

The **Audio Critic** is a biweekly advisory service and technical review for consumers of sophisticated audio equipment. To maintain total dedication to the consumer's point of view, **The Audio Critic** carries no advertising by commercial interests. Any conclusion, rating, recommendation, criticism or caveat published by **The Audio**

The Audio Critic

Critic represents the personal findings and judgments of the Editor and the Staff, based only on the equipment available to their scrutiny and on their knowledge of the subject, and is therefore not offered to the reader as an infallible truth nor as an irreversible opinion applying to all extant and forthcoming samples of a particular product.

Editor and Publisher: Peter Aczel

Retail price: \$1

This Is It: Our New Format, Coming to You Every Other Week from Now On

Our metamorphosis from an irregularly published esoteric journal of many pages into a brief but pungent biweekly presence in your mailbox (as announced on page 2 of Vol. 2, No. 3, our last magazine-size issue) marks, we believe, the coming of age of noncommercial audio reviewing addressed to the purist. Amateurish little cult periodicals, published a few times a year by totally unqualified individuals without adequate laboratory facilities or even a familiarity with the fundamentals of electricity, are beginning to come out of the woodwork everywhere, and quite frankly we wish to dissociate ourselves as completely as possible from the very suggestion of that format and that ambience. The message we've been getting from our subscribers is that they want to know what we know about interesting new equipment just as fast as we're finished testing it. Our biweekly Bulletins are the best response to that message we've been able to come up with.

*We're starting with a 4-page Bulletin in order not to raise your quantitative expectations too high; there will be a few 6-page foldout issues, however, and on rare occasions an 8-pager. Don't forget that the 24 Bulletins to be published in 1981 represent only two thirds of a full subscription; one third goes for **The Audio Critic Handbook**, coming in the latter part of the year. What you're holding in your hand now is actually 83 cents' worth as prorated at the domestic subscription price.*

*Remember, also, that 6 of these Bulletins are equivalent to one old-style issue in fulfillment of unexpired subscriptions. **The Audio Critic Handbook**, when it's out, will be equivalent to two old-style issues. Some current subscriptions will expire with Bulletin 6, some with Bulletin 12, and so forth.*

Please let us know what you think of the new format and the new schedule. We're now in a position to react very quickly to your wishes and needs.

In this issue:

- 1 **Power Amplifier:** Carver M-400
- 2 **Cartridge Alignment Gauge:** Cart-a-lign
- 3 **Records&Recording:** Sheffield Lab 13
- 3 **Reference Systems**
- 4 **Box 392:** Letters to the Editor

Power Amplifier:

Carver M-400

Carver Corporation, PO Box 664, 14304 NE 193rd Place, Woodinville, WA 98072. Model M-400 Magnetic Field Amplifier, \$399. Three-year warranty; manufacturer pays return freight. Tested #2914 and #3264, on loan from manufacturer.

There couldn't be too many audiophiles who are unaware of the existence of Bob Carver's miniature monster amplifier; relatively few have heard it, however, especially in a system of reference quality, and as a result its sonic rating on a perfectionist scale has been subject to wild conjecture and inaccurate secondhand attribution. So far we've seen reviews by Julian Hirsch in *Stereo Review* and Leonard Feldman in *Audio*, two nice guys who never met an amplifier they didn't like; sure enough, they found the sound of the M-400 to be marvelous. Our review is the first, to our knowledge, in a noncommercial publication and by a critic who is willing to be not so nice when the occasion demands it.

When a 201/201-watt stereo power amplifier (manufacturer's rating) is a cube measuring less than 7 inches (17½ centimeters) along each edge and weighing less than 10 pounds (4½ kilograms), one is reminded of Dr. Johnson's famous simile of a dog walking on its hind legs. The issue is not whether it's well done; one is amazed that it's done at all and in this case wonders how it's done. Especially for 99 cents per watt per channel. Not to keep you in suspense, though, we'll state right up front that it's done surprisingly well; this is a respectable amplifier regardless of size and price. More about that in a moment.

As to how it's done, there are elaborate explanations accompanying both Julian Hirsch's and Leonard Feldman's reviews, so it would be an unnecessary duplication of effort to go over the same ground here, especially in view of our tight new format. Very briefly, the Carver design cleverly eliminates the need for storing large amounts of electrical energy in a heavy and costly built-in power supply, in effect letting the utility company store it instead and make it available instantaneously as the need arises; furthermore, the design enables the amplifier to feed a relatively large part of the utilized energy into the speaker and dissipate a relatively small part of it as heat (in other words, high efficiency), so that no large and costly heat sinks are required, the small

(continued on page 2)

chassis alone doing the whole job. The techniques employed to achieve these results include the use of a magnetic field coil and of an electronic "commutator" that tracks the audio signal and delivers the moment-to-moment power supply voltage required. The originality of this approach as applied to audio amplification is unquestionable, although some of the same techniques have been familiar for many years in other areas of electrical engineering, for example in the operation of compressor motors in air conditioners. Obviously Bob Carver's mind ranges well beyond the confined horizons of the audio ghetto.

The amplifier sounded very clean and dynamic in our reference system; that 201/201-watt rating is audibly evident, not just a spec. What's more, the sound is pleasant, musical and nonfatiguing, without any of the hardness or edginess we so often fault in much costlier power amps of greater audiophile pretensions. (An hour or two of warm-up is necessary, however, to get to that point.) On the other hand, transparency and delineation of detail are quite a bit short of the ultimate; for example the \$499 Amber Series 70, which is capable of only a little more than one third the power output of the Carver, has a considerably more clearly etched and less veiled sound. The M-400 is somewhat reminiscent of the big McIntosh tube amplifiers of yesteryear—a little loose on the bottom end, a little woolly in the midrange, but very listenable, with an almost soothing quality and plenty of headroom. You could do a lot worse for \$399, and if you need all that power you simply can't do any better. The unforgiving purist, however, won't be satisfied.

On the lab bench, our tests corroborated the specs as well as the findings of Hirsch and Feldman; conventional distortion and power output measurements were A-OK. We also discovered a number of unmentioned (unmentionable?) time-domain peculiarities, however. Square-wave response into an 8-ohm resistive load, a piece of cake for most power amps, looked quite poor; the leading edge rose to a small spike of about 10 microseconds duration, followed by a slight dip before the flat top became reestablished. The rise time itself was a very slow 5 microseconds, apparently as a result of the bandwidth-limiting output filter used. In cascade with all the other inevitable bandwidth-limiting electrical and electroacoustic stages in a chain of audio components, such a filter could conceivably slow down the total rise time of the system to the point of audibility. The slight dullness and stuffed-up quality of the M-400 are possibly accounted for by this finding, but we can't be sure. Adding various capacitive loads across the resistor didn't elicit more than the normally expected amount of ringing.

Another unpublicized idiosyncrasy of the M-400 is that it inverts the absolute phase. A positive-going pulse fed into either channel will make the speaker diaphragm go backward instead of forward. This has nothing to do with the fact that the design deliberately operates the left and right channels electrically out of phase with each other in order to reduce the instantaneous power drain and to make mono strapping possible without a phase inverter. That condition need not concern the user, since the red and black output terminals are also inverted in the channel where the "hot" side is negative, so that stereo channel phasing will be automatically correct. What we're saying is that red is actually negative and black is positive in either channel, from the *speaker's* point of view, the way the amplifier is set up now. How about correcting that, Bob? Meanwhile, the user must invert his speaker leads. (Yes, Virginia, abso-

lute phase is sometimes audible.)

As for mono strapping, it gives you 500 watts into an 8-ohm load with pretty much the same sound quality. In other words, \$798 will buy you a 500/500-watt stereo power amplifier system that sounds acceptable and musically enjoyable even to the critical ear, although it falls short of ultimate accuracy and resolution. What's more, you can carry both amplifiers with one hand, in a paper bag. No wonder the high-end amplifier crowd is turning green with envy, knowing deep down that while they're engaged in ecclesiastic controversies about lower-midrange warmth and upper-midrange liquidity, Bob Carver is getting richer and richer.

Cartridge Alignment Gauge: **Cart-a-lign**

Cart-a-lign Research Corp., 60 East 42nd Street, Suite 411, New York, NY 10165. Cart-a-lign phono cartridge alignment system, \$29.95. Tested sample on loan from manufacturer.

About a year ago, in the January 1980 issue of *Audio*, an article on tonearm geometry intimated that **The Audio Critic** was mainly responsible for the recent wave of interest in correct overhang and offset angle in pivoted arms. It's true that we've been screaming the loudest about the ridiculous errors of the industry ("... nearly all tonearm mounting holes are drilled in the wrong place, nearly all headshells are offset at the wrong angle, and nearly all cartridges are mounted in the wrong position within the headshell," we wrote in Vol. 1, No. 6 two years ago); the point is, however, that we acted only as messengers all along, the message itself having been available to all competent engineers since the classic Baerwald paper of 1941. That simple fact didn't prevent the underground audio journals from fatuously regarding cartridge alignment for correct tracking geometry as our own trademark, setting us apart from other reviewers, since to this day they refuse to talk about it or else gloss over it with a certain embarrassment—even though we have reason to believe that until the arrival of commercially fabricated gauges they were secretly using our published alignment tables and instructions to trim in their systems. That, of course, is human comedy of a rare order.

Now that cartridge alignment is becoming mainstream, the two best-known gauges are the D B Systems DBP-10 Protractor and the Dennesen Geometric Soundtracktor, both of which we reviewed in Vol. 2, No. 2. The Cart-a-lign system is a newer development offering some features and advantages not possessed by the other two. The most important of these is a small mirror with etched hairlines that makes it possible to use the reflection of the stylus cantilever itself for lining up the cartridge, rather than referencing all adjustments to the sides of the cartridge housing, which may or may not be perfectly parallel to the cantilever. Another advantage of the Cart-a-lign gauge is that it uses no adjustable sliding parts for determining the correct overhang; the whole device is complete and self-contained on a single boomerang-shaped piece of rigid plastic. Very neat and rugged.

Like the Dennesen, the Cart-a-lign has its own clever little geometrical insight that makes it work. In this case, it's the fact that the various arcs of travel across the record described by the stylus tips of *all* tonearms of correct overhang, regardless of length, intersect in a fixed point. When

the alignment is optimized for LP records cut according to the IEC Standard, that point is located 3.516 inches (89.3 mm) from the turntable spindle along the radius which is perpendicular to the line from pivot to spindle. This overhang reference point is marked with cross hairlines on the mirror, as are the two fixed zero-tracking-error points at radii of 4.76 and 2.60 inches (120.9 and 66.0 mm). The alignment starts with immobilizing the turntable platter, placing the Cart-a-lign gauge on the spindle, and aiming a sight line engraved on one leg of the boomerang at the pivot axis, which can be made more apparent by creating a diffraction line on the tonearm column by means of a small flashlight. This is by far the loosest and least accurate part of the procedure (as is the indexing of the pivot in the case of the Dennesen gauge); however, a little practice will get you to the point where the error due to sighting will in most cases be insignificant in terms of the total alignment. After this step, the mirror is used to set the overhang and then to line up the cartridge with the two zero-error marks. Although correct overhang and alignment at one zero-error point are sufficient to lock in the desired tracking geometry, the redundancy of the second zero-error point is a great help in verifying the accuracy of your work (especially if you had difficulties sighting the pivot), and is one feature sorely missed in the Dennesen gauge. The mirror can also be used for precise azimuth adjustment, but of course almost any other small mirror would serve that purpose equally well.

All in all, our inclination now is to recommend the Cart-a-lign as the best cartridge alignment gauge for all seasons, mainly because the mirror and hairlines are a more accurate guide for the eye than a printed grid a la Dennesen or D B and the cantilever a better reference datum than the cartridge housing. Be aware, however, that working with a reflected image has quite a different feel to it than eyeballing the actual object; some people have more difficulty getting the hang of it than others. The Cart-a-lign kit includes an unframed magnifier lens and a tiny flashlight to help you, and the instruction sheets provided are quite lucid and detailed. The clincher is that a careful check with the Cart-a-lign occasionally reveals minute inaccuracies in alignment as performed with another good gauge or even the hard way with the alignment tables and direct measurements on the arm. Our compliments to the chef, Dr. Michael Goldstein, who is a physician in pursuit of aural happiness in his spare time.

Records & Recording

Technically superior classical recordings are still so rare that once again we can't find anything exciting to talk about except a musically negligible pop record of striking sonic attributes.

Sheffield Lab

Lincoln Mayorga and Amanda McBroom: Growing Up in Hollywood Town. Vocals by Amanda McBroom; arranged and conducted by Lincoln Mayorga; engineered by Bill Schnee; produced by Lincoln Mayorga and Doug Sax. Sheffield Lab 13 (made in 1980).

Although Sheffield Lab is the original direct-to-disc super-audiophile record company, this is the first recording in their small catalog that doesn't sound overbright and edgy to our ears. We don't know what changes, if any, in microphones and other equipment account for the perceived improvement; the fact remains that this multimike job is absolutely clean, transparent, beautifully focused, solid on the bottom and superbly delineated on top. The dynamic range is outstanding; it's a demo record *par excellence* and a great argument for direct-to-disc recording. The next step beyond this would be a palpable dimensionality that can only be achieved with two microphones, alas.

Musically the record is a collection of pleasant and unimportant fluff with the big pop-ensemble sound. Its saving grace is the fine ear, cultivated voice and secure musicality of Amanda McBroom, a songwriter making her debut here as a vocalist. She is an excellent pop singer, lacking only a touch of eccentricity to compete with "personalities" who can't sing half as well but affix more of a remember-me signature to their vocal style. Her own song, "The Rose," from which the Bette Midler motion picture took its name, is the stuff of which Midleresque personality cults are made, yet is sung here straight and pretty. Maybe Amanda should try some Mozart. We're almost certain she'd be good at it.

—Ed.

Reference Systems

Reference A (the best we've tested so far)

Quad electrostatic loudspeaker with **Janis W-1** subwoofer; optional **Pyramid T-1** ribbon tweeter; **Bedini Model 25/25** power amp with **Janis Interphase 1A** bass amplifier/crossover; **Robert Grodinsky Research Model Four** preamp; **Fidelity Research MC-201** moving-coil cartridge with **Cotter MK-2L** transformer; **Win Laboratories SDC-10** turntable with **SDA-10** tonearm.

Alternative substitution at a huge saving: **Fourier 1** full-range speaker, also driven by Bedini Model 25/25 or **The Leach Superamp** (much more dynamic headroom but a little less transparency than with Bedini).

Reference B (best sound per dollar)

Fourier 1 full-range speaker; **Amber Series 70** power amp; **Robert Grodinsky Research Model Four** preamp; **PS Audio** pre-preamp (tentative rating); **Fidelity Research MC-201** moving-coil cartridge; **Kenwood KD-650** turntable/tonearm; optional **Platter Matter** turntable mat and **Cotter B-2** isolation platform.

Low-priced substitution at some sacrifice in sound quality: **DCM QED** speaker.

* * *

Note: The Fourier 1 speaker will be available in March, according to the best present estimate.

Box 392

Letters to the Editor

Obviously, our new format allows no room for epistolary prolixity, so please keep 'em short. Letters published here may or may not be excerpted, at the discretion of the Editor. Ellipsis (. . .) indicates omission. Address all editorial correspondence to The Editor, The Audio Critic, Box 392, Bronxville, New York 10708.

The Audio Critic:

As a subscriber to your publication, I have a technical question which has occurred to me several times in reading your reviews on speakers.

Often you refer to a speaker's tweeter being out of phase with the bass and midrange.

My question is whether this can be corrected by simply removing the out-of-phase tweeter (or midrange, or bass) if it is

front-mounted in the speaker enclosure, switching the leads, resoldering, and then reinstalling the speaker element back in the enclosure, using silicone caulk to seal it well.

Sincerely,
Richard J. Olsen
Ramsey, NJ

We've been getting a lot of letters asking essentially the same question over and over again. Apparently our reviews haven't made sufficiently clear the basic principle involved here.

Speaker designers don't wire up their drivers out of phase because they're forgetful (like a man putting his left shoe on the right foot) or because they don't care about the difference between the plus and minus terminals. No, they deliberately reverse the polarity of a particular driver as a delay compensation device, to make up for time delay problems in their crossover network and for differences in speed between their drivers. It's a simplistic and only partially

successful technique in nearly all cases; however, the solution is certainly not to rewire the drivers for uniform polarity across the board and leave everything else the same. That would almost surely create severe amplitude response problems—the very things the designer noticed and decided to correct by reversing polarities.

A speaker designed with an adequate understanding of network theory, diaphragm behavior and wave-launch geometry can be made almost perfectly flat in amplitude response while keeping all drivers in phase. That's the ideal solution, resulting in the best possible time-domain behavior. (See the article on the new Fourier 1 speaker system in Vol. 2, No. 3.) Typical speakers using out-of-phase drivers to maintain flat response should be left alone, on the other hand, unless you're willing and able to redesign the entire system, including the crossover network and the driver spacing.

—Ed.

How to Subscribe

For 24 biweekly Bulletins (one year's worth) plus *The Audio Critic Handbook*, send your check or money order in the amount of \$30 (U.S. and Canada) or \$36 (overseas) to The Audio Critic, Box 392, Bronxville, New York 10708.

All payments from abroad, including Canada, must be in U.S. funds, collectable in the U.S. without a service charge.

Back issues in the old magazine-size format cost \$5 each to subscribers (\$6 each to overseas subscribers).

The Audio Critic is published biweekly, except for two consecutive issues skipped during the summer vacation, for \$30 per year by The Audio Critic, Inc., 800 Gramatan Avenue, Mount Vernon, NY 10552. Application to mail at second-class postage rates is pending at Mount Vernon, NY. **Postmaster:** Send address changes to **The Audio Critic**, Box 392, Bronxville, NY 10708.

Contents of this issue copyright © 1981 by The Audio Critic, Inc. All rights reserved under international and Pan-American copyright conventions. Reproduction in whole or in part is prohibited without the prior written permission of the Publisher, which will be automatically denied if the reproduced material is to be juxtaposed to advertising copy or any other additional text serving a commercial purpose. Paraphrasing of product reviews for advertising or other commercial purposes is also prohibited. **The Audio Critic** will use all available means to prevent or prosecute any such unauthorized use of its material or its name.

The Audio Critic
Box 392, Bronxville,
New York 10708

Application to
Mail at Second-
Class Postage
Rates Is Pending
at Mount
Vernon, NY