PC TO PC INFRARED COMMUNICATION

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ABSTRACT

The setup used in base of free space communication. In which communication between two PC's is established using laser light. IC max-232 is used. IR diodes are used for short distance communication between 2-3 m. The distance could be further increase up to 100m by using laser diodes. Laser pointers available commonly are used as the laser module in the setup which has about 3 mw power as output. Laser beam from one module is made to point towards the photo diode of the other module which is connected with the personal computer and vice versa. Software module is written using c language to perform this process. His c codes are used in chatting and data transfer between nodes when line of sight must exist.

Keywords: *C Programming, Serial Port, MAX232 IC, Optical Transmitter, Infrared Diodes, Optical Receiver*

I. INTRODUCTION-

In 1930 transmission of data using modulated laser light was used in televisions for military applications. Invention of laser lights increased the data transfer rate as well as the source detector distance. Primary aspect during the first satellite launch was to have stable transmission of data between ground stations and satellites."Airborne flight test system (AFTS)" was developed by McDonnell Douglas in the year 1970; this system allowed unidirectional data transmission with data rate up to 1 g bit/s a distance of up to 60 miles. To insure secure data transfer at high data rate, optical data transmission has key benefits than RF technology.

In 1960 laser of radiation was developed by Theodore Maiman at Hughes laboratory. First people to publish their findings on laser and also to apply for patent physicists Charles H.Townes and his brother-in-law Arthur Schawlow. During the year 1968, He-Ne laser (red beam) was commercially used .Recently, wide range of lasers is available to perform various applications.

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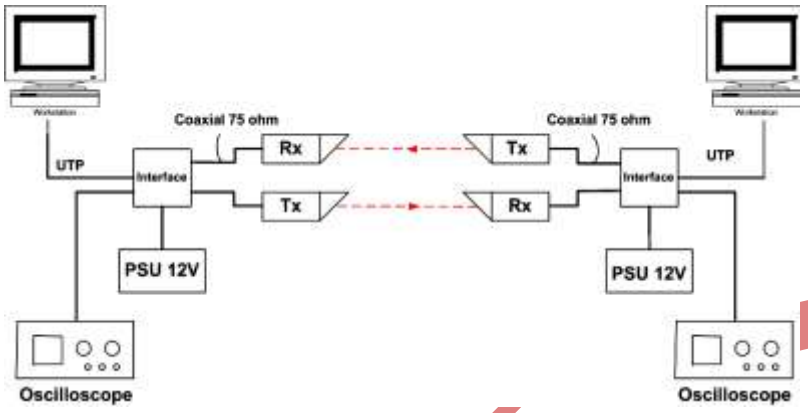
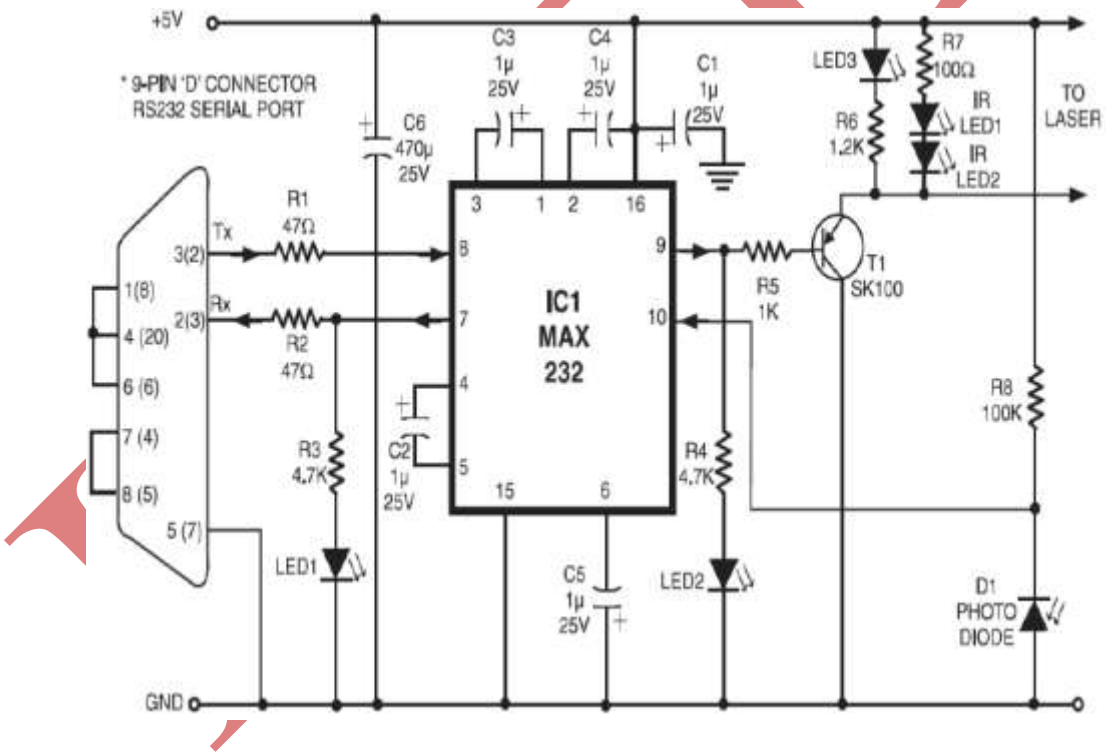
II. BLOCK DIAGRAM



III. CIRCUIT DIAGRAM



TRANSMITTER

Data signals are transmitted through pin 3 of '9' pin 'd' connector of RS-232 COM ports are sent to pin 8 of MAX232 IC which converts these EIA RS-232c compatible levels of +/- 9 volt to 0/5 volt TTL levels. Output pin 9 of MAX232 IC drives the p-n-p transistor SK100 and powers IR LEDs. The output pin 9 also drives an LED indicator (LED2) during

the positive output at its pin 9. At logic 0 output at pin 9, LED2 goes off, but drives the p-n-p transistor through a bias register of 1 kilo ohm (R5), to switch 'on' IR LED1 and IR LED2 and also a visible LED3. Since very low drive current is used, use of high-efficiency visible LEDs, which light up at 1 mA, is needed. The electrical pulses sent by the COM port are now converted into corresponding modulated pulses of IR light.

RECIEVER

The IR signals are detected by photodiode (D1). (A photodiode is reversing biased and breaks down when IR light falls on its junction.)The detected TTL level(0/5 v) signals are coupled to pin 10 of MAX232 IC .These TTL levels converted to +9 V and -9 V levels internally and output at pin 7.

A visible LED1 at pin 7 of MAX232 IC indicates that the signals are being received .Pin 7 is also connected to pin 2(receiver pin) of 9 pin (or pin 3 of 25-pin) 'D' connector is used for serial port in the PC, so that the data may be read. The optical signals received by the photodiodes are infact converted to electrical pulses and both PCs 'think' that is a null modem cable connected between them.

IV. OPERATION PRINCIPLE

A photodiode is a p-n junction p-i-n structure .When light with sufficient photon energy strikes a semiconductor; photon can be absorbed, resulting in generation of a mobile electron and electron hole. If the absorption occurs in the junction's depletion region, these carriers swept from the junction by the built-in field of the depletion region, producing a photocurrent. Photodiodes can be used in either 0 biases or reverse bias. In 0 bias ,light falling on the diode causes a voltage to develop across the device ,leading to a current in the forward bias direction .this is called photovoltaic effect ,and is the basis for solar cells – in fact a solar cell is just a large number of big, cheap photodiodes. Diodes usually have extremely high resistance when reversed biased. this resistance is reduced when light of an appropriate frequency shines on the junction. Hence, a reverse biased diode can be used as a detector by monitoring the current running through it. Circuits based on this effect are more sensitive to light than ones based on the photovoltaic effect. Avalanche photodiode have a similar structure; however they are operated with much higher reverse bias. This allows each – generated carrier to be multiplied by avalanche breakdown, device.

V. ADVANTAGES-

1. Operates at high speed.

2. Large carrying capacity.

3. Signal can be transmitted further without needing to be strengthened.

4. Its cost much less to maintain**.**

VI. CONCLUSION

A full-duplex 10 Mbps free-space optical transceiver complying with IEEE802.3 standards for Ethernet networking has been implemented and is successfully tested for a distance of about 300meters.Empoyingeasy-to-find components and is

manufacturing cost makes this system more accessible and applicable for people including hobbyists, experimenters, academics, or serious investors. Future work can also include the development of low-cost transceiver that could handle fast or gigabit Ethernet link with longer link rang, due to constant demand for high-bandwidth communication.

VII. ACKNOWLEDGEMENT

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