Multi-Gigabit Enterprise Client Connectivity

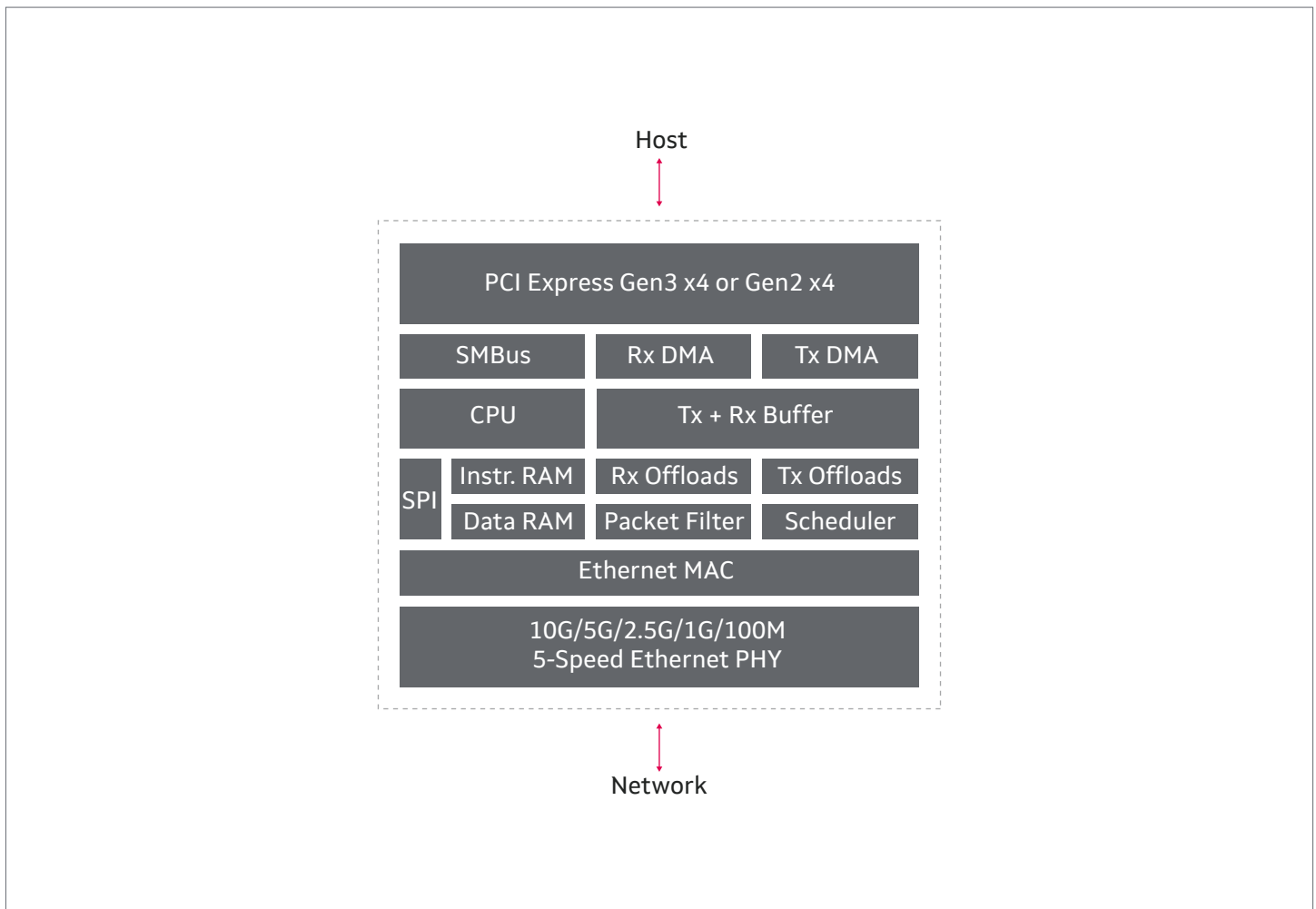AQtion Multi-Gigabit Ethernet Controller

Overview

AQtion Ethernet controllers leverage industry proven AQrate PHY technology to deliver Multi-Gigabit Ethernet over copper cables, including Cat5e and Cat 6, which were previously limited to Gigabit Ethernet speeds.

Marvell's AQtion devices, the AQC107 and AQC108 support 5/2.5 Gigabit Ethernet over copper, and 2.5/5GBASE-T respectively, and are compliant with the NBASE-T specification and the new IEEE 802.3bz standard that was formally ratified in September 2016. AQtion devices are packaged in a 12 mm x 14 mm, 0.8 mm pitch flip-chip BGA.

In addition, both devices also support backward compatibility with 100MbE and Gigabit Ethernet. The AQC107 has the extra feature of supporting up to 10 Gigabit Ethernet, or 10GBASE-T, on Cat 6A copper cables, complying with the IEEE standard 802.3an. These AQtion controllers are designed with a PCI Express Gen2/3 x1, x2, x4 for optimal line rate performance connecting to the CPU on the system side.

The AQtion software includes drivers for Windows (10, 8.x, and 7), macOS X, and Linux. Marvell also provides UEFI and PXE boot code, as well as ROM programming and Windows Installer utilities.

Block Diagram

Key Features

Features	Benefits
Single-chip solution	• Integrated PCIe, MAC, and PHY minimizes board space and power utilization
PCI Express Gen3/Gen2	• Supports line rate of up to 8.0 GT/s per lane
Bus width	• Supports Gen3/Gen2 x1
MSI, MSI-X, and legacy INTx PCIe interrupts	• Improves CPU utilization and network performance
Two SMBus (Master/Slave + Slave)	• Supports communication and management function

PHY Specific Features	Benefits
Integrated Marvell AQrate PHY featuring NBASE-T technology	• 100 meters over Cat 5e or better at 5 Gbps, 2.5 Gbps, 1 Gbps, • 100 Mbps (requires no change to existing infrastructure or cabling)
Advanced cable diagnostics	• On-chip high resolution cable analyzer
Audio Video Bridging (AVB) and PTP/1588v2	• Management of time-sensitive traffic packets

MAC Specific Features	Benefits
• Large Send Offload (LSO) • Receive Side Scaling (RSS) • Direct Cache Access (DCA) • Header checksum	• Increased network performance and lower host CPU utilization
Wake-on-LAN (WoL) power management	• Supports lower power modes
On-chip CPU DASH	• Desktop management
Internet Control Message Protocol (ICMP)	• Supports diagnostic, error, and operational information messages
Address Resolution Protocol (ARP)	• Resolves network layer addresses into link layer addresses
Multicast Domain Name System (mDNS)	• Resolves host names to IP addresses
Transmission Control Protocol (TCP) Keepalives (KA)	• Supports link checking between devices
Quality of Service (QoS)	• Supports up to eight traffic classes and Data Center Bridging (DCB)
Jumbo Frames (up to 16Kbytes)	• Improves network performance while reducing CPU utilization
IPv4/v6, IPv6/TCP, and IPv6/UDP checksum offload	• Offloads calculations and improves CPU usage

Ordering Codes

Part Number	Speed	Package
AQC111C	4-Speed	9 mm x 9 mm
AQC112C	3-Speed	9 mm x 9 mm

This AQtion device is in a 9 mm x 9 mm, 0.8 mm pitch 100-pin FCBGA

Target Applications

Motherboards, PCs, Workstations, docking stations, NAS, Routers, Gateways, and other embedded applications.

Drivers: Windows 10 (32-bit/64-bit), Windows 8.0/8.1 (32-bit/64-bit), Windows 7 (32-bit/64-bit), Linux 3.10 and higher

Utilities: ROM programming and Windows installer

Boot Options: UEFI and PXE