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Automatic Rain Sensing Wiper

Govind Singh, Harshal More, Vaibhav Sharma, Shubham Singh Tomar

Students, Madhav Institute of Technology & Science Gwalior
Corresponding Author: Govind Singh

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ABSTRACT: The purpose of this project report is to supply a mature approach to the essential principle of mechatronics. The mixing of electronic engineering, technology with technology is progressively forming a vital half within the style, manufacture and maintenance of a good vary of engineering merchandise and processes. A consequence of this can be the requirement for engineers associate degreed technicians to adopt a knowledge base and integrated approach to engineering. A consequence of this approach is that engineers and technicians want skills and information that don't seem to be confined to one field of study. they have to be capable of operational and human action across a variety of engineering disciplines and linking with those having additional specialized skills. The aim is to style associate degreed develop a bearing system based mostly an electronically controlled automotive rain operated motor is named Automatic Rain Operated Wiper System. Rain operated motor is include conductive device (Tough sensor) circuit, management Unit, electric motor and glass frame. The device is employed for notice of the rain or water flow. If there's any rain on the category, the device sense rain or flow water and giving the management signals to the electric motor.

I. INTRODUCTION

We have pleasure in introducing our new project Automatic Rain Operated Wiper System, that is absolutely equipped by sensors circuit and electric motor.

It is a real project that is absolutely equipped and designed for Automobile vehicles.

This form associate degree integral a part of highest quality. This product underwent strenuous check in our Automobile vehicles and it's smart. the automated rain operated wiper system could be an absolutely automation project.

This is associate degree era of automation wherever it's broadly speaking outlined as replacement of manual effort by mechanical power altogether degrees of automation. The operation remains a necessary a part of the system though with dynamical demands on physical input because the degree of mechanization is exaggerated.

Degrees of automation square measure of 2 sorts, viz.

- Full Automation.
- Semi Automation.

In the semi automation both the manual efforts and mechanical power is required whereas in a full automation manual effort is mostly negligible.

II. MOTORS

To make the vehicles we'd like to own motors and therefore the management electronic equipment that would management the motors. There square measure completely different styles of motors accessible for various application.

DC motor
Stepper motor
Servo motor

III. NEED FOR AUTOMATION

Automation is also achieved through computers, hydraulics, pneumatics, robotics, etc., of these sources, mechanics kind a beautiful medium for low worth automation. Automation plays an important role in automobile.

Now-a-days the majority the auto vehicle is being atomized so as to product the individual. the automobile vehicle is being atomized for the subsequent reasons.

- To achieve high safety
- To reduce man power
- To increase the potency of the vehicle
- To reduce the work load
- To reduce the vehicle accident
- To reduce the fatigue of employees

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● To high responsibility

The major parts of the automated rain operated wiper square measure follows conductive device category frame and structure battery electric motor and its arrangement relay.

IV. MATERIAL REQUIRED

When the final layout of the electrical vehicle and automatic wiper has been fabricated from roaring operating it's necessary to pick out correct material. This involves the thought of the many facts concerning accessible material like weight, size form of the element material value, fabrication value, overhead charges and plenty of alternative properties peculiar to the employment of that to member is to be fitted.

The following five forms of principle properties of fabric result their selection.

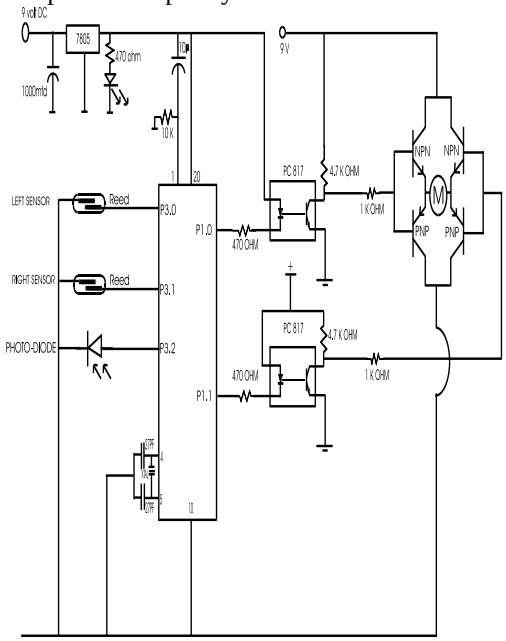
1. Mechanical
2. Electronics circuit
3. Physical
4. Chemical
5. Form producing purpose of read.

It is vital that the fabric to be utilized in such some way on take full advantage of their natural characteristics following material is chosen for the fabrication of electrical vehicle and automatic wiper.

1. Frame
2. Wiper DC Gear Motor
3. DC Gear Motor
4. Wiper Fiber Sheet
5. Connecting Wire
6. IC 89S51 Microcontroller
7. IC 293D Motor Driver
8. On/Off Switch
9. Speed Regulator
10. Four Wheel
11. Fiber Sheet
12. Shaft
13. Magnet
14. Reed device
15. NPN & PNP semiconductor device
16. Resistances
17. L.E.D.
18. Capacitors
19. Transformer
20. Cast
21. Iron Sheet
22. Paint
23. Push Button

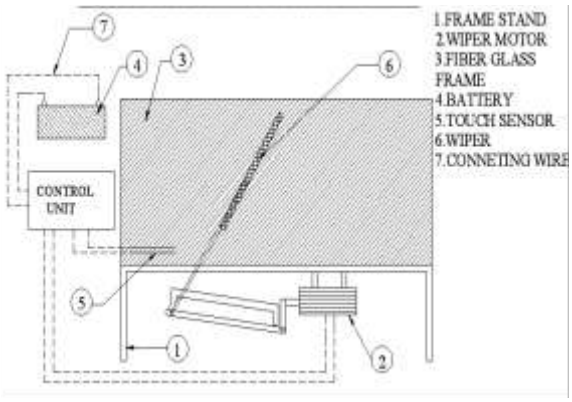
V. WORKING AND CONSTRUCTION

The battery provides the power facility to the device as well as rain operated motor. Electric wiper motor is mechanically ON throughout the time of rainfall. The device is fixed within the vehicle glass. The conductive (Touch) device is employed in this project. It senses the rainfall and giving management signal to the management unit. The management unit activates the electric motor mechanically. This operation is named Automatic Rain Operated Wiper System.



VI. MOTOR CONTROL CIRCUIT:

In the motor control circuit, we use one slow speed dc gear motor to left and right movement. In this portion of the circuit, we use one motor driver circuit with the microcontroller circuit.



In the motor driver circuit, we use H bridge driver circuit to drive the motor. Motor is to be control by the two-transistor circuit. With the help of the four-transistor circuit we move the motor for forward and reverse direction. Output from the controller is connected to the H bridge circuit via

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opto-coupler circuit. In this project we use two opto-couplers to drive the motor. Opto-coupler provides an optical isolation between microcontroller circuit and motor control circuit.

Reed sensor connected with the controller is to provide a break on left and right movement of the wiper circuit.

When sensor sense a magnet then op-amp provides a signal to the controller, controller stops the motor. Output of the controller is further connected to the reed sensor circuit drive.

Here we use IC 89S51 controller. This controller is a 40 pin ic. The pin no 40 of the ic is connected with the positive 5-volt current supply. Pin no 31 is connected to the positive supply of the battery. Pin no 20 of the ic is connected to the ground of the pin. Pin no 9 is reset pin. In this pin we connect a one capacitor and resistor to provide an auto reset circuit. When supply is on then capacitor is charge through the supply and immediately discharge through the resistor, so pin no 9 is active high for a second and for this the ic is to be reset properly and always start from the 0000 location.

Pin no 1 to pin no 8 is port 1 and from pin no 10 to 17 is the port 3, pin no 18 and 19 of the ic is connected to the external crystal to provide an external clock which helps to run the internal CPU of controller. Pin no 20 is the ground pin. From pin no 21 to 28 is the port 2 pins. The pin no 29,30,31 is not use in this project. We can use these pins only when we require an extra memory for the project. If we internal memory of the 89S51then we connect pin no 31 to the positive supply.

There are total 32 pins are available for the input and the output. Pin no 39, 38 is connected to the motor control circuit via H bridge circuit and opto-coupler circuit. Pin no 2,3,4,5 is connected to the four LED. Out of hence four LED, two LED is for the reed sensor output indicator and two led for the photo-sensor output. Output of LM 358 is connected to the pin no 2,3 of the controllers. Pin no 4,5 is connected to the external LED and reed sensor. Reed sensor sense a magnet which is place under the platform of the wiper. When, wiper move from left to right then magnet under the wiper effect the sensor and further change the direction of the wiper.

VII. MATERIAL DESCRIPTION

We use 8051 base controllers to control the movement of the wiper. We use 89S51 controller to control the direction of the DC motor.

7.1 MICROCONTROLLER 89S51

In this project we use IC 89S51 controller to move the motor for both directions. The microcontroller 89S51 is a family member of the ATMEL 8051 family

7.2 DC MOTOR

DC gear motor: here in this project we use slow speed gear motor to move the platform.

7.3 POWER SUPPLY

We use a 5-volt battery regulated power supply to supply a regulated 5 volt to the complete circuit. Motor supply is 12-volt dc power supply.

7.4 SENSOR

In this project we use one photo sensor and two reed sensors to control the movement of the platform. Reed sensor change the direction and photo sensor sense the wiper.

7.5 REED SENSOR

A reed switch, sometimes called a proximity sensor reacts when a magnet is moved close to it. Inside the case there is a thin piece of metal that moves, touching another piece of metal. This makes the contact for the current to flow.

7.6 DC GEAR MOTORS

The first electromagnetic motors were invented by the Michael Faraday in the year 1821 and it consisted of free-hanging wire which is dipped into the pool of mercury. A permanent magnet is placed in the middle of the pool of the mercury. When the current is passed through the wire, the wire gets rotated around the magnet, this method shows that the current gave rise to a circular magnetic field around the wire. The working of this motor is demonstrated in the school physics laboratory often, but the salt water is sometimes used in place of the toxic mercury. This is the simplest form of a class of an electric motor called the homopolar motors. A later refinement is the Barlow's Wheel.

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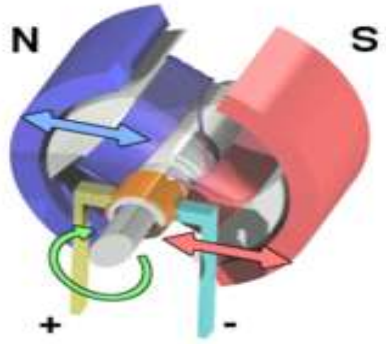
Another electric motor design which uses a reciprocating plunger inside a switched solenoid moreover it could be viewed as an electromagnetic version of a two-stroke Internal Combustion engine.

The DC motor has a spinning armature in the form of an electromagnetic. A rotary switch called commutator reverses the direction of the current double in every cycle, to flow through the armature so the poles of an electromagnet push and pull against the permanent magnet on the outside of an electric motor. As the poles of the armature electromagnet passes through the poles of the permanent magnets, the commutator reverses the polarity of an armature electromagnet. During that time of switching polarity, inertia keeps the classical motor operating in the proper direction (See the diagrams below).



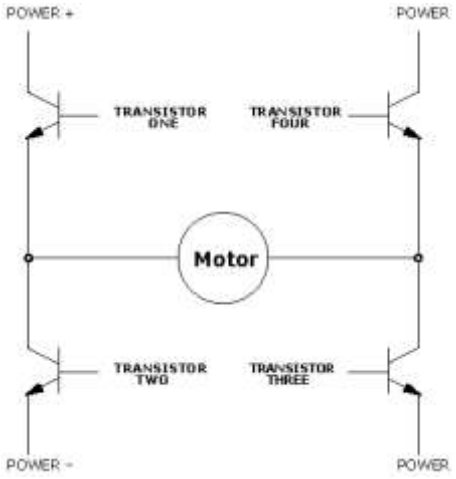
These motors are commonly found in the toys and the tape recorders. These motors change the direction of rotation of motor by changing the polarity. The main problem is that most of the chips can't pass enough current or voltage to spin an electric motor. Also, motors tend to be more electrically noisy and can damage the control lines when the direction or speed of the motor gets changed.

Fig. Motor

Specialized circuits called a motor driver have been developed to supply power to motors and to isolate the other ICs from electrical problems. These circuits are designed in a way that it can be completely separate the boards, and are reusable from one project to another project.

A very popular circuit is used for driving the DC motors is called an H-bridge. It's called 'H' bridge because it looks like the capital letter 'H' on classic schematics. The main advantage of this circuit is that the motor can be driven in both the direction at any speed, without using a completely independent power source.

7.7 The H-Bridge Circuit



This circuit is the H-bridge (named for its similarity to the letter "H") is commonly used to drive electric motors. In this circuit two of four transistors are enabled to control the current flow through the electric motor.

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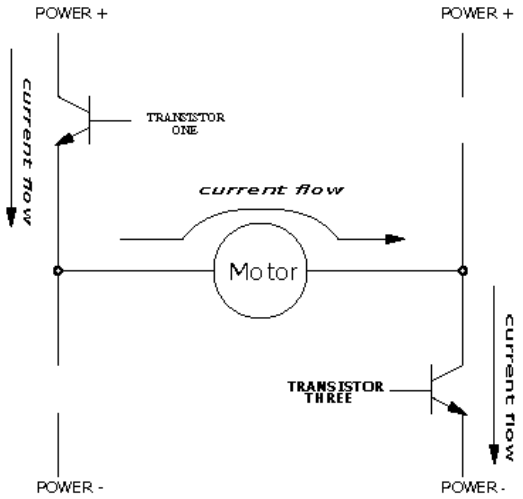
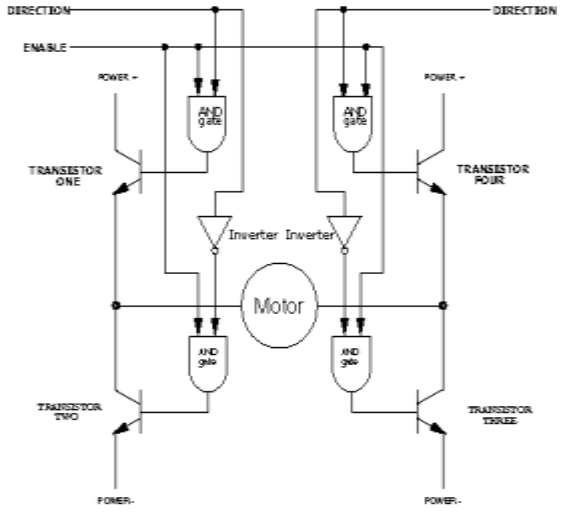


Two pairs of transistors (Transistor One and Transistor Three) is enabled, which allows the current to flow through the motor. Another pair is disabled, and can be out of the circuit. The pairs of transistors are enabled and the current can be made to flow in either of the two directions through the use of a DC motor. The permanent-magnet motors reverse the polarity when the current flow is reversed, this circuit allows the bidirectional control of the electric motor.

7.8 The H-Bridge with Enable Circuitry



It should be noted that one would never enable Transistors One and Two or Transistors Three and Four simultaneously. This would cause the current to flow from Power positive to Power negative through the transistors, and not the motors, at the maximum current-handling capacity of either the power supply or the transistors. This usually results in failure of the H-Bridge. For the prevention the possibility of this failure, enable a circuitry as depicted in Figure is typically used.

In the following circuit, all the internal inverters ensure that the vertical pairs of the transistors are never enabled simultaneously. The enabled input determines if the whole circuit is operational or not. If this given input is false, then none of the transistors are enabled, and the motor is free to coast to a stop. By switching on the enable input and controlling the two directional inputs, the motor can be made to turn in either of the direction.

It should be noted that that if both the direction inputs are the same state (either true or false) and the circuit is enabled, both terminals will be brought to the same voltage (Power positive or Power negative, respectively). This operation will break the motor, due to a property of the motors also known as the back emf, in which a motor which is turning generates a voltage counter to its rotation. When both the terminals of the motor are brought to the same electrical potential, the back emf causes resistance to the motor's rotation.

7.9 SERVO MOTORS

Servo motors has to be controlled by the timing signal. This motor has only a single coil. It is widely used in vehicles because of its lightweight and less power consumption. The servo motors can be accurately rotated by making the control signals of the servo motor high for a definite period of time. Actually, the servo motor consists of three wires where two are for power supply and another one is for the control signal. Operating principle of the servomotors is so simple that you simply need to make the control signal high for the specific period

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of time. The width of the pulse generated determines the output position of the shaft.

7.10 TRANSISTOR

A transistor is semiconductor device which consists of three regions separated by the two P-N junctions. These three regions are Base, Emitter and the Collector.

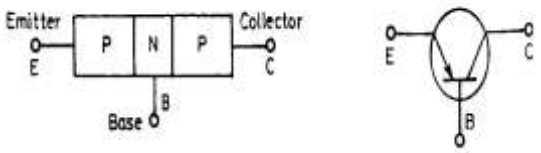

Fig. Structure and Symbol of P-N-P Transistor

The base can be N- type or P- type. The emitter and the collector terminal have the same impurities but it is different from that of the base. Thus, if the base is of N- type then emitter and collector are of P- type then transistor is called as the P-N-P transistor and vice versa transistor is called N-P-N transistor.

The base is made up of a thin and number density of majority carriers is always less than that of emitter and the collector. The base provides the junction for proper interaction between emitter and collector.

Electrons are the major charge carriers in N- region and in P-region, holes are the major charge carriers. Thus, the two types of charge carriers are involved in current flow through N-P-N or P-N-P transistor.

7.11 DIODE

It is formed by the P-type region and N-type region in the same crystal structure, and hence the P-N junction is formed. Some of the conductive electrons near the junction disperse into the P-type semiconductor from the N-type semiconductor across the junction combining with the holes. Losing electrons makes the N-type semiconductor positively charged and the neutralization of the holes on the other hand makes P-type semiconductor negatively charged. The region where the positive and negative charges develop is called depletion region.

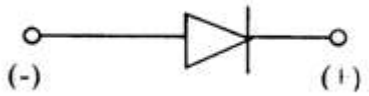

Fig. Diode

when a P-region is made positive with respect to the N-region using an external circuit then junction is called forward biased and this junction has a very low resistance to the flow of current. Holes in the positive P-type material are attract the junction to the negative side and the free electrons in the N-type material attract to the opposite side. If positive voltage is applied to the N-zone with respect to the P-zone terminal, then the P-N junction is reverse.

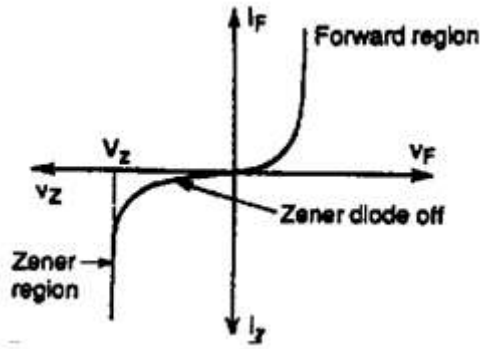

Fig. Volt-Ampere Characteristics of a P-N Diode

1. Maximum Ratings & Electrical Characteristics:

Note: 1. Lead length = 0.375 in (9.5 mm).

Measured at 1MHz and also an applied reverse voltage of 4 volts.

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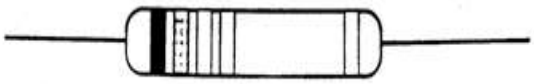
Parameter (Test Conditions)	Symbol	Ratings	Units
Maximum DC Blocking Voltage	V_{rm}	50	Volt
Maximum RMS Voltage	V_{rms}	35	Volt
Maximum Peak Recurrent Reverse Voltage	V_{rrm}	50	Volt
Average Forward Rectified Current @T_a=75°C (Lead length = 0.375 in (9.5mm)	I_0	1	Amp.
Peak Forward Surge Current (8.3m Sec single half sine wave superimposed on rated load)	I_{fsm}	50	Amp.
Maximum Forward Voltage at 1 amp. DC	V_{fm}	1	Volt
Maximum Full Cycle Reverse Current @T_1 = 75°C	$I_{rm\ (AV)}$	30	µA
Maximum Average DC Reverse Current @T_a = 25°C At Rated DC Blocking Voltage @T_a = 100°C	I_{rm}	5 50	µA
Typical Thermal Resistance, Junction to Ambient	R_{0ja}	30	°C/W
Typical Junction Capacitance	C_j	26	pF
Operating and Storage Temperature Range	T_j, T_{stg}	-65 to +175	°C

7.12 RESISTANCE

Resistance is used to control the current passing through the circuit. They are calibrated in ohms. In the other word's resistance are circuit elements having the function introducing electrical resistance into the circuit. There are three basic types:

1. Fixed Resistance
2. Rheostat
3. Potentiometer

A fixed Resistance is a two terminal resistance its electrical resistance is constant. A rheostat is a variable resistor used to control the current. They vary the resistance in a circuit without interruption. The construction is very similar to the construction of a potentiometers. It uses only two connections, even when 3 terminals (as in a potentiometer) are present.



1. Color coding for resistors:

S. No	(a) olor	First Fig.	Second Fig.	Multiplier	Tolerance
1.	Black	0	0	1	-
2.	Brown	1	1	10	17%
3.	Red	2	2	102	2%
4.	Orange	3	3	103	3%
5.	Yello	4	4	104	4%

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	w				
6.	Green	5	5	105	-
7.	Blue	6	6	106	-
8	Violet	7	7	107	-
9	Grey	8	8	108	-
10.	White	9	9	109	-
11.	Gold	x	x	0.1	± 5%
12.	Silver	x	x	0.01	± 10%

7.13 CAPACITOR

A capacitor is a device which stores an electric charge (static electricity). It has two metal plates which is separated by a dielectric material. Capacitors are available in values ranging from less than one picofarad to thousands of microfarads. While using a capacitor it's ratings must be carefully observed to make certain that the potential to be applied across the capacitor is not greater than the rated value.

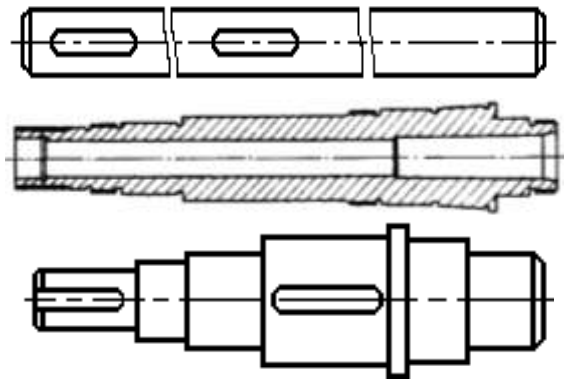
1. TYPES OF CAPACITORS:

Depends upon the basis of dielectric used:

- Air insulated & vacuum capacitors
- Paper insulated capacitors
- Mica capacitors
- Plastic film capacitors
- Ceramic capacitors
- Electrolytic & tantalum capacitors

7.14 SHAFTS

A shaft is the most important components in machines. Shafts support then rotating elements and transmit rotational motion and power.



To machining techniques straight shafts are the most effective but is difficult to fixed. To the forces on the shafts equality intensity shafts are good, but difficult to machining and to install it. Hence, there are all stepped shafts are used.

The word "**shaft**" covers numerous variations and according to the masses exerted on the shafts, the shafts is classified into three groups:

(a) Shafts with only bending moments which are usually called as axle,

(b) Shafts with only torsional moments which are usually called as spindle,

(c) Shafts with bending and torsional moments,

7.15 BATTERY VOLTAGE:

The Battery voltage varies throughout the lifetime of battery. If we measure the voltage on a fresh 1.5V alkaline battery, it will read approximately 1.65V. Because the battery discharges, its voltage drops. Battery is taken into account "dead" when the voltage drops to 1.0V. A fresh NiCd 1.5V battery which actually delivers about 1.35V. While its initial voltage is lower, its discharge curve is fairly flat compared to it of carbon-zinc and alkaline batteries delivering the constant 6V current.

- Primary Batteries
- Secondary Batteries

Completely discharging the electrical power, a rechargeable battery contains before recharging is called deep cycle. Mainly secondary batteries can be recharged 200 to 1000 times. In many cases a simple recharging circuits can be built into the vehicle so that it can becomes unnecessary to remove batteries for charging.

7.16 SPEED CONTROLLER & ELECTRONIC CIRCUIT

An electric motor's speed can be controlled by regulating of voltage & current only.

We have chosen control of voltage by a rotary switch controlled mechanically by two gear wires which turns the switch to and from as per

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requirement, regulating the speed of the motor. We avoided regulation of current because it well effect motor performance because of conversion of magnetic energy into heat energy within the armature coils.

Electronic Circuit is the most sensitive part in the electric vehicle. Due to non-availability of high-power DC motor in 12 volt we were forced to choose the DC motor requiring 40-volt DC energy.

It marked a question on our project as two batteries in series will generate 12 volt and our electric vehicle have to bear an extra weight of two batteries, which was not viable.

We turn 6-volt DC to 12-volt DC by developing an electronic circuit (keeping model of inverter in mind) to generate 9 volts through a reliable circuit.

7.17 THE GEAR SYSTEM

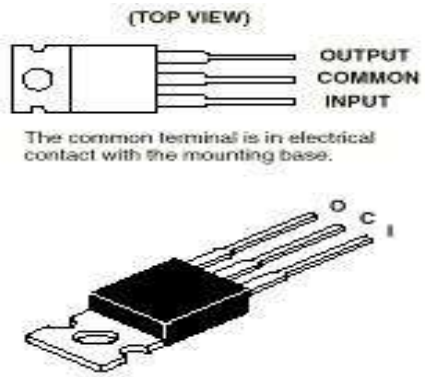
Each of the Joints are powered by electric motor (stepper and dc motor) whose output were mechanically coupled to gear boxes for amplification of the output torque so as to satisfy the weight requirements of the arm and therefore the object being picked. The Principal requirement for effective power transmission within the vehicle arm.

7.18 WHEEL ALIGNMENT

The term wheel alignment is employed in reference to the steadiness and control of the vehicle while in motion. Wheel alignment means while moving straight ahead the wheels should be parallel within the event they are pointing inward; they are said to be toe in and if they are pointing outward, they are said to be toe out.

Tires vary enormously. Skinny, road-racing tires is also completely smooth, or (slick). On the other extreme, off-road tires are much wider and thicker, and typically have a deep tread for gripping in muddy conditions.

7.19 IC 7805:



Three Terminal Positive Fixed Voltage Regulators

- ❖ Output Current of 1.0A
- ❖ No external components required
- ❖ Internal thermal overload protection
- ❖ Internal short circuit current limiting
- ❖ Output transistor safe – area compensation
- ❖ Output voltage offered in 2% and 4% tolerance
- ❖ Available in surface mount D2pAK and standard 3-lead transistor packages
- ❖ Previous commercial temperature range has been extended to a junction temperature range of –40°C to +125°C.

DEVICE TYPE/NOMINAL OUTPUT VOLTAGE

MC7805AC LM40AT-5 MC7805C LM340T-5	5.0V	MC7812C LM340T-12	12V
		MC7815AC LM340AT-15 MC7815C LM340T-15	15V
MC7806AC MC7808C	6.0V		
MC7805AC MC7808C	8.0V	MC7818AV MC7818C	18V
MC7800C	9.0V	MC7824AC MC7824C	24V
MC7812AC LM340AT-12	12V		

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MAXIMUM RATINGS (T_A = 25°C Unless otherwise noted)

Rating	Symbol	Value	Unit
Input voltage (5.0 - 18V) (24V)	V_I	35 40	Vdc
Power Dissipation a) Case 221A T_A = 25°C Thermal Resistance, Junction to Ambient Thermal Resistance, Junction to Case **Case 936 (D^2PAK)** T_A = 25°C Thermal Resistance, Junction to Ambient Thermal Resistance, Junction to Case	 P_D R_{OJA} R_{OJC} P_D R_{OJA} R_{OJA}	 Internally Limited 65 5.0 Internally Limited See figure 5.0	 W C/W C/W W C/W C/W
Storage Junction Temperature Range	T_{sig}	-0.5 to +150	°C
Operating Junction Temperature	T_j	+150	°C

7.20 MICROCONTROLLER AT89C51

Architecture of 8051 family: -

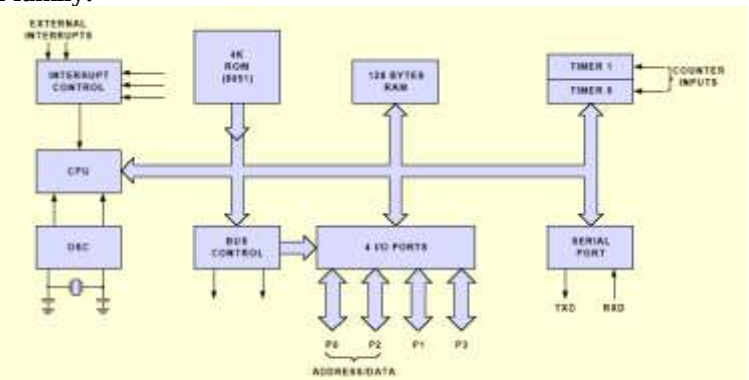

Figure 1 - Block Diagram of the 8031 Core

1. Features

• Compatible with MCS-51™ Products
• 4K Bytes of In-System Reprogrammable nonvolatile storage
– Endurance: 1,000 Write/Erase Cycles
• Fully Static Operations from 0 Hz to 24 MHz
• Three-Level Program Memory Lock
• 128 x 8-Bit Internal RAM
• 32 Programmable I/O Lines
• Two 16-Bit Timer/Counters
• Six Interrupt Sources
• Programmable Serial Channel
• Low Power Idle and Power Down Modes

2. Description

The AT89C51 is a high-performance low power 8-bit microcomputer with the storage of 4K Flash Programmable and Erasable Read Only Memory. This device is manufactured in industry using the Atmel's high-density nonvolatile memory technology and it is compatible with the industry standard. It allows the program memory to be reprogrammed in the system by a standard nonvolatile memory programmer. By combining a flexible 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 may be a powerful

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microcomputer which provides a highly flexible and value effective solution to several embedded control applications.

3. VCC

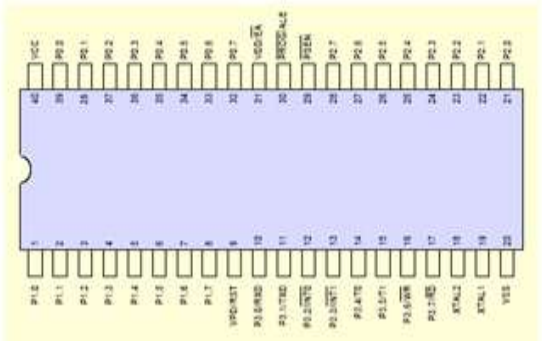
Supply voltage.

4. GND

Ground

5. Port 0

Port zero is a 8-bit open drain bidirectional I/O port. An output port with every pin can sink 8 TTL inputs. When its miles written to port zero pins, the pins may be used as high impedance inputs. Port 0 can be configured to be the multiplexed low order, address/facts bus for the duration of accesses to outside software and records memory. In this mode P0 has inner pull-ups. Port 0 also gets a code byte throughout Flash programming and output the code bytes throughout this system for verification. External pull-united states are required at some stage in program verification.



6. Port 1

Port 1 is an 8-bit bidirectional I/O port with the internal pull-ups. The Port 1 output buffers can be sink/source four TTL inputs. When 1t is written to Port 1 pins they are pulled high by the internal pull-ups and can be used as an input. The Port 1 pins that are pulled low with the source current (IIL) because of the internal pull-ups. Port 1 also receives the low-order address bytes during Flash programming and the verification.

7. Port 2

Port 2 is an 8-bit bidirectional I/O port with an internal pull-up. Port 2 al receives the high order the address bits and some control signals during Flash programming and verification.

8. Port 3

Port 3 is an 8-bit bidirectional I/O port with an internal pull-up. The Port 3 in the system serves as the function of various special features of AT89C51 Port 3 also receives some control signals for the Flash programming and the verification.

9. RST

Reset input- A high in this pin for two machine cycles while the oscillator is running resets in the device.

10. ALE/PROG

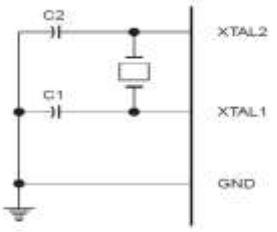
The Address latch which allows the output pulse used for latching the low byte of the address during access to the external memory. This pin is also the main program pulse input (PROG) during Flash programming. However, that one ALE pulse is then skipped during each access to the external Data Memory. If the desired ALE operation can be then, disabled by setting bit 0 of SFR location at 8EH. With the bit set the, ALE is active only during the MOVX or MOVC instruction. Otherwise, the pin is weakly pulled high. Setting the ALE-disable bit has no effects if the micro controller is in external execution mode.

11. PSEN

Program Store Enable is that the read strobe to external program memory.

12. Oscillator Characteristics

XTAL1 is input and XTAL2 is the output, of an inverting amplifier and can also be used as an the on-chip oscillator, as shown in Figure 1. Either a quartz or ceramic resonator could also be used. To drive this device an external clock source the XTAL2 should be left unconnected, while the XTAL1 is driven as shown in Figure 2.There aren't any requirements on this duty cycle of an external clock signals but since the input to the interior clocking circuitry is through a divide-by-two flip-flop, and minimum and maximum voltage are high and low time specifications and must be observed.



Note: C1, C2 = 30 pF ± 10 pF for Crystals
= 40 pF ± 10 pF for Ceramic Resonators

Figure 2. External Clock Drive Configuration

13. Idle Mode

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In idle mode condition the CPU puts itself to sleep while all the on-chip peripherals remain active. The mode is invoked and is operated by a software. All content of the on-chip RAM and each special function register remains unchanged during this mode. The idle mode is often terminated by any enabled. Interrupt or by hardware reset. It should be noted that when idle is terminated by a tough. Hardware that resets the device normally resumes the program execution from where it left off up to two different machine cycles before the internal resets and algorithm takes control. On-chip hardware stop access to internal the RAM during this process, but access to the port pins isn't inhibited. To eliminate unexpected write to a port pin when Idle is terminated by reset, the instruction following the one that invokes Idle shouldn't be one that writes to the port pin or to the external memory.

7.21 IC 293D

L293D may be a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers because they take a low-current control signal and supply a higher-current control signal. Higher current signals are employed to drive the motors.

L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors are often driven simultaneously, both in forward and reverse direction. The motor operations of two motors are often controlled by input logic at pins 2 & 7 and 10 & 15. The Input logic 00 or 11 will stop the corresponding operated motor. Logic 01 and 10 will rotate motor in clockwise and anticlockwise directions respectively.

Enable pins 1 and 9 (corresponding to the 2 motors) must be high for motors to start out operating. When an input enabled is high, the associated drivers will get enabled. As a result, the outputs become active and add phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and within the high-impedance state.

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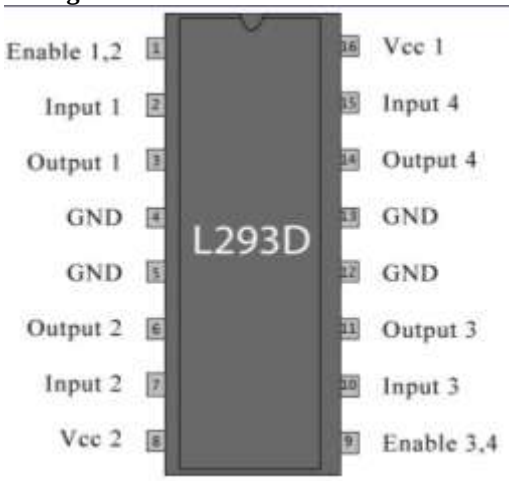
Pin Diagram:



Pin Description:

Pin No	Function	Name
1	Enable pin for Motor 1; active high	Enable 1,2
2	Input 1 for Motor 1	Input 1
3	Output 1 for Motor 1	Output 1
4	Ground (0V)	Ground
5	Ground (0V)	Ground
6	Output 2 for Motor 1	Output 2
7	Input 2 for Motor 1	Input 2
8	Supply voltage for Motors; 9-12V (up to 36V)	$V_{CC\ 2}$
9	Enable pin for Motor 2; active high	Enable 3,4
10	Input 1 for Motor 1	Input 3
11	Output 1 for Motor 1	Output 3
12	Ground (0V)	Ground
13	Ground (0V)	Ground
14	Output 2 for Motor 1	Output 4
15	Input2 for Motor 1	Input 4

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16	Supply voltage; 5V (up to 36V)	Vcc_1

VIII. FABRICATION PROCESS

The layout of the PCB has to incorporate all the information on the board before one can go on to the artwork preparation. This means that a concept that clearly defines all the details of circuitry and partly of final equipment is a pre-request before the actual layout can start. The detailed circuit diagram is extremely important for the layout designer but it must be familiar with the design concept.

The first rule is to prepare each and every PCB layout as viewed front he components side. Among the components larger ones are placed first. In designed the inter connections. Which do pencil lines space requirements in the artwork must be considered usually do?

After the circuit layout has been prepared on the tracing paper it is traced by inverting paper on the PCB so that side which has been traced becomes the opposite side of the conductor.

8.1 PAINTING:

Painting should be uniformly applied.

8.2 ETCHING:

In all substrate PCB processes etching is one of the most important steps. The final copper pattern is made by the selective removal of all unwanted copper which is not protected by an etch resist.

During the etching process, it is expected that keeping the etching time as short as possible can minimize etching progresses vertically under etching. Mostly etching is done by ferric chloride because it is very simple to use in small scale PCB production.

Ferric chloride has lump FeC1 H_2O & as aqueous solution. Etching temperature is kept in the range of 20 to 45 to etch one kg of copper 5.1 Kg. of ferric chloride is conserved in order to increase the copper solving capacity & to bring the etching time slightly down often HCI is added HOI acts simultaneously against excessive sludge formation.

8.3 DRILLING:

Drilling the holes for the mounting components is important mechanical operation in PCB production process. The importance of hole drilling into PCB has further gone up with electronic component mine transition. After rinsing drilling is done using drill bit as per the circuit provided. The following hole diameter has been generally accepted.

1. D = 1 mm
2. D = 0.8 mm
3. D = 0.5 mm

Where D = hole diameter.

8.4 SOLDERING

Soldering is the process which joining two metallic conductors, the joint where the two metal conductors are to be joined or fused is heated with a device called soldering iron and then a alloy of tin and lead called solder is applied to the component, which melts and covers the joint. The solder then it cools and solidifies quickly to ensure a good and durable connection between the two joined metals. Covering the joint solder also prevents oxidation.

1. How to Solder

Soldering is important for connecting any electronic circuit. A properly soldered joint or connection in electronic circuit is the important step which help in good and concerned soldering.

1. The use of coned type of soldering iron and solder avoid the use of excessive fault.
2. Always keep the soldering iron hot during the working period and let it rest on its stand when not in use.
3. All components lead and wires should be thoroughly cleared to remove dust and rust before soldering.
4. Enough of the heat is applied to the joint in order that the solder metal flows freely over the joint.

Overheating of components in PCB is avoided, over heating may results in damage to components on PCB.

IX. APPLICATIONS, ADVANTAGES & DISADVANTAGES

9.1 APPLICATIONS:

- Four-wheeler applications.

9.2 ADVANTAGES:

- Low cost automation project.
- Free from wear adjustment.
- Operating Principle is very easy.
- Installation is simplified.
- Helps in avoid other burnable interactions viz.… (Diaphragm) is not used.
- It is possible to operate it manually/automatically by proving the on/Off switch. The Sensor cost is very low because of conductive sensor.

9.3 DISADVANTAGES:

- This system is applied only when water falling on the surface of conductive sensor.
- Addition cost is required when this system is installed to four the four-wheel vehicle.

X. SAFETY & PRECAUTION

- Always unplug your charger from the wall, and from the vehicle. Some chargers will discharge the battery if they are left plugged into the machine.
- A kickstand that will not keep the vehicle upright can often be corrected by simply tightening the mounting bolt. A broken kickstand is easily replaced (usually) by your local bicycle shop.
- Keeping the tires at the recommended maximum pressure will increase your speed and range.
- Some chargers will stop charging when the battery is full, but others will keep charging which leads to overcharging and damaging battery ensure you know the instructions for your specific charger.
- Some chargers are dual voltage? and have a small switch that must be set to the correct voltage. This switch can sometimes be a source of trouble if it is set wrong? or the switch is half way between settings.
- Batteries can be replaced! If your machine has unsatisfactory performance, a new set of batteries may be needed.
- It has been said here before, but as an important safety note? only use the charger that came with your unit. Using wrong charger can result in a fire.

XI. CONCLUSION

Mechatronics involves the bringing together variety of technologies: mechanical engineering, electronic engineering, electrical engineering, computer technology, and control engineering. This can be considered to be the application of the electronic and the electric circuit, to mechanical engineering problems. Mechatronics provides an opportunity to take a new look into the problems, with the mechanical engineers not only just seeing a problem in terms of mechanical principles but having to see it in terms of a range of technologies that is being used. The electronics, etc. shouldn't be seen as a bolt on item to existing mechanical hardware. A mechatronics approach should be adopted right from the design phase. There it needs to be a complete rethink of the requirements in terms of what an item is required to do.

There are many applications of mechatronics in the mass-produced products used in our homes. They are also found in cars in the active suspension, antiskid brakes, engine control, speedometer display, transmission etc.

Pollution is the major problems faced by the peoples in a routine life. Increasing the use of different types of automobile plate plays an important role to create this big problem, several efforts are made by the automobile industry to solve this big problem. Our project, will be very effective to reduce this problem in a cheaper way.

Electric is greener alternative than other fuels so during our study we appreciated the importance of electric conversion and found that it is really helpful in controlling the pollution and also less expensive than the petrol.

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