## Features

- Single chip USB 3.0 to 10/100/1000M Gigabit Ethernet controller with Energy Efficient Ethernet (EEE)

- **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 (US Patent 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 mode only)
  - 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 IP/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 back-pressure flow control
  - Supports IEEE 802.1P Layer 2 Priority Encoding and Decoding

## Product Brief

- Supports IEEE 802.1Q VLAN tagging and 2 VLAN ID filtering; received VLAN Tag (4 bytes) can be stripped off or preserved
- Supports Jumbo frame
- PHY loop-back diagnostic capability

- **Support Wake-on-LAN Function**
  - Supports suspend mode and remote wakeup via link-change, Magic Packet, Microsoft Wakeup Frame and 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 – Soft-disconnected from USB host when Ethernet cable is unplugged
  - 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 after power-on initialization
- Single 25MHz clock input from either crystal or oscillator source
- Integrates on-chip power-on reset circuit
- 68-pin QFN 8mm x 8mm RoHS/REACH compliant package
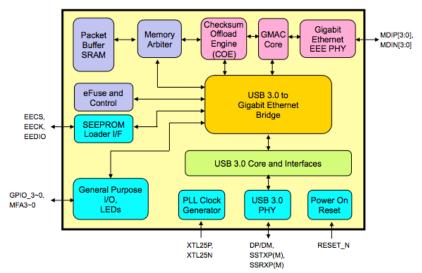- Operating over 0°C to 70°C temperature range

## Product Description

AX88179 can be used in any embedded system with a USB host microcontroller requiring a twisted pair physical network 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, IEEE802.3u and 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 auto-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 Ethernet. It 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 Wakeup Frame and Link Status Change that allows systems to enter a low power state and wake on desired network traffic.
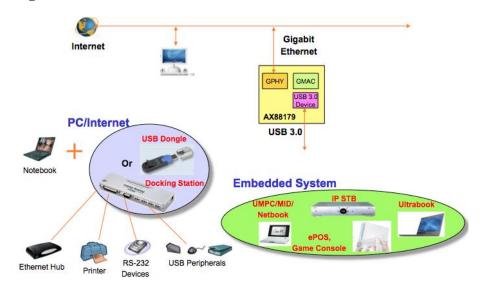
## Block Diagram



## Application Diagram



## SuperSpeed USB-to-LAN Applications