

"There is no reason anyone would want a computer in their home" - Ken Olson, Founder of Digital Equipment Corp., 1977

Chapter 3: The Personal Computer

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MAINFRAME, MINI, MICRO

For the first couple of decades after the room-sized ENIAC was built in 1946, computers were much too expensive and much too bulky for each person to have their own. The trend through that time was to make it easier and easier to share computers, until by the late 1970s a computer slightly smaller than a desk could be used by 64 people at the same time. It was called a "mini-computer" in honor of its small size. Under the mini-computer scheme, a monitor with a keyboard was the only part of the computer each person had on their own desk, and from there a cable went back to the big box that had all the brains, as well as all the disk drives, memory, etc.



The first personal computer, the Apple 1

In 1978 Apple Computer announced the Apple computer, and in 1981 IBM introduced their PC or Personal Computer. The rest, as they say, is history.

Although the big mainframe and mid-size mini-computers still exist in some larger corporations and government agencies, when most people today say "computer", they mean their own personal desktop computer.

Besides "personal" or "desktop" computers, these were also called "micro-computers" in honor of their small size, since the name "mini-computer" was already taken. The term 'micro-computer' is not used much these days, and anyway there are

now hand-held computers that make the desk-top PC look like a giant. Back in the 1980's though, it was a real breakthrough. Not only was everything small enough that a person could put the whole thing on (or near) their desk, it also cost less than a new car which meant that the average executive could have his very own. So could the average computer fanatic, if he* wanted it badly enough.

** I don't mean to be sexist by assuming the computer user was a guy, but in those early days a woman in a computer club was about as rare as a guy in a home economics class. Fortunately, both of those things are changing.*

In the 20+ years since then, personal computers have dramatically increased in power and just as dramatically decreased in price. They look very similar, though, to that original PC in 1980. There is usually a separate keyboard and a separate monitor, both attached by cables to a breadbox-sized cabinet that holds everything else.



For those of you too young to remember breadboxes, they were about the size of a PC cabinet and were used to hold a couple of loaves of bread. There were also single-loaf models, so if PC cabinets get smaller, my comparison will still be valid.

PLAYING IT SAFE

PROTECTING YOURSELF

Before you start poking your nose around in the PC's cabinet, there are a couple of things you need to know in order to protect the computer, and yourself, from damage.

The first rule is to disconnect the power. At this stage, we're just looking and not troubleshooting, so there is no need for power anyway. Pull that plug out of the wall. Pull the other end of the power cord out of the back of the cabinet. Next, coil up that cord, stick it in the bottom of a desk drawer somewhere, and lock the drawer. Now we're ready.

I'm exaggerating slightly, but you get the idea. Don't just turn the computer off. **Unplug the power cord** before you loosen even a single screw on that cabinet. This will eliminate most of the risk of shock.



*Note: These beginning safety tips apply only to the PC cabinet. Do **not** attempt to open a monitor until you have studied Monitor Safety in Volume 2, because a monitor can be **lethal** if not properly handled.*

The only other shock hazards you'll need to watch out for inside the cabinet are capacitors. These are electrical components designed to store an electrical charge. Because the electricity is stored, capacitors can give you a kick even after the power is disconnected. Capacitors come in all shapes and sizes, but only the larger ones will make you wish you had stayed in bed that day. These are typically found in the power supply and monitor and usually look like silver containers (see figure below) with two wires coming out, although you won't be able to see the ones in the power supply enclosure. In Volume 2 there's a procedure for discharging the electricity stored in capacitors. In the meantime, it's easy enough to avoid a shock from capacitors. Just don't touch them or any wires that might be connected to them.

It's also a very good idea to remove any rings or other jewelry from your hands before sticking them into the cabinet. And this step is absolutely essential if you ever have to put your hands into a cabinet while the power is still connected.



Capacitors

PROTECTING THE COMPUTER

I'm sure some winter day you've shuffled your feet on the carpet and then received a sharp ZAP when you reached for the door-knob. Irritating, isn't it? You should be thankful you are made out of tougher stuff than the computer. A zap many times smaller than that, so small you wouldn't even know it happened, can be fatal to some of the components inside that cabinet.

This is such a serious problem in the computer industry that it has its own initials: ESD. These initials stand for Electro-Static Discharge. Which is a serious way of saying something is getting zapped. Shocked. Fried. Kaput.

There is an entire section of the electronics industry that has grown up around solutions for the problem of ESD. There are special mats you can stand on, there are straps for your wrist, special packaging materials, even spray cans of solutions that reduce the danger of ESD.



ESD is much more of a problem when conditions are cold and dry. You may have noticed that's when you get zapped from touching the doorknob, never when the weather is hot and humid. However, it takes so little ESD to damage some computer circuitry that even though it's worse during cold, dry spells, it's still a hazard all year round.

There is more to be said about ESD (in Volume 2, of course). For now, here are a couple of tips for avoiding it.

1. Don't poke around in the cabinet.
2. If you can't help poking around, first grab the chassis (the computer's metal frame) with your other hand (the one that's not poking). That way, your body and the computer will be at the same potential, so no current will flow to damage the chips, see? This rule about grabbing the chassis only applies if you are absolutely sure the power is disconnected. If the power is on, you shouldn't be poking around in there anyway.

If you insist on poking with both hands at the same time or you forget to grab that chassis, be prepared to buy some new parts for your computer. Even if you never shuffle your feet.

CHAPTER QUIZ

MULTIPLE CHOICE

Circle the best answer for each statement.

1. Another name for a PC is:
 - a. desktop computer.
 - b. mini-computer.
 - c. Eniac.
 - d. abacus.

2. ESD stands for:
 - a. Electronic System Device.
 - b. Electro-Static Discharge.
 - c. Enhanced Secure Data.
 - d. Electro-Spark Download.

3. The first rule of computer safety is:
 - a. Find the capacitors.
 - b. Grab hold of the chassis.
 - c. Unplug the computer.
 - d. Use ESD.

4. Before working around voltage you should remove:
 - a. your shoes.
 - b. eyeglasses.
 - c. rings and other jewelry.
 - d. a kidney or two.

TRUE OR FALSE

*Read each statement carefully. If the statement is true, circle T.
If the statement is false, circle F.*

1. You can't get shocked inside a computer if the power switch is OFF. T F
2. Standing in a puddle while working on a PC is perfectly safe if you've pulled the plug first. T F
3. Zapping your computer hardware with even a little static electricity can be fatal to it. T F
4. Capacitors store electricity and can discharge even AFTER you unplug the computer. T F

CHAPTER 3
