



# Underwater Communication Using Li-Fi Technology

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## Abstract:

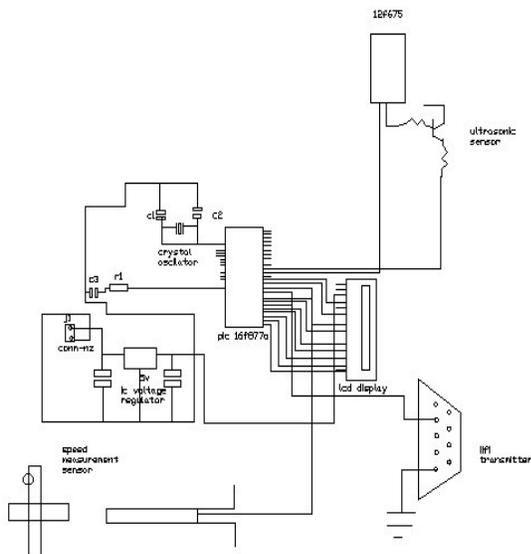
Nowadays, there is extensive ongoing research activity relating to underwater communications and underwater sensor networks. On one hand, the main research lines are based on increasing the distance and bandwidth, and, on the other hand, the attempt to reduce the energy consumption of underwater devices, with the aim of increasing the network lifetime. The proposed system underwater communication system using Li Fi technology which provides protection against ship collisions on the sea. Li Fi (Light Fidelity) is an emerging technology which uses the visible light spectrum for communication. This project focuses on the safety on sea in which the headlights, which consists of LEDs acting as transmitter, communicate with photo sensors acting as receiver. White LEDs used in the head and tail lights can effectively be used for short range communication with the photo detectors. The application is cost effective as LEDs are cheap and simple algorithms are proposed for signal generation and transmission.

**Keywords:** Li-Fi, PIC, Transmitter, Receiver

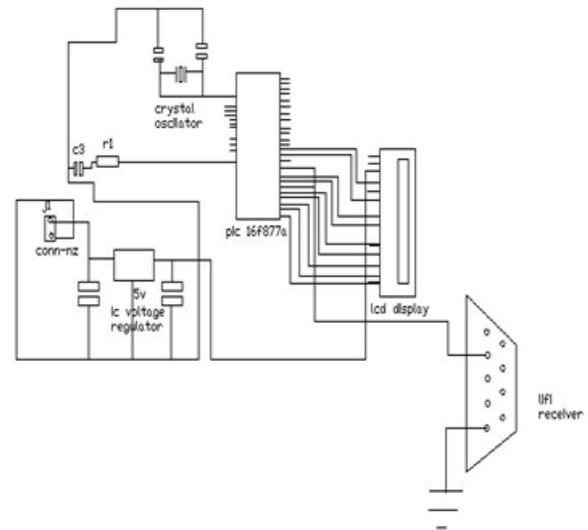
## 1. INTRODUCTION:

The term Li-Fi was coined by Professor Harald Haas, and refers to light based communications technology that delivers a high-speed, bidirectional networked, mobile communications in a similar manner as Wi-Fi. Although Li-Fi can be used to off-load data from existing Wi-Fi networks, implementations may be used to provide capacity for the greater downlink demand such that existing wireless or wired network infrastructure may be used in a complementary fashion.

## 2. CIRCUIT DIAGRAM:



Circuit Diagram of Transmitter



Circuit Diagram of Receiver

## 3. DESCRIPTION:

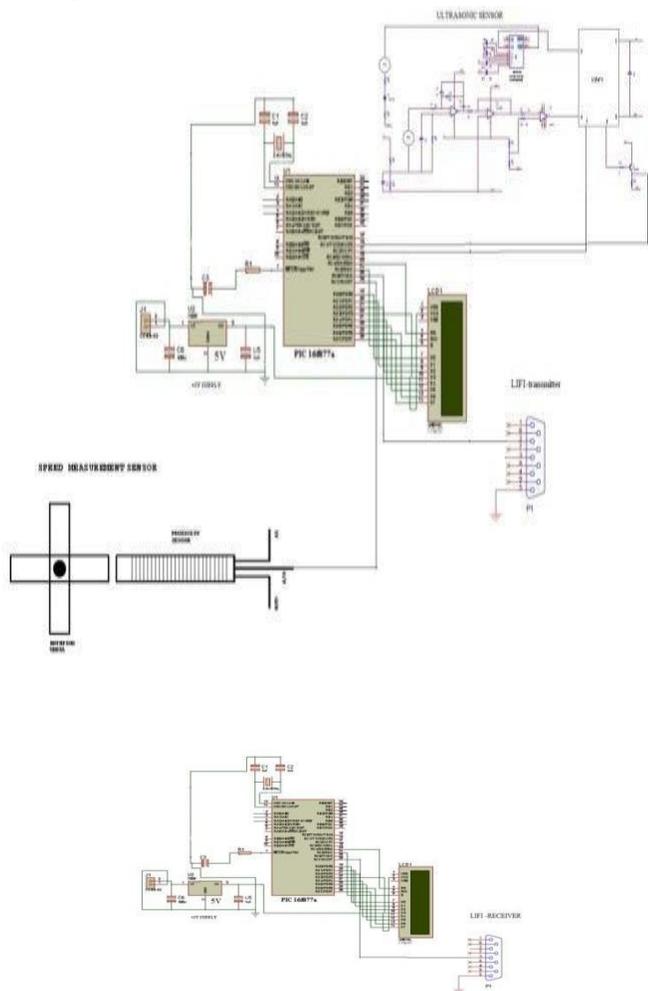
Li-Fi is the use of the visible light portion of the electromagnetic spectrum to transmit information at very high speeds. This is in contrast to established forms of wireless communication such as Wi-Fi which use traditional radio frequency (RF) signals to transmit data.

With Li-Fi, data is transmitted by modulating the intensity of the light, which is then received by a photo-sensitive detector, and the light signal is demodulated into electronic form. This modulation is performed in such a way that it is not perceptible to the human eye.

Li-Fi is a category of Optical Wireless Communications (OWC). OWC includes infra-red and ultraviolet communications as well as visible light. However, Li-Fi is unique in that the same visible light energy used for illumination may also be used for communication.

#### 4. RESULT:

[3] N. M. Husain Fidvi, "Car to Car Communication System," source: car communication system.



Circuit Diagram of Receiver

#### 5. CONCLUSION:

The concept of Li-Fi had been introduced along with existing techniques and classical trends used for vehicle to vehicle communications. As this project aims to propose a cost effective solution to reduce accidents in Oman, the design guidelines and details of system components were thoroughly explored. Due to unavailability of all system components, proof of concept has been illustrated in this paper by sending data through Li-Fi small- scale prototype. Both numerical simulations and experimental work were presented and results agree well.

#### 6. REFERENCES:

[1] W.-L. Jin, "SPIVC: A Smartphone- based inter-vehicle communication system," Proceedings of Transportation Research Board Annual Meeting, 2012.

[2] A. Boukerche et al., "Vehicular Ad Hoc Networks: a new challenge for localization- based systems," Computer Communications, Science Direct, 2008, pp. 1-12.