application brief

Intel® Solutions for Ethernet Backplanes

Utlizing Intel® LXT9880AGE, LXT973, and LXT971A

Ethernet in Next Generation Networks

Today, the dynamic, intersecting environments of local and wide area networks (LANs and WANs) face the dual challenge of supporting increased data traffic and a growing demand for "application aware" networking such as video services, IP telephony and quality of service (QoS). Metropolitan area networks (MANs) also have emerged, with a promise of high-speed optical access and high-reliability Internet protocol (IP) data transmission. Ethernet has proven ideal for these "next generation" networks, as telecommunications and networking equipment providers require building blocks for cost-effective, reliable communications solutions.

Ethernet Leads the Backplane Revolution

Telecommunications system designers are turning to Ethernet to solve the challenge of providing communication links between printed circuit boards (PCBs) in chassis-based networking equipment. Ethernet is an ideal technology for interconnecting multiple line cards and modules within telecommunications equipment backplanes and is widely displacing high-speed serial and proprietary communication protocols.

Implementing Ethernet in backplane solutions provides many benefits. As a standards-based technology, Ethernet is available from several silicon manufacturers, eliminating concerns of single-source supply. In addition, Ethernet uses innovative filtering and scrambling techniques to provide a high level of data integrity and noise suppression, and has the built-in capability to check for data corruption. Ethernet is gaining acceptance beyond the traditional LAN into larger MANs and eventually to the home. Ethernet backplanes are a natural progression for an end-to-end Ethernet infrastructure eliminating the cumbersome requirement for protocol translations.

Improving Ethernet Backplane Solutions with Intel Networking Silicon

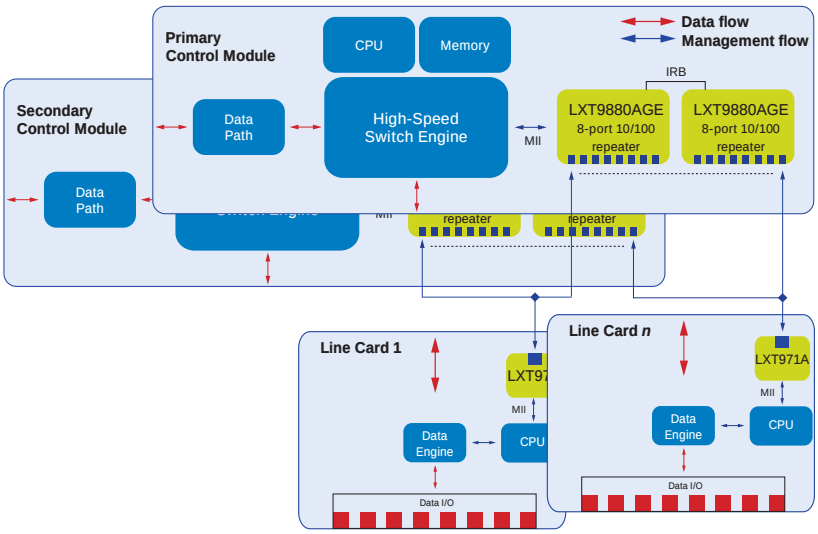
Intel has taken a leadership position for backplane communications solutions by providing board-level termination networks designed for ideal operation with a wide variety of Ethernet transceivers and repeaters. Intel has manufactured several validation boards and worked with leading OEMs to validate Ethernet backplane solutions. Intel's high-quality transceivers and repeaters provide robust performance for magnetic-less Ethernet applications. Removing the requirement for magnetic transformers reduces board complexity, space, and cost in developing backplane solutions.

Intel® Carrier Class Ethernet products expand the current Ethernet product line to address stringent requirements beyond commercial networking needs. These products support operation over the extended temperature range (-40°C to +85°C) while providing features that increase reliability. Each Carrier Class Ethernet device has a 10-year operation lifetime with less than 100 failures per billion hours. All Intel Carrier Class Ethernet devices will be available a minimum of 5 years from product introduction. Intel's leadership in backplane solutions and the introduction of robust carrier class products deliver low cost, extended life, and extended temperature solutions for Ethernet backplanes.

Intel® Internet Exchange Architecture

Ethernet Backplane Solution

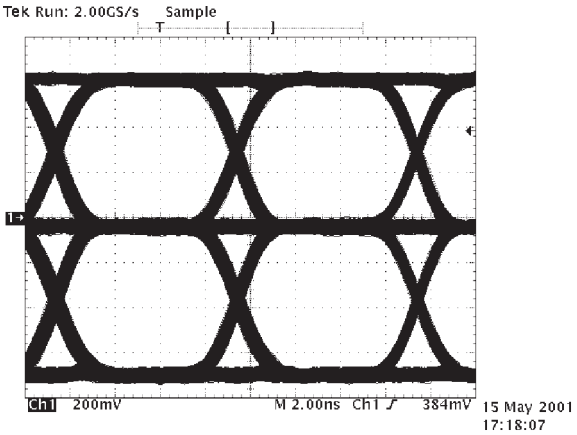
The diagram below shows the use of the LXT9880AGE and LXT971A for management capability of a digital subscriber line access multiplexer (DSLAM) or cellular base station. The LXT9880AGE propagates control and management data from the line cards throughout the system. Information originates on a line card and is transmitted across the Ethernet backplane to the control card. The LXT973 dual 10/100 Ethernet PHY could be an alternative to the LXT971A providing two Ethernet ports for redundancy, while reducing board complexity and power.



Ethernet Eye-Pattern

The Ethernet eye-pattern to the right indicates the robust signal quality achieved with Intel silicon. This data was generated by connecting the LXT9880AGE to a LXT971A on an Intel development platform. Due to the exceptional electrical transceiver performance, the Ethernet backplane solution is a robust method for implementing an Ethernet communications link.

Note: Scope capture of data on an Intel development platform utilizing a 6-inch micro-strip transmission line, without magnetics, across a PCB. Twisted-pair data was transmitted from the LXT9880AGE and recorded at the LXT971A.



LXT9880AGE Repeater for Backplane Applications

The Intel LXT9880AGE is a 10/100 eight-port Ethernet repeater with integrated transceivers ideal for backplane applications. The LXT9880AGE provides two media independent interface (MII) ports and eight 10/100 transceivers for 100BASE-TX and 10Base-T copper media support.

LXT973 PHY for Ethernet Backplane Applications

The Intel LXT973, 10/100 dual-port Ethernet PHY is a low-power transceiver ideal for backplane applications. Each PHY has a management data input/output (MDIO) interface allowing for software configuration and a media independent interface (MII), which can integrate seamlessly to media access controllers (MACs). The LXT973 can be used in a redundant application with one PHY active and the other in a stand-by mode.

LXT971A PHY for Ethernet Backplane Applications

The Intel LXT971A, 10/100 single-port Ethernet PHY is a low-power transceiver ideal for backplane applications. The PHY has a management data input/output (MDIO) interface allowing for software configuration, and a media independent interface (MII), which can integrate seamlessly to media access controllers (MACs).

Additional Collateral

- LXT9880AGE - Product Brief, Data Sheet, Demo Boards, Design and Layout Guide
- LXT973 - Product Brief, Data Sheet, Demo Boards, Design and Layout Guide
- LXT971A - Product Brief, Data Sheet, Demo Boards, Design and Layout Guide
- Magnetic-less Ethernet Backplane Application Note

Intel® Internet Exchange Architecture

Intel® Internet Exchange Architecture is an end-to-end family of high-performance, flexible and scalable hardware and software development building blocks designed to meet the growing performance requirements of today's networks. Based on programmable silicon and software building blocks, Intel® IXA solutions enable faster development, more cost-effective deployment and future upgradability of network and communications systems.

Intel Access

Developer's Site	http://developer.intel.com
Intel Internet Exchange Architecture Home Page	http://www.intel.com/IXA
Networking Components Home Page	http://developer.intel.com/design/network
Other Intel Support: Intel Literature Center	http://developer.intel.com/design/litcentr (800) 548-4725 7 a.m. to 7 p.m. CST (U.S. and Canada) International locations please contact your local sales office.
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Order Number: 249229-001 Printed in USA/0401/SB/CR