

The motherboard is a core component of a functioning computer. It functions as the medium of interaction between all the components and is integral for the computer to operate. It allows for intercomponent communication inside the computer and facilitates the coordination of hardware functions. A modern motherboard is generally composed of the CPU socket, where the CPU is installed; the DIMM slots, or more conventionally known as the RAM slots, where system memory is inserted; the chipset, where the communication between the CPU, memory, and peripherals is facilitated; the expansion slots, where graphics cards, sound cards, or network adapters are inserted; the storage connectors, where storage devices such as HDDs or SSDs are connected; the power connectors, where power is received from the power supply and is distributed to the motherboard and its components; the BIOS chips, where firmware is located that tests the components; and the I/O ports, located at the back of the motherboard to connect to peripherals. Given the generally well defined makeup of a motherboard, variations of motherboards have been made to suit specific purposes and system requirements. The most common motherboard types are the ATX, the Micro-ATX, and the Mini-ITX. They serve as the industry benchmark for their balance between compatibility, performance, and size. High-end or specialized motherboards, such as the Extended-ATX, are a variation of the ATX design and are typically used for server or workstation builds that require higher end hardware. Given the advance in technological standards, older boards such as the AT, LPX, and Mini-ATX have been obsoleted by newer boards. Lastly, the BTX Motherboard and the Pico BTX Motherboard were experimental thus never gained traction among users.

Form Factor	Build	CPU Slots	Memory Slots	Chipsets	BIOS	PCI Slots	SATA	Built-in Features
AT Motherboard	350 mm × 305 mm	1 (PGA/ZIF)	4–6 (SIMM)	Intel 486/586 series	Legacy BIOS	3–4 (PCI/ISA)	None (IDE-based)	Bulky size, many I/O ports, outdated; no onboard USB.
ATX Motherboard	305 mm × 244 mm	1	2–4 (DIMM)	Intel Z690, AMD X670	UEFI/EFI OS	4–7 (PCIe/PCI)	4–10	Mainstream design, integrated I/O panel, optimized airflow.
BTX Motherboard	325 mm × 267 mm	1	2–4 (DIMM)	Intel 900 series	BIOS/EFI	3–4 (PCIe/PCI)	4–6	Reverse layout for better cooling, failed to gain popularity.
Extended-ATX Motherboard	305 mm × 330 mm	1–2 (for server/workstation)	4–8 (DIMM)	Intel X299, AMD TRX40,	UEFI/EFI OS	7–8 (PCIe/PCI)	6–10	Large format for high-end builds, supports dual CPUs and multi-GPU.
LPX Motherboard	229 mm × 330 mm	1 (PGA/ZIF)	2–4 (SIMM)	Intel 486/Pentium	Legacy BIOS	Riser Card (PCI/ISA)	IDE	Compact, used in slim desktops; now obsolete.
Micro-ATX Motherboard	244 mm × 244 mm	1	2–4 (DIMM)	Intel Z690, AMD X670	UEFI/EFI OS	4 (PCIe/PCI)	4–8	Compact and affordable; ideal

								balance of performance and size.
Mini ITX Motherboard	170 mm × 170 mm	1	2 (DIMM)	Intel/AMD current gen	UEFI/EFI OS	1 (PCIe x16)	4–6	Smallest consumer board; ideal for compact PCs and HTPCs.
Mini-ATX Motherboard	284 mm × 208 mm	1	2–4 (DIMM)	Early Pentium chipsets	Legacy BIOS	4 (PCI)	Used IDE	Older mid-size form factor; short-lived between ATX and Micro-ATX.
Pico BTX Motherboard	203 mm × 267 mm	1	2 (DIMM)	BTX chipsets	BIOS/EFI	2–4	Ultra-compact	Smallest BTX variant; limited use in OEM systems.
Standard-ATX Motherboard	305 mm × 244 mm	1	2–4 (DIMM)	Intel Z690, AMD X670	UEFI/EFI OS	4–7 (PCIe/PCI)	4–10	Equivalent to ATX; same specifications and layout.

References:

HP. (2024, April). *What is a chipset? Computer motherboard component guide*. HP Tech Takes.
<https://www.hp.com/us-en/shop/tech-takes/what-is-a-chipset>

Micro Center. (n.d.). *Anatomy of a motherboard*. Micro Center Tech Center.
https://www.microcenter.com/tech_center/article/11166/anatomy-of-a-motherboard

Corsair. (n.d.). *ATX vs Micro ATX vs Mini ITX: What's the difference?* Corsair Explorer.
<https://www.corsair.com/us/en/explorer/diy-builder/cases/atx-vs-microatx-vs-mini-itx-whats-the-difference>

Overclockers UK. (2021). *Motherboard form factors explained: Everything you need to know*. Overclockers Blog.
<https://www.overclockers.co.uk/blog/motherboard-form-factors-explained-everything-you-need-to-know>

BuildComputers.net. (n.d.). *Motherboard form factors: Guide to motherboard sizes*. BuildComputers.
<https://www.buildcomputers.net/motherboard-form-factors.html>