

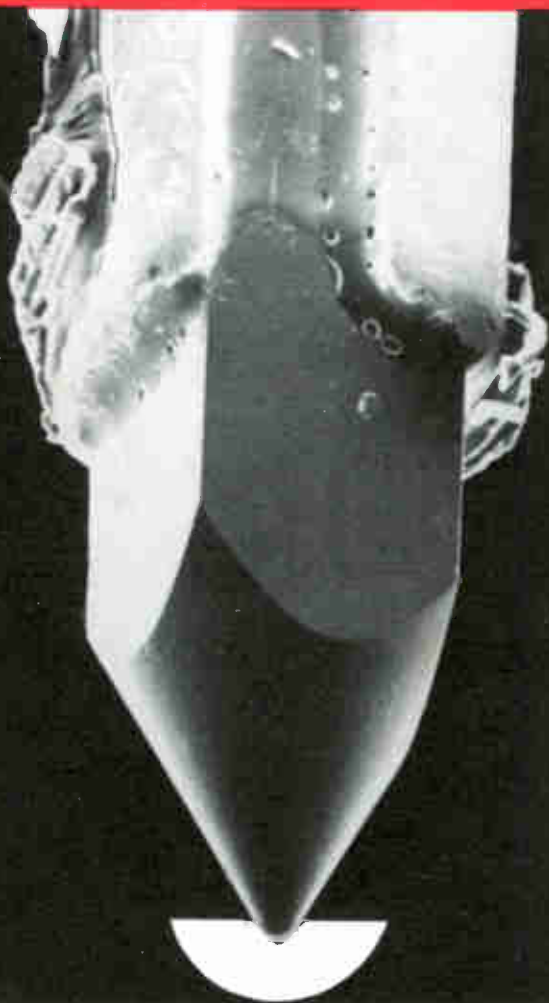
the

stereophile

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1973

For the High-Fidelity Stereo Perfectionist



**Reports on: Revox A-77-III Dolby B Tape Deck;
Hegeman 1 Speaker System; Audio Research
SP-3 Preamp & Magneplanar Speakers.**

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The Cover

A droll cynic stated recently that he didn't care what the evidence was, common sense told him that micro-groove disc reproduction could not possibly work. After studying our cover, you may be inclined to agree.

The large object at the top is the stylus, slightly enlarged, of a top-rated pickup -- the Decca Mk V. The little widget at the bottom is the cross-section of a groove, for comparison. Could that groove conceivably vibrate that stylus 10,000 times per second?
(Electron-scanning microscope photo by John Facq, courtesy Paoli Hi-Fi Consultants.)

As We See It...

What's Right?

A recent experience with two excellent loudspeaker systems and two of the top power amplifiers raised a question that has been cropping up more and more frequently these days: When one component sounds more top-pish or more bassy than another, which one is really flat and which isn't?

The question arose this time in connection with some listening tests on a pair of FMI 80 speakers and a pair of IMF Monitor IIIs, and an Audio Research Dual 75 and Crown DC-300A power amplifier.

Both speakers, according to their manufacturers, had been designed to produce the flattest, most-extended high end possible. Yet there was an obvious difference between the high-end character of each. Either the FMIs were up at the high end and the IMFs were flat, or the FMIs were flat and the IMFs were somewhat dull.

Okay, how would you determine which was correct? Connect each to a power amplifier of unimpeachable credentials, and listen to recordings that are known to have a flat high end on them? Okay, now name an amplifier of unimpeachable credentials. How about the two abovementioned ones: the Dual 75 and the DC-300A.

Let's try the Dual 75 first. With that amp driving each speaker, the FMIs were obviously flat, the IMFs rolled down at the top. Now we have the answer! Or do we? Let's try the other amplifier OUC -- the DC-300A. Now the IMFs sound flat and the FMIs sound obviously tipped up and fiery.

Which is right? The average person's answer at this point will be prejudiced by whether he is a solid-state worshipper or a vacuum-tube infidel. If he believes in the in-

herent superiority of transistors he will know that the DC-300A is right because its extra "snap" is due to its superior rise time. If he is a tube man, he will say the Dual 75 is right because its "softer" sound is due to the fact that it produces less high-order harmonic distortion than do solid-state amplifiers. Both assertions are true, and could account for the audible difference. But is the sound of either one "right"? Or is it possible that neither is right, and that the right sound lies somewhere in between?

We have observed the same thing at the low end. The Monitor IIIs have truly awesome low-frequency response, with a slight tendency toward heaviness. With the DC-300A, the low end is merely a bit "rich." With the Dual 75 it is intolerably woolly and turgid. Yet it goes almost without saying that both amplifiers have absolutely identical measured frequency response from 30 to 20,000 Hz. And the Dual 75, which starts to roll off below 25 Hz, elicits more bass from the Monitors than does the DC-300A which is flat down to 0 Hz (DC)! And both have such low distortion at levels below overload that it is impossible to measure with most test instruments, and should not be audible to the most critically tuned ear.

So why the difference at the low end? Available power makes for tighter bass? Or is it higher damping factor that causes the DC-300A to better-control the IMF's low end?

And which one is right? The Crown, because it makes the IMF sound more natural at the low end and makes some other systems sound too taut and sparse? Or the Audio Research, which underdamps the IMFs and produces just the right bass quality from some other speaker systems?

We did not cite the IMF Monitors or FMI 80s as examples here because they are unusual in the way in which they react to different amplifiers, but because they are typical in this respect. (They differ from most

other speakers in that they are good enough to reveal the amplifier differences rather conspicuously, and from one another in that the FMIs were designed for use with tube amplifiers while the IMFs were not.)

The point we're trying to make is that, at least at the present state of the audio art, there is no right or wrong, there's only incompatibility. The IMFs sounded best with the DC-300A because that amplifier approximates what was used to design them. The FMIs and a few other loudspeakers sound best with the ARC Dual 75 because, by design or (in the case of most electrostatics) by happenstance, they work best with tubes.

If you're looking for an earth-shaking conclusion, we can give you that, too. Conclusion: There is no "best" amplifier; there is only a best one of the type that the speaker was designed for. And it's a pretty safe bet that, as of today, one is the Dual 75 and the other is the DC-300A.

If in addition you're looking for something new to worry about in the wee hours of the morning, try this on for size: Can we really trust the device that is used to calibrate the microphones that are used for recording and for measuring the frequency response of the loudspeakers we listen to? Can we be even reasonably certain that anything is right? Have you ever had an audiometry curve run on your ears?

Sleep tight, now!

Since this is the last Stereophile issue you'll see before the New Year (And please, no cracks about Which Year?), we take the opportunity to thank all our subscribers for their support, and to wish everyone a

**Merry Christmas
and a
Happy New Year!**

Revox A-77-III Dolby B Tape Deck

MFR'S SPECS— TYPE: Open-reel deck with Dolby noise-reduction system.
SPEEDS: 3-3/4 and 7-1/2 ips or (in HS Model) 7-1/2 and 15 ips. **STEREO TRACKS:** Standard 4, 2 on special order. **REEL CAPACITY:** 10-1/2 inch.
WEIGHT: 34 lbs. **PRICE:** \$999. **MFR:** Revox Corp., 155 Michael Dr., Syosset, N. Y. 11791.

In the *Stereophile* issue dated Spring '71 (no longer available from us), our report on the original Revox A-77 concluded "For sheer fidelity of recording, we doubt that it is beatable at the present state of the art."

Well, the state of the art changes with time, and the A-77 has been surpassed by at least one other open-reel machine: The A-77-III Dolby B.

This contains four complete Dolby circuits, to allow simultaneous pro-

cessing and deprocessing, so one can listen to the de-Dolbyed playback from a tape while it is being recorded. And since we all know by now just how effectively the Dolby noise-reduction works, we won't linger to

rhapsodize about it all over again. Just think of this as an ordinary A-77 with 10 dB less audible hiss. There are other differences between this and the earlier Revokes, too. Because a Dolby requires careful adjustment of play and record levels, Revox has finally seen fit to provide metering of playback level (ahead of the play volume control). Aside from its value in Dolby setup, this greatly facilitates in-the-field checks of bias and signal levels, as well as making tape copying considerably easier. (Play any moderately loud passage, note the VU meter reading, and adjust record level on the second machine for the same reading.)

Needless to say, all current-model Revokes (including non-Dolby ones) incorporate design modifications that were prompted by some problems in early models. The reel brakes no longer tear themselves apart if actuated during a high-speed wind, relays are much more reliable, and the motors now run

The Revox A-77-III Dolby B deck. Record-level adjustments for matching the tape to the standard Dolby level are under the flip-down head-cover strip.



cessing and deprocessing, so one can listen to the de-Dolbyed playback from a tape while it is being recorded. And since we all know by now just how effectively the Dolby noise-reduction works, we won't linger to

cool. And Revox's astounding warranty policy still applies: One year for the capstan, pinchwheel and heads, and a lifetime warranty on everything else. (This means your lifetime, as long as you own the

recorder....not the "lifetime" of the recorder.)

The machine is still as much of a pain in the neck to thread as it always was, and the service manual is a horror. The only real glitches we found in our sample, though, were (1) a tendency for the Input/Tape monitor switch to imprint audible clicks on the tape, and (2) a rather pronounced boost of low-end frequencies when playing back tapes that were recorded to conform to the NARTB equalization curve that is standard for all tapes, including pre-recorded ones, made in the U.S.

We contacted Revox, U.S.A. about the clicks, and were told that they had not encountered the problem. It struck us as highly unlikely that we would receive for testing the only clicky A-77-III that had been manufactured, so we conducted a telephone poll of local Revox dealers whom we know well enough to get the straight poop from. Not one had encountered the clicky switching, and neither had any of their customers. So we were forced to conclude that the problem, if not unique to our sample, is quite rare. If you do encounter it, though, don't despair. It is not supposed to happen, and Revox will willingly if not joyfully undertake to eliminate it.

The low-end rise was more difficult to pin down. Playing its own tapes, the A-77-III's low end was almost perfectly flat down to around 25 Hz. Yet when playing tapes made on other good recorders (and this included commercially-produced music tapes), there was a low-end rise amounting to what sounded like about 3 dB of boost at 40 to 50 Hz. To date, Revox has not acknowledged the existence of this, and neither were we able to find anything in their playback circuitry that would account for it, but there it is. And we did not find it in their 2-track model or in any of their previous 4-track models. It is not related to the Dolby, for the rise is there whether the Dolby is in or out of

circuit. It is easily corrected with any variable-turnover tone control, but there is really no excuse for its being there at all.

Revox prices keep going up. When we bought ours in 1971, the basic 4-track model (we got a 2-track one) was priced at \$569, which was a good price for a recorder of such performance capability. Now the price for the same model (but incorporating the improvements we mentioned before) is \$799 without the Dolby, which is likely to make a prospective buyer take a long, thoughtful look at the competition. Even at their inflated prices, though, the Revox units are going to be hard to beat on over-all performance. And no-one else is offering a warranty like Revox's. That's worth something.

(Manufacturer's Comment on Page 25)

Hegeman I Speaker System

MFR'S SPECS— TYPE: Omnidirectional 2-way dynamic with multiresonant woofer loading. **IMPEDANCE:** 8 ohms. **POWER CAPACITY:** 25 watts. **DIMENSIONS:** 11 in. W x 8-3/4 D x 26 H. **PRICE:** \$114. **MFR:** Hegeman Laboratories, Inc., 176 Linden Ave., Glen Ridge, N. J. 07028

Ye Editor had his first exposure to a true omnidirectional speaker system 15 years ago, while he was employed as chief equipment tester for High Fidelity magazine. The speaker was a most unusual-looking device for its time, being roughly a foot square and standing 3 feet high, with a "cube" of grille cloth at the top like a cupola. Inside the cupola was an 8-inch woofer facing upwards. Directly above it was the weirdest-looking tweeter you ever saw.

Instead of a cone, it had what looked for all the world like a large, white lily sticking up from

the voice coil, and close inspection revealed fine blue ruled squares on the "lily," earning for it the nickname by which it is remembered: "the ledger-paper tweeter." That system, designed by Stewart Hegeman and later produced by EICO as their HF-S2, was memorable for two other reasons, too. It was the most astonishingly spacious-sounding system of its size that anyone had ever heard, with a truly hair-raising sense of depth even when heard from a distance of a foot or so. And it produced the best stereo imaging and center-fill of

any hitherto-available system. It was a commercial disaster, partly because of poor promotion, but mainly because the production-line samples, in marked contrast to the preproduction prototypes, were alarmingly variable in sound and had severe mid-range colorations. But their stereo performance left a lasting favorable impression that our experience with more-recent omnidirectional systems has done nothing to change. All of which made us immensely curious about Stew Hegeman's latest design.

The Hegeman 1 (the logic of that

The Noise Cone

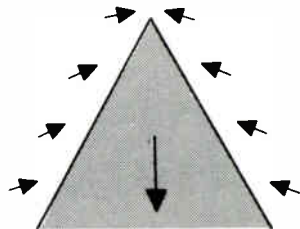
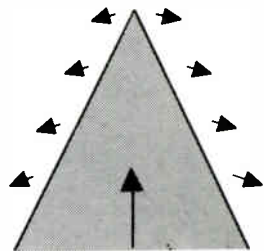
Although Hegeman no longer uses his "lily tweeter" in current designs, there are some other systems on the market now whose tweeters work in essentially the same manner, so it's worthwhile to examine just how these devices produce their 360-degree radiating pattern.

A conventional tweeter has its axis aimed forward, and the diaphragm movements push and pull the air in front of it. So how does a lily cone and its ilk manage to produce 360-degree air-pressure waves in a horizontal plane with its axis facing upwards?

Forget for a moment that the lily cone is vibrating, but think of it as the nose cone of an aircraft, moving forwards. The air around it is (relatively) stationary, so as the cone passes through it, the air is first "pierced" by the point of the cone, and is then displaced more and more to the sides as the tapered cone opens an increasingly large "hole" in the air. The result is an air-pressure wave travelling outwards at a right angle to the direction of the cone's movement.

Now, if the cone reverses direction and starts to withdraw, the displaced air moves inwards to fill the diminishing "hole," and a rarefaction wave is produced. Vibration of

the cone along its axis creates a series of compressions and rarefactions, radiating in all directions at a right angle to the axis of the



cone. Stand the cone on end, with its axis vertical, and you have perfectly omnidirectional radiation throughout the horizontal plane around the tweeter.

chronology escapes us) differs from the HF-S2 system in several respects. The woofer, still facing upwards, is now angled slightly forwards. The lily is gone, and in its place is a small upward-facing, forward-angled dome tweeter, with a hemispherical underside to reflect the woofer's sound waves outwards. And like the HF-S2, the Hegeman 1 has the rear surface of its cupola closed off with a solid panel so that the compartment is open on four surfaces only, but the loss of rear radiation does not seem to impair, and probably improves, the behaviour of the 360-degree radiators in the speaker (by suppressing delayed reflections from the room wall behind the systems).

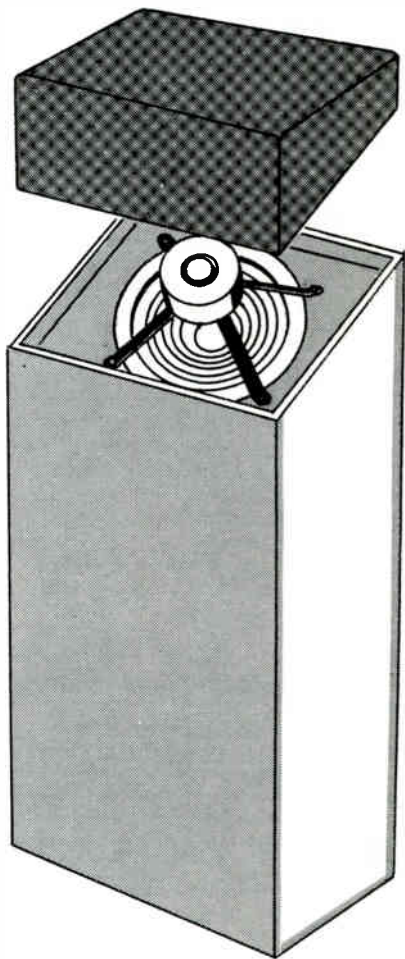
The only thing that distressed us initially when we read the manufacturer's literature for the Hegeman 1 was its description of the woofer-loading arrangement as a "multi-resonant system." We have heard such systems in the past, and the best thing we could say about them was that they did what they were claimed to do. They resonated, and the resonances were both multiple and painfully audible as smearing, hangover, and gross colorations.

We should have given Mr. Hegeman more credit. His multiresonances are all at low frequencies, where response irregularities are less noticeable than in the upper ranges, and they appear to be very well damped (just as it is possible to damp out the resonances in any other kind of speaker system). The result, to our surprise, was some of the deepest, tightest bass we've heard from any system of comparable size or price.

Sweeping an oscillator through the Hegeman 1's range revealed signs of its "multiresonant" bass loading, as a series of equally-spaced peaks and dips of rather substantial magnitude, very similar in fact to the low-end bumps encountered in most cassette recorders, but with broader humps and much narrower dips.

The bass range sounds considerably

smoother when reproducing music than when sweeping an oscillator slowly through the bottom range, for our ears tend to judge low-end response largely on the basis of the heights of the peaks, and narrow dips are



not noticed at all except on those very rare occasions when a bass note's frequency coincides exactly with that of a dip. The lowest-frequency hump occurred slightly above 30 Hz, and since this was only a few dB down in level from the output at

middle frequencies, the system (or a pair of them, at least) was able to maintain subjectively flat response down to about 50 Hz and usable response down to an astonishing 27 Hz!

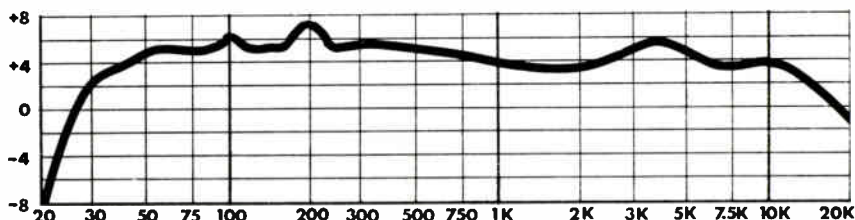
Our subjective response curve (below) reflects how a pair of Hegeman is sounded to us when reproducing program material (rather than oscillator sweeps). As shown, they were not entirely free from coloration. The over-all balance was generally good, although with a rather soft and somewhat distant-sounding quality. Highs were free from conspicuous peaks, but were judged to be somewhat rolled-off in comparison with the best high ends we've heard. The result was sweetness but a mild shortage of "snap."

Middle highs were somewhat accentuated, causing a touch of hardness which tended to exaggerate the differences between the relative hardness of different amplifiers and preamps. The presence range, on the other hand, was slightly depressed, which accounts for the system's distant perspective and its over-all quality of "richness."

Two mild peaks were observed in the low-end range, but neither was of sufficient magnitude to be of

means they sound thin in rooms which have trouble supporting low end. (Most compacts are thin in typical rooms and are even thinner in bass-shy rooms.)

When bottom-thinning does take place, it does so through the entire low-frequency range rather than just at the extreme bottom, so although the over-all balance is affected (and tweeter-level adjustment doesn't help -- the crossover is too high), the system's deep-bass response relative to the upper bass is virtually unaffected. Oddly though, what is more affected is the middle range, which develops a perceptible "aww" coloration. And since a certain proportion of recordings also have some of the same coloration, the net result is an apparent enhancement of the differences between the sound of different recordings. This quality of "selective fidelity," whereby a speaker seems to point up differences between recordings is often held up as evidence that the speaker is more "analytical" and is thus a more-accurate reproducer. Sometimes this is the case, but not always, because it can stem from tendencies on the part of the speaker to exaggerate certain aspects of the pro-



Subjective frequency response of the Hegeman 1 speakers when listening to program material. Oscillator sweeps revealed deep but narrow low-frequency dips.

significance except when, by coincidence, a standing wave in the room happened to occur at the same frequency. Unlike most small systems, though, the low-end range of the Hegemans is essentially linear in most locations in most rooms, which

gram material, and this is not an aspect of fidelity, but is rather a sign of imperfection in the speaker system.

We mentioned the tendency for the Hegemans to spotlight differences in the hardness of sound from differ-

ent amplifiers. Their low end, too, is moderately affected by the power amplifier characteristics, being a bit heavy and loose with moderate-powered amplifiers of moderate damping factor (like the Audio Research units), and slightly sparse and taut with high-powered high-DF amps like the Crown DC-300A. This suggests a way of coping with the effects of the listening room on the system's low end.

Efficiency was quite low -- estimated at around 1%, so the manufacturer's recommendation of 20 amplifier watts per channel minimum is no idle jest. A maximum rating of 25 per channel, though, is ridiculous. We would recommend 60/ch and a modicum of restraint in use, or a couple of hundred per and 1½-amp fast-acting fuses in the lines. Since it is however just a bit ridiculous to use a \$700 amplifier to drive a pair of \$114 speakers, we would recommend the Citation 12 as being the ideal driving amp for the Hegemans.

We were not surprised to note that the Hegeman 1's strongest asset was its tremendous sense of spaciousness. Like the original Hegeman system, you have the feeling of listening through the Hegeman 1 rather than to them, for which reason they are ideal speakers for use in small listening rooms or in difficult decor situations where it is impossible for one reason or another to sit farther than a few feet from the speakers. Like other omnidirectional systems, you can get full stereo spread even when listening from the left of the left-channel speaker (or vice versa). Because of their rather distant sound, though, they are likely to sound too remote if listened to from a distance of more than about 10 feet.

One thing we did however find the Hegemans to be ideal for was the rear channels of an ambient stereo system, which calls for just those qualities in which the Hegemans excel -- spaciousness, omnidirectionality, and a feeling of distance

rather than of immediacy. Because of their rather erratic impedance characteristics, though -- due to their multiresonant bass loading -- we recommend driving them from their own stereo amplifier (with an appropriate decoder) rather than via a Hafler-type "passive" decoder which connects the ambience speakers between the front-channel amplifier outputs.

We did most of our listening to the Hegemans as normal stereo speakers, and after having lived with them for several months, in different rooms and with a wide variety of program material, we would describe them as spacious, rich, and despite their minor irritations, easy to live with. But that breath of life was never there. Most musical instruments just didn't sound quite real to us, and we were always at least vaguely aware of listening to reproduced sound rather than to live music. (The Hegemans are in good company in this respect; we have observed the same shortcoming in some of the Class A Recommended speaker systems, which are listed because they are state-of-the-art components in some other respects.)

If we were shopping for speakers in this price class, we would probably choose the Dyna A-35s because, to our ears, they sound more alive than either the Hegemans or the large Advents, and they are more easily able to fill a moderate-sized room than either of those, with amplifiers of the power one would use with them. There are some nice things about the Hegemans, though -- their spaciousness and their remarkable ability to provide adequate center fill despite wide spacing -- and although they are not our cuppa tea, we have heard from too many satisfied Hegeman 1 owners for us to be able to dismiss these speakers out of hand. Our suggestion, then: Audition a pair of Hegeman 1s for yourself.

(No Manufacturer's Comment)

Audio Research SP-3 Preamp

MFR'S SPECS — TYPE: Vacuum-tube stereo preamplifier. **FREQUENCY RESPONSE:** 15 to 30,000 Hz, ± 1 dB. **DISTORTION (THD & HARMONIC):** .005% @ 5 V out. **MAX OUTPUT:** 25 V @ 1 kHz. **S/N RATIO:** 90 dB (Aux input). **DIMENSIONS:** 15-5/8 in. W x 5 H x 12-1/2 D. **PRICE:** \$595. **MFR:** Audio Research Corp., 2843 26th Ave. S., Minneapolis, Minn. 55406

We have been watching with fascination the announcements for what looks like a new breed of preamplifier (as typified by the Phase Linear), equipped with sophisticated circuitry for reducing noise and expanding dynamic range, and whose manufacturers make a point of the

Quite simply, it modifies the input signal less than any other preamp that is currently available (with the tone controls out, that is), and what change it does effect -- an extremely subtle softening of "hard" transients -- is of a kind that the ear finds much more agreeable than the typical solid-state hardness (which exaggerates the hardness of commercial recordings) or the typical vacuum-tube haziness.

We mentioned that there is some degradation of the sound passing through an SP-3. We should qualify that by stating that the unit is equipped with a tone-control bypass switch (actually, the controls are normally out of circuit; the switch puts them into operation), and that the sound is just a hair cleaner with the controls out. With them in, the difference between the sound com-

ARC's SP-3 preamp:
almost a straight
wire with gain.



fact that they are not straight-wires-with-gain. We are fascinated because we are just dying to see what these preamps can do with program material that is noisy and compressed. We are also curious to hear what they can do with program material that is quiet and uncompressed -- the kind, that is, which calls for a preamp that is a straight wire with gain.

Meanwhile, we will continue to be completely happy with the closest thing we have found to that ideal straight-wire-with-gain -- the ARC SP-3.

There is really little more that can be said about the SP-3's sound.

ing out of the SP-3 and the same sound fed direct to the power amplifier, bypassing the preamp, is so slight that, even with the very best associated equipment, it takes a sophisticated ear to detect any difference at all. And it is precisely that kind of an ear that will appreciate the superiority of the SP-3 over any other preamp.

Most perfectionists have noticed by now that the earliest stages in a system seem to be the most crucial as far as distortion is concerned. A very small amount of distortion which would be virtually undetectable in the latter stages of a power amplifier seems to add entire-

ly disproportionate amounts of hardness and edge to string tone and mis-tracking distortion when it originates in the preamp stages. We don't know just how low the distortion is in the SP-3's preamp (it was unmeasurable on our modest little Heath Audio Analyzer), but it sounds lower than in any other preamp we have ever heard, if cleanness and musical purity are any indication, which they are. There is less of the things which generally annoy us in phono reproduction, but virtually none of the dulling or softening that has characterized the sound of other preamps which don't exaggerate breakup or steeliness.

You may not like the sound of your system with the SP-3 in it, for you may want or your system may need some extra hardness to cover up the fact that your speakers have lousy transient response, and it's your God-given right to be wrong about such matters. But if you want the best-sounding preamplifier that money can buy, and have the money to buy it, the SP-3 is unquestionably it. (Two designers of new preamplifiers have told us recently that theirs sound "as good as the SP-3." Maybe they do, maybe they don't, but when the competition admits that a product is the standard by which they judge their own efforts, it says something for that product.)

Since the SP-3 uses tubes instead of transistors, there is of course the possibility of tube-type problems and the certainty, at some future time, of the need for tube replacements. Audiophiles who have owned only solid-state gear may be introduced to microphonics -- an other-worldly binging or boinging noise that a rare tube will inject into the system when the preamp is jarred. Since all the tubes in the SP-3 are identical (12AX7 types), it is a simple matter, when microphony is encountered, to locate the bad tube (by gently tapping each one in turn with the fingernail) and swap it for one of the others.

The old bugaboo of creeping distortion -- which sneaks insidiously up on you as the tubes start to wear out, and which transistors were supposed to eliminate (some of them do the same thing but for different reasons) -- is of course a consideration with the SP-3, but a small one. There will come a time when tubes will have to be replaced, and there are 8 of them in the SP-3. This should not be cause for alarm, though, for the tubes are operated at below-normal heater voltage and power dissipation, which means they will last several times longer than normal. ARC indicates that 5 years "under normal-use conditions of several hours per day" is not an unreasonable expectation, but we should add that the 12AX7s in our ancient Dyna PAM-1 preamp (operated under similar power-supply and use conditions) racked up nine years before starting to sound sour.

Since different tubes do sound a bit different, we would advise obtaining replacements from ARC, whatever the cost. Just remember, when the time comes, what you paid for the preamp to begin with, but if you're feeling cheap anyway, you can always order the tubes from Allied, Lafayette or Radio Shack. For example, Lafayette's 1973 catalog lists 12AX7/ECC83 tubes for \$1.40 each, or \$1.26 each in quantities of 6 to 24. That adds up to around \$10 for a set of new tubes, which is \$2 a year for 5 years, assuming they don't exceed that. Hardly an outrageous price for some of the best sound you've ever heard.

We mentioned the creeping distortion menace, though, and the question that a lot of prospective SP-3 buyers are going to raise is "If tube-decay distortion comes on so gradually, how will I know when it's time to replace the tubes?" Well, there are two ways of deciding. You can elect to be conservative, assume that five years is the life of the tubes, and replace all of them routinely on that basis. Or, you can

check them all periodically on one of those dinky tube testers that you see in supermarkets, drug stores, etc. If you're in doubt about the veracity of the readings, try the tester on a new 12AX7 out of its own stock bin. (Our warning about the use of tube testers, many issues ago, referred to the complex high-conductance multigrid types used mainly in tuners and TV receivers.)

Inevitably, there are some things to criticize. Here they are:

There are two pushbutton-operated Tape Monitor switches for selecting either of two recorders, but it is not possible to switch one recorder's output into the other's input (for copying) without modification of the preamp. This will be done free by ARC on special order, but some other preamps have that provision as a standard feature.

There are two unswitched AC outlets at the rear and four switched ones. The only things in a typical installation that should be switched on and off with the preamp are the power amps, so why not two switched and four unswitched outlets?

There are separate AC power switches for the preamp and for the switched outlets, presumably to prevent switch-on thumps from other components from getting through to the speakers. But only solid-state components have switch-on thumps, and if these are ahead of the preamp in the circuit, the preamp's slow tube warmup would prevent them from getting through anyway. If the power amp thumps, it will do it regardless of when it is switched on, so the extra switch serves no purpose there either. So why the separate switches?

Oh well, it's still a hell of a good preamp. In fact, after having lived with one for several months, it has occurred to us that we just can't do without it. We can't afford it, but we can less afford to be without it.

(Manufacturer's Comment Next Issue.)

Audio Research Magneplanar Speakers (A Progress Report)

Originally scheduled as a follow-up report on the Tympany IA system, which had superseded the original Tympany I just before our last-issue deadline, this will have to be more of an interim, or progress, report than a follow-up, for it seems the Magneplanars are still evolving.

Our sample IAs -- among the first of them -- were clearly superior to the last of the Is in bass and treble range, but had a somewhat sparse, dry sound and what struck us as an inordinately hard quality in the upper middle range (around 5 kHz?). The system was in fact intolerable to listen to from a single amplifier, and had to be biamplified (to the tune of another \$1600) in order to sound as good as a \$90 Dyna A-25.

When biamplified (to allow the tweeter level to be cut back a bit), the sound had what we considered to be great promise in a number of respects (it still has better inner detail than anything we've heard), but the hardness was still there although at reduced level. The sound was absolutely dreadful from any solid-state amplifier we tried -- harsh and gritty -- and even with ARC's own Dual 75, there was an irritating brittleness which was for some reason reduced by driving the tweeters from the Dual 75's 4-ohm taps but was not eliminated. It could on occasion give you goose bumps, though (which the Tympany I rarely did), although it still did not sound real to us, no matter what program material we fed to it. Big and detailed, yes. Realistic, no.

Now we are getting the impression, from some dealers, that later IAs sound different from the ones we have -- less tweeter efficiency and a shade less hardness, but with less transient "snap," too. So we will reserve judgement on the IAs until

things stabilize to the point where the ones we report on will still be current by publication time.

More recently, we have had an opportunity to audition the new Tympany III system in a dealer's showroom, and were rather more impressed. The system is huge, with three separate screens -- one for bass, two for the upper ranges -- covering enough wall space to completely close off one end of a good-sized living room, windows and all. It has provision for triamplifying, at stupendous cost (\$3000 for amplifiers alone), but fortunately, it will work very nearly as well with one stereo amp driving the woofers and another driving the middle-range speakers and tweeters. Even with two amps, it is quite a lot better than the early Tympany IAs. Bass sounded flat to around 40 Hz, but still with the Magneplanar's remarkable definition and tautness. The system had much of the warmth and fatness that the IA was lacking, but there was still a hint of that hard quality. And as before, it was minimized by using the Dual 75's 4-ohm taps.

The III was much more alive and realistic-sounding than any of the previous models, but while the extreme highs were very smooth and extended, they still sounded a bit soft, and still not quite as focused as we have heard from some considerably-less-expensive speakers. But then, that too was an early sample III, we were told. So, we shall wait and see what, if anything, develops. And that, dear reader, is also our advice to you.

(No Manufacturer's Comment)

Ad Quote

"The S N ratio of more than 5 dB ensures interference-free and clearer sound." -- From a blurb sheet for Maxell Ultra-Dynamic cassettes.

A dolby would help, but not much.

Quickies

RTR ESR-6 Electrostatic Tweeter

Most Stereophile readers know by now that we have a weakness for electrostatic tweeters, but we have never denied that, along with their unequalled transient response, they have a tendency toward spitty high end and can often throw normally-stable amplifiers into hysterics.

Well, we may have found the ultimate electrostatic tweeter. It's the RTR Model ESR-6, which sells for \$149. We heard a pair of them but briefly, filling in the extreme high end of another system (from 10 kHz up) that had excellent but not perfect high-end range. The result was the most natural reproduction of extreme highs we have ever heard, from any system.

A pair of them are on their way to us now for a full report, at which time we'll be able to try them over their entire range (down to 1200 Hz) for detailed analysis in a future issue. We can however report now that, above 10 kHz (assisting otherwise-superb systems like the Magneplanars or IMFs), they do everything an electrostatic should and none of the things it shouldn't.

More about the ESR-6 at a later date.

Fulton Model 80 Speaker System

The bottom-of-the-line speaker from a new company, this little box -- slightly smaller than a Dyna A-25 -- must be heard to be believed.

There's no deep bass of course, although what there is is remarkably tight and clean, and the system will take some low-bass boost without stress. But it's the rest of the range that's hard to accept, for this is one of the most musically natural and realistic-sounding systems we have ever heard, regardless of price. And the 80 costs \$79.95!

It's designed for driving from a tube amplifier, and does exceedingly well with a Dyna Stereo 70. But it

Recommended Components →

These are listings of components which we feel to be the best available in each of four quality categories, based upon all the information available to us at the time of publication.

Components are selected for listing on the basis of our own tests as well as reports in other magazines and from users.

Component evaluations which lead to inclusion in or exclusion from this list are biased to an extent by our feeling that things added to reproduced sound -- flutter, distortion, various forms of coloration -- are of more concern to the musically-oriented listener than things subtracted from the sound, such as a certain amount of deep-bass or extreme-treble range. On the other hand, components which are markedly deficient in one or more respects are down-rated accordingly to the extent to which we feel their deficiencies interfere with the full realization of the program material that is likely to be fed to them.

Some of the items listed have been discontinued by their manufacturers. They are listed because they are still better than any comparable ones of current manufacture that we have found, and are frequently available, used, at substantial price reductions.

Component categories are as follows:

Class A: Price-no-object, best possible sound in at least one respect, excellent sound in all other respects. Class B: Sound not quite comparable to Class A, but lower cost. Loudspeakers in this class span a wide price range and offer a wide selection of "flavors." Class C: Somewhat lower-fi sound but far better than average home hi-fi. Class D: Good, musical sound but significantly lower fidelity than the best available.

The order in which components are listed within each category has nothing whatsoever to do with the relative fidelity of items in that category, but components which are judged to belong at the bottom of one category and at the top of a lower category are listed in both groups.

Some components have no listing in the D Group. This is because we have yet to find one that is that much better than the competition in all (or even most) respects to warrant singling out.

The following changes have been made in the listings since the last issue:

- Ortofon M-15E Super pickup supersedes Stanton 681A in Group B.
- Stanton 681A supersedes 681EE in Group C.
- Long-discontinued B&O mikes dropped from list.
- Harman-Kardon Citation 14 tuner added to Group B.
- FMI 80 speaker system added to Group B.
- RTR ESR-6 electrostatic tweeter added to Group A.

Pickups

- (A) Decca Mark V, Shure V-15-III
- (B) Decca 4RC (1), Ortofon M-15E Super
- (C) Stanton 681A, Decca Mark II (1, 2, 3, 4)

Tone Arms

- (A) Rabco SL-8E, Decca International, Shure/SME 3009 Improved or 3009/S2 Improved
- (B) Shure/SME 3009
- (C) ADC

Turntables

- (A) Thorens TD-125B, Panasonic SP-10, Sony TTS-3000
- (B) Thorens TD-150, Dual 1229 changer
- (C) Acoustic Research TA or XA player, Dual 1019 changer
- (D) Bogen B-52 player

Tape Recorders

- (A) Revox A-77
- (B) Sony TC-650
- (C) Sony 353D, Harman-Kardon 1000, Sony 155 (play only), Advent 201
- (D) Sony 252D, Sony TC-160

Microphones

- (A) Sony C-500
- (B) Sony C-37P, Neumann U-87
- (C) PML DC-20 or 21
- (D) Beyer M-260

Tuners

- (A) Marantz 10B
- (B) Dynaco FM-5, Heath AJ-15, Citation 14
- (C) Dynaco FM-3, Quad
- (D) EICO 3300, Heath AJ-14

Preamps

- (A) Audio Research SP-3
- (B) Citation 11, Crown IC-150
- (C) Sony TA-2000, Dynaco PAT-4, Dynaco PAS-3x

Amplifiers

- (A) Audio Research Dual 75 and 51, SAE Mk IIA, Crown DC-300A
- (B) Quad 303, Crown D-150, Citation 12

- (C) Dynaco Stereo 120, Stereo 80, SCA-80 (4), Stereo 70

Receivers

- (B) Heath AR-1500
- (C) Heath AR-15

Headphones

- (A) Koss E-9, Stax SR-3
- (B) Koss PRO-4aa, Beyer DT-48S w/round cushions
- (C) Sharpe Mk II, Beyer DT-480
- (D) Beyer DT-90

Speaker Systems

- (A) Audio Research Magneplanar Tympani 1A, KIH Nine (4 panels), Infinity SS-1, Hartley Concertmaster, EPI 1000 "Tower," RTR ESR-6 electrostatic tweeter
- (B) Larger Advent (no model number), Janszen Z-600, Infinity 2000A, KIH Nine (two panels), Hartley 220MS/Holton, Quad, IMF Studio III, FMI 80
- (C) Dynaco A-10, A-25, A-35, larger Advent, Hegeman H-1
- (D) Dynaco A-10

Miscellaneous Devices

- (A) Soundcraftsmen 20-12 or SAE Mark Seven equalizer, Gately ProKit SM-6A input mixer
- (B) Sony MX-12 mixer, Advent 100A Dolby device
- (C) Advent 101 Dolby device

Footnotes: (1) Imperfect hum shielding. (2) Strong magnetic attraction to ferrous platters. (3) Usable only with SME or Ortofon arms, with suitable adapter. (4) Integrated preamp-amplifier.

is at its best, audibly, with an Audio Research Dual 75, which sounds like an utterly absurd pairing until you hear it. If you want a real shock, try comparing that combination with an ARC Magneplanar with a single Dual 75 driving it.

Fulton makes their own power amp, for which the Model 80 was probably designed, but we hadn't auditioned it as of this writing. We will do so in time for a report of some kind in our next issue.

Since nobody has heard of Fulton Musical Industries as yet, the address is 4428 Zane Ave. N., Minneapolis, Minn. 55422.

The Three Top Pickups

The detailed comparative report on the three top pickups -- the Ortofon (not "phon," as a lot of people insist on spelling it) M-15 Super, the Shure V-15-III and the Decca Mk V -- originally scheduled for this issue, got completely out of hand to the tune of 11 pages, and had to be bumped for lack of space. It will appear in the next issue. Meanwhile, here is a summary of our findings:

Not surprisingly, none of the three was found to be The Ultimate Pickup. The Shure V-15-III was judged to have a subtly wiry high end, but average production of the pickup was felt to produce the best sound of the three.

The Decca Mark V's strongest asset is its remarkably "alive" sound, which can unfortunately become an irritatingly glassy quality if the associated equipment tends that way and/or the sample you get isn't as good as it could be.

Randomly-chosen Decca Mark Vs vary too much in sound even to consider, pre-tested ones (as supplied by some US importers) are generally good to excellent, and a rare sample is superb -- preferable in overall sound, we feel, to a V-15-III.

The Ortofon M-15E Super's tracking ability was judged to be about equal to that of the Shure, but its

sound was somewhat darker and softer, an ideal complement for the hardness of solid-state electronics, but sounding rather veiled when combined with the high-end character of good tube-type equipment.

Details in the next issue, for sure!

Crown DC-300A Power Amp

Our second Crown DC-300A arrived to replace the one we had that we suspected may have been defective. A quick comparison revealed that the second one did sound a shade more lucid than the first, but specific comparisons between the new one and the other top-of-the-pile power amplifiers will have to wait until our next round of equipment testing, after this issue goes to press.

IMF Monitor III Speaker System

Big, gutsy sound with a rich but rather soft high end and a subtle "aww" coloration in the middle range. The extreme low end is astoundingly deep and very tight but the over-all sound is a bit on the heavy side, and although judicious room placement can control the heaviness in some rooms, the speakers are less sensitive to room placement than most, and are thus best used in rooms that don't have runaway-bass problems to begin with.

Although too sodden and dull in sound when driven by a Dual 75 (or by any other good tube amplifier), the Monitors are at their best with high-powered high-damping-factor amplifiers like the Crown DC-300A and slightly "hot" pickups like the Shure V-15-III. With that specific combination (and an Audio Research SP-3 preamp), the Monitors were what we would describe as awesomely dramatic-sounding systems, but rather like recent London recordings: Luscious, but a little too rich to be convincingly real.

Stereo imaging, spaciousness and depth (perspective) were judged to be excellent, and with adequate amplifier power, a pair of Monitors

were easily able to produce 100-dB listening levels in a fairly large room with no trace of audible strain.

With the right associated equipment, this is probably the best cabinet-type speaker system available, but its slightly over-ripe quality may not appeal to all listeners. We liked it, with the full realization that we probably shouldn't, for there are others, costing less money, which are in many respects more natural reproducers than these.

(Manufacturer's Comment on Page 25)

Gately SM-6A Mixer

Sometimes we wonder why we bother to compile "Recommended Components" lists. We have one microphone mixer listed in "Group A." Yet our mail in the past two months has brought us several letters from readers asking what's the best mike mixer for the serious amateur (or professional) recordist. Our answer is: The Gately Prokit SM-6A, which goes for \$339 as a kit or \$539 ready-built. If your corner drug store doesn't carry it, write to Gately Electronics, 57 West Hillcrest, Havertown, Pa. 19083.

Stax SRD-7 Electrostatic Phones

Whoever said high fidelity in two channels had gone about as far as it could go obviously didn't envision anything like these headphones.

Our impression, after a fairly brief listen, was that they are the most perfect reproducers we have ever heard, bar none. Forget about what headphone listening does to directionality, forget about the petty annoyance of listening with an umbilical cord connecting your head to the system, forget about the fact that these phones provide virtually no exclusion of outside sounds (a virtue for some applications, a liability for others like on-location recording). There is just no describing the sound of these except in terms of the original. But for \$250, they should be good.

We'll have a full report on these in a future issue.

Record Reviews

As of this issue, William Marsh comes to the Stereophile as music editor with an extensive musical background, a vast knowledge of recorded music, and a pretty respectable stereo system. A chemist by profession (like Borodin), Marsh's musical training and active participation in musical organizations spans nearly 3 decades. He has served as accompanist for many choral groups and singers and has on occasion been a church organist. Recently he has been singing with the Mendelssohn Club of Philadelphia and the men's and boy's choir of St. Marks church, Philadelphia. He is a member of the American Guild of Organists, as well as of several recording societies.

His special musical interests include the organ, church music of all periods, and 19th and 20th-century British composers. In pursuit of the latter interest, he has travelled twice in the last two years to England, and plans to report on the music and record scene in Great Britain for a future issue.

His musical credentials are impressive, but since you don't know Bill from Adam as a judge of recorded sound, your confidence in that department can only be built over a period of time, by trying some of the discs he recommends and seeing how they measure up to your own standards of quality.

If you don't like how he's going about things, write to him at our usual address and tell him what he's doing wrong. We may disagree with your suggestion, but we can't give you the kinds of information you want unless you tell us what you want.

Many of the recordings Mr. Marsh will be reviewing are available only

in Europe, where the level of recording quality is generally far superior to what is available in the US.

If you are interested in obtaining any of these, we might point out that an advertiser in this issue (On page 34) specializes in mail-order record service from England. Ye Ed.

NOEHRN PLAYS BACH. Prelude & Fugue in D Minor (BWV#539), Prelude & Fugue in E Minor "Cathedral" (#533), Chorale Prelude "Christ lag in Todesbanden" (#695), Fantasie & Fugue in G Minor "The Great" (#542), Toccata & Fugue in D Minor (\$565). Robert Noehren at the Noehren organ at St. John's Cathedral, Milwaukee. Dimension Stereo DC-1. (Dimension Recording, Inc., 711 W. Capitol Dr., Milwaukee, Wis. 53206, \$5.98.)

Another organ record? Yes, and perhaps the best recording ever made of an organ. That's some statement, but this obscure disc rates it.

Noehren is a consummate artist who plays these familiar works with great style. The Noehren organ, built along the principles of Arp Schnitger (17th century, North-German school), 17th-century French builders, and Cavaille-Coll (19th-century French), is a magnificent instrument that has been recorded here from fairly close-up but with some hall ambience. Only the 32' bombarde sounds a little rough, but that's mostly due to the voicing of this stop. Surfaces on my copy were immaculate, and there was virtually no inner-groove distortion. Try to obtain this one and enjoy the ubiquitous T&F in D Minor (Yes, it's that war horse!) all over again. The G Minor fugue is particularly stunning here also. W.M.

PIANO MUSIC BY GEORGE GERSHWIN. Wm. Bolcom, piano. Nonesuch H-71284.

More Americana from Nonesuch. On paper, this collection looks appeal-

ing, particularly since virtually none of this piano music is available elsewhere, and Nonesuch has captured the Baldwin Grand's sound very well. But Bolcom has an ice-pick touch that seems to work against some of the Gershwin in much the same way as it does against his Joplin (Nonesuch H-71257). Joshua Rifkin might have presented this music more effectively. Furthermore, a whole side of the complete 1932 Song Book, minus any improvised verses to these famous choruses, is a little bit dull. It is good to have the Three Preludes (1936) recorded, though; they are Gershwin's only "serious" solo-piano pieces.

Perhaps the most surprising piece here is the early (1916) "Rialto Ripples." Now I know where the old Ernie Kovacs theme song "Oriental Blues" came from. W.M.

HANDEL: Cantata No. 46, "Lucrezia Cantata No. 22, "Tu fedel, tu costante?"; Cantata No. 10, "Crudel tiranno, Amor." Emilia Petrescu, soprano; Kurt Mild, harpsichord; Elena Botez, cello; Micea Opreano & Avy Abramorici, violins; Jeanine Costecu, viola. Musical Heritage Society MHS-1358.

A five-star recording! Emilia Petrescu's name certainly isn't well known, yet she is the voice-of-the-year on discs as far as I'm concerned. This soprano has a big, dramatic voice with no wobble or heavy vibrato, and it moves with uncanny accuracy and cleanness through some of the most cruelly rapid passages Handel ever inflicted on the human voice. "Lucrezia" isn't done very often simply because most sopranos can't handle it! Janet Baker's forthcoming version for Angel should provide interesting comparison. If the incredible texts of these Italian cantatas normally turn you off, forget your prejudice this time and listen to sheer vocal ambrosia. Kurt Mild's harpsichord playing is outstanding, too.

The Cantatas 22 and 10 are not quite as spectacular as 46, but again we hear Petrescu produce one beautiful phrase after another. The chamber ensemble provides adequate support, but their sound isn't the most ravishing around.

This disc on MHS derives from the Baerenreiter-Musicaphon catalog. Let's hope there are more Petrescu gems to be issued, and let's have some decent biographical notes on her. One annoying minus: There are no band separations between cantatas. Full texts and translations are on the sleeve. W.M.

RACHMANINOV Symphonic Dances, Vocalise. Dallas Symphony, Johanos. Turnabout TV-34145S.

Not a new recording, and one that has already received raves in all the other audiophile publications, but if Stereophile is the only such magazine you read, you'd just better know about it, for this is the definitive symphonic recording to date.

Buy it, listen to it, and get a good idea of what the other record companies have been doing to the sound of live music. The performance is a bit blah and imprecise, but in a case like this, musical values will have to take a back seat to sound. And what sound! J.G.H.

ROCHBERG: String Quartet No. 3 (1972). The Concord String Quartet. Nonesuch H-71283.

Don't let the name Rochberg frighten you! His last serial work was a 1963 trio, and now we have a style that is basically tonal but containing elements of atonality. Somehow this adds up to a listenable amalgamation, as witness the 3rd Quartet.

The composer's extensive liner notes are required reading as a preliminary to hearing this piece, but it is certainly one of the century's major contributions in this genre. The Concord string quartet play well together on a set of modern Italian

instruments, and Nonesuch has provided vivid, close-up recording that could in fact stand a little more breathing space.

An important disc.

W.M.

VIVALDI: The Four Seasons, Op. 8, Nos. 1 to 4. Academy of St. Martin-in-the-Fields; Alan Loveday, violin; Simon Preston, organ and harpsichord; Neville Marriner, director. Argo ZRG-654.

Inspired playing, superb recorded sound and a decent pressing (my sample, anyway) all add up to a truly superior record. My first hearing of this performance left me with the impression that it is the definitive one on records, and while I haven't heard all of the available versions, my feeling is "Why look further?"

Recently I heard the same forces (with George Malcolm in place of Simon Preston) play the entire piece in the London church that gave this ensemble its name. What a tremendous concert! Fortunately for the record buyer, the vitality of the Academy's live performance is reflected in the recorded one. The precision of attacks, intonation and style are without parallel in the concert world today, and there is none of that boring, squeaky, dry-as-dust playing that is supposed to be "authentic." This playing is the real thing!

There are so many plusses for this disc that it is hard to single out any one. I did enjoy hearing the particularly fine col legno bowing in those sections that call for it.

Alan Loveday is a joy; he has obviously lived with the music a long time, and brings his experience to a performance that should stay with us for some time. My only regret on listening to the record is that I can't see Alan smiling at the harpsichordist as he plays a particularly felicitous passage. The Vivaldi-attributed poems are included as an insert. W.M.

The BAFFLE BOARD

Because of time limitations, we are unable to answer readers' questions on an individual basis except through our Personal Consulting Service. Questions of general interest, though, are answered in this department.

Poly-Magne

The name of Audio Research's new speaker system sounds vaguely familiar to me. Could the "Magneplanars" be made by the same firm that makes those hideous-sounding little foam-plastic things for use in automobile doors?

Neville Howard
Bronxville, N.Y.

They could, we suppose, but they aren't. The speakers you are thinking of are called "Polyplanar" speakers, and while you may (justifiably) scoff at their hideous sound, you may also spend the rest of your life looking for other speakers that will fit as shallow a "baffle" as will these.

Where's Mac?

Why don't you ever test any Mac-Intosh components? Mac is one of the oldest firms in the business, their equipment has an admirable record for dependability, and the manufacturer is second to none in providing prompt and efficient service when something does go wrong.

R. E. Rudel
Hamilton, Oh.

If the criteria you mentioned were the only ones, Mac components would be on the top of our list. As a matter of fact, one of their tuners was on the list until it was discontinued some years ago. But we have yet

to hear a Mac amp or preamp whose sound we felt to be comparable to that of some other units costing considerably less, and as far as we're concerned, if a component's sound isn't all that good when it is working right, who cares how long it will continue to work right?

Receiver Reports

While you people are sitting with your finger up your chimney, oohing and ahing at this new preamp and that new power amplifier, the audio industry is passing you by. Don't you ever read the equipment catalogs? Don't you know that 90 per cent of all hi-fi electronics that are being sold these days are receivers? If you do know that, why don't you ever acknowledge that they exist? Let's have some receiver reports.

Carroll Preston
Bronx, N. Y.

We don't really like receivers, for some reasons we can explain and a couple we cannot. To begin with, there is something about the whole receiver mystique that turns us off -- the preoccupation with gimmicks, gadgets, features, styling, everything in fact except sound. Along with this goes the basic assumption that the receiver is for people who can't be bothered -- to make decisions about separate components, to find the space for separates, to persuade the spouse that good sound may require giving up some shelf space that might have displayed that collection of souvenir ash trays from the Bahamas.

Then there is the very real problem of qualitative inertia, in which the audiophile who finds that his

aural perspicacity is outgrowing his fi is unable to upgrade the system bit by bit because the whole damned thing is rolled up into a single \$400 bit.

Finally, there is the simple fact that, at the present time, no one manufacturer is able to design the best tuner, the best preamp and the best power amplifier. And if one did, the resulting receiver would probably sell for around \$4000. Not really an impossible price for some perfectionists to pay, 'tis true, but certainly a price they would rather pay at the rate of one component at a time.

We list two receivers in our "Recommended Components" section because they're really very good units despite what we just said. They may just be the best receivers available. But no part of them is as good as can be bought separately.

Discriminating Speakers

Why is it that some loudspeaker systems which sound marvellous when reproducing from tape sound so horribly distorted when reproducing discs? I have noticed this particularly with Klipschorn systems and some of the big JBL's. As a matter of fact, Paul Klipsch himself advises against the use of discs, presumably for just this reason.

A. K. Mason
State College, Pa.

Generally, this acute "discrimination" on the part of loudspeakers is due to the presence of severe high-frequency peaks in their tweeters, which exaggerate certain kinds of program distortion which are not generally present in tapes.

Tape distortion is mainly in the form of spurious harmonics or sum-and-difference signals which, although audible (mainly as a "haze" or a slight hardening of the sound), are not overly offensive to the ear unless they occur in very large quantities.

Disc-tracking distortion, on the

other hand, is comprised mainly of sharp impulses, caused when the mis-tracking stylus rattles back and forth between the groove walls. Most of this energy occurs at high frequencies, and any high-frequency peaks in the speaker system (or in the pickup) will tend to exaggerate them. Since they are not harmonically related to the signal (as are most tape distortion products), they tend to be more offensive to the ear, so anything which exaggerates them will tend to widen the "quality gap" between tape sound and disc sound.

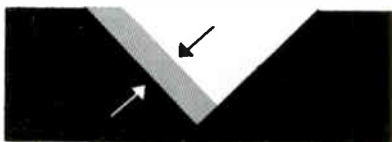
Note also that very small amounts of electronic distortion in a system — amounts which are generally thought to be "negligible" — can further aggravate the annoyance value of disc distortion, by spreading the initially-high-frequency impulses down through the lower (and more readily-audible) parts of the audio spectrum.

Stereo Groove Modulations

Perhaps you can settle an argument I've been having with some friends. The question in point is: which side of a stereo groove carries the Left channel and which the Right?

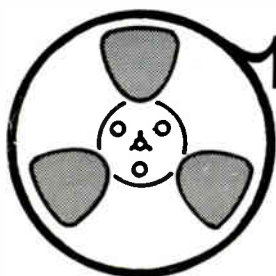
C. Schmidt
Denver, Colo.

As you look at the groove end-on, facing the business-end of the arm, Left-channel modulations are represented by undulations of the left



Left-channel modulations.

groove wall, and Right-channel modulations as undulations of the right groove wall. That shouldn't be too difficult to remember, now should it?



A-to-Z Recorder Setup

(Part 2A)

After having adjusted the recorder's playback circuits to conform to the prevailing standards for output level and equalization, it is necessary to adjust the record circuits so that the recordings you make will reproduce properly via the standard playback conditions. Unlike the playback adjustments, though, which can be set and then forgotten, the recording adjustments will be different for each brand and type of tape that you use, and it is more than likely that only one combination of adjustments will suit a particular recording tape.

Here's why: Different tapes differ in ease of magnetization, oxide-coating thickness and surface smoothness, and all of these things affect the amount of bias current, the signal level (for a given VU-meter reading) and the high-frequency preemphasis required to produce a tape that will play back optimally with the standard play characteristics.

RECORD SETUP

For record-circuit setup, you'll need an audio oscillator that provides, at the least, a mid-range signal of 400 to 1000 Hz and a 10,000-Hz signal, preferably at identical output levels. And if it will produce 8 kHz and 15 kHz too, so much the better.

You'll also need an audio VTVM capable of reading down to 0.1 volt full-scale, as well as a Y adaptor or a short (4-inch) jumper wire with crocodile clips at both ends. You

may also need to use the standard alignment tape that you used for playback setup.

It is assumed from this point that you have either completed the playback setup of your machine or are satisfied with its present state of adjustment. It is also assumed that you know exactly where each adjustment is located, and have already disassembled the recorder as much as necessary to make the adjustments accessible.

First, degauss all heads and tape guides if you haven't already just done so. Then connect the oscillator to the Channel A Line input and the VTVM to the Channel A Output.

Azimuth Adjustment

This needs to be done only once in the life of a typical recorder (or in the event that the head is replaced, which is a major operation), and may not be necessary at all, for most manufacturers do an adequate job of it at the factory. If you trust the factory adjustment, or if you have previously aligned your record head, skip this step and go on to Section 7. If you have aligned your play head but not the separate record head, here's how:

6. Set the oscillator to 10 kHz (or, if available, to 15 kHz for a tape speed of $7\frac{1}{2}$ ips or more) and adjust the record level to read -15 dB on the VU meter. Set the recorder's AB switch to monitor the signal from the tape, start the machine recording, and adjust the VTVM and/or the

playback volume control (Not the screwdriver adjustment for playback level) for a reading about center-scale, and diddle the record-head azimuth screw for a maximum reading on the VTVM. That's the coarse adjustment. The fine adjustment will come later.

In the event that your VU meter has no dB calibrations, the -15-dB level (and others called for later) can be determined in either of two ways:

The most accurate way is to play the Zero-VU tone of a standard test tape, set the VTVM for a reading near mid-scale between 0.5 and 1 volt, and make a note of the reading on its dB scale. If the recorder's playback level is not changed thereafter, you can use as Zero dB that recording level which produces that VTVM reading on playback. And -15 dB would be 15 dB below that.

The second way, which is accurate enough for most purposes, is to feed 1 kHz into the recorder from the oscillator, adjust for Normal Maximum on the VU meter (the left-hand edge of the red area), note the resulting reading on the VTVM, and use that reading as the Zero point. A level of -15 dB would then be 15 dB below that.

Bias Adjustment

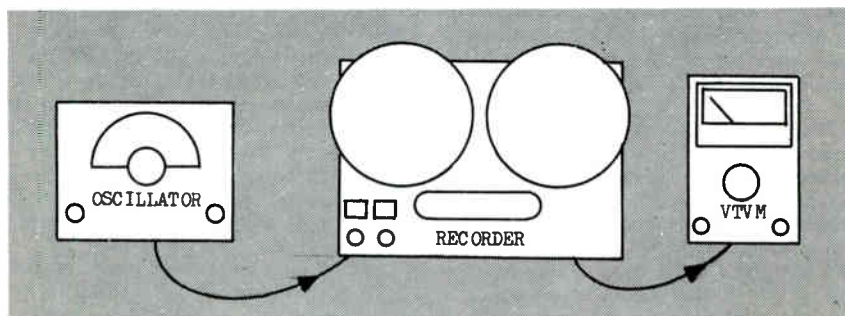
This adjustment, and the others which follow, should be made every time you change from one kind of re-

cording tape to another, or whenever you notice rising or falling high-end response from recently-made recordings.

The ultrasonic bias current passing through the record head determines the efficiency with which the tape converts audio signals into magnetic patterns, and since the amount of bias needed to do this varies from one kind of tape to another, the only way to set the bias is by observing its effect on the playback from the tape. Tape-output level can be observed while recording if the machine has a separate play head. If yours uses a single head for play and record, skip to section 8. If it has a separate play head with off-the-tape monitoring facilities, proceed as follows:

7. First, make sure the tape-selector switch is set for the kind of tape you are adjusting for, and that you have exposed and identified the proper adjustment screw. If you are adjusting for chromium dioxide tape, these bias adjustments may affect those for the other settings of the tape selector, so check the operation of the other positions afterwards if you plan to use other tapes too.

Feed a 10,000-Hz signal to the recorder and set the record level to -15 VU for a speed of $7\frac{1}{2}$ ips or higher, or to -20 VU for lower speeds. (A cassette is 1-7/8 ips.)



Test equipment connections for setup of record circuits.

Start recording, switch to monitor the Tape output, and obtain a mid-scale reading on the VTVM. Now, turn the bias-adjust screw very slightly clockwise and note whether the reading on the VTVM goes up or down. If it goes up, make a mental note that clockwise rotation decreases bias current. Make this rotation check before adjusting any bias screw, for in some recorders some screws work the way you would expect -- increasing bias with clockwise rotation, like a volume control -- while others work backwards. It is essential for bias setting that you know which ones are which. A pencil mark next to each screw -- + for normal, - for backwards -- will simplify bias setting in future.

Now, switch the oscillator to 1000 Hz, raise the record level to Zero VU, readjust the VTVM for a suitable reading, and adjust the bias for maximum output from the tape. If necessary, reset the VTVM for a reading near the right-hand end of the scale, take a very careful note of that reading, and then very slowly increase the bias current until the measured output from the tape drops by exactly $1/2$ dB for an open-reel recorder or $1/4$ dB for a cassette recorder. No more, no less.

As a double-check, load on another sample of the same kind of tape and re-check the output level. If it is not exactly the same as before, try some other samples and, if you find they all differ, choose another brand of tape. Now go on to Section 9.

8. Bias adjustment of two-headed recorders is a deadly bore, because you must make the adjustment, record a segment of tape, rewind it, and play it back to observe the effect of the adjustment. Unfortunately, it must be done if the recorder is to work at its best (unless it is one of those rare machines whose manufacturer set it up properly for a specific tape and listed the tape in

the instruction manual). Here, though, is the procedure:

Feed 400 or 1000 Hz to the recorder from the oscillator, adjust the record level for Zero VU, set the digital counter (if any) to 000, and record a 15-second segment of tape. Rewind to the start of that segment, play it back, and note the reading on the VTVM. Adjust this to the upper part of its scale if necessary. Reset the counter to 000, adjust the bias very slightly in one direction, and repeat the procedure, noting the VTVM reading on playback again. Continue this dreary business until you obtain the highest possible reading from the VTVM on playback.

9. If there is a tape selector switch, set this for any other kind of tape you may wish to use and repeat the biasing steps, starting with Section 7.

Record Level

This step involves adjusting the signal level going to the tape so that the volume remains the same whether you are listening to the input signal or the playback from the tape. It is necessary to match these levels for proper functioning of an Input/Tape AB switch or of a Dolby unit, but two-headed recorders without a built-in Dolby often have no such adjustment. If yours hasn't, skip to section 11. If it has, here's how to set it:

10. For a recorder with a separate play head, record a 400 or 1000 Hz signal from the oscillator at a VU-meter reading of Zero dB, set the recorder's AB switch to monitor Input, and observe the VTVM reading. Then switch to monitor the Tape and adjust the appropriate Record Level or Record Calibrate screw for the same VTVM reading.

For a two-headed recorder, record a 15-second segment of Zero-VU 400 or 1000-Hz signal as before, observing the VTVM reading. Rewind and play it back, observing the VTVM

reading again. Adjust the appropriate Record Level or Record Calibrate screw until the VTVM readings are the same when recording or playing back.

(Part B of Part 2 of this article will appear in the next issue.)

Manufacturers' Comments On Equipment Reports In This Issue

Revox A-77

On return of the sample A-77-III Dolby that *Stereophile* tested, we checked the low-end response with a 1/4-track STL alignment tape and found a 1½-dB rise at 40 Hz -- well within our published specifications. A 4-track non-Dolby machine and a 2-track Dolby machine checked at the same time showed a similar response.

With regard to pricing, in the high-fidelity industry it is unusual for a piece of equipment to be in production for long enough for price increases to become apparent. The Revox A-77, because of its superior design, has been in production for some five years without its performance

being surpassed. During this time, costs of raw materials have risen world-wide, production costs have increased, improvements in components and materials have been incorporated into the A-77, and the dollar has suffered an unusually severe decline in purchasing power. To put it simply, quality, like gold, has retained its intrinsic value. The dollar unfortunately has not.

The value-for-money of the A-77 is still extremely good though, and this is reinforced by your comments about the original A-77 and the A-77-Dolby B: "For sheer fidelity of recording, we doubt that it is beatable at the present state of the art."

IMF Monitor

We agree completely with most of your listening observations. The Monitor was originally designed as a lab reference speaker, and on modern discs will often sound as you described. We would suggest that our Studio III, whose predecessor you did like very much, and our new ALS-40A, will sound more balanced on the vast majority of modern discs, and we would recommend them more highly for disc playback in the home.



The First 12 Issues

Reprinted in their original format (typeset, on 8½-by-11 glossy pages) and bound into a single 228-page soft-cover volume, the *Stereophile* issues dated Sept-Oct '62 through Spring '66 will be available for \$25 on special order only, and only if we receive enough orders (with checks) within the next four weeks.

Reports included ones on the Weathers PS-11 and Shure V-15 pickups, the Hartley 220MS/Holton speaker systems, the SME 3009 tone arm and the Ampex F-44 recorder.

Articles included "Tracking Distortion and What to Do About It," "How to Write an Ad" (A nasty satire), "Why Hi-Fi Experts Disagree," "How Hi-Fi Are Stereo Discs?" (A polemic), "Stereophile Record Ratings" (by label), and "The Disc Sound and Why It Sounds That Way."

Also enlightening and embarrassing letters, cynical comment on the audio parade, and a few cartoons.

Miscellany

Better Sound from the PAT-4

For the price, the Dyna PAT-4 preamp is still one of the best-sounding that money can buy. (Another is the Dyna PAS-3x.) But not even the most loyal Dyna admirer can deny that the tone controls in both units are of questionable value, to understate the case. Most owners leave them set for Flat and enjoy the preamp for its sound. Well, its sound can be improved by an order of magnitude by bypassing the tone controls entirely, and it's a cinch to do if you're handy with a soldering iron and dikes.*

Open up the preamp and expose the rear of the tone controls. Note that each has two sections, each with three terminals protruding therefrom.

Using the dikes, clip off all the wires from the treble control terminals. Then clip off each now-loose wire at its connection to the printed-circuit board.

Strip the insulation from 2 inches of hookup wire and tin its entire length. (That is, flow a thin layer of solder onto it.) If you don't have hookup wire on hand, strip several inches of insulation from some ordinary AC cord, separate out half of the strands, twist them around one another so they aren't frayed, and tin them. Use these for the hookup. Solder the tinned wire to all three terminals on one section of the bass control, and clip off the excess (with the dikes). Do the same to the three terminals on the other section of the bass control. Now

*For the tyro audiophile, we should explain that "dikes" are diagonal cutters, used for clipping wires, trimming fingernails, and chopping off the excess length of brass or aluminum machine screws.

reassemble the preamp.

The result of this modification is a slight improvement in the response linearity of the preamp and an increase in over-all transparency. Both are subtle but audible.

The PAT-4 has another small shortcoming that is equally easily cured: Bass thin-ness on phono. This stems from some supposedly-inaudible filtering of subsonic frequencies, that was done to improve s/n measurements and to reduce the effect of acoustic-feedback-inducing use conditions.

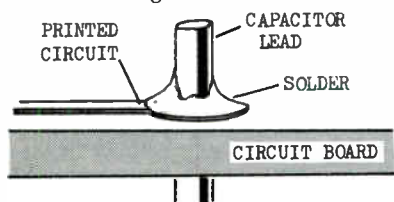
The thin-ness is remediable, with of course the attendant risk of increasing a feedback problem, as follows:

De-cover the preamp and locate connection Number 5 on each of the printed-circuit boards. The parts you are looking for look like little metal firecrackers with a plastic sleeve around them. You'll notice there are several such. One of them (on each board) has one end connected to the circuit-board strip that comes from connection # 5, and is placed with its axis parallel to the long dimensions of the PC board. That is not the one you're looking for. Your goal is another one, just slightly fatter, which lies directly behind (or under, if you're looking down) that connection # 5. Unsolder each of its leads in turn from the PC board and discard it. Do the same on the other board.

Now, replace both of these (which are marked 100 μ f 6 v) with ones marked 300 μ f 6 v, obtainable from any electronics supply house. Make sure that the end of each that is marked with a + is oriented toward the side of each PC board that is toward the bottom of the preamp chassis.

Before installing the new capacitors, bend their leads parallel and tightly at right angles to the axis of the capacitor. Then trim each lead to a length of about $\frac{1}{2}$ inch, and tin it with the soldering iron. Place each lead in turn into its hole in the circuit board, touch the

iron to the hole on the other side of the board, and work the lead gently through. Remove the iron and see-saw the lead through the hole so it will not be immobilized by the cooling solder. When both leads are protruding through the board, press the capacitor against the board, touch the iron to the back of the board where each wire comes through until you see the solder melt, and let it cool. If the soldered connection doesn't look like the sketch below, as viewed from the edge of the circuit



board, use the iron to resolder it or remove excess solder. Don't keep the iron there longer than is necessary to melt the solder, or you'll char the circuit board.

Check to make sure no solder ran down from either contact and shorted

against an adjacent circuit strip. If it did, wipe it off with the iron tip. Finally, clip off any excess lead wire with the dikes.

As before, the difference due to this modification is not dramatic, but it is an audible improvement. And after all, that's what high fidelity's all about.

Phasing Standard

Ever since stereo came to be, one recommended way of ensuring loud-speaker phasing has been to use the molding seam along one wire of a zip-cord pair as a means of following that wire through from one end to the other.

Unfortunately, there has never been any standard for which electrical polarity the ridged conductor should represent, for there has never seemed to be any logical relationship between the ridge and the polarity that could serve as a mnemonic anchor. Well, we have come up with just such a logical relationship, and are herewith proposing it as an audiophile standard.

Here it is: The moulding seam is

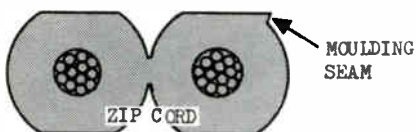
Why Not?

If you subscribe to our views, why not subscribe to our magazine? Our undercover investigator tells us that there are thousands of you clods out there who borrow each issue from friends, and to you we say "Shame!" Freeloading may be in these days, but when a report in Stereophile can save you from \$10 to several hundred dollars by steering you away from junk and toward the best buys for your money, isn't it worth a measly \$7 to you to help keep this worthy rag in business? We're taking dealer ads now, but subscriptions are still almost our entire source of support. Without that support -- and that means your support -- there will be no more Stereophiles to borrow or to buy. So don't just sit there on your freeloading fanny; do your bit to ensure our continued publication. Send us your subscription today. There's a handy-dandy coupon on the next page which can be clipped out without removing any of our deathless prose from this copy of the mag. Clip it.

Time Up?

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raised, raised is up, and up is always more plus than minus. Therefore the wire with the moulding seam or ridge is the plus or "hot" conductor. And for consistency, so is the conductor that is marked in any other



fashion, as by a knot or a spot of paint.

If you can remember that ridge-is-up-is-plus relationship, you will

never again have to recheck the way you connected the first speaker before making the connections to the second. The ridged wires go to the "hot" terminals at the amplifier outputs and the speakers.

Lo, How the Mighty...

With the phonograph record just five years short of its centennial, it is interesting to note that for many of those years RCA used to brag that "The world's greatest artists are on RCA Victor records!"

And what do they advertise these days? "For the record buyer who doesn't know the difference between Paganini and Cacciatores," that's what. And shouldn't that have been "...Trovatore and Cacciatores"?

We wonder what happened to that cultural explosion we were hearing about a few years ago? Maybe it was ruined by the excesses of those Red-Seal guards.

High-Speed Taping

We've been hearing, and reading, a lot lately about this or that tape recorder being as good at 3.75 ips

Subscription Order

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as a professional machine at 15 ips. Well, 'taint so.

Every tape recorder must use more treble pre-emphasis when recording at a lower speed. No reflection on the recorder, or the tape; it's just the nature of magnetic recording to produce less high-end output as tape speed decreases. And the more the recording pre-emphasis, the more the record head or the tape or both will tend to "round off" transients -- little spikes of energy that put the edge on muted trumpets and the ear-shattering power into the sound of a full chorus. Some recorders, with some tapes, can reproduce these things very nicely at 3.75 ips, and maybe even at 1.875 ips. But they'll do it better at 7.5, and better still at 15 ips.

Admittedly, limitations in the program material fed into any recorder may render the advantages of the higher speeds inaudible if not superfluous. And there are times when running speed must be governed by the need for a certain uninterrupted recording time. But with top-notch program material -- live, on-the-spot recording with good mikes, the higher the running speed, the better the results. The improvement may be slight, to be sure. But many of us will happily trade in a \$300 power amp for a \$900 one in order to gain a "slight" improvement. Isn't it worth double or triple the cost per second of tape on some recording jobs? We think so.

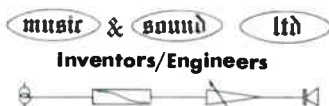
Improving TV(6) Audio

TV viewers who have a Channel 6 within their receiving area might be interested to know (if they don't already) that any FM tuner will pick up the audio portion of the TV programs at a spot 'way down at the bottom of the dial. If you haven't tried viewing your favorite Channel-6 programs this way, you're in for a pleasant surprise.

It's true, much TV sound is execrable, but at least as much of it is far better than any of us have been

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led to believe, with really earth-shaking low end and better highs than one would expect from a 10-kHz upper limit.

Getting the Wires There

A frequent problem in stereo installations is that of getting the wires to the speakers without creating trip hazards across the living-room floor. Several solutions have been suggested, such as using TV twin-lead under the carpet (so it won't create too much bulge), or running zip-cord up around door frames or along the wall baseboards. Neither of these alternatives is likely to appeal to the audio perfectionist who is aware of what unnecessary DC resistance in speaker leads can do to amplifier damping, so what else can be done to allow the use of heavier speaker wire?

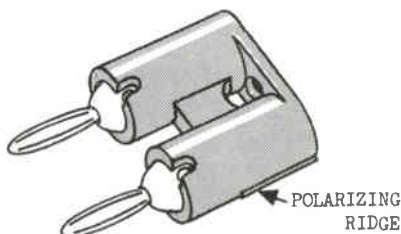
If you own your own home, or have carte blanche from the landlord to drill small holes in your rented

abode, the best idea is to go down through the floor near the power amp, run the wires in a direct line across the basement ceiling, and come up through the floor right behind each speaker. This, however, can be difficult if, instead of a basement directly below, there is another apartment.

But there's another, slightly more irksome way of doing the job. Run the wires right across the listening-room floor when you're listening, and disconnect them when you're not.

To facilitate connection, use a pair of double-banana-plug connectors in each cable, locating them several feet from one end of each cable, so you won't have to go fussing around behind things to make the connections. Use black plugs for one cable (left) and red for the other, and make sure the wires with the moulding seams are connected to the polarizing marks or ridges on the

plugs (as well as to the "hot" terminals of amplifier and speakers). And to avoid people- or equipment-damage through tripping accidents, provide enough wire so that you can



lay each across the floor in an open "S" configuration. That will allow enough slack so that it isn't likely to be pulled tight at either end if someone's shoe pulls it a foot or so across the floor.

Stereo Layoff

Stereophile readers who have been following Ye Ed's "Stereo Scene" col-

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umns in Popular Electronics magazine may be interested to know that he will not be doing any more of them after the February issue.

Future "Stereo Scene" columns will, according to a polite letter of dismissal from PE, be done "internally." To quote from the letter: "Our close personal contact with hi-fi manufacturers and our physical location is (sic) the reason for this change."

And that's why the Stereophile came to be.

That's Professional?

After having tested (and liked) Sony's compact MX-12 input mixer, we were intrigued to learn that it was to be followed by a 16-channel "Professional" model providing up to four output channels. We haven't seen one in person yet, but we did get a blurb sheet on it that included descriptive data (which looks good), a listing of Sony's microphone line (all of which use professional-type Cannon XLR connectors), and some photos of the mixer (impressive looking, but...). Would you believe, all the mike inputs on the ruddy mixer are phone plugs! And all the outputs are phono plugs.

Come on, now, Sony, do you really expect to sell that to professionals?

Dolbyed Tapes

We've auditioned a goodly sample of commercially-recorded Dolbyed open-reel tapes now, and were unimpressed.

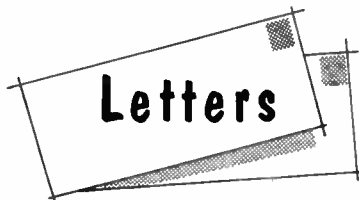
There is of course less hiss -- that after all is what the Dolby is all about. But in every other respect, we felt the sound to be worse than from most non-Dolbyed open-reel tapes.

Why? Very variable high end, ranging from dull to zizzy and hot. Apparently, the frequency-response uniformity of Dolbyed prerecorded tapes is not much better than it was from the non-Dolbyed ones, but Dolby playback doubles the amount of deviation from ideal flat high end.

We almost hate to say it again, but it looks as if the disc is still the perfectionist's preferred signal source. But when is someone going to start releasing Dolbyed discs?

Super Supex?

Phil Coelho of Electrostatic Sound Systems tells us that perfectionists on the West coast are doing flips over a new Shibata-stylus pick-up called the Supex. He described it as sounding "about as alive as a Deca Mark V but with less of the brittle hardness of many Vs," and promised to send us one for evaluation. To say that we are impatient is an understatement.



Revox Errors

I have found two small but significant errors in the design of the Revox A-77 machines.

First, the headphone outputs are reversed. That is, the connection to the tip of a 3-way plug is the Right channel, instead of the Left as it should be.

And second, the Zero-level mark on the VU meter is colored red instead of black, thus suggesting that Zero is the overload point, which it is not and should not be.

A. F. Morrissey
Perkiomen, Pa.

The phone reversal is an error only according to the unofficial US standard. It is correct according to the unofficial European standard.

It is no problem at all to correct the phone output mixup: You remove all knobs (but not the push buttons), remove two screws that are

nearest to the outer edges of the deck, and which become visible when you swing down the head-cover plate, and pull the force-fit pins at the bottom corners of the control panel out of their receptacles, lifting off the panel.

The phone jack is the left of three identical black columns, and the hot leads are clipped to the bottom pins on this. Just unclip, interchange them, and re-fasten.

There is nothing that can be done about the VU meter "problem." You get used to it and learn to live with it, but it does cause some confusion when one frequently uses other components with VU meters that are correctly colored.

Punny Business

I shouldn't be encouraging your depravity but I confess to having enjoyed the cover of your last issue.

Harry Lewis
Halifax, NS
Canada

For your last cover you are condemned to the lowest level of Hell, where people must listen to a worn and scratched copy of the "Grand Canyon" Suite played on a -----* console at 105 dB and 28% distortion through all eternity.

Bill Goldsmith
Salt Lake City, Ut.

Disc Wipeoff

Nice try, but you only get half a cigar for your Cassette Wipeoff item in the Winter 1971-72 issue. Whether you intended it or not, you succeeded in causing anxiety about cassette tape where none is warranted (except perhaps in the case of cobalt-doped tapes). The data you cited appeared in the Audio Engineering Society journal, and was intended to give

*Because we have some respect for the libel laws, we are withholding the brand name of the console that Mr. Goldsmith envisions in hell.

relative information about the three high-performance cassette tapes.

What you warn of as a potential problem in cassettes is a virtue. After 30 consecutive passes of a 15-kHz signal on chromium dioxide tape, the loss was about 1.5 dB. My own experience, and comments from cartridge testers, suggests that 30 consecutive plays of 15 kHz on a disc would result in a very marked decrease in output if not a virtual wipeout.

Your explanation of the cause of cassette "wipeout" is not totally correct. You state (correctly) that HF loss in playback is related to the ease with which the coating particles are magnetized (or demagnetized), which is why CrO₂ exhibits the least playback loss and cobalt-doped tapes the most. The reason HF loss occurs at all is because the small amounts of magnetism induced into the head pole pieces by the magnetized domains cause the pole pieces themselves to do the polarity-flipping on adjacent domains.

Andrew G. Petite
Advent Corp.
Cambridge, Mass.

We did not intend to indict the cassette medium, but to point out (as did Mr. Petite) that if you want your cassettes to retain as much as possible of their high end through frequent playings, you should use chromium-dioxide tape and avoid cobalt-doped tape.

The "wipeoff" problem with discs is not, we suspect, quite as acute as Mr. Petite suggests. Our own observations have been that most "erasure" on test discs occurs at frequencies above 15 kHz, and that the rate of this depends on the tip mass of the stylus. On a one-play-per-day basis, the range below 15 kHz should not be audibly affected for at least 50 and probably 100 plays. Actually, many discs are discarded before the 100-play mark anyway because of the accumulation of noise and distortion.

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Unrecommended Components

A complete listing of products which were given full reports in past issues of the *Stereophile* but were not listed in our "Recommended Components" section because, either their sound was not as good as that of others that cost the same or less money, or they did not in our opinion fully serve the purpose that they were intended to.

If you find your favorite component listed here, please don't write to ask us why it was rejected. The reason, as we said previously, is that for one reason or another we did not feel it to be among the best of its kind for the money. We will not be more specific than that.

The listings are in the chronological order in which their reports appeared in the magazine.

Knight KN-845 headphones
Lafayette F-767 headphones
Monarch ES-300 headphones
Permoflux DHS-Series headphones
Sharpe HA-8 headphones
Argus X-3 speaker system
E-V 2 speaker system
E-V 6 speaker system
Neumann DST-62 pickup

Isotone "Cellini" and "Egmont" speaker systems

Decca Mark III pickup

Shure 578 microphone

Shure M-55 pickup

Euphonics Miniconic pickup

Jensen PF-2 speaker system

Superex ST-PRO headphones

Shure 667A microphone

Shure Solo-Phone headphone amplifier

Harned full-range electrostatic speaker system

Thorens TD-150AB turntable & arm

Janszen Z-900 speaker system

Shure V-15-II pickup

Ortofon RS-212 tone arm

Ampex 915 and 4010 speaker systems

Revox G-36 tape recorder

E-V RE-15 microphone

Acoustic Research amplifier

Shure M-91E pickup

Frazier SEE24 environmental equalizer

SAE Mark I preamplifier

Stax UA-70 tone arm

Crown D-40 power amplifier

Infinity 2000A speaker system

Bose 901 speaker system

Ace Audio basic preamplifier

Dynaco A-50 speaker system

Elektra Amplidyne Research SE-III loudspeaker equalizer

Advent cassette-storage devices

Next issue: The components that we didn't even bother to test because they flunked on preliminary hearings at dealers' establishments or because reader reactions to them were consistently unfavorable.

Audio Mart

All ads submitted for "Audio Mart" must be accompanied by a remittance calculated on the basis of 10¢ per word for private insertions or 20¢ per word for commercial insertions.

FOR SALE

Stereophile back issues: All of Volume 1, less # 3. Two each of: Vol. 1 # 12 through Autumn '68, then Spring '71 to Winter '71/'72. Offers? Decca Mk V, used 10 hours, \$50. Uher A-121 mixer, unused -- special leather case, \$135. MBC-520 cardioid condenser mike, 5 micron nickel diaphragm, slightly used, list price about \$220, sell for \$90. Decca SC4E, broken tieback cord, free with purchase! Ashton Brown, 945 Kains Ave, Albany, Calif. 94706 (415) 525-7092.

Citation 12 power amplifier, \$175; Koss ESP-7 headsets, \$50; Crown IC-150 preamp \$185; Kenwood KT-7001 tuner, \$190; Shure V-15 Improved, \$25 mint condn; MB K-600 German \$80 headphones, \$40; Dual 1019 changer, \$85. Jas. Donovan, 3 Thompson Rd., Marblehead, Mass. 01945.

Stereophiles, complete set of 12 first issues bound into one soft-cover volume, \$25. See page 25, this issue, for details.

Used fast-acting speaker-protection fuses, like new except slightly blown, 10¢ each. Box FASPF-SB, Stereophile.

ESS Transtatic I speakers; Audio Research SP-2C preamp; Audio Research Dual 50F-1B power amp; Decca International arm and Export Mk V cartridge; Ortofon M/15E Super cartridge. J. O'Connell, 22 Bremond St., Belleville, N.J. 07109

Janszen Z-600 speaker systems (electrostatic tweeters), \$280 the pair. Psychology Dept., Richfield High School, Richfield, Minn. 55423.

Marantz 77 preamp/control center, \$170; KLR 18 FM tuner, \$80; Equalizer for Bose 901 speakers, \$30; Classical records, \$1 each. More -- write for list. RDD, 1807, Elmcrest, Arlington, Tex. 76012.

Doomsday device, title of ownership, reciprocal agreements of nonaggression with potent

nations, instruction manual. Never used. Best offer from qualified purchaser. Dept. 4Q, Box 49DDD, Stereophile.

Janszen Z-600 speakers, excellent condition, \$195 pair. B. W. Falt, 25 Winding Lane, Basking Ridge, N. J. 07920. (201) 766-7426

Phase Linear 700 and 400 amplifiers with cabinets, 4 months old, mint condition, best offers. Evenings (516) 751-3526.

Magneplanars, Soundcraftsmen, DC-300, Uher 4000L w/ accessories, Normande radio. Hyde, 301 Springdale, Wintersville, Oh. 43952. (614) 264-4987.

WANTED

All back issues of Stereophile. No reasonable offer refused. Charles Martin, Rt. 1, Orchard, Neb. 68764.

Stereophiles: Fall 1968 and pre-1968. Mark Mahan, 1101 West McArthur Blvd., Apt. 174, Santa Ana, Calif. 92707. (714) 557-4000.

Crown D-150, AKG D200E mikes. Hyde, 301 Springdale, Wintersville, Oh. 43952. (614) 264-4987.

Ionovac tweeters. State condition and price. George Mueller, Sliker's Lane, Schoeley's Mt., N. J. 07870.

Will the person who advertised the Measurements 201A standard FM signal generator in the last issue please contact us. The phone number you listed was apparently wrong and we have had some inquiries about the ad. Stereophile

DEALERS

ELECTRONIC CROSSOVERS -- ALL TYPES. Definitive booklet describes applications; how to improve all types of speaker systems: \$5, credited towards first purchase. HUNTINGTON ELECTRONICS, Box 2009-S, Huntington, Conn. 06484.

EVERYTHING ON OPEN REEL! Specialists in pre-recorded open-reel tapes. Latest releases. Dolby. Quadraphonic. Discounts. "Reel News." 96-page catalogue, \$1. BARCLAY-CROCKER, Room 320, 11 Stone St., NYC, 10004.

Books by Gilbert A. Briggs: Loudspeakers, Audio, Biographies, Cabinet Handbook. Also speakers, crossovers and components, breakers, other hard-to-find items. Catalogue \$1 deposit, refunded w/ first order. CENTURY AUDIO-ELECTRONICS, INC., Box 1471, Tucson, Ariz. 85702.

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