Marvell® AQRATE GEN1 Ethernet PHYs

10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX Ethernet PHYs

Overview

The Marvell® AQrate GEN1 PHYs are low-power, high-performance multi-speed 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX transceivers. AQrate technology bridges the bandwidth gap between the legacy Enterprise cabling infrastructure designed for 1 Gbps data rates and the emergent 802.11ac WLAN technology aggregating bandwidth in excess of 1 Gbps. AQrate delivers 5 GbE and 2.5 GbE network connectivity speed through 100 meters of Cat 5e or Cat 6 cabling enabling the unabated roll-out of 802.11ac WLAN infrastructure with zero change to legacy cabling.

AQrate PHYs are compatible with the NBASE-T™ Alliance PHY Specification and the IEEE® 802.3an standard to perform all the physical layer functions required to implement 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX transmission over 100 meters of twisted pair cabling. The AQrate PHY family integrates such features as Energy Efficient Ethernet (EEE), 1588v2, MACsec, and supports all PoE standards up to 60W.
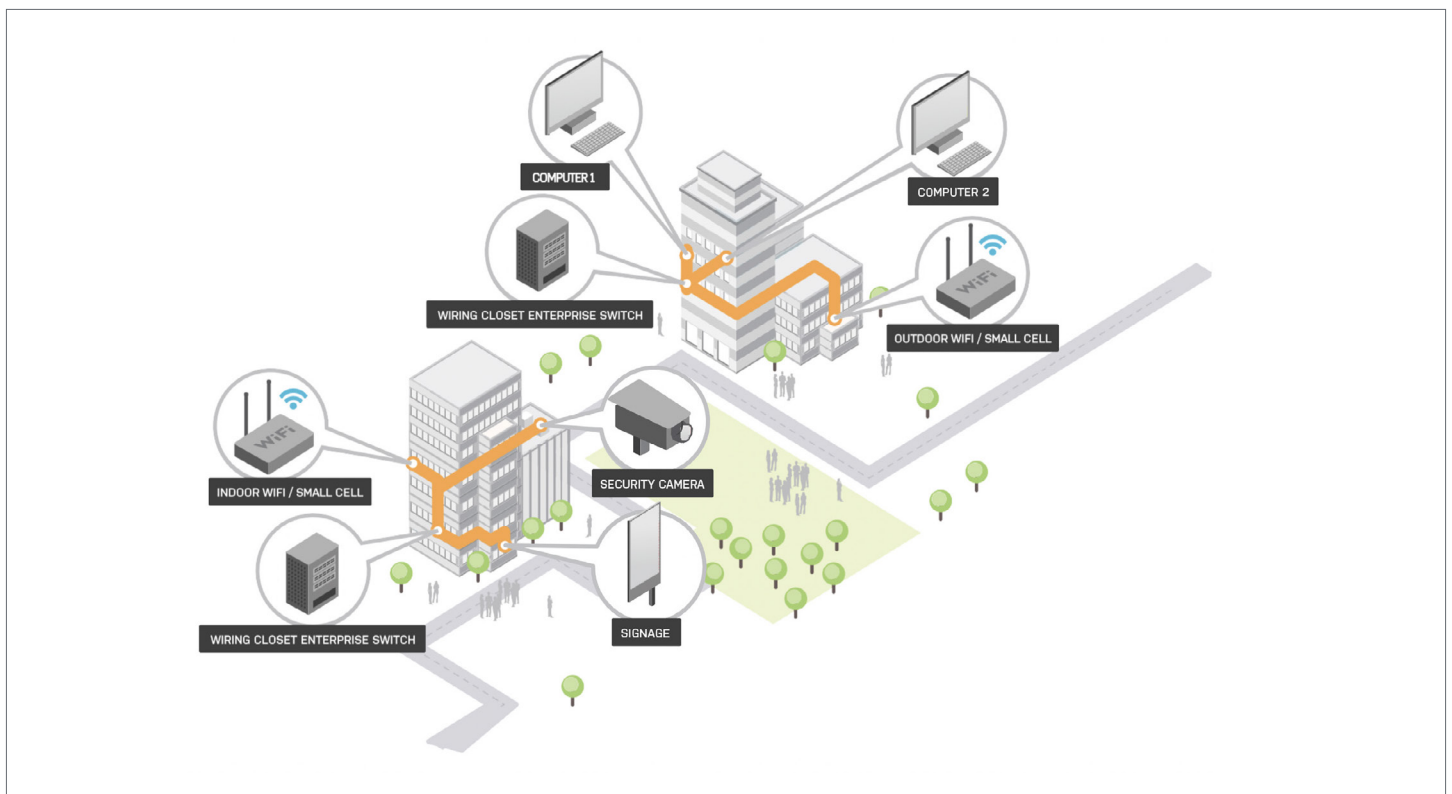
Quad

AQR405 is housed in a 25 mm flip-chip BGA package enabling efficient high density design for high port-count and compact switches.

Dual

Wireless APs, compact switches, and a myriad of applications leverage low power of AQR205 to create passively cooled solutions. Its 19 mm flip-chip BGA package features flexible system interfaces including full KR (with auto- negotiation)/XFI/USXGMII/RXAUI/XAUI/2500BASE-X/SGMII.

Single

The 19 mm AQR105 is pin compatible to AQR205 providing the option for single- or dual-port solutions with minimal design edits. The AQR105 features flexible system interfaces including full KR (with auto-negotiation)/XFI/USXGMII/ RXAUI/XAUI/ 2500BASE-X/SGMII.
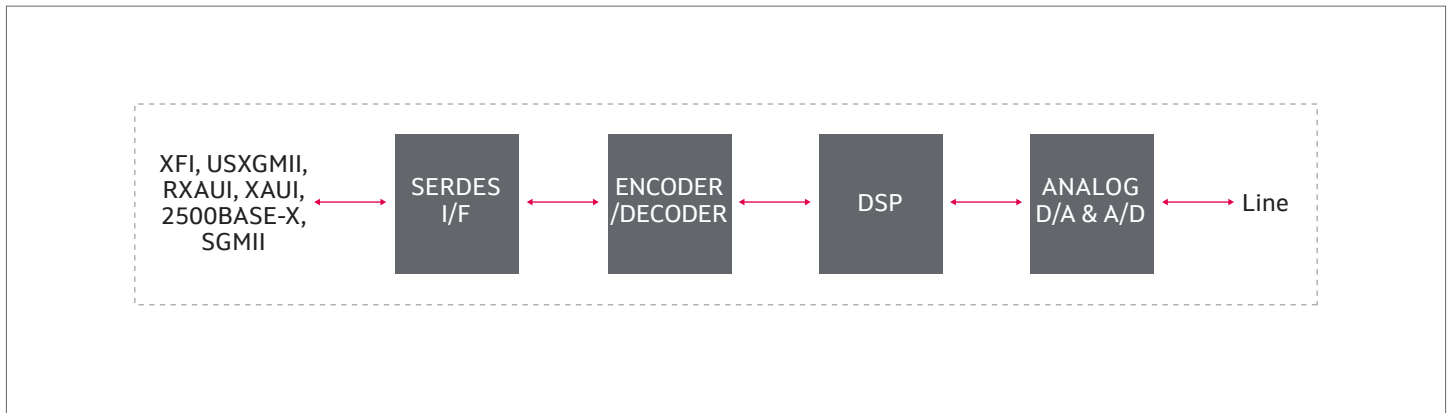
Key Features

Features	Benefits
• NBASE-T featuring AQrate Adaptive Rate Operation 　• Supports 10GBASE-T/5GBASE-T/2.5GBASE-T/1000BASE-T/ 100BASE-TX • Integrated MACsec, 1588v2, EEE support 　• Full support for AES-256 and stand-alone operation • Advanced Cable Diagnostics 　• On-chip high-resolution cable analyzer • Built-in Thermal Management 　• On-chip thermal sensor with alarm and warning thresholds • High-Performance Interfaces 　• Full KR with auto-negotiation/XFI/USXGMII/RXAUI/XAUI/ 2500BASE-X/SGMII	• 100 meters over Cat 6A at 10 Gbps • 100 meters over Cat 5e and Cat 6 at 5 Gbps/2.5Gbps/ 1 Gbps/ 100 Mbps • MACsec, 1588v2, EEE 　• Enables refresh of legacy switches without ASIC re-spin, Robust Radio Frequency Interference (RFI) Performance 　• Resilient operation when exposed to RFI • Comprehensive Interface Support 　• Supports legacy and next-gen MACs/switches/ processor interfaces

Target Applications

Marvell's AQrate is a game changing technology enabling Enterprise Networking to evolve beyond 1 Gbps to 5 Gbps and 2.5 Gbps data rates. The dual- and single-port product family is ideally suited for wireless APs, compact switches and a myriad of networked device applications while the quad-port family permits efficient high-port density Enterprise and Campus switch design.

Block Diagram

XFI, USXGMII, RXAUI, XAUI, 2500BASE-X, SGMII ↔ SERDES I/F ↔ ENCODER /DECODER ↔ DSP ↔ ANALOG D/A & A/D ↔ Line