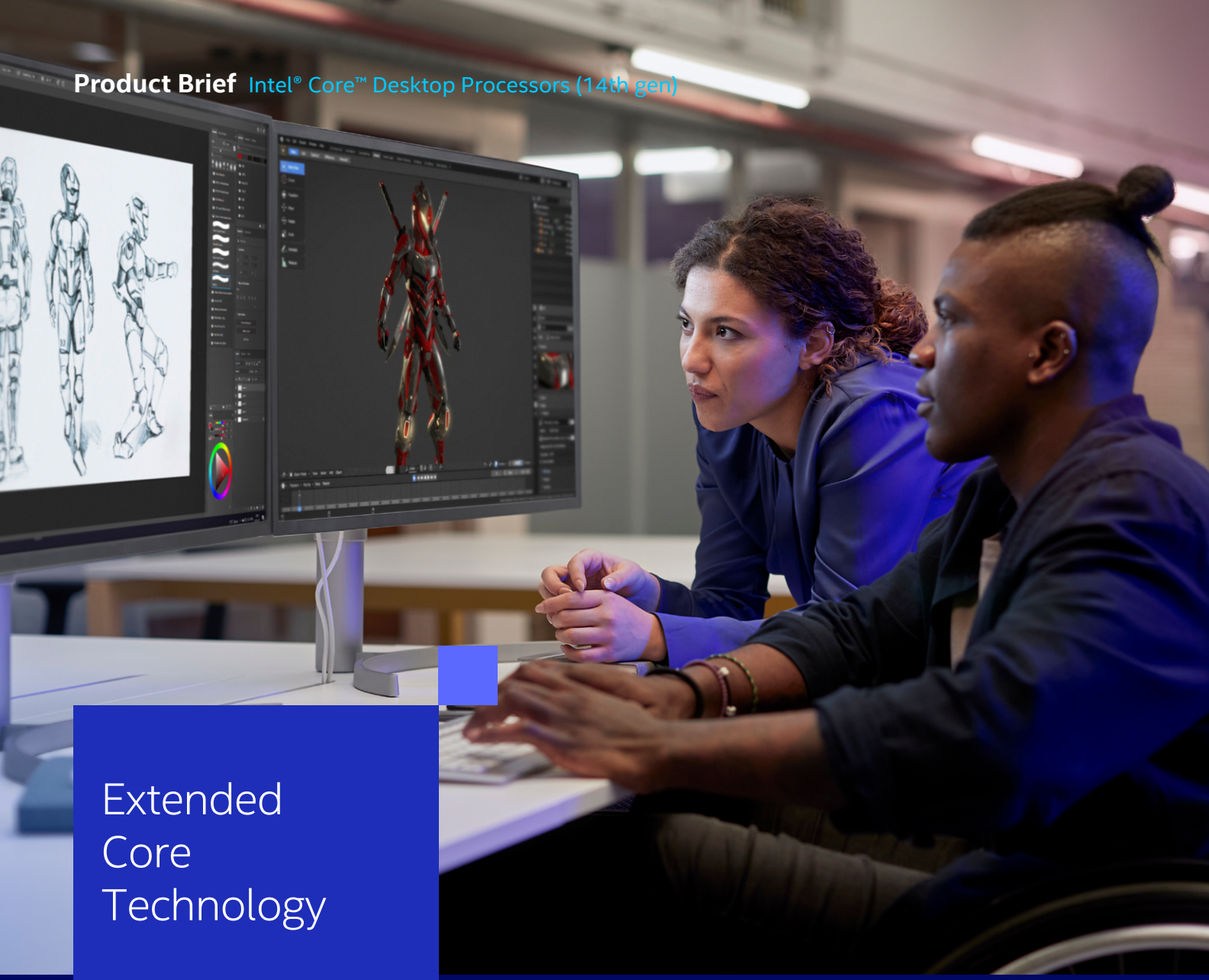
Intel® Core™ Desktop Processors

The Intel® Core desktop processors (14th gen) deliver the ultimate immersive experience for gaming and creating.

This new generation of processors continue to utilize Intel's performance hybrid architecture[1] to optimize your gaming, content creation, and productivity. Take advantage of platform innovation designed for delivering flexibility and supercharge your CPU performance with a powerful suite of tuning and overclocking tools. Support for the Intel® 700 series chipsets and backwards compatibility with the Intel® 600 series chipsets allow you to access the features you need for any task. Whether you are working, streaming, gaming, or creating, Intel® Core desktop processors deliver the ultimate immersive experience.

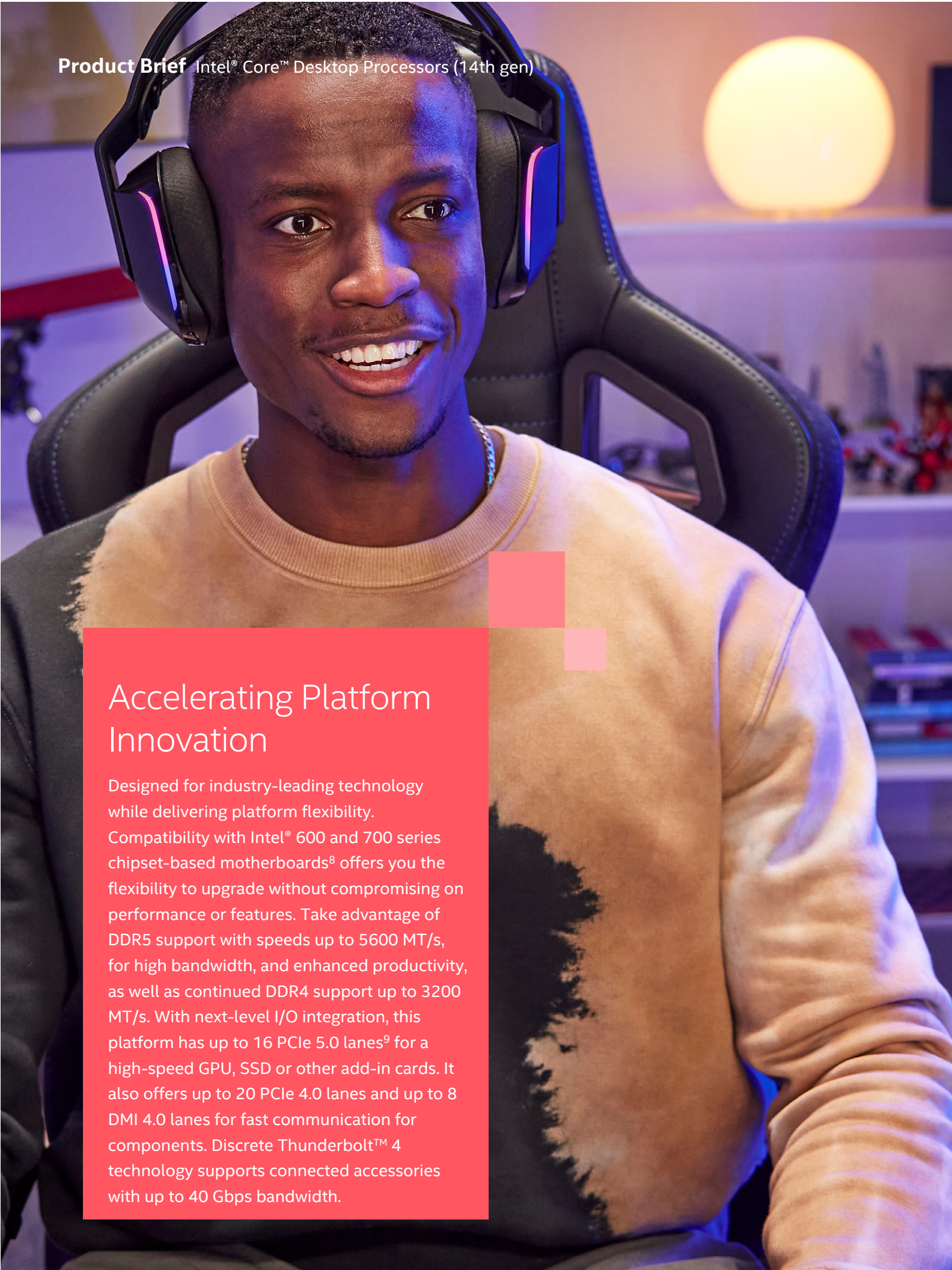


Extended Core Technology

Intel® Core desktop processors feature enhancements and technologies designed to enable the experiences you are looking for. These processors feature performance hybrid architecture[1], combining two core microarchitectures on a single processor die. This architecture features Performance-cores, Efficient-cores and Intel® Thread Director[2]. With up to 24 cores (8 Performance-cores and 16 Efficient-cores) and up to 32 threads. The Intel® Core i9 processor P-cores are capable of reaching 6.0 GHz with Intel® Thermal Velocity Boost[3,4] to elevate performance. The Intel® Core i7 processor Efficient-cores have been increased, with now up to 20 cores (8 P-cores + 12 E-cores) and 28 threads to handle demanding multitasking workloads. Intel® Core™ desktop processors include a suite of advanced tools and technologies, Intel® Dynamic Tuning Technology, Intel® Turbo Boost Max 3.0 Technology[3,] Intel® Thermal Velocity Boost[3,4], Intel® Adaptive Boost[3,4], and more.

Immersive Experiences

Whether you're interested in overclocking, graphics technologies, or connectivity features, Intel® Core desktop processors deliver the features to enable immersive experiences. Featuring overclocking tools for both experts and new users; Intel® Extreme Tuning Utility[5], Intel® Extreme Memory Profile[5], and Intel® Dynamic Memory Boost[5,6]—help deliver intelligent overclocking performance to get more from unlocked processors. Intel® graphics technologies are more than just integrated graphics—they enable next-gen immersive experiences. with Intel® Ultra-High-Definition Graphics featuring Xe architetcure[7]. Supporting up to for concurrent DDI ports, and up to 8K HDR support and enhanced media support[7]. This new generation of processors supports discrete Intel® Wi-Fi 7 (5 Gig). Wi-Fi 7 will expand upon the innovation of Wi-Fi 6 and Wi-Fi 6E to not only enable faster speeds, but dramatically improve responsiveness and reliability for future usages that demand extreme consistency and precision. Take advantage of Bluetooth LE Audio support for true wireless stereo, higher-fidelity sound, and new audio sharing capabilities.



Accelerating Platform Innovation

Designed for industry-leading technology while delivering platform flexibility. Compatibility with Intel® 600 and 700 series chipset-based motherboards[8] offers you the flexibility to upgrade without compromising on performance or features. Take advantage of DDR5 support with speeds up to 5600 MT/s, for high bandwidth, and enhanced productivity, as well as continued DDR4 support up to 3200 MT/s. With next-level I/O integration, this platform has up to 16 PCIe 5.0 lanes[9] for a high-speed GPU, SSD or other add-in cards. It also offers up to 20 PCIe 4.0 lanes and up to 8 DMI 4.0 lanes for fast communication for components. Discrete Thunderbolt™ 4 technology supports connected accessories with up to 40 Gbps bandwidth.

INTEL® CORE DESKTOP PROCESSORS: FEATURES AT A GLANCE

FEATURE	BENEFIT
Performance-core (P-core)	The highest-performing CPU core ever built by Intel, designed to handle single-threaded, lightly threaded, or burst workloads like 4K gaming and 3D design.
Efficient-core (E-core)	Designed to handle multi-threaded and background tasks such as minimized browser tabs, IT services, and cloud syncing, leaving P-cores free to deliver incredible performance without interruption.
Performance Hybrid Architecture[1]	Integrates two core microarchitectures into a single die, prioritizing and distributing workloads to optimize performance.
Intel® Thread Director[2]	Optimizes workloads by helping the OS scheduler intelligently distribute workloads to the optimal cores.
PCIe 5.0[2] up to 16 Lanes	Offers readiness for up to 32 GT/s for fast access to discrete graphics, storage, and peripheral devices with up to 16 PCI Express 5.0 lanes.
PCIe 4.0 up to 4 Lanes	Offers up to 16 GT/s for fast access to storage and peripheral devices with up to 4 PCI Express 4.0 lanes.
Up to DDR5 5600 MT/s[10]	Delivers the latest, industry-leading innovation in memory capabilities for fast speeds, high bandwidth, and enhanced workflow productivity.
Up to DDR4 3200 MT/s	Continued support of existing memory technology and speeds.
L3 and L2 Cache	Increased shared Intel® Smart Cache (L3) and L2 cache sizes allow users to work faster, with larger datasets.
Intel® Deep Learning Boost	Accelerates AI inference to improve performance for deep learning workloads.
Gaussian & Neural Accelerator 3.0 (GNA 3.0)	Processes AI speech and audio applications such as neural noise cancellation while simultaneously freeing up CPU resources for overall system performance and responsiveness.
Intel® Adaptive Boost Technology[3,4]	Intel® ABT improves performance by opportunistically allowing higher multi-core turbo frequencies, while operating within system power and temperature specifications when current, power, and thermal headroom exists.
Intel® Thermal Velocity Boost[3,4]	Intel® Thermal Velocity Boost opportunistically and automatically increases clock frequency of select 13th Gen Intel® Core desktop processors by up to 100 MHz if the processor is at a temperature of 70°C or lower and turbo power budget is available.
Intel® Turbo Boost Max Technology 3.0[3]	Identifies the processor's fastest cores and directs critical workloads to them.
Intel® UHD Graphics driven by Xe Architecture[7]	Rich media and intelligent graphics capabilities enable amplified visual complexity, enhanced 3D performance, and faster image processing.
Overclocking[5] Features and Capabilities	When paired with the Intel® Z790 or Z690 chipset, processor P-cores, E-cores, graphics, and memory can be set to run at frequencies above the processor specification resulting in higher performance.
Intel® Extreme Tuning Utility[5]	A precision toolset for tuning and overclocking, featuring memory and hybrid processor overclocking, so that new and experienced users can get more from their unlocked processors.[6]
Intel® Extreme Memory Profile 3.0	Simplifies the memory overclocking experience with increased flexibility, additional profiles, and expanded voltage controls.
Intel® Dynamic Memory Boost[2,11]	Intelligent memory overclocking performance on-demand that optimizes platform performance based on usage.

INTEL® CORE™ DESKTOP PROCESSORS COMPARISON

	Intel® Core i9 Processors	Intel® Core i7 Processors	Intel® Core i5 Processors	Intel® Core i3 Processors
Max Turbo Frequency [GHz]	Up to 6.0	Up to 5.6	Up to 5.3	Up to 4.7
Intel® Turbo Boost Max Technology 3.0 Frequency [GHz]	Up to 5.8	Up to 5.6	n/a	n/a
Performance-core Max Turbo Frequency [GHz]	Up to 5.6	Up to 5.5	Up to 5.1	Up to 4.7
Efficient-core Max Turbo Frequency [GHz]	Up to 4.4	Up to 4.3	Up to 3.9	n/a
Processor Cores (P-cores + E-cores)	24 (8P+16E)	20 (8P+12E)	14 (6P+8E)	4 (4P+0E)
Intel® Hyper-Threading Technology	Yes			
Total Processor Threads	32	28	20	8
Intel® Thread Director	Yes			No
Intel® Smart Cache (L3) Size [MB]	36	33	24	12
Total L2 Cache Size [MB]	32	28	20	5
Max Memory Speed [MT/s]	Up to DDR5-5600 DDR4-3200			DDR5 4800 DDR4 3200
Number of Memory Channels	2			
CPU PCIe 5.0 Lanes	Up to 16			
CPU PCIe 4.0 Lanes	4			
Enhanced Intel® UHD Graphics driven by Xᵉ Architecture	i9: Intel® UHD Graphics 770 i9F: no	i7: Intel® UHD Graphics 770 i7F: no	i5: Intel® UHD Graphics 770 i5F: no	i3: Intel® UHD Graphics 730 i3F: no
Graphics Dynamic Frequency [MHz]	1650	1600	1550	1500
Processor P-core / E-core / Graphics / Memory Overclocking	Yes			No
Intel® Quick Sync Video	Yes			
Intel® Deep Learning Boost (Intel® DL Boost)	Yes			
Intel® Advanced Vector Extensions 2 (Intel® AVX2)	Yes			
Intel® Gaussian and Neural Accelerator (GNA)	Yes			

Performance varies by use, configuration, and other factors. Learn more on the Performance Index site.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

Your costs and results may vary.

Intel technologies may require enabled hardware, software, or service activation.

1. Performance hybrid architecture combines two core microarchitectures, Performance-cores (P-cores) and Efficient-cores (E-cores), on a single processor die first introduced on 12th Gen Intel® Core™ processors. Select 12th Gen and newer Intel® Core™ processors do not have performance hybrid architecture, only P-cores or E-cores, and may have the same cache size. See ark.intel.com for SKU details, including cache size and core frequency.

2. Built into the hardware, Intel® Thread Director is provided only in performance hybrid architecture configurations of 12th Gen or newer Intel® Core™ processors; OS enablement is required. Available features and functionality vary by OS.

3. Intel® Hyper-Threading Technology, Intel® Turbo Boost Max Technology 3.0, and Intel® Thermal Velocity Boost are only available on Performance-cores.

4. Intel® Core™ i9 desktop processors (14th gen) only.

5. Unlocked features are present with select chipsets and processor combinations. Altering clock frequency or voltage may void any product warranties and reduce stability, security, performance, and life of the processor and other components. Check with system and component manufacturers for details.

6. Intel® Dynamic Memory Boost enablement capability requires BIOS selection of the feature, a compatible Intel® Core™ desktop processor, a compatible motherboard with BIOS support for the feature, and XMP certified DDR4 or DDR5 main system memory.

7. Available only on Intel® Core™ processors (14th gen) featuring integrated graphics.

8. Check motherboard vendor for compatible BIOS.

9. CPU PCIe lanes are only validated for discrete graphics (x16) and PCIe storage.

10. On select processor SKUs. DDR5-5600 MT/s 1DPC UDIMM 1Rx8, 1Rx16 (lead supplier) and DDR5-5200 1Rx8, 1Rx16, 2Rx8 are POR on all Intel® Core™ i9 desktop processor SKUs, all Intel® Core™ i7 desktop processor SKUs, and select Intel® Core™ i5 desktop processor SKUs (14th gen).

11. Intel® Dynamic Memory Boost enablement capability requires BIOS selection of the feature, a compatible Intel® Core™ desktop processor, a compatible motherboard with BIOS support for the feature, and XMP certified DDR4 or DDR5 main system memory.

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