Who is this ‘audio diy-er’?

The most poorly maintained piece of equipment around most diyaudio workbenches is the guy who sits in front of it. Most of us ‘hang in there’ with this audio enterprise not because we feel confident of our ability or our knowledge or experience or skill but because we have a lot of hope and guts. And thousands of audio diy-ers have given up along the way somewhere and turned to golf, or bowling, or model railroading. They did so because of a number of reasons which we think must be sorted out if this avocation is to have any future.

The typical audio diy-er is a music lover whose appetite is partly satisfied by reproduced music. The pursuit of lifelike music in any particular place calls for a great variety of skills. Seldom are all of them present in one person. But the development of one or more of those skills is the substance of the audio diy-er’s avocation.

It may be speakers, and speaker construction that captivates those who usually combine a love for woodworking and a strong back.
The kit building diy-er sometimes develops a passion for kits like some people do for crossword puzzles. The kit maven searches for friends for whom he can build, or may even go so far as to set up a mail order kit building service for a price. At least he has found a way for his addiction to pay for itself.

The tinkerer has all the parts for some twenty-three projects gathered together on his basement shelves – all ready to be built – someday. Several other projects – in various stages of completion – also occupy his shelves. But little of his handiwork has found its way to completion or into his audio system – yet.

The modifier likes to customize. He’s built a few kits but is happiest when he’s changing a value here and there to make his equipment ‘his own’.

The general diy-er may have a little or any or all of the preceding types in him. He probably started in kits, has tried a speaker or two, has done some modification of his equipment, maintains it – most of the time – and has several partly finished and more ‘parts collected’ projects ready to do ‘when he gets a little time’.

The audio diy hobby requires a place to work. No matter how small – the table in the corner of a small apartment – or how big, which may be half a cellar full of benches and tools. It is the place the audio diy-er finds his fulfillment. The tools are as various as the wide range of related skills the diy-er must call on to do his work. Some diy-ers limit themselves, by preference or because they live in tiny apartments, to the basic hand tools and do little in the way of metalwork or original construction from scratch. Their test gear maybe limited to a meter, a generator, and a small ‘scope. Currently possibilities abound to design a metal case for your project, or indeed a complete multilayer PCB on your own PC, then ordering it through the ‘net. Nothing more is really needed to turn out projects that cannot be distinguished from what comes off a manufacturers’ assembly line.

Any diy-er will have to invest in test gear, construction tools, and materials. The serious diy-er

keeps stocks of resistors, capacitors of a wide variety of vales and types on hand to try out a circuit idea he gets. He probably owns a small library of reference books which he turns to regularly for information.

The moment of truth

Every audio diy-er experiences a moment which sums up our whole reason for being what we are. The project is finished. You have checked it over several times. The terrible last moments of anxiety before turn-on are with you. You make a quick look – to again make sure the clippings are all shaken out, the connections are all secure, the capacitor polarities are all correct, the transistor leads are all properly oriented. That's it. The loneliness, stillness, and anxiety of those last moments are nearly unbearable.

You flip the switch and one of three things happens: 1. Absolutely nothing; 2. a bright flash and a sickening smell; 3. a quiet hum, a reassuring LED coming on, and a fuse that stays intact. The test signal goes in, the wave pops up on the 'scope screen.

Out of dread to ecstasy. No flight is faster, no distance further. No feeling is quite like this one. And it is what audio diy is all about. It is the central essence of what this hobby is all about. Our delight and satisfaction is something no one can understand who has not experienced it himself.

We are convinced that home craftsmanship is a vitally necessary development to our quality of life as a people in this post-industrial revolution era. Your pleasure and mine in the systematic exploration of the by-ways of audio with our minds and hands is a pleasure – and a journey we ought to cultivate. But what are the obstacles to that path of endeavor?
Ourselves, mostly.

Our most basic problem as audio diy-ers isn't knowledge of electronic theory, it is knowledge of ourselves. If, when you turn on that switch and result No. 1 or No. 2 occurs, what you think of your own ability, and the kind of confidence you have in yourself is the most important consideration in the whole matter.

We have developed some suggestions about this game all of us should be playing for keeps.

First: believe that you can do the job. Despite the momentary setback, be sure you are going to come through this eventually. Never give in to the idea you are too uninformed, or stupid, to solve the problem sooner or later. It has an answer and you can find it

Second: do not think the worst. You will be strongly tempted to do so. Don't panic. Decide ahead of time that things often go wrong. Electronic circuits are by nature, very intolerant of even small mistakes. They need to be nearly perfect to work at all.

Third: be sensible. Don't work when you are overtired. Leave a problem overnight and come back to it fresh.

Fourth: ninety-nine percent of the problems of construction are simple errors on your part. A later, refreshed look at the problem may show you the error clearly and immediately. Don't blame the designer. Troubles are very seldom engineering, although published articles do tend to have errors in them and it takes time to catch them. Be wary of projects which show signs of being based on theory or calculations or simulations only. Look for prototypes and some indication that the author has actually built what he describes.

Fifth: Audio Diy-ers, being few, tend to be loners, often out of necessity but sometimes out of lack of effort or because of personal preference. A friend who can go over your work – and whose work you can check – is a highly valuable and effective help with trouble shooting and morale. Even a non-audio type can help by listening as you go through the circuit and explain it to him. You can catch errors by verbalizing what you have done for him – and hearing yourself in the process. Of course, diyaudio is a limitless resource for this type of help.

Sixth: Check out the work systematically, follow a plan that is logical and do it step by step:

1. 1. Check component values and polarity;
2. 2. Inspect for cold solder joints;
3. 3. Check for loose connections and intermittents;
4. 4. Check your input and output cables;
5. 5. Measure voltages for peculiarities and follow the clues to their source;
6. 6. Follow the signal through the unit backwards from output to input for signs of life;
7. 7. Systematically begin a check of components and substitute where you have doubts about the component;
8. 8. Stay with it until you find the problem. Don't 'put it away' on a shelf for a later day. It will stagnate and get cold – ending up as junk and mute evidence of your inability to deal with the problem;
9. 9. Be aggressive. Intelligent caution is to be observed, but don't let your fear of the beast make you unwilling to try things that will unravel the mystery.

What becomes obvious from the above list is that careful work habits, and high standards of construction practice can save a lot of headaches after turn-on. Unless they are new, check resistors for value, capacitors for value and for leakage or insulation.

Check transformers for continuity and power types for correct voltage (remembering that you are checking peak, unloaded values). Diodes and transistors can be checked for junctions with an ohmmeter – or the latter checked for gain on a tester. Be sure that reverse or blocking reading on the diode junction is high resistance too. That can be as important as the 10-20 ohms reading on the current passing connection.

Clean circuit boards just before assembling them and clean all component leads (except gold or silver flashed ones) by using a pair of diagonal cutters to scrape away the oxide from the tinning material. This speeds the soldering process and insures a good joint, quickly made.

Use a heat sink like X-Acto's handy reverse tension tweezers on all semiconductor leads. It takes a little more time but is a good precaution against post-construction problems. Systematic,

constructive thinking, perhaps out loud – or even on paper – is basic to finding troubles in electronic circuitry.

It is important to remember that a very modest store of theoretical knowledge can carry you a long, long way in this field. This is not to say we don't all need theory knowledge, it I only to remind ourselves that the lack of such knowledge is no excuse for giving up on trouble shooting a piece of construction. Theory is important to design. Out-and-try experimentation can accomplish some things in design but good results are nearly all luck in such cases. But proper function of audio equipment is possible with modest amounts of information.

The same truth ought to give audio diy-ers without much formal training the needed courage to try projects on their own. That basic lack of confidence, with the feeling that one doesn't know enough, keeps many diy-ers stuck in the shallow wading pool permanently.
Venturing into scratch building will give you new experiences, give you the chance to gain new knowledge, and send you on a search for new information. All of us are apt to look for new information when we have a pressing, practical reason for doing so. Trouble shooting can provide that reason if we keep our heads - and our courage – and press on to a solution. You will be surprised, as you push your way on through projects, how much information you pick up along the way. The knowledge is cumulative, too. The parts and ideas begin to fit together in a whole structure.

Every rule, of course, has its exceptions. Some of us seem to be born 'all thumbs'. And for some conditions of that kind a few of us will simply have to accept in ourselves a permanent limitation. But much of that 'all thumbs' syndrome, however, seems to me psychological in origin with a basis which is mostly dependent on the opinion of the person about himself. Doubtless some of us are destined to remain onlookers for lack of manual dexterity, but though that limitation may close off original construction, it does not preclude some modification, maintenance and testing, nor all the pleasures of live recording.

This avocation of audio is worth the best efforts we can give it. Its value is far more than the pleasure of listening to superbly reproduced music. It is basically a satisfaction of one innate human appetite to create, to achieve, and to add one more artifact to the world's collection of wonders. And the best of it all is that you did create that particular wonder yourself.

This forum you are perusing is meant to help every member to become an active, self-conscious, and in many instances articulate, audio diy-er. We ought to spread the word about this hobby among those who most certainly would enjoy its pleasures and satisfactions.

Let those who will, be content with what the merchandiser is willing to market. The audio diy-er is a different breed.