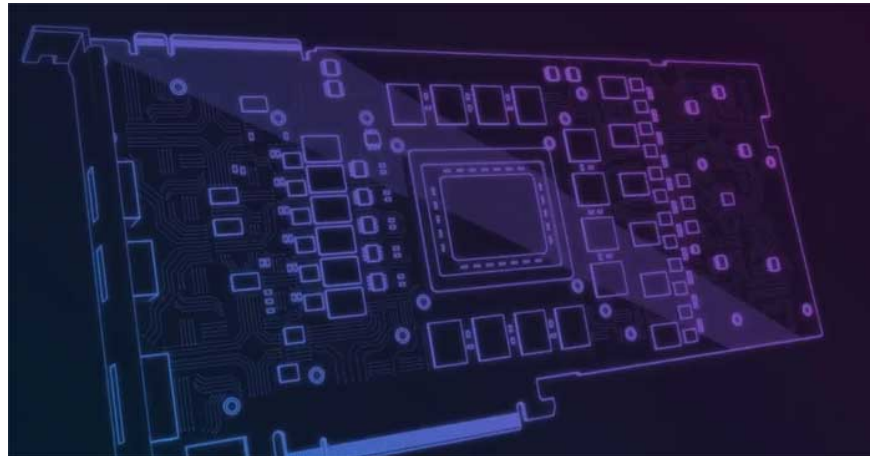


What is GDDR7? Everything you need to know about the next-generation VRAM.

GDDR7 is the driving force behind the next generation of GPUs. So what exactly is GDDR7? Let's find out!

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What is GDDR7?

GDDR7 is the latest generation of GPU RAM that most next-generation graphics cards will use to boost bandwidth and memory capacity. As modern games start demanding more from graphics cards, gamers need more GPU memory. We see even AAA games at low graphics settings benefit from 12GB of VRAM or more, so any next-generation graphics card is likely to come with larger capacities across its product line.

Performance is the biggest upgrade with GDDR7, boasting memory speeds up to 36 Gbps. That's over 50% more bandwidth than GDDR6X and significantly more than GDDR6. Energy efficiency is another key upgrade, with new read clock modes allowing memory to be read in various ways to maximize efficiency and reduce overall power consumption. When GDDR7 enters the gaming laptop market, it will enable better battery life or, more likely, larger video memory capacities to improve gaming performance.

Key features of GDDR7

1. **Ultra-high speeds:** GDDR7 supports data rates up to 32 Gbps upon initial release, with a roadmap for future expansion to 48 Gbps. This is more than double the actual speeds of previous generations like GDDR6X, which only reached a maximum of 21 Gbps.
2. **Superior bandwidth:** Each GDDR7 device can deliver 128 GB/s of bandwidth at 32 Gbps (and 192 GB/s at 48 Gbps), providing the throughput needed for data-intensive workloads such as AI inference and next-generation graphics.
3. **Enhanced Signaling (PAM3):** GDDR7 introduces triple-level pulse amplitude modulation (PAM3), transmitting over 50% more data per clock cycle than NRZ (PAM2) used in previous generations. This innovation allows for higher data rates without requiring higher clock speeds, improving efficiency and minimizing signal integrity challenges. Lower Voltage and Improved Performance: Operating at 1.2V, GDDR7 is more energy efficient than GDDR6X (1.35V), helping to manage overall system power consumption while delivering higher performance.
4. **Enhanced Reliability and RAS Features :** GDDR7 incorporates advanced data integrity features such as on-chip ECC with real-time reporting, data error detection, error checking and cleaning, and instruction address parity with instruction blocking. These features improve reliability, availability, and maintainability (RAS), which are critical for AI and graphics-critical applications.
5. **Enhanced channel parallelism:** GDDR7 switches from two 16-bit channels (in GDDR6) to four 10-bit channels (8 bits of data, 2 bits for error reporting), allowing for greater parallelization and more efficient data processing.
6. **JEDEC Standard:** GDDR7 is an open standard approved by JEDEC, ensuring broad support and interoperability within the industry.

Do AMD graphics cards use GDDR7?

No, AMD graphics cards do not use GDDR7 VRAM. Presumably to save costs, AMD is still using the older and slower GDDR6 VRAM standard for its current RDNA 4 graphics card lineup. The same is true for Intel, which will also use GDDR6 for its budget Battlemage GPUs from late 2024.

Comparing GDDR7 with GDDR6 and GDDR6X

Prior to GDDR7, the fastest graphics memory available on modern graphics cards like the Nvidia RTX 4080 was GDDR6X , operating at 22.4 Gbps. AMD's RX 7000 graphics cards only used GDDR6 memory, with a maximum performance of 20 Gbps.

In comparison, GDDR7 is capable of operating at speeds up to 36 Gbps. This is a significant upgrade, potentially unlocking a substantial increase in memory bandwidth. It is hoped that this could alleviate some of the VRAM bandwidth issues of previous generation mid-range cards, which were limited by memory capacity and memory bus width. However, the increased cost of GDDR7 may keep it a feature exclusive to high-end graphics cards in the first generation.

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