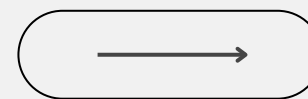


# DIFFERENT TYPES OF MOTHERBOARDS



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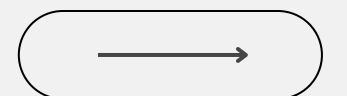
## What's the His-tea-ory?

The motherboard was first introduced to the world by IBM in 1981 and was called the "planar." It housed a CPU and RAM and served a very basic purpose. The board had chips wired together and ports for a keyboard, mouse, and cassette tapes (Murphy, 2022).

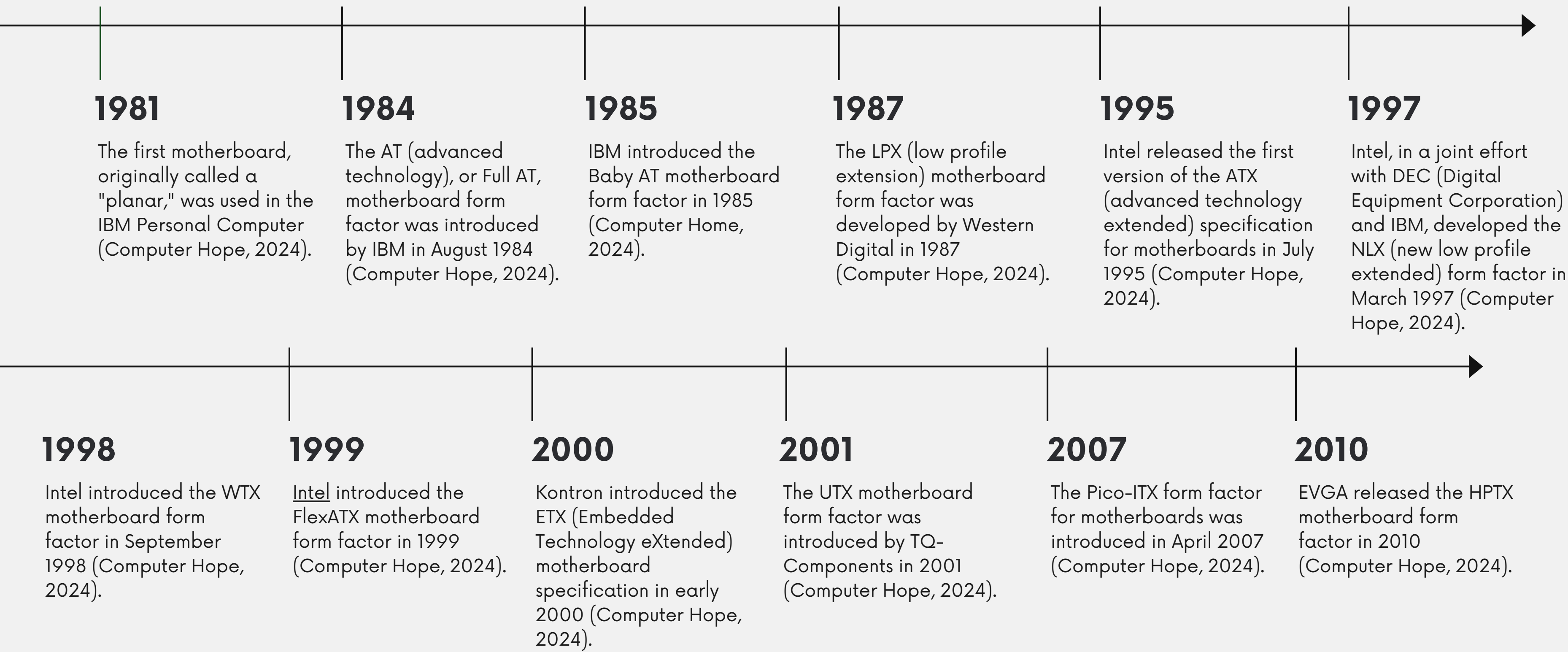
## What do we know?

A **motherboard** is a circuit board inside computers that stores electrical components and helps them communicate (BasuMallick, 2024).

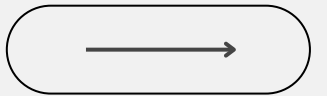
# THE MOTHERBOARD



# BRIEF HISTORY ON MOTHERBOARDS

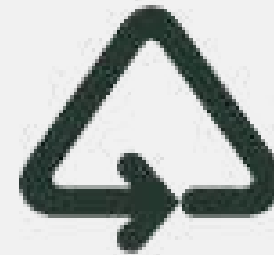


# FUNCTIONS OF A MOTHERBOARD



## MANAGES DATA FLOW

The BIOS component of the motherboard ensures that the operating system interacts well with input and output devices. This ensures that the data sent to the computer moves as expected to perform the intended purpose (BasuMallik, 2024).



## CONSERVES RESOURCES

The motherboard saves consumers time, energy, and money by connecting all the computer connects. The motherboard provides a platform on which manufacturers can connect all the necessary components to ensure that the computer functions (BasuMallik, 2024).

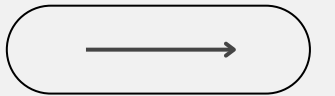


## OPTIMIZES POWER DISTRIBUTION

The motherboard provides and distributes power optimally. Computers require electricity to function (BasuMallik, 2024).



# FUNCTIONS OF A MOTHERBOARD<sub>(cont'd)</sub>



## DRIVES COMMUNICATION

For a computer to process a particular set of instructions, sometimes it may require several components to communicate and work together to complete the task. In such scenarios, the motherboard relies on its circuit technology to enable communication between these components. (BasuMallik, 2024).



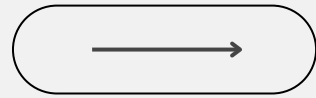
## ENHANCES PERFORMANCE

The motherboard boosts the capabilities of a computer. Motherboards often transform the capabilities of a computer. (BasuMallik, 2024).



## ENABLES PRODUCTIVITY

While traditional computers came pre-installed with BIOS, modern ones are pre-installed with EFI and UEFI. BIOS, EFI, and UEFI enable computers to boot without requiring users to reconfigure basic settings, time, and date. (BasuMallick, 2024).



# types of motherboards



01 **AT Motherboard**

02 **ATX Motherboard**

03 **BTX Motherboard**

04 **Extended-ATX Motherboard**

05 **LPX Motherboard**

06 **Micro-ATX Motherboard**

07 **Mini ITX Motherboard**

08 **Mini-ATX Motherboard**

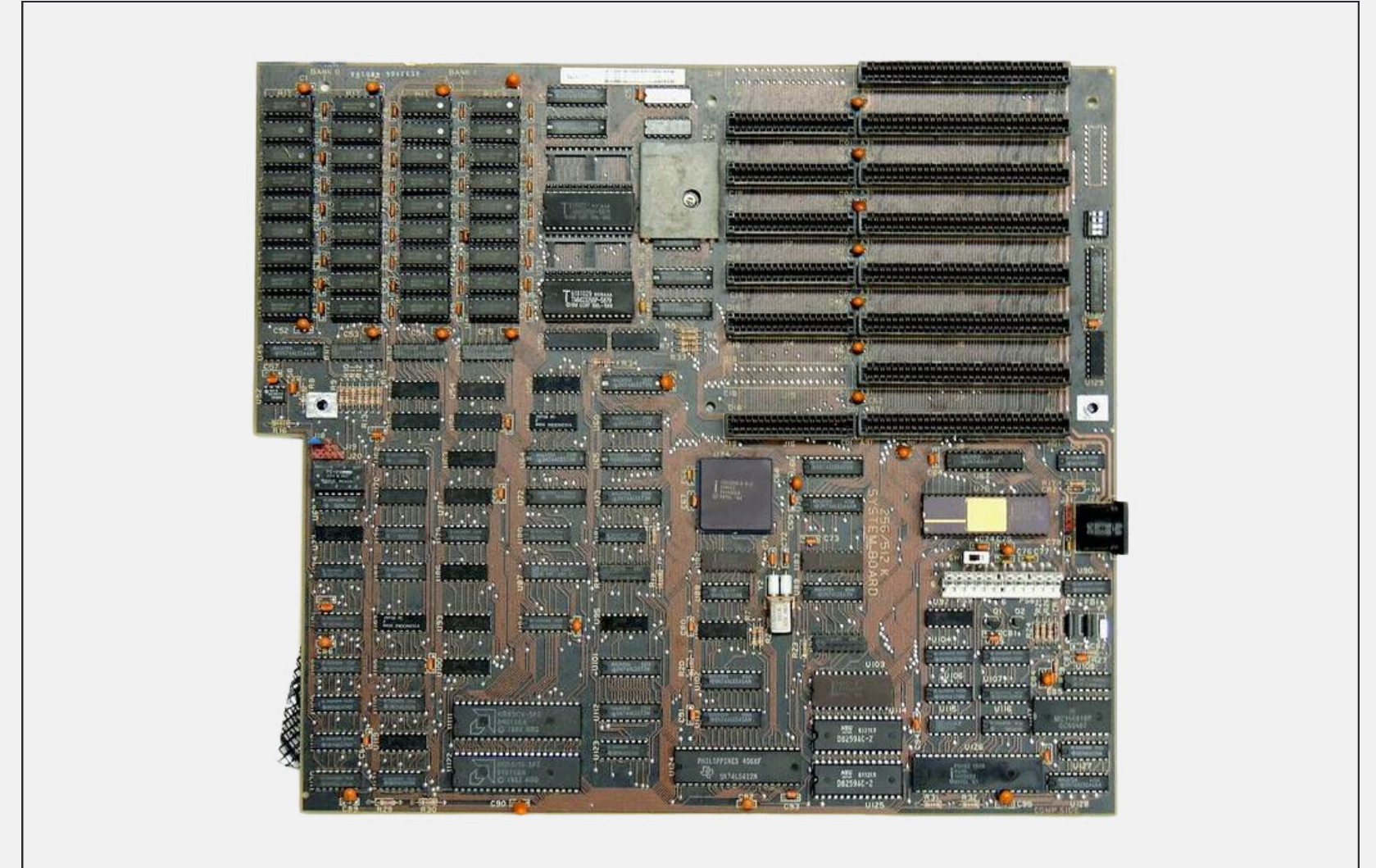
09 **Pico BTX Motherboard**

10 **Standard-ATX Motherboard**

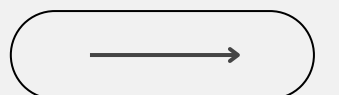
# AT MOTHERBOARD

The AT form factor was developed by IBM and was the common form factor of the 1980s. AT is an abbreviation for *Advanced Technology* and this form factor comes in two flavors - AT (sometimes referred to as Full-AT) and Baby AT (MERIDIANOUTPOST, n.d.). Due to their larger physical dimensions, these motherboards do not work properly with computers that fall into the category of smaller desktops (BasuMallick, 2024).

## Different Types of Motherboard



IBM PC AT System Board







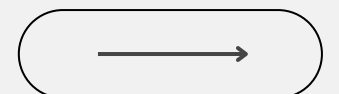
# AT Motherboard

## Advantages

- Compatible with early PC hardware
- Simple design made troubleshooting easier

## Disadvantages

- Larger physical size incompatible with smaller desktops
- Six-pronged power connectors
- Limited expandability



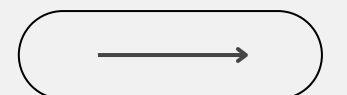
# ATX MOTHERBOARD

The ATX was first introduced in 1995 by Intel. It was an evolutionary design built on the previous Advanced Technology (AT) model by improving the outline of the case, the power supply and the motherboard. With a better use of space and resources, ATX quickly became the default form factor for most new PC systems (Rouse, 2011).



MB990 ATX motherboard

## Different Types of Motherboard





# ATX Motherboard

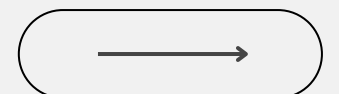
## Advantages

- Larger motherboard area supports more hard drives and add-on cards
- Wider choice of high-performance cooling systems and components

## Disadvantages

- Bulkier size takes up more space
- Heavier than smaller form factors

How to Choose a Gaming Motherboard (n.d.)  
<https://www.intel.com/content/www/us/en/gaming/resources/how-to-choose-a-motherboard.html>





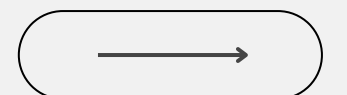
# BTX MOTHERBOARD

**Balance technology extended (BTX)** is a form factor for motherboards that was initially intended to replace the 2004 and 2005 ATX motherboard. BTX is designed to decrease power needs and reduce heat. Furthermore, it employs enhanced technology that includes the serial advanced technology attachment (ATA), universal serial bus (USB) 2.0 and peripheral component interconnect (PCI) express (Rouse, 2011).

## Different Types of Motherboard



HP Compaq DC7800 SFF PC Motherboard







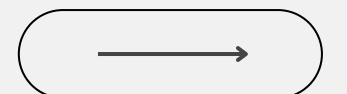
# BTX Motherboard

## Advantages

- Better airflow and cooling compared to ATX boards
- Reduced latency due to component placement

## Disadvantages

- More expensive than ATX boards
- Limited adoption and support from manufacturers



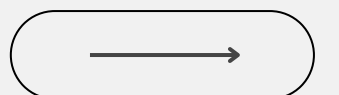
# EXTENDED-ATX MOTHERBOARD

**Extended ATX** is the largest of all ATX variants. This motherboard is designed to build a powerful PC system. Its configuration allows it to work alongside full tower cases and provide ample space and features. The massive size of this motherboard not only allows expansion but also offers a good breathing room for essential components. This affects the overclocking of the system, thus improving the performance (Teja, 2024).

## Different Types of Motherboard



Gigabyte Z790 Aorus Master X





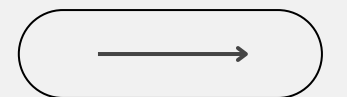
# Extended-ATX Motherboard

## Advantages

- Can support dual CPU sockets in some cases
- More RAM slots available (up to 8)
- More PCIe slots for graphics cards and other expansion cards

## Disadvantages

- Less common than ATX motherboards
- May not be compatible with standard PC cases due to larger size
- Potentially more expensive than ATX boards

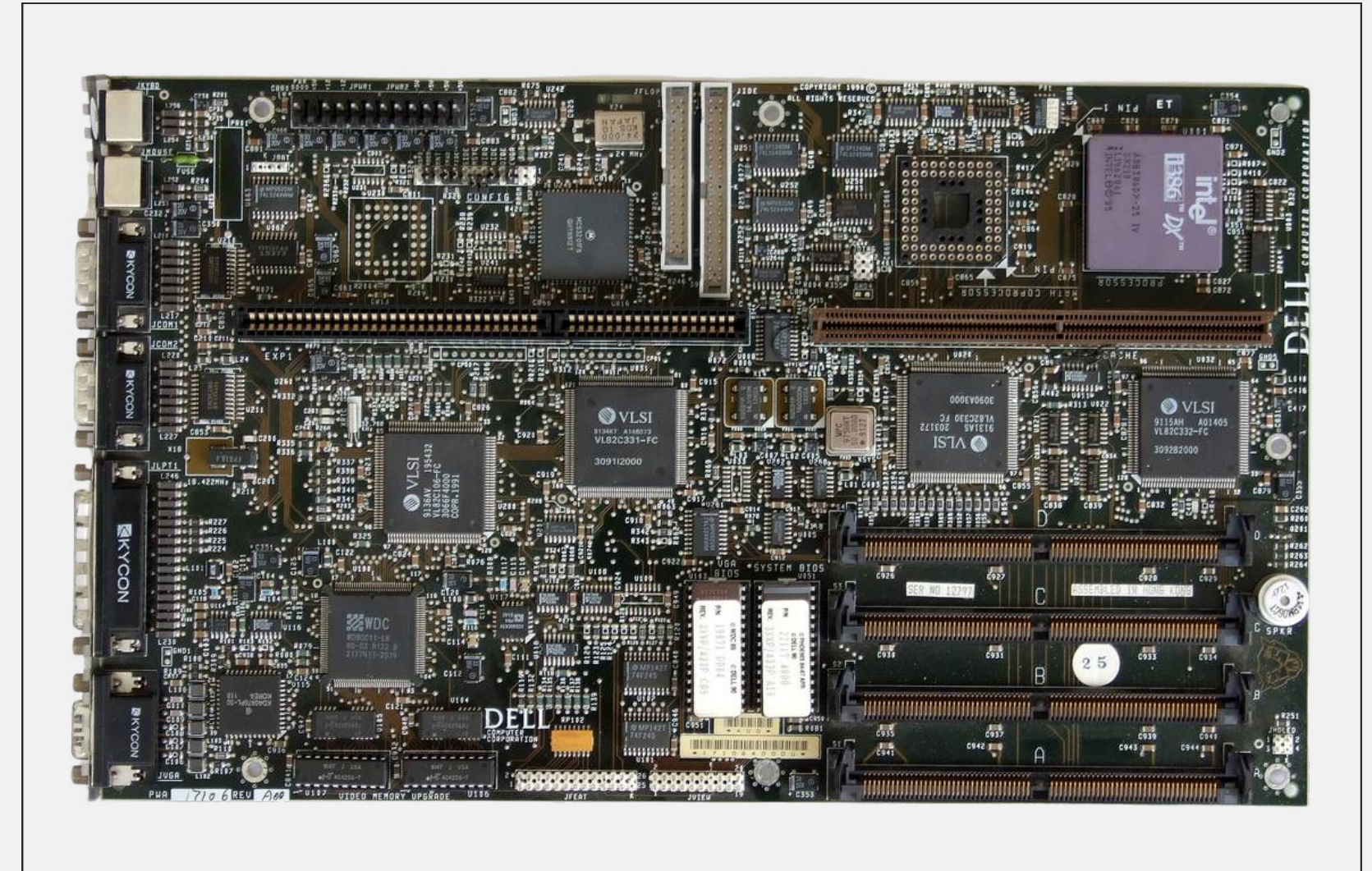




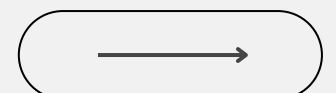
# LPX MOTHERBOARD

**LPX (low profile extension)** is a motherboard form factor developed by Western Digital in 1987 that was used in the late 1980s and throughout the 1990s. An LPX motherboard is 9" wide x 13" deep, uses a riser card, and has different placement of the video, parallel, serial, and PS/2 ports compared to other motherboards (Computer Home, 2023).

## Different Types of Motherboard



System 325P







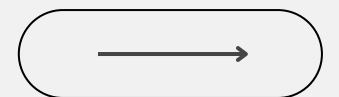
# LTX Motherboard

## Advantages

- More compact size suitable for smaller cases
- Lower cost compared to larger form factors

## Disadvantages

- Limited expansion options due to smaller size
- May have fewer features compared to standard ATX boards



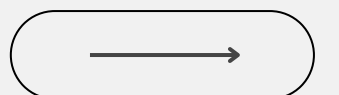
# MICRO-ATX MOTHERBOARD

A **micro ATX motherboard** is a smaller one with a typical 244 x 244 mm size. Micro ATX motherboard was first introduced in 1997, about 2 years after ATX's invention. This motherboard took the design of ATX and shrunk that, as its name suggests (Fodenn, 2023).

## Different Types of Motherboard



Biostar B760MX2-E





# Micro-ATX Motherboard

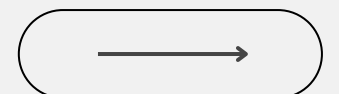
## Advantages

- More compact size suitable for smaller cases
- Lower cost compared to larger form factors
- Suitable for building gaming PCs without needing large cases

## Disadvantages

- Limited expansion options due to smaller size
- Fewer PCIe slots than ATX boards
- May have fewer RAM slots (typically 4) compared to ATX boards

APEX (2024). ATX Vs Micro-ATX: Your Guide to Motherboard Sizes  
<https://apexgamingpcs.com/blogs/apex-support/atx-vs-micro-atx>



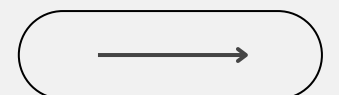
# MINI-ITX MOTHERBOARD

The **Mini-ITX** is a compact and versatile motherboard form factor, popularly found at the heart of small form factor (SFF) personal computers. Its dimensions are 6.7 inches by 6.7 inches (170 mm x 170 mm), roughly two-thirds the size of a standard ATX motherboard. Mini-ITX motherboards are designed for energy efficiency and typically boast low power consumption (Ashtari, 2024).

## Different Types of Motherboard



Mini ITX Motherboard MANO540







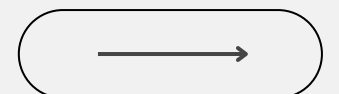
# Mini-ITX Motherboard

## Advantages

- Extremely compact size suitable for very small cases
- Low power consumption due to smaller size
- Ideal for building small form factor (SFF) computers

## Disadvantages

- Limited expansion options due to very small size
- Fewer PCIe slots than ATX boards
- May have fewer RAM slots (typically 2) compared to larger boards



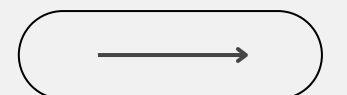
# MINI-ATX MOTHERBOARD

**Mini-ATX**, also known as **Mini Advanced Technology Extended**, is a smaller form factor motherboard standard that falls between the standard ATX and the smaller micro-ATX sizes. It measures 11.2 x 8.2 inches and is designed to fit into smaller computer cases while still providing a balance of expandability and compatibility (Lenovo, n.d.).

## Different Types of Motherboard



VIA EPIA-M910-16 Dual Core Nano X2 E  
1,6GHz MiniITX





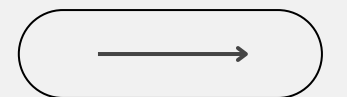
# Mini-ATX Motherboard

## Advantages

- More compact size suitable for smaller cases
- Lower cost compared to larger form factors

## Disadvantages

- Limited expansion options due to smaller size
- Fewer PCIe slots than ATX boards



# PICO BTX MOTHERBOARD

Pico means small, so as the name says, **Pico BTX Motherboards** are the motherboards that are smaller in size, which has got two expansion slots that are being supported despite developing have them getting shared with the top half of BTX. These have half-height cards or the Riser cards features where it will be helpful for the demands of the applications that are digital (Wallen, 2021).

## Different Types of Motherboard



Pico-ITX SBC Axiomtek PICO512 7th Gen  
Intel Core i7-7600U i5-7300U i3-7100U,  
Celeron 3965U, HDI/LVDS and LAN DDR4  
motherboard







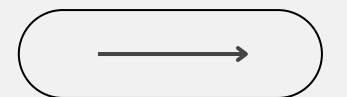
# Pico BTX Motherboard

## Advantages

- Extremely compact size suitable for very small cases
- Low power consumption due to smaller size

## Disadvantages

- Very limited expansion capabilities
- May have fewer RAM slots compared to larger boards



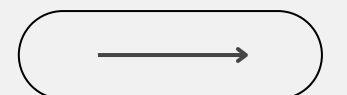
# STANDARD-ATX MOTHERBOARD

**ATX** is an enhanced version of the **AT** motherboard that Intel created in the 1990s. Its name means “*advanced technology extended*,” and its initials stand for “advanced technology.” Unlike AT, it is much more compact and enables the associated components to be interchanged. The connection elements have witnessed significant progress and development (BasuMallick, 2024).

## Different Types of Motherboard



ASUS K8V-X SE VIA K8T800 / VIA  
VT8237R Socket-754 Athlon 64 DDR  
400MHZ ATX Motherboard





# Standard - ATX Motherboard

## Advantages

- Widely compatible with standard PC cases
- Offers good balance between features and cost
- Suitable for building full-tower or mid-tower PCs

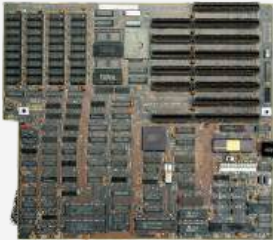
## Disadvantages

- Not ideal for very small PC builds
- May be more expensive than smaller form factors



<b>CPU Slots:</b> <ul style="list-style-type: none"><li>Limited compatibility with early Intel processors</li></ul>	
<b>Memory Slots:</b> <ul style="list-style-type: none"><li>Typically supported up to 64KB of RAM in two slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>Early versions had limited chipsets compared to modern designs</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>Stored firmware and boot instructions</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>Limited expansion capabilities</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>Not present - used IDE interfaces instead</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>Compatible with early PC hardware</li><li>Simple design made troubleshooting easier</li></ul>	

AT Motherboard



<b>CPU Slots:</b> <ul style="list-style-type: none"><li>Supports modern processors compatible with the board</li></ul>	
<b>Memory Slots:</b> <ul style="list-style-type: none"><li>Typically four RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>Integrated northbridge and southbridge chips</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>Firmware stored on the board for boot instructions</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>Multiple PCI-E x16 slots, supplemented by PCIe x4 and x1 slots</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>A handful of SATA ports</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>Front audio and power connectors</li></ul>	


ATX Motherboard





<b>CPU Slots:</b> <ul style="list-style-type: none"><li>Designed for modern processors compatible with the board</li></ul>	
<b>Memory Slots:</b> <ul style="list-style-type: none"><li>Typically four RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>Integrated northbridge and southbridge chips</li><li>The northbridge manages CPU communication with components</li><li>The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>Firmware stored on the board for boot instructions</li><li>Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>Multiple PCI-E x16 slots, supplemented by PCIe x4 and x1 slots</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>A handful of SATA ports</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>Front audio and power connectors</li><li>USB ports for connecting peripherals</li></ul>	


BTX Motherboard





<b>CPU Slots:</b> <ul style="list-style-type: none"><li>• Can support dual CPU sockets in some cases</li><li>• Memory Slots:</li><li>• Typically 2 to 8 RAM slots</li><li>• Some models support up to 8 RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>• Integrated northbridge and southbridge chips</li><li>• The northbridge manages CPU communication with components</li><li>• The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>• Firmware stored on the board for boot instructions 2</li><li>• Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>• Typically 4 to 8 PCIe slots</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>• Usually 4 to 12 SATA ports</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>• Front audio and power connectors</li><li>• USB ports for connecting peripherals</li></ul>	
	<div>Extended-ATX Motherboard</div>

<b>CPU Slots:</b> <ul style="list-style-type: none"><li>• Typically supports modern processors compatible with the board</li><li>• Memory Slots:</li><li>• Usually has fewer RAM slots compared to larger form factors</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>• Integrated northbridge and southbridge chips</li><li>• The northbridge manages CPU communication with components</li><li>• The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>• Firmware stored on the board for boot instructions</li><li>• Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>• Limited number of PCI slots compared to larger form factors</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>• Typically has fewer SATA ports than ATX boards</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>• Front audio and power connectors</li><li>• USB ports for connecting peripherals</li></ul>	
	<div>LPX Motherboard</div>


<b>CPU Slots:</b> <ul style="list-style-type: none"><li>• Supports modern processors compatible with the board</li><li>• Memory Slots:</li><li>• Typically four RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>• Integrated northbridge and southbridge chips</li><li>• The northbridge manages CPU communication with components</li><li>• The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>• Firmware stored on the board for boot instructions</li><li>• Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>• Typically has two PCI-E x16 slots</li><li>• Fewer PCI-E x4 and x1 slots compared to ATX boards</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>• Fewer SATA ports compared to ATX boards</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>• Front audio and power connectors</li><li>• USB ports for connecting peripherals</li></ul>	
	<div>Micro-ATX Motherboard</div>

<b>CPU Slots:</b> <ul style="list-style-type: none"><li>Typically supports modern processors compatible with the board</li><li>Memory Slots:</li><li>Usually has two RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>Integrated northbridge and southbridge chips</li><li>The northbridge manages CPU communication with components</li><li>The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>Firmware stored on the board for boot instructions</li><li>Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>Usually has one PCI-E x16 slot</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>Typically has fewer SATA ports compared to larger form factors</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>Front audio and power connectors</li><li>USB ports for connecting peripherals</li></ul>	
	<div>Mini ITX Motherboard</div>

<b>CPU Slots:</b> <ul style="list-style-type: none"><li>Typically supports modern processors compatible with the board</li><li>Memory Slots:</li><li>Usually has 2 RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>Integrated northbridge and southbridge chips</li><li>The northbridge manages CPU communication with components</li><li>The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>Firmware stored on the board for boot instructions</li><li>Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>Typically has fewer PCIe slots compared to ATX boards</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>Usually has fewer SATA ports compared to larger form factors</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>Front audio and power connectors</li><li>USB ports for connecting peripherals</li></ul>	
	<div>Mini-ATX Motherboard</div>

<b>CPU Slots:</b> <ul style="list-style-type: none"><li>Typically supports modern processors compatible with the board</li><li>Memory Slots:</li><li>Usually has limited RAM slots compared to larger form factors</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>Integrated northbridge and southbridge chips</li><li>The northbridge manages CPU communication with components</li><li>The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>Firmware stored on the board for boot instructions</li><li>Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>Limited expansion options due to small size</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>Typically has fewer SATA ports compared to larger form factors</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>Front audio and power connectors</li><li>USB ports for connecting peripherals</li></ul>	
	<div>Pico BTX Motherboard</div>



<b>CPU Slots:</b> <ul style="list-style-type: none"><li>• Typically supports modern processors compatible with the board</li><li>• Memory Slots:</li><li>• Usually has 4 RAM slots</li></ul>	
<b>Chipsets:</b> <ul style="list-style-type: none"><li>• Integrated northbridge and southbridge chips</li><li>• The northbridge manages CPU communication with components</li><li>• The southbridge controls USB ports, sound cards, and other peripherals</li></ul>	
<b>BIOS:</b> <ul style="list-style-type: none"><li>• Firmware stored on the board for boot instructions</li><li>• Allows users to configure system settings</li></ul>	
<b>PCI Slots:</b> <ul style="list-style-type: none"><li>• Typically has 4 to 7 PCIe slots</li></ul>	
<b>SATA:</b> <ul style="list-style-type: none"><li>• Usually has 4 to 12 SATA ports</li></ul>	
<b>Builtin Features:</b> <ul style="list-style-type: none"><li>• Front audio and power connectors</li><li>• USB ports for connecting peripherals</li></ul>	
	<div><div><b>Standard-ATX Motherboard</b></div><div></div></div>

# AN ANALYSIS ON THE DIFF TYPES OF MOTHERBOARDS

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Motherboards are like the unsung heroes of computers, doing a lot of work behind the scenes to make everything run smoothly. When comparing different types of motherboards, their diversity really shows how technology has evolved to meet various needs. Whether it's size, features, or compatibility, each type has its strengths and weaknesses.

For example, the **ATX motherboard** is a versatile choice for standard desktops, offering plenty of slots for upgrades and efficient airflow. But if you're short on space, a **Micro-ATX** or **Mini-ITX** could be better. These smaller boards are compact and cost-effective but sometimes lack expansion options. This makes them great for everyday use or building budget gaming PCs, though you might feel limited if you want to add extra features later.

# AN ANALYSIS ON THE DIFF TYPES OF MOTHERBOARDS<sub>(cont'd)</sub>

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On the other hand, more specialized motherboards like the **Extended-ATX (E-ATX)** cater to power users and enthusiasts. These boards can handle dual CPUs and offer tons of RAM slots, making them perfect for heavy workloads like video editing or 3D rendering. But they're also bulkier and pricier, so not everyone would need one unless they're building a high-performance PC.

The **BTX motherboard** was a fascinating attempt at improving cooling and efficiency, but it didn't gain much traction. It reminds us that not all innovations stick around, even if they have good intentions. Similarly, older models like the **AT motherboard** laid the groundwork for modern designs but are now obsolete because they can't keep up with current demands.



# AN ANALYSIS ON THE DIFF TYPES OF MOTHERBOARDS<sub>(cont'd)</sub>

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What really stood out to me is how motherboards reflect the balance between innovation and practicality. Manufacturers have to think about size, compatibility, cost, and user needs all at once. For example, while **Mini-ITX motherboard** excel in portability and energy efficiency, they're not ideal for gamers or professionals who need more robust systems. Meanwhile, motherboards like the **LPX** show how designs catered to older technologies eventually phased out as new standards emerged.

To conclude, there is no universal choice; the ideal motherboard depends on the intended use. For gaming enthusiasts, **ATX** or **E-ATX** options offer enhanced performance, while **Micro-ATX** or **Mini-ITX** designs are better suited for simpler tasks, balancing cost and space efficiency. Each type reflects a unique chapter in computing history, showcasing how innovation adapts to evolving needs and technologies.

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