LI-FI

Table of Contents

Overview

At the heart of this technology, a new generation of high-brightness light-emitting diodes. Very simply, if the LED is ON, user can transmit a digital string of 1, if it's OFF then user can transmit a string of 0. It can be switched ON and OFF very quickly, which gives instant opportunity for transmitting data. It is possible to encode data in the light by varying the rate at which the LEDs flicker ON and OFF to pass different strings of 1s and 0s. The modulation is so fast that the human eye doesn't notice. There are over 14 billion light bulbs used across the world, which needs to be replaced with LEDs ones that transmit data.

Visible Light Communication

Communication system components are:

1. A high brightness white LED which act as a communication source.
2. Silicon photo diode which shows good response to visible wavelength region.

LED illumination can be used as a communication source by modulating the LED light with the data signal. The LED light appears to be continuous to the human eye due to the fast flickering rate. The high data rate can be achieved by using a high speed LED's and appropriate multiplexing technique. Each LED transmits at different data rate which can be increased by parallel data transmission using LED arrays.

What is LI-FI??????

VLC represents only a fraction of what appears to be a much larger movement towards optical wireless technologies in general. This larger world has been dubbed 'Li-Fi' (Light Fidelity) by people such as Dr Harald Haas of Edinburgh University and organizations such as the Li-Fi Consortium.

Li-Fi is transmission of data through illumination of the LED by taking the fiber out of the fiber optics by sending data through the LED light bulb that varies in intensity faster than the human eye can follow.

The LED blubs will hold a micro-chip that will do the job of processing the data.

The light intensity can be manipulated to send the data by tiny changes in the amplitude.

This technology uses visible spectrum of light, a part of the electromagnetic spectrum that is still not greatly utilized.

In fact this technology transfers thousands of streams of data simultaneously in parallel in higher speed with the help of the special modulation using a unique signal processing technology.

The light used to transmit the data is called D-light by herald hass, the inventor of LiFi.

Features

- Transmit data serially at 38400 baud rate
- Distance of 1 feet to 10 feet can be achieved
- low power requirement
- no effect on human health
- highly secure compared to Wi-Fi
- high data density because visible light can be well contained

Application

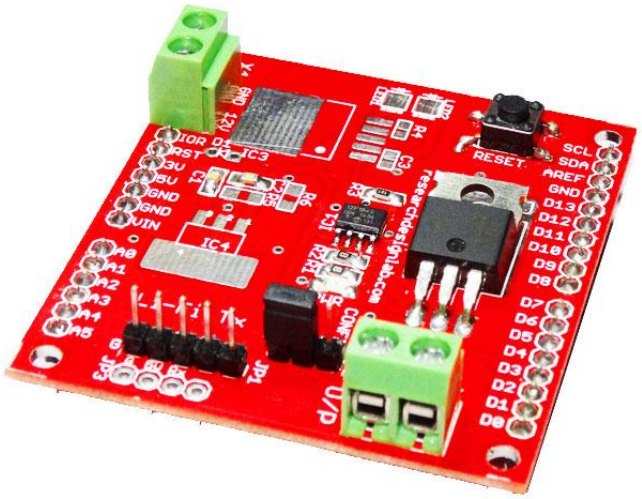
- Indoor wireless open optical communication.
- Indoor navigation.
- Under water visible light communication.
- Smart indoor blind assistive application.
- Vehicle to vehicle communication.
- Depends on the LED power.

Li-Fi Tx side

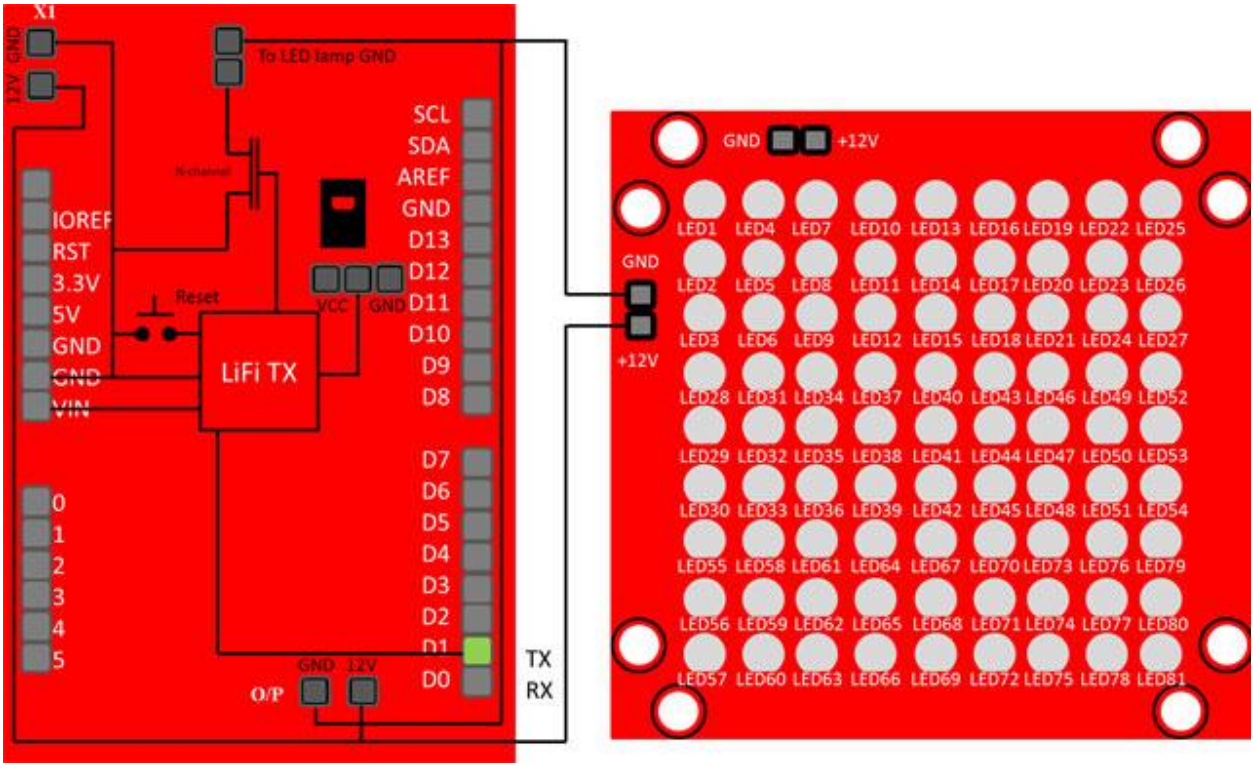
• The Tx side will transmit the data.

• It is connected to arrays of led through which data is transferred.

• This data will be received by the receiving side(Rx) side .

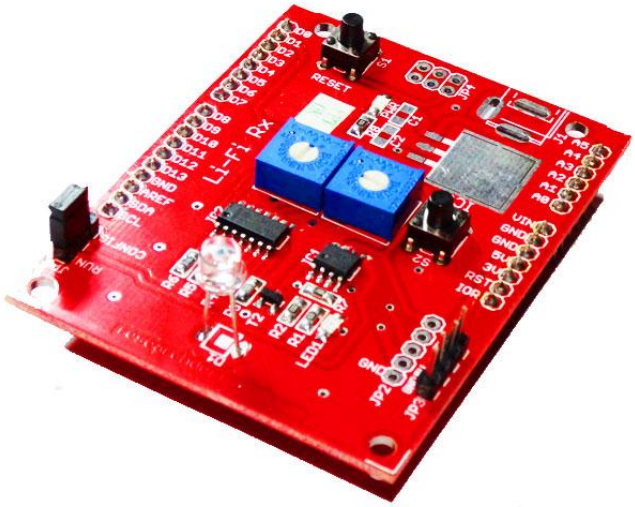


Connection with LED Panel

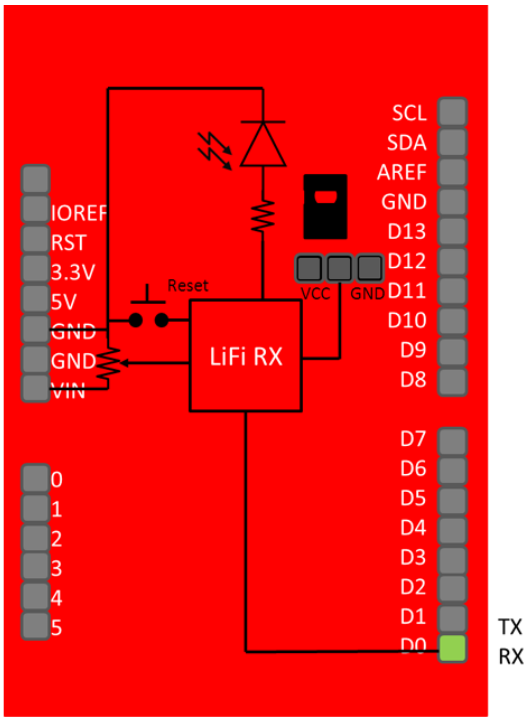


Li-Fi Rx side

- **The receiver side will receive the data that is transmitted through the led panel**
- **This led can be displayed to the HyperTerminal of the Pc by connecting a serial uart**

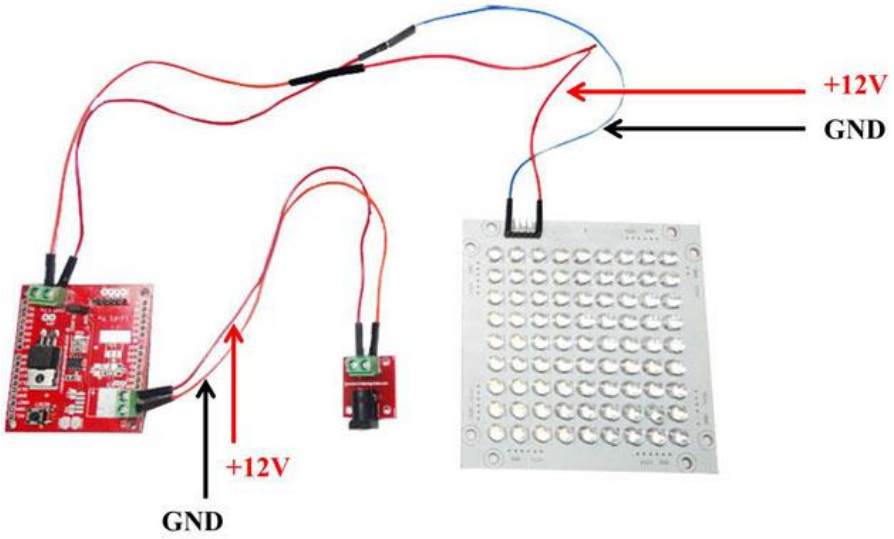


Block Diagram

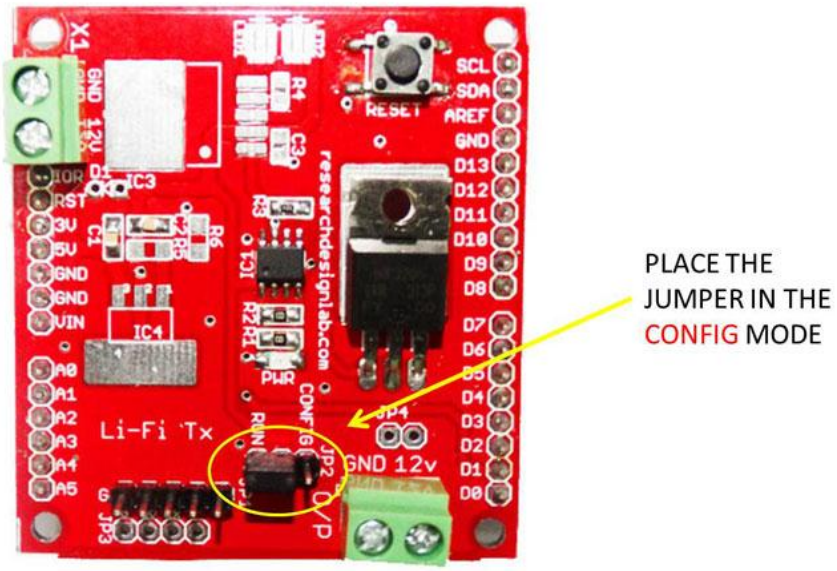


Experimental Setup

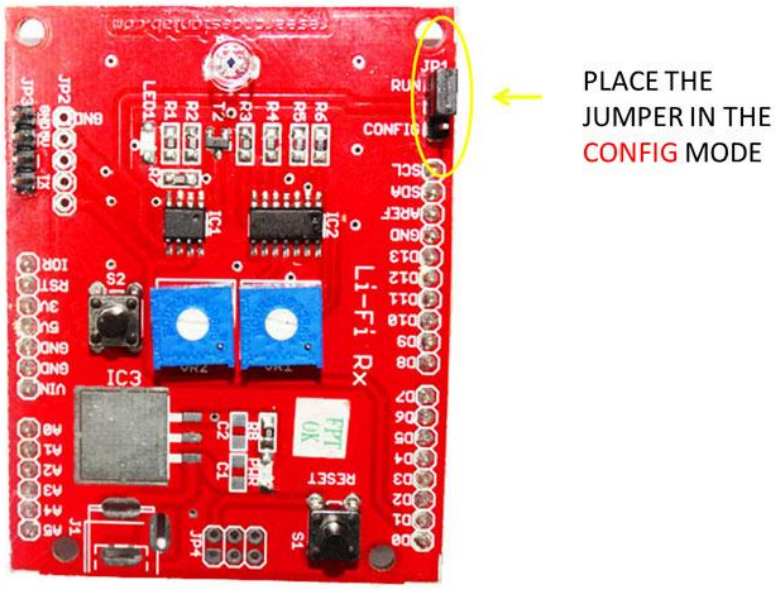
- **Make the required connection as show n in the pic**



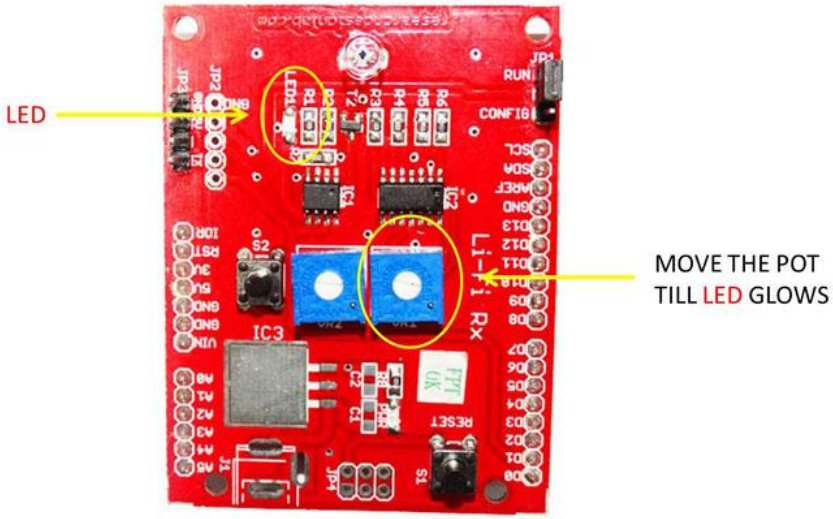
- **Place the jumper in the configure mode**



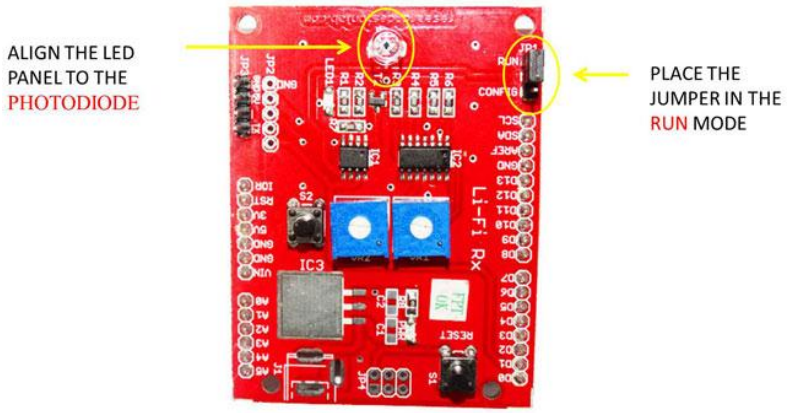
- **For the receiver section also place it in config mode**



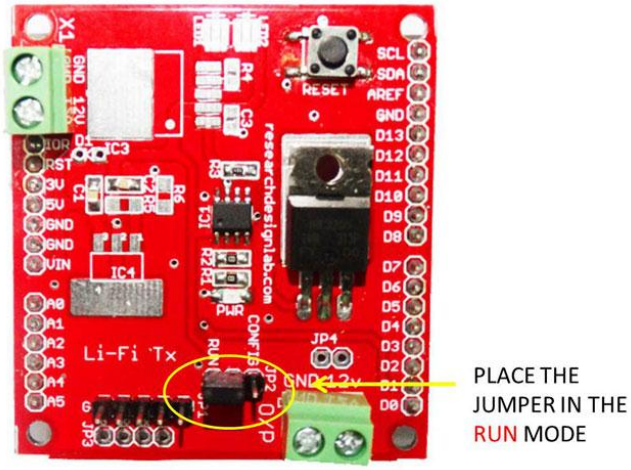
- **Once both the jumper are in the configure mode place the led panel aligned to the receiver at the same time move the pot of the receiver till you see the led glowing on once the led glows means that the led panel is configured for that distance and angel**



- **Now keep that led panel steady at that same place and change the jumper from configure to run mode**



In receiver side



In transmitter side

CODE

(set baud rate to 38400)

LI-FI CODE TX

http://researchdesignlab.com/module-code-lifitx

Li-Fi CODE RX

http://researchdesignlab.com/li-fi-arduino-code.html