

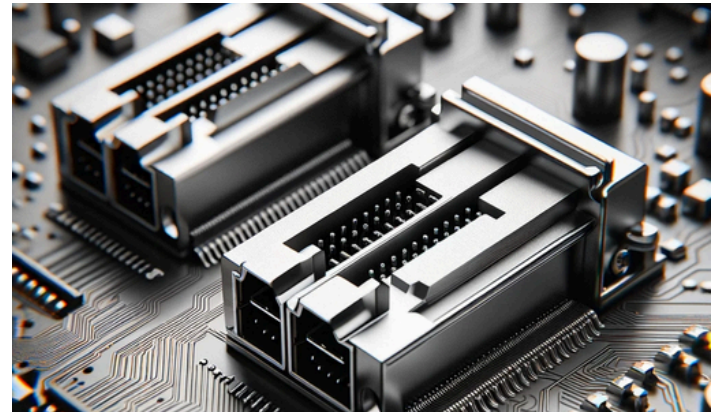
SILICON IP

HIGH SPEED INTERFACE: PCIe GEN5

A High-speed interface delivering up to 64 GB/s bandwidth in a x16 configuration, designed for next-gen computing with improved data transfer rates and backward compatibility.

OVERVIEW

PCIe Gen 5, or PCI Express Gen 5, is the fifth generation of the PCI Express interface standard, which is widely used for high-speed communication between various components in computing systems. It builds upon the advancements of PCIe Gen 4 and introduces several improvements to meet the demands of modern applications. PCIe 5.0, was introduced by PCI-SIG (PCI Special Interest Group) in May 2019. It is designed to provide a substantial increase in data transfer rates and efficiency compared to its predecessor, PCIe Gen 4. The key highlight of PCIe Gen 5 is its ability to deliver twice the bandwidth of PCIe Gen 4, making it particularly suited for high-performance computing environments.



KEY FEATURES

Increased Data Rate

- **Data Rate:** PCIe Gen 5 operates at a maximum data rate of 32 GT/s (Giga-transfers per second) per lane, which is double the 16 GT/s data rate of PCIe Gen 4.
- **Bandwidth:** Each lane provides up to 4 GB/s of unidirectional bandwidth, enabling a 16-lane (x16) link to achieve up to 64 GB/s bidirectional bandwidth (32 GB/s in each direction).

Enhanced Bandwidth

- **Double the Throughput:** PCIe Gen 5 doubles the throughput of PCIe Gen 4, which significantly benefits high-performance computing and data-intensive applications by allowing faster data transfer rates.

Backward Compatibility

- **Compatibility:** PCIe Gen 5 is fully backward compatible with PCIe Gen 4, Gen 3, and Gen 2. This means that PCIe Gen 5 devices can work with older PCIe slots and vice versa, ensuring a smooth transition and interoperability with existing infrastructure.

Improved Signal Integrity

- **Signal Integrity:** PCIe Gen 5 incorporates advanced signal integrity techniques, including improved equalization and advanced coding schemes to handle the higher data rates. This helps maintain data accuracy and reliability at faster speeds.

Low Latency

- **Reduced Latency:** PCIe Gen 5 maintains and improves upon the low-latency performance of previous generations. This is crucial for applications requiring real-time processing, such as high-frequency trading and certain AI workloads.

Enhanced Error Correction

- PCIe Gen 5 includes enhanced error correction mechanisms to detect and correct data transmission errors, improving overall data integrity and reliability.

Power Efficiency

- While PCIe Gen 5 provides higher performance, it also focuses on power efficiency. Power management features are designed to handle increased data rates without excessive power consumption or thermal challenges.

Advanced Protocol Features

- PCIe Gen 5 introduces protocol enhancements that improve efficiency and reduce overhead. This includes optimizations for data packet processing and management.

Increased Scalability

- PCIe Gen 5 supports a wide range of link widths (x1, x2, x4, x8, x16) and can be used in various configurations, from consumer devices to enterprise servers and data centers.

Support for New Applications

- PCIe Gen 5 is particularly well-suited for emerging applications that require high bandwidth and low latency, such as advanced AI and machine learning workloads, high-speed networking, and next-generation storage.

Design and Integration

- PCIe Gen 5 provides design and integration support through silicon IP cores, including PHYs, controllers, and verification tools, facilitating the development of new PCIe Gen 5-enabled devices and systems.

PCIe GEN5 APPLICATIONS

High-Performance Computing (HPC)

- PCIe Gen 5 enhances HPC systems by enabling rapid data transfer between CPUs, GPUs, and storage for improved performance in simulations and data analysis.

Artificial Intelligence (AI) and Machine Learning (ML)

- PCIe Gen 5 connects AI accelerators to CPUs and memory, providing high throughput for training and inference while minimizing bottlenecks in AI and ML pipelines.

Data Centers

- PCIe Gen 5 enables faster data transfer and lower latency in data centers, enhancing high-performance SSDs and NICs.

Networking

- PCIe Gen 5 enables high throughput in 100G and 400G Ethernet NICs, reducing network congestion and supporting low-latency edge computing.

Scientific Research

- PCIe Gen 5 enables fast data transfer for complex simulations and high-resolution medical imaging, enhancing accuracy and speed.

Automotive Systems

- PCIe Gen 5 enables high-speed data transfer for ADAS and infotainment systems in automotive applications.

Storage

- PCIe Gen 5 enhances enterprise SSD performance and improves high-speed RAID data redundancy and recovery.

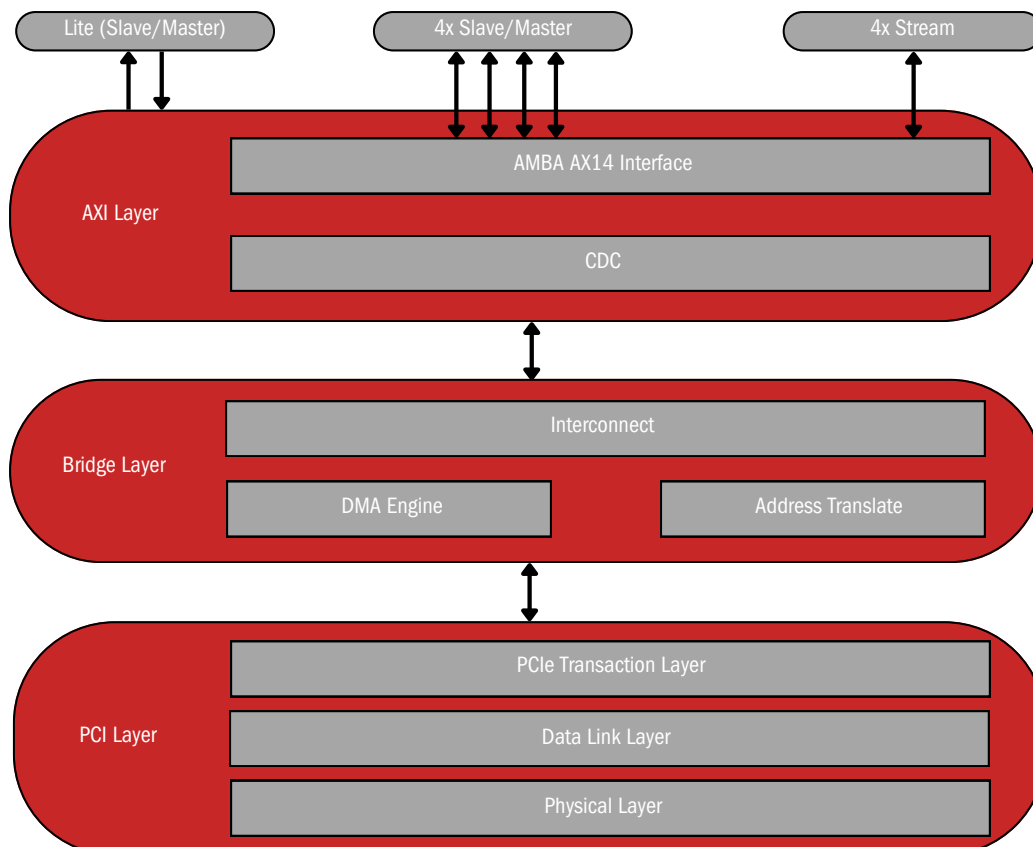
Telecommunications

- Enables high-speed data transfer in 5G infrastructure for faster, more reliable communication.

Gaming and Consumer Electronics

- PCIe Gen 5 enhances high-performance gaming and supports 4K/8K video editing and streaming with faster data transfer.

PCIe GEN5 ARCHITECTURE





XtremeSilica Technologies Private Limited

494, 2nd Floor, CMH Road, Indiranagar,

Bengaluru, Karnataka 560038 India

www.xtremesilica.com

info@xtremesilica.com

+91 79932 79934