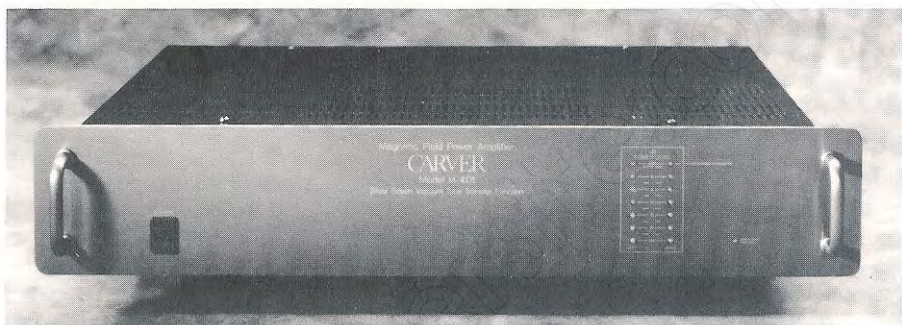


REVIEWS

AMPLIFIERS



CARVER M-4.0t

MANUFACTURER: Carver Corporation, PO Box 1237, Lynnwood, WA 98046

PRICE: \$799, discounts available (10-15%)

SOURCE: Manufacturer's loan

Considering that this solid-state power amplifier from Carver is rated at 375 watts per channel and weighs in at a trim 23 pounds, it should arouse the interest of audiophiles based on just those specifications alone. With the added mystique of Carver's claim that the amplifier is designed to duplicate the transfer function, and thus the sound of the 8-ohm tap of Carver's no-holds-barred Silver Seven tube amplifier, the M-4.0t becomes even more intriguing. Face it – if you can buy 375 watts per channel in a package that runs cool and weighs only 23 pounds for only \$799, and if it sounds decent, not driving you out of the room or blowing up your speakers, you are

going to be pretty happy. The idea that this amp could be the sonic clone of perhaps the world's most exotic tube amplifier is intellectually interesting, makes for great marketing copy – but has very little to do with the real value of the amplifier itself, so let us take a look at the design of the M-4.0t.

The main reason that the Carver is able to offer so much power in a compact, relatively inexpensive amplifier is the magnetic field power supply. A look under the cover of the M-4.0t reveals that the "magnetic field coil" in this amplifier is actually a pretty healthy hunk of iron, but still relatively modest in mass when compared to the transformers one finds in even much less powerful power amplifiers. Carver ads imply that the amplifier does not store any energy, but there do seem to be some power supply capacitors in the unit – a couple of fairly large ones, in fact, take up a noticeable part of the interior space. In any event, the power

supply seems to work quite well, as the amplifier packs plenty of wallop and is capable of controlling the bottom end of large loudspeakers.

The owner's manual warns that the amplifier should not be turned on unless all input and output connections have been made, and advises against disconnecting anything until a minute after the amplifier has been switched off. This seems reasonable – if a bit ominous. The amplifier runs relatively cool, despite the small internally-mounted heat sinks, and except for a bit of buzzing when first turned on, it runs quiet.

The speaker outputs will accept Pomonas, but not spade lugs: they are somewhere between five-way binding posts and some of the Japanese output connectors, and except for those audiophiles who insist on using speaker cables resembling garden hose, these output connectors should serve quite well.

The front panel has an on-off switch and an LED power display. The power display cannot be defeated, but only starts dancing when the music gets really loud. When I first put the M-4.0t in my system, driving the JSE 2s, I thought the LED display must not be working. Only the bottom two LEDs, which are pilot lights for the two channels, ever illuminated, even though I kept cranking the music up to levels louder than I really wanted to hear. It was not until I got really carried away that one of the power indicator LEDs began to flicker occasionally, and I began to realize that the problem was the efficiency of the speakers, not the LED display itself.

Now that I am more familiar with the amp, I occasionally light two or three power LEDs when listening to the JSEs, and three or four with the Carver Amazings – but in general, the LEDs are not a distraction because they are usually nothing more than pilot lights. Unfortunately, Carver has chosen a lettering scheme for this amp that is something along the lines of silver on pewter – it is almost impossible to read

the power levels unless your eyeballs are three inches away from the faceplate at the proper angle on a sunny afternoon when you have your dunnies open. No, I don't want to see Carver change the lettering to the old G.A.S. style, but a bit more contrast would be appreciated, at least by these tired old eyeballs.

OK, OK – how does the darned thing sound?? Glad somebody finally asked me that obvious question . . . In discussing the sonic performance of the M-4.0t, I would rather ignore the controversy surrounding Carver's past record of trying to make his amplifiers sound like more powerful clones of other designs. This time, at least, Carver is copying himself. If making a \$17,500 pair of ultra-exotic mono tube amps is what Carver wants to do in order to establish a sonic target for his \$799 solid-state stereo consumer-oriented amplifier, then more power to him. I am not really all that interested in how the Silver Sevens sound, I would not want a pair of the things in my home (if my insurance agent got wind of it, my homeowner's insurance would probably skyrocket, given that the amplifiers would nearly double the value of my house!), but I was certainly curious about the sound of the M-4.0t.

To be quite honest, I had no idea what to expect when I hooked this amplifier into my reference system and connected it to my trusty old JSE 2s. How could an amp that cost so few dollars for so many watts actually sound any good? Didn't some corners have to be cut?

Well, maybe some corners were cut – but the amplifier surely didn't sound like it. It sounded good – *really good*, in fact. My first reaction, skeptic that I am, was that the amplifier must be colored, and that I was reacting favorably to something that would prove tiring over the long haul. Four months later, however, the M-4.0t still sounds really good; moreover, not only is it on an overall basis the best-sounding amplifier I have ever auditioned in my own system, it is more powerful and

less expensive than its chief sonic challengers.

The main thing that really seems to impress those who have auditioned the amplifier here is that the M-4.0t seems to serve the music so well in terms of dynamics, transparency, and imaging. The system just seems to come alive when the M-4.0t is inserted into it. The ease with which the Carver reproduces complex orchestral passages, even on inefficient speakers (yes, the JSE 2s are rather efficient – but not so the Apogee Calipers or Carver Amazing), is truly impressive. But this dynamic ability does not come at the expense of delicacy and subtle shading. The Carver sounds clean and detailed without sounding etched or electronic, and the music somehow just comes across as more real with the Carver amplifier in the system. For lovers of big orchestral music – Bruckner, Mahler, Wagner, Berlioz, Shostakovich, John Adams, etc. – the muscular yet delicate sound of the M-4.0t offers a way to get power without hardness or glare, even with inefficient speakers.

Describing the sonic spectrum from bottom to top, I would opine that the M-4.0t has a powerful bottom end, perhaps a shade on the warm side, but always in control. It did a fine job of driving the bottom end of both the JSE 2s and the Amazing Silver Editions, two speaker systems with impressive but different-sounding bass capability. (I promised to avoid Silver Seven comparisons, but I cannot restrain myself from pointing out that this is not the kind of bass I would associate with the tube amplifiers, but looking at the pictures of the output transformers on the Silver Seven leads me to believe that the Silver Seven probably does not offer “tube bass” either.)

In the midrange, the Carver is remarkably detailed and open, but without the feeling that midrange detail is actually being provided courtesy of an overly-sharp presentation of treble information. If anything, the top end of this amplifier is on the soft and forgiv-

ing side, but it does not sound rolled off or veiled. In fact, the midrange and treble produced by the M-4.0t is remarkably transparent and detailed. In comparison to the AVA Transcendence 280, for example, the Carver sounds slightly soft on the top end – or does the Transcendence sound slightly etched and electronic? Choosing between the two may be at bottom a question of taste, but the more I listen to the two amplifiers – both very fine products – the more satisfied I am with the sound of the Carver, although I sometimes have the sneaking suspicion that the AVA may be a touch more accurate in terms of objective measurements.

The sweetness and clarity in the midrange and treble regions is the sonic attribute of the M-4.0t that reminds me of tubes. My experience with tube power amplifiers is limited, but my experience with tube preamps tells me that this kind treble performance is on the tubish side. Realize, however, that the effects that I am trying to describe are subtle. Indeed, what is so impressive about the M-4.0t is that there is really nothing about its tonal balance or overall sonic character that calls attention to itself, not even the treble performance.

What does call attention to itself, as I mentioned above, is the music which is presented with a feeling of authority and rightness that makes you quickly forget about the power amp and get caught up in the melody instead. This is one of those audio products where the musical whole is greater than the sum of the sonic parts.

I have listened to some very good power amplifiers over the last year or so, and have recommended many of them in these pages. All of these amps offer good sound and good value, but when push comes to shove, I prefer the sound of the Carver to any of them, at least on an overall basis. When I consider that the Carver offers more power than any of these amps, and is cheaper than most of them, I have to conclude that the Carver is potentially one of the

better values in audio.

One member of my listening panel, a person who listens to just about everything that I do, recently spent some time with his Acoustat TNT-200, the AVA Transcendence 280, and the M-4.0t. He found the AVA amp to be preferable to the Acoustat, but the price of the AVA kept his enthusiasm in check. After a weekend with the Carver, he visited a local dealer to trade in his TNT-200 on a new M-4.0t to drive his Apogeess. More than a month later, he

still thinks he got a superb deal.

Do I hear someone objecting that he or she does not need 375 watts per channel (switchable to 1000 watts in mono, by the way), and is therefore not interested? Don't worry about the 375 watts – remember, this amp weighs 23 pounds and runs cool. A 100-watt amp that sounded this good for \$799 would be considered quite a bargain, so you can look at the extra 275 watts per side as a little extra bonus.

KWN

A M P L I F I E R S

POWER AMPLIFIERS THE CONTINUING STORY . . . AVA TRANSCENDENCE 280 AND CARVER M-4.0T

As promised last issue, we are presenting the results of MM's lab and listening sessions with two significant new amplifier designs that were reviewed by KWN in issue #39, the AVA Transcendence 280 Series Two and the Carver M-4.0t, two amplifiers that feature patented circuitry and controversial nameplates. Following MM's report, KWN will offer some further thoughts on the sound of these two amplifiers now that he has been able to evaluate both of them for an extended period of time in with a wide variety of ancillary equipment. First, however, we will let MM explain some of the changes he has made in his evaluations procedures.

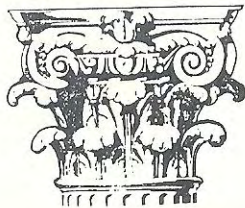
Technical Notes

Starting with this issue, there are minor changes in two tests that I have been using for some time. Specifically, the combination square wave performance/crosstalk graph and the square wave performance with a reactive load no longer use a square wave as the test signal. The step function, used previously for testing low frequency performance, has replaced the square wave.

I have never been happy with the results of traditional sine wave testing. The limitations of sine wave test signals are so severe that many of the unit's imperfections (which we believe we hear) are not revealed. One problem that both sine waves and square waves share involves periodicity. This basically means that the test signal is constantly repeating at regular intervals. Because audio equipment generally deviates from perfection most obviously when asked to reproduce some rapid change

in voltage, there would be three transitions (or voltage changes) the unit would have to follow for every square wave cycle. Should a unit exhibit an error, enduring for a period of time longer than the time between repetitions, the error signal we see in a graph (e.g., crosstalk or ringing) will be the sum of both the present transition and the transition before that. Obviously, music is not as consistent in its periodicity as a square wave, thus the error we see in our tests using square waves may not give us a good idea of the mechanisms behind the sound when playing out favorite recording.

In addition, square waves have the problem that when they are used to test equipment not capable of flat frequency response to DC, they center the signal around the zero output value, thus placing exactly half the signal above this zero line and the other half below. As I hope everyone is aware from the positive and negative pulse tests of previous reviews, many amplifiers and preamplifiers do not exhibit identical response above and below the zero value. Such units are not symmetrical for both positive- and negative-going waveforms. This asymmetry is also seen in the crosstalk and reactive load tests of some equipment, yet when using square waves, this phenomenon is not detectable. By incorporating these simple changes in the test procedure, our reviews should be better able to identify accurate audio equipment and better describe the sonic consequences of the less successful designs.



AVA Transcendence 280

The AVA Transcendence 280 is the most natural sounding and accurate amplifier Van Alstine has produced. This latest amplifier is only another in a remarkably consistent series of nice sounding electronics available from AVA. Each new offering has consistently performed better than its predecessor.

One change made to this incarnation of the Transcendence amplifier is the new "patented" circuitry. Comparing this new circuit to a circuit topology which has been incorporated into a couple of commercial amplifiers of the past, we find that there is not much difference. Essentially, AVA has changed one transistor for another transistor, using a FET rather than a bipolar transistor as a buffer between the input differential and integrator stages. I am amazed that it is possible to receive a patent for such a minor innovation. (This is more a comment on the Patent Office than on the circuit, however.) If what Van Alstine has produced is sufficient for the issuing of a patent, then more power to him. At the very least, the patent makes a great ad copy and gives the company something to brag about at the trade show. And, to be fair, he has produced a good-sound-

ing circuit.

More to the point, however, the consistently good performance of AVA electronics over the past decade has been due more to good execution of the circuit designs than the designs themselves. This holds for the new Transcendence.

Now, on to the actual performance of the amplifier. Figure #1 is the new falling step function and crosstalk graph, which shows the amplifier to have extended usable frequency response and a very simple crosstalk pattern. The crosstalk is complex, made up of both polarity constant and polarity inverting signals. The magnitude of the crosstalk is great enough to slightly reduce, on an absolute scale, the realism of the image, but is still better than those amps KWN classed as Transcendence's major competitors.

Figure #2, the step function response, shows a fault that is intentionally designed into virtually every AVA piece of equipment. Van Alstine sets his low frequency cut-off at too high a frequency. This circuit is an improvement, though, over past AVA designs that cascaded several filter poles very close to one another in frequency, exhibiting low

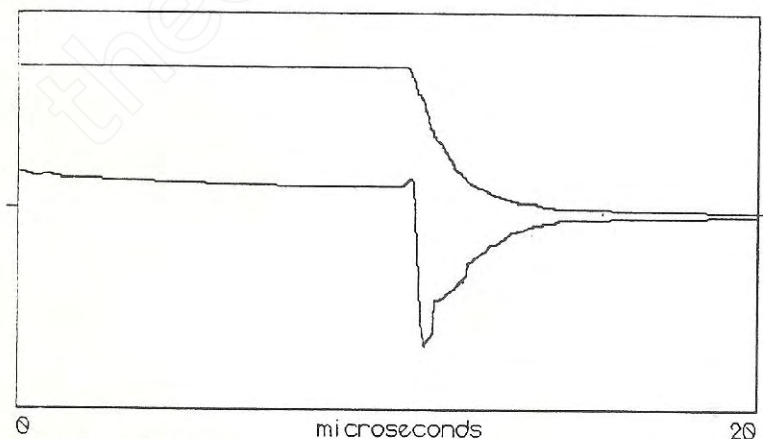


FIGURE # 1. Transcendence 280. Response to a falling step the output from the undriven channel, input shorted.

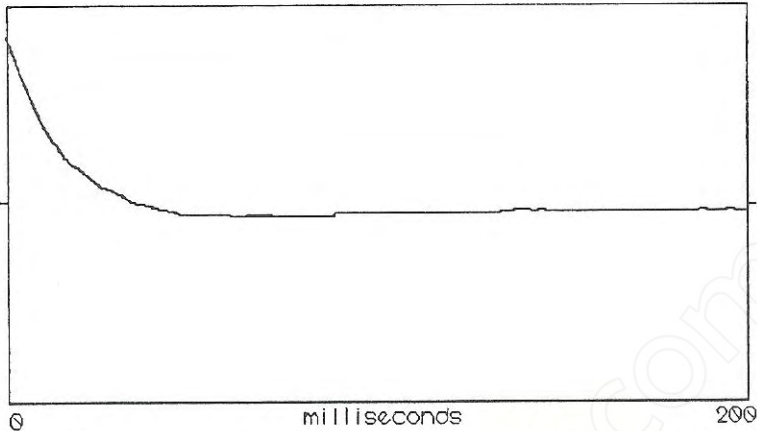


FIGURE # 2. Transcendence 280. Step function response.

frequency ringing. The new low frequency cut-off design, although better, still overshoots, and combined with the relatively high frequency the cut-off, destroys the natural harmonic structure of a note played on one of the big drums. I am sure Van Alstine has very good reasons for choosing this present design; however, the sonic result is low frequency warmth. Many listeners may enjoy this added warmth, even through

it changes the natural sound and feel of any of the big percussive instruments.

The reactive load test (Figure #3), now done with a step function instead of a square wave, shows the ringing all too typical of modern amplifiers, but in this amp, at least it is well damped. Duplicating this test with actual speakers indicates, by the change in sound of the pop of the step function and an increase in hardness of the sound when

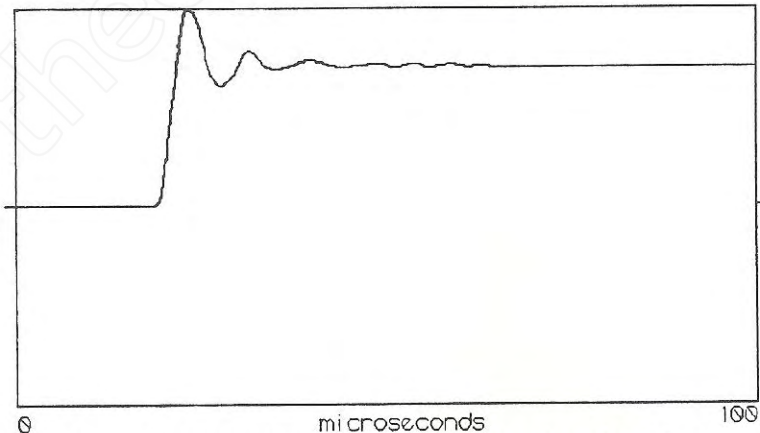


FIGURE # 3. Transcendence 280. Rising step function response into an eight ohm load with a one microfarad capacitor in parallel.

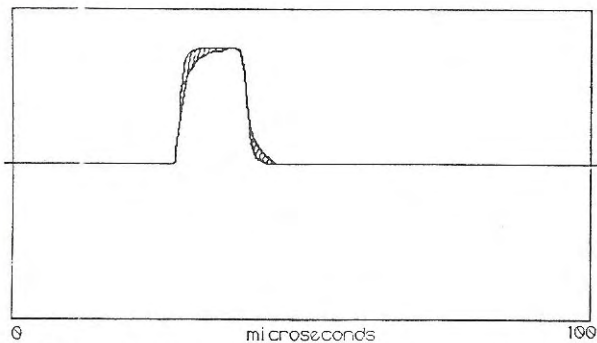


FIGURE # 4. Transcendence 280. Ten microsecond positive going pulse into eight and two ohm resistive loads. Amplifier exhibits only slight high frequency loss into low impedance load.

playing music, that even this small amount of ringing is too much.

Figure #4 is a test of the output current capability and the output impedance of the amplifier. The Transcendence amplifier exhibits excellent performance in both characteristics. The small decrease in pulse output at rising and falling edges is because of a passive high frequency output filter that prevents amplifier oscillation into usual loads.

Figure #5 is a graph of the distortion the amplifier produces in response to a

1 kHz sine wave. If any test can demonstrate an improvement provided by the patent circuitry change, it is the distortion spectrum test. Unfortunately, there is no significant improvement over previous Transcendence designs that we have looked at.

Two tests not shown are the positive and negative pulse symmetry tests and the 2 dB sine wave overdrive tests. In both cases the Transcendence amplifier performs so well that there is really nothing to show in the graphs.

KWN and I pretty much agree on the

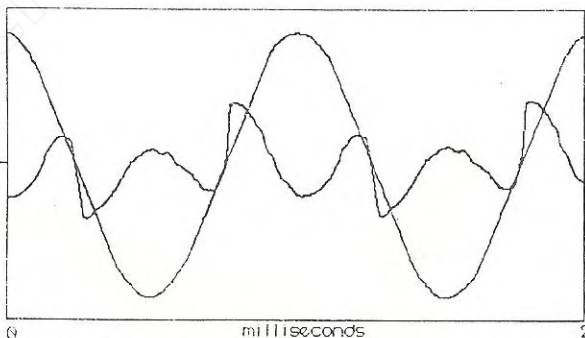


FIGURE # 5. Transcendence 280. Distortion minus noise of one kilohertz, 0.5 volts peak to peak.

sound of this amplifier. We both like it a lot. I, however, would use slightly different terms in a couple of sonic areas. What KWN called a smooth treble I would define as slightly compressed and lacking in details. Where KWN felt the image was deep and spacious, I would say the image was a little diffused. A solo vocalist, center stage, whose voice should seem to originate in a space about head size, actually seems to be beach ball size (This may be an accurate representation of the size of the ego of the vocalist, but it is not sonically accurate). The amplifier may not be able to do full justice to the powerful bass sound of timpani and concert drums, but once you get into the midbass region, the sound improves significantly. Plucked acoustic bass, more of a midbass instrument, sounds really wonderful with the AVA Transcendence 280 in the system.

CARVER M-4.0t

Using KWN's criteria of price, power, and sonic quality, the Carver M-4.0t is definitely worth consideration. I have not heard an amplifier that was more listenable than the Carver at the \$800 price point.

By far, bass is this amplifier's best area of sonic performance. The bass is extended, powerful, and at least compared to the AVA Transcendence 280, not overly warm. For the rest of the sonic spectrum, the best way to characterize the M-4.0t would have to be as eccentric-listenable and enjoyable, but not 100% accurate or truthful to the original recording.

I think other reviewers have covered the design details of the magnetic field power supply in such sufficient detail that I won't have to repeat their accounts. Very simply, Carver has decided to trade large, heavy, and expensive passive power supply components for large numbers of lighter weight and cheaper active components, both in the power supply itself and in the amplifier circuits. Anyone who has a

VCR or a modern television in his or her home may already own equipment whose designers have made similar design decisions (although the implementation of Carver's design is unique).

These complex electronic designs are capable of years of reliable, trouble-free operation. Still, should failure occur once the unit is out of warranty, the repair bill is likely to be many dollars. The electronic parts are cheap when bought in large quantities by the manufacturer, but when bought in small quantities with the local repair shop's markup, the same parts can become expensive. Couple this with the tendency for the failure of one part in these circuits to cause additional failures of other parts, and you are likely to receive a good handful of parts back instead of just one or two. I do not mean to scare anyone off from buying equipment of complex electronic design. Everyone should, however, factor in potential repair costs and warranty quality when determining how good of a deal you are getting at the time of original purchase.

A fault of using output transformers has always been the difficulty of achieving wide bandwidth. One way to make a wide bandwidth direct-coupled amplifier more like one that uses a transformer is to limit the bandwidth. Compare the slope of the falling step function of the AVA Transcendence to the slope of the Carver M-4.0t in Figure #1. The Carver is definitely bandwidth restricted in comparison. The output in the undriven channel during this transition slope looks very much like the ringing found in other amplifiers when driving a high reactive load. The slope of the ringing is actually greater than the step function slope. I fear the Carver amplifier could be just as happy as an oscillator as it is an audio amplifier. This near oscillation, unfortunately, masks the details of the crosstalk. We can tell very little about the relation of the image the M-4.0t produces and its crosstalk, except to say that there is lots of interchannel interfer-

ence.

Figure #2 shows the unusually good low frequency reproduction of the Carver amplifier. Please note that the time base for this test is 5 times longer than used for the AVA Transcendence 280. The Carver has *much* deeper bass response.

Figure #3 is the first major example of asymmetrical amplifier operation. The positive-going step function ringing is much better controlled than for the negative-going step function. The small magnitude of the ringing, either positive or negative, is a result of the bandwidth limiting.

The two versus eight-ohm load pulse comparison of figure #4 shows the effect of the high output impedance of the Carver. The lower the high frequency impedance of your speaker, the softer this amplifier is going to sound.

The distortion shown in Figure #5 is much lower in magnitude than found in the AVA and is smoother at the zero crossing points. Of some interest is the asymmetry at the zero crossover points: the crossover from negative to positive is much smoother than the positive to negative crossover.

The first generation of CD players were, as almost everyone would now agree, bright, hard and harsh sounding. Many found relief from the sonic torture by adding a passive output filter. Those "audiophiles" who reported better sound when they added an external volume control and ran their CDs directly into

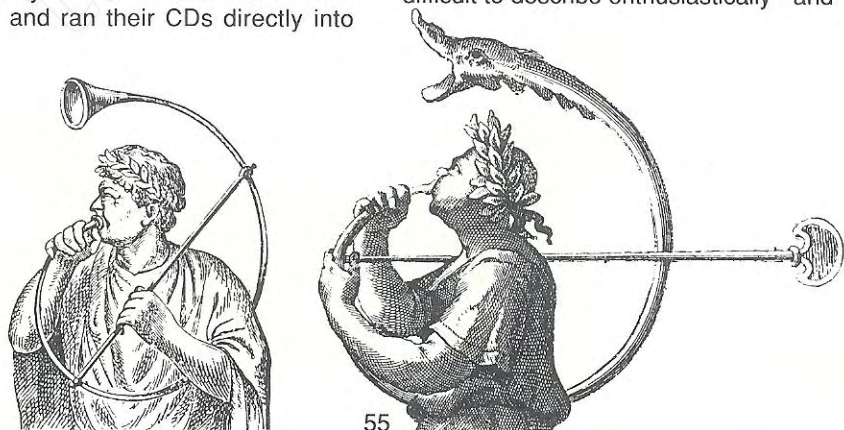
their amplifiers were adding their own high frequency filter. The combination of the extra source resistance caused by the volume control coupled with the capacitance of their interconnects effectively created a nice high-frequency roll-off.

In sum, Carver has created an above-average high-powered amplifier, then through the application of a technique most designers would never even consider, has produced an amplifier that even KWN likes. Bob Carver, I applaud you!

-MM

KWN Comments: Having lived with both of these amplifiers for many months now, I would have to say that my admiration for both of them has continued to grow. These are two of the nicest-sounding amplifiers ever to see duty in my listening room, and neither of them has ever given even the slightest indication of any sonic or reliability problems in many months of being turned on and off and shuffled in and out of several systems.

I fear I may have slighted the Transcendence 280 in issue #40, partly because the amplifier really did nothing to call attention to itself - it just sounded accurate to my ears, as though it was not adding anything to the signal coming into itself (except for gain, of course!), and such performance can be difficult to describe enthusiastically - and



partly because the Carver amplifier, which arrived the very same day as the AVA, came across as such an enticing sonic bargain. The Carver still comes across as an enticing sonic bargain (and I will elaborate in a few paragraphs), but the AVA is certainly no slouch in terms of value, and for those with difficult loudspeaker loads (e.g., electrostatics or the Infinity Kappa 9), there may be no better overall amplifier value on the market.

The Transcendence 280 may not be built with the brute force overkill of a Krell, for example, but it still possesses an unflappable power supply and an output stage that can handle some pretty tough loads. It is sadly ironic that although AVA is sometimes seen as "another flaky modifier," the truth is that AVA amps and preamps are solidly built, are new circuits (not modifications), and over the past several years have exhibited consistent performance without any surprises on the test bench; indeed, it is often the more highly-touted and highly-priced designs that tend to exhibit transient overshoot, positive/negative asymmetry, excessive crosstalk, and other "flaky" performance characteristics.

Van Alstine's drive to have his circuit patented seems to stem primarily from his contention - which he has spelled out, naming names, in his newsletter - that one of his early MOSFET 150 circuits has copied part-for-part by a competitor who became commercially successful with the allegedly pirated design. As MM says, the design may not be all that innovative, but if he can get a patent on it, more power to him.

Another amp with patented circuitry, the Carver M-4.0t (\$799), is being replaced in the Carver line by the TFM-45 (\$949) and TFM-42 (\$899). According to Bob Carver, the circuitry in all three amps is identical: only the faceplates are different - the TFM-45 has analog power output meters, while the TFM-42 and M-4.0t have LED power indicators.

The Carver has a softer sonic signature than the AVA. Listeners will have to decide for themselves which approach they prefer, but I will offer a few comments. On pop recordings such as *The Manhattan Transfer's Greatest Hits*, or classical recordings such as the Chandos *Shostakovich 10th Symphony*, I find that the slightly softer sound of the Carver is a blessing. The 4.0t seems to be able to pass through all of the musical detail without the slightest edge (no doubt in the recordings themselves) that the AVA dutifully passes through the speakers.

One could protest at this point that what I am really enjoying is the bandwidth limiting on the Carver, and that anybody could put a filter in his or her system and get the same sound. I don't think so - the Carver has other strengths that other amplifiers do not seem to be able to match. It has a cleanness, a delicacy, and an overall sense of musical rightness that seem to be functions of more than a soft treble. On the other hand, the relatively high output impedance of the Carver means that it is going to be affected sonically by the load to which it is connected - much more so than the AVA, for example - so an audition with your speakers is a must if you are considering giving this amp a try.

In contrast, the AVA is able to drive just about any load without changing its frequency response, so if you like its sound in one system, you should like its sound in another. It is too bad that AVA products are not more widely available for audition at audio dealers - on the other hand, there is something to be said for being able to pick up the phone and talk directly to the people who designed and manufactured your amplifier, and AVA is one of the only manufacturers who make such a call possible. (In fact, they *welcome* calls about their products - just don't ask them about repairing Jensen car speakers!).

Overall, I remain impressed by both of

these amplifiers, and can recommend them both. Especially for those with speakers that are difficult loads for an amplifier, the AVA Transcendence 280 Series Two is an amplifier that rolls up its sonic sleeves and gets the job done. At \$1275, this is not an inexpensive amplifier, but it is fully capable of holding its own with the big boys. The Carver amps (the 4.0t, and by implication, the TFM-45 and TFM-42) are smooth, powerful, and musical. This is an exceptional amplifier design in terms of both sonics and value.

It will be quite interesting to see whether audiophobes will be able to put aside their prejudices and give the Carvers and the AVA an honest audition. I had to admit in my original review that I was skeptical of Carver's advertising claims, and was not predisposed to like the amp. But it sounded good at first hearing, and it continues to sound good nearly a year later. Having auditioned many AVA products over the years, I had no misgivings about auditioning the new Transcendence 280, but I often hear from people who are extremely skeptical about AVA products. The proof of both these patented designs lies in the listening.

I could respect someone who would report that either of these somewhat unusual amps is not what he or she is looking for, or not the best amp he or she has heard; however should someone say that either amp sounds **bad**, I would infer that their the amp was malfunctioning or the listener was hearing what he or she *wanted* to hear, based on politics rather than sonics. For better or worse, both Carver and Van Alstine have gained reputations for rocking the audiophile boat over the years, with the result that their personalities often overshadow their products. Be that as it may, these are both fine products that deserve widespread auditioning by those who are serious about the reproduction of music in their homes.



Hybrid 70, the voices sounded a bit metallic. Again, the sound wasn't that objectionable, but one was always reminded that electronic reproduction was at work. Bass response on the EAST70 gave a sense of greater extension and definition. Treble response sounded cleaner and less distorted. The EAST70 also walked away from the group in dynamic range.

The comparison with the EAST70 is, perhaps, unfair. It is, after all, a rather radically modified ST70, while the Hybrid is an \$80 conversion of a stock ST70's driver board.

After living with the Hybrid 70 for several months now, it strikes us as a work-in-progress. The basic idea of using MOSFETS in the driver stage is a sound one. The 7199 vacuum tubes it replaces are increasingly becoming harder to find. But the slightly had sound of the current Hybrid configuration will not sit well with some vacuum tube aficionados. Perhaps some circuit revisions are all that's needed to make the Hybrid 70 really shine. Perhaps it's just a matter of time, but for the time being we'll have to reserve our recommendation.

On the other hand, \$80 is a very low price to pay if you're interested in exploring hybrid technology. At least with the Hybrid 70, if you don't like what you hear, you can always convert back to the stock configuration.

THE CONTINUING STORY, CONTINUED ... CARVER M 4.0T

In Issue #41, MM presented some technical commentary based on step-function and pulse testing of the AVA Transcendence 280 and Carver M-4.0t. Unfortunately, the figures for the Carver amplifier were somehow left out of the final layout, so we have included them here along with MM's explanatory comments. Although the M-4.0t has been discontinued, the current Carver TFM-45 and TFM-42 are the same amplifier as the M-4.0t, with only the faceplates being changed, so the measurements and comments apply equally well to those units.

Readers interested in the full story of these interesting amplifiers should check out KWN's original review in #40 and MM's technical comments, together with some followup observations by KWN, as printed in #41.

At any rate, here are the results of the step function tests, along with highlights from MM's commentary:

One way to make a wide bandwidth direct-coupled amplifier more like one that uses an output transformer is to limit the bandwidth. Compare the slope of the falling step function of the Transcendence (#41) to the slope of the Carver M-4.0t in Figure 1. The Carver is definitely bandwidth restricted in comparison. The output in the undriven channel during this transition slope looks very much like the ringing found in other amplifiers when driving a highly reactive load.

Figure 2 shows the unusually good low frequency reproduction of the Carver amplifier. Please note that the time base for this test is five times longer than used for the AVA Transcendence 280. The Carver has much deeper bass response.

Figure 3 is the first major example of asymmetrical amplifier operation. The positive-going step function ringing is much better controlled than for the negative-going step function. The small magnitude of the ringing, either positive and negative,



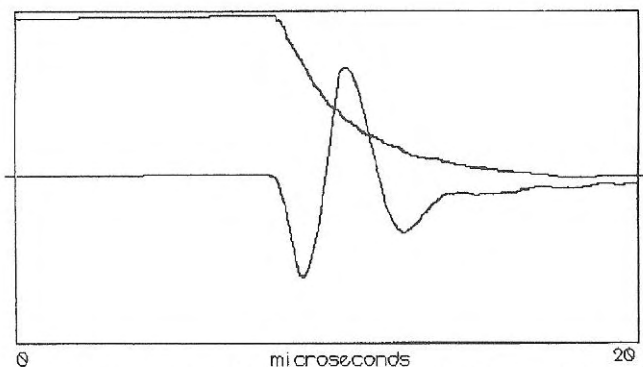


FIGURE # 1. Carver M4.0t. Response to a falling step function and the output in the undriven channel, input shorted.

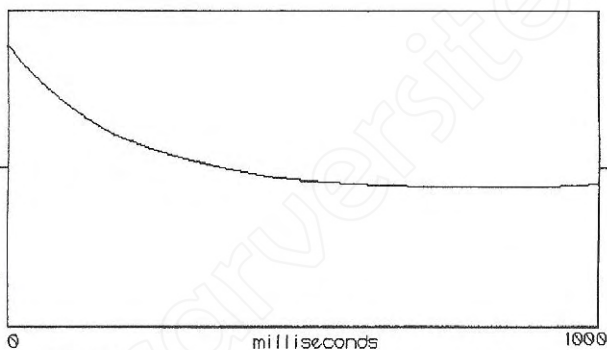


FIGURE # 2. Carver M4.0t. Step function response.

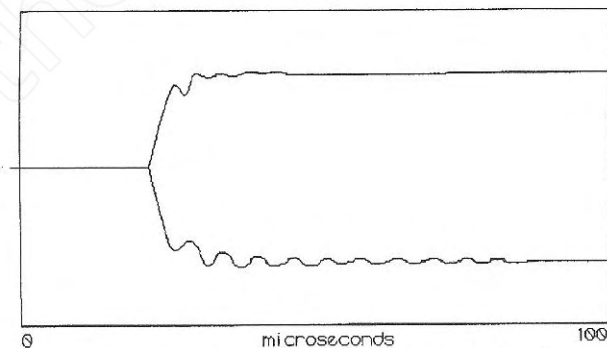


FIGURE # 3. Carver M4.0t. Positive and negative rising step function response into an eight ohm load with a one microfarad capacitor in parallel. The ringing persists longer on the negative transition.

is a result of the bandwidth limiting.

The two-versus eight-ohm load pulse comparison of Figure 4 shows the effect of the high output impedance of the Carver. The lower the high frequency impedance of your speaker, the softer this amplifier is going to sound.

The distortion shown in Figure 5 is much lower in magnitude than found in the AVA, and is smoother at the zero crossing points. Of some interest is the asymmetry at the zero crossover points: the crossover from negative to positive is much smoother than the positive to negative crossover.

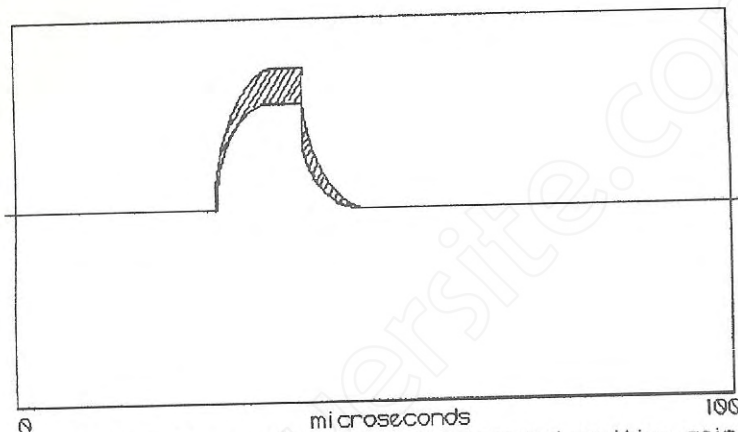


FIGURE # 4. Carver M4.0t. Ten microsecond positive going pulse into eight and two ohm resistive loads. Carver amp exhibits large load dependent high frequency output.

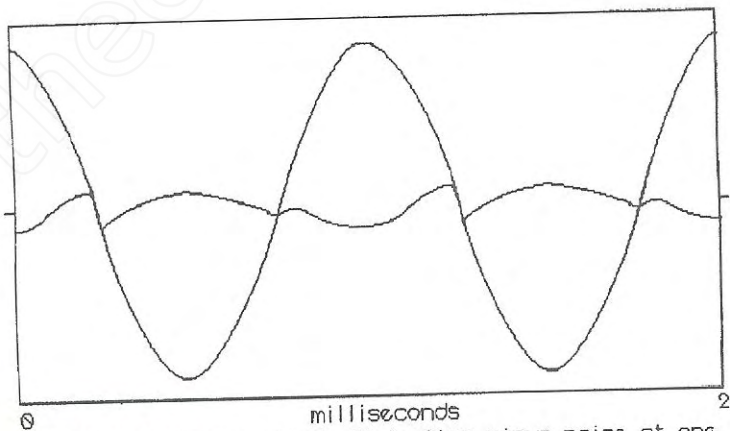


FIGURE # 5. Carver M4.0t. Distortion minus noise at one kilohertz, 0.5 volts peak to peak.

thecarversite.com

This manual is either an original scan from tech's who worked at Carver corp, donated by forum members, or both. These manuals are NOT intended for re-sale. If you purchased a 'Carver Manuals' disc on ebay or another auction site, and it has this material on it, you were ripped off!

Please report any resale of this material to us at thecarversite.com

thecarversite.com