

Comparative Study on Different Types of Motherboards

Introduction

- Motherboards are the backbone of a computer system, housing essential components. It links and facilitates communication between all of the necessary parts, including the graphics card, storage devices, peripheral devices, CPU (central processing unit), and RAM (random access memory). The system board, is a crucial component that makes sure power and data move smoothly between all parts.
- It includes connectors, sockets, and slots for the installation of hardware parts. The chipset, which controls data transport between the CPU, memory, and other devices, is also included and it contains the BIOS or UEFI firmware, which aids in loading the operating system and initializes the hardware during startup.
- There are different types of motherboards, such as ATX, Micro-ATX, and Mini-ITX. When building a small personal computer, modern motherboards also come with built-in functions including M.2 slots for SSDs, network interfaces, audio systems, and USB ports. Without these features your personal computer's space is very cluttered.

Types of Motherboards

AT Motherboard

popular in personal computers in the 1980s. AT stands for Advanced Technical. These motherboards were a specific size and shape, fitting only in AT computer cases.



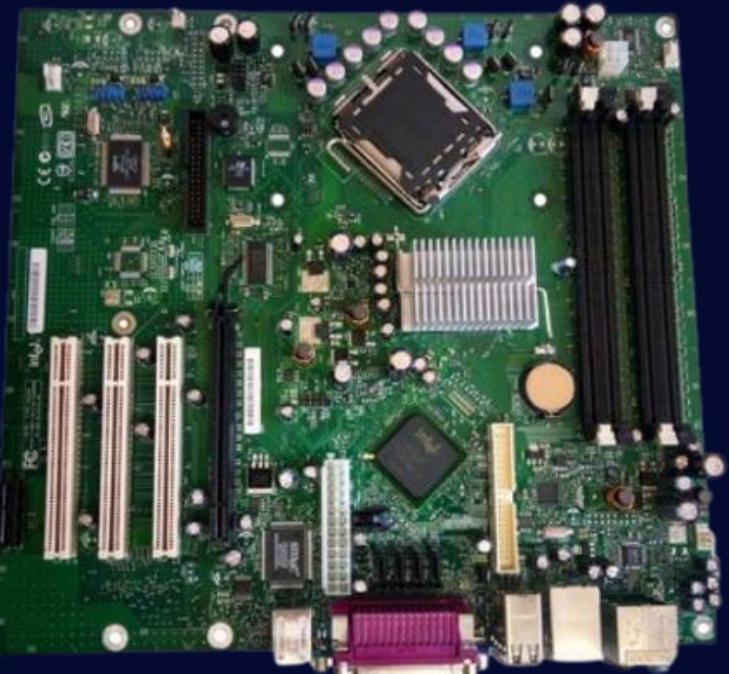
ATX Motherboard

are the newer type of motherboard used in most modern computers. ATX stands for the Advanced Technology Extended. These motherboards are the improved version of the older AT motherboards. These ATX motherboards have the specific size and layout.



BTX Motherboard

known as balanced technology extended, or BTX for short, was created to meet the demands of developing technologies, which ask for higher power consumption and, as a result, produce more heat. In order to focus on low-power CPUs, Intel stopped making BTX boards in the middle of the 2000s.



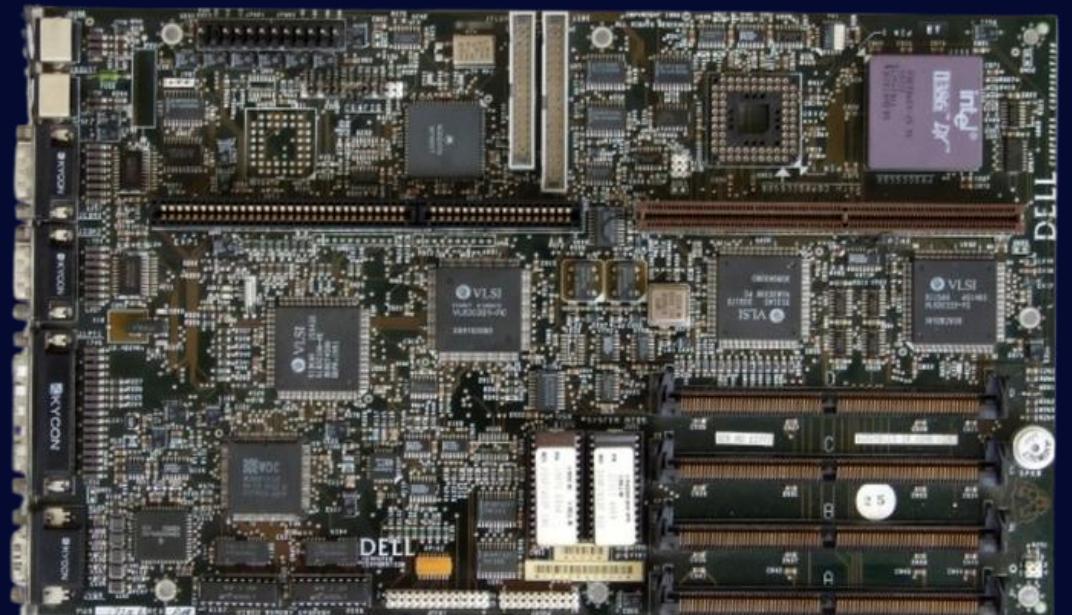
Extended-ATX Motherboard

is designed for both dual CPU and single configuration and has up to 8 RAM slots and has more PCIe and PCI slots for adding PCI cards for different purposes.



LPX Motherboard

The output and input ports were relocated to the device's back as the first change, in comparison to previous iterations, and the second change was to add a riser card, which makes it simpler to attach components.



Micro-ATX Motherboard

has less ports and slots as compared to Standard ATX board. This type of motherboard is more suitable for those who don't want to much connectivity and later upgrades like adding more ram and additional GPU and adding PCI cards.



Mini ITX Motherboard

known as the information technology extended (ITX) has been reduced in size and made smaller than in previous generations in its place. It was created in the 2000s, and it is 17 by 17 centimetres in size.



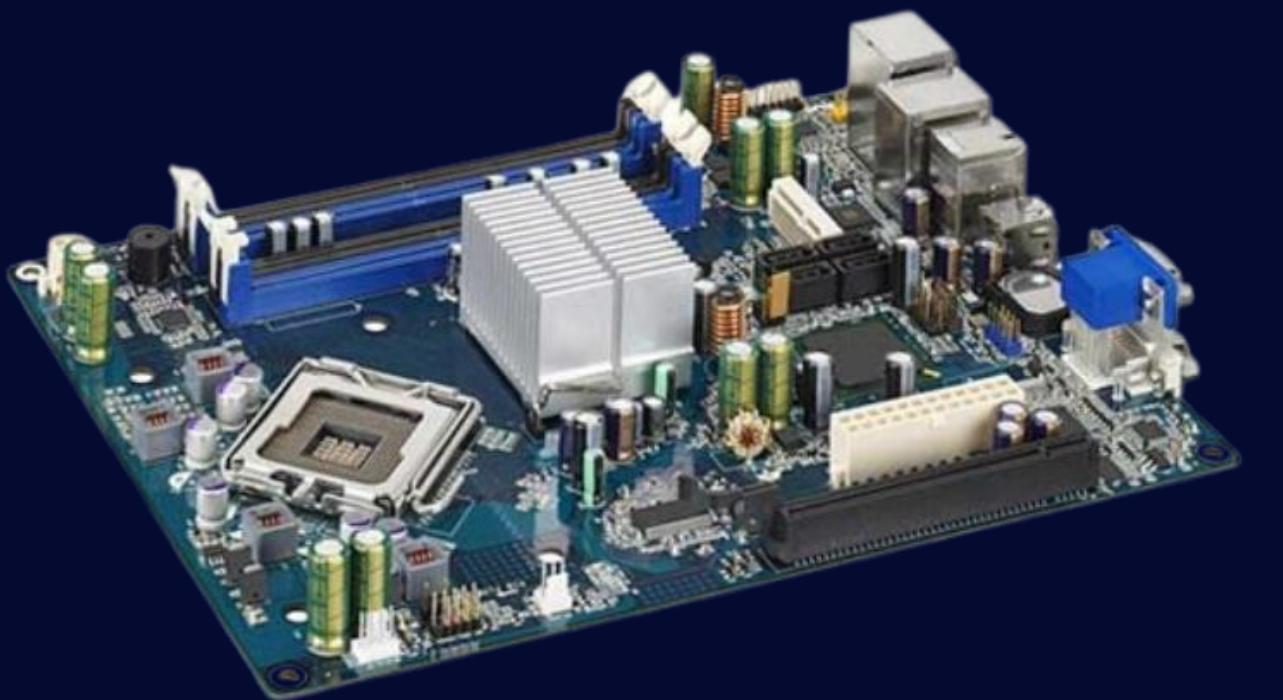
Mini-ATX Motherboard

the most compact members of the ATX family. They had a small price tag and were made to take up the least amount of space possible. Mini ATX was modified into Flex ATX by Intel between 1999 and 2000.



Pico BTX Motherboard

due to their small size when compared to a regular motherboard. Despite the fact that the top half of the BTX is shared, two expansion slots are supported. It is made to satisfy the demands of digital applications, and its distinguishing features include the half-height or riser cards.



Standard-ATX Motherboard

offers more expansion slots, up to four slots for RAM, Two or sometimes more than two PCIe slots for dual graphics cards and more USB and other ports for connectivity, Also its size gives space in between components for airflow to keep heat in control.



Data Table of Types of Motherboards

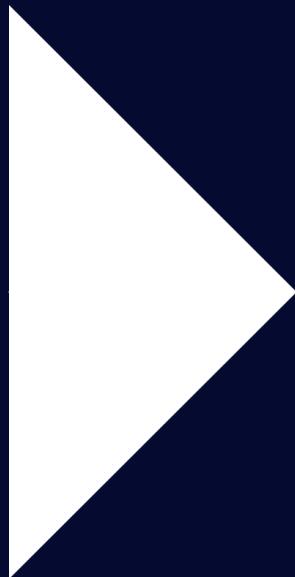
Table

Form Factor	Build	CPU Slots	Memory Slots	Chipsets	BIOS	PCI Slots	SATA	Built-in Features
AT Motherboard	Large, rectangular design (1980s-1990s)	Socket 4 / Socket 7	2-4 SIMM	Intel 430FX, VIA VPX	Legacy BIOS	2-3 PCI + 2-3 ISA	IDE (PATA), No SATA	Basic I/O (serial, parallel, PS/2), limited USB
ATX Motherboard	Standard mid-size (modern PCs)	LGA 115x / AM4 / AM5	2-4 DIMM (DDR-DDR5)	Intel Z / B / H, AMD B / X	UEFI / BIOS	3-6 PCIe	4-8 SATA, M.2 NVMe	USB 3.x, LAN, HDMI, Wi-Fi, RGB
BTX Motherboard	Designed for better airflow	LGA 775 / LGA 1156	2-4 DIMM	Intel 945 / 965	BIOS / UEFI	2-4 PCIe	2-4 SATA	Improved cooling layout, audio, LAN
Extended-ATX Motherboard	Larger high-end version of ATX	LGA 2066 / AM5 / Threadripper	4-8 DIMM	Intel X299, AMD TRX40	UEFI / BIOS	4-7 PCIe	6-10 SATA, multiple M.2	Dual LAN, Wi-Fi 6E, RGB, multiple GPU support
LPX Motherboard	Low-profile slim build	Socket 7 / Slot 1	2-3 SIMM / DIMM	Intel 430TX / VIA VPX	Legacy BIOS	Riser card (limited expansion)	IDE (PATA)	Integrated video and audio

Table 2

Form Factor	Build	CPU Slots	Memory Slots	Chipsets	BIOS	PCI Slots	SATA	Built-in Features
Micro-ATX Motherboard	Smaller ATX version	LGA 115x / AM4 / AM5	2-4 DIMM	Intel B / H, AMD B / A	UEFI / BIOS	2-3 PCIe	4-6 SATA, M.2	LAN, audio, HDMI, optional Wi-Fi
Mini ITX Motherboard	Very compact square build	LGA 1151x / AM4 / AM5	2 DIMM	Intel B / H, AMD A / B	UEFI / BIOS	1 PCIe x16	2-4 SATA, 1 M.2	Built-in Wi-Fi, Bluetooth, USB-C, HDMI
Mini-ATX Motherboard	Slightly smaller than Micro-ATX	LGA 115x / AM4	2-3 DIMM	Intel B / H, AMD B	UEFI / BIOS	2-3 PCIe	4-6 SATA	Compact, audio, LAN, USB 3.0
Pico BTX Motherboard	Compact version of BTX	LGA 775 / LGA 1156	2 DIMM	Intel 945G / G41	BIOS / UEFI	1-2 PCIe	2-3 SATA	Small cooling design, onboard LAN/audio
Standard-ATX Motherboard	Common desktop form	LGA 115x / AM4 / AM5	2-4 DIMM	Intel Z / B / H, AMD B / X	UEFI / BIOS	3-6 PCIe	4-8 SATA, M.2	Full connectivity (USB 3.x, LAN, Wi-Fi, RGB)

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