

# LETTERS

Dear Sir,

I was one of the first to rush out and buy one of the ETI 466 300 watt amps. Since the first day I built it I've started losing hair!

Having made over 20 kits of numerous things, done repairs on my friends' amps and repaired computer cards, (the latter for a living) I thought I'd be up to building this amp.

I was on holidays at the time and I had the amp built in next to no time. When it came to set up the current through the output transistors, I found I could get only 1.5 V across the 10 ohm resistors replacing the fuses and then it quickly increased till the 10 ohm resistors exploded. Thus ended the first lot of power transistors.

Next time I earthed the input the same thing happened, but not so quickly. After I had spent about \$80 on output trannies and the complete replacement of all transistors (twice!!) the manager of Dick Smith's at Buranda, Brisbane enquired as to what was going wrong. I explained what was happening and that I'd even gone to the extent of checking each component to see that it was within tolerance. I was in luck! There was a chap up from Dick's head office and he sent it down (the amp) to be fixed by the experts down south. About three weeks later it returned. I managed to get hold of the same gentleman (I forget his name) and he informed me it was going wild at about 2 MHz and that the chaps replaced one of the feedback caps and moved my heatsink earth strap (the amp wasn't mounted in a box yet) and replaced the output transistors again. It was working!

I might add **all** those repairs were done for free and I was very grateful for their assistance. The amp ran perfectly for about six months without fault until it received a short on the output which promptly killed it. I replaced the faulty parts and she was away again!

About two months ago the amp once again failed and I might add at this point the amp does get used for disc jockey work into 4 ohms. My speakers will only handle 100 watts each so I have a power meter set for 200 watts (it was calibrated on a professional amp). The heatsink is a sheet of aluminium 13 x 7 inches with 14 7" x 3" fins fixed to it. This keeps things really cool. Anyway — I carry a 120 watt Auditec amp (these

are indestructible!) as back-up so I used it till I had time to look at the 466.

I bought four new output transistors, checked all surrounding BD140s and 139s, and it set up OK. Plugged her in — no worries, away she went, flat chat into distortion, no worries. The next time I had to use it whilst DJ-ing, I ran it for half an hour at about 3 - 5 watts and then I decreased the level (due to the party noise) and bang!, dead again. Back to the back-up amp.

I then took the 466 into work where I have a full workshop except for a CRO. I checked **all** transistors and replaced the faulty ones. I even replaced some of the suspect resistors and diodes. It set up OK so I added two more output transistors (total of 6). I increased the current a little to cover the addition of these and it set up perfectly. I took it home and plugged in one 8 ohm speaker and it promptly blew up. I took it back to work again and practically stripped the board. I replaced every transistor standing. I checked all voltage levels. It set up perfectly again (only four output transistors as replacing six each time is **very** expensive). I even gave it a short test run on a small speaker at work. I took it home and it self destructed again! I then picked up the case which housed both the 300 W and the 120 W Auditec and threw it down the stairs at the front of my house!



Crushed and mangled, I took the remains upstairs and realised the Auditec was also in the mess somewhere. I plugged it in and away went the Auditec as if nothing had happened!

I won't say what I think about the chap who designed this 'novel paperweight' but I have never been so disgusted with anything in all my years. I defy all attempts to reverse it. The only satisfaction I ever got from building it was destroying it.

I know of many other amps which have also met the same fate, because I'm at Dick Smith's store so often I've seen many a frustrated hobbyist bewildered by the 466. All I could tell them is 'pull it apart before it gets you'. If you want to keep hair on the heads of Australian men **DON'T GIVE US ANY MORE KITS OR PROJECTS LIKE THIS, EVER!!!**

Yours sincerely,  
A. Stewart  
Gumdale, Qld.

*Well, well. You certainly seem to have had the rounds of Murphy's Law, Mother Nature and mayhem on this one! You should have called us the first time. We built three of these projects prior to publication without experiencing the difficulties you report.*

*The problem, as you found out, stems from high frequency instability. This is not a fault inherent in either the electronic design or the physical construction, as we described in the article (Feb. '80). Let us make that point abundantly clear at the outset. The instability is brought about by components which have different characteristics to those employed in the units we constructed. This is something over which we have no control, nor was it something we were aware of until after the project was published and kits became available.*

*Prime offender was the capacitors supplied for C15. The network on the output consisting of C15 and R47 is there to provide a low impedance load to the amplifier at frequencies beyond the audio range — where speakers and crossover networks look like strange reactances. For this network to do its job, C15 must look like a 'real' capacitor. If, owing to its particular internal construction, it looks like an inductor at the frequencies concerned (above 25 kHz) then that little network will have entirely the opposite effect to that desired. Which is what happened in your case — and many others.*

*The next culprit (or culprits) we discovered turned out to be the emitter ballast resistors for the output devices. As is evident from the photographs of the pc board included in the article, we used 'Noble' brand resistors. Unbeknown to us, these just happen to be the types having the lowest inductance available. Types supplied with some kits had up to four times the inductance of the ones we used. Result, instability! ▶*



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When problems became evident following publication we quickly researched what might be causing the problem. We had discussions with Gary Crapp, Service Manager at Dick Smith Electronics, about reported problems with kits supplied by Dick Smith. Following our investigations, we made certain recommendations which we understand were followed and common problems, much of the nature you experienced, rapidly cleared up. Details of our recommendations were circulated to other kit and component suppliers.

In addition, some people were using output devices (MJ15003/MJ15004) which had differing specifications to the Motorola-manufactured devices we used. We recommend the Motorola devices as the protection circuitry was designed around the published Motorola specifications for these devices.

A very large number of these amplifiers have been built and appear to work satisfactorily. It is apparent that you are the victim of circumstances beyond our control. We are indebted to Gary Crapp of Dick Smith Electronics

for his cooperation in respect of this project.

To our certain knowledge, other firms supplying this kit have not reported customers experiencing difficulties as you did. Components which do not behave as one would reasonably expect can catch out anyone and the only consolation you, the Dick Smith organisation and anybody else has, is that we have all been in the same boat.

When difficulties like this arise, constructors should make **absolutely certain** that the components used are as we specify in the project article. We can take no responsibility for substitutions. In any event, you can phone us (after 4.30 pm please) and check with technical staff.

A similar problem arose with the ETI-477 MOSFET amplifier, published earlier this year. The capacitor in the HF load network on the output, C9, was a source of trouble in some kits, as were the source ballast resistors for the output devices. A note to this effect was published on page 11 of the August '81 issue.

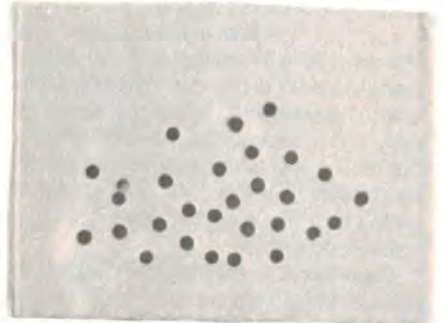
Roger Harrison, Editor

Dear Sir,

Many thanks for solving the *big* problem with my mini-drill which, until now, has been frustrating to use. I constructed the ETI-258 on Veroboard around a 7805, using a scratch-built 0R22, and deleting the rectifier diodes and zener. By substituting a 1000  $\mu$ F capacitor I was able to get the project into Dick Smith's smallest Zippy box, using the cover as a heatsink. I find 9 volts from my LM317 power supply quite sufficient for most jobs, as the increased torque from the drill is truly remarkable.

I am enclosing an electronic tea-strainer for Roger, as a token of appreciation for publishing Graeme's circuit.

F. Hawkins, Townsville Qld.



Many thanks, Mr. Hawkins, all donations gratefully accepted and usefully applied ... except I rarely drink tea! (R.H.)

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