3.3.2 Motherboard Facts

A *motherboard* (also called system board, logic board, or mainboard) is a circuit board that either houses or is connected to all of the components operating in the computer. When selecting a motherboard, consider the following motherboard specifications:

- CPU socket type
- Memory module compatibility
- Number of memory slots
- Maximum supported memory
- Expansion slot count and type
- Onboard devices (video, audio, or network)

A typical motherboard includes the following components:

Component	Function / Characteristic
CPU Socket	The CPU socket houses the CPU. There are a variety of CPU socket types, each of which have unique shapes, pin arrangements, or mounting configurations. Because of this, it's important to match the motherboard socket type with the processor socket type. Some motherboards support multiple processors and have a socket for each CPU.
Memory Slots	Most motherboards have multiple memory slots. Memory slots are designed to be compatible with a specific type of memory module.
Expansion Slots	Expansion slots (also called expansion buses) allow you to expand the capabilities of your computer by installing expansion cards. There are a number of different expansion slot types: ▪ PCI (Peripheral Component Interconnect) ▪ PCI-X (Peripheral Component Interconnect Extended) ▪ PCIe (Peripheral Component Interconnect Express) ▪ Accelerated Graphics Port (AGP)
Onboard Components	Many motherboards include onboard components (such as network cards, audio cards, video cards, or USB and FireWire connections). Selecting a motherboard with onboard devices is typically cheaper than buying separate expansion cards for each feature. However, the quality of these onboard devices might not be as high as dedicated expansion cards.
I/O Connectors	I/O connectors for onboard components are located on the back of the motherboard. These connectors typically include the following: ▪ PS/2 mouse and keyboard ports ▪ USB ports ▪ Serial ports (COM 1, 2, 3, and 4) ▪ Parallel port ▪ Audio jacks ▪ Ethernet port An I/O shield fits over the connectors to secure them and protect the inside of the computer from dust and debris.

	computer from dust and debris.
Internal Connectors	There are a number of connectors on motherboards for components such as power supplies, fans, and LED lights. Computer cases often have front panel ports (e.g., USB, FireWire, or audio ports) that need to be connected to the motherboard. These ports are connected to the motherboard's front panel connectors, which are also called headers. External ports that are not available on the motherboard are often added using expansion cards.
Firmware	The firmware on a motherboard is stored on integrated flash memory. Motherboards use one of two firmware implementations: ▪ BIOS (Basic Input/Output System) ▪ UEFI (Unified Extensible Firmware Interface) Older motherboards stored the BIOS on removable, read-only memory (ROM) chips.
CMOS Battery	The CMOS battery is used to keep an accurate date and time, even when the motherboard has no power. In older motherboards, the CMOS battery was also used to retain BIOS configuration settings, which were stored in volatile memory called the CMOS chip.

Chipset	The *chipset* is a group of chips that facilitates communication between the processor, memory, and peripheral devices.
	With chipsets:
	▪ The memory controller and graphics controller are on the CPU.
	▪ The remaining functionality is combined into a single controller chip.
	  ▪ Intel processors use the Platform Controller Hub (PCH).
	  ▪ AMD processors use the Fusion Controller Hub (FCH).
	▪ The front-side bus is replaced by the Direct Media Interface (DMI).

Support manual	A motherboard's support manual is an excellent source of information. Support manuals contain technical specifications as well as diagrams that identify the motherboard's components. If you are missing a motherboard's support manual, check the manufacturer's website.

Selecting a motherboard with the same form factor as the case and power supply is an easy way to assure compatibility.

A typical motherboard includes the common connectors shown in the following diagram: