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IR WIRELESS UNDERWATER COMMUNICATION SYSTEM

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ABSTRACT

Underwater wireless communications system comprising first and second communications modules which transmit and receive data utilizing infrared radiation. Each module has a transmitter/receiver which converts each received data. The infrared light detecting unit then provides a logic zero at its output when it receives a pulsed burst of infrared radiation for time period of approximately six hundred microseconds and a logic one when the unit fails to detect a pulsed burst of infrared radiation for a time period of six hundred microseconds, Wireless infrared (IR) communication system is meant to use free space propagation of light waves as a transmission medium in near infrared band. Message communication is implemented by using IR as a source that is established a light communication (link to transmit and receive data via infrared light). The outcome of this proposed work is to design and implementation an optical wireless system to transmit data over a certain distance. This system has many advantages such as is an inexpensive and the transmitter or receiver can be showed to another location with least distraction. This system is used for easy communication with transmitter and receiver in underground water. if they need any help means the transmit the signal using IR transmitter remote the signal transfer to IR receiver circuit. So thus, why they can easily identify the information.

1.INTRODUCTION

1.1 Introduction

Wireless communication allows information to be transmitted between two devices without using wire or cable. The data is being transmitted and received using electromagnetic radiation, the electromagnetic spectrum orders electromagnetic energy according to wavelength or frequency, the electromagnetic spectrum ranged from energy waves having Extremely Low Frequency (ELF) to energy waves having much higher frequency, e.g., x- rays. Infrared is an electromagnetic radiation has a wavelength longer than that of visible light but shorter than radio waves and has wavelength between (750 nm-1mm) Infrared LEDES are classified into Near Infrared (NIR) and Far Infrared (FIR). In this project (NIR) is our interest, it is divided into two bands the long wave and short wave (NIR), So the used part of the infrared spectrum in laser communication system is divided into various bands based on the type of the light sources, transmitting\absorbing materials(fibers) and detectors. IR communication system consists of three main parts transmitter circuit, medium propagation (IR) and receiver circuit. In this project, short distance transmission of signal is realized by the design and achievement of infrared communication link.

1.2 Block Diagram

 <p>(Enriching the Research)</p>	Open Access Research Article
	Volume: 23 Issue: 06
	May, 2023

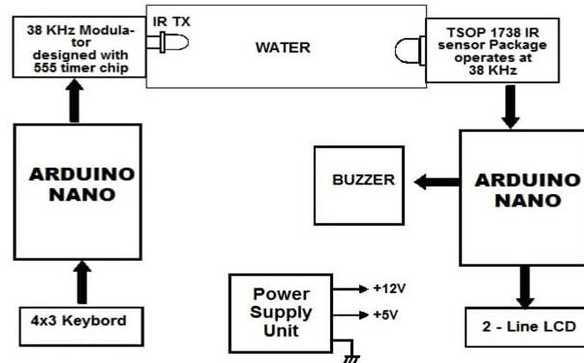


Fig 1.1 Block diagram

II. DESIGN OF HARDWARE

This chapter briefly explains about the Hardware. It discusses the circuit diagram of each module in detail.

ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Arduino board has the following new features:

- 1.0 pin out: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes.
- Stronger RESET circuit.
- Atmega 16U2 replace the 8U2.

"Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.



Fig: ARDUINO UNO

	Open Access Research Article
	Volume: 23 Issue: 06
	May, 2023

POWER SUPPLY:

The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can be broken down into a series of blocks, each of which performs a particular function. A d.c power supply which maintains the output voltage constant irrespective of a.c mains fluctuations or load variations is known as “Regulated D.C Power Supply”.

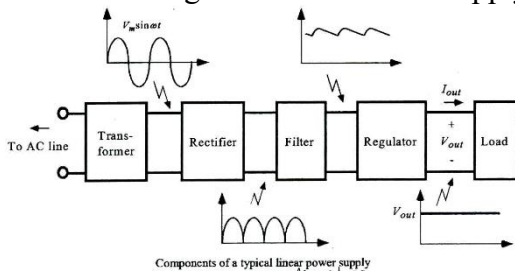


Fig: Block Diagram of Power Supply

LCD DISPLAY

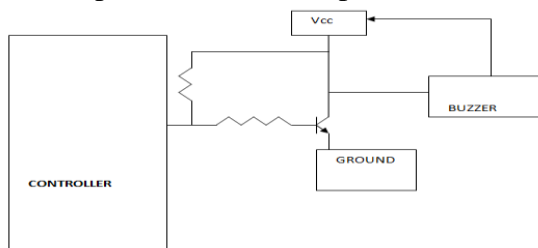
A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.



Fig: LCD

BUZZER

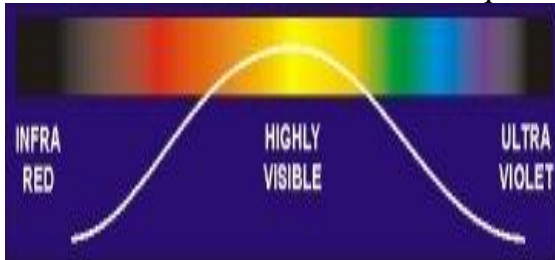
Digital systems and microcontroller pins lack sufficient current to drive the circuits like relays, buzzer circuits etc. While these circuits require around 10milli amps to be operated, the microcontroller’s pin can provide a maximum of 1-2milli amps current. For this reason, a driver such as a power transistor is placed in between the microcontroller and the buzzer circuit.



	Open Access Research Article
	Volume: 23 Issue: 06
	May, 2023

IR SENSOR

Infrared is a energy radiation with a frequency below our eyes sensitivity, so we cannot see it Even that we can not "see" sound frequencies, we know that it exist, we can listen them.



Even that we can not see or hear infrared, we can feel it at our skin temperature sensors. When you approach your hand to fire or warm element, you will "feel" the heat, but you can't see it. You can see the fire because it emits other types of radiation, visible to your eyes, but it also emits lots of infrared that you can only feel in your skin.

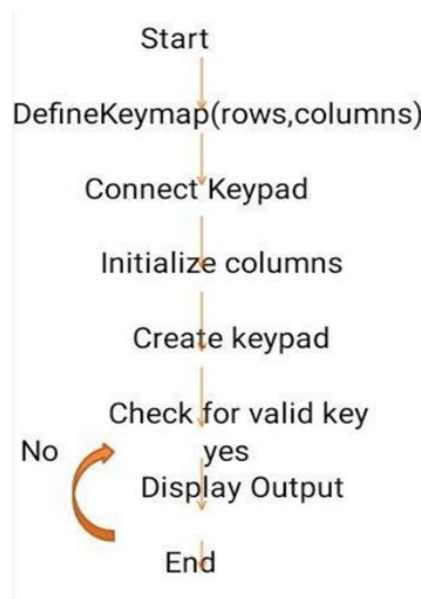
INFRARED IN ELECTRONICS

Infra-Red is interesting, because it is easily generated and doesn't suffer electromagnetic interference, so it is nicely used to communication and control, but it is not perfect, some other light emissions could contains infrared as well, and that can interfere in this communication. The sun is an example, since it emits a wide spectrum or radiation.

The adventure of using lots of infra-red in TV/VCR remote controls and other applications, brought infra-red diodes (emitter and receivers) at very low cost at the market.

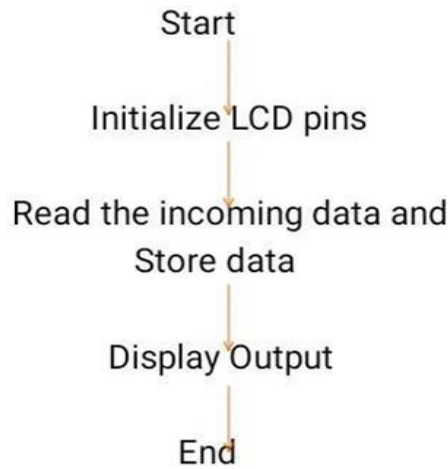
From now on you should think as infrared as just a "red" light. This light can means something to the receiver, the "on or off" radiation can transmit different meanings. Lots of things can generate infrared, anything that radiate heat do it, including out body, lamps, stove, oven, friction your hands together, even the hot water at the faucet.

**III. FLOW CHART:
TRANSMITTER**



 <p>(Enriching the Research)</p>	Open Access Research Article
	Volume: 23 Issue: 06
	May, 2023

RECEIVER:



IV.CIRCUIT DIAGRAM AND RESULT
CIRCUIT DIAGRAM

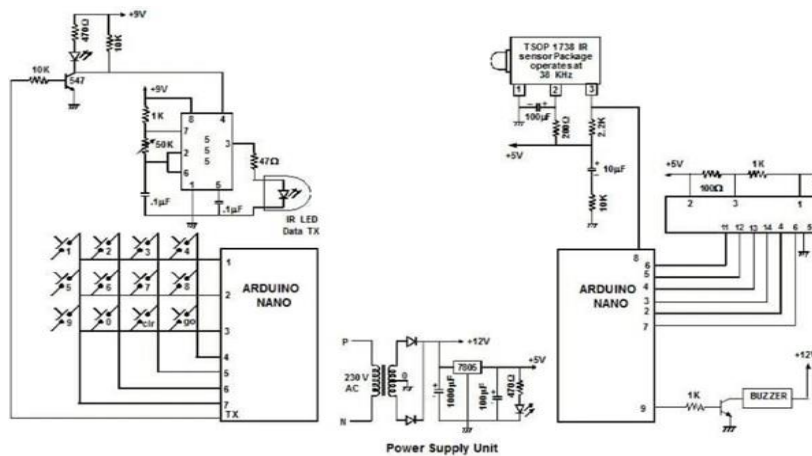


Fig : Circuit diagram

RESULT

Without power supply:

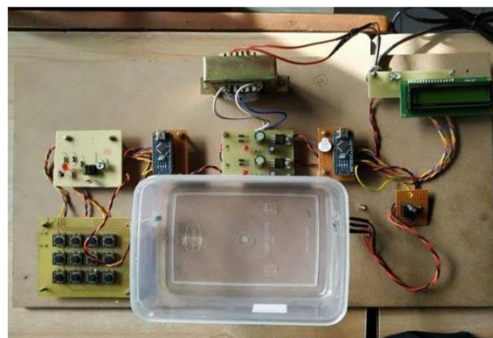


Fig: Before power supply

This project is focusing on transmitting data from the transmitter end to the receiver end using the infrared transmitter equipment in underwater this design is called it wireless underwater communication system. The designing in this project devoted on the development of the conventional infrared radiation communicating by increasing the transmission distance and the effective signal coverage region, likewise, this system has unique advantages such as minimal

	Open Access Research Article
	Volume: 23 Issue: 06
	May, 2023

effort with low cost, high speed communication. So, this system can be easy and fast communication with underground water.

With power supply :

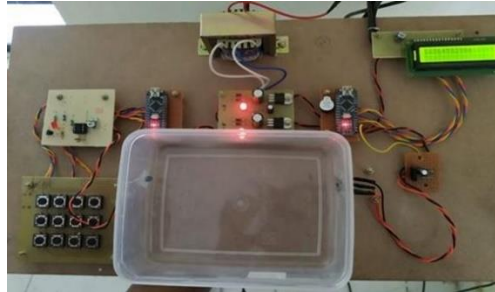


Fig 5.3:After power supply

ADVANTAGES

- IR transmission can operate with a very minimal power.
- High data rate can be achieved with a minimum propagation loss.
- It is secured way to transfer the data between the devices in the underwater environment
- In wireless IR networks, communication does not require elaborate physical infrastructure or maintenance practices

DISADVANTAGES

- Battery power is limited and these batteries cannot be recharged easily
- The available bandwidth is severely limited
- Can be affected by environmental conditions like dust, pollution

APPLICATIONS

- Used in Submarine Communications
- Underwater Navigation and Tracking
- Oceanography
- Marine biology
- Particle physics

V.CONCLUSION

As I conclude that the main objective is to overcome the present limitations and implement advanced technology for oceanographic research and cope up with the environmental effects on the performance of the underwater wireless communication systems to compete with the future challenges by the effective transmission of audio and video signals. also the above proposed system seems feasible in order to achieve high data rate transmission with low propagation delay as far as short distance communication is concerned. When low frequency signals are used even if the communication range is more.

FUTURE SCOPE

To provide very cheap and low energy communications. To enlarge communication areas in space, sea and sky .To introduce new spectrum with terahertz (THz) frequencies.To improve abilities for large-scale network sensing To achieve extreme trust and integrity assured data transmission.

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	Open Access Research Article
	Volume: 23 Issue: 06
	May, 2023

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