A

PROJECT REPORT

on

"UV Light of Hand Sanitizer"

By

ANKUSH SHANTARAM WALAVANE

Under the Guidance of

Aishwarya Pawar Ma'am

Electronics Research Laboratory

Department of Physics

KARMAVEER SHANTARAM BAPU KONDAJI WAVARE (K.S.K.W)

ARTS, SCIENCE & COMMERCE COLLAGE, CIDCO, NASHIK-422008

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Maratha Vidya Prasarak samaj's

Karmveer Shantarambapu Kondaji Wavare Arts, Commerce & Science College, Cidco, Nashik-422008

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This is to certify that the project entitled

"UV Light of Hand Sanitizer"

has been successfully completed by

ANKUSHSHANTARAMWALAVANE

Seat no:----------

During the academic year 2021-22 forfulfilment of

M.Sc-II (Physics) degree

Aishwarya Pawar

(Project Guide)

Internal Examiner

Dr. A. B. Gawande

Head, Dept. of Physics & Electronics

Arts, Commerce College,

(CIDCO), Nashik-422009

(Head of department)

External Examiner

UV / LIGHT OF HAND SANITIZER

WALAVANE ANKUSH , Prafull Jadhav, Dr. A.B. Gawande

Department of Physics and Electronics, Karmveer Shantarambapu Kondaji Wavare, Arts, Science and Commerce College, Uttamnagar, CIDCO, Nashik-422008.

*Corresponding E-Mail: gawandeab@gmail.com

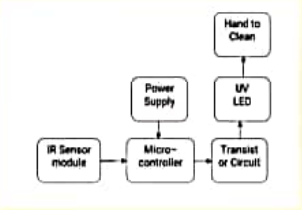
Abstract

There are over 229,000 germs per square inches on a commoun Sink faucet handle! That is over 1 million germs on the average faucet! That was not enough to get the germs Turning than may be the fact that there are more germs on an office desk than present on an average toilet might ! The spread of germs is the leading cause of illness around the world and surprisingly there is an easy solution, WASH YOUR HANDS !If human washed their hands multiples timess day the number of sick days a year, as well as the number of illnesses , would decrease dramatically. It is most commoun to wash your hands after using the bathroom, coughing or sneezing ,and working or playing outside . But there are many more intenses where we should wash our hands like after handing animals , before and after eating when arriving work or school after giving and taking medication, before and after touching your face and middle of our day after using all kinds of doors knods , light, switches and other surfaces .

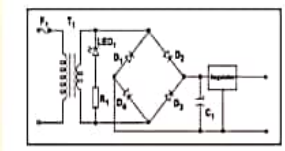
Introduction

In the healthcare field, there is necessity to sanitize medical instruments before and after use. In areas with modern convinience like electricity and water utilities advanced sanitisation method such as the use of autoclaves are common place in healthcare institution. However not everywhere has luxury of having access to electricity and water. In many development countries healthcare proffesionals find themselves not being properly equipment or contained sanitized equipment . The issue causes many patience run the risk of further sickness or injury even through there are getting treatment. In the order to solve the issue , our team solar powered sanitization device. This design was assuming there was no sufficient source of water or an available powergrid. With this restrictions the device implements UV Technology in order to sanitize varies medical instruments and waste. UV LEDs are powedered by on – board battery packs that are battery packs recharged by solar pannel with tracking system scar powder sanitation with the use of LEDs offers a portable light weight and low powdered option for remove for remote areas and underdeloped regions to obtain needed medical equipment.

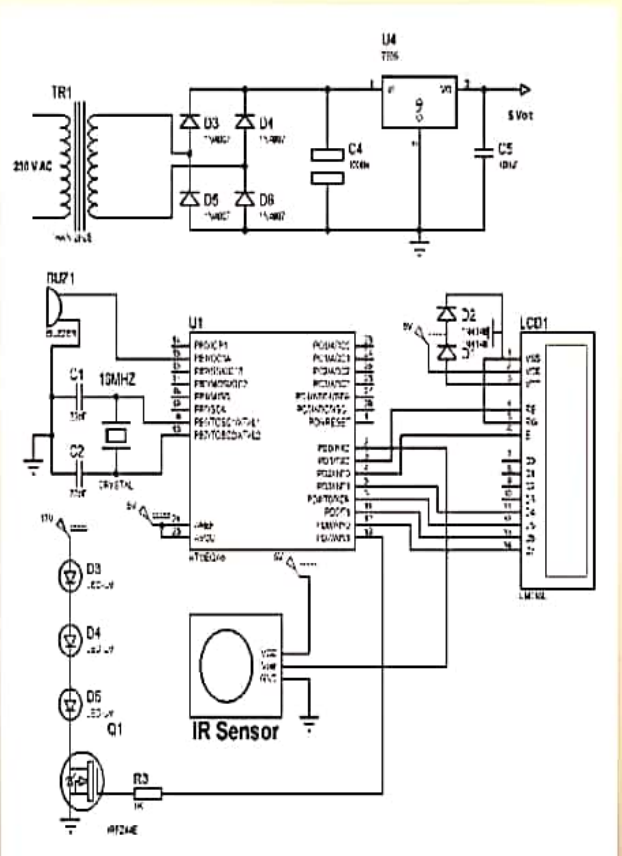
Construction



Block diagram

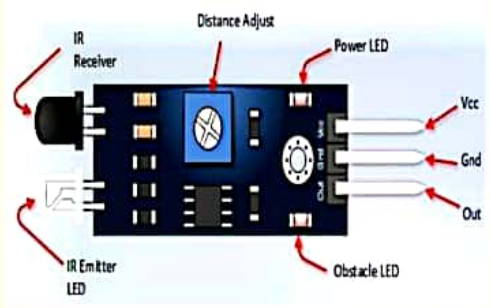


Power supply



Circuit Diagram

Schematic diagram



Results

This system can be applied in hospital, banks, offices, home, shopping malls etc.Also this system is a primary test of covid-19This system give audio instruction to the parson who has more body temperature and tell him the contact number and address of nearest hospital.

Conclusion

➢Using UV LEDs to sanitize equipment is feasible as long as the correct design implemented . As explained in section 3, the speed of sanitisation can be decreased by adding LEDs , making them closer together both linearly and angularly in the LED are placed in proper orientation to allow for full sanition coverage the target object is able to sanitize in certain time.

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Sangola Taluka Shetkari Shikshan Prasarak Mandal Sangola's

Vidnyan Mahavidyalaya,Sangola.

Tal-Sangola, Dist-Solapur, MH-413307,India.

Affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur.

Certificate

This is to certify that

Prof./Dr./Mr./Ms.: Ankush Walavane

of Department of Physics, KSKW Arts, Science and Commerce College, CIDCO,

has presented paper entitled

UV / LIGHT FOR HAND SANITIZER at

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Date: April 22-23, 2022.

Dr. J. V. Thombare	**Dr. R. A. Fule**	**Dr. S. S. Dhasade**
Organizing Secretary	Acting Principal	Convener
RTNA-2022		RTNA-2022

RTNA-2022

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Name of Student

ABSTRACT

There are over 229,000 germs per square inch on a common sink faucet handle! That is over 1 million germs on the average faucet! If that was not enough to get the gears turning then maybe the fact that there are more germs on an office desk than present on an average toilet might! The spread of germs is the leading cause of illness around the world and surprisingly there is an easy solution, WASH YOUR HANDS! If humans washed their hands multiple times a day the number of sick days a year, as well as the number of illnesses, would decrease dramatically. It is most common to wash your hands after using the bathroom, coughing or sneezing, and working or playing outside. But there are many more instances where we should wash our hands like after handling animals, before and after eating, when arriving to work or school, after giving and taking medication, before and after touching your face, and in the middle of your day after using all kinds of door knobs, light switches, and other surfaces. Technology today is coming up with anti-bacterial soaps, waterless hand sanitizers, and even UV light sanitation systems to kill off germs. But, even as the Centers for Disease Control and Prevention and Department of Health, and so many other sources tell you the simplest and best way to prevent the spread of germs is simply by washing your hands multiple times a day, and not just when they physically look or feel dirty

CHAPTER 1
INTRODUCTION

1.1 Introduction

In the healthcare field, there is a necessity to sanitize medical instruments before and after use. In areas with modern conveniences like electricity and water utilities, advanced sanitization methods such as the use of autoclaves are commonplace in healthcare institutions. However, not everywhere in the world has the luxury of having access to electricity and water. In many developing countries, healthcare professionals find themselves not being able to properly sanitize equipment or obtain sanitized equipment. This issue causes many patients run the risk of further sickness or injury even though they are getting treatment. In order to solve this issue, our team has designed a solar powered sanitization device. This device was designed assuming there was no sufficient source of water or an available powergrid. With these restriction the device implements UV technology in order to sanitize various medical instruments and waste. The UV LEDs are powered by on-board battery packs that are recharged by a solar panel with a tracking system. Solar powered sanitation with the use of UV LEDs offers a portable, lightweight, and low powered option for remote areas and underdeveloped regions to obtain needed medical equipment.

1.2 Why Is Hand Washing Important

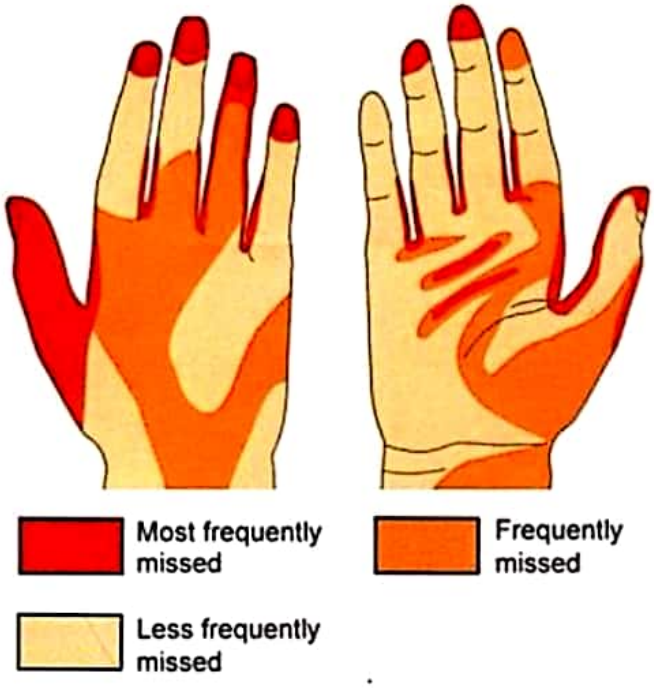
Washing hands is the number one and most effective way to prevent the spread of diseases. Hand washing aims to eliminate germs as fast as possible before contaminating objects around us and infecting other. A few main times hands should be washed include:

- Before preparing or eating food
- After preparing or eating food
- After using the bathroom

- After coughing, sneezing, or blowing your nose
- After coming into contact with animals or other human skin.

1.3 Proper Ways to Wash Hands

To keep good hand hygiene one must wash hands properly. Washing ones hands involves scrubbing the hands with soap, rinsing the hands with water, and drying the hands completely. Figure 1 is an illustration of, on average, how well hands actually get once washed.

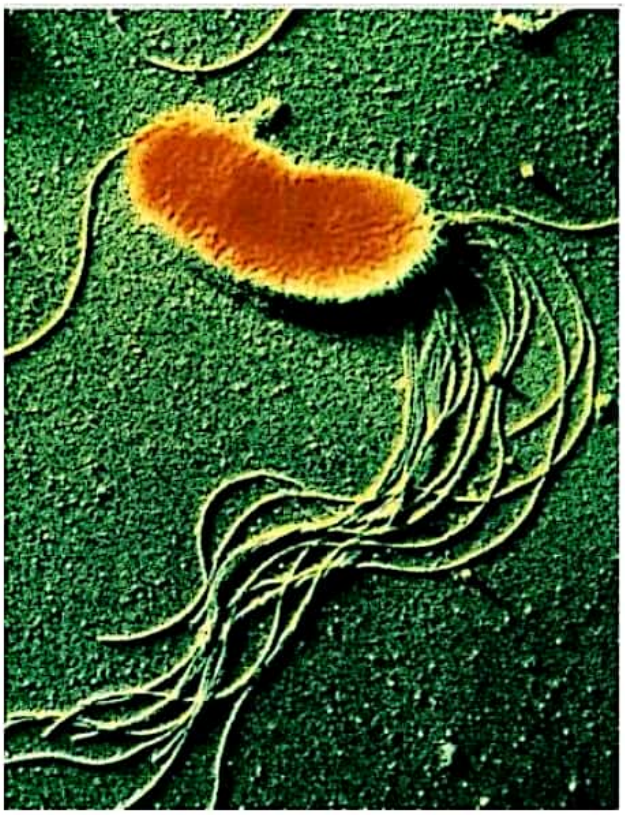


The Center of Disease Control gives five important steps to proper hand washing.

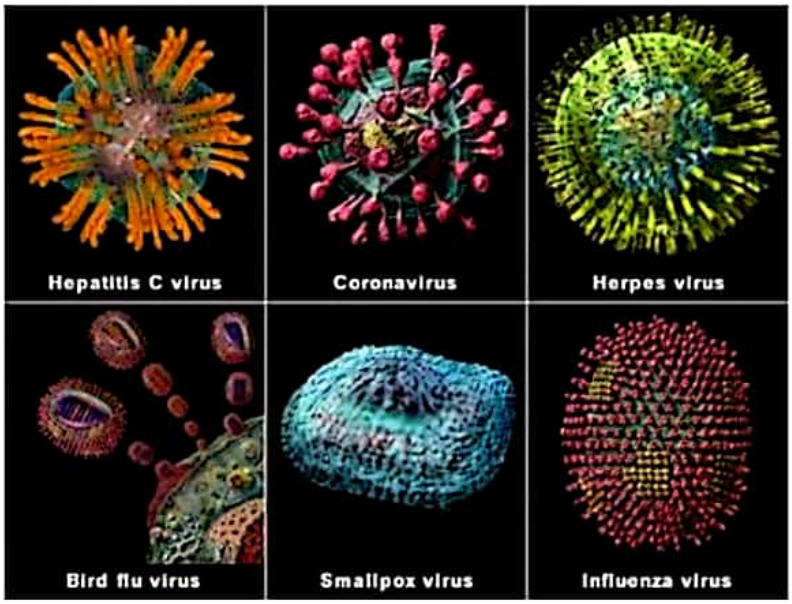
1. Hands should be washed with soap and warm running water.
2. Hands should be rubbed for 20 seconds making sure to get backs of the hand, writs, and between fingers.
3. Hands should be rinsed WHILE leaving the water running.
4. With the water running hands should be dried with a single-use-towel.
5. Using the towel to prevent re-contamination, turn off the water

1.4 Germs and What Are Germs

A germ is a microbes that can be found in the air, soil, water, on plants, humans, animals, surfaces around the home, schools, hospitals, restaurants, and just about everywhere. When the word "germ" is used there is a common negative notion about it but germs can be helpful as well. The two main types of germs are bacteria and viruses. The main difference between bacteria and viruses is that bacteria are a unicellular prokaryotic microorganism, meaning they are single celled organisms that lack membrane-bound organelles like a nucleus or mitochondria. A bacteria cell seen under a microscope is illustrated in Figure 2. They have their own set of DNA and RNA and are able to self-reproduce. Bacteria reside in almost every habitat on earth including living inside other living organisms or on top of 7 nonliving surfaces. Bacteria are generally larger than viruses. Approximately 99% of bacteria are actually harmless to humans because they break down organic matter that spreads infections and destroy harmful parasites (Thobaben [25]). Bacteria usually cause infections due to toxins and acids they release but these infections can usually be treated with antibiotics.



Viruses are much smaller than bacteria. They are also acellular, non-living, organisms. Viruses need a living "host" to live and reproduce. So unlike bacteria they are unable to thrive anywhere on Earth. After a virus finds a host it replaces the host's DNA or RNA with its own genetic instructions to spread. Unfortunately viruses are not helpful to us like bacteria; some of the common illnesses they cause are shown in Figure 3. To treat a virus a vaccine or an antiviral drug is needed (Thobaben [25]).



There is a wide antimicrobial spectrum: gram-positive bacteria, gram-negative bacteria, mycobacteria, fungi, positive and negative envelope viruses, bacterial spores, and oocysts but for our purposes we are going to focus on the common germs bacteria and viruses as a whole instead of broken up into the different categories of the antimicrobial spectrum (Rybicki [19]).

Where Are Germs Found

The important locations for good hygiene are healthcare institutions, within the food industry comprising of restaurants and supply chains, in domestic settings, and areas within the community including schools, malls, grocery stores, recreation centers and many more. In 2005 reported 2-3 million deaths due to diarrheal diseases that could be prevented. It has been estimated hand washing with soap could reduce incidences of diarrhea by 42-47% save 1 million lives a year (Thobaben [25]).

CHAPTER 2

LITERATURE REVIEWS

Disinfectant Activity of A Portable Ultraviolet C Equipment

Healthcare-associated infections (HAIs) can be caused by microorganisms present in common practice instruments generating major health problems in the hospital environment. The aim of this work was to evaluate the disinfection capacity of a portable ultraviolet C equipment (UV Sanitizer Corvent® -UVSC-) developed to disinfect different objects. For this purpose, six pathogens causing HAIs: Acinetobacter baumannii, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Candida albicans, were inoculated on slides and discs of different biomaterials (borosilicate, polycarbonate, polyurethane, silicone, Teflon and titanium) and exposed to ultraviolet C radiation. UVSC disinfection was compared with ethanol and chlorhexidine antimicrobial activities following the standards EN14561 and EN14562. Disinfection, established as a reduction of five logarithms from the initial inoculum, was achieved with the UVSC at 120 s of exposure time, with and without the presence of organic matter. The disinfectant effect was observed against S. aureus, P. aeruginosa, E. coli, B. subtilis and C. albicans (reduction >99.999%). Disinfection was also achieved with 70% ethanol and 2% chlorhexidine. As conclusion, UVSC was effective disinfecting the most contaminated surfaces assayed, being a promising alternative for disinfecting hospital materials and inanimate objects that cannot be immersed in liquid biocides, reducing the risk of pathogen transmission.

Ultraviolet (UV) and other Disinfection Devices for Public Transit in Response to COVID-19

This project was designed as a rapid 25-day effort to evaluate ultraviolet (UV) disinfection technologies with a specific emphasis on UVC (germicidal ultraviolet wavelength) efficacy and practicality for surface disinfection of bus interiors. With more than 3,700 vehicles in NJ TRANSIT's fleet, the deployment of any new technology must be carefully weighed to ensure it achieves the desired results and if it can be scaled up for such a large fleet. Although very little information currently exists for UVC efficacy against SARS-CoV-2 (COVID-19) there is a wealth of information for SARS-CoV-1. As new data becomes

available it's likely the kill-curve recommendation will change; current data suggested ranges from 0.56 mJ/cm2 to 37 mJ/cm2.1 At this time, after reviewing the literature, the research team recommends a conservative but reasonable estimate of 10.6 mJ/cm2 to achieve a 1-log (90% reduction) kill rate. While working with NJ TRANSIT several operational constraints were also established. For example, an acceptable maximum UVC operational time of 7 minutes, which directly relates to turnaround time while the buses are readied for the next day. Each of the 16 garages house on average 200 buses with a turnaround of only a few hours to refuel, clean, and perform daily service before the buses return to the road. Seven minutes effectively means an equivalent of 24hrs of UVC lamp on-time would be required per garage every night. This has implications on equipment needs for simultaneous disinfection, storage of UVC equipment, power draw, dedicated staffing, and other impacts on nightly service and garage operations. The study also LiDAR surveyed six vehicle types and developed virtual environment models for a NABI 40-ft bus and a mini-bus used for paratransit.

Defining The Effectiveness Of Uv Lamps Installed In Circulating Air Ductwork

The use of ultraviolet (UV) lights to disinfect room air and air streams dates to about 1900. Richard Riley has numerous publications in the 1960's and 1970's that deal with UV disinfection and has published an extensive review (Riley, 1988), as has Shechmeister (1991). Early work established that the most effective UV light wavelength was the wavelength range from 220 to 300 nanometers (nm), with the peak effectiveness near 265 nm. In current commercial practice, UV light of the appropriate wavelength is generated by electrical discharge through low-pressure mercury vapor, which is enclosed in a glass tube that transmits UV light. The resulting germicidal lamp produces UV light that has a primary wavelength of 253.7 nm. This wavelength is within the short-wave, or "C" band of UV light. It is sometimes abbreviated as UVC and is alternately known as germicidal UV or ultraviolet germicidal irradiation (both abbreviated as UVGI). UVGI has been shown to deactivate viruses, mycoplasma, bacteria, and fungi. To date, most of the use of UVGI for airborne organism control in buildings has focused on limiting the transmission of very infectious diseases (particularly TB) in occupied spaces such as medical waiting or treatment rooms. In this application, UVGI lamps are often located in the upper part of a room (near the ceiling) and must be visually shielded from the occupied space. Mixing between the breathing zone and the irradiated zone is critical to operation, and mixing fans are sometimes used. The effectiveness of near-ceiling UVGI lamp use is fairly well known. Numerous publications are available. In a recent paper that includes an extensive list of references, Miller and Macher (2000) discuss the use and characterization of occupied-space, near-ceiling UVGI. Application principles have been published

(CDC, 1994), as have guidelines for system selection and use (CDC 1999a, CDC 1999b.) The occupied space application of UVGI is not discussed further in this report.

Solar Powered Sanitation Device

This project identifies how UV-C LED technology can be used for medical instrument surface sanitation within a portable application. The necessary light intensity, power requirements and general portability of such a system were evaluated to design a testable device. With the test results gathered, a prototype device was created to show the feasibility of portable solar powered sanitation with UV-C LED technology.

CHAPTER 3

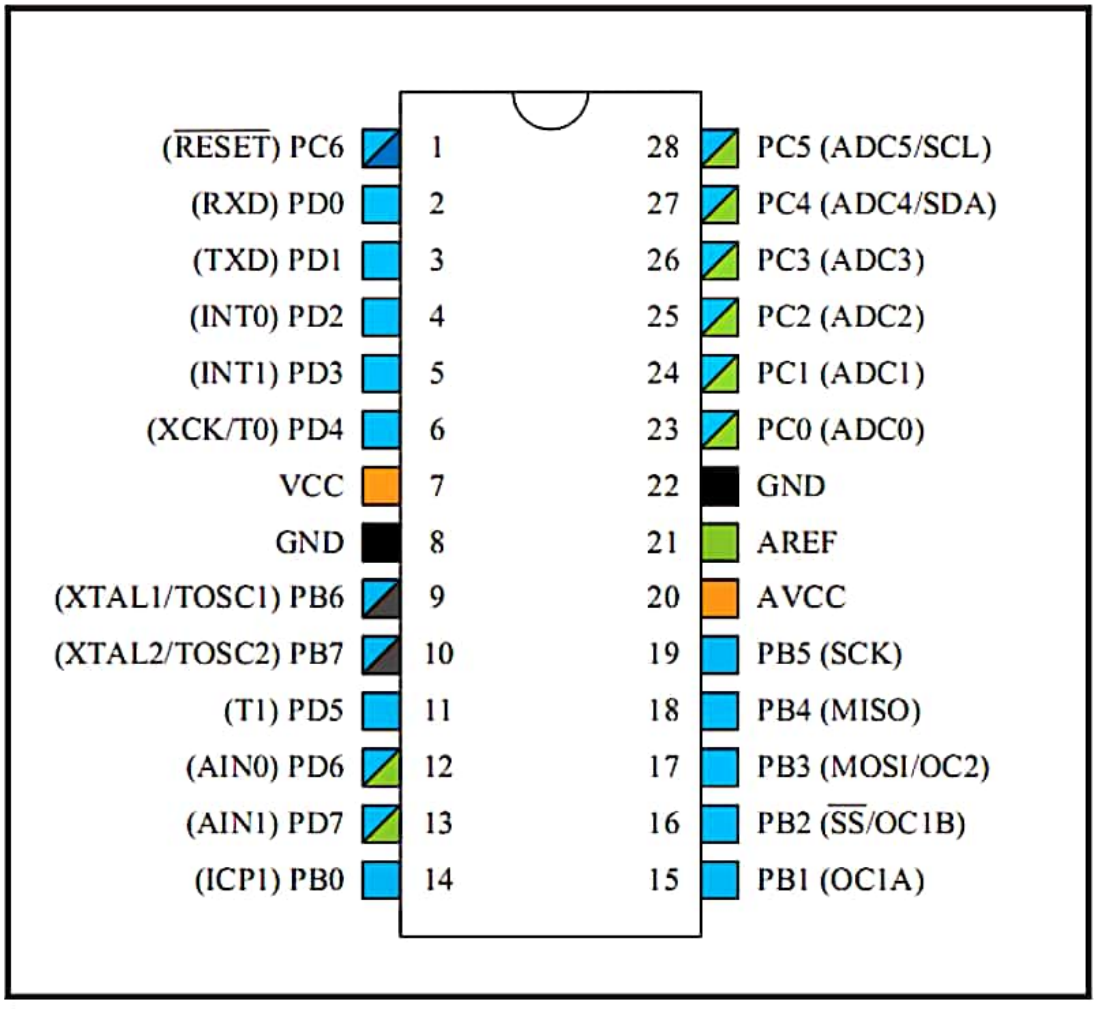
SYSTEM DETAILS

ATmega328L

Introduction

The Atmel ATmega8A is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8A achieves throughputs close to 1MIPS per MHz. This empowers system designer to optimize the device for power consumption versus processing speed.

Pin Diagram



Pin Descriptions

VCC

Digital supply voltage

GND

Ground

Port B (PB7:PB0) – XTAL1/XTAL2/TOSC1/TOSC2

Port B is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port B output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port B pins that are externally pulled low will source current if the pull-up resistors are activated. The Port B pins are tri-stated when a reset condition becomes active, even if the clock is not running. Depending on the clock selection fuse settings, PB6 can be used as input to the inverting Oscillator amplifier and input to the internal clock operating circuit. Depending on the clock selection fuse settings, PB7 can be used as output from the inverting Oscillator amplifier. If the Internal Calibrated RC Oscillator is used as chip clock source, PB7:6 is used as TOSC2:1 input for the Asynchronous Timer/Counter2 if the AS2 bit in ASSR is set. The various special features of Port B are elaborated in Alternate Functions of Port B and System Clock and Clock Options.

Port C (PC5:PC0)

Port C is a 7-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port C output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port C pins that are externally pulled low will source current if the pull-up resistors are activated. The Port C pins are tri-stated when a reset condition becomes active, even if the clock is not running.

PC6/RESET

If the RSTDISBL Fuse is programmed, PC6 is used as an I/O pin. Note that the electrical characteristics of PC6 differ from those of the other pins of Port C. If the RSTDISBL Fuse is un-programmed, PC6 is used as a Reset input. A low level on this pin for longer than the minimum pulse length will generate

a Reset, even if the clock is not running. The minimum pulse length is given in Table 30-5. Shorter pulses are not guaranteed to generate a Reset. The various special features of Port C are elaborated in Alternate Functions of Port C.

Port D (PD7:PD0)

Port D is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port D pins that are externally pulled low will source current if the pull-up resistors are activated. The Port D pins are tri-stated when a reset condition becomes active, even if the clock is not running. Port D also serves the functions of various special features of the ATmega8A as listed in Alternate Functions of Port D.

RESET

Reset input. A low level on this pin for longer than the minimum pulse length will generate a reset, even if the clock is not running. The minimum pulse length is given in Table 30-5. Shorter pulses are not guaranteed to generate a reset.

AVCC

AVCC is the supply voltage pin for the A/D Converter, Port C (3:0), and ADC (7:6). It should be externally connected to VCC, even if the ADC is not used. If the ADC is used, it should be connected to VCC through a low-pass filter. Note that Port C (5:4) use digital supply voltage, VCC.

AREF

AREF is the analog reference pin for the A/D Converter.

ADC7:6 (TQFP and QFN/MLF Package Only)

In the TQFP and QFN/MLF package, ADC7:6 serve as analog inputs to the A/D converter. These pins are powered from the analog supply and serve as 10-bit ADC channels.

Features

- High-performance, Low-power Atmel AVR 8-bit Microcontroller
- Advanced RISC Architecture

– 130 Powerful Instructions - Most Single-clock Cycle Execution

– 32 x 8 General Purpose Working Registers

– Fully Static Operation

– Up to 16MIPS Throughput at 16MHz

– On-chip 2-cycle Multiplier

- High Endurance Non-volatile Memory segments

– 8KBytes of In-System Self-programmable Flash program memory

– 512Bytes EEPROM

– 1KByte Internal SRAM

– Write/Erase Cycles: 10,000 Flash/100,000 EEPROM

– Data retention: 20 years at 85°C/100 years at 25°C(1)

– Optional Boot Code Section with Independent Lock Bits

- In-System Programming by On-chip Boot Program
- True Read-While-Write Operation

– Programming Lock for Software Security

LCD

Introduction

LCD is a type of display used in digital watches and many portable computers. LCD displays utilize to sheets of polarizing material with a liquid crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them. LCD technology has advanced very rapidly since its initial inception over a decade ago for use in laptop computers. Technical achievement has resulted in brighter displace, higher resolutions, reduce response times and cheaper manufacturing process. The liquid crystals can be manipulated through an applied electric voltage so that light is allowed to pass or is blocked. By carefully controlling where and what wavelength (color) of light is allowed to pass, the LCD monitor is able to display images. A back light provides LCD monitor's brightness. Just as there are many varieties of solids and liquids, there is also a variety of liquid crystal substances. Depending on the temperature and particular nature of a substance, liquid crystals can be in one of several distinct phases. Over the years many improvements have been made to LCD to help enhance resolution, image, sharpness and response times. One of the latest such advancements is TFT or Thin Film Transistor. TFT-LCD's make use of a very thin transistor that is applied to glass during acts as switch allowing control of light at the pixel level, greatly enhancing image sharpness and resolution. This has been particularly important for improving LCD's ability to display small-sized fonts and image clearly. LCD interfacing with 8051 is a real-world application. In recent years the LCD is finding widespread use replacing LEDs (seven segment LEDs or other multi segment LEDs).

- The declining prices of LCDs.
- Incorporation of a refreshing controller into the LCD, thereby relieving the CPU to keep displaying the data.
- Ease of programming for characters and graphics.

➢ **Pin diagram**

Most of the LCD modules conform to a standard interface specification. A 14pin access is provided having eight data lines, three control lines and three power lines. The connections are laid out in one of the two common configurations, either two rows of seven pins, or a single row of 14 pins. One of the, pins are numbered on the LCD's print circuit board (PCB), but if not, it is quite easy to locate pin1. Since this pin is connected to ground, it often has a thicker PCB track, connected to it, and it is generally connected to metalwork at same point.

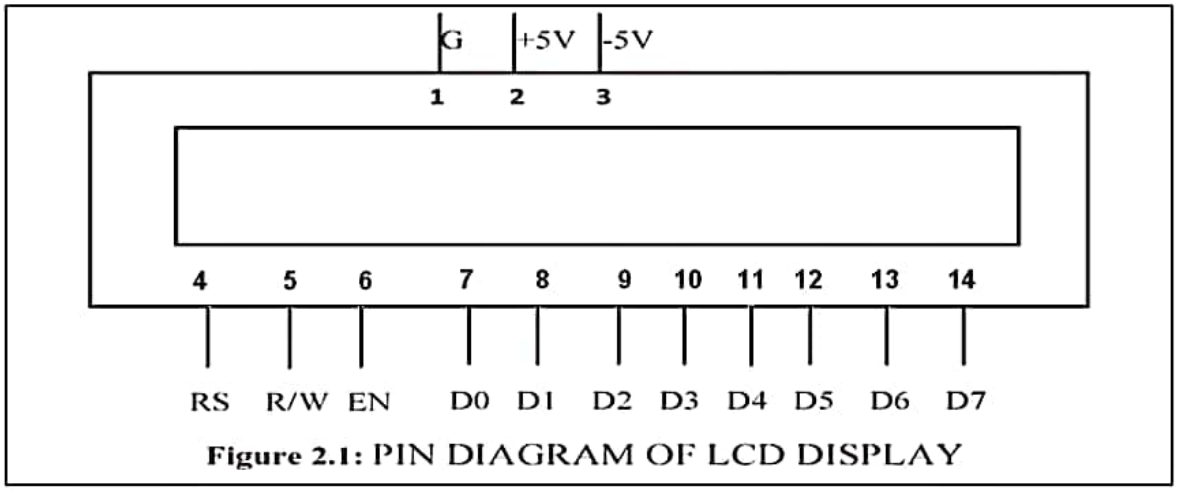


Figure 2.1: PIN DIAGRAM OF LCD DISPLAY

➢ ***Pin descriptions***

Vcc, Vss and Vee

While Vcc and Vss provide +5V and ground respectively, Vee is used for controlling LCD contrast.

RS, register select

There are two very important registers inside the LCD. The RS pin is used for their selection as follows.

a) If RS=0, the instruction command code register is selected, allowing the user to send a command such as clear display, cursor at home, etc.,

b) If RS=1 the data register is selected, allowing the user to send data to be displayed on the LCD.

R/W, read/write

R/W input allows the user to write information to the LCD or read information from it. R/W=1 when reading; R/W=0 when writing.

EN, Enable

The enable pin is used by the LCD to latch information presented to its data pins. When data is supplied to data pins, a high-to-low pulse must be applied to this pin in order for the LCD to latch in the data present at the data pins. This pulse must be a minimum of 450ns wide.

D0-D7

The 8-bit data pins, D0-D7, are used to send information to the LCD or read the contents of the LCD's internal registers. To display letters and numbers, we send ASCII codes for the letters A-Z, a-z, and numbers 0-9 to these pins while making RS=1. We also use RS=0 to check the busy flag bit to see if the LCD is ready to receive information. The busy flag is D7 and can be read when R/W=1 and RS=0, as follows:

If R/W=1, RS=0. When D7=1 (busy flag=1), the LCD is busy taking care of internal operations and will not accept any information.

The pin descriptions are given in table below:

PIN	SYMBOL	I/O	DESCRIPTION
1	Vss	--	Ground
2	Vcc	--	+5V power supply
3	Vee	--	Power supply to control contrast
4	RS	I	RS=0 to select command register RS=1 to select data register
5	R/W	I	R/W=0 for write R/W=1 for read
6	EN	I/O	Enable
7	DB0	I/O	The 8-bit data bus
8	DB1	I/O	The 8-bit data bus
9	DB2	I/O	The 8-bit data bus
10	DB3	I/O	The 8-bit data bus
11	DB4	I/O	The 8-bit data bus
12	DB5	I/O	The 8-bit data bus
13	DB6	I/O	The 8-bit data bus
14	DB7	I/O	The 8-bit data bus

TABLE 8 : PIN DESCRIPTIONS OF LCD

➢ *Basic Commands Of LCD*

Set Cursor Move Direction:

04h – Shift cursor to the left

06h – Shift cursor to the right

80h – force cursor to the beginning of the first line

C0h – force cursor to the beginning of second line

02h – return home

Enable Display/Cursor:

0Ch - Turn Display On, cursor off

0ah - Turn Cursor On, Display off

08h - Cursor off, Display off

0eh/0fh- display on, cursor blinking

Shift Display:

18h – 1Ch - Display Shift to left, right respectively

Set Interface Length:

38h – Initialize LCD as 2 lines, 5*7 matrix

Reading Data back is used in this application, which requires data to be moved back and forth on the LCD. The "Busy Flag" is polled to determine whether the last instruction that has been sent has completed processing. Before we send commands or data to the LCD module, the Module must be initialized. For eight bit mode, this is done using the following series of operations:

- Wait more than 15 ms after power is applied.
- Write 0x030 to LCD and wait 5 ms for the instruction to complete
- Write 0x030 to LCD and wait 160 µs for instruction to complete
- Write 0x030 AGAIN to LCD and wait 160 µs or Poll the Busy Flag
- Set the Operating Characteristics of the LCD
- Write "Set Interface Length"

- Write 0x010 to turn off the Display
- Write 0x001 to Clear the Display
- Write "Set Cursor Move Direction" Setting Cursor Behavior Bits
- Write "Enable Display/Cursor" & enable Display and Optional Cursor.

IR Sensor module

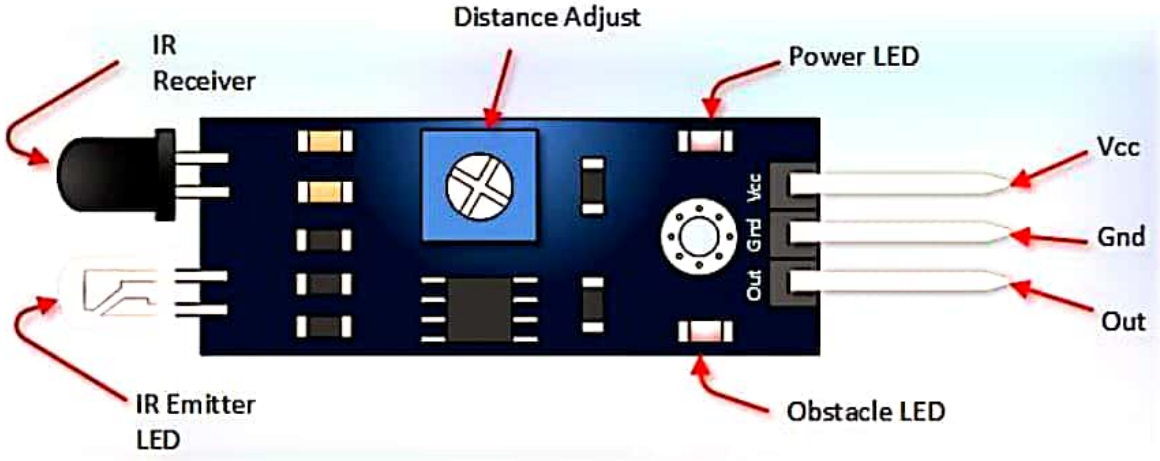
IR Infrared Obstacle Avoidance Sensor Module has a pair of infrared transmitting and receiving tubes. When the transmitted light waves are reflected back, the reflected IR waves will be received by the receiver tube. The onboard comparator circuitry does the processing and the green indicator LED comes to life.

The module features a 3 wire interface with Vcc, GND and an OUTPUT pin on its tail. It works fine with 3v3 to 5V levels. Upon hindrance/reflectance, the output pin gives out a digital signal (a low-level signal). The onboard preset helps to fine tune the range of operation, effective distance range is 2cm to 80cm.

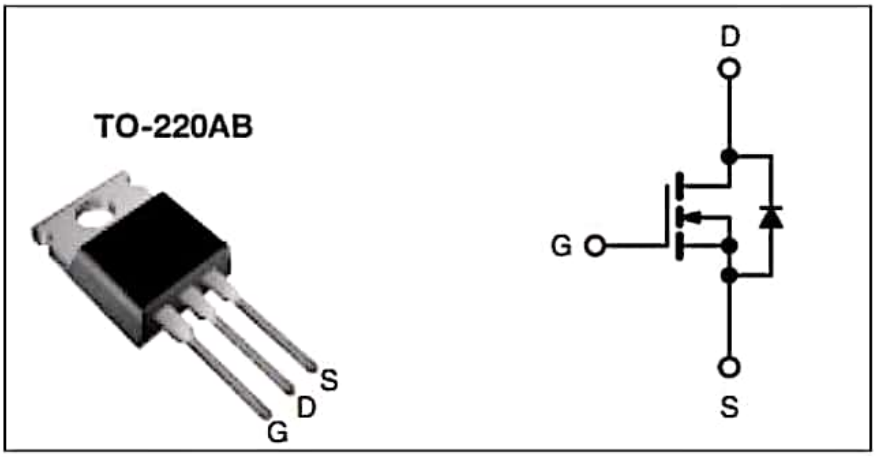
Features:

- Onboard detection indication
- Effective distance range of 2cm to 80cm
- A preset knob to fine-tune distance range
- There is an obstacle, the green indicator light on the circuit board
- Detection distance: 2 ~ 30cm

- Detection angle: 35 °
- Comparator chip: LM393
- 3mm screw holes for easy mounting
- Dimensions: 48 x 14 x 8 mm (LxWxH)
- Weight: 3gm



IRFZ44



Advanced HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications. The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.

Features:

- ★ Advanced Process Technology
- ★ Ultra Low On-Resistance
- ★ Dynamic dv/dt Rating
- ★ 175°C Operating Temperature
- ★ Fast Switching
- ★ Fully Avalanche Rated

Power Supply:-

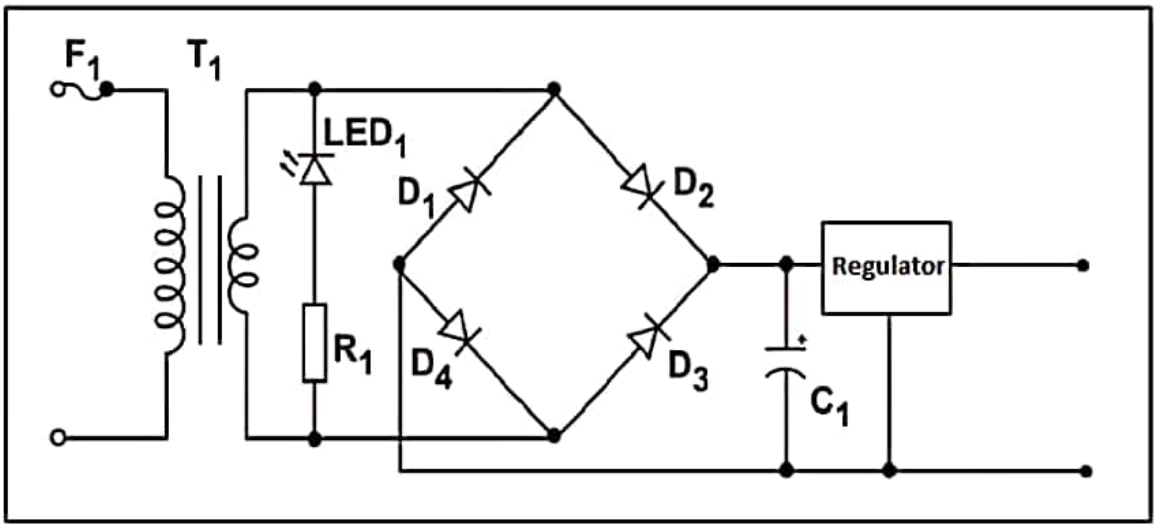


Fig : power supply Design

Types of DC power supply:

1. Unregulated DC power supply
2. Regulated DC power supply

Unregulated DC power supply

An unregulated power supply is circuit which converts AC into a fluctuating DC which gets change according to variation in input AC as well as change in load current.

Regulated DC power supply

A dc power supply which maintains the output voltage constant irrespective of ac mains fluctuations or load variations is known as regulated dc power supply.

Need of regulated power supply:

The function of a linear voltage regulator is a convert a varying DC voltage to a constant, often specific, lower DC voltages. when an unregulated DC power supply is the energy source, its output voltage will also vary with changing input voltage. To circumvent this, some power supplies use a linear voltage regulator to maintain the output voltage at a steady value, independent of fluctuations in input voltage and load impedence. Linear regulators can also reduce the magnitude of ripple and noise present appearing on the output voltage.

Step down transformer:

The step down transformer is used to step down the main supply voltage from 230V AC to lower value. The step down transformer is static device which decreases mains to the desired value without changing its frequency. It generates pure sine wave with zero average value to the rectifier circuit.

Rectifier unit

The rectifier unit is used to convert the AC voltage into its corresponding DC voltage. There are half-wave ,full-wave, and bridge wave rectifiers are available for these specific function. The most important and simple device used in rectifier circuit is the diode. The simple function of diode is to conduct when forward bias and not conduct in reverse bias. During the positive half-cycle of secondary voltage, one end of the secondary winding becomes positive and other end negative. This makes two diode forward biased while remaining two diodes as reverse biased. Therefore, only two forward biased diode will be in series through the load. It may seen that current flows from top to bottom of the load.

During the negative half cycle of secondary voltage, the polarity of voltage across secondary gets reverse. This makes previous reverse biased diodes as forward biased and vice versa. These two diodes will be now in series through the load. It may be seen that again current flows from top to bottom of the load i.e. in the same direction as for the positive half cycle. Therefore the pulsating dc output is obtained across load.

The reasons for choosing the bridge rectifier are:

The TUF is increased to 0.812 as compared the full wave rectifier.

The PIV rating requirement of each diode is Vm and not 2Vm as in two diode rectifier.

Input filters

Capacitors are used as filter. The ripples from DC voltage are removed and pure DC voltage is obtained. And also these capacitors are used to reduce the harmonics of the input voltage.

Regulator unit

Regulator requires the output voltage to be always constant. The output voltage is maintained irrespective of the fluctuations in the input AC voltage. As the AC voltage changes, the DC voltage also changes. Thus to avoid this regulators are used.

Output filter

The filter circuit is often fixed after the regulator circuit. capacitor is most often used as filter. The principle of the capacitor is to charge and discharge. It charges during the positive half cycle of the AC voltage and discharges during the negative half cycle so, it allows only AC voltage and does not allow the DC voltage.

IC voltage regulators

Voltage regulator comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC.

Fixed positive voltage regulators

The series 78xx regulators provide fixed positive voltages from 5 to 24V, last two digits xx of this number indicates the output voltage of this regulator IC. Maximum unregulated permissible input voltage to these regulators IC is provided by manufacturer in data sheets (mostly this value 37VDC). A 78xx is connected to provide voltage regulations with output from this unit of +vdc.

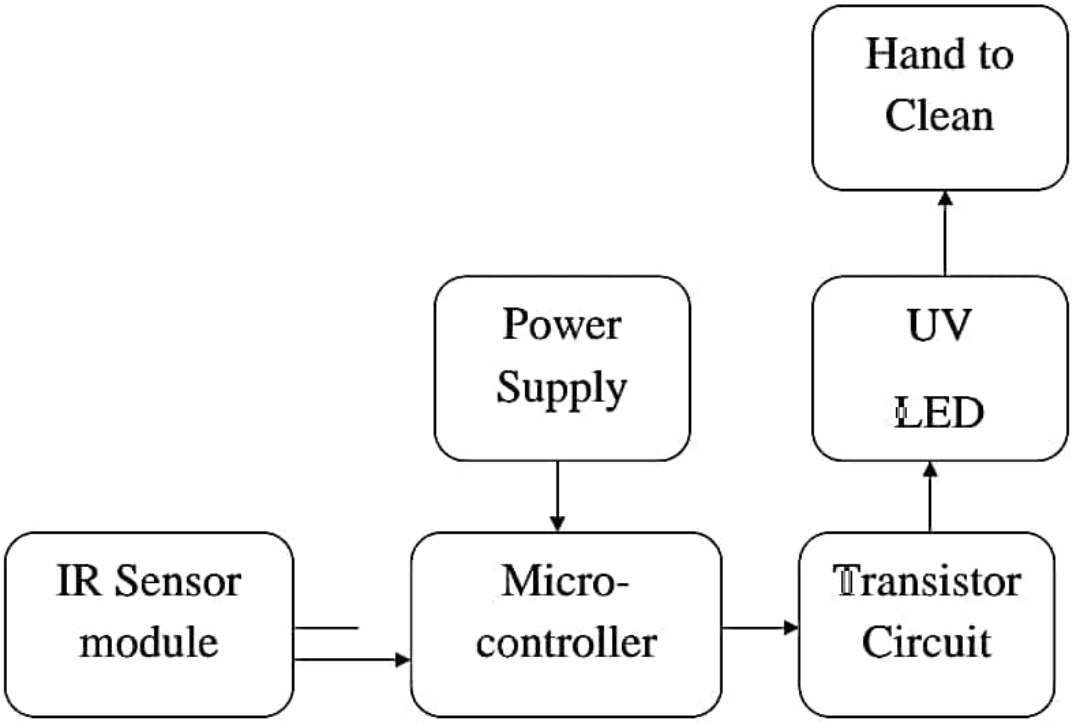
An unregulated input voltage Viis filtered by capacitor c1 and connected to the ICs IN terminal. The IC's OUT terminal provides a regulated +v, which is filtered by capacitor c2.

The third IC terminal is connected to ground. While the input voltage may vary over some permissible voltage range and the output load may vary over some acceptable range, the output voltage remains constant within specified voltage variations limits. These limitations are spelled out in manufacturer's specification sheets.

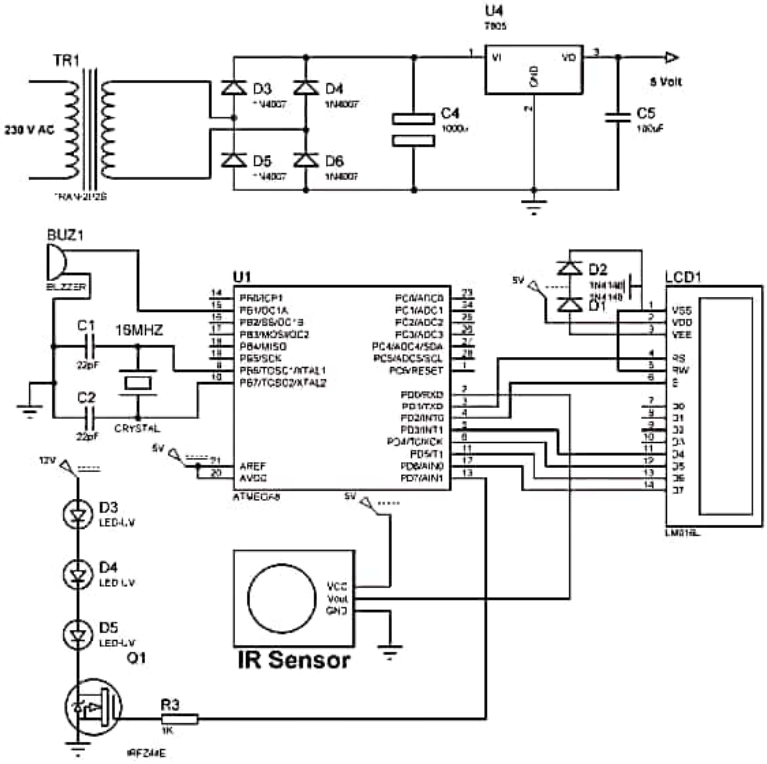
CHAPTER 4

SYSTEM DESIGN

4.1 Block Diagram



Design and Circuit Diagram:



CHAPTER 5

ADVANTAGES AND APPLICATIONS

Applications

- This system can be applied in hospital, banks, offices, home, shopping malls etc.
- Also this system is a primary test of covid-19
- This system give audio instruction to the parson who has more body temperature and tell him the contact number and address of nearest hospital.

Advantages

- Heavy Duty Purifiers
- Automatic Operation
- Easy to Clean Movable
- Giving way to cleaner environment.
- Eco friendly.
- Lower initial investments

CHAPTER 6

CONCLUSION

Using UV LEDs to sanitize equipment is feasible as long as the correct design is implemented. As explained in Section 3, the speed of sanitation can be decreased by adding LEDs, making them closer together both linearly and angularly. When the LEDs are placed in a proper orientation to allow for full sanitation coverage the target object is able to become sanitized in a certain length of time. This system however may encounter some problems. Within the chamber, the device will be sitting on a wire shelf which holds it in the center of the sanitation chamber. The points of the device which are covered by the shelf with not be sanitized. This then requires sanitizing the device moving it so the hidden portions are visible then complete the sanitation process for a second time. This problem inevitably can double your sanitation time unless another system such as a motor powered rotation system is implemented or there are materials created which are clear and do not degrade or refract the power intensity of the LED

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