8 Port 10/100 Mbit/s Dual Speed Fast Ethernet Switch

- Supports eight 10/100 Mbit/s Ethernet ports with MII and RMII interface
- Capable of trunking up to 800 Mbit/s link
- Full- and half-duplex mode operation
- Speed auto-negotiation through MDIO
- Built-in storage of 1K MAC addresses expandable to 16K
- Designed to utilize low-cost SGRAM
- Scalable design for stackable switch implementation
- RoX expansion link supports 4.8 Gbit/s throughput
- Serial EEPROM interface for low-cost system configuration
- Gigabit Ethernet ready

- Automatic source address learning
- Secure mode traffic filtering
- Broadcast storm control
- Port monitoring support
- IEEE 802.3x flow control for full-duplex operation
- Optional backpressure flow control support for half-duplex operation
- Supports store-and-forward mode switching
- VLAN support
- RMON and SNMP support with external management (MIB) device
- 0.35 micron, 3.3V CMOS technology
- Packaged in 456-pin BGA

Product Description

The AL116 is an eight-port 10/100 Mbit/s dual speed Ethernet switch. A low-cost and scalable solution for up to 32 ports is achieved through using low-cost buffer memory and Allayer's proprietary RoX architecture. In addition, the AL116 supports VLAN and multiple-link aggregation trunks.
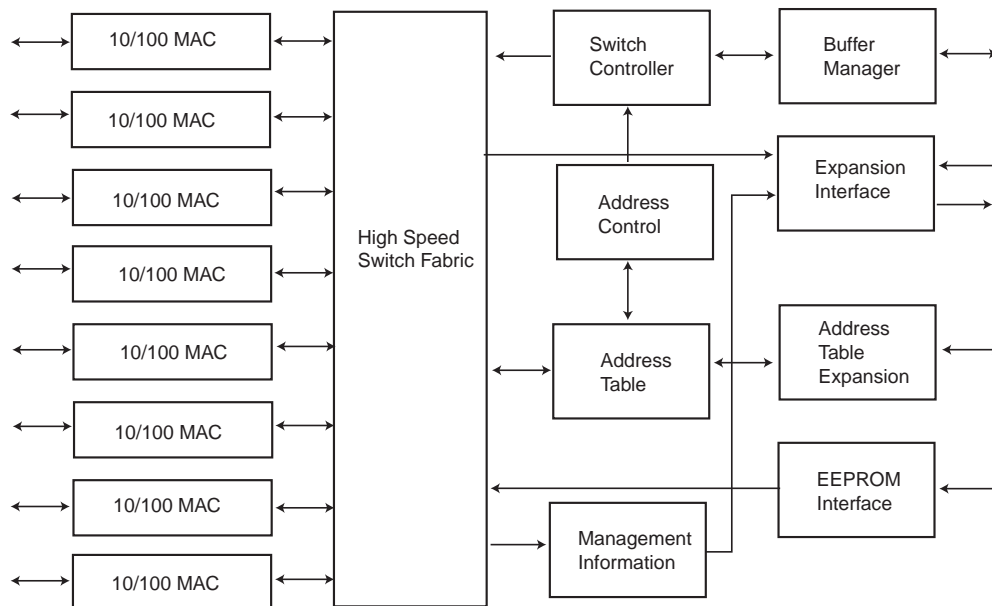

Figure 1   System Block Diagram

AL116 Overview

The RoX interface is a 2.4 Gbit/s interface (4.8 Gbit/s full-duplex). The interface can support up to four switch chips. Various combinations can be used for different configurations. The maximum port configuration will be either 32-100 Mbit/s ports or 24-100 Mbit/s ports plus two-Gigabit Ethernet ports.

The RoX interface also supports an external management device, the AL300A. SNMP and RMON are supported through this external management device.

The AL116 provides eight 10/100 Mbit/s Ethernet ports. Each port supports both 10 and 100 Mbit data rate. The operation mode is auto-negotiated by the PHY. All ports are full-duplex capable. The device also supports VLAN for workgroup and segment switching applications.

The AL116 also supports trunking applications. The chip provides two optional load balancing schemes, explicit and dynamic. With trunking, it is possible to group up to four full-duplex links together to form a single 800 Mbit/s link.

Data received from the MAC interface is stored in the external memory buffer. The AL116 utilizes cost effective SGRAM to provide 8-Mbit or 16-Mbit of buffer memory.

During transmission, the data is obtained from the buffer memory and routed to the destination port. For half duplex operation, in the event of a collision, the MAC control will back off and retransmit in accordance to the IEEE 802.3 specification.

The AL116 provides two flow-control methods. For half-duplex operations, an optional jamming based flow-control (also known as backpressure) is available to prevent loss of data. With this method of flow-control, the switch will generate a jam signal when the receive-buffer is full. The sending station will not transmit until the line is clear. In the full-duplex mode, the AL116 utilizes IEEE 802.3x as the flow-control mechanism.

All ports support multiple MAC addresses. The switch chip supports up to 1K MAC addresses internally. These MAC addresses are shared among all eight ports. Additional SRAM can be added to provide support for 16K MAC addresses.

The initialization and configuration of the switch is programmed by an external EEPROM. For an unmanaged switch design, there is no need for a CPU. Field reconfiguration can be achieved by using a parallel interface to reprogram the EEPROM.

For managed switch applications, the AL116 supports network management through the network management option. When the management option is enabled, network statistics for each port is gathered and sent across the RoX bus. The management information base chip on the bus will collect and store the data for network management agent. Access to the statistical counters is provided via the CPU interface of the MIB device.

The AL116 supports port based VLAN. The VLAN register set is used to configure the destination ports for multicast and broadcast frames.

The AL116 operates only in the store and forward mode. The entire frame is checked for error. Frames with errors are automatically filtered and will not be forwarded to the destination port.

The device also provides two levels of security for intrusion protection which can be implemented on a per port basis.

Other features include port monitoring and broadcast storm throttling.