



AQCITE™ FPGA-PROGRAMMABLE MULTI-GIGABIT BASE-T PHY

Aquantia® AQcite™ is a product family of programmable PHYs that includes the AQLX107, a PHY+FPGA multi-gigabit connectivity solution. The AQLX107 is a single-chip programmable BASE-T PHY+Controller/Bridge device based on AQRate® technology and the Xilinx® Kintex7® FPGA. The AQLX107 is the first FPGA-programmable multi-gigabit BASE-T PHY that includes an integrated FPGA enabling “Any-to-Ethernet” programmability and connectivity up to 100 meters of Cat 5e or better cabling. On the line side,

AQLX107 supports the following protocols:

- 10GBASE-T
- 5GBASE-T
- 2.5GBASE-T
- 1000BASE-T
- 100BASE-TX

AQLX107 is compatible with both the IEEE® 802.3an and IEEE 802.3bz standards and the NBASE-T™ Alliance PHY Specification. AQLX107 integrates such features as Energy Efficient Ethernet (EEE), 1588v2, MACsec, and supports all PoE standards up to 100W. With AQLX107, customers can create their own unique controller, protocol converter, and bridge devices that can connect directly to standard Ethernet switches using the most versatile and advanced BASE-T PHY technology.

An integrated device that lowers costs, complexity, and power by delivering the following benefits and features:



FEATURES

- Single chip with integrated multi-gigabit Ethernet PHY and FPGA
- On-chip PHY supports the following rates:
 - 100 meters over Cat 6a at 10 Gbps
 - 100 meters+ over Cat 5e /Cat 6 at 5 Gbps /2.5 Gbps 1 Gbps/100 Mbps
- On-chip FPGA supports the following:
 - 14 (7 input, 7 output) 10.3125 Gbps HSIO differential SerDes signal
 - 194 1.86 Gbps GPIO (HR)
 - 100 1.4 Gbps GPIO (HP)
- Integrated MACsec (IEEE-802.1ae) and PTP (IEEE-1588v2):
 - Enables refresh of legacy switches without an ASIC re-spin
 - Full support for AES-256 and stand-alone operation
- IEEE 802.3an/bz and NBASE-T compliant featuring AQRate Adaptive Rate Operation:
 - Supports 10GBASE-T /5GBASE-T /2.5GBASE-T 1000BASE-T /100BASE-TX
- Robust Radio Frequency Interference (RFI) performance:
 - Designed for resilient operation when exposed to RFI/EMI
- Advanced Cable Diagnostics:
 - On-chip high-resolution cable analyzer
- Built-in Thermal Management:
 - On-chip thermal sensor with alarm and warning thresholds

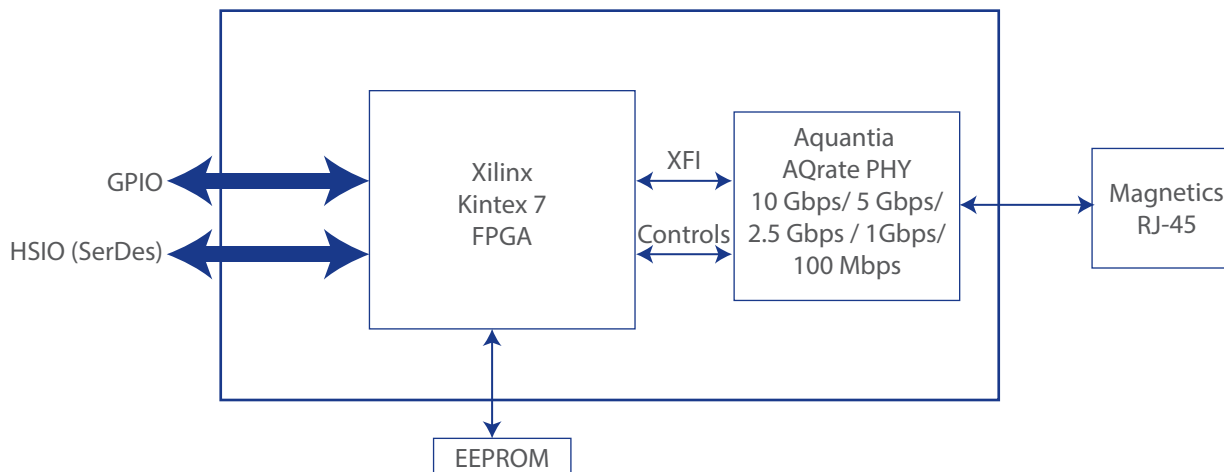
SUMMARY OF BENEFITS

- AQLX107 provides a complete and highly flexible networked system solution
- IEEE 802.3an and IEEE 802.3bz-compliant multi-gigabit Ethernet enables increased network speeds over existing Cat 5e or better cabling infrastructure
- Multi-gigabit USXGMII 10G PHY interface reduces system delay jitter variation and simplifies traffic management for non-10 G speeds

DESIGN KIT

- PHY Application Programming Interface (API)
- AQRate PHY programming and monitor GUI
- Aquantia and Xilinx FPGA native support materials:
 - AQLX107 to K160 (FF676) pad numbers translation (text-based)
 - AQLX107_helpers_v2.tcl file
 - AQLX107_pin_mapping_TCL_v5.xlsx file
 - AQLX107_Design_Flow_v1.docx file (Aquantia App Note)
- AQLX107 Development Board:
 - 10 GBASE-T MDI interface including magnetics and RJ-45
 - Memory support for on-board Double Data Rate (DDR3) SDRAM
 - High-speed connectors (FMC) for connection to customer board
 - SMA connectors for high-speed SerDes signals
 - USB connector for external board and system control
 - Power over Ethernet (PoE)
- Comprehensive Interface Support:
 - Supports legacy and next-generation MACs/switches/processor interfaces

AQUANTIA AQLX107 PHY BLOCK DIAGRAM



APPLICATIONS

Aquantia's AQLX107 enables customers to engineer their own unique controller and protocol converter of "Any-to-Ethernet" and connect it directly to standard Ethernet networks using the most versatile and advanced BASE-T PHY technology. Typical applications include Audio/Video over Ethernet, Machine Vision, and Enterprise data center, campus, and metro environments.

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