



Pooging The Quad 405: Chicken Salad From Chicken Bleep

by Max Duidous

Preface

There was a time in my life when I was susceptible to the notion that more expensive meant better performance, and that an amplifier built by a speaker manufacturer was going to be a better match for its speakers than anything else on the market. Having become the proud owner (through the 2nd hand market) in 1969-70 of two pair of Original Quad (1957) electrostatic speakers, I went for the moderately expensive (for me) transistorized Quad amplifier model #405 that debuted (in 1973) at \$450—but I was able to buy it, used, and at half-price. The Quad 405 was O.K., if *not as good a match* for my purposes as a Pooged Dynakit Stereo 70, (augmented power supply, polypropylene caps and 1% metal-film resistors in the signal path) which had *such* a synergistic relationship with Quads you might have thought the Dyna was designed for them; especially with my two pair of stacked Quads, bi-amped, and supported by my pair of 18" Hartley woofers in Klipsch horns (designed for the Electro-Voice Patrician speaker). That system was patterned on a Mark Levinson system that was marketed about that time, and it was bitchin'. So it was not surprising that my Quad 405 yielded to the Dynakits and wound up down at the bottom of a shelf of seldom used back-up gear in my garage. It might have been there for over 25 years (since I sold my Quads), and was forced into use only when other gear went down.

A Corroborative Quote

In the January 2009 *Stereophile* "As We See It" section, Art Dudley, making another point entirely, wrote: "*No domestic audio product—or type of audio product—does all possible things equally well.*" That is to say, some amps play Rock well, while other amps play classical chamber music well; but damn few (if any) amps play both well. I agree with him, here, though I often disagree with him—as when he disregards his usually incisive reasoning by omitting the possibility of "voicing" various pieces of gear with AC cords, interconnect cables, speaker cables, as he does in this column. Let's bear in mind the idea that there are some products that become seen as "specialty items," good for specific tasks, like tubed guitar amps. I think Art Dudley would have no problem with my invoking his name in this regard.

The Quad 405

The Quad 405 was one such specialty item. It wasn't that the Quad amp was a bad amp: it wasn't—but it wasn't anywhere as good an amp as the Quad speakers were speakers. There is a 1976 review by Gordon Holt in the *Stereophile* archives, in which he made clear he didn't think too highly of the amp. I'd guess he didn't do a listening test with the 405 and the Original Quad speakers to which it was dedicated. I recently did a few mods to my 405: I replaced the op-amp chip and installed a new

diode bridge. Finally! It sounded terrific to me, way cooler than it had been sounding, but I'm not sure what it was that got the damn amp to improve. Was it the impact of Baltimore summers, where it gets pretty hot (like three weeks or more of 95-105E F, outdoors) when my garage behaves like a solar collector and it might get to 135-140EF, indoors? Or, was it due to cold snaps, where it might stay below freezing from early January to mid February when (as lately) my garage acts like an industrial freezer chest? The newspapers reported this January was nearly 4EF colder, on average, which put the average temperature around 31E. (We know of more than a few manufacturers who value cryogenic treatment of their gear.) Or, was it more the case that the last part-substitutions on the Quad 405 were most audibly perceptible, hence successful?

With these final "poooges," or tweaks, this Quad 405 did quite a turn-around, so much so I feel it warrants attention being paid. It went, and this is an approximation, from like a class C- (as Gordon Holt implied) to a class B+ (as I aver). That's really about five notches if you figure each letter grade is three: up to C, then C+, B-, B, and B+. Just suppose this amp started with a C-, and with each of the five poooges below (I don't count #6: it's real subtle, but some of my listening panel pick it right up.) you got *at least* a just noticeable difference up to B+. That's a significant upgrade, just shy of a re-design. I think I'll only outline the mods because, skipping things like, "cut a piece of red hookup wire 3.5 inches in length, and trim and tin the ends." In the past, these types of articles did not meet with more than a limited response. This, then, is for you of serious intentions, the top of the grade-curve, Poogers with lots of circuit repair experience. It might be worth it to sub-contract the parts-swap to a trusted technician to actually do the work if you want to assure success. I personally *Guar-aunt-tee* you that if you do these poooges you will have an amp that will put a smile on your face every night for the next decade.

The 6 Mods

There are only six things in particular I'd recommend. I think they'd go like this: 1) replace small-value signal-path caps with new polypropylene caps, 1.5 or 2 times higher in mf value than called for, yet physically small enough to fit the vacancies in the printed circuit board where they'll go; 2) add a large capacitor bank (4 x 10,000 mf, 75v., caps; with 20,000 mf connected to the + rail, and 20,000 mf to the - rail), and connect the umbilical cords in series with the "stock" supply; 3) build & substitute for the stock diode-bridge, a new diode-bridge, using *only* Fairchild 8A, 1200V, "Stealth" diodes (available from Mouser; P/N 512-ISL9R8120P2_Q), and a bit of perforated circuit board; 4) for the stock chip, exchange a way-better 8 pin dip op-amp chip (*only* the Intel 1360, check Mouser or Digi-Key) in the two front ends, or first-stages; 5) for the stock AC cord, substitute a new, much higher quality cord, like a WireWorld AC cord (as much \$\$ as you can justify); and 6) replace the original RCA input jacks with new according to size (I think Radio Shack still sells smallish, gold-plated pairs in blister packs.), and the old loudspeaker connection hardware with new chassis mounted receptacles for (single) banana plugs also according to space available on the chassis and inside as well.

Sounds simple, but there can be a lot of little problems that come up due to the size of your selected caps and hardware parts. And you can't disassemble the whole piece without having to unsolder and re-solder a whole lot more than I'm comfortable with. I completed all of these mods with only moderate disassembly, so the project can be undertaken by an experienced technician, or *expert* audio hobbyist who is used to working in close quarters. That is not to say, if I can do it—anyone can. It is to say that anyone, like me (and I've rebuilt dozens of amps, pre-amps, tuners, and loudspeakers) who has similar experience and specialized tools (I own soldering pencils rated at 15W, 25W, and 35W, plus a soldering "gun" at 100W and 150W), can do it.



This shot shows the stock IEC female connector, and how beat up they can get. I guess I'll have to get a new one soon. My mother warned me not to wash my dirty laundry in public.

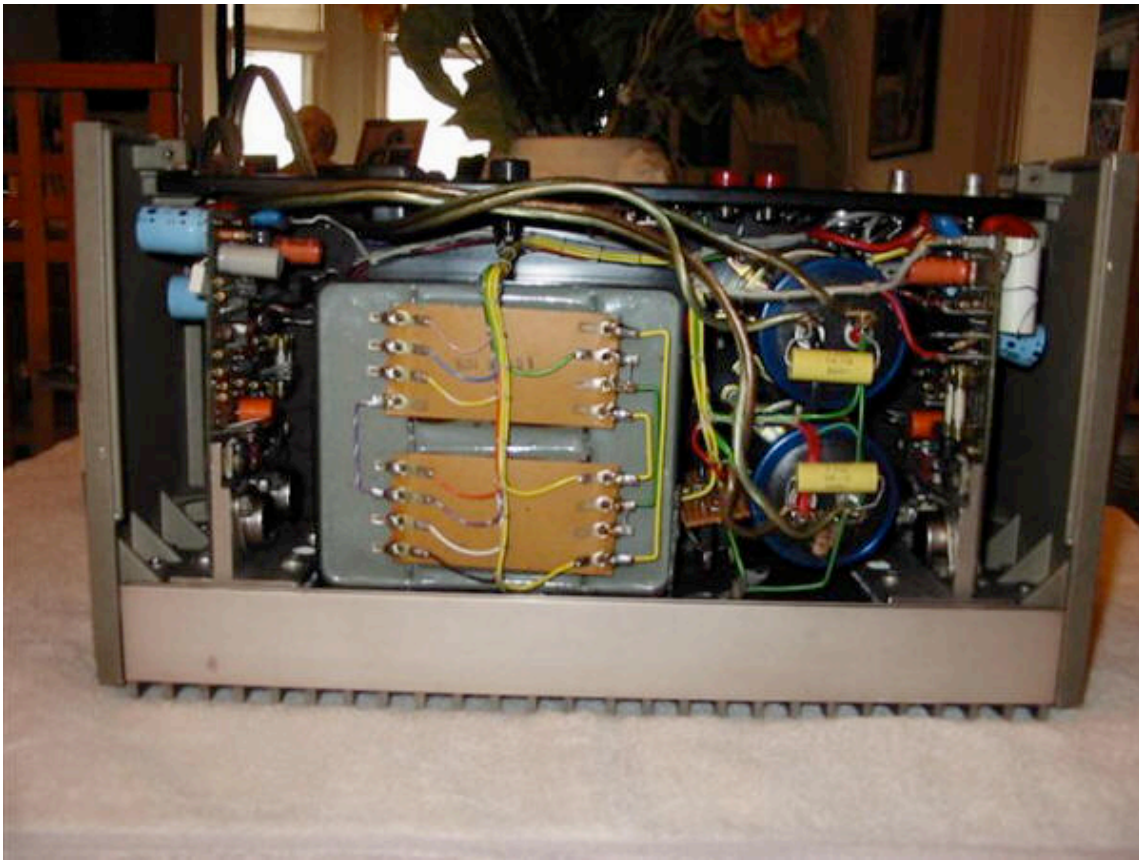


On the Printed Circuit Board, near the rear wall of the chassis is, in the top right corner of what is

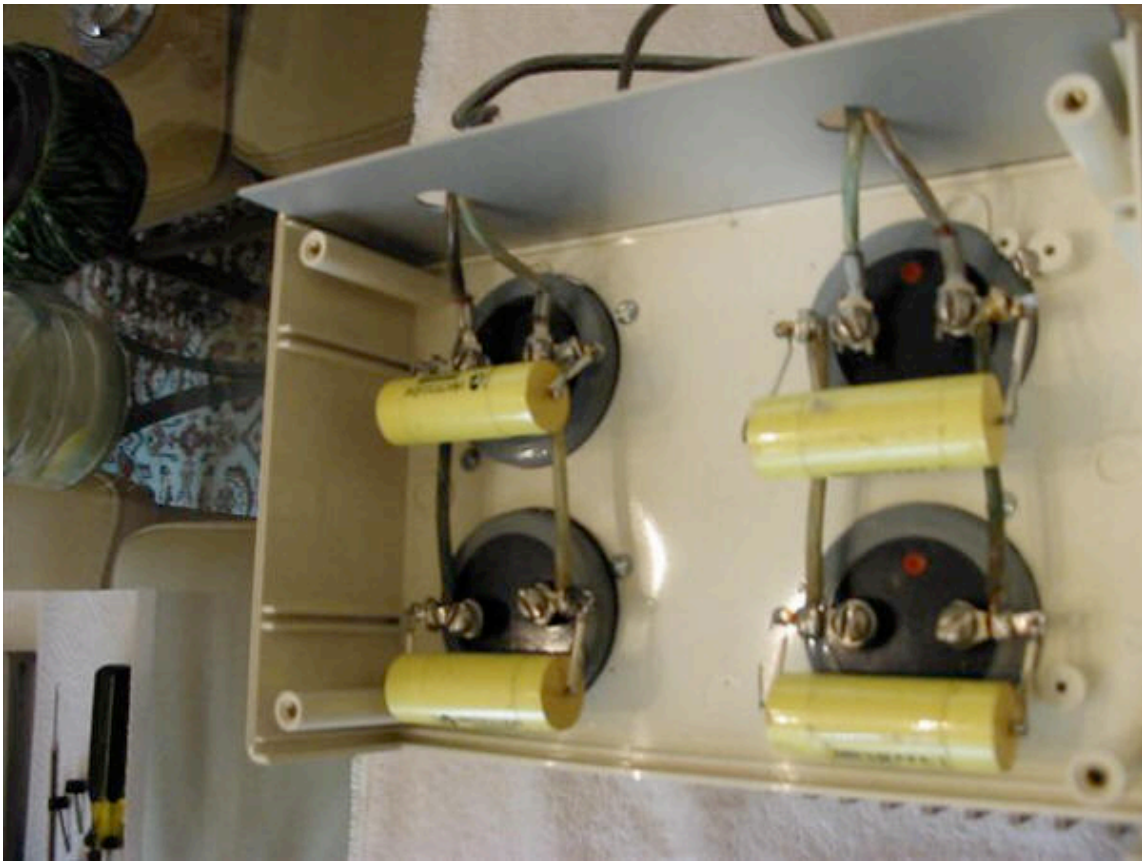
exposed of the PCB, a small blue part. Actually, it is the same cap we saw from another angle in a previous picture, only now it is mostly obscured by a shadow. Below the small blue cap is the op-amp of the other channel. You can see how accessible it is. I ran into little trouble swapping the old for the new, improved, better than ever, great taste, less fattening, op-amp chip.



This one shows how accessible the op-amp is. Near the far chassis wall, you can make out a small, blue capacitor, and to its right an orange ('lytic) cap. Between them is an 8 pin dip chip, the op-amp that drives the whole front end of the amp. Remember, not every op-amp will do: only Intel 1360. When you swap the 1360 for the original, make sure the notch is facing the same orientation.



This top view shows how the leads from the capacitor bank attach to the Bib Blue caps, which are also shunted. With a flash, this shot shows how you can use a small rectangle of perforated board to hold the diode bridge, and to use duct tape to keep everything insulated and nearly immobilized. You will have to remove the original diode bridge which is potted and screwed into the wall of the transformer shield. Trim the wires as close as possible to the diode bridge's housing. The perforated board can be seen just to the right of the transformer, near the bottom. This shows how accessible the diode bridge is. Remember, only "Stealth" diodes from Fairchild.



This is the underside of the capacitor bank. It's also pretty self-explanatory. The two 10,000 mf on the one side are for channel A, and they connect in parallel to the Big Blue 10,000 mf caps on the main chassis. Note the red dots on the two caps are oriented in one direction, while on the other channel the red dots are reversed, though obscured by the yellow shunt caps.





Recognize the Quad 405 amp on the rack of used gear, I enclose this. Note the name and model number are in the lower left corner of the piece, for those who've never seen one. The capacitor bank is on top, though it needn't be.



This one of the audio in (RCA jacks), and out (banana receptacle) hardware. The metals are better, and the insulators are better. It's worth the few bucks after all you've already spent. You wouldn't

cheap out on something that could undermine all your efforts, would you?

Bad Mouthing The 405

Regarding the Quad 405, most folks, even Gordon Holt, forgot this amp was designed to drive the Quad Electrostatic speakers, so a lot of current was not desired: high-current amplifiers made the electrostatic elements arc and burn holes in themselves when played loudly. By way of contrast, the Quad 405 was given a "Current-Dumping Circuit" to protect the Quad electrostatic speakers. When driving regular cone and dome systems the 405 was often found not to have enough "punch," especially in the bass and high trebles. Also in keeping with protecting the Quad speakers, they actually never produced much bass below 45 or 50Hz. So the amp was designed not to press the speakers into the lowest octave where they were least able. It seems the 405 was designed with protection of the Quad speakers as a goal. In this regard, it is a successful design. It wasn't designed to be used with current-hungry speakers. So the charges of lacking punch are justified, if not the whole story.

Proper Use With Proper Speakers

On the other hand, this amp, with the six pooges incorporated as above, is a damn fine specialty piece for a quality high efficiency speaker like the Lowther, and most likely, when it is running in a system that is bi-amped and uses a self-powered sub-woofer below 80 or 100Hz. Of course it will do very well with the Original Quads, or the Quad ESL-63s, and even better if they are augmented by sub-woofing. In such a biamped system, with highly efficient speakers that are crossed over into one or two sub-woofers, the pooged Quad 405 does an *senbleepingational* job, and it can't, by design, harm the speakers on top.

When used in this way, I find the Quad 405 a *first tier* amplifier. I expect it will also do well with high-efficiency horn systems, especially those with high efficiency woofers. The die hard tweaker can have some fun by finding the right crossover values for the load resistors, or by installing variable resistors in series with the mid-range horn, and tweeter horn to reduce their output and match up to overly polite woofers. But once in such systems, the 405 ought to do very well. I think I used the 405 with a pooged Altec "Voice of the Theater," for a while, that acquitted itself well enough and convinced me to keep it.

Associated Costs

I have only been able to find one, collector's quality (as new), Quad 405 on *Audiogon*, and that was selling for \$600. I figure a scratched and dinged up one, like mine, ought to sell for half that or less, on-line. But it must be in good working order. So say it costs \$300 (and you might find one cheaper than that, off-line), and the mod's parts cost about \$100 - \$150, that would total about \$400 - \$450 and be a real nice price for a high-quality, if specialty, amp. I'd say it would be worth the time to find one, get all the parts in house and lined up, and perform the part replacements (maybe a workday at the bench). If you have Lowthers, or Quads, or horn-driven high efficiency systems, you'll soon be in heaven.

Sequence Is Paramount

If you have some reservations you might proceed part by part, and then, after each, continue or not. The two most spectacular improvements, that involve the least time and effort, are replacing 1) the chips and 2) the diode bridge. With those swaps, you ought to get a most notable improvement in sound, *lowered noise floor, reduced colorations* like splashy sibilance, etc. Next comes a bigger job, 3) building and installing the outboard capacitor bank. Once installed, it will give you a *bigger sound stage, more punch on transients, and more mid-bass* fill-in to give a "rounder" sound. Swapping out 4) the stock signal path capacitors for more modern Wima or AuriCap polypropylene-on-foil-type capacitors will give you even *cleaner transients, and much greater clarity*. The last two items are only audible if you have done all that has gone before.

I find the engineering behind the WireWorld product line very thoughtful and not "me-too." Their power cords all are built on the same premise (see www.wireworldcable.com). You might read the promotional blurb about the price ladder of their AC cords. If you have an unused audio grade AC cord hanging around, by all means use it. Later, when you want to get the last smidgeon of improved performance out of your Quad 405, you can 5) go for a WireWorld AC cord at a price point that suits your budget. Anything to improve on the "stock" cord with its "tizzy" (some say "dirty") high end. The result I found most noticeable was *less tizz on violin bowing noises*, which also means *cleaner cymbals*. Finally, 6) new female, chassis mount RCA jacks, and new banana plug receptacles can offer metallurgical improvement upon the old speaker cable connectors on the chassis' rear end. The improvement is real, but small, probably due to "dis-similar" metal contacts that cause dioding. Try to

avoid the nickel layer in the plating process. It seems to me, this will cause a *reduction of a very low-level, but audible, haze; the kind of thing you notice by its absence*. If you replace the two connectors (in and out) on one channel, you'll be able to do an A/B comparison just by using your balance pot. You have to smite the big problems before you can work on and hear the little ones. Otherwise, you'll get frustrated, and you'll say, "That Ole Max has lost it this time. There is absolutely no difference." If you do these tasks in reverse order, that judgment will seem true. And that's what I did, unwittingly, and because better chips and diodes weren't available in 1980, or thereabouts, when I bought my 405.

Summing Up

This is a Do It Yourself Project that can rehabilitate an amp with a dodgy reputation that showed up as a specialized amp in 1973. Sticking with the series of six steps, and sticking only to the parts designated, a good technician can revive this Quad 405 amplifier to the stage where it would be ideal for The Original, or the ESL-63, Quad Electrostatic Loudspeakers. It is also an excellent mate for Lowther 8"speakers, or high efficiency horn loaded speakers like the Altecs, or with just about any small speakers (Lowther 5" or, BBC Monitors) used with a self-powered subwoofer. I've used it with lots of various speakers, and while it is not "great" in the sense that the Parasound JC-1 is great, able to play comfortably anything from chamber jazz to giant symphonic works without stress or strain, sounding suavely accurate all the way; or in the sense that my rebuilt Fisher 50A's are great, able to remain suave and warm no matter how etched the software, and spreading a huge sound-stage doing it; or in the way a pair of Marantz 8Bs strapped to mono are great, remaining highly articulate and shimmery no matter what flaws a given system may show, and soprano friendly all the while; the Quad 405 is great because it does play all types of music with extra-ordinary beauty, if not overwhelming bass.

The fully tricked-out Quad 405 flexes its current-dumping muscles (rated at 100W per side) without threatening your speakers, spreads a very convincing facsimile of a medium-sized sound-stage, and captures the differences between the textures of soprano and contralto voices in duet—without seeming to draw chalk across a blackboard. It is a very smooth and well-mannered amp, and it does what it does in trustworthy fashion, never calling attention to itself, nor seeming unable to play music in a less than pleasant manner, with no rough edges or screeching—a joy to hear. Maybe it is, overall, an A-, lacking only a degree of muscle and a larger sound-stage worthy of a solid A.

A handful of you guys will have to get into this project and report back your vote. If you like your music on the intimate side (jazz, folk), this amp is definitely worth your time whatever speakers you use. *Lotts*a bang for the buck. *Lotts*a sound from a 35 year old design. And since it never enjoyed a great rep, there ought to be some of them around, cheap, not on E-Bay. That's about it from the chilly Chesapeake, where last night the weather flirted with single digit F temperatures. Not so much global warming from my porch thermometer for the first week in Feb. I remember seeing archival photographs of B&O Railroad tracks laid across the frozen Chesapeake Bay from Baltimore to the Eastern Shore. That was pretty thick ice. Que sera, sera. Ciao, Bambini.

Max Duidous, bargain hunting igloo dweller.

