

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 the 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