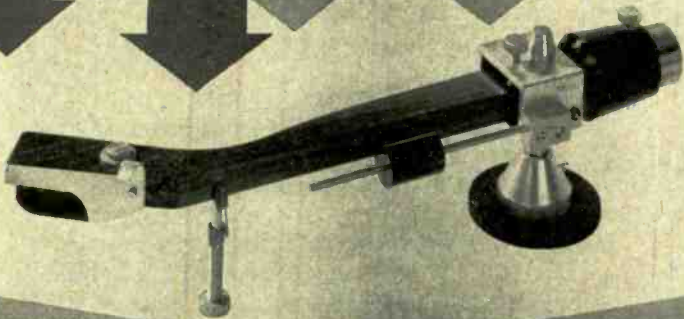
RCA Victor LSC 2465 stereo

I found this young pianist just as RCA describes him, a remarkably intelligent and perceptive prizewinner who plays both the noisy Prokofiev and the relatively delicate Haydn sonata with style and lots of musical understanding. But I still have to object to the RCA approach to this sort of thing.

Is this "Let 'em eat cake"? Not even a word of any sort about Prokofiev's very tough

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music on this record jacket (nor anything about a good orchestra and a very knowing conductor). Everything is about RCA's latest scoop, Mr. Frager. Does RCA assume that just because Mr. F. won The Queen Elizabeth prize the average man is going to sit down and listen to one of the most difficult concertos in the entire literature with a beaming smile of joy upon his self-satisfied face? Evidently RCA counts on that very thing and thus is probably right. But I call it unfair to good ears. And to poor ears.

The plain fact is that this early concerto is from the first and noisiest of Prokofiev's periods (1913), a driving, heavyweight piece that is closely related to the "Scythian Suite" of the same time, and though it is a fine work of its type, its unremittingly tortured dissonance (sounding rather old fashioned today), its complex, persistently pounding texture, the floridly elaborate piano part, all make for a decided lack of easy impact upon the average ear. Very long, very noisy. It's safe to say that on its own merits, this piece would not sell a handful of copies per year in the open market. (It has received just one earlier recording that I know of, a relatively ancient RCA Victor job out of Boston).

And yet this disc was "rushed" to the stores, I can guess from its get-up, to cash in upon the young pianist's sudden fame.

Well, OK, he's good all right. But "caveat emptor," let the buyer beware. Serve you right if you buy it on faith—in publicity—and find the stuff is 'way out, for you!

Opernarien und-duette—Pierrette Alarie, Leopold Simoneau. Radio-Symphonie-Orchester Berlin, Schaenen.

Deutsche Gramm. LPM 18593 mono

Don't gulp at the German title, above, on an album of French and Italian opera excerpts sung by two Canadians! It's merely normal for LP these days: the record is imported in its original European soft jacket with notes on the back in four languages. One LP world, more or less.

Alarie and Simoneau are husband and wife, though they started their respective careers independently. Strange, how similar are their present styles and even their vocal traits—Both of them sing anything and everything, but in spite of predominantly American training they are most easily suited to the French school of singing performance and do best in that area: both have the typically bright, slightly nasal-colored production that is a specialty of the French school.

And both, oddly, have the same general difficulty with the vocal apparatus, though

it manifests itself differently. Alarie has trouble getting started—she swoops badly up to the beginning notes of many a phrase; but once under way, her vocal line is accurate, pure, and arises easily to very high notes. Simoneau, a high tenor, has a peculiar way of straining every so often at his higher notes, as though about to crack into falsetto (though this he seldom actually does). It is merely the emotional threat of it that we hear and, interestingly enough, it serves as an aid to greater eloquence and power. Like the implicit sob in a blues singer's voice!

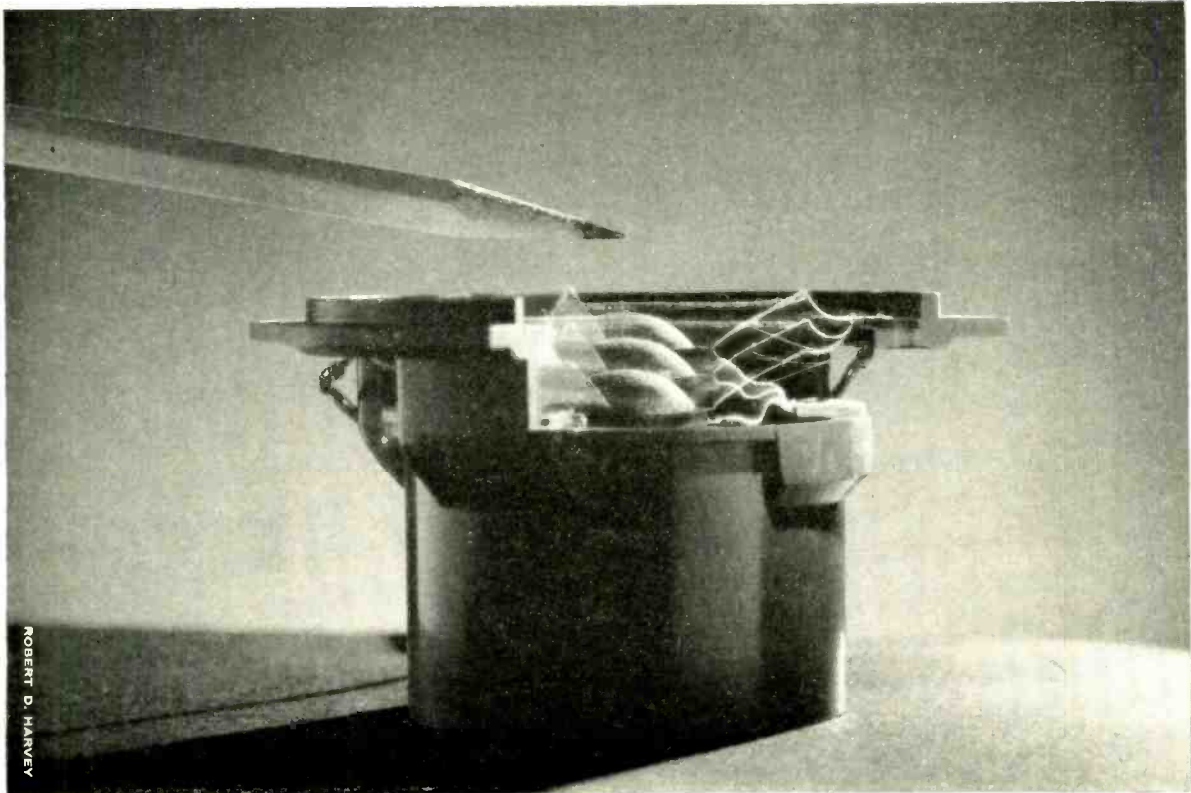
These duets, Italian on one side and French on the other, suffer a bit from the vocal idiosyncrasies of the pair but the general level is high, the performances earnest and musical, the material relatively fresh. I liked the French music best, for all its sentiment.

STEREO FOR THE MODERNS

Copland: The Second Hurricane (1937). Soloists, Chorus, High School of Music and Art, New York, N. Y. Philharmonic, Bernstein.

Columbia MS 6181 stereo

This is a moving little documentary and, incidentally, a superb example of stereo dra-



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matics. It is inconceivable as a recording without stereo and, indeed, I see no indication of a mono version on the cover, as is Columbia's usual practice. Good!

The high-school opera was composed in 1937, at the height of Mr. Copland's "popular" period, as an attempt to write opera in an American idiom for American young people. Today it is in a good many ways dated, almost quaintly—how this music reeks of the mid-thirties in its jazzy, "New Deal" sort of language! I can't help thinking of "Pins and Needles" and the "CCC kids," the Chrysler Building, Mayor La Guardia in New York . . . but let that pass; the significant thing is that here we have a batch of accomplished 1960 high-school kids singing this work with tremendous enthusiasm and understanding, a testament to its relatively eternal appeal to those for whom it was intended.

And we have another phenomenon here, of our age too—Leonard Bernstein, conducting the music and also (through the left speaker) acting as an obviously enthusiastic narrator, speaking folksy high-school English to an obviously American audience. What previous Philharmonic conductor could talk like this?

It was clearly a great day when Copland pulled off this American operetta. For though it is not of our time, it surely ranks as a pioneer venture, scarcely surpassed since, in reconciling the older operatic traditions with ordinary Americanism. Pulitzer prizes have been won by "American" operas not half as original nor as interesting. It's a wonder, you'll agree when you hear this, that Copland didn't go on to write some top-notch Broadway musicals. Bernstein did—and that is clearly why he takes such pleasure in producing this piece, which led straight into his own work in such stage shows as "West Side Story." The performance, by the way, honored Copland's 60th birthday in 1960.

The plot is pretty thin—a batch of kids are sent out to do relief work after a hurricane and get marooned on a hilltop in the face of a second hurricane. They fight like kids at first, then "get together" in the face of danger and come through happily; the background

comment is via a kids' chorus (on the right), alternating with Bernstein's comment on the left, and the kids themselves are spaced out between your speakers, sometimes singing sometimes talking; the orchestra is all around and about.

This was before the hurricanes of the 1950's, but the kids in my Connecticut town did exactly this sort of relief work after hurricane Diane. It was before the era of guitars and folk song, too—these opera kids keep up their nerve by singing some preposterous stuff about General Burgoyne, whereas ours would have a hundred authentic folk songs memorized and ready to sing, even minus guitars! Time marches on.

Bartok: Deux Images, Op. 10 (1910).

Brahms: Hungarian Dances. Vienna Symphony, Tibor Paul.

Eric BC 1053 stereo

It's getting so that whenever I see Hungarian music with the name Tibor attached, I sit up and take notice. There's Tibor Serly, for instance, who does a splendid job on his friend Bartok's music. . . .

This is a splendid set of performances, reminding me, as I listened, that less than fifty years ago (and until after this music was composed), Vienna and Budapest were still parts of one kingdom. In both the Bartok and the Brahms—gypsy music of the Nineteenth century and the true Hungarian peasant music absorbed into Bartok's idiom—the playing by this Viennese orchestra is wonderfully at ease, natural, clearly *right*. The rapport must be not only with the music but with the conductor whose name is Tibor. He's good, for these works.

This is early-middle Bartok, a big dual piece, the first still romantic (though dissonant) and vaguely evoking Debussy, as of the French title, the second a marvelously peppy big orchestra essay on a batch of zippy Hungarian-style dance tunes. It's the best of the early Bartok and ought to be a lot better known. Brahms wrote his gypsy stuff at *echt-*

Hungarian folk music in classical guise, but it still comes off as music, when played with such style as this.

Bartok: Music for Stringed Instruments, Percussion and Celesta (1936).

Martin: Petite Symphonie Concertante for Harp, Harpsichord and Two String Orchestras (1945). Soloists, Leopold Stokowski and His Symphony Orch.

Capitol SP8507 stereo

For those with really competent stereo equipment (which includes rightly spaced separate speakers and a symmetrical room location), this disc is a revelation in the use of stereo to enhance the sense of musical reproduction. It is a right-left recording, to be sure: both pieces feature two string orchestras, on each side, plus assorted solo sounds in the middle. But this is no crude ping-pong stereo! Indeed, it is safe to say that neither of these works can possibly be realized in recorded form without the stereo spacing that places the instruments in the spatial contrast the music requires.

The Bartok, one of the most dazzling works of his tremendous late period, is increasingly fascinating to us in this day of furious tension—for it is an incredible display of musical intensity, of virtuoso instrumental color and performance. There are sounds here you will always remember—and hear nowhere else on earth. The solidly craftsmanlike string counterpoint is set off against violent, high-tension percussion, from the ominous roll of a sliding-pitch tympanum to the irregular tweak of a single xylophone block, the walling glissando of a high violin (balancing the kettle-drum's slide), the curious sound of the celesta, an explosive piano, a cogently rhythmic harp.

The Martin is a milder work, but of a remarkable similarity (both had first performances by the same players and conductor, in Basel) in outward shape—and even the principal themes of each are oddly similar. Martin's two orchestras spread out in the rear; in front are harpsichord, harp, and a bit fur-

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ther back, piano, as a strange but expertly treated solo group. This music, of the same generation in Europe, is perhaps more academic, yet owes much to Bartok. There is a distinct similarity at times to the harpsichord concerto of De Falla in the treatment of that instrument and I can think, in another way, of the wry, though polished and conservative-modern music of Walter Piston in this country.

Capitol's stereo technique is endlessly interesting here. The large, resonant hall pulls the disparate elements together and imparts a superb "wall bounce" liveness in stereo, as well as a huge and impressive sound to the music. The solos are close, but never spatially out of touch with the background instruments in the whole tonal "picture." A part of an hour with this record is a study worth every stereo doubter's time.

Stokowski's conductorial touch is a bit heavy for these works, especially the ebullient Bartok, which can double as a chamber work (with solo strings, one to a part, in a small space) and was so recorded in a notable earlier Capitol 10-inch LP of many years back. "His" orchestra works hard but is occasionally rough at the edges in this very tough playing assignment. Still and all, Stok may lean to old-fashioned molasses but his music is never unmusical. It is far from that, here.

Bartok: Concerto for Orchestra. New York Philharmonic Bernstein.

Columbia MS 6140 stereo
(Mono: ML 5471)

I can't say more for this new Bartok than that it shows again the peculiarly boyish, enthusiastic, almost lovable sincerity that, somehow, Bernstein manages to transmit through his hard-boiled New York players, in recording after recording. The Bernstein version of this piece accents his two special *fortes*, the snazzy modern—there's plenty of that in it—and the wryly expressive, which is also featured in the music. This is nowhere near as powerful and economical a reading as the famous Fritz Reiner way of doing it and I still prefer that as the best of all. But Bernstein also avoids nicely the late-Romantic Brahmsian lack of humor that Ansermet gives it. Not Bernstein!

The piece is a natural for hi fi and even more for stereo, with its orchestra-of-soloists, in solo parts, pairs, groups, dialogues a riot of orchestral color and melody.

Ravel: Piano Concerto in G; Piano Concerto in D for the Left Hand. Samson Francois; Paris Conservatory Orch., Cluytens.

Angel S35874 stereo

This all-French performance of the two Ravel concerti out of the Gershwin era (he was enormously impressed by Gershwin upon his visit to America, and the response was the same on Gershwin's part) has a curiously un-French sound to it. Somehow, I keep thinking of Rachmaninoff here, both in the highly temperamental playing of Francois on his tremendous piano (as recorded) and in the heavily tempestuous sound of the orchestra's performance. Only the snazzy last movement of the "G Major (two-handed) Concerto" begins to loosen up into the properly razor-edged brilliance that is always Ravel's.

The stereo sound is perfectly enormous. I've never heard a piano so big, up in the foreground, nor an orchestra seem so vast and yet so immediate, on all sides. Musically I'm not enthusiastic about this particular effect for the music in question, which is from the dry days of 1930 and 1931 (M. Francois was then 7). But for those who aren't too worried about M. Ravel himself, the sound is surely a gorgeous one.

FUN FOR ALL

Johann and Josef Strauss: Waltzes and Polkas. Boys' Choir of Vienna, State Opera Orch.

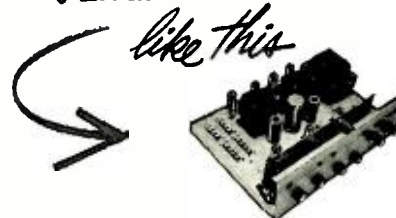
Omega OSL-38 stereo

These must be the "Wiener Sengerknaben", if I get the spelling right, that in earlier
(Continued on page 57)

with **ASSEMBLY MANUALS**



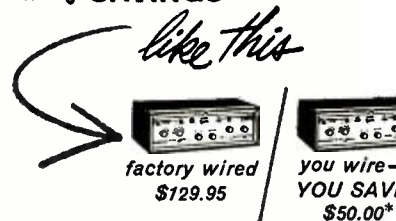
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STEREO

The Count Basie Story Roulette SRB-1
Joe Williams: Just The Blues
 Roulette SR52054
Count Basie: String Along With Basie
 Roulette SR52051

The exact day in 1935 when Count Basie assumed the mantle of leadership at the Reno Club in Kansas City seems to have eluded jazz historians. Raymond Horricks failed to pinpoint the date in his book-length survey of the band, and Leonard Feather is no more successful at penetrating the mists of memory in the informative brochure prepared to supplement the two records which make up "The Count Basie Story." Nor does either chronicler reveal when the youth from Red Bank, New Jersey, made his professional debut, though Feather unearths one ancient photograph showing a nineteen-year-old Basie as pianist in a 1923 vaudeville group soon after the start of his career. So, having produced these three albums to account for the leader's silver anniversary, Roulette can do a little research of its own and look forward to marking the pianist's fortieth milestone in a year or so. And lest anyone forget, a sixtieth birthday is due in four years.

Starting off with a dazzling review of the great numbers which the early band thought up in its first decade of existence, the present occasion affords Basie followers ample cause for celebration. Frank Foster, who reworked the original versions to fit current personnel, takes advantage of slightly enlarged sections to extract a fuller sound and give new impetus to familiar riffs. Stereo also works its wonders in relaying the deeper ensemble voicings, permitting older fans to discover subtleties of dynamics and expression not conveyed on previous recordings. It almost makes up for the sense of anticipation that was felt when each new Basie creation arrived in the stores long ago.

When Basie reorganized the band in 1951, he also concentrated on building a fresh stock of arrangements and many older tunes were dropped from the book or given new treatments. As Marshal Royal, the present deputy leader, points out: "The emphasis in the old band was essentially on soloists; now it's more on ensembles and the soloists are sometimes secondary. There was more emphasis on highness then and there's more on depth today; as a result the voicings in the arrangements are spread wider and of course there are five saxes instead of the original four, and seven brass instead of six."

Besides restoring fellow soloists to full prominence, Foster also prevails upon his employer to stretch out and play the blues in the Kansas City style on *Red Bank Boogie*, and *Rock-A-Bye-Basie*. The leader's short piano introductions, superbly phrased as always, are an open invitation to dance and invariably lead into tempos that are irresistible. Rather than just an attempt to recapture the past, each number becomes a live and valid projection of today's band due to his presence. Perhaps he will even begin to collect royalties on some of the twenty-three titles listed.

* 732 The Parkway, Mamaroneck, N. Y.

When the band was first getting on its feet, Basie agreed to do two-dozen sides outright for \$750. Several of these 1937-38 classics are reclaimed for the first time since then and should finally start paying dividends.

Foster splits tenor-sax assignments with Billy Mitchell, but stakes out his own claim on *Lester Leaps In*. Joe Newman handles the majority of trumpet solos, while Henry Coker's trombone is featured on *Dickie's Dream*. Gus Johnson deputizes on drums for Sonny Payne during the Joe Williams vocals on *Boogie Woogie*, and *Sent For Your Yesterday*. Marshal Royal assumes the clarinet part on *Blue And Sentimental*. Due respect is paid to the creators of the originals in every case, right down to the uninhibited spirit which characterized the early band.

Feather's account touches lightly on facts available elsewhere, but is rich in personal recollections and anecdotes about the leader. Several rare photographs decorate the text, and the twenty pages provide a new generation with a fine introduction to the historic tunes. The generation that grew up with them should need no encouragement to relive the experience time and again.

Joe Williams, who is scheduled to part company with the Basie band and set out on his own shortly, salutes the boss with one of his best blues programs. The question is whether he will miss the pianist or Al Grey most. The blues singer once found Grey's ribald trombone interjections upsetting, but now they form a team that is unmatched in *Mean Mistreater*, and *Night Time Is The Right Time*. Williams is generally more flexible under his prodding and should seek out another master of the plunger mute as a future partner. Basie switches to organ on a mellow sounding *Keep Your Hand On Your Heart*, one of three Big Bill Broonzy tunes included.

While Basie has scarcely spent the last twenty-five years learning to play with a string section, he adds that laurel to his collection at last. A propensity to swing on all occasions and an unflinching touch allows him to carry out the project in fine style. Basie recorded with strings back in 1945, but the date foundered because the whole band was involved. The leader's piano shares the spotlight this time with tenor-saxists Ben Webster and Illinois Jacquet, while Andy Fitzgerald assists on bass flute. George Williams and Quincy Jones are responsible for the arrangements, with Jones contributing the pensive *Blues Bittersweet*, and the strings never get in the way. Jimmy Jones pens the other original, *Stringing The Blues*, but Basie meanders for the most part along such familiar paths as *Summertime*, *These Foolish Things*, and *She's Funny That Way*.

The choice of a mood album to crown Basie's achievements may seem ironical to some, but the real irony lies in climbing sales figures. Basie appears to have united jazz fans and buyers of mood music on a common ground.

Firehouse Five Plus Two: Dixieland Favorites
 Good Time Jazz S10040
Phil Napoleon: In The Land Of Dixie
 Capitol ST1428

Dixieland stalwarts from opposite coasts parade, all in the sprightliest of stereo, to a

beat that is adaptable to Saturday night dancing or mundane chores about the house. Traditionalists also will enjoy moments of satisfied listening, especially when Fire Chief Ward Kimball orders George Probert to take his time over King Oliver's *Canal Street Blues*. Probert's expressive soprano-sax solo demonstrates once again that soul music, in spite of current promotion schemes, dates from a long way back. No wonder his skill is also employed by Harry Partch, the forty-three tones-to-the-octave contemporary composer and fellow Californian. The entire company responds with characteristic goodwill on Oliver's *Doctor Jazz*, and *Workingman Blues*. In fact, attention to the absorbing art of ensemble playing causes the customary hijinks with sirens and firebells to be forgotten until the concluding *That's A Plenty*.

Phil Napoleon, stepping out the second time on Capitol, turns in another vigorous performance, even though he was brought up on Boston baked beans rather than Memphis mint julep. Blessed with the same staying powers as Red Nichols, his constant competitor, the veteran trumpeter pumps new life into *Dardenella*, *Runnin' Wild*, and *Sensation*. Assisting in the operation are clarinetist Kenny Davern, trombonist Harry di Vito, and an accomplished engineering staff. Napoleon also is encouraged to dip into his bag for *Anything*, and *Just Hot*, tunes he had a hand in writing for a more venerable Memphis Five.

Marty Grosz: Banjo At The Gaslight Club
 Audio Fidelity AFSD5933

Garry Sherman: Percussion Goes Dixieland
 Columbia CS8337

Although the newest brands of stereo polish are applied, the patina achieved on both programs dates back to ancient, unadulterated dixieland hokum. Marty Grosz, who is the son of the artist George Grosz, has previously demonstrated his talents on unamplified guitar while recording with groups from the Chicago area. To entertain members in good standing of the Gaslight Club, he becomes the principal soloist and turns to the crisper, more robust sounding banjo. No electric guitars, vibras, or other electronic marvels are allowed to pass through club portals. Grosz is enough of a marvel himself on such relics as *Rufus Rastus Johnson Brown*, *Hello My Baby*, and *I Had A Dream Dear*. His unidentified Gaslighters remain pretty much in the background, while stereo deals them straight across the board with a happy banjo sound in the center.

Garry Sherman stands in front of an octet of rampaging dixielanders, a spot where even Paul Whiteman hesitated to tread. The young New Yorker's arrangements follow the current vogue for scattering percussive effects back and forth across the stereo stage, causing him to double as conductor and cue in klaxon horns, Chinese gongs, temple blocks, and other paraphernalia. Chasey Dean heads the pack on clarinet and bass sax, but the extraneous noises are pure hokum on such tunes as *In My Merry Oldsmobile*, *I Hear Music*, and *Trolley Song*.

Donald Byrd: Fuego
 Blue Note ST84026

The extent to which a quartet or quintet is benefited by stereo depends largely upon how well the players are matched. If one of the group should never have been invited to the studio in the first place, the error is compounded and becomes more evident in stereo. When the ideas and tonal qualities of all concerned fit together, stereo aids greatly in bringing the fact home to the listener in minutest detail. Donald Byrd and Jackie McLean developed along similar lines at about the same time and share identical views. Their collaboration on a series on recordings has molded a balanced team, as effective as any in jazz, and stereo versions of the joint efforts are worth seeking out.

Top billing usually falls to the one taking credit for the bulk of the writing. In this case, Byrd assumes full responsibility and several themes deserve more than passing notice. Byrd plays B-flat piccolo trumpet this time, but the mellower tone is noticeable only during his tender solo on *Lament*. When comparisons are made with his work of three



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years ago, Byrd now not only shows maturity but fire, as the title tune both indicates and provides. McLean's alto-sax solos are fluent and assured, and they probe the blues deeply before turning to a happier gospel shout on the rousing *Amen*. Duke Pearson, piano, Doug Watkins, bass, and drummer Iex Humphries complete the quintet.

Jimmy Heath: Really Big! Riverside RLP1188

The second of Riverside's efforts to build a catalogue of big-sounding bands that operate with the ease of small groups enlists the talents of Jimmy Heath as improviser on tenor sax, composer, arranger and supervisor. Unlike Johnny Griffin, who absorbed most of the solo space on the initial LP, Heath shares honors with a liberal hand, assigning a primary role to Clark Terry, former kinkpin of the Ellington trumpet section. The Adderley brothers assist, while drummer Albert and bassist Percy, Heath's own brother's, lend moral support. Trombonist Tom McIntosh contributes the scorings of Bobby Timmons' *Dat Dere*, and Heath's original *The Picture Of Heath*.

Not the least of the program's accomplishments is the return of the unexpected to big band sound. Both Griffin and Heath manage to keep the ten pieces at their disposal moving, and interest never wanes for long. While neither aims for the perfection of an organized band or concert group, each has his methods for avoiding monotony. Heath finds a place for his ballad style on *My Ideal*, and *Green Dolphin Street*. Engineer Ray Fowler, however, avoids tricks and the stereo is always pleasantly predictable.

Art Pepper: Gettin' Together Contemporary S7573

After having met the 1957 Miles Davis rhythm section at a previous session for Contemporary, Art Pepper gets together with the present team for comment on happenings during the interval between. As the only member of the original trio to revisit the west coast, Paul Chambers opens the discussion with a dexterous example of bass playing on *Whims Of Chambers*. Pepper shows the results of listening to Thelonious Monk, both on *Rhythm-A-Ning*, and when telling about the family pet on his own *Bijou The Poodle*. Conte Candoli, his partner at the Lighthouse, adds a few remarks on trumpet. Pepper also notes the rise to prominence of a fellow alto-saxist, slipping in a few wry phrases to indicate that he knew Ornette Coleman locally before the great discovery was made.

Pepper is happiest over an introduction to pianist Wynton Kelly, and their joint conversation on *Softly, As In A Morning Sunrise*, or the trade secrets of handling a ballad, are definitely worth overhearing. Their subjects are *Why Are We Afraid?*, a piece Pepper plays in the movie "The Subterraneans," and *Diane*, a theme created for his wife and not Jack Teagarden's heroine. By way of summing up, drummer Jimmie Cob sets a leisurely pace on an ad-lib blues, allowing Pepper to switch to tenor sax and ask when Sonny Rollins is coming out of retirement. Stereo brightens the verbal exchanges.

Dave Bailey: One Foot In The Gutter Epic BA17008

The soul bandwagon is capacious enough to hold all the musicians record companies are trying to push on board, but a few strolling groups should be left to march on the pavements. Despite a soul billing blazoned on the liner, the sextet assembled here seems able to walk as well as ride. It engages in the same sort of studio jam session as Prestige staged to produce the LP titled "All Morning Long," before soul was a commodity to be vended about. With no one to hold a stop watch on soloists, a Clifford Brown theme on the blues, *Sandu*, is ventilated for nearly twenty-one minutes. Dave Bailey, the drummer who planned the date, works on the theory that an invited audience gives an extra lift often missing in the studio. Record buyers may soon find the applause after every solo sounding forced. The paying customers at in-person club dates usually wait until the end. How-

ever, the party atmosphere is here for those so inclined, and stereo brings it into full play. The album is titled for a Clark Terry original, on which the trumpeter taps blues and gospel roots with greater accuracy and reverence than many writers now working with similar material. Terry's exchanges with trombonist Curtis Fuller are especially fertile, while Junior Cook on tenor sax, Horace Parlan on piano, and bassist Peck Morrison have ample room to speak freely. Thelonious Monk's *Well You Needn't*, the third and last tune, also receives extended treatment.

Will Bradley and Johnny Guarneri: Live Echos Of The Best In Big Band Boogie
RCA Victor LSP2098

As popularized by the big bands of the late '30s and early '40s, boogie-woogie was already just an echo of the piano style founded a decade or so before. The records sold millions of copies, however, and few dancing couples were unaware of the names and histories of Meade Lux Lewis, Albert Ammons and Pete Johnson. Will Bradley, who gleaned his share of the profits with *Beat Me Daddy*, knows all the deadfalls a band meets while attempting to swing and play eight to the bar. Ray McKinley's drumming kept the old band from sounding sluggish, and a new partnership with Johnny Guarneri, a Benny Goodman and Artie Shaw alumnus, fills the bill today. Guarneri's piano interludes enliven a dozen boogie specialties made famous by Tommy Dorsey, Earl Hines, Count Basie, Bob Crosby and other bandleaders. Bradley's easy trombone style also helps, and Clancy Hayes comes in for the vocals. With a further assist from stereo and Charles Shirley's faithful transcriptions of the original versions, the echo sounds loud and clear.

Charlie Shavers: Here Comes Charlie
Everest SDBR1108
Billy Butterfield: Billy Blows His Horn
Columbia CS8314

Different approaches to the same material often lead to the same end result. In either of these cases, it means a pleasant set of pop tunes for dancing or listening from one of the top trumpeters in the business. Backed by a rhythm section, Charlie Shavers solos in the perky, muted style he employs when following Jonah Jones into the Embers. More subdued than when filling an engagement on the West Side of Manhattan, still he never suppresses a witty remark or lessens the vibrancy of his tone. Memories of his days with John Kirby are revived on *Loch Lomond*, and *Undecided*. The stereo image is sharp and intimate.

Billy Butterfield plays open trumpet so clearly and melodiously that it sounds warm and romantic even when soaring out over a band. His rich tone is equally mellow in high or low register, and few will dispute his mastery of *What's New*. As he wrote the tune with Bob Haggart, its inclusion should have ended the search for an album title. He solos at length on every number, while the band provides dancers a good beat in roomy stereo on *Tuxedo Junction*, *Sunrise Serenade*, and *Just Friends*.

Mundell Lowe: Other TV Action Jazz
RCA Camden CAS627

Following on the success of a previous economy-ticketed bout with themes of the private eyes, Mundell Lowe becomes more ambitious and engages a trombone quartet to stand behind the roundhouse swing of his guitar. This time he picks eight of the newer themes (they seem to rise and fall every week or so) and the ten-piece studio group makes pushovers of *Mr. Lucky*, *The Untouchables*, *Johnny Staccato*, and *Markham*. Clark Terry plays trumpet and flugelhorn in his best Radio City Music Hall style, and Phil Bodner doubles on flute, tenor and baritone sax. The carnage would be worth it at twice the price, and the stereo is fine.

Theodore Bikel: Songs Of Russia Old & New
Elektra EKS7185

The number of Russian language students now enrolled throughout the country should be



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Since 1935, Peerless has been the pioneer—designing and manufacturing transformers of the highest reliability to most-exacting specifications of the electrical and electronics industries. A policy of creative engineering, precision construction and rigid quality control has given Peerless acknowledged leadership—particularly in the design of specialized units. Pioneering in miniaturization, Peerless has also established the industry standards for reliability in sealing and ruggedness of packaging. Products range from units 1/10 cubic inch to more than 20 cubic feet, from fractional voltages to 30,000; from less than 1 cycle to almost a half megacycle; in 1, 2 and 3-phase or phase-changing configurations. Constructions cover the range from open-frame to potted, hermetically-sealed and vacuum-impregnated units. Whatever your transformer needs, Peerless can design to your specification and deliver in quantity. In addition to the units shown here, Peerless has solved these special problems:

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Single-phase, oil-immersed unit rated at power level of 26KVA. Frequency response of $\pm .5$ db from 20 cps to 5 KC. Above resonant frequency, at 28 KC, attenuation slope and phase shift are smooth and without irregularity. Suited to such applications as driving high-power shaker tables.



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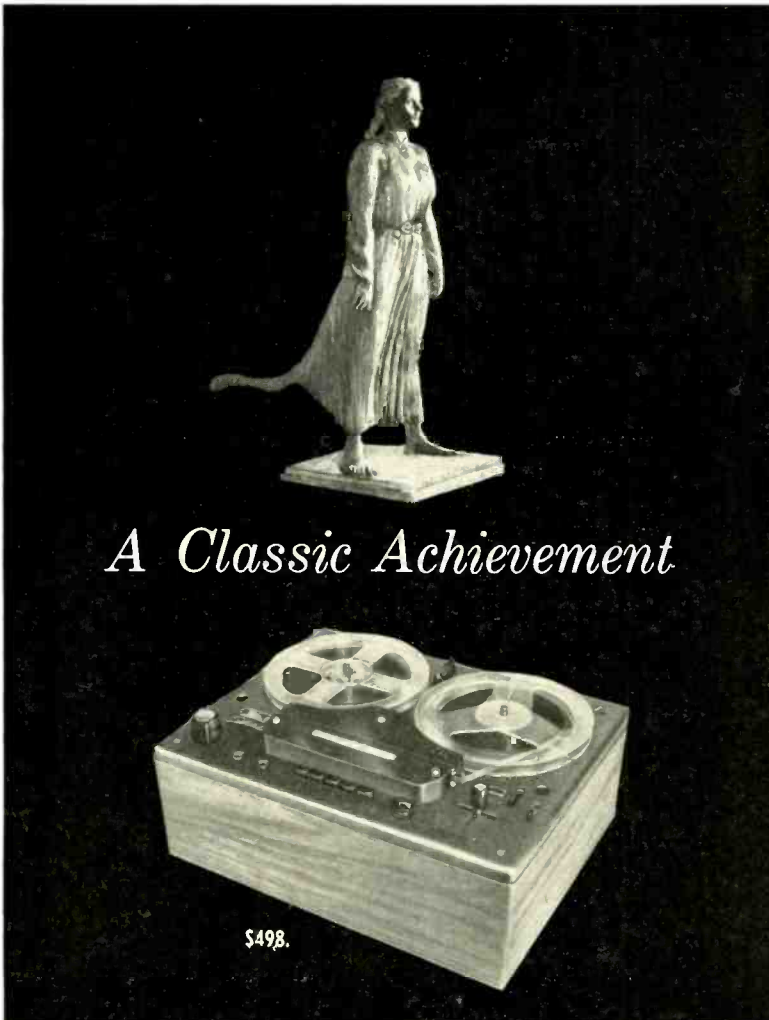
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Tandberg Series 6 $\frac{3 \text{ SPEED}}{4 \text{ TRACK}}$ Stereo Tape Deck

The breathtaking performance and brilliant versatility of this remarkable instrument can be matched only by pride of ownership. From every aspect... design, engineering and styling...

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- Self-demagnetizing circuit; Pabst Hysteresis motor.
- 4 track stereo or monaural record; built-in remote control.
- Sound-on-Sound simultaneous record and playback.

it is *the* stereo tape deck demanded by the critical user for incorporation into existing Hi-Fi systems. Review the major features. Hear, see, try it. The results will be more than convincing.

- Direct monitor from signal source or active recording.
- High and low level input; wide range of frequency response.
- Silent pause, start-stop, control; push button operation.
- Digital counter; dual pulsating recording level indicator.

Remote control switch available.

Tandberg OF AMERICA, INC., 8 THIRD AVENUE, PELHAM, NEW YORK

enough to ensure a good reception for this gathering of songs from before the 1918 revolution and after. A good reason for Theodore Bikel's success as a folksinger is his knack for entering into the spirit of songs from distant lands to the point where their meaning becomes clear to audiences everywhere. Wide acquaintance with various cultures prompts him to emphasize the similarity between songs of different backgrounds. This is not to say that everything is reduced to the same common denominator, but a song often springs to life under his urging and acquires a familiarity not always felt in native versions. It would be hard to imagine the member of a Cossack choir who could deal as effectively with the material contained on opposite sides of this LP.

If Bikel prefers to see in the new songs "what we thought had perished with the old," a perusal of the enclosed text and translations soon reveals ideological contrasts and other changes. The casual listener, however, is more likely to be entertained by the varied character and appeal of the separate collections. About the only subjects omitted are paeans to the Czar or the Soviet state. Bikel sings of love and nostalgia instead, and his tale of the old droschke driver and the new subway rouses sentiments not bounded by the Iron Curtain. Fred Hellerman conducts supporting groups that range in size according to each song's needs and include a vocal quartet from the Russian Orthodox Church in Manhattan. The more ambitious productions benefit greatly from stereo.

One symptom of a shrinking globe is the steady growth of interest in folk songs from other countries. Bikel's part in this development is an important one, through numerous concerts and recordings, and his latest contribution has just been published by Meridan Books under the title "Folksongs and Footnotes." Containing eighty-four songs from all over the world, it is described most accurately in the subtitle as an international songbook. The author may not be the first international folksinger, but a command of seventeen languages certainly makes him the most versatile of the new breed. Many songs are copied from Bikel's own recordings, and each is fitted with guitar chordings and Milt Okun's piano transcriptions. Except for a Yiddish section, the songs are grouped according to subject rather than origin. The commentaries often reflect his sense of humor, and the kind words reserved for the Kingston Trio and Harry Belafonte are good to hear after all the snappish remarks by lesser authorities.

MONO

Thesaurus Of Classic Jazz, Volumes I-IV
Columbia C4L18

The extensive reissue program which John Hammond has in store at Columbia gets underway with a four-volume study of that happy music generally designated as "New York Style." Nurtured in the speakeasies and dance bands of the period, it grew to full stature in the thriving pre-depression recording studios. At worst, it bears little resemblance to the background music currently dispensed during prohibition scenes on television.

Appearing under such colorful guises as the Tennessee Tooters, Broadway Bellhops, Birmingham Babies, Six Hottentots, and The Goofus Five, its progenitors made hundreds of records and developed a rare proficiency at the art. Perhaps never before or since has there been a group of musicians able to go into a studio, in any number of haphazard combinations, and say so much without advance preparation in the three-minute confines of a single 78-rpm side. Among the few born in Manhattan were the Rollini brothers and Frank Signorelli, but other prominent members came to work along Broadway from all points in the compass. The style, however, was named for the records rather than the place.

Forty numbers barely scratch the surface of either titles or labels, but the selection is representative and includes the cream of early improvised jazz. They were released between 1927 and 1929, just before radio and the depression closed recording studios to jazz musicians. When records began to sell again, the demand for big bands caused Red Nichols, Glenn Miller and the Dorsey brothers to

switch allegiance. The swing juggernauts were never a happy home for many, including Nichols himself, and Miff Mole, Arthur Schutt, Fud Livingston, Vic Berton and Frankie Trumbauer preferred playing dixieland or studio work. The clan's days for collective creativity were over, but its influence had scattered widely and still lingers on. The serious jazz student can no more appreciate Lester Young or Miles Davis without a knowledge of Frankie Trumbauer and Red Nichols than he can understand Thelonious Monk without first hearing James P. Johnson.

Red Nichols discovered the talents of trombonist Miff Mole when both were playing in the pit band at the Earl Carroll Theater in 1925. They formed a partnership that lasted four years and resulted in most of the titles surveyed. Two volumes are devoted to groups Nichols headed under the names of Charleston Chasers, Arkansas Travellers, and The Red-heads. One LP is turned over to Miff Mole's Little Molers, while the first volume introduces units led by the Dorseys, Frankie Trumbauer, Joe Venuti and Eddie Lang.

Early collectors trying to locate jazz performances or just one hot chorus spent hours searching through bins of such defunct labels as Okeh, Perfect, Harmony, Domino and Velvet Tone. The surfaces were never velvety, and a good ear was needed to determine the personnel. With no published information or discographies available, the real test of an aficionado was an ability to tell immediately whether a cornet passage, found lurking behind a Cliff Edwards vocal effort, was played by Nichols, Biederbecke, Phil Napoleon or Chelsea Qualey. The remastering by Jack Ashkenazy and Eddie Michalski makes the test easier today, but a passing mark is still required.

The sixteen-page brochure enclosed is abundantly illustrated, and notes by Richard DuPage and Frank Driggs reveal just why the sound and style is still worthy of study. Besides being an invaluable collection, it augurs well for the proposed Fletcher Henderson and Billie Holiday reissues.

Ersine Hawkins: After Hours

RCA Victor LPM2227

Benny Goodman: The Kingdom Of Swing

RCA Victor LPM2247

The swing-era nostalgia of these reissues is likely to appeal mostly to dancers, but points of interest for the armchair listener crop up on both. Ersine Hawkins, whose powerful trumpet could cause a whole auditorium to sway, was a great ballroom favorite. Nearly every other band played *Tuxedo Junction*, but none quite matched the version heard here along with *Tippin' In*, *Fine And Mellow*, *Cherry*, and *Bear Mash Blues*. Paul Bascomb's lusty tenor sax is featured on *Sweet Georgia Brown*. The album takes its title from a fine Avery Parrish blues, and pianists still emulate his great solo.

Benny Goodman once wrote an autobiography with Irving Kolodin and strung together a few riffs to help promote the book. After deciding at the last moment not to reissue the recording, Victor now resurrects both tune and title to head up an LP. Other rarities are three Ella Fitzgerald vocals of 1936, including *Goodnight My Love*, which were quickly withdrawn because of her Decca contract. Helen Ward and Martha Tilton also sing pop songs of the day, but the saving grace at this late date is Jess Stacy's piano backing. Goodman heads the trio on *Nobody's Sweetheart*, and the quartet on *Vibraphone Blues*.

Swingville All-Stars: Rockin' In Rhythm

Prestige/Swingville 2010

The Moods Of Taft Jordan

Mercury MG20429

Although Taft Jordan toured recently with Benny Goodman and figures prominently on popular recordings, the rarity of his jazz dates make these appearances doubly welcome. The first might almost be called an Ellington reunion, as two other alumni join Jordan on three numbers associated with the band. In

addition to the title tune and *Things Ain't What They Used To Be*, there is an exciting refurbishing by Al Sears of *New Carnegie Blues*, his virile tenor-sax specialty from the days when it stopped stage shows. Basie comes in for attention on *Li'l Darling*, and Jordan's trumpet is warmly melodic on *Tenderly*. Hilton Jefferson revives *Willow Weep For Me*, a number the singing tone of his alto-sax made famous with rival bandleader Cab Calloway. Don Abney on piano, Wendell Marshall on bass, and drummer Gus Johnson complete one of the best editions of the Swingville All-Stars yet.

Jordan's muted style is brought to the fore on the first LP under his name. Contrary to the impression conveyed on the liner cover, he fronts an unidentified rhythm section instead of an orchestra. The quintet boasts a fine guitarist, and Jordan indulges in a superior version of the Jonah Jones formula on such ditties as *Marquita*, *September Song*, and *Second Balcony Jump*. Now, if some company would only team this trumpet pair in stereo.

John LaTouche: The Golden Apple

Elektra EKL5000

People fortunate enough to have witnessed a performance still talk about "The Golden Apple," giving rise to both envy and curiosity in the breasts of many who missed the 1953 musical. To partially fill the gap, RCA Victor has allowed an independent company to reissue the original cast recording. The Phoenix Theatre players are truly superb, while the book and lyrics by the late John LaTouche and the Jerome Moross score are landmarks in the growth of the American musical. Kaye Ballard sings the classic *Lazy Afternoon*, and Bibi Osterwald visits *Goona-Goona Lagoon*. Priscilla Gillette and Stephen Douglas unite on *It's The Going Home Together*. Jack Whiting narrates, and the only thing missing is his soft-shoe dance. Stereo would have taken care of that, just as it is now doing for Jackie Gleason and Walter Pidgeon. So buy the record and then see "Take Me Along."

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NEW PRODUCTS

• **New Reverberation Unit.** Easily adaptable to nearly any stereo or monophonic system the Knight KN-701 reverberation unit is designed to duplicate the reverberation of the concert hall. At the heart of the KN-701 is the Hammond Type 4 Reverbator which introduces a short time delay in the audio signal by "reflecting sound." The KN-701 can be plugged into any system using a separate preamp and



power amplifier(s), or an amplifier with a "Tape Monitor" switch. Any high-level source (tuner, ceramic cartridge, etc.) can be fed directly to the control unit. It is claimed that the acoustical characteristics of large, highly sound-reflective enclosed areas can be closely simulated when the KN-701 is used with the echo feature incorporated in some tape recorders. Supplied with complete instructions and a one-year guarantee of a price of \$49.95. Allied Radio Corporation, 100 N. Western Ave., Chicago 80, Illinois. A-1

• **120-Watt Amplifier Kit.** Adding to its already well-known line of amplifier kits Acro introduces the Stereo 120, which provides an output of 120 watts (60 watts per channel). Incorporating printed circuits the Stereo 120 is exceptionally easy to construct and provides performance equal to the laboratory model. Claimed to be



the first commercially available amplifier which combines ultra-linear operation with hybrid feedback for unusually low distortion and high stability. Intermodulation distortion is less than 1 per cent at 60 watts and less than 0.5 per cent at 50 watts output. Variable damping is provided on each channel for optimum speaker performance. Illuminated meter is provided for bias adjustment and circuit check. Price for the kit, including protective cover, is \$159.50. Acro Products Company, 369 Shurs Lane, Philadelphia 28, Pa. A-2

• **Professional Tape Recorder.** Offering quality and performance of a studio, console combined with portability, the new portable Ampex PR-10 answers the needs of both professional and advanced amateur. Featuring an automatic tape threading



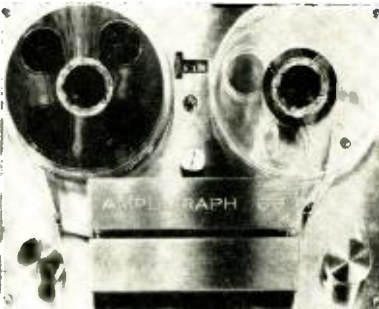
accessory which eliminates the fumbling, time-consuming, tape tearing aspects of tape threading, the PR-10 also incorporates electrodynamic clutches for positive and gentle tape handling during operation. Other features are pushbutton relay solenoid controls, 4-position head assembly (erase, record, playback, plus space for an extra head), hysteresis synchronous motor, and extra-rugged construction. Available in either stereo/monophonic or monophonic models with full- or half-track head configurations, the PR-10 may be rack mounted or carried in a case which is available as an accessory. A wide variety of accessories are available. Performance specifications are well within professional standards. Ampex Professional Products Co., Audio Products Division, Redwood City, Calif. A-3

• **Improved Headphones from AKG.** The AKG (Austria) featherweight K-50 headphones are now available with low-frequency response down to 30 cps and high-frequency response to 20,000 cps. This improved frequency response, coupled with its 3-ounce weight, makes the K-50 ideal for applications involving many hours of listening. Requiring less than 1 milliwatt input, the K-50 has a high output when used in conjunction with the U-50



transformer and a cathode-follower circuit. It is easily disassembled for cleaning, and converts to monophonic operation without soldering. Electronic Applications, Inc., Stamford, Conn. A-4

• **Stereo Tape Deck.** Offering professional-type construction in the medium price range, the Ampligraph Model 66 tape deck features a heavy cast deck plate and precision machined running parts. Designed for use with audio systems, the XX Model 66 is available as a quarter-track playback machine or as a record/playback machine. Frequency range is 30-20,000 cps at 7½ ips. Wow and flutter measures less than



0.15 per cent which is well within professional standards. Timing accuracy is within plus or minus 5.7 seconds for a standard 1200-foot reel. Editing is facilitated by the ability to control tape speed continuously between zero and the full fast forward or reverse positions. An automatic stop is provided at the end of either forward or rewind. Features include virtually noise-free mechanical operation, a large dynamically balanced flywheel, and a torque drive and braking system which minimizes tape stretch. Two-speed operation (7½ and 3¾ ips) is provided. A stereo recording preamplifier on a single chassis is available separately. Also available are a wooden base and a portable carrying case. Ampligraph Corporation, Box 103, Sudbury, Mass. A-5

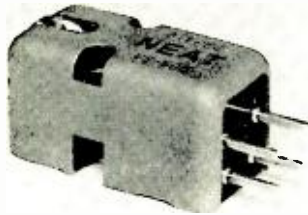
• **Home Music Center.** Advanced design and performance with an accent on style is featured in the new Altec Lansing 707 stereo AM-FM tuner-amplifier. Operating as a complete home music center the 707 can accommodate either mono or stereo systems with equal facility. Featured also is a connection for a center speaker which makes the unit suitable for extended stereo applications. Power output of the amplifier section is 48 watts (24 watts



per channel) by IHFM ratings. The 707 is part of line of matched monophonic and stereophonic components. Altec Lansing Corporation, 1515 S. Manchester Ave., Anaheim, Calif. A-6

• **Stereo Cartridge.** Manufactured in Japan by one of their best known high-fidelity manufacturers, the Neat VS-500 stereo cartridge employs the moving magnet principle for maximum channel balance and separation. Featuring simple stylus replacement and complete freedom from

Induced hum, the VS-500 delivers an output of 5 mv at 1000 cps at 5 cm/sec. Optimum stylus force is 3 to 5 grams with a 0.7 mil stylus. Frequency range is 30-



18,000 cps. Channel balance is within 1 db at 1000 cps and channel separation at 1000 cps is 30 db and 25 db at 10,000 cps. EIA standard mounting is used. Neat Onkyo Denki Co., Ltd., No. 4-1 chome, Kanda Hatago-cho, Chiyoda-ku, Tokyo, Japan.

A-7

NEW LITERATURE

• **International Electronics Corp.**, 81 Spring St., New York 12, N. Y. has just made available a revised technical bulletin listing Mullard "preferred" receiving tubes for AM-FM, high fidelity amplifier, television, and industrial applications. Complete specifications together with basing diagrams for more than 60 tube types are listed. Copies of this bulletin are available from Mullard distributors or by writing to International Electronics. **A-8**

• **Precision Apparatus Company, Inc.**, and its subsidiary Pace Electrical Instruments Co., Inc., 70-31 84th Street, Glendale 27, N. Y. have just issued a combined catalog of Precision electronic test instruments and Pace panel meters, for industrial and communications applications. Free copies may be obtained by writing for Catalog Number 28/Industrial on your company stationery.

• **Amperex Electronic Corp.**, Advertising Dept., 230 Duffy Ave., Hicksville, Long Island, New York, has announced the publication of their new condensed Semiconductor Catalog. This 12-page catalog includes basic specifications of their line of VHF transistors as well as a complete listing and specifications for their comprehensive line of germanium PNP and NPN audio (small and large signal), computer and switching transistors. Also listed with specifications are the complete Amperex lines of germanium and silicon reference and power rectifier diodes. Free copies may be obtained by writing to Amperex on company stationery.

AUDIO ETC

(from page 36)

distant yet close at the same time; you can't locate it by ear, and you can't get away from it. That's acoustic hum, for the musician!

This Dyna 70 has merely given me an excuse to sound off on the general subject by presenting me with a small quantity of it, much less than in my two earlier Mark III Dynakits, both of which hummed loudly and forthrightly while they did their marvelous work. (I originally banished my power amplifier location to a



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sideroom in my house because of this problem.) The 70 merely hums gently, sleepily, and, were it not for that mosquito-like pervasiveness (a mosquito two octaves down?) I would scarcely be able to notice it. 99 per cent of my music drowns it out.

I must say at once that I have seen—and heard—dozens of Dynakit in dozens of public places not one of which produced any audible hum. A plain fact. Maybe it depends on the weather. I *know* it depends very much on the location. And I've noticed that some amplifiers hum or cease to hum when you merely twist their chassis frames a bit, one way or the other. Mechanical vibration of this sort is very tricky to control and the bigger your transformers the tougher is the problem.

Yet, as I say, it has been licked, and often. It ought always to be licked, in every respectable component amplifier, large or small. Especially in the high-power ones. That's where it is most likely to crop up.

Don't take this as more than indirectly aimed at the Dyna 70 stereo amplifier. A small amount of acoustic hum (maybe in your living room it might disappear entirely) is scarcely much to hold against Dyna's fabulous electronic virtues and its ultra-reasonable kit price. If you build your own, you can probably anchor down your transformers as tight as you wish; and anyhow, this big powerhouse will make enough loud, clean noise to drown out the sound of billions and billions of acoustic mosquitos. **RE**

EQUIPMENT PROFILE

(from page 40)

cones, with separate high-frequency speakers to cover the ranges above a maximum of 800 cps—but we must admit that we were amazed at the output below 100 cps that was available from the Patrician 700. On organ music, which is where the extreme low power becomes especially important, the over-all feeling was just about as though one were actually in the organ loft, and that is an experience any sound enthusiast should go through some time. Among other selections, we heard a HiFi-Tape of Richard Purvis playing the Toccata from Widor's Fifth Symphony. On the Patrician, this becomes an emotional experience—on anything else it leaves a lot to be desired after one had heard it on the Patrician.

Two of these loudspeakers would make a perfect combination for a church that had to get along with an electronic organ. One of the problems of electronic organs is the reproduction of the very low frequencies, and in order to get over the feel of a genuine pipe organ, it is necessary to use a hank of smaller speakers or a single large one, and there is no denying the ability of a large cone to reproduce the extreme low notes—even at low volumes—with a realism that is astounding.

For those conditions where two Patrician 700's are not practicable, and yet a stereo installation of quality is desired, a single Patrician 700 may be used with a Stereon 200, carrying the material of both channels below 100 cps through the Patrician with the aid of an XP-1 isolation transformer. Above 100 cps the two units are electrically identical, and the performances of the two blend together well. On listening to tones

throughout the spectrum, we found that we could hear up to 20,000 cps, even though we had previously felt that we couldn't hear above 13,500. We can only attribute this to the efficiency of the T350, since we heard everything up to 20,000 readily. We heard no doubling down to 20 cps on the Patrician. Reproduction throughout was smooth and crisp, yet with the sensation of tremendous power in the lower registers.

A few hours listening to the Patrician and one wants to start looking for a larger home—this is the sound that this reviewer would enjoy living with continuously—a fine *large* loudspeaker. A-21

RECORDS

(from page 47)

generations have often toured the U.S. They sing with that familiar throaty, lilting Austrian style and the orchestra plays the same way. The only trouble is that they drown each other out.

The orchestra just plays the waltzes as usual, as though the boys weren't around; the boys sing the same parts, more or less, doubled by fiddles and oboes and what-not. Sort of a silly way to do it, though this must be the traditional Austrian manner, judging by the enthusiasm of all concerned.

Strauss Waltzes. Vienna Symphony, Paul Walter.

Epic BC 1045 stereo

The Viennese waltzes are best when played in Vienna, though sometimes they sound a bit tired.—The Viennese musicians must spend half their lives with the *Blue Danube*. This set is very authentic and reasonably peppy—I do believe the Viennese really never do get tired of their own past music. Sounds nice. In mild stereo. Æ

AUDIOCLINIC

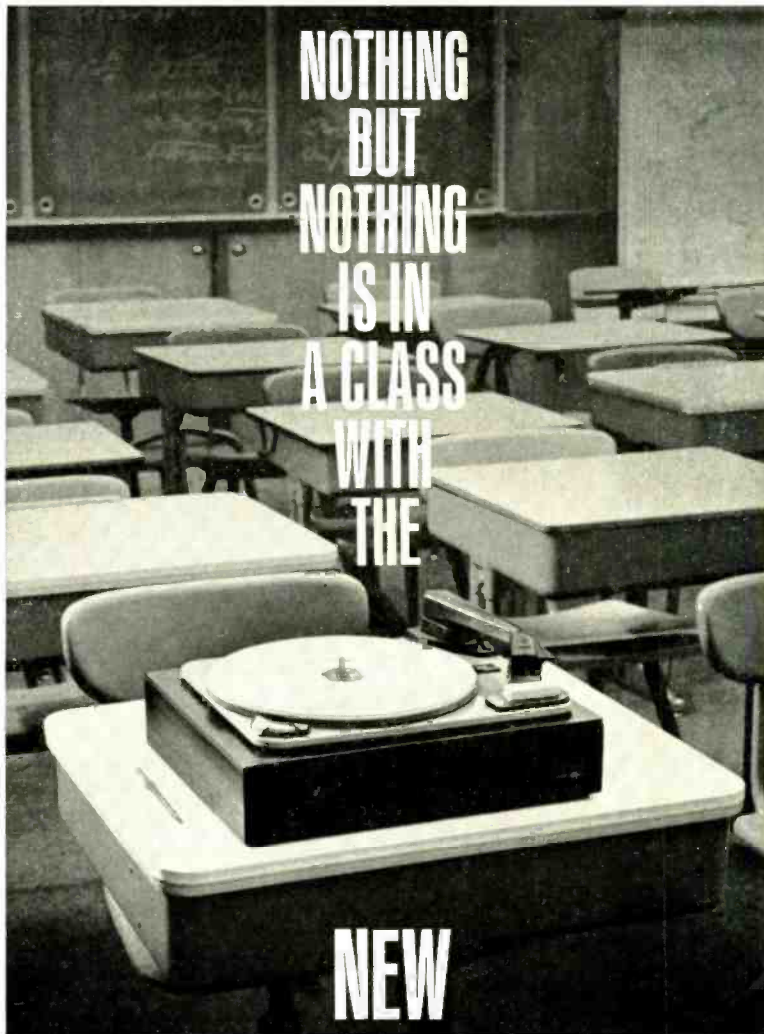
(from page 4)

The trouble is not caused by the cartridge or any other portion of your equipment. What happens is that random vibrations from the speaker or floor of the listening room are sufficiently strong to vibrate the tone arm and cartridge. The output from the cartridge resulting from such vibrations is sufficient—after passing through the amplifier—to vibrate the speaker to a greater extent than the vibration which initiated this cycle. The result is a vicious circle. This situation is really a typical feedback oscillator, such feedback being produced acoustically rather than electrically.

Of course, such a condition cannot occur when the tonearm is on its rest because the stylus is in free air. When the stylus is placed on the record, however, the cartridge can be actuated by random vibrations. Remember that it is the stylus which initiates cartridge output.

Monophonic systems were not prone to acoustic feedback because the monophonic cartridge would produce output only during lateral excitation of the stylus. Stereo cartridges, however, respond not only to lateral stylus motion but to vertical motion as well. Most of the feedback is produced by vertical excitation. Æ

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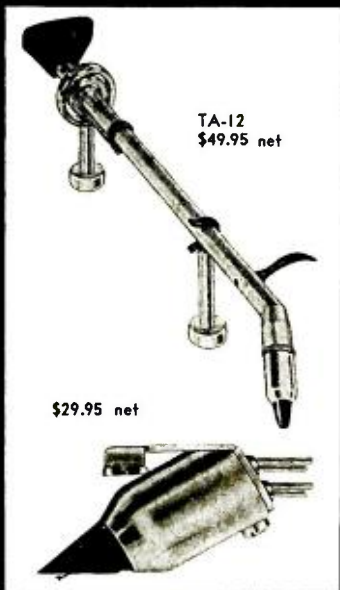
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ABOUT MUSIC

HAROLD LAWRENCE*

Silent Film Music-Making

THE CRASH and the introduction of talking pictures together dealt a staggering blow to the American musician: thousands migrated to other fields and steady jobs became as elusive as the Depression dollar. Until then, movie music had been a thriving industry in which composers, arrangers, publishers, and players alike prospered. The end came with dramatic swiftness; at one stroke, the silent film musician was rendered obsolete. Memories of the period linger on, however. At the Museum of Modern Art, the George Eastman House and other institutions, old pictures are being repaired, reproduced, and exhibited to audiences, many of whom were not even born when the last silent films were made. The so-called "art" movie houses occasionally revive the old films, and several television stations now broadcast many of the silent era classics.

It is a perpetual source of amusement to watch the stars of the Twenties go through their accelerated paces. The mute screen lovers took themselves quite seriously; they rolled their eyes, heaved mightily, gesticulated in the manner of Italian operatic singers, and assumed grotesque poses. It is only natural that the music chosen to accompany these performers should reflect the actors and the prevailing cinematic techniques. Accordingly, there are sentimental tunes, capricious melodies that recall violin encores by Drdla and Cui, "danger" sequences along the lines of Burgmüller's piano exercises for children, and appassionato bits *à la tzigane*. In "Son of a Sheik," a recently revived feature starring Rudolph Valentino, the love scenes on the moonlit Sahara dunes were acted out to the accompaniment of an emasculated version of the second theme of the last movement of Tchaikovsky's *Pathétique* Symphony. Unfortunately for Tchaikovsky, the cut-off points of these scenes never seem to coincide with those of the symphony and, therefore, the arranger had to telescope the original melodies, supplying them at the same time with "happy" endings.

Latter-day movie composers are certainly less crude than their "silent" predecessors, but they are also more sly in their use of the classics. The best known exception is the case of an award-rich Hollywood composer who, on accepting an Oscar for one of his film scores, thanked the Academy on behalf of himself and all the others who helped make it possible; whereupon he ticked off the names of Tchaikovsky, Rachmaninoff, Strauss, Debussy, and several other of his "collaborators."

While Tchaikovsky provided some of the background music for "Son of a Sheik" in one theatre, it was more than likely that

* 26 W. 9th St., New York, N. Y.

completely different scores were used in other movie houses throughout the land. For in the silent film era, screen music had not yet been "centralized"—each theatre was responsible for its own "sound track," and such factors as geography, box-office receipts, patrons' tastes, and the calibre of the music director influenced the form and content of the musical score. It was the job of the music director to preview the coming attraction, time the various sequences, and outline the music to be used. (These preliminaries were dispensed with in the case of smaller theatres, where a solo pianist or organist constituted both "orchestra" and music director.) During the heyday of the silent film, arrangers, publishers, and musicians flocked to the movie houses to sell their wares and their services. Since every film frame required a musical background, this added up to considerable numbers of notes, not to mention the various arrangements needed for all sizes of theatres. The scoring ranged from solo keyboard to symphony orchestra; at the Capitol Theatre, for example, the instrumentation included 16 violins, 8 violas, 7 cellos, 6 basses, double woodwinds, 4 French horns, 4 trumpets, 3 trombones, tuba, 3 "drummers," and harp.

To key exhibitors, the musical part of the show was as vital as the film itself. They realized that a smoothly-integrated score, performed by competent orchestral players, could contribute basically to the success of the screen play. Erno Rapee (1891-1945), a leading music director in the silent film years and a notable survivor of the coming of the talkies (he became music director of the Radio City Music Hall), recognized the need for better screen-music coordination. His *Encyclopedia of Music for Pictures* (1925) became the movie maestro's bible. Drawing on his experience in moviehouse pits, Rapee prefaced the body of his work with words of advice for music directors. More of the flavor and atmosphere of the musical life behind the "silent" scenes is found in these pages than in most books about movies B.T. (before talkies).

Except in the "stately pleasure domes" of the big cities, movie houses during the silent era were plagued with miscues, incongruous background music, false sound effects, and countless other diseases which, Rapee wrote, "[would provoke] hilarious laughter on the audience's part. [In one instance] Dvorák's *Largo* was played from beginning to end with frightful tuning and wrong tempo during a reel of events depicting dancing cannibals, Italian Army, Streets of New York, etc." Conversely, the *William Tell* Overture, a favorite among movie maestros, would often accompany pastoral scenes and tranquil episodes, because the musicians forget to glance at

the screen. And when they did, the flash-backs would almost invariably spread consternation among their ranks as they shifted gears to arrive at another theme and tempo. Sudden cutoffs, too, were dangerous because they would often catch the musicians smack in the middle of a soaring melody. There would then occur either an abrupt silence as the men turned to the next piece, or a comically accelerated cadence.

Turning from the obvious hazards of movie music-making, Rapee now dealt with the deeper aspects of the art. These concerned the selection of themes. It was not enough merely to accompany a love scene with a romantic melody: the geographical setting, period, and national context must also be borne in mind. For example, for Western lovers, the music should be "simple and sweet"; and for society lovers, who are "usually portrayed as sophisticated and blasé," Rapee suggests Victor Herbert or Chaminade (times have changed). The music director should also determine the precise nature of each situation and character. When he sees a villain, he should not pick a villain theme out of his library

at random; he should stop and think about this particular villain's characteristics. Is he "sneaky, boisterous, crafty, powerful, or evil-minded?"

Rapee's encyclopedia contains entries relating to tempo (*Hurries, Agitados, Misteriosos, Andantes* subdivided into "Happy" and "Neutral"), mood (*Emotional, Stister, Pompous*), nationality (there's even one for *Ruritania!*), character (*Mother Themes*), animals (*Mouse*), nature (*Storm*), and assorted categories such as *Monotony* and *Gnomes*.

Proceeding to the advanced calculus of silent film music, Rapee now puts the reader on his mettle. When two characters appear together, "it will be necessary to write original music for that particular scene treating the two themes according to the rules of counterpoint."

Rapee's quaint advice to the silent film composer and music director now makes entertaining reading. It's regrettable that the late Lloyd Morris did not apply his perceptive pen to a study of this interesting phase of the American musical scene.

Æ

LIGHT LISTENING

(from page 10)

Koto and Flute

World Pacific 1299

California provides a meeting ground for an Oriental and a Western musician in one of the more novel records of the season. Try this one if you're looking for something off the beaten path. The koto virtuosity of Kimio Eto is already known to admirers of that 13-string Japanese instrument in a previous World Pacific release (WP 1278) but the real surprise here is the easy assimilation of Oriental music by flutist Bud Shank. The noted West Coast jazz luminary joins Eto in a performance of exceptional sensitivity in a suite for koto and flute by Michio Miyagi. Having studied with Miyagi, one of the great kotoists of his generation, Kimio Eto was able to initiate Shank into all the secrets of the impressionistic score. The music is accessible to any Westerner possessing even a nodding acquaintance with Debussy or Ravel and the mono balance between disparate instruments is first rate. The other side of the disc is confined to compositions for koto, two of them composed by the soloist.

Dick Contino and Eddie Layton:

In The Mood
Mercury MG 20471

When I started reviewing stereo discs some two-and-a-half years ago, I did not discard my old turntable. I kept it in use for mono discs with a mono cartridge still in the arm. Next to it was placed a higher-grade table with the considerably lower rumble figure demanded by stereo discs. Whenever I tried a fresh stereo pickup on the newer table, it was very easy to check its performance on mono discs by indulging in a little table hopping that steered clear of the gossip that usually accompanies such a practice. At first, the mono combination was busier than its stereo neighbor. With each passing month, the stereo table has been getting a greater share of the traffic. However, I still turn to the mono table for optimum enjoyment of mono discs.

When this Mercury mono record arrived, I happened to have the stereo table running so I tried it on that side. Those familiar with the free-wheeling accordian style of Dick Contino and the hit-em-hard school of Hammond organists represented by Eddie Layton in previous Mercury recordings will know what to

expect in this joint release. Listening with the stereo pickup, in the first band of side one in this program of ballroom favorites, I heard Layton hit some chords midway through the arrangement of *Woodchopper's Ball* that showed real promise of crispness. You've probably noticed that some stereo cartridges can give a pretty good account of themselves in a mono groove when the disc consists of smooth, easy-going melody. There was nothing gradual about these chords. Interesting though the transients seemed at first hearing, they sounded even better when the record was transferred to the all-mono table. Then the organ chords had the slap of the flat side of a paddle struck against the surface of a pond.

Getting deeper into the record and selections such as *Cherokee, String of Pearls, and Perdidido*, the Contino accordian began to show up further differences between the mono and the stereo pickup. A tightly-packed flurry of notes was easier to unravel in playback with the mono cartridge. I don't deny that it's now possible to build a pretty good case for the use of stereo pickups in mono grooves—given music that doesn't tax the transient response of the pickup. The stereo pickup that couldn't quite keep up with the rapid-fire stream of notes issuing from Dick Contino's accordian sounds terrific when I play a mono recording of a lush selection featuring a Wurlitzer pipe organ. For the time being, I'm sticking with the lower mass of a good mono cartridge for best results when playing all records in my mono collection.

Don Baker: Baker's Dozen

Capitol ST 1363

Don Baker's organ album takes in a lot of territory. It's a generous sampling of the tremendous repertoire Baker amassed during his ten year stay at the console of the Paramount Theatre in Times Square. In this release, he plays a Robert Morton pipe organ—four manuals, 24 ranks, and 2000 separate pipes. The sound is gentler and less penetrating than the output of a typical theatre Wurlitzer. Organ buffs will miss the excitement of a large auditorium talking back to the pipes. Stereo separation is only moderate. The emphasis in Baker's playing is on color and change of pace as he switches from ballads and folk songs to tangos and novelties that have survived in the organ folios.

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VOLTAGE

(from page 32)

V_T = value of anode voltage drop

R = value of series resistance

I_L = value of load current in milliamperes

Applications

While the VR tube is not an absolutely stable voltage reference and does vary slightly with current, it is quite suitable for all but critical applications. The OA2, for example, provides a voltage that varies less than 1.5 per cent throughout the full range of current op-

eration (see Fig. 4). Other typical VR tubes vary as listed in Table 1. Available tubes include both octal and miniature types. Examples of circuits suitable for VR tube application are local oscillators in receivers, oscillators in frequency meters, bias oscillators in tape recorders, tuned oscillators in a V-F-O, audio pre-amplifiers, tape recording amplifiers, screen supplies for audio amplifiers, bridge circuits in vacuum-tube voltmeters, and so on.

Practical Considerations

In actual design practice, a quick look at the tube characteristics will reveal the

major limitations associated with circuits of this type:

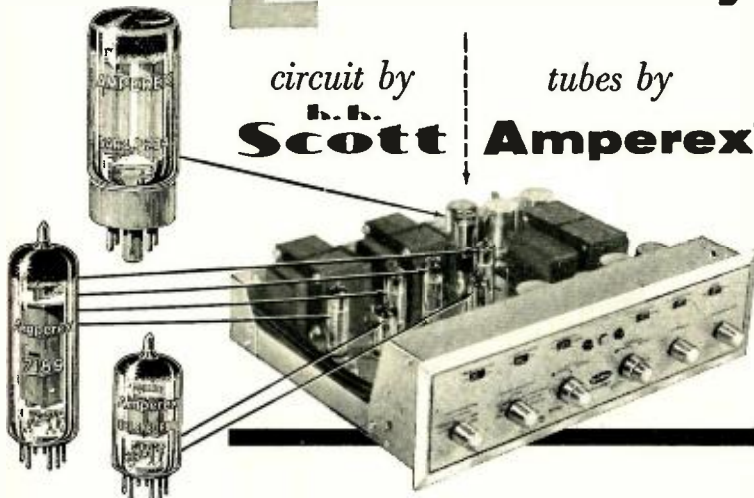
1. low current carrying capacity
2. fixed voltage ratings

Circuit designs to isolate heavy current requirements not specifically requiring regulation can be effected as in Fig. 6. This example allows regulation of voltages to the first two stages and the screens of an audio amplifier and bypasses the heavier current requirements within the power amplifier section. Where it is necessary to exceed the current rating of a given VR tube, a parallel connection of two such tubes may be employed. Such operation, however, requires a resistor (approx. 100 ohms) in series with each VR tube to assure equal division of current. The use of such resistors, of course, may affect the regulation characteristic slightly.

With regard to the fixed voltage limitation, a combination of various tubes connected in series will provide the sum of the voltage of the various tubes employed (see Fig. 5a). The value of the series resistance is calculated in the manner described except that V_{TMAX} and V_{TMIN} are the sum of the anode voltage

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6BQ5/EL84: 17 w., push-pull
6CW5/EL88: 25 w., high current, low voltage
6BM8/ECL82: Triode-pentode, 8 w., push-pull

VOLTAGE AMPLIFIERS

62B7/EF86: Pentode for pre-amps
12AT7/ECC81: Twin triodes, low hum, noise and microphonics
12AX7/ECC82: hum, noise and microphonics
6BL8/ECF80: High gain, triode-pentode, low hum, noise and microphonics

RF AMPLIFIERS

6ES8: Frame grid twin triode
6ER5: Frame grid shielded triode
6E7/EF183: Frame grid pentode for IF, remote cut-off
6E17/EF184: Frame grid pentode for IF, sharp cut-off
6AQ6/ECC85: Dual triode for FM tuners
6DC8/EBF89: Duo-diode pentode

RECTIFIERS

6V4/EZ80: Indirectly heated, 90 mA
6CA4/EZ81: Indirectly heated, 150 mA
5AR4/GZ34: Indirectly heated, 250 mA

INDICATORS

6FG6/EM84: Bar pattern
1M3/DM70: Subminiature "excitation" pattern

SEMICONDUCTORS

2N1517: RF transistor, 70 mc
2N1518: RF transistor, 70 mc
2N1515: RF transistor, 70 mc
1N542: Matched pair discriminator diodes
1N67A: AM detector diode, subminiature

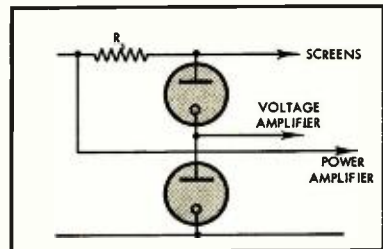


Fig. 6. Voltage regulator circuit for an audio amplifier.

drops for the tubes employed in series connection.

Additional changes in fixed value voltages also may be obtained by a difference rather than a sum connection as shown in Fig. 5b.

Combinations of regulated voltages, of course, are obtained by series connections tapped where required. For example three OC2 tubes in series would provide 75, 150, and 225 volts.

Regulated bias voltages may be obtained as shown in Fig. 5c.

A word of caution relative to the design of regulated circuits supplying tubes as the load. Filament type tubes do not conduct current until the heaters have warmed up and, therefore, when calculating minimum load current, a zero minimum current should be assumed. This assumption dictates a maximum load current not exceeding the current rating of the tube, since the tube is the full load until such time as the load tubes conduct. Under these conditions, a practical method of assuring proper series resistance consists of disconnect-

ing the load and adjusting the series resistor for a tube current of slightly less than the maximum rating of the tube employed.

Higher load currents may be used if the power supply rectifier is changed to a separate cathode type in order to insure that the load conducts whenever voltage is impressed across the VR tube.

Wherever a requirement exists to shunt capacitance across the VR tube, such as to reduce tube noise or reflect a low impedance, a possibility of tube oscillation exists. To prevent such oscillation, the tube manufacturer usually specifies the maximum value of such shunt capacitance.

When wiring the VR tube, do not use pins 3 or 6 since these pins extend inside the tube and their use as tie points could affect operation of the tube. **Æ**

#4, 80 POUNDS

(from page 21)

the better eight-inchers will produce a low-frequency response clean and full down to 45-60 cps. This response will depend, of course, not only on the speaker fitted but also on the tuning of the cabinet. The novel tuning procedure and porting method described above yield good results, and call for a minimum of hard work. While the hum-tuning procedure would seem to be somewhat limited in application,⁴ the shim method should prove workable in many reflex systems, particularly larger ones, where the major difficulty frequently encountered is panel resonance. In a large reflex, panel resonance caused by very low frequencies can often be controlled by more rigid panels, or effective bracing. On the other hand, with a very small reflex, panel resonance becomes much less of a problem, and the main difficulty turns out to be cabinet damping. When conventional speakers are used in small enclosures, cabinet damping requirements are usually quite severe, and the author would be inclined—because of the practical impossibility of applying port damping material when using a shim—to abandon the shim method in favor of a more standard reflex construction. However, when and where the shim method can be applied to advantage, the result is likely to be a speaker capable of turning in some very fine performances. #4 has done this so well and so often, in fact, that it appears as though this one Super 8 has finally found a permanent and happy home. And for this the author is thankful, being a little low both on funds and ideas for cabinet #5 at the present time. **Æ**

⁴ Limited, that is, because hum-tuning can only be used when the speaker fitted has a resonant frequency near 60 cps.



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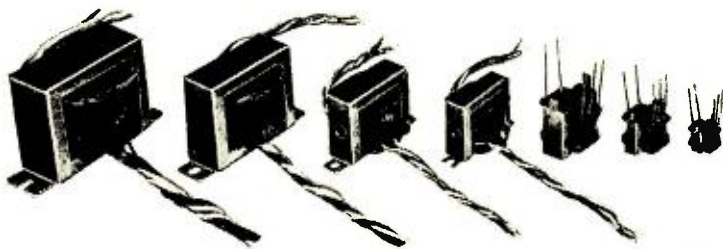
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PREAMP

(from page 26)

this point is 36,000 ohms, the required series resistance, R_s , is $\left(\frac{2^{-1}}{0.1}\right) 36 = 685,000$ ohms. The nearest standard value is 680,000 ohms. To correct for the loss at the high-frequency end a small capacitor should be connected across R_s such that $R_s C = 7$ microsecond. In this case 10 picafarads. The total input impedance is then 716,000 ohms. Since the recommended load for some cartridges is 2 megohms there will be some loss of bass which can be corrected with the bass control.

Measurements

The effect of the tone controls is shown in Fig. 4. There is 17 db boost and 10 db cut at 30 cps. At 10,000 cps there is 13 db boost and 13 db cut. The two intermediate positions shown reveal some interaction between the controls which was not found objectionable in listening tests.

The measured distortion is less than 1 per cent at 1000 cps for 1 volt output with volume control in maximum position and tone controls flat for both the high- and low-level inputs. At 2 volts the distortion is about 2 per cent, mainly second harmonics.

The signal-to-noise ratio is about 65 db in all positions of the volume control. Listening tests show that this is inaudible under normal conditions.

Appendix

$$\text{Let } i_e = I_E (1 + m \cos \omega t)$$

$$\text{and } V_{BE} = \frac{kT}{q} \ln \left(\frac{i_e}{I_{ES}} \right)$$

The a.c. portion of V_{BE} is approximately:

$$kT (m \cos \omega t - 1/4 m^2 \cos 2\omega t)$$

so that $d_2 = 1/4 m$

With feedback $d_2 = \frac{m}{4N}$ if $N =$ feedback factor.

The peak input voltage is in this case:

$$\hat{V} = N m \frac{kT}{q}$$

or

$$m = \frac{q \hat{V}}{kT} \cdot \frac{1}{N}$$

yielding

$$d_2 = \frac{q \hat{V}}{kT} \cdot \frac{m}{4N^2} = \frac{10 \hat{V}}{N^2}$$

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Industry Notes...

TERMINAL, HUDSON MERGE. Terminal Electronics and Hudson Radio have merged to form Terminal-Hudson Electronics, Inc., with combined U. S. and overseas sales exceeding \$10,000,000 annually. William Filler, former President of Terminal, is President and Chairman of the Board of the new company. Sol Baxt and Robert Corenthal are Vice Presidents. Terminal-Hudson will carry many lines of electronic parts and equipment for both the industrial and retail trade. In addition, export activities will be continued by Terminal Radio International Ltd. as a separate subsidiary. Corporate headquarters of Terminal-Hudson are 236 West 17th Street, New York City, N. Y.

TRANSIS-TRONICS MOVES. Public acceptance of Transis-Tronics, Inc. new TEC S-15 stereo amplifier has been so exceptional that the company is moving to new headquarters, tripling its floor space to meet the demand for the new product, according to Bernard D. Cirlin, president of the electronic manufacturing firm. Move to the new plant, located at 1601 Olympic Boulevard, Hollywood, California, will be completed sometime this month.

LANGEVIN PURCHASED BY SONOTEC. Langevin, manufacturer of professional audio equipment for over 25 years, was purchased from The W. L. Max Corporation by Sonotec of Santa Ana, California. The Sonotec line of attenuators, variable hi-lo equalizers, precision instrument switches, keys, plugs, jacks, and other transmission equipment will now be offered under the Langevin name. The new principals of Langevin are Arthur C. Davis, President, and Howard Souther, Executive Vice-President.

Industry People...

Ampex Audio Company has named John A. Larson as Assistant Manager of Advertising and Sales Promotion. He replaces Richard R. Grant, who left the company. Philip J. Wood has been named Manager of the Equipment Division of Ampex Audio. Prior to joining Ampex, Mr. Wood was Marketing Manager of Zenith Sales Corporation.

Thomas Organ Co. names George Gilchrist Director of Merchandising. For the past 8 years Mr. Gilchrist has been Manager of the Organ Division of Lyon and Healy of Chicago. He will be responsible for contacting Thomas Distributors and setting up special merchandising programs. Mr. Gilchrist has written a number of articles and conducted studies in various phases of the organ business during his 25 years with Lyon and Healy.



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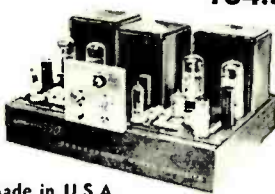
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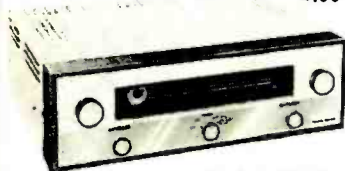
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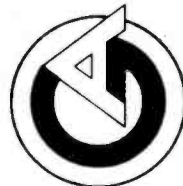
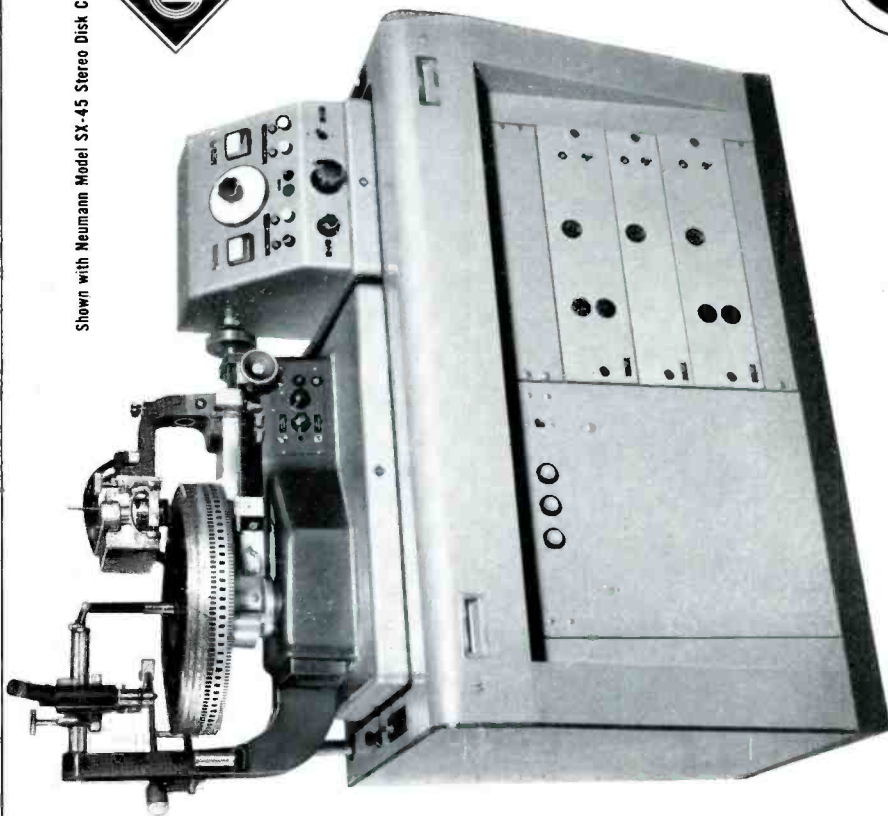
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TEC S-15

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