



Article Title: Infrared Led Based Wireless Audio Transmitter and Receiver

Infrared Led Based Wireless Audio Transmitter and Receiver

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ABSTRACT

The Wireless Audio Transmitter and Receiver presented in this paper are IR-based. The main technologies used in the technically advanced field of wireless audio are RF communications and Bluetooth (though extreme marketable audio tools acts with Bluetooth). Scheming the basic circuit for an IR Audio Link would be a nice learning experience for wireless audio transfer but would not be advantageous in comparison to the current technologies. Because IR is line-of-sight message instead of Bluetooth, it is not advantageous. i.e. without any obstacles both the receiver and transmitter must always face one other. Furthermore, the range could not be as extensive as a regular Audio via Bluetooth wireless. None the less, using easily available components let me create a basic IR audio link circuit for the purpose of understanding.

1. Introduction

Li-Fi technology is founded on the principle of Visible Light Communication that offers wireless internet communications at an extremely high speed without radiation. Li-Fi implants the data in the light beams, hence, when a light bulb is in on state it discharges pulses of light and inside those pulses, data can move to the receivers. In short ranges data-heavy communication is provided. It can be called a green technology since it does not pollute.

2. Literature Review

We have already discussed the basic IR Receiver and Transmitter circuit, which is the furthestmost often utilised wireless data transfer method for close distances. This circuit should allow you to play music through an AUX cable to an exterior speaker from your computer, mobile device or iPod without having to connect them directly. The circuit has numerous limits and there are improved ways to play music wirelessly, like Bluetooth, so this post mainly seeks to support you understand simple audio circuits and have fun making them. Also, to mark the build at ease the circuit of this project is easy as much as likely to keep things modest and steady.

3. Working principle

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We will have two separate circuits, according to the circuit's theoretical base. First is the receiver circuit and the another is the transmitter circuit, to play the songs, a speaker will be linked to the receiving circuit and for the transmitter circuit the 3.5mm Audio jack will be used as the audio input. An IR LED is used to send the audio signal from the transmitter circuit; a photodiode will then be used to receive the IR signals, which is present on the receiver circuit. Due to the photodiode's inability to establish an audio signal, it will first be improved by an LM386 amplifier before being played on a speaker. When the button is pressed, the signal selected by the photodiode is transmitted by the IR led, which is similar to the working of a TV remote. In this case, the receiver is a straightforward photodiode and the signal carried is an audio signal. Usual LEDs and solar panels can both be used using this strategy. Li-Fi technology and this approach are extremely similar.

4. Components required

- An IR LED (2 Nos)
- 3.5mm Audio Jack
- LM386 IC
- Photo diodes
- 100K POT
- Capacitors (0.1uF, 10uF, 22uF)
- Resistors (1k, 10k, 100k)

5. Circuit Diagram

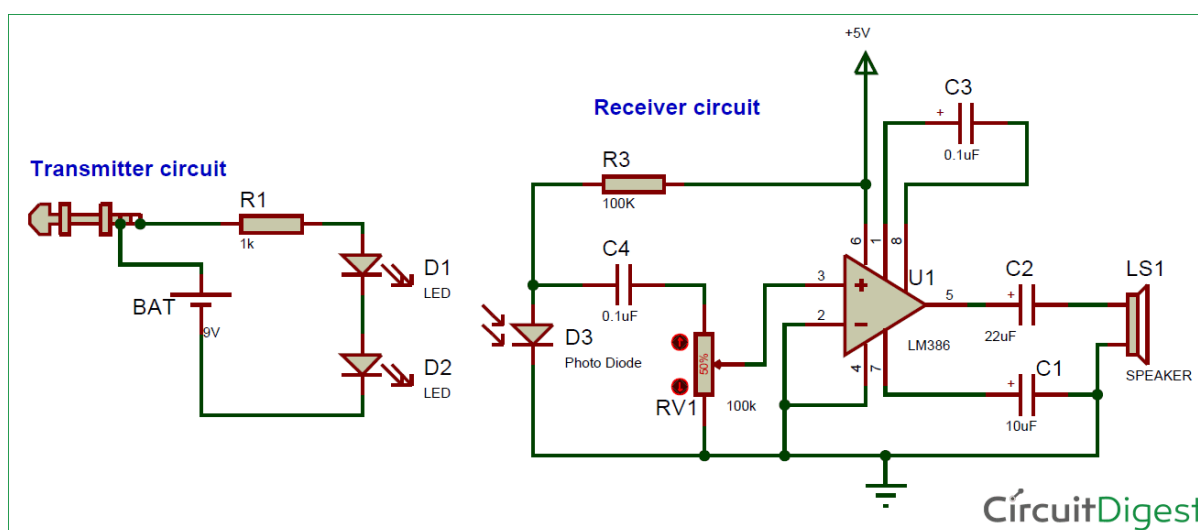


Figure 1: Block Diagram

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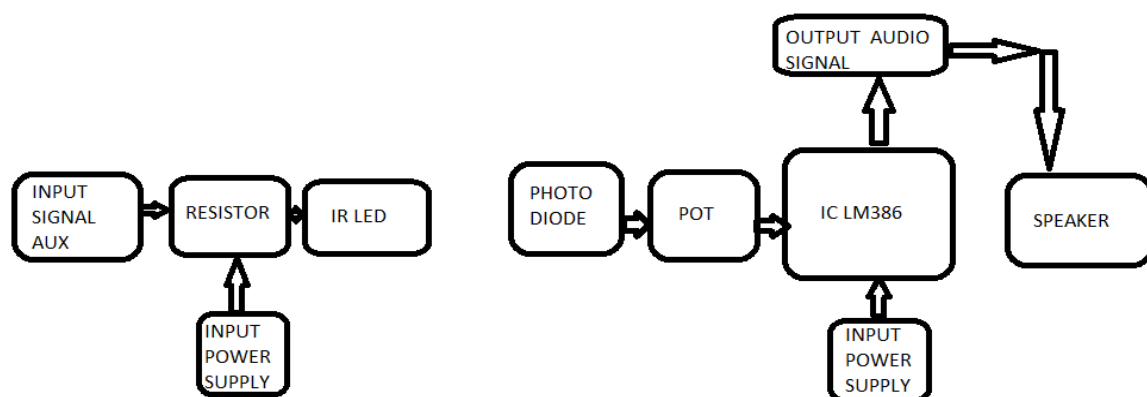
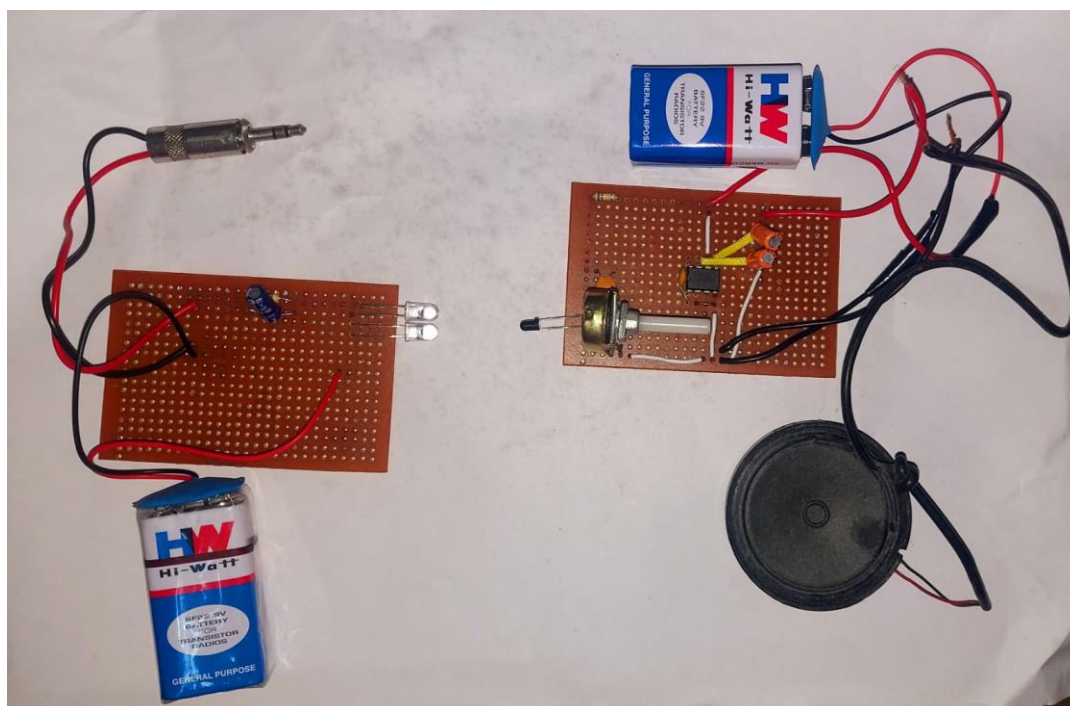


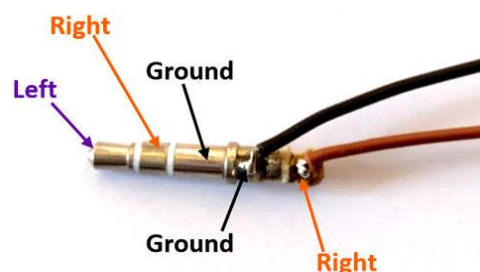
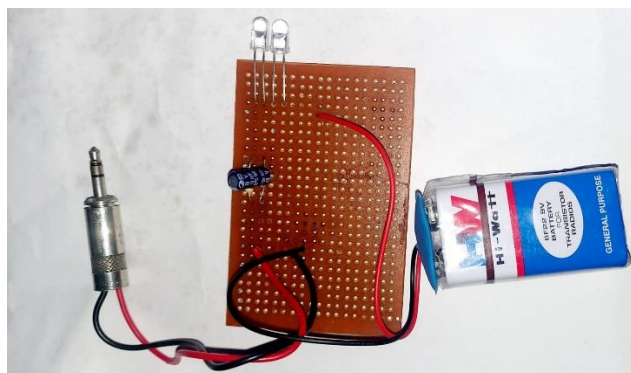
Figure 2: Circuit Image



6. Transmitted Circuit

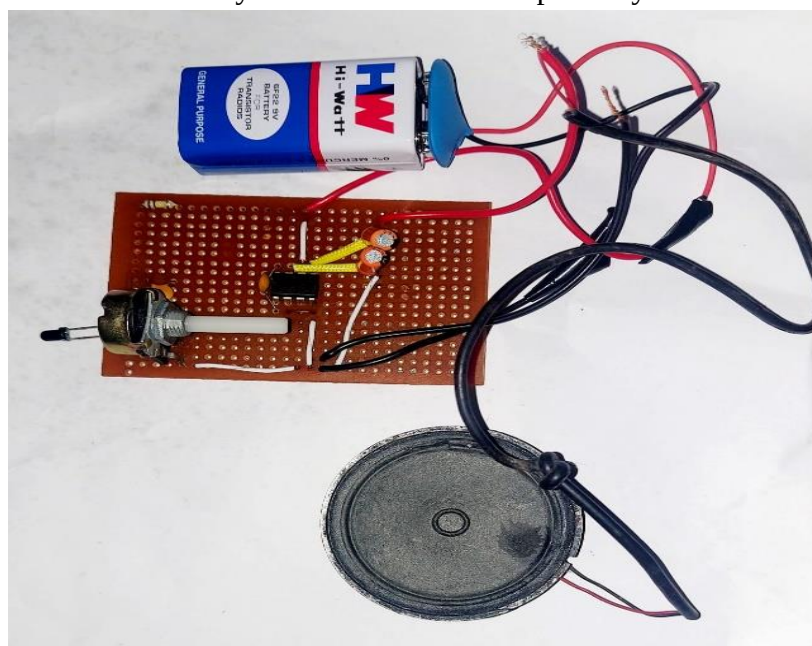
A resistor and a few IR LEDs linked straight to the battery and audio source make up the entire transmitter circuit. Relating the audio jack to the circuit is one challenging area where you could experience difficulties. Three output pins make up a typical audio jack: the shield, which serves as ground, and the two pins for the left and right earphones. For our circuit, we require one ground pin and one signal pin, which can be either leftward or rightward. In connection, a multi meter can be used to identify the proper pin outs.

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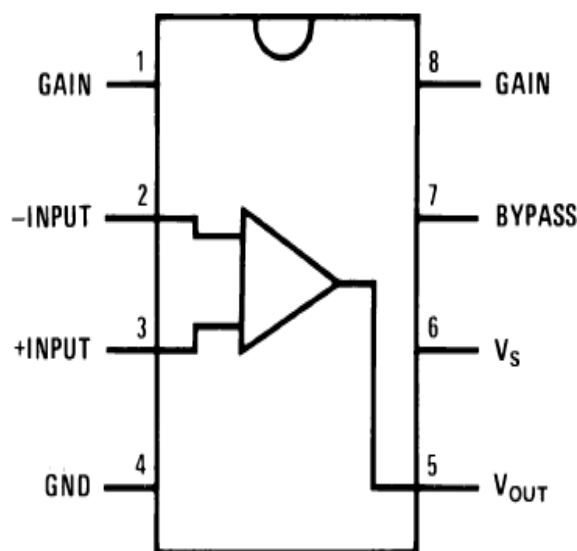


7. Receiver Circuit

A photodiode and an audio amplifier circuit are coupled in the receiver circuit. The advantage of this circuit is that it only requires a small number of components, as it is constructed using Texas Instruments' well-known LM386 IC. This circuit can also run on a voltage between 5 and 12 volts; I supplied the circuit with +5 volts using my breadboard regulator module, but you could also use a 9 volt battery. The bread board setup for my transmitter



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LM386 Pin Diagram

PIN 1 and 8: The gain is 20 internally, but may be improved to 200 by adding a capacitor between PINs 1 and 8. We selected 10uF **capacitor C3**, i.e. 200, for the highest gain. Gain can be changed from 20 to 200 by utilising the correct capacitors.

Pin 2 and 3: The sound signal input PINs are these. The negative input terminal that is grounded is pin 2. To improve the sound, it is sent into Pin 3's positive input terminal. It is linked to the positive terminal of the condenser mic in our circuit using a **100k potentiometer RV1**. A potentiometer controls the loudness.

Pin 4 and 6: These are the IC's power source pins; pin 4 is for +Vcc and pin 6 is for ground. Voltage between 5 and 12 volts can power the circuit.

Pin 5: We obtain the amplified sound signal from this output PIN. To filter DC coupled noise, a capacitor C2 is used to link it to the speaker.

Pin 7: The bypass pin is located here. For stability, it can be left open or grounded with the use of a capacitor.

8. Applications and Uses

- It is generally use in Remote controlling operations
- It likewise uses in Data transfer
- Moreover, this circuit can be used in Several Security applications
- Similarly, the Distance measuring devices are the second most common device of this cirucuit.



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- It likewise uses in Proximity sensors

9. Conclusion

- In the near future, LI-FI will further integrate technology into our daily life.
- With the power of light, it may make our environment a more pleasant place to live in terms of cleanliness, safety, and brightness.
- Environmentally and economically friendly, Li-Fi technology. It has fewer components than radio technology and only needs visible light to send data.

References

1. Chauhannaman : “ IR Based Wireless Audio Transmitter And Receiver” 2018.
2. Harald Haas : “ LiFi technology” in 2011.
3. Aswinth Raj : “IR Based Wireless Audio Transmitter And Receiver” 2018.
4. Lijo George : “ IR Transmitter and Receiver using 555” 2019.
5. Shaguffa Shahjahan : “IR Transmitter and Receiver” 2017.

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