

# An Extended-Range Ethernet and Clock Distribution Circuit for Distributed Sensor Networks

*Thursday, 29 September 2011 16:00 (2h 30m)*

This talk describes a high speed ethernet-based data and clock network for applications which require an array of multiple sensor nodes distributed over distances of up to 250 m from a central hub. Speeds of up to 100 Mbit/sec and clock skew at the level of 50 ps are achievable using commercially available network-grade twisted pair cables and low-power ethernet transceiver circuits. No fiber optic components are necessary. A specific application of this technology is presented: the ARA neutrino telescope located at the South Pole.

## Summary 500 words

The ARA group at the Université Libre de Bruxelles has been developing a system by which clock, data, and power may be distributed via twisted pair CAT5E/CAT6 networking cables of length up to 250 m. The intended target of this technology development is the remote ARA station which incorporates 16 antennas deployed up to 200 m deep in the ice. While the system currently uses RF analog optical signal transmission, in the future the group is interested to reduce cost, power, and deployment complexity by moving the digitizer local to the antenna system. This requires a digital data link capable of transmitting antenna triggers firing in excess of 1 MHz and clock synchronization between the various down-hole digitizers to a precision of 50 ps in order to cross-correlate captured waveforms from the array of antennas. We achieve these goals using a circuit built from COTS components.

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