

**Introduction:**

Motherboards play a crucial role in any computer system, acting as the central platform that links all components and ensures smooth operation. Over the years, various motherboard form factors have been introduced to meet diverse requirements, from everyday home use to advanced high-performance tasks. Each form factor has distinct characteristics, including size, expandability, and features, that make it suitable for specific purposes. This research focuses on comparing the different types of motherboards, examining their designs, slots, chipsets, and integrated features to assist users in understanding their capabilities and selecting the most appropriate option.

**Discussion:**

Motherboards come in different form factors, each tailored to specific needs related to size, performance, and functionality. For example, ATX motherboards are popular for their good balance between expandability and size, while smaller options like Micro-ATX and Mini-ITX are perfect for compact systems. Extended-ATX motherboards are preferred for high-performance tasks, offering more slots and features for advanced users. Older designs, such as AT and LPX, are no longer widely used due to limited capabilities and compatibility. Key factors like the number of CPU and memory slots, chipset features, and built-in options like Wi-Fi or extra USB ports greatly impact a motherboard's usability. Understanding these aspects is important when choosing the right motherboard for tasks like gaming, professional work, or everyday use.

Form Factor	Build	CPU Slots	Memory Slots	Chipsets	BIOS	PCI Slots	SATA	Built-in Features
AT Motherboard	Large, outdated, bulky	1	2–4	Basic	Legacy BIOS	2–3	None	Minimal; limited connectors
ATX Motherboard	Standard modern size	1	4–8	Advanced, mainstream	UEFI/BIOS	4–7	4–8	Multiple USB ports, audio, LAN
BTX Motherboard	Optimized airflow design	1	2–4	Advanced	UEFI/BIOS	4–7	2–6	Improved cooling layout
Extended-ATX Motherboard	Larger than ATX; professional use	1	4–8	High-end	UEFI/BIOS	5–8	6–10	Multiple GPUs, enhanced power delivery
LPX Motherboard	Outdated, compact size	1	2–3	Limited legacy support	Legacy BIOS	1–2	None	Basic; no advanced features
Micro-ATX Motherboard	Smaller version of ATX	1	2–4	Mid-range	UEFI/BIOS	2–4	2–6	Budget-friendly, decent performance
Mini ITX Motherboard	Ultra-compact, portable	1	1–2	Compact but powerful	UEFI/BIOS	1	2–4	Wi-Fi, Bluetooth, onboard graphics
Mini-ATX Motherboard	Small build; uncommon	1	2–3	Limited	Legacy BIOS	2–3	2–4	Basic connectivity
Pico BTX Motherboard	Smaller than BTX	1	1–2	Compact design	UEFI/BIOS	1–2	2–4	Optimized for cooling, small cases
Standard-ATX Motherboard	Modern, widely used	1	4–8	Mainstream to high-end options	UEFI/BIOS	4–7	4–8	Multiple GPUs, USB ports, audio, LAN