LESS WAR, MORE PEACE (OR VALVET AMPLIFIER)

Due to a slight mis-communication, I didn't see the final proofs of my article "Amplifier War and Peace" about the Valvet™ hybrid amplifier before printing (March '07, p. 14). Thus, potential builders should note that C7 is shown in Fig. 1 as 47µF, but should be 0.47µF (plastic film).

Also, if built as shown, there is a nasty (but not fatal) "turnon thump" through the speakers. This is due to the HT turn-on upsetting the MOSFET biasing momentarily. The simple fix is to add another step to the power switch, so heaters, then HT, then MOSFETs are progressively turned on.

Simon Brown
simon@designbuildlisten.com

OSCILLATOR PARTS

Reading Dennis Colin's "A Wide-Range Audio Sweep Oscillator" (*aX* 2/07, p. 26), I found that he is, as usual, making it difficult to obtain parts! Harris Semiconductor no longer exists as a separate entity; they were eaten by Intersil, long ago.

Allied Electronics used to carry this part (under Harris), but no longer carry Intersil. A google search turns up loads of suppliers—in Hong Kong, and other exotic places—bad news if you live here. I did find one stocking distributor in the US: www.1sourcecomponents.com. I have requested a quote for small quantities. We'll see what happens.

John Nickerson
johnnickerson@verizon.net

Dennis Colin responds:

My sincerest apology; I hadn't known that the CA3280AE wasn't available. Digi-Key has some Intersil parts, but not this one. What a shame; this part is extremely versatile. I have six Harris units and one original RCA; I'd better preserve them in a time capsule!

Please let *aX* know if your search is successful. If not, and there's no substitute, I could try to design a discrete transistor equivalent, or change the oscillating circuit to use analog multipliers. That could reduce the frequency range because of voltage offsets.

Thanks for your letter; in future projects I'll make sure all parts are available.

DVD/SACD PLAYERS

I decided to document my recent experiences with SACD/DVD player modifications. I first pursued this back in 2003 when I procured a Philips SACD1000 unit. I then had a lot of trouble obtaining technical information (tech service manual) until I wrote your magazine, detailing my experiences.

With help from your readers, I eventually *did* obtain a CD-ROM containing the information I wanted. However, that's "ancient history" right now—I was diverted from that path by involvement in other projects and put it aside. My experience now is with a pair of cheap players—Sony DVP-NS500V and the oppo-digital DV-970 universal disc player.

Back in 2003, I had also (easily and quickly thanks to Sony's professional services) procured the tech manual for the Sony unit. At that time, I did an ultra simple (and simple-minded) revision, installing "pull-down" resistors (4.32k, RN55D) at the outputs of the main stereo output op amp and also bypassing the output coupling caps (47µF/16V) with small polypropylene caps (the well-known 50V Panasonic units available from Digi-Key). The audio output channels in the Sony unit are all handled by the *cheap* and ubiquitous 4558 dual op amp.

The results were modest but apparent, and listening quality did improve a bit. I put *that* aside for a while until I remembered how useful the AD827 had been in my previous projects. This fast-settling video op amp works very well as a substitute for other unity-gain stable devices in common audio circuits—it has always outperformed the garden variety chips I have encountered in other pieces of consumer gear (line-level applications).

Its one drawback is that it is *not* available in an 8-pin surface-mount package. Luckily a friend came to the rescue and mentioned the AD828, which is stable down to a gain of 2 (no problem in these players I am referring to) and is otherwise reasonably similar in performance to the AD827. It is also *cheaper* and is available in an 8-pin SOIC package (surface-mount).

The temptation was too great. I tried it out in the Sony DVP-S500V (IC202 position) and the results were what I'd been dreaming about for SACD playback (and the 24/96 Classic Records DAD discs—which are DVD-V in two-channel stereo).

All of the problems with the SACD and the DAD were eliminated, including the new "Living Stereo" hybrid SACD series, the older Sony Classical SACD-only discs dating back to 1999/2000 and later, *and* the original circa-1998 Classic Records DAD discs. By comparison, the playback results are thrilling. My resources are *very* limited, so I don't have access to more than about 20 discs with which to demonstrate these results; others will need to go further afield than I can right now.

How do these hi-res discs compare to CD? (My current CD reference is any transport used with the heavily modified Philips DAC960. . . work done on it in 1993 and in 1998—all documented in the essential POOGE book by Jung and Galo.) They are decisively superior—in every way. And this is with an el-cheapo (but now modified with the AD828) SONY DVP-NS500V DVD/SACD/CD player. It's possibly the most dramatic transformation I've experienced in several years.

My suspicions that SACD and DVD-V (at 24/96) formats were capable of outstanding results are now confirmed (and almost *nobody* I know is aware of this!). I am surprised and pleased that my suspicions were correct. However, *beware* of producers who issued SACD discs made from CD masters (John Atkinson—and others?—have exposed these charlatans in the past. . . and I can tell you now, the differences are amazingly obvious).

I also performed this "trick" on my

oppo-digital DV-970 player (the main stereo outputs only—and yes, it also uses the 4558 chip too—perhaps *everything* does). . . and with some trepidation, because I have *no* documentation for it. Luckily a scope and the old CBS CD-1 test disc come in handy. The sonic improvements are similar, and are *also* obvious when playing-back a movie DVD (PCM - stereo option). This is a good all-round improvement, with good results for every application.

R. K. LeBeck. Jr.
Kirkland, Wash.

MATT HAMILTON—IN MEMORIAM

In January 1994, I placed an ad in *Speaker Builder* and *Audio Amateur*. It brought Matt Hamilton and me together. I wrote about my relationship with Matt as my mentor in the May 2004 issue of *audioXpress* ("Letters," p. 68).

It is with great sadness and a profound sense of personal loss that I report Matt's passing on October 29, 2006, in Bradenton, Fla., after a prolonged illness.

William Matthew Hamilton was born on May 21, 1925, in Audra, W.Va. While growing up, he and a friend built radios, and never lost his love for electronics. He graduated from Buckhannon Upshur High School, W. Va., in 1943; attended Fenn College in Cleveland, Ohio, and married Wanita Waugh in 1947. He worked as a mechanic on both automobiles and buses until 1955.

Matt then worked for the Thew Shovel Company in Lorain, Ohio, in the engineering department until 1959, when he started working for the Burroughs Corporation. During the period he worked for Burroughs, he assisted in selling and installing many large computer systems in Ohio, Michigan, Wisconsin, Pennsylvania, California, and also in Amsterdam, The Netherlands. He returned to the US in 1971, retired from Burroughs in 1986, and moved from Pennsylvania to Bradenton, Fla., in 1988.

Sometime in the 1990s, he started giving computers to academically motivated, needy children. He accepted computers and associated equipment from individuals and companies, and made sure the computers were in good working condition and configured them so the children could use them with ease. He gave away dozens and dozens of entire computer systems, complete with monitors, mouse devices, printers, and speakers, to children of all backgrounds.

I recall one very poor Mexican family who had previously been living in a van. They'd finally gotten a home to live in, and the little girl who was the recipient of Matt's generosity of heart was recommended as an outstanding student to Matt to be a computer recipient by her school teacher. Another fortunate beneficiary of Matt's kindness was a little Mexican-American girl whose mother my wife had seen through four pregnancies (my wife is an Advanced Registered Nurse Practitioner—Certified Nurse-Midwife), and she has mentored the entire family. Matt was happy to give her a computer system, too. He never asked all the dozens and dozens of children and their families for anything more than thanks.

His wife, Wanita, says of Matthew: "He was very capable—no job was impossible for him." Wanita figures prominently in this story because she was always very supportive of his involvement in his many and varied projects. She supplied the grille material for his D'Appolito speakers and actually helped him stretch the material over and around the speakers. She also provided the foregoing biographical information on Matt.

I miss my friend more than words can say. He will be forever in my mind and in my heart.

Angel Luis Rivera
angelluisrivera@excite.com

CD/VINYL TESTING

After scanning the Feb. '07 issue of *audioXpress*, especially the CD/vinyl system in Indonesia (p. 31), it occurs to me that an overlooked issue in the entire controversy may be related to whatever occurred in mastering.

I roundly criticize the current practice of severe peak limiting on many CD releases in a misguided attempt to make something with a brickwall peak ceiling play louder. I thought this practice came about with the adoption of CDs as our primary music transport media.

In the process of transferring some vintage vinyl to CD, I was surprised when I looked at the audio envelope of the transferred disc on my audio workstation and found it looked like toothpaste, as most contemporary CD releases look.

My conjecture, at this point, is that at least part of the differences heard in CD/vinyl comparisons are differences in mastering practice rather than differences between the two methods of delivery. It is folly to assume that the master tapes are transferred verbatim to either medium, because they aren't. The record companies have finally recognized the value of their back catalog and are bringing more and more of their old recordings back into circulation. But when they do this, the recordings are inevitably subjected to "mastering," and in the process they may be caressed or abused.

I plan to explore this further by comparing the long-term envelopes of the recordings between vinyl and CD releases of the same material. I know that I have an original Capitol Records release of *Sgt. Peppers*, a British pressing of the same, and the CD release of the same. It will be interesting to compare the three.

Rick Chinn
Sammamish, Wash.

SAFETY FIRST

I would like to comment about certain technical viewpoints expressed in the article "Grounding and System Interfacing" (Jan. '07, p. 26).

While I certainly agree with most of Mr. Galo's statements and those he attributes to Mr. Whitlock, I must take exception to one major issue: Attributions to Mr. Whitlock that ". . . earth grounds are for lightning protection," and that ". . . . earth ground plays no role in protecting people from electrocution." These seem to be contradictory statements. If earth grounds are for lightning protection, then they certainly play a role in protecting people from electrocution (from lightning and from a little-known effect I describe later).

I can only assume that Mr. Whitlock was only considering his example shown in Fig. 1 on page 26, in which defective equipment develops an internal short and, if the equipment's chassis were to be not grounded, the chassis would be "hot" and thus dangerous. While lightning strikes occur very rarely in most of the country, Mr. Whitlock's figure shows the components of a more menacing, 24-hours-a-day threat to equipment and humans. This threat is the utility distribution system itself; and this is where the building ground, in my opinion, does its "thing."

The utility transformer does *not* have perfect isolation, as depicted in the schematic, between its primary (typically 4kV, 12kV, or more volts) and the building's load (typically 120, 208, 240, or 480V). This lack of isolation "in the real world" produces leakage currents that are primarily due to capacitance effects (proximity of windings and wires) and resistance (dirty insulators, poor insulation, and so on). While the leakage current may be relatively small as far as building loads are concerned, it can easily provide more than enough amperage to electrocute someone. This current is always there to varying degrees, depending upon transformer and wiring condition and age. Admittedly, the ground rod (or any other grounding system) is not a perfect connection to "ground" (it has a low, but not zero resistance), and this is one of the reasons that it is possible to measure voltage differences between grounds.

Stated another way, if the ground rod (or ground system) were not present, people would be electrocuted every day in their homes, office buildings, or factories just by touching perfectly functional equipment that has *no* internal faults.

Another point I'd like to make is that utility companies ground their power transformer secondaries in addition to the customers' grounds. This is due partly to the fact that utility transformers rarely feed just one customer. If they had multiple customers, they would have multiple grounds anyway (and could not depend upon one customer to provide an adequate ground for all of the other customers). Additionally, there are times when they might need to disconnect the lines to customer(s), so they certainly need to be concerned about the safety of their own personnel and wiring.

Imagine an ungrounded transformer with a 12kV primary and its secondary

is not grounded. The utility's wiring and the customer's wiring are rated at 600V. Without a ground, the wiring is subject to voltages (thought to be zero) but that could be many kilovolts, maybe 12kV. Over a prolonged time, even new wiring would fail, and—more important than this—personnel could be subjected to the same voltage (very, very dangerous). Ironically, new wiring would lead to a more dangerous condition, because more leakage current would be available.

With 50 years as an electrician, I am personally aware of several dangerous—and lethal—instances of this type of problem. In one case, a utility worker was killed near a pumping plant I was maintaining when he was working inside a relatively small ground-mounted transformer feeding several houses nearby. He was working on the secondary when he received a "high-voltage" burn even though the 12kV was not accessible.

Another instance occurred when an electrician working at a pumping plant received a call that the pumps were not working in the facility and decided to measure the voltage-to-ground of a 480V service to the pump building. This was a three-phase system with a 12kV primary and 480V secondary (he was not aware at the time that the secondary was ungrounded). Normally, the voltage-to-ground is 277V on each phase; but this is only true in a grounded system. The utility source was in trouble (apparently one or two of the three transformers' primary fuses had blown due to insulation breakdown in the old secondary wiring as described previously).

Even though the blown fuses would not permit any pumps to run, that one good fuse was allowing leakage current to flow from the high to the low voltage connections. When the electrician touched the leads of his voltmeter, which was set to the 750V scale, the meter exploded in his hands and he was slightly burned and very surprised and frightened. If he had touched *any* electrical connections in the building with any part of his body—thinking that power was off—he could have been killed by a current that might not have been strong enough to even light a light bulb.

As far as the article's discussion of good and bad ways to try to eliminate noise in audio gear, I couldn't agree more. Three-prong to two-prong adapters (used as "ground lifters") is a misunderstood, and thus, dangerous item to deploy by persons testing or trying to eliminate ground loops. They are used because they are convenient; and alternatives may not be known or available at the time. Perhaps their discontinued use for these purposes, thanks to Mr. Galo's article with information from Mr. Whitlock, may prevent someone's tragedy.

Gene Davis
gdavis219@hawaii.rr.com

CAR AUDIO

I thank you for publishing *audioXpress*, without which a *large* part of my life would be missing. I do, however, have a few complaints.

Please, more modern topics and less of the "good old tube amps." I understand why you run so many tube articles, and empathize. But, may I suggest you take even a brief look at the automotive amp industry (repair, maintenance, building)?

I am an automotive installer, but prefer the permanence of "home" equipment/installs. I've seen Class BD, Class D, Class T, and so on each hit big in the automotive field (and last), years before home stereo even considered them. Also, nearly all of the innovations for speakers, *especially* subwoofers, have come from auto needs/desires.

So please, do music a favor by getting more young people involved in how all this stuff works. (I'm 47 and have saved/repaired massive quantities of amps, EQs, subwoofers, and so on through simple repairs and total rebuilds.) My daily driven "grocery getter" van has done 160dB at the dash.

Topics of most interest, I think, might be:

1. The amp power converter/supplies.
2. Amp topologies and special needs in autos.
3. Matching subs with amps. (None of our customers seem to understand that you don't need 3000W RMS and subs to match, when 300W with efficient drivers will rattle the mirror off the windshield.)

I'm not sure whether you're aware—or care—but it is interesting that in competition concrete filled cars are nearing 190dB. Personally, I prefer sound quality. Again, thank you for what you do.

Glenn Ray Dõrzök
Dimock, SD

NIGHT SCHOOL

I love your magazine. I also think there are a few subscribers like myself who love the hi-fi hobby, love to solder and rebuild equipment, but may have needed extra work in areas of mathematics. In that respect many of your articles go over my head. But one did not.

The February issue featured an article by Jan Didden about a visit with some Indonesian audiophiles. It was a really great article! Keep those special reports coming, they make your magazine more adaptable to all audio nuts. In turn, I will go back to night school to brush up on decimals, fractions, and graphs. Thanks for a great mag.

Mark Korda
mark.korda@verizon.net aX