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V- SURVE AND LANGUID ESPIAL

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ABSTRACT

The safety and rescue are the primary concerns in every part of the fast-moving world. There are many accidental events that occur due to unavoidable reasons. Many lives could have been saved if emergency services could get accident information and reach in time. Nowadays, GPS has become an integral part of a vehicle system. This project proposes to utilize the capability of a GPS to send accident locations to an Alert Service Center. The MEMS sensor is used to detect the vehicle accident. The eye blink sensor is used for driver sleeping detection. If any accident is detected, the message will be sent to the control room through the GSM. The system will then send the location acquired from the GPS along with the time and the speed by utilizing the GSM network. This will help the rescue service to arrive in time and save the valuable human life. Same automatically the engine will be turned off and the air bug will be open.

I. INTRODUCTION

Road accidents are a growing global concern, ranking as the 9th leading cause of death according to World Health Organization (WHO). To address this, there's a focus on monitoring driving behavior and style. This involves automated data collection and computer algorithms to profile drivers. Sensors like Global positioning services (GPS), Inertial Measurement Units (IMU), and cameras, including those in smartphones, are used. Researchers aim for low-cost, high-performance solutions. Smartphones are increasingly pivotal in Intelligent Transport Systems (ITS) for driver behavior detection and vehicle monitoring. This paper reviews recent research on driver behavior detection methods based on various parameters**.** Akshatha.V., et. al., 2017processed the vehicle has an onboard unit to detect an accident and report the GPS location of the crash through e-NOTIFY system. Alberto Fernández., et. al., 2016focused on the role of computer vision technology applied to the development of monitoring systems to detect distraction. Martin Wollmer., et. al., 2011 introduced that Long Short-Term Memory (LSTM) recurrent neural networks enable a reliable, subject-independent detection of inattention with an accuracy of up to 96.6% and significantly outperforms conventional approaches such as Support Vector Machines. Yulan Liang., 2009 identifies the two major types of distraction (i.e) Visual and cognitive distraction. AfizanAzman., et. al., 2011dealt with the experiment was 8 minutes and 49 seconds for each participant. Eye and mouth movements were obtained using the Face LAB Seeing Machine cameras and their magnitudes of the r-values were found more than 60% thus proving that they are strongly correlated to each other.

II. METHODOLOGY

CIRCUIT DESCRIPTION

Power supply gives supply to all components. It is used to convert AC voltage into DC voltage. Transformer used to convert 230V into 12V AC.12V AC is given to diode. Diode range is 1N4007, which is used to convert AC voltage into DC voltage. AC capacitor used to charge AC components and discharge on ground. LM 7805 regulator is used to maintain voltage as constant, and then the signal will be given to next capacitor, which is used to filter the unwanted AC component. Load will be LED and resister. LED voltage is 1.75V. At mega 328 microcontroller was used. Eye blink sensor, MEMS sensor, is connected with controller pin 23, pin 24. Eye blink sensor checks the driver eye is open or closed if eye is closed output level is high so pass the information to controller. MEMs sensor is used to detect the vehicle accident. Controller receive the sensor data, and to send the information message to control room via GSM. GPS is used to track the vehicle location. GSM and GPS is

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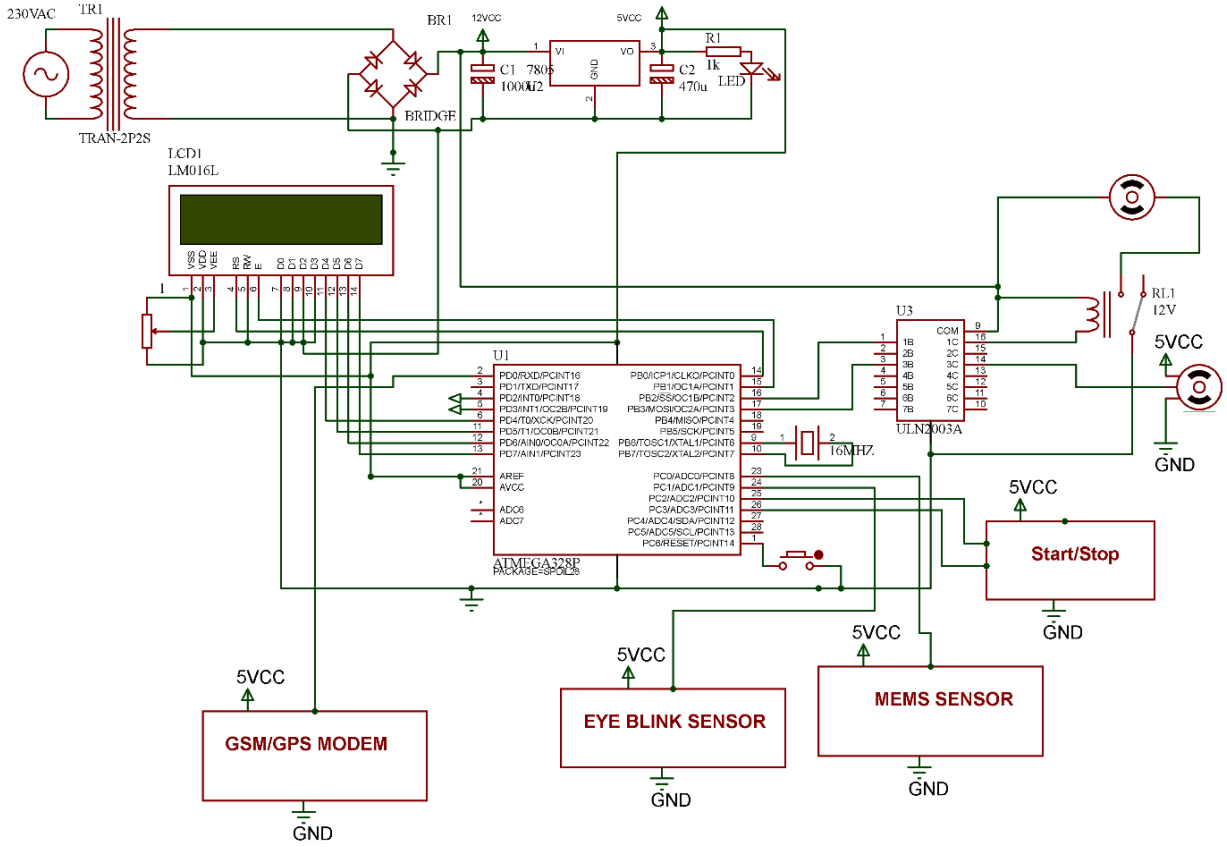
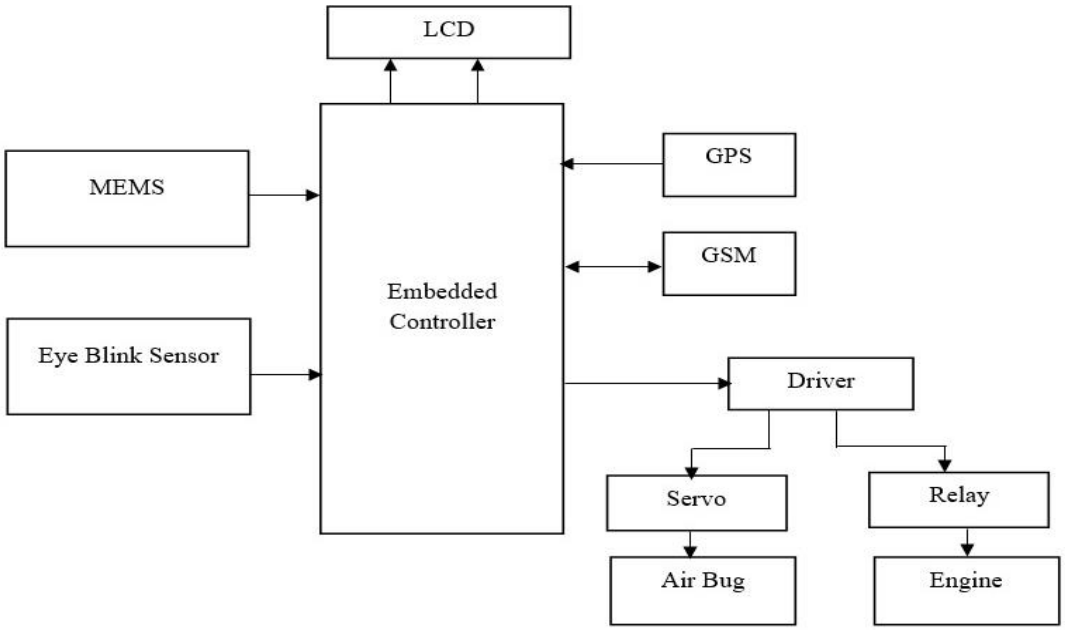
connected to controller port 2 & 3 through is used for serial communication between controller and modem. Controller to control the vehicle motor by using driver circuit. Driver we use ULN2003. It is used to drive the relay. It is connected to controller port D12 & D13. Relay is act as a switch. It is connected to driver output port 11. The vehicle motor is connected to relay N/O port. Controller to also display the information by using LCD. It is connected to controller port to D4 to D9.

CIRCUIT DIAGRAM



III. MODELING AND ANALYSIS

BLOCK DIAGRAM



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BLOCK DESCRIPTION

Power supply is used to convert the voltage as AC to constant DC voltage. In this project, to monitor the driver behavior by using sensors, like eye blink sensor and heart beat sensor. Eye Blink sensor is used to measure the drowsiness, it sense the eye blink using is infrared. The Variation across the eye will vary as per eye blink. If the eye is closed the output is high otherwise output is low. Controller we use Atmega328. It has 28 ports. It has inbuilt ADC. In this project we monitor the vehicle accident by using sensors. MEMS sensor is used to detect the vehicle accident. The sensor values is given to controller. Controller receive the data and to send the information in message to control room through GSM. GPS is used to track the current location in vehicle. If accident is detected, the controller to stop the vehicle via GSM. Controller to stop the vehicle motor by using driver unit. Driver we use ULN2003. It is used to drive the motor through the relay. Relay is act as a switch. Servo motor is used to open the air bug model. Controller also display the current status in our project kit by using LCD.

IV. HARDWARE DETAILS

ATMEGA 328

The ATMEGA 328 microcontroller serves as the processor for the Arduino board, featuring 28 pins for input and output control. It includes pulse width modulation (PWM) for signal transmission and requires Vcc and Gnd power supplies. The IC handles both analog and digital inputs for various applications.

DESCRIPTION OF INPUT

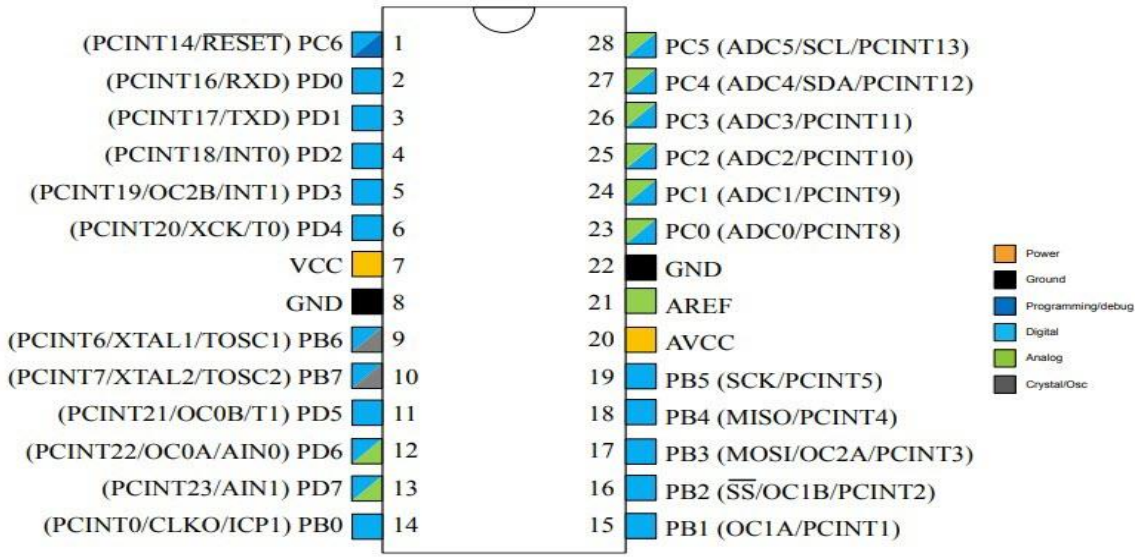
ANALOG INPUT

The Arduino ATmega328 board has 6 analog input pins (A0 to A5) with a voltage range of 0 to 5V. These pins handle continuous-time analog signals suitable for specific applications, offering an alternative to digital inputs.

DIGITAL INPUT

Digital inputs are discrete signals represented as 0s and 1s, with on and off states. The Arduino ATmega328 microcontroller has 12 digital input pins (D0 to D11) for digital input/output applications. These pins can handle discrete input pulses and serve as both input and output ports. They exclusively handle digital inputs.

ATMEGA-328 IC



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The ATmega328 chip has 28 pins, including 6 analog inputs (PC0 to PC5) for continuous-time signals and 12 digital inputs (PD1 to PD11) for PWM-based digital input. These pins are versatile for various applications and require VCC and GND for power. Additionally, PB6 and PB7 serve as a crystal for clock signal generation, while PC6 is used for program reset.

The table below gives a description for each of the pins, along with their function.

Pin Number	Description	Function
1	PC6	Reset
2	PD0	Digital Pin (RX)
3	PD1	Digital Pin (TX)
4	PD2	Digital Pin
5	PD3	Digital Pin (PWM)
6	PD4	Digital Pin
7	Vcc	Positive Voltage (Power)
8	GND	Ground
9	XTAL 1	Crystal Oscillator
10	XTAL 2	Crystal Oscillator
11	PD5	Digital Pin (PWM)
12	PD6	Digital Pin (PWM)
13	PD7	Digital Pin
14	PB0	Digital Pin
15	PB1	Digital Pin (PWM)
16	PB2	Digital Pin (PWM)
17	PB3	Digital Pin (PWM)
18	PB4	Digital Pin
19	PB5	Digital Pin
20	AVCC	Positive voltage for ADC (power)
21	AREF	Reference Voltage
22	GND	Ground
23	PC0	Analog Input
24	PC1	Analog Input
25	PC2	Analog Input

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26	PC3	Analog Input
27	PC4	Analog Input
28	PC5	Analog Input

Features

High Performance, Low Power Design

- 8-Bit Microcontroller Atmel® AVR® advanced RISC architecture
  - 131 Instructions most of which are executed in a single clock cycle
  - Up to 20 MIPS throughput at 20 MHz
  - 32 x 8 working registers
  - 2 cycle multiplier
- Memory Includes
  - 32KB of of programmable FLASH
  - 1KB of EEPROM
  - 2KB SRAM
  - 10,000 Write and Erase Cycles for Flash and 100,000 for EEPROM
  - Data retention for 20 years at 85°C and 100 years at 25°C
  - Optional boot loader with lock bits
    - In System Programming (ISP) by via boot loader
    - True Read-While-Write operation
  - Programming lock available for software security
- Features Include
  - 2 x 8-bit Timers/Counters each with independent prescaler and compare modes
  - A single 16-bit Timer/Counter with an independent prescaler, compare and capture modes
  - Real time counter with independent oscillator
  - 10 bit, 6 channel analog to digital Converter
  - 6 pulse width modulation channels
  - Internal temperature sensor
  - Serial USART (Programmable)
  - Master/Slave SPI Serial Interface – (Philips I2C compatible)
  - Programmable watchdog timer with independent internal oscillator
  - Internal analog comparator
  - Interrupt and wake up on pin change
- Additional Features
  - Internal calibrated oscillator
  - Power on reset and programmable brown out detection
  - External and internal interrupts
  - 6 sleep modes including idle, ADC noise reduction, power save, power down, standby, and extended standby
- I/O and Package
  - 23 programmable I/O lines
  - 28 pin PDIP package
- Operating voltage:
  - 1.8 – 5.5V
- Operating temperature range:
  - -40°C to 85°C
- Speed Grades:
  - 0-4 MHz at 1.8-5.5V
  - 0-10 MHz at 2.7-5.5V

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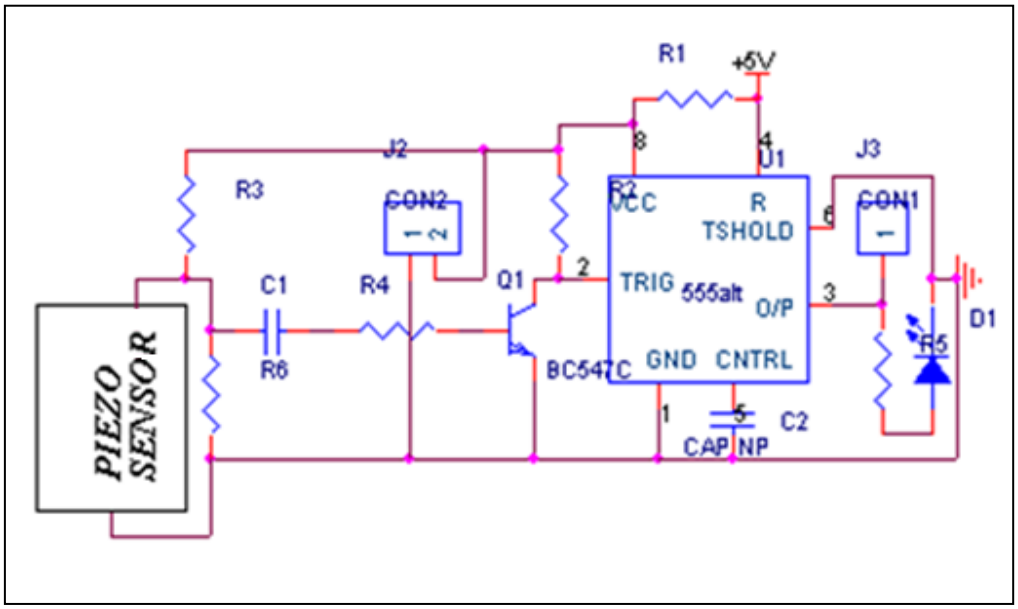
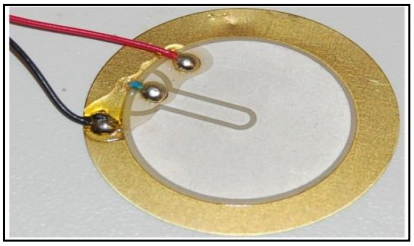
- 0-20 MHz at 4.5-5.5V
- Low power consumption mode at 1.8V, 1 MHz and 25°C:
- Active Mode: 0.3 mA
- Power-down Mode: 0.1 µA
- Power-save Mode: 0.8 µA (Including 32 kHz RTC)

APPLICATIONS

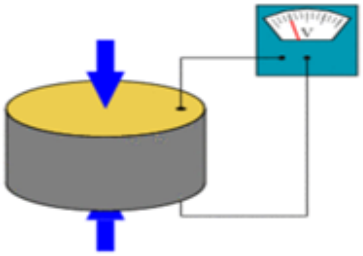
- DIY project prototyping.
- Developing varied varieties of projects that require a code based control.
- Automation System development.
- Learning AVR programming.
- Entry level circuit designing.

PIEZO SENSOR (Accident Detection)





PIEZOELECTRIC SENSOR



A piezoelectric disk generates voltage when deformed. Piezoelectric sensors convert pressure, acceleration, strain, or force into electrical charge. They're not suitable for truly static measurements due to charge loss, resistance changes, and sensitivity reduction at high temperatures. However, they can be used for various applications, including quasi-static measurements and high-temperature environments. Piezoelectric sensors also exist in nature, such as collagen in bones, which may function as biological force sensors.

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EYE BLINK SENSOR

DESCRIPTION

The Objective of this project is to develop a system to keep the vehicle secure and protect it by the occupation of the intruders.

Scope

We can't take care of ours while in running by less conscious. If we done all the vehicles with automated security system that provides high security to driver, also gives alarm.

Function

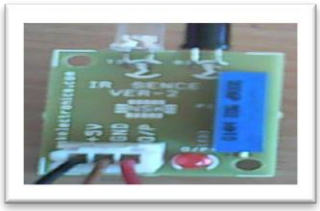
This Eye Blink sensor is IR based, The Variation Across the eye will vary as per eye blink. If the eye is closed means the output is high otherwise output is low. This to know the eye is closing or opening position. This output is given to logic circuit to indicate the alarm.

Application

This can be used for project involves controlling accident due to unconscious through Eye blink.

IR SENSOR

Infrared radiation is in the electromagnetic spectrum between visible light and microwaves, with wavelengths from 0.75µm to 1000 µm. It's invisible to humans and divided into near infrared (0.75µm to 3 µm), mid-infrared (3 µm to 6 µm), and far infrared (above 6 µm) regions, though definitions can vary.



IR sensors are used to produce IR waves. IR sensors consist of IR Transmitter and IR receiver. IR transmitter is the one type of LED which emits infrared rays generally called IR transmitter. One important point is that both IR transmitter and receiver it placed in the straight line to each other.

Specifications

- Operating Voltage: 3.0V – 5.0V
- Detection range: 2cm – 30cm (Adjustable using potentiometer)
- Current Consumption: at 3.3V : ~23 mA, at 5.0V: ~43 mA
- Active output level: Outputs Low logic level when obstacle is detected
- On board Obstacle Detection LED indicator

GSM MODEM

The GSM modem is a specific type of device, which accepts a SIM card operate on a subscriber's mobile number over a network, as a cellular phone. Modem sim300 is tri band GSM/GPRS locomotives that perform on EGSM900MHz, DCS1800MHz and PCS1900MHz frequencies. GSM Modem is used as a RS232-logic level compatible, i.e., it various from -3v to -15v as logic high and +3v to +15 as logic low.MAX232 is used to convert TTL into RS232 logic level converter is used between the microcontroller and the GSM board. The microcontroller signal is sent to the GSM modem through pin 11 of max232. The pin2 of the GSM modem

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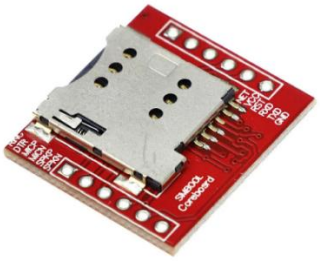
received the signal from microcontroller. The GSM modem transmits the signals from pin3 to the microcontroller through MAX232.

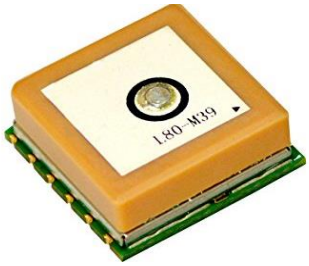


Features of GSM

- Single supply voltage 3.2v-4.5v
- Typical power consumption in SLEEP Mode: 2.5mA.
- SIM300 tri-band
- Typical power consumption in SLEEP Mode: 2.5mA.
- SIM300tri-band
- MT, MO, CB, text and PDU mode, SMS storage: SIM card
- Supported SIM Card: 1.8V, 3V

GPS

The Global Positioning System (GPS) is a space-based navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver



L80GPS

The L80 is a compact GPS Module with an integrated patch antenna. The high performance MTK positioning engine brings a high level of sensitivity, accuracy, and TTFF (Time to First Fix) with the lowest power consumption in a small-footprint lead-free package. With 66 search channels, 22 tracking channels, L80 can acquire and track satellites in the shortest time even at indoor low signal level.

L80 is an ultra-compact GPS POT (Patch on Top) module with an embedded 15.0 × 15.0 × 4.0mm patch antenna. This space-saving design makes L80 the perfect module for the miniature devices. Adopted by LCC package and integrated with patch antenna, L80 has exceptional performance both in acquisition and tracking. Combining advanced AGPS called EASY™ (Embedded Assist System) and proven Always Locate™ technology, L80 achieves the highest performance and fully meets the industrial standard.

EASY™ technology ensures L80 can calculate and predict orbits automatically using the ephemeris data (up to 3 days) stored in internal flash memory, so L80 can fix position quickly even at indoor signal levels with low power consumption. With Always Locate™ technology, L80 can adaptively adjust the on/off time to achieve balance between positioning accuracy and power consumption according to the environmental and motion conditions.

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L80 supports automatic antenna switching function. It can achieve the switching between internal patch antenna and external active antenna. Moreover, it keeps positioning during the switching process. With its tiny design, high precision and sensitivity, L80 is perfectly suitable for a broad range of M2M applications such as portable device, automotive, personal tracking, security and industrial PDA, especially suitable for special applications, like GPS mouse and OBD.

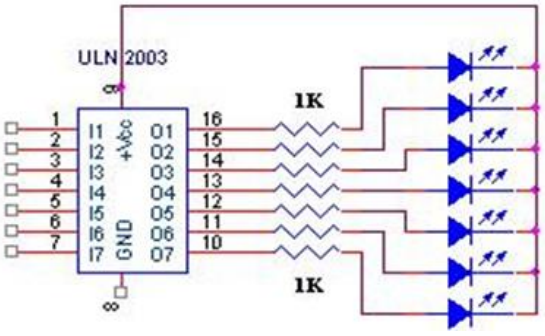
- Embedded patch antenna (15 x 15 x 4 mm).
- Extremely compact size (16 x 16 x 6.45 mm.
- Automatic antenna switching function.
- Support short circuit protection and antenna detection.
- Built-in LNA for better sensitivity.
- EASY™, advanced AGPS technology without external memory.
- Ultra-low power consumption in tracking mode, 20mA.
- Always Locate™, an intelligent controller of periodic mode.

Specifications

Supported Bus Interfaces	UART
Number of Channels	22 (Tracking), 66 (Acquistion)
Acquisition Sensitivity	-148dBm
Tracking Sensitivity	-165dBm
Dimensions	16 x 16 x 6.45mm
Height	6.45mm
Length	16mm
Maximum Operating Temperature	+85°C
Minimum Operating Temperature	-40°C
Width	16mm

PIN DIAGRAM

DRIVER CIRCUIT DIAGRAM



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DRIVER

Driver is used for drive the relay. ULN2003A IC is used as driver. This IC has some special features

- Seven Darlington's per package
- output current 500ma per driver (600ma peak)
- output voltage 50v
- integrated suppression diodes for inductive loads
- outputs can be paralleled for higher current
- ttl/cmos/pmos/dtl compatible inputs

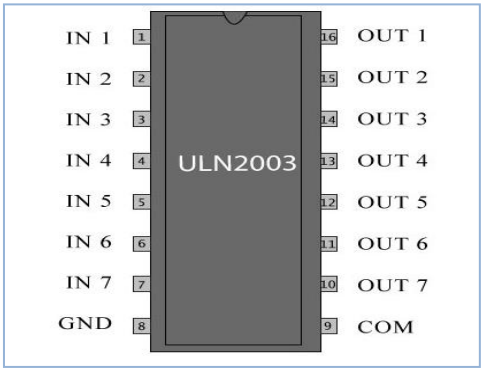
DESCRIPTION

The ULN2001A, ULN2002A, ULN2003 and ULN2004Aare high voltage, high current Darlington arrays each containing seven open collector dar-lington pairs with common emitters. Each channel rated at 500mAand can withstand peak currents of 600mA. Suppression diodes are included for inductive load driving and the inputs are pinned opposite the outputs to simplify board layout. The four versions interface to all common logic families

ULN2001A	General Purpose, DTL, TTL, PMOS, CMOS
ULN2002A	14-25V PMOS
ULN2003A	5V TTL, CMOS
ULN2004A	6–15V CMOS, PMOS

These versatile devices are useful for driving a wide range of loads including solenoids, relays DC motors; LED displays filament lamps, thermal print-head sand high power buffers ULN2001A/2002A/2003Aand 2004A is sup-plied in 16 pin plastic DIP packages with a copper lead frame to reduce thermal resistance. They are available also in small outline package (SO-16) as ULN2001D/2002D/2003D/2004D.

Pin Diagram – ULN 2003



The ULN2003A is a high voltage, high current, Darlington Arrays each containing seven open collection Darlington pairs with common emitters. Each channel rated at 500mA and can withstand peak currents of 600mA. Suppression diodes are included for inductive load driving and the inputs are pinned opposite to outputs to simplify layout. It is a 5V TTL, CMOS. This versatile device is useful for driving a wide range of loads including solenoids, relays, DC motors, LED displays, and high power buffers. Outputs can be paralleled for higher current.

The output of MC is applied to the input of relay driver transistor at its phase terminals. When the input base voltage is reduced so that the relay is de-energized, the collector current falls to zero abruptly. This sudden switching off the relay current induces a very high back emf in the relay coils, which may be high enough to puncture the collector-emitter junction at the transistor and damage it. A large capacitor connected in parallel

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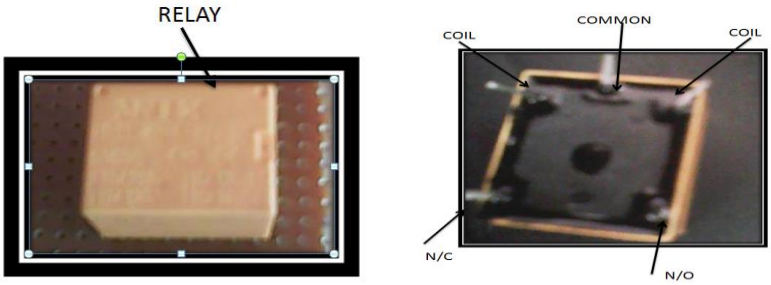
with the relay coil absorbs this transient and protects the transistor. However large capacitor connected in parallel with the relay coil absorbs this transient, protects the transistor and sluggish the relay operations.

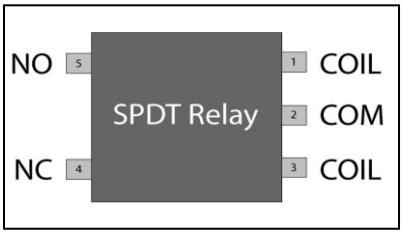
In an alternative method, a diode is connected in parallel with relay coil instead of the capacitor. During normal operation, the diode is reversed biased and has no effects on circuit performance, but, when the high back emf is induced, it has the proper polarity for the diode to conduct. The diode there after conducts heavily and absorbs all the transient voltage. The use of a diode is parallel with the relay coil is highly recommended.

RELAY

Relays are essential switching devices in industrial electronics. When energized, they make or break contacts to control AC or DC power, enabling sequence control in various systems, including heaters, counters, welding circuits, X-ray equipment, alarms, and more. Electromagnetic relays use coil currents to move contacts, allowing for multiple ON/OFF combinations.



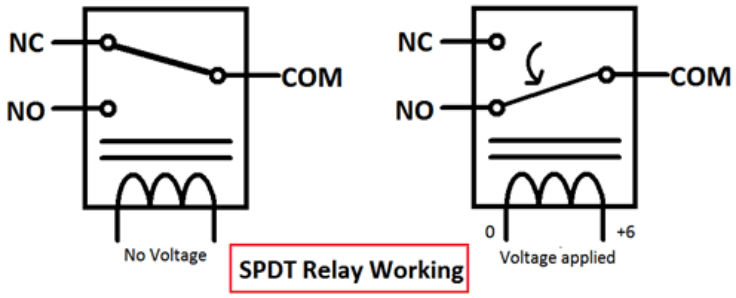
Relay Pin Diagram



OPERATION OF ELECTROMAGNETIC RELAY

Relays are usually dc operated. When dc is passed to the coil, the core gets magnetized. The iron armature towards the core contacts 1 and 2 open and contacts 2 and 3 close. When coil current is stopped, the attraction is not there and hence the spring tension brings 1 and 2 to closed position, opening the other set 2 and 3.

ELECTROMAGNETIC RELAY



RELAY CONTACTS AND IDENTIFICATION

The heart of the relay is the 'junction' of the contact points. The relay contact points may be flat, spherical, pointed and combination of all these. Flat contacts require more pressure for perfect contact closing. Half round contacts are better because the surface contamination will be minimum. The twin contacts give reliable operation.

Relay contacts are made of silver and silver alloys in small power applications. For large relays, contacts are made up of copper. Certain relays use silver – palladium of platinum – ruthenium alloys for contacts. The special types mentioned above give long life, carry moderate currents and keep shape for long time.

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To identify relay contacts, some important contact arrangements must be remembered.

SPST - Single Pole Single Throw

SPDT - Single Pole Double Throw

NO - Normally Opened

NC - Normally Closed

Break - Relay action opens or breaks contacts

Make - Relay action makes or closes contacts

Relays are electromagnetic switches that control one or more circuits using electromagnetism. They consist of a coil wound around a soft iron rod, which becomes a magnet when voltage is applied. Relays act as automatic switches to turn external circuits ON/OFF based on specific conditions, unlike manual switches.

When this coil gets enough supply then it becomes electromagnet and attracts the strip of pole towards itself and changes the position of switch. When supply cuts off then coil demagnetizes and thus switch comes in its normal position. In telephony, the relays are used widely. The relay that we used in this circuit has two states.

Normally closed state (NC)

Normally opened state (NO)

The control circuit of the relay transistor is shown in figure. When the input to transistor is logic 0, the transistor will be open. So the relay will be holding +12 and which will be in normally closed state.

Relays require very little power (e.g., 720mW for voltage stabilizers) and can be controlled by transistor circuits. Normally Closed (NC) contacts are closed when the relay is not activated, and Normally Open (NO) contacts are open. When the relay is activated, NC opens and NO closes. Double contact relays have two independent load connections, while single contact relays have only one.

The amount of electrical power required to drive a relay is very small. Most Voltage stabilizers use relay coils of 720mw.It means that 12v relay coil will have resistance of 200 ohms and operated up to 60mA.The same relay with 450 ohms coil will operate on 18v with 40mA.Transistor circuits can easily supply this much of power and this much of power and thus control large amount of power through relay contacts.

When the relay is not activated (ie.) in the reenergized state, NC contacts are closed and NO connections are opened. When the relay is activated (ie.)in the energized state, NC contacts broken and NO contacts are made. When the relay is de energized the original states of the contacts are returned. The Above relays are single contact relays. This means that the relays have one common point, one NO contact and one NC contact.

Double contact relays are also present. These relays have a set of common points, a set of NO contacts and set of NC contacts. In single contact relay, only one relay independent load or a series of different loads can be connected. In double contact relay, two independent loads can be connected at two different contacts and these two different and these two loads can be operated as desired.

SERVO MOTOR

A servo motor is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a servo mechanism. If motor is powered by a DC power supply then it is called DC servo motor, and if it is AC-powered motor then it is called AC servo motor. For this tutorial, we will be discussing only about the DC servo motor working. Apart from

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these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics. A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight packages. Due to these features, they are being used in many applications like toy car, RC helicopters and planes, Robotics, etc.

Servo motors are rated in kg/cm (kilogram per centimeter) most hobby servo motors are rated at 3kg/cm or 6kg/cm or 12kg/cm. This kg/cm tells you how much weight your servo motor can lift at a particular distance. For example: A 6kg/cm Servo motor should be able to lift 6kg if the load is suspended 1cm away from the motors shaft, the greater the distance the lesser the weight carrying capacity. The position of a servo motor is decided by electrical pulse and its circuitry is placed beside the motor.

Servo Motor Working Mechanism

It consists of three parts:

1. Controlled device
2. Output sensor
3. Feedback system

It is a closed-loop system where it uses a positive feedback system to control motion and the final position of the shaft. Here the device is controlled by a feedback signal generated by comparing output signal and reference input signal.

Here reference input signal is compared to the reference output signal and the third signal is produced by the feedback system. And this third signal acts as an input signal to the control the device. This signal is present as long as the feedback signal is generated or there is a difference between the reference input signal and reference output signal. So the main task of servomechanism is to maintain the output of a system at the desired value at presence of noises.

Servo Motor Working Principle

A servo system includes a motor, potentiometer, gear assembly, and a control circuit. The gear assembly reduces motor RPM and increases torque. The potentiometer generates an electrical signal based on shaft position. An error signal is created by comparing this signal to an external input, driving the motor until the potentiometer's output matches the input, stopping when they match.

Controlling Servo Motor

All motors have three wires coming out of them. Out of which two will be used for Supply (positive and negative) and one will be used for the signal that is to be sent from the MCU. Servo motor is controlled by PWM (Pulse with Modulation) which is provided by the control wires. There is a minimum pulse, a maximum pulse and a repetition rate. Servo motor can turn 90 degree from either direction form its neutral position. The servo motor expects to see a pulse every 20 milliseconds (ms) and the length of the pulse will determine how far the motor turns. For example, a 1.5ms pulse will make the motor turn to the 90° position, such as if pulse is shorter than 1.5ms shaft moves to 0° and if it is longer than 1.5ms than it will turn the servo to 180°.

Servo motor works on Pulse width modulation (PWM) principle, means its angle of rotation is controlled by the duration of applied pulse to its Control PIN. Basically servo motor is made up of DC motor which is controlled by **a** variable resistor (potentiometer) and some gears. High speed force of DC motor is converted into torque by Gears. We know that WORK= FORCE X DISTANCE, in DC motor Force is less and distance (speed) is high and in Servo, force is High and distance is less. The potentiometer is connected to the output shaft of the Servo, to calculate the angle and stop the DC motor on the required angle.

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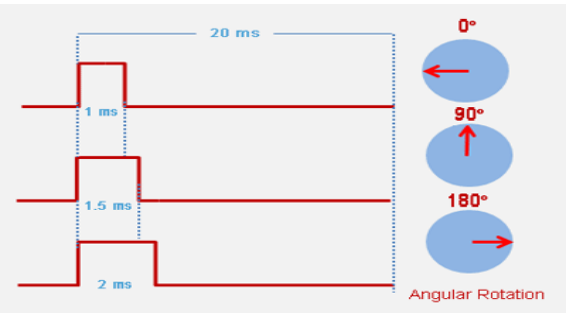

Servo motor can be rotated from 0 to 180 degrees, but it can go up to 210 degrees, depending on the manufacturing. This degree of rotation can be controlled by applying the Electrical Pulse of proper width, to its Control pin. Servo checks the pulse in every 20 milliseconds. The pulse of 1 ms (1 millisecond) width can rotate the servo to 0 degrees, 1.5ms can rotate to 90 degrees (neutral position) and 2 ms pulse can rotate it to 180 degree. All servo motors work directly with your +5V supply rails but we have to be careful about the amount of current the motor would consume if you are planning to use more than two servo motors a proper servo shield should be designed.

DC fan and its working principle

In simple terms, a DC fan is a cooling fan that converts electrical energy into electromagnetic energy through DC voltage and electromagnetic induction, and then electromagnetic energy into mechanical energy, and finally into kinetic energy, so that the fan blades rotate.
The core components of the DC fan are the stator and transfer. We know from the ampere right-hand rule that a conductor passes current and a magnetic field is generated around it. If this conductor is placed in another fixed magnetic field, it will produce attraction or repulsion, which will cause the object to move. Inside the fan blade of the DC fan, a rubber magnet filled with magnetism is attached, surrounding the silicon steel sheet, and the shaft core part is wound with two sets of coils, and the Hall sensor component is used as a synchronous detection device to control a set of circuits. The circuit makes the two sets of coils wound around the shaft core work in turn, so that the silicon steel sheet produces different magnetic poles, and this magnetic pole and the rubber magnet generate repulsive force. When the repulsive force is greater than the static friction of the fan, the fan blades will rotate naturally. Due to the synchronization signal provided by the Hall sensor components, the fan blades can continue to operate, and the direction of rotation is determined by Fleming's right-hand rule. This is the working principle of DC fan.

LCD – Liquid Crystal Display

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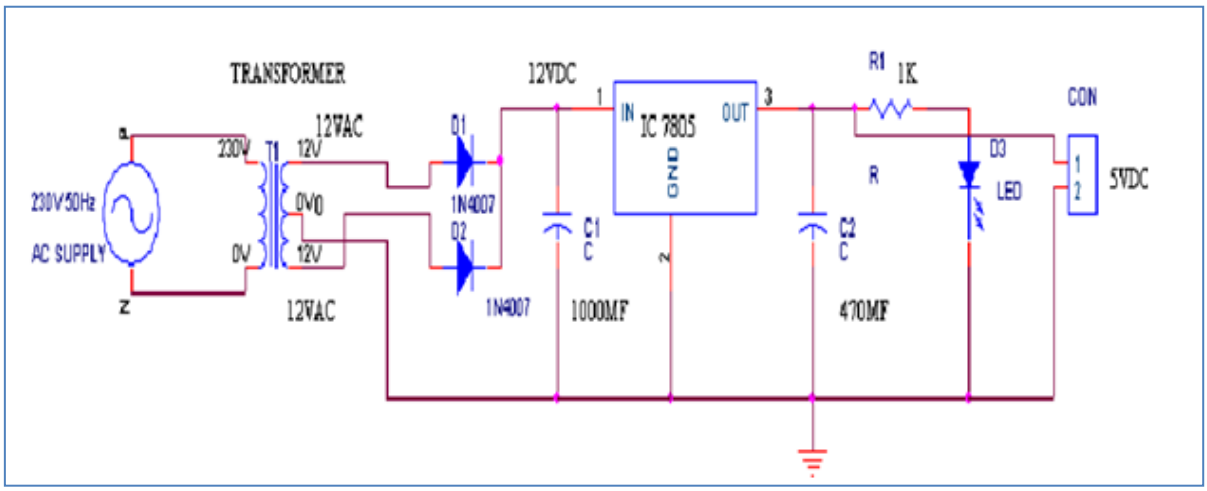
Liquid Crystal Displays (LCDs) combine liquid and crystal properties. They consist of two glass panels with liquid crystal material in between, electrodes, and polarizers. Applying voltage aligns the liquid crystals to display characters or patterns. LCDs are thin, lightweight, energy-efficient, and can use backlighting for dark environments. They offer long life and versatility in display size. LCDs are widely used in electronics, from watches to telecommunications, and have replaced CRTs in many applications. LCD display use of our project title message and information message. Our project connect to a microcontroller unit data line connected to a 'PORT 2' and control lines connected to a P3.5, P3.6, P3.7.

Pin Description:

Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	Vcc
3	Contrast adjustment; through a variable resistor	V_{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V_{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

SINGLE POWER SUPPLY

Power supply gives supply to all components. It is used to convert AC voltage into DC voltage. Transformer used to convert 230V into 12V AC.12V AC is given to diode. Diode range is 1N4007, which is used to convert AC voltage into DC voltage. AC capacitor used to charge AC components and discharge on ground. LM 7805 regulator is used to maintain voltage as constant. Then signal will be given to next capacitor, which is used to filter unwanted AC component. Load will be LED and resister.LED voltage is 1.75V.if voltage is above level beyond the limit, and then it will be dropped on resister.



POWER SUPPLY

Most electronic circuits require DC voltage sources or power supplies. If the electronic device is to be portable, then one or more batteries are usually needed to provide the DC voltage required by electronic circuits. But batteries have a limited life span and cannot be recharged. The solution is to convert the alternating current lose hold line voltage to a DC voltage source.

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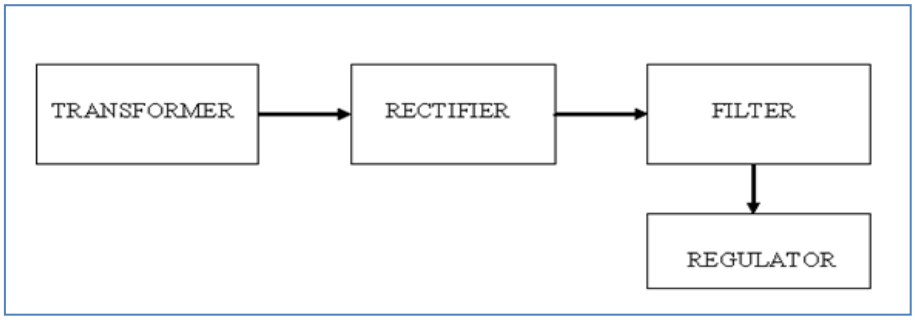
BLOCK DIAGRAM FOR POWER SUPPLY



Block diagram of AC to DC power Supply consists,

1. Transformer: Steps the household line voltage up or down as required.
2. Rectifier: Converts ac voltage into dc voltage.
3. Filter: Smooth the pulsating DC voltage to a varying DC voltage.
4. Regulator: Fix the output voltage to constant value.

Rectifiers

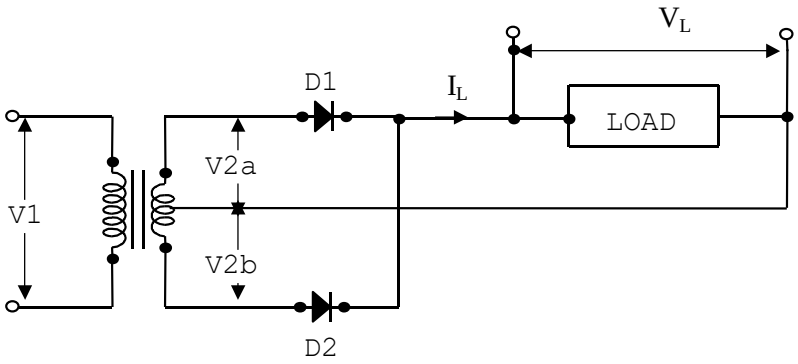
A rectifier circuit converts an AC voltage into a pulsating DC voltage. This is accomplished by using one or more diodes because diodes conduct current in only one direction.

Full-wave Rectifier

The full wave rectifier circuit requires a transformer with two secondary windings.

i.e. center-tapped secondary winding.

The secondary windings are 180 out of phase.



Diode D1 contacts when V2a is positive, producing a half-wave rectified voltage across the load. Diode D1 does not conduct when V2a is negative. Diode D2 contacts when V2b is positive and does not conduct when V2b is negative. One of the two diodes is conducting at all times because V2a and V2b are 180 out of phase and thus producing full-wave rectified voltage. In the Full wave rectifier, Dc component is larger than ripple.

USEFUL FORMULAS

V_L (DC) = 0.637V2

V_L (AC) = 0.307V2

%RIPPLE = V_L (AC)/V_L (DC) = 48.2%

RIPPLE FREQUENCY = 2 x SUPPLY FREQUENCY

Full-wave bridge rectifier

The full-wave bridge rectifier circuit requires four diodes. The transformer has only one secondary winding.

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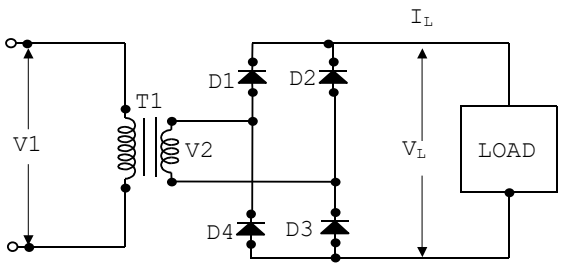


When V2 is positive, diodes D1 & D3 conduct current through the load. Diodes D2 and D4 block current flow. When V2 is negative, diodes D2 and D4 conduct current through the load. Diodes D1 and D3 block current flow. The full-wave bridge rectifier fully utilizes the transformer winding during both half cycles.

USEFUL FORMULAS

V_L (DC) = 0.637V2

V_L (AC) = 0.307V2

%RIPPLE = V_L (AC)/V_L (DC) = 48.2%

RIPPLE FREQUENCY = 2 x SUPPLY FREQUENCY

Filters

The 121% ripple in the output of the half-wave rectifier and 48% in the full-wave rectifier is more than can be normally tolerated. In the full wave filtering, wherein the frequency of the ripple is 100Hz for a 50Hz ac line voltage. This is an advantage where either an inductor is used to prevent the passage of the ripple current(due to its high inductive reactance to ac but quite low resistance to dc), or a capacitor is used to 'short' the ripple to ground but leave the dc to appear at the output. Various combinations of L and C are also used.

Regulators

The simplest regulator is a large capacitor in parallel with the load. The capacitor stores DC voltage while the load voltage increases to its peak value. The capacitor converts the pulsating DC voltage of a rectifier into a smooth Dc load voltage.

Two important parameters of a capacitor regulator are its working voltage and its capacitance. The working voltage must be at least equal to no-load output voltage of power supply. The capacitance determines the amount of ripple that appears on the Dc output when current is drawn from the circuit. The amount of ripple decreases with increase in capacitance.

Capacitance regulator circuit

L-regulator circuit

This circuit consists of a series inductor and a capacitance in parallel with load. The L-regulator is often used in high-power DC supplies.

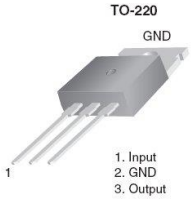
MC 7800 Regulators standard application circuit

The Mc 7800 is a 3 terminal, positive, fixed voltage integrated circuit regulator. These regulators employ internal current limiting, thermal shutdown and safe area compensation. Mc 7800 series requires no external components.

The input voltage must be at least two volts higher than the output voltage capacitor c1 is required if the regulator is located far from the power supply. Capacitor c2 improve the transient response.

POWER SUPPLY

PIN DETAILS



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IC 7805:

FEATURES

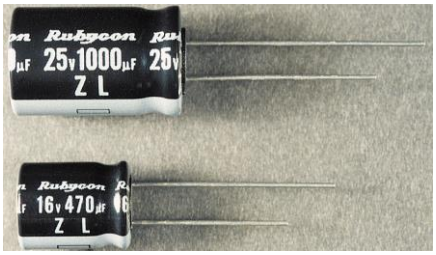
- Suitable for TTL, DTL, HTL, C-MOS Power supply.
- Internal short-circuit current limiting.
- Internal Thermal Overload Protection.
- Maximum Output Current of 150mA.
- Packaged in TO-92.

Electrical characteristics

Input voltage : 5V~15V.
Power dissipation : 600mW.
Operating Junction Temperature : 30~150 °C.
Operating Temperature : 30~75 °C.

OTHER COMPONENTS

CAPACITORS



Features

- Enabled high ripple current by a reduction of impedance at high frequency range.
- Load Life : 105°C 2000~5000hours.
- Operating Temperature Range : -40~+105°C
- Rated Voltage Range : 6.3~100V.DC
- Capacitance Tolerance : ±20%(20°C, 120Hz).

RESISTORS

Color	1st band	2nd band	3rd band (multiplier)	4th band (tolerance)	Temp. Coefficient
Brown	1	1	$\times 10^1$	±1% (F)	100 ppm
Red	2	2	$\times 10^2$	±2% (G)	50 ppm
Orange	3	3	$\times 10^3$		15 ppm
Yellow	4	4	$\times 10^4$		25 ppm
Green	5	5	$\times 10^5$	±0.5% (D)	
Blue	6	6	$\times 10^6$	±0.25% (C)	
Violet	7	7	$\times 10^7$	±0.1% (B)	
Gray	8	8	$\times 10^8$	±0.05% (A)	

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White	9	9	$\times 10^{9}$		
Gold			$\times 10^{-1}$	±5% (J)	
Silver			$\times 10^{-2}$	±10% (K)	
None				±20% (M)	

Features

- Temperature Range -55°C ~ +155°C
- ±5% tolerance
- High quality performance at economical prices
- Compatible with automatic insertion equipment
- Flame retardant type available
- Tin coated annealed copper wire.

LIGHT EMITTIND DIODE (LED)

Features

- Choice of various viewing angles
- Available on tape and reel.
- Reliable and robust
- Consumes very power.

Electrical characteristics

- Forward Current (IF) : 15 mA
- Operating Temperature (Topr) : -40 to +85 ℃
- Storage Temperature (Tstg) : -40 to +100 ℃
- Soldering Temperature(Tsol) : 260 ± 5 ℃
- Power Dissipation (Pd) : 45 mW
- Peak Forward Current (IF Peak) : 50 mA
- Reverse Voltage (VR) : 5 V

ADVANTAGES

- Intelligent Transportation
- Accidents due to drowsiness can be avoided.
- Drunken driving also prevented by using alcohol detector

V. CONCLUSION

The road accidents in metropolitan areas as well as in countryside areas have increased to an uncertain level due to these developments. The system can also be implemented for the rescue of the accident victims. Many issues like arrival of ambulance, the investigations made by the police department and operating the victim by the hospitals can be minimized by implementing the proposed system in every vehicle, including two wheelers and three wheelers. However, by building intelligence mechanisms on the top of the hardware, taking advantage of possible existing sensors and the existence of a network of embedded units, one can both optimally manage available resources at the unit and network levels as well as provide augmented functionalities, well beyond those available.

VI. REFERENCES

[1] Azman, A., Meng, Q., Edirisinghe, E.A. and Azman, H., 2011. Non-intrusive physiological measurement for driver cognitive distraction detection: Eye and mouth movements. International Journal of Advanced Computer Science, 1(3), pp.92-99.

[2] Fogue, M., Garrido, P., Martinez, F.J., Cano, J.C., Calafate, C.T. and Manzoni, P., 2012. Automatic accident detection: Assistance through communication technologies and vehicles. IEEE Vehicular Technology Magazine, 7(3), pp.90-100.

[3] Gallahan, S.L., Golzar, G.F., Jain, A.P., Samay, A.E., Trerotola, T.J., Weisskopf, J.G. and Lau, N., 2013, April. Detecting and mitigating driver distraction with motion capture technology: Distracted driving warning system. In 2013 IEEE Systems and Information Engineering Design Symposium (pp. 76-81). IEEE.

[4] Schuller, B.S., Blaschke, C.B., Wöllmer, M.W., Färber, B.F., Trefflich, B.T., Mayer, S.M. and Schindl, T.S., 2020. Online Driver Distraction Detection Using Long Short-Term Memory.

[5] Tango, F. and Botta, M., 2013. Real-time detection system of driver distraction using machine learning. IEEE Transactions on Intelligent Transportation Systems, 14(2), pp.894-905.