



ANX5808

DSP-based Long-Range Ethernet PHY

8-port 10/100 Mbps Capable of 1000 meters

FEATURES AND BENEFITS

8-port IEEE 802.3-compliant 10/100 PHY with 10x reach improvement

Long-range operation makes Ethernet viable as a triple-play access solution

Leveraging existing Ethernet equipment simplifies network and reduces OAMP costs

Operates on standard CAT 3, 5, 5e cable infrastructures found in multi-dwelling and multi-tenant buildings

Advanced analog+DSP architecture adds high-precision ADC, DFEs, and NEXT and echo cancellers

IEEE 802.3u auto negotiation support with extension for long-range operation

RMII, SMII, (DDR) SS-SMII interfaces for reduced pin-count

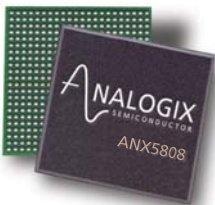
Power management modes with dissipation as low as 200 mW/port

Automatic MDI/MDIX crossover, integrated LED drivers, and virtual cable tester simplifies deployment

Manufactured on standard 0.18-micron CMOS process

Space-saving 17x17 mm BGA with 1-mm ball pitch

EXTENDING ETHERNET'S REACH: NEW APPLICATIONS, FURTHER DISTANCE



Ethernet is the most pervasive networking protocol with massive deployment within the enterprise and the home, but what about to those locations? Today, xDSL and cable technologies dominate the copper-connected first mile even though these protocols are converted

to Ethernet at their destination. Ethernet's high performance, low equipment cost, and ease of use would seem to make it an ideal end-to-end broadband access mechanism, if it were not for one problem: distance. In large multi-dwelling and multi-tenant buildings (MxUs), Ethernet has been restricted by its 100 meter distance limitation, which requires the installation of additional repeaters and switches and negates its inherent performance, cost, and operational benefits. Analogix removes these barriers with its ANX5808 long-range Ethernet (LRE) PHY, expanding Ethernet's market reach by extending the technology's reach to 1000 meters.

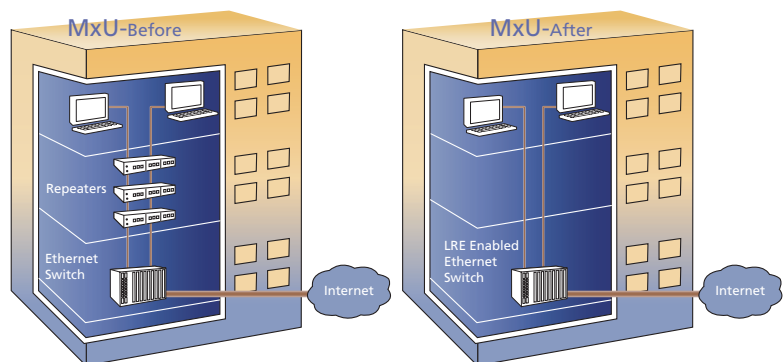
LRE ENABLES NEW APPLICATIONS FOR ENTERPRISE SWITCHES

Today's mid-range Ethernet switches are primarily deployed in enterprise and data center environments. Analogix ANX5808 LRE PHYs extend the application breadth of these switches without major redesigns. By simply replacing the existing 10/100 PHYs with LRE, system vendors have created

the same standard Ethernet switch, but now with extended reach. The 1 km distance transforms these Ethernet switches into broadband access switches for MxU deployment and extends their revenue generating capabilities. For service providers, these LRE systems dramatically reduce equipment and OAMP costs by simplifying their access infrastructure.

LRE AND FTTB: A PERFECT FIT FOR TRIPLE PLAY

Combining voice, video, and data on a single subscriber link is the ultimate broadband access application. Analogix LRE enables this triple-play service by providing the much needed bandwidth to customer in two ways. First, LRE is a viable end-to-end solution when the distance from the central office to the enterprise or home does not exceed 1 km. However, the most pervasive application is to use LRE in the second way - as a delivery mechanism within or between



LRE EXTENDS COPPER WITHIN BUILDING

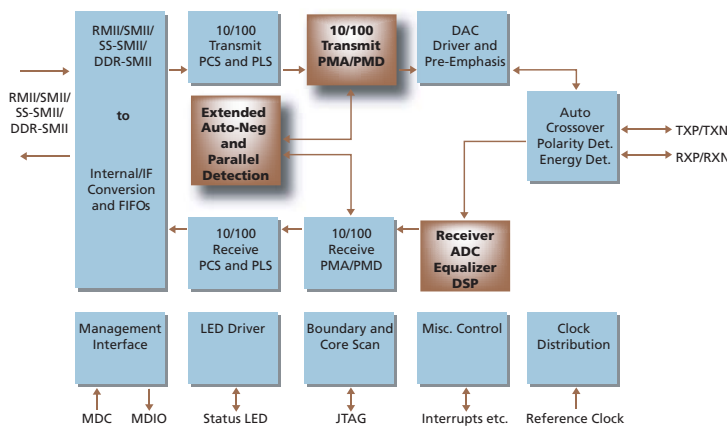
MxUs that already have “fat pipe” access. Fiber-to-the-building (FTTB) solutions, such as EPON, provide the most cost effective method of getting broadband to a building. Then, LRE can be used to deliver this bandwidth to tenants within an office or residential high-rise at the lowest possible cost using existing UTP cabling and without repeaters.

ANALOGIX LRE ENHANCES THE STANDARD

LRE devices are fully compatible with standard IEEE 802.3 10BASE-T/100BASE-TX/100BASE-FX Ethernet PHY chips, but, when used on both ends of a connection, dramatically increase the standard's reach on CAT 3 and CAT 5 cable to make native Ethernet a reality for broadband access deployment. The ANX5808 offers 8 independent 10/100 Mbps ports, supports IEEE 802.3u auto negotiation for automatic range, speed, and duplex selection, and offers low-pin count RMII and SMII parallel interfaces. The extended 1000 meter reach is achieved through the use of advanced analog and digital signal processing (DSP) techniques.

ADVANCED ANALOG+DSP ARCHITECTURE EXTENDS PERFORMANCE

The ANX5808 takes the analog+DSP architecture of third-generation Fast Ethernet PHYs to the next level, while still using a generic, low-power CMOS process. Two unique architecture elements - PAM4 transmit encoding and enhanced analog/DSP receiver functions - differentiate the



ADVANCED ANALOG + DSP ARCHITECTURE

LRE architecture from that used in typical Ethernet PHYs. LRE devices use standard Manchester encoding for 10-Mbps speeds and MLT-3 encoding for 100-Mbps, in addition to offering PAM4 encoding for long-range capabilities. PAM4 reduces fundamental frequencies and boosts pulse widths, lessening the “noise” issues that normally hinder longer-distance transmission.

On the receive side, LRE devices improve on two existing receiver functions and add two new ones. A higher-resolution analog-digital converter (ADC) generates a far more accurate digital mapping of the signal, and extra TAP filters added to the NEXT (near-end crosstalk) canceller improve adaptive crosstalk cancellation. The two new adaptive DSP elements in the receiver architecture are an LRE decision feedback equalizer, for more powerful equalization than feed forward equalization (FFE) alone can provide; and an LRE echo canceller, to reduce noise at the cable connector interface.

SEAMLESS EXTENDED AUTO NEGOTIATION

To support extended distances, Analogix LRE devices incorporate a superset of the IEEE 802.3u standard Ethernet auto-negotiation protocol for automatic selection of range, speed and duplex. This “blind adaptive” negotiation enables an LRE chip to know when its “link partner” across a transmission line is also an LRE chip, and automatically turn on PAM4 encoding and other DSP elements. Conversely, if the link partner is not another LRE, the device reverts to standard MLT-3 or Manchester encoding to maximize operational efficiency.

APPLICATIONS

The ANX5808 LRE PHY can be designed into standard Ethernet switches and transform these systems into efficient broadband access delivery platforms that:

- Provide broadband access within MTUs and MDUs
- Offer copper-based switch interconnect between MxUs
- Replace/augment xDSL and cable modem services
- Extend fat pipe delivery of FTTP solutions within MxUs
- Enable triple play services (including IPTV) over UTP cable

CONTACT ANALOGIX

For more information on the ANX5808, please contact Analogix or visit the web at www.analogix.com.

