Building Your Own Equipment

Equipment construction has been a tradition among radio amateurs since the very beginning. It is one of the core activities for many of us. Whether it be home-brew, kit building, or modification, there is a wonderful satisfaction when using a piece of equipment that you made yourself. Hand made. Real DIY radio. The skills that we learn this way last a lifetime. They allow us the confidence to repair things when they break and to better use the stuff that we have.

Construction challenges us to learn how things really work and ways to make them work better. By actually doing things, instead of just reading about them, we educate ourselves like no classroom can. Many of us owe our careers to these skills. The best part? It's fun!

Tools

No matter if you are modifying your gear, building a kit, or setting up a prototype on the bench you will need some basic tools. Wire cutters, needle-nosed pliers, magnifier, soldering iron, and a hobby knife at the minimum. Let's take a brief look at some:

Wire cutter: Often called “diagonal cutters” or “dikes”.Nothing fancy here, just needs to make a clean cut even with very small diameter wire. Close the jaws and hold them to the light. There should be no wide gaps visible, just the finest of a straight line as possible. We want to cut wires, not just weaken them. You will also want a flush-cutting wire cutter, one that will cut wires off cleanly quite close to a circuit board. That means that the cutting edges are on the side of the cutting head, not in the middle like most cutters.

Needle-nosed pliers: Not just long-nosed pliers (although those are handy, too), you will need pliers with a very skinny nose to reach those hard-to-get places in order to attach wires, thread on washers, and hold small hardware. Stores that sell crafting supplies, especially for jewelry making, have a nice assortment of small pliers and cutters.

Soldering Iron: Not soldering GUN (although guns are handy for big stuff like antenna connectors). Here is a good place to splurge if you can. Buy the best that you can pay for comfortably. If need be, get a used one. It should be 20 to 60 watts, have easily changeable tips (with fine tips available, for small work), and temperature controlled if possible. More beginners are discouraged by poor soldering iron quality than any other single source. You cannot do quality construction without a quality soldering iron. A plated tip will last many times longer than an unplated one and is well worth the expense. While you are at it, good quality rosin-flux solder is also imperative. Get the tin/lead type, small diameter, 60/40 or 63/37 (eutectic) alloy. While the new lead-free (RoHS) type avoids the unhealthy lead it takes much higher heat to melt, is more brittle, and costs more. Use lead but avoid breathing the solder smoke, wash your hands, and don't eat your projects! When you get experienced then you might want to try the new formulations.

A magnifier: Great for inspecting your work. Some of us like them for seeing what we are doing when doing small-scale stuff. Those slip-down goggles are pretty good but a well-lit large magnifier on a spring-loaded arm is better. I like the cheap little jewelers loupes, myself, but I am migrating to the big leagues, stereoscopic microscopes, for those REALLY little gadgets. Whatever works for you, even a reading glass is good.

Hobby knife: Very non-critical. Whatever you are comfortable with. I like my 40 year old electrician's pocket knife. Use it for stripping wires, scraping old component leads, and cutting printed circuit board traces. Knives are cheap, keep several types handy for different uses.

As you do more construction you will expand your toolkit. Real wire strippers, files, drills, dentist picks, all sorts of things will find use on your work bench. Do not limit yourself. You can never have enough tools.

Kit Building

Perhaps the easiest way to start electronic construction is kit building. Kits are available from a myriad of sources and range from extremely simple to incredibly complex. The prices vary accordingly. You should start with something simple, of course, but something that you will find useful. You will learn to solder and how to use basic hand tools. You will see how schematics apply to actual circuit layout and how connectors and controls are mounted and attached. An entire generation owes a debt to the Heathkit company for their electronic education. Too bad that they are not around any more.

An advantage of kit building is that most all of the needed parts are included. Read the advertisements carefully as some kits don't include cases or some of the switches and connectors needed to complete the item. In this case be certain that you have them available. If you are supplying your own enclosure then make sure that you get one large enough to accommodate all of the controls, connectors, and such. It is important not to confine your efforts at first. Perhaps you envision yourself building tiny, pocket-sized gadgets to amaze your friends. Fine. But start with something large and spacious until you get familiar with the processes. Besides, big things are easier to use, usually, and a big enclosure can be quite impressive. Add lights, meters, and switches. No one needs to know what simple little circuit dwells within.

Modifications and Repairs

Changing your equipment to suit your personal needs is fun. Adding a little kit circuit to your radio to add an extra function will make it uniquely yours. You don't have to tear into your expensive transceiver right off, maybe you would want to build a Digital Signal Processor or audio filter and amplifier into an external speaker instead. There are loads of kits and circuit boards that will upgrade an old analog radio so that it has a fine, accurate digital read out.

Finding an old broken radio and fixing it up can be a hobby in itself. Not only will you find out how they work but also how they fail. Be a detective. Then be an engineer so that you can make it better.

Home Brew

Nothing exemplifies amateur radio construction like building your stuff from scratch. Most amateur radio magazines publish schematics for projects. Find something that interests you, order the parts that you need, and start building. There are many books dedicated to providing a wide diversity of projects. There are projects for every skill level.

Start small. Keep it simple. Build your skills. Most of all, have fun!

Author's note:
Over the next few months I intend to describe a variety of simple projects, some construction ideas, maybe even a little inspiration. If you have questions, suggestions, or comments please drop me an email at ND6T_6@yahoo.com or catch me on the air.
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