AQUANTIA

Leading the Multi-Gig Revolution in Automotive

AQcelerate AQV107 Automotive Ethernet PHY

Product Overview

The Aquantia AQcelerate AQV107 Automotive PHY delivers high-performance, Multi-Gig transfer rates and supports up to 10Gbps Ethernet speeds, which are critical for safe, secure Level 4 and Level 5 autonomous driving while providing OEMs the reliability and cost effectiveness of copper cabling. New automotive applications requiring data rates well beyond gigabit Ethernet can only be enabled by an In-Vehicle Network (IVN) based in Multi-Gig technology. These applications include higher resolution cameras, improved telematics and rich, in-cabin entertainment experiences.

The industry shift towards Level 4 and 5 autonomous driving requires an IVN architecture that can support:

- **Increasing bandwidth** requirements to support the increasing number of sensors and high-resolution cameras.
- **Redundancy** of all the function-critical components and systems to provide the utmost levels of safety.
- **Simplification** – moving from multiple network/interfaces into an industry proven, coherent, secure network that supports all the required features of autonomous driving.

The AQV107 is based on Aquantia's industry proven AQrate PHY technology which has shipped well over ten million ports into the Data Center and Enterprise Infrastructure markets. Just as these markets have benefited from increased throughput, the Automotive industry will be able to introduce new classes of applications courtesy of Aquantia Multi-Gig technology.

The AQV107 handles all physical layer functions required for 10/5/2.5Gbps transmissions over Automotive cables. It also includes key features such as Energy Efficient Ethernet (EEE), IEEE 1588v2 Precision Time Protocol (PTP), and IEEE MACsec.

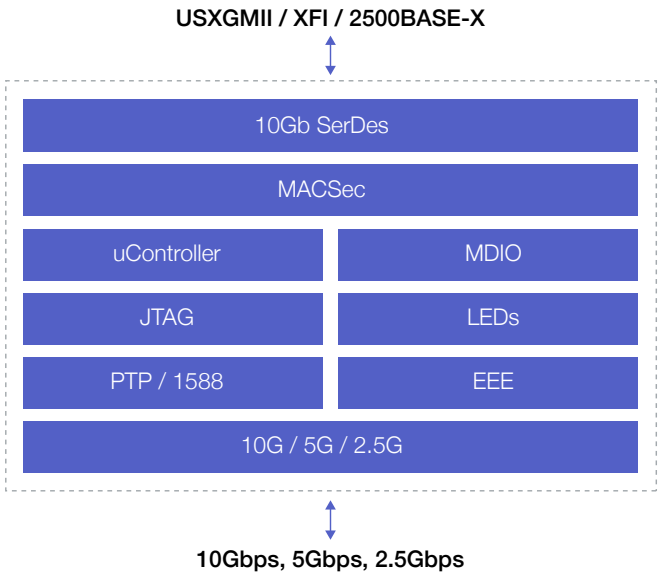
The AQV107 is Automotive qualified based on AEC-Q100 industry standard.

Applications

The target applications supported by the AQV107 include:

- Advanced Driver Assistance System (ADAS)
- High-resolution front & rear-view cameras
- Surround view & parking assist systems
- Radar, Lidar & Sonar
- Advanced telematics
- Audio video bridging
- Infotainment

AQcelerate AQV107 Block Diagram



Key Features	Benefits
10Gbps / 5Gbps / 2.5Gbps over 15m automotive cables with 4 inline connectors	Meets automotive requirements for immunity and emissions on automotive cabling
Energy-Efficient Ethernet (EEE)	EEE lowers overall power consumption
MACsec (IEEE 802.1ae, MAC security standard) • Full support for Advanced Encryption Standard (AES-256) and stand-alone operation	MACsec provides for secure, encrypted data communications across networks
PTP/1588v2	PTP/1588v2 provides for timing accuracy across the network
Synchronous Ethernet (Sync-E), ITU-T standard in cooperation with IEEE	Provides accurate clock recovery for time aware applications
Built-in Thermal Management • On-chip thermal sensor with alarm and warning thresholds	Enables deployment in thermally constrained environments
Advanced Cable Diagnostics • On-chip high-resolution cable analyzer	Enables the deployment of meaningful cable analysis tools for debugging installation problems
High-Performance full KR (with autonegotiation)/ XFI/USXGMII/2500BASE-X • Capable of rate adapting all rates into KR/XFI via PAUSE	Ensures trouble-free operation over a range of interconnect scenarios Comprehensive interface support • Supports legacy and next generation MACs/switches/processors
Advance Loopback and Diagnostic Capability • Flexible on-chip BERT • Full 1-second packet counters and CRC-32 checkers	Enables extensive system test and debug with remote loopback control

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