

ANSWERING THE AUDIO-SCRAMBLER CHALLENGE

I am responding to Michael Harwick's critical letter (*Electronics Now*, April 1994) about what he alleges is a "design flaw" in my Audio Scrambling System circuit. He seems to think that the addition of resistor R4 and capacitor C12 is a "patch" to get rid of a troublesome glitch, and he suggests that the circuit either will not work or it will have nasty faults.

When working on the initial breadboard for that project, it was evident that the addition of R4 and C12 solved a potential problem. When we prepare a construction article for publication, we typically build from five to ten prototypes. All of those for this and other projects have worked the first time.

I'll admit that the addition of R4 and C12 is an inexpensive quick fix—but it works! We stand behind the reliability and the simplicity of this circuit. In my opinion, it is one of the simplest approaches to speech inversion so far published. It appeared several years ago in an engineering journal. Admittedly the counter chain has a flaw, but it is easily overcome.

We expect every one of our prototypes to work satisfactorily the first time they are powered up without the builder having to resort to any tricky tweaking or special component selection. Unless that goal is achieved, we continue to work on the project to iron out all the difficulties before we submit the manuscript for publication or offer part kits for it.

We also design complex circuits so that the reader has no need for specialized, expensive test instruments to complete the projects. We

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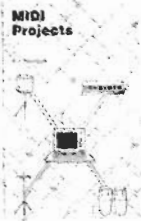
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know that most hobbyists and experimenters do not have access to well-equipped electronics test labs.

Moreover, we strive to achieve that goal even with radio frequency projects that operate well up into the UHF region where more problems relating to parts layout are likely to appear. If Mr. Hardwick was aware of all the engineering and testing man hours that go into the development of projects such as those we submit to *Electronics Now*, he would have known that we were aware of the problem he mentioned.

We do not want to discourage any reader interested in building the Audio Scrambling System. We had no problems with the prototype, and it seems that no one else has had any. We have not been asked about any difficulties with the circuit so far.

Based on orders for parts that we have received, we estimate that well over 100 systems have been built—and repeat orders have been coming in. Thus, we must conclude that the probability of any problem showing up at this time is very low. We are confident that any we hear about can be easily resolved.

We do not design experimenter projects for critical safety or life-support applications, so we do not perform the kinds of exhaustive en-

vironmental tests that would be required to qualify projects for those applications. We have made it a matter of pride and good business to help out those readers who have, through inexperience or error, been unable to get our projects to work successfully at first turn-on. If any components in our kits are faulty, we replace them free of charge.

Many circuits published in magazines, technical papers and operator's manuals have inadvertent "glitches." Component specification sheets might not give enough design data or support information to permit them to be applied successfully in all situations. (The manufacturer might not have tested his product extensively enough to provide this information to cover all "gray" areas.)

Economic factors might force component manufacturers to cut corners in characterizing their products for all possible extremes of operation to save money. Capable component engineers know how to get around these "blank spots." The company can still offer a component that satisfies the vast majority of customers for general middle-of-the-road applications.

The products are, for the most part, cost-effective, suitable for high-volume production, and rela-

ble, despite some technical limitations. Overcoming those limitations in certain applications requires engineering ingenuity—perhaps the use of "patches," as Mr. Hardwick calls them. This calls for experience and judgment not given by computer-aided design programs.

Perhaps a better way for Mr. Hardwicke to demonstrate the viability of his alternative design would be to write a complete article describing it, rather than trying to "sell" it through negative comments in the "Letters" column. WILLIAM SHEETS, MEE.
Hartford, NY

VINTAGE-RADIO LINE CORDS

I got into the radio hobby/repair field in the 1930's, so I enjoyed Marty Knight's article, "Vintage Radio," in the January issue of *Electronics Now*. I remember many enjoyable hours spent reading Hugo Gernsback's *Radio Craft* magazine.

One thing that Marty didn't mention is the use of power resistors inside some line cords. Finding a replacement for them is a special challenge. (However, if your set has a transformer, you don't have to worry about that.)

Resistor line cords were installed on some AC/DC (transformerless)

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