

## Switch Management Engine

- Manages up to 32 Fast Ethernet ports and up to eight Gigabit Ethernet ports
- Ethernet MAC interface for the host CPU via dual channel DMA
- On-chip buffers for network management frame to and from the host CPU
- Glueless interface to Intel 80486 and Power PC MPC801 series microprocessors. Interfaces easily to any modern 32-bit CPU bus
- Provides Spanning Tree support to the switch ports on Allayer's RoX bus
- Compliant to Ethernet-like MIB and Bridge MIB. Compliant to RMON Etherstats MIB to allow for support of first four groups of RMON
- DMA channels also provide bridging function for WAN access
- 2.5 and 3.3V operations
- Packaged in 208-pin PQFP

### Product Description

The AL320 is the management device for Allayer's RoX™ chip set. This management engine provides CPU Interface to the Ethernet via the RoX Bus and gathers all the required MIB statistics to support popular SNMP based management. The AL320 supports Ethernet-like MIB, MAU MIB, and RMON MIB. It also supports all other management variables particular to the Allayer's switch chipset, such as trunking port groups and port security enable/disable.

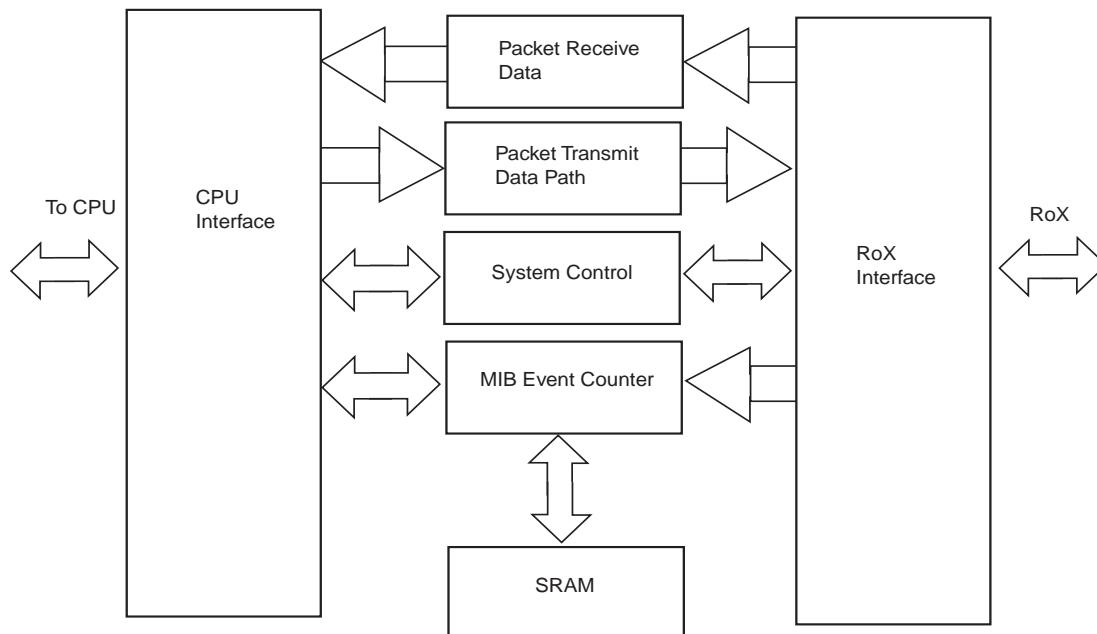


Figure 1 System Block Diagram

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## AL320 Overview

The AL320 provides all the necessary functions to provide a network management agent for the RoX bus based Fast Ethernet and Gigabit Ethernet Switching Systems. The AL320 is designed to interface to Motorola PowerPC 800 Series or Intel 486 Series without use of glue-logic, although the AL320 could interface with any 32-bit microprocessor (non-PCI bus) with little effort and glue logic.

The following are five fundamental functions built into the AL320.

1. Provides MAC services for the CPU to transmit and receive Ethernet frames to and from the RoX bus via high-speed dual DMA channels.
2. Gathers the MAC address updates in real-time for Bridge MIB support.
3. In conjunction with the RoX Bus Ethernet Switch devices, provide Spanning-Tree support.
4. Provides access to all the internal registers of the RoX Bus switch devices and their associated PHY devices.
5. Provides Ethernet related (EtherType), PHY related, and RMON MIB network statistics counters (42 counters per port).

The AL320 transmits and receives Ethernet frames via dual DMA channels, one for receive and one for transmit. When sending frames, the CPU prepares frames in memory and issues the transmit command, along with the frames address and size, to the AL320. The AL320 then transmits the frame from the memory to the proper output port. When receiving frames, the AL320 stores the frames in the next available frame buffer out of 32 receive buffers it keeps via a DMA channel. The AL320 receives frames addressed to itself, or special frames are trapped to the AL320 (BPDU, Multicast and Broadcast, GARP, etc.).

The AL320 also gathers real time MAC address change information from the RoX bus and optionally forwards it to the CPU via a DMA channel. Every time 32 MAC address change information is received, it is stored in memory, and every time 2K bytes worth of this message is stored, the CPU can be optionally interrupted.

RoX Bus Switching Devices (such as AL101, AL116, etc.) provide built-in spanning-tree functions such as spanning-tree port state control and BPDU frame trapping to the CPU. Switch Devices support Learning, Blocking, Forwarding, etc., and spanning tree states. In the Learning and Blocking states, BPDU frames are still received and transmitted out of switch ports.

The AL320 provides access to all registers and MAC address tables on RoX Bus Switching Devices via remote register access command. The CPU issues a remote register read or write command to the AL320. The AL320 then performs the access and sets status bit (done) and optionally interrupt the CPU. All the vendor unique and IEEE standard registers in the PHY (100BASE-T and MII registers) are accessible via this interface as well.

The AL320 also provides all the network statistics counters to support RMON groups 1 through 4 (EtherStats, History, History Control, Alarm) as well as Ethernet-Like MIB. All counters are 32 bit counters except for the octet counters, which are 64-bit counters. RMON host groups (Top Talker, etc.) are also implemented in the AL320, but the host number is limited to one. It may be useful to track one host, such as network file server, via the use of these counters.