Disassembly and Power

Chapter 5

This presentation covers:

- Qualities of a good technician
- Disassembly and static electricity
- Tools needed to work on computers
- Reassembly
- Power supply basics
- Power protection

Qualities of a Good Technician

"Soft skills" as they are known across many industries are essential

Written Communication Skills

Use this list to improve and avoid making the common mistakes:

- Avoids doing documentation in a timely manner
- Does not provide adequate or accurate information on what was performed or tried
- Has poor spelling, grammar, capitalization, and punctuation skills
- Writes in short, choppy sentences, using technical jargon
- Does not provide updates on the status of a problem

Written Communication Skills: Email

The following is a list of guidelines for effective email communication:

- Do not use email when a meeting or a phone call is more appropriate
- Include a short description of the email topic in the subject line
- Do not write or respond to an email when you are angry
- Send email only to the appropriate people; do not copy others unnecessarily
- Stick to the point; do not digress
- Use a spelling and grammar checker; if one is not included in the email client, write the email in a word processing application, check it, and then paste the document into the email

Written Communication Skills: Email (cont.)

- Use proper grammar, punctuation, and capitalization; do not write in all uppercase or all lowercase letters
- Smile when you are typing; your good attitude will come across in your writing
- Focus on the task at hand; read your note over out loud if it is a critical one
- Write each email as if you were putting the message on a billboard; you never know how the content might be used or who might see it

Disassembly and Electrostatic Discharge

Disassembly Overview

Sometimes, the only way to diagnose a problem is to disassemble the computer outside the case or remove components one by one.

- Remove jewelry
- Use proper lifting techniques
- Keep humidity between 45 and 55 percent to reduce the threat of Electrostatic Discharge (ESD)
- Use an anti-static wrist strap also called an ESD strap
  - Note: Do not wear an ESD wrist strap when working inside a CRT monitor or power supply
- Anti-static bags are good for storing spare adapters and motherboards when the parts are not in use

EMI (Electromagnetic Interference)

- Also know as EMR (electromagnetic radiation)Noise caused by electrical devices
- Many devices can cause EMI
  - e.g. a computer, a pencil sharpener, a vacuum cleaner, an air conditioner, and fluorescent lighting
- A specific type that negatively affects computers is RFI (radio frequency interference)

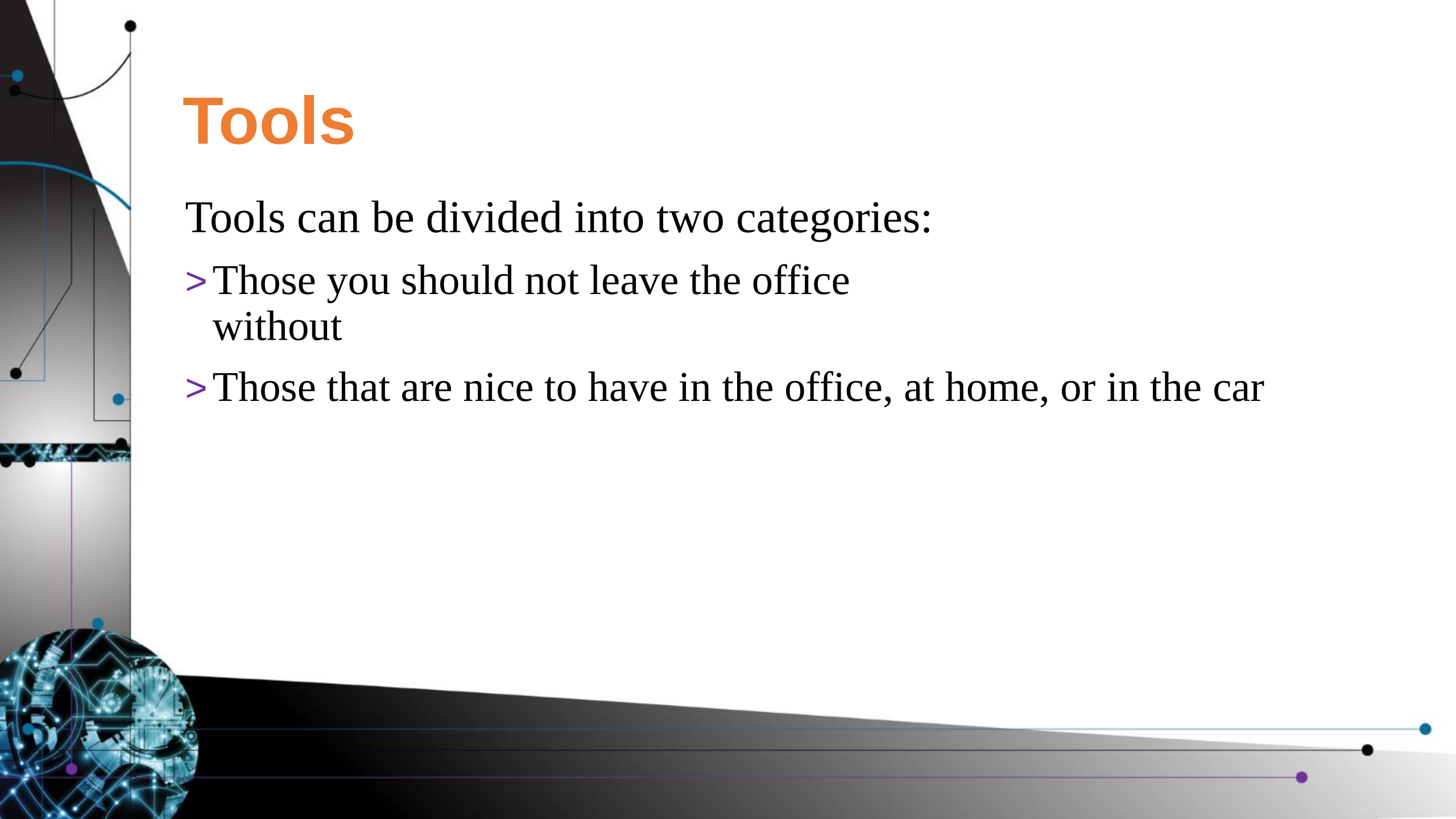
RFI (radio frequency interference)

- RFI is noises that occur in the radio frequency range
- Check the surrounding devices for the source of that problem
  - e.g., if the computer goes down only when the pencil sharpener operates or when using the optical drive, EMI could be to blame
- EMI can also come through power lines
  - Move the computer to a different wall outlet or to a totally different circuit to determine whether the power outlet is the problem source
- EMI can affect files on a hard drive

Tools

Tools can be divided into two categories:

- Those you should not leave the office without
- Those that are nice to have in the office, at home, or in the car



Tools, cont'd

95% of all repairs are completed with the following basic tools:

- Small and medium flat-tipped screwdrivers
- #0, #1, and #2 Phillips screwdrivers
- 1/4- and 3/16-inch hex nut drivers
- Small diagonal cutters and needle-nose pliers

Disassembly

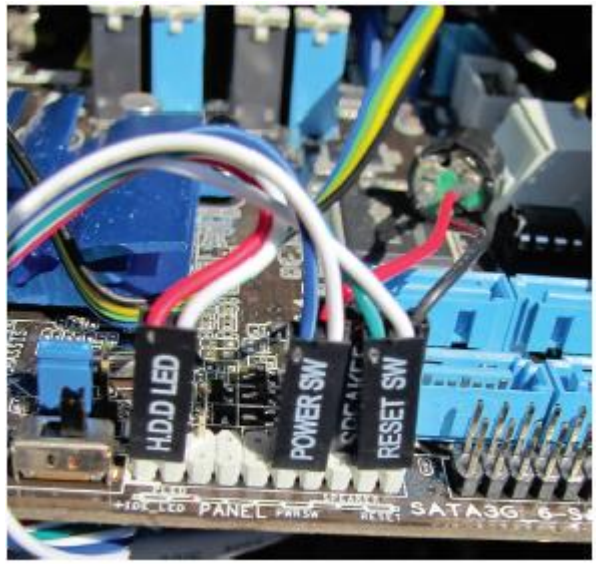
- Do not remove the motherboard battery, or the configuration information in CMOS will be lost
- Use proper grounding procedures to prevent ESD damage
- Keep paper, a pen, a phone, and a digital camera nearby for note taking, diagramming, and photo taking
- Have ample flat and clean workspace
- When removing adapters, do not stack the adapters on top of one another
- Place removed adapters inside a special ESD protective bag

Disassembly, cont'd

- Handle each adapter, motherboard, or processor on the side edges
- Avoid touching the gold contacts on the bottom of adapters. Sweat, oil, and dirt cause problems
- Remember that hard drives require careful handling; a very small jolt can cause damage to stored data
- You can remove a power supply, but do not disassemble a CRT-style monitor or power supply without proper training and tools
- Document screw and cable locations; label them if possible

Disassembly Basic Steps

- Step 1. Remove Power and External Cables
- Step 2. Open the Case
- Step 3. Remove Internal Cables and Connectors
- Step 4. Remove Adapters
- Step 5. Remove Storage Devices
- Step 6. Remove Motherboard

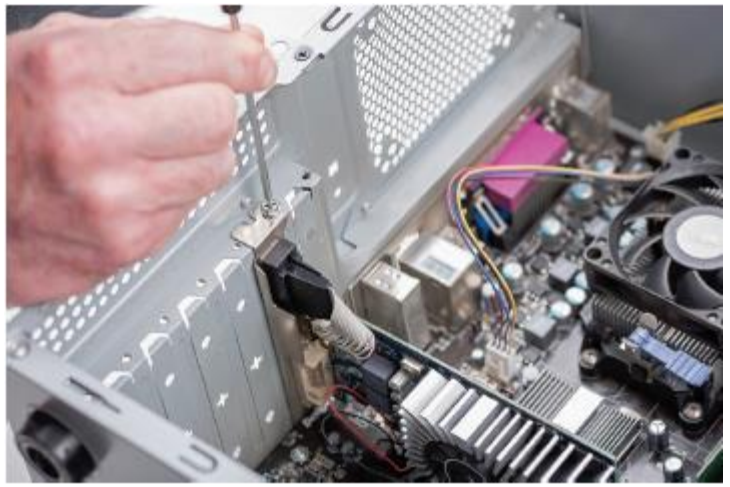


Motherboard connectors/cables that go to the front panel

Reassembly

Reassembly

- Be careful and properly diagram the disassembly
- Write reminders or taking photos
- Reinsert all components into their proper place; be careful to replace all screws and parts
- Install missing slot covers
- When reinstalling a motherboard, reverse the procedure used during disassembly
- Ensure the motherboard is securely seated into the case and all retaining clips and/or screws are replaced



Reassembly, cont'd

- Ensure the ports extend fully from the case through the I/O shield
- Ensure the drives and cover are aligned properly when the case is reinstalled
- Ensure that cables are fully attached to devices and the same motherboard connector
- Ensure that power cables are securely attached

Preventive Maintenance

A computer in a normal working environment should be cleaned at least once a year

- Vacuum the computer and clean the optical drive laser, keyboard keys, printers, and display screen
  - Be sure to power down the computer and remove the power cord for any computer, remove the battery and AC adapter for a laptop or other mobile device, and allow a laser printer to cool before accessing internal parts
- Always ensure that the device has proper ventilation and vents are clear of any obstructions

Power Supply

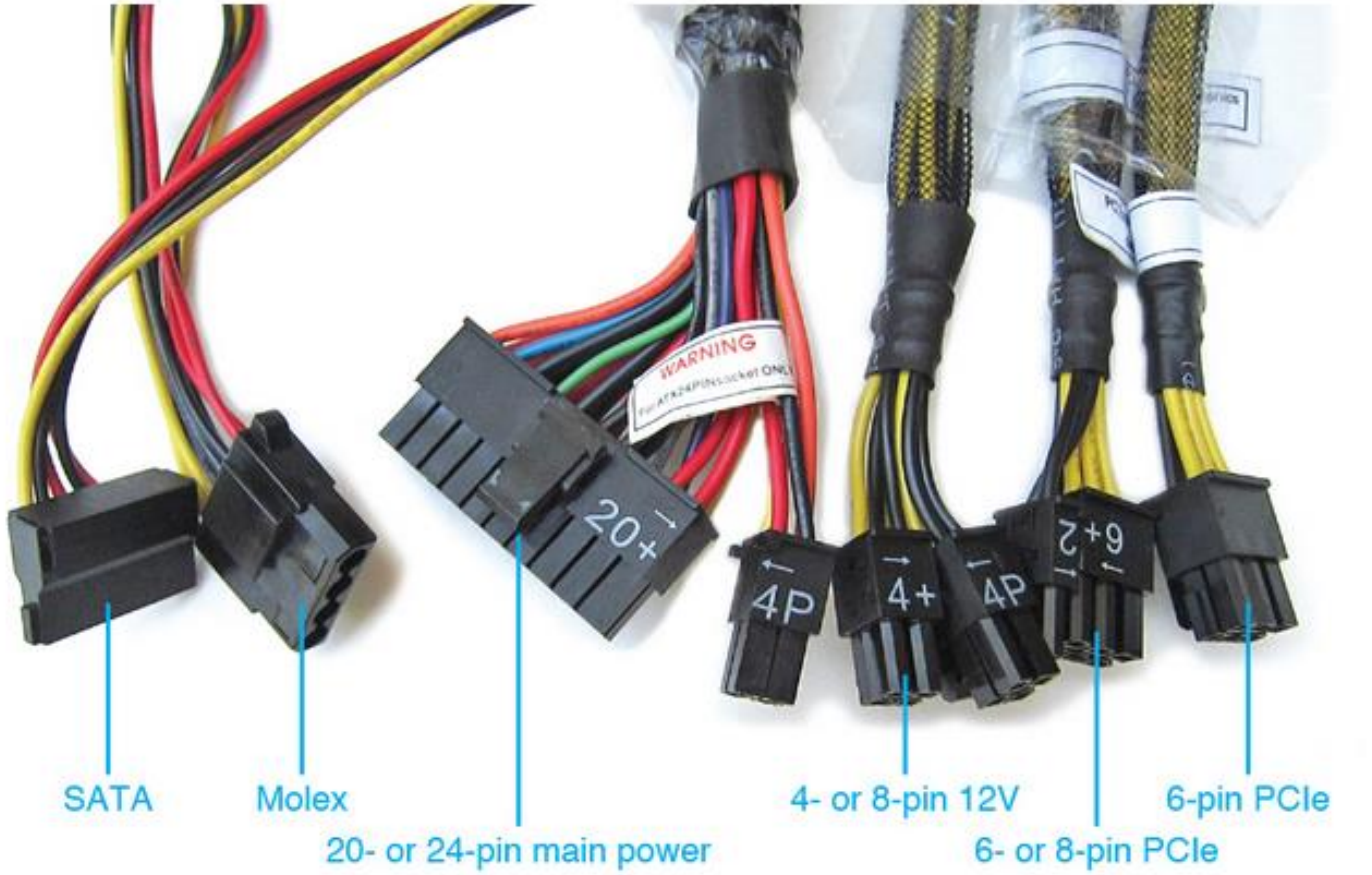
Power Supply Overview

- A power supply is an essential component within a computer; internal computer devices do not work without it
- The power supply converts AC to DC, distributes DC power to components throughout the computer, and provides cooling through the use of a fan located inside the power supply
- The AC voltage a power supply accepts is normally either 100 to 120 volts or 200 to 240 volts

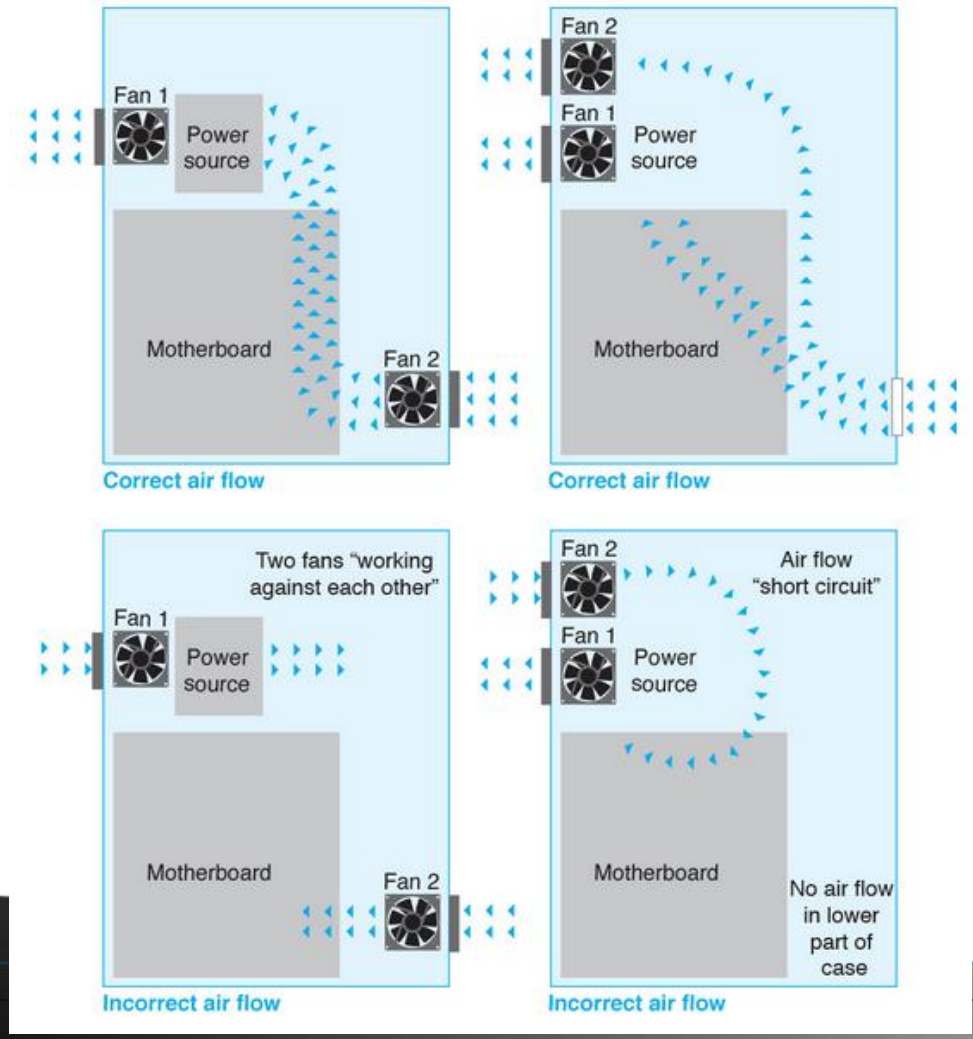
Power Supply Form Factors

- Power supplies come in different shapes and sizes, so do cases
- Today's power supply form factors are ATX, ATX12V v1.x, ATX12V v2.x, and micro-ATX. The ATX power supply form factor allows a small amount of voltage to be provided to the motherboard
- The ATX12V version 2 standard has a 24-pin motherboard connector instead of a 20-pin version 1 connector and have a SATA power connector
- The micro-ATX power supply form factor is a smaller version than a full-sized ATX power supply to fit in smaller cases
- Laptop power supplies are commonly proprietary

ATX Power Supply Connectors



Auxiliary Fans – Air Flow



Sample Computer Component Power Requirements

Table 5.6 Sample computer component power requirements

Component	Power consumption
Motherboard (without processor)	5 to 150 W
Processor	10 to 140 W
PATA IDE hard drive	3 to 30 W
SATA hard drive	2 to 15 W
Optical drive	10 to 30 W
Nonvideo adapter	4 to 25 W
AGP video adapter	20 to 50 W
PCIe video card with one power connector	50 to 150 W
PCIe video card with two power connectors	100 to 300 W
Extra fan	3 W
RAM module	15 W

Symptoms of Power Supply Problems

The following is a list of symptoms of a power supply problem:

- The power light is off and/or the device won't turn on
- The power supply fan does not turn when the computer is powered on
- The computer sounds a continuous beep
- When the computer powers on, it does not beep at all
- When the computer powers on, it sounds repeating short beeps
- The computer reboots or powers down without warning
- The power supply fan is noisy

Symptoms of Power Supply Problems

- During POST, a 02X or parity POST error code appears; one of the POST checks is a power good signal from the power supply; a 021, 022, . . . error message indicates that the power supply did not pass the POST test
- The power supply is too hot to touch
- The computer emits a burning smell
- The power supply fan spins, but there is no power to other devices
- The monitor has a power light, but nothing appears on the monitor, and no PC power light illuminates

Power Protection

Power Protection

Computers need a steady stream of AC that the power supply converts to DC. Sometimes the AC voltage is too high or too low. Protection can be provided with the following devices:

- Surge suppressor – protects against overvoltage; may include a warranty
- Line conditioner – conditions the AC voltage from the wall before passing it on to the computer
- UPS – provides power during an outage and conditions the voltage when there is no outage
- SPS – provides power during an outage

Computer Terms

Refer to the glossary terms at the end of the textbook chapter. Review Chapter 5 and become familiar with the terms.

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The Complete CompTIA A+ Guide to IT Hardware and Software 7th Ed.

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