

CompTIA IT Fundamentals Study Guide (FC0-U61)

Chapter 1: Core Hardware Components

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- Illustrate the basics of computing and processing
 - Input
 - Processing
 - Output
 - Storage
- Compare and contrast common units of measure
 - Storage unit
 - Bit
 - Byte
 - KB
 - MB
 - GB
 - TB
 - PB
 - Processing speed
 - MHz
 - GHz
- Explain the purpose of common internal computing components
 - Motherboard/system board
 - Firmware/BIOS
 - RAM
 - CPU
 - ARM
 - Mobile phone
 - Tablet
 - 32-bit
 - Laptop
 - Workstation
 - Server
 - 64-bit
 - Laptop
 - Workstation
 - Server
 - GPU
 - Storage
 - Hard drive
 - SSD
 - Cooling
 - NIC
 - Wired vs. wireless
 - Onboard vs. add-on card

Chapter 1: Core Hardware Components (con't.)

- Compare and contrast storage types
 - Volatile vs. non-volatile
 - Local storage types
 - RAM
 - Hard drive
 - Solid state vs. spinning disk
 - Optical
 - Flash drive

Introducing Internal Components

- Replaceable components are called field replaceable units (FRUs)
- The case protects internal components

Motherboard Overview

- Connect all components together
- Also called system board or mainboard
- Form factor refers to size and shape
- Chipset is the technology on the motherboard – perform interface and peripheral functions

Motherboard Connectivity

- Contains sockets or slots for:
 - Processor (CPU)
 - Memory (RAM)
 - Expansion cards (PCI, PCIe)
 - Disk controllers (PATA, SATA)
 - Power connectors
 - BIOS/firmware
 - CMOS and CMOS battery
 - Back panel connectors
 - Front panel connectors

Processors (CPUs)

- Central Processing Unit (CPU)
 - The “brain” of the computer
- Intel and AMD major manufacturers
- Speed measured in gigahertz (GHz)
- Processors perform binary math

Processors (CPUs)

- CPU slots usually square
 - Pin Grid Array (PGA), Land Grid Array (LGA)
- Characteristics
 - Architecture
 - 32-bit
 - 64-bit
 - ARM
 - Speed
 - GHz – billion cycles per second
 - Cache
 - Built-in memory, small and fast

Memory

- Read only memory (ROM)
 - Permanent, no changes allowed
 - Example: BIOS
- Random access memory (RAM)
 - Can be static or dynamic
 - Static is nonvolatile, like a thumb drive
 - Dynamic used inside computers
 - Analogous to short-term memory
 - Needs power to retain contents

More Memory

- Form factors:
 - Desktops
 - Double data rate 2 (DDR2)
 - Double data rate 3 (DDR3)
 - Double data rate 4 (DDR4)
 - Laptops
 - Small outline dual inline memory module (SODIMM)
- Virtual Memory

Hard Drives

- Permanent long-term storage
- Size usually in hundreds of gigabytes (GB) or terabytes (TB)
- Spinning (or mechanical) hard disk drives (HDD) versus solid state hard drives (SSD)
- Connected via SATA or PATA

Optical drives

- CD-ROM
 - Compact Disc Read Only Memory
- DVD-ROM
 - Digital Video Disc Read Only Memory
- BD-ROM
 - Blu-ray Read Only Memory

Power, BIOS, and CMOS Battery

- Power Connectors for power supply
- Basic Input/Output System (BIOS) boots the system and initiates hard drive and memory
- Complimentary Metal Oxide Semiconductor (CMOS) chip holds BIOS
 - CMOS battery helps chip store BIOS information when powered off

Back and Front Panel

- Back panel connectors
 - For keyboards, mice, network cables, and more
 - Will cover in detail in Chapter 2
- Front panel connectors
 - Power and reset buttons
 - Drive activity lights
 - Audio ports
 - Other connectors, such as USB

Video Cards

- Also called graphics cards or video adapters
- Responsible for rendering video
 - Monitor is connected to them
- Good ones will have a graphics processing unit (GPU) and their own memory
- Typically PCIe

Sound Cards

- Produce sound
- Often integrated into the motherboard

Network Cards

- Network Interface Card (NIC)
- Allow the computer to participate on a network
- Wired (needs a cable to send/receive network signals) or wireless (no cable needed)

Modems

- Practically obsolete today
- Allows a computer to participate on a network via standard telephone lines

Power Supplies

- Power Supply Unit (PSU)
- Converts AC from wall to DC the computer needs
- Capacity measured in watts
- Has connectors for the motherboard as well as peripherals such as hard drives, optical drives, and video cards

Cooling Systems

- Computers get hot – components such as the processor can melt
- Case cooling
 - Front intake fan
 - Rear exhaust fan
 - Power supply exhaust fan
- CPU cooling
 - On the processor itself
 - Usually heat sink and a fan
 - Liquid cooling and other advanced methods available