

Sunti Pahsoog 2011: Design and Implementation of a Data Transceiver via Visible Light Beam. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Assistant Professor Wachira Chongburee, Ph.D. 91 pages.

This research presents a design and implementation of a point to point data transceiver via visible light beam for 10Base-T, a standard of Ethernet transmission links. It is aimed to be used in the situations that cable wiring and radio interfering are the problems. The designed equipment consists of a transmitter and a receiver. The transmitter converts the electrical signal to a light signal by using either a light emitting diode or a 5 mW laser pointer. The receiver converts light signal back to an electrical signal by a PIN photodiode. Then the signal is amplified by a differential amplifier and reshaped to a rectangular waveform by a differentiator amplifier. The receiver also resolves the problem that the burst Ethernet waveform contains inconsistent DC component by changing it to a polar waveform to maintain the DC level before passing to the Schmitt trigger, a pulse regenerating circuit. The experimental results show that the receiving system works with acceptable errors when the received light intensity is in range of 15-200 lux. The system completely fails when the received light intensity is less than 10 lux or greater than 800 lux. In a workable operating environment, the speed test results for Internet traffic are 6,846 kbps downlink and 7,388 kbps uplink. The packet loss tested by using the Ping command shows that at a distance of about 360 meters, the packet loss in an Ethernet network are 4 out of a total of 2,350 packets tested, or 0.17%

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Thesis Advisor's signature

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