

Key Components & Form Factors

Essential Components

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

Motherboard Form Factors

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

Chipsets and Compatibility

Intel Chipsets (Examples)

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

AMD Chipsets (Examples)

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

Compatibility Considerations

<ul style="list-style-type: none">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.
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BIOS/UEFI and Overclocking

BIOS/UEFI Basics

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

Overclocking (Advanced)

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