

SILICON IP

HIGH SPEED INTERFACE: USB 3.2

SuperSpeed data transfer for high-performance I/O systems

OVERVIEW

USB 3.2 is a high-speed serial interface standard that delivers data transfer rates up to 20 Gbps using dual-lane operation. It supports SuperSpeed and SuperSpeed+ signaling while maintaining backward compatibility with legacy USB protocols. Built upon the existing USB infrastructure, USB 3.2 ensures high throughput, efficient power delivery, and seamless host-device communication, making it ideal for modern embedded and computing platforms. As part of the USB Implementers Forum (USB-IF) specification, USB 3.2 is widely adopted across consumer electronics, storage systems, embedded platforms, and mobile devices. It enhances data bandwidth for applications requiring rapid communication between host processors and peripheral interfaces such as cameras, displays, and mass storage devices.

KEY FEATURES

SuperSpeed+ Throughput

- Delivers up to 20 Gbps bandwidth using two 10 Gbps lanes, supporting high-throughput applications like 4K/8K video streaming and fast storage access.

Backward Compatibility

- Supports seamless operation with USB 3.1, 3.0, and 2.0 hosts and devices, ensuring integration in legacy and mixed protocol environments.

Dual-Lane Architecture

- Implements dual-channel signaling over USB Type-C connectors to maximize data rates without increasing clock frequency.

Low Latency Transmission

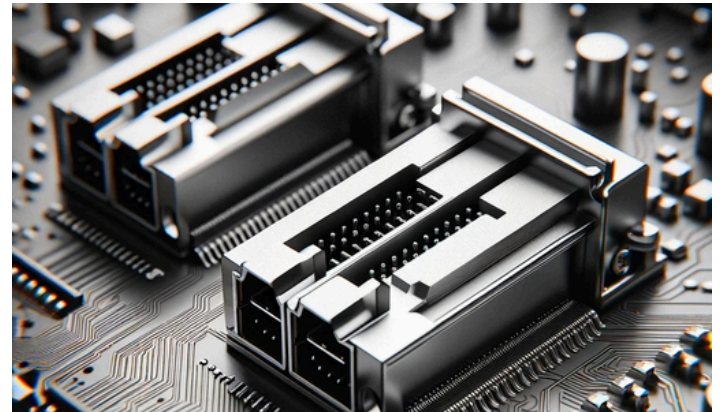
- Optimized for reduced transfer delays, critical for real-time applications and high-speed peripheral communication.

Power Delivery Support

- Enables USB Power Delivery (USB PD) integration for efficient power negotiation and device charging capabilities.

Multiple Transfer Modes

- Supports Bulk, Control, Isochronous, and Interrupt transfer types for flexibility across data, audio/video, and control signal applications.



Robust Error Handling

- Includes CRC, Link Training, and LFPS-based signaling to ensure reliable data integrity across high-speed links.

PHY Interface Compatibility

- Compliant with PIPE and UTMI+ interfaces, enabling flexible integration with various PHY layers and SoC architectures.

Low Power States

- Supports U1/U2/U3 power states for improved power efficiency in idle and suspend conditions.

Host and Device Mode Support

- Allows integration of both host and device functionality in embedded platforms through configurable controller logic.

USB 3.2 APPLICATIONS

Consumer Electronics

- Enables high-speed connectivity for smartphones, tablets, laptops, and gaming consoles, ensuring rapid media transfer, fast charging, and enhanced peripheral interaction.

Embedded Systems

- Integrates seamlessly into embedded SoCs and MCUs, providing efficient host/device interfaces for edge devices, development boards, and industrial platforms.

High-Speed Storage Devices

- Supports external SSDs, USB flash drives, and docking stations with faster file transfer and backup performance using SuperSpeed+ interfaces.

Audio and Video Interfaces

- Facilitates high-definition audio and video streaming between host systems and peripherals like webcams, monitors, and capture devices.

Automotive Infotainment

- Enables USB ports in automotive systems for media access, firmware updates, diagnostics, and fast device charging within in-vehicle infotainment modules.

IoT and Smart Devices

- Provides connectivity for smart hubs, gateways, and other IoT systems needing fast data sync and power capabilities via a unified USB-C interface.

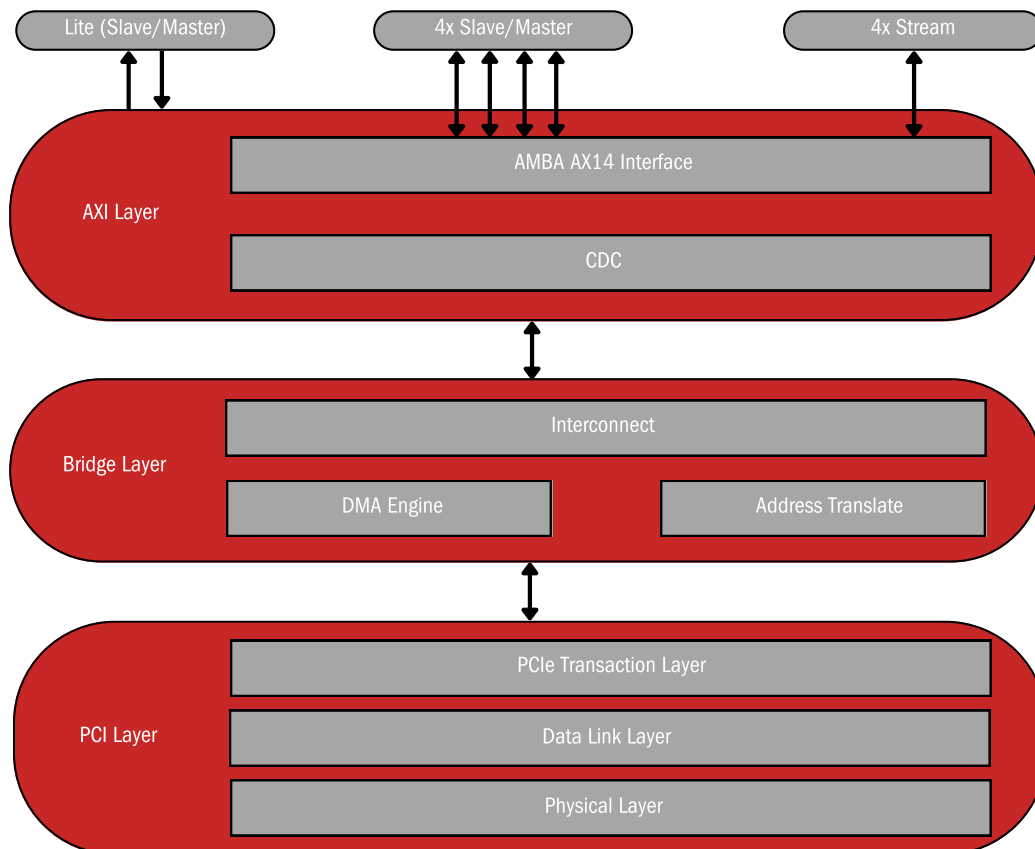
Test and Measurement Equipment

- Delivers reliable high-speed data interfaces in oscilloscopes, analyzers, and lab devices requiring stable USB-based host communication.

Medical Devices

- Enables secure, high-bandwidth connections for diagnostic imaging equipment, data loggers, and wearable health monitoring systems.

USB 3.2 ARCHITECTURE





XtremeSilica Technologies Private Limited

494, 2nd Floor, CMH Road, Indiranagar,
Bengaluru, Karnataka 560038 India

www.xtremesilica.com

info@xtremesilica.com

+91 79932 79934