



Features

- Single chip USB 2.0 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 2.0 PHY and controller compliant to USB Spec 2.0 and 1.1
 - Supports USB 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
 - Supports IEEE 802.1Q VLAN tagging and 2

Product Brief

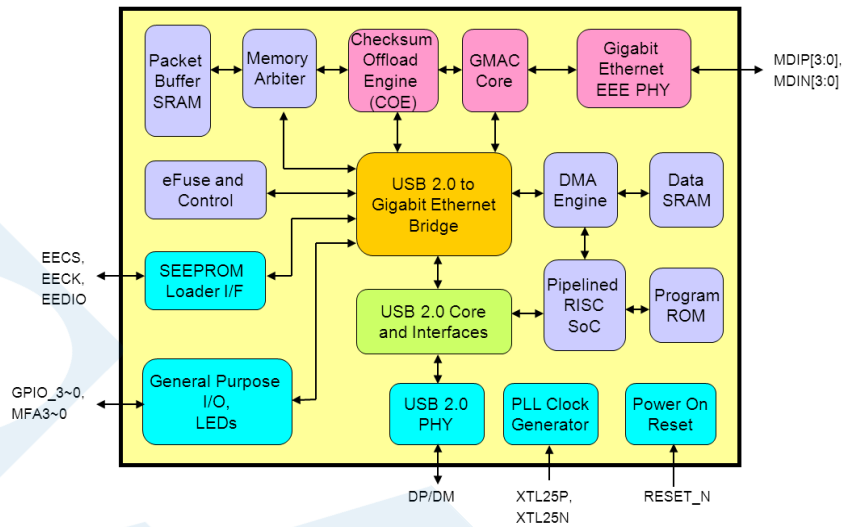
- VLAN ID filtering; received VLAN Tag (4 bytes) can be stripped off or preserved
- Supports Jumbo frame up to 4KB
- PHY loop-back diagnostic capability
- **Support Wake-on-LAN Function**
 - Supports suspend mode and remote wakeup via link-change, Magic Packet, Microsoft Wakeup Frame and external wakeup 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
- 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 range

Product Description

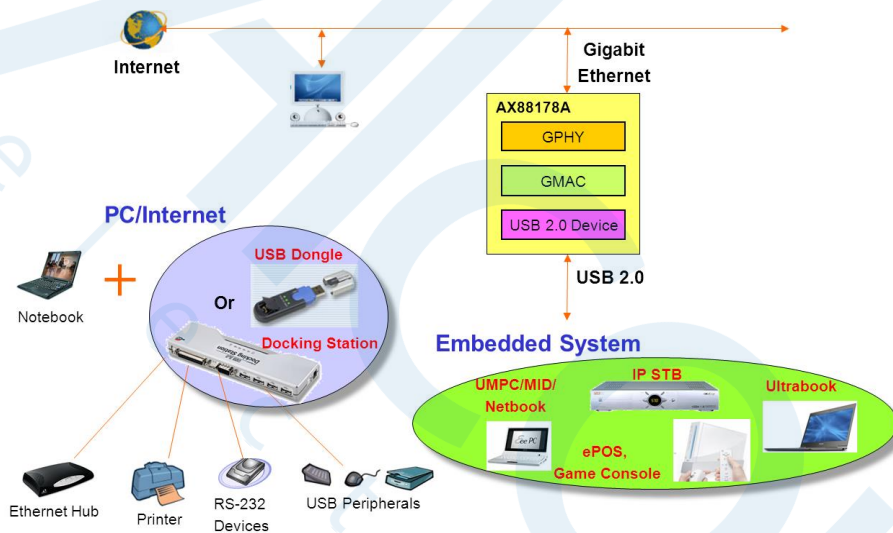
AX88178A can be used in any embedded system with a USB host microcontroller requiring a twisted pair physical network connection. Featuring a USB interface (compliant with USB specification V2.0 and V1.1) to communicate with a USB Host Controller, the AX88178A also integrates on-chip Gigabit Ethernet MAC and PHY (IEEE802.3, IEEE802.3u and IEEE802.3ab compatible). Additionally, the AX88178A needs only a single 25MHz crystal to drive both the USB and Ethernet PHYs.

The AX88178A 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 AX88178A 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 AX88178A 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



High-speed USB-to-LAN Applications

