Are you interested in electronics? Would you like to set up your own “electro lab” to conduct amazing experiments, build crazy gizmos, and repair or modify your existing electronics? Then this book is for you!

Your very own electronics laboratory is a great place to build, repair, invent, and learn more about electronics. We seem to be surrounded by electronics more and more every day. We can easily become dependent upon them, without even understanding how they work. Having your own electronics lab can help you gain some control over your electronic minions. Here you can learn about their inner mysteries, including how to repair them when possible or, better yet, improve them with your own custom modifications. You can also turn your own ideas into reality by building electronic circuits from scratch.

What will you need to plan your lab? What if you already have a basic understanding of electronics and the beginnings of a workshop at your disposal? This chapter helps get you going in the right direction.

What to Expect

This book can’t teach you everything about electronics, and it doesn’t try. That would take several lifetimes. What it can do is introduce you to the tools and the skills you will need to set up your own electronics lab. This will include a very basic introduction to electricity, a little bit of theory, some safety tips, and a whole lot of example projects. It’s a great starting place. Where it will lead you is mostly determined by you and what you’re wanting to do with electronics.

If you’re already familiar with electricity and electronic concepts, there is still plenty of fun and interesting stuff waiting for you to explore. The field of electronics itself is constantly expanding. From the time this book was written to the time that you’ve finished reading this sentence, many advances will have occurred in both our understanding of electronics as well as the development of new applications and electronic devices. This is one of the many things that makes the study of electronics so interesting and exciting.

Every lab is different. Your lab will reflect not only your immediate electronics goals but also your personality. Feel free to pick and choose from all the ideas presented in this book and add in some of your own. The repair shop and the design studio are necessarily going to be arranged differently. There really is no right or wrong way to go.

Even the best laid plans, so the saying goes, end up somewhere unexpected. When planning your electronics lab for the first time, or for the tenth time, keep in mind that your interests, resources, and reasons for wanting to work on electronics are going to change over time. Please feel free to reinvent yourself and your lab as conditions permit. You might also be forced to reconsider your priorities when
other factors in your life exert themselves. That being said, stay tuned for “A Cautionary Tale” at the end of this chapter.

Some configurations are more appropriate for certain endeavors, and nothing replaces the right tool for the job. This book should at least give you an idea of what is involved and get you pointed down the right road.

**It Starts with a Plan**

Most of the decisions you’ll make when planning your laboratory will depend on what you’re interested in doing there. Having a good plan at the beginning is like having a clear map when taking a long journey. It helps you from getting lost and also is handy for figuring out when you’ve arrived.

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**Note** If you fail to plan, you plan to fail.

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Remember, at this point in the game, you don’t have to make any final decisions about what you want to be able to do in your lab. This book is all about illustrating possibilities and giving you the information and advice necessary to branch out into the areas that hold the most interest for you.

**A Broad Outline**

Here’s what you need to get started: a little time, a small amount of space, some basic tools, and a few components. Those are the boring parts. The fun stuff includes your ideas, goals, and inspiration. Combine all that with some fundamental information about how electricity and electronics work, and you’re in business.

**A Little Time**

Like any good hobby, setting up your electronics lab and conducting experiments there is going to take up some of your time. For some, this is the main reason for getting started in electronics and building a lab: a place to escape, unwind, and tinker with ideas, prototypes, and complex systems. Maybe it’s your job. Maybe it’s your passion. Perhaps it’s a bit of both.

You’re going to need time to plan and build your lab. This book will spell out several specific arrangements for various-sized labs, but they are just examples and not hard-and-fast rules. More time will be required for obtaining the proper tools and materials that you will use there. Time will be spent not only doing things in your lab, but also in just thinking about doing things in your lab. For example, you might build a clever little gizmo that ought to do a simple task, only to find out that it refuses to work. You might need to spend a little bit of time thinking of ways of testing it to find out where the problem lies. This is sometimes called troubleshooting or debugging.

This is the basis of the scientific method. To help understand how something works, you first form a theory that would explain its behavior. Next you prepare one or more experiments that will demonstrate the accuracy of your theory. The experiments are conducted and their results are analyzed. If the results are in agreement with your theory’s predictions, then your theory is more than likely correct. If not, you may need to modify or extend your theory to accommodate the behavior observed. All of these things take time, which helps explain why we don’t have jet packs or time machines yet.