4 Channel Aurora Data Capture Card

The iWave Aurora Data Capture Card is a high-throughput serial link data acquisition and recording solution designed for applications that require low-latency point-to-point data movement. Built around the AMD Zynq Ultrascale+ MPSoC FPGA and lightweightAurora protocol, the card establishes a Multi-lane, high bandwidth serial link between two endpoints and streams the captured payload directly into host memory over a PCIe Gen3 x8 interface using a PCIe DMA engine.

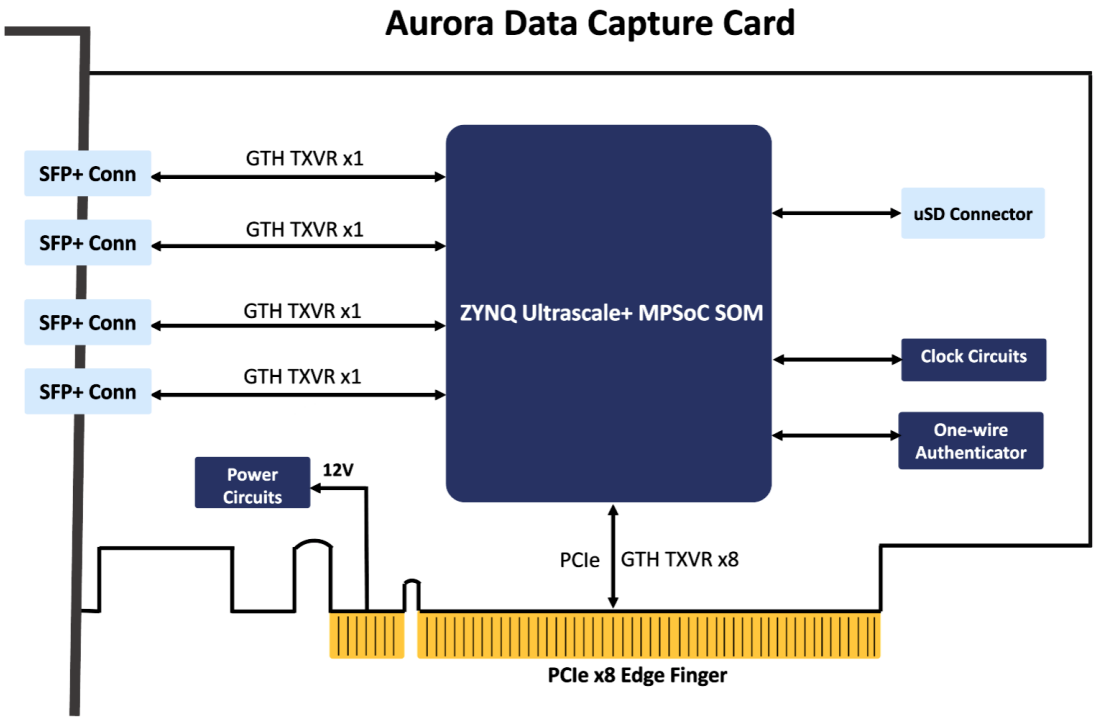


The design incorporates efficient packetization, flow control, and CRC-based error checking to ensure reliable, low-latency data transmission across multi-lane Aurora links. Captured data on the host can be further processed for analysis, validation, visualization, or application-specific computation, making the card well-suited for high-bandwidth, real-time data movement and performance-critical applications such as software-defined radio, hardware-in-the-loop testing, and high-speed data recording.

Highlights

- 4× SFP+ high-speed interfaces supporting bidirectional data transfer, enabling both multi-lane data capture to the Host and transmission from the Host.
- Supports Aurora 8B/10B and 64B/66B line encoding
- Data integrity via CRC and built-in flow control (NFC / UFC)
- PCIe Gen 3, x8 lane Full-Height Half-Length (FHHL) PCIe form factor
- Cross-platform support - Windows and Linux

Block Diagram



Technical Specifications

FPGA	Zynq UltraScale+ MPSoC
Data Interfaces	**Aurora 8B/10B:** 4× SFP+ (up to 6.6 Gb/s/lane) **Aurora 64B/66B:** 4× SFP+ (up to 10 Gb/s/lane)
Host Interface	PCIe Gen3.0 x8, total maximum theoretical bandwidth of 64 Gbps
Software Features	• Multi-lane bonding (up to 4 lanes) for bandwidth scalability • Bidirectional DMA Data Transfer: Supports C2H (Card-to-Host) and H2C (Host-to-Card) transfers. • Deterministic low latency, lightweight Aurora protocol

Software Features	• Built-in 16/32-bit CRC data integrity • Automatic Link Initialization with User-Configurable Transceiver Tuning • NFC/UFC flow control for sustained host-to-disk data writes until disk capacity is reached. • Link health and error status monitoring
OS Support	Windows and Linux OS
Power Input	12V PCIe Power
Form Factor	Full Height (111.15 mm), Half Length (167.65 mm) PCIe form factor
Operating Temp.	-40°C to +85°C
Environment Specification	RoHS compliant

Ordering Information

iG30A-SFP4-PCI-ACL	4 channel 10G Aurora Data Capture Card

Product accessories

Thermal Solutions

For any highly integrated product, thermal design is a very important factor. iWave supports Heat/Fan Sink for Card.

PCIe Bracket

Facilitates secure Card installation, ensures compatibility with standard chassis, and withstands mechanical stress.

Card Backplate

Facilitates secure Card installation, ensures compatibility with standard chassis, and withstands mechanical stress.

Applications

- **Four-Channel Data Acquisition and Playback**

  Simultaneous four-channel data capture to the host and transmission from the host for high-throughput data acquisition and playback.

- **High-Speed NVMe Recording**

  Continuous raw data can be recorded to NVMe storage for long-duration capture, replay, and offline analysis.

- **Real-Time Signal Processing**

  GPU acceleration enables low-latency filtering, FFT, spectral analysis, feature extraction, and live visualization of high-speed FPGA data.

- **System Validation & Testing**

  Incremental, sine-wave, and PRBS patterns support performance measurement, data-integrity validation, and production testing.

- **AI/ML Inference**

  Acquired FPGA data can be processed by GPU-based AI and machine-learning models for real-time detection, classification, and analytics.

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