

AX88179 -- USB3.0 to 10/100/1000M Gigabit Ethernet Controller

AX88179 is the world's first USB 3.0 to Gigabit Ethernet controller which integrates USB 3.0 PHY and 10/100/1000M Gigabit Ethernet MAC/PHY in a single chip. The AX88179 is the latest addition to ASIX's USB-to-LAN product line, providing a small form factor solution and plug-and-play usability, enabling embedded system designers to deliver high-speed Ethernet connectivity while leveraging the growth and speed of USB 3.0 SuperSpeed technology.

AX88179 can be used in any embedded system with a USB host microcontroller requiring a twisted pair PHY connection. Featuring a USB interface (compliant with USB specification V3.0, V2.0 and V1.1) to communicate with a USB Host Controller, the AX88179 also integrates on-chip Gigabit Ethernet MAC and PHY (IEEE802.3, IEEE802.3ab compatible). Additionally, the AX88179 needs only a single 25MHz crystal to drive both the USB and Ethernet PHYs.

The AX88179 offers a wide array of features including IPv4/IPv6 checksum offload engine, crossover detection and correction, TCP large send offload and IEEE802.3az EEE (Energy Efficient Ethernet). The EEE defines a mechanism that allows the AX88179 to enter a low power idle state to reduce power and to achieve a more energy efficient network. It also supports dynamic cable length detection and dynamic power adjustment Green Ethernet in Gigabit mode. The AX88179 also offers multiple power management Wake-on-LAN features, including Magic Packet, Microsoft Wake-on-LAN, and Link Status Change that allows systems to enter a low power state and wake on desired network traffic.

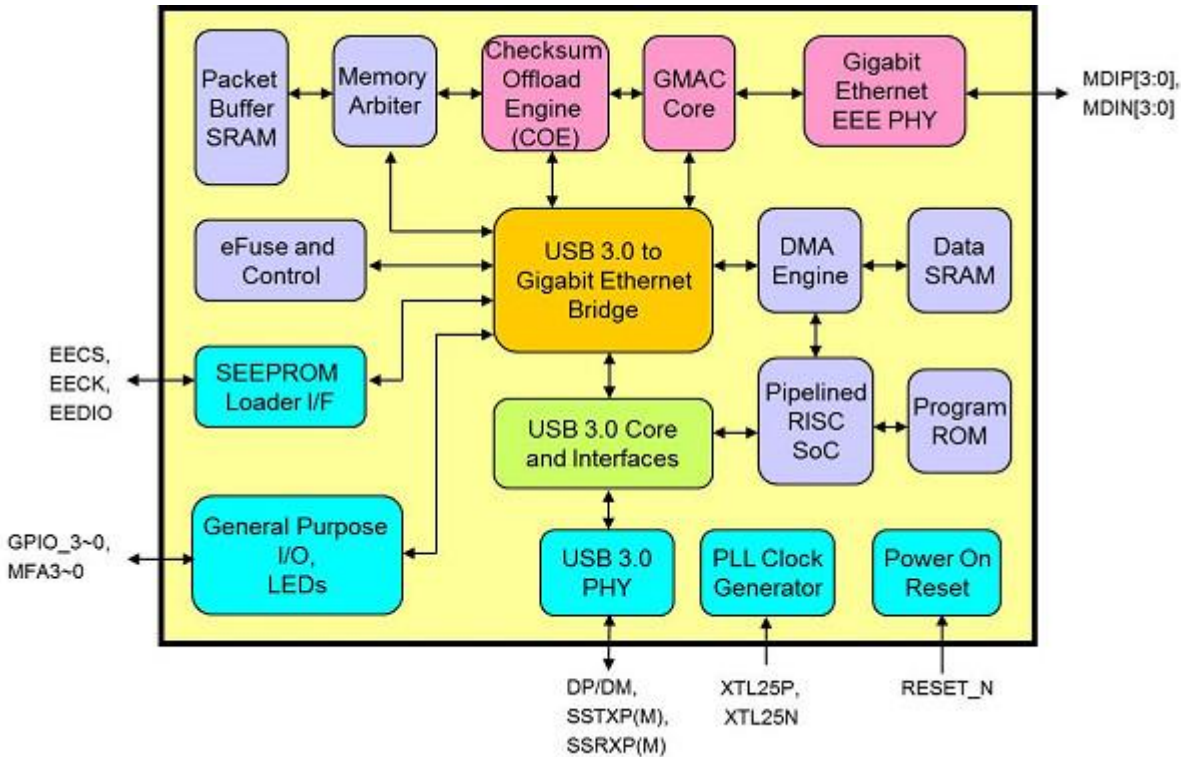
The AX88179 is a high performance and highly integrated ASIC which enables a low cost, small form factor solution for plug-and-play Gigabit Ethernet network connection capability for desktops, notebook PCs, ultrabooks, tablet PCs, replicators/docking stations, game consoles, digital-home appliances, and any embedded system using a standard Ethernet PHY.

Feature:

- Single chip USB 3.0 to 10/100/1000M Gigabit Ethernet controller with Energy Efficient Ethernet (EEE) base on digital signal processing (DSP) technology with low dissipation
- USB Device Controller
 - Integrates on-chip USB 3.0 PHY and controller compliant to USB Spec 3.0, 2.0 and 1.1
 - Supports all USB 3.0 power saving modes (U0, U1, U2, and U3)
 - Supports USB Super/High/Full Speed modes with Bus-power or Self-power device auto-detect capability
 - High performance packet transfer rate over USB bus using proprietary burst transfer mechanism (USB 3.0 SuperSpeed Approval)
- Gigabit Ethernet Controller
 - Supports IEEE 802.3az (Energy Efficient Ethernet)
 - IEEE 802.3, 802.3u and 802.3ab compatible
 - Integrates 10/100/1000Mbps Gigabit Ethernet MAC/PHY
 - Supports dynamic cable length detection and dynamic power adjustment Green Ethernet (Gigabit Ethernet)
 - Supports parallel detection and automatic polarity correction
 - Supports crossover detection and auto-correction
 - Supports IPv4/IPv6 packet Checksum Offload Engine (COE) to reduce CPU loading, including IPv4/TCP/UDP/ICMP/IGMP & IPv6 TCP/UDP/ICMPv6 checksum check & generation
 - Supports TCP Large Send Offload V1
 - Supports full duplex operation with IEEE 802.3x flow control and half duplex operation with backpressure control
 - Supports IEEE 802.1P Layer 2 Priority Encoding and Decoding
 - Supports IEEE 802.1Q VLAN tagging and 2 VLAN ID filtering; received VLAN Tag (4 bytes) can be discarded or preserved
 - Supports Jumbo frame up to 4KB
 - PHY loop-back diagnostic capability
- Support Wake-on-LAN Function
 - Supports suspend mode and remote wakeup via link-change, Magic Packet, Microsoft Wakeup Pattern, etc.
 - Supports external wakeup pin
 - Supports Bonjour wake-on-demand
- Advanced Power Management Features
 - Supports power management offload (ARP & NS)
 - Supports dynamic power management to reduce power dissipation during idle or light traffic
 - Supports AutoDetach power saving
 - Supports advanced link down power saving when Ethernet cable is unplugged
- Supports optional serial EEPROM (93c56/66) for storing USB Descriptors, Node-ID, etc.
- Supports embedded eFuse (64-byte) to store USB Device Descriptors, Node-ID, etc to save external EEPROM
- Supports automatic loading of USB Device Descriptors, Node-ID, etc. from embedded eFuse or external EEPROM at power-on initialization
- Single 25MHz clock input from either crystal or oscillator source
- Integrates on-chip power-on reset circuit
- Integrates pipelined RISC (System on a Chip, SoC) for handling protocol and control functions
- 68-pin QFN 8mm x 8mm RoHS/REACH compliant package

- Operating over 0°C to 70°C temperature rang

Block Diagram



Selection Guide

Part No.	USB Speed	Ethernet MAC/ PHY (Mbps)	Microsoft AOAC	MAC Interface	Crossover Detection and Auto-correction	IP/TCP/UDP Checksum	Wak on-LA
AX88179	Super (3.0)	10/100/1000	-	-	✓	✓	✓
AX88178A	High (2.0)	10/100/1000	-	-	✓	✓	✓
AX88178	High (2.0)	10/100/1000 (MAC only)	-	MII/GMII/ RGMII	-	-	✓
AX88772C	High (2.0)	10/100	✓	RMII/Rev- RMII(Optional)	✓	✓	✓
AX88772B	High (2.0)	10/100	-	RMII/Rev- RMII(Optional)	✓	✓	✓
AX88772A	High (2.0)	10/100	-	-	✓	-	✓
AX88172A	High (2.0)	10/100	-	(Rev-)MII/ Rev-RMII	✓	-	✓

Development Board

AX88179 Demo Board

This is an AX88179 USB 3.0 to Gigabit Ethernet dongle adapter for users to verify AX88179 function on any platform that supports USB 3.0 host interface



Available

Technical Documentation

Product Brief, Product Introduction and Datasheet

AX88179 Product Brief	278.2 KB	2015-01-16	
AX88179 Product Introduction	643.7 KB	2013-07-19	
AX88179 Datasheet	1.2 MB	2016-04-11	

Reference Manuals and User Guides




AX88179 EEPROM/Manufacture User Guide			
AX88179/AX88178A macOS Driver Installation Guide	1.4 MB v2.20	2017-11-30	

Reports




AX88179 Reliability Report	215.7 KB	2012-07-16	
AX88179 RoHS Report			
AX88179 Performance Test Report			
AX88179 USB-IF Compliance Test Report			
AX88179 IEEE 802.3 Compliance Test Reports			

Hardware Design Documentation

Reference Schematics

AX88179 Demo Board Reference Schematic	275.3 KB	v2.07	2016-11-01	
AX88179 USB Type C Plug Connector Reference Schematic	276.8 KB	V1.00	2014-09-26	
AX88179/VL100/VL210 USB Type C PD Charging Reference Schematic	796.7 KB	V1.00	2015-12-31	



Bill of Materials, Application Notes and Layout Guides

AX88179 Demo Board BOM File	190.8 KB		2015-01-29	
AX88179 USB 3.0 to Gigabit Ethernet Applications Design Note	1.3 MB	v1.23	2016-11-01	
AX88179 Default Wake-On-LAN(DWOL) Ready Mode Application Note	779.5 KB	v1.00	2019-08-26	


PCB Layout, Gerber and IBIS Model

















AX88179 Demo Board PCB Layout Files	308.3 KB		2012-11-26	
AX88179 Demo Board Gerber Files	462.1 KB		2012-11-26	
AX88179 IBIS Model	360 KB		2017-06-19	

Utilities

Windows SROM Programming Tool Please contact ASIX Sales to get zip password	1.6 MB	v1.0.22.0	2019-04-24	
Windows Production Test Tool Please contact ASIX Sales to get zip password	1.6 MB	v1.9.0	2019-04-24	

Drivers

Driver Type	Revision	Release Date	Description	File Size	
Apple Mac OS X 10.15 above Drivers Installer	v2.16.0	2020-01-30	For Apple x86, 32-bit/64-bit platforms	1.3 MB	

Apple Mac OS X 10.9 to 10.14 Drivers Installer	V2.14.0	2019-01-07	For Apple x86, 32-bit/64-bit platforms	1.3 MB	
Linux kernel 4.x/3.x/2.6.x Driver	V1.19.0	2018-01-02	For all Android systems, Linux kernel 2.6.14 and later	15.7 KB	
Windows 10 32-bit Driver	v1.20.6.0	2019-05-10	For x86 CPU platform, HLK/WHCK certified	53.6 KB	
Windows 10 64-bit Driver	v1.20.6.0	2019-05-10	For x64 CPU platform, HLK/WHCK certified	58.9 KB	
Windows 10 32-bit/64-bit HLK/WHCK drivers setup program	V1.0.6.0	2019-06-04	For 32-bit/64-bit x86 CPU platform HLK/WHCK certified	8.8 MB	
Windows 8.x 32-bit Driver	V1.18.5.0	2019-04-11	For 32-bit x86 CPU platform, HLK/WHCK certified	53.3 KB	
Windows 8.x 64-bit Driver	V1.18.5.0	2019-04-11	For 64-bit x86 CPU platform, HLK/WHCK certified	60.1 KB	
Windows 8.x 32-bit/64-bit HLK/WHCK drivers setup program	V1.0.4.0	2019-04-29	For 32-bit/64-bit x86 CPU platform HLK/WHCK certified	8.8 MB	
Windows 7 32-bit Driver	V1.12.11.0	2018-01-19	For 32-bit x86 CPU platform WHCK certified	42.9 KB	
Windows 7 64-bit Driver	V1.14.11.0	2018-01-19	For 64-bit x86 CPU platform, WHCK certified	47.7 KB	
Windows 7 32-bit/64-bit WHCK drivers setup program	V3.0.6.0	2018-02-09	For 32-bit/64-bit x86 CPU platform WHCK certified	8.9 MB	
Windows XP/Vista 32-bit Driver	V1.4.2.0	2013-05-24	For 32-bit x86 CPU platform, WHQL certified	1.4 MB	
Windows XP/Vista 64-bit Driver	V1.6.2.0	2013-05-24	For 64-bit x86 CPU platform, WHQL certified	1.6 MB	
WinXP/Vista 32-bit/64-bit WHQL drivers setup program	v1.0.4.0	2013-06-04	For 32-bit/64-bit x86 CPU platform WHQL certified	11.7 MB	
Windows Embedded Compact 2013 Driver	v1.6.0.0	2017-04-07	For ARMv7 platform	664.5 KB	
Windows Embedded Compact 2013 Driver	v1.6.0.0	2017-04-04	For CEPC x86 platform	664.5 KB	

Windows Embedded Compact 7/CE 7.0 Driver	v1.4.1.0	2013-10-25	For ARMv7 platform	522 KB	
Windows Embedded Compact 7/CE 7.0 Driver	v1.4.1.0	2013-10-25	For ARMv6 platform	522.2 KB	
Windows Embedded Compact 7/CE 7.0 Driver	v1.4.1.0	2013-10-25	For ARMv5 platform	522.2 KB	
Windows Embedded Compact 7/CE 7.0 Driver	v1.4.1.0	2013-10-25	For CEPC x86 platform	519.1 KB	
Windows Embedded Compact 7/CE 7.0 Driver	v1.4.1.0	2013-10-25	For MIPS-II platform	526.7 KB	
Windows CE 6.0 Driver	v1.2.0.0	2013-07-31	For Intel PXA27x ARM platform	534 KB	
Windows CE 6.0 Driver	v1.2.0.0	2013-07-31	For CEPC x86 platform	531.1 KB	
Windows CE 6.0 Driver	v1.2.0.0	2013-07-31	For NEC VR5500 MIPS-II platform	538.9 KB	
Windows CE 6.0 Driver	v1.2.0.0	2013-07-31	For NEC VR5500 MIPS-IV platform	539.5 KB	
Windows CE 6.0 Driver	v1.2.0.0	2013-07-31	For Renesas US7750R HARP(Aspen) SH4 platform	535.3 KB	
Windows CE 5.0 / Mobile 5 / Mobile 6 Driver	v1.0.0.0	2014-04-16	For MainStone II Intel PXA27X platform	674.1 KB	
Windows CE 5.0 / Mobile 5 / Mobile 6 Driver	v1.0.0.0	2014-04-16	For SMDK2410 ARM platform	674.2 KB	
Windows CE 5.0 / Mobile 5 / Mobile 6 Driver	v1.0.0.0	2014-04-16	For CEPC x86 platform	662.1 KB	
Windows CE 5.0 / Mobile 5 / Mobile 6 Driver	v1.0.0.0	2014-04-16	For NEC VR5500 MIPS-II platform	685.6 KB	
Windows CE 5.0 / Mobile 5 / Mobile 6 Driver	v1.0.0.0	2014-04-16	For NEC VR5500 MIPS-IV platform	687.9 KB	
Windows CE 5.0 / Mobile 5 / Mobile 6 Driver	v1.0.0.0	2014-04-16	For Renesas US7750R HARP(Aspen) SH4 platform	676 KB	
UEFI X64/IA32 Drivers	V2.9.0	2019-09-02	For UEFI X64/IA32 platforms	23.9 KB	
UEFI ARM/AARCH64 Drivers	v2.8.0	2018-11-16	For UEFI ARM/AARCH64 platforms	24 KB	

FAQs [click here for more AX88179 FAQs....](#)

Q0001: Where can I obtain the latest AX88179 drivers?

A0001: Please visit the AX88179 Driver Download web page (<http://www.asix.com.tw/download.php?sub=driverdetail&PItemID=131>) for details.

Q0002: Are AX88179 Windows drivers qualified by the WHCK/WHQL compliant certification?

A0002: Yes, the AX88179 Windows 8/7 32-bit/64-bit drivers were qualified by Microsoft WHCK certification and the AX88179 Windows XP/Vista 32-bit/64-bit drivers were qualified by Microsoft WHQL certification.