



### Key Components & Form Factors

#### Essential Components

<b>CPU Socket</b>	Connects the CPU to the motherboard. Different sockets support different CPUs (e.g., LGA 1700 for Intel, AM5 for AMD).
<b>Chipset</b>	Manages communication between the CPU, RAM, storage, and peripherals. Determines supported features and expansion options.
<b>RAM Slots (DIMM)</b>	Slots for installing RAM modules (DDR4, DDR5). Number of slots and supported speeds vary.
<b>PCIe Slots</b>	Expansion slots for graphics cards, sound cards, SSDs, and other peripherals. Different lengths and speeds (e.g., PCIe 5.0 x16).
<b>SATA Ports</b>	Connect hard drives and SSDs. Number of ports and supported speeds vary.
<b>M.2 Slots</b>	Connect NVMe SSDs for faster storage speeds. Support different lengths and PCIe lanes.
<b>Front Panel Connectors</b>	Connect power button, reset button, USB ports, and audio jacks on the computer case.
<b>Power Connectors</b>	ATX power connector (24-pin), CPU power connector (8-pin or 4+4 pin), and PCIe power connectors for graphics cards.

#### Motherboard Form Factors

<b>ATX (Advanced Technology Extended)</b>	Standard size, offers the most expansion slots and features.
<b>Micro-ATX</b>	Smaller than ATX, fewer expansion slots, suitable for mid-sized builds.
<b>Mini-ITX</b>	Smallest size, limited expansion, ideal for compact builds.
<b>E-ATX (Extended ATX)</b>	Larger than ATX, offers more expansion slots and features, often used for high-end builds.

### Chipsets and Compatibility

#### Intel Chipsets (Examples)

<b>Z790</b>	High-end, supports CPU overclocking, multiple GPUs, and advanced features (e.g., PCIe 5.0).
<b>B760</b>	Mid-range, supports most features, but typically lacks overclocking capabilities.
<b>H710</b>	Entry-level, fewer features and limited expansion options.
<b>W680</b>	Workstation chipset, supports ECC memory and professional features.

#### AMD Chipsets (Examples)

<b>X670E</b>	High-end, supports CPU overclocking, multiple GPUs, and advanced features (e.g., PCIe 5.0).
<b>B650</b>	Mid-range, supports most features, but typically fewer PCIe lanes than X670.
<b>A620</b>	Entry-level, fewer features and limited expansion options.

#### Compatibility Considerations

- **CPU Socket:** Ensure the motherboard's socket matches your CPU (e.g., AM5 for Ryzen 7000 series).
- **RAM Type:** Check the motherboard's supported RAM type (DDR4 or DDR5) and speed.
- **PCIe Lanes:** Determine if the motherboard has enough PCIe lanes for your expansion cards.
- **Form Factor:** Verify the motherboard fits your computer case.

### BIOS/UEFI and Overclocking

#### BIOS/UEFI Basics

<b>Accessing BIOS/UEFI</b>	Press <b>Del</b> , <b>F2</b> , <b>F12</b> , or <b>Esc</b> during startup (check your motherboard manual).
<b>Boot Order</b>	Set the boot order to prioritize your operating system drive.
<b>System Information</b>	View CPU, RAM, and storage information.
<b>Fan Control</b>	Adjust fan speeds to optimize cooling and noise levels.
<b>Secure Boot</b>	Enable/disable secure boot for operating system security.

#### Overclocking (Advanced)

<b>CPU Overclocking</b>	Adjust CPU frequency and voltage to increase performance (voids warranty, requires good cooling).
<b>RAM Overclocking (XMP)</b>	Enable XMP (Extreme Memory Profile) to run RAM at its rated speed and timings.
<b>Voltage Adjustments</b>	Adjust CPU, RAM, and chipset voltages for stability during overclocking (requires caution).
<b>Monitoring</b>	Monitor CPU temperature, voltage, and frequency to ensure safe overclocking.

### Troubleshooting and Maintenance

#### Common Issues

- **No Power:** Check power supply connections and power switch.
- **No Boot:** Reseat RAM, check CPU installation, and clear CMOS.
- **Overheating:** Ensure proper CPU cooler installation and adequate case airflow.
- **Driver Issues:** Install the latest drivers for your motherboard and peripherals.

#### Maintenance Tips

- **Dust Removal:** Regularly clean dust from the motherboard and components using compressed air.
- **Thermal Paste:** Reapply thermal paste to the CPU every few years for optimal cooling.
- **BIOS Updates:** Update the BIOS/UEFI to the latest version for improved compatibility and performance.
- **Cable Management:** Ensure proper cable management for airflow and aesthetics.