

# AQtion AQC111U & AQC112U

USB 3.1 Multi-Gig Ethernet Controllers for Adapters, Docking Stations and On-board LAN

## PRODUCT OVERVIEW

The Marvell AQtion AQC111U and AQC112U are Universal Serial Bus 3 (USB) to Multi-Gig Ethernet controllers that integrate a USB v3.1 Gen1 PHY and 5GBASE-T/2.5GBASE-T MAC+PHY in single-chip packages. These high-performance, small footprint devices enable low-cost, small form factor docking stations and adapters for simple plug-and-play, Multi-Gig Ethernet network connection capabilities, suitable for a wide variety of applications. These Ethernet controllers enable a new class of accessories for laptop users who want mobility combined with the reliability and performance of wired Multi-Gig Ethernet connectivity when at their desks or on the road.

These new controllers enable the perfect solution for notebook users. The ubiquity of the USB connection also makes the adapters and docking stations based on the AQC111U and AQC112U suitable for use with desktops, game consoles, home gateways or any system with a USB 3.x port that would benefit from a high-speed network connection.

All AQtion controllers incorporate Marvell's AQrate PHY technology, that supports data rates of up to 5 Gbps, a USB host controller, and is compliant with USB v3.1, v3.0, v2.0, and v1.1 specifications. These devices implement Multi-Gig Ethernet functionality with the AQC111U integrating a four-speed Ethernet PHY (5GBASE-T/2.5GBASE-T/1000BASE-T/100BASE-TX), while the AQC112U integrates a three-speed Ethernet PHY (2.5GBASE-T/1000BASE-T/100BASE-TX).

FEATURES	BENEFITS
Single-chip solution	Integrated PCIe, MAC, and PHY minimizes board space and power utilization
Integrated USB v3.1 Gen1 PHY	Supports line rates of up to 5 Gbps
Integrated USB Device Controller	<ul style="list-style-type: none"> <li>• USB v3.1/3.0/2.0/1.1-compliant</li> <li>• Supports USB v3.1 Gen1 power saving modes (U0/U1/U2/U3)</li> <li>• Provides USB Super/High/Full-Speed modes with bus or self-powered device</li> <li>• Supports virtual CD-ROM storage for driver</li> </ul>
USB Power Delivery (PD) v2.0	<ul style="list-style-type: none"> <li>• Provides USB Type-C port capable of operating as a Downstream Facing Port (DFP) or Upstream Facing Port (UFP)</li> <li>• Supports two USB Type-C Configuration Channel (CC) ports</li> <li>• Provides integrated Baseboard Management Controller (BMC) Encode/Decode PHY</li> </ul>
Advanced Security Features	<ul style="list-style-type: none"> <li>• Firmware anti-tampering security:               <ul style="list-style-type: none"> <li>- Secure Hash Algorithm (SHA-2) authentication</li> <li>- RSA public-key encryption</li> </ul> </li> </ul>
128-Byte Programmable eFuse	Supports security keys and stores device-related information

FEATURES	BENEFITS
SPI FLASH Interface	Supports external FLASH for storing USB ID and Ethernet MAC address
Package	<ul style="list-style-type: none"> <li>• 224-pin Ball Grid Array (BGA), 12 mm x 14 mm</li> <li>• Commercial temperature range (0°C -108°C)</li> </ul>

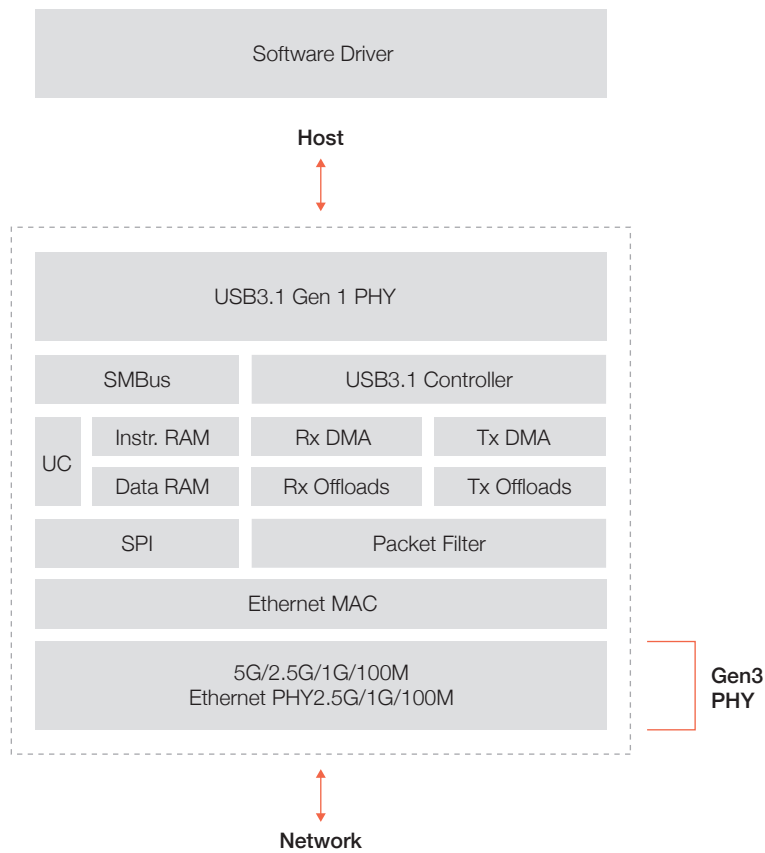
## PHY & MAC FEATURES AND BENEFITS

PHY FEATURES & BENEFITS	
AQrate PHY with NBASE-T technology	Supports 100 meters on Cat 5e at 5G/2.5G/1G/100M
Advanced Cable Diagnostics	On-chip high-resolution cable analyzer
Energy Efficient Ethernet (EEE)	Advanced PHY power savings
Power over Ethernet (PoE)	<ul style="list-style-type: none"> <li>• I<sup>2</sup>C master for external PoE controller</li> <li>• PoE AT Type-2 or AF information notice for CPU via GPIO pin</li> </ul>
MAC FEATURES & BENEFITS	
Wake-on-LAN (WoL) Power Management	Supports lower power modes
Quality of Service (QoS) support	Supports up to eight traffic classes and Data Center Bridging (DCB)
Jumbo frames (up to 16Kbyte)	Improved network performance with reduce CPU utilization
IPv4, IPv6/TCP, and IPv6/UDP checksum offload	Offloading calculations and improved CPU usage
ETHERNET CONTROLLER/CHIP FEATURES	
Advanced Power Management Features	<ul style="list-style-type: none"> <li>• Power management offload (ARP and NS requests)</li> <li>• Multicast DNS (mDNS) offloads</li> </ul>

## TARGET APPLICATIONS

Marvell AQtion AQC111U and AQC112U controllers are ideally suited for use in desktops, notebook PCs, ultrabooks, docking stations, game consoles, digital-home appliances, network printers, USB dongles, IP Set-Top Box (STB) and IP televisions, and virtually any embedded system that uses a standard USB port.

## AQC111U & AQC112U BLOCK DIAGRAM



**ABOUT MARVELL:** Marvell first revolutionized the digital storage industry by moving information at speeds never thought possible. Today, that same breakthrough innovation remains at the heart of the company's storage, network infrastructure, and wireless connectivity solutions. With leading intellectual property and deep system-level knowledge, Marvell's semiconductor solutions continue to transform the enterprise, cloud, automotive, industrial, and consumer markets. For more information, visit [www.marvell.com](http://www.marvell.com).